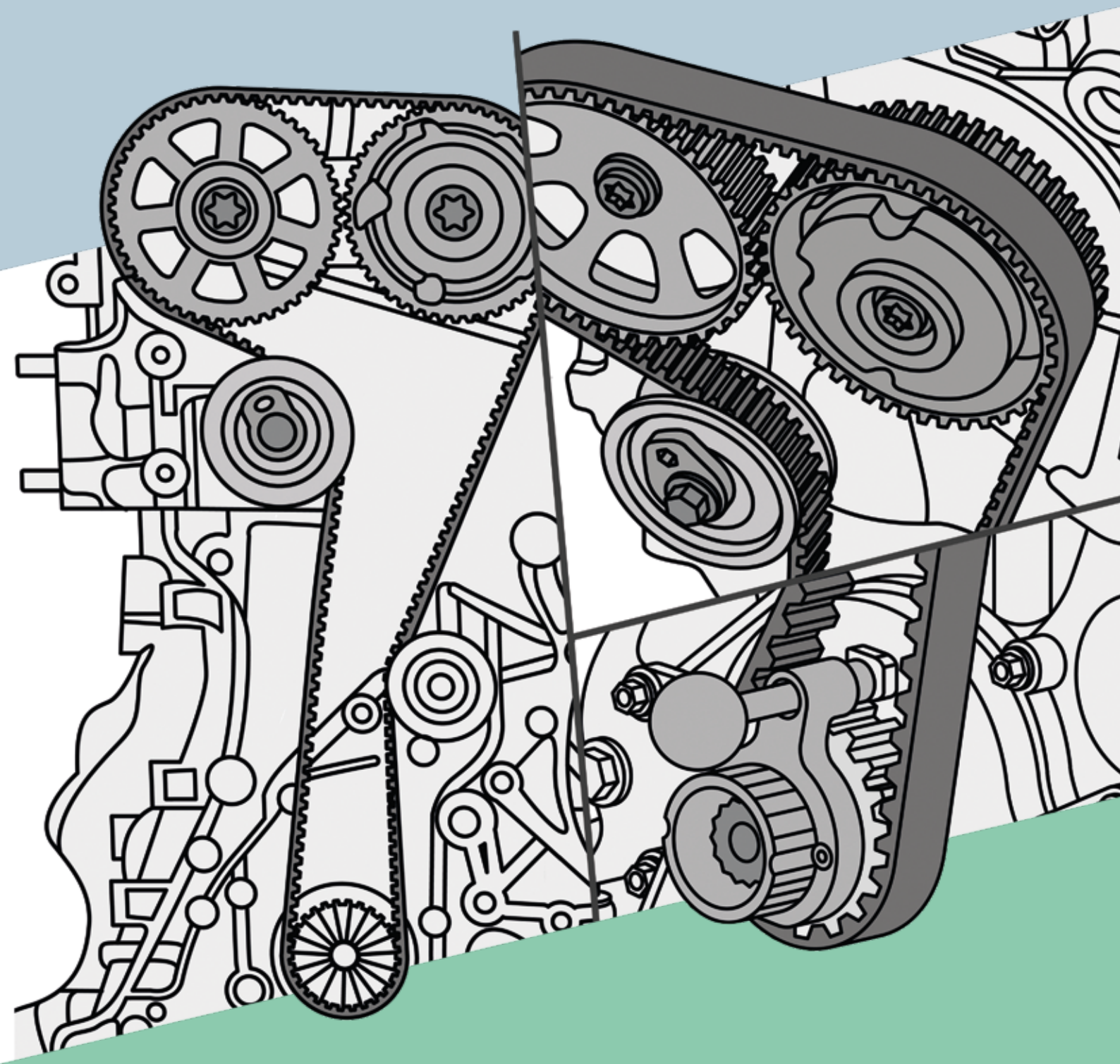


# Timing Belt Manual

From professionals for professionals



**Test the TecDoc Catalogue online!**



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## About TecAlliance

As an independent workshop, your ability to deliver first class results depends on three things: reliability, availability and competence. With TecAlliance, one of the world's leading data specialists in the automotive aftermarket, you have a partner at your side offering everything you need from a single source.

For more than 20 years, we have worked to deliver the prerequisites for independent workshops to do a good job, to ensure that their customers are satisfied and to maintain their market position on a long-term basis. We do this by preparing and delivering a wide range of data of the highest quality – for vehicle identification through repair and maintenance information to fast and targeted spare parts searches. Within the industry, the TecDoc Standard stands for spare parts data of the highest quality.

We have compiled this vehicle and spare parts data in the TecDoc Catalogue, the leading manufacturer-independent collection of vehicle parc data, spare parts data and repair and maintenance information worldwide. The TecDoc Catalogue includes more than 7.7 million test and adjustment values, approximately 22.8 million standard labour times, over 4.2 million maintenance plans and intervals as well as over 3.9 million repair instructions combined with 6.6 million articles and 254 million vehicle linkages. TecAlliance offers one of the world's leading reference publications. In addition, our specialists are continuously developing new solutions to make workshop jobs and collaboration with your partners easier for you. Also, here, our extensive databases are an integral element of the applications.

TecAlliance employees have extensive industry and specialist knowledge of the automotive aftermarket: the company now employs more than 550 people from 26 countries who are dedicated to the success of independent workshops, the parts trade, and automotive parts manufacturers.



# Introduction

These mounting instructions contain important information about the removal and installation of timing belt/toothed belt drive. The maintenance procedures are described in the sequences necessary to complete the operation at a minimum of time, as specified in the labour times table.

The instructions are arranged in different sections:

1. Warning
2. Note
3. Required special tools
4. Required labour times/torques/settings
5. Remove
6. Install

## **1. Warning**

Warnings give important information to prevent from personal injury.

## **2. Note**

Notes give additional information to prevent from material damage.

## **3. Required special tools**

All special tools required to perform a maintenance procedure, are shown in this section. The illustration shows the original special tool of the manufacturer. In addition, the original tool number is listed.

## **4. Required labour times, torques and settings**

The times table shows the time normally needed to replace the timing belt/toothed belt. Tightening torques are shown in the torque specifications table with reference to the respective figure. Torque wrench settings must be strictly observed! One instruction includes test values and settings. These values and settings have to be observed too!

## **5. Remove**

In this section, working procedures are described in the provided order. Illustrations contain important work steps. Some illustrations are given to show the special tools needed within the progress. Important notes are printed in bold.

## **6. Install**

Installation instructions that differ from the removal are listed here.

Notes on the correct setting of the timing belt/toothed belt tension are sufficiently explained in illustration and text.

## ALFA ROMEO Giulia (952\_), 2.2 JTD, 132 kW

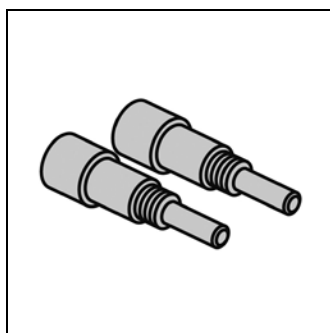


Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

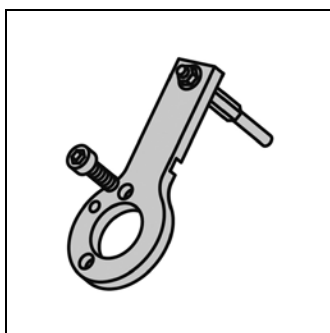
### NOTE

Rotate engine in the direction of rotation only by the crankshaft pulley.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
When turning the camshaft, the crankshaft must not be at TDC.  
The toothed belt must not come into contact with oil or coolant!  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
Disconnect battery (negative terminal).  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

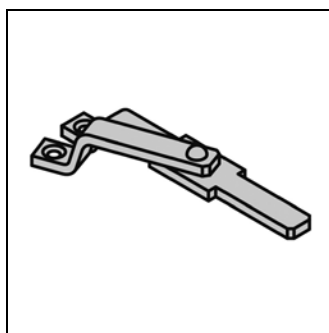
### Required special tools



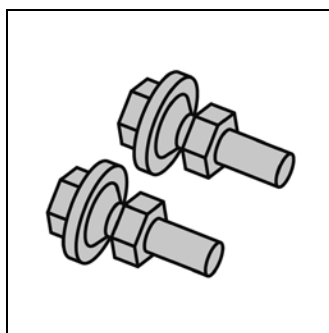
Camshaft(s) blocking pin(s)  
OE (1870896900)



Crankshaft blocking tool  
OE (2027400090)



Counter support  
OE (1870815000)



Counter support bolt  
OE (1870836000)

### Required Labour times/torques

#### Scheduled times

Replace toothed belt	1,70 h
----------------------	--------

#### Tightening torques

Self-locking screws and nuts must always be replaced.

Crankshaft pulley screw(s) (1)	(see figure 1)		M8 27 - 33 Nm
Toothed belt guard screw(s) lower (1)	(see figure 2)	Use new screw(s).	M6 8 - 10 Nm
Screw(s) – center of toothed belt guard (1)(2)	(see figure 5)		M8 23 - 28 Nm; M10 45 - 55 Nm; M18 8 - 10 Nm
Rail pressure sensor (2)	(see figure 6)		65 - 75 Nm
Oil feed line banjo bolt(s) (1)	(see figure 7)	Use new seal(s).	M10 24 - 30 Nm
Turbocharger bracket (3)	(see figure 8)	Replace nut.	M8, Screw(s) 23 - 28 Nm; Collar nut(s), M8 8 - 10 Nm
Valve cover locking screw (5)	(see figure 8)	Use new seal(s).	Inlet camshaft, M16 14 - 17 Nm; Outlet camshaft, M16 14 - 17 Nm
Valve cover locking screw (1)	(see figure 10)	Use new seal(s).	Inlet camshaft, M16 14 - 17 Nm; Outlet camshaft, M16 14 - 17 Nm
Bolt(s), crankcase (1)	(see figure 11)	Use new seal and screws.	M6 8 - 10 Nm
Tensioning roller screw(s) (1)	(see figure 12)	Use new screw(s).	M8 23 - 28 Nm
Camshaft pulley bolt(s) (2)	(see figure 13)		M12, 01 stage 28 - 31 Nm; M12, 02 stage 40°

## **Remove**

### **Remove the accessory drive belt.**

Remove crankshaft pulley cover.

Unscrew crankshaft pulley screw(s). **(1)**

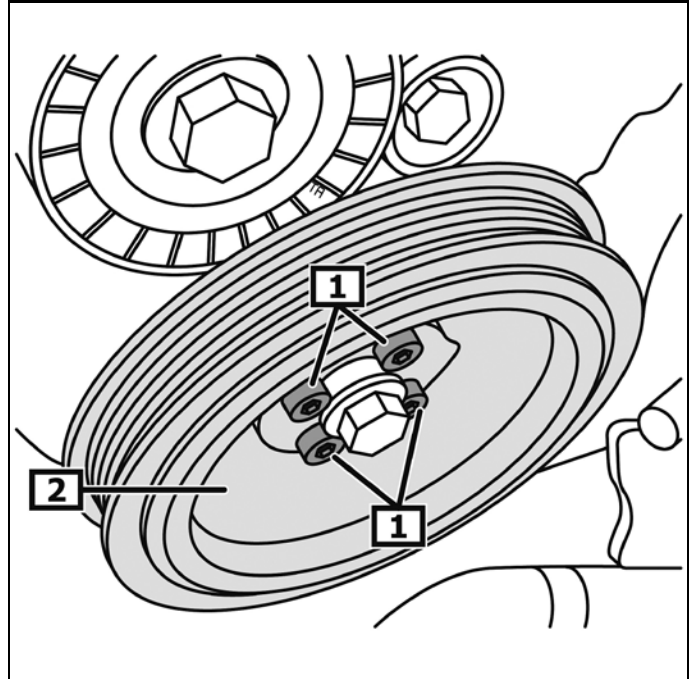
Remove crankshaft pulley. **(2)**

(see figure 1)

Remove accessory drive belt tensioning roller.

Remove accessory drive belt deflection pulley.

**Figure 1**



1 Crankshaft pulley screw(s)

2 Crankshaft pulley

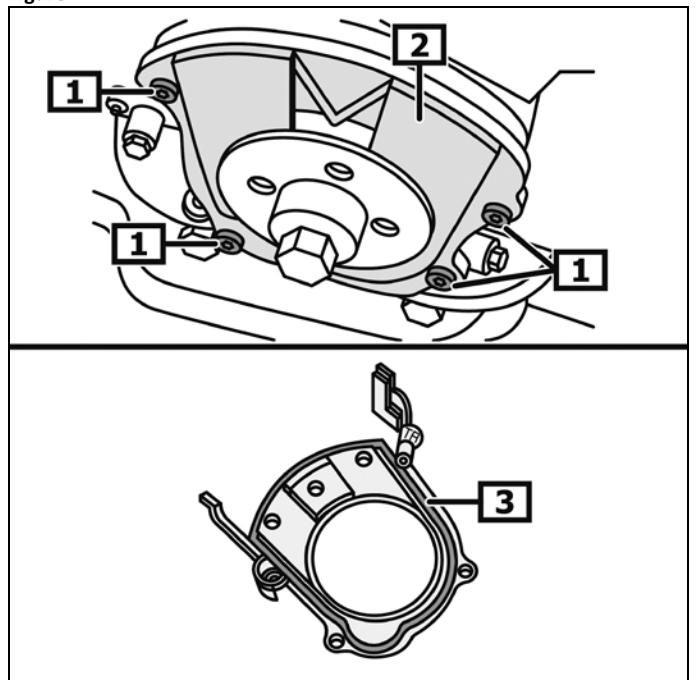
Unscrew toothed belt guard screws, bottom. **(1)**

Remove toothed belt guard at the bottom. **(2)**

Check seal(s) for damage. **(3)**

(see figure 2)

