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# *Engine Service Manual*

## *Model TH306D, TH314D, TH417D*

SN TD200100 to Present, SN TD300100 to Present,  
SN TA200100 to Present, SN TA300100 to Present,  
SN MYT00150 to Present, SN MLZ00150 to Present

Engine

492-2140, 505-6559,  
492-5092, 505-7229,  
2501-1875

**31211272**  
**UENR7958-01**

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*June 23, 2017*

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# EFFECTIVITY PAGE

<b>DATE</b>	<b>REVISION</b>	<b>DESCRIPTION</b>
February 15, 2017	A	Original Issue Of Manual.
June 23, 2017	B	Revised manual to add models TH314D, TH417D.

# EFFECTIVITY PAGE

## 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 recognized health and safety regulations must be observed.

Maximum economy, reliability and long life is only guaranteed when using 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. Unauthorized modifications to the engine exclude manufacturer liability for resulting damages. Failure to observe this will void the warranty.

The engines 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.

**DISCLAIMER:** Information provided within (excluding Section 1) is supplied directly from the component manufacturer. Due to continuous improvements, the component manufacturer reserves the right to make changes without prior notification.

# FOREWORD

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# Section 1

## JLG Safety Practices

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### 1.1 INTRODUCTION

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This service manual provides general directions for accomplishing service and repair procedures. Following the procedures in this manual will help assure safety and equipment reliability.

Read, understand and follow the information in this manual, and obey all locally approved safety practices, procedures, rules, codes, regulations and laws.

These instructions cannot cover all details or variations in the equipment, procedures, or processes described, nor provide directions for meeting every possible contingency during operation, maintenance, or testing. When additional information is desired consult the local Caterpillar Dealer.

Many factors contribute to unsafe conditions: carelessness, fatigue, overload, inattentiveness, unfamiliarity, even drugs and alcohol, among others. For optimal safety, encourage everyone to think, and to act, safely.

Appropriate service methods and proper repair procedures are essential for the safety of the individual doing the work, for the safety of the operator, and for the safe, reliable operation of the machine. All references to the right side, left side, front and rear are given from the operator's seat looking in a forward direction.

Supplementary information is available on SIS Web.

### 1.2 DISCLAIMER

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All information in this manual is based on the latest product information available at the time of publication. The manufacturer reserves the right to make changes and improvements to its products, and to discontinue the manufacture of any product, at its discretion at any time without public notice or obligation.

### 1.3 OPERATION & MAINTENANCE MANUAL

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The mechanic must not operate the machine until the Operation & Maintenance Manual has been read and understood, training has been accomplished and operation of the machine has been completed under the supervision of an experienced and qualified operator.

An Operation & Maintenance Manual is supplied with each machine and must be kept in the manual holder located in the cab. In the event that the Operation & Maintenance Manual is missing, consult the local Caterpillar dealer before proceeding.

### 1.4 DO NOT OPERATE TAGS

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Place Do Not Operate Tags on the ignition key switch and the steering wheel before attempting to perform any service or maintenance. Remove key and disconnect battery leads.

### 1.5 SAFETY INFORMATION

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To avoid possible death or injury, carefully read, understand and comply with all safety messages.

In the event of an accident, know where to obtain medical assistance and how to use a first-aid kit and fire extinguisher/ fire suppression system. Keep emergency telephone numbers (fire department, ambulance, rescue squad/ paramedics, police department, etc.) nearby. If working alone, check with another person routinely to help assure personal safety.



## 1.6 SAFETY INSTRUCTIONS

Following are general safety statements to consider **BEFORE** performing maintenance procedures on the telehandler. Additional statements related to specific tasks and procedures are located throughout this manual and are listed prior to any work instructions to provide safety information before the potential of a hazard occurs.

For all safety messages, carefully read, understand and follow the instructions **BEFORE** proceeding.

### 1.6.1 Personal Hazards

**PERSONAL SAFETY GEAR:** Wear all the protective clothing and personal safety gear necessary to perform the job safely. This might include heavy gloves, safety glasses or goggles, filter mask or respirator, safety shoes or a hard hat.

**LIFTING:** **NEVER** lift a heavy object without the help of at least one assistant or a suitable sling and hoist.

### 1.6.2 Equipment Hazards

**LIFTING OF EQUIPMENT:** Before using any lifting equipment (chains, slings, brackets, hooks, etc.), verify that it is of the proper capacity, in good working order, and is properly attached.

**NEVER** stand or otherwise become positioned under a suspended load or under raised equipment. The load or equipment could fall or tip.

**DO NOT** use a hoist, jack or jack stands only to support equipment. Always support equipment with the proper capacity blocks or stands properly rated for the load.

**HAND TOOLS:** Always use the proper tool for the job; keep tools clean and in good working order, and use special service tools only as recommended.

### 1.6.3 General Hazards

**SOLVENTS:** Only use approved solvents that are known to be safe for use.

**HOUSEKEEPING:** Keep the work area and operator's cab clean, and remove all hazards (debris, oil, tools, etc.).

**FIRST AID:** Immediately clean, dress and report all injuries (cuts, abrasions, burns, etc.), no matter how minor the injury may seem. Know the location of a First Aid Kit, and know how to use it.

**CLEANLINESS:** Wear eye protection and clean all components with a high-pressure or steam cleaner before attempting service.

When removing hydraulic components, plug hose ends and connections to prevent excess leakage and contamination. Place a suitable catch basin beneath the machine to capture fluid run-off.

It is good practice to avoid pressure-washing electrical/electronic components. In the event pressure-washing the machine is needed, ensure machine is shut down before pressure washing. Should pressure washing be utilized to wash areas containing electrical/electronic components, it is recommended a maximum pressure of 750 psi (52 bar) at a minimum distance of 12 in (30.5 cm) away from these components. If electrical/electronic components are sprayed, spraying must not be direct and for brief time periods to avoid heavy saturation,

Check and obey all Federal, State and/or Local regulations regarding waste storage, disposal and recycling.



## JLG Safety Practices

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### 1.6.4 Operational Hazards

**ENGINE:** Stop the engine before performing any service unless specifically instructed otherwise.

**VENTILATION:** Avoid prolonged engine operation in enclosed areas without adequate ventilation.

**SOFT SURFACES AND SLOPES: NEVER** work on a machine that is parked on a soft surface or slope. The machine must be on a hard level surface, with the wheels blocked before performing any service.

**FLUID PRESSURE:** Before loosening any hydraulic or diesel fuel component, hose or tube, turn the engine OFF. Wear heavy, protective gloves and eye protection. **NEVER** check for leaks using any part of your body; use a piece of cardboard or wood instead. If injured, seek medical attention immediately. Diesel fluid leaking under pressure can explode. Hydraulic fluid and diesel fuel leaking under pressure can penetrate the skin, cause infection, gangrene and other serious personal injury.

Refer to the engine manufacturers manual for specific details concerning the fuel system.

Relieve all pressure before disconnecting any component, part, line or hose. Slowly loosen parts and allow release of residual pressure before removing any part or component. Before starting the engine or applying pressure, use components, parts, hoses and pipes that are in good condition, connected properly and are tightened to the proper torque. Capture fluid in an appropriate container and dispose of in accordance with prevailing environmental regulations.

**COOLANT SYSTEM CAP:** The cooling system is under pressure, and escaping coolant can cause severe burns and eye injury. To prevent personal injury, **NEVER** remove the coolant system cap while the cooling system is hot. Wear safety glasses. Turn the coolant system cap to allow pressure to escape before removing the cap completely. Failure to follow the safety practices could result in death or serious injury.

**FLUID FLAMABILITY: DO NOT** service the fuel or hydraulic systems near an open flame, sparks or smoking materials.

Properly disconnect battery prior to servicing the fuel or hydraulic systems.

**NEVER** drain or store fluids in an open container. Engine fuel and hydraulic fluid are flammable and can cause a fire and/or explosion.

**DO NOT** mix gasoline or alcohol with diesel fuel. The mixture can cause an explosion.

**PRESSURE TESTING:** When conducting any test, only use test equipment that is correctly calibrated and in good condition. Use the correct equipment in the proper manner, and make changes or repairs as indicated by the test procedure to achieve the desired result.

**LEAVING MACHINE:** Lower the forks or attachment to the ground before leaving the machine.

**TIRES:** Always keep tires inflated to the proper pressure to help prevent tipover. **DO NOT** over inflate tires.

**NEVER** use mismatched tire types, sizes or ply ratings. Always use matched sets according to machine specifications.

**MAJOR COMPONENTS:** Never alter, remove, or substitute any items such as counterweights, tires, batteries or other items that may reduce or affect the overall weight or stability of the machine.

**BATTERY: DO NOT** charge a frozen battery. Charging a frozen battery may cause it to explode. Allow the battery to thaw before jump-starting or connecting a battery charger.

### 1.7 SAFETY DECALS

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Check that all safety decals are present and readable on the machine. Refer to the Operation & Maintenance Manual supplied with machine for information.



## Section 2 General

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## General

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### **2.1 GENERAL INFORMATION**

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These 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 engine manufacturer's spare parts in the event of damage.

Original spare parts from engine manufacturer are always manufactured according to the state of the art.



## Section 3

# Safety Information / User Information

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### 3.1 GENERAL

The documentation of the workshop manual has been created based on the engine available at the time of going to press.

There may be deviations in the descriptions, illustrations and parts due to further developments.

The valid documents published by engine manufacturer (such as Service Info Technology, Technical Bulletin, Service Bulletins, Installation guidelines etc.) must be observed.

The prescribed tightening specifications as well as the test and setting data must be taken into consideration and adhered to.

The high safety and quality level of our engines is constantly guaranteed due to technical improvements and further developments. As a result, there may be deviations between the documentation and the current state of technological knowledge.

As a result of further developments, changes may be announced at short notice by means of bulletins (Service Info Technology, Technical Bulletin, Service Bulletin).

The maintenance work prescribed in the operating instructions and workshop manual must be carried out properly and completely. The maintenance staff must have the necessary expertise for carrying out the work. Any safety and protection devices which had to be dismantled during maintenance work must be reinstalled.



#### 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. Unauthorized 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:
  - The common rail systems used work with operating pressures up to approximately 2000 bar. In the case of potential faults, the pressure can even rise to significantly higher values before the pressure reducing valve opens.
  - Ignition must be switched off.
  - Do not start engine.





- Depending on version of the common rail system, the electrical fuel supply pump is activated when the ignition is switched or during starting and supplies the fuel directly.
- After shutting down the engine, wait at least 30 seconds before performing work on the fuel system. Depending on the version of common rail system, the fuel pressure in the common rail system will still not have dissipated after 30 seconds. The fuel pressure can permanently be several 100 bar. The fuel pressure here does not drop until the fuel system is opened and the fuel can escape.
- 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.
- Fuel lines, injection lines or fuel high-pressure lines must never be disconnected when the engine is running.
- Danger of injury!  
The fuel jet can deeply penetrate the skin.
- Do not come close to the leakage area in the fuel high-pressure system with any body parts (e.g. hand, head).
- Always carry out an exact visual inspection of all high-pressure carrying components before tests on the running engine. Wear suitable protective clothing (for example goggles, gloves) for this. Leakages entail potential hazard sources for the workshop personnel.
- Even if no leakages can be discerned in the fuel high-pressure system, the workshop personnel should avoid the direct hazard zone or wear protective clothing (for example goggles, gloves) during tests when the engine is running and during the first test run.
- Always stay out of range of a fuel jet, as it could cause severe injury.
- Fuel lines, injection lines and high-pressure lines must not be deformed.
- Damaged fuel lines, injection lines and high pressure lines must be replaced.
- 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.
- Loosen screw connections slowly and not abruptly
- Open screw connections on the fuel system with extreme caution.
- After all work on the fuel system, it must be bled. See the operation manual, chapter 6 "Fuel system".

### 3.2.2 Cleanliness Instructions and Measures for Working with Common Rail Systems

The common rail system used in engines comprise high-precision components subjected to extreme loads. In view of the high-precision technology, ensure utmost cleanliness when working on the fuel system.

#### a. 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 blaster, the components (e.g. cable plugs, all other electrical plug connections, control unit, generator, starter, solenoid valves, transmitters, sensors etc.) must first be covered and must not be directly impacted with the steam blaster.
- 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.



## Safety Information / User Information

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- 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 chromeplated.

### **b. 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 chromeplated. 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.

### **c. 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.

### **d. 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 chromeplated.

### **3.2.3 Additional information and measures for the handling of exhaust after treatment systems**

- Basically all the same regulations and instructions up to and including chapter 3.2.2 must also be observed for work on exhaust aftertreatment systems!
- Utmost cleanliness must be observed for all work.

#### **a. DPF (Diesel Particle Filter)**

- The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.
- The duration of a full filter regeneration 25-30 minutes on average. High exhaust temperatures occur in the exhaust system/on the end exhaust pipe independently of the actual load state of the engine (i.e. also during engine idling).
- No foreign bodies may get into the exhaust line or the combustion chamber. If this happens, the engine must be "run free" without diesel particle filter.
- Tensions and deformations of the shape of the Vbelt clip must be avoided. The DPF module may only be transported using the transport sleeves.



- V-belt clips and seals may not be reused (this also applies as soon as the screw connection has been loosened once).

**b. Ignition system (engines with ignition system)**



**Caution**

Dangerous high voltage

The ignition system operates with ignition voltages upto 10000 volts.

- The ignition system must not be operated without a secondary load.
- Dirt and moisture on the primary and high voltage connections can cause malfunctions (leakage current, misfiring, high voltage sparks).
- Check the protective caps of the ignition lines for discolouration, deformation and cracks before each usage.

**Engine 492-5092 & 505-7229:**

- Store the components in a dry and clean area.
- It is not permitted to: store the components temporarily or stack them without their transport packaging.
- Components may only be stored and transported in the specified packaging.
- Only remove new parts from the original packaging just before installation.
- Incorrectly operated or damaged components or parts that have been dropped must not be installed.
- Do not subject the components to any hard impacts or any other use of force.
- Faulty earthing, cable and plug connections can lead to malfunctions. Electronic components can be destroyed.

**c. SCR (Selective Catalytic Reduction)**

- AdBlue® is a caustic medium which causes heavy corrosion damage when it comes into contact with electronic components or similar.
- Leaks on the AdBlue® pipes, the tank, the supply module and the feeding unit must be fixed immediately to avoid leakage of AdBlue®.
- Make sure the room is well ventilated.
- Contact with the skin should be avoided. Wear latex gloves if possible.
- Wash hands thoroughly before taking breaks and at the end of shifts.
- If the substance comes into contact with eyes, rinse thoroughly with water.
- If swallowed, rinse out mouth with a lot of water, drink

plenty of water and seek medical advice.

- If discomfort or illness continues, seek medical advice.
- Product can pose danger of slipping if spilled. It is essential to remove spilled liquid. In so doing, ensure that the liquid does not enter the sewage system or ground/surface water. This means that the contamination should be physically removed and disposed of in suitable containers. Minimal amounts of remaining liquid may be rinsed away with a lot of water.
- The so-called lag time is application-dependent and may be up to 2 minutes because the SCR pipes have to be pumped empty in this time.

**3.2.4 General Information on the Electrical System, Electrical/Electronic Components/Systems (Engine 492-2140 & 505-6559)**

- Do not touch live parts.
- Ensure correct polarity of the connections.
- When disconnecting the battery, electronically stored data may be lost.
- When disconnecting the battery, always disconnect the minus pole first. Otherwise there is a danger of short circuiting!
- When connecting, connect the plus pole first and then the minus pole. Otherwise there is a danger of short circuiting! earth terminal of the welding device must be connected directly to the part that is to be welded.
- For electrical welding parts, all plug connectors must be disconnected from the control unit to protect the electronics.
- Opening sensors, transmitters, actuators and control units is not permissible. Otherwise, any warranties will be invalidated.
- When the engine is running, do not interrupt the connection between the battery, generator and regulator.
- When using a steam blaster, the components (e.g. cable plugs, all other electrical plug connections, control unit, generator, starter, solenoid valves, transmitters, sensors etc.) must first be covered and must not be directly impacted with the steam blaster.
- Electrical plug connections must be plugged when spraying.
- Store the components in a dry and clean area.
- It is not permitted to: store the components temporarily or stack them without their transport packaging.
- Components may only be stored and transported in the specified packaging.
- Only remove new parts from the original packaging just



before installation.

- Incorrectly operated or damaged components or parts that have been dropped must not be installed.
- Do not subject the components to any hard impacts or any other use of force.
- Faulty earthing, cable and plug connections can lead to malfunctions. Electronic components can be destroyed.
- A pressure balance element and the sealing area of the components (e.g. control units) must not be immersed in water. It is not permitted to soak the components with water, especially when cleaning using a high-pressure cleaner or similar.
- Use the fastening points provided for fastening. Tensions must be avoided during assembly.
- Drills or additional fastenings on the control unit housing are impermissible.
- The prescribed tightening specifications for all components (e.g. transmitters, sensors etc.) must be complied with.
- Cable plugs must only be removed or connected when the supply voltage is switched off, where possible at the end of the lag time.
- Cable plugs must be inserted and removed carefully so that metal lugs and plastic retainers are not damaged.
- Rubber seals in the cable plug must always be pressed down flat onto the housing edges.

### 3.2.5 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

In order to structure the information layout in a user friendly way, the service documentation is divided into operating instructions and job cards (workshop manual).

The operation manual contains a general description and instructions for all other maintenance work. It contains the following chapters:

### Engine 492-2140 & 505-6559:

1. Contents, General
2. Engine description
3. Operation
4. Operating media
5. Maintenance
6. Care and maintenance work
7. Faults, causes and remedies
8. Transport and storage, protecting the engine against corrosion
9. Technical data

### Engine 492-5092 & 505-7229:

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 use of job cards (workshop manual) presupposes knowledge of the operating instructions content, this applying in particular for the service specifications. Repairs to the engine and components are described in the job cards (workshop manual), for the implementation of which more effort and correspondingly qualified experts are required.



### 3.4 JOB CARDS

The job cards are differentiated into “W” and “I” job cards.

The “W” job card documents the standard repairs to the engine and/or its components. The necessary tools and special tools are also indicated in the “W” job card.

The “I” job card also documents corresponding workflows for repairing the engine and/or its components. Special prerequisites must be fulfilled by the workshops for implementation of these workflows. For example, special tools and machine tools must be available.

#### 3.4.1 Numbering of Job Cards

The job card numbering uses the format **W 08-03-01**. The individual parts of this format are explained below:

- **W** 08-03-01: Documentation type
  - W... Workshop manual
  - I..... Repair manual
- **W 08**-03-01: Module according to module list
- **W 08-03**-01: Component group
- **W 08-03-01**: Consecutive number

### 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



**Reference**

Within the workflow or to assemblies in which further documents or job cards are provided.



**Test and setting data**

The necessary values are indicated here with link to a table within the job card.



**Tightening specifications**

The necessary values are indicated here with link to a table within the job card.



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# Section 4

## Job Card Overview

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**4.1 SORTED ALPHABETICALLY**

<b>Activity</b>	<b>Job Card</b>	<b>Maintenance Group</b>
Adapter	<a href="#">W 39-90-67</a>	Fan bearing
Catalytic converter DOC (Diesel Oxidation Catalyst) DPF (Diesel Particle Filter)	<a href="#">W 71-90-45</a>	Exhaust gas treatment
Catalytic converter SCR (Selective Catalytic Reduction)	<a href="#">W 71-90-45</a>	Exhaust gas treatment
Charge air line	<a href="#">W 22-90-55</a>	Charge air line
Charge air manifold	<a href="#">W 22-90-54</a>	Charge air line
Checking the compression pressure (when injectors are removed)	<a href="#">W 08-00-01</a>	Cylinder head
Checking the thermostat (in the removed state)	<a href="#">W 38-01-02</a>	Thermostat housing
Closing parts	<a href="#">W 02-90-01</a>	Lubricating oil sump
Closing parts	<a href="#">W 01-90-01</a>	Crankcase
Compensator structure (assembly material)	<a href="#">W 71-90-21</a>	Exhaust gas treatment
Compensator structure (Exhaust line)	<a href="#">W 41-90-21</a>	Exhaust pipe
Connection (Crankcase housing, exhaust gas circulation, coolant line)	<a href="#">W 41-90-04</a>	Exhaust gas recirculation
Connection housing	<a href="#">W 52-90-53</a>	Connection housing
Console	<a href="#">W 71-90-51</a>	Exhaust gas treatment
Coolant line SCR (Selective Catalytic Reduction)	<a href="#">W 71-90-32</a>	Exhaust gas treatment
Cover	<a href="#">W 09-90-37</a>	Gearcase
Control valve	<a href="#">W 09-90-63</a>	Gearcase
Drain valve	<a href="#">W 02-90-04</a>	Lubricating oil sump
Drive components	<a href="#">W 37-90-06</a>	Coolant pump
Engine mounting	<a href="#">W 46-90-15</a>	Engine mounting
Engine mounting	<a href="#">W 46-90-15</a>	Engine mounting
Engine mounting	<a href="#">W 46-90-15</a>	Engine mounting
Engine mounting	<a href="#">W 46-90-15</a>	Engine mounting
Exhaust back pressure sensor (mixing pipe) SCR (Selective Catalytic Reduction)	<a href="#">W 71-90-20</a>	Exhaust gas treatment
Exhaust manifold (exhaust turbocharger)	<a href="#">W 43-90-36</a>	Exhaust gas turbocharger
Fastening parts	<a href="#">W 20-90-05</a>	Fuel filter
Fastening parts	<a href="#">W 82-90-05</a>	Coolant compressor
Fastening parts	<a href="#">W 48-90-05</a>	Cable harness
Fastening parts	<a href="#">W 44-90-05</a>	Add-on parts
Fastening parts	<a href="#">W 48-90-05</a>	Cable harness
Fastening parts	<a href="#">W 48-90-05</a>	Cable harness
Fastening parts	<a href="#">W 48-90-05</a>	Cable harness
Fuel filter	<a href="#">W 20-90-17</a>	Fuel filter
Fuel line	<a href="#">W 20-90-30</a>	Fuel pipes
Fuel pre-filter	<a href="#">W 20-90-16</a>	Fuel filter





Activity	Job Card	Maintenance Group
Generator	W 44-90-42	Parts to generator
Holder	W 41-90-10	Exhaust pipe
Holder	W 41-90-09	Exhaust gas recirculation
Holder	W 71-90-09	Exhaust gas treatment
Holder	W 71-90-09	Exhaust gas treatment
Holder	W 41-90-09	Exhaust gas recirculation
Holder (Relay)	W 48-90-09	Electrical equipment
Impulse transmitter (camshaft)	W 51-90-20	Measuring instruments
Impulse transmitter (crankshaft)	W 51-90-20	Measuring instruments
Installing the lubricating oil filter	W 15-90-38	Lubricating oil filter add-on
Inlet module	W 71-90-48	Exhaust gas treatment
Intake nozzle (exhaust turbocharger)	W 22-90-35	Air intake pipe
Line	W 38-90-32	Coolant pipes
Line	W 01-90-32	Crankcase breather
Line	W 38-90-32	Coolant pipes
Line (Crankcase housing, exhaust gas circulation, coolant line)	W 41-90-32	Exhaust gas recirculation
Line (Thermostat housing, exhaust gas circulation, coolant line)	W 41-90-32	Exhaust gas recirculation
Lubricant oil filter console	W 15-90-38	Lubricating oil filter
Lubricating oil line	W 16-90-32	Lubricating oil pipe
Mixing pipe (Screw connection)	W 71-90-80	Exhaust gas treatment
Oil filling	W 02-90-24	Lubricating oil sump
Oil measuring device	W 01-90-23	Oil measuring device
Outlet module	W 71-90-49	Exhaust gas treatment
Pressure fan	W 39-90-52	Fan
Pressure transmitter / temperature pressure transmitter (charge air)	W 22-90-20	Charge air line
Pressure transmitter installation (oil pressure)	W 51-90-20	Messgeräte
Relay	W 48-90-20	Electrical equipment
Removing and install the charge air line	W 22-01-01	Charge air line
Removing and installing charge air manifold	W 22-04-01	Charge air line
Removing and installing hydraulic pump drive	W 83-02-01	Hydraulic pump drive
Removing and installing pressure sensor (exhaust back pressure) SCR (Selective Catalytic Reduction)	W 71-05-05	Exhaust gas treatment
Removing and installing temperature transmitter (before diesel oxidation catalyst)	W 71-07-01	Exhaust gas treatment
Removing and installing the belt tensioner (V-rib belt)	W 44-01-01	Add-on parts
Removing and installing the belt tensioner (V-rib belt, level 1)	W 44-01-01	Add-on parts
Removing and installing the compensator (exhaust turbocharger)	W 71-09-01	Exhaust gas turbocharger



## Job Card Overview

Activity	Job Card	Maintenance Group
Removing and installing the connection housing	<a href="#">W 52-01-01</a>	Connection housing
Removing and installing the console (V-rib belt, level1)	<a href="#">W 44-02-06</a>	Add-on parts
Removing and installing the control valve	<a href="#">W 09-17-01</a>	Gearcase
Removing and installing the coolant compressor	<a href="#">W 82-01-01</a>	Coolant compressor
Removing and installing the coolant pump	<a href="#">W 37-03-01</a>	Coolant pump
Removing and installing the cooler	<a href="#">W 41-05-02</a>	Exhaust gas recirculation
Removing and installing the cylinder head cover	<a href="#">W 08-01-01</a>	Cylinder head cover
Removing and installing the dosing device SCR (Selective Catalytic Reduction)	<a href="#">W 71-06-02</a>	Exhaust gas treatment
Removing and installing the exhaust gas return pipe	<a href="#">W 41-05-05</a>	Exhaust gas recirculation
Removing and installing the exhaust gas return valve	<a href="#">W 41-05-03</a>	Exhaust gas recirculation
Removing and installing the exhaust line	<a href="#">W 41-01-01</a>	Exhaust pipe
Removing and installing the flutter valve	<a href="#">W 41-05-01</a>	Exhaust gas recirculation
Removing and installing the flywheel (Fastening parts)	<a href="#">W 05-03-01</a>	Flywheel
Removing and installing the fuel line (injector, rail, high-pressure pump)	<a href="#">W 21-05-05</a>	Fuel pipes
Removing and installing the gasket housing	<a href="#">W 01-03-01</a>	Crankcase
Removing and installing the glow plugs	<a href="#">W 63-02-01</a>	Start aid
Removing and installing the high-pressure pump	<a href="#">W 17-01-04</a>	High-pressure pump
Removing and installing the injector	<a href="#">W 19-01-01</a>	Injector
Removing and installing the lubricating oil cooler	<a href="#">W 15-02-01</a>	Lubricating oil cooler
Removing and installing the lubricating oil line (exhaust turbocharger)	<a href="#">W 16-04-01</a>	Lubricating oil pipe
Removing and installing the lubricating oil pan	<a href="#">W 02-01-01</a>	Lubricating oil sump
Removing and installing the lubricating oil return line (exhaust turbocharger)	<a href="#">W 16-05-01</a>	Lubricating oil pipe
Removing and installing the oil pressure regulating valve	<a href="#">W 01-16-01</a>	Crankcase
Removing and installing the oil suction pipe	<a href="#">W 16-01-01</a>	Oil suction pipe
Removing and installing the pressure transmitter	<a href="#">W 41-06-02</a>	Exhaust gas recirculation
Removing and installing the pressure/temperature sensor (charge air)	<a href="#">W 48-03-01</a>	Electrical equipment
Removing and installing the rail	<a href="#">W 21-04-01</a>	Fuel pipes
Removing and installing the sensor (NOx)	<a href="#">W 71-05-04</a>	Exhaust gas treatment
Removing and installing the sensor wheel	<a href="#">W 05-07-01</a>	V-belt pulley add-on
Removing and installing the starter	<a href="#">W 44-03-01</a>	Starter
Removing and installing the temperature sensor	<a href="#">W 41-06-01</a>	Exhaust gas recirculation
Removing and installing the thermostat	<a href="#">W 38-01-01</a>	Thermostat housing
Removing and installing the transfer line	<a href="#">W 01-07-05</a>	Crankcase
Removing and installing the turbocharger	<a href="#">W 43-01-01</a>	Exhaust gas turbocharger



Activity	Job Card	Maintenance Group
Removing and installing the V-belt pulley / V-ribbed pulley	<a href="#">W 05-01-01</a>	Crankshaft
Removing and installing the Venturi tube	<a href="#">W 41-05-10</a>	Exhaust gas recirculation
Removing and installing turning gear / locking device	<a href="#">W 49-02-01</a>	Tools
Renewing the crankshaft sealing ring (flywheel side)	<a href="#">W 01-02-01</a>	Crankcase
Renewing the crankshaft sealing ring (opposite side to flywheel)	<a href="#">W 09-01-01</a>	Gearcase
Screw plug (Thermostat housing, exhaust gas circulation, coolant line)	<a href="#">W 41-90-04</a>	Exhaust gas recirculation
Suction fan	<a href="#">W 39-90-52</a>	Fan
Supply pump (Fuel)	<a href="#">W 20-90-47</a>	Fuel supply pump
Supply pump SCR (Selective Catalytic Reduction)	<a href="#">W 71-90-47</a>	Exhaust gas treatment
Tank SCR (Selective Catalytic Reduction)	<a href="#">W 71-90-56</a>	Exhaust gas treatment
Temperature sensor (air intake temperature, ambient air temperature)	<a href="#">W 71-90-20</a>	Exhaust gas treatment
V-belt pulley	<a href="#">W 05-90-13</a>	V-belt pulley add-on
V-rib belt pulley	<a href="#">W 37-90-13</a>	Coolant pump



## Job Card Overview

### 4.2 SORTED NUMERICALLY

Job Card	Activity	Maintenance Group
W 01-02-01	Renewing the crankshaft sealing ring (flywheel side)	Crankcase
W 01-03-01	Removing and installing the gasket housing	Crankcase
W 01-07-05	Removing and installing the transfer line	Crankcase
W 01-16-01	Removing and installing the oil pressure regulating valve	Crankcase
W 01-90-01	Closing parts	Crankcase
W 01-90-23	Oil measuring device	Oil measuring device
W 01-90-32	Line	Crankcase breather
W 02-01-01	Removing and installing the lubricating oil pan	Lubricating oil sump
W 02-90-01	Closing parts	Lubricating oil sump
W 02-90-04	Drain valve	Lubricating oil sump
W 02-90-24	Oil filling	Lubricating oil sump
W 05-01-01	Removing and installing the V-belt pulley / V-ribbed pulley	Crankshaft
W 05-03-01	Removing and installing the flywheel (Fastening parts)	Flywheel
W 05-07-01	Removing and installing the sensor wheel	V-belt pulley add-on
W 05-90-13	V-belt pulley	V-belt pulley add-on
W 08-00-01	Checking the compression pressure (when injectors are removed)	Cylinder head
W 08-01-01	Removing and installing the cylinder head cover	Cylinder head cover
W 09-01-01	Renewing the crankshaft sealing ring (opposite side to flywheel)	Gearcase
W 09-17-01	Removing and installing the control valve	Gearcase
W 09-90-37	Cover	Gearcase
W 09-90-63	Control Valve	Gearcase
W 15-02-01	Removing and installing the lubricating oil cooler	Lubricating oil cooler
W 15-90-38	Installing the lubricating oil filter	Lubricating oil filter add-on
W 15-90-38	Lubricant oil filter console	Lubricating oil filter
W 16-01-01	Removing and installing the oil suction pipe	Oil suction pipe
W 16-04-01	Removing and installing the lubricating oil line (exhaust turbocharger)	Lubricating oil pipe
W 16-05-01	Removing and installing the lubricating oil return line (exhaust turbocharger)	Lubricating oil pipe
W 16-90-32	Lubricating oil line	Lubricating oil pipe
W 17-01-04	Removing and installing the high-pressure pump	High-pressure pump
W 19-01-01	Removing and installing the injector	Injector
W 20-90-05	Fastening parts	Fuel filter
W 20-90-16	Fuel pre-filter	Fuel filter
W 20-90-17	Fuel filter	Fuel filter



Job Card	Activity	Maintenance Group
W 20-90-30	Fuel line	Fuel pipes
W 20-90-47	Supply pump (Fuel)	Fuel supply pump
W 21-04-01	Removing and installing the rail	Fuel pipes
W 21-05-05	Removing and installing the fuel line (injector, rail, high-pressure pump)	Fuel pipes
W 22-01-01	Removing and install the charge air line	Charge air line
W 22-04-01	Removing and installing charge air manifold	Charge air line
W 22-90-20	Pressure transmitter / temperature pressure transmitter (charge air)	Charge air line
W 22-90-35	Intake nozzle (exhaust turbocharger)	Air intake pipe
W 22-90-54	Charge air manifold	Charge air line
W 22-90-55	Charge air line	Charge air line
W 37-03-01	Removing and installing the coolant pump	Coolant pump
W 37-90-06	Drive components	Coolant pump
W 37-90-13	V-rib belt pulley	Coolant pump
W 38-01-01	Removing and installing the thermostat	Thermostat housing
W 38-01-02	Checking the thermostat (in the removed state)	Thermostat housing
W 38-90-32	Line	Crankcase breather
W 38-90-32	Line	Coolant pipes
W 39-90-52	Pressure fan	Fan
W 39-90-52	Suction fan	Fan
W 39-90-67	Adapter	Fan bearing
W 41-01-01	Removing and installing the exhaust line	Exhaust pipe
W 41-05-01	Removing and installing the flutter valve	Exhaust gas recirculation
W 41-05-02	Removing and installing the cooler	Exhaust gas recirculation
W 41-05-03	Removing and installing the exhaust gas return valve	Exhaust gas recirculation
W 41-05-05	Removing and installing the exhaust gas return pipe	Exhaust gas recirculation
W 41-05-10	Removing and installing the Venturi tube	Exhaust gas recirculation
W 41-06-01	Removing and installing the temperature sensor	Exhaust gas recirculation
W 41-06-02	Removing and installing the pressure transmitter	Exhaust gas recirculation
W 41-90-04	Screw plug (Thermostat housing, exhaust gas circulation, coolant line)	Exhaust gas recirculation
W 41-90-04	Connection (Crankcase housing, exhaust gas circulation, coolant line)	Exhaust gas recirculation
W 41-90-09	Holder	Exhaust gas recirculation
W 41-90-09	Holder	Exhaust gas recirculation
W 41-90-10	Holder	Exhaust pipe
W 41-90-21	Compensator structure (Exhaust line)	Exhaust pipe
W 41-90-32	Line (Thermostat housing, exhaust gas circulation, coolant line)	Exhaust gas recirculation
W 41-90-32	Line (Crankcase housing, exhaust gas circulation, coolant line)	Exhaust gas recirculation
W 43-01-01	Removing and installing the turbocharger	Exhaust gas turbocharger
W 43-90-36	Exhaust manifold (exhaust turbocharger)	Exhaust gas turbocharger
W 44-01-01	Removing and installing the belt tensioner (V-rib belt)	Add-on parts



## Job Card Overview

Job Card	Activity	Maintenance Group
W 44-01-01	Removing and installing the belt tensioner (V-rib belt, level 1)	Add-on parts
W 44-02-06	Removing and installing the console (V-rib belt, level 1)	Add-on parts
W 44-03-01	Removing and installing the starter	Starter
W 44-90-05	Fastening parts	Add-on parts
W 44-90-42	Generator	Parts to generator
W 46-90-15	Engine mounting	Engine mounting
W 46-90-15	Engine mounting	Engine mounting
W 46-90-15	Engine mounting	Engine mounting
W 46-90-15	Engine mounting	Engine mounting
W 48-03-01	Removing and installing the pressure/temperature sensor (charge air)	Electrical equipment
W 48-90-05	Fastening parts	Cable harness
W 48-90-05	Fastening parts	Cable harness
W 48-90-05	Fastening parts	Cable harness
W 48-90-05	Fastening parts	Cable harness
W 48-90-09	Holder (Relay)	Electrical equipment
W 48-90-20	Relay	Electrical equipment
W 49-02-01	Removing and installing turning gear / locking device	Tools
W 51-90-20	Pressure transmitter installation (oil pressure)	Messgeräte
W 51-90-20	Impulse transmitter (camshaft)	Measuring instruments
W 51-90-20	Impulse transmitter (crankshaft)	Measuring instruments
W 52-01-01	Removing and installing the connection housing	Connection housing
W 52-90-53	Connection housing	Connection housing
W 63-02-01	Removing and installing the glow plugs	Start aid
W 71-05-04	Removing and installing the sensor (NOx)	Exhaust gas treatment
W 71-05-05	Removing and installing pressure sensor (exhaust back pressure) SCR (Selective Catalytic Reduction)	Exhaust gas treatment
W 71-06-02	Removing and installing the dosing device SCR (Selective Catalytic Reduction)	Exhaust gas treatment
W 71-07-01	Removing and installing temperature transmitter (before diesel oxidation catalyst)	Exhaust gas treatment
W 71-09-01	Removing and installing the compensator (exhaust turbocharger)	Exhaust gas turboCharger
W 71-90-09	Holder	Exhaust gas treatment
W 71-90-09	Holder	Exhaust gas treatment
W 71-90-20	Temperature sensor (air intake temperature, ambient air temperature)	Exhaust gas treatment
W 71-90-20	Exhaust back pressure sensor (mixing pipe) SCR (Selective Catalytic Reduction)	Exhaust gas treatment
W 71-90-21	Compensator structure (assembly material)	Exhaust gas treatment
W 71-90-32	Coolant line SCR (Selective Catalytic Reduction)	Exhaust gas treatment
W 71-90-45	Catalytic converter SCR (Selective Catalytic Reduction)	Exhaust gas treatment



<b>Job Card</b>	<b>Activity</b>	<b>Maintenance Group</b>
W 71-90-45	Catalytic converter DOC (Diesel Oxidation Catalyst) / DPF (Diesel Particle Filter)	Exhaust gas treatment
W 71-90-47	Supply pump SCR (Selective Catalytic Reduction)	Exhaust gas treatment
W 71-90-48	Inlet module	Exhaust gas treatment
W 71-90-49	Outlet module	Exhaust gas treatment
W 71-90-51	Console	Exhaust gas treatment
W 71-90-56	Tank SCR (Selective Catalytic Reduction)	Exhaust gas treatment
W 71-90-80	Mixing pipe (Screw connection)	Exhaust gas treatment
W 82-01-01	Removing and installing the coolant compressor	Coolant compressor
W 82-90-05	Fastening parts	Coolant compressor
W 83-02-01	Removing and installing hydraulic pump drive	Hydraulic pump drive



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## Section 5

# Disassembly and Assembly

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## 5.1 CRANKCASE

### 5.1.1 Renewing the Crankshaft Sealing Ring (Flywheel Side) (W 01-02-01)



Standard tools

Special tools:

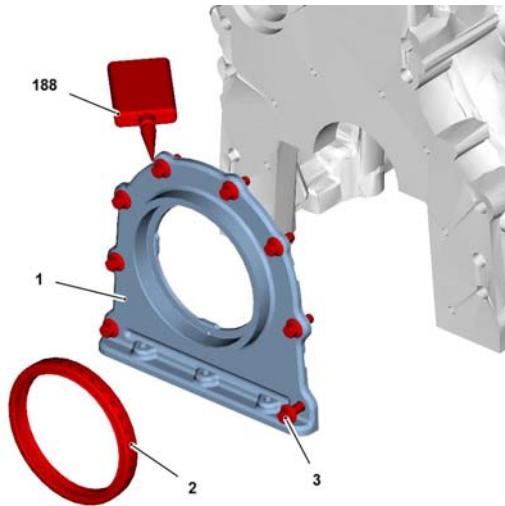
- Pricker - PN 449-2485
- Assembly Lever - PN 449-2488
- Assembly Tool - PN 449-2500



Self-tapping screw

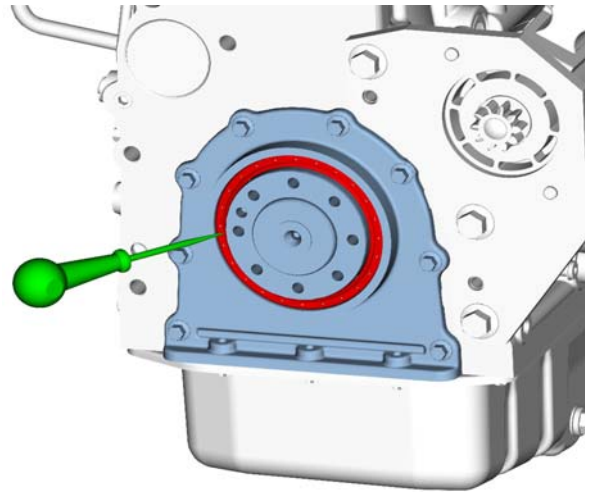
- Washer

#### a. Removing the Crankshaft Sealing Ring



MAE6960

1	Gasket housing
2	Shaft sealing ring
3	Hexagon head screw
188	Packing compound



MAE6290

1. Remove flywheel.



Module

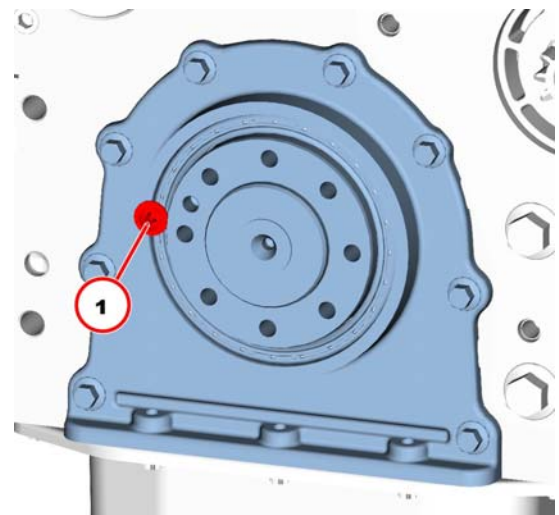
05

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



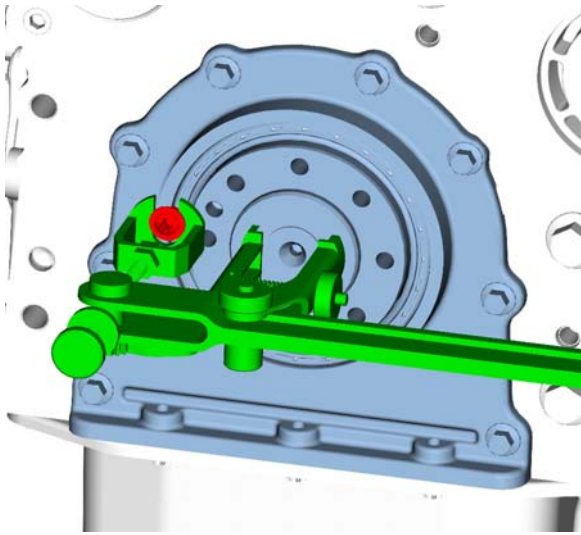
**Attention!**

Do Not damage the gasket housing and crankshaft!



MAE6970

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



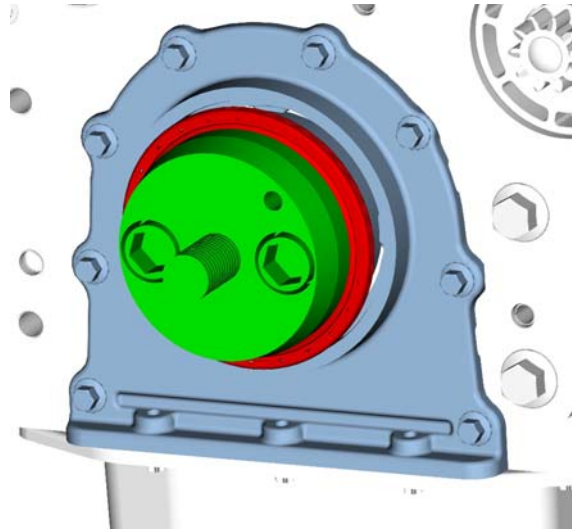
MAE6300

4. Pull out the crankshaft sealing ring with assembly lever.



Ensure that the crankshaft does not get damaged.

5. Visually inspect the crankshaft sealing ring running surface.



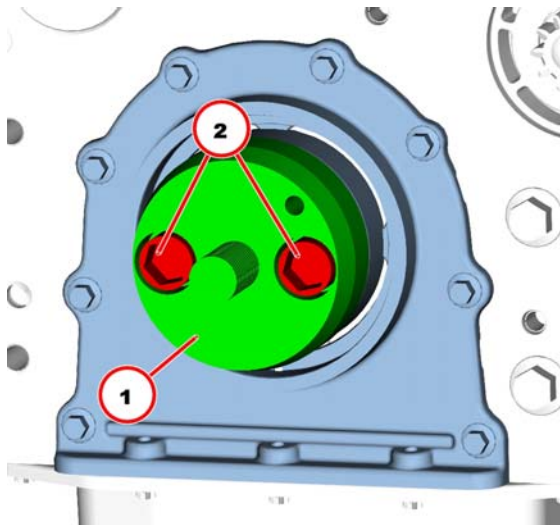
MAE6310

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



Do Not oil wax crankshaft sealing rings.  
The sealing lip faces the crankshaft.

**b. Installing the Crankshaft Sealing Ring**



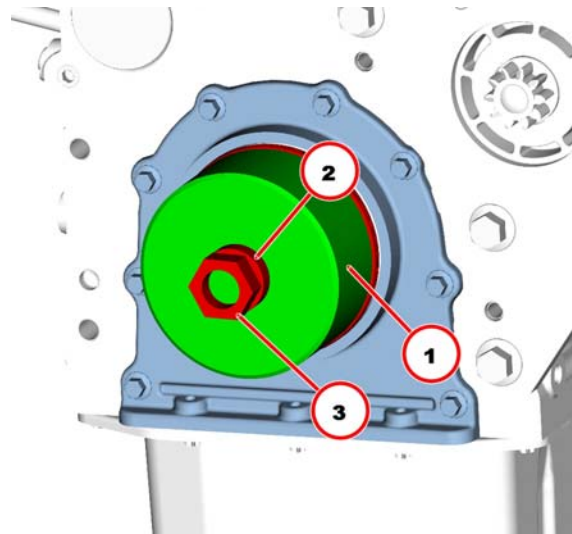
MAE6980

6. Mount guide sleeve (1).

7. Tighten screws (2).



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



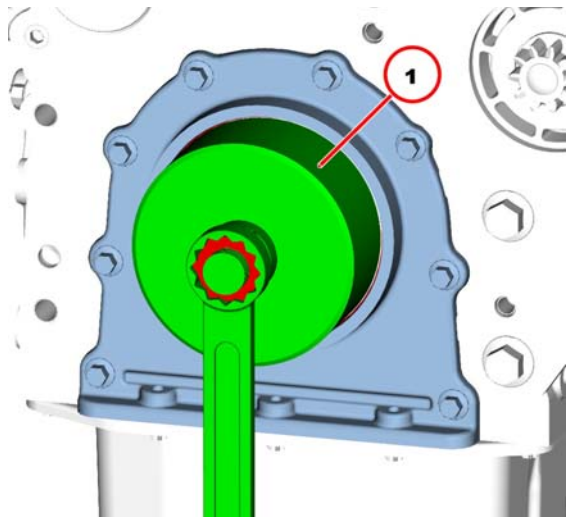
MAE6990

9. Mount assembly sleeve (1).

10. Press on the crankshaft sealing ring to the stop.

11. Plug in the bearing (2).

12. Screw on nut (3).



MAE7100

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



The installation depth is determined by the assembly tool.

14. Remove assembly tool.

15. Install flywheel.



Module

05

### 5.1.2 Removing and Installing the Gasket Housing (W 01-03-01)



Standard tools  
- Splint driver

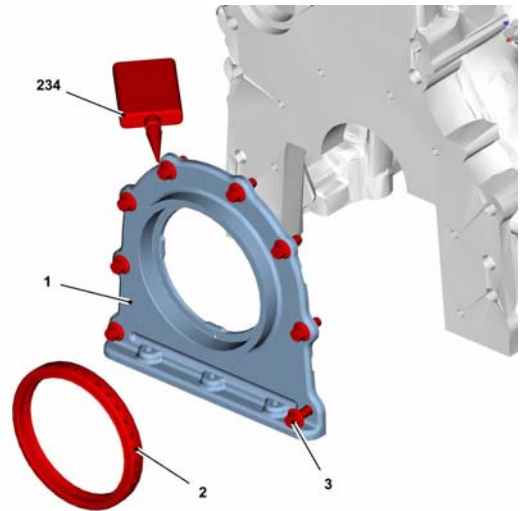


Safety Information / User Information



Packing compound

#### a. Removing the Gasket Housing



MAE7110

1	Gasket housing
2	Shaft sealing ring
3	Hexagon head screw
234	Packing compound

1. Remove flywheel.



Module

05

2. Remove connection housing.



Module

52



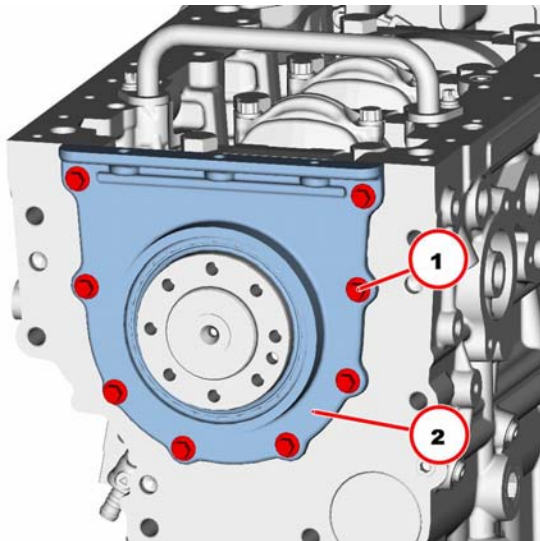
## Disassembly and Assembly

3. Remove lubricating oil pan.



Module

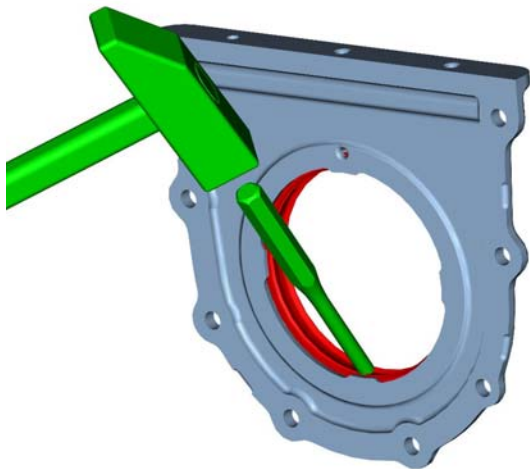
02



MAE7120

4. Unscrew all screws (1).

5. Remove gasket housing (2).



MAE6320

6. Knock out crankshaft sealing ring (1).



### Attention!

Do Not damage the sealing surfaces.

7. Visually inspect the components.

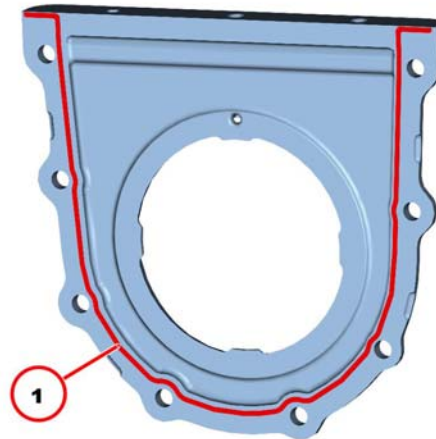
### b. Installing the Gasket Housing

1. Clean sealing surfaces.

2. Apply sealing compound (1) evenly on the sealing surface.



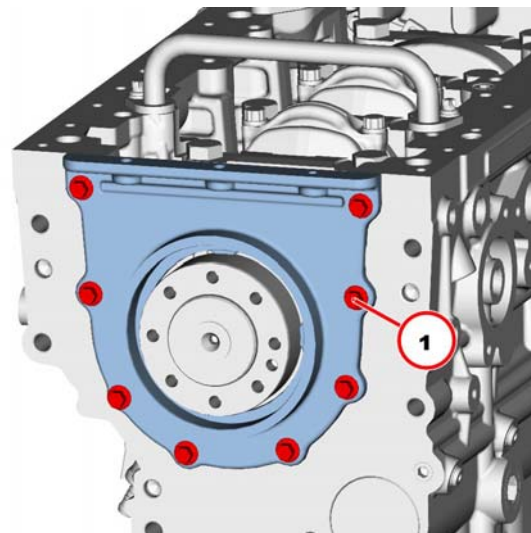
Sealing cord strength approx. 0.5 - 0.6 mm.



MAE7130

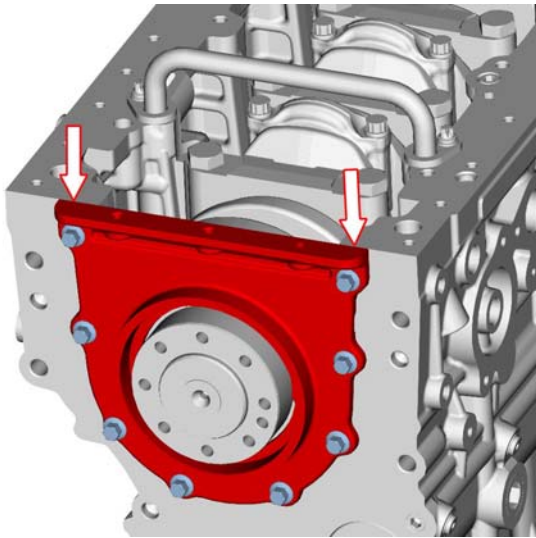
3. Mount gasket housing.

4. Tighten screws (1).



MAE7140

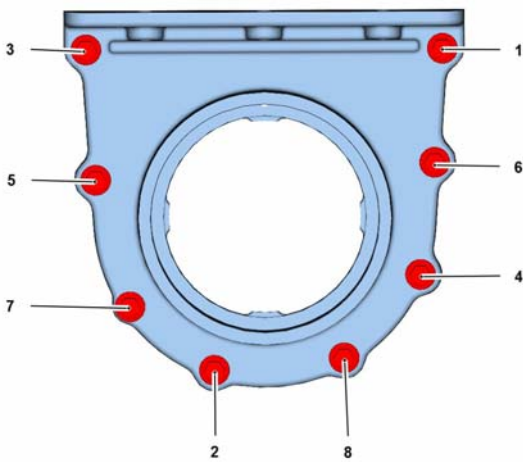




MAE6330



The sealing face (arrows) must be flush with the oil pan sealing face.



MAE7150

5. Tighten the screws according to the tightening sequence.



**Engine 492-2140 & 505-6559:** 30 Nm

**Engine 492-5092 & 505-7229:** 20 Nm

6. Renew crankshaft sealing ring (flywheel side).



Module 01

7. Install lubricating oil pan.



Module 02

8. Install connection housing.



Module 52

9. Install flywheel.



Module 05



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw Type	Notes / Remark	Value
A01 095	Gasket housing on crankcase		Observe tightening sequence	<b>Engine 492-2140 &amp; 505-6559:</b> 30 Nm <b>Engine 492-5092 &amp; 505-7229:</b> 20 Nm



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



### 5.1.3 Removing and Installing the Transfer Line (W 01-07-05)



Standard tools

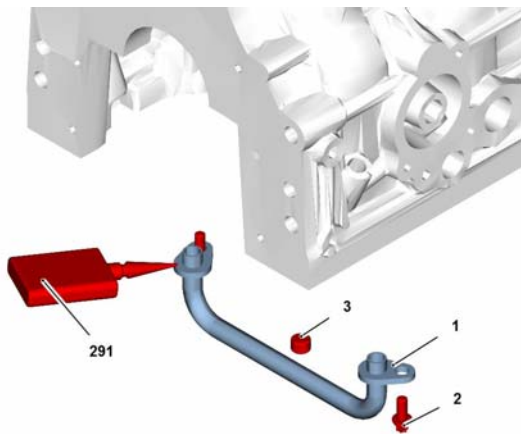


Safety Information / User Information



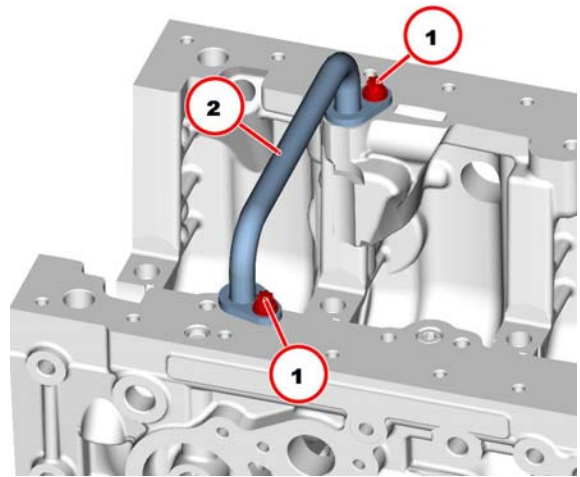
Packing compound  
Loctite 5900

#### a. Removing the Transfer Line



MAE7160

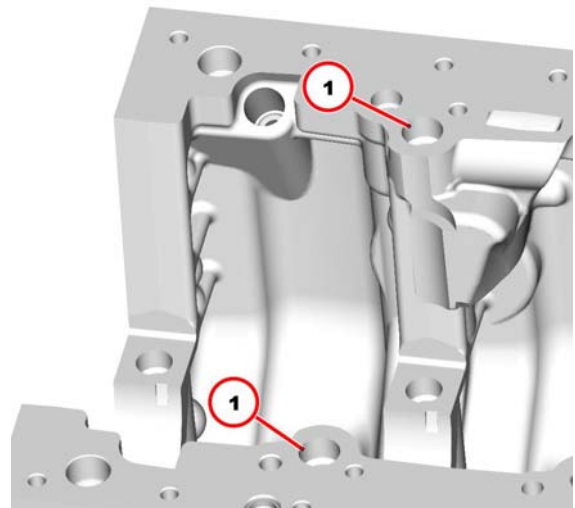
1	Transfer line	
2	Torx screw	
3	Screw plug	35 Nm
291	Packing compound	



MAE7170

1. Remove lubricating oil pan.  
 Module 02
2. Unscrew screws (1).
3. Remove transfer line (2).
4. Visually inspect the component.

#### b. Installing the Transfer Line



MAE7180

1. Clean sealing surfaces.

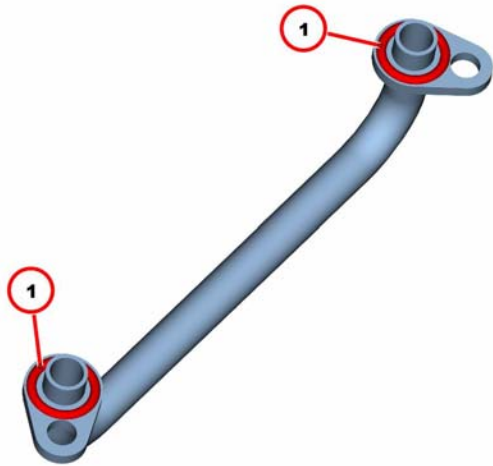


#### Attention!

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

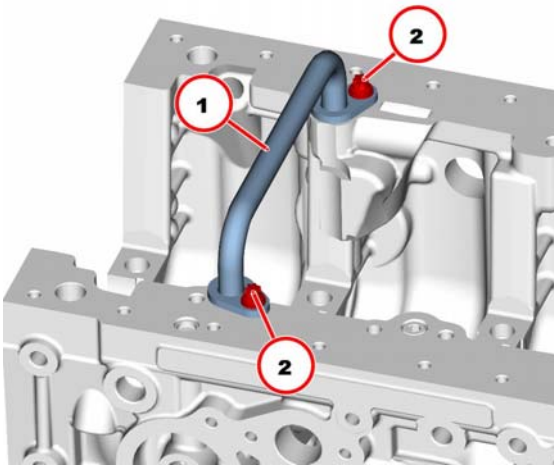


## Disassembly and Assembly



MAE7190

2. Apply sealing compound (1) evenly on the sealing surface.



MAE7200

3. Clean sealing surfaces.
4. Mount transfer line (1).
5. Tighten screws (2).



**Engine 492-2140 & 505-6559:** 30 Nm

**Engine 492-5092 & 505-7229:** 20 Nm

6. Install lubricating oil pan.



Module

02

**c. Technical Data*****Tightening specifications***

ID no.	Name	Screw Type	Notes / Remark	Value
A01 095	Gasket housing on crankcase		Observe tightening sequence	<b>Engine 492-2140 &amp; 505-6559:</b> 30 Nm <b>Engine 492-5092 &amp; 505-7229:</b> 20 Nm



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



## Disassembly and Assembly

### 5.1.4 Removing and Installing the Oil Pressure Regulating Valve (W 01-16-01) (Engine 492-2140 & 505-6559)



Standard tools  
- Splint driver



Safety Information / User Information



Packing compound



#### **Danger!** **Hot Components!**

Danger of burns.

Let the engine/component cool down sufficiently (to at least ambient temperature).



#### **Attention!**

Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

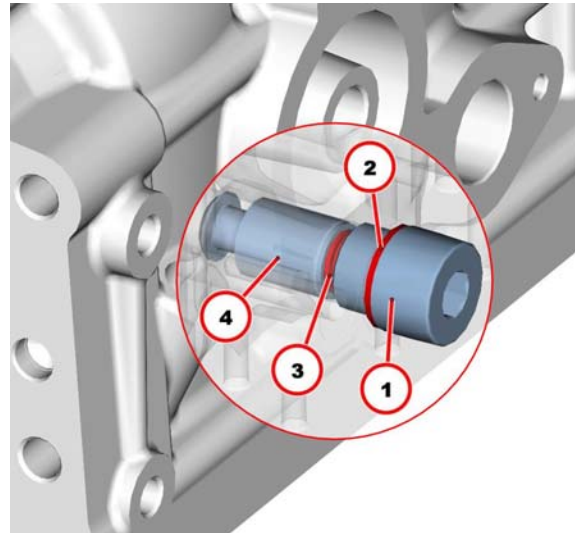
Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.



Collect leaking operating substances in suitable vessels and dispose of according to regulations. Observe the appropriate operating instructions for emptying and filling the engines.

#### a. Removing the Oil Pressure Regulating Valve



MAE7210



#### **Danger!**

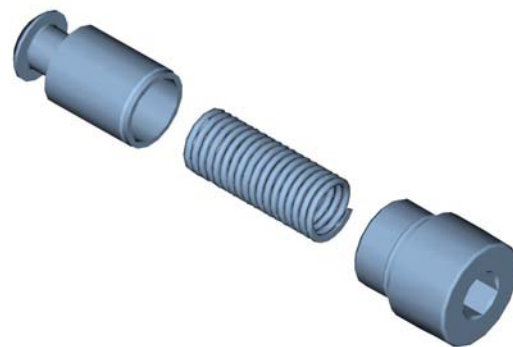
Hot parts!

Risk of injury!

High spring tension!

Components can spring out during removal!

1. Unscrew locking screw (1).
2. Remove sealing ring (2).
3. Remove valve spring (3).
4. Remove valve piston (4).



MAE6340

5. Clean components.
6. Visually inspect the components.

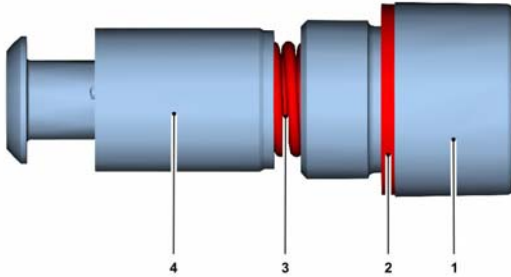


Renew components if worn.



 Service Bulletin

**b. Installing the Oil Pressure Regulating Valve**

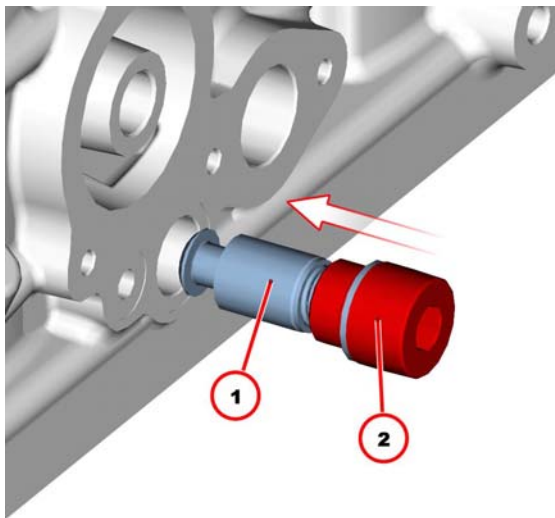


MAE7220

1. Assemble oil pressure regulating valve.



Use a new sealing ring.  
Please observe assembly sequence.



MAE7230



**Danger!**  
High spring tension!

2. Insert oil pressure regulating valve completely (1) in the direction of the arrow.
3. Screw on locking screw (2).
4. Tighten screw plug (2).



110 Nm



### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw Type	Notes / Remark	Value
A01 054	Locking screw on crankcase		Use new sealing ring	110 Nm



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





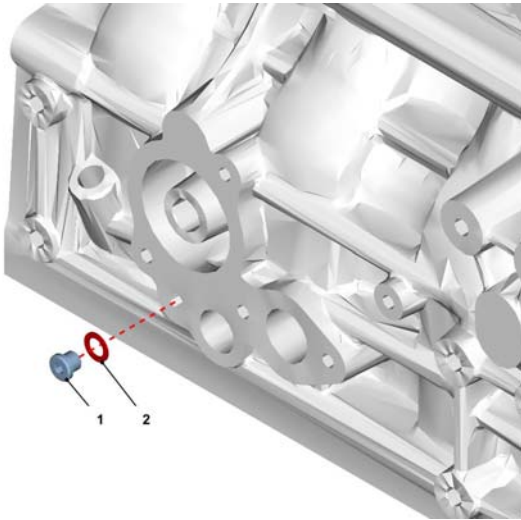
**d. Closing Parts (W 01-90-01)**



Standard tools  
- Splint driver



Safety Information / User Information



MAE7240

1	Screw plug	13 Nm
2	Sealing ring	



Use a new sealing ring.

**5.3 CRANKCASE BREATHER**

**5.3.1 Line (W 01-90-32)**

**Engine 492-2140 & 505-6559:**



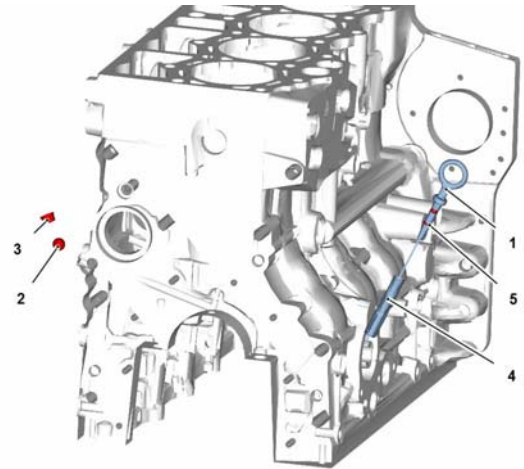
Standard tools  
Special tools:  
- Spring band pliers - PN 449-2489

**5.2 OIL MEASURING DEVICE**

**5.2.1 Oil Measuring Device (W 01-90-23)**



Standard tools



MAE7250

1	Oil dipstick
2	Ball
3	Stopper
4	Guide tube
5	O-ring



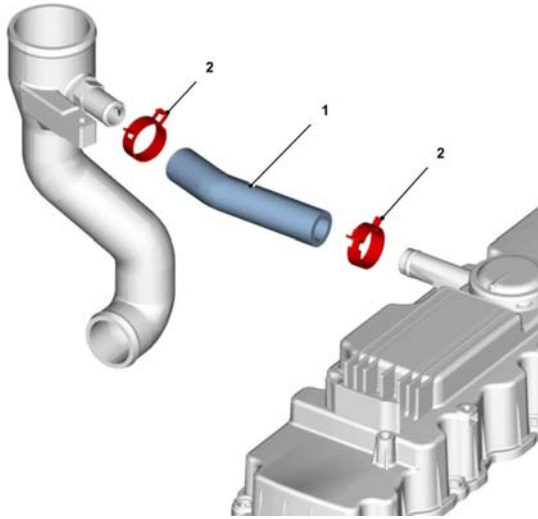
Use a new round sealing ring.



Safety Information / User Information



## Disassembly and Assembly

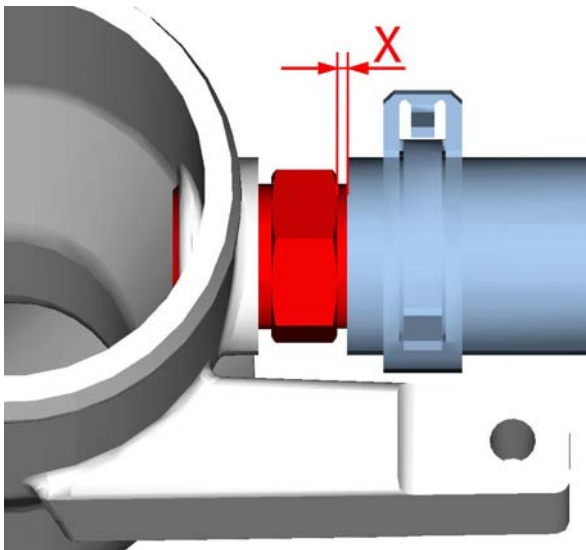


MAE7260

1	Rubber hose
2	Spring band clip



Position the spring band clip facing upwards in an easy to reach position. Ensure that the installation location is free from faults.



MAE6350



Ensure that the installation location is free from faults.

### 5. Dimension X



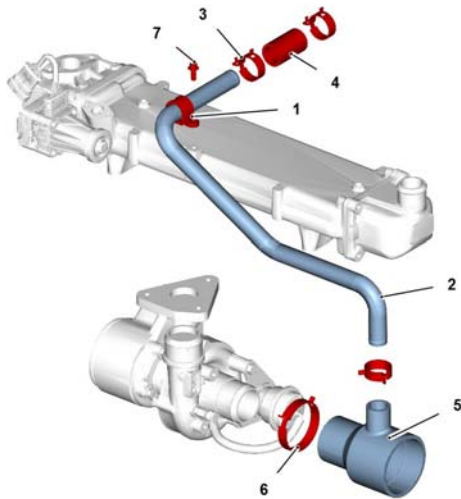
3 mm



Engine 492-5092 & 505-7229:



Standard tools



MAE12580

1	Pipe clip	
2	Pipe	
3	Spring band clip	
4	Rubber sleeve	
5	Intake nozzle	
6	Spring band clip	
7	Hexagon head screw	8 Nm

5.4 LUBRICATING OIL SUMP

5.4.1 Removing and Installing the Lubricating Oil Pan (W 02-01-01)



Standard tools

Special tools:

- Separating tool - PN 461-1697



Packing compound

Loctite 5900



Safety Information / User Information

Operation manual



**Attention!**

Make sure that no gasket residue falls into the crankcase.

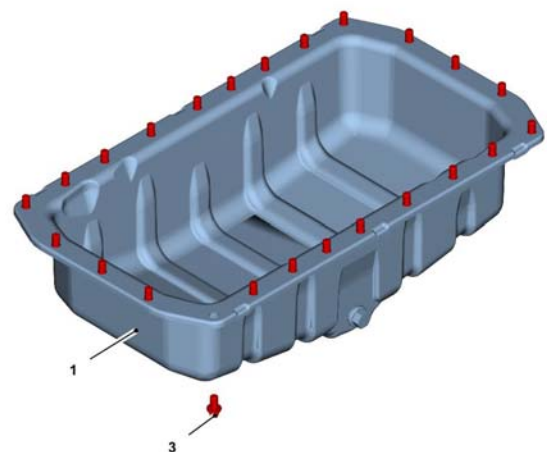
Seal all openings.



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.

a. Removing the lubricating oil pan

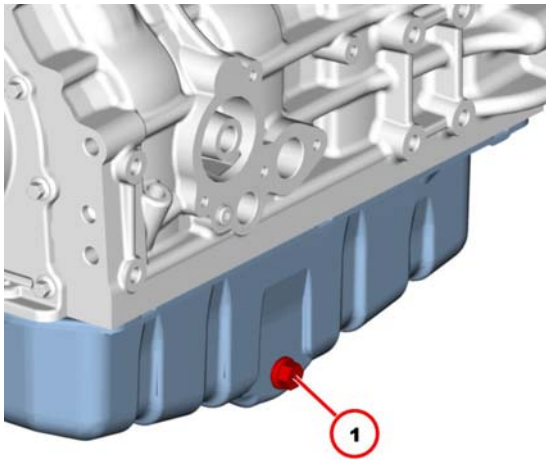


MAE7270

1	Lubricating oil pan
3	Torx screw

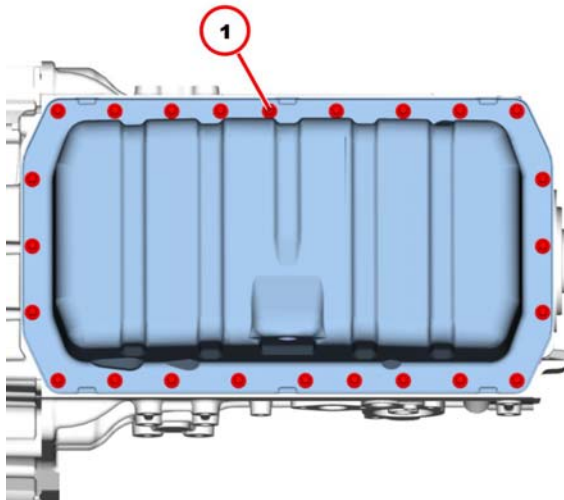


## Disassembly and Assembly



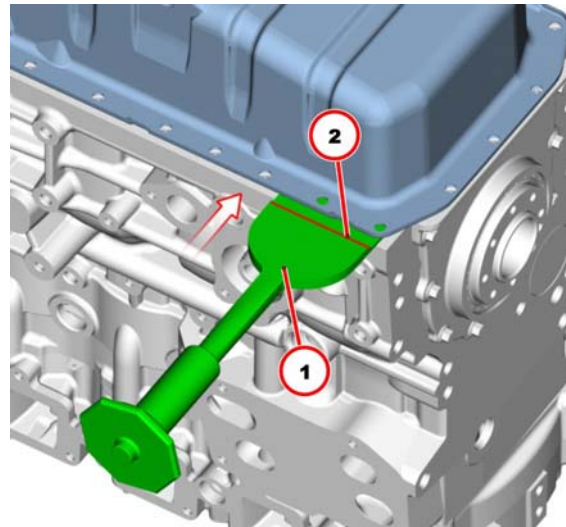
MAE7280

1. Unscrew locking screw (1).
2. Remove sealing ring.
3. Drain lubricating oil, collect and dispose of according to regulations.



MAE7290

4. Unscrew all screws (1).



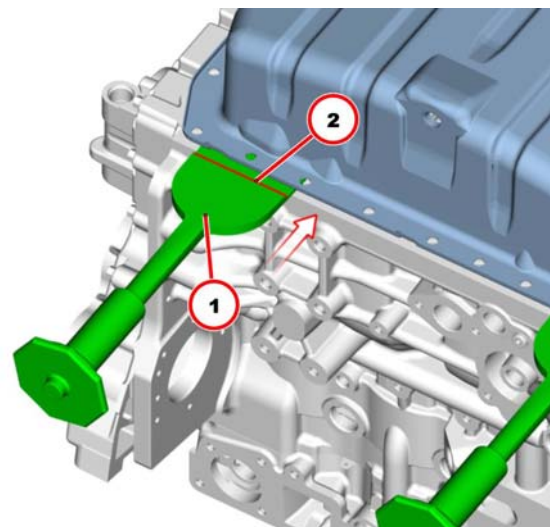
MAE7300

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



### Attention!

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



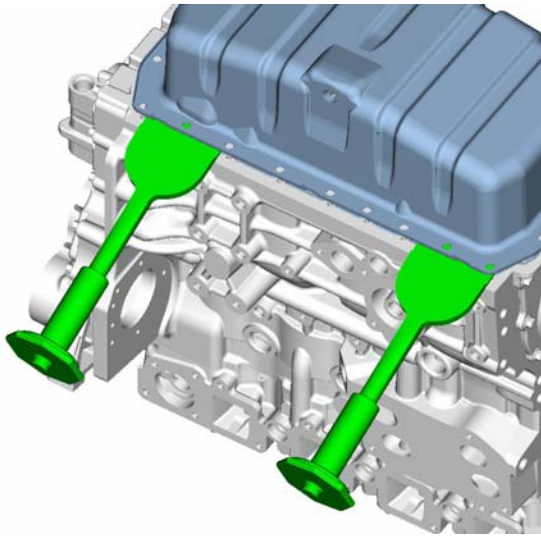
MAE7310

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



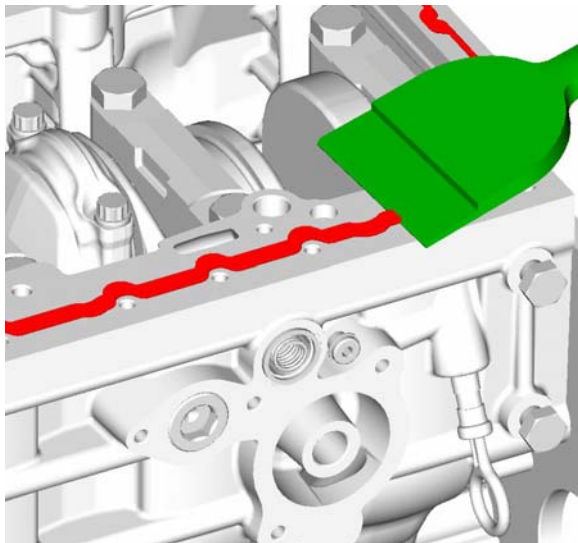
### Attention!

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



MAE6360

7. Lever out lubricating oil pan.
8. Remove lubricating oil pan.



MAE6370

9. Scrape off sealing compound with separating tool.

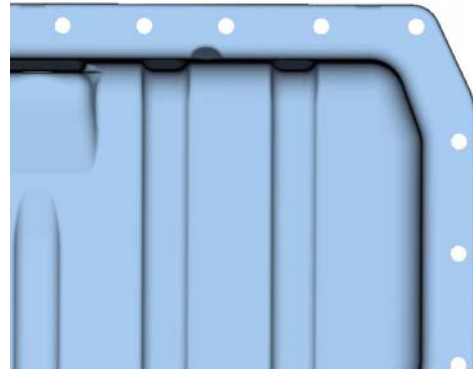


**Danger!**  
Wear protective glasses.

10. Clean the sealing surface on the crankcase with a wire brush.



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



MAE6380



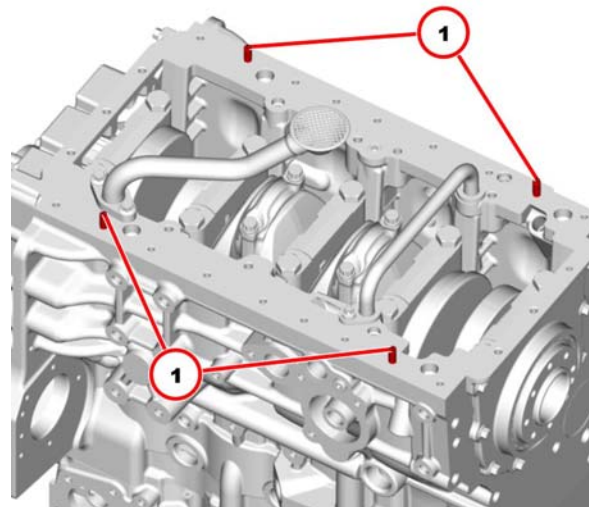
**Danger!**  
Wear protective glasses.