**Figure 2**



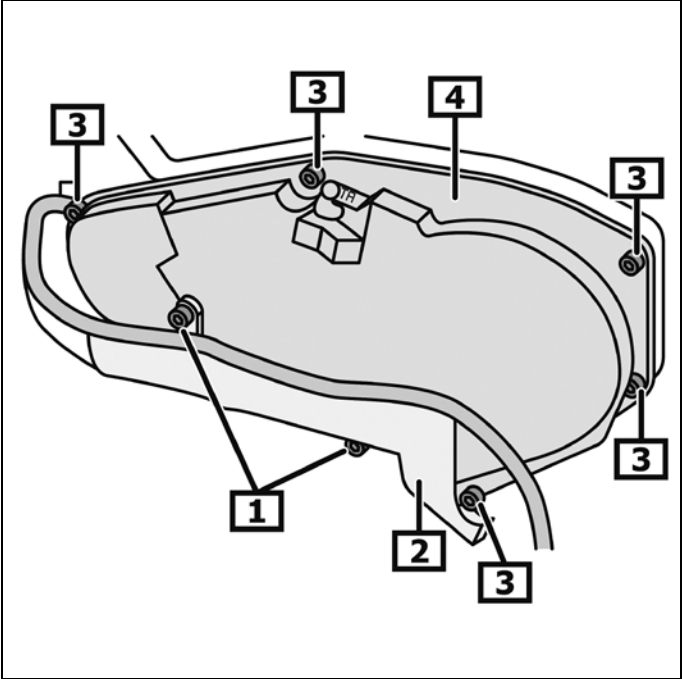
1 Toothed belt guard screw(s) lower

2 Toothed belt guard at the bottom

3 Seal

Unscrew and remove cable channel screw(s). **(1)**  
 Disconnect cable duct. **(2)**  
 Screw(s) – unscrew top toothed belt guard **(3)**  
 Remove toothed belt guard at the top. **(4)**  
**(see figure 3)**

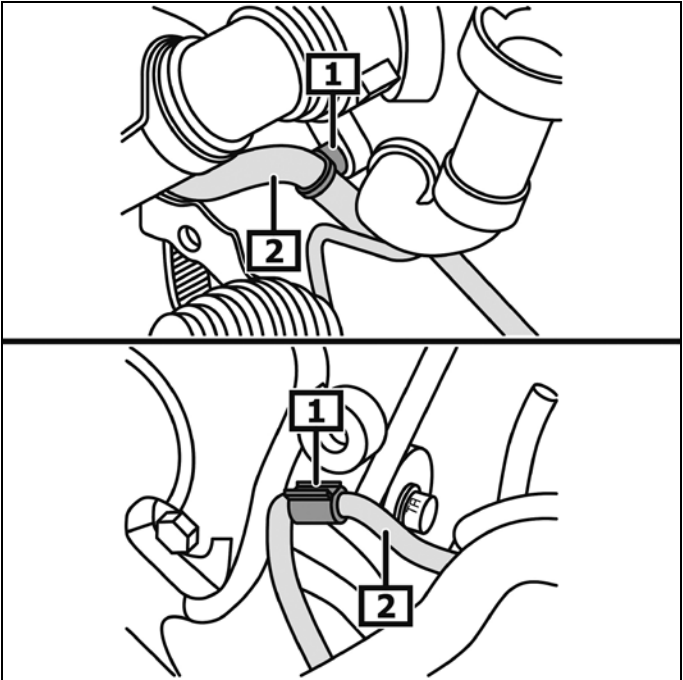
**Figure 3**



- |                                      |                                 |
|--------------------------------------|---------------------------------|
| 1 Cable duct screw(s)                | 2 Cable duct                    |
| 3 Upper toothed belt guard screw(s). | 4 Toothed belt guard at the top |

Disconnect the cable harness. **(1)(2)**  
**(see figure 4)**

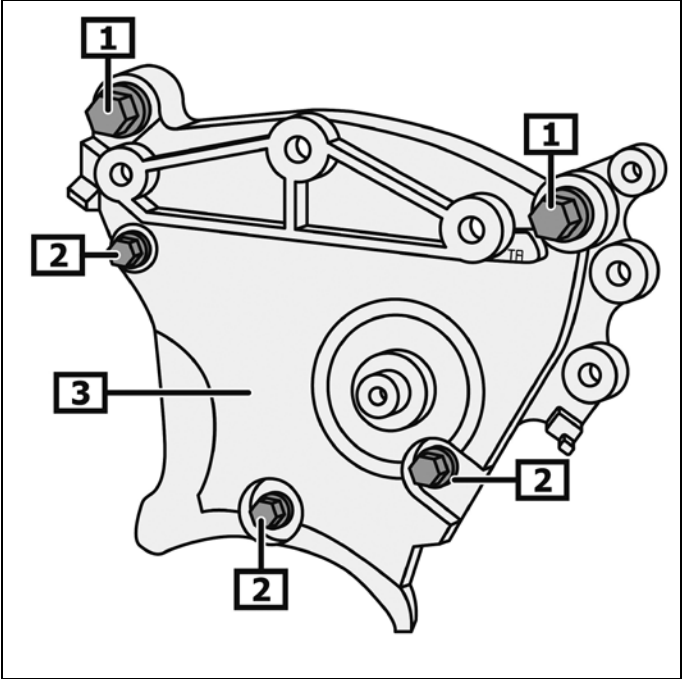
**Figure 4**



- |                        |                 |
|------------------------|-----------------|
| 1 Cable harness holder | 2 Cable harness |
|------------------------|-----------------|

Unscrew and remove the toothed belt guard middle screw(s). **(1) (2)**  
Remove the central toothed belt guard. **(3)**  
**(see figure 5)**

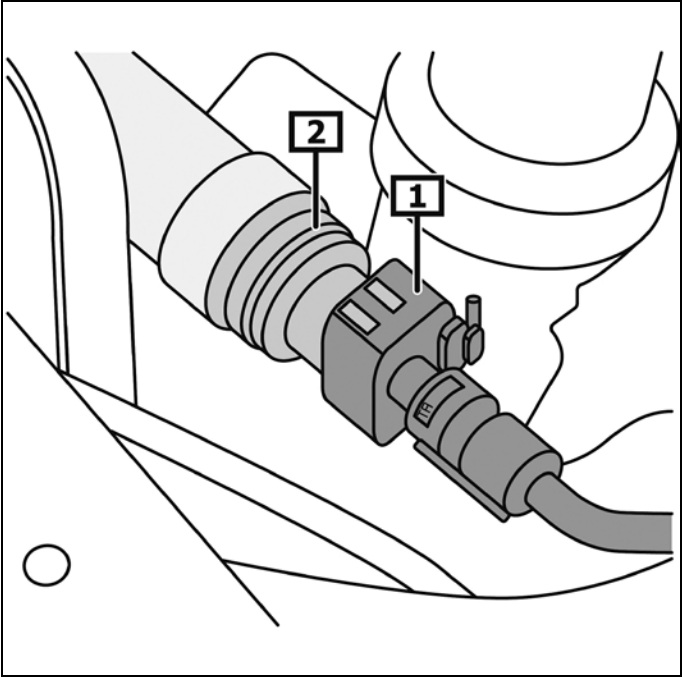
**Figure 5**



- 1 Screw(s) – center of toothed belt guard      2 Screw(s) – center of toothed belt guard  
3 Toothed belt guard center

Remove rail-pressure sensor connector. **(1)**  
Remove rail-pressure sensor. **(2)**  
**(see figure 6)**

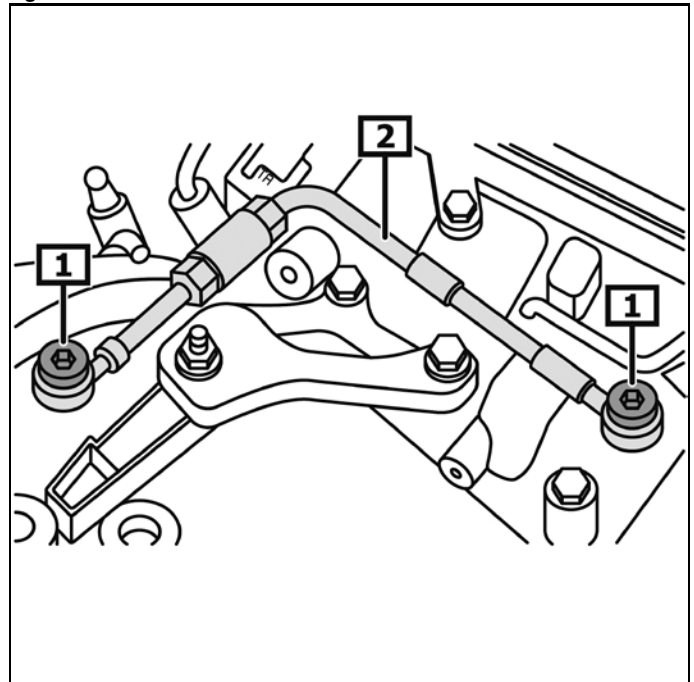
**Figure 6**



- 1 Rail-pressure sensor connector      2 Rail pressure sensor

Unscrew and remove oil feed line banjo bolt(s). **(1)**  
 Dismantle turbocharger oil feed line. **(2)**  
 Remove the sealing ring(s).  
**Replace sealing ring(s).**  
**(see figure 7)**

**Figure 7**

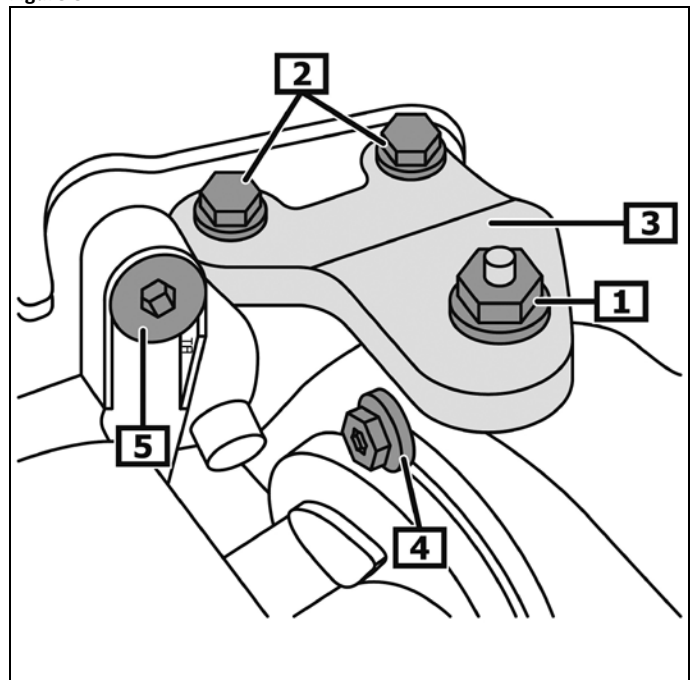


1 Oil feed line banjo bolt(s)

2 Turbocharger oil feed line

Unscrew and remove turbocharger bracket nut(s). **(1)**  
 Unscrew and remove turbocharger bracket screw(s). **(2)**  
 Remove turbocharger bracket. **(3)**  
 Unscrew and remove turbocharger screw(s). **(4)**  
 Unscrew locking screw(s) on the side of the outlet camshaft. **(5)**  
**Remove remains of sealant.**  
**Replace seal(s).**  
**(see figure 8)**

**Figure 8**



1 Holder nut(s)

2 Turbocharger bracket screw(s)

3 Turbocharger bracket

4 Turbocharger screw(s)

5 Locking screw



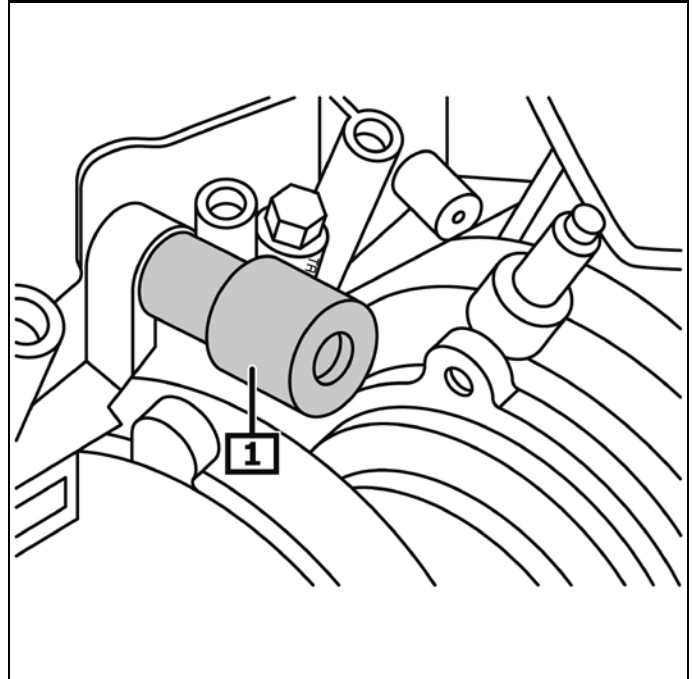
Insert exhaust camshaft blocking pin(s). (1)

**Required special tools**

Camshaft(s) blocking pin(s) (1) OE (1870896900)  
(see figure 9)

Turn crankshaft slowly in direction of engine rotation until camshaft locking pin snaps in.

**Figure 9**



1 Outlet camshaft blocking pin(s)

Unscrew and remove locking screw(s) on the side of the inlet camshaft. (1)

**Remove remains of sealant.**

Insert blocking pin(s) for intake-camshaft position. (2)

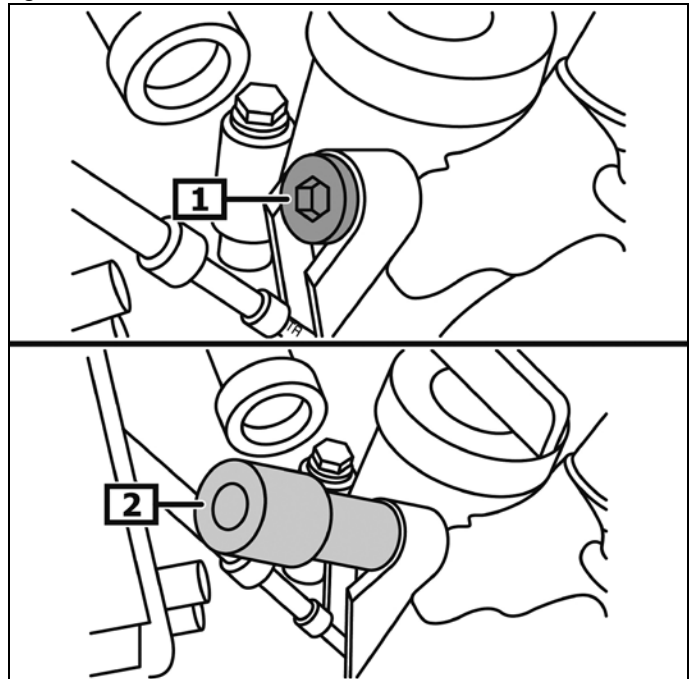
**Replace seal(s).**

**Required special tools**

Camshaft(s) blocking pin(s) (2) OE (1870896900)  
(see figure 10)

Turn crankshaft slowly in direction of engine rotation until camshaft locking pin snaps in.