11. Clean the sealing surface on the crankcase with a wire brush.



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

#### b. Installing the Lubricating Oil Pan

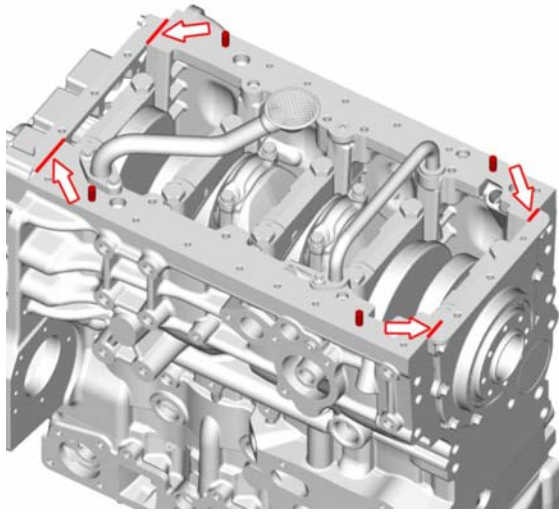


MAE7320

1. To align the lubricating oil pan, screw four pin bolts (1) diagonally opposed into the crankcase.



## Disassembly and Assembly



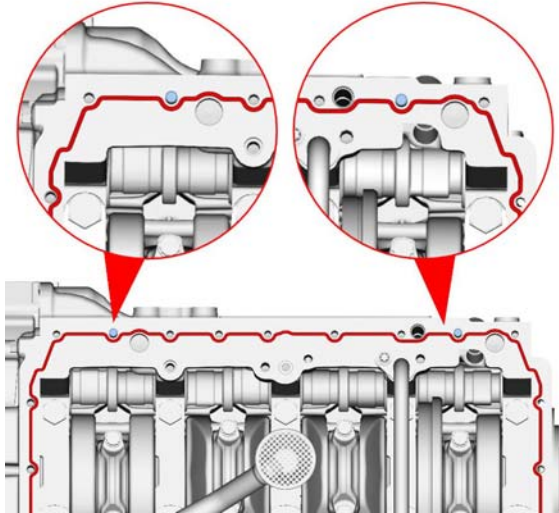
MAE6390

2. Clean sealing surfaces.



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

3. Apply packing compound to the joints (arrows).



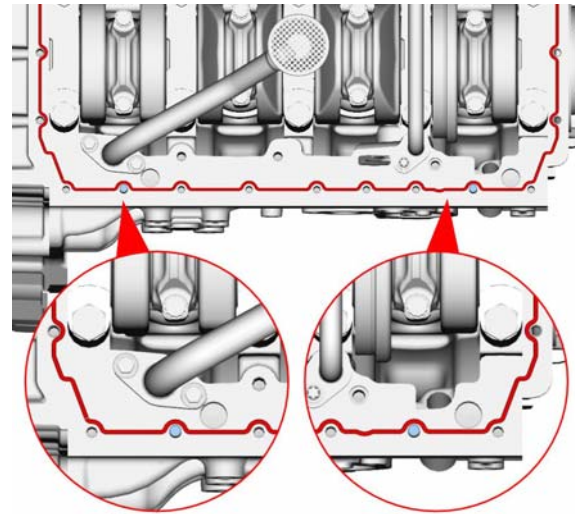
MAE6400

4. Apply the sealing compound evenly.  
Thickness 3 - 3.5 mm



**Attention!**

The specified packing cord process must be complied with.



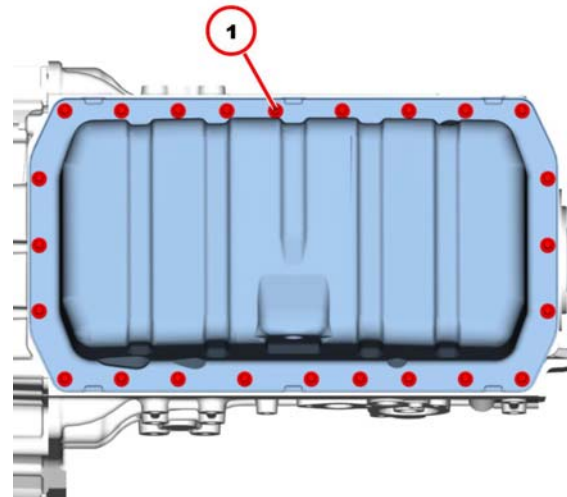
MAE6410

5. Apply the sealing compound evenly.  
Thickness 3 - 3.5 mm



**Attention!**

The specified packing cord process must be complied with.



MAE7330

6. Align the lubricating oil pan in the appropriate installation position with the pin bolts.

7. Mount lubricating oil pan.



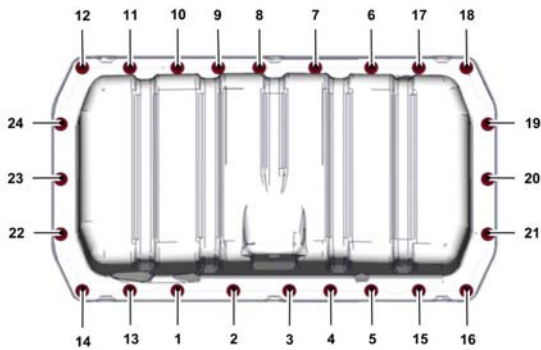
**Attention!**

Do not move the lubricating oil pan any more. Observe the drying time for the packing compound.

8. Unscrew the pin bolts.



9. Fasten all screws (1).

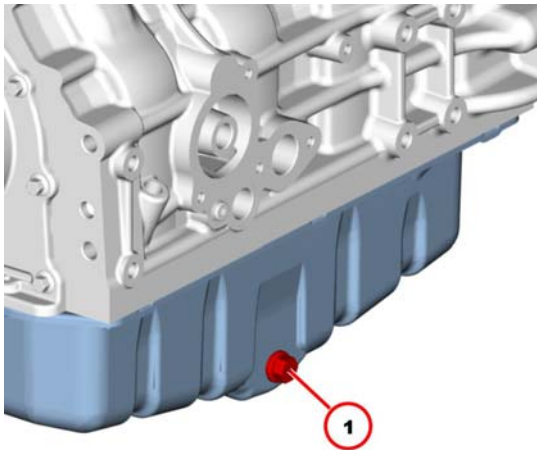


MAE7340

10. Tighten the screws according to the tightening sequence.



20 Nm



MAE7350

11. Mount new sealing ring.

12. Tighten screw plug (1).



55 Nm

13. Fill in lubricating oil according to operating manual.



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw Type	Notes / Remark	Value
A02 030	Lubricating oil pan on crankcase		Observe tightening sequence!	20 Nm
A02 031	Locking screw on lubricating oil pan		Replace sealing ring	55 Nm



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





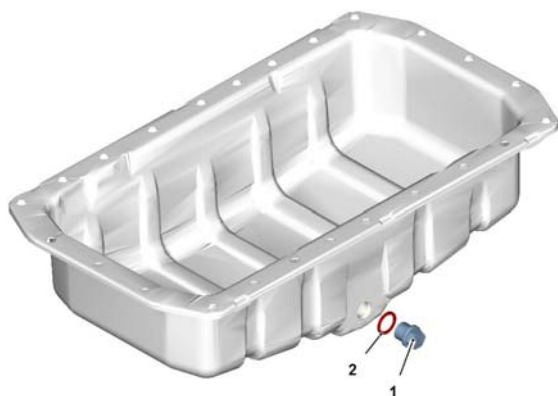
**d. Closing Parts (W 02-90-01)**



Standard tools



Collect draining lubricating oil and dispose of properly.



MAE7360

1	Screw plug	55 Nm
2	Sealing ring	



Use a new sealing ring.

**f. Oil Filling (W 02-90-24)**



Standard tools



Safety information / User information

**e. Drain Valve (W 02-90-04)**



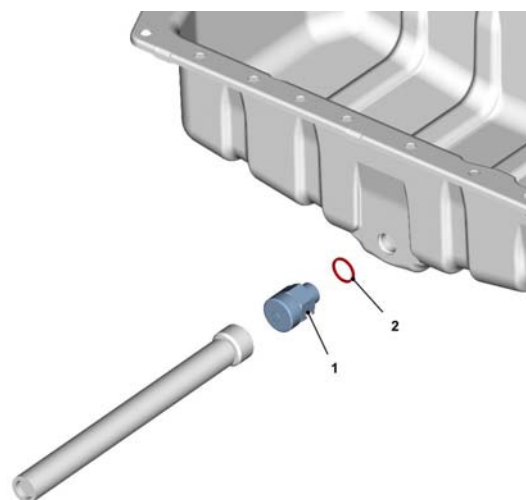
Standard tools



Safety information / User information



Collect draining lubricating oil and dispose of properly.



MAE7370

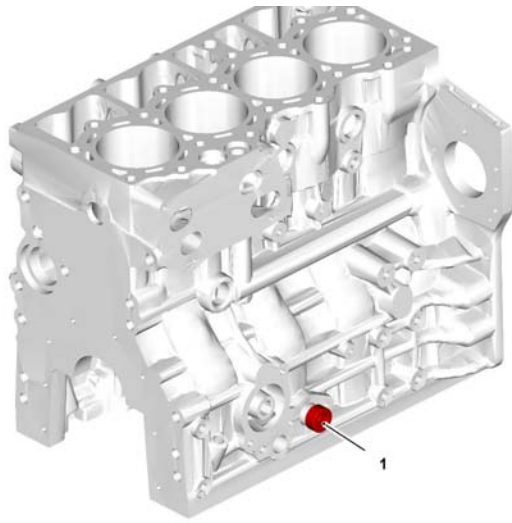
1	Drain valve	55 Nm
2	Sealing ring	



Use a new sealing ring.



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



MAE7380

1	Screw plug	<b>Engine 492-2140 &amp; 505-6559:</b> 110 Nm <b>Engine 492-5092 &amp; 505-7229:</b> 95 Nm
---	------------	---

## 5.5 CRANKSHAFT

### 5.5.1 Removing and Installing the V-belt Pulley / V-ribbed Pulley (W 05-01-01)



Standard tools:

- Torque wrench -  $\geq 100$  Nm
- Adapter 1/2 inch inner square to 1 inch external square

Special tools:

- Pin type socket wrench insert, wrench size 36
  - PN 01899199
- Force multiplier - PN 01899370
- Turning gear / locking device - PN 449-2502
- Counter support - PN 449-2506



Marker pen, waterproof, permanent  
Degreasing agent/cleaning agent



Safety information / User information  
Operation manual



#### Attention!

Pay attention to utmost cleanliness.

#### Engine 492-2140 & 505-6559:

A new friction disc must always be used if there is no friction disc present.

The friction disc must always be renewed after dismantling.

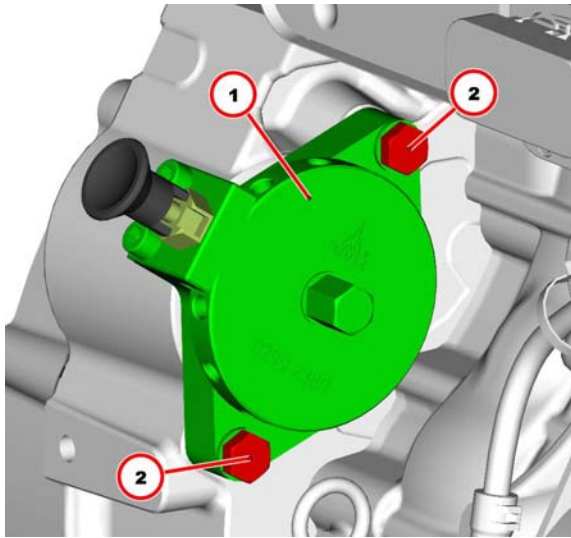


The following work procedure describes the removal and installation of the V-ribbed pulley.

The V-belt pulley is removed and installed in the same way.




**a. Removing the V-belt pulley / V-ribbed pulley**




MAE7390


1. Remove the V-belt / V-ribbed belt.

 Operation Manual


2. Remove starter.

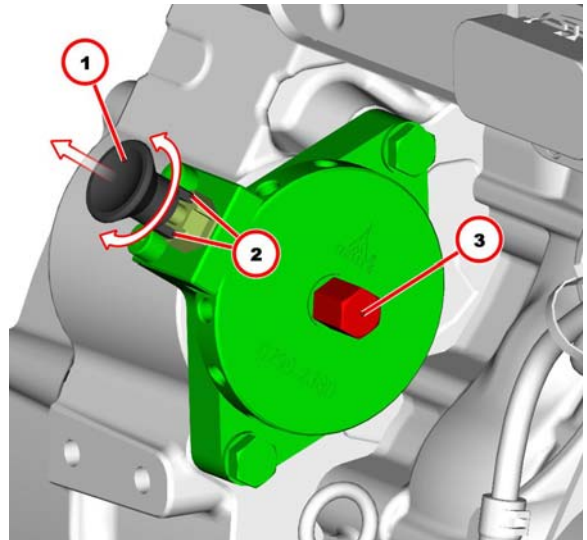
 Module 44

3. Insert turning gear / locking device (1).

 Toothed wheel of the turning gear/locking device in the toothed starter ring.

4. Tighten screws (2).

 30 Nm



MAE7400

5. Pull out and turn detent pin (1).



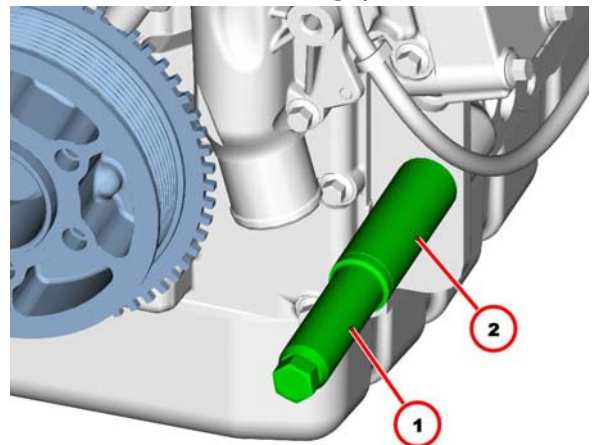
Observe position of the latches (2).

6. Turn drive (3) carefully until the detent pin latches into place.



Observe engine direction of rotation.

**Version without air-conditioning system**



MAE7410

1. Push spacer sleeve (2) onto screw-in bolt (1).
2. Screw on the screw-in bolt (1) and spacer sleeve (2).
3. Tighten the screw-in bolt (1).

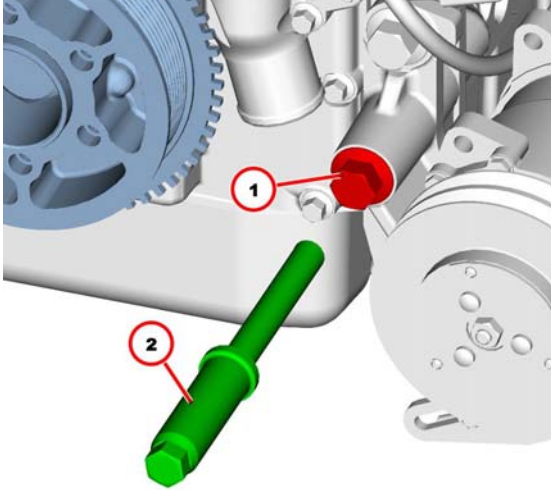


## Disassembly and Assembly



50 Nm

### Version with air-conditioning system



MAE7420

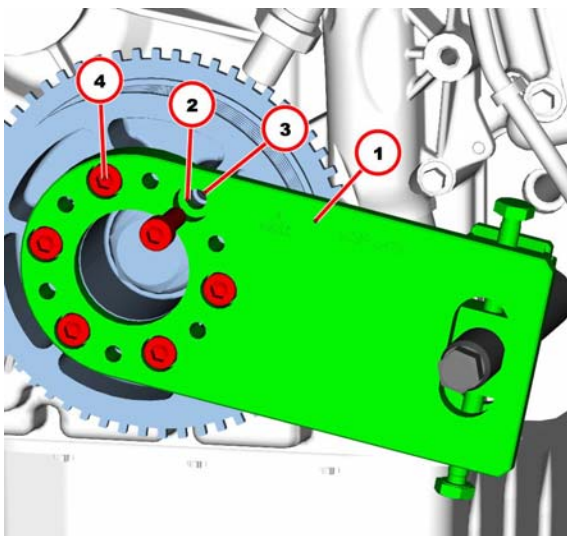
1. Unscrew screw (1).
2. Screw on screw-in bolt (2).
3. Tighten the screw-in bolt (2).



If a console is available for the coolant compressor, mount the screw-in bolt without the spacer sleeve.



50 Nm



MAE7430

4. Attach pressure plate (1).

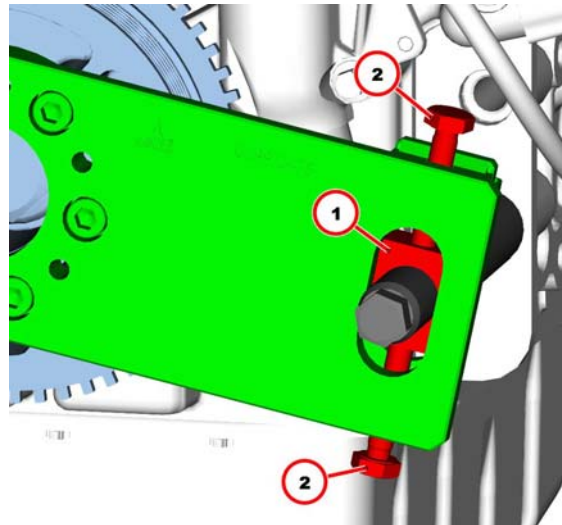


Bores (2) and threaded bores (3) must be in alignment.

5. Tighten all screws (4).



30 Nm

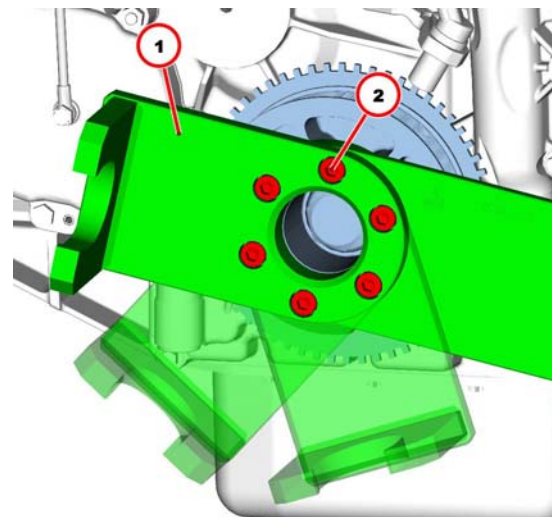


MAE7440

6. Align spline end (1) in such a way that the screw-in bolt lies almost in the centre of the recess.
7. Tighten screws (2).



30 Nm



MAE7450

8. Insert counter support (1).
9. Fasten all screws (2).



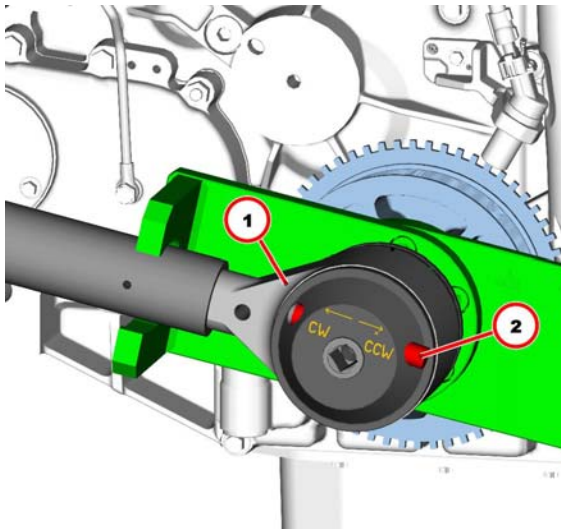
10. Tighten screws (2).



30 Nm



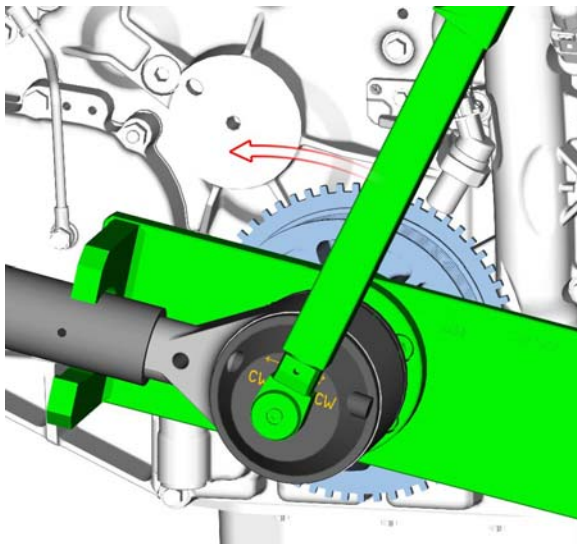
Depending on the installation situation, the counter holder can be positioned variably.



MAE7460

11. Insert socket wrench insert and force multiplier (1).

12. Snap in non-return device (2) in position CCW.



MAE6420

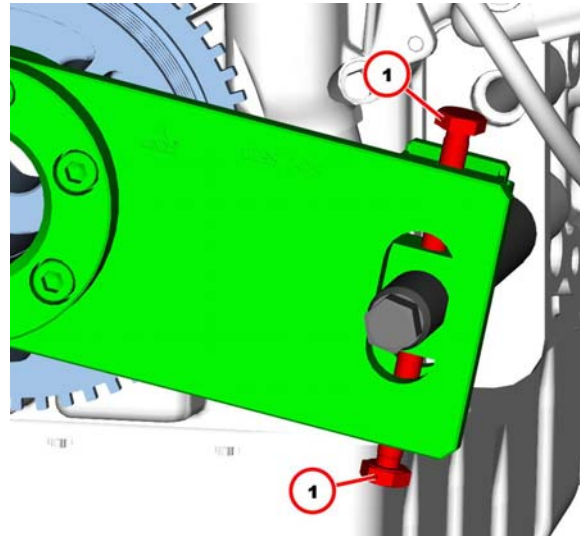
13. Hold force multiplier.

14. Loosen central screw in direction of arrow.

15. Remove force multiplier and socket wrench insert.

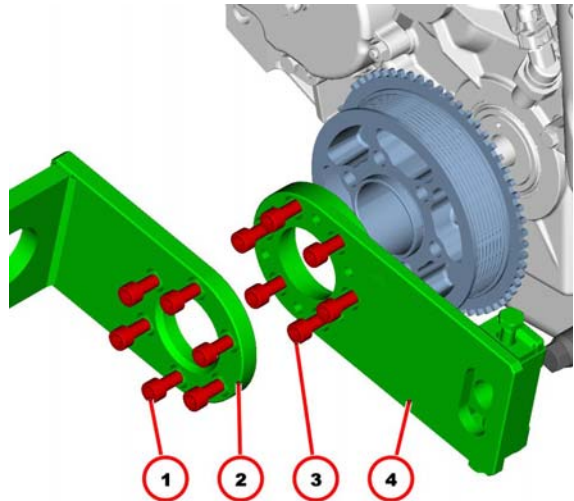
16. Remove central screw.

17. **Engine 492-2140 & 505-6559:** Remove Washer.



MAE7480

18. Loosen screws (1).



MAE7490

19. Unscrew screws (1).

20. Remove counter holder (2).

21. Unscrew screws (3).

22. Remove compressor plate (4).

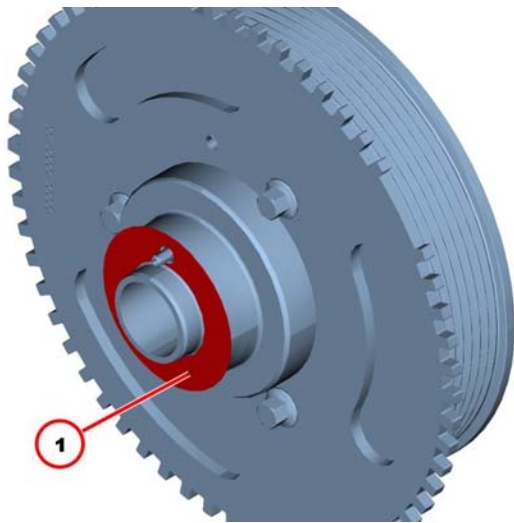
23. Detach the V-belt pulley / V-ribbed pulley.

24. Remove sensor wheel.



Module

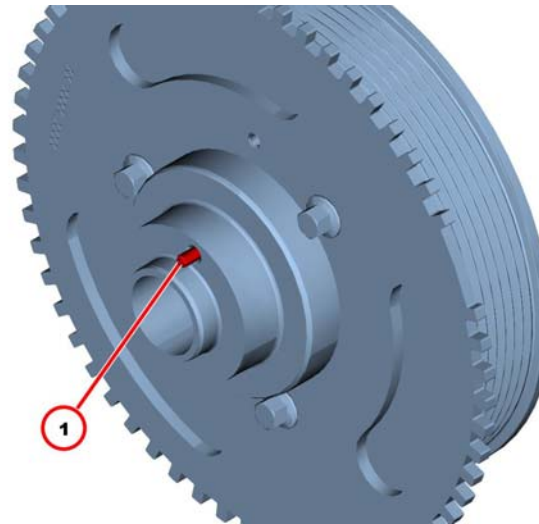
05



MAE7470

25. If present, remove friction disc (1).

**b. Installing the V-belt pulley / V-ribbed pulley**



MAE7500

1. Install sensor wheel.



Module

05



**Attention!**

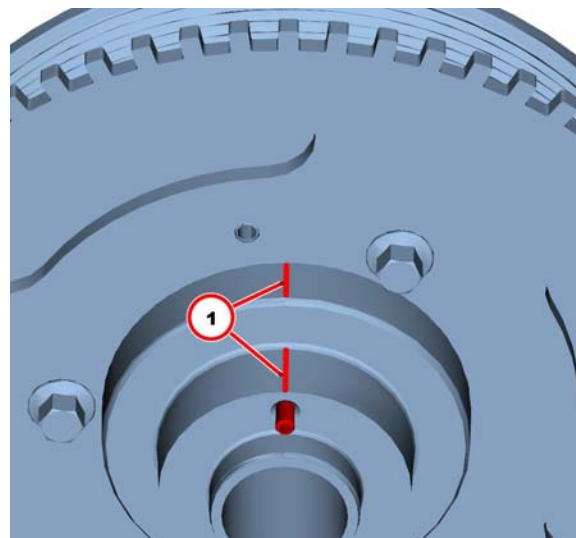
Pay attention to utmost cleanliness.

2. Clean contact surfaces.
3. Clean the locating hole.
4. Press in the clamping pin (1) to the end stop.



**Attention!**

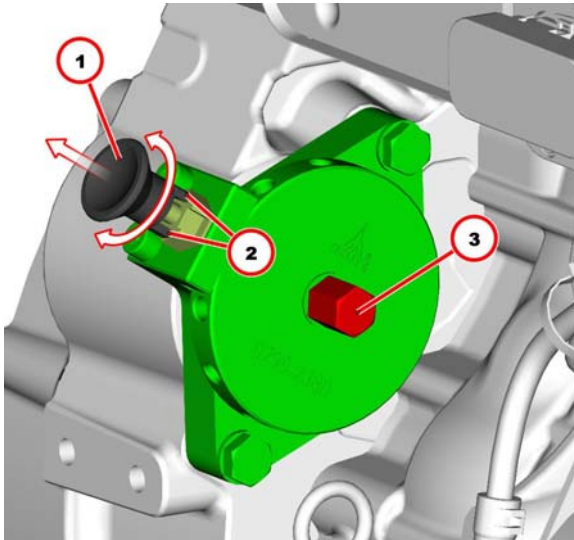
Ensure that the installation location is free from faults.



MAE7510



5. Apply help marking (1).



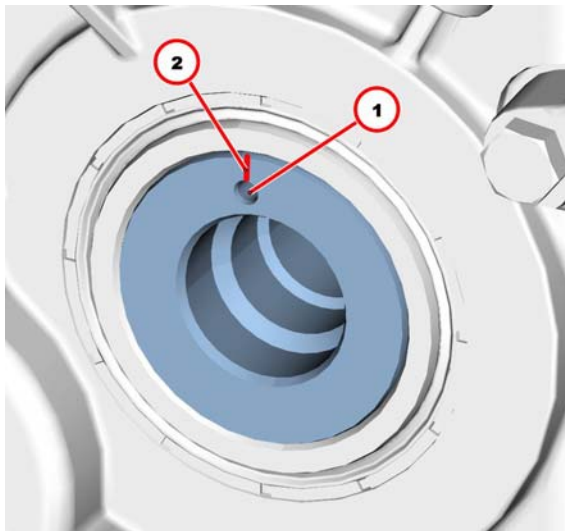
MAE7520

6. Pull out and turn detent pin (1).



Observe position of the latches (2).

7. Turn drive (3) carefully up to the desired crankshaft position.



MAE7530

8. Turn drive carefully until the bore (1) is at the top and the detent pin latches into place.



**Attention!**

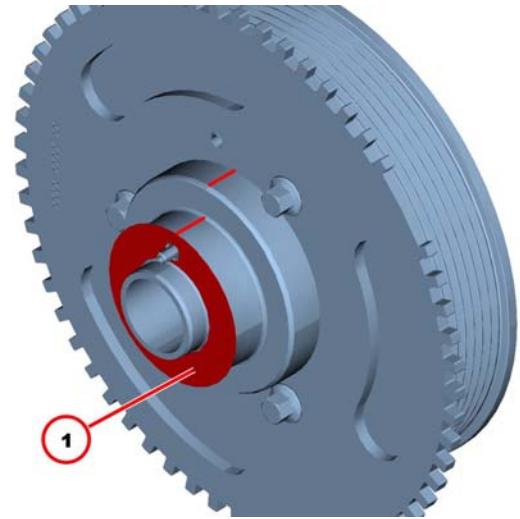
Pay attention to utmost cleanliness.

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

9. Clean contact surfaces.

10. Clean the locating hole.

11. Apply help marking (2).



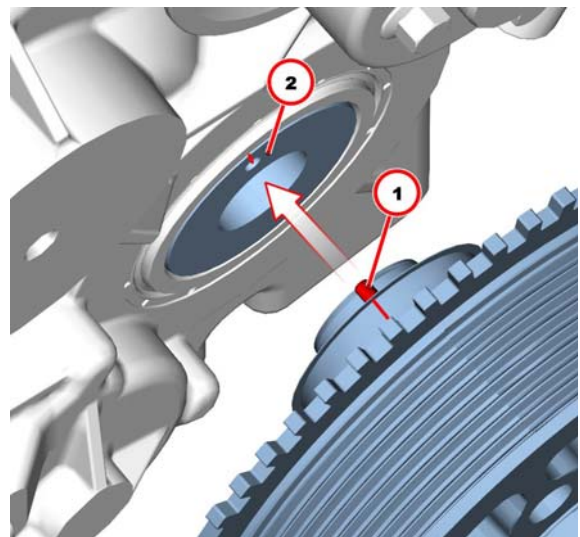
MAE7540

12. Position new friction disc (1) on clamping pin.



**Attention!**

Ensure that the installation location is free from faults.



MAE7550



**Attention!**

Pay attention to utmost cleanliness.

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

13. Attach V-belt pulley / V-ribbed pulley to bore (2) with clamping pin (1).

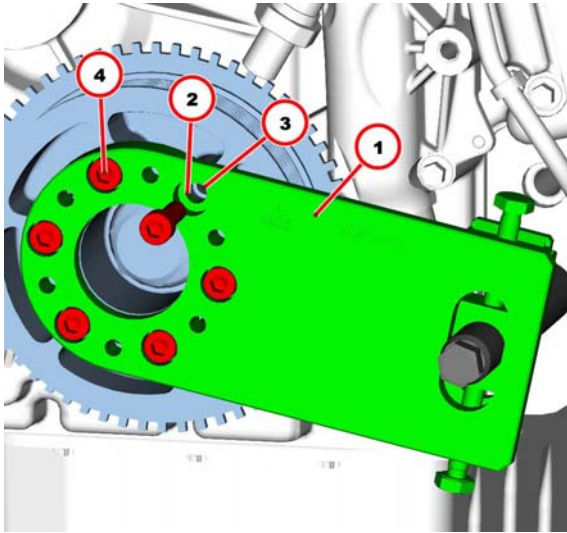


Observe help markings.



## Disassembly and Assembly

14. Press on the V-belt pulley / V-ribbed pulley.



MAE7560

15. Mount new washer on new central screw.

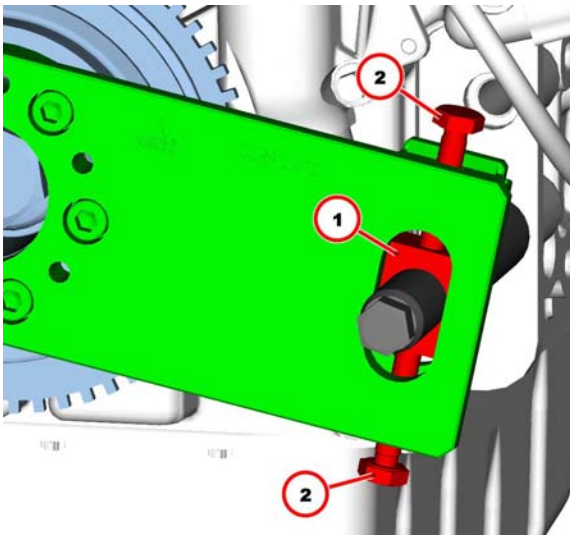
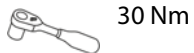
16. Turn in new central screw with socket wrench insert.

17. Attach pressure plate (1).



Bores (2) and threaded bores (3) must be in alignment.

18. Tighten all screws (4).

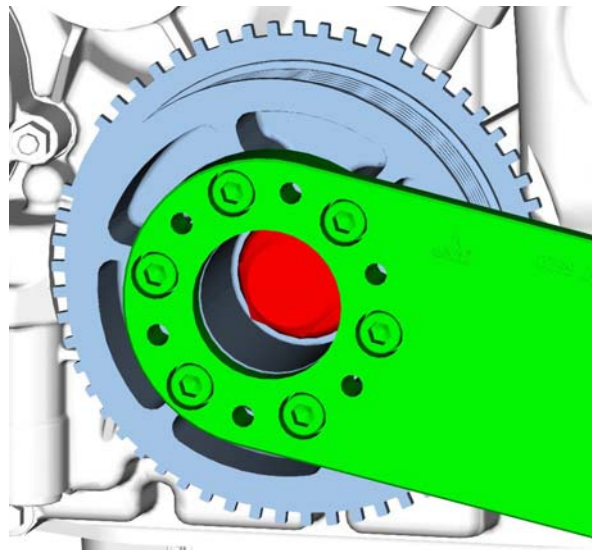


MAE7570

19. Align spline end (1) in such a way that the screw-in bolt lies almost in the centre of the recess.

20. Fasten all screws (2).

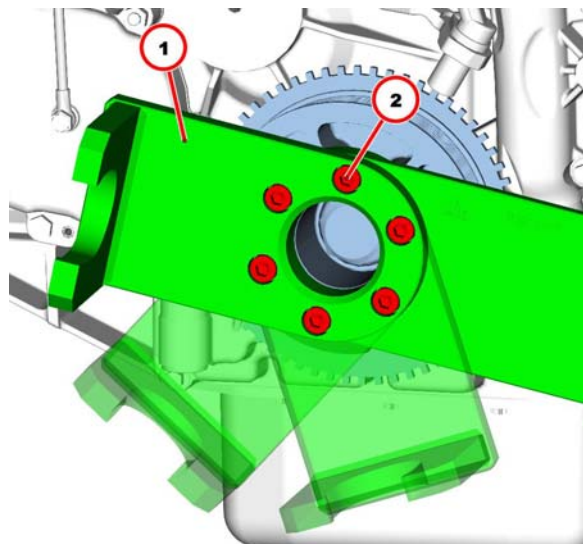
21. Tighten screws (2).



MAE6430

22. Tighten new central screw with torque wrench.

- Stage 1:



MAE7580

23. Insert counter support (1).





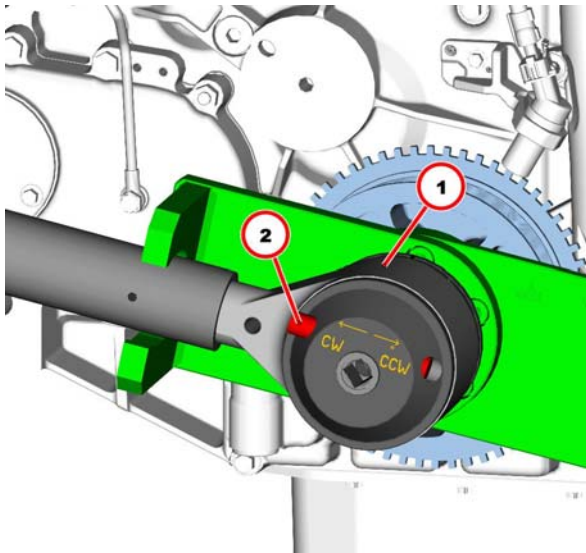
24. Tighten screws (2).



30 Nm



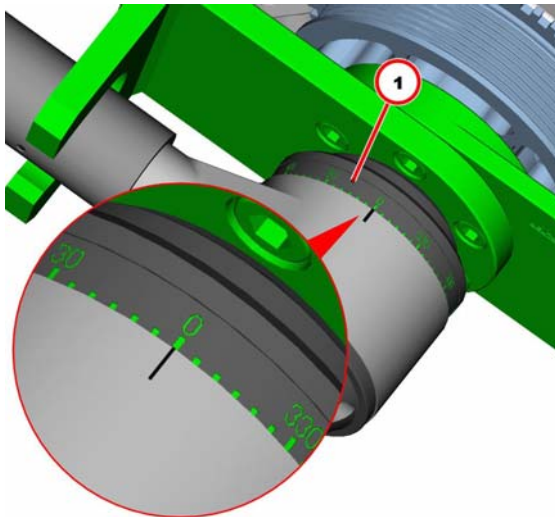
Depending on the installation situation, the counter holder can be positioned variably.



MAE7590

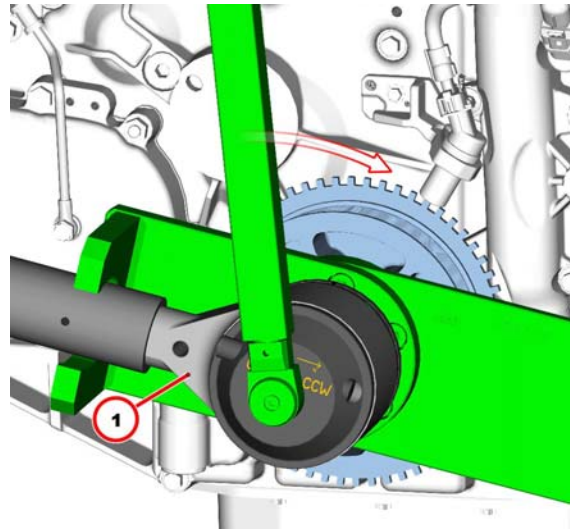
25. Insert socket wrench insert and force multiplier (1).

26. Snap in non-return device (2) in position CW.



MAE7600

27. Set graduated collar (1) to "0".



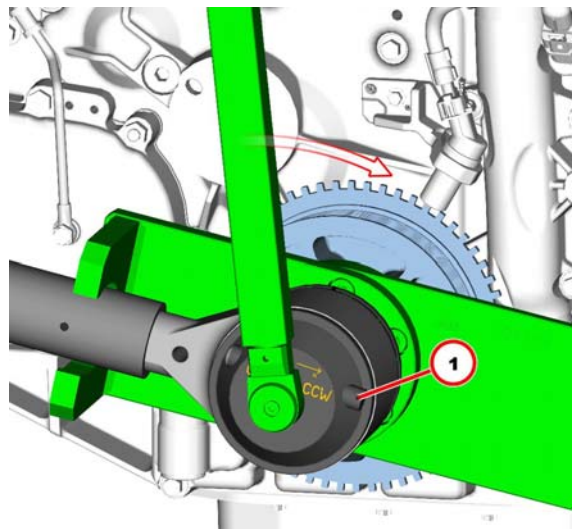
MAE7610

28. Hold force multiplier (1).

29. Tighten central screw in direction of arrow.



130 Nm



MAE7620

30. Keep torque wrench pressed in direction of arrow.

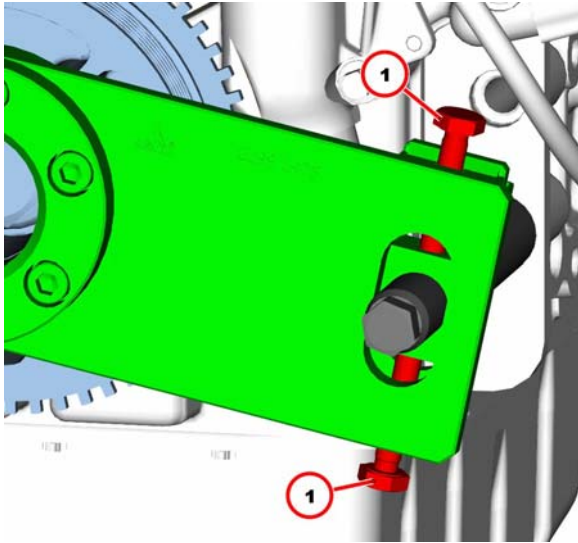
31. Move non-return device (1) into position CCW.



**Danger!**

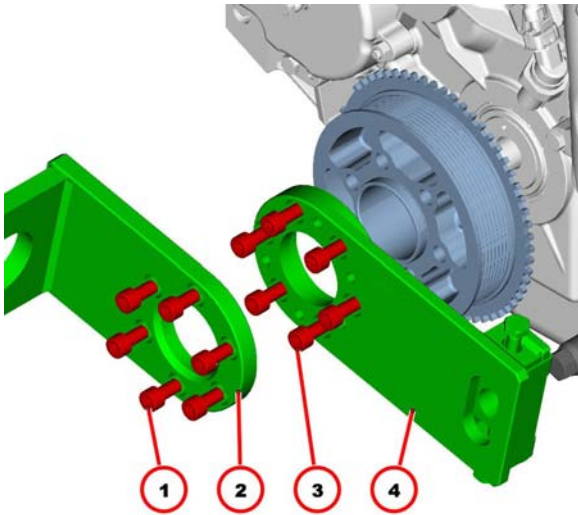
There is danger of injury if a force multiplier is removed without being discharged.

32. Remove force multiplier and socket wrench insert.



MAE7630

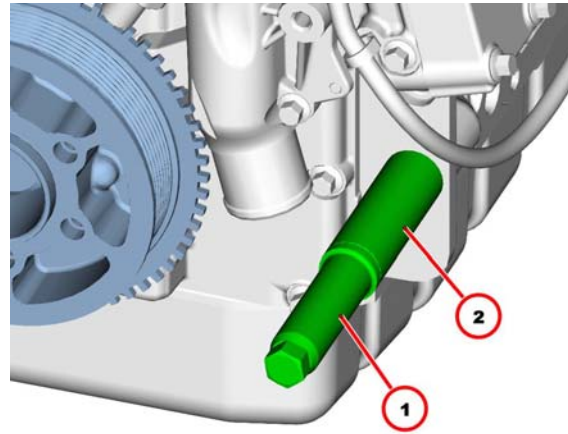
33. Loosen screws (1).



MAE7640

- 34. Unscrew screws (1).
- 35. Remove counter holder (2).
- 36. Unscrew screws (3).
- 37. Remove compressor plate (4).

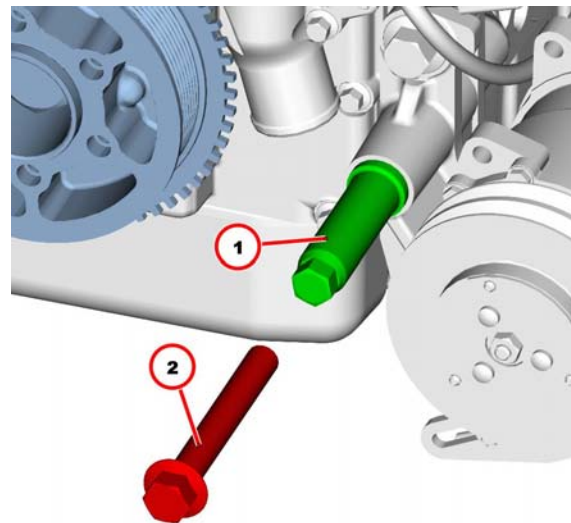
**Version without air-conditioning system**



MAE7650

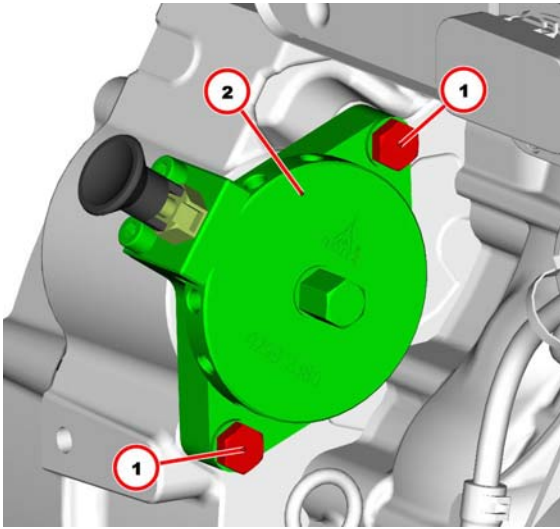
- 1. Unscrew screw-in bolt (1).
- 2. Remove screw-in bolt (1) and spacer sleeve (2).

**Version with air-conditioning system**




MAE7660

- 1. Unscrew screw-in bolt (1).
- 2. Fasten screw (2).
- 3. Tighten screw (2).




MAE7670

1. Unscrew screw (1).
2. Remove turning gear / locking device (2).
3. Install starter.

 Module 44

4. Fit and tension V-belt / V-ribbed belt.

 Operation manual



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name:	Screw Type	Notes / Remark	Value
A05 030	V-belt pulley / V-ribbed pulley on crankshaft		Use new washer Use new screw. Stage 1:	100 Nm
A05 030	V-belt pulley / V-ribbed pulley on crankshaft		Stage 2:	130°
A49 050	Turning gear / locking device, fastening			30 Nm



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



## 5.6 FLYWHEEL

### 5.6.1 Removing and Installing the Flywheel (Fastening Parts) (W 05-03-01)



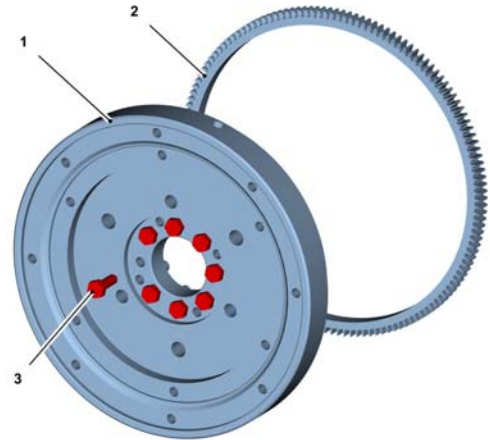
Standard tools

Special tools:

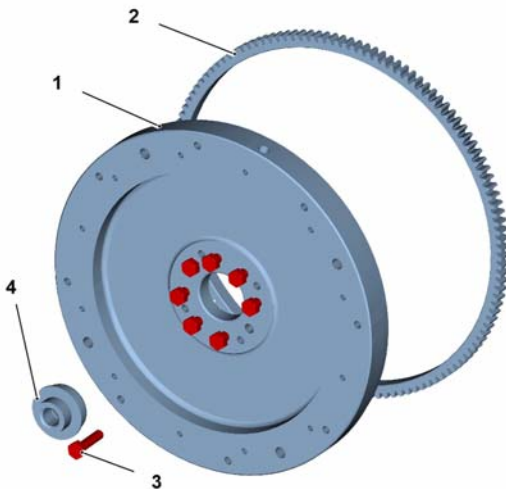
- Guide pin (self-constructed)
- Auxiliary screws - M10x120
- Rotation angle disc - PN 449-2484



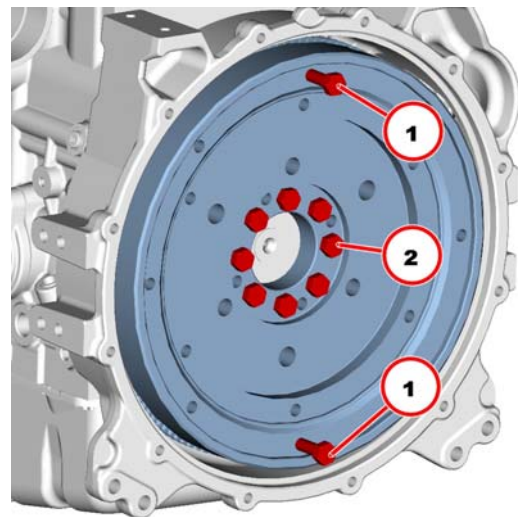
Safety information / User information



#### a. Removing the Flywheel



MAE12590



MAE7680

MAE7690

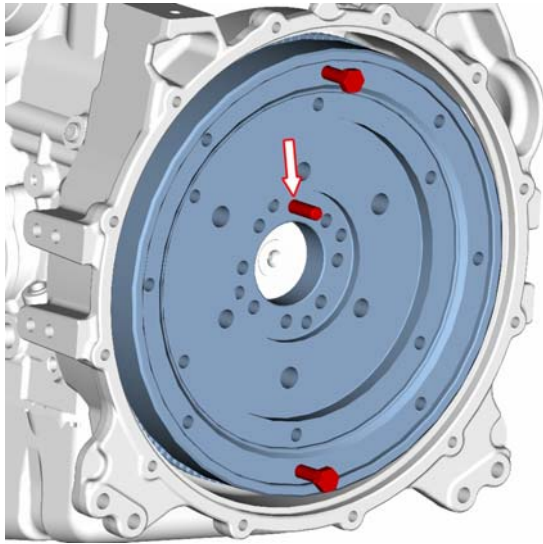
1	Flywheel
2	Ring gear
3	Screw
4	Bearing bush ( <b>Engine 492-2140 &amp; 505-6559</b> )

5. Hold the crankshaft at the central screw.
6. Screw in auxiliary screws (1).
7. Unscrew screws (2).
8. Remove flywheel using auxiliary screws.
9. Visually inspect the components.

#### b. Installing the Flywheel



## Disassembly and Assembly



MAE7700

1. Insert self-made guide pin (arrow)



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

2. Mount flywheel using auxiliary screws.



MAE7710



### Attention:

Renew screws every time they are loosened.

3. Tighten screws alternately.

- Stage 1:



30 Nm

4. Tighten screws with rotation angle disc.

- Stage 2:



60 Nm

- Stage 3:



30 Nm

5. Remove guide pin.

6. Unscrew auxiliary screws.



### c. Technical Data

#### *Tightening specifications*

ID no.	Name:	Screw Type	Notes / Remark	Value
A05 001	Flywheel on crankshaft		Stage 1: Use new screws. Oiled screws.	30 Nm
A05 001	Flywheel on crankshaft		Stage 2:	60°
A05 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.



## 5.7 V-BELT PULLEY ADD-ON

### 5.7.1 Removing and Installing the Sensor Wheel (W 05-07-01)



Standard tools



Locking agent

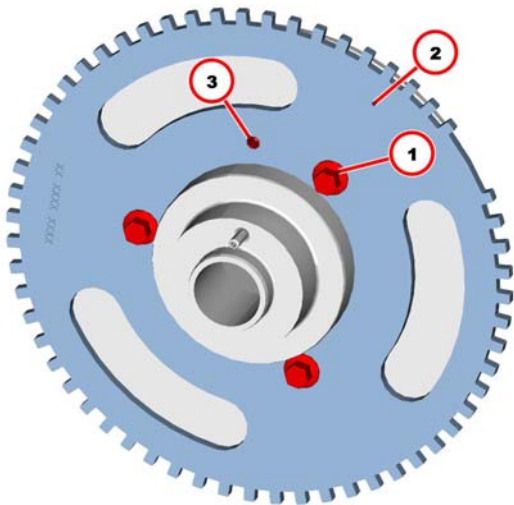


**Engine 492-2140 & 505-6559:**  
Safety information / User information



**Engine 492-2140 & 505-6559:**  
The removal and installation of the sensor wheel with V-belt pulley is described in the following.  
The procedure is the same for the removal and installation of the sensor wheel with V-ribbed pulley.

#### a. Removing the Sensor Wheel



MAE7720

1. Remove ribbed / V belt pulley.



Module 05

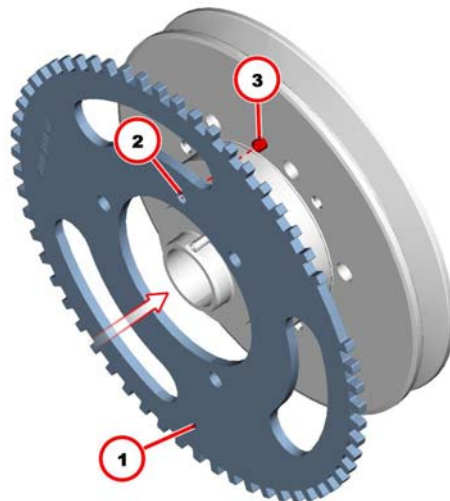
2. Unscrew screws (1).
3. Remove sensor wheel (2).
4. Remove clamping pin (3).

#### b. Installing the Sensor Wheel



MAE7730

1. Press in the new clamping pin (1) to the end stop.



MAE7740

2. Position sensor wheel (1).



Bore (2) and clamping pin (3) must be in alignment.

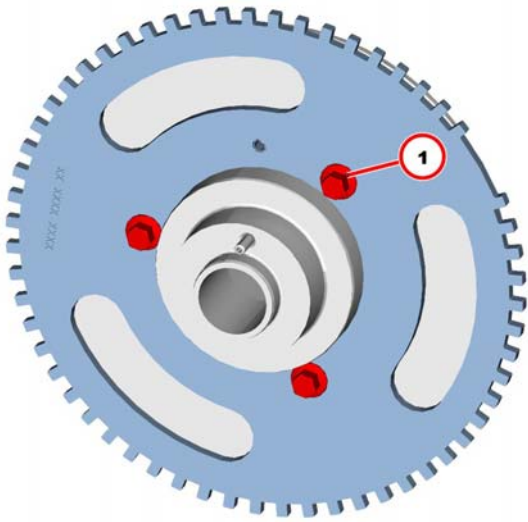
3. Press in sensor wheel (1).



**Attention!**

Do not deform or damage sensor wheel.





MAE7750

4. Insert screws with locking agent.
5. Tighten screws (1).



13 Nm

6. **Engine:** Install V-belt pulley.



Module

05



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name:	Screw Type	Notes / Remark	Value
A05 032	Sensor wheel on V-belt pulley		Insert with engine manufacturer's locking agent.	13 Nm



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



**5.7.2 V-belt Pulley (W 05-90-13)**

**Engine 492-2140 & 505-6559**



Standard tools



Safety information / User information

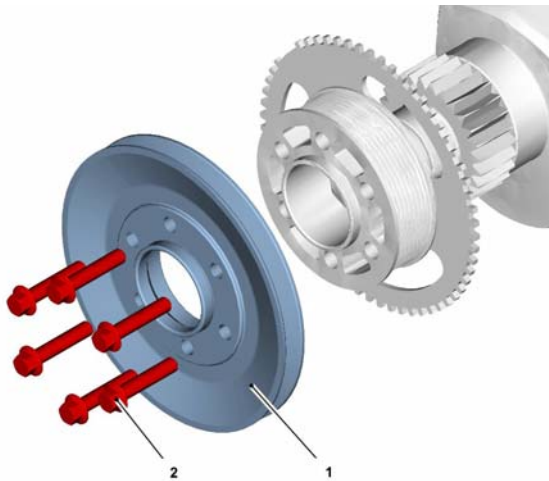
**Engine 492-5092 & 505-7229**



Standard tools

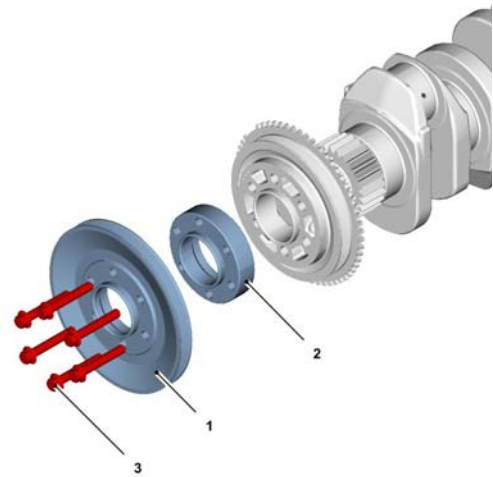


Safety information / User information



MAE7760

1	V-belt pulley	
2	Hexagon head screw	60 Nm



MAE12600

1	V-belt pulley	
2	Adapter	
3	Hexagon head screw	



## 5.8 CYLINDER HEAD

### 5.8.1 Check the Compression Pressure (W 08-00-01) (Engine 492-2140 & 505-6559)

When injectors are removed



Standard tools

Special tools:

- Compression pressure tester - PN 01899034
- Torx tool set - PN 461-1692
- Torque handle - PN 449-2475
- Insert holder - PN 461-1695
- Tool kit - PN 01899403
- Fuel hose clamp - PN 01899404
- Connector - PN 02992017
- Diagnostic tool SerDia 2010
- Protective gloves
- Protective glasses



Safety information / User information



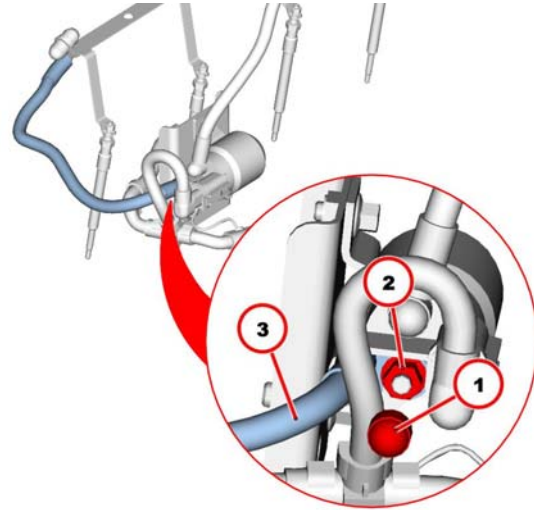
#### Danger!

Under no circumstances should the rail be closed completely.  
No electrical wiring should be left exposed.  
Prevent sparking.  
Wear protective gloves and glasses!



Perform the compression check on all cylinders consecutively.  
The following work procedure is described for cylinder 1 as an example.  
Repeat this procedure for the remaining cylinders.  
Read out error memory of the motor control timer with SERDIA.

### a. Checking the Compression Pressure



MAE7770



#### Attention!

Danger of short circuit.

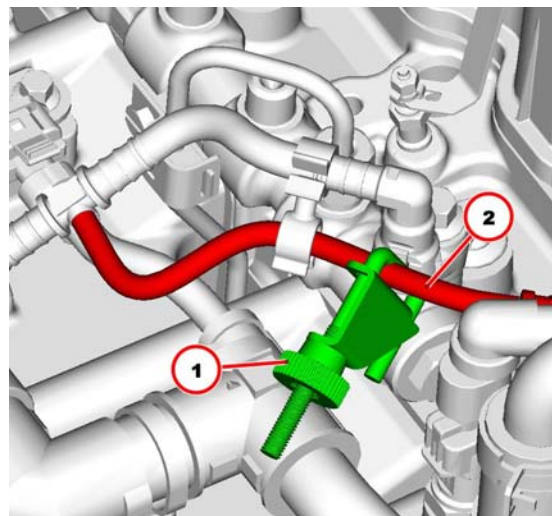
1. Disconnect the battery.
2. Remove injectors.



Module

19

3. Remove protective cap (1).  
- Preheating relay
4. Unscrew nut (2).
5. Remove connection line (3).
6. Place connection line (3) to one side.



MAE7780

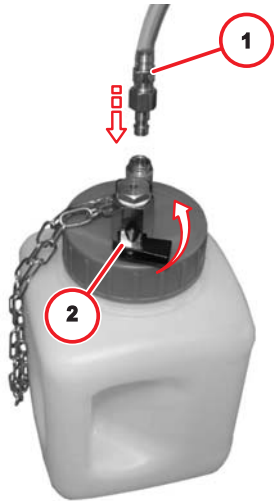


7. Attach fuel hose clamp (1) to return line (2).



**Attention!**

Do not damage return line.  
Do not lay return line on hot parts.

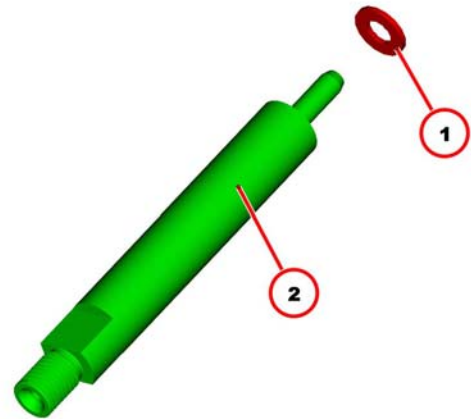


MAE7790



15 Nm

Do not damage sealing cone.



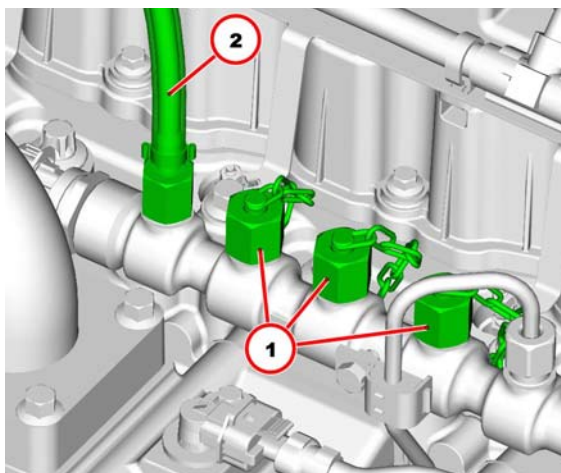
MAE7810

8. Mount hose pipe (1) on collecting vessel.
9. Open breather valve (2) in the direction of the arrow.
10. Position collecting vessel securely.



**Attention!**

Secure collecting vessel against overturning, heat and damage.



MAE7800

11. Screw on caps (1).



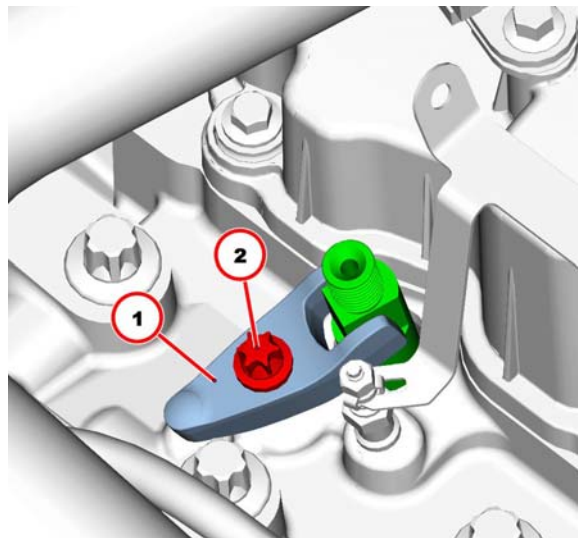
20 Nm

12. Mount hose line (2).  
- Tighten union nut.



The following work procedure is performed on every cylinder.

13. Mount sealing ring (1).
14. Insert connector (2).



MAE7820



Attach clamping claw turned at an angle of 180°.

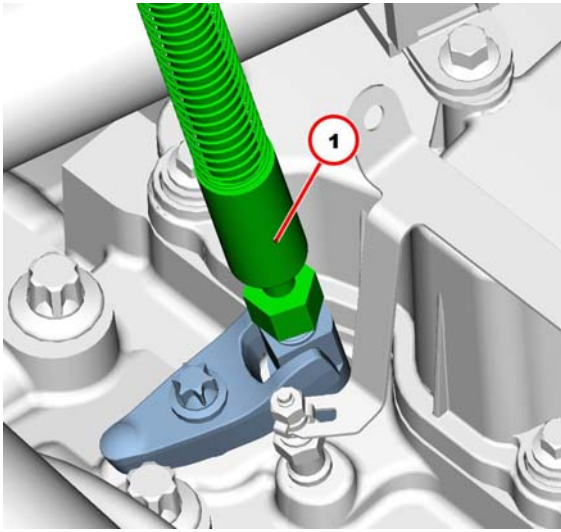
15. Mount clamping shoe (1).
16. Tighten screw (2).



30 Nm



## Disassembly and Assembly



MAE7830

17. Connect adapter (1) to connector.



MAE7840

18. Screw together the compression checker and the adapter<sup>o</sup>(1).

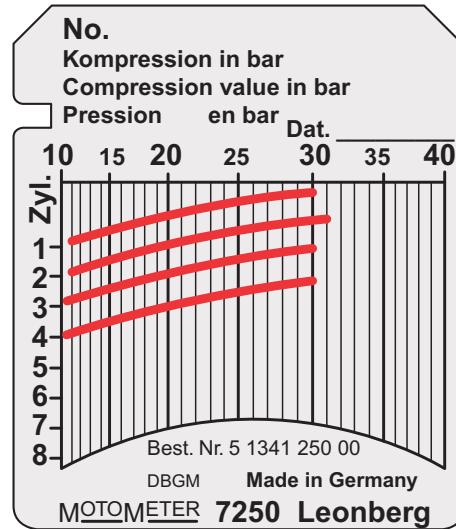
19. Connect the battery.

20. Turn over engine with starter.

21. Check compression.



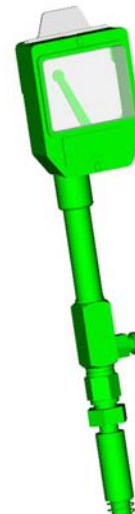
25 - 30 bar (2500 - 3000 kPa)



MAE6460

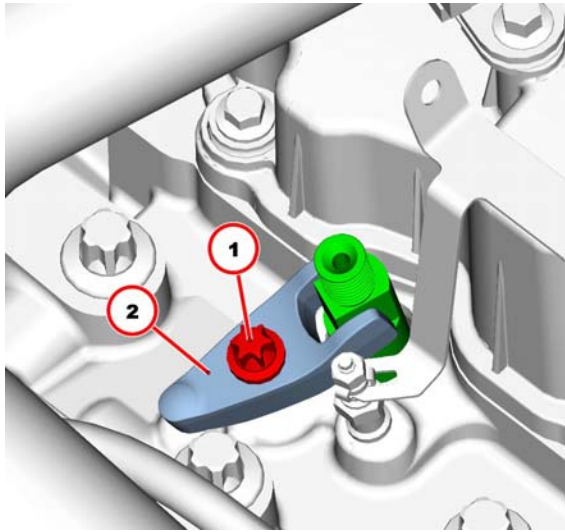


The measured compression pressure depends on the starting speed during the measuring process and the altitude of the engine installation site. Therefore, limit values cannot be determined exactly. The compression pressure measurement is only recommended as a reference measurement of all cylinders of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



MAE6470

22. Remove the compression pressure tester.

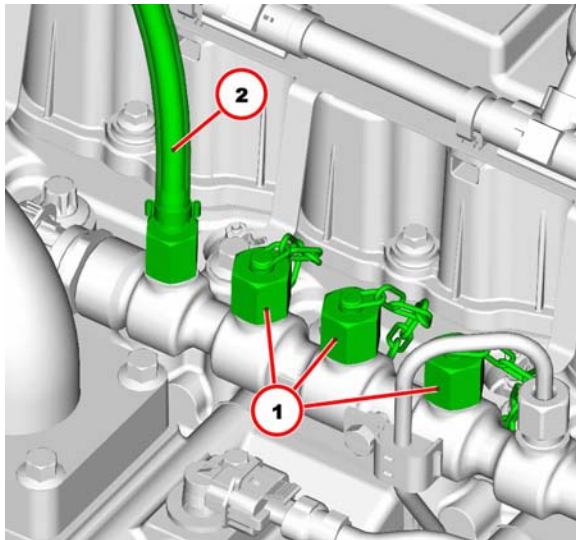


MAE7850

23. Unscrew screw (1).
24. Remove clamping shoe (2).
25. Remove connector.
26. Remove sealing ring.



Perform the compression check on the next cylinder.

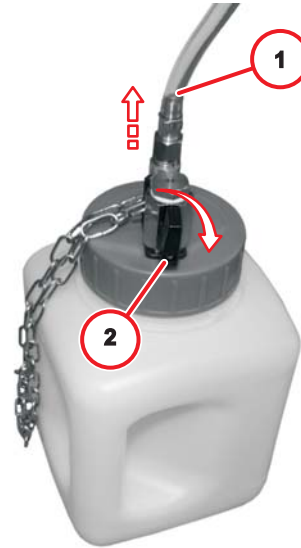


MAE7860

27. Disconnect the battery.
28. Unscrew the caps (1).
29. Remove hose pipe (2).



Collect draining fuel and dispose of according to regulations.



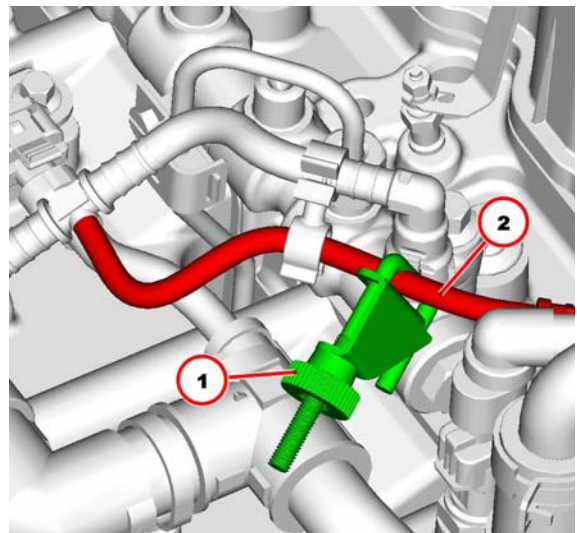
MAE7870

30. Disconnect hose pipe (1) from collecting vessel.
31. Close breather valve (2) in the direction of the arrow.
32. Position collecting vessel securely.
33. Remove collecting vessel and dispose of fuel in an environmentally-friendly way.



**Attention!**

Observe the safety regulations and national specifications for handling fuels.



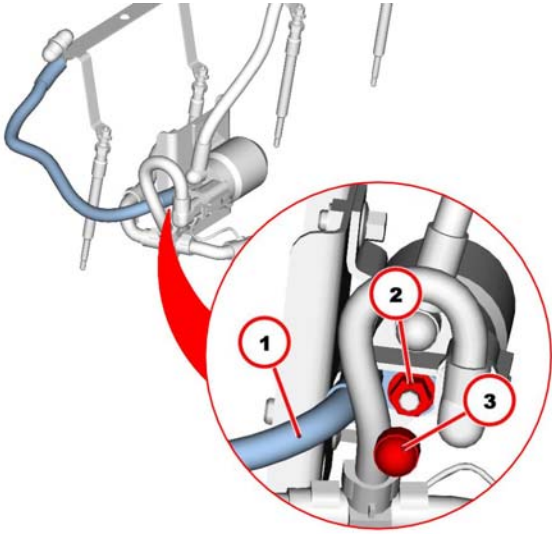
MAE7880

34. Release fuel hose clamp (1) from return line (2).



## Disassembly and Assembly

35. Remove fuel hose clamp<sup>o</sup>(1).



MAE7890

36. Install the injectors.



Module

19

37. Mount connecting pipe (1).

38. Tighten nut (2).



1.5 Nm

39. Mount protective cap (3).

40. Connect the battery.




**b. Technical Data**
**Testing and Setting Data**

ID no.	Name	Additional Information	Value
P00 51	Compression pressure	Insert with engine manufacturer's locking agent.	25 - 30 bar (2500 - 3000 kPa)

**Tightening specifications**

ID no.	Name	Screw Type	Notes / Remark	Value
A08 007	Connection piece on cylinder head, clamping claw			30 Nm
A48 073	Connection piece on cylinder head, clamping claw	Nut, M6		1.5 Nm



## 5.9 CYLINDER HEAD COVER

### 5.9.1 Removing and Installing the Cylinder Head Cover (W 08-01-01)



Standard tools

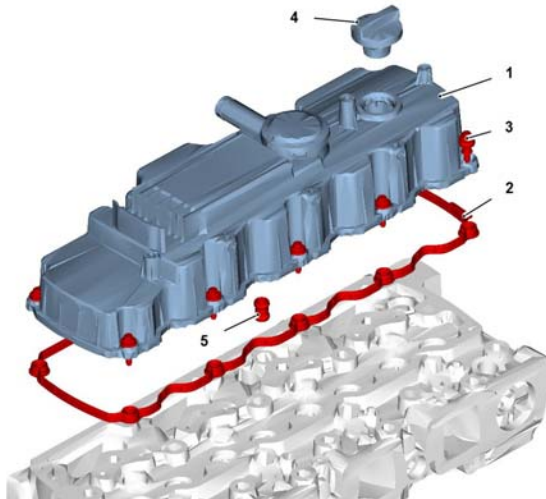


Fitting compound



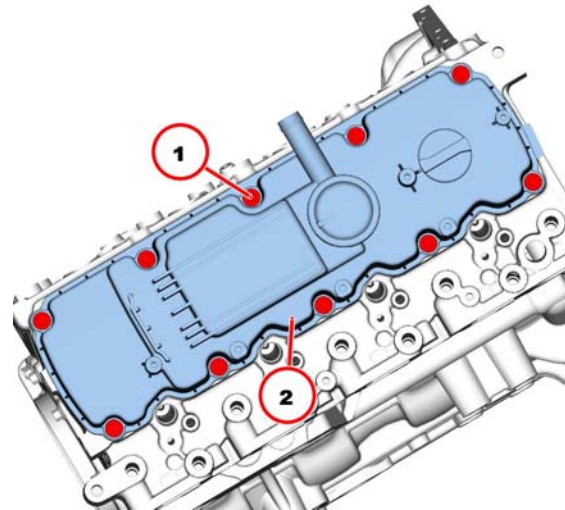
Safety information / User information

#### a. Removing Cylinder Head



MAE7900

1	Cylinder head cowling
2	Seal
3	Screw
4	Filler lock
5	Plug piece



MAE7910

1. Removing the crankcase breather.

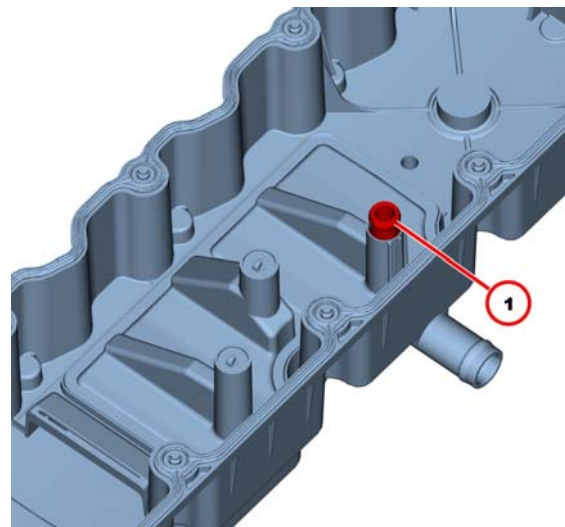


Module

01

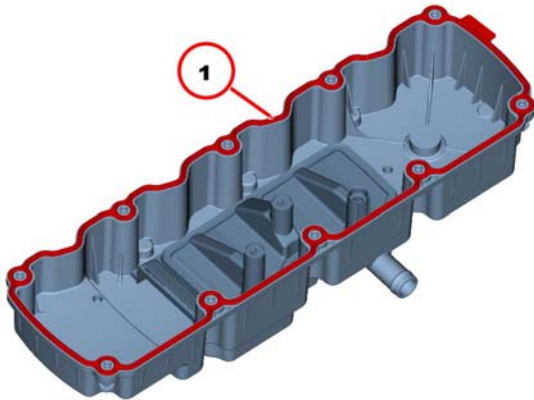
2. Unscrew screws (1).

3. Remove cylinder head cowling (2).



MAE7920

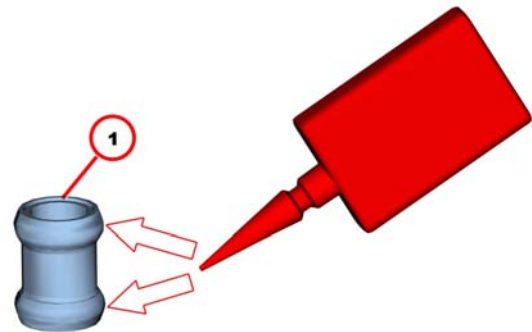
4. Pull out plug element (1).



MAE7930

5. Remove gasket (1).
6. Visually inspect the components.

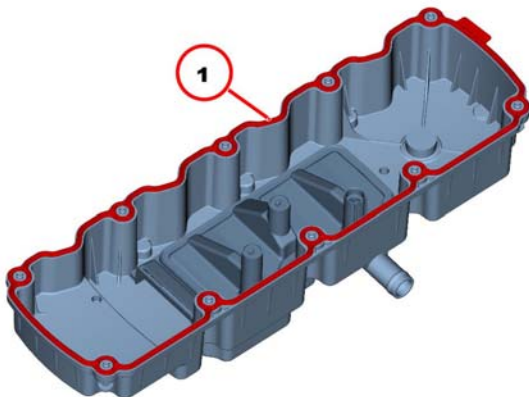
**b. Installing Cylinder Head Cover**



MAE7950

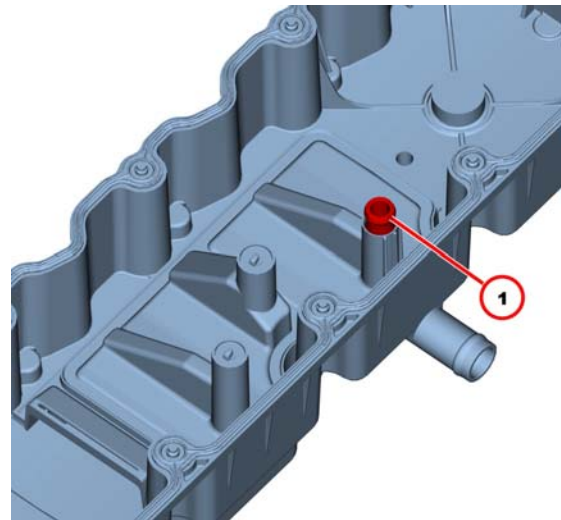
2. Coat new plug piece (1) with mounting compound.

**b. Installing Cylinder Head Cover**



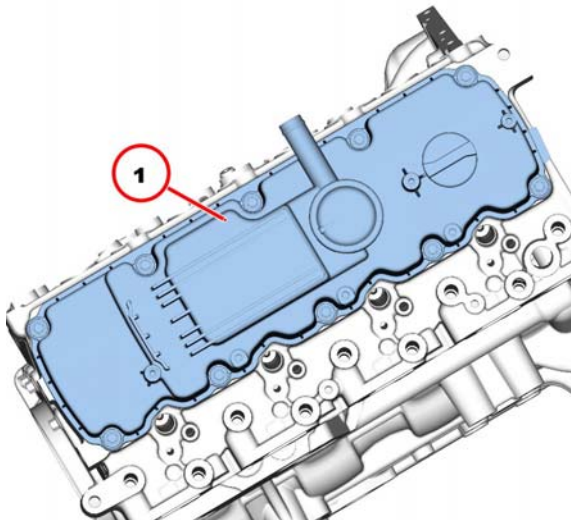
MAE7940

1. Mount new gasket (1).



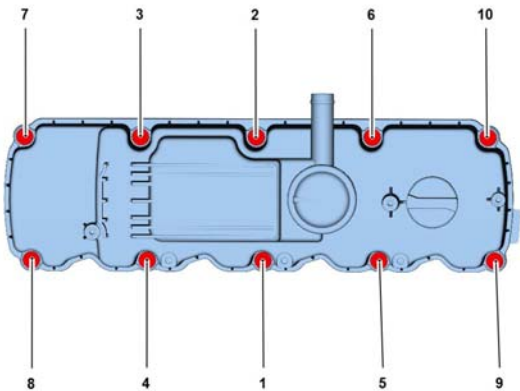
MAE7960

3. Insert new plug piece (1).



MAE7970

4. Mount cylinder head cover (1).



MAE7980

5. Tighten the screws according to the tightening sequence.



8.5 Nm

6. Install crankcase breather.



Module

01

**c. Technical Data*****Tightening specifications***

ID no.	Name	Screw Type	Notes / Remark	Value
A08 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.



## 5.10 GEARCASE

### 5.10.1 Renewing the Crankshaft Sealing Ring (Opposite side to Flywheel) (W 09-01-01)



Standard tools

Special tools:

- Pricker - PN 449-2485

- Assembly lever - PN 449-2488

- Assembly tool - PN 449-2504



- Self-tapping screw

- Washer



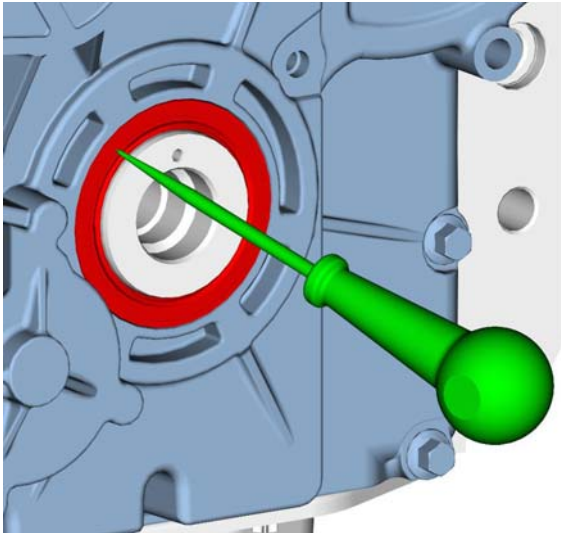
Safety information / User information



#### Attention!

The crankshaft sealing ring is coated in wax at the factory. Do not lubricate the crankshaft sealing ring.

#### a. Removing the Crankshaft Sealing Ring



MAE6480

1. Remove ribbed / V belt pulley.



Module

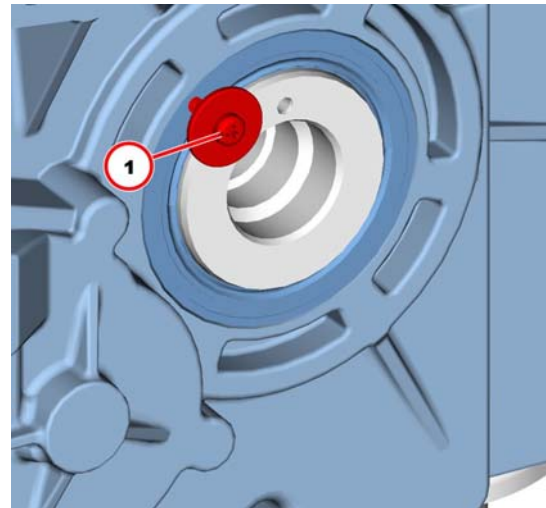
05

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



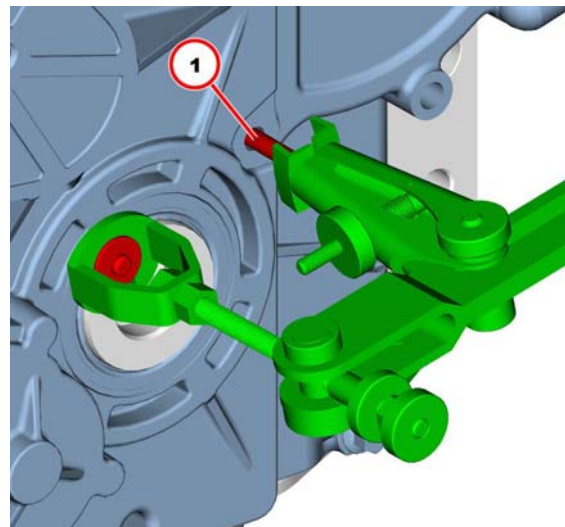
#### Attention!

Do not damage the gear case cover and crankshaft.



MAE7990

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



MAE3990

4. Tighten auxiliary screw (1).

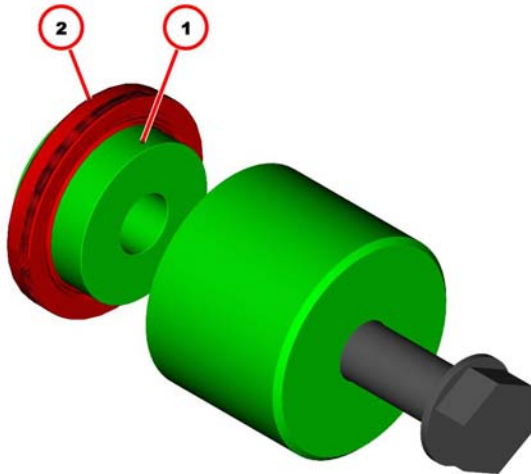


Do not use installation levers on the gearcase.

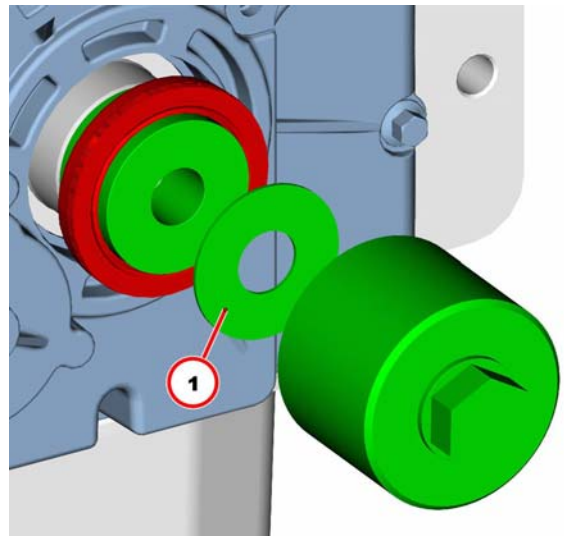
5. Pull out the crankshaft sealing ring with assembly lever.
6. Visually inspect the crankshaft sealing ring running surface.
7. Visually inspect all running surfaces.



**b. Installing the Crankshaft Sealing Ring**



MAE4100



MAE4120

1. Place new crankshaft sealing ring on guide (1).



**Attention!**

The crankshaft sealing ring is coated in wax at the factory. Do not lubricate the crankshaft sealing ring.



The sealing lip (2) faces the crankcase.

- Repair Stage:

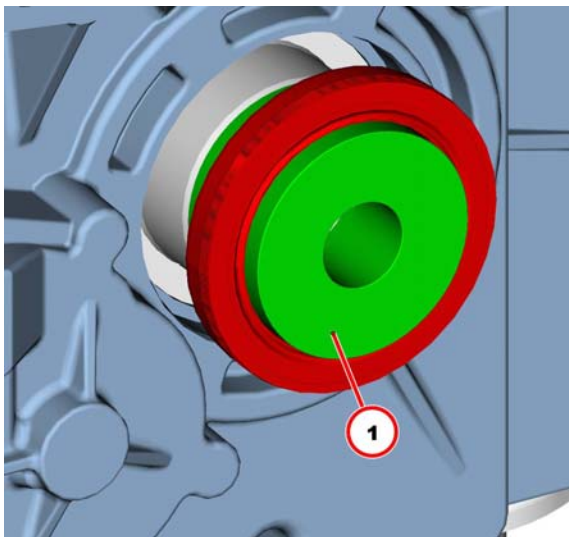


If there is a groove on the crankshaft journal, it is possible to fit the crankshaft sealing ring in a further installation depth (repair stage).

3. Mount shim (1).

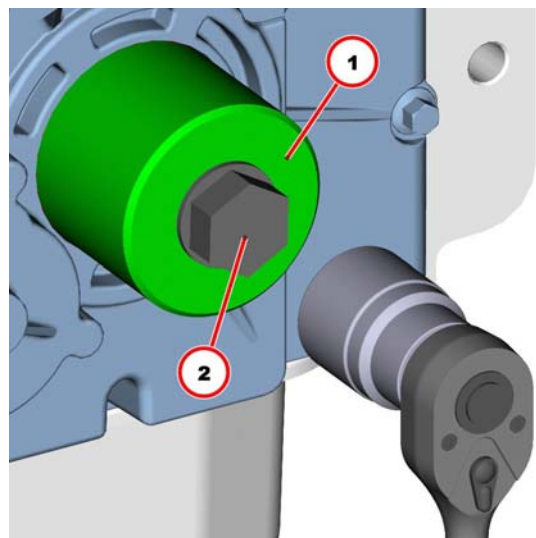


The installation depth is determined by the assembly tool.



MAE4110

2. Attach guide (1).



MAE4130

4. Mount assembly sleeve (1).
5. Fasten screw (2).
6. Tighten the screw (2) to the end stop.



## Disassembly and Assembly



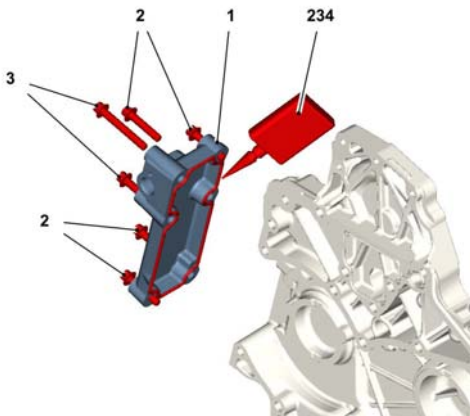
The installation depth is determined by the assembly tool.

7. Unscrew screw (2).
8. Remove assembly tool.
9. Install ribbed / V belt pulley.



Module 05

### 5.10.2 Cover (W 09-90-37)



MAE4640



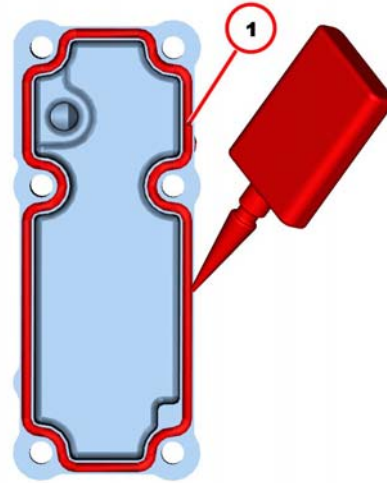
Standard tools



Packing compound

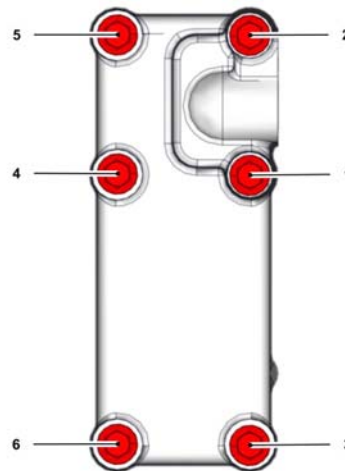


Safety information / User information



MAE4650

1. Apply sealing compound (1) evenly on the sealing surface.
2. Apply the sealing compound evenly. Thickness approximately 3.5 mm



MAE4660

3. Tighten all screws according to the tightening sequence.

1	Console	
2	Hexagon head screw	30 Nm
3	Hexagon head screw	30 Nm
234	Packing compound	



See graphic for tightening sequence.





**5.10.3 Removing and Installing the Control Valve (W 09-17-01)(Engine 492-2140 & 505-6559)**



Standard tools  
Special tools  
Disassembly tool - PN 461-1696



Fitting compound  
Ultra 5 Moly



Safety information / User information  
Service Bulletin



**Danger!**  
Hot components!  
Danger of burns!  
Let the engine / components cool down sufficiently (to at least ambient temperature).

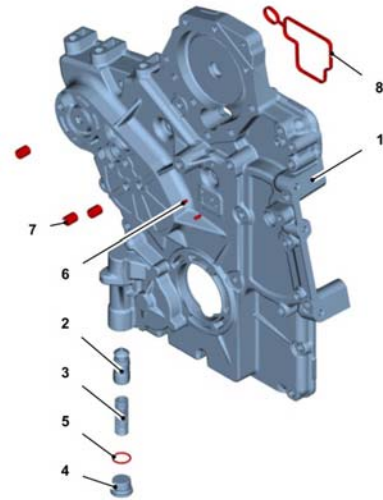


**Attention!**  
Ensure utmost cleanliness for all work.  
Remove any paint residue and dirt particles before disassembly.  
Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.  
Close all connections immediately after opening with new, clean plugs/caps.  
Do not remove plugs/caps until immediately before assembling.



Collect leaking operating substances in suitable vessels and dispose of according to regulations.  
Observe the appropriate operating instructions for emptying and filling the engine.

**a. Removing the Control Valve (W 09-90-63)**



MAE13390

1	Gear case
2	Valve piston
3	Valve spring
4	Screw plug
5	O-ring
6	Clamping pin
7	Threaded insert
8	Profile seal



Use new round sealing ring.

Position 8

Profile Seal

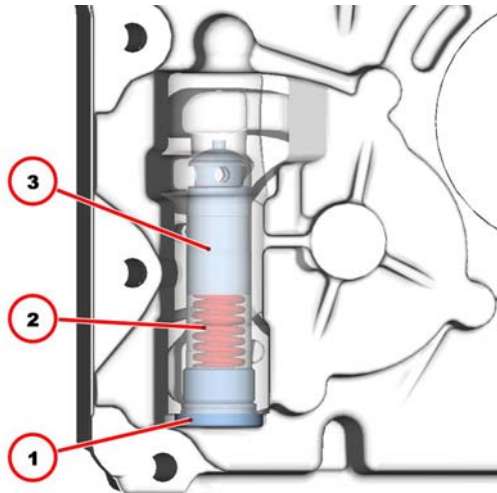


Module

09



## Disassembly and Assembly



MAE4670



### Danger!

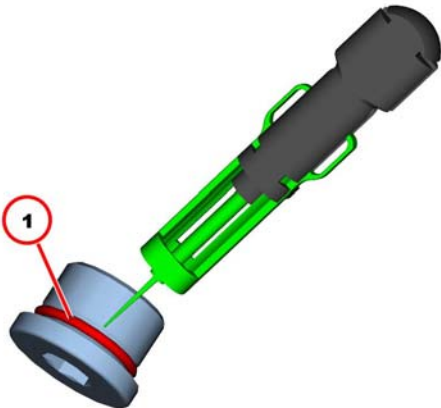
Hot parts!

Risk of injury!

High spring tension!

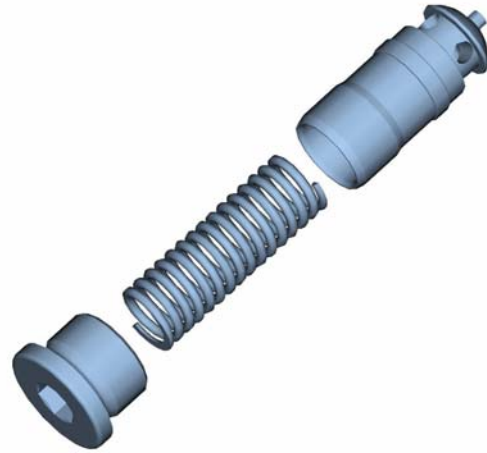
Components can spring out during removal!

1. Unscrew locking screw (1).
2. Remove valve spring (2).
3. Remove valve piston (3).



MAE4680

4. Remove the o-ring (1) with the disassembly tool.
5. Visually inspect the component.



MAE6490

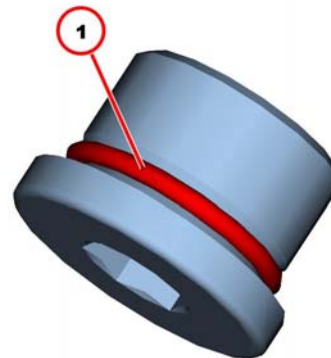
6. Clean components.
7. Visually inspect the components.



Renew components if worn.

Service Bulletin - 0199-99-11066

### b. Installing the Control Valve



MAE4690

1. Clean sealing surfaces.
2. Coat new round sealing ring slightly with mounting compound.



### Attention!

Do not twist or overtighten the o-ring.

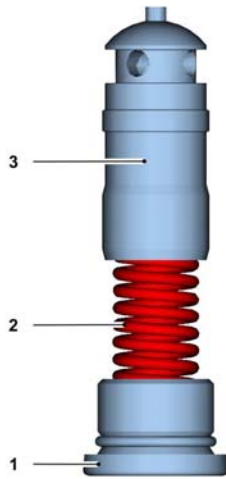
Do not damage the o-ring!



Use a suitable assembly aid.

Provide protection for sharp edges.

3. Insert new o-ring (1).

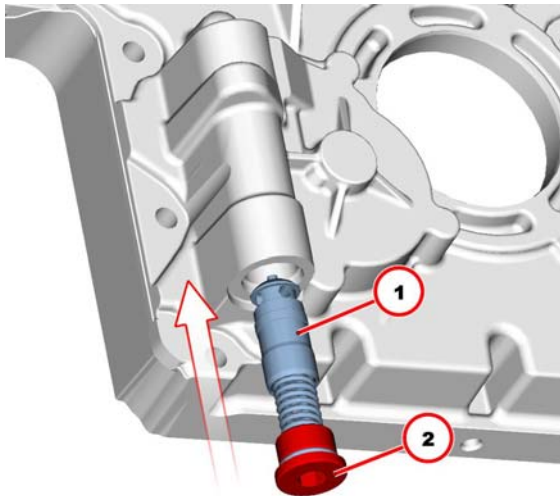


MAE4700

4. Assemble control valve.



Please observe assembly sequence!



MAE4710



**Danger!**  
High spring tension!

5. Insert control valve (1) completely in the direction of the arrow.
6. Screw on locking screw (2).
7. Tighten screw plug (2).



60 Nm



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name:	Screw Type	Notes / Remark	Value
A09 097	Locking screw on gear case		Use new round sealing ring	60 Nm



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



## 5.11 LUBRICATING OIL COOLER

### 5.11.1 Removing and Installing the Lubricating Oil Cooler (W 15-02-01)



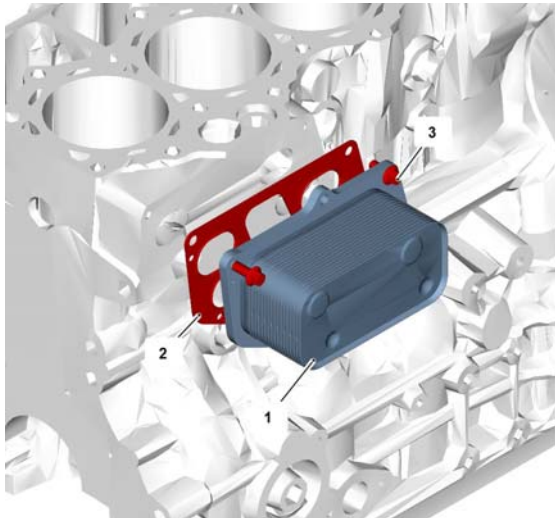
Standard tools



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

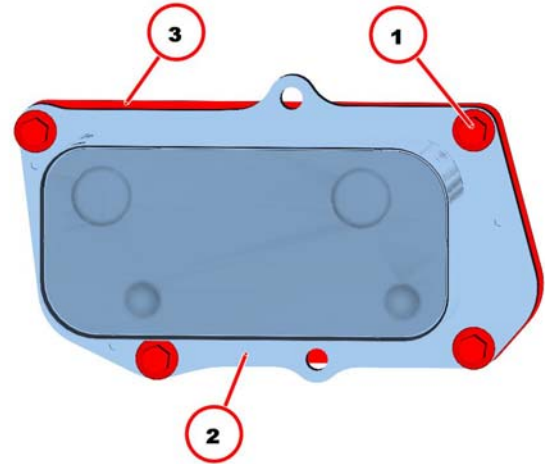
The appropriate operating manual should be observed for emptying and filling the engine.

#### a. Removing the Lubrication Oil Cooler



MAE4720

1	Lubricating oil cooler
2	Seal
3	Hexagon head screw



MAE4730

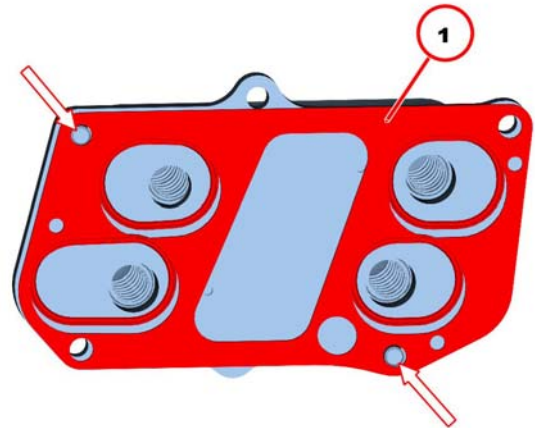
1. Unscrew all screws (1).
2. Remove lubricating oil cooler (2).
3. Remove gasket (3).



Collect draining lubricating oil and dispose of properly.

4. Visually inspect the components.

#### b. Installing the Lubricating Oil Cooler



MAE4740

1. Visually inspect the components.
2. Clean sealing surfaces.
3. Turn in screws (arrows).

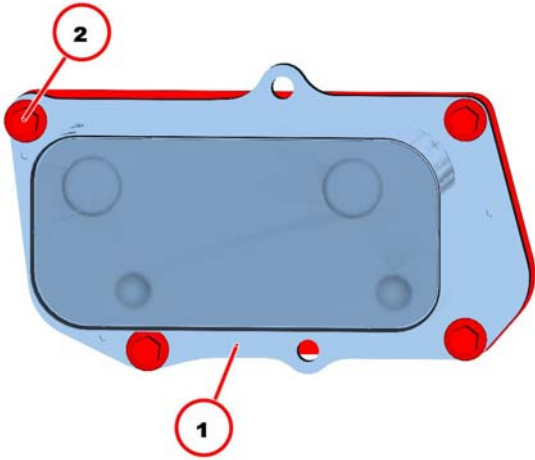


M8x20-10.9



## Disassembly and Assembly

4. Fasten new seal (1) on lubricant oil cooler housing with screws.



MAE4750

5. Mount lubricating oil cooler (1).
6. Tighten screws (2).
7. Tighten all screws (2) alternately.



30 Nm

**c. Technical Data*****Tightening specifications***

ID no.	Name	Screw Type	Notes / Remark	Value
A15 051	Oil cooler housing on crankcase		Use new round sealing ring	30 Nm



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



## Disassembly and Assembly

### 5.12 LUBRICATING OIL FILTER ADD-ON

#### 5.12.1 Installing the Lubricating Oil Filter (W 15-90-38)



Standard tools



Safety information / User information



#### Attention!

Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

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.

Observe the appropriate operating instructions for emptying and filling the engine.

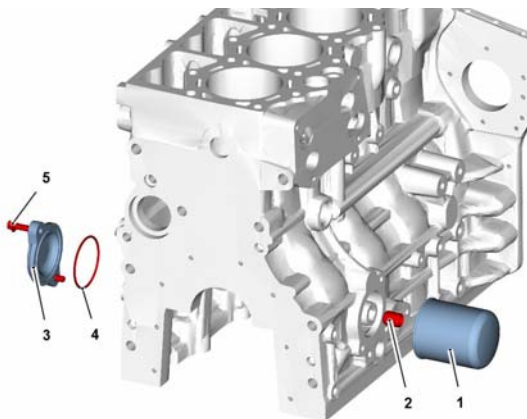
1	Interchangeable filter	12 Nm
2	Threaded bush	40 Nm
3	Cover	
4	O-ring	
5	Hexagon head screw	30 Nm



Use new round sealing ring.

Position 2

Screwed in to the end stop.



MAE4760





## 5.13 OIL SUCTION PIPE

### 5.13.1 Removing and Installing the Oil Suction Pipe (W 16-01-01)

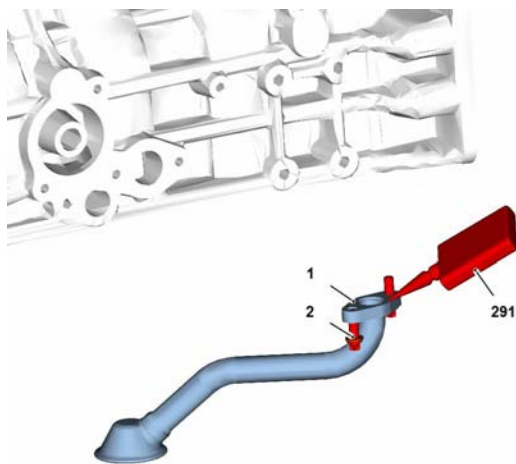


Standard tools



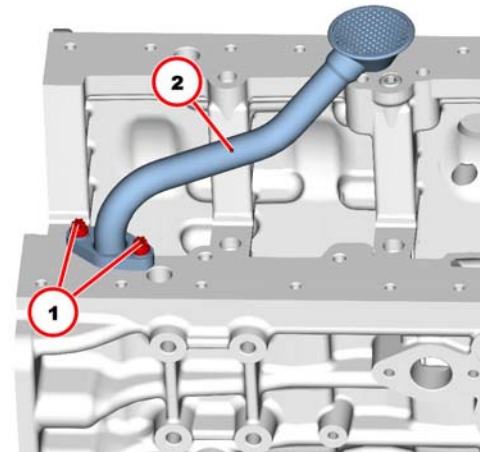
Packing Compound  
Loctite 5900

#### a. Removing the Oil Suction Pipe



MAE4770

1	Oil suction pipe
2	Torx screw
291	Packing compound



MAE4780

1. Remove lubricating oil pan.

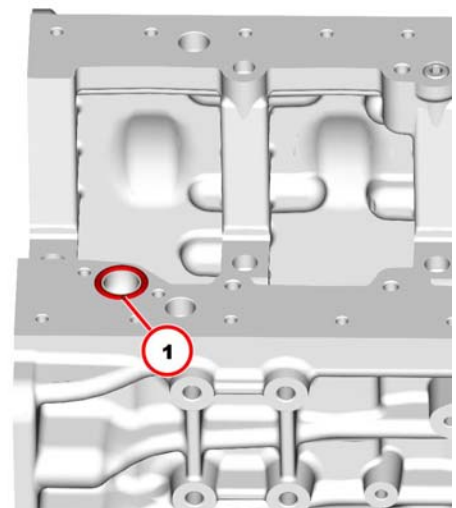


Module

02

2. Unscrew screws (1).
3. Remove oil suction pipe (2).
4. Visually inspect the component.

#### b. Installing the Oil Suction Pipe

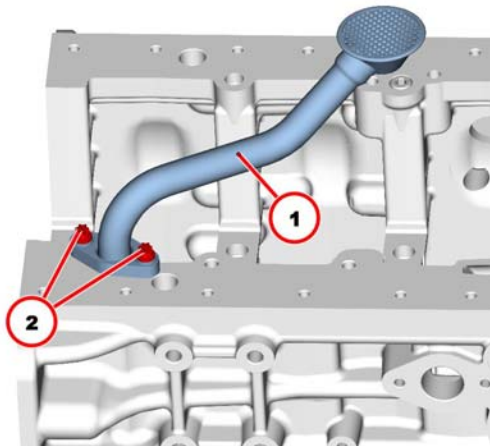


MAE4790

1. Clean sealing surface.
2. Apply sealing compound (1) evenly on the sealing surface.



## Disassembly and Assembly



MAE4800

3. Clean sealing surface.
4. Install oil suction pipe (1).
5. Tighten screws (2).



22 Nm

6. Install lubricating oil pan.



Module

02

**c. Technical Data*****Tightening specifications***

ID no.	Name	Screw Type	Notes / Remark	Value
A16 015	Oil suction pipe on crankcase	M8x25-10.9		22 Nm



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



## 5.14 LUBRICATING OIL PIPE

### 5.14.1 Removing and Installing the Lubricating Oil Line (W 16-04-01)



Standard tools

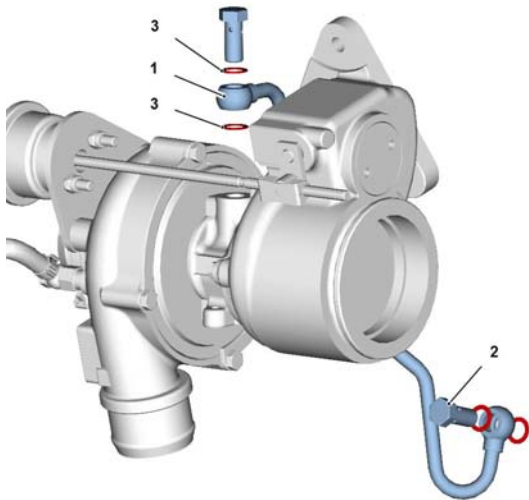


Safety information / User information

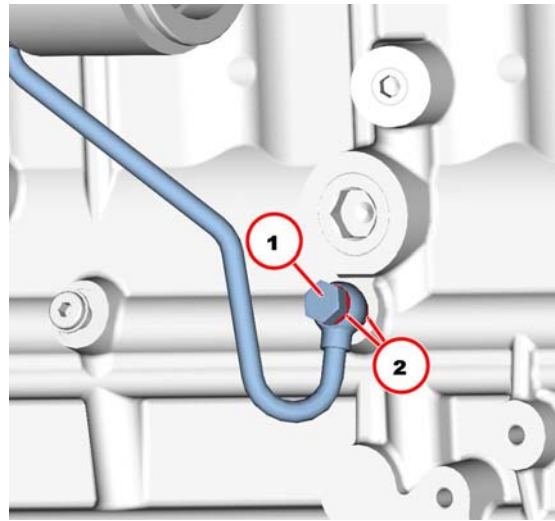


Collect leaking operating substances in suitable vessels and dispose of according to regulations.  
Observe the appropriate operating instructions for emptying and filling the engine.

#### a. Removing the Lubricating Oil Line

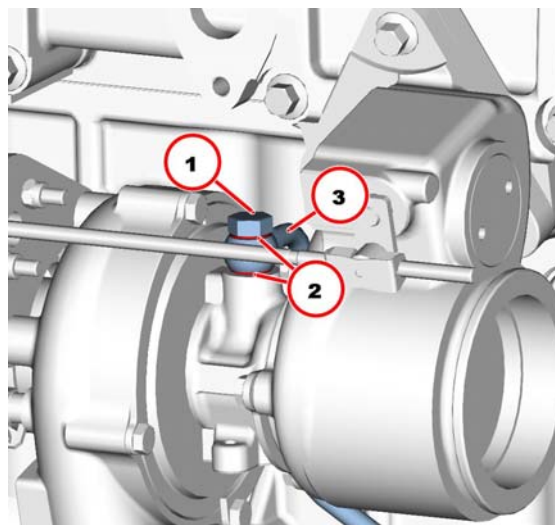


MAE4810



MAE4820

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



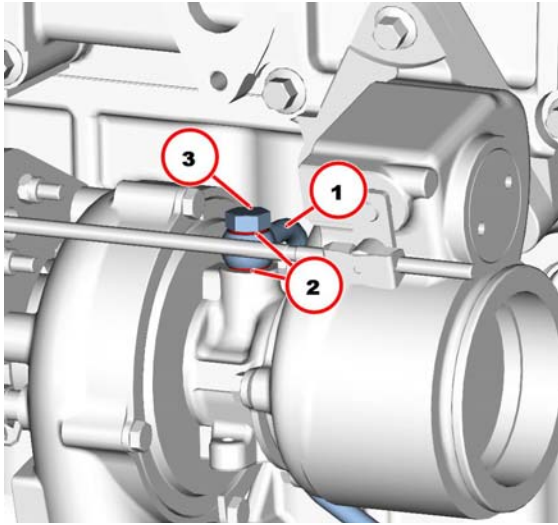
MAE4830

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

1	Lubricating oil line
2	Hollow screw
3	Sealing ring

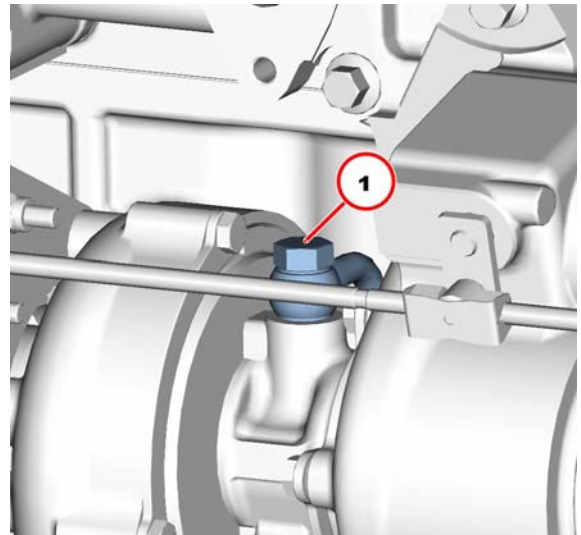


**b. Installing the Lubricating Oil Line**



MAE4840

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

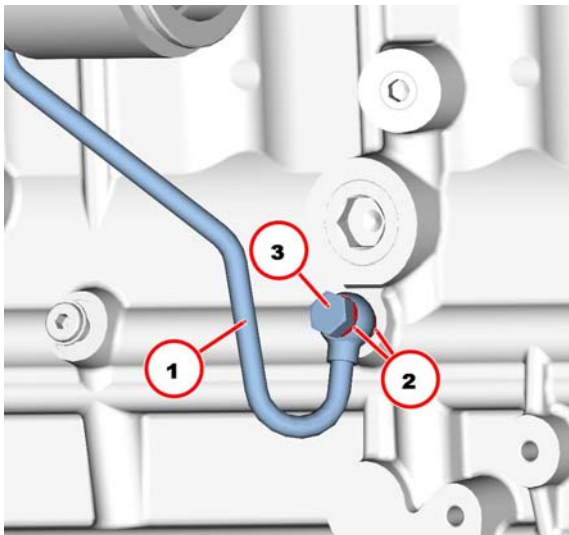


MAE4860

9. Tighten hollow screw (1).



**Attention!**  
Install tension-free.



MAE4850

5. Clean sealing surfaces.
6. Mount lubrication oil line (1).
7. Mount sealing rings (2).
8. Tighten hollow screw (3).



**Attention!**  
Install tension-free.



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw Type	Notes / Remark	Value
A43 047	Lubricating oil pipe on exhaust turbocharger	Hollow screw	Use new sealing rings	18 Nm
A43 048	Lubricating oil line on crankcase	Hollow screw	Use new sealing rings	18 Nm



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



**5.14.2 Removing and Installing the Lubricating Oil Return Line (W 16-05-01)**



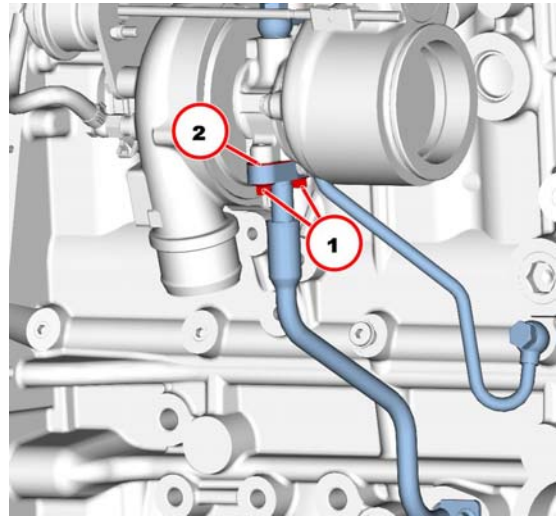
Standard tools  
Special tools  
- Disassembly tool - PN 461-1696



Fitting compound  
Ultra 5 Moly

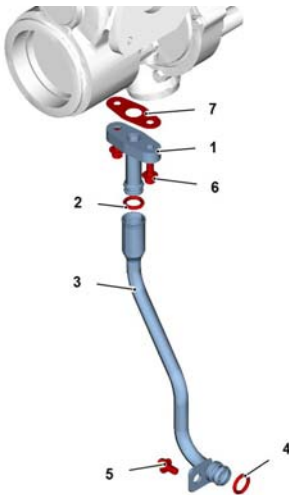


Collect leaking operating substances in suitable vessels and dispose of according to regulations.  
Observe the appropriate operating instructions for emptying and filling the engine.



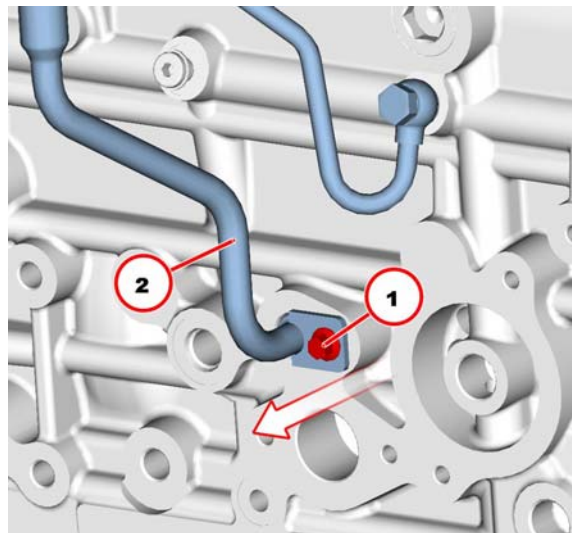
MAE4900

**a. Removing the Oil Return Line**



MAE4890

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



MAE4910

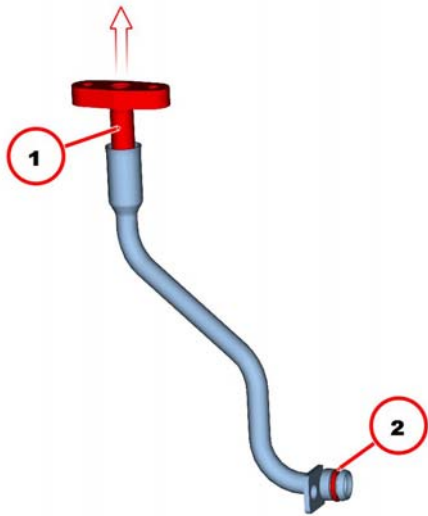
3. Unscrew screw (1).
4. Pull out oil return line (2) in direction of arrow.

1	Fastening flange
2	O-ring
3	Oil return line
4	O-ring
5	Hexagon head screw
6	Hexagon head screw
7	Seal



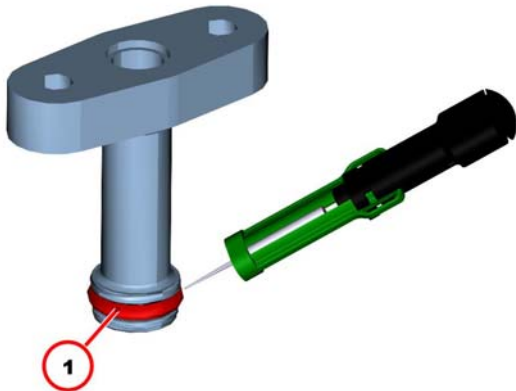
## Disassembly and Assembly

### b. Mounting the Oil Return Line



MAE4920

5. Remove flange (1) in direction of arrow.
6. Remove round sealing ring (2) with disassembly tool.
7. Visually inspect the component.



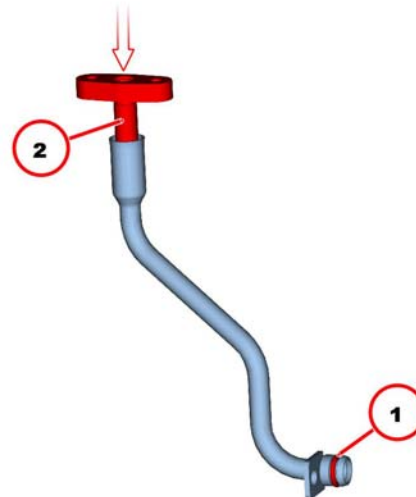
MAE4930

8. Remove the o-ring (1) with the disassembly tool.
9. Visually inspect the component.



MAE4940

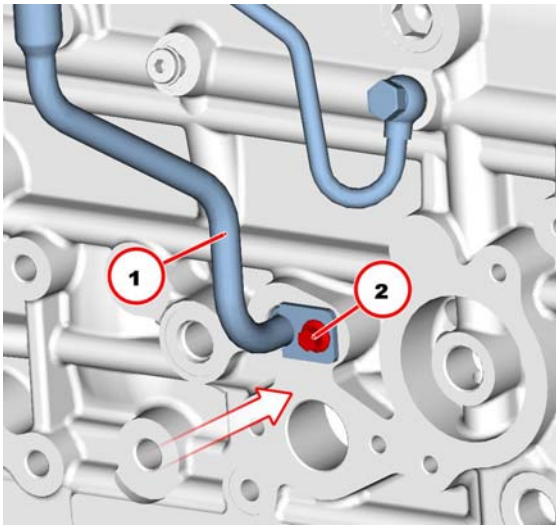
1. Clean sealing surfaces.
2. Lightly coat new round sealing ring with engine manufacturer's mounting compound.
3. Insert new o-ring (1).



MAE4950

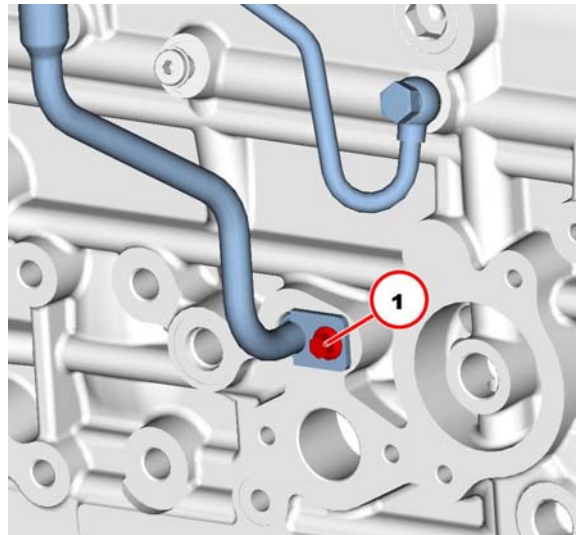
4. Clean sealing surfaces.
5. Lightly coat new round sealing ring with engine manufacturer's mounting compound.
6. Insert new o-ring (1).
7. Insert flange (2) in direction of arrow.





MAE4960

8. Clean sealing surfaces.
9. Mount oil return pipe (1).
10. Insert oil return line (1) in direction of arrow.
11. Fasten screw (2).



MAE4880

16. Tighten screws (3).

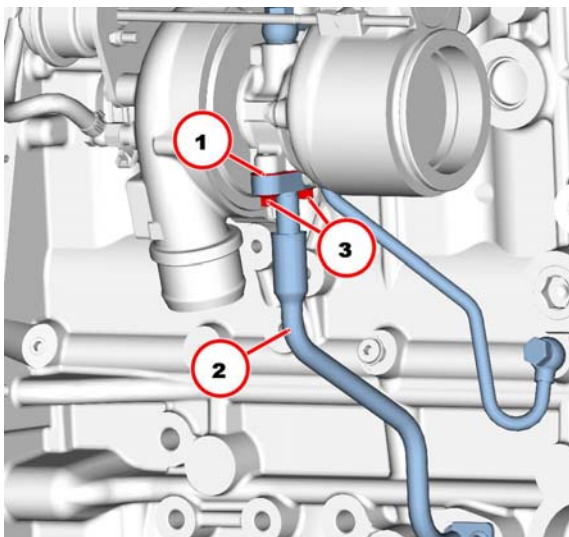


8.5 Nm



**Attention!**

Install tension-free.



MAE4870

12. Clean sealing surfaces.
13. Mount gasket (1).
14. Mount oil return pipe (2).
15. Tighten screws (3).



8.5 Nm



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw Type	Notes / Remark	Value
A43 044	Oil return line on exhaust turbocharger			8.5 Nm
A43 046	Oil return line on crankcase			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.



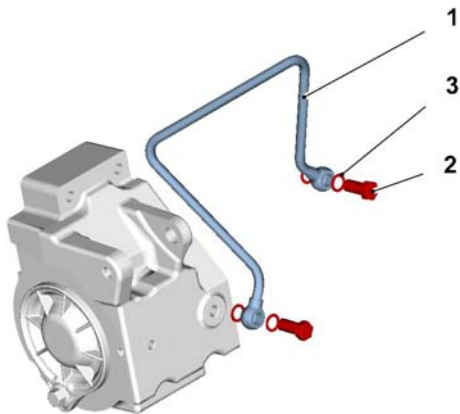
### 5.14.3 Lubricating Oil Line (W 16-90-32)



Standard tools  
Special tools  
Disassembly tool



Safety information / User information



MAE4970

1	Lubricating oil line	
2	Hollow screw	30 Nm
3	Sealing rings	



**Attention!**

Ensure that the installation location is free from faults.

Install line without tension!

Use new sealing rings.





### 5.15 HIGH-PRESSURE PUMP

#### a. Removing the High-Pressure Pump

#### 5.15.1 Removing and Installing the High-Pressure Pump (W 17-01-04)



Standard tools:  
- Separating tool

Special tools:  
- Disassembly tool - PN 461-1696  
- Special wrench - PN 449-2496

**Engine 492-2140 & 505-6559**

- Plugs/caps - PN 01899368

**Engine 492-5092 & 505-7229**

- Plugs/caps - PN 449-2493



- Mirror  
- Marker pen, waterproof, permanent  
- Mounting compound - Multipurpose Grease



Safety information / User information



**Danger!**

Do not carry out work on the fuel system when the engine is running.

The fuel system is under high pressure - Danger of death.

The fuel pressure can continuously remain up to several 100 bar even after stopping the engine.

Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



**Attention!**

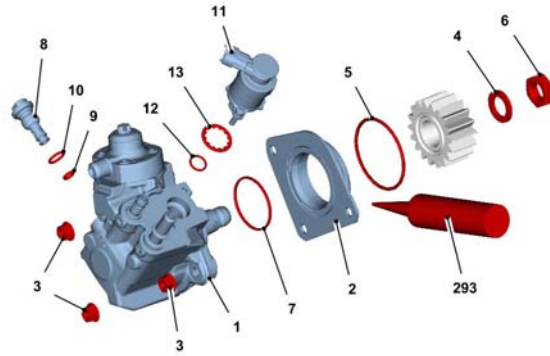
Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

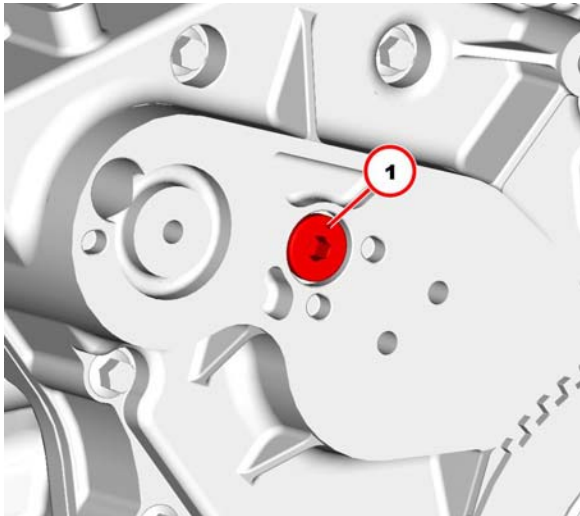
Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.




MAE4980

1	High-pressure pump
2	Spacer
3	Hexagonal nut
4	Washer
5	O-ring
6	Hexagonal nut
7	O-ring
8	Overflow valve
9	O-ring
10	O-ring
11	Flow control valve
12	O-ring
13	Seal
293	Mounting compound




MAE4990

1. Unlock cable plug and remove.
2. Remove high-pressure line.
3. Remove fuel pipes.

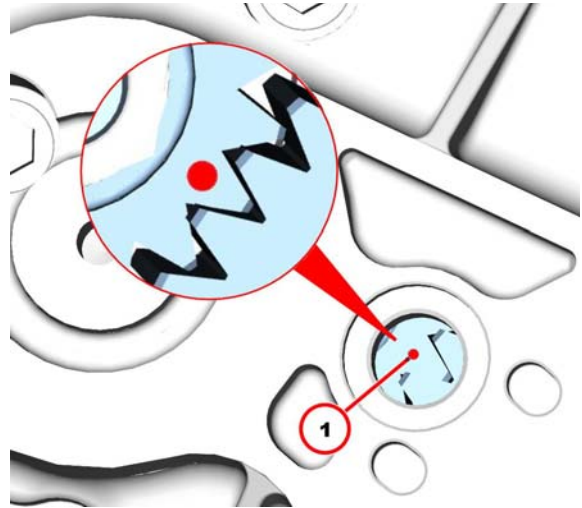
 Module 21

4. Unscrew locking screw (1).
5. Remove sealing ring.

 Module 09

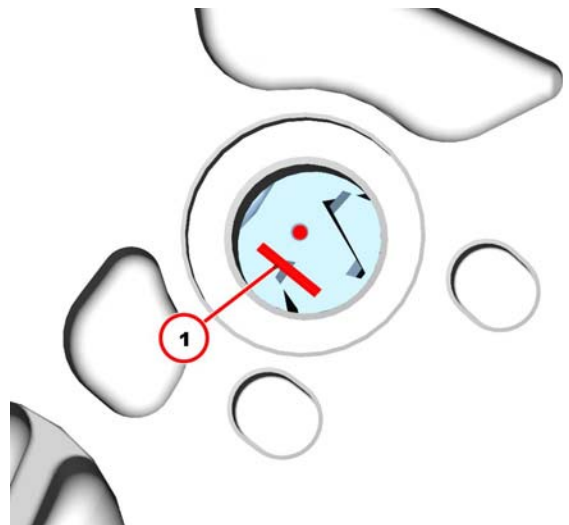
6. Install turning gear / locking device.

 Module 44, 49



MAE9830

7. Turn crankshaft in engine direction of rotation until marking is visible.  
(1) Marking high-pressure pump gear wheel.



MAE9840

8. Apply help marking (1).  
High-pressure pump gear wheel and intermediate gear

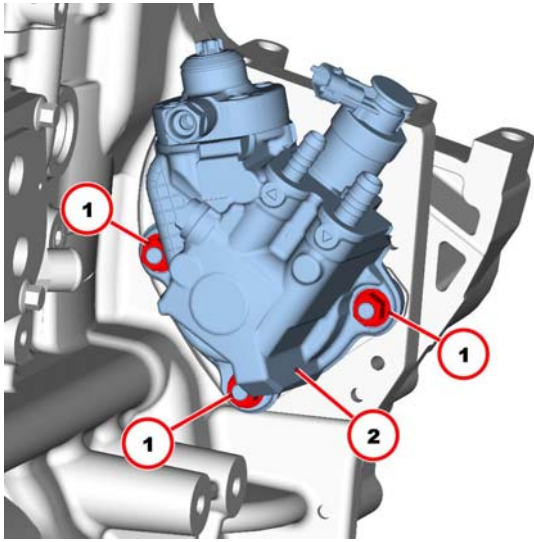


**Attention!**

Do not turn the crankshaft any more!



## Disassembly and Assembly



MAE9850

9. Unscrew nuts (1).



### Attention!

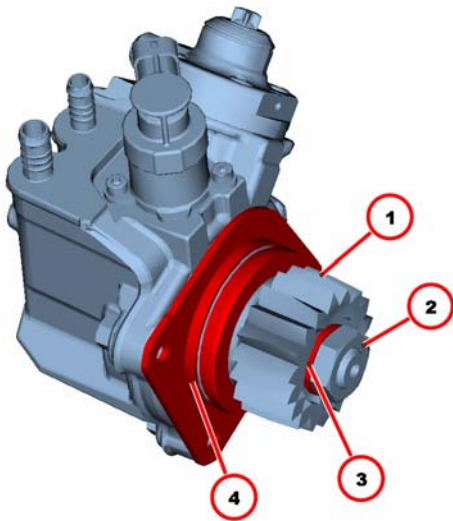
Do not twist the high-pressure pump.  
Do not twist the spacer.  
Do not damage the components.

10. Remove high-pressure pump (2).



### Attention!

Do not turn the crankshaft any more!



MAE9860



### Attention!

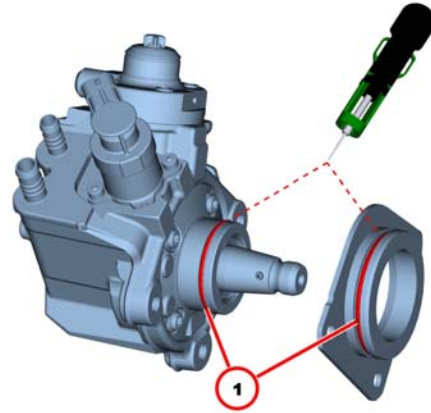
Do not damage the high-pressure pump gear wheel.



**Engine 492-2140 & 505-6559:** Use aluminium protective jaws.

**Engine 492-5092 & 505-7229:** Use a suitable tool.

11. Hold high-pressure pump gear wheel (1). Clamp it in the vice.
12. Unscrew nut (2).
13. Remove washer (3).
14. Pull off high-pressure pump gear wheel (1) with separating tool.
15. Remove spacer (4).
16. Visually inspect the components.



MAE9870

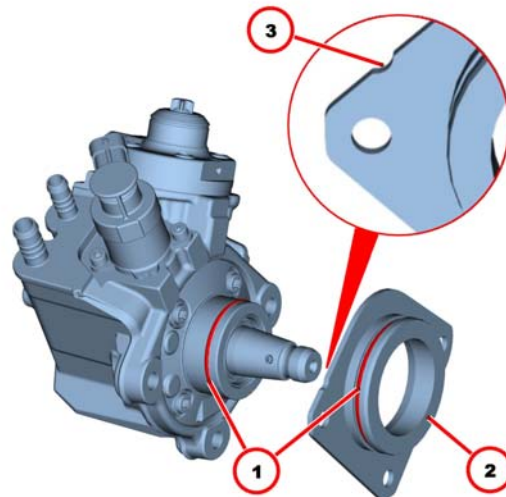
17. Remove the o-rings (1) with the disassembly tool.



### Attention!

All the help marking must be transferred when renewing/changing a part.  
Do not turn the crankshaft any more!

## b. Installing the High-Pressure Pump



MAE9880

1. Clean sealing surfaces.
2. Mount new o-rings (1).



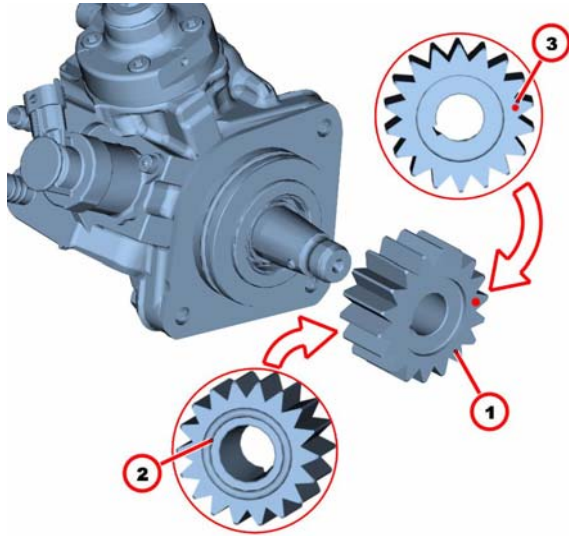
3. Push on spacer (2).



**Attention!**

Ensure that the installation location is free from faults.

Recess (3) is on the fuel supply side.



MAE9890

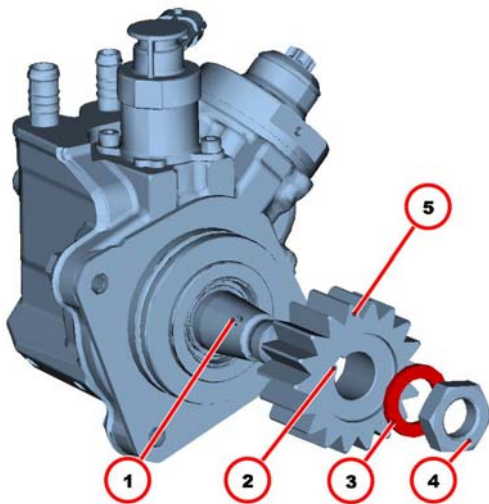
4. Mount high-pressure pump gear wheel (1).



**Attention!**

Pay attention to installation position.

2	Surrounding groove
3	Marking



MAE9900



**Attention!**

Ensure that the installation location is free from faults.

Do not damage the high-pressure pump gear wheel.

The clamping pin (1) must engage in the groove (2).

5. Fit washer (3).

6. Screw on nut (4).

**Engine 492-2140 & 505-6559**



Use aluminium protective jaws.

**Engine 492-5092 & 505-7229**



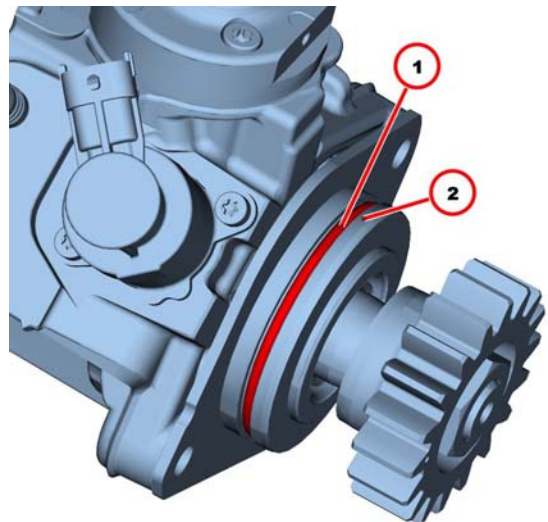
Use a suitable tool.

7. Hold high-pressure pump gear wheel (5). Clamp it in the vice.

8. Tighten nuts (4).



80 Nm



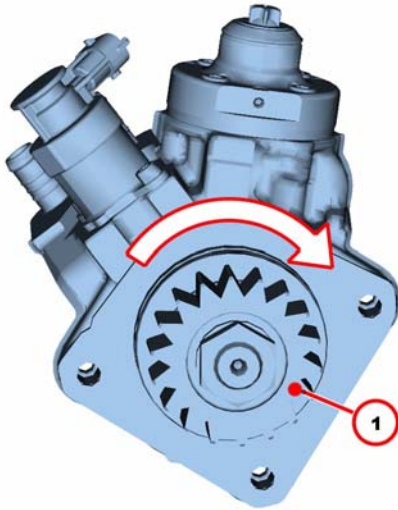
MAE9910

9. Coat the o-ring (1) with fitting compound.

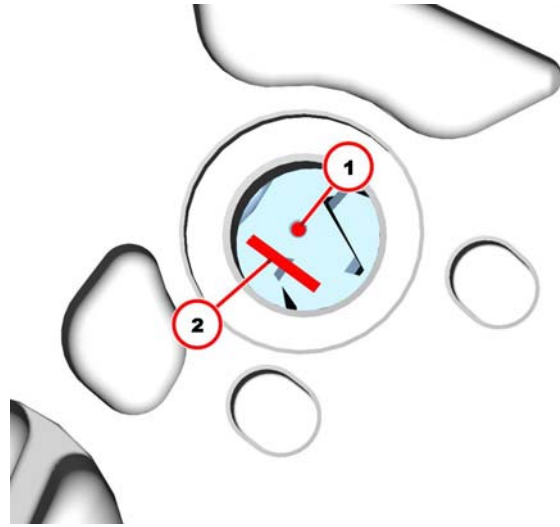


## Disassembly and Assembly

10. Coat bordering surfaces of the spacer (2) with mounting compound.



MAE9920



MAE9930



### Attention!

Observe direction of rotation of the high pressure pump drive!

Observe position of the drive shaft and high-pressure pump.

(1) Marking high-pressure pump gear wheel.



11. Install high-pressure pump.

Markings must be visible.  
Help marking must match.

- (1) Marking high-pressure pump gear wheel
- (2) Help marking high-pressure pump gear wheel and intermediate gear.

View	Direction of rotation
On high-pressure pump drive	Right (clockwise)

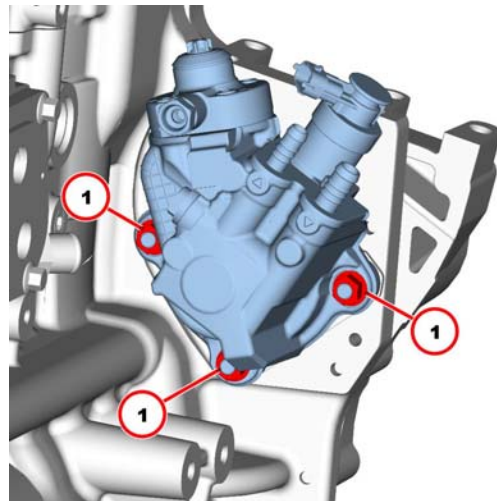


### Attention!

Dry running is not permissible.

Sufficient fuel pressure must be available at the high-pressure pump.

Fuel pressure at the supply: at least 3.2 bar



MAE9940





**Attention!**

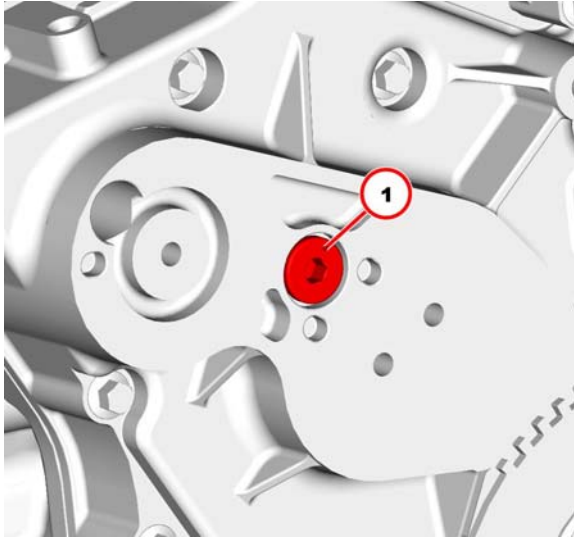
Do not twist the high-pressure pump.

12. Screw on nut (1).

13. Tighten nuts (1).



20 Nm.



MAE9950

14. Mount locking screw (1).



Use a new sealing ring.

15. Tighten screw plug (1).



55 Nm



Module 09

16. Install fuel pipes.

17. Fit new high-pressure line.



Module 21

18. Plug in and lock cable plug.

19. Remove turning gear / locking device.



Module 44, 49



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A17 004	High-pressure pump gear wheel and high-pressure pump drive shaft		Hold high-pressure pump gear wheel.	80 Nm
A17 031	High-pressure pump on crankcase			20 Nm



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



## 5.16 INJECTOR

### 5.16.1 Removing and Installing the Injector (W 19-01-01)



Standard tools

Special tools:

- Diagnostic tool
- SerDia 2010
- Assembly pliers - PN 461-1690
- Torx tool set - PN 461-1692
- Plugs/caps - PN 01899368
- Lever tool - PN 449-2497
- Disassembly tool - PN 461-1696
- Extraction tool - PN 449-2498
- Slide hammer - PN 449-2501



Safety information / User information

Operation manual

Service Bulletin

SerDia manual 2010



#### **Danger!**

Do not carry out work on the fuel system when the engine is running.

The fuel system is under high pressure -  
Danger of death.

The fuel pressure can continuously remain up to several 100 bar even after stopping the engine.

Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



#### **Attention!**

Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts 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.

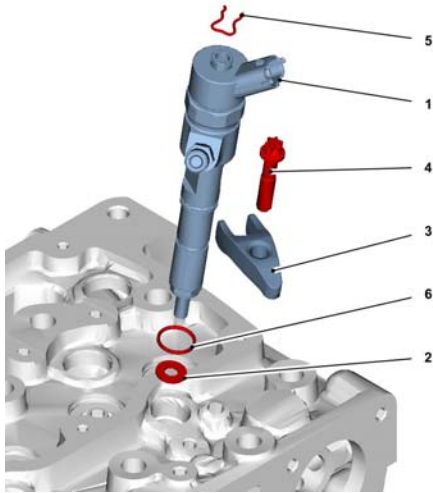
Do not remove plugs/caps until immediately before assembling.

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



## Disassembly and Assembly

### a. Remove Injector



MAE9960

1	Injector
2	Sealing disc
3	Clamping claw
4	Torx screw
5	Clip
6	O-ring



MAE9970

1600 bar	Injection system
----------	------------------



### Attention!

Note assignment of the injector to the cylinder. The injector is assigned by the relevant IMA code (1) to the corresponding cylinder.

The assignment is saved in the control unit.

Each time an injector is replaced/renewed, the correct assignment to the relevant cylinder must be made by transferring the new IMA code in the control unit.

Observe installed injection system!

The IMA codes of the different injection systems are basically different.

The injector calibration depends on the installed injection system.

**Engine 492-2140 & 505-6559:** Reset injector correction values (ZFL).

The exact procedure can be taken from the listed documentation and must be observed.



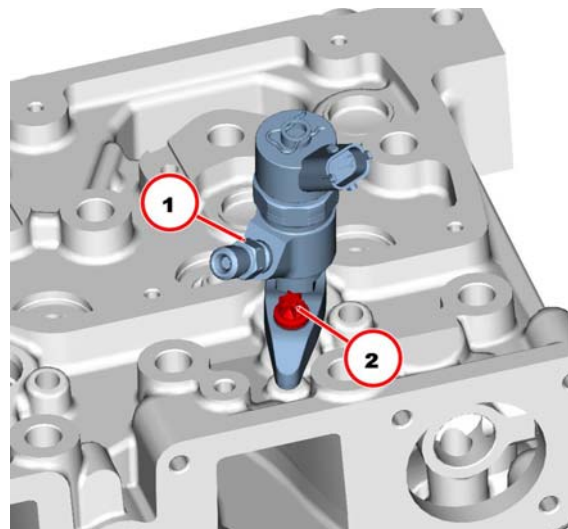
Diagnostic tool SerDia 2010  
SerDia manual



Report back changed data record to engine manufacturer.



Service Bulletin 0199-99-11045



MAE9980




The following work procedure describes the removal and installation of an injector. Proceed in the same way to remove further



injectors.

1. Unlock cable plug and remove.
2. Disconnect the fuel line from the injector.

 Module 21




**Attention!**


Position (1):

The injector must be renewed if the pipe connection is disconnected.

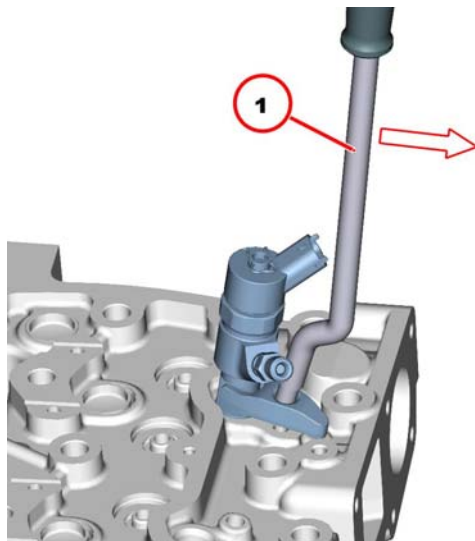
3. Hold pipe connection (1).
4. Remove injection line.

 Module 21

5. **Engine 492-2140 & 505-6559:** Remove connecting rail.
  - Glow plugs

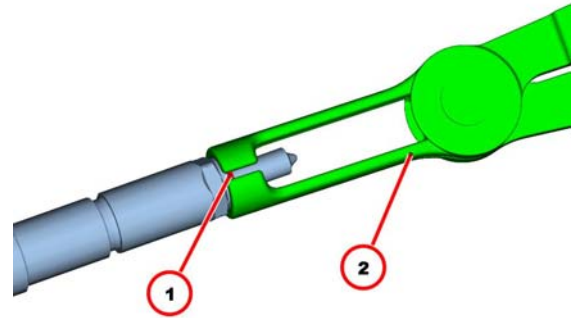
 Module 63

6. Unscrew screw (2).



MAE9990

7. Insert lever tool (1) in the clamping claw.
8. Loosen the injector by moving the lever tool (1) in the direction of the arrow.
9. Remove injector and clamping claw.



MAE10010

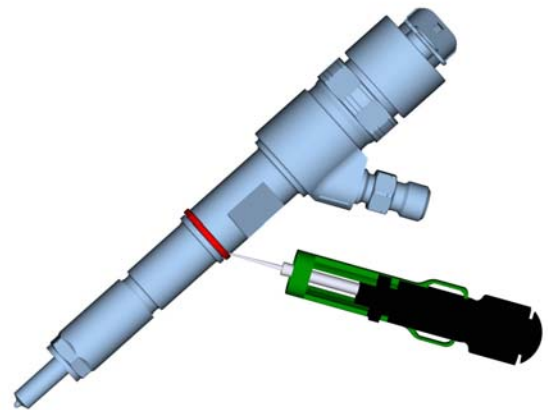


**Attention!**

Do not brush off the nozzle tip of the injector.

Do not damage nozzle head on the injector during disassembly of the sealing disc (1).

10. Grip fixed sealing disc (1) using the assembly pliers (2) and pull off with slight turning movements.



MAE6500



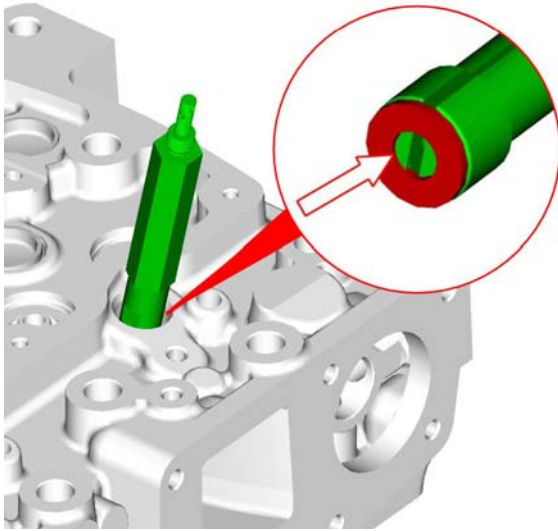
**Attention!**

Do not damage the injector.

11. Remove the round sealing ring (1) carefully from the injector with the disassembly tool.



## b. Removing Fixed Sealing Disc at Cylinder Head

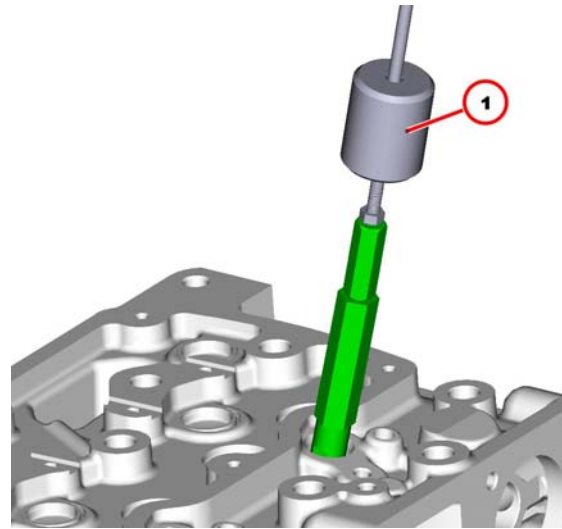


MAE6510

1. Insert extraction device (1).



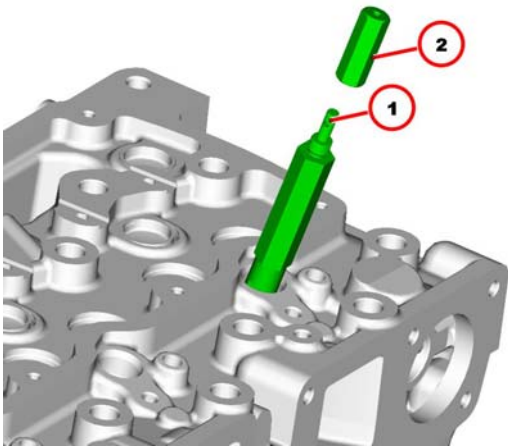
The supports (arrow) must rest in the bore of the sealing disc.



MAE10030

4. Install slide hammer (1) on disassembly device.
5. Pull out fixed sealing disc.

## c. Installing the Injector



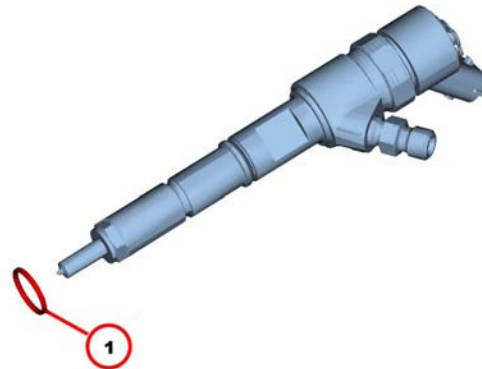
MAE10020

2. Screw in spindle (1) until the sealing disc is fastened on the pull-out device.



Hold puller on hexagon.

3. Install adapter (2) on disassembly device.



MAE10040



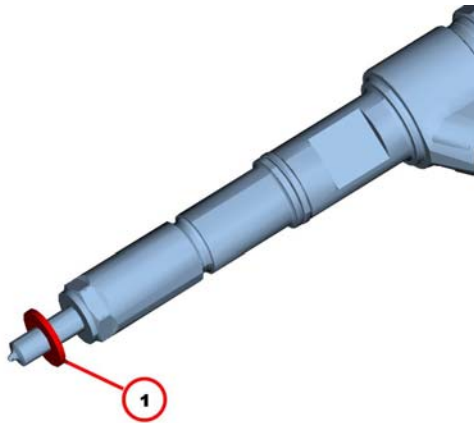
### Attention!

Do not twist or overtighten the o-ring, Do not damage the o-ring.

1. Mount new o-ring (1).



Use a suitable assembly aid. Provide protection for sharp edges.



MAE10050

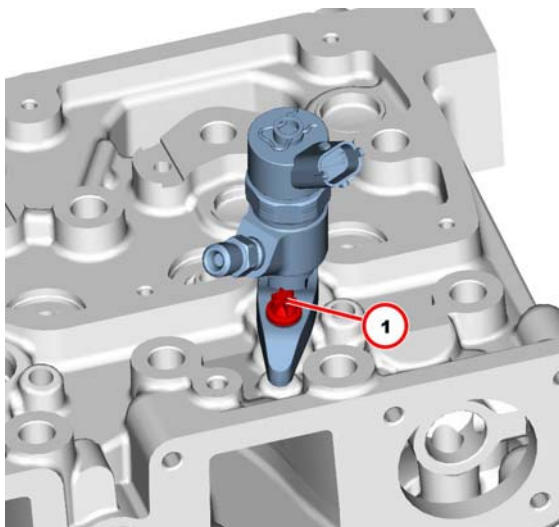
2. Mount new sealing disc (1) on injector.



**Attention!**

Before installing the injector, combustion residue must be cleaned carefully from the bore on the cylinder head.

Suck off dirt particles.



MAE10060



**Attention!**

Note assignment of the injector to the cylinder. Ensure that the installation location is free from faults.

3. Insert injector carefully in the cylinder head.
4. Mount clamping shoe.
5. Insert screw (1).



Do not tighten the screw until after assembling the injection line.

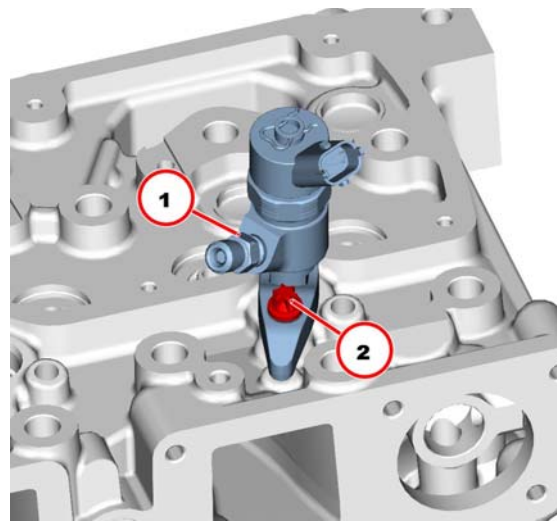
6. Mount new injection pipe.



Module 21



Do not tighten union nuts.



MAE10070



**Attention!**

Position (1):

The injector must be renewed if the pipe connection is disconnected.

7. Tighten screw (2).



30 Nm



## Disassembly and Assembly

---

### 8. Engine 492-2140 & 505-6559:

Mount connecting rail.

Glow plugs



Module 63

### 9. Tighten union nuts of the injection line.



Module 21

### 10. Connect fuel line.



#### **Attention!**

Removed, missing and bent clips must be renewed.

The clip must spring back to the hold position automatically. Otherwise renew the clip.



Module 21

### 11. Plug in and lock cable plug.



**d. Technical Data*****Tightening specifications***

ID no.	Name	Screw type	Notes / Remark	Value
A19 001	Injector on cylinder head, clamping claw		Observe order of installation. Install injector without tension.	30 Nm



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



### 5.17 FUEL FILTER

#### 5.17.1 Fastening Parts (W 20-90-05)



Standard tools



Safety information / User information



#### **Danger!**

Do not carry out work on the fuel system when the engine is running.

The fuel system is under high pressure - Danger of death.

The fuel pressure can continuously remain up to several 100 bar even after stopping the engine.

Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



#### **Attention!**

Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

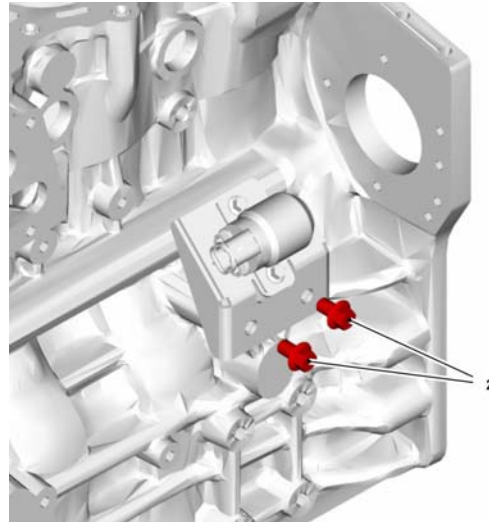
Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

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.



MAE10080

2 Hexagon head screw 42 Nm

#### 5.17.2 Fuel Pre-filter (W 20-90-16)



Standard tools



Safety information / User information  
Operation manual



#### **Danger!**

Do not carry out work on the fuel system when the engine is running.

The fuel system is under high pressure - Danger of death.

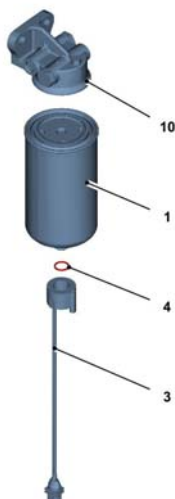
The fuel pressure can continuously remain up to several 100 bar even after stopping the engine.

Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



**Attention!**

Ensure utmost cleanliness for all work.  
 Remove any paint residue and dirt particles before disassembly.  
 Clean the area around the components concerned carefully. Blow wet parts 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.



MAE10090

1	Fuel pre-filter	
3	Sensor	1.6 Nm
4	Sealing ring	
10	Fuel filter	



Use a new sealing ring.  
 Vent fuel system according to operating instructions.

Fuel pre-filter



Operation manual

**5.17.3 Fuel Filter (W 20-90-17)**



Standard tools  
 Special tools:

**Engine 492-2140 & 505-6559**

- Plugs/caps - PN 01899368

**Engine 492-5092 & 505-7229**

- Long socket wrench insert - PN 461-1693

- Plugs/caps - PN 449-2493



Safety information / User information

**Engine 492-2140 & 505-6559**

- Operation manual



**Danger!**

Do not carry out work on the fuel system when the engine is running.

The fuel system is under high pressure - Danger of death.

The fuel pressure can continuously remain up to several 100 bar even after stopping the engine.

Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



**Attention!**

Ensure utmost cleanliness for all work.  
 Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts 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.

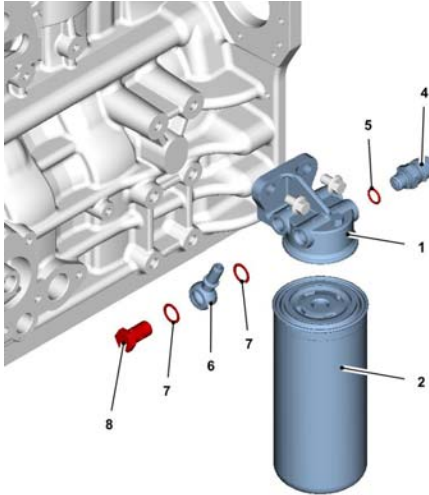
Do not remove plugs/caps until immediately before assembling.

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



## Disassembly and Assembly

### Engine 492-2140 & 505-6559



MAE10100

1	Filter head	
2	Fuel spare filter	
4	Pressure sensor	25 Nm
5	O-ring	
6	Ring piece	
7	Sealing ring	
8	Hollow screw	49 Nm



#### Attention!

Pay attention to utmost deadliness.



Collect draining fuel and dispose of according to regulations.

Use new round sealing ring.

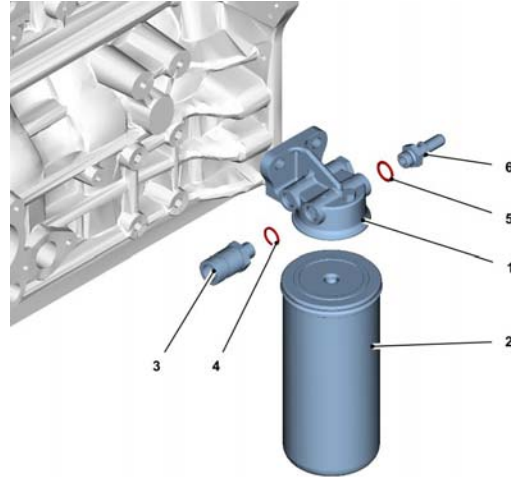
Use new sealing rings.

1. Unscrew fuel filter.



Operation manual

### Engine 492-5092 & 505-7229:



MAE12610

1	Filter head	
2	Fuel spare filter	
3	Pressure sensor	25 Nm
4	O-ring	
5	Sealing ring	
6	Coupling plug	49 Nm



Use new round sealing ring and sealing ring.



## 5.18 FUEL PIPES

### 5.18.1 Fuel line (W 20-90-30) (Engine 492-5092 & 505-7229)



Standard tools

Special tools:

- Hose clip pliers - PN 449-2478
- Spring band pliers - PN 449-2489
- Plugs/caps - PN 449-2493



Safety information / User information

Operation manual



**Danger!**

Do not carry out work on the fuel system when the engine is running.

The fuel system is under high pressure - Danger of death.

The fuel pressure can continuously remain up to several 100 bar even after stopping the engine.

Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



**Attention!**

Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

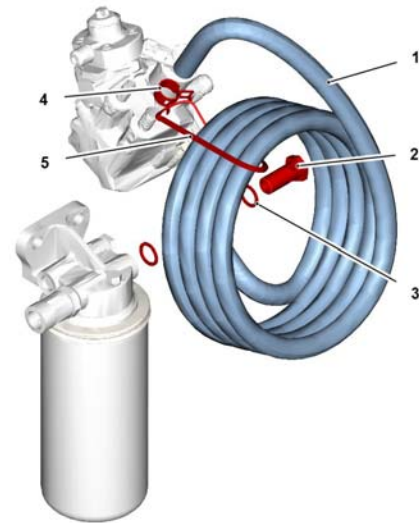
Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

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.

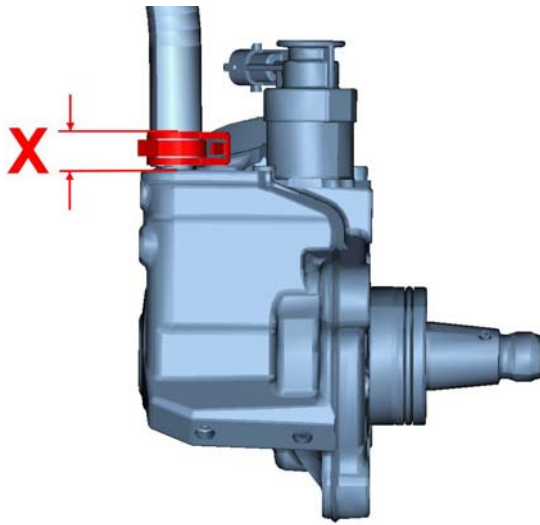


MAE12620

1	Hose pipe	
2	Hollow screw	20 Nm
3	Sealing ring	
4	Clip	
5	Holding tape	



Use new sealing rings.



MAE12630



### Attention!

Ensure that the installation location is free from faults.

Lay the hose pipe free from chafing and tension.

Dimension X  
14 - 18 mm

## 5.19 FUEL SUPPLY PUMP

### 5.19.1 Supply pump (Fuel) (W 20-90-47)



Standard tools

Special tool

**Engine 492-2140 & 505-6559**

- Plugs/caps - PN 01899368

**Engine 492-5092 & 505-7229**

- Plugs/caps - PN 449-2493



Safety information / User information

Installation Guidelines



### Danger!

Do not carry out work on the fuel system when the engine is running.

The fuel system is under high pressure - Danger of death.

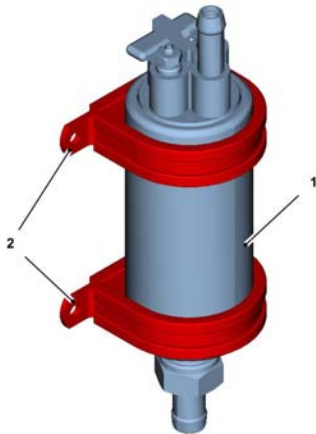
The fuel pressure can continuously remain up to several 100 bar even after stopping the engine.

Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



**Attention!**

Ensure the utmost cleanliness when performing all work.  
 Before dismounting, remove any paint residues and dirt particles.  
 Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.  
 Observe safety regulations and national regulations when working with fuels.  
 Seal all connections immediately with new and clean stoppers/caps after opening.  
 Only remove stoppers/caps immediately before assembly.  
 Collect escaping operating media in suitable vessels and dispose of them according to regulations.  
 The following must be observed for installation:  
 Installation guidelines of engine manufacturer.  
 Installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.  
 The documentation of the vehicle manufacturer/ equipment manufacturer must be complied with for dismantling and installing.



MAE10110

1	Supply pump
2	Clip

2. Fastening Screws  
 4 x M5-8.8

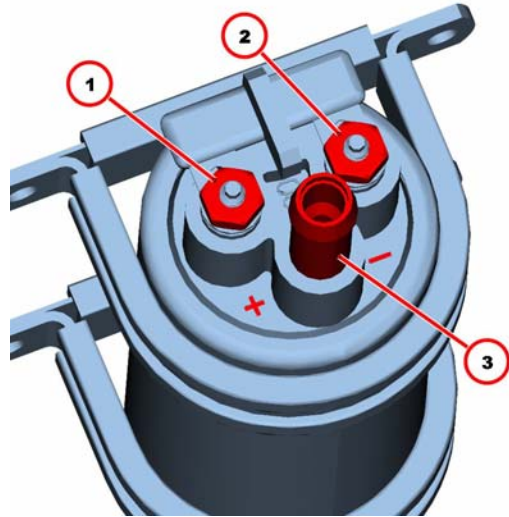


6,5 - 8,5 Nm



**Attention!**

Ensure that the installation location is free from faults.  
 The fuel outlet is facing upwards.



MAE10120

1	Nut Terminal +	M5 6,5 - 8,5 Nm
2	Nut Terminal -	M5 6,5 - 8,5 Nm
3	Connection nozzle Fuel outlet	



**Attention!**

Ensure that the cables are connected properly.



## Disassembly and Assembly

### 5.20 FUEL PIPES

#### a. Removing the Rail

#### 5.20.1 Removing and Installing the Rail (W 21-04-01)



Standard tools

- Wrench insert size 14

Special tools:

- Long socket wrench insert - PN 461-1693

- Disassembly tool - PN 461-1696

- Special wrench - PN 449-2496

**Engine 492-2140 & 505-6559:**

- Plugs/caps - PN 01899368

**Engine 492-5092 & 505-7229:**

- Plugs/caps - PN 449-2493



- Marker pen, waterproof, permanent

- Assembly grease - Multipurpose Grease



Safety information / User information



#### **Danger!**

Do not carry out work on the fuel system when the engine is running. The fuel system is under high pressure - Danger of death.

The fuel pressure can continuously remain up to several 100 bar even after stopping the engine. Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



#### **Attention!**

Ensure utmost cleanliness for all work. Remove any paint residue and dirt particles before disassembly.

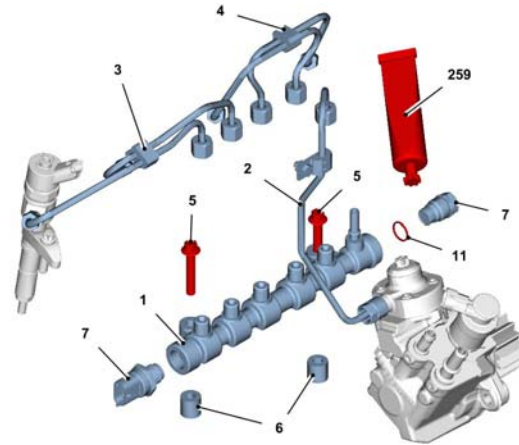
Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

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.



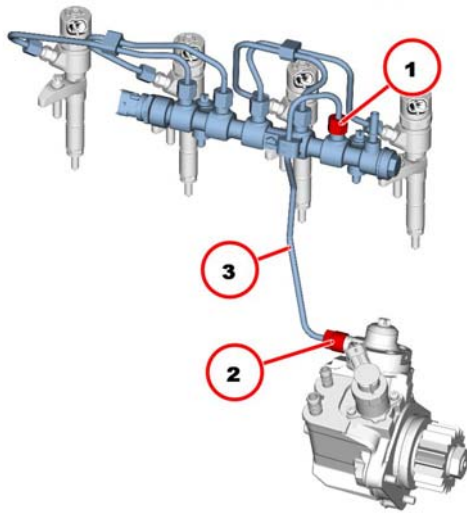
MAE10130

1	Rail
2	High-pressure line
3	Injection line
4	Injection line
5	Screw
6	Spacer
7	Repair kit Pressure sensor Pressure limiting valve
11	O-ring
259	Mounting grease





**b. Removing High-pressure Line**



MAE10140

1. Remove fuel return line.
2. Unscrew union nut (1) with special wrench.
3. Remove cable harness holder and swing aside.
4. Unscrew union nuts (2) with special wrench.
5. Remove high-pressure line (3).



Collect draining fuel and dispose of according to regulations.



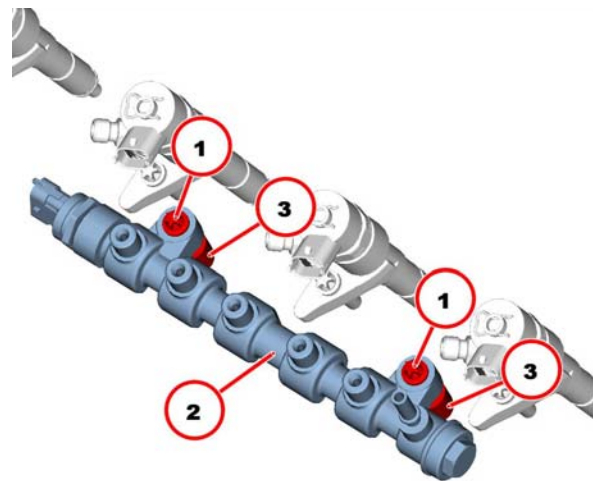
**Attention!**

Position (3):  
The injector must be renewed if the pipe connection is disconnected.

2. Hold pipe connection of injector.
3. Unscrew lock nuts (2).
4. Remove injection lines.

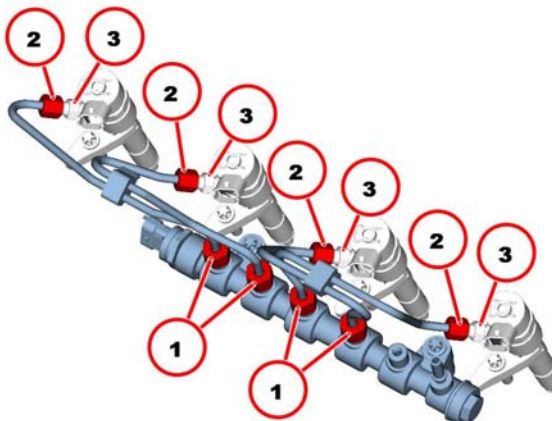


Collect draining fuel and dispose of according to regulations.



MAE10160

**c. Removing Injection Pipes**



MAE10150

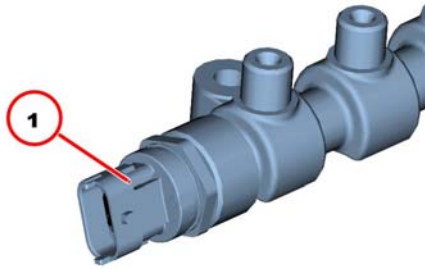
1. Unscrew lock nuts (1) with special wrench.

5. Unlock cable plug.
6. Pull out cable plug.
7. Unscrew screws (1).
8. Remove the rail (2).
9. Remove spacer (3).
10. Visually inspect the components.



## Disassembly and Assembly

### d. Removing the Pressure Sensor



MAE10170

1. Unscrew the rail pressure sensor (1) with the socket wrench.



Collect draining fuel and dispose of according to regulations.



MAE6520



#### Attention!

Do not touch the pin contacts of the rail pressure sensor with your hands to avoid electrostatic discharging.

Ensure absolute cleanliness of the connector.

2. Visually check the thread and the sealing edge (arrows) of the rail pressure sensor.

### e. Installing the Pressure Sensor



MAE6530

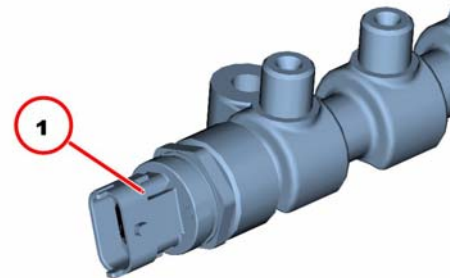


#### Attention!

No foreign bodies may get into the rail. Ensure utmost cleanliness. Especially on the thread and the sealing surface of the rail.

See the spare parts documentation. Rail pressure sensor and pressure limiting valve must be replaced as a pair.

1. Clean thread and sealing area of the rail.
2. Coat the thread and sealing edge of the rail pressure sensor lightly with assembly grease.



MAE10180



#### Attention!

Only tighten the rail pressure sensor with the hexagon.

3. Screw in rail pressure sensor (1).
4. Tighten rail pressure sensor (1) with the socket wrench insert.



70 Nm



**f. Removing the Pressure Limiting Valve**



MAE10190

1. Unscrew pressure limiting valve (1).



Collect draining fuel and dispose of according to regulations.



MAE6540

2. Visually check the thread and the sealing edge of the pressure limiting valve.



MAE6550

3. Remove the o-ring with the disassembly tool.



## g. Installing the Pressure Limiting Valve



MAE10200



MAE10210



### Attention!

No foreign bodies may get into the rail. Ensure utmost cleanliness. Especially on the thread and the sealing surface of the rail. See the spare parts documentation. Rail pressure sensor and pressure limiting valve must be replaced as a pair.

1. Mount new o-ring (1).



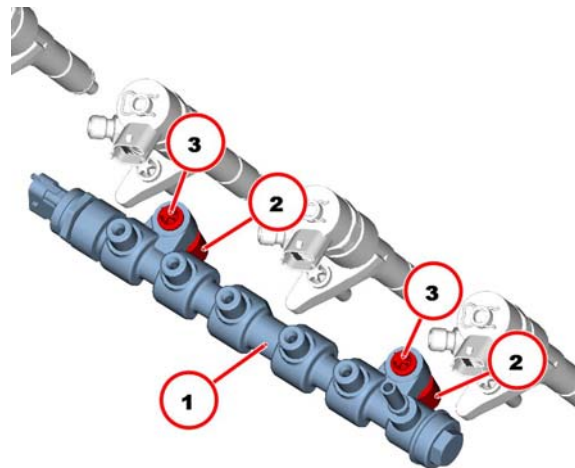
MAE6560

2. Lightly coat the thread and sealing edge of the pressure limiting valve with assembly grease.

3. Clean thread and sealing area of the rail.
4. Screw in pressure limiting valve (1).
5. Tighten pressure limiting valve.



## h. Mounting Rail



MAE10220

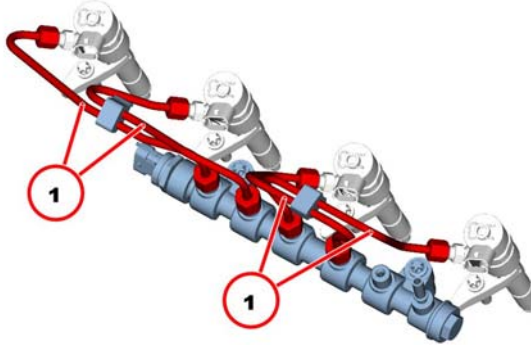
1. Mount rail (1) with spacer (2).
2. Loosely preassemble rail (1) with screws (3).



Do not tighten screws.



**i. Installing Injection Pipes**



MAE10230



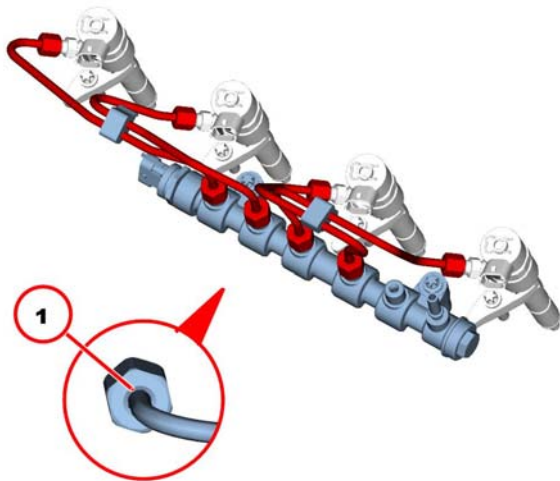
**Attention!**

The injection lines must always be renewed after disassembly.



Note assignment and installation position of the injection lines.

1. Mount new injection lines (1).



MAE10240



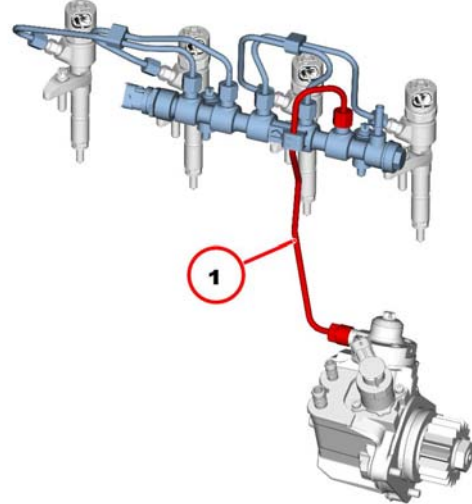
**Attention!**

Pay attention to alignment of the injection pipes. Lines must not be in the bores (1) of the union nuts. Install injection lines without tension and without touching.

They must be a safe distance away from adjacent parts.

1. Align injection lines.
2. Tighten union nuts hand-tight.

**j. Installing High-pressure Line**



MAE10250



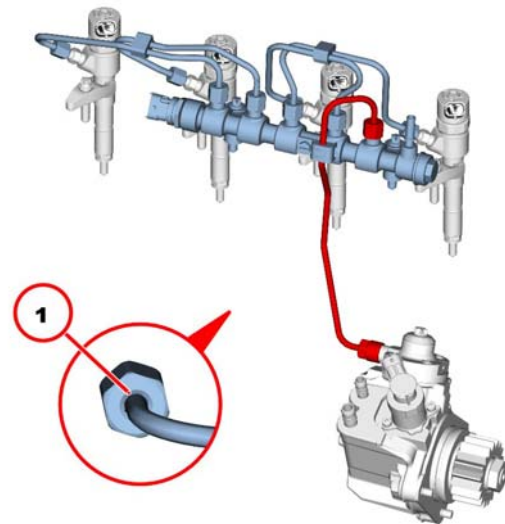
**Attention!**

The high-pressure line must always be renewed after dismantling.



Ensure that the installation location is free from faults.

1. Mount new high-pressure line (1).



MAE10260



**Attention!**

Pay attention to alignment of the high-pressure line.

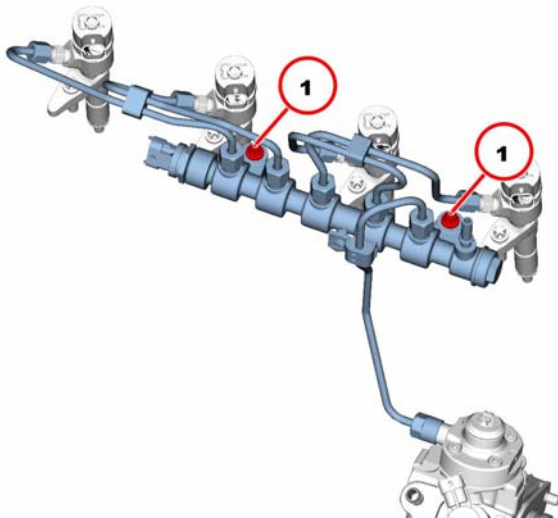
Line may not touch in the bore (1) of the union nut. Install high-pressure line without tension and contact.

They must be a safe distance away from adjacent parts.



## Disassembly and Assembly

2. Align high-pressure line.
3. Tighten union nuts hand-tight.

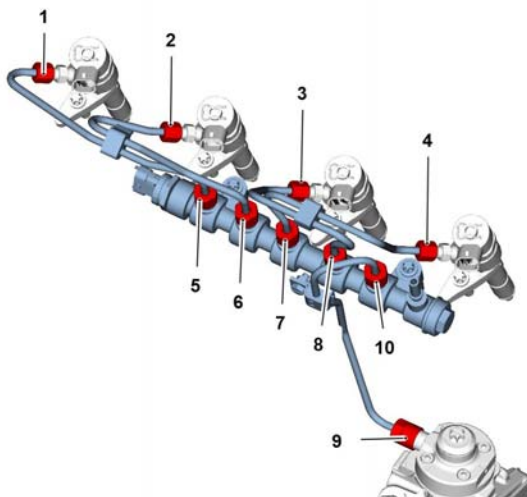


MAE10270

4. Tighten screws (1).



30 Nm

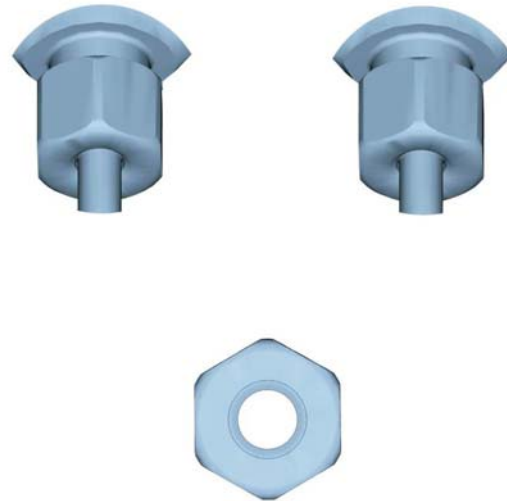


MAE10280

5. Tighten the union nuts in order.
- Stage 1:



10 Nm



MAE10290

6. Draw help markings (1).

7. Tighten union nut.

- Stage 2:



60 - 65 Nm

8. Check injection lines for perfect installation position.
9. Check the high-pressure line for perfect installation position.
10. Mount fuel return line.
11. Mount cable harness holder.
12. Plug in and lock cable plug.



Ensure that the connection is perfect.



## k. Technical Data

### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A21 003	Injection line on rail and injector, high pressure line on high-pressure pump and on rail	Union nut	Stage 1: Observe assembly instructions. Use new line.	10 Nm
A21 003	Injection line on rail and injector high pressure line on high-pressure pump and on rail		Stage 2:	65°
A21 038	Rail on cylinder head		Observe assembly specification.	30 Nm
A21 039	Pressure limiting valve on rail		Lightly coat the thread and sealing edge with assembly grease.	100 Nm
A21 040	Pressure sensor on rail	M18x1.5	Lightly coat the thread and sealing edge with assembly grease.	70 Nm



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



## Disassembly and Assembly

### 5.20.2 Removing and Installing the Fuel Line (W 21-05-05)



Standard tools

Special tools:

- Spring band pliers - PN 449-2489

**Engine 492-2140 & 505-6559:**

- Plugs/caps - PN 01899368

**Engine 492-5092 & 505-7229:**

- Plugs/caps - PN 449-2493



Safety information / User information



#### Danger!

Do not carry out work on the fuel system when the engine is running. The fuel system is under high pressure - Danger of death.

The fuel pressure can continuously remain up to several 100 bar even after stopping the engine. Here the fuel pressure is only reduced if the fuel system is opened and the fuel can escape outside.



#### Attention!

Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully.

Blow wet parts dry with compressed air.

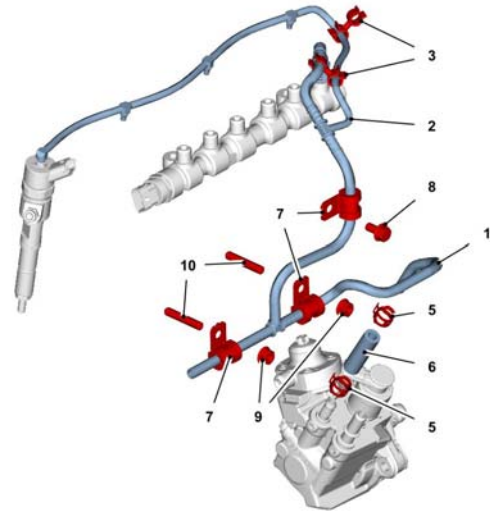
Observe the safety regulations and national specifications for handling fuels.

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.

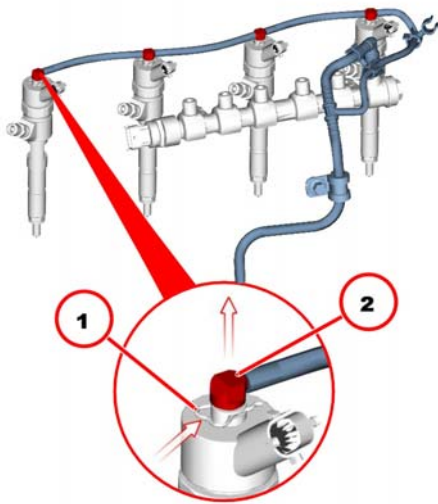
#### a. Removing the Fuel Line



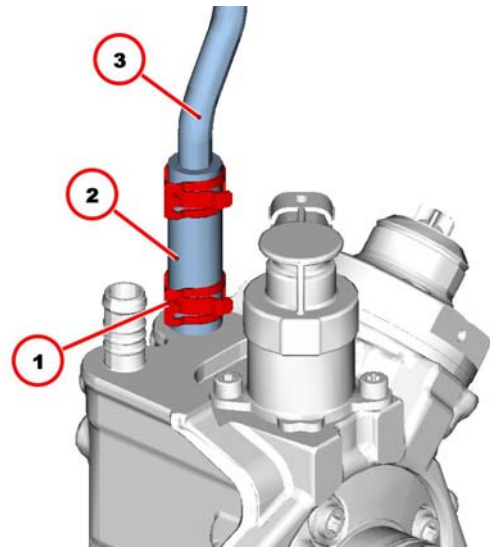
MAE10300

1	Fuel line
2	Return line
3	Hose holder
5	Spring band clip
6	Hose pipe
7	Pipe clip
8	Hexagon head screw
9	<b>Engine 492-2140 &amp; 505-6559:</b> Hexagonal nut
10	<b>Engine 492-5092 &amp; 505-7229:</b> Threaded pin





MAE10310



MAE10330

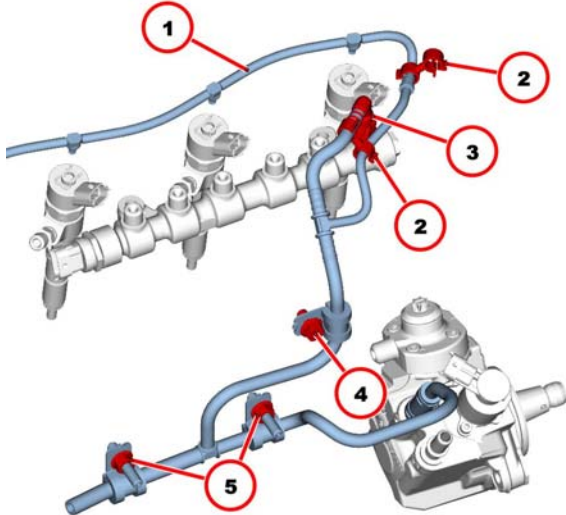


**Attention!**

Removed, missing and bent clips must be renewed. The clip must spring back to the hold position automatically. Otherwise renew the clip.

1. Press in the clip (1) to the stop.
2. Pull out return line (2).

7. Loosen spring band clip (1) with spring band pliers.
8. Pull off hose pipe (2).
9. Remove fuel line (3).
10. Visually inspect the components.
11. Replace damaged components.



MAE10320

3. Remove return line (1) from hose holder (2).
4. Unlock coupling plug (3) and pull off.
5. Unscrew screw (4).
6. **Engine 492-2140 & 505-6559:** Unscrew nuts (5).



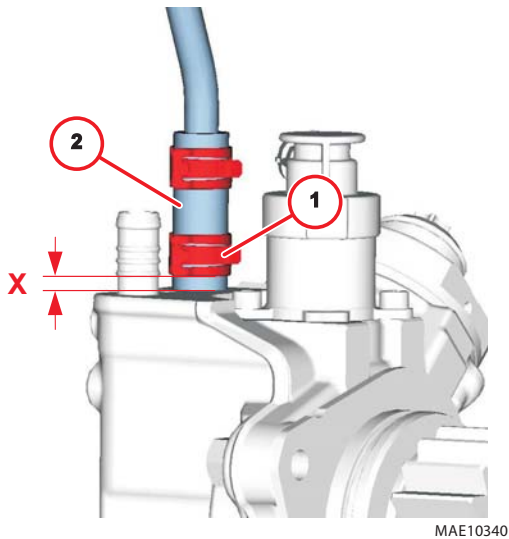
**Attention!**

Damaged fuel lines must be replaced completely.



## Disassembly and Assembly

### b. Mounting the Fuel Line



MAE10340



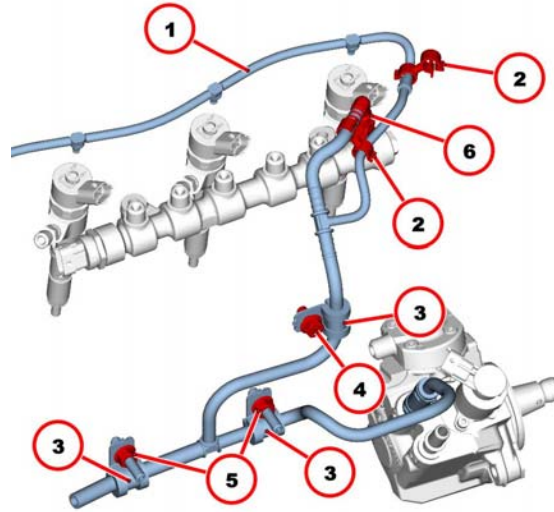
#### Attention!

Damaged fuel lines must be replaced completely. Ensure that the installation location is free from faults.

Lines must be pushed on so that they are flush.

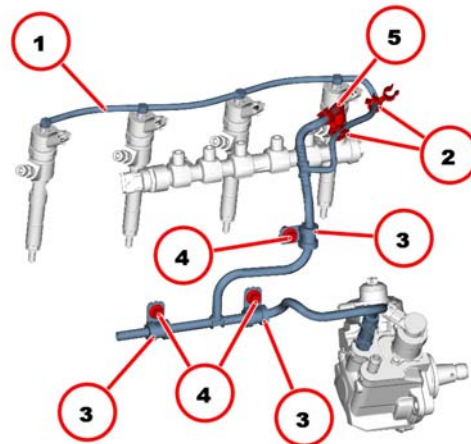
1. Position fuel pipe.
2. Position the spring band clip (1) with the spring band pliers.
3. Dimension X  
2 - 6 mm
4. Mount the hose pipe (2).

### Engine 492-2140 & 505-6559



MAE10350

### Engine 492-5092 & 505-7229



MAE13330



#### Attention!

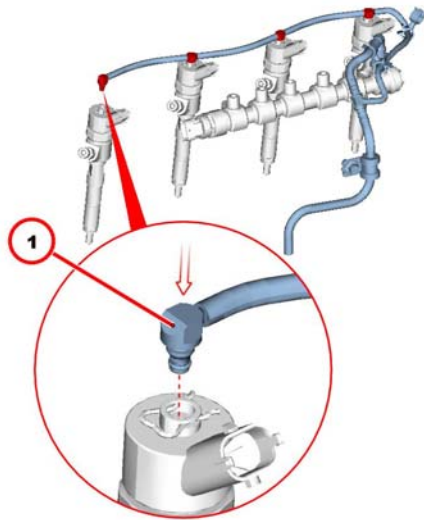
Ensure that the installation location is free from faults.

#### Fuel line with fabric casing:

If a hose piece is pulled off of the hose connection, the hose line must be replaced completely.

Push hose piece onto the hose connection up to the end stop!

1. Position fuel pipe.
2. Insert return line (1) in hose holder (2).
3. Position pipe clips (3).
4. **Engine 492-2140 & 505-6559:** Turn in screw (4).
5. **Engine 492-5092 & 505-7229:** Screw in nuts (5).
6. Mount coupling plug (6) and latch into place.



MAE10360



**Attention!**

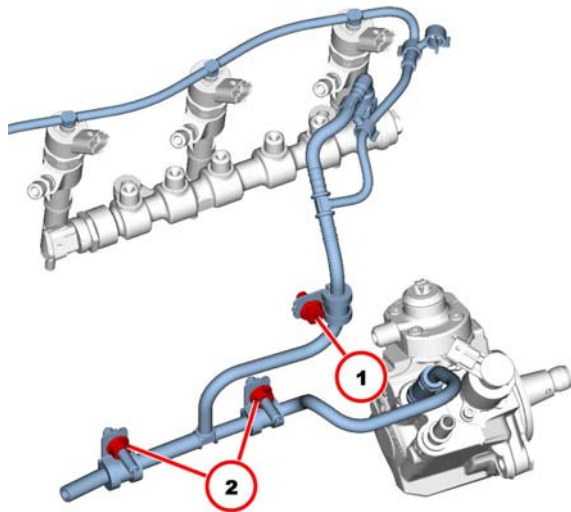
Removed, missing and bent clips must be renewed.  
The clip must spring back to the hold position automatically. Otherwise renew the clip.

7. Position return line (1) vertically to the injector.
8. Insert return line (1) in injector by hand.



**Attention!**

Ensure that the installation location is free from faults.  
Return line must snap in audibly.



MAE10370

9. Tighten screw (1).



**Engine 492-2140 & 505-6559:** 21 Nm

**Engine 492-5092 & 505-7229:** 30 Nm

10. Tighten nuts (2).



**Engine 492-2140 & 505-6559:** 21 Nm

11. Carry out a trial run.
12. Check fuel system for leaks.  
- Visual inspection for leaks



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A12 095	Pipe clips, fastening			<b>Engine 492-2140 &amp; 505-6559:</b> 21 Nm <b>Engine 492-5092 &amp; 505-7229:</b> 30 Nm



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



## 5.21 CHARGE AIR LINE

### 5.21.1 Removing and Installing the Charge Air Line (W 22-01-01)

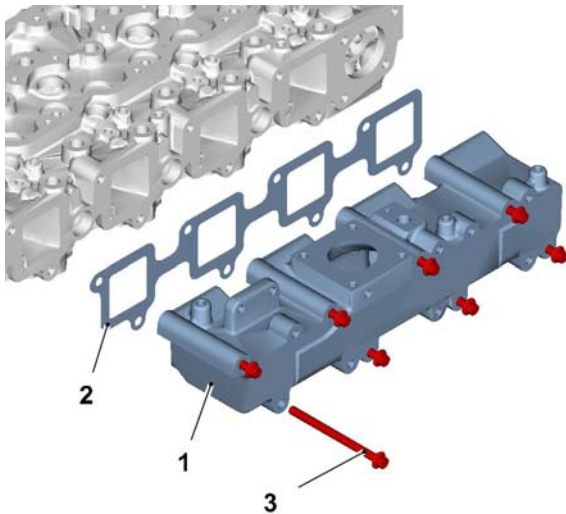


Standard tools



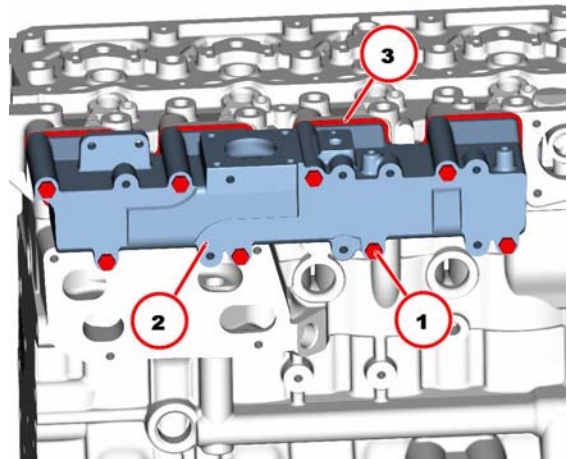
Safety information / User information

#### a. Remove Charge Air Line



MAE10380

1	Charge air line
2	Seal
3	Hexagon head screw



MAE10390

1. Remove fuel return line.
2. Unlock cable plug and disconnect.
3. Unscrew screws (1).
4. Remove charge air line (2).
5. Remove gasket (3).
6. Visually inspect the components.

#### b. Install Charge Air Line



MAE10400

1. Clean sealing surfaces.
2. Mount new gasket (1).
3. Turn screws into the seal a few turns.

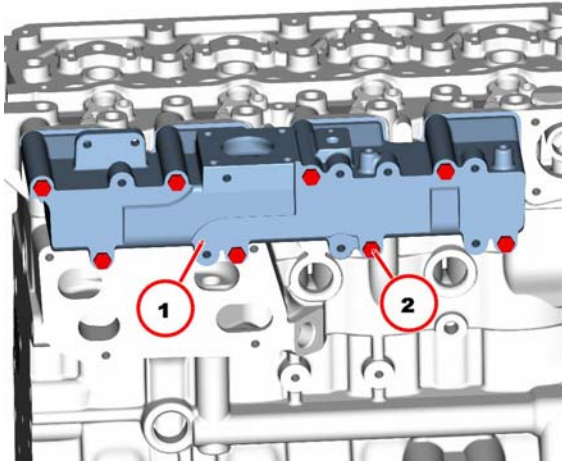


The seal is locked by the screw thread.

Ensure that the installation location of the gasket is free from faults.



## Disassembly and Assembly

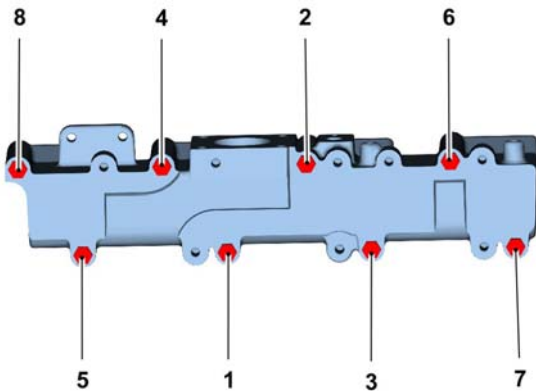


MAE10410

4. Mount charge air line (1).
5. Tighten screws (2).



Do not move gasket



MAE10420

6. Tighten the screws according to the tightening sequence.



**Engine 492-5092 & 505-7229:** 30 Nm



### Attention!

Ensure that the cables are laid perfectly.

7. Plug in and lock cable plug.
8. Mount fuel return line.

**c. Technical Data*****Tightening specifications***

ID no.	Name	Screw type	Notes / Remark	Value
A22 030	Charge air line on cylinder head			30 Nm



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



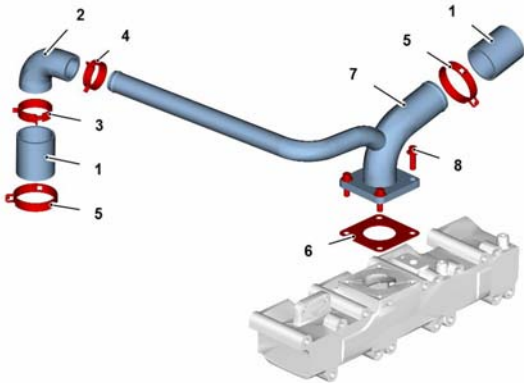
## Disassembly and Assembly

### 5.21.2 Removing and Installing Charge Air Manifold (W 22-04-01) (Engine 492-5092 & 505-7229)

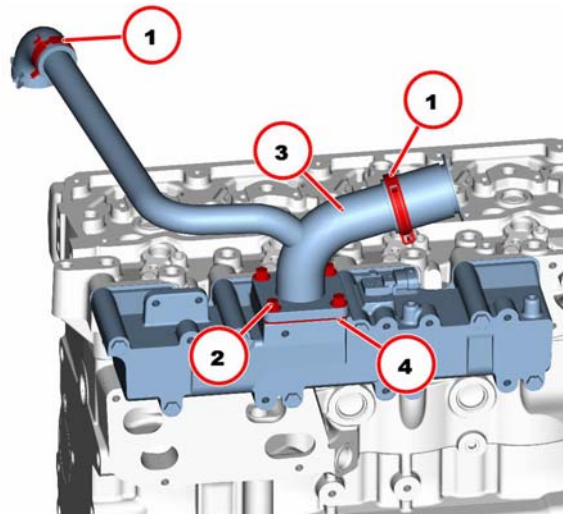


Standard tools  
- Spring band pliers - PN 449-2489

#### a. Removal



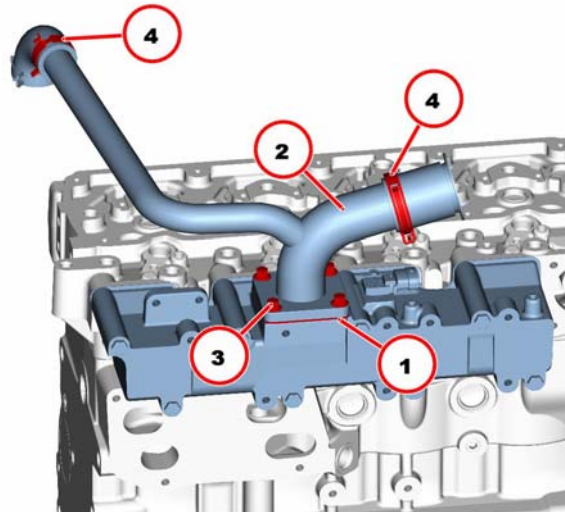
MAE12670



MAE12680

1. Loosen spring band clips (1) with spring band pliers.
2. Unscrew screws (2).
3. Remove charge air manifold (3).
4. Remove gasket (4).
5. Visually inspect the component.

#### b. Installation



MAE12690

1. Clean sealing surfaces.
2. Mount gasket (1).
3. Mount charge air manifold (2).
4. Fasten screws (3).
5. Tighten screws alternately.



30 Nm

6. Position spring band clips (4) with spring band pliers.

1	Rubber sleeve
2	Hose nozzles
3	Spring band clip
4	Spring band clip
5	Spring band clip
6	Seal
7	Charge air manifold
8	Hexagon head screw



**c. Technical Data*****Tightening specifications***

<b>ID no.</b>	<b>Name</b>	<b>Screw type</b>	<b>Notes / Remark</b>	<b>Value</b>
A22 046	Charge air manifold on charge air line			30 Nm



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



## Disassembly and Assembly

### 5.21.3 Pressure transmitter / temperature pressure transmitter (charge air) (W 22-90-20) (Engine 492-5092 & 505-7229)



Standard tools



Fitting compound



Safety information / User information



#### Attention!

Ensure utmost cleanliness for all work. Remove any paint residue and dirt particles before disassembly. Clean the area around the components concerned carefully. Blow wet parts dry with compressed air. Close all connections immediately after opening with new, clean plugs/caps. Do not remove plugs/caps until immediately before assembling.

4	Hexagon head screw	5 Nm
5	Pressure sensor	
6	Console	
7	Sealing ring	
8	Hollow screw	18 Nm
9	Hose ring piece	
242	Mounting compound	

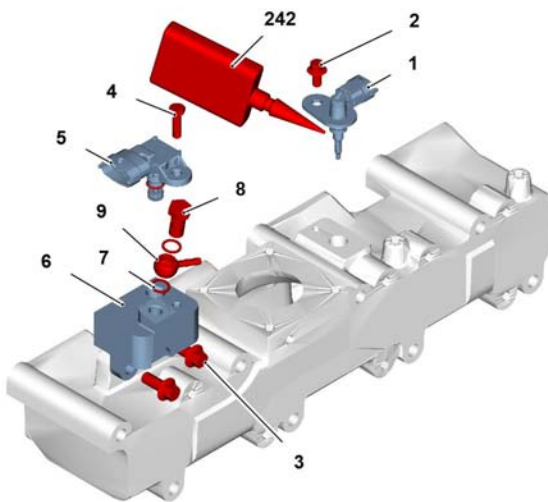
1. Clean sealing surfaces.



Use new sealing rings.



Positions: 1,5  
Use mounting compound.  
Use new round sealing ring.



MAE12700

1	Temperature sensor	
2	Hexagon head screw	11 Nm
3	Hexagon head screw	30 Nm



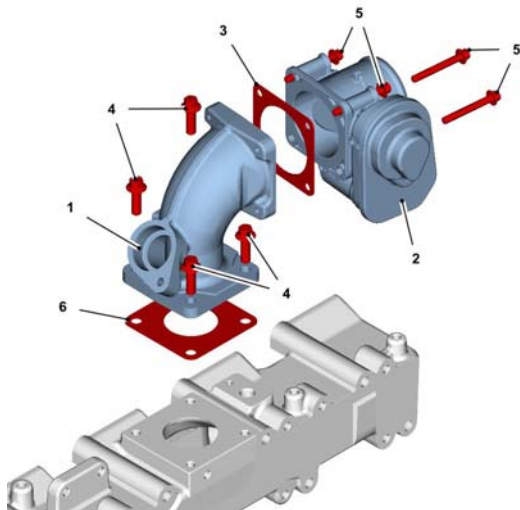
### 5.21.4 Charge Air Manifold (W 22-90-54)



Standard tools



**Engine 492-2140 & 505-6559:**  
Safety information / User information



MAE10440

1	Charge air manifold	
2	Throttle valve	
3	Seal	
4	Hexagon head screw	30 Nm
5	Hexagon head screw	13 Nm
6	Seal	

#### 1. Removing and installing the exhaust gas return pipe



Module 41



Use new gaskets.



## Disassembly and Assembly

---

### a. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A22 046	Charge air manifold on charge air line			30 Nm



**5.21.5 Charge Air Line (W 22-90-55)  
(Engine 492-5092 & 505-7229)**



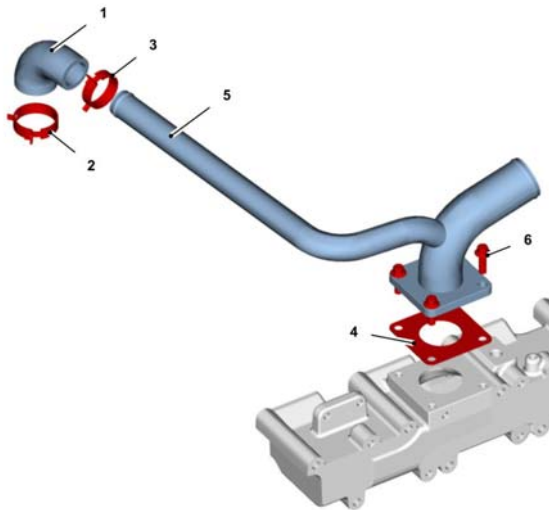
Standard tools

Special tools:

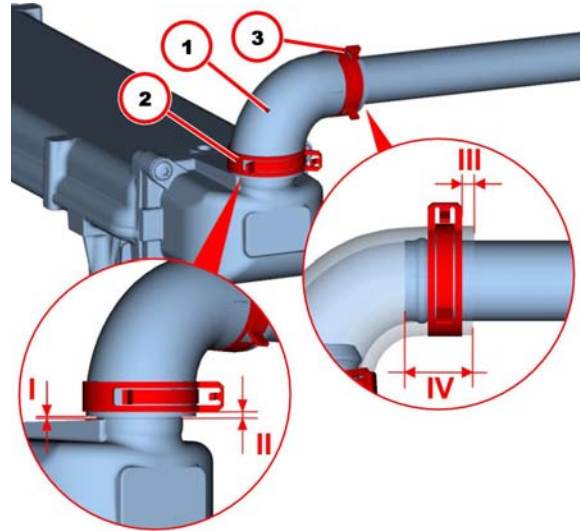
– Spring band pliers - PN 01899112



Safety information / User information



MAE12560



MAE12570



Positions: 1, 2, 3



**Attention!**

Ensure that the installation location is free from faults.

1. Dimension I  
1 mm
2. Dimension II  
4 mm
3. Dimension III  
2 mm
4. Dimension IV  
24 mm

1	Hose pipe	
2	Spring band clip	
3	Spring band clip	
4	Seal	
5	Charge air line	
6	Hexagon head screw	30 Nm



Use a new gasket.



## 5.22 AIR INTAKE PIPE

### 5.22.1 Intake Nozzle (Exhaust Turbocharger) (W 22-90-35)

Engine 492-2140 & 505-6559:



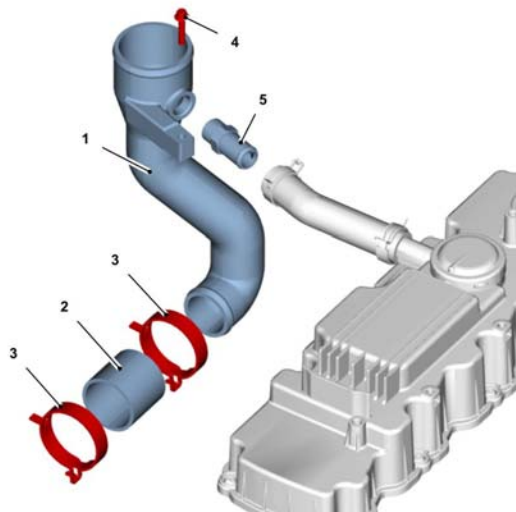
Standard tools

Special tools:

- Spring band pliers - PN 449-2489



Safety information / User information

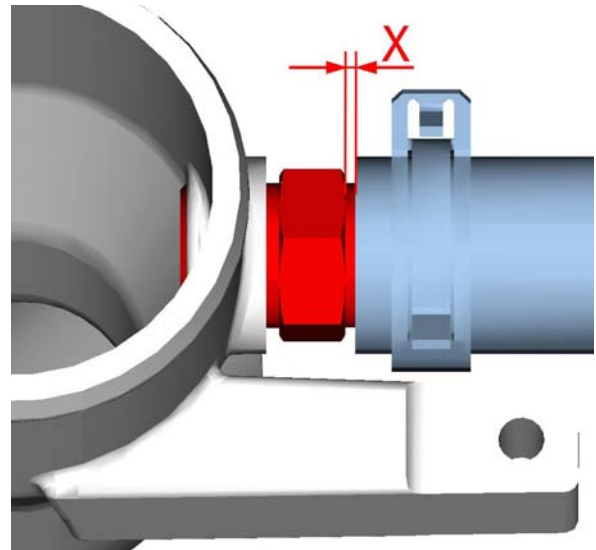


MAE10430

1	Intake nozzle	
2	Rubber sleeve	
3	Spring band clip	
4	Hexagon head screw	8,5 Nm
5	Screw-in nozzle	10Nm



Position spring band clips to be freely accessible. Ensure that the installation location is free from faults.



MAE13400



Ensure that the installation location is free from faults.

1.Dimension X



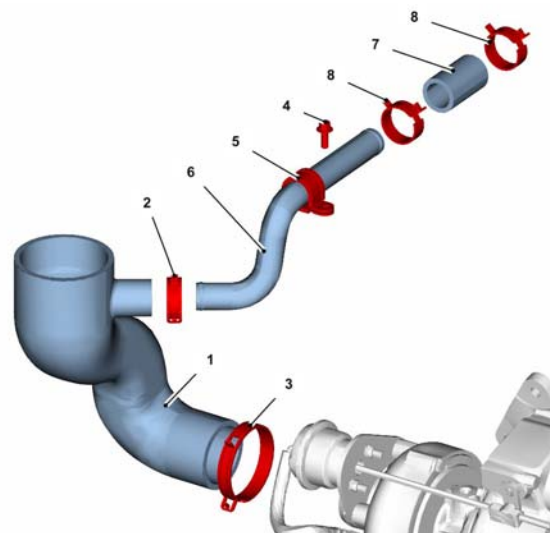
3 mm

Engine 492-5092 & 505-7229:



Standard tools:

- Spring band pliers - PN 01899112

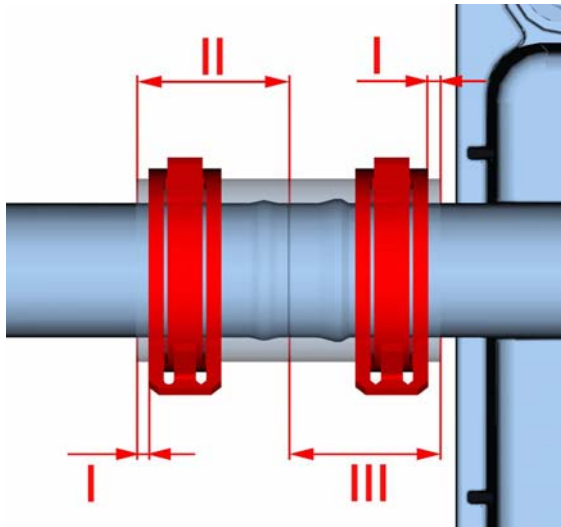


MAE12710

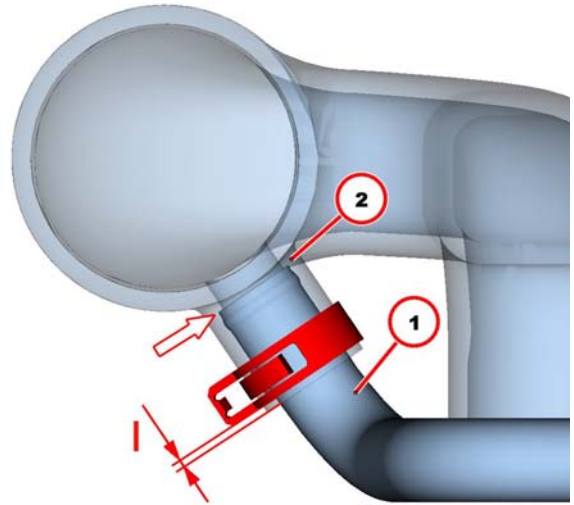
1	Intake nozzle	
2	Spring band clip	
3	Spring band clip	



4	Hexagon head screw	13 Nm
5	Pipe clip	
6	Pipe	
7	Rubber sleeve	
8	Spring band clip	



MAE12720



MAE12730

5. Push in pipe (1) until it reaches the detent (2).



Position the spring band plier so that it is freely accessible from above.



**Attention!**

Ensure that the installation location is free from faults.

Dimension I  
2 mm

1. Position spring band pliers on the marks of the rubber sleeve.



Position the spring band clip facing upwards in an easy to reach position.



**Attention!**

Ensure that the installation location is free from faults.

2. Dimension I  
2 mm

3. Dimension II  
25 mm

4. Dimension III 25 mm



## 5.23 COOLANT PUMP

### 5.23.1 Removing and Installing the Coolant Pump (W 37-03-01)



Standard tools

Special tools:

- Special pliers - PN 01899191
- Disassembly tool - PN 461-1696



Fitting compound - Ultra 5 Moly



Safety information / User information  
- Operation manual



#### Danger!

Observe specifications for working on the cooling system see operating manual.



#### Attention!

Due to leakage, the coolant pump must be replaced after being removed.

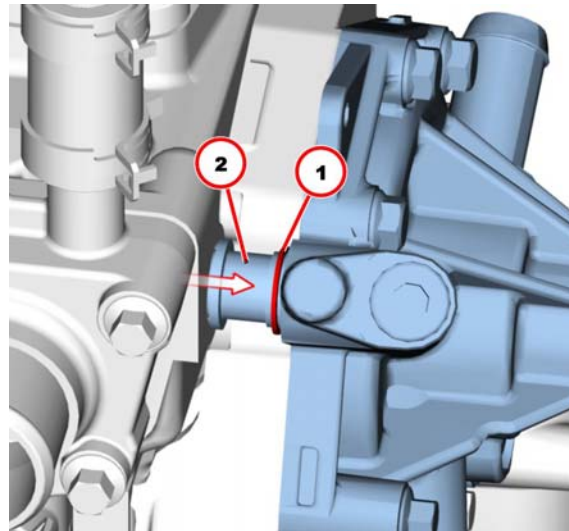


Collect leaking operating substances in suitable vessels and dispose of according to regulations. Observe the appropriate operating instructions for emptying and filling the engine.

1	Coolant pump	
2	Laminated seal	
3	Hose connection	35 Nm
4	Screw plug	35 Nm
5	Screw plug	60 Nm
6	Sealing ring	
7	Sealing ring	
10	Hexagon head screw	

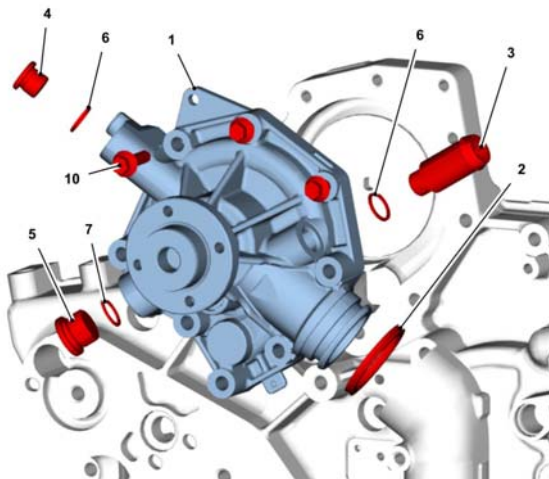


Use new sealing rings.



MAE10460

#### a. Removing Coolant Pump



MAE10450

1. Remove ribbed belt / V-belt.



Operating Manual

2. Remove ribbed / V belt pulley.



Module 37

3. Remove coolant line.

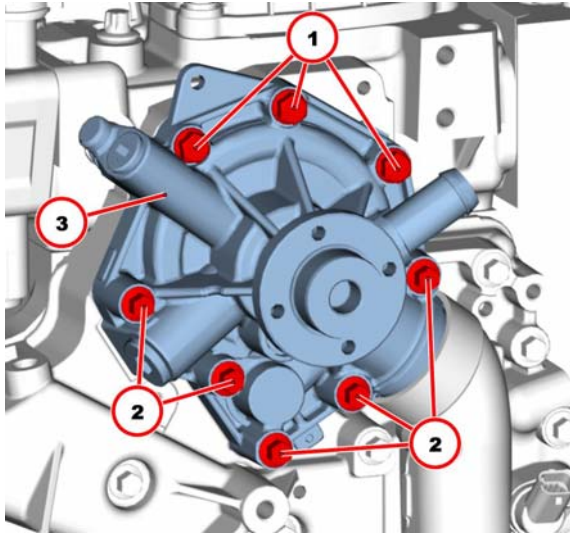


Module 38

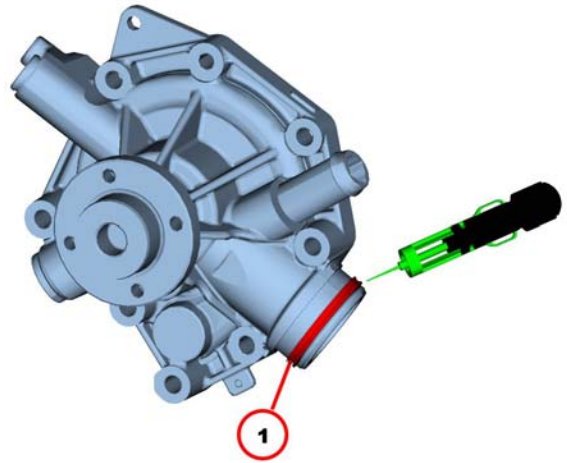




4. Remove locking ring (1).
5. Remove connector piece (2) with special pliers in the direction of the arrow.



MAE10470



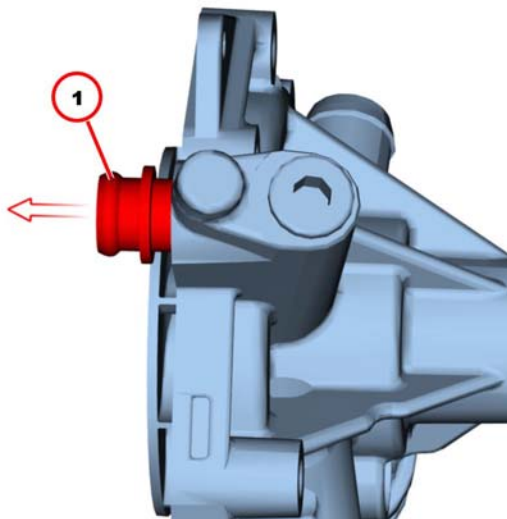
MAE10490

10. Remove the laminated seal (1) with the disassembly tool.



Note different screw lengths.

6. Unscrew screws (1).
7. Unscrew screws (2).
8. Remove coolant pump (3).



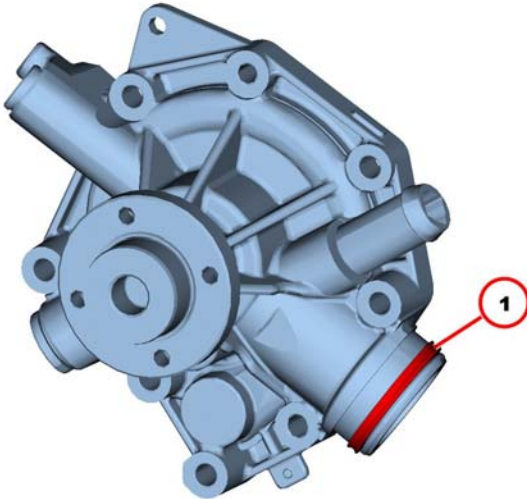
MAE10480

9. Remove plug element (1) in direction of arrow.

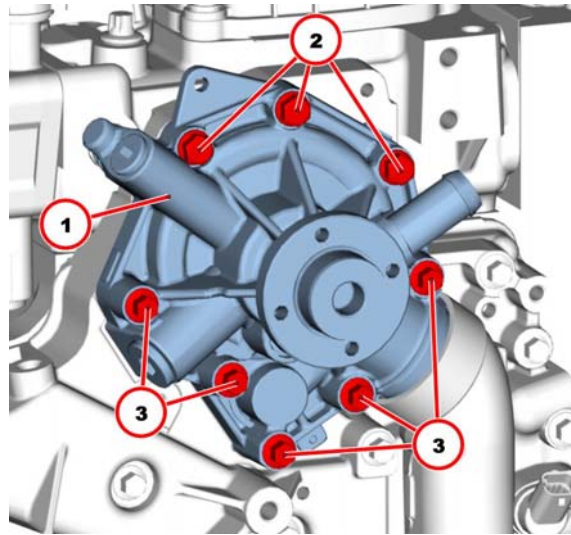


## Disassembly and Assembly

### b. Installing Coolant Pump



MAE10500



MAE10520



#### Attention!

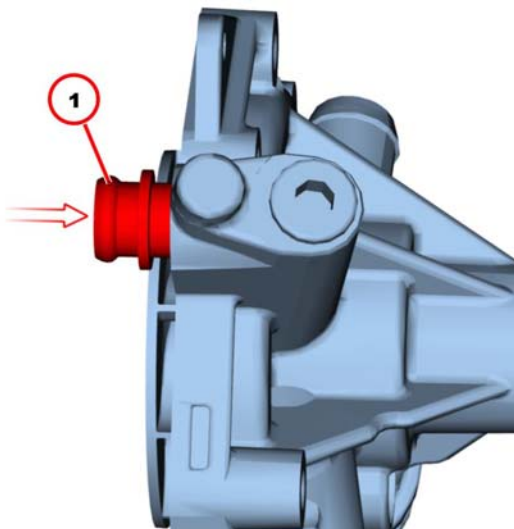
Due to leakage, the coolant pump must be replaced after being removed.

1. Insert a new laminated seal (1) with assembly paste.
2. Insert a new laminated seal (1).



#### Attention!

Ensure that the installation location is free from faults.



MAE10510

3. Coat new plug piece (1) with mounting compound.
4. Push in a new connector piece (1) in the direction of the arrow until reaching the detent

5. Clean sealing surfaces.

6. Attach coolant pump (1).



Note different screw lengths.

#### Engine 492-2140 & 505-6559:

1. Tighten screws (2) alternately.
2. Tighten screws (3) alternately.
3. Tighten screws (2) alternately.

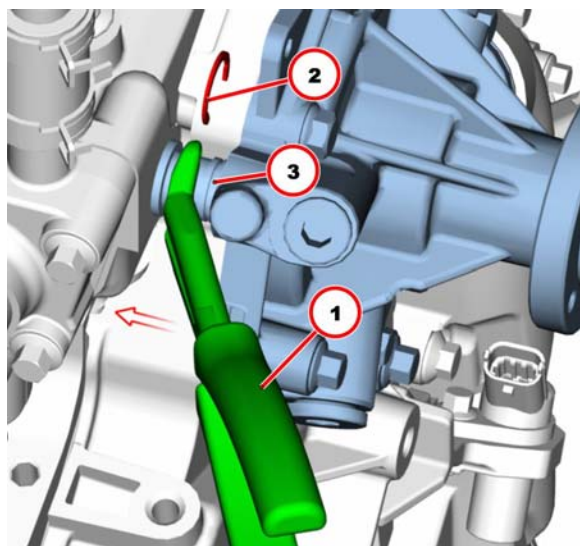


18 Nm

4. Tighten screws (3) alternately.




30 Nm




MAE10530

5. Push in and hold the connector piece in the direction of the arrow with the special pliers (1)
6. Insert the circlip (2) into the groove (3).
7. Install coolant pipe.

 Module 38

8. Install ribbed / V belt pulley.

 Module 37

9. Replace ribbed belt / V-belt.

 Operation manual



### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A37 010	Coolant pump on gear case			<b>Engine 492-2140 &amp; 505-6559:</b> 18 Nm
A37 010	Coolant pump on gear case/ crankcase			<b>Engine 492-2140 &amp; 505-6559:</b> 30 Nm
A37 010	Coolant pump on cylinder head			<b>Engine 492-5092 &amp; 505-7229:</b> 30 Nm



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



**5.23.2 Drive Components (W 37-90-06)**



Standard tools

**Engine 492-5092 & 505-7229:**

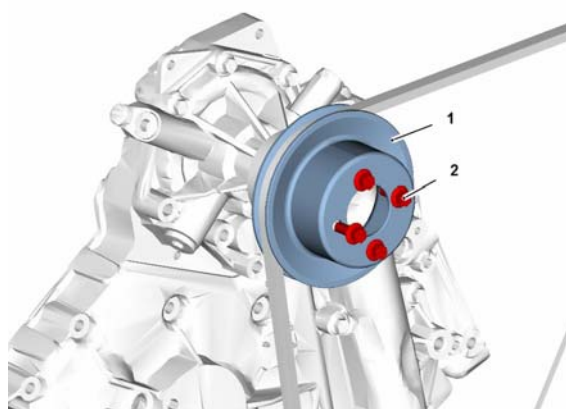
Special tools:

- Torx tool set - PN 461-1692



**Engine 492-5092 & 505-7229:**

Safety information / User information



MAE13340

1	V-belt pulley	
2	<b>Engine 492-2140 &amp; 505-6559:</b> - Torx screw	20 Nm
	<b>Engine 492-2140 &amp; 505-6559:</b> - Hexagon head screw	20 Nm

**5.23.3 V-rib Belt Pulley (W 37-90-13)**

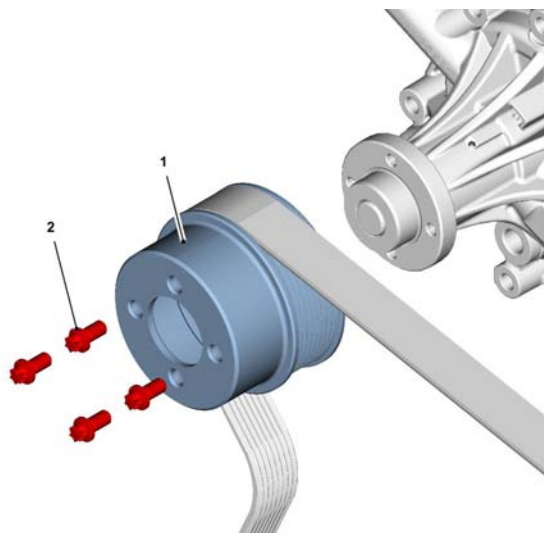


Standard tools



**Engine 492-2140 & 505-6559:**

Safety information / User information



MAE10550

1	V-rib belt pulley	
2	<b>Engine 492-2140 &amp; 505-6559:</b> Torx screw	30 Nm
	<b>Engine 492-5092 &amp; 505-7229:</b> Hexagon head screw	30 Nm



## 5.24 THERMOSTAT HOUSING

### 5.24.1 Removing and Installing the Thermostat (W 38-01-01)



Standard tools



Safety information / User information  
- Operation manual



**Attention!**

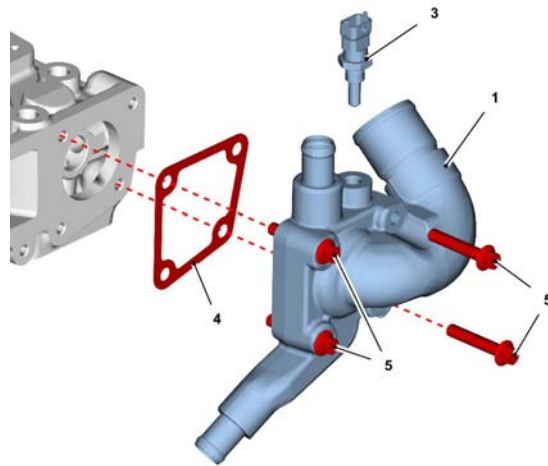
The thermostat and thermostat housing are firmly connected together at the factory.



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

Observe the appropriate operating instructions for emptying and filling the engine.

#### a. Removing the Thermostat (Engine 492-2140 & 505-6559)

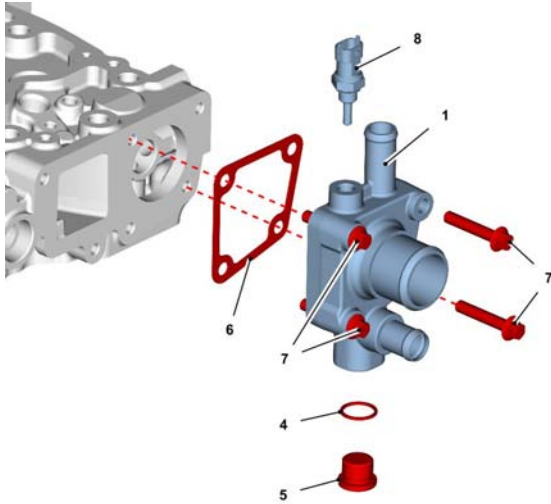


MAE10560

1	Thermostat housing including thermostat	
3	Temperature sensor	30 Nm
4	Seal	
5	Hexagon head screw	30 Nm

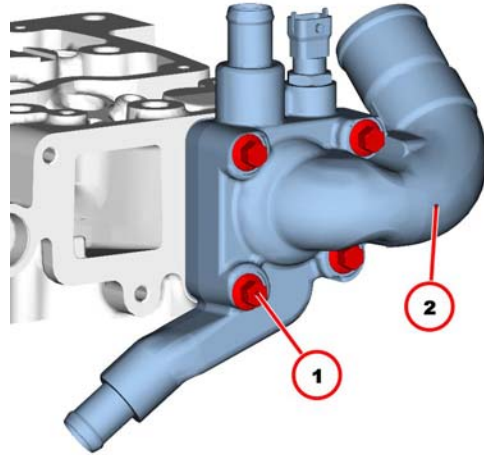


**b. Removing the Thermostat  
(Engine 492-5092 & 505-7229)**



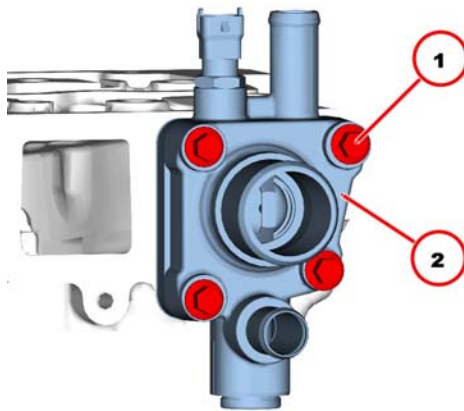
MAE12640

**Engine 492-2140 & 505-6559:**



MAE10570

**Engine 492-5092 & 505-7229:**



MAE12650

1	Thermostat housing including thermostat	
4	Sealing ring	
5	Screw plug	65 Nm
6	Seal	
7	Hexagon head screw	30 Nm
8	Temperature sensor	25 Nm

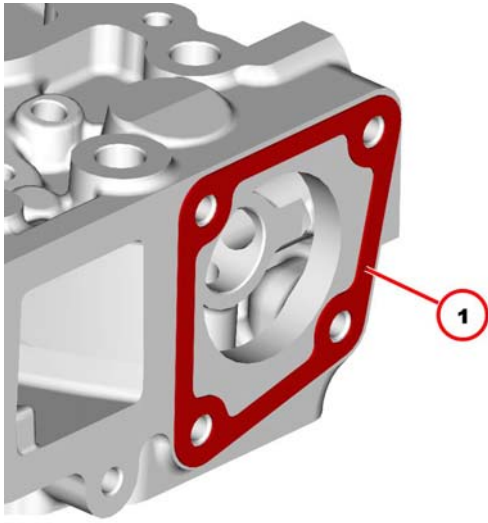


Use a new sealing ring.

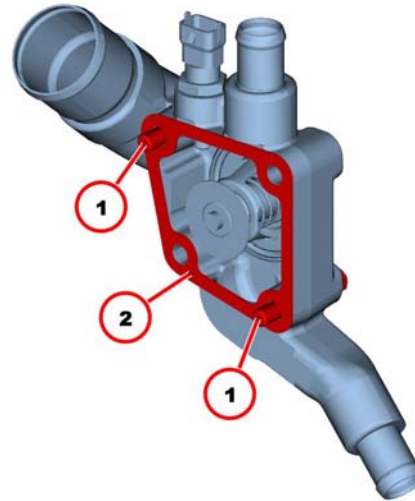
1. Drain, collect and dispose of coolant according to regulations.
2. Unscrew screws (1).
3. Remove thermostat housing (2).
4. Visually inspect the component.



Engine 492-2140 & 505-6559:



MAE10580



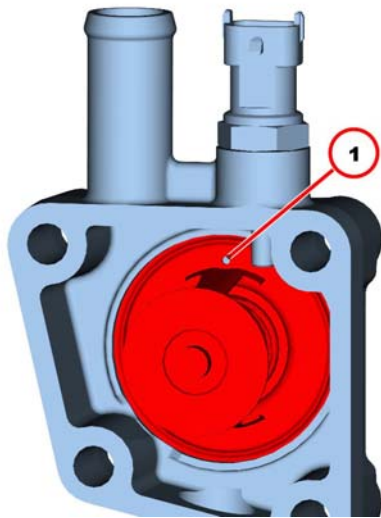
MAE10590

5. Remove gasket (1).

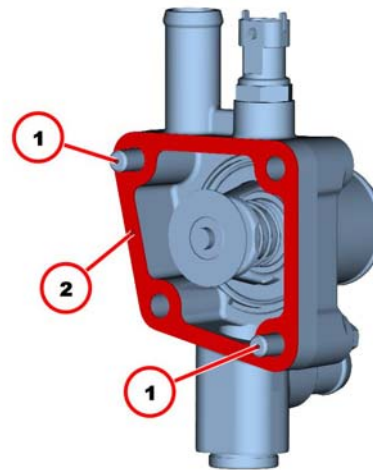
Engine 492-5092 & 505-7229:

c. Installing the Thermostat

Engine 492-5092 & 505-7229:



MAE12660



MAE12740

1. Clean sealing surfaces.
2. Insert screws (1).
3. Fix new gasket (2) to the thermostat housing with screws.



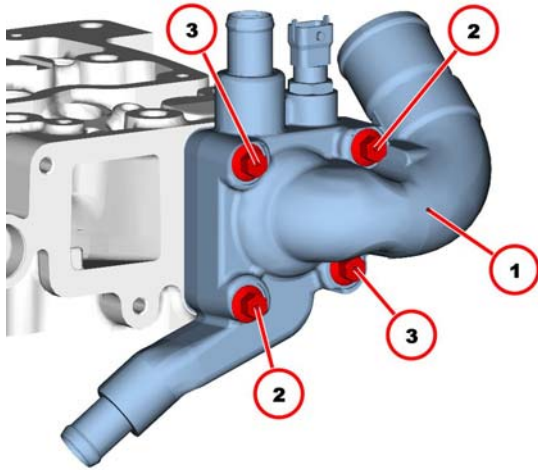
**Attention!**

The venting hole (1) must be at the highest point.