**Figure 10**



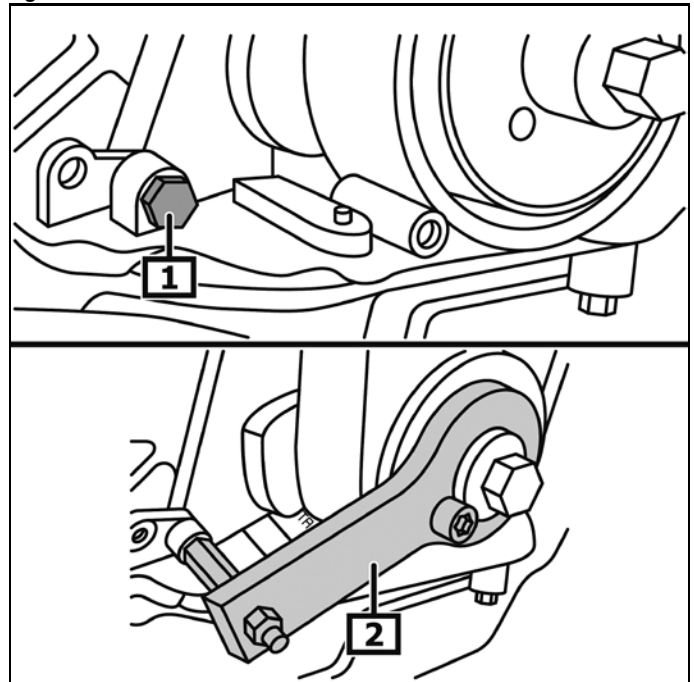
1 Locking screw

2 Inlet camshaft blocking pin(s)

Remove screw from crankcase. **(1)**  
 Fit locking tool for crankshaft but don't fully insert it. **(2)**  
 Turn engine in direction of rotation until crankshaft blocking tool engages in the hole out of the rotary movement.  
**Check engine steering time.**  
 Remove crankshaft blocking tool. **(2)**

**Required special tools**  
 Crankshaft blocking tool **(2)** OE (2027400090)  
 (see figure 11)

**Figure 11**

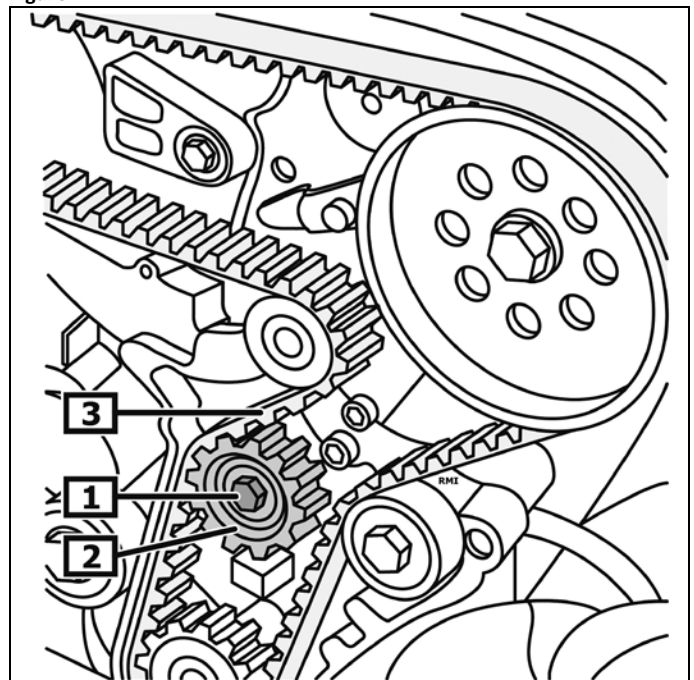


1 Bolt(s), crankcase

2 Crankshaft blocking tool

Unscrew tensioning roller screw(s). **(1)**  
 Release tensioning roller. **(2)**  
 Take off toothed belt. **(3)**  
**Use new screw.**  
 (see figure 12)

**Figure 12**



1 Tensioning roller screw(s)

2 Tensioning roller

3 Toothed belt

## Install

Use only toothed belts approved by the manufacturer.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

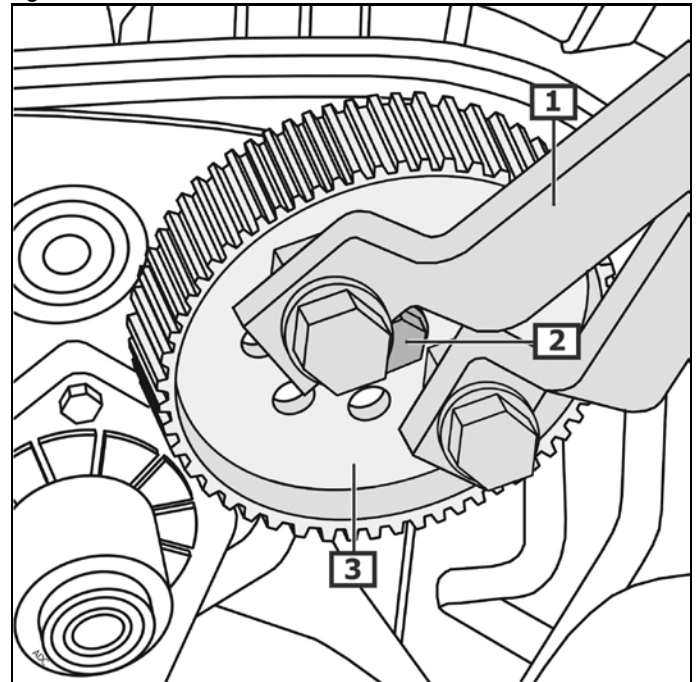
Hold the camshaft pulley in position using the special tool. (1)  
Unscrew camshaft pulley screw(s). (2) (3)  
Remove the opposing holder. (1)  
(see figure 13)

### Required special tools

Counter support (1) OE (1870815000)

Counter support bolt OE (1870836000)

Figure 13



1 Counter support

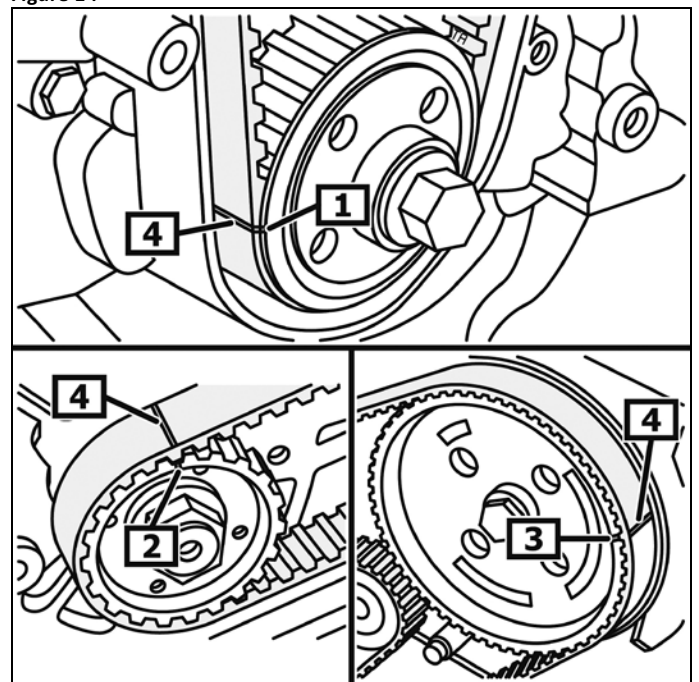
2 Camshaft pulley bolt(s)

3 Camshaft timing gear

Place toothed belt on crankshaft wheel starting clockwise.  
Marking(s) of the camshaft timing gear wheel, injection pump wheel and crankshaft timing gear must check with the toothed belt markings.  
(1)(2)(3)(4)  
(see figure 14)

Insert crankshaft blocking tool. (2)  
(see figure 11)

Figure 14



1 Crankshaft pulley marking(s)

2 Injection pump pulley marking(s)

3 Camshaft pulley marking(s)

4 Toothed belt markings

Tighten tension roller max. at adjustment eccentric using suitable tool (I) (1) (2)

Tighten tensioning roller screw(s). (II) (3)  
(see figure 15)

Remove crankshaft blocking tool. (2)  
(see figure 11)

Remove blocking pin(s). (2)  
(see figure 10)

Remove blocking pin(s). (1)  
(see figure 9)

Hold the camshaft pulley in position using the special tool. (1) (3)  
Tighten camshaft pulley screw(s). (2)  
(see figure 13)

**Turn crankshaft by two revolutions in running direction of the engine.**

Unscrew tensioning roller screw(s). (II) (3)  
Tighten tension pulley until pointer and reference mark align. (II) (1) (2) (4)  
Tighten tensioning roller screw(s). (II) (3)  
(see figure 15)

**Turn crankshaft by two revolutions in running direction of the engine.**

Insert exhaust camshaft blocking pin(s). (1)  
(see figure 9)

Insert blocking pin(s) for intake-camshaft position. (2)  
(see figure 10)

Insert crankshaft blocking tool. (2)  
(see figure 11)

If it is not possible to insert the blocking tools, adjust the valve timing.  
**Check engine steering time.**

Remove all blocking tool(s).

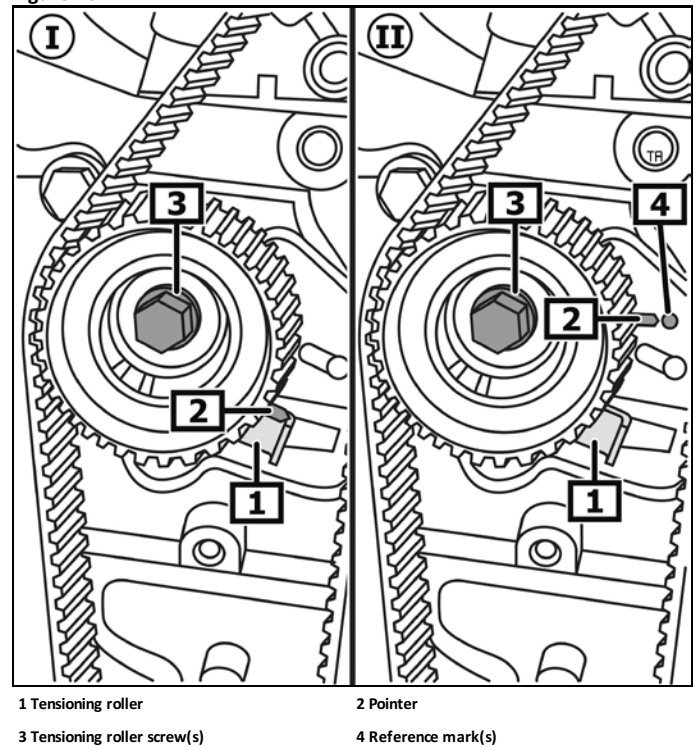
**Replace bolt. (1)**  
Screw in crankcase bolt(s). (1)  
(see figure 11)

**Continue assembly in reverse order of removal.**

Start engine and check function.

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

**Figure 15**



### AUDI A4 (8K2, B8), 2.0 TDI, 105 kW



#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

Do not use camshaft retainers as a support while removing or attaching the camshaft pulley.

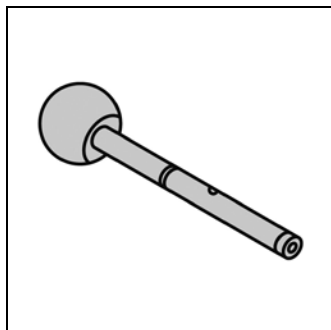
When turning the camshaft, the crankshaft must not be at TDC.

The toothed belt must not come into contact with oil or coolant!

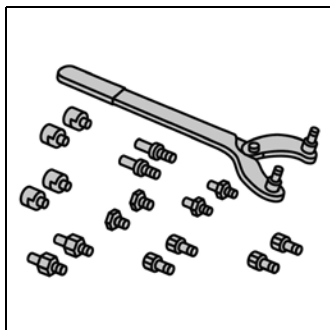
Adjustment work on the toothed belt must only be carried out with a cold engine.

It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

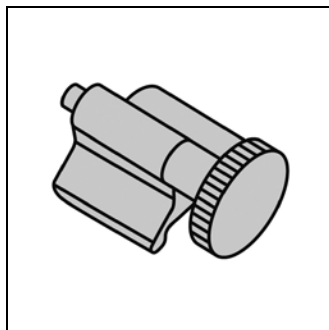
#### **Required special tools**



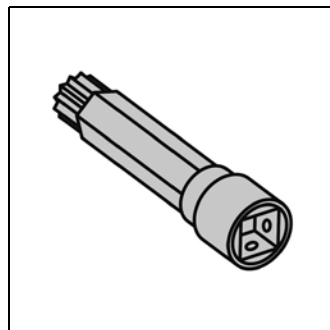
Camshaft blocking tool  
OE (3359)



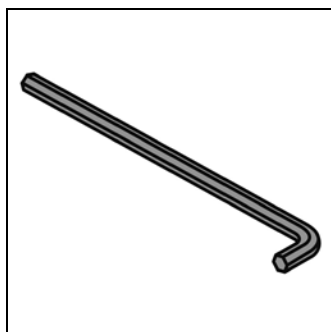
Counter support kit  
OE (T10172)



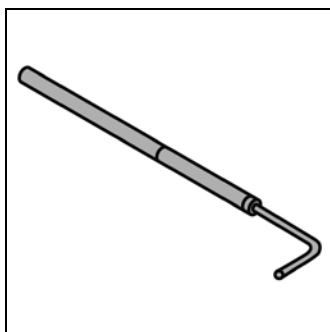
Crankshaft locking tool  
OE (T10050)



Wrench socket  
OE (T10385)



Allen key  
OE (T10264)



Tensioning roller blocking pin(s)  
OE (T10265)

## Required Labour times/torques

### Scheduled times

Replace the toothed belt.	2,00 h
---------------------------	--------

### Tightening torques

Self-locking screws and nuts must always be replaced.