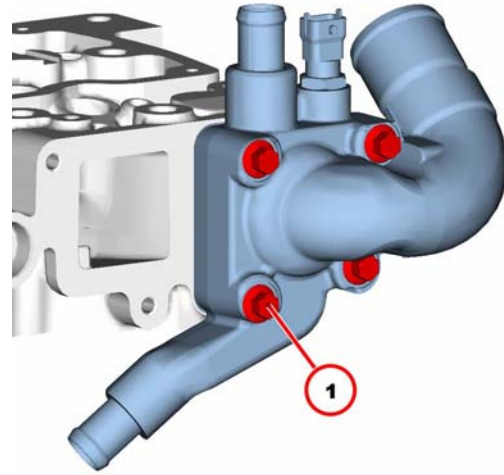


Engine 492-2140 & 505-6559:



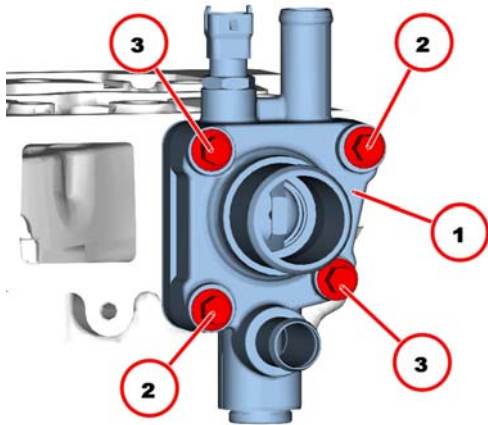
MAE10600

Engine 492-2140 & 505-6559:



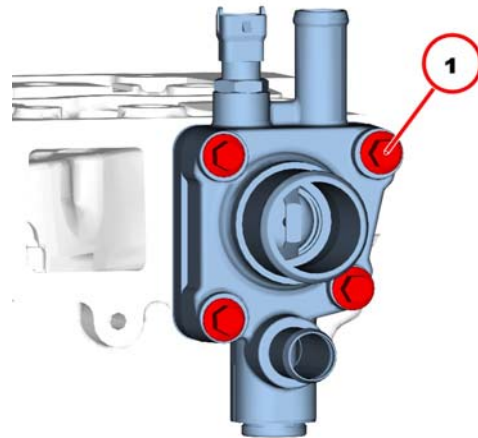
MAE10610

Engine 492-5092 & 505-7229:



MAE12750

Engine 492-5092 & 505-7229:



MAE13350

4. Mount thermostat housing (1).
5. Tighten screws (2).
6. Fasten screws (3).

1. Tighten all screws (1).



30 Nm

2. Fill cooling system according to the operating manual.



Operation manual



## Disassembly and Assembly

---

### d. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A38 001	Thermostat housing on cylinder head			30 Nm



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



**5.24.2 Checking the Thermostat (In the Removed State) (W 38-01-02)**



Standard tools  
- Thermometer



Safety information / User information



**Danger!**  
Danger of injury!  
Hot water and hot components.

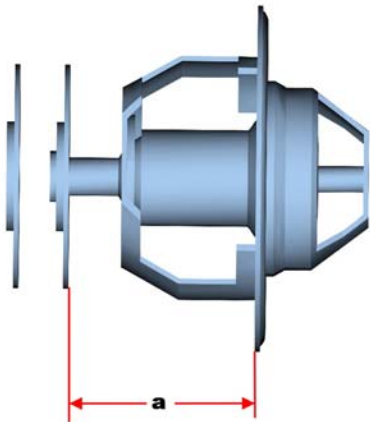


**Attention!**  
The thermostat and thermostat housing are firmly connected together at the factory.



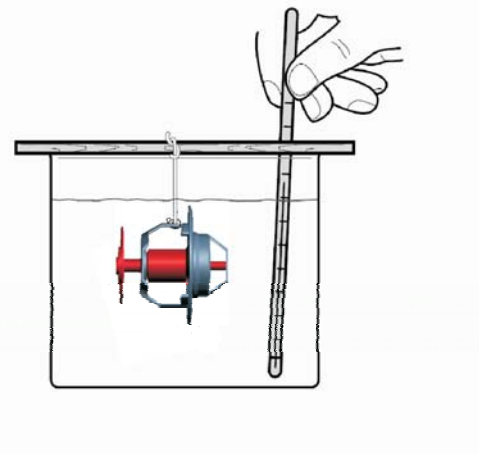
Schematic diagram: For better illustration, the thermostat is shown without the thermostat housing.

**a. Checking Thermostat**



MAE6570

1. Measure beginning of stroke, dimension (a).
2. Note measured value, dimension (a).



MAE6580

3. Heat up the thermostat in the water bath.
4. Determine beginning of opening.



In order to determine the exact beginning of opening, the temperature should be measured as close as possible to the thermostat.

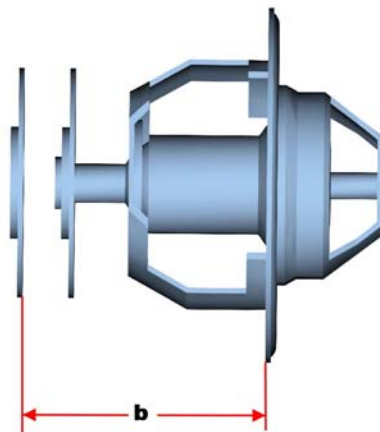
Do not touch the thermostat.

The water should be continuously stirred for an even temperature distribution. The temperature rise should not take place faster than 1°C/min. Otherwise the beginning of opening will be delayed accordingly.

5. Nominal value:



86 °C – 90 °C



MAE10620

6. Measure water temperature.  
Nominal value:

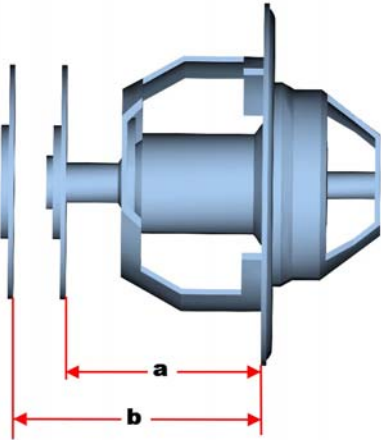


## Disassembly and Assembly



99 °C – 102 °C

7. Measure end of stroke, dimension **(b)**.
8. Note measured value, dimension **(b)**.



MAE10630

9. Determine stroke.

Calculation example	
Desired:	Stroke
Given:	-
Measured:	Beginning of stroke, dimension <b>(a)</b> End of stroke, dimension <b>(b)</b>
Calculation:	Dimension <b>(b)</b> - dimension <b>(a)</b>
Result:	= stroke

10. Compare result with setpoint value.

Nominal value:



9 mm

**b. Technical Data*****Testing and Setting data***

<b>ID no.</b>	<b>Name</b>	<b>Additional information</b>	<b>Value</b>
P38 11	Thermostat, start of opening		86 °C – 90 °C
P38 13	Thermostat, stroke	at 99 °C – 102 °C, minimum	9 mm
P38 14	Thermostat, stroke, test temperature		99 °C – 102 °C



## Disassembly and Assembly

### 5.25 COOLANT PIPES

Engine 492-5092 & 505-7229 (W 38-90-32):

#### 5.25.1 Line (W 38-90-32)



Standard tools

**Engine 492-2140 & 505-6559:**

Special tools:

- Spring band pliers - PN 449-2489
- Plugs/caps - PN 01899368



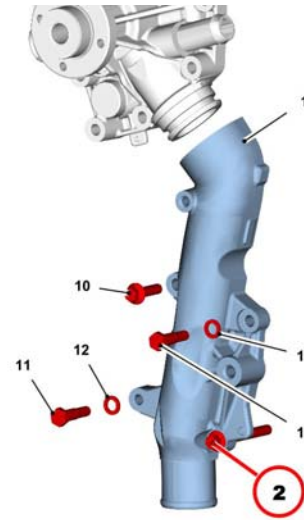
Safety information / User information  
Operation manual



**Engine 492-2140 & 505-6559:**

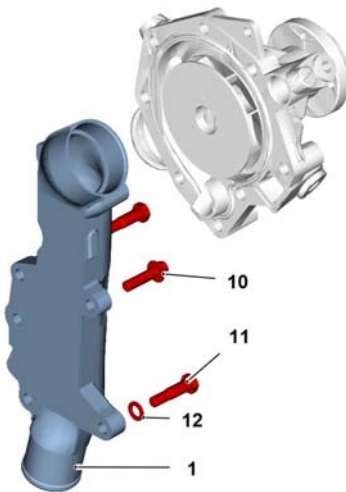
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

Observe the appropriate operating instructions for emptying and filling the engine.



MAE12760

**Engine 492-2140 & 505-6559:**



MAE10640

1	Coolant line	
10	Hexagon head screw	18 Nm
11	Hexagon head screw	18 Nm
12	Washer	



Note different screw lengths.

Position 2



30 Nm

1. Tighten screws alternately.



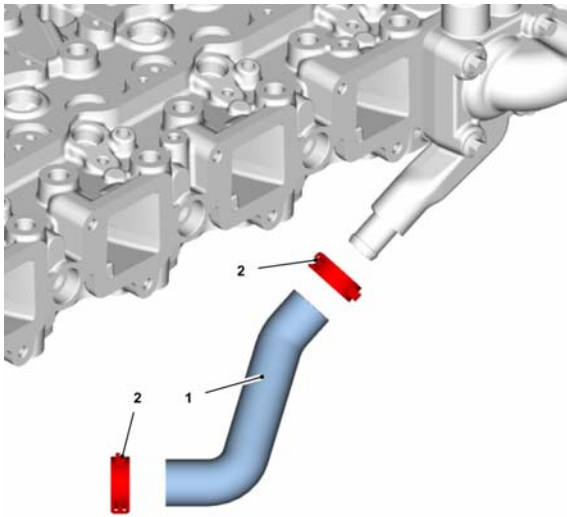
**Attention!**

See the spare parts documentation.

1	Coolant line	
10	Hexagon head screw	18 Nm
11	Hexagon head screw	18 Nm
12	Washer	



Engine 492-2140 & 505-6559:



MAE10650

1	Hose pipe
2	Spring band clips

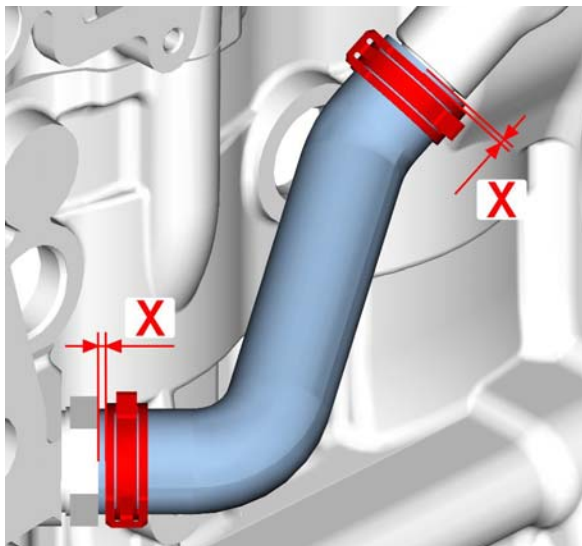


Push on hose line as far as limit stop.



**Attention!**

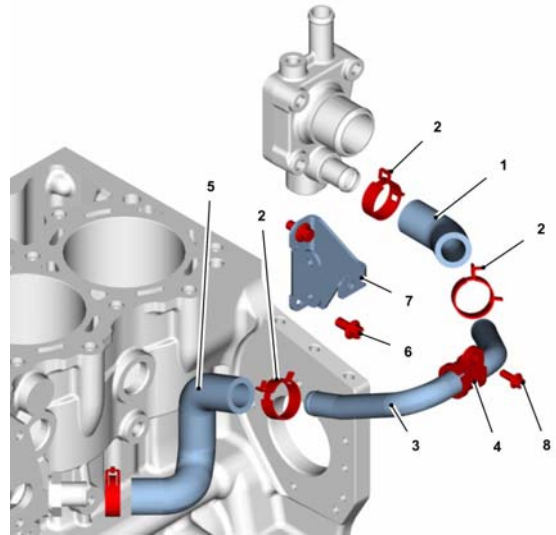
Lay the hose pipe free from chafing and tension.



MAE10660

1. Position spring band clip with spring band pliers.
2. Dimension X 1 - 3 mm

Line (Thermostat housing, lubricating oil cooler, coolant line) (Engine 492-5092 & 505-7229)



MAE12770



Standard tools

Special tools:

- Spring band pliers - PN 449-2489
- Plugs/caps - PN 449-2493



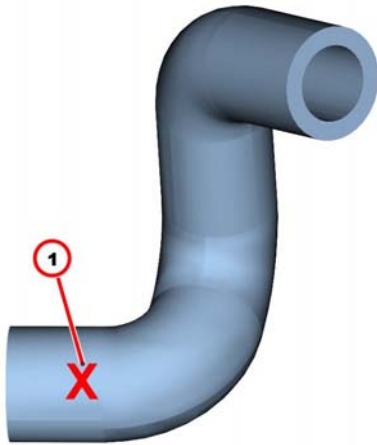
Safety information / User information



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

Observe the appropriate operating instructions for emptying and filling the engine.

1	Elbow	
2	Spring band clips	
3	Coolant line	
4	Pipe clip	
5	Hose pipe	
6	Hexagon head screw	30 Nm
7	Support plate	
8	Hexagon head screw	13 Nm



MAE12780

1. Position 5



**Attention!**

Lay the hose pipe free from chafing and tension.



Marking (1) faces the crankcase

## 5.26 FAN

### 5.26.1 Suction Fan (W 39-90-52)

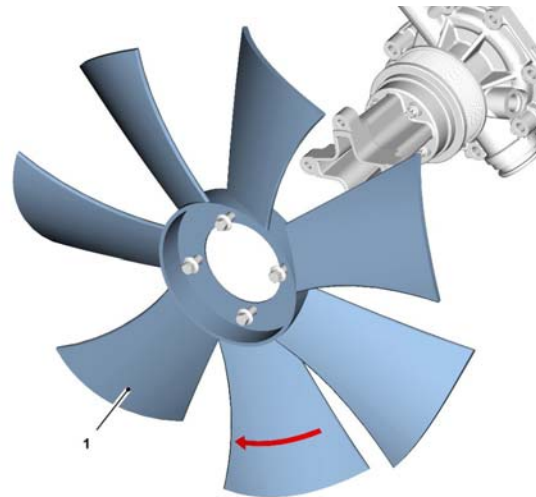
Engine 492-2140 & 505-6559:



Standard tools



Safety information / User information



MAE10670

1	Pressure fan
---	--------------



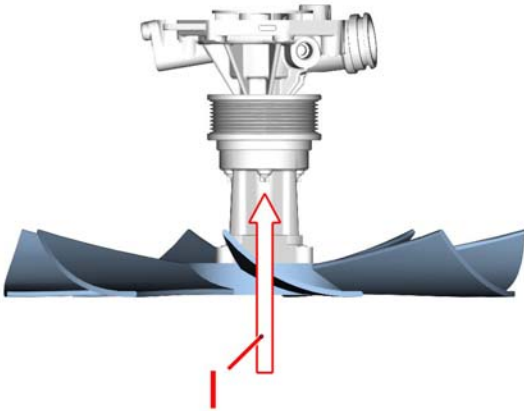
**Attention!**

Note the direction of rotation. Note installation position. "ENGINE SIDE" label faces engine!

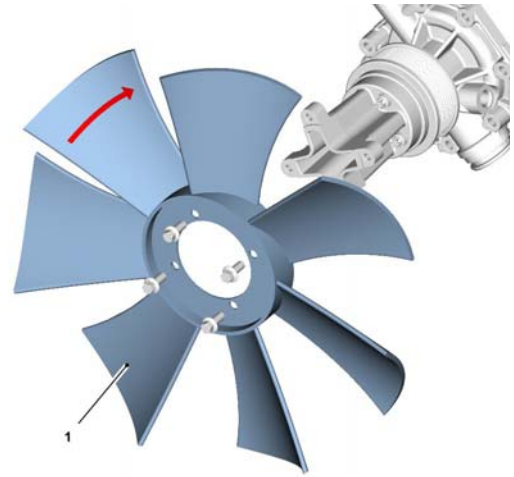




**Engine 492-2140 & 505-6559:**



MAE10680



MAE10690

1	Air flow
---	----------



**Attention!**  
Inside of blade faces engine.

**5.26.2 Pressure Fan (W 39-90-52)**

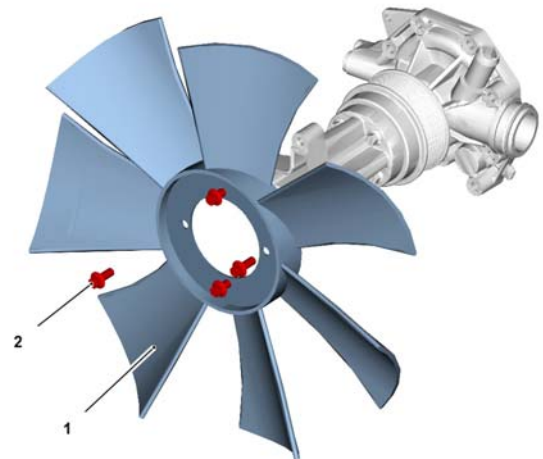


Standard tools



**Engine 492-2140 & 505-6559:**  
Safety information / User information

**Engine 492-5092 & 505-7229:**

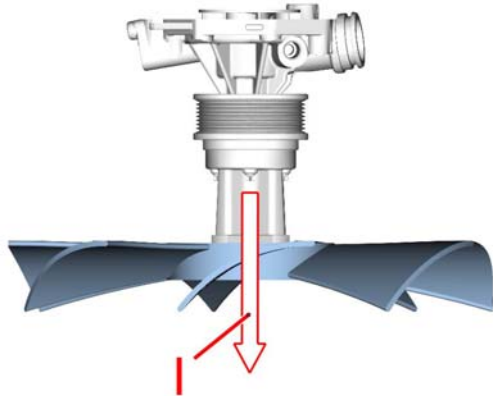


MAE13880

1	Pressure fan	
2	<b>Engine 492-5092 &amp; 505-7229:</b> Hexagon head screw	30 Nm



**Attention!**  
Note the direction of rotation. Note installation position. "ENGINE SIDE" label faces engine!



MAE10700

1	Air flow
---	----------



**Attention!**  
Outside of blade faces engine.

## 5.27 FAN BEARING

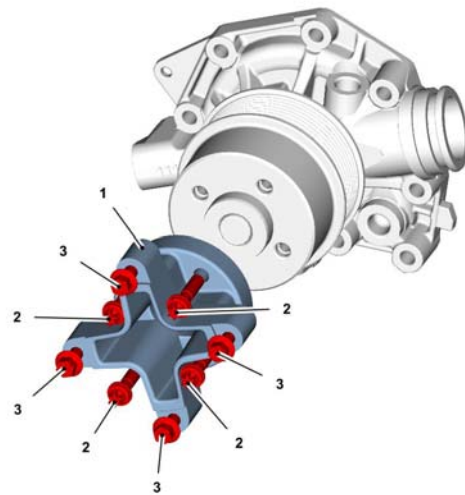
### 5.27.1 Adapter (W 39-90-67)



Standard tools



Safety information / User information



MAE10710

1	Adapter	
2	Torx screw 30 Nm	30 Nm
3	Hexagon head screw 30 Nm	30 Nm



Position 3



**Attention!**  
Note installation position.  
Note installation position of the fan.



## 5.28 EXHAUST PIPE

### 5.28.1 Removing and Installing the Exhaust Line (W 41-01-01)



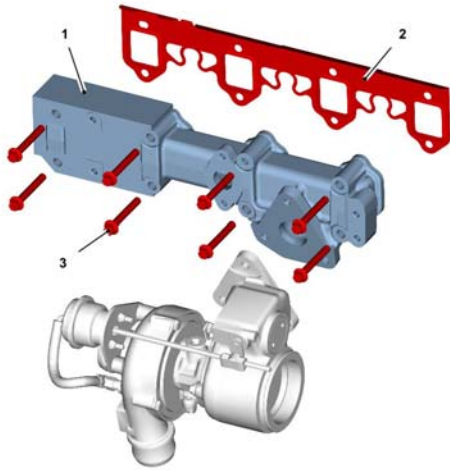
Standard tools



Safety information / User information

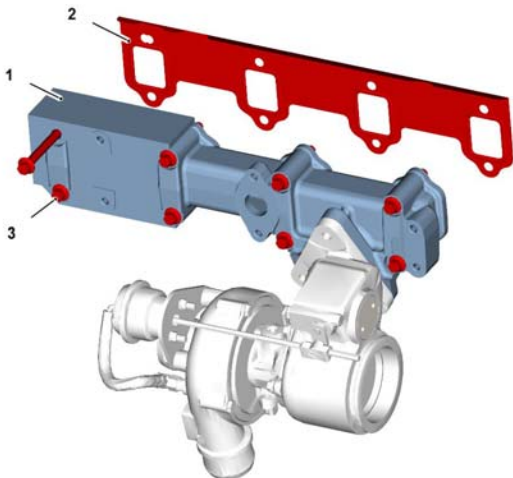
#### a. Removing Exhaust Line

Engine 492-2140 & 505-6559:



MAE10720

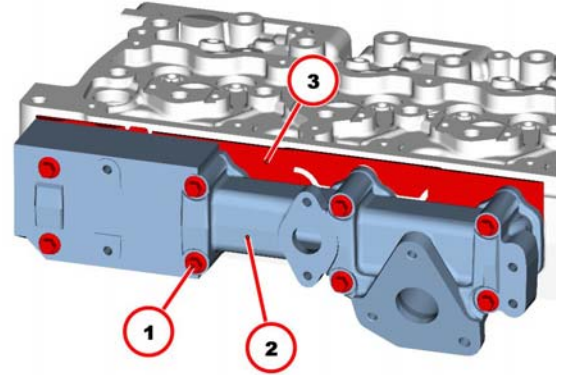
Engine 492-5092 & 505-7229:



MAE12790

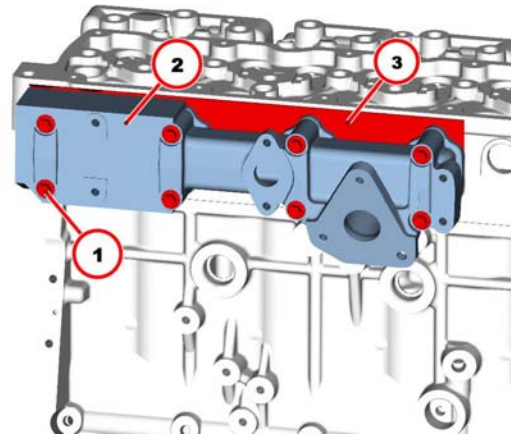
1	Exhaust line
2	Seal
3	Hexagon head screw

Engine 492-2140 & 505-6559:



MAE10730

Engine 492-5092 & 505-7229:



MAE12800

1. Remove turbocharger.



Module

43

2. Remove cooler.



Module

41

3. Unscrew all screws (1).

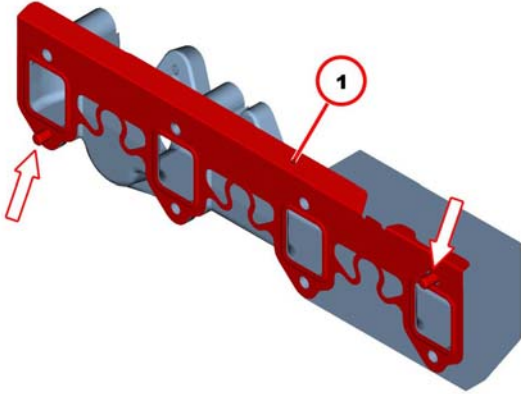


## Disassembly and Assembly

4. Remove exhaust line (2).
5. Remove gasket (3).

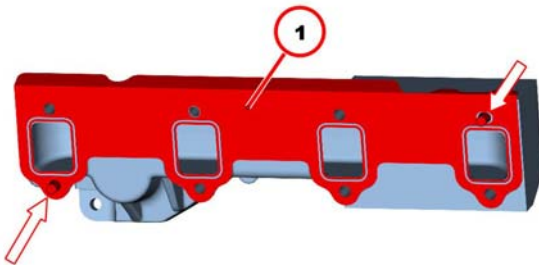
### b. Installing Exhaust Line

#### Engine 492-2140 & 505-6559:



MAE10740

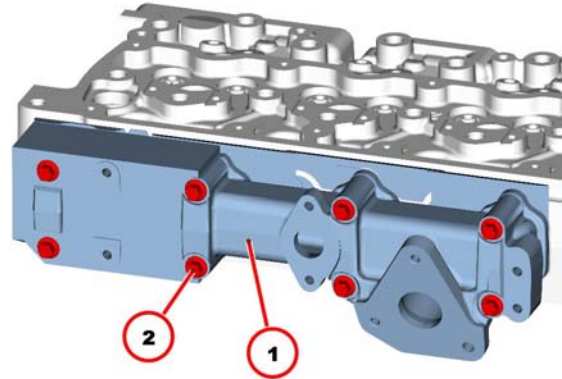
#### Engine 492-5092 & 505-7229:



MAE12810

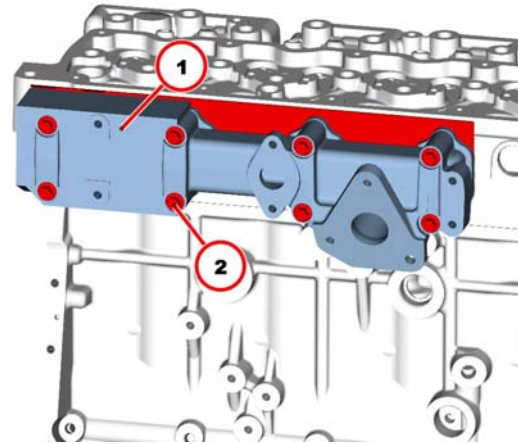
1. Visually inspect the components.
2. Clean sealing surfaces.
3. Turn in screws (arrows).
4. Fasten new seal (1) with screws on exhaust line.

#### Engine 492-2140 & 505-6559:




MAE10750

#### Engine 492-5092 & 505-7229:

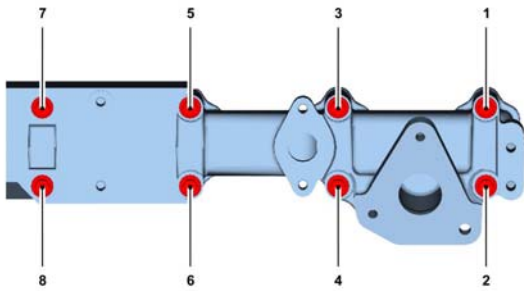


MAE12820

5. Clean sealing surfaces.
  6. Mount exhaust line (1).  
Note installation position.
- 
7. Fasten all screws (2).

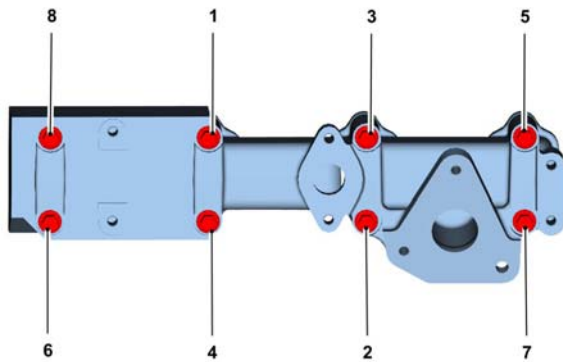


**Engine 492-2140 & 505-6559:**



MAE10760

**Engine 492-5092 & 505-7229:**



MAE12830

8. Tighten the screws according to the tightening sequence.



30 Nm

9. Install the turbocharger.



Module

43

10. Install cooler.



Module

41



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A41 001	Exhaust line on cylinder head		Observe tightening sequence	30 Nm



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



## 5.29 EXHAUST GAS RECIRCULATION

### 5.29.1 Removing and Installing the Flutter Valve (W 41-05-01)



Standard tools

Special tools:

- Spring band pliers - PN 449-2489

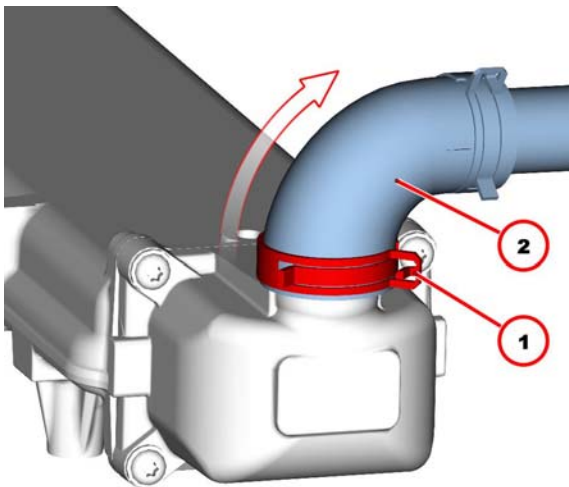


Fitting compound - Ultra 5 Moly



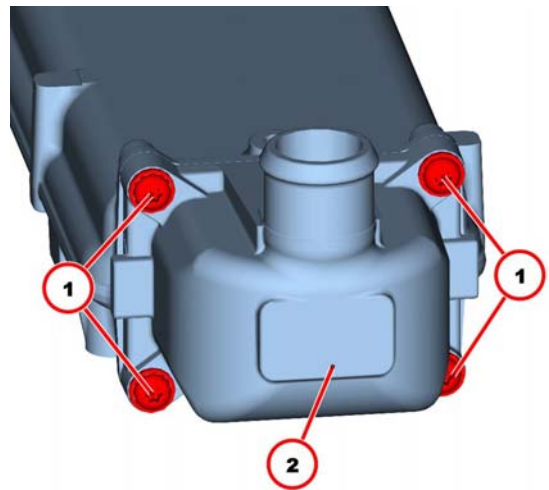
Safety information / User information

#### a. Removing the Flutter Valve (Engine 492-2140 & 505-6559)



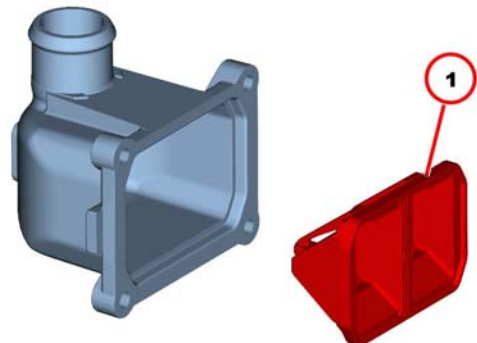
MAE10770

1. Push spring band clip (1) in the direction of the arrow.
2. Pull off hose pipe (2).



MAE10780

3. Unscrew screws (1).
4. Remove housing (2).



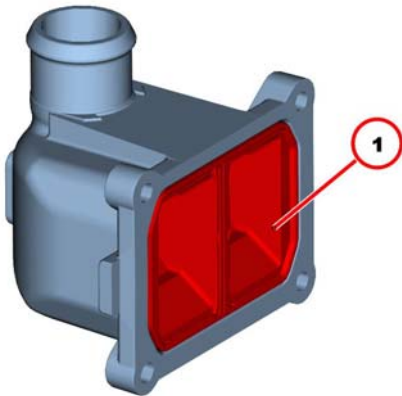
MAE10790

5. Remove flutter valve (1).
6. Visually inspect the components.



## Disassembly and Assembly

### b. Installing the Flutter Valve (Engine 492-2140 & 505-6559)



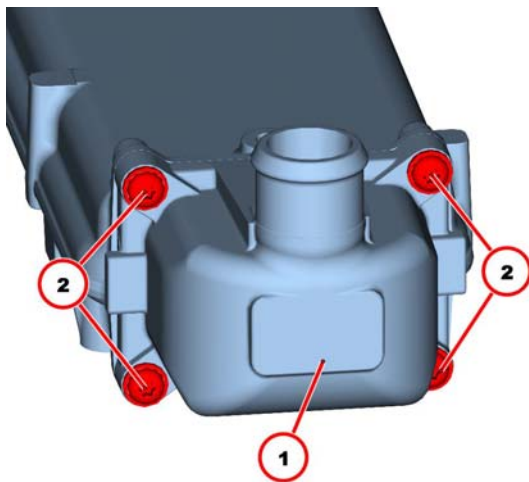
MAE10800

1. Clean housing.
2. Clean sealing surfaces.
3. Insert flutter valve (1).



#### Attention!

Ensure that the installation location is free from faults.



MAE10810

4. Mount housing (1).



#### Attention!

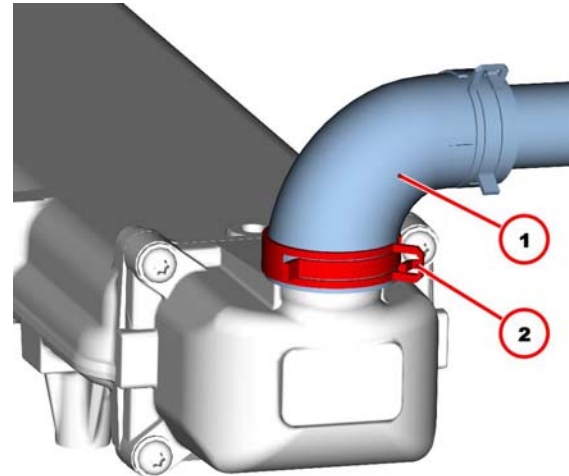
Self-tapping screws. Do not exert any great axial force onto the screws when tightening. Danger of forming a "second" thread turn.

5. Turn in screws (2) a few turns at least 3 revolutions

6. Tighten screws (2).



8 Nm



MAE10820

7. Mount the hose pipe (1).
8. Position spring band clip (2) with spring band pliers.



**c. Technical Data*****Tightening specifications***

ID no.	Name	Screw type	Notes / Remark	Value
A41 059	Flutter valve housing on cooler (exhaust gas return)			8 Nm

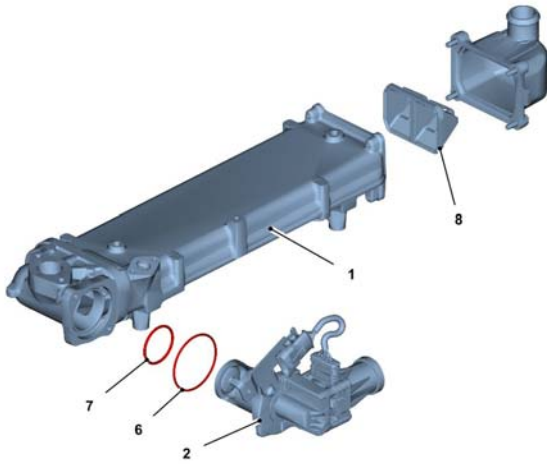


For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



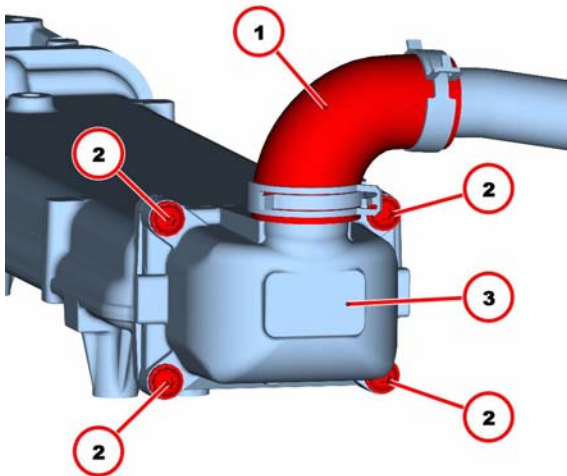
## Disassembly and Assembly

### a. Removing the Flutter Valve (Engine 492-5092 & 505-7229)



MAE12840

1	Cooler
2	Exhaust gas recirculation valve
6	O-ring
7	O-ring
8	Flutter valve



MAE12850

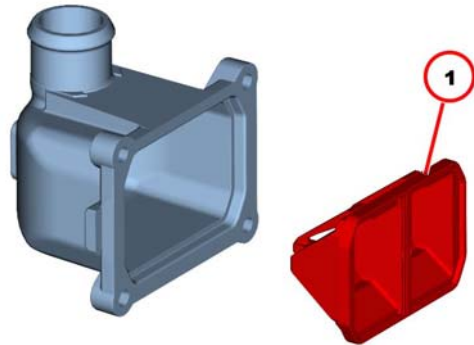
1. Remove hose pipe (1).



Module

22

2. Unscrew screws (1).
3. Remove housing (2).



MAE12860

4. Remove flutter valve (1).
5. Visually inspect the components.

### b. Installing the flutter valve (Engine 492-5092 & 505-7229)



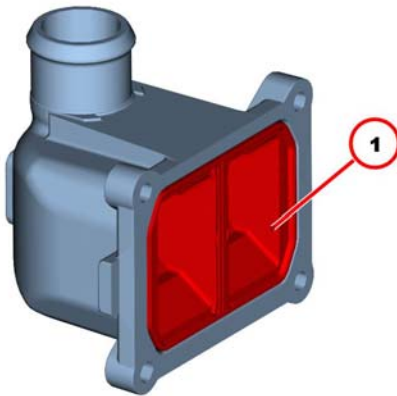
MAE12870

1. Clean housing.
2. Clean sealing surfaces.
3. Insert flutter valve with mounting compound.



#### Attention!

Ensure that the installation location is free from faults.



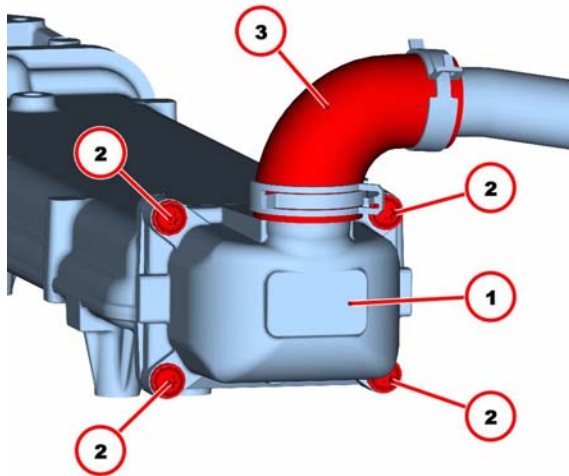
MAE12880

4. Insert flutter valve.



**Attention!**

Ensure that the installation location is free from faults.



MAE12890

5. Mount housing (1).
6. Tighten screws (2)
7. Tighten screws (2)
8. Mount hose pipe (3).



Module

22

**5.29.2 Removing and Installing the Cooler (W 41-05-02)**



Standard tools



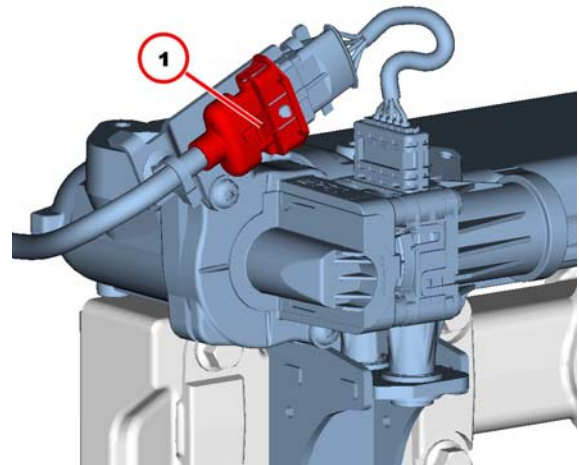
Safety information / User information



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

Observe the appropriate operating instructions for emptying and filling the engine.

**a. Removing the Cooler (Engine 492-2140 & 505-6559)**



MAE10830

1. Disconnect the battery.
2. Remove lines.
3. Unlock cable plug (1) and disconnect.

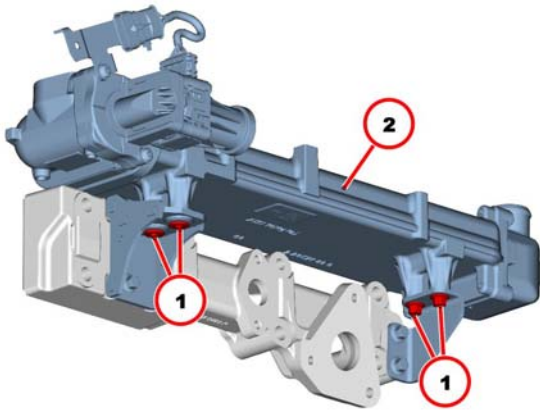


**Attention!**

To avoid electrostatic discharges, do not touch the plug contacts with your bare hands. Pay attention to utmost cleanliness.



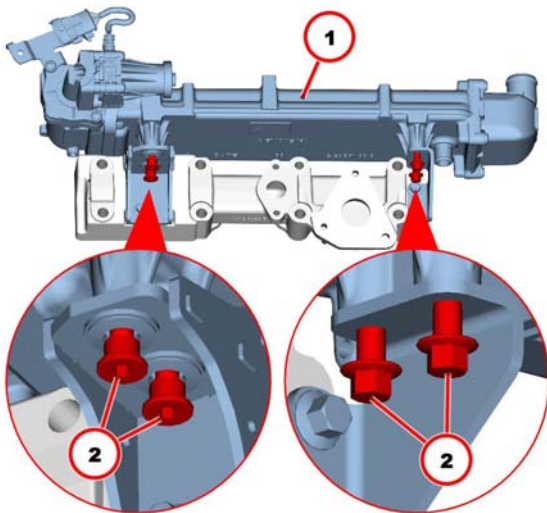
## Disassembly and Assembly



MAE10840

4. Unscrew screws (1).
5. Remove cooler (2).
6. Visually inspect the component.

### b. Installing the Cooler (Engine 492-2140 & 505-6559)



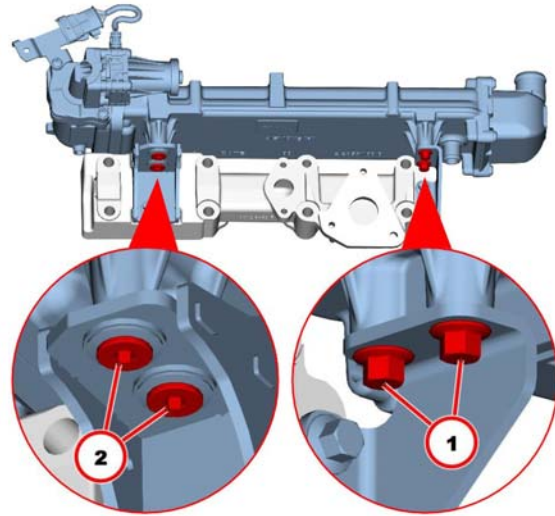
MAE10850

1. Mount cooler (1).



Please observe assembly sequence!

2. Screw in screws (2) two turns.



MAE10860

3. Tighten screws (1).

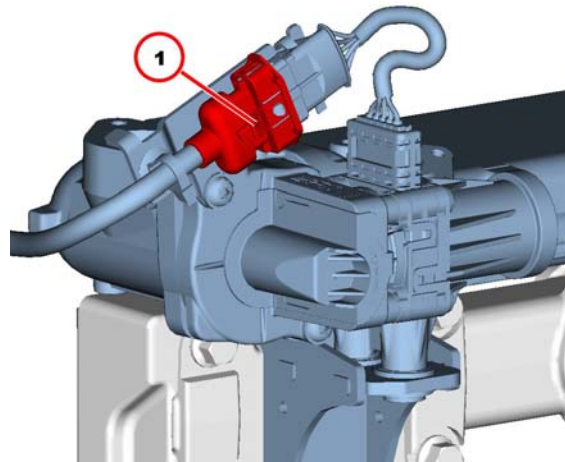


20 Nm

4. Tighten screws (2).



20 Nm



MAE10870



### Attention!

To avoid electrostatic discharges, do not touch the plug contacts with your bare hands.  
Pay attention to utmost cleanliness.

5. Mount cable plug (1) and lock.



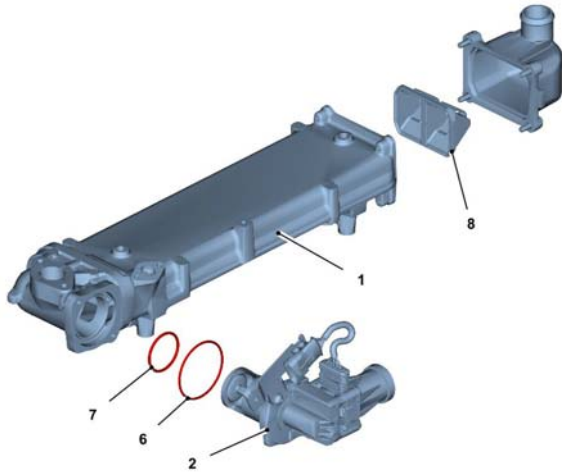
### Attention!

Ensure that the connection is perfect.



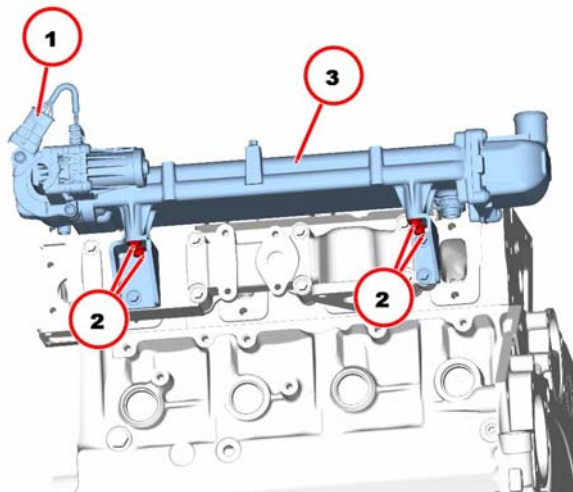
6. Insert lines.
7. Connect the battery.

**a. Removing the cooler  
(Engine 492-5092 & 505-7229)**



MAE13360

1	Cooler
2	Control valve
3	O-ring
4	O-ring
5	Flutter valve



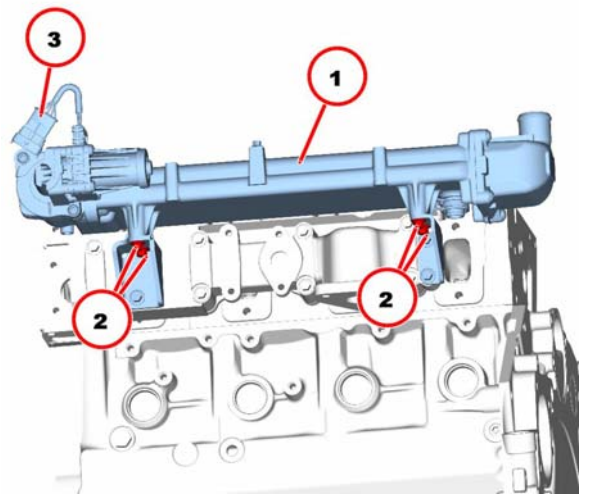
MAE13370

1. Remove coolant pipes.

Module 41

2. Unlock cable plug (1) and disconnect.
3. Unscrew screws (2).
4. Remove cooler (3).
5. Visually inspect the component.

**b. Installing the cooler  
(Engine 492-5092 & 505-7229)**



MAE13380

1. Mount cooler (1).
2. Tighten screws (2).
3. Tighten screws (2).

20 Nm

4. Insert cable plug (3) and lock into place.

Ensure that the connection is perfect.

5. Attach coolant lines.

Module 41



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A41 052	Cooler on holder (exhaust gas recirculation)			20 Nm



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



### 5.29.3 Removing and Installing the Exhaust Gas Return Valve (W 41-05-03)



Standard tools

Special tools:

– Disassembly tool - PN 461-1696



– Fitting compound - Ultra 5 Moly

– Ethanol C<sub>2</sub>H<sub>5</sub>OH

CAS No. 64-17-5

(not in the scope of delivery of engine manufacturer)



Safety information / User information

- Operation manual



**Danger!**

**Hot components!**

Danger of burns / explosion!

Let the engine / components cool down sufficiently (to at least ambient temperature).

Observe safety regulations and national regulations when working with ethanol.



**Attention!**

Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

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

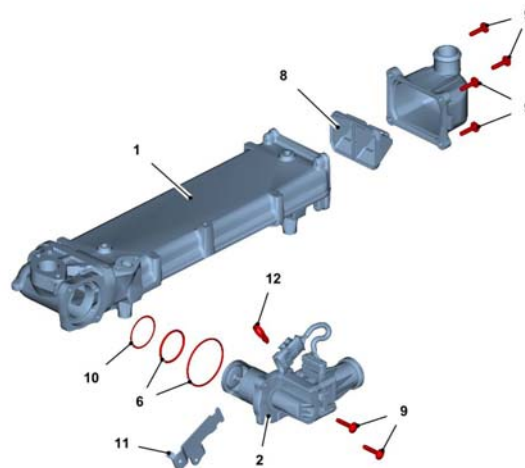
Do not remove plugs/caps until immediately before assembling.



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

Observe the appropriate operating instructions for emptying and filling the engine.

#### a. Removing the Exhaust Gas Return Valve



MAE10880

**Engine 492-2140 & 505-6559:**

1	Cooler
2	Exhaust gas recirculation valve
6	O-rings
8	Flutter valve
9	Screw
10	Sealing disc
11	Holder
12	Cable tie

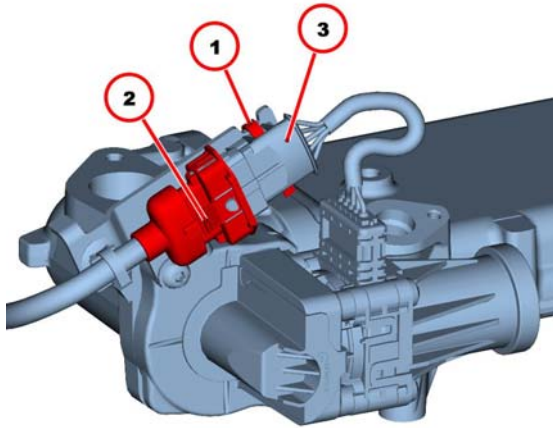
**Engine 492-5092 & 505-7229:**

1	Cooler
2	Exhaust gas recirculation valve
6	O-rings
7	O-rings
8	Flutter valve



## Disassembly and Assembly

### Engine 492-2140 & 505-6559:



MAE10890

1. Drain, collect and dispose of coolant according to regulations.
2. Disconnect the battery.
3. Remove the compensator.



Module 41

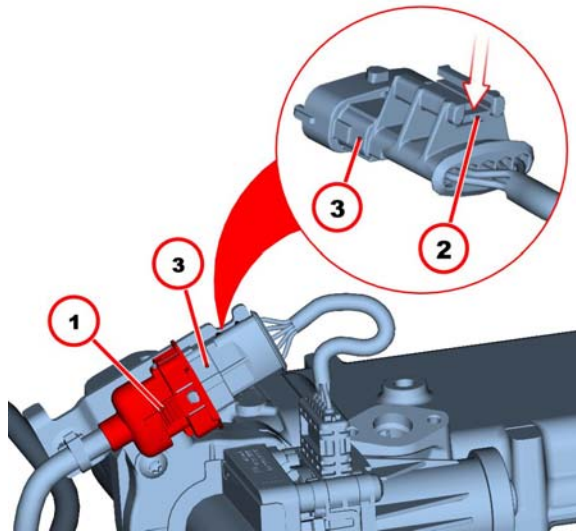
4. Remove cable tie (1).
5. Unlock cable plug (2).
6. Pull off cable plug (3)



#### Attention!

To avoid electrostatic discharges, do not touch the plug contacts with your bare hands.  
Pay attention to utmost cleanliness.

### Engine 492-5092 & 505-7229:



MAE12900

1. Drain, collect and dispose of coolant according to regulations.
2. Disconnect the battery.
3. Remove the compensator.



Module 41

4. Unlock cable plug (2) and remove.
5. Push latch (2) in the direction of the arrow.
6. Pull off cable plug (3)



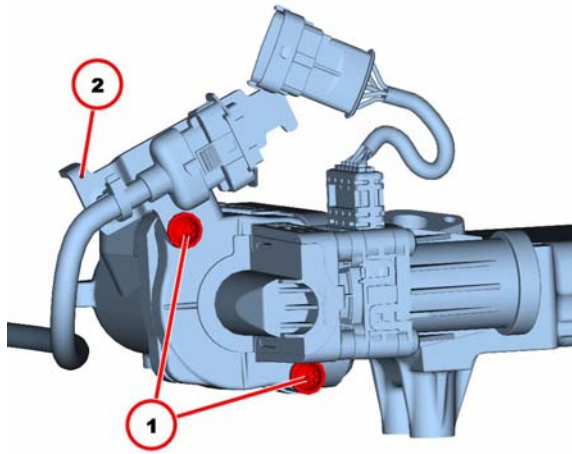
#### Attention!

To avoid electrostatic discharges, do not touch the plug contacts with your bare hands.  
Pay attention to utmost cleanliness





Engines All:

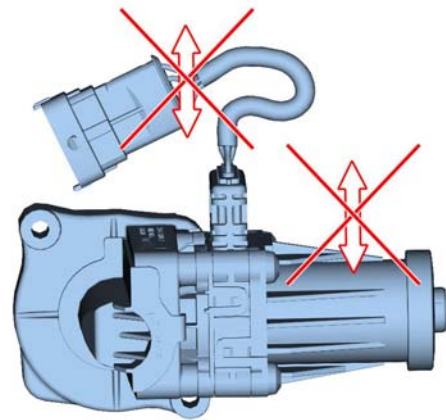


MAE10900

7. Unscrew screws (1).
8. Swing holder (2) to the side.



Note installation position.

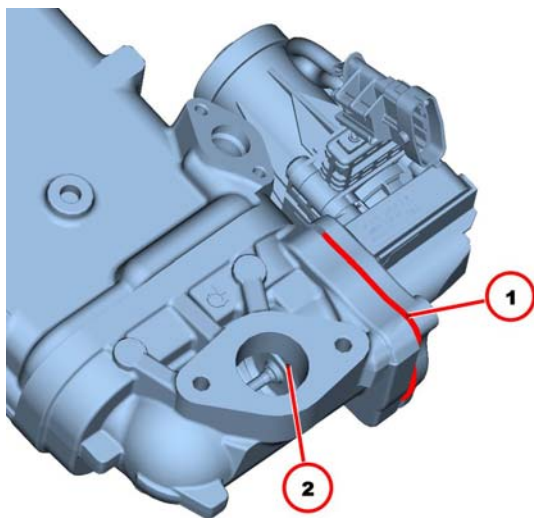


MAE10920



**Attention!**

Do not exert force onto the crankcase.  
Do not exert force onto the cable strand.

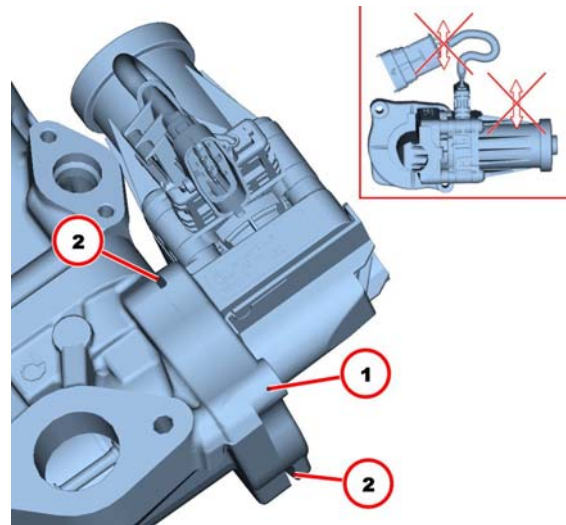


MAE10910

9. Apply ethanol to joint (1) in opening (2).



Allow ethanol to take effect until the incrustation in the seat is removed.



MAE10930



**Attention!**

Do not damage the components.  
Do not twist the exhaust gas recirculation valve.

10. Pry out the exhaust gas recirculation valve (1) evenly at the recesses (2).



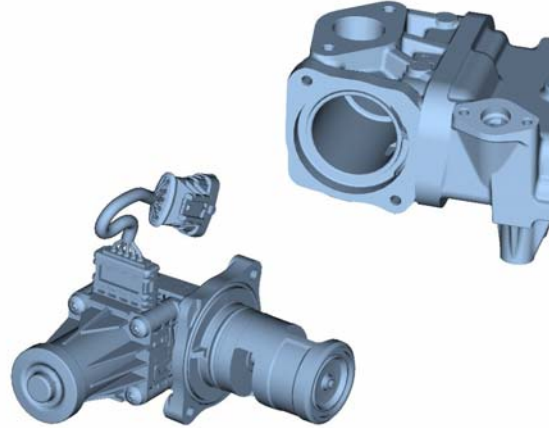
## Disassembly and Assembly

11. Pull out exhaust gas recirculation valve (1) evenly.  
Distance approximately 70 mm.



MAE10940

14. Remove the o-rings (1) with the disassembly tool.



MAE6590



### Attention!

See the spare parts documentation.  
Note the version of the cooler.

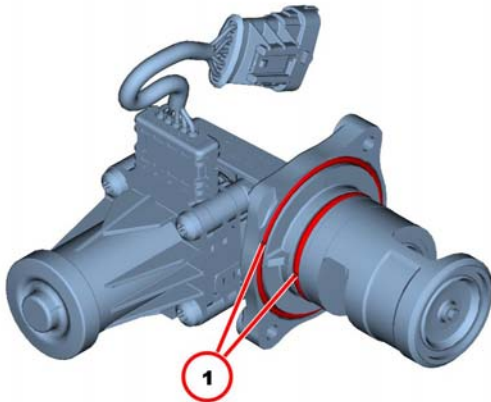
12. For the version with a sealing disc:



### Attention!

**Engine 492-5092 & 505-7229:** Note installation position.

13. Remove sealing disc (1).

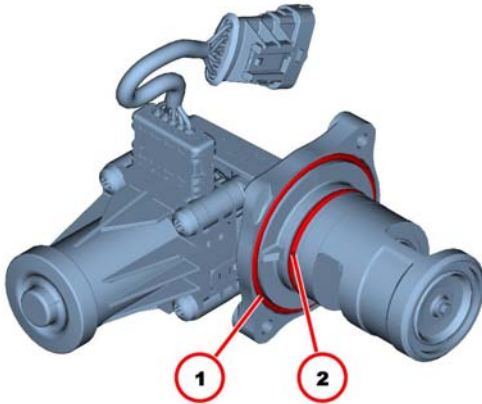


MAE10950

15. Check components for damage.



**b. Installing the Exhaust Gas Return Valve**



MAE10960

1. Clean contact surfaces.
2. Clean the locating hole.
3. Coat new round sealing rings slightly with mounting compound.



**Attention!**

Do not twist or overstretch round sealing rings. Do not damage o-rings!

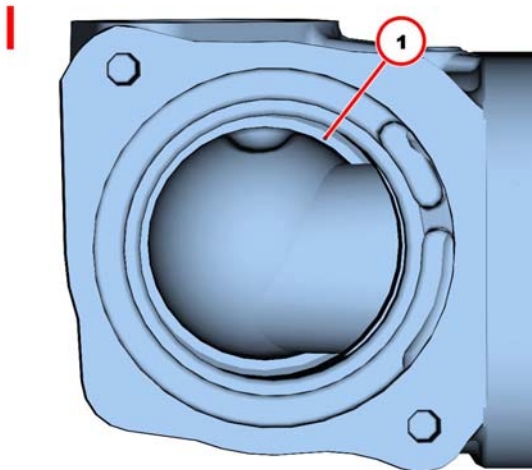
4. Mount new o-ring (1).



Use a suitable assembly aid. Provide protection for sharp edges.

5. Mount new round sealing ring (2)

**Engine 492-2140 & 505-6559:**



MAE10970



**Attention!**

See the spare parts documentation. Note the version of the cooler.

**Type I**



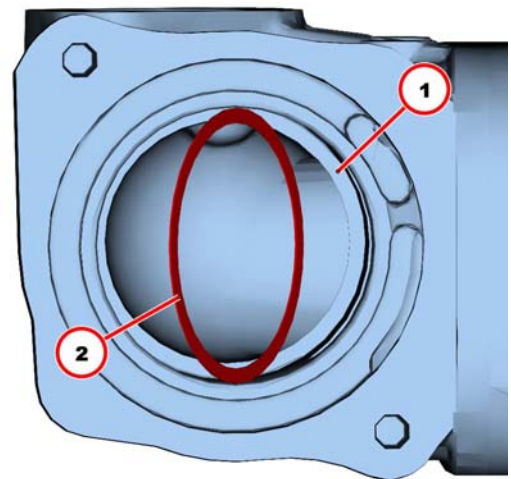
Contact surface (1) is not continuous.



**Attention!**

No sealing disc may be installed.

**Type II**



MAE10980



Contact surface (1) is continuous.

6. Clean sealing surfaces.
7. Insert new sealing disc° (2).



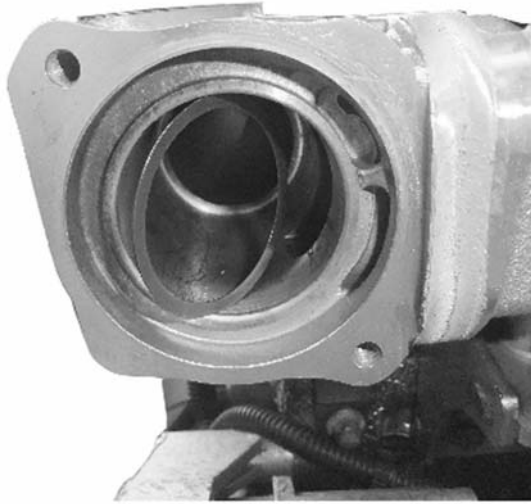
**Attention!**

When new, the sealing disc is flat. Ensure that the installation location is free from faults.



## Disassembly and Assembly

### Engine 492-5092 & 505-7229:



MAE12910



#### Attention!

See the spare parts documentation.

6. For the version with a sealing disc:
7. Insert sealing disc (1).

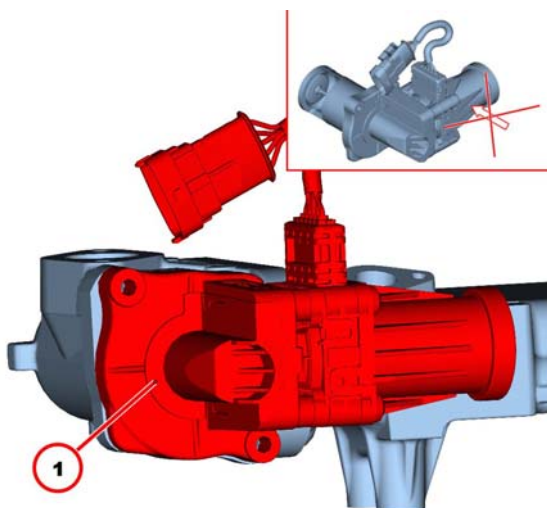


#### Attention!

Ensure that the installation location is free from faults.

The cone is facing the contact surface of the cooler.

8. Clean sealing surfaces.



MAE10990



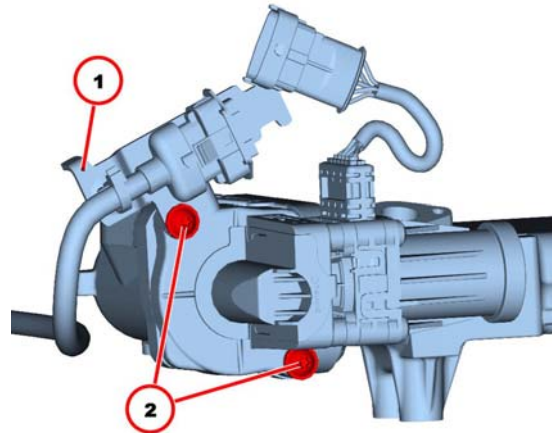
#### Attention!

Do not twist the exhaust gas recirculation valve.  
Do not exert force onto the crankcase.

The exhaust gas recirculation valve must not be tightened to the stop via the screws.

Ensure that the installation location is free from faults.

1. Insert exhaust gas recirculation valve (1) evenly to the stop.



MAE11000

2. Position holder (1).



Ensure that the installation location is free from faults.

**Attention!**

Self-tapping screws.

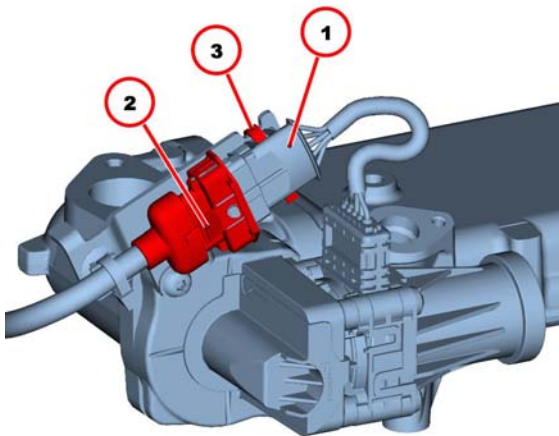
Do not exert any great axial force onto the screws when tightening.

Danger of forming a "second" thread turn.

3. Turn in screws (2) a few turns at least 3 revolutions
4. Tighten screws (2).



8 Nm



MAE11010

**Attention!**

To avoid electrostatic discharges, do not touch the plug contacts with your bare hands.

Pay attention to utmost cleanliness.

5. Fit cable plug (1) and cable plug (2) together and lock.
6. Fasten new cable tie (3).
7. Install the compensator.



Module

41

8. Connect the battery.
9. Fill cooling system according to the operating manual.



Operation manual

10. Check gas system for leaks.



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A41 049	Exhaust gas recirculation valve on cooler		Self-tapping screws	8 Nm



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



**5.29.4 Removing and Installing the Exhaust Gas Return Pipe (W 41-05-05) (Engine 492-2140 & 505-6559)**



Standard tools

Special tools:

- Spring band pliers - PN 449-2489
- Disassembly tool - PN 461-1696

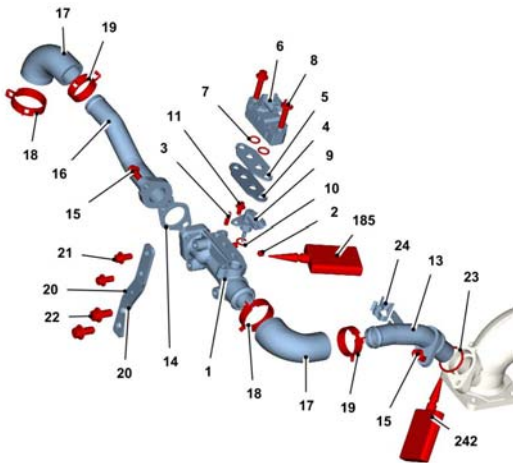


Fitting compound



Safety information / User information

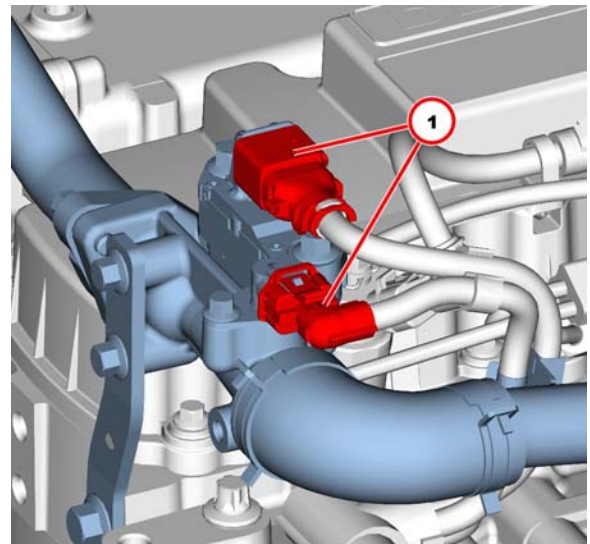
**a. Removing the Exhaust Gas Return Pipe**



MAE11020

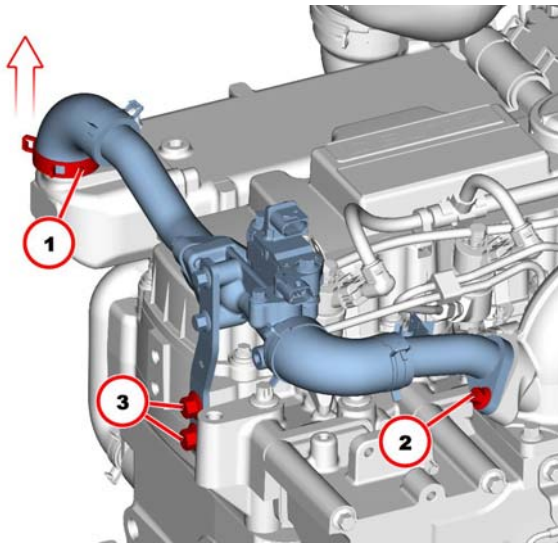
1	Venturi tube
2	Threaded pin
3	Clamping pin
4	Insulating plate
5	Adapter
6	Pressure sensor
7	O-ring
8	Hexagon head screw
9	Temperature sensor

10	O-ring
11	Hexagon head screw
13	Exhaust line
14	Seal
15	Hexagon head screw
16	Exhaust line
17	Hose pipe
18	Spring band clip
19	Spring band clip
20	Holder
21	Hexagon head screw
22	Hexagon head screw
23	O-ring
24	Holder
185	Locking agent
242	Mounting compound



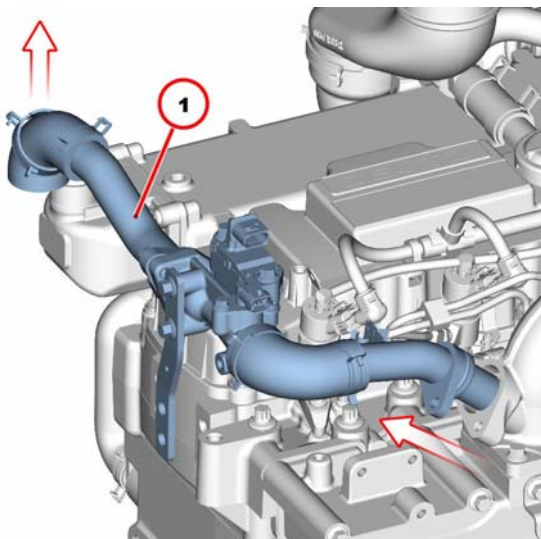
MAE11030

1. Unlock cable plug (1) and remove.



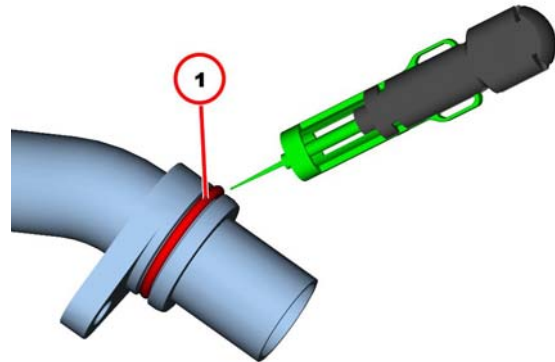
MAE11040

2. Loosen spring band clip (1) with spring band pliers.
3. Push spring band clip (1) in the direction of the arrow.
4. Unscrew screw (2).
5. Unscrew screws (3).



MAE11050

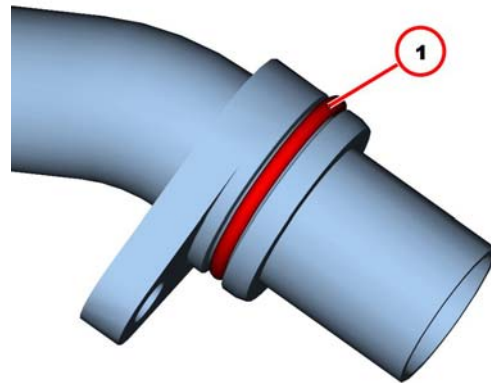
6. Remove the exhaust pipe (1) in direction of the arrow.



MAE11060

7. Remove the o-ring (1) with the disassembly tool.

### b. Installing the Exhaust Gas Return Pipe



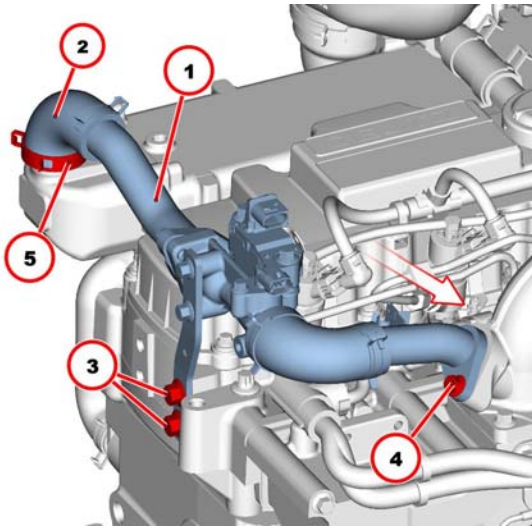
MAE11070

1. Clean sealing surface.
2. Coat new round sealing ring (1) with mounting compound.
3. Insert new o-ring (1).



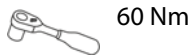


12. Mount cable plug (1) and lock.

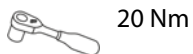


MAE11080

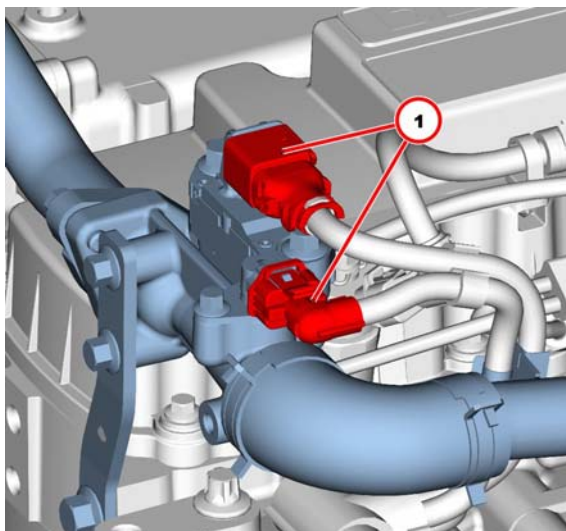
4. Clean sealing surface.
5. Mount exhaust pipe (1) in the direction of the arrow.
6. Mount the hose pipe (2).
7. Mount screws (3).
8. Insert screw (4).
9. Tighten screws (3).



10. Tighten screws (4).



11. Position spring band clip (5) with spring band pliers.



MAE11090



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID No.	Name	Screw Type	Notes / Remark	Value
A41 012	Holder on cylinder head			60 Nm
A41 044	Exhaust pipe on charge air manifold			20 Nm



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



**5.29.5 Removing and Installing the Venturi Tube (W 41-05-10) (Engine 492-2140 & 505-6559)**

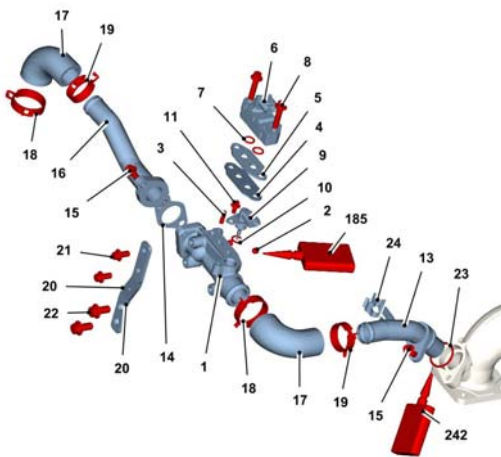


Standard tools  
Special tools:  
- Spring band pliers - PN 449-2489



Safety information / User information

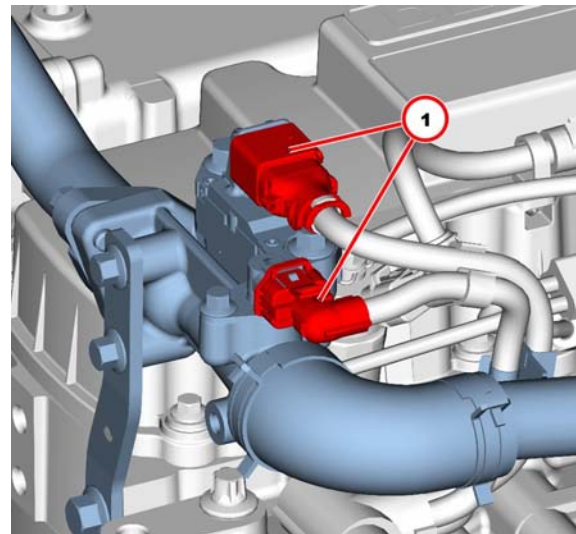
**a. Removing the Venturi Tube**



MAE11100

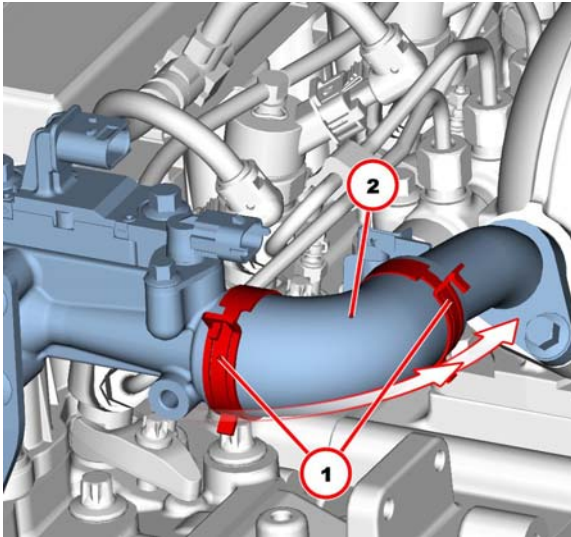
14	Seal
15	Hexagon head screw
16	Exhaust line
17	Hose pipe
18	Spring band clip
19	Spring band clip
20	Holder
21	Hexagon head screw
22	Hexagon head screw
23	O-ring
24	Holder
185	Locking agent
242	Mounting compound

1	Venturi tube
2	Threaded pin
3	Clamping pin
4	Insulating plate
5	Adapter
6	Pressure sensor
7	O-ring
8	Hexagon head screw
9	Temperature sensor
10	O-ring
11	Hexagon head screw
13	Exhaust line



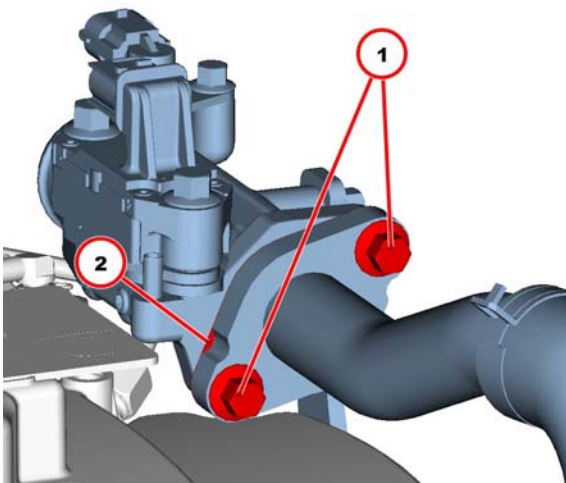
MAE11110

1. Unlock cable plug (1) and remove.



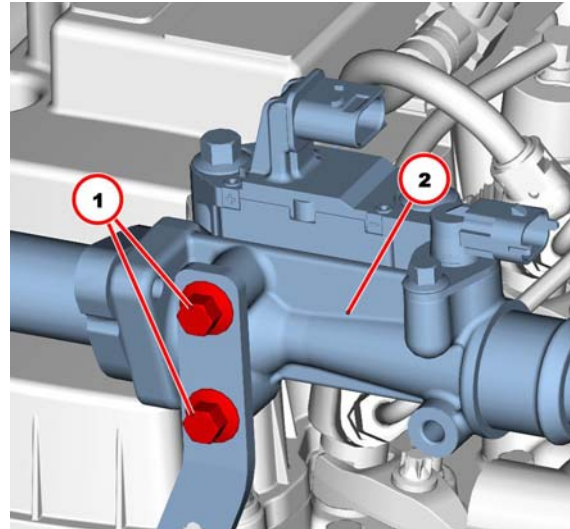
MAE11120

2. Loosen spring band clip (1) with spring band pliers.
3. Pull off spring band clips (1) in the direction of the arrow.
4. Pull off hose pipe (2).



MAE11130

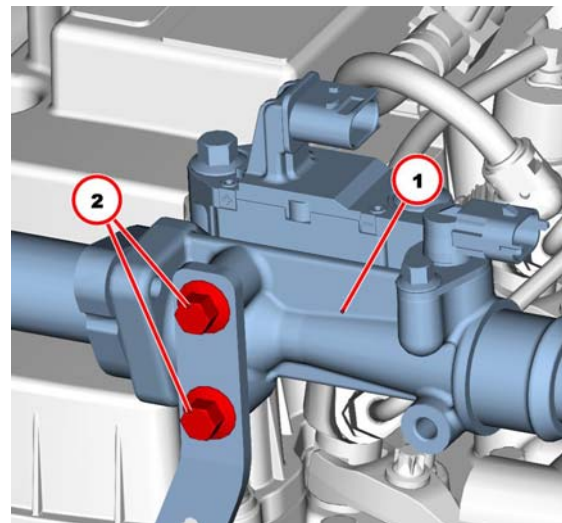
5. Unscrew screws (1).
6. Remove gasket (2).