Torque arm screw(s)	(see figure 1)	Use new screw(s).	on chassis, Cross support 40 Nm; on the engine block 25 Nm
Camshaft pulley bolt(s) (3)	(see figure 3)		Engine CAGA, Central bolt 100 Nm; Engine CAGA, Wheel, 01 stage 20 Nm; Engine CAGA, Wheel, 02 stage 45°; Engine CJCA, Central bolt 100 Nm; Engine CJCA, Wheel, 01 stage 20 Nm; Engine CJCA, Wheel, 02 stage 45°; Engine CMEA, Central bolt 100 Nm; Engine CMEA, Wheel, 01 stage 20 Nm; Engine CMEA, Wheel, 02 stage 45°; Engine CMFA, Central bolt 100 Nm; Engine CMFA, Wheel, 01 stage 20 Nm; Engine CMFA, Wheel, 02 stage 45°
Bolt(s), high-pressure pump impeller (2)	(see figure 4)	Use new screw(s).	Engine CAGA, central nut 95 Nm; Engine CAGA, Wheel 20 Nm; Engine CJCA, central nut 95 Nm; Engine CJCA, Wheel 20 Nm; Engine CMEA, central nut 95 Nm; Engine CMEA, Wheel 20 Nm; Engine CMFA, central nut 95 Nm; Engine CMFA, Wheel 20 Nm
Tensioning roller nut (4)	(see figure 5)	Use new nut(s)	01 stage 20 Nm; 02 stage 45°
Toothed belt guard center			10 Nm
Toothed belt guard at the bottom			10 Nm
Vibration damper			Engine CAGA, 01 stage 10 Nm; Engine CAGA, 02 stage 90°; Engine CJCA, 01 stage 10 Nm; Engine CJCA, 02 stage 90°; Engine CMEA, 01 stage 10 Nm; Engine CMEA, 02 stage 90°; Engine CMFA, 01 stage 10 Nm; Engine CMFA, 02 stage 90°



## Remove

Remove ignition key.

**Lift vehicle.**

Remove underride guard.

**Bring lock carrier into service position.**

### Vehicles with torque support

Remove the exhaust pipe engine-independent heating. (If present)

Remove torque arm screw(s). (1)

Unscrew cross support screw(s). (2)

Remove cross support. (3)

(see figure 1)

### Vehicles with multitronic

Place collecting container underneath.

Detach oil line(s) from oil cooler.

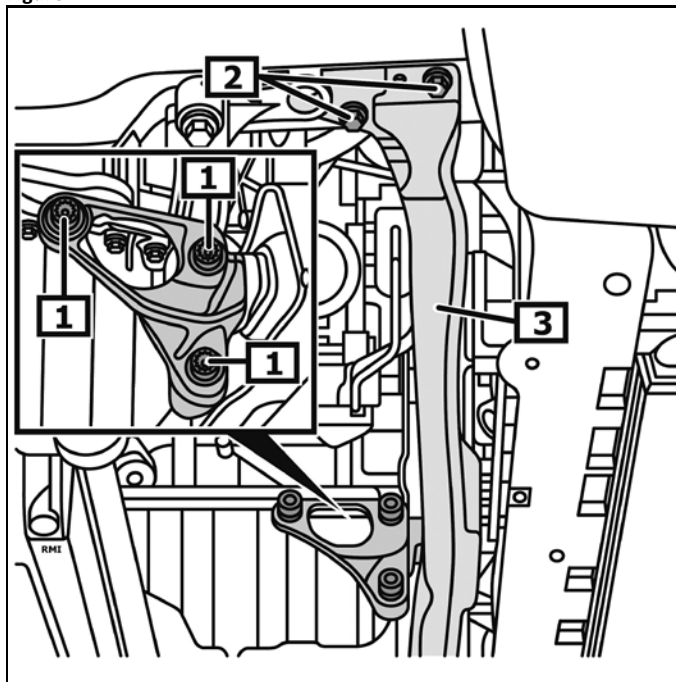
Shut off the oil line(s) using plugs.

### Continuation for all vehicles

Disconnect radiator fan electric plug connection(s).

Remove radiator fan control unit.

Figure 1



1 Torque arm screw(s)

2 Cross support screw(s)

3 Cross support

## **Remove the accessory drive belt.**

Remove vibration damper.

Remove toothed belt guard at the top.

Remove the central toothed belt guard.

Remove toothed belt guard at the bottom. Turn crankshaft clockwise until 1. cylinder is shortly before TDC. (1)

(see figure 2)

The toothed segment on toothed belt sprocket - camshaft must be on top. (Arrow)

(see figure 3)

Insert the crankshaft locking tool. (2)

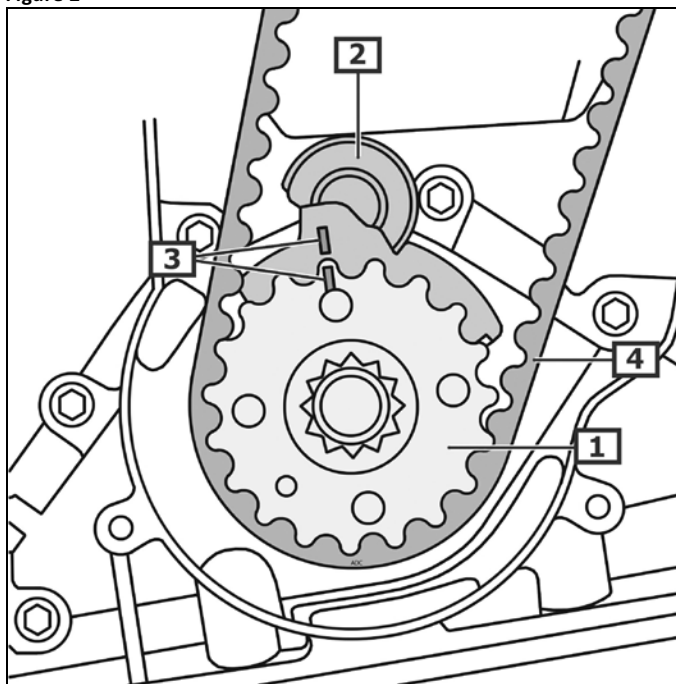
Markings must align. (3)

Carefully rotate crankshaft until setting tool engages. (2)

(see figure 2)

**Mark running direction of toothed belt.**

Figure 2



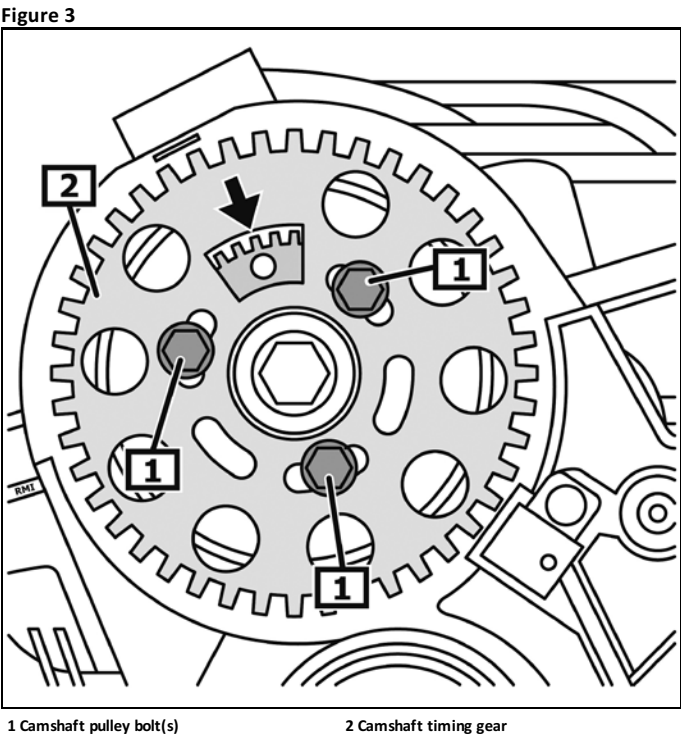
1 Crankshaft pulley

2 Crankshaft locking tool

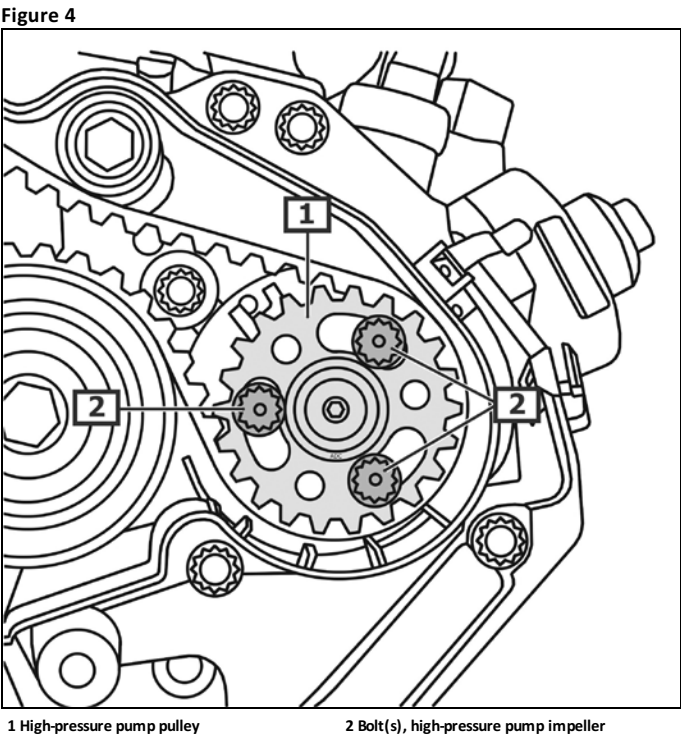
3 Mark(s)

4 Toothed belt

Slacken camshaft timing gear wheel screw(s). **(1)**  
(see figure 3)



Loosen bolt(s) from high-pressure pump impeller. **(2) (1/4 revolutions)**  
(see figure 4)

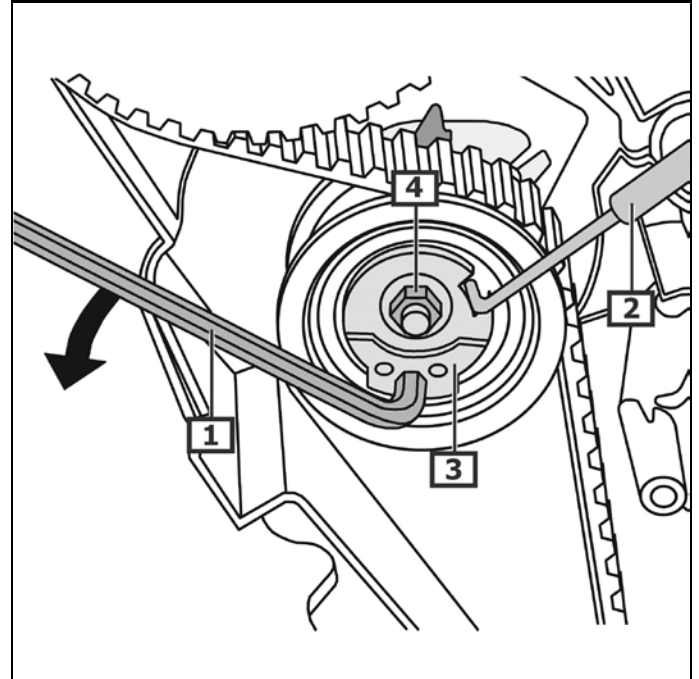


Loosen tensioning roller nut(s). **(4)**  
 Turn the eccentric tensioning roller anti-clockwise. **(1)(3)**  
 Block tension pulley using appropriate tool. **(2)**

**Required special tools**

Allen key **(1) OE (T10264)**  
 Tensioning roller blocking pin(s) **(2) OE (T10265)**  
**(see figure 5)**

**Figure 5**



1 Allen key  
 2 Tensioning roller blocking pin(s)  
 3 Tensioning roller eccentric  
 4 Tensioning roller nut(s)

Using an Allan wrench, rotate tension pulley clockwise as far as it will go. **(1)(3)**  
 Screw down tensioning roller nut(s) hand-tight. **(4)**

**Required special tools**

Allen key **(1) OE (T10264)**  
 Tensioning roller blocking pin(s) **(2) OE (T10265)**  
**(see figure 6)**

First take off toothed belt from deflection pulley and then from the gears.

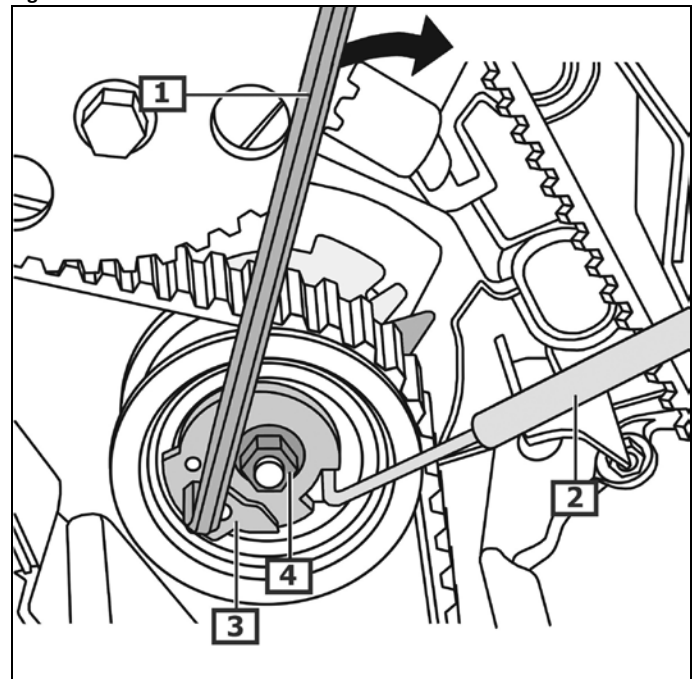
**Install**

**Ensure correct seating of the tensioning roller retaining lug(s).**

The tension roller must be pegged using the rig pin and fixed up to the right stop.  
**(see figure 6)**

Crankshaft locking tool must engage in sealing flange hole.  
**(see figure 2)**

**Figure 6**



1 Allen key  
 2 Tensioning roller blocking pin(s)  
 3 Tensioning roller eccentric  
 4 Tensioning roller nut(s)

Insert camshaft blocking pin(s). (1)  
(see figure 7)

**If the blocking pin cannot be inserted, proceed as follows:**

Screw in camshaft timing gear wheel screw(s) hand-tight. (3)

Turn camshaft timing gear wheel until the camshaft blocking pin can be inserted. (1)

Screw(s) – loosen camshaft timing gear wheel - approx. two turns. (3)

**Required special tools**

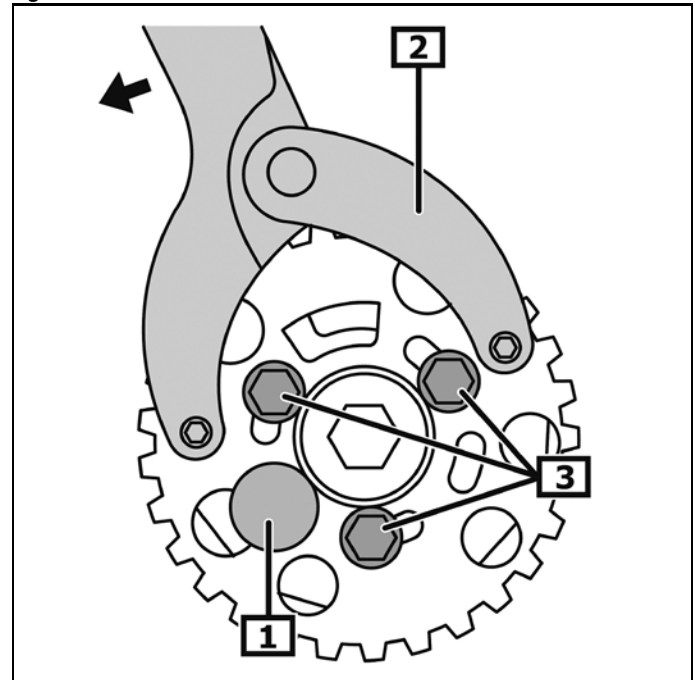
Camshaft(s) blocking pin(s) (1) OE (3359)

Counter support kit (2) OE (T10172)

- Counter support bolt OE (T10172/4)

(see figure 7)

Figure 7



1 Camshaft(s) blocking pin(s)

2 Counter support kit

3 Camshaft pulley bolt(s)

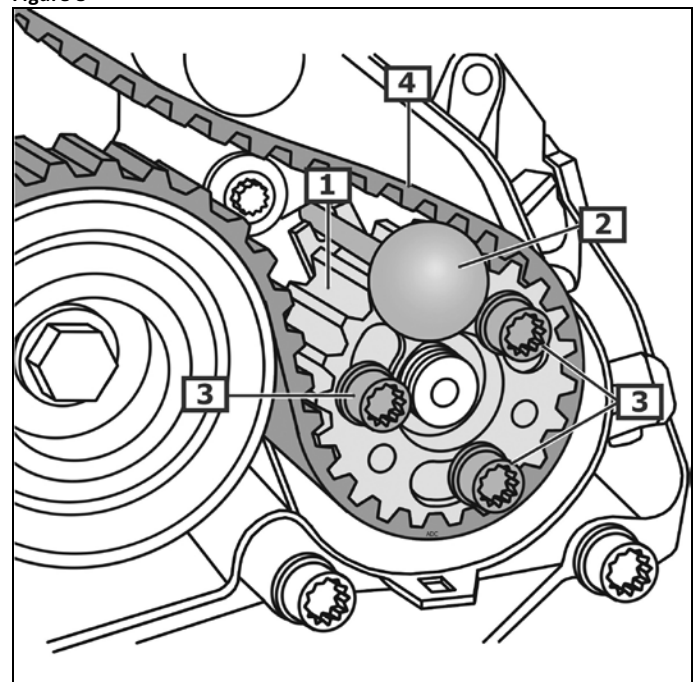
Insert camshaft(s) blocking pin(s) from high-pressure pump impeller.  
(2)

**Required special tools**

Camshaft(s) blocking pin(s) (2) OE (3359)

(see figure 8)

Figure 8



1 High-pressure pump pulley

2 Camshaft(s) blocking pin(s)

3 Bolt(s), high-pressure pump impeller

4 Toothed belt

**Proceed as follows if high-pressure pump impeller blocking tool cannot be inserted:**

Rotate high-pressure pump impeller. (1)  
(see figure 9)

Insert camshaft(s) blocking pin(s) from high-pressure pump impeller.  
(2)  
(see figure 8)

Turn both the crankshaft timing gear and the high-pressure pump impeller clockwise, in the oblong holes, up to the stop.

Place toothed belt in the order of crankshaft, tension roller, camshaft gear, coolant pump, high-pressure pump, deflection pulley.

Loosen tensioning roller nut(s). (4)  
Remove tensioning roller blocking pin(s). (2)  
(see figure 6)

**Ensure correct seating of the tensioning roller retaining lug(s).**

Position counter support. (2)  
Press arm bracket in direction of arrow and keep camshaft gear pretensioned. (2)  
Pre-tighten camshaft timing gear wheel screw(s) applying 20 Nm. (3)

**Required special tools**  
Counter support kit (2) OE (T10172)  
(see figure 7)

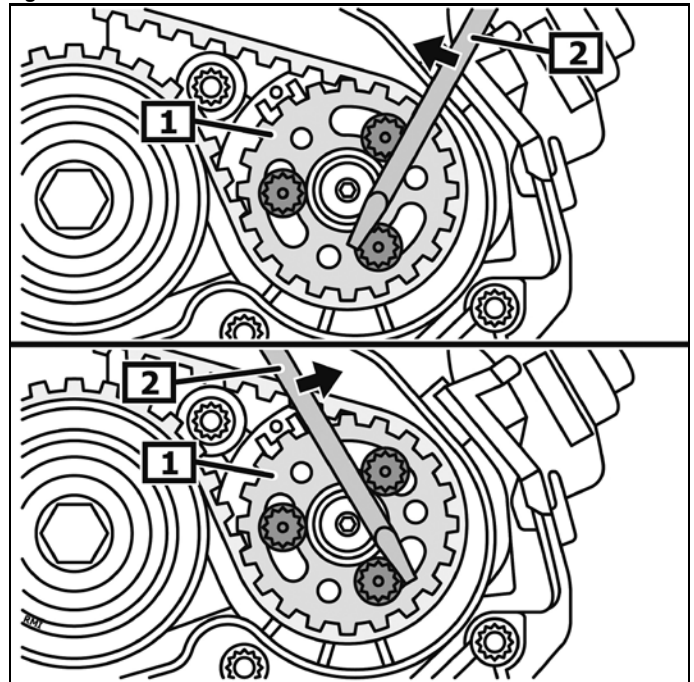
Pre-tighten high-pressure pump impeller screw(s) applying 20 Nm. (3)  
(see figure 8)

Rotate tension roller eccentric clockwise using an Allen wrench till pointer is in recess center. (2)(4)(5)  
The tensioning roller nut must not turn during this process. (3)  
Hold the tensioning roller in position.  
Nut(s) – tighten tension pulley. (3)

**Required special tools**  
Allen key (1) OE (T10264)  
(see figure 10)

Remove all blocking tool(s).

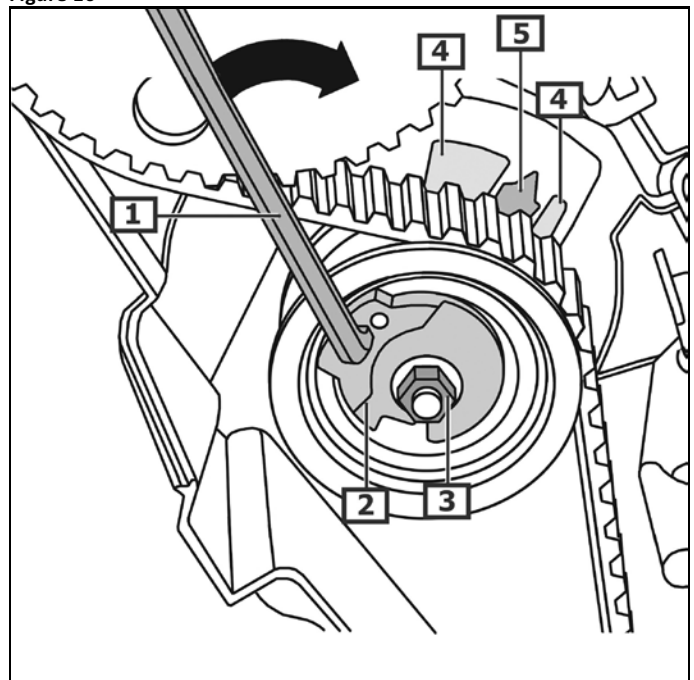
Figure 9



1 High-pressure pump pulley

2 Screwdriver

Figure 10



1 Allen key

2 Tensioning roller eccentric

3 Tensioning roller nut(s)

4 Baseplate

5 Pointer

## Check engine timing

Turn the engine at the crankshaft by two revolutions in the engine running direction until marking is shortly before TDC.

Insert the crankshaft locking tool. (1)

Turn engine in direction of rotation until crankshaft blocking tool engages in the hole out of the rotary movement. (1)

### Required special tools

Crankshaft locking tool (1) OE (T10050)

(see figure 11)

Insert camshaft blocking pin(s). (1)

(see figure 7)

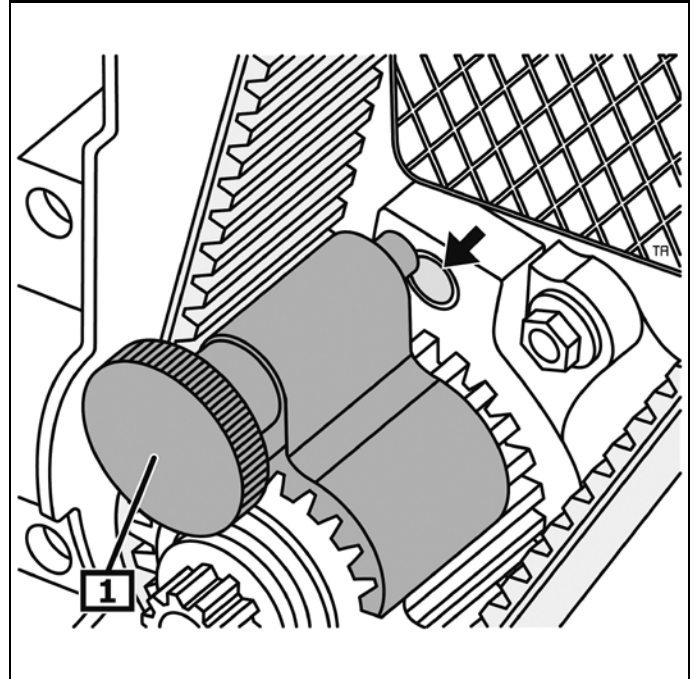
Pointer of the tension roller must be positioned in the middle of the base plate recess but may be turned max. 5 mm further to the right.

## Correct timings

Retract crankshaft blocking tool until journal releases hole. (1)

(see figure 11)

Figure 11



1 Crankshaft blocking tool

Turn crankshaft against engine running direction until marking is shortly after TDC.

Rotate engine in direction of rotation until the camshaft locking tool can be inserted. (1)

Slacken camshaft timing gear wheel screw(s). (3)

(see figure 7)

**Once the journal on the crankshaft blocking tool is positioned just before the hole, proceed as follows:**

Turn engine in direction of rotation until crankshaft blocking tool engages in the hole out of the rotary movement. (1) (Arrow)

(see figure 11)

Pre-tighten camshaft timing gear wheel screw(s) applying 20 Nm. (3)

(see figure 7)

**Once the journal on the crankshaft blocking tool is positioned just after the hole, proceed as follows:**

Now after all turn crankshaft pulley slightly against the engine rotary direction until bolt is located left before hole.

Turn engine in direction of rotation until crankshaft blocking tool engages in the hole out of the rotary movement. (1) (Arrow)

(see figure 2)

Pre-tighten camshaft timing gear wheel screw(s) applying 20 Nm. (3)

(see figure 7)

Remove all blocking tool(s).

Check the control times.

Tighten camshaft pulley screw(s).

**Continue assembly in reverse order of removal.**

Carry out a test drive.

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.