MAE11140

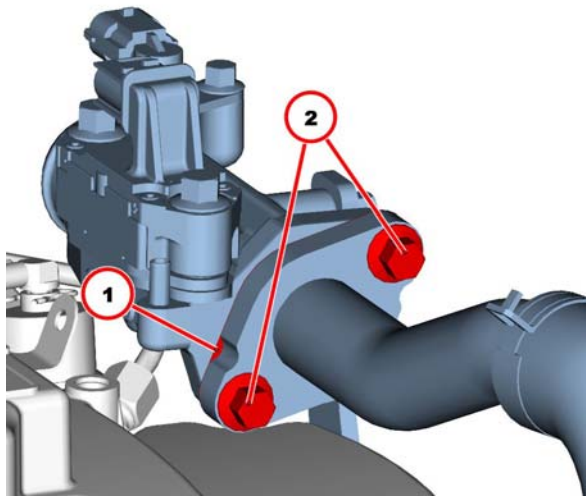
7. Unscrew screws (1).
8. Remove Venturi tube (2).
9. Clean sealing surfaces.

### b. Installing the Venturi Tube



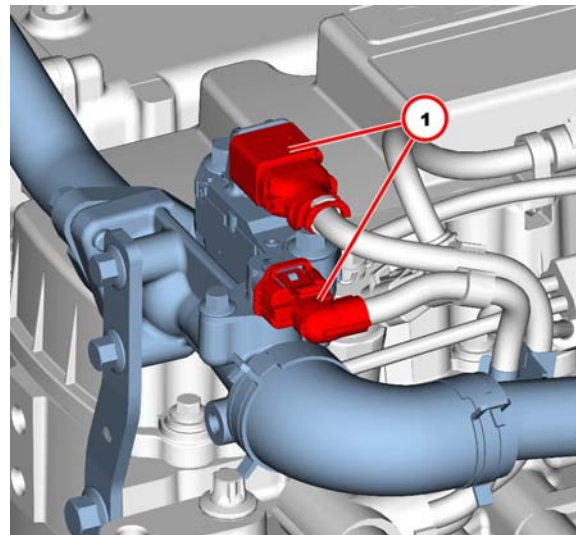
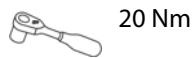
MAE11150

1. Mount Venturi tube (1).
2. Mount screws (2).



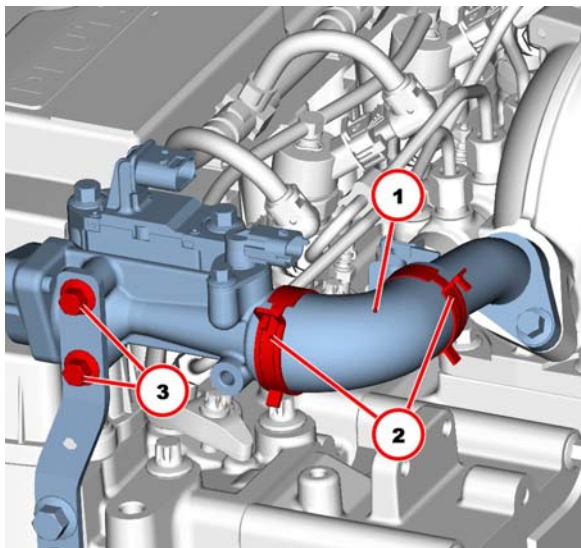
MAE11160

3. Position seal (1).
4. Mount screws (2).
5. Tighten screws (2).



MAE11180

9. Mount cable plug (1) and lock.



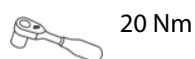
MAE11170

6. Mount hose line (1).
7. Position spring band clips (2) with spring band pliers.



**Attention!**  
Ensure that the connection is perfect.

8. Tighten screws (3).





## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A41 013	Holder on venturi tube			20 Nm
A41 045	Exhaust pipe on Venturi tube			20 Nm



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



**5.29.6 Removing and Installing the Temperature Sensor (W 41-06-01) (Engine 492-2140 & 505-6559)**



Standard tools  
Special tools  
- Disassembly tool - PN 461-1696

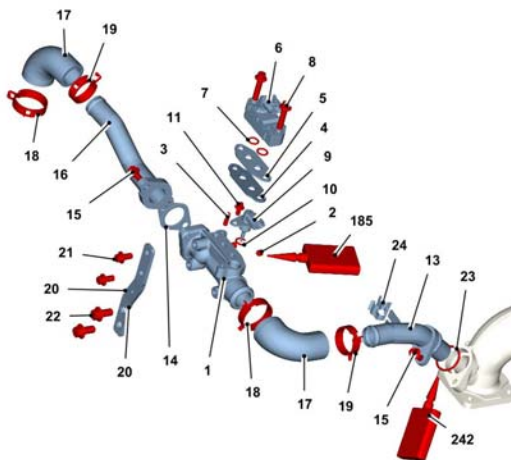


Fitting compound



Safety information / User information

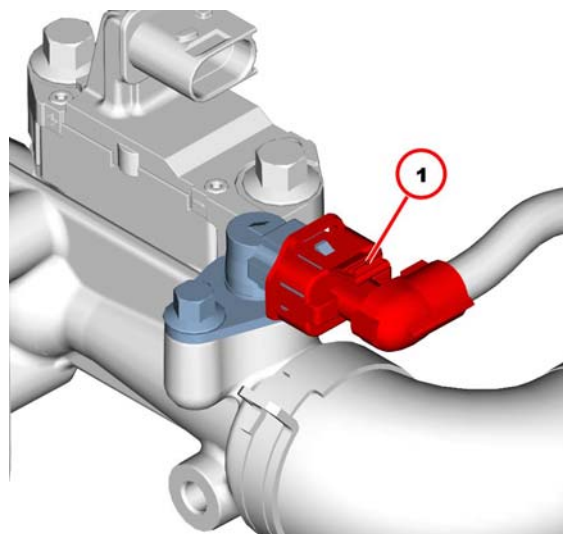
**a. Removing the Temperature Sensor**



MAE11190

11	Hexagon head screw
13	Exhaust line
14	Seal
15	Hexagon head screw
16	Exhaust line
17	Hose pipe
18	Spring band clip
19	Spring band clip
20	Holder
21	Hexagon head screw
22	Hexagon head screw
23	O-ring
24	Holder
185	Locking agent
242	Mounting compound

1	Venturi tube
2	Threaded pin
3	Clamping pin
4	Insulating plate
5	Adapter
6	Pressure sensor
7	O-ring
8	Hexagon head screw
9	Temperature sensor
10	O-ring

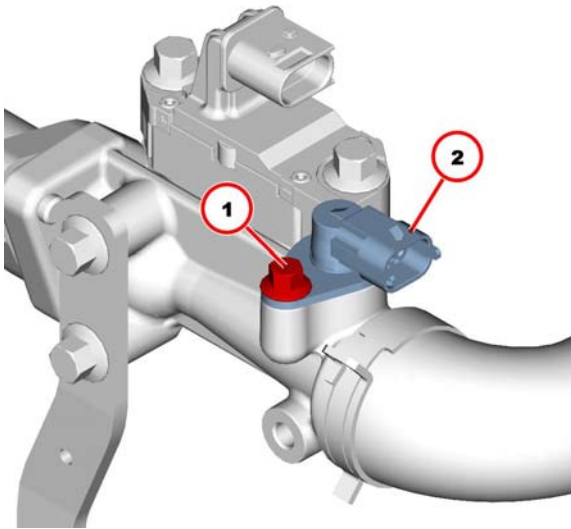


MAE11200

1. Unlock cable plug (1) and remove.

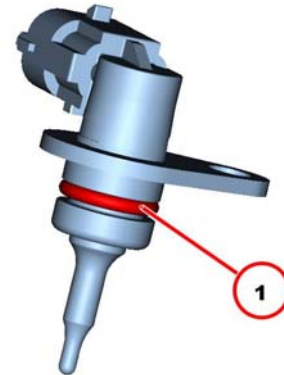


## b. Installing the Temperature Sensor



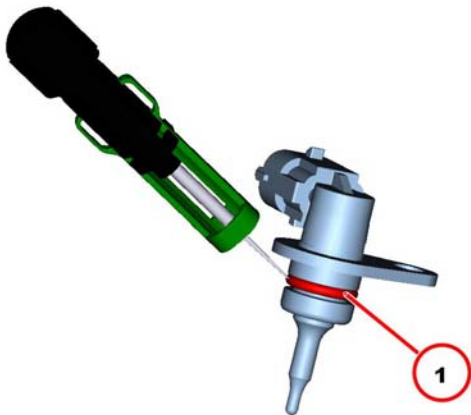
MAE11210

2. Unscrew screws (1).
3. Remove temperature sensor (2).
4. Visually inspect the component.



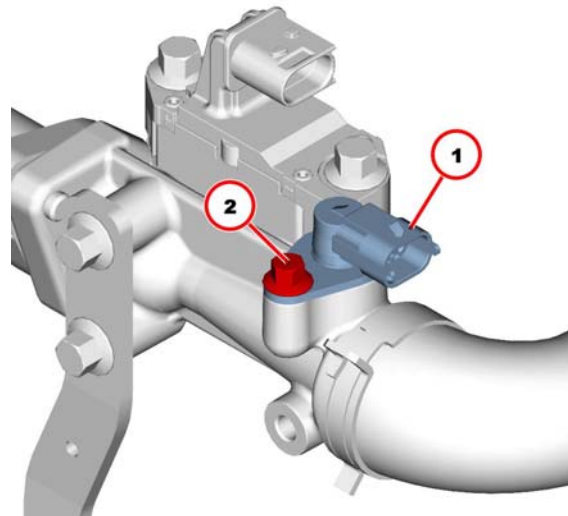
MAE11230

1. Clean sealing surface.
2. Coat new round sealing rings (1) with mounting compound.
3. Insert new o-rings (1).



MAE11220

5. Remove the o-ring (1) with the disassembly tool.



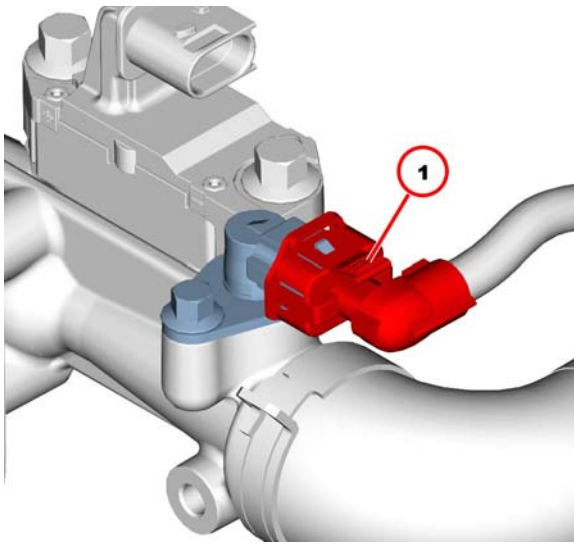
MAE11240

4. Insert temperature transmitter (1).
5. Insert screw (2).
6. Tighten screw (2).



8.5 Nm





MAE11250

7. Plug in the cable plug (1) and snap in lock.



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A41 061	Temperature sensor on Venturi tube (exhaust gas recirculation)			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.



**5.29.7 Removing and Installing the Pressure Transmitter (W 41-06-02) (Engine 492-2140 & 505-6559)**



Standard tools  
Special tools:  
- Spring band pliers - PN 449-2489

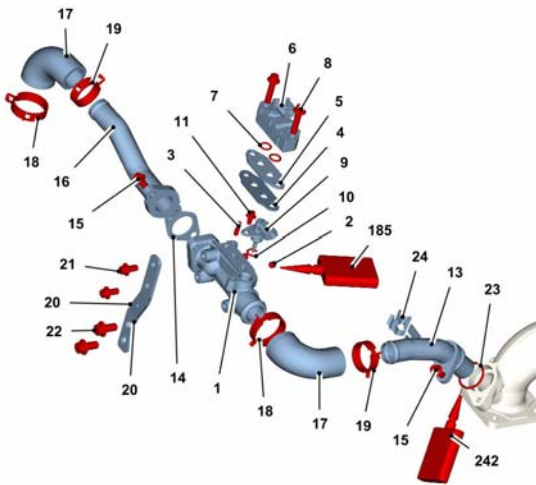


Fitting compound  
Ultra 5 Moly



Safety information / User information

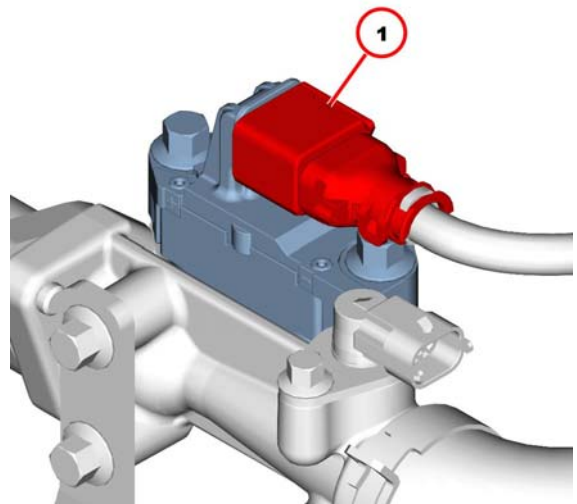
**a. Removing the Pressure Transmitter**



MAE11260

1	Venturi tube
2	Threaded pin
3	Clamping pin
4	Insulating plate
5	Adapter
6	Pressure sensor
7	O-ring
8	Hexagon head screw
9	Temperature sensor
10	O-ring

11	Hexagon head screw
13	Exhaust line
14	Seal
15	Hexagon head screw
16	Exhaust line
17	Hose pipe
18	Spring band clip
19	Spring band clip
20	Holder
21	Hexagon head screw
22	Hexagon head screw
23	O-ring
24	Holder
185	Locking agent
242	Mounting compound

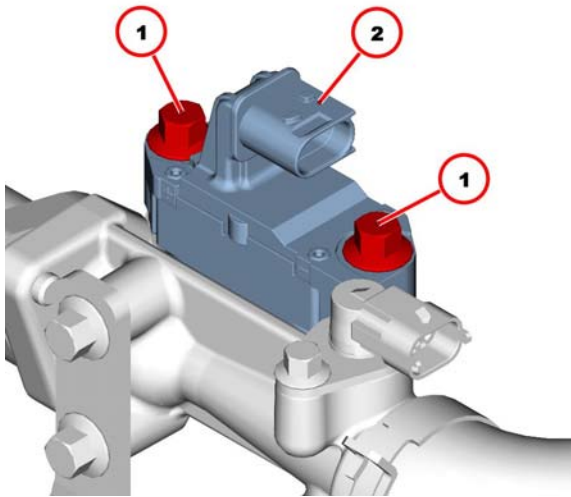


MAE11270

1. Unlock cable plug (1) and remove.

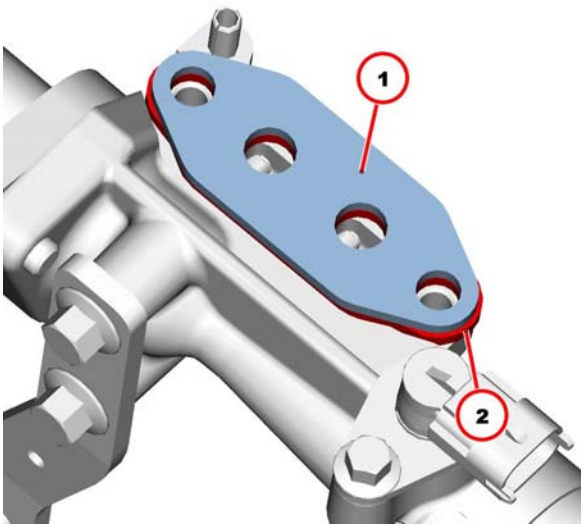


## Disassembly and Assembly



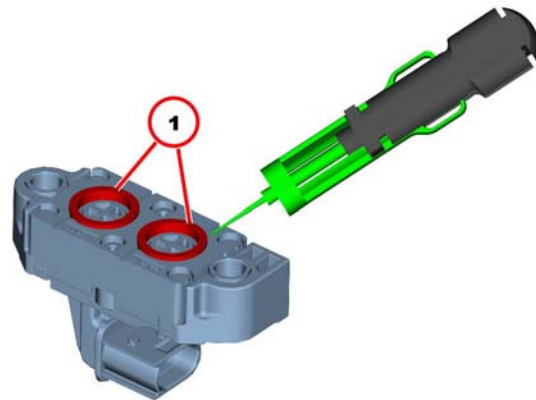
MAE11280

2. Unscrew screws (1).
3. Remove pressure sensor (2).



MAE11290

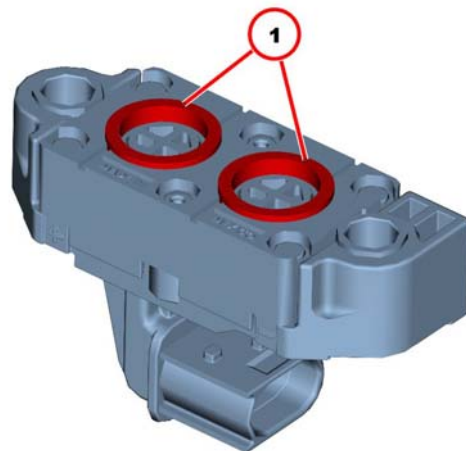
4. Remove adapter (1).
5. Remove insulating plate (2).



MAE11300

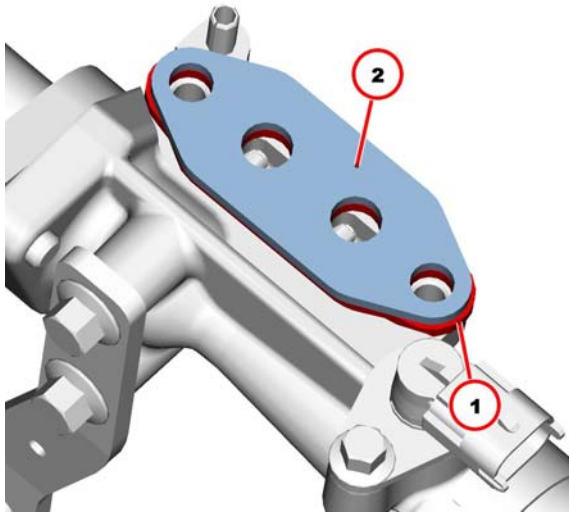
6. Remove the o-rings (1) with the disassembly tool.

### b. Installing the Pressure Transmitter

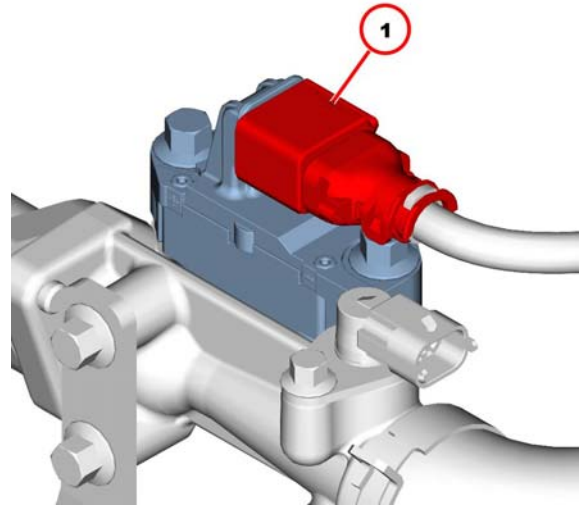


MAE11310

1. Clean sealing surface.
2. Coat new round sealing rings (1) with mounting compound.
3. Insert new o-rings (1).

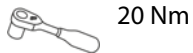


MAE11320

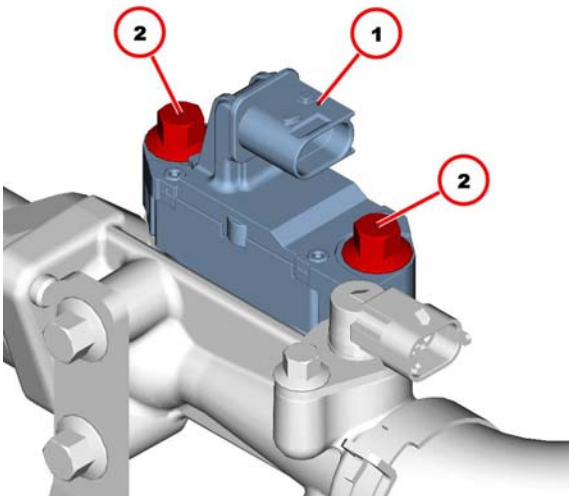


MAE11340

4. Clean sealing surface.
5. Mount new insulating plate (1).
6. Mount adapter (2).

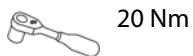


10. Mount cable plug (1) and lock.



MAE11330

7. Mount pressure sensor (1).
8. Mount screws (2).
9. Tighten screws (2).





## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A41 063	Pressure sensor on Venturi tube (exhaust gas recirculation)			20 Nm



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



**5.29.8 Connection (W 41-90-04)**



Standard tools  
Special tools  
- Spring band pliers - PN 449-2489



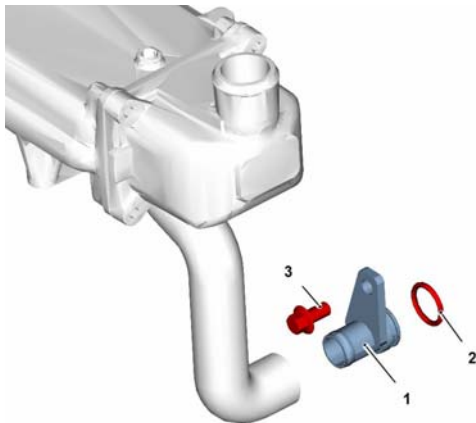
Fitting compound  
Ultra 5 Moly



**Engine 492-2140 & 505-6559:**  
- Operation manual  
- Safety information / User information



Collect leaking operating substances in suitable vessels and dispose of according to regulations.  
Observe the appropriate operating instructions for emptying and filling the engine.



MAE13320

1	Hose nozzles
2	O-ring
3	Hexagon head screw 20 Nm



Use new round sealing ring.

1. Coat new round sealing ring slightly with mounting compound.

**5.29.9 Screw Plug (W 41-90-04)**



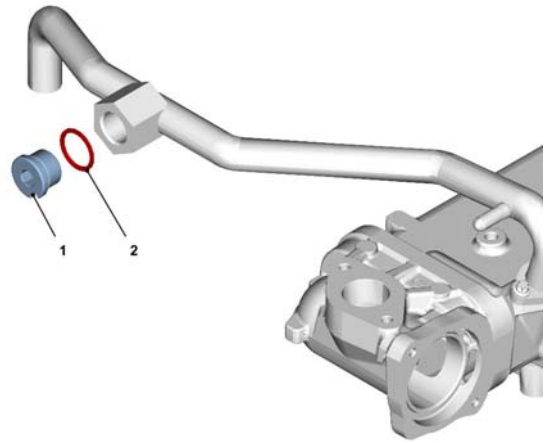
Standard tools



Safety information / User information



Collect leaking operating substances in suitable vessels and dispose of according to regulations.  
Observe the appropriate operating instructions for emptying and filling the engine.



MAE11360

1	Screw plug 80 Nm
2	O-ring



Use new round sealing ring.



**Attention!**  
**Engine 492-2140 & 505-6559:** Hold hexagon.



## Disassembly and Assembly

### 5.29.10 Holder (W 41-90-09)



Standard tools



Safety information / User information



#### Engine 492-2140 & 505-6559:

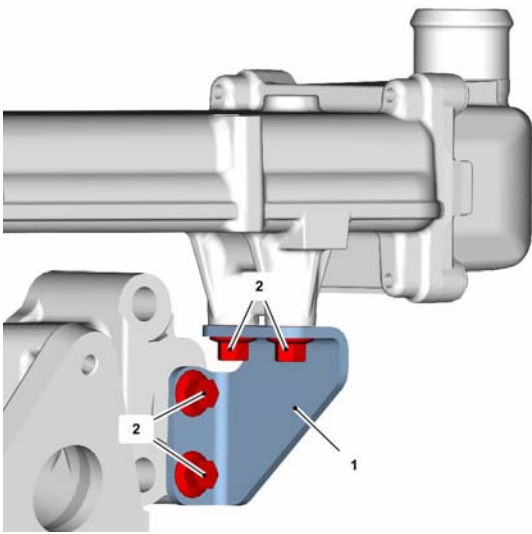
Please observe assembly sequence.

1. **Engine 492-2140 & 505-6559:** Removing and installing the cooler.



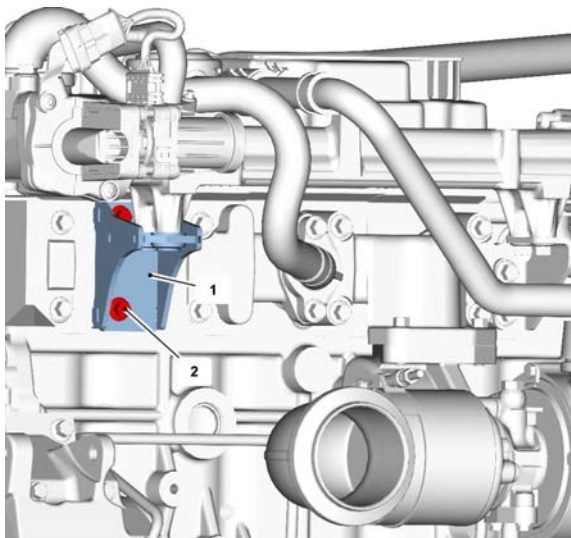
Module 41

#### Engine 492-2140 & 505-6559:



MAE11370

#### Engine 492-5092 & 505-7229:



MAE12920

1	Holder	20 Nm
2	Hexagon head screw	20 Nm





**5.29.11 Holder (W 41-90-09)**

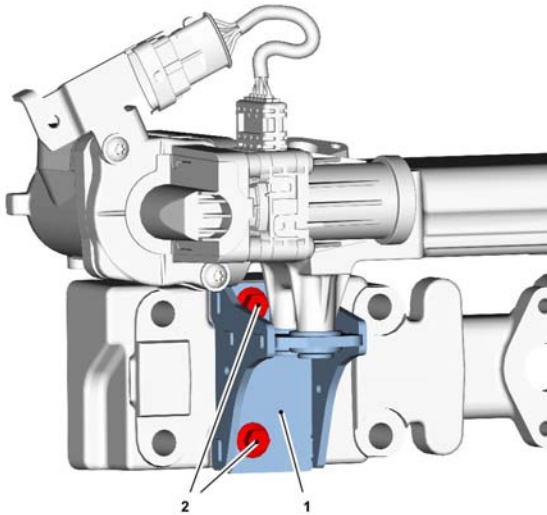


Standard tools



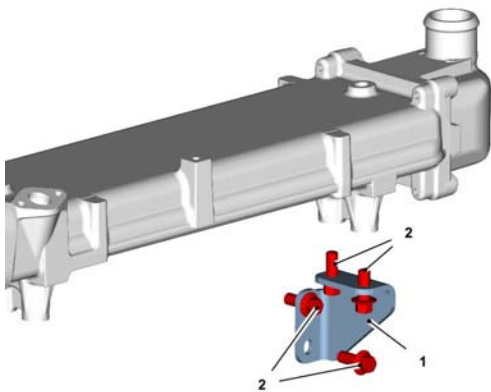
Safety information / User information

**Engine 492-2140 & 505-6559:**



MAE11380

**Engine 492-5092 & 505-7229:**



MAE12930

1	Holder	20 Nm
2	Hexagon head screw	20 Nm



**Engine 492-2140 & 505-6559:**  
Please observe assembly sequence!

**Engine 492-2140 & 505-6559:**

1. Removing and installing the cooler.



Module 41

**5.29.12 Holder (W 41-90-10)**



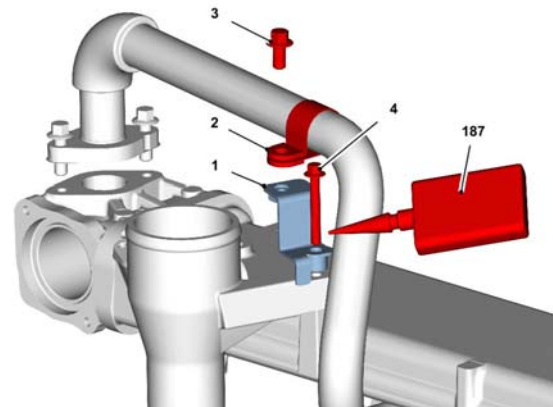
Standard tools



Locking agent



Safety information / User information



MAE11390

1	Holder	
2	Pipe clip	
3	Hexagon head screw	30 Nm
4	Hexagon head screw	8,5 Nm
187	Locking agent	



Mount pipe without tension.



## Disassembly and Assembly

1. Insert all screws with locking agent.

### 5.29.13 Compensator Structure (Exhaust line) (W 41-90-21)



Standard tools



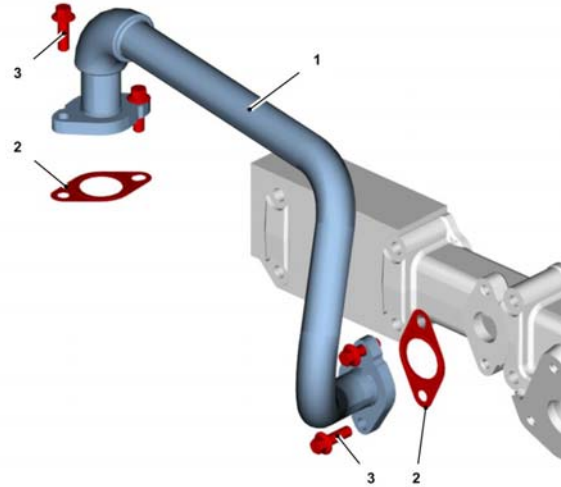
**Engine 492-2140 & 505-6559:**  
Safety information / User information

1	Compensator	
2	Seal	
3	Hexagon head screw	20 Nm



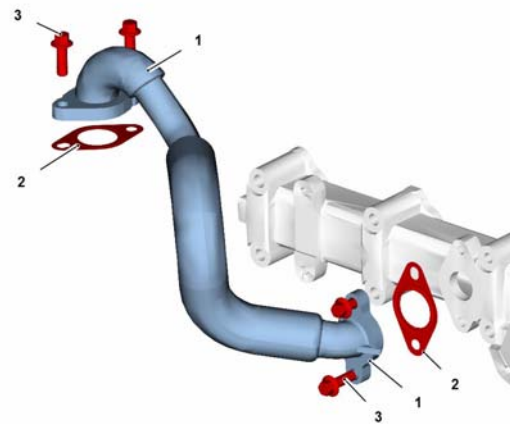
Use new gaskets.

#### Engine 492-2140 & 505-6559:



MAE11400

#### Engine 492-5092 & 505-7229:



MAE12940



#### Attention!

#### Engine 492-2140 & 505-6559:

Ensure that the installation location is free from faults.  
Check seal.



**5.29.14 Line (Crankcase Housing, Exhaust Gas Circulation, Coolant Line) (W 41-90-32)**



Standard tools

Special tools:

- Spring band pliers 449-2489
- Plugs/caps

**Engine 492-2140 & 505-6559-** PN 01899368

**Engine 492-5092 & 505-7229-** PN 449-2493



**Engine 492-2140 & 505-6559:**

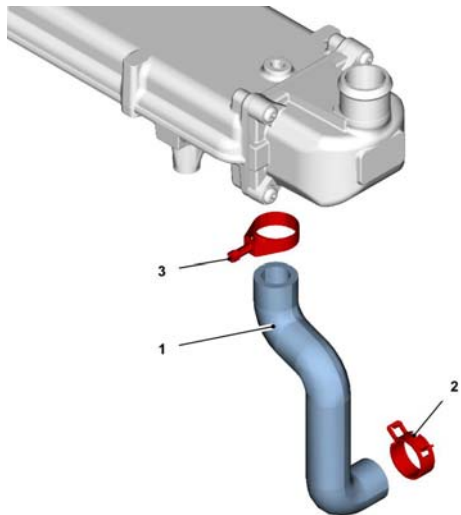
Safety information / User information  
Operation manual



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

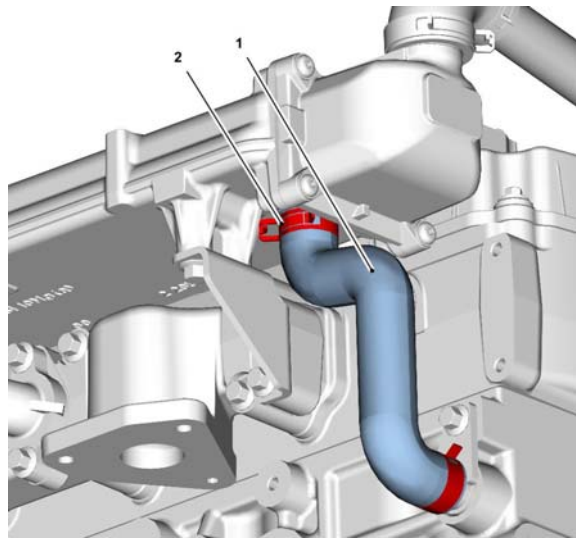
Observe the appropriate operating instructions for emptying and filling the engine.

**Engine 492-2140 & 505-6559:**



MAE11410

**Engine 492-5092 & 505-7229:**



MAE12950

1	Hose pipe	
2	Spring band clip	
3	<b>Engine 492-2140 &amp; 505-6559:</b> Hose clip	1,5 Nm



**Engine 492-2140 & 505-6559:**

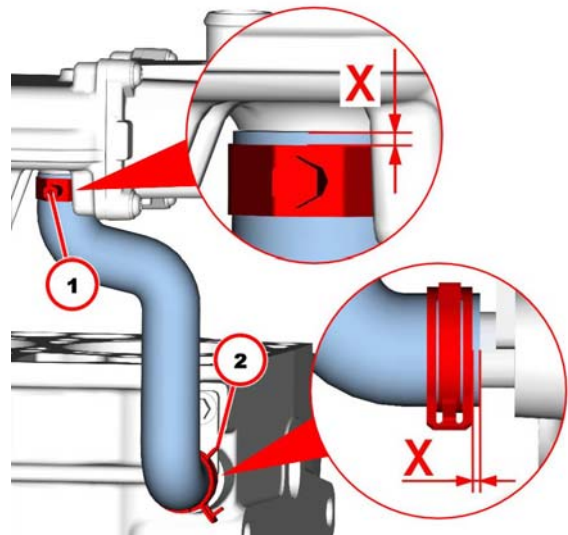
Push on hose line as far as limit stop.



**Attention!**

Lay the hose pipe free from chafing and tension.

**Engine 492-2140 & 505-6559:**



MAE11420



## Disassembly and Assembly

1. Position hose clip (1).

Dimension X  
 $20^{+2}$  mm



See spare parts documentation.

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

Dimension X  
 $20^{+2}$  mm

### 5.29.15 Line (Thermostat Housing, Exhaust Gas Circulation, Coolant Line) (W 41-90-32)



Standard tools

Special tools:

- Torx tool set 461-1692
- Spring band pliers 449-2489
- Plugs/caps

**Engine 492-2140 & 505-6559:** PN 01899368

**Engine 492-5092 & 505-7229:** PN 449-2493



**Engine 492-2140 & 505-6559:**

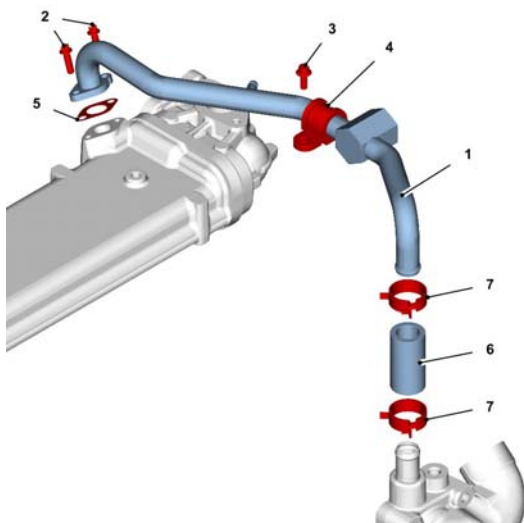
Safety information / User information  
 Operation manual



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

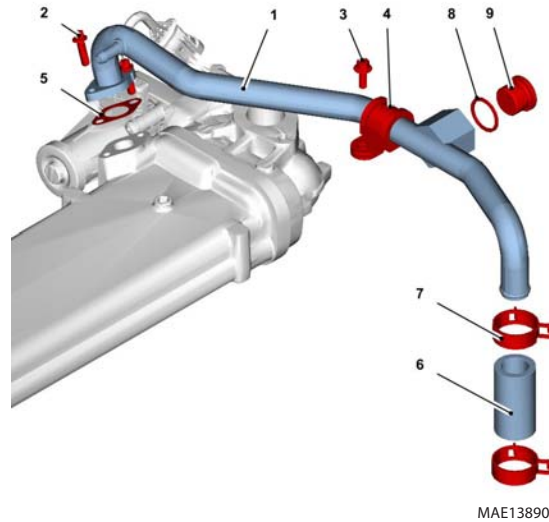
Observe the appropriate operating instructions for emptying and filling the engine.

#### Engine 492-2140 & 505-6559:



MAE11430

#### Engine 492-5092 & 505-7229:



MAE13890

1	Coolant line	
2	Torx screw	<b>Engine 492-2140 &amp; 505-6559:</b> 8,5 Nm <b>Engine 492-5092 &amp; 505-7229:</b> 10 Nm
3	Hexagon head screw	<b>Engine 492-2140 &amp; 505-6559:</b> 8,5 Nm <b>Engine 492-5092 &amp; 505-7229:</b> 8 Nm
4	Pipe clip	
5	Seal	
6	Rubber sleeve	
7	Spring band clip	
8	Sealing ring	<b>Engine 492-5092 &amp; 505-7229</b>
9	Screw plug	<b>Engine 492-5092 &amp; 505-7229:</b> 80 Nm



#### Attention!

Lay the hose pipe free from chafing and tension.



Use a new gasket.

**Engine 492-5092 & 505-7229:**

Use a new sealing ring.



## 5.30 EXHAUST GAS TURBOCHARGER

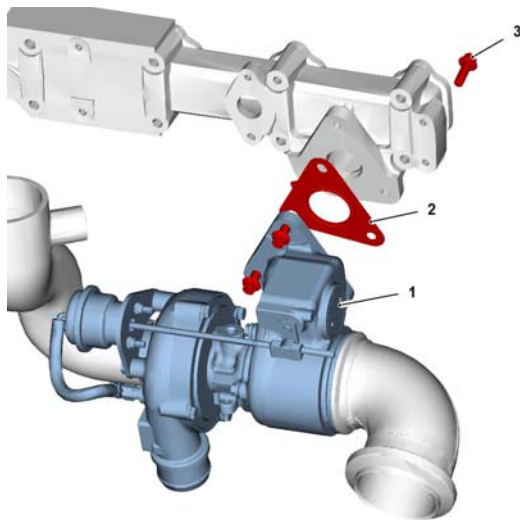
### 5.30.1 Removing and Installing the Turbocharger (W 43-01-01)



Standard tools



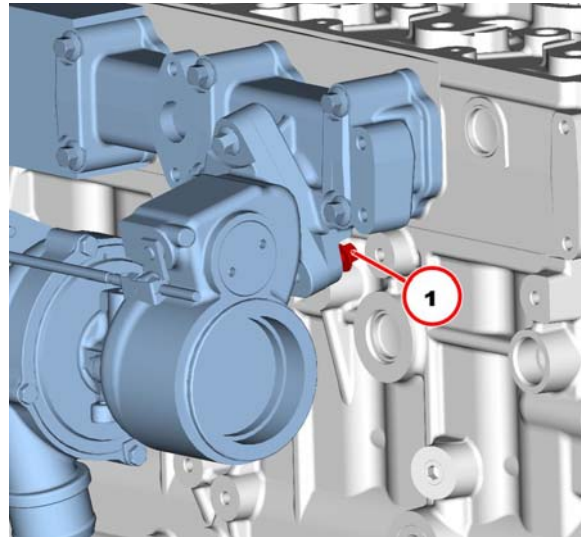
**Engine 492-2140 & 505-6559:**  
Safety information / User information



MAE11440

1	Exhaust turbocharger
2	Seal
3	Hexagon head screw

#### a. Removing Turbocharger



MAE11450

1. Remove intake nozzle.



Module 22

2. Remove the lubricating oil line.
3. Remove lubricating oil return line.



Module 16

4. Remove exhaust manifold.

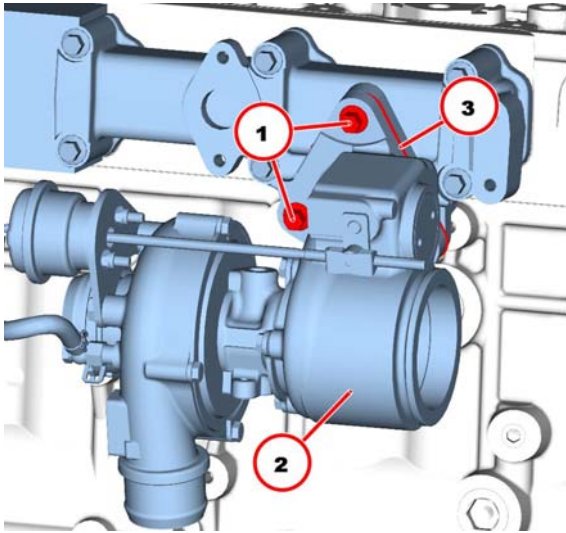


Module 43

5. Unscrew screw (1).



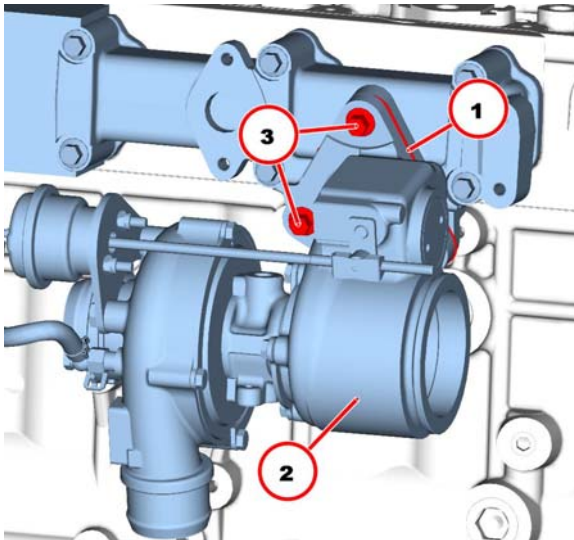
## Disassembly and Assembly



MAE11460

6. Unscrew screws (1).
7. Remove turbocharger (2).
8. Remove gasket (3).
9. Visually inspect the component.

### b. Installing the Turbocharger



MAE11470

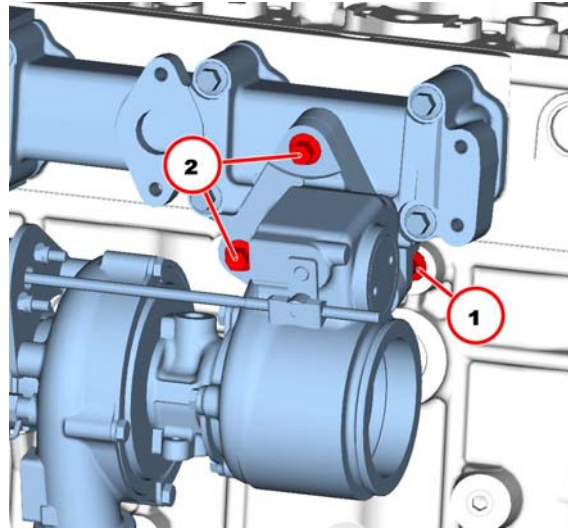
1. Clean sealing surfaces.
2. **Engine 492-2140 & 505-6559:** Fasten new seal (1) on exhaust turbocharger with screws.



**Engine 492-2140 & 505-6559:** Beading (elevation) faces the Exhaust gas turbocharger.

3. Mount turbocharger (2).

4. Fasten screws (3).



MAE11480

5. Fasten screw (1).
6. Tighten screw (1).



30 Nm

7. Tighten screws (2).



30 Nm

8. Fit intake nozzle.



Module

22

9. Install lubricating oil line.
10. Install lubricating oil return line.



Module

16

11. Install exhaust manifold.



Module

43

**c. Technical Data*****Tightening specifications***

ID No.	Name	Screw Type	Notes/ Remark	Value
A43 020	Turbocharger on exhaust line			30 Nm



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



## Disassembly and Assembly

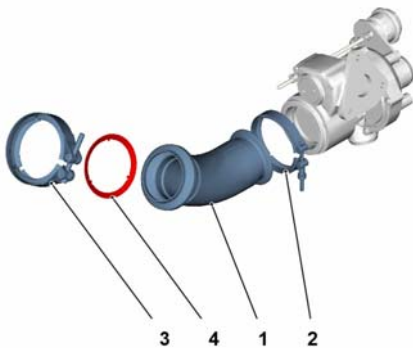
### 5.30.2 Exhaust Manifold (Exhaust Turbocharger) (W 43-90-36) (Engine 492-5092 & 505-7229)



Standard tools



Safety information / User information  
- Operation manual



MAE12960

1	Exhaust line	
2	Clip	12 Nm
3	Clip	12 Nm
4	Seal	



Note installation position.  
Use a new gasket.

MAE12180

### 5.30.3 Removing and Installing Compensator (Exhaust Turbocharger) (W 71-09-01) (Engine 492-2140 & 505-6559)



Standard tools



Safety information / User information



#### **Danger!**

#### **Hot components!**

Danger of burns / explosion!

Let the engine / components cool down sufficiently (to at least ambient temperature)



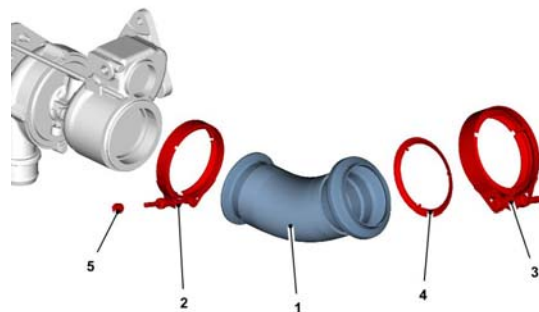
#### **Attention!**

Note installation position.

Externally damaged parts must be renewed.

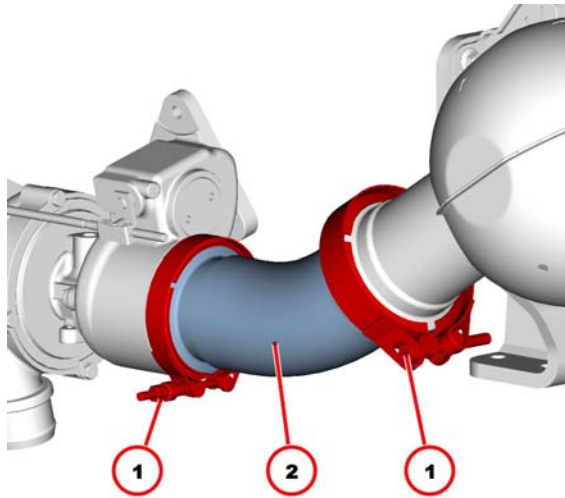
V-belt clips must be replaced each time they are loosened.

#### a. Removing the Compensator



1	Compensator
2	V-belt clip
3	V-belt clip
4	Seal
5	Nut





MAE12190

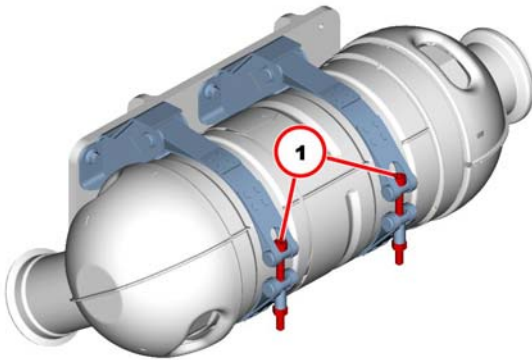


**Attention!**

V-belt clips must be replaced each time they are loosened.

1. Loosen V-belt clips (1).
2. Remove V-belt clips (1).
3. Remove compensator (2).

**b. Installing the Compensator**

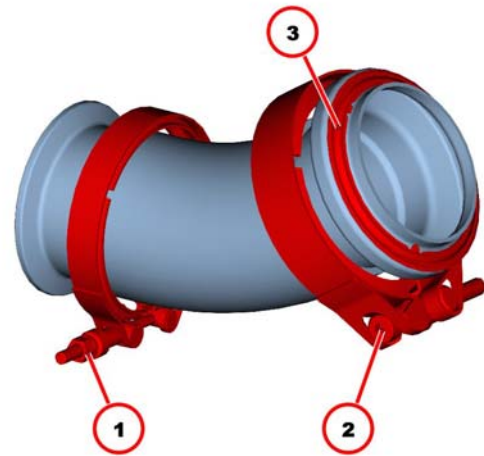


MAE12200

1. Loosen screws (1).

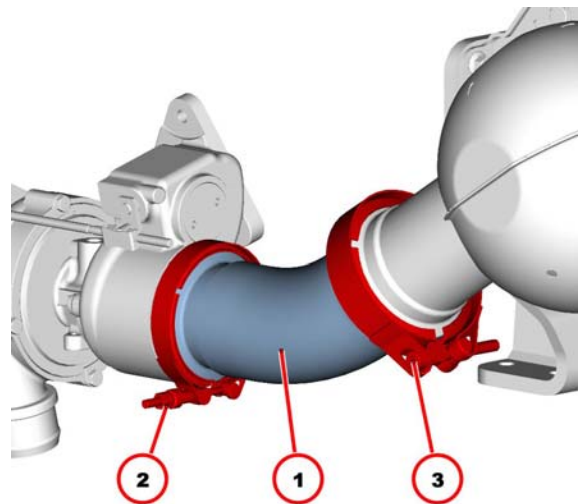


Diesel oxidation catalyst or diesel oxidation catalyst/diesel particle filter must move freely.



MAE12210

2. Clean sealing surfaces.
3. Pre-position new V-belt clip (1).
4. Pre-position new V-belt clip (2).
5. Mount gasket (3).



MAE12220



**Attention!**

Ensure that the installation location is free from faults.

Observe different sealing surface contours.

6. Position compensator (1).
7. Mount new V-belt clip (2).
8. Mount new V-belt clip (3).

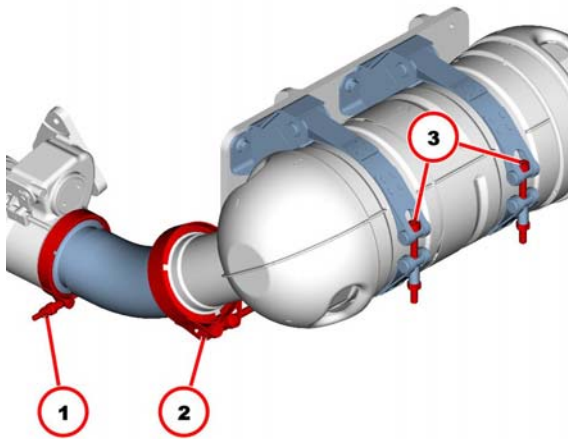


Install compensator without tension.

Position V-belt clips so that they are easily accessible.



## Disassembly and Assembly



MAE12230

9. Tighten nut (1).



12 Nm

10. Tighten screw (2).



12 Nm

11. Tighten screws (3).



18 Nm



### Attention!

Ensure that the installation location is free from faults.

Check seal.

**c. Technical Data*****Tightening specifications***

ID no.	Name:	Screw Type	Notes / Remark	Value
A71 028	V-belt clip		Use new V-belt clip	12 Nm
A71 051	V-belt clip screw		Use new V-belt clip	12 Nm
A71 052	Strap, fastening			18 Nm



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



### 5.31 ADD-ON PARTS

Engine 492-5092 & 505-7229:

#### 5.31.1 Removing and Installing the Belt Tensioner (V-rib Belt) (W 44-01-01)



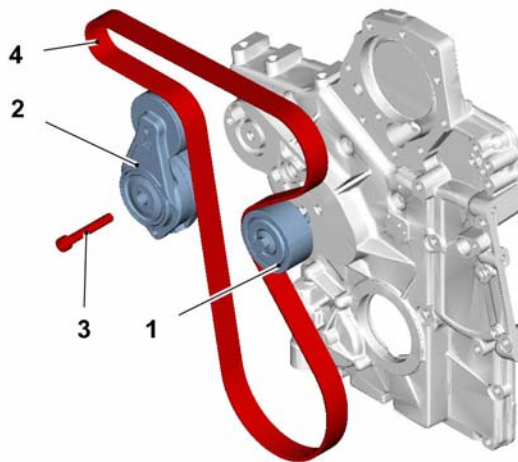
Standard tools



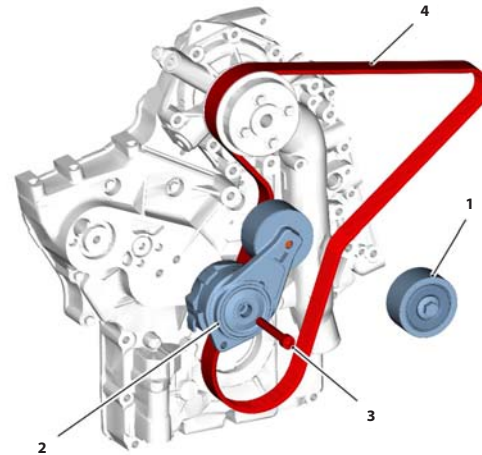
**Engine 492-2140 & 505-6559:**  
Safety information / User information  
Operation manual

##### a. Removing the belt tensioner

Engine 492-2140 & 505-6559:



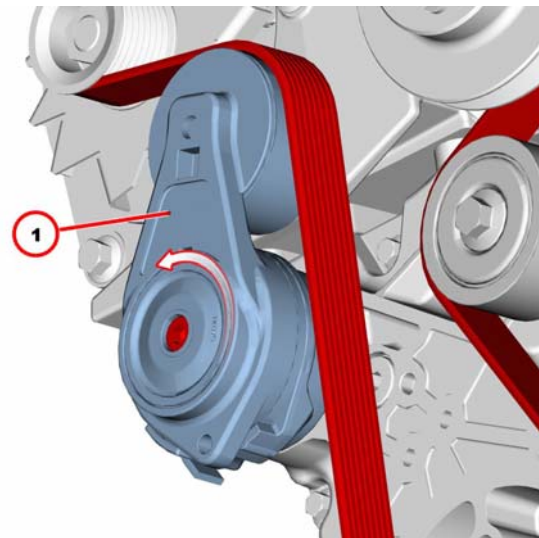
MAE11490



MAE12970

1	Deflection pulley	55 Nm
2	Belt tensioner	
3	Cylinder head screw	
4	V-rib belt	

Engine 492-2140 & 505-6559:

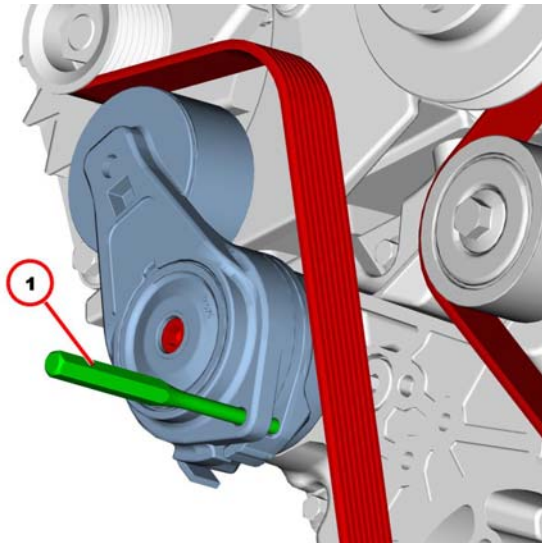


MAE11500

1. Tension the belt tensioner (1) in the direction of the arrow.

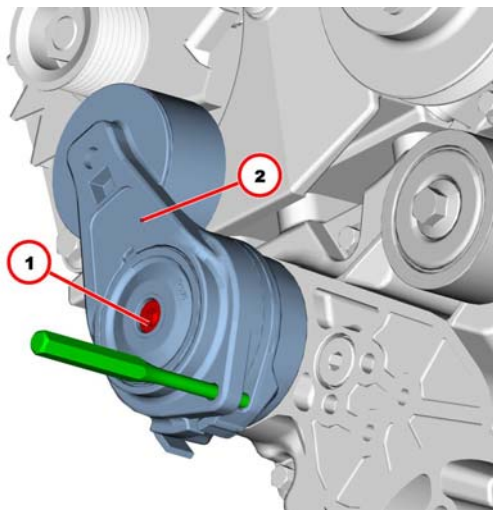


**Engine 492-2140 & 505-6559:**



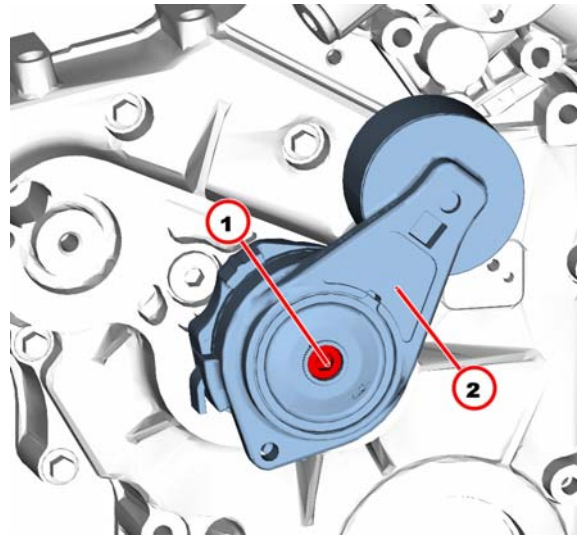
MAE11510

2. Lock belt tensioner with retaining pin (1).




MAE11520

**Engine 492-5092 & 505-7229:**



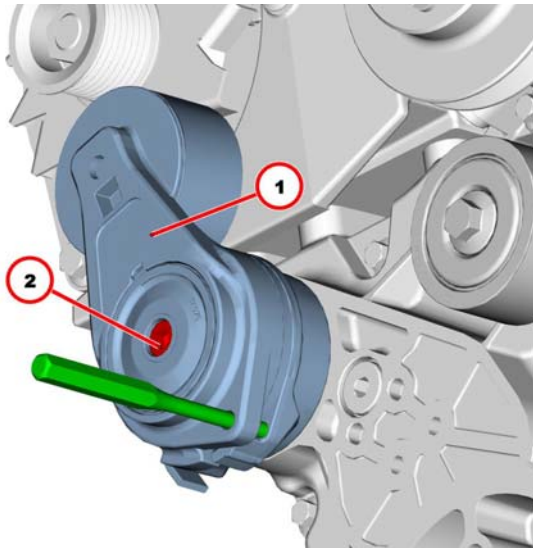
MAE12980

3. Remove V-rib belt.
-  Operation manual
4. Unscrew screw (1).
5. Remove belt tightener (2).
6. Visually inspect the component



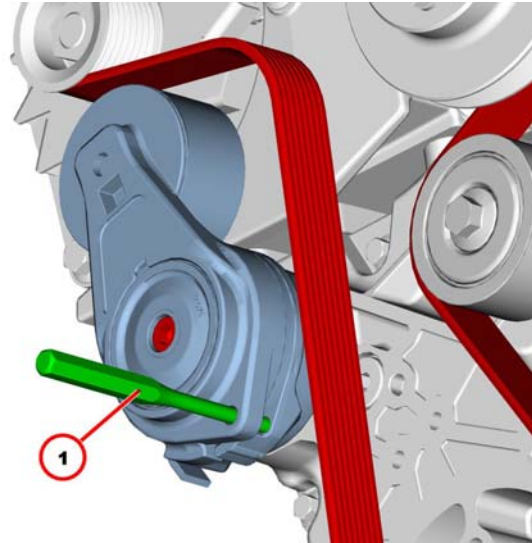
### b. Installing the belt tensioner

Engine 492-2140 & 505-6559:



MAE11530

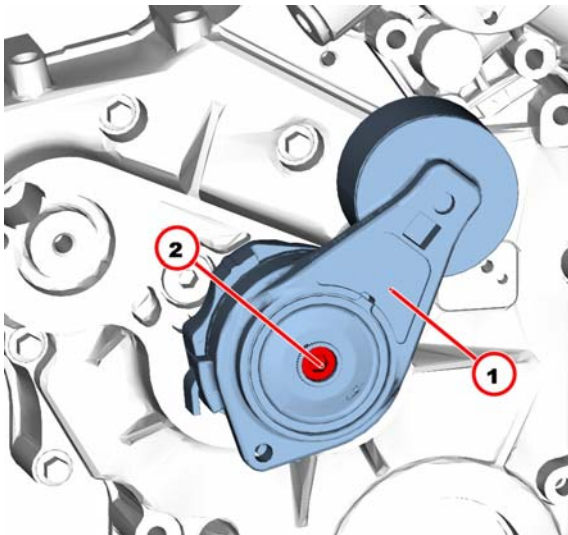
Engine 492-2140 & 505-6559:



MAE11540

1. Hold the belt tensioner.
2. Remove holding pin (1).
3. Relieve the belt tightener.

Engine 492-5092 & 505-7229:



MAE12990

1. Mount belt tensioner (1).
2. Fasten screw (2).
3. Tighten screw (2).



55 Nm

4. Fit the V-rib belt according to the running direction.



Operation manual

**c. Technical Data*****Tightening specifications***

ID No.	Name	Screw Type	Notes/ Remark	Value
A44 041	Belt tensioner on gearcase			55 Nm



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



## Disassembly and Assembly

### 5.31.2 Removing and Installing the Console (V-rib Belt, Level 1) (W 44-02-06)



Standard tools

**Engine 492-2140 & 505-6559:**

Special tools:

- Disassembly tool - PN 449-2487
- Assembly tool - PN 01899148



Safety information / User information  
Operation manual

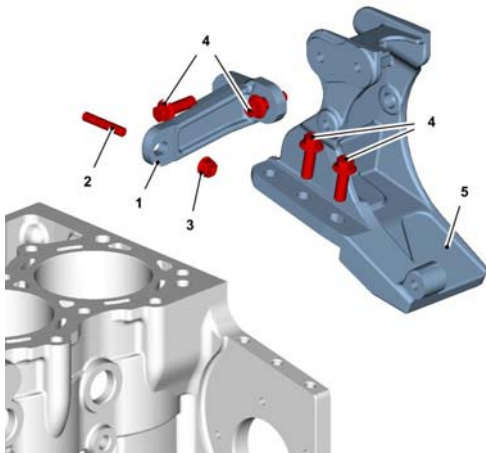


**Engine 492-5092 & 505-7229:**

Packing compound  
Loctite 5900

#### a. Removing the Console

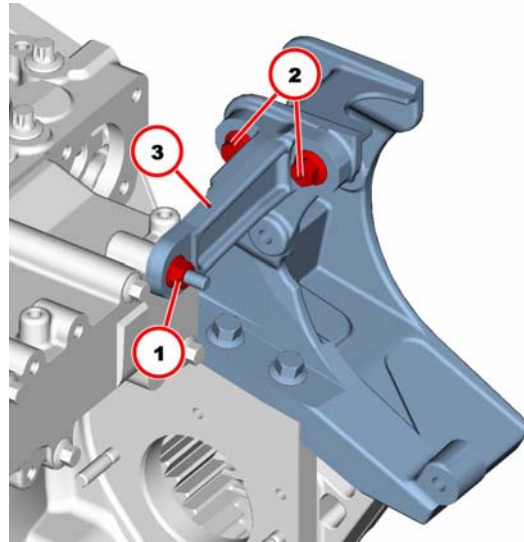
**Engine 492-2140 & 505-6559:**



MAE11550

1	Support	55 Nm
2	Stud	
3	Hexagonal nut	
4	Hexagon head screw	
5	Console	

**Engine 492-2140 & 505-6559:**



MAE11560

1. Remove V-rib belt.



Operation manual

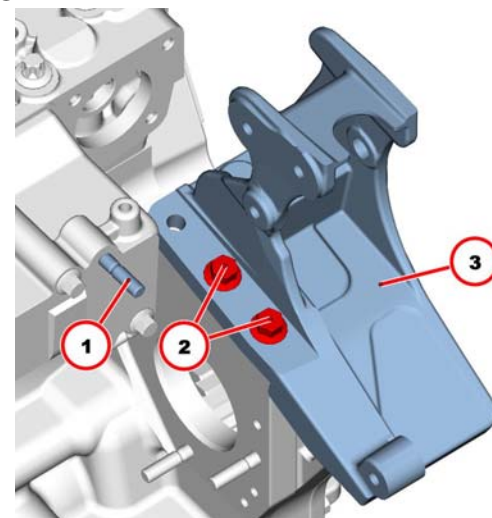
2. Remove generator (level 1).



Module 44

3. Unscrew nut (1).
4. Unscrew screws (2).
5. Remove support (3).
6. Visually inspect the components.

**Engine 492-2140 & 505-6559:**



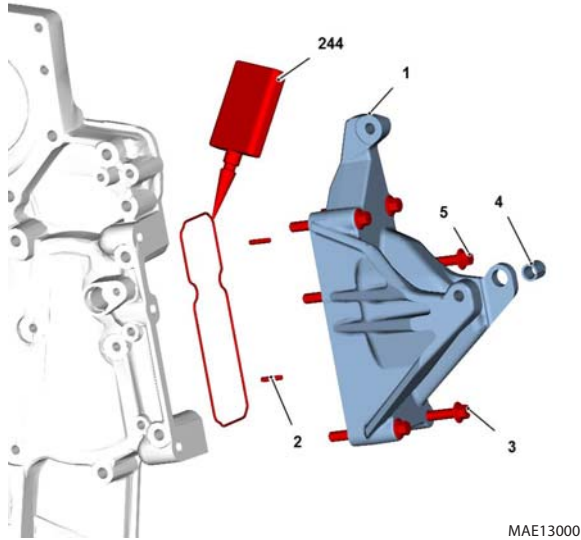
MAE11570





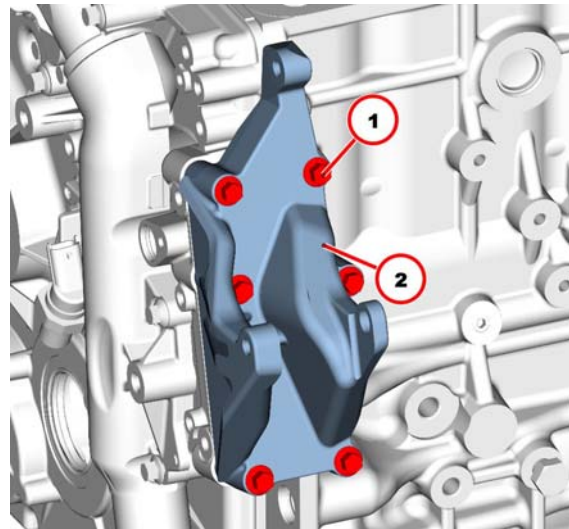
7. Unscrew stud bolt (1) with disassembly tool.
8. Unscrew screws (2).
9. Remove console (3).
10. Visually inspect the components.

**Engine 492-5092 & 505-7229:**



1	Console
2	Clamping pin
3	Hexagon head screw
4	Clamping sleeve
5	Hexagon head screw
244	Packing Compound

**Engine 492-5092 & 505-7229:**



1. Remove V-rib belt.

Operation manual

2. Remove generator (level 1).

Module 44

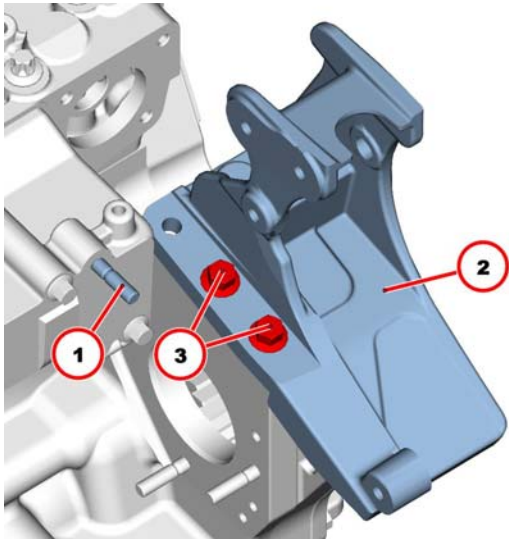
3. Unscrew screws (1).
4. Remove console (2).
5. Visually inspect the components.



## Disassembly and Assembly

### b. Mounting the console

Engine 492-2140 & 505-6559:



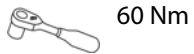
MAE11580

1. Screw in studs (1).
2. Tighten stud bolt (1) with assembly tool.

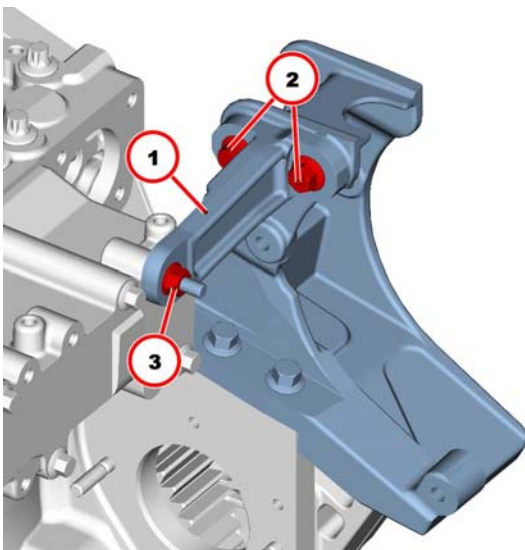


15 Nm

3. Mount console (2).
4. Fasten screws (3).
5. Tighten screws (3).



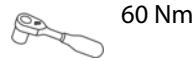
60 Nm



MAE11590

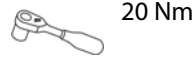
6. Mount support (1).
7. Tighten screws (2).

8. Screw on nut (3).
9. Tighten screws (2).




60 Nm

10. Tighten nut (3).



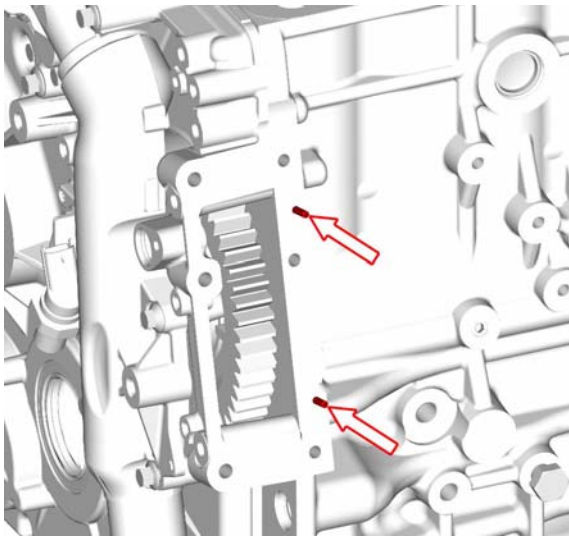
20 Nm

11. Mount generator (level 1).

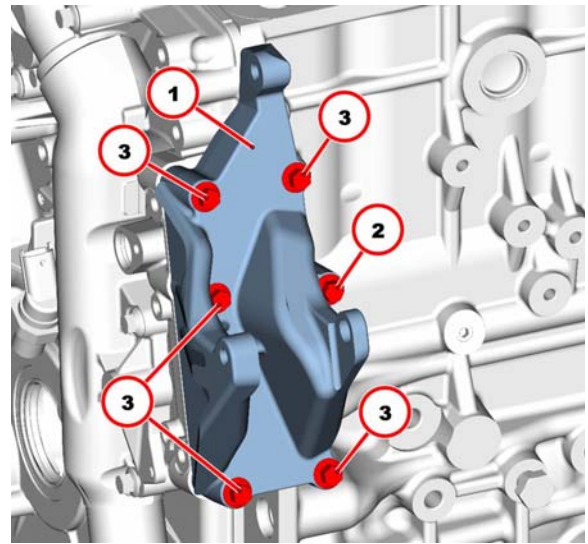
 Module 44



Engine 492-5092 & 505-7229:



MAE13020



MAE13040

1. Clean sealing surfaces.

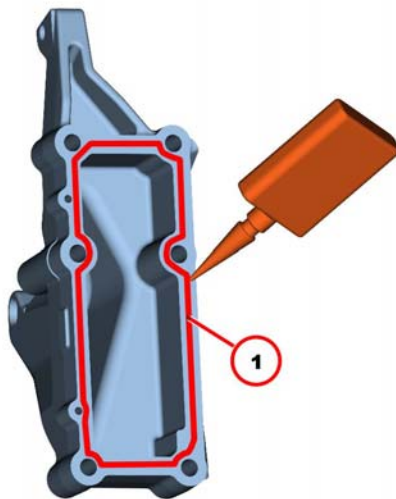


Make sure the clamping pin (arrow) is in place.

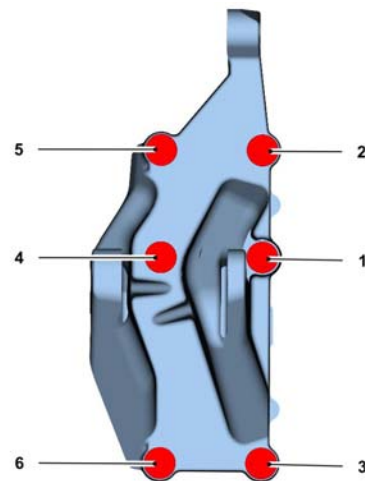
4. Mount console (1) over the clamping pins.

5. Fasten screw (2).  
M8x85-10.9

6. Fasten screws (3).  
M8x60-10.9



MAE13030



MAE13050

2. Clean sealing surfaces.

3. Apply sealing compound (1) evenly on the sealing surface.



Sealing cord strength approx. 3 mm.

7. Tighten all screws according to the tightening sequence.



30 Nm

8. Mount generator (level 1).



Module

44



## Disassembly and Assembly

---

9. Fit the V-rib belt according to the running direction.



Operation manual



### c. Technical Data

#### *Tightening specifications*

##### **Engine 492-2140 & 505-6559:**

ID No.	Name	Screw Type	Notes/ Remark	Value
A44 011	Support on crankcase			20 Nm
A44 011	Support on console			60 Nm
A44 013	Console on crankcase / gear case			60 Nm
A44 053	Stud bolt on charge air line			60 Nm

##### **Engine 492-5092 & 505-7229:**

ID No.	Name	Screw Type	Notes/ Remark	Value
A44 013	Console on crankcase/gear case			30 Nm



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



## Disassembly and Assembly

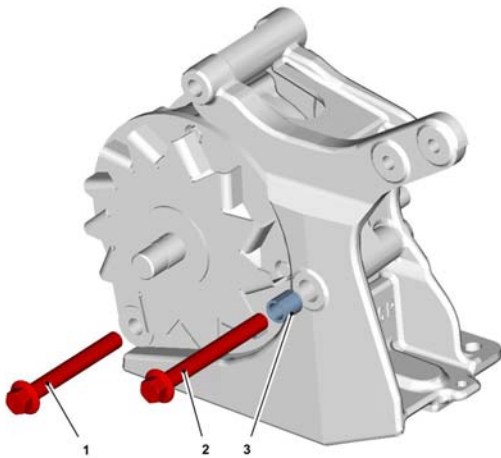
### 5.31.3 Fastening Parts (W 44-90-05) (Engine 492-2140 & 505-6559)



Standard tools



Safety information / User information



MAE11650

1	Hexagon head screw	42 Nm
2	Hexagon head screw	42 Nm
3	Clamping sleeve	

## 5.32 STARTER

### 5.32.1 Removing and Installing the Starter (W 44-03-01)

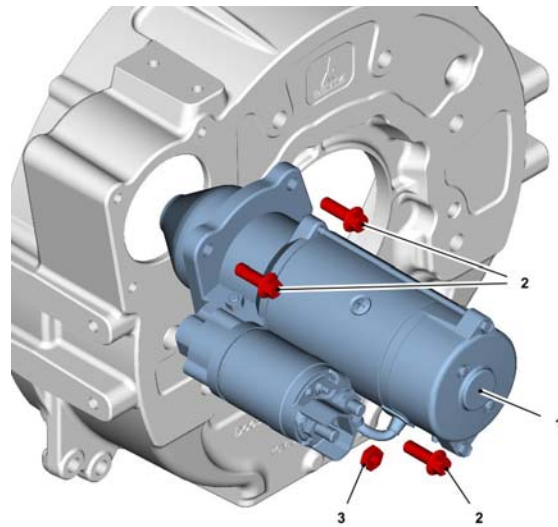


Standard tools



Safety information / User information

#### a. Removing the Starter

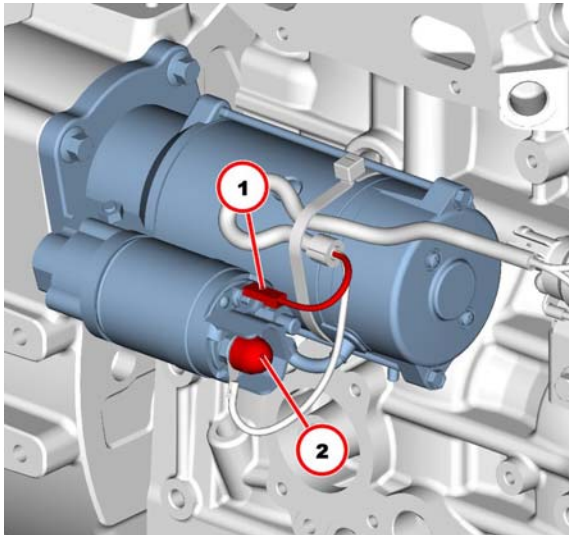


MAE11600

1	Starter
2	Hexagon head screw
3	<b>Engine 492-2140 &amp; 505-6559:</b> Nut



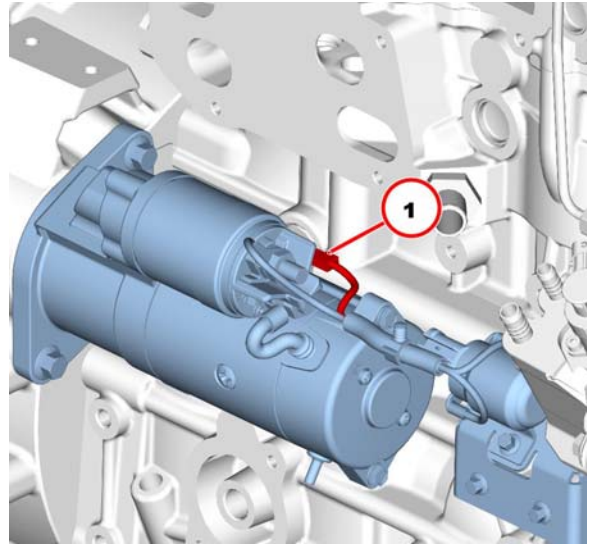
**Engine 492-2140 & 505-6559:**



MAE11610

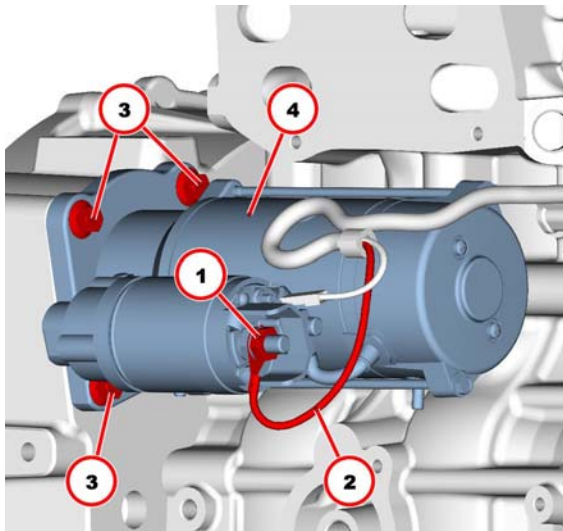
1. Disconnect the battery's negative terminal.
2. Pull out cable plug (1).
3. Remove protective cap (2).