## FIAT 500 (312\_), 1.2, 51 kW



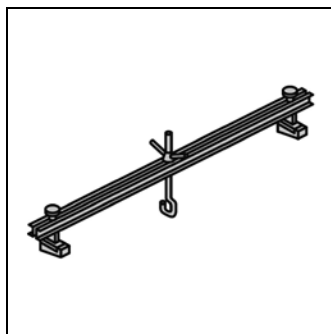
### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

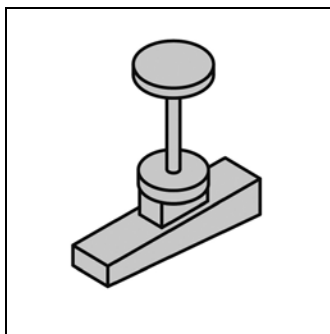
### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
When turning the camshaft, the crankshaft must not be at TDC.  
The toothed belt must not come into contact with oil or coolant!  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
Note radio code. Disconnect battery (negative terminal).  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

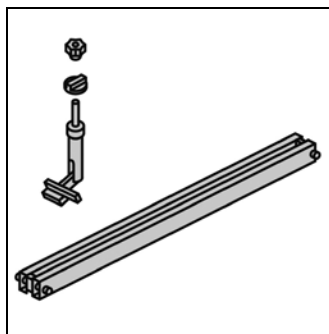
### **Required special tools**



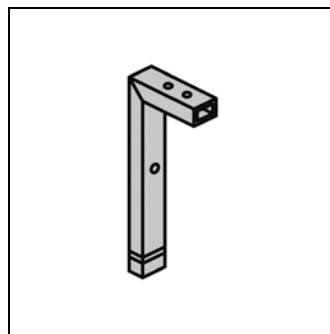
Engine bridge  
OE (1870595000)



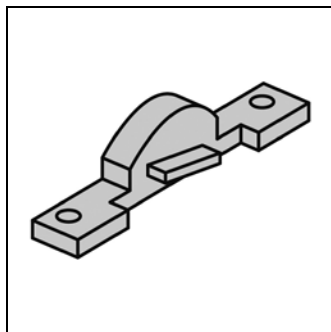
Engine bridge support(s)  
OE (1870650000)



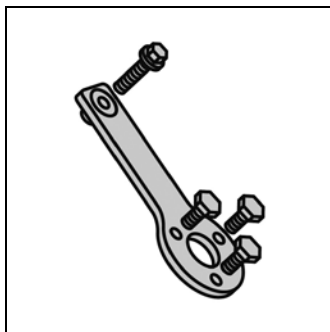
Engine bridge additional support  
OE (1860851003)



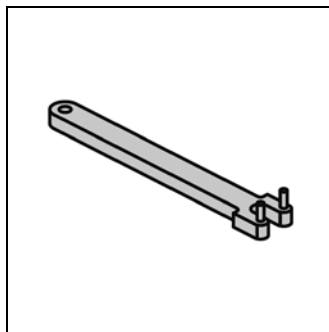
Engine bridge support(s)  
OE (1871001300)



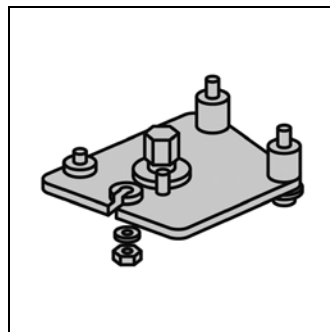
Adjusting tool – camshaft(s)  
OE (2000004400)



Crankshaft blocking tool  
OE (2000004500)



Tensioning device  
OE (1860987000)



Centring tool  
OE (2000004300)

## **Required Labour times/torques**

### **Scheduled times**

Replace toothed belt	2,35 h
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### **Tightening torques**

**Self-locking screws and nuts must always be replaced.**

Support strut screw(s) (1)	(see figure 1)	M10 x 1,25 51 Nm
Crankshaft pulley screw(s) (1)	(see figure 2)	M8 23 - 28 Nm
Camshaft sensor screw (1)	(see figure 6)	8 - 12 Nm
Screw(s) – valve cover (2)	(see figure 9)	M6, Screw(s) 9 Nm
Engine mounting nut(s) (1)(2)	(see figure 10)	on chassis, M10, Nut(s) 50 Nm; on engine bracket, M10, Nut(s) 50 Nm
Engine bracket screw(s) (4)	(see figure 10)	M10, Screw(s) 60 Nm
Tensioning roller nut(s) (2)	(see figure 14)	M8, Nut(s) 25 - 31 Nm
Wheel attachment		M12 x 1,25, Steel rim(s) 77 - 95 Nm; with aluminium rim(s), M12 x 1,25 88 - 108 Nm

## **Remove**

Remove toothed belt guard at the top.

### **Lift vehicle.**

Remove the right front wheel.

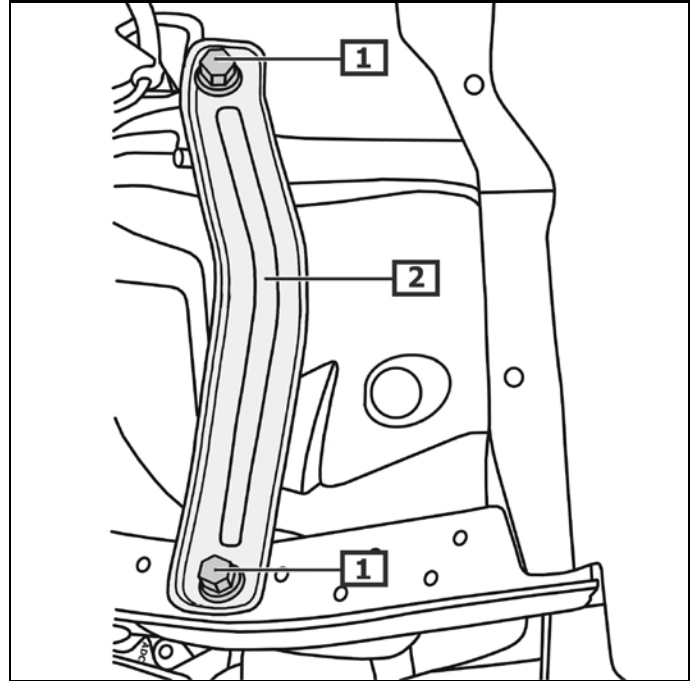
Unscrew support strut screw(s). (right side only) **(1)**

Remove supporting strut(s). **(2)**

(see figure 1)

Remove accessory drive belt.

**Figure 1**



1 Support strut screw(s)

2 Support strut(s) - Cross strut on bodywork.

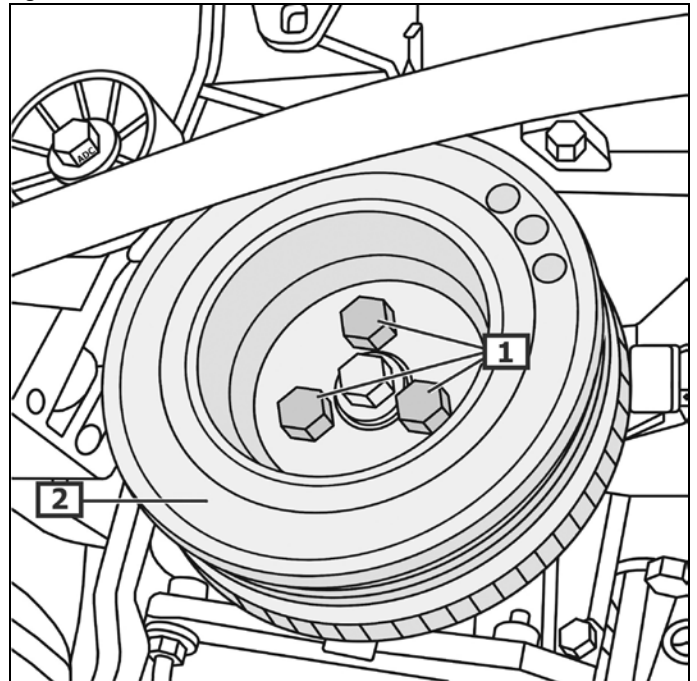
Unscrew crankshaft pulley screw(s). **(1)**

Remove crankshaft pulley. **(2)**

(see figure 2)

Remove toothed belt guard at the bottom.

**Figure 2**



1 Crankshaft pulley screw(s)

2 Crankshaft pulley

Position completed engine bridge in place. (1) - (4)

**Required special tools**

Engine bridge (1) OE (1870595000)

Engine bridge support(s) (2) OE (1870650000)

Engine bridge additional support (3) OE (1860851003)

Engine bridge support(s) (4) OE (1871001300)

(see figure 3)

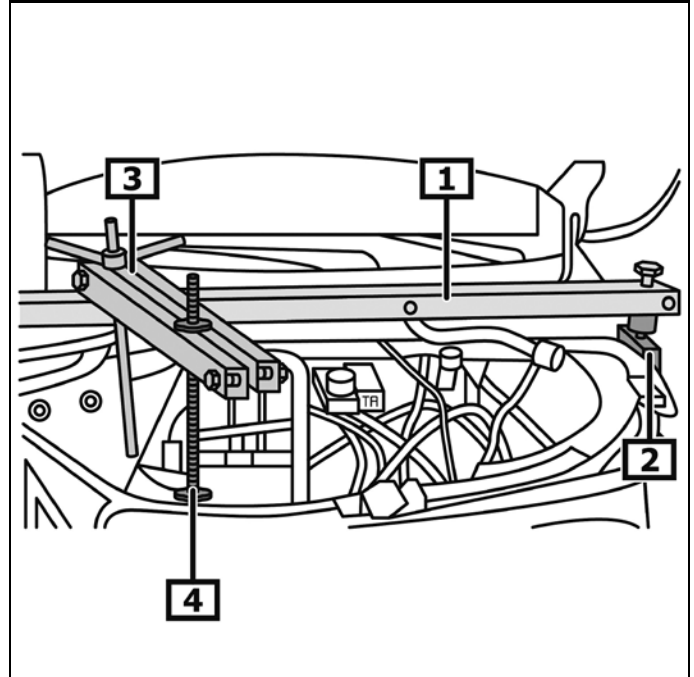
Remove air filter housing.

**Disconnect battery.**

Remove battery.

Remove the battery tray.

**Figure 3**



1 Engine bridge

2 Engine bridge support(s)

3 Engine bridge additional support

4 Engine bridge support(s)

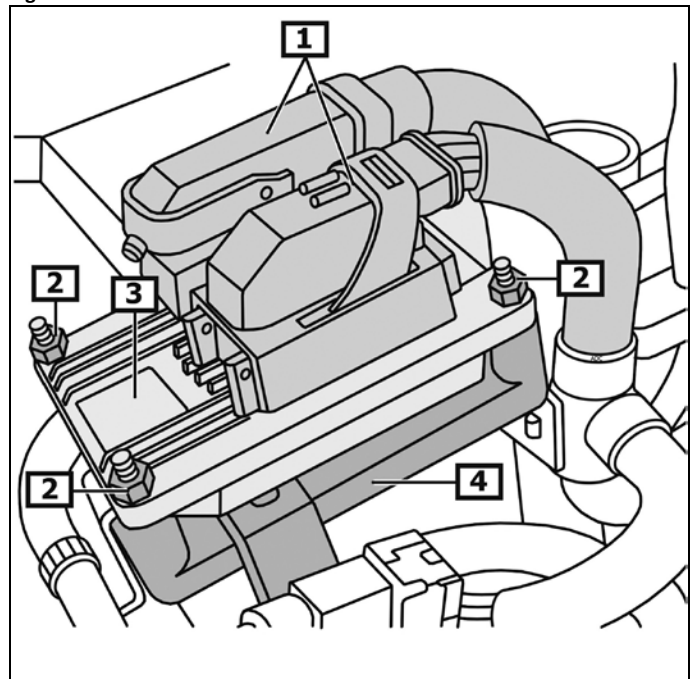
Disconnect engine control unit plug. (1)

Unscrew and remove engine control unit nut(s). (2)

Remove engine control unit. (3)

(see figure 4)

**Figure 4**



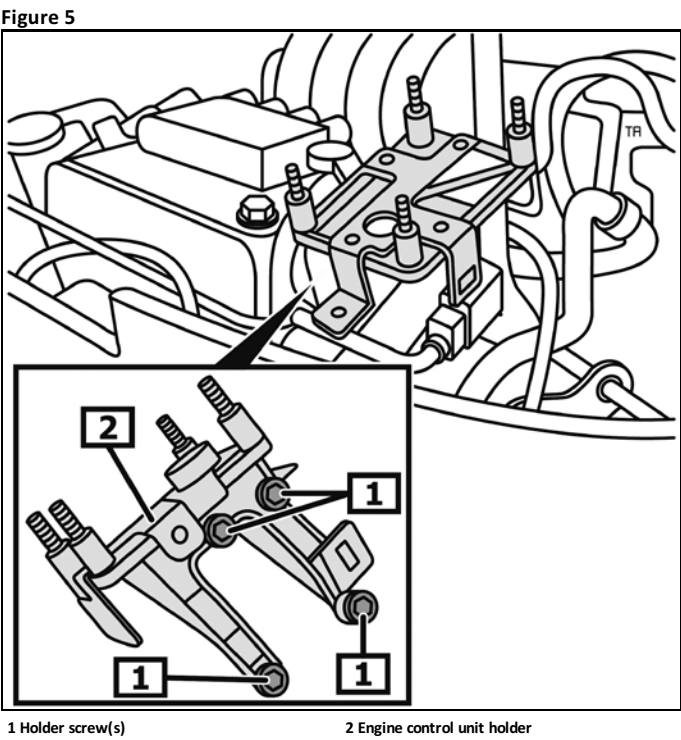
1 Engine control unit plug

2 Engine control unit nut(s)

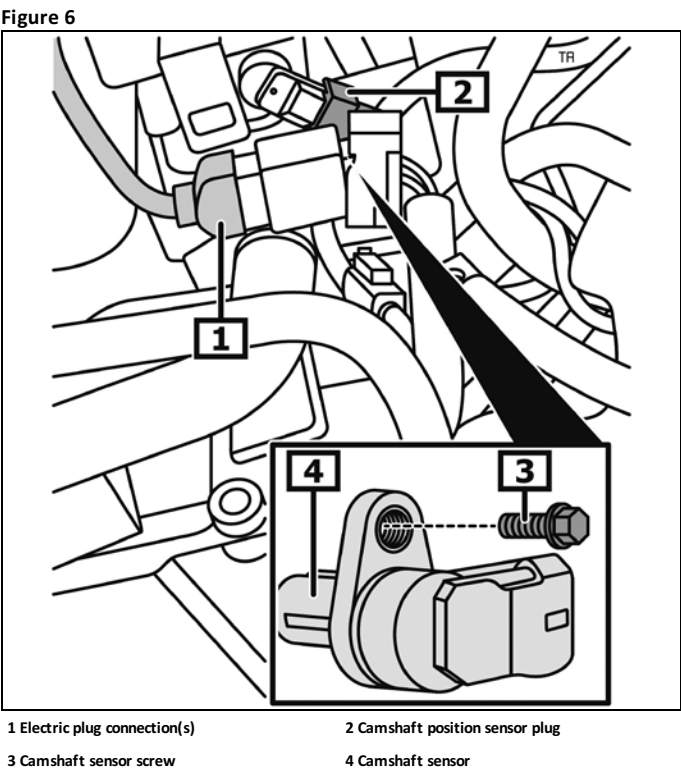
3 Engine control unit

4 Support

Unscrew and remove bracket screw(s). **(1)**  
 Remove engine control unit holder. **(2)**  
**(see figure 5)**