**Engine 492-5092 & 505-7229:**



MAE13070

1. Disconnect the battery's negative terminal.
2. Remove plus cable.
3. Pull out cable plug (1).



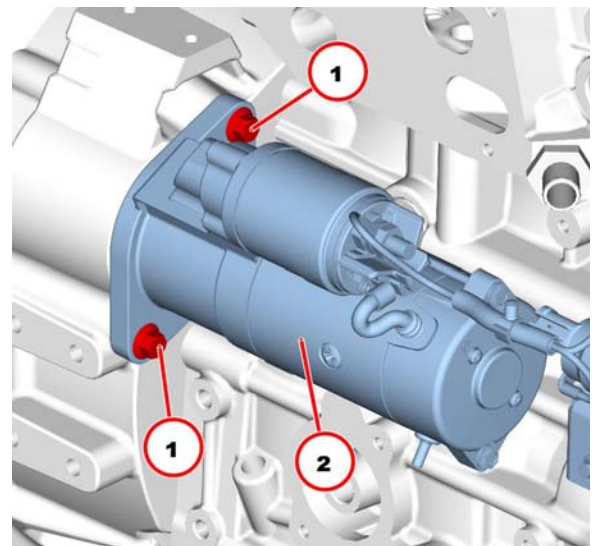
MAE11620

4. Unscrew hexagonal nut (1).
5. Remove plus cable.



The documentation of the vehicle manufacturer / equipment manufacturer must be observed.

6. Remove cables (2).
7. Unscrew screws (3).
8. Remove starter (4).
9. Visually inspect the components.



MAE13080

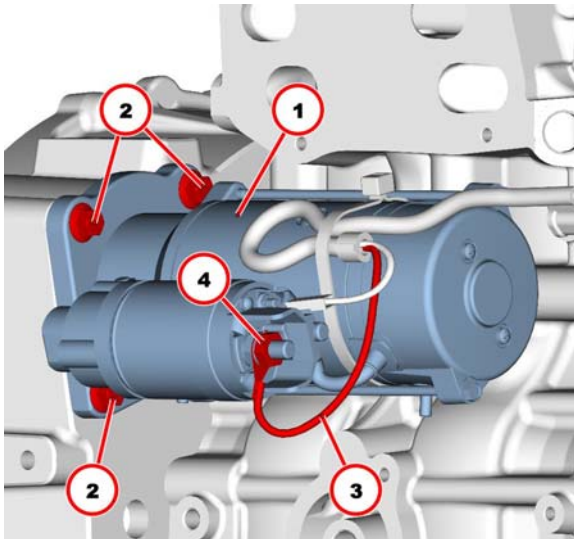
4. Unscrew screws (1).
5. Remove starter (2).
6. Visually inspect the components.



## Disassembly and Assembly

### b. Installing the Starter

Engine 492-2140 & 505-6559:



MAE11630

1. Insert starter (1).
2. Mount screws (2).
3. Tighten screws (2).



60 Nm

4. Position cable (3).
5. Fit plus cable.

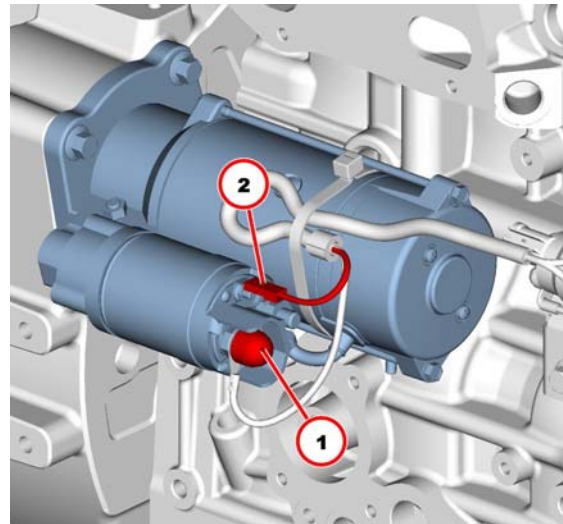


The documentation of the vehicle manufacturer/  
equipment manufacturer must be observed.

6. Screw on nut (4).
7. Tighten nuts (4).



15 Nm



MAE11640

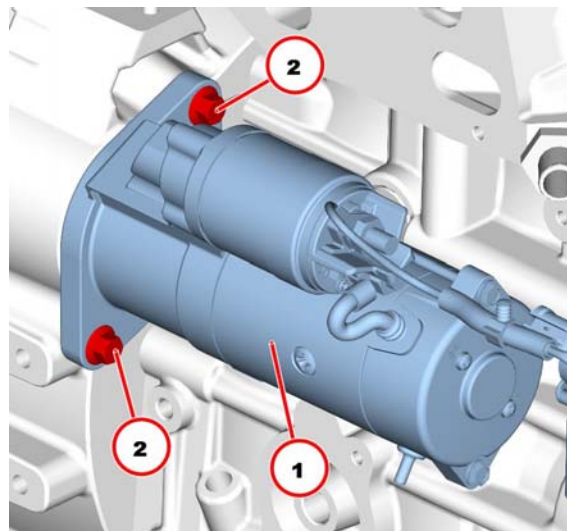


#### Attention!

Lay the hose pipe free from chafing and tension.

8. Fit protective cap (1).
9. Plug in the cable plug (2).
10. Connect the battery's negative terminal.

Engine 492-5092 & 505-7229:



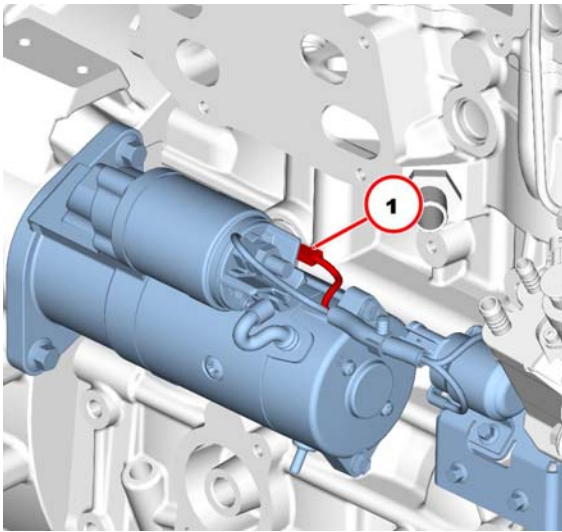
MAE13090

1. Insert starter (1).
2. Tighten screws (2).



60 Nm





MAE13100

**Attention!**

Lay the cables free from chafing and tension.

3. Plug in the cable plug (1).
4. Fit plus cable.
5. Connect the battery's negative terminal.



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

##### **Engine 492-2140 & 505-6559:**

ID No.	Name	Screw Type	Notes/ Remark	Value
A44 001	Starter on connection housing			60 Nm
A44 005	Cable lug on starter relay			15 Nm

##### **Engine 492-5092 & 505-7229:**

ID No.	Name	Screw Type	Notes/ Remark	Value
A44 001	Starter on connection housing			60 Nm



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



### 5.33 PARTS TO GENERATOR

#### 5.33.1 Generator (W 44-90-42)

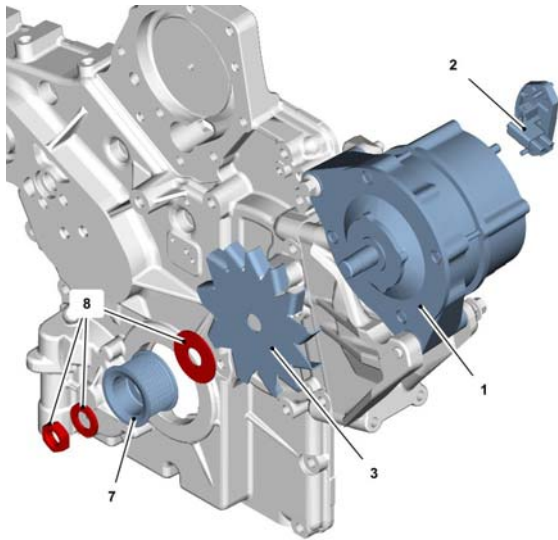


Standard tools



Safety information / User information

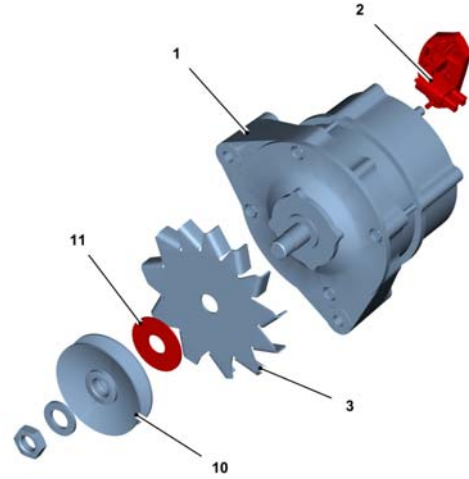
#### Engine 492-2140 & 505-6559:



MAE11660

1	Generator	
2	Voltage regulator	
3	Fan	
7	V-rib belt pulley	
8	Fastening parts	90 Nm

#### Engine 492-5092 & 505-7229:



MAE13110

1	Generator Terminal B+ Terminal L	7.5 - 8 Nm 2.7 - 3.8 Nm
2	Voltage regulator	4 Nm
3	Fan	
10	V- belt pulley	
11	Add-on parts	



Position 11



**Attention!**

Observe tightening torque for V-rib belt pulley with clamping cone.

1. Hexagonal nut  
90 Nm
2. Hexagonal nut in conjunction with clamping cone and V-rib belt pulley.  
75 Nm

### 5.34 ENGINE MOUNTING

#### 5.34.1 Engine Mounting (W 46-90-15)



Standard tools



## Disassembly and Assembly

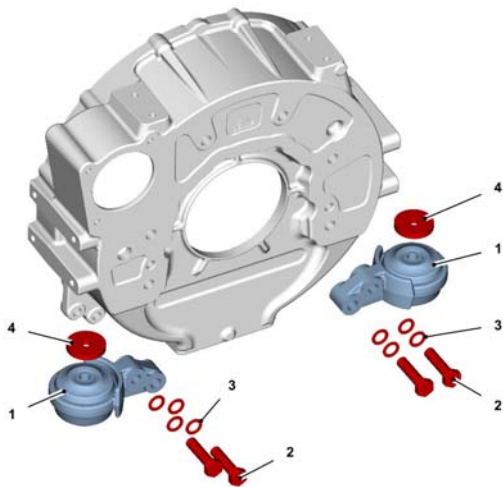


**Engine 492-2140 & 505-6559:**  
Safety information / User information



**Engine 492-2140 & 505-6559:**  
**Attention!**  
Observe installation guideline /  
documentation of the vehicle manufacturer/  
equipment manufacturer.

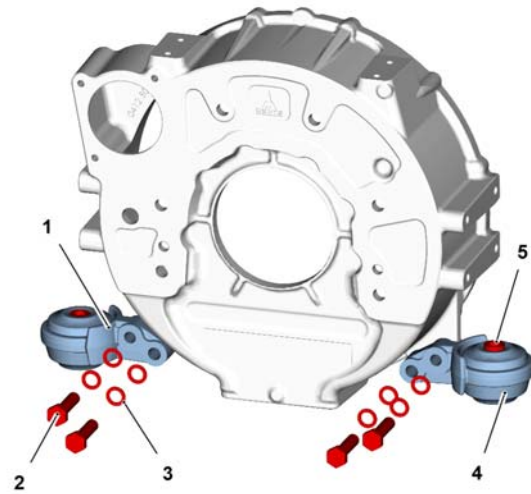
### Engine 492-2140 & 505-6559:



MAE11670

1	Stand foot	
2	Hexagon head screw	200 Nm
3	Washer	
4	Washer	

### Engine 492-5092 & 505-7229:



MAE13230

1	Stand foot	
2	Hexagon head screw	200 Nm
3	Washer	
4	Mount buffer	
5	Bushing	



**5.34.2 Engine Mounting (W 46-90-15)**



Standard tools



Safety information / User information

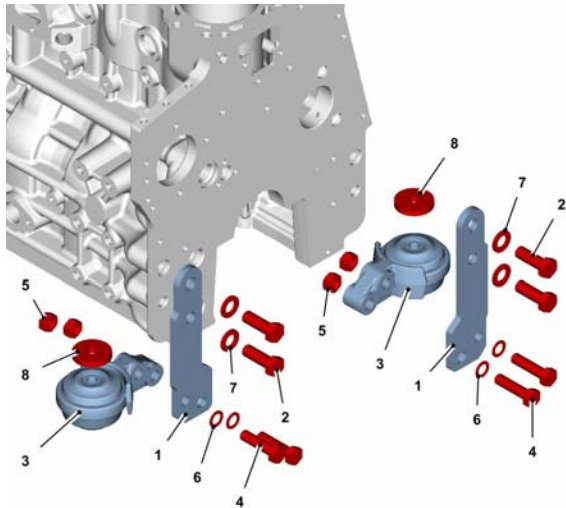


**Engine 492-2140 & 505-6559:**

**Attention!**

Observe installation guideline / documentation of the vehicle manufacturer/ equipment manufacturer.

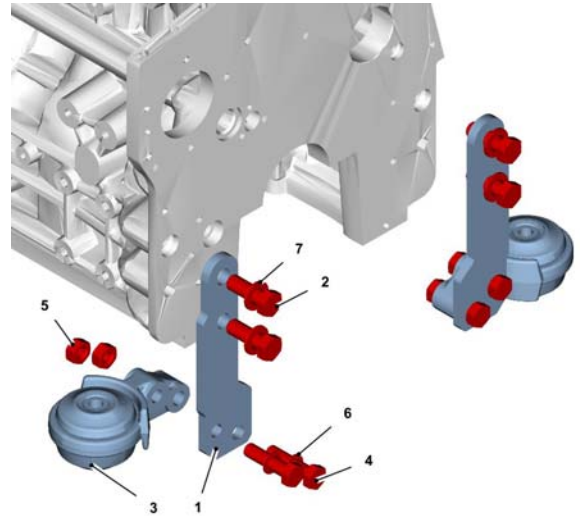
**Engine 492-2140 & 505-6559:**



MAE11680

1	Holder	
2	Hexagon head screw	260 Nm
3	Stand foot	
4	Hexagon head screw	200 Nm
5	Hexagonal nut	
6	Washer	
7	Washer	
8	Washer	

**Engine 492-5092 & 505-7229:**



MAE13240

1	Holder	
2	Hexagon head screw	260 Nm
3	Stand foot	
4	Hexagon head screw	200 Nm
5	Hexagonal nut	
6	Washer	
7	Washer	



## Disassembly and Assembly

### 5.34.3 Engine Mounting (W 46-90-15)



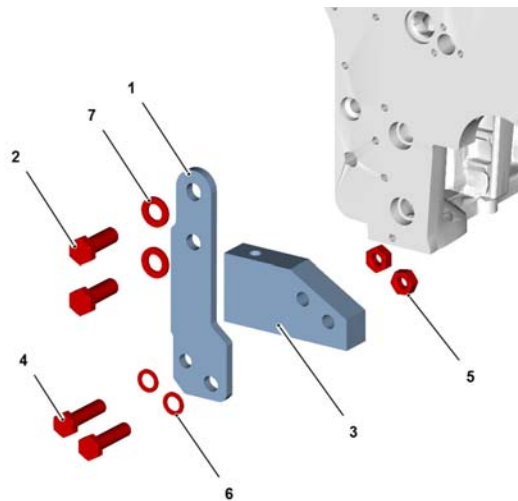
Standard tools



**Engine 492-2140 & 505-6559:**  
Safety information / User information



**Engine 492-2140 & 505-6559:**  
**Attention!**  
Observe installation guideline /  
documentation of the vehicle manufacturer/  
equipment manufacturer.



MAE11690

1	Holder	
2	Hexagon head screw	260 Nm
3	Stand foot	
4	Hexagon head screw	200 Nm
5	Hexagonal nut	
6	Washer	
7	Washer	

### 5.34.4 Engine Mounting (W 46-90-15)



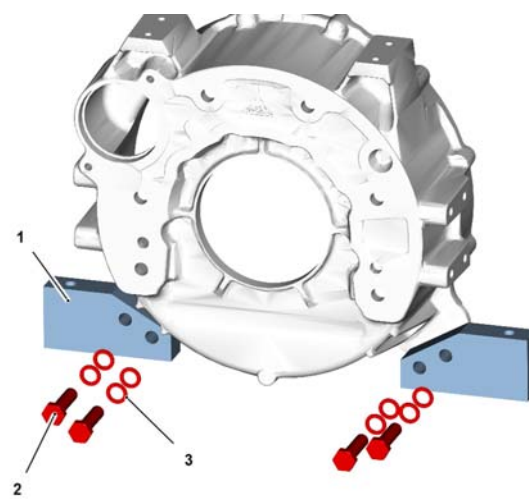
Standard tools



**Engine 492-2140 & 505-6559:**  
Safety information / User information



**Engine 492-2140 & 505-6559:**  
**Attention!**  
Observe installation guideline /  
documentation of the vehicle manufacturer/  
equipment manufacturer.



MAE11700

1	Stand foot	
2	Hexagon head screw	200 Nm
3	Washer	



## 5.35 ELECTRICAL EQUIPMENT

### 5.35.1 Removing and Installing the Pressure/ Temperature Sensor (W 48-03-01)



Standard tools

Special tools:

- Disassembly tool - PN 461-1696



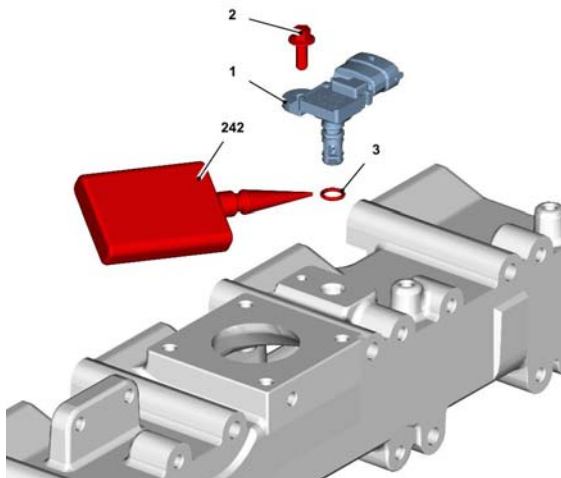
Fitting compound

Ultra 5 Moly



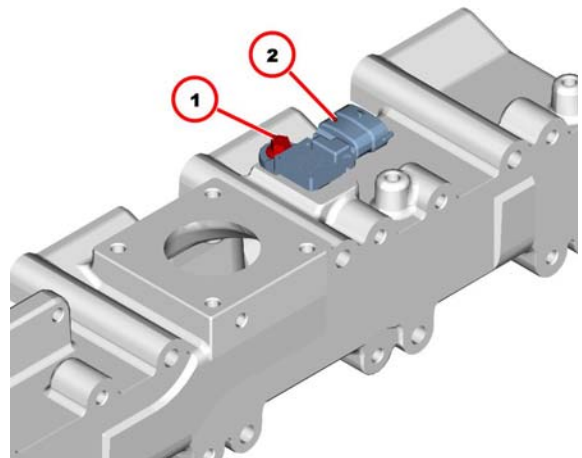
Safety information / User information

#### a. Remove Pressure/Temperature Sensor



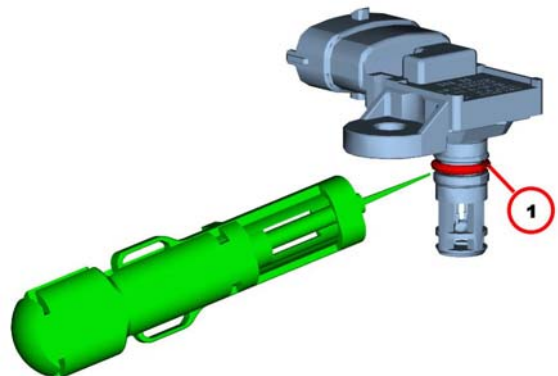
MAE11710

1	Pressure/Temperature sensor
2	Hexagon head screw
3	O-ring
242	Mounting compound



MAE11720

1. Unlock cable plug.
2. Pull out cable plug.
3. Unscrew screw (1).
4. Remove pressure/temperature sensor (2).



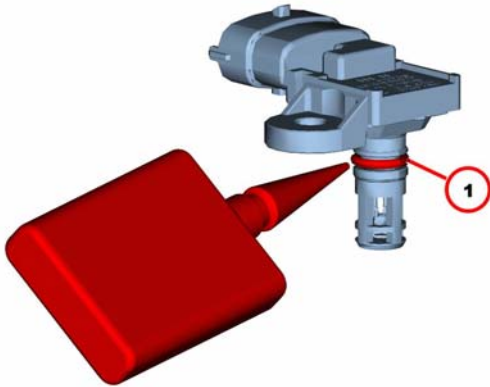
MAE11730

5. Remove the o-ring (1) with the disassembly tool.
6. Visually inspect the component.



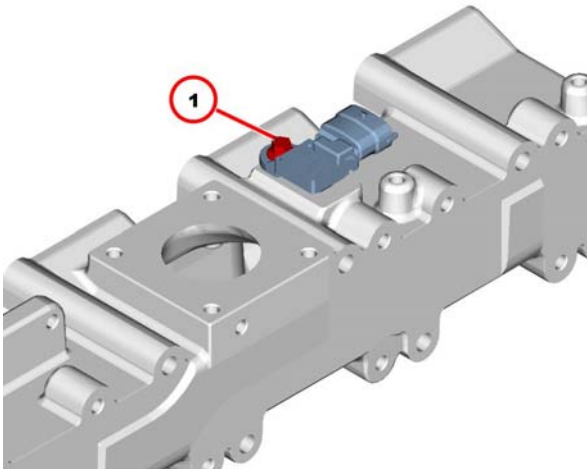
## Disassembly and Assembly

### b. Installing the Pressure/Temperature Sensor



MAE11740

1. Insert new o-ring (1).
2. Lightly coat o-ring with fitting compound.



MAE11750

3. Insert pressure/temperature sensor.



Ensure that the installation location is free from faults.

4. Tighten screw (1).



11 Nm

5. Plug on cable plug.



Ensure that the connection is perfect.



**c. Technical Data*****Tightening specifications***

ID No.	Name	Screw Type	Notes/ Remark	Value
A48 046	Pressure/temperature sensor on charge air line		Use new round sealing ring	11 Nm



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



## Disassembly and Assembly

### 5.35.2 Relay (W 48-90-20)

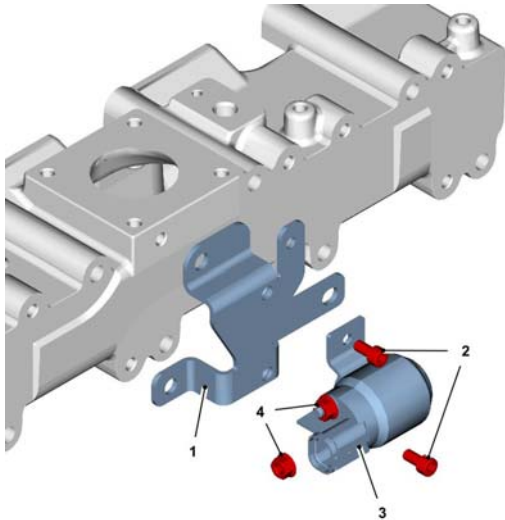


Standard tools



**Engine 492-2140 & 505-6559:**  
Safety information / User information

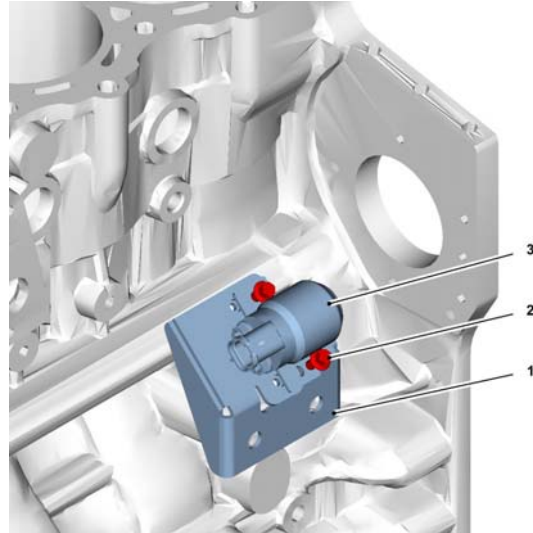
#### Engine 492-2140 & 505-6559:



MAE11810

1	Holding plate	
2	Relay	
3	Cylinder head screw	13 Nm
4	Hexagonal nut	1,5 Nm

#### Engine 492-5092 & 505-7229 (W 48-90-09):



MAE13130

1	Holding plate	
2	Hexagon head screw	13 Nm
3	Relay	



**5.36 CABLE HARNESS**

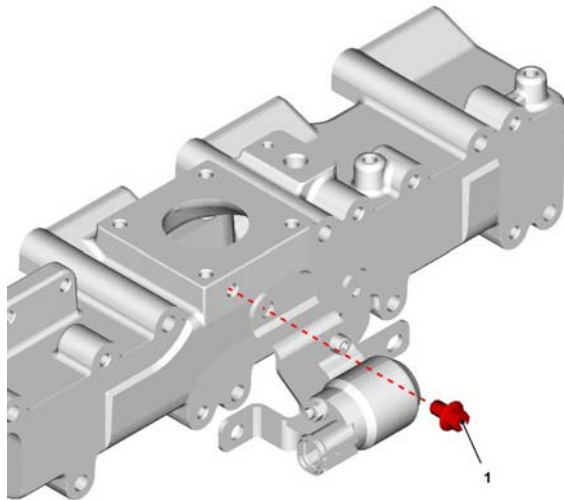
**5.36.1 Fastening Parts (W 48-90-05)  
(Engine 492-2140 & 505-6559)**



Standard tools



Safety information / User information



MAE11760

1	Hexagon head screw	30 Nm
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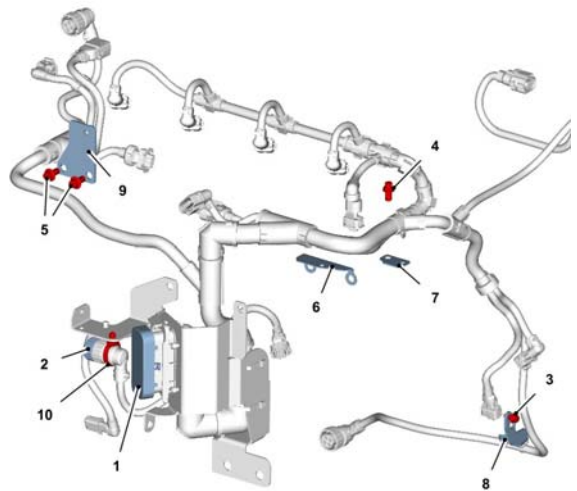
**5.36.2 Fastening Parts (W 48-90-05)  
(Engine 492-2140 & 505-6559)**



Standard tools



Safety information / User information



MAE11770

1	Covering cap	
2	Protective cap	
3	Hexagon head screw	20 Nm
4	Torx screw	20 Nm
5	Hexagon head screw	30 Nm
6	Holding plate	
7	Holding plate	
8	Holding plate	
9	Holding plate	
10	Holding plate	



## Disassembly and Assembly

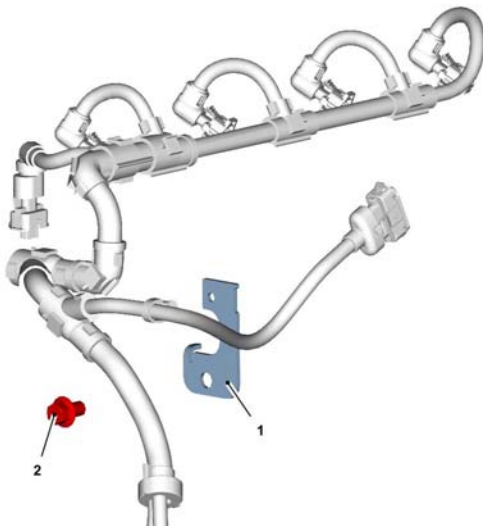
### 5.36.3 Fastening Parts (W 48-90-05) (Engine 492-2140 & 505-6559)



Standard tools



Safety information / User information



MAE11780

1	Holding plate	
2	Hexagon head screw	60 Nm

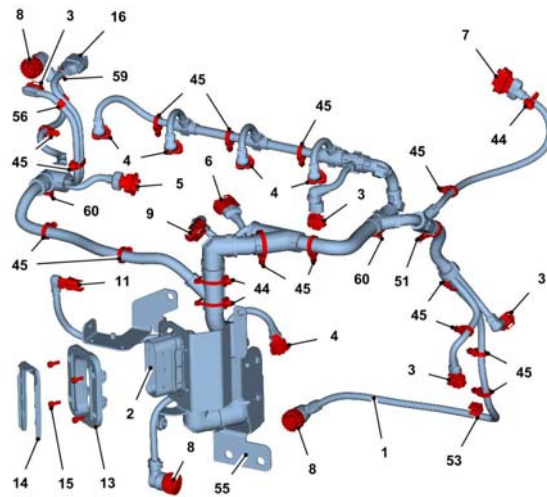
### 5.36.4 Fastening Parts (W 48-90-05) (Engine 492-2140 & 505-6559)



Standard tools



Safety information / User information



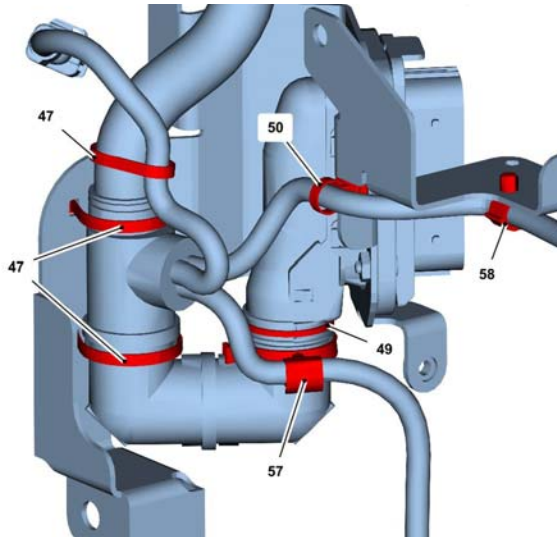
MAE11790

1	Cable harness	
2	Connector	
3	Connector	
4	Connector	
5	Connector	
6	Connector	
7	Connector	
8	Connector	
9	Connector	
11	Connector	
13	Adapter	
14	Attachment angle	
15	Cylinder head screw	5 Nm

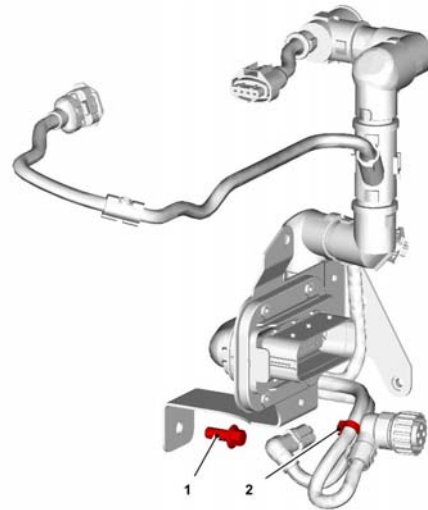


16	Connector	
44	Holding tape	
45	Holding tape	

**5.36.5 Fastening parts (W 48-90-05)  
(Engine 492-5092 & 505-7229)**



MAE11800



MAE13120



Standard tools



Safety information / User information

47	Holding tape	
49	Cable tie	
50	Holding tape	
51	Holding tape	
53	Holding tape	
55	Holding tape	
56	Spacer	
57	Holding tape	
58	Holder	
59	Holding tape	
60	Retaining clip	

1	Hexagon head screw	20 Nm
2	Holding plate	



## 5.37 TOOLS

### 5.37.1 Removing and Installing Turning Gear / Locking Device (W 49-02-01)



Standard tools

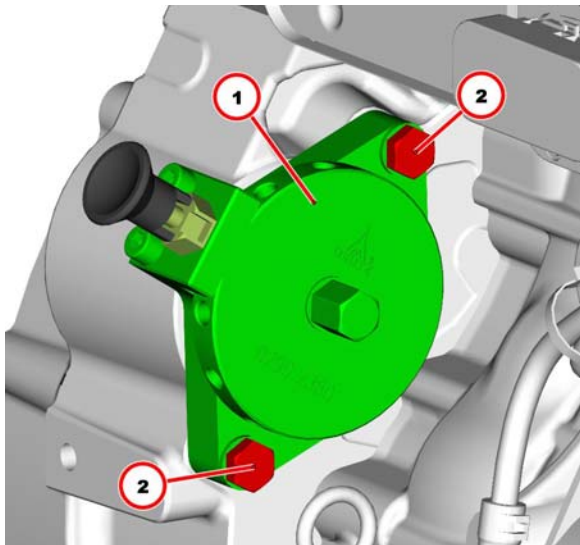
Special tools:

– Turning gear / locking device - PN 449-2502



Safety information / User information

#### a. Installing Turning Gear / Locking Device



MAE11820

1. Remove starter.



Module

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2. Insert turning gear / locking device (1).



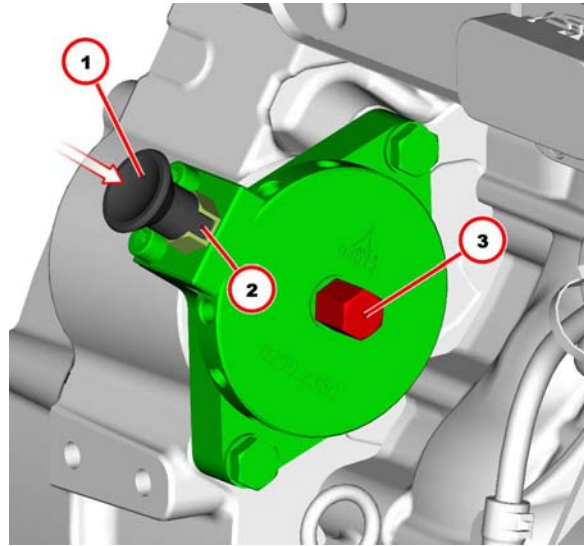
Toothed wheel of the turning gear / locking device in the toothed starter ring.

3. Tighten screws (2).



30 Nm

#### b. Rotating the engine



MAE11840

1. Pull out and turn detent pin (1).



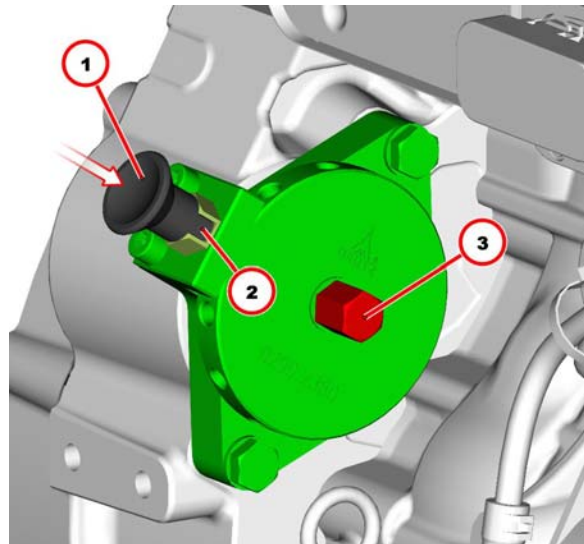
Observe position of the latches (2).

2. Turn drive (3) carefully up to the desired crankshaft position.



Observe engine direction of rotation.

#### c. Locking the engine



MAE11840

1. Pull out and turn detent pin (1).



Observe position of the latches (2).



2. Turn drive (3) carefully until the detent pin latches into place.



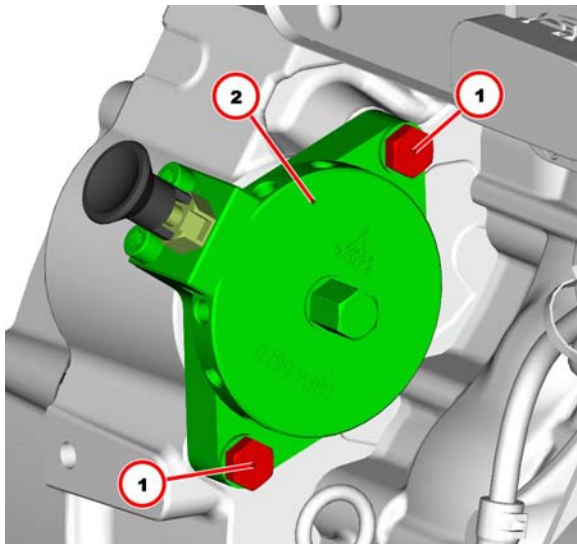
Observe engine direction of rotation.



**Attention!**

Detent pin must latch easily into place. The crankshaft is locked and can no longer be turned.

**d. Removing turning gear / locking device**



MAE11850

1. Unscrew screws (1).
2. Remove turning gear / locking device (2).
3. Install starter.



Module

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## Disassembly and Assembly

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### e. Technical Data

#### *Tightening specifications*

ID No.	Name	Screw Type	Notes/ Remark	Value
A49 050	Turning gear / locking device, fastening			30 Nm



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





## 5.38 MEASURING INSTRUMENTS

### 5.38.1 Impulse Transmitter (Crankshaft) (W 51-90-20)



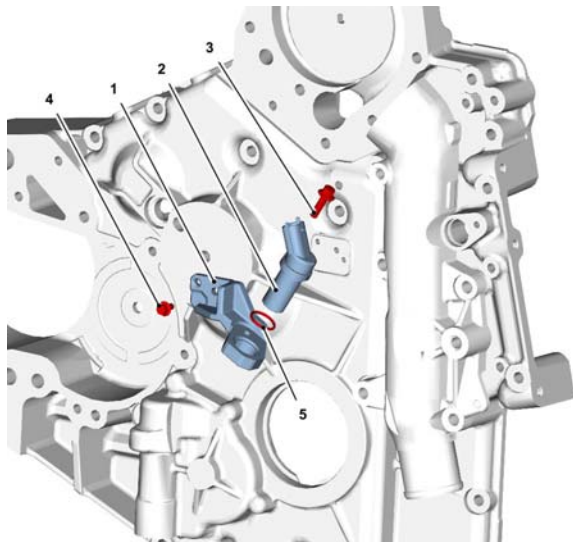
Standard tools

Special tools:

- Disassembly tool - PN 461-1696



Safety information / User information



MAE11860

1	Holder	
2	Impulse Transmitter	
3	Hexagon Head Screw	8,5 Nm
4	Hexagon Head Screw	5 Nm
5	O-ring	

1. Remove the o-ring with the disassembly tool.
2. Insert new o-ring.



#### Attention!

Ensure that the installation location is free from faults.



Position 1

Position fixing using two clamping pins in the gear case.

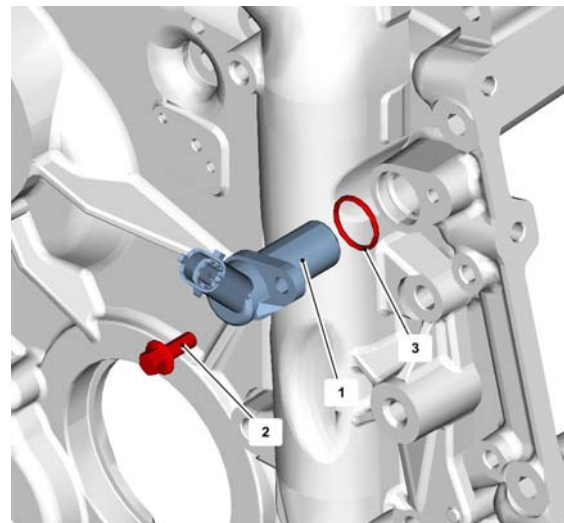
### 5.38.2 Impulse Transmitter (Camshaft) (W 51-90-20)



Standard tools



Safety information / User information



MAE13410

1	Impulse transmitter	
2	Hexagon Head Screw	8,5 Nm
3	O-ring	

1. Clean sealing surfaces.



Use new round sealing ring.



## Disassembly and Assembly

### 5.39 MESSGERATE

#### 5.39.1 Pressure Transmitter Installation (Oil Pressure) (W 51-90-20)

Engine 492-2140 & 505-6559:



Standard tools

Special tools:

- Plugs/caps - PN 01899368
- Crow foot wrench size 24 - PN 01899406

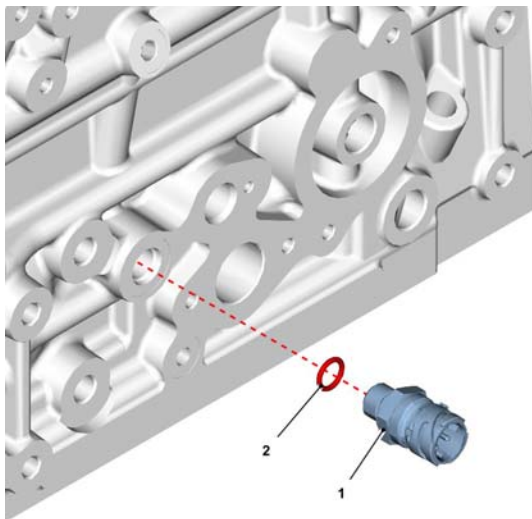


Safety information / User information



#### Attention!

Ensure utmost cleanliness for all work. Remove any paint residue and dirt particles before disassembly. Clean the area around the components concerned carefully. Blow wet parts dry with compressed air. Close all connections immediately after opening with new, clean plugs/caps. Do not remove plugs/caps until immediately before assembling.



MAE11880

1	Pressure Sensor	25 Nm
2	O-ring	



#### Attention!

Pay attention to utmost cleanliness.



Use new round sealing ring.

Engine 492-5092 & 505-7229 (W 51-90-20):

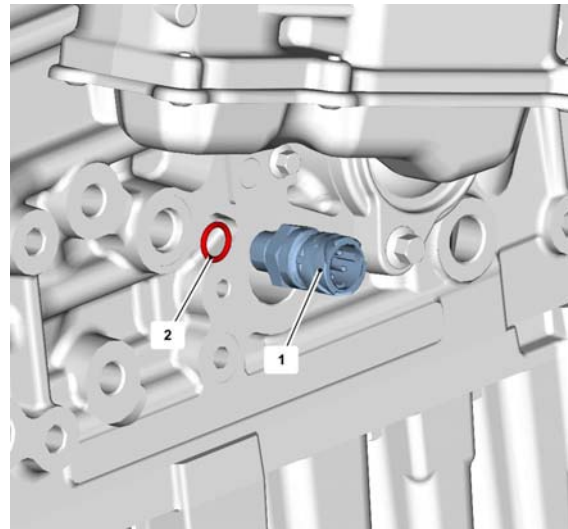


Standard tools

- Long socket wrench insert - PN 461-1693



Safety information / User information



MAE13140

1	Pressure Sensor	25 Nm
2	O-ring	



Use new round sealing ring.



**5.40 CONNECTION HOUSING**

Engine 492-5092 & 505-7229:

**5.40.1 Removing and Installing the Connection Housing (W 52-01-01)**



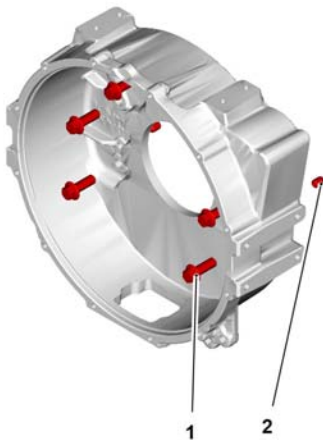
Standard tools



Safety information / User information

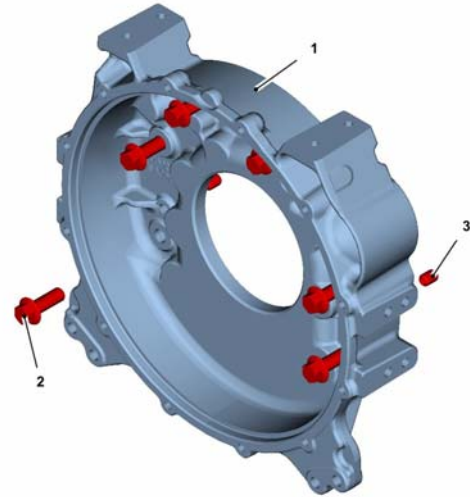
**a. Removing the Connection Housing**

Engine 492-2140 & 505-6559:



MAE11890

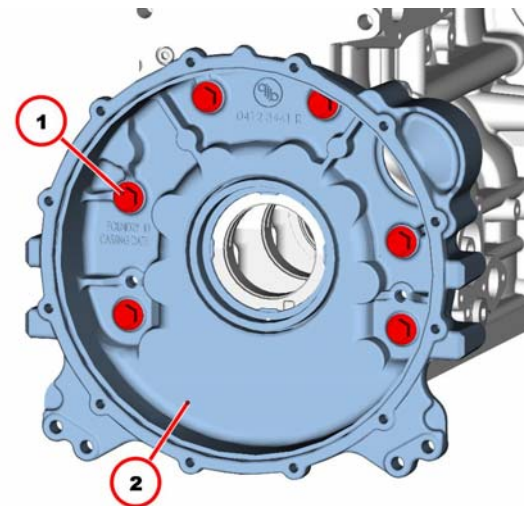
1	Hexagon head screw
2	Bushing



MAE13250

1	Connection housing	
2	Hexagon head screw	8.5 Nm
3	Cover plate	
4	Hexagon head screw	
5	Bushing	

Engine 492-2140 & 505-6559:

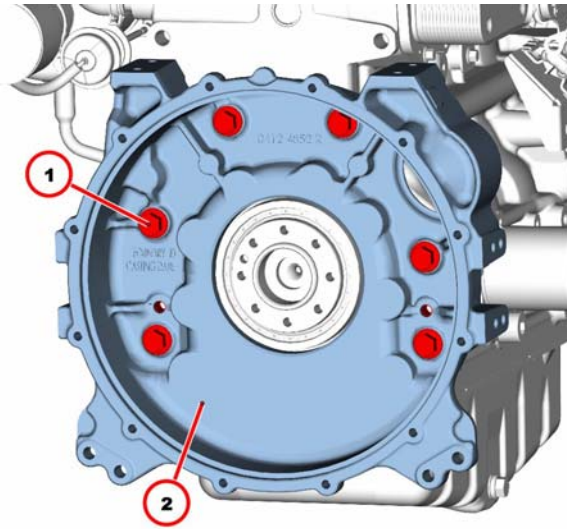


MAE11900



## Disassembly and Assembly

### Engine 492-5092 & 505-7229:



MAE13260

1. Remove flywheel.



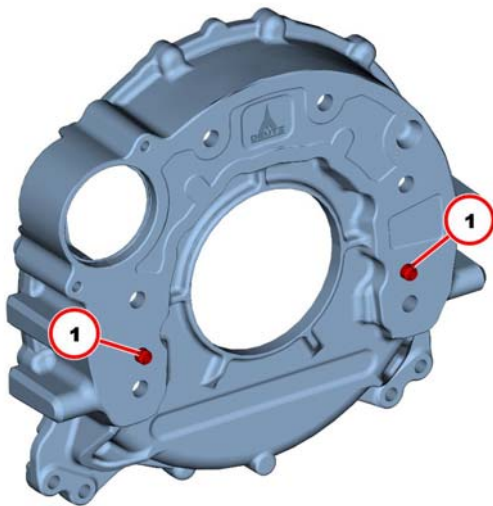
Module

05

2. Unscrew screws (1).
3. Remove connection housing (2).
4. Visually inspect the component.

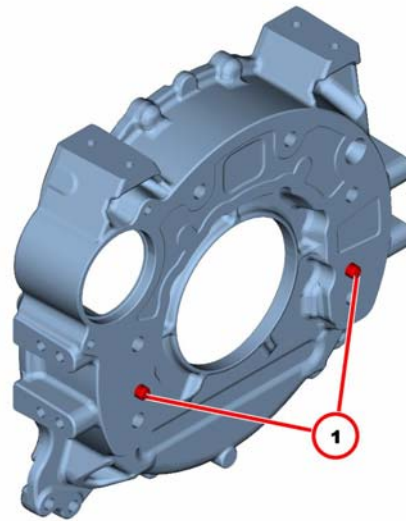
### b. Installing the Connection Housing

#### Engine 492-2140 & 505-6559:



MAE11910

### Engine 492-5092 & 505-7229:



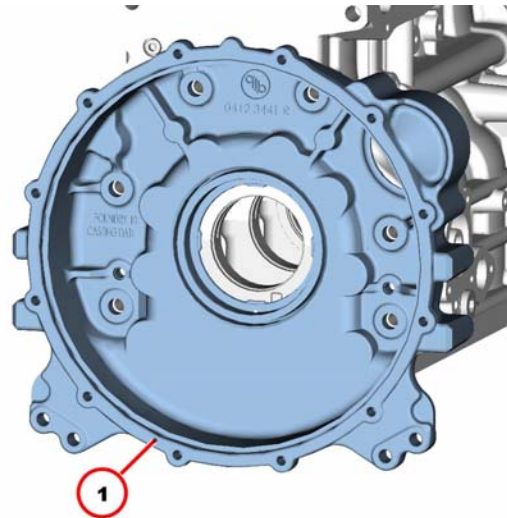
MAE13270

1. Clean contact surfaces.



Make sure the clamping bushings (1) are in place.

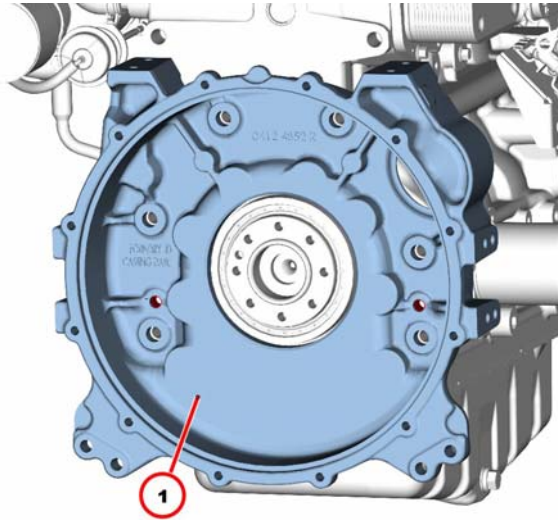
#### Engine 492-2140 & 505-6559:



MAE11920



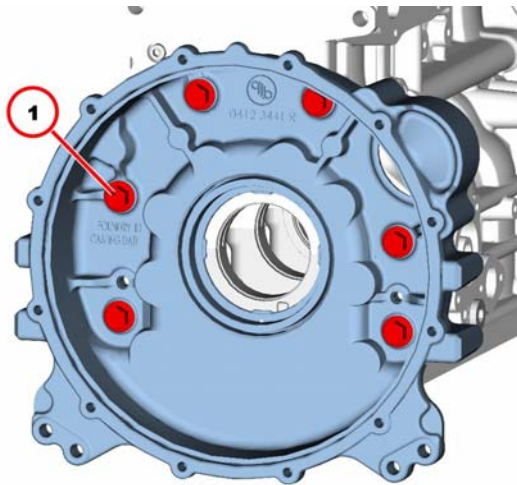
**Engine 492-5092 & 505-7229:**



MAE13280

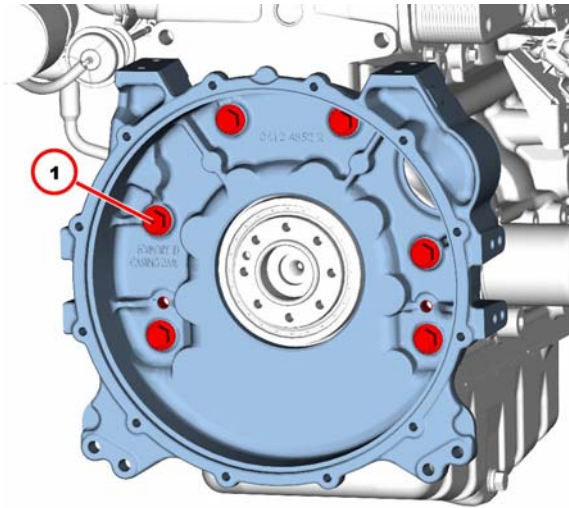
2. Position connection housing (1).
3. Centre connection housing over the clamping bushings.

**Engine 492-2140 & 505-6559:**



MAE11930

**Engine 492-5092 & 505-7229:**



MAE13290

4. Tighten screws (1).
5. Tighten all screws (1) alternately.



170 Nm

6. Install flywheel.



Module

05



## Disassembly and Assembly

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### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A52 080	Connection housing on crankcase		Tighten diagonally opposed	20 Nm



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



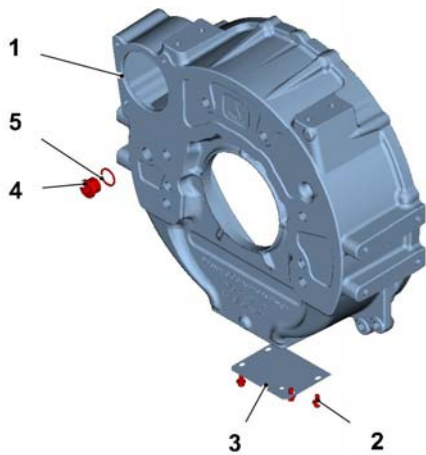
### 5.40.2 Connection Housing (W 52-90-53)



Standard tools



**Engine 492-2140 & 505-6559:**  
Safety information / User information



MAE11940

1	Connection housing	
2	Hexagon head screw	<b>Engine 492-2140 &amp; 505-6559:</b> 13 Nm <b>Engine 492-5092 &amp; 505-7229:</b> 8.5 Nm
3	Cover plate	
4	Screw plug	80 Nm
5	Sealing ring	



Use a new sealing ring.



### 5.41 START AID

#### 5.41.1 Removing and Installing the Glow Plugs (W 63-02-01)



Standard tools

Special tools:

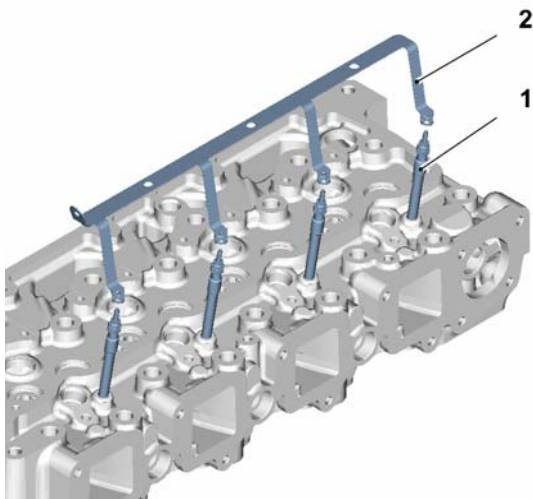
- Crowfoot Wrench Size 10

**Engine 492-2140 & 505-6559**- PN 01899407



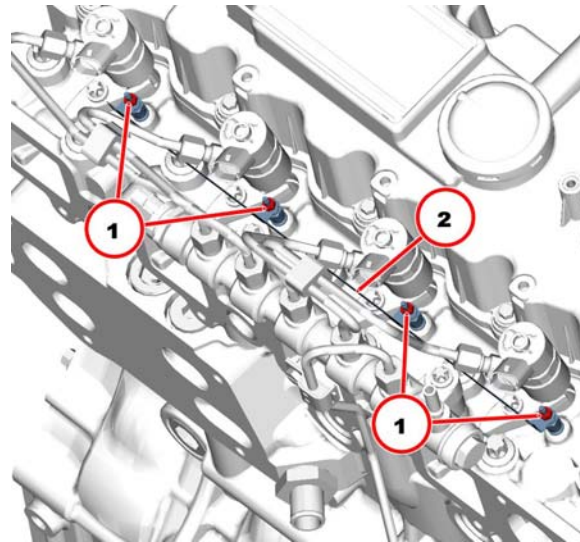
Safety information / User information

##### a. Removing the Glow Plug



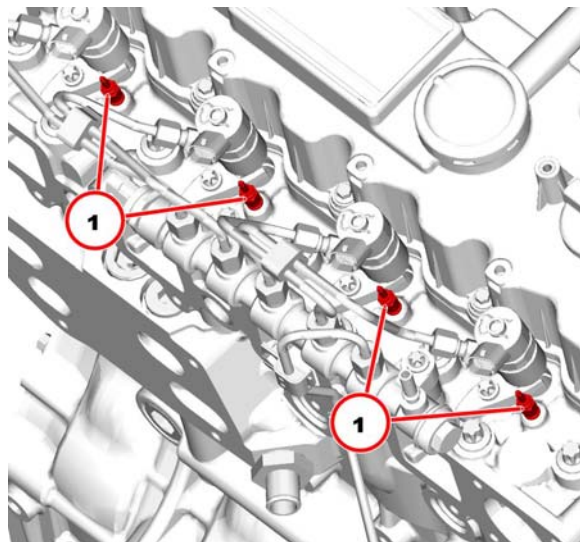
MAE11950

1	Glow plug
2	Connecting rail



MAE11960

1. Disconnect the battery.
2. Unscrew nuts (1).
3. Remove connecting rail (2).



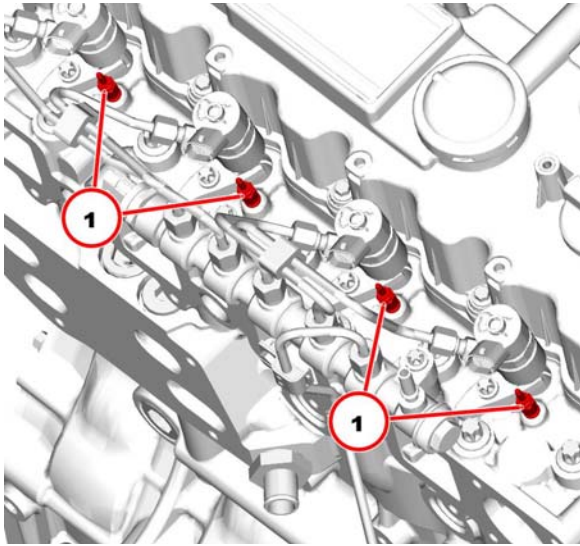
MAE

4. Unscrew glow plugs (1).
5. Visually inspect the components.





**b. Installing the Glow Plugs**



MAE11980

1. Screw in glow plugs (1).



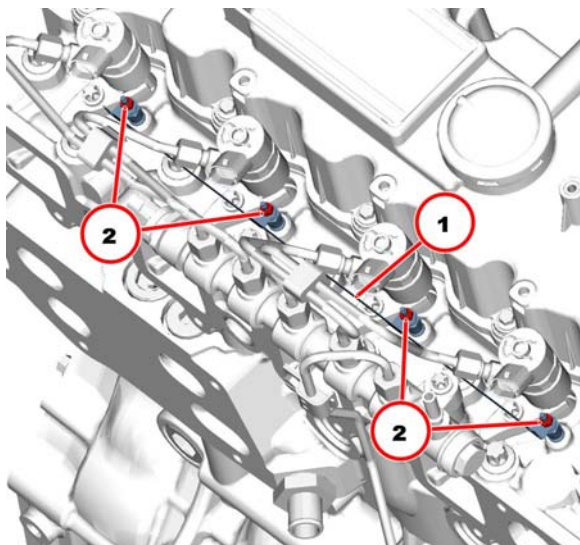
**Attention!**

Ensure that the installation location is free from faults.

2. Tighten glow plugs (1).



13.5 Nm



MAE11990

3. Mount connecting rail (1).
4. Turn on nuts (2).



**Attention!**

Ensure that the connection is perfect.

5. Tighten nuts (2).



**Engine 492-2140 & 505-6559:** 2 - 2.5 Nm

**Engine 492-5092 & 505-7229:** 2.5 Nm



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A63 032	Glow plug on cylinder head			13.5 Nm
A63 033	Connecting rail on glow plug			<b>Engine 492-2140 &amp; 505-6559:</b> 2 - 2.5 Nm <b>Engine 492-5092 &amp; 505-7229:</b> 2.5 Nm



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



## 5.42 EXHAUST GAS TREATMENT

### 5.42.1 Removing and Installing the Sensor (NOx) (W 71-05-04) (Engine 492-2140 & 505-6559)



Standard tools

Special tools:

- Plugs/caps - PN 01899368
- Dog wrench - PN 02992345



Fitting compound  
Henkel C5-A Anti-Seize



Safety information / User information  
Operation manual  
Service Bulletin



#### **Danger!**

Hot components!

Danger of burns / explosion! Let the engine / components cool down sufficiently (to at least ambient temperature).

The duration of the so-called lag time is application dependent and can be up to 2 minutes in engines with SCR system, for example, because the SCR pipes have to be pumped empty in this time.

The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.



#### **Attention!**

Ensure utmost cleanliness for all work. Remove any paint residue and dirt particles before disassembly.

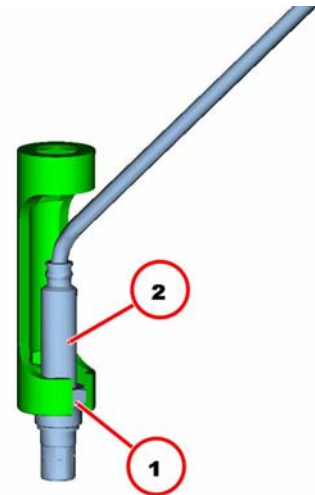
Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

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

Do not remove plugs/caps until immediately before assembling.

Replacing the NOx sensors influences the emissions and therefore has an effect on the certification of the vehicle. As such, the information in the Service Bulletin must be observed.

#### a. Removing the Sensor



MAE12000



The following work procedure describes the removal and installation of one sensor.

The procedure is the same to install and remove further sensors.

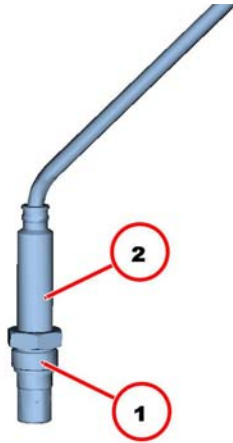
Mark assignment of cables/connections before removing.

1. Unlock cable plug and remove.
2. Unscrew union screw (1) with claw wrench.
3. Remove sensor (2).
4. Visually inspect the components.



## Disassembly and Assembly

### b. Installing the Sensor



MAE12010



#### Attention!

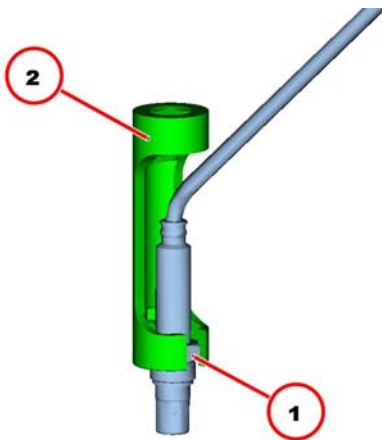
Replacing the NOx sensors influences the emissions and therefore has an effect on the certification of the vehicle. As such, the information in the Service Bulletin must be observed.



Diagnostic tool  
SerDia manual

SerDia 2010

1. Coat the thread (1) with fitting compound.
2. Mount sensor (2).



MAE12020

3. Unscrew glow plugs (1).



#### Attention!

Do not turn the cable. Ensure that the cables are laid perfectly.

4. Hold the sensor with your hand.
5. Screw in union screw (1) with claw wrench (2).



50 Nm



MAE12030

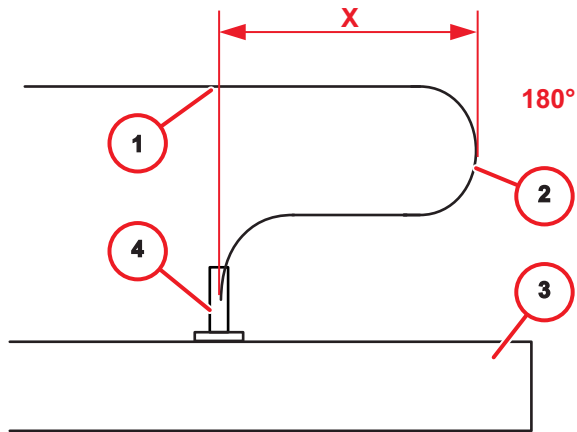


#### Attention!

Note assignment and installation position.

6. NOx sensor assignment:

Installation site	Color of plug connection (1)
Diesel particle filter	black
SCR (Selective Catalytic Reduction)	
Before catalytic converter	grey
After catalytic converter	black



MAE12040

7. Lay cable between NOx sensor and NOx control unit with a safety loop.



**Attention!**

Ensure that the cables are laid perfectly.

Lay the cables free from chafing and tension.

The length of the safety loop must be based on the appropriate documentation of the vehicle/equipment manufacturer.

Position	Remark/name	Value
1	Last fastening point	
2	Safety loop	180°
3	Exhaust system	
4	NOx sensor	
X	Length	at least 100 mm

8. Plug in and lock cable plug.



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name	Screw type	Notes / Remark	Value
A71 068	NOx sensor, fastening		Insert with Engine manufacturer's mounting compound.	50 Nm



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



### 5.42.2 Removing and Installing Pressure Sensor SCR (W 71-05-05) (Engine 492-2140 & 505-6559)



Special tools:

- Plugs/caps - PN 01899368
- Special wrench - PN 449-2496



Safety information / User information  
Operation manual  
Installation guideline



**Danger!**

Hot components!

Danger of burns / explosion! Let the engine / components cool down sufficiently (to at least ambient temperature).

The duration of the so-called lag time is application dependent and can be up to 2 minutes in engines with SCR system, for example, because the SCR pipes have to be pumped empty in this time.

The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.

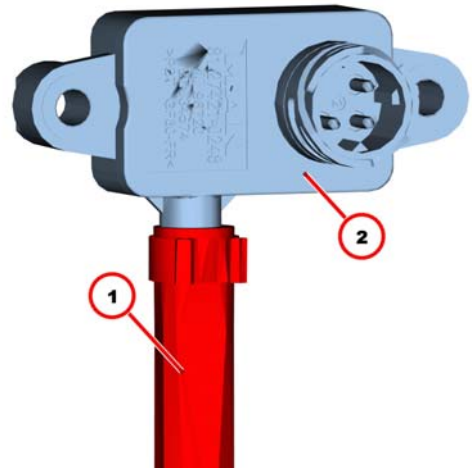


**Attention!**

Ensure utmost cleanliness for all work. Remove any paint residue and dirt particles before disassembly. Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

Close all connections immediately after opening with new, clean plugs/caps. Do not remove plugs/caps until immediately before assembling.

#### a. Removing the Pressure Transmitter



MAE12050

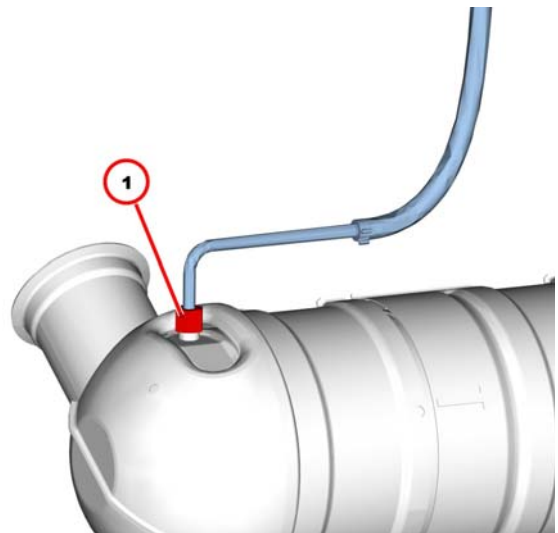
1. Unlock cable plug and remove.



**Attention!**

To avoid electrostatic discharges, do not touch the plug contacts with your bare hands.

2. Remove hose pipe (1).
3. Remove screws.
4. Remove pressure sensor (2).
5. Visually inspect the components.



MAE12060



**Attention!**

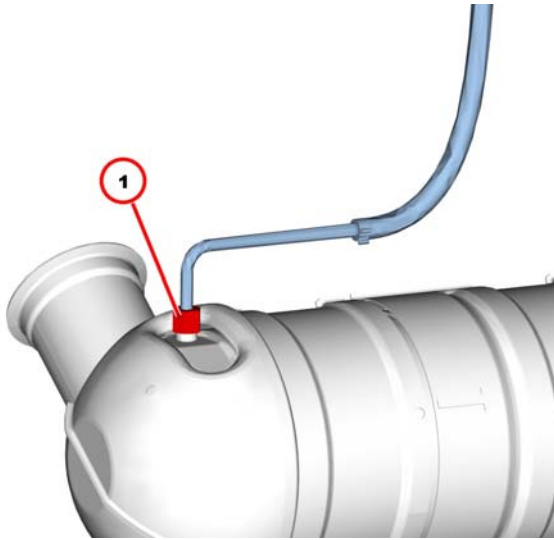
Note assignment and installation position.

6. Unscrew lock nut (1).
7. Remove hose line.
8. Visually inspect the components.



## Disassembly and Assembly

### b. Installing the Pressure Transmitter



MAE12070

1. Unscrew glow plugs (1).



#### Attention!

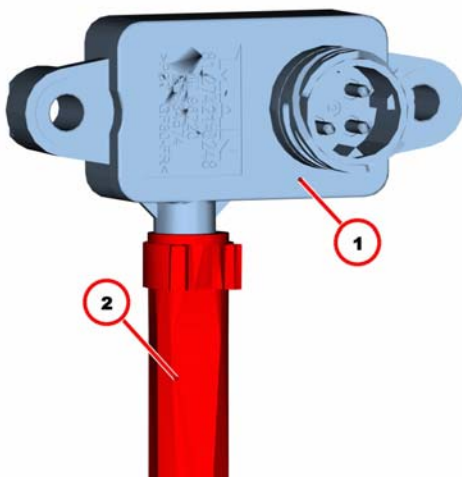
The following must be observed during installation:  
Refer engine manufacturer's installation guidelines.  
Installation guideline/documentation of the vehicle  
manufacturer/equipment manufacturer.

Note assignment and installation position. Ensure  
that the installation location is free from faults.

2. Mount hose line.
3. Tighten lock nut (1).



60 Nm



MAE12080

4. Install pressure sensor (1).

5. Tighten screws.



9 Nm

6. Mount hose pipe (2).



#### Attention!

Note assignment and installation position. Ensure  
that the installation location is free from faults.



**c. Technical Data*****Tightening specifications***

ID no.	Name	Screw type	Notes / Remark	Value
A71 069	Line, pressure sensor			60 Nm
A71 070	Pressure sensor, fastening			9 Nm



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



## Disassembly and Assembly

### 5.42.3 Removing and Installing the Dosing Device SCR (W 71-06-02) (Engine 492-2140 & 505-6559)



Standard tools  
Special tools  
- Plugs/caps - PN 01899368



Fitting compound Henkel C5-A Anti-Seize  
Protective gloves  
Protective glasses



Safety information / User information  
Operation manual



#### **Danger!** **Hot components!**

Danger of burns / explosion! Let the engine / components cool down sufficiently (to at least ambient temperature).

The duration of the so-called lag time is application dependent and can be up to 2 minutes in engines with SCR system, for example, because the SCR pipes have to be pumped empty in this time.

The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.



#### **Danger!**

Ensure the utmost cleanliness when performing all work.

Before dismounting, remove any paint residues and dirt particles.

Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

Observe safety regulations and national regulations when working with fuels.

Seal all connections immediately with new and clean stoppers/caps after opening.

Only remove stoppers/caps immediately before assembly.

Collect escaping operating media in suitable vessels and dispose of them according to regulations.

The following must be observed for installation:

Installation guidelines of engine manufacturer.

Installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.

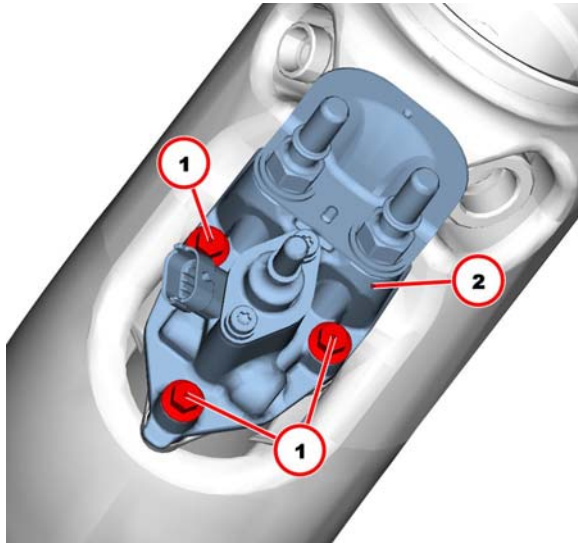
The documentation of the vehicle manufacturer / equipment manufacturer must be complied with for dismantling and installing.



Installation variant shown as an example.



**a. Removing the Dosing Device**



MAE12090

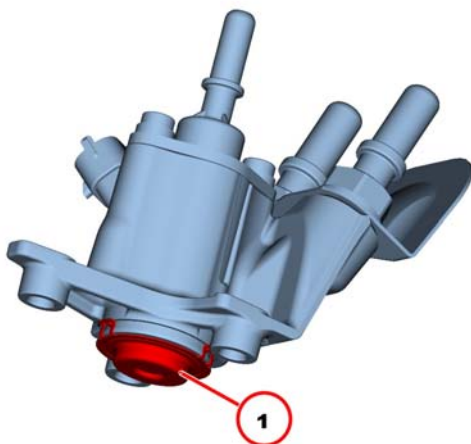
1. Unlock cable plug and remove.
2. Unlock coupling plug and pull off.
3. Remove lines.
4. Unscrew screws (1).
5. Carefully remove the dosing device (2).



**Attention!**

Do not damage the component.

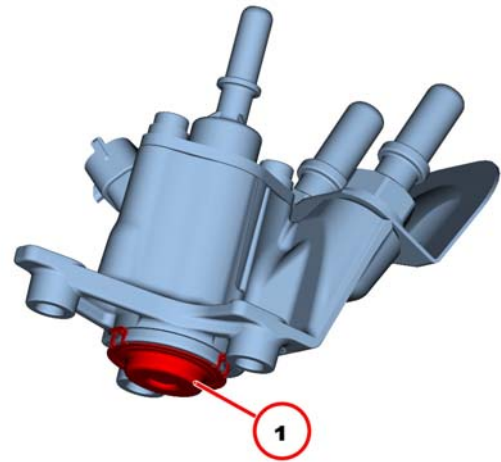
6. Visually inspect the components.



MAE12100

7. Remove gasket (1).
8. Visually inspect the components.

**b. Installing the Dosing Device**



MAE12110



**Attention!**

Do not use any sharp tools.

Do not damage the components.

Do not damage the sealing surfaces.

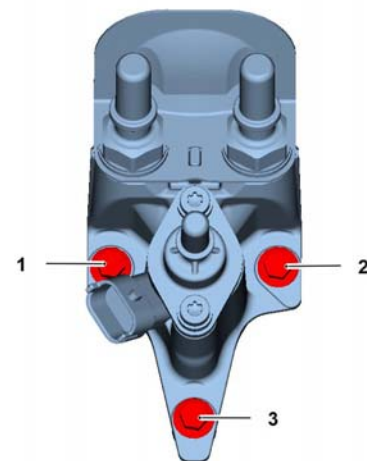
Pay attention to utmost cleanliness.

All sealing surfaces / sealing points must be completely clean.

The nozzle hole disc must not be touched.

Ensure that the installation location is free from faults.

1. Mount gasket (1).



MAE12120

2. Carefully insert the dosing device.
3. Insert screws.

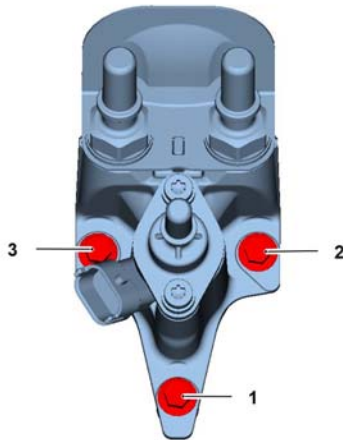


## Disassembly and Assembly

4. Tighten the screws in sequence until the sealing plate is pressed down.



Hand tight



MAE12130

5. Tighten the screws according to the tightening sequence.



8 Nm



### Attention!

Install line without tension and contact.

Ensure that the installation location is free from faults.

Ensure that the connection is perfect.

6. Align the lines.
7. Insert lines.
8. Mount coupling plug and latch into place.
9. Plug in and lock cable plug.

**c. Technical Data*****Tightening specifications***

<b>ID no.</b>	<b>Name:</b>	<b>Screw Type</b>	<b>Notes / Remark</b>	<b>Value</b>
A71 091	Dosing device, fastening		Stage 1: Observe tightening sequence.	30 Nm
A71 091	Dosing device, fastening		Stage 1: Observe tightening sequence.	



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



## Disassembly and Assembly

### 5.42.4 Removing and Installing Temperature Transmitter (W 71-07-01) (Engine 492-2140 & 505-6559)



Standard tools  
Plugs/caps - PN 01899368  
Special wrench - PN 449-2496



Safety information / User information  
Operation manual  
Installation guideline



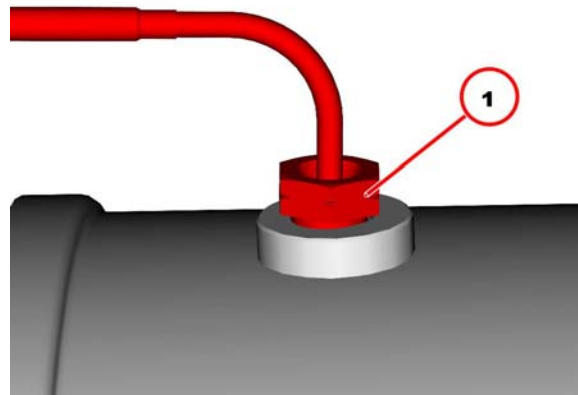
**Danger!**  
**Hot components!**

Danger of burns / explosion!  
Let the engine / components cool down sufficiently (to at least ambient temperature).  
The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.



**Danger!**  
Ensure utmost cleanliness for all work.  
Remove any paint residue and dirt particles before disassembly.  
Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.  
Close all connections immediately after opening with new, clean plugs/caps.  
Do not remove plugs/caps until immediately before assembling.  
Observe installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.

#### a. Removing Temperature Transmitter

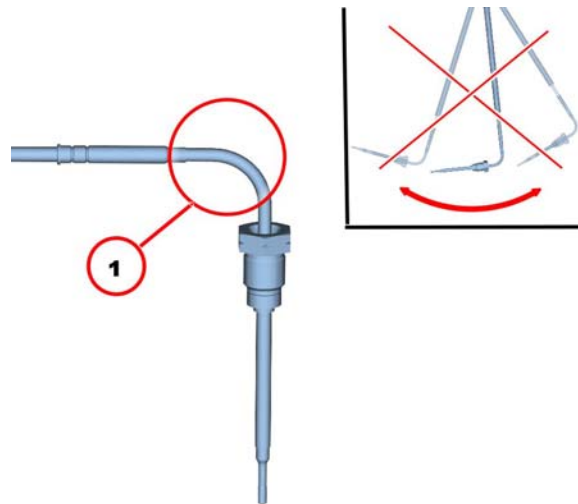


MAE12140



The following work procedure describes the removal and installation of a temperature transmitter.  
The procedure is the same for removing/installing a further temperature transmitter.