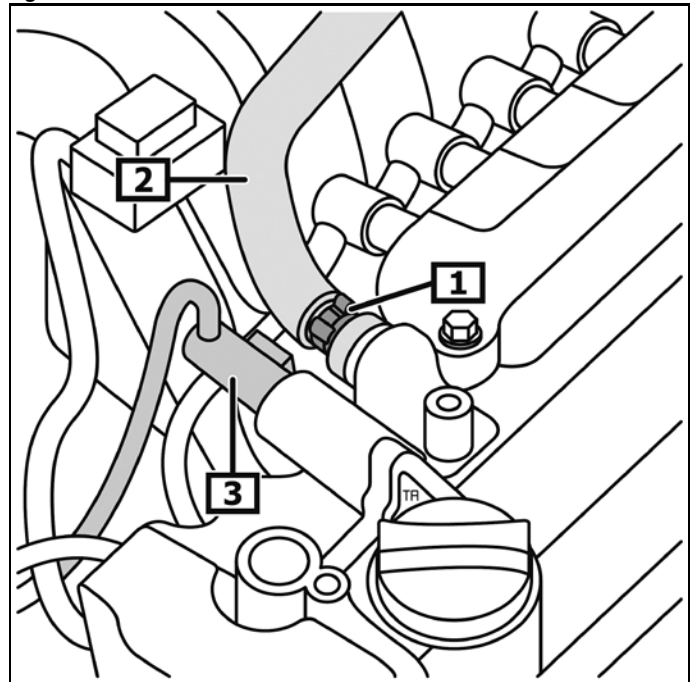


Disconnect electric plug connection(s). **(1)**  
 Disconnect camshaft sensor plug. **(2)**  
 Unscrew and remove camshaft sensor screw. **(3)**  
 Remove camshaft sensor. **(4)**  
**(see figure 6)**



Remove clamp(s). **(1)**  
 Remove the crankcase ventilation system hose. **(2)**  
 Pull off electr. plug connection from solenoid valve for camshaft adjustment. **(3)**  
**(see figure 7)**

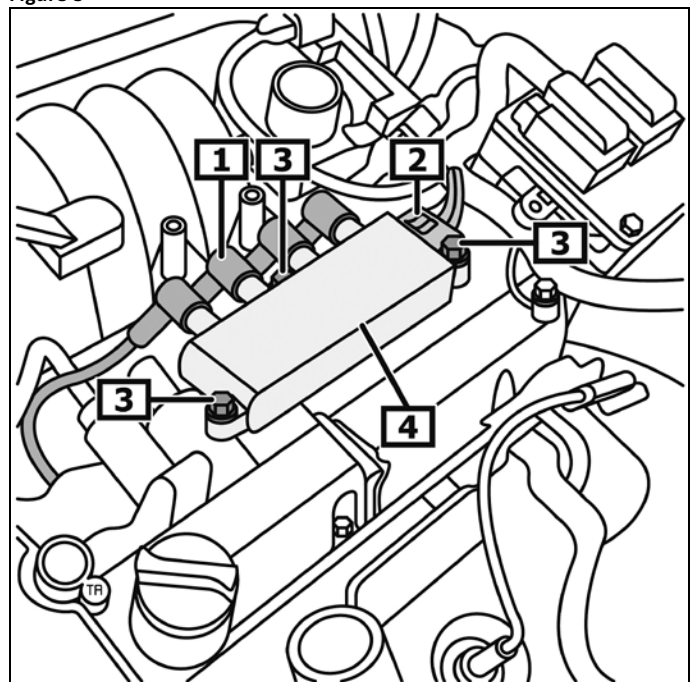
**Figure 7**



- |                               |                                |
|-------------------------------|--------------------------------|
| 1 Clamp(s)                    | 2 Hose - crankcase ventilation |
| 3 Electric plug connection(s) |                                |

Pull off ignition cable from ignition coil. **(1)**  
 Disconnect the ignition coil plug. **(2)**  
 Unscrew the ignition coils screw(s). **(3)**  
 Remove ignition coil. **(4)**  
**(see figure 8)**

**Figure 8**

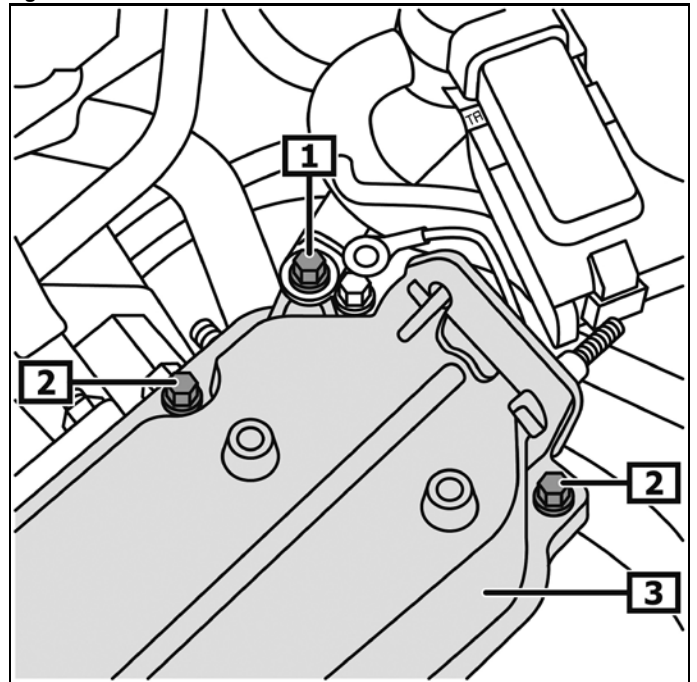


- |                            |                      |
|----------------------------|----------------------|
| 1 Ignition cable           | 2 Ignition coil plug |
| 3 Screw(s) - ignition coil | 4 Ignition coil      |



Unscrew and remove cable harness bracket screw(s). **(1)**  
 Bolt(s) - unscrew and remove valve cover. **(2)**  
 Remove valve cover. **(3)**  
**(see figure 9)**

**Figure 9**



1 Cable harness bracket screw(s)

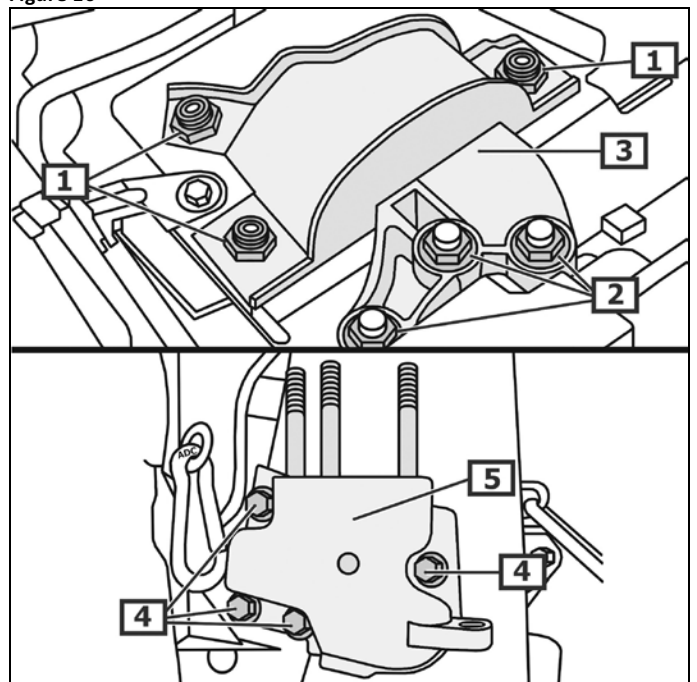
2 Screw(s) – valve cover

3 Valve cover

Support engine with workshop car jack.

Unscrew engine mounting nut(s). **(1)(2)**  
 Remove engine mounting. **(3)**  
 Unscrew engine bracket screw(s). **(4)**  
 Remove engine bracket. **(5)**  
**(see figure 10)**

**Figure 10**



1 Engine mounting nut(s)

2 Engine mounting nut(s)

3 Engine mounting

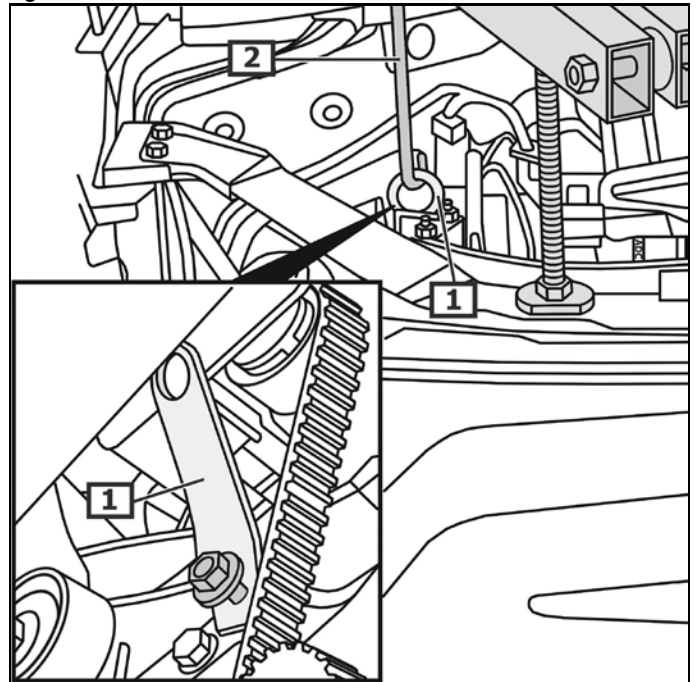
4 Engine bracket screw(s)

5 Engine bracket

Insert holding strap. **(1)**  
(see figure 11)

Lift engine slightly.

Figure 11



1 Retaining clamp

2 Holder(s) - Engine bridge

Rotate crankshaft in the direction of engine rotation using a suitable tool.

The marking(s) must point towards the top. **(1)**

Align camshaft(s) on the adjusting tools. **(2)**

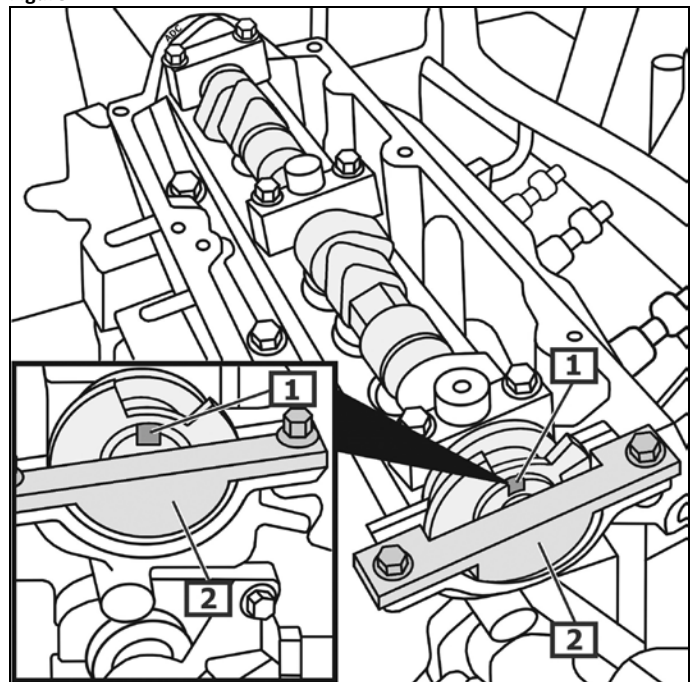
Attach camshaft(s) adjusting tool. **(2)**

**Required special tools**

Adjusting tool – camshaft(s) **(2)** OE (2000004400)

(see figure 12)

Figure 12



1 Marking(s) – camshaft(s)

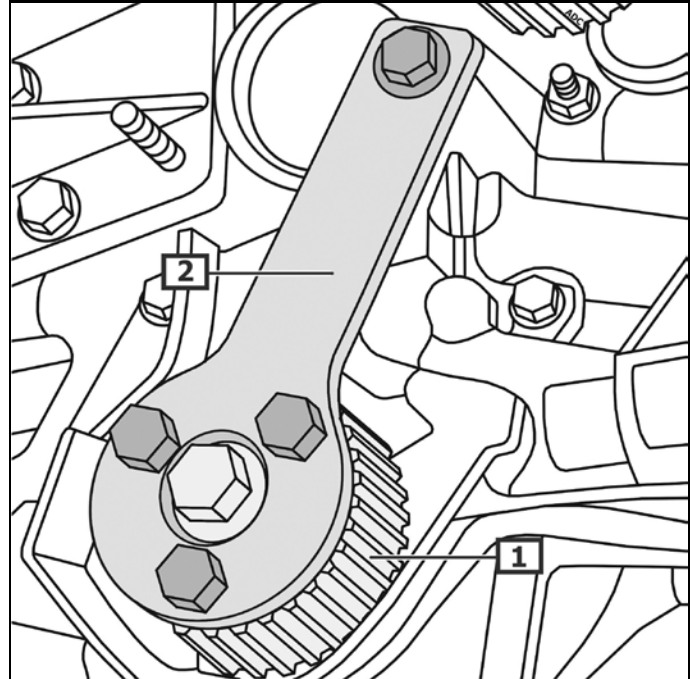
2 Adjusting tool – camshaft(s)

Insert crankshaft blocking tool. (2)

**Required special tools**

Crankshaft blocking tool (2) OE (2000004500)  
(see figure 13)

**Figure 13**

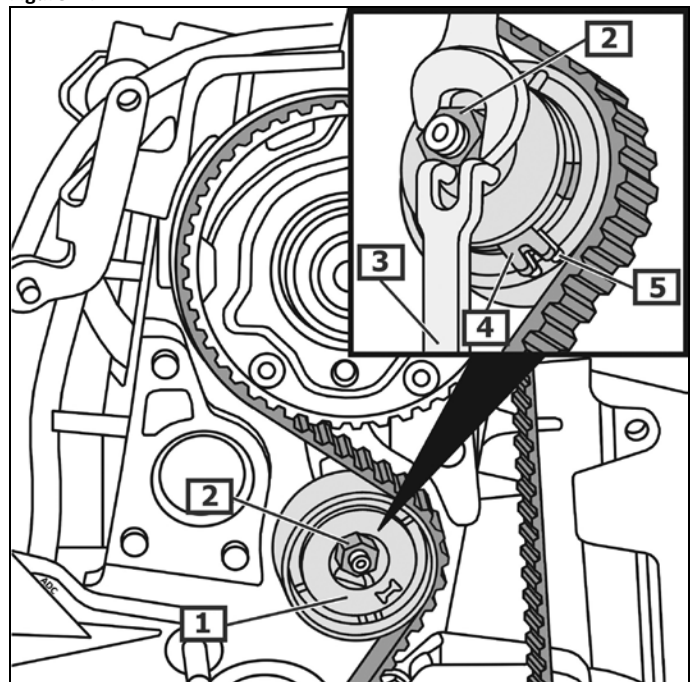


1 Crankshaft pulley

2 Crankshaft blocking tool

Loosen tensioning roller nut(s). (2)  
Release tensioning roller. (1)  
Take off toothed belt.  
(see figure 14)

**Figure 14**



1 Tensioning roller

2 Tensioning roller nut(s)

3 Tensioning spanner

4 Pointer

5 Reference mark(s)

## Install

**Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.**

Fit toothed belt.