1. Unlock cable plug and disconnect.
2. Unscrew union nut (1) with special wrench.



MAE12150

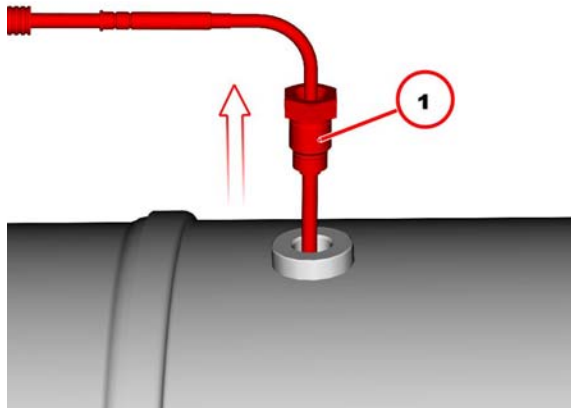


**Attention!**

The temperature transmitter may only be handled in the area shown (1).

**The following are not permitted:**

- Soaking or oscillating,
- Swinging or similar movements or exertion of force of the entire temperature transmitter on the plug.



MAE12160



**Attention!**

Note installation position.  
Note axial removal position.  
Sensor tip must not be damaged.

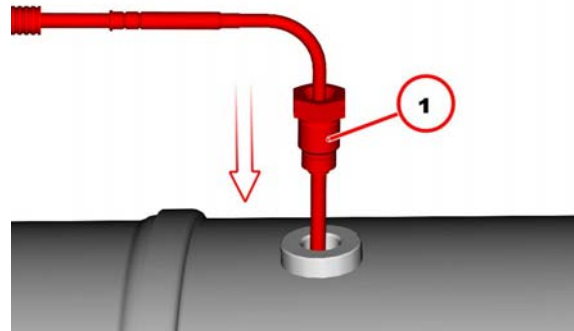
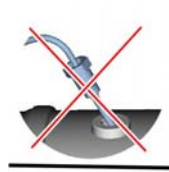
3. Remove temperature transmitter (1) in direction of arrow.
4. Visually inspect the components.



**Attention!**

Storage time without plugged-in mating plug:  
maximum 24 hours.

**b. Installing Temperature Transmitter**



MAE12170



**Attention!**

The following must be observed during installation:  
Engine Manufacturer's installation guidelines.  
Installation guideline/documentation of the  
vehicle manufacturer/equipment manufacturer.  
Note axial installation position.  
Sensor tip must not be damaged.  
Ensure that the installation location is free from  
faults.

1. Insert temperature transmitter (1) in direction of arrow.
2. Tighten temperature transmitter (1).



45 Nm

3. Lay cable strand free from tension and chafing.
4. Fit together cable plug.



**Attention!**

Ensure that the connection is perfect.  
Ensure that the cables are laid perfectly.



## Disassembly and Assembly

---

### c. Technical Data

#### *Tightening specifications*

ID no.	Name:	Screw Type	Notes / Remark	Value
A71 067	Temperature transmitter, fastening			45 Nm



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





5.42.5 Holder (W 71-90-09)

Engine 492-2140 & 505-6559:



Standard tools



Safety information / User information



**Danger!**  
**Hot components!**

Danger of burns / explosion!  
Let the engine / components cool down sufficiently (to at least ambient temperature).



**Attention!**  
Note installation position.  
The installation situation is application and equipment-dependent.  
The documentation of the vehicle manufacturer/ equipment manufacturer must be observed for disassembly and installation.

Make sure that the particle filter, V-belt clips and fastening points are reassembled in the same installation position.

Do not scratch or damage surfaces.

Externally damaged parts must be renewed.

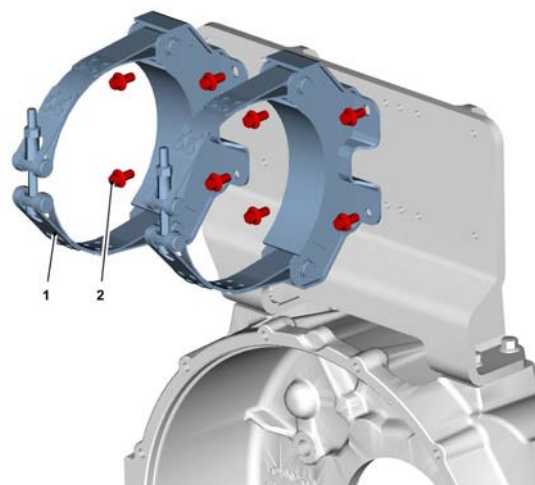
All the help markings must be transferred when renewing/changing a part.

V-belt clips must be replaced each time they are loosened.



MAEXXX

1	Holder	
2	Nut	22 Nm



MAE12250

1	Holder	18 Nm
2	Hexagon head screw	30 Nm

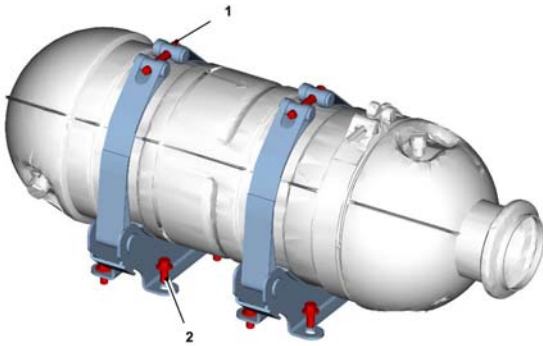


Component in the holder must move freely in order to be aligned.



## Disassembly and Assembly

### Engine 492-5092 & 505-7229:



MAE13200

1	Holder	9 Nm
2	Hexagon head screw	20 Nm

### 5.42.6 Exhaust Back Pressure Sensor SCR (W 71-90-20) (Engine 492-2140 & 505-6559)



Standard tools

Special tools:

- Plugs/caps - PN 01899368



Safety information / User information

Operation manual

Installation guideline



#### **Danger!**

#### **Hot components!**

Danger of burns / explosion!

Let the engine / components cool down sufficiently (to at least ambient temperature).

The duration of the so-called lag time is application-dependent and can be up to 2 minutes in engines with SCR system, for example, because the SCR pipes have to be pumped empty in this time.

The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.



#### **Attention!**

Ensure utmost cleanliness for all work.

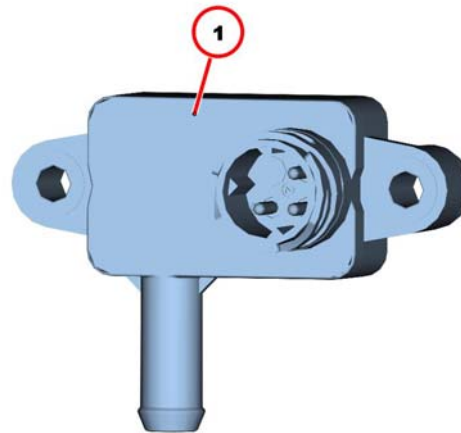
Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

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

Do not remove plugs/caps until immediately before assembling.

Observe installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.



MAE12260

1	Pressure sensor
	Exhaust back pressure



#### **Attention!**

To avoid electrostatic discharges, do not touch the plug contacts with your bare hands.

Pay attention to utmost cleanliness.

Observe engine manufacturer's installation guidelines.

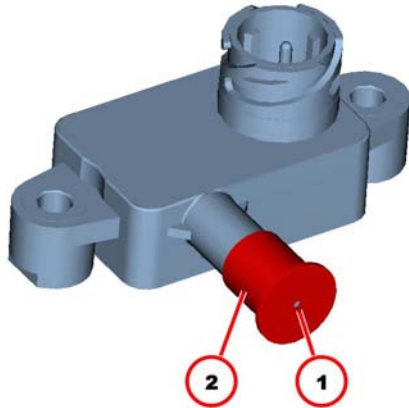
Observe installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.

Note assignment and installation position.

Ensure that the installation location is free from faults.



**5.42.7 Temperature Sensor (W 71-90-20)  
(Engine 492-2140 & 505-6559)**

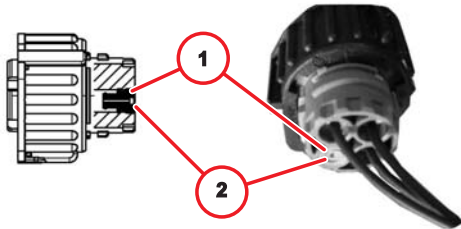


MAE12270



**Attention!**

Do not seal pressure balance opening (1) when pulling out the protective cap (2).



MAE12280

Mating plug for exhaust back Pressure Sensor Chamber 4



**Attention!**

Seal (1) must close flush with the housing.  
The seal opening (2) must not be closed.



The seal opening balances the pressure.



Standard tools

Special tools:

- Plugs/caps - PN 01899368

- Disassembly tool - PN 461-1696



Safety information / User information

Operation manual

Installation guideline



**Danger!**

**Hot components!**

Danger of burns / explosion!

Let the engine / components cool down sufficiently (to at least ambient temperature).

The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.



**Attention!**

Ensure utmost cleanliness for all work.

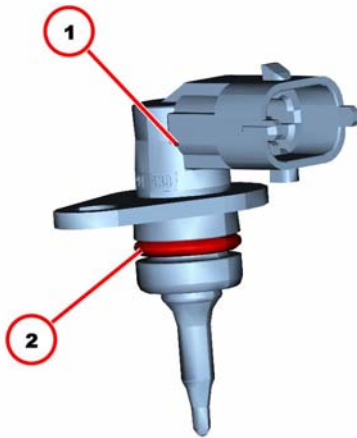
Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

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

Do not remove plugs/caps until immediately before assembling.

Observe installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.



MAE12290

1	Temperature sensor
2	O-ring



### Attention!

Use new round sealing ring.  
 Observe engine manufacturer's installation guidelines.  
 Observe installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.  
 Note assignment and installation position.  
 Ensure that the installation location is free from faults.

## 5.42.8 Coolant Line SCR (W 71-90-32) (Engine 492-2140 & 505-6559)



Standard tools  
 Special tools:  
 - Plugs/caps - PN 01899368



Safety information / User information  
 Operation manual



### Danger! Hot components!

Danger of burns / explosion!  
 Let the engine / components cool down sufficiently (to at least ambient temperature).  
 The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.

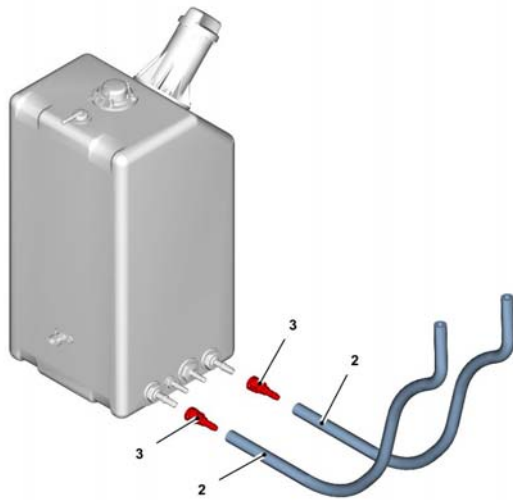


### Attention!

Ensure utmost cleanliness for all work.  
 Remove any paint residue and dirt particles before disassembly.  
 Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.  
 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.  
 Observe the appropriate operating instructions for emptying and filling the engine.



MAE12300

2	Coolant line
3	Coupling plug



**Danger!**  
Observe specifications for working on the cooling system - see operating manual.



**Attention!**  
Ensure that the connection is perfect.  
Ensure that the installation location is free from faults.  
Lay the hose pipe free from chafing and tension.

1. Fill cooling system according to the operating manual.

### 5.42.9 Catalytic Converter DOC (Diesel Oxidation Catalyst) / DPF (Diesel Particle Filter) (W 71-90-45) (Engine 492-2140 & 505-6559)



Standard tools  
- Industrial vacuum cleaner  
Special tools:  
- Plugs/caps - PN 01899368



- Respirator according to FFP2  
- Protective gloves  
- Protective glasses



Safety information / User information  
Operation manual



**Danger!**  
**Hot components!**

Danger of burns / explosion!  
Let the engine / components cool down sufficiently (to at least ambient temperature).  
Wear respirator with at least protection class FFP2.

Wear protective gloves and glasses!  
The duration of the so-called lag time is application-dependent and can be up to 2 minutes in engines with SCR system, for example, because the SCR pipes have to be pumped empty in this time.

The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.

Wear a respirator with at least protection class FFP2, goggles and protective gloves as protection against fine dust and soot particles.

Do not blow compressed air onto soot-covered areas.

Do not carry out work on the fuel system when the engine is running.



## Disassembly and Assembly



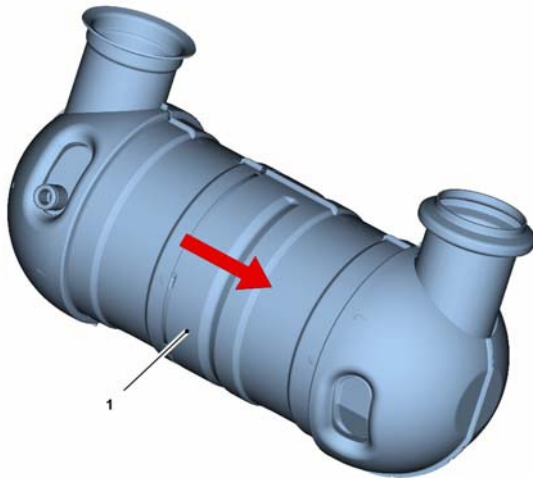
### Attention!

Ensure utmost cleanliness for all work.  
 Remove any paint residue and dirt particles before disassembly.  
 Clean the area around the components concerned carefully. Blow wet parts 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.



### Attention!

The installation situation is application and equipment-dependent.  
 Externally damaged parts must be renewed.  
 The documentation of the vehicle manufacturer/ equipment manufacturer must be observed for disassembly and installation.  
 All the help markings must be transferred when renewing/changing a part.  
 V-belt clips must be replaced each time they are loosened.  
 The gaskets must be disposed of properly and always renewed.  
 Ensure that the installation location is free from faults.  
 Note flow direction.  
 The arrow indicates the flow direction.  
 Pay attention to utmost cleanliness.  
 All sealing surfaces / sealing points must be completely clean.  
 See the spare parts documentation.



MAE12310

Operation manual

### 5.42.10 Catalytic Converter SCR (Selective Catalytic Reduction) (W 71-90-45) (Engine 492-2140 & 505-6559)



Standard tools  
 Special tools:  
 – Plugs/caps - PN 01899368



Safety information / User information  
 Operation manual

1	Catalytic converter	
950	Stopper	15 Nm



Installation variant shown as an example.  
 Proceed in the same way for other fittings.



**Danger!**  
**Hot components!**

Danger of burns / explosion!  
 Let the engine / components cool down sufficiently (to at least ambient temperature).  
 Wear protective gloves and glasses!  
 The duration of the so-called lag time is application-dependent and can be up to 2 minutes in engines with SCR system, for example, because the SCR pipes have to be pumped empty in this time.  
 The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.  
 Do not carry out work on the fuel system when the engine is running.

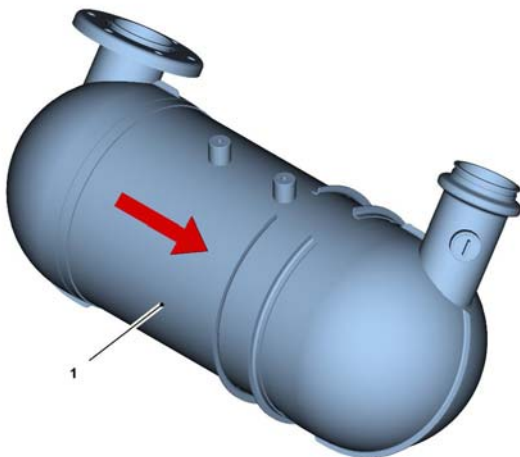


**Attention!**

Ensure that the installation location is free from faults.  
 Note flow direction.  
 The arrow indicates the flow direction.  
 The documentation of the vehicle manufacturer/ equipment manufacturer must be observed for disassembly and installation.  
 Pay attention to utmost cleanliness.  
 All sealing surfaces / sealing points must be completely clean.  
 See the spare parts documentation.



Operation manual



MAE12320

1	Catalytic converter
---	---------------------



## Disassembly and Assembly

### 5.42.11 Supply Pump SCR (Selective Catalytic Reduction) (W 71-90-47) (Engine 492-2140 & 505-6559)



- Standard tools  
Special tools:
- Plugs/caps 01899368
  - Protective gloves
  - Protective glasses
  - Glycerine



- Protective gloves
- Protective glasses
- Glycerine



Safety information / User information  
Operation manual



#### **Danger!** **Hot components!**

Danger of burns / explosion!  
Let the engine / components cool down sufficiently (to at least ambient temperature).  
Wear protective gloves and glasses!  
The duration of the so-called lag time is application-dependent and can be up to 2 minutes in engines with SCR system, for example, because the SCR pipes have to be pumped empty in this time.  
The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.  
Do not carry out work on the fuel system when the engine is running.



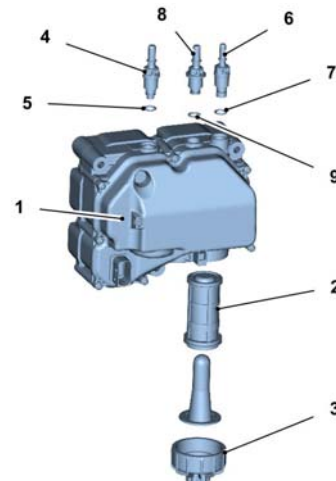
#### **Attention!**

Ensure the utmost cleanliness when performing all work.  
Before dismounting, remove any paint residues and dirt particles.  
Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.  
Observe safety regulations and national regulations when working with fuels.  
Seal all connections immediately with new and clean stoppers/caps after opening.



#### **Attention!**

Only remove stoppers/caps immediately before assembly.  
Collect escaping operating media in suitable vessels and dispose of them according to regulations.  
The following must be observed for installation:  
Installation guidelines of engine manufacturer.  
Installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.  
The documentation of the vehicle manufacturer / equipment manufacturer must be complied with for dismantling and installing.



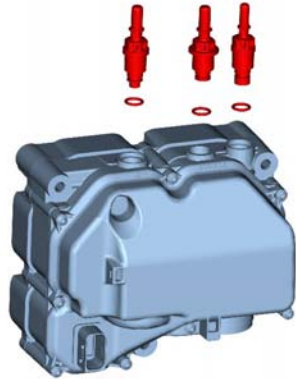
MAE12330

1	Supply pump	
2	Main filter Filter cartridge	
3	Filter cover	
4	Nozzle	4 - 4,5 Nm
5	O-ring	
6	Nozzle	4 - 4,5 Nm
7	O-ring	
8	Nozzle	4 - 4,5 Nm
9	O-ring	





5.42.12 Console (W 71-90-51)



MAE6600



**Attention!**

Pay attention to utmost cleanliness.  
All sealing surfaces / sealing points must be completely clean.

To avoid electrostatic discharges, do not touch the plug contacts with your bare hands.  
See the spare parts documentation.



Use new round sealing rings.  
Coat new round sealing rings slightly with glycerine.  
Supply pump  
Filter cartridge



Operation manual

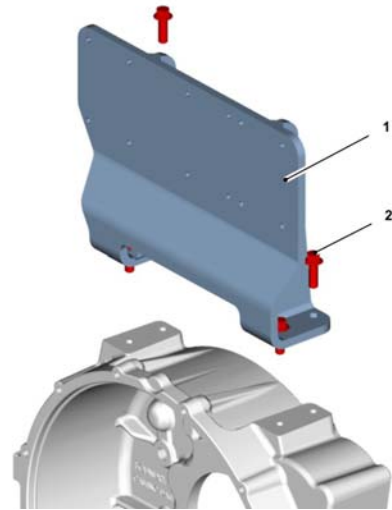


Standard tools



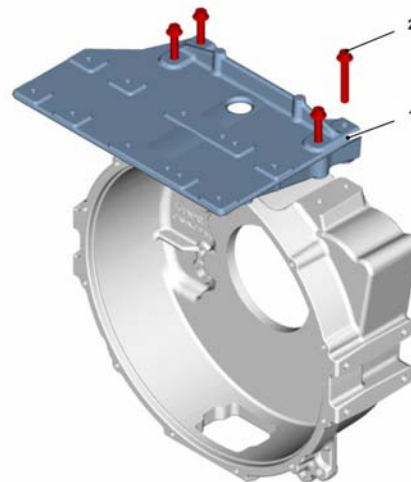
Safety information / User information  
Operation manual

**Engine 492-2140 & 505-6559:**



MAE12340

**Engine 492-5092 & 505-7229:**



MAE13190

1	Console	
2	Hexagon head screw	60 Nm



## Disassembly and Assembly

### 5.42.13 Tank SCR (Selective Catalytic Reduction) (W 71-90-56) (Engine 492-2140 & 505-6559)



Standard tools

Special tools:

- Plugs/caps PN 01899368



- Protective gloves

- Protective glasses



Safety information / User information

Operation manual



#### **Danger!**

Hot components!

Danger of burns / explosion!

Let the engine / components cool down sufficiently (to at least ambient temperature).

Wear protective gloves and glasses! The duration of the so-called lag time is application-dependent and can be up to 2 minutes in engines with SCR system, for example, because the SCR pipes have to be pumped empty in this time.

The filter regeneration must be deactivated or, in systems with a filter regeneration prompt, not activated before performing service work.

Observe safety regulations and national regulations when working with ethanol.



#### **Attention!**

Ensure utmost cleanliness for all work.

Remove any paint residue and dirt particles before disassembly.

Clean the area around the components concerned carefully. Blow wet parts dry with compressed air.

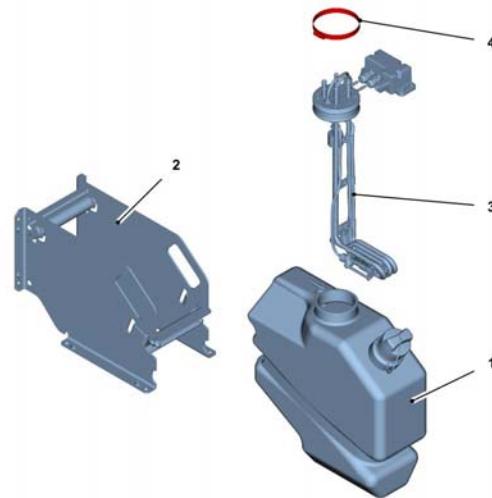
Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.

Observe installation guideline / documentation of the vehicle manufacturer / equipment manufacturer.



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



MAE12350

1	Tank	
2	Holder	60 Nm
3	Sensor	
4	Clip	7,5 Nm
950	Filter	



#### **Danger!**

Wear protective gloves and glasses!



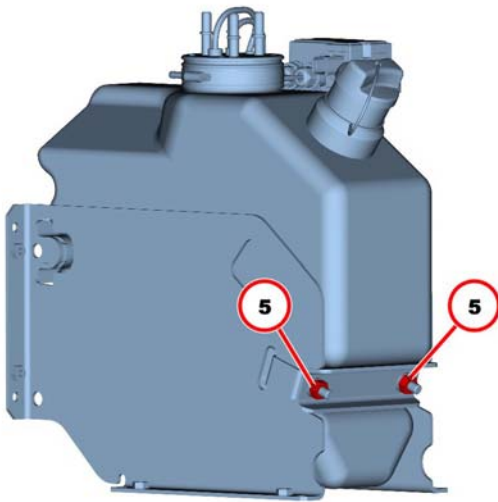
#### **Attention!**

The documentation of the vehicle manufacturer / equipment manufacturer must be observed for disassembly and installation.

Pay attention to utmost cleanliness.



Operation manual



MAE12360

5	Nut	45 Nm
---	-----	-------

**5.42.14 Mixing pipe (Screw Connection)  
(Engine 492-2140 & 505-6559)  
(W 71-90-80)**



Standard tools



Safety information / User information



**Danger!**

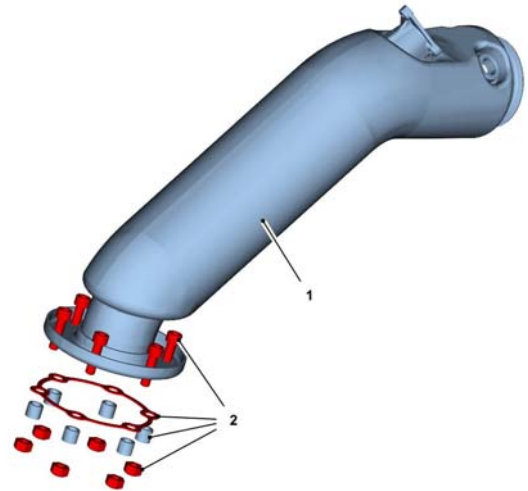
**Hot components!**

Danger of burns / explosion!  
Let the engine / components cool down sufficiently (to at least ambient temperature).



**Attention!**

Note installation position.  
The installation situation is application and equipment-dependent.  
The documentation of the vehicle manufacturer/ equipment manufacturer must be observed for disassembly and installation.  
Externally damaged parts must be renewed.  
The gaskets must be disposed of properly and always renewed.



MAE12370

1	Mixing pipe	
2	Screw connection	43 Nm



Use a new gasket.

**5.42.15 Compensator structure  
(Assembly Material)  
(Engine 492-5092 & 505-7229)  
(W 71-90-21)**



Standard tools



Safety information / User information



**Danger!**

**Hot components!**

Danger of burns / explosion!  
Let the engine / components cool down sufficiently (to at least ambient temperature).



## Disassembly and Assembly



### Attention!

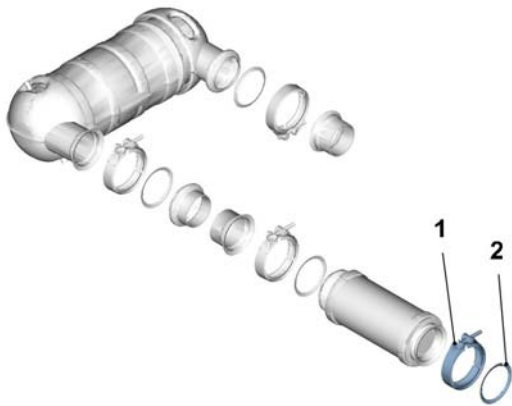
Note installation position.

The installation situation is application and equipment-dependent.

The documentation of the vehicle manufacturer/ equipment manufacturer must be observed for disassembly and installation.

Externally damaged parts must be renewed.

The gaskets must be disposed of properly and always renewed.



MAE13180

1	Clip	12 Nm
2	Seal	



Use new gaskets.  
Use new V-belt clips.



### Attention!

Ensure that the installation location is free from faults.

Check seal.

## 5.42.16 Inlet module (Engine 492-5092 & 505-7229) (W 71-90-48)



Standard tools  
Industrial vacuum cleaner  
Lifting gear  
Carrying straps



- Fitting compound Henkel C5-A Anti-Seize  
- Cleaning fleece  
- Marker pen, waterproof, permanent



Safety information / User information



### Danger!

Hot components!  
Danger of burns!

Let the engine / components cool down sufficiently (to at least ambient temperature).  
Do not carry out work when the engine is running.

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

It is not permitted to stay under moving loads.

Place the components on a level and secure surface.

Secure the components against tipping over.

Wear a respirator with at least protection class FFP2, goggles and protective gloves as protection against fine dust and soot particles.

Extract soot from the end faces with an industrial vacuum cleaner.

Do not blow compressed air onto soot-covered areas.

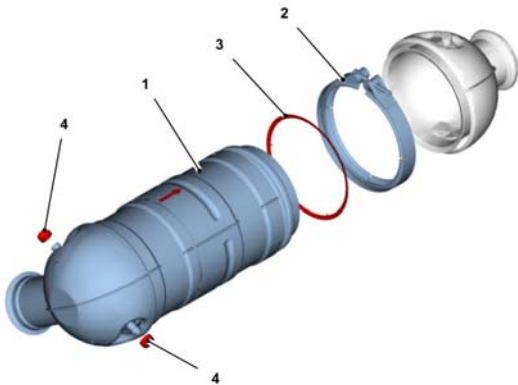


**Attention!**

The installation situation is application and equipment-dependent.  
 Externally damaged parts must be renewed.  
 The documentation of the vehicle manufacturer/ equipment manufacturer must be observed for disassembly and installation.  
 Dismantling and assembly should only be done in the vertical position.  
 All the help markings must be transferred when renewing/changing a part.  
 V-belt clips must be replaced each time they are loosened.  
 The gaskets must be disposed of properly and always renewed.



Use new gaskets.



MAE13160

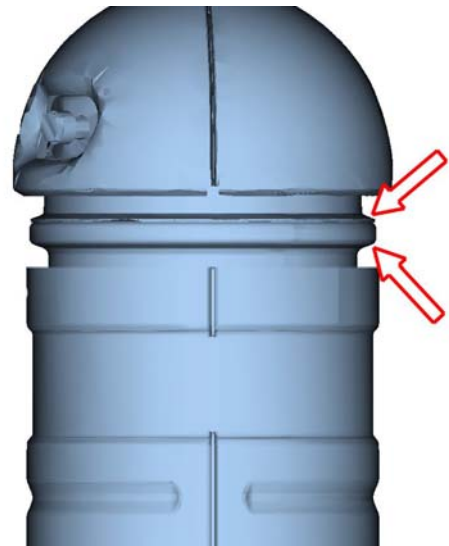
1	Inlet module	
2	V-belt clip	10 Nm
3	Seal	
4	Cap	15 Nm

1. Mark installation position.
2. Apply help markings.



**Attention!**

Ensure that the installation location is free from faults.  
 Make sure that the inlet module, outlet module, particle filter, V-belt clips and fastening points are reassembled in the same installation position.  
 Do not scratch or damage surfaces.  
 All the help markings must be transferred when renewing/changing a part.  
 Note flow direction.  
 The arrow indicates the flow direction.



MAE13170

3. Clean sealing surfaces.

Use a new gasket.



4. Coat surfaces (arrows) with mounting compound.



**Attention!**

Make sure it is applied evenly and without gaps.  
 V-belt clip must be replaced each time it is loosened.

5. Perform leak test.



## Disassembly and Assembly

### 5.42.17 Outlet Module (Engine 492-5092 & 505-7229) (W 71-90-49)



Standard tools  
Industrial vacuum cleaner  
Lifting gear  
Carrying straps



Fitting compound Henkel C5-A Anti-Seize  
Cleaning fleece  
Marker pen, waterproof, permanent



Safety information / User information



#### **Danger!**

Hot components!  
Danger of burns!  
Let the engine / components cool down sufficiently (to at least ambient temperature).  
Do not carry out work when the engine is running.  
When using hoists (workshop crane) the safety regulations for handling hoists must be observed.  
It is not permitted to stay under moving loads.  
Place the components on a level and secure surface.  
Secure the components against tipping over.  
Wear a respirator with at least protection class FFP2, goggles and protective gloves as protection against fine dust and soot particles.  
Extract soot from the end faces with an industrial vacuum cleaner.  
Do not blow compressed air onto soot-covered areas.

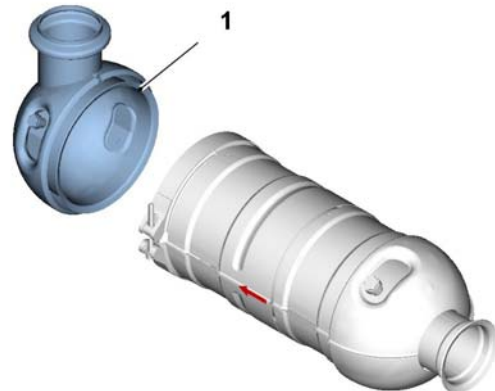


#### **Attention!**

The installation situation is application and equipment dependent.  
Externally damaged parts must be renewed.  
The documentation of the vehicle manufacturer/ equipment manufacturer must be observed for disassembly and installation.  
Dismantling and assembly should only be done in the vertical position.  
All the help markings must be transferred when renewing/changing a part.  
V-belt clips must be replaced each time they are loosened.  
The gaskets must be disposed of properly and always renewed.



Use a new gasket. Use new sealing rings.



MAE13150

1	Outlet module
---	---------------



Use a new gasket.  
Use new sealing rings.



#### **Attention!**

Disassemble and assemble according to the job card listed below.



W 71-90-48  
Inlet Module



## 5.43 COOLANT COMPRESSOR

### 5.43.1 Removing and Installing The Coolant Compressor (W 82-01-01)



Standard tools  
Special tools  
- Plugs/caps 449-2493



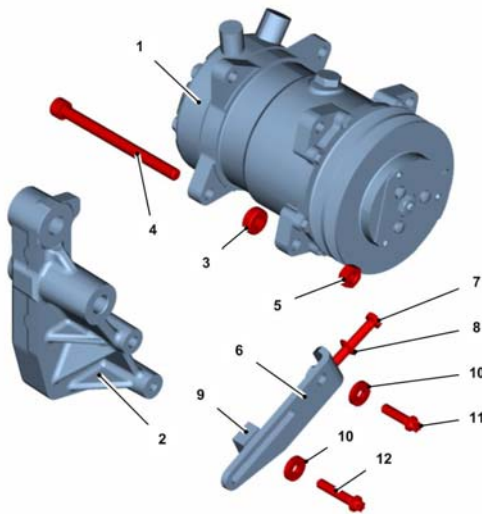
Safety information / User information  
Operation manual



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.

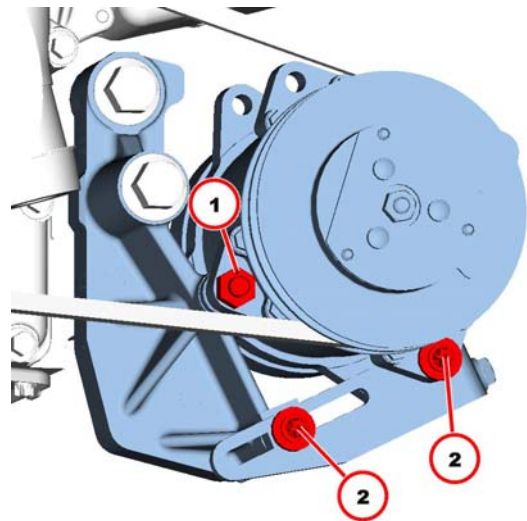
#### a. Removing the Coolant Compressor



MAE12380

1	Coolant compressor
2	Console
3	Bushing
4	Cylinder head screw
5	Hexagonal nut
6	Clamping strap

7	Hexagon head screw
8	Ball disc
9	Threaded piece
10	Washer
11	Torx screw
12	Torx screw



MAE12390



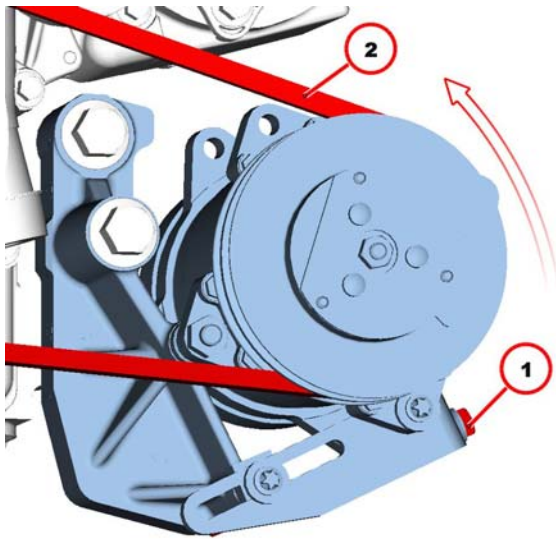
#### Attention!

Emptying and filling the air-conditioning system must be carried out according to the operating manual and the appropriate documentation/specifications of the vehicle/equipment manufacturer.

1. Unscrew coolant lines.
2. Attach locking caps.
3. Hold screw.
4. Loosen nut (1).
5. Loosen screws (2).

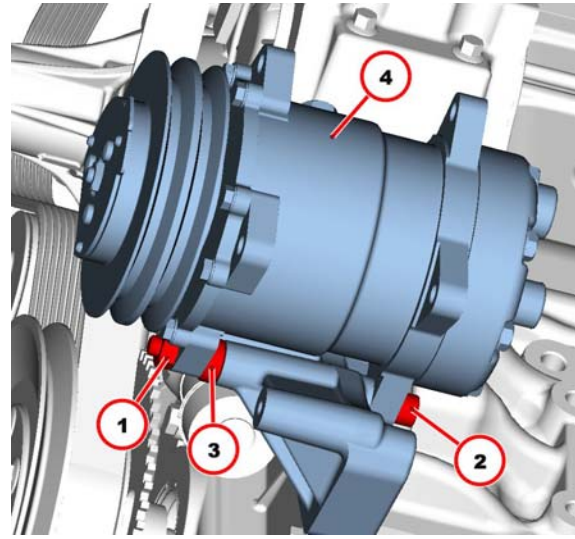


## Disassembly and Assembly



MAE12400

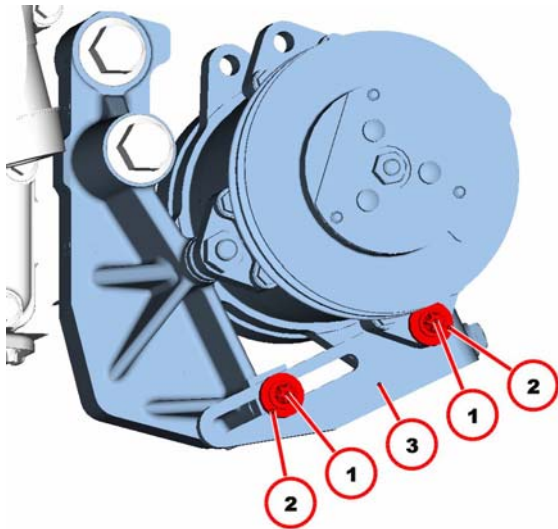
6. Loosen screw (1).
7. Swing the coolant compressor into the direction of the arrow.
8. Remove V-belt (2).



MAE12420

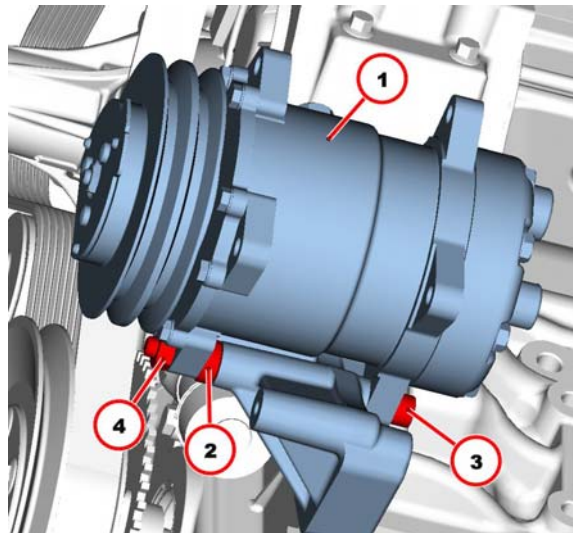
12. Hold screw (2).
13. Unscrew nut (1).
14. Remove screw (2).
15. Remove sleeve (3).
16. Remove coolant compressor (4).

### b. Mounting the Coolant Compressor



MAE12410

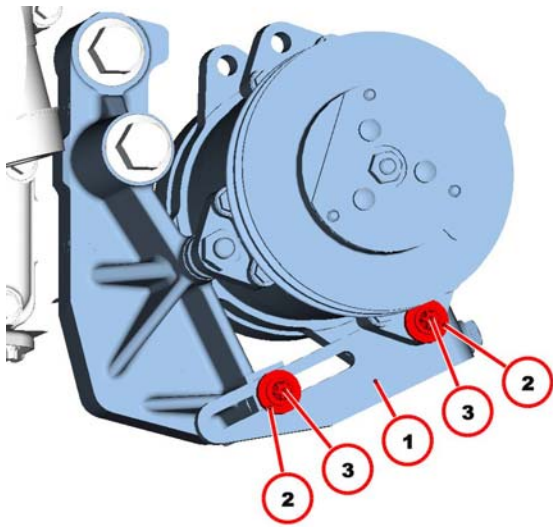
9. Unscrew screws (1).
10. Remove washers (2).
11. Remove the clamping latch (3).



MAE12430

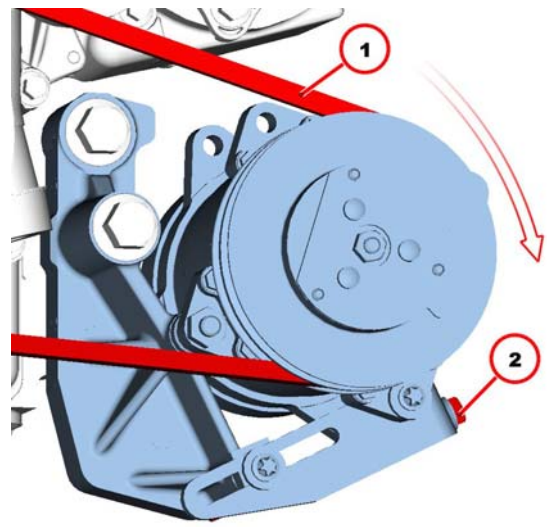
1. Attach coolant compressor (1).
2. Fit sleeve (2).
3. Insert screw (3).
4. Screw on nut (4).





MAE12440

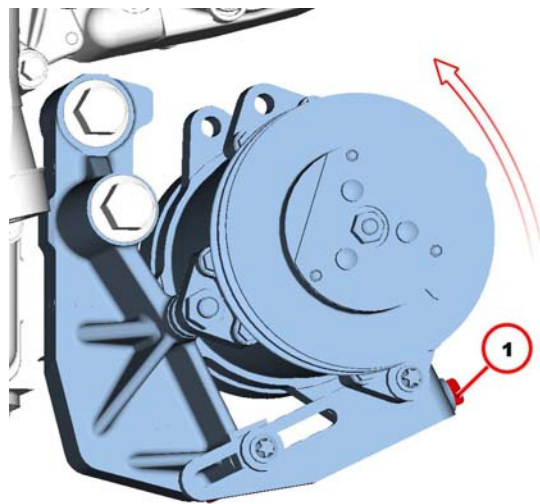
5. Mount clamping latch (1).
6. Mount washers (2).
7. Fasten screws (3).



MAE12460

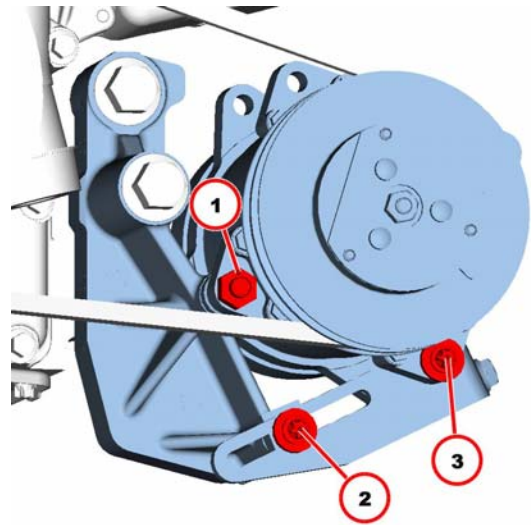
11. Tighten V-belt (1) by turning the clamping screw (2).
12. Check V-belt tension.

Operation manual



MAE12450

8. Loosen screw (1).
9. Swing the coolant compressor into the direction of the arrow.
10. Mount V-belt.



MAE12470

13. Hold screw.
14. Tighten nut (1).  
 42 Nm
15. Tighten screw (2).  
 20 Nm



## Disassembly and Assembly

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16. Tighten screw (3).



20 Nm

17. Pull off locking caps.

18. Screw on coolant lines.



### **Attention!**

Emptying and filling the air-conditioning system must be carried out according to the operating manual and the appropriate documentation/specifications of the vehicle/equipment manufacturer.

**c. Technical Data*****Tightening specifications***

<b>ID no.</b>	<b>Name:</b>	<b>Screw Type</b>	<b>Notes / Remark</b>	<b>Value</b>
A82 051	Coolant compressor on console			42 Nm
A82 052	Clamping latch on console / coolant compressor			20 Nm



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



## Disassembly and Assembly

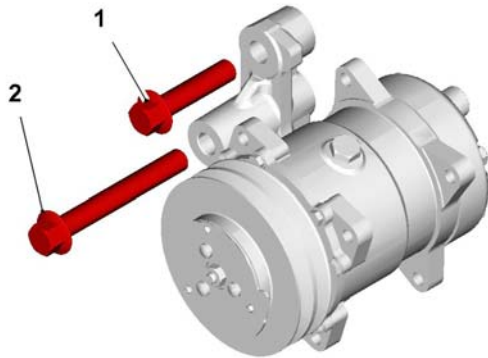
### 5.43.2 Fastening Parts (W 82-90-05)



Standard tools



Safety information / User information



MAE12480

1	Hexagon head screw	260 Nm
2	Hexagon head screw	260 Nm

### 5.44 HYDRAULIC PUMP DRIVE

#### 5.44.1 Removing and Installing Hydraulic Pump Drive (W 83-02-01)



Standard tools



Packing compound



Safety information / User information

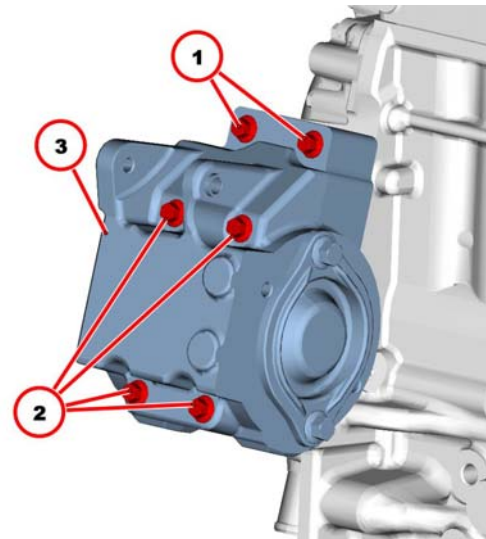


Collect draining lubricating oil and dispose of properly.

A variant of the hydraulic pump drives is described here as an example.

Proceed in the same way for other fittings.

#### a. Removing Hydraulic Pump Drive

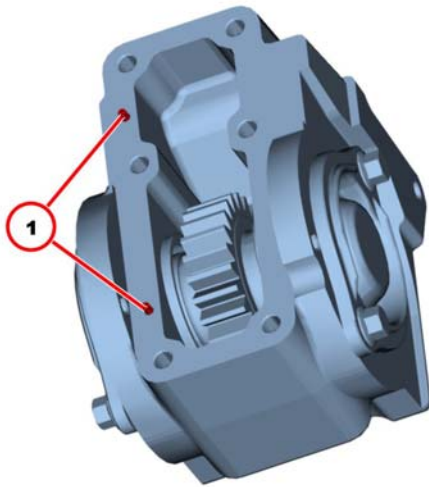


MAE12490

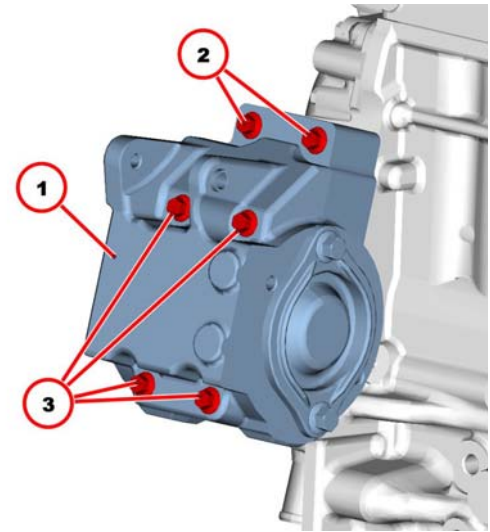
1. Unscrew screws (1).
2. Unscrew screws (2).
3. Remove hydraulic pump drive (3).



**b. Installing Hydraulic Pump Drive**



MAE12500



MAE12520

1. Clean sealing surfaces.

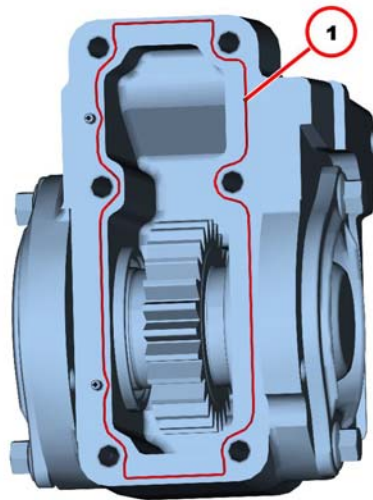


Ensure that the clamping pins (1) are present.

3. Center the hydraulic pump drive (1) via the clamping pins.

4. Tighten screws (2).  
M8x60-10.9

5. Fasten screws (3).  
M8x110-10.9

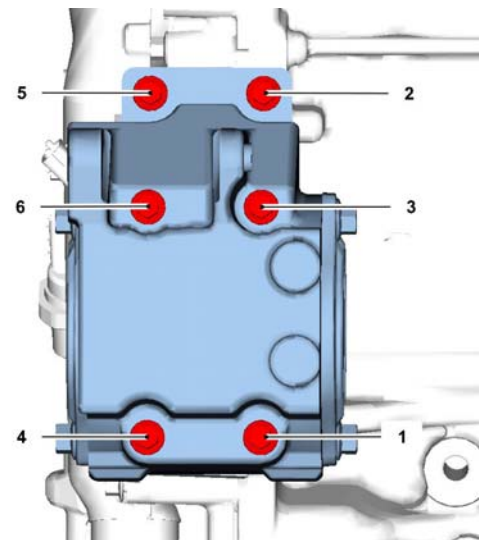


MAE12510

2. Apply sealing compound (1) evenly on the sealing surface.



Sealing cord strength approx. 0.5 - 0.6 mm.



MAE12530

• Tighten all screws according to the tightening sequence.



30 Nm



## Disassembly and Assembly

### c. Technical Data

#### *Tightening specifications*

ID no.	Name:	Screw Type	Notes / Remark	Value
A83 003	Hydraulic pump on crankcase/gear case			30 Nm



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



## Section 6 Special Tools

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### Contents

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PARAGRAPH	TITLE	PAGE
6.1	Tools (Engine 492-2140 & 505-6559).....	6-2
6.2	Tools (Engine 492-5092 & 505-7229).....	6-10



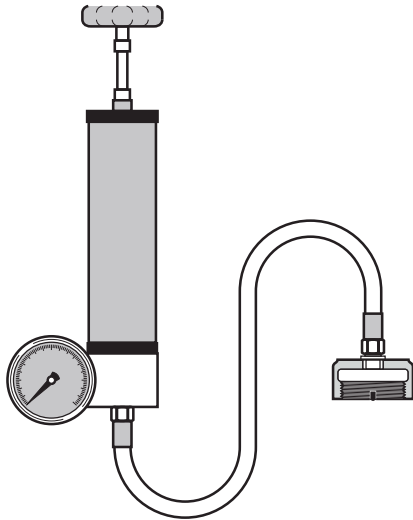
## Special Tools

### 6.1 TOOLS (ENGINE 492-2140 & 505-6559)



These must be ordered like normal engine manufacturer's spare parts with specification of the order number.

#### 6.1.1 Pressure Pump (PN 01899031)



MAE6610

- Checking cooling system for leak-tightness

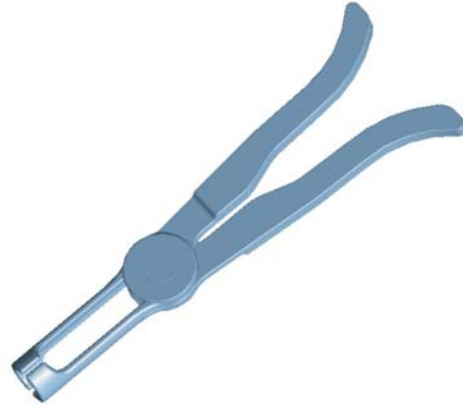
#### 6.1.2 Compression Pressure Tester (PN 01899034)



MAE6620

- For diesel engines (10 - 40 bar)
- Checking compression pressure

#### 6.1.3 Assembly Pliers (PN 461-1690)



MAE6630

- Pull out fixed injector sealing disc

#### 6.1.4 V-belt Tension Measuring Device (PN 01899062)



MAE6640

- 150 to 600 N
- Check V-belt tension





**6.1.5 Torx Tool Set (PN 461-1692)**



MAE6650

- 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)

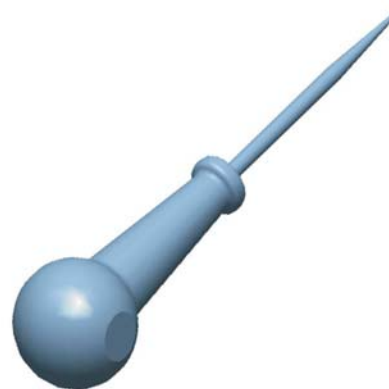
**6.1.6 Rotation Angle Disc (PN 449-2484)**



MAE6660

- With Solenoid

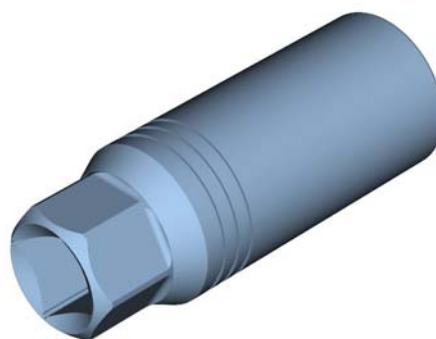
**6.1.7 Pricker (PN 449-2485)**



MAE6670

- Removing rotary shaft lip seal

**6.1.8 Disassembly Tool (PN 449-2487)**



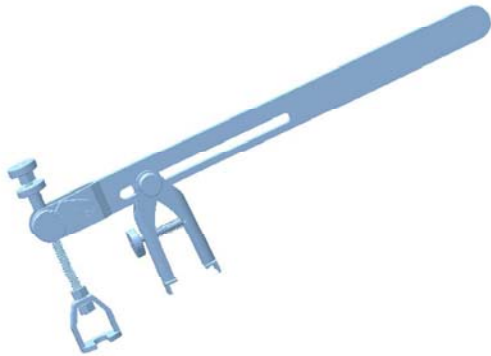
MAE6680

- Disassemble pin screw (M8)



## Special Tools

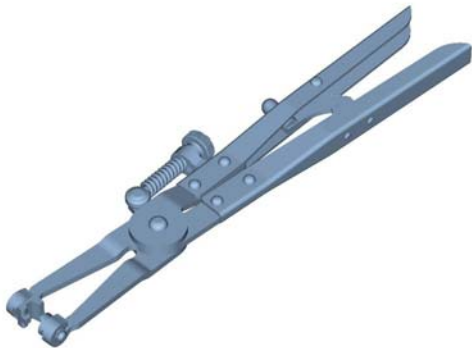
### 6.1.9 Assembly Lever (PN 449-2488)



MAE6690

- Removing crankshaft sealing rings

### 6.1.10 Spring Band Pliers (PN 449-2489)



MAE6700

- 320 mm
- Tighten spring clamp

### 6.1.11 Socket Wrench Insert (PN 461-1693)



MAE6710

- Wrench size 27.
- Version: long
- Removing and installing pressure sensor

### 6.1.12 Special Wrench (PN 01899142)

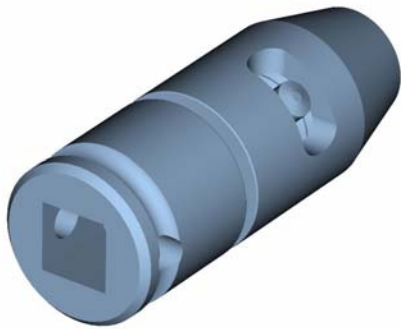


MAE6720

- Unscrewing the filter cartridges



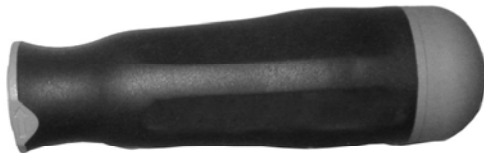
**6.1.13 Assembly Tool (PN 01899148)**



MAE6730

- Mount pin screw (M8)

**6.1.14 Torque Handle (PN 449-2475)**



MAE6740

- 0.6°-°1.5 Nm

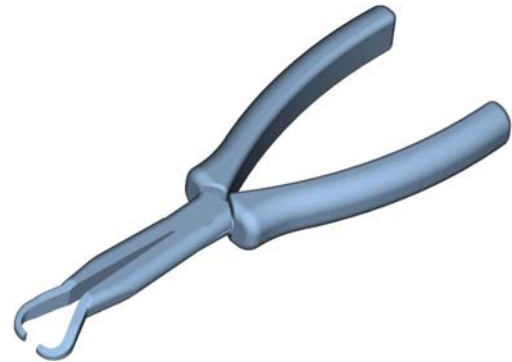
**6.1.15 Insert holder (PN 461-1695)**



MAE6750

- Drive square 1/4"
- Drive hexagon 1/4"

**6.1.16 Special Pliers (PN 01899191)**



MAE6760

- Pull out plug piece of the coolant pump

**6.1.17 Socket Wrench Insert (PN 01899199)**



MAE6770

- Size 36,
- Removing and installing the centre screw



## Special Tools

### 6.1.18 Stoppers/Caps (PN 01899368)



MAE6780

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

### 6.1.19 Force Multiplier (PN 01899370)



MAE6790

- Removing and installing the centre screw

### 6.1.20 Tool Kit (PN 01899403)

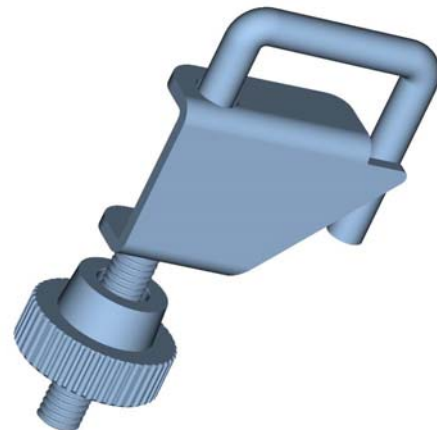


MAE6800

- Contents:
  - Caps
  - Overflow pipe with hose pipe
  - Collecting vessel

(In conjunction with compression check when injectors are removed)

### 6.1.21 Fuel Hose Clamp (PN 01899404)



MAE13480

- Disconnect fuel pipe



**6.1.22 Crow Foot Wrench (PN 01899406)**



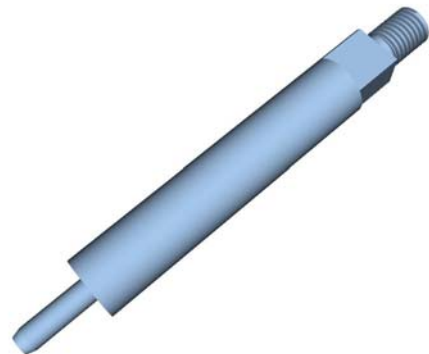
MAE6820

- Wrench size 24
- Removing and installing the pressure sensor

**6.1.23 Crowfoot Box Wrench (PN 01899407)**

- Wrench size°10
- Removing and installing the glow plugs

**6.1.24 Connector (PN 02992017)**



MAE6830

- In conjunction with compression pressure tester PN 01899034

**6.1.25 Lever Tool (PN 449-2497)**



MAE6840

- Removing the injector



## Special Tools

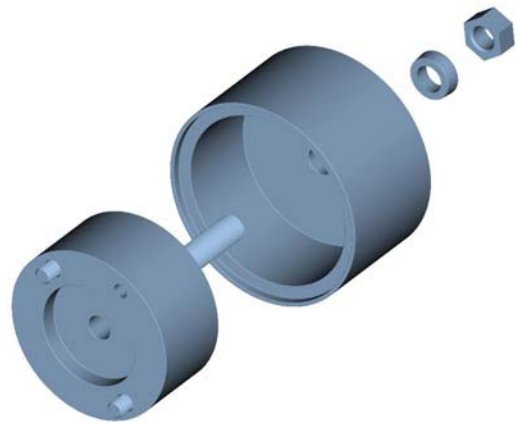
### 6.1.26 Disassembly Tool (PN 461-1696)



MAE6850

- Removing O-ring

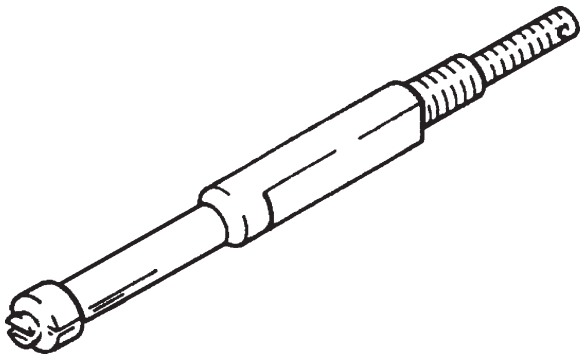
### 6.1.28 Assembly Tool (PN 449-2500)



MAE6870

- Installing crankshaft sealing ring (flywheel side)

### 6.1.27 Puller (PN 449-2498)



MAE6860

- In conjunction with slide hammer PN 449-2501
- Removing fixed injector sealing disc

### 6.1.29 Slide Hammer (PN 449-2501)

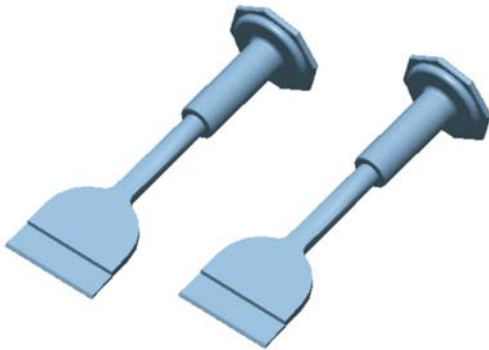


MAE6880

- In conjunction with extraction tool PN 02992137
- Removing fixed injector sealing disc



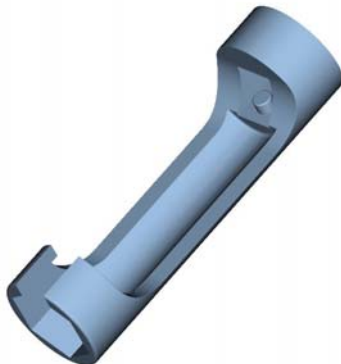
### 6.1.30 Separating Tool (PN 461-1697)



MAE6890

- Removing metal sheet lubricating oil pan from crankcase

### 6.1.31 Claw wrench (PN 02992345)



MAE6900

- NOx sensor, removal and installation

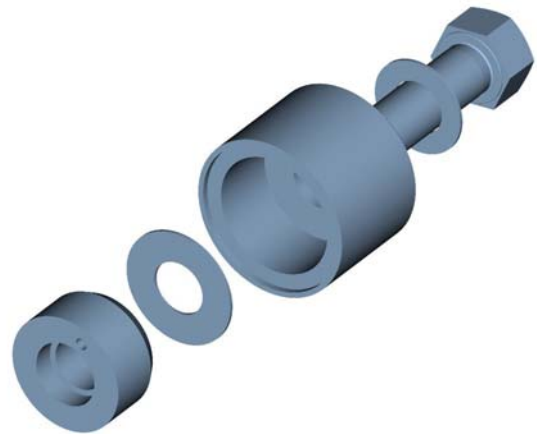
### 6.1.32 Turning Gear / Locking Device (PN 449-2502)



MAE6910

- Turn or block crankshaft at the flywheel

### 6.1.33 Assembly Tool (PN 449-2504)



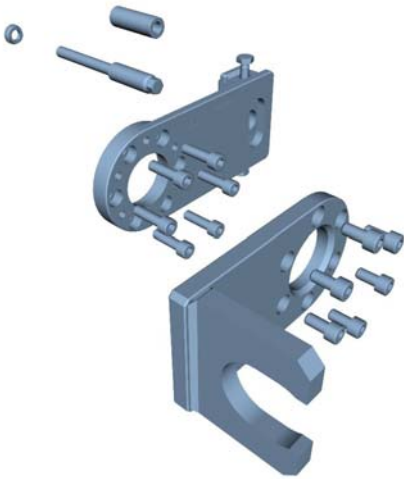
MAE6920

- Installing crankshaft sealing ring (opposite side to flywheel)



## Special Tools

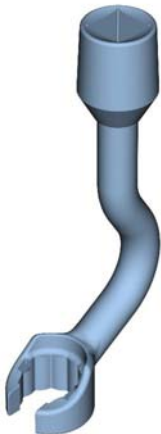
### 6.1.34 Counter Support (PN 449-2506)



MAE6930

- Hold crankshaft against the V-belt pulley/V-ribbed pulley

### 6.1.35 Special Wrench (PN 449-2496)



MAE6940

- Wrench size 17
- Removing and installing high-pressure lines

## 6.2 TOOLS (ENGINE 492-5092 & 505-7229)



These must be ordered like normal engine manufacturer's spare parts with specification of the order number.

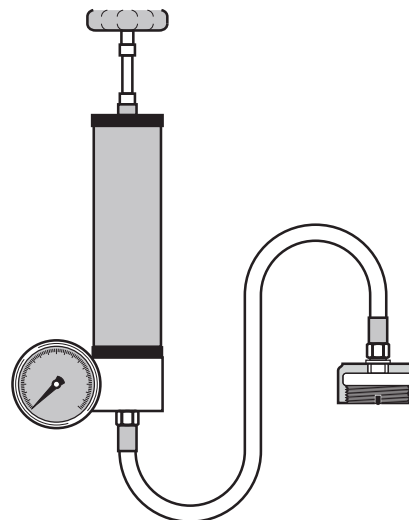
### 6.2.1 Engine Lifting Device (PN 01899028)



MAE13420

- Load (2000 Kg), 3-point Suspension, Spindle Clamp, Cross Member, Chains and Hooks

### 6.2.2 Pressure Pump (PN 01899031)



MAE6610

- Checking cooling system for leak-tightness





**6.2.3 Compression Pressure Tester (PN 01899034)**



MAE6620

- For diesel engines (10 - 40 bar)
- Checking compression pressure

**6.2.4 Hose Clip Pliers (PN 449-2478)**



MAE13430

- Loosen Hose Clips and Fasten

**6.2.5 Assembly Pliers (PN 461-1690)**



MAE6630

- Pull out fixed injector sealing disc

**6.2.6 V-belt Tension Measuring Device (PN 01899062)**



MAE6640

- 150 to 600 N
- Check V-belt tension

**6.2.7 Torx Tool Set (PN 461-1692)**



MAE6650

- 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)



## Special Tools

### 6.2.8 Rotation Angle Disc (PN 449-2484)



MAE6660

- With Solenoid

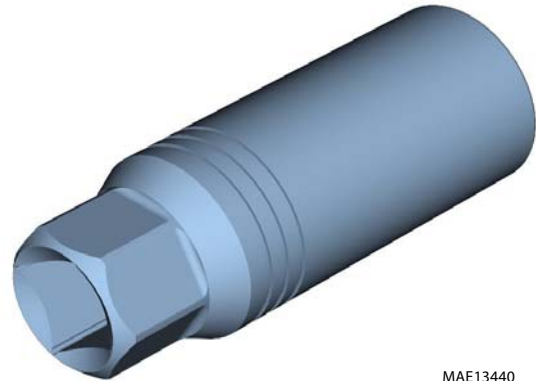
### 6.2.9 Pricker (PN 449-2485)



MAE6670

- Removing rotary shaft lip seal

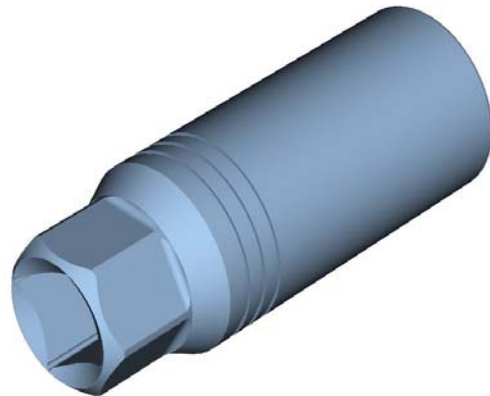
### 6.2.10 Disassembly Tool (PN 01899105)



MAE13440

- Disassemble pin screw (M10)

### 6.2.11 Disassembly Tool (PN 01899106)

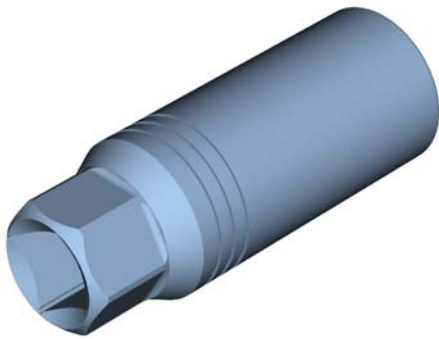


MAE13450

- Disassemble Pin Screw (M12)



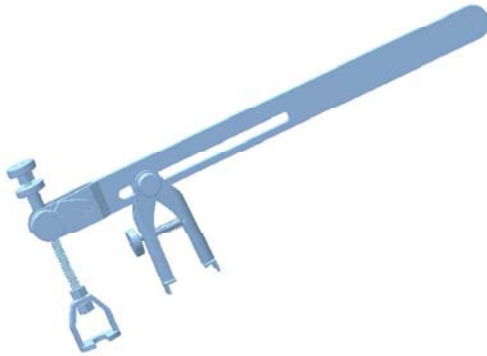
**6.2.12 Disassembly Tool (PN 449-2487)**



MAE6680

- Disassemble pin screw (M8)

**6.2.13 Assembly Lever (PN 449-2488)**



MAE6690

- Removing crankshaft sealing rings

**6.2.14 Spring Band Pliers (PN 449-2489)**



MAE6700

- 320 mm
- Tighten spring clamp

**6.2.15 Socket Wrench Insert (PN 461-1693)**



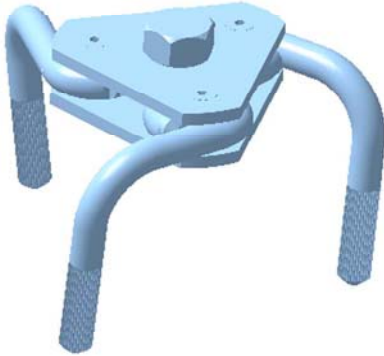
MAE6710

- Wrench size 27.
- Version: long
- Removing and installing pressure sensor (rail pressure, oil pressure, fuel pressure)



## Special Tools

### 6.2.16 Special Wrench (PN 01899142)



MAE6720

- Unscrewing the filter cartridges

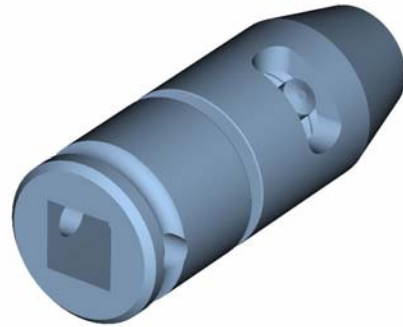
### 6.2.17 Stoppers/Caps (PN 449-2493)



MAE6780

- 1 set of differently-sized stoppers and caps
- Sealing Openings on the Fuel System

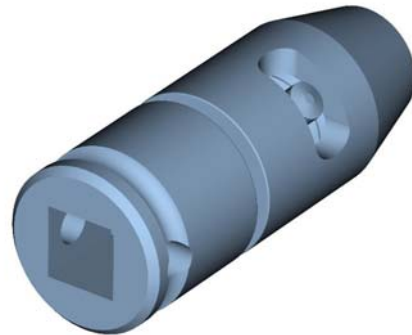
### 6.2.18 Assembly Tool (PN 01899148)



MAE6730

- Mount pin screw (M8)

### 6.2.19 Assembly Tool (PN 01899149)

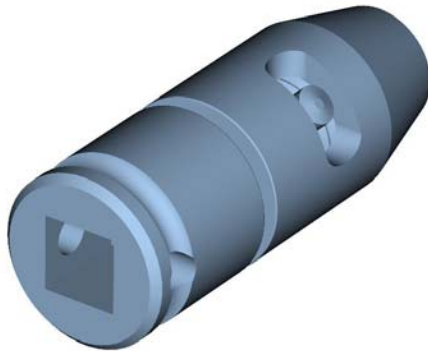


MAE13460

- Mount Pin Screw (M10)



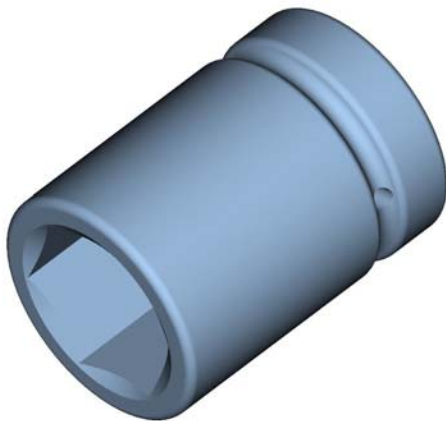
**6.2.20 Assembly Tool (PN 01899150)**



MAE13470

- Mount pin screw (M12)

**6.2.21 Socket Wrench Insert (PN 01899199)**



MAE6770

- Size 36,
- Removing and installing the centre screw

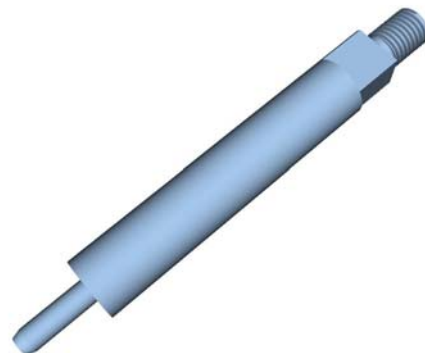
**6.2.22 Force Multiplier (PN 01899370)**



MAE6790

- Removing and installing the centre screw

**6.2.23 Connector (PN 02992017)**



MAE6830

- In conjunction with compression pressure tester PN 01899034



## Special Tools

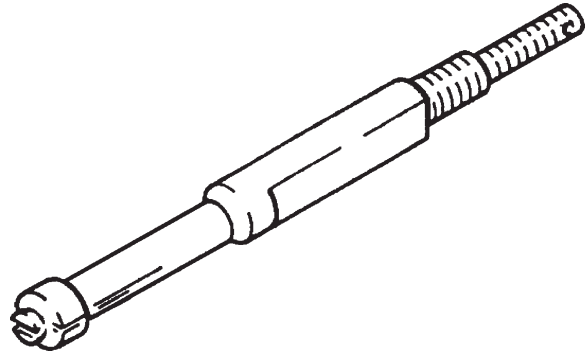
### 6.2.24 Lever Tool (PN 449-2497)



- Removing the injector

MAE6840

### 6.2.26 Puller (PN 449-2498)



- In conjunction with slide hammer PN 449-2501
- Removing fixed injector sealing disc

MAE6860

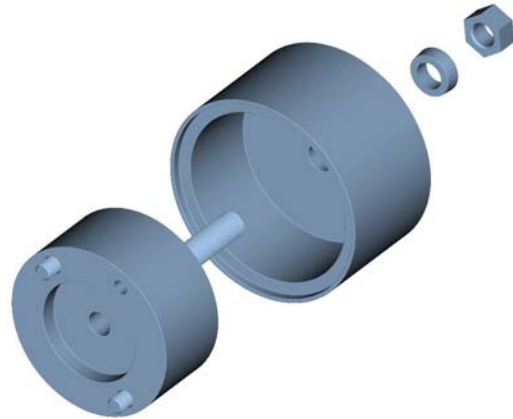
### 6.2.25 Disassembly Tool (PN 461-1696)



- Removing O-ring

MAE6850

### 6.2.27 Assembly Tool (PN 449-2500)

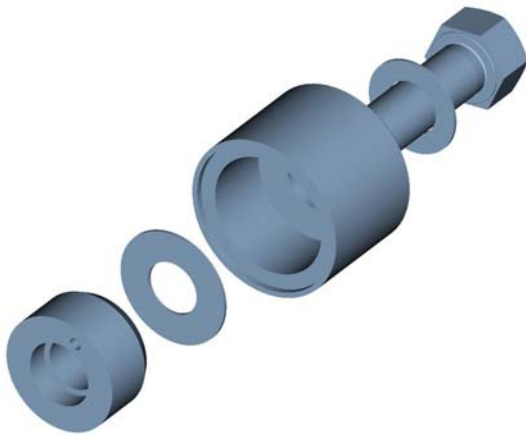


- Installing crankshaft sealing ring (flywheel side)

MAE6870



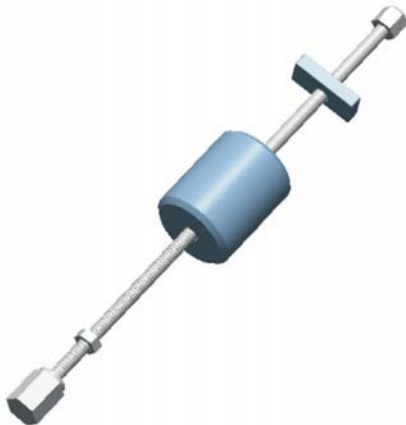
### 6.2.28 Assembly Tool (PN 449-2504)



MAE6920

- Installing crankshaft sealing ring (opposite side to flywheel)

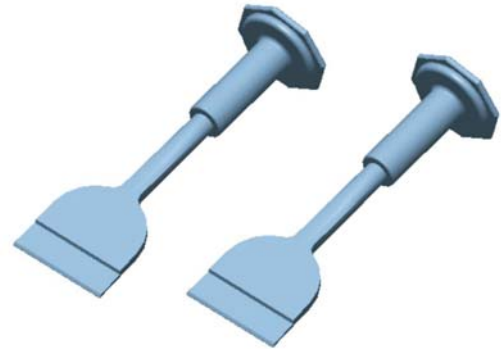
### 6.2.29 Slide Hammer (PN 449-2501)



MAE6880

- In conjunction with extraction tool PN 02992137
- Removing fixed injector sealing disc

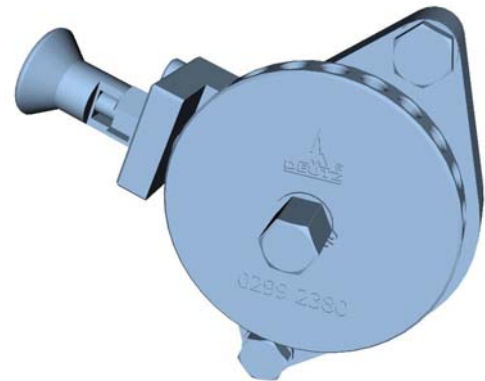
### 6.2.30 Separating Tool (PN 461-1697)



MAE6890

- Removing metal sheet lubricating oil pan from crankcase

### 6.2.31 Turning Gear / Locking Device (PN 449-2502)



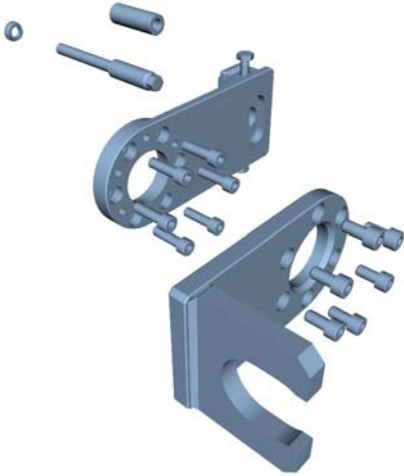
MAE6910

- Turn or block crankshaft at the flywheel



## Special Tools

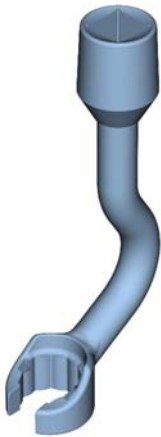
### 6.2.32 Counter Support (PN 449-2506)



MAE6930

- Hold crankshaft against the V-belt pulley/V-ribbed pulley

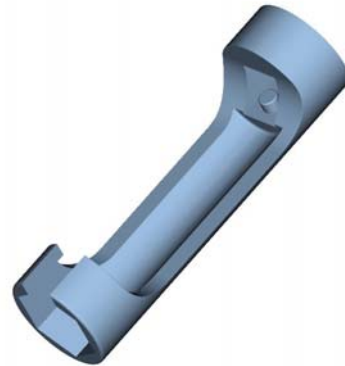
### 6.2.33 Special Wrench (PN 449-2496)



MAE6940

- Wrench size 17
- Removing and installing high-pressure lines

### 6.2.34 Claw wrench (PN 02992345)



MAE6900

- NOx sensor, removal and installation

**Diagnostic tool**  
SerDia 2010







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