Rotate tensioning roller anti-clockwise in the direction of the stop. **(1)**  
Tighten tensioning roller nut(s). **(2)**

### Required special tools

Tensioning spanner **(3)** OE **(1860987000)**  
**(see figure 14)**

Remove all blocking tool(s).

Turn crankshaft by two revolutions in running direction of the engine.  
Set engine to TDC cylinders 1.  
Use setting tool.  
Check engine settings.  
Remove all blocking tool(s).

Loosen tensioning roller nut(s). **(2)**  
Turn the tensioning roller anti-clockwise until the pointer aligns with the reference mark. **(1)(4)(5)**  
Tighten tensioning roller screw(s) to specified torque. **(2)**  
**(see figure 14)**

Turn crankshaft by two revolutions in running direction of the engine.  
Set engine to TDC cylinders 1.  
Use setting tool.  
Check engine settings.  
Remove all blocking tool(s).

**Continue assembly in reverse order of removal.**

Install valve cover. **(1)**  
Screw in the screw(s), but do not tighten yet. **(2)**  
Attach centring tool. **(3)**  
Tighten valve cover screw(s). **(2)**  
Remove centring tool. **(3)**

### Required special tools

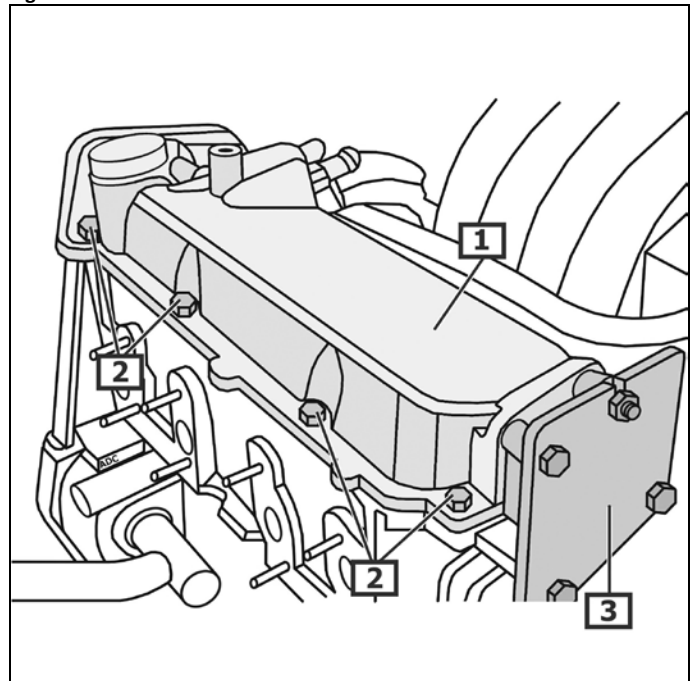
Centring tool **(3)** OE **(2000004300)**  
**(see figure 15)**

**Fit accessory drive belt.**

Start engine and check function.  
Decode radio, program volatile memories.  
Document toothed belt change.

Carry out a test drive.

**Figure 15**



1 Valve cover

2 Screw(s) – valve cover

3 Centring tool

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

## FORD Fiesta VI, 1.5 TDCi, 70 kW

**WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

**NOTE**

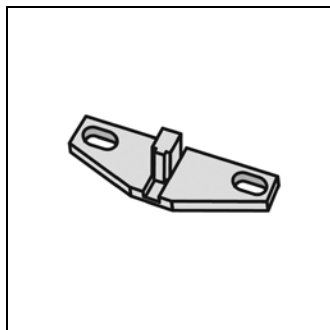
Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

When turning the camshaft, the crankshaft must not be at TDC.

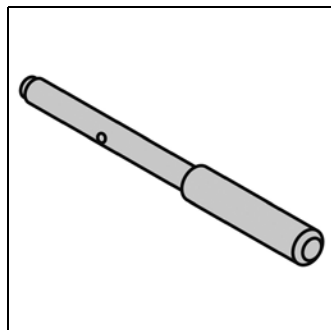
The toothed belt must not come into contact with oil or coolant!

Adjustment work on the toothed belt must only be carried out with a cold engine.

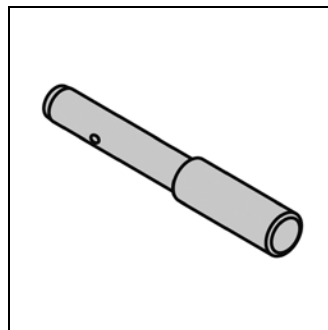
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

**Required special tools**

Flywheel blocking tool  
OE (303-393)



Crankshaft locating pin  
OE (303-732)



Camshaft(s) locating pin(s)  
OE (303-735)

**Required Labour times/torques****Scheduled times**

Replace toothed belt	2,10 h
----------------------	--------

**Tightening torques**

Self-locking screws and nuts must always be replaced.

Upper toothed belt guard screw(s) (1)	(see figure 2)		4 Nm
Vibration damper screw(s) (1)	(see figure 5)	Use new screw.	01 stage 35 Nm; 02 stage 190°
Crankshaft sensor screw(s) (3)	(see figure 5)		10 Nm
Toothed belt guard screw(s) lower (1)	(see figure 6)		5 Nm
Engine mounting (3)	(see figure 8)		on engine bracket 48 Nm; on chassis 48 Nm
Engine bracket screw(s) (4)	(see figure 8)		55 Nm
Tensioning roller screw(s) (1)	(see figure 9)	Use new screw.	30 Nm
Deflection pulley nut (2)	(see figure 10)	Use new screw.	37 Nm

## **Remove**

**Disconnect battery.**

Remove engine cover(s).

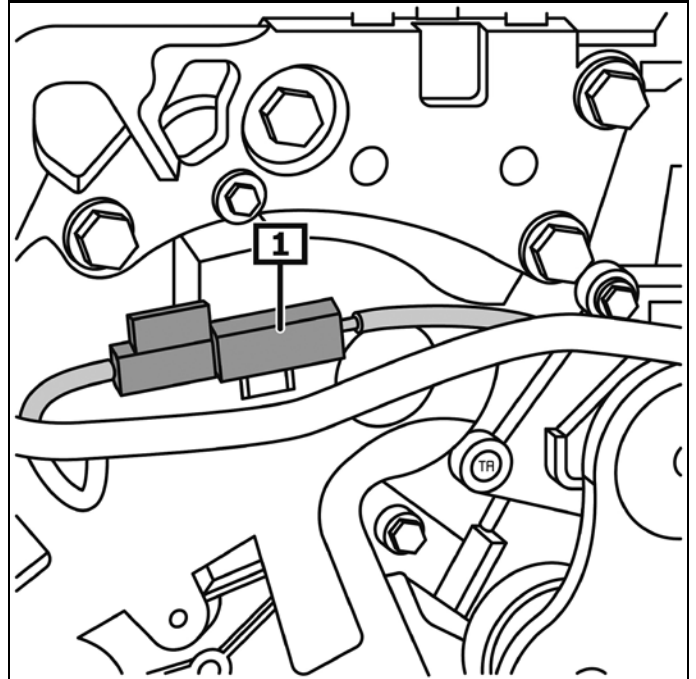
### **Lift vehicle**

Remove underide guard.

Disconnect electric plug connection(s). **(1)**  
**(see figure 1)**

Loosen coolant expansion reservoir and put it aside.  
**Lines remain connected.**

**Figure 1**

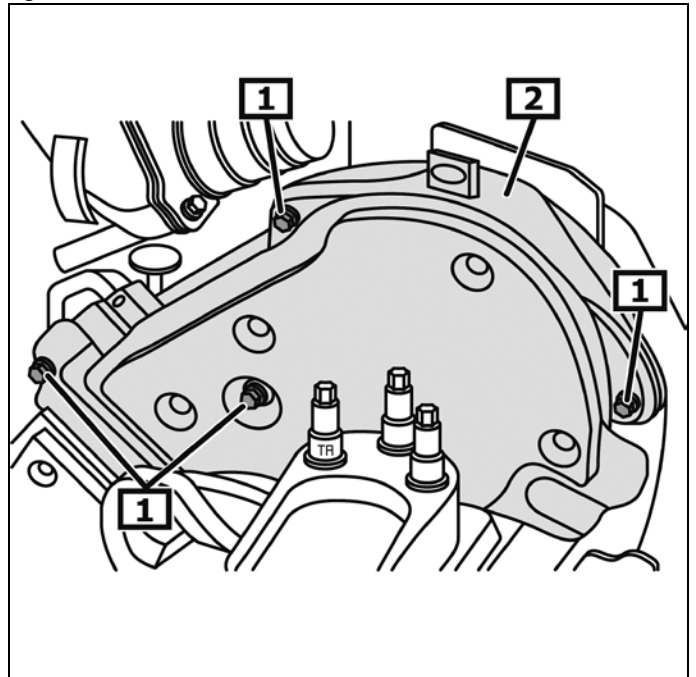


**1** Electrical plug connection

Screw(s) – unscrew top toothed belt guard **(1)**  
Remove toothed belt guard at the top. **(2)**  
**(see figure 2)**

**Remove accessory drive belt.**

**Figure 2**



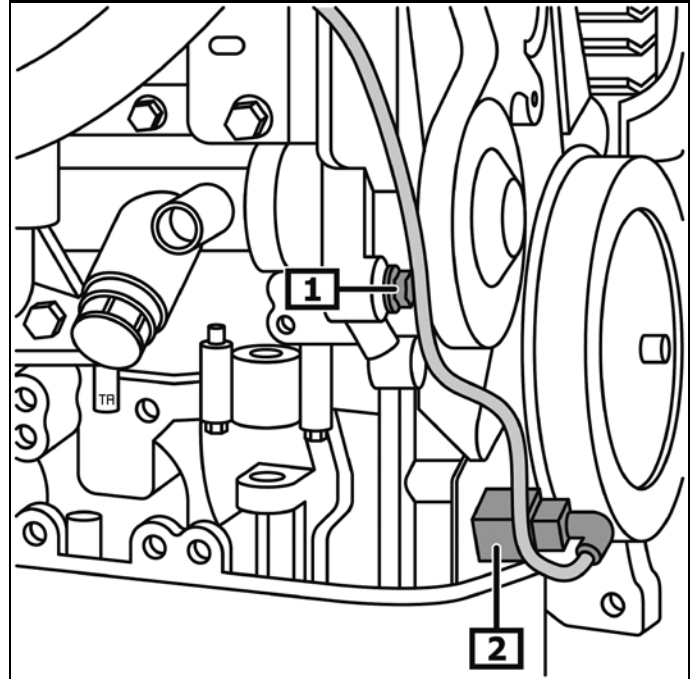
**1** Upper toothed belt guard screw(s).

**2** Toothed belt guard at the top

Remove fixing clip(s). (1)  
Disconnect the crankshaft sensor plug. (2)  
(see figure 3)

Remove starter.

Figure 3



1 Fixing clip

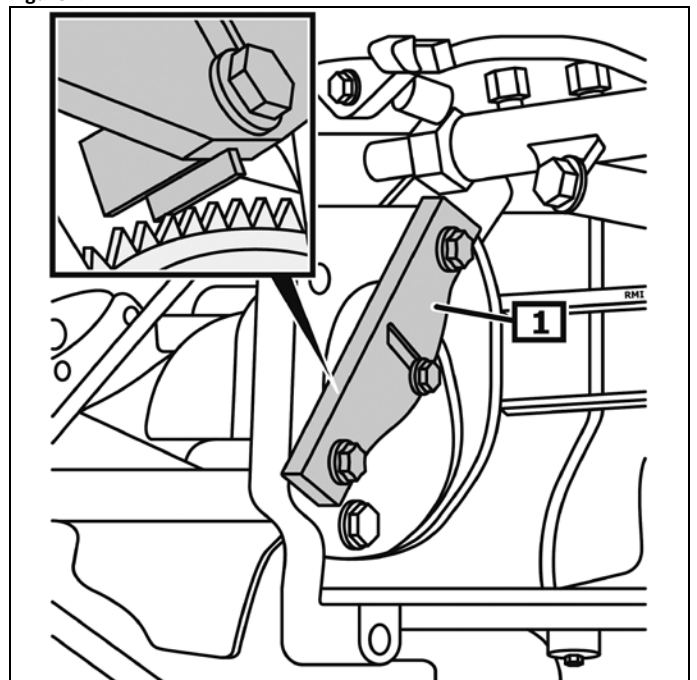
2 Plug, crankshaft sensor

Use blocking tool flywheel. (1)

**Required special tools**

Flywheel blocking tool (1) OE (303-393)  
(see figure 4)

Figure 4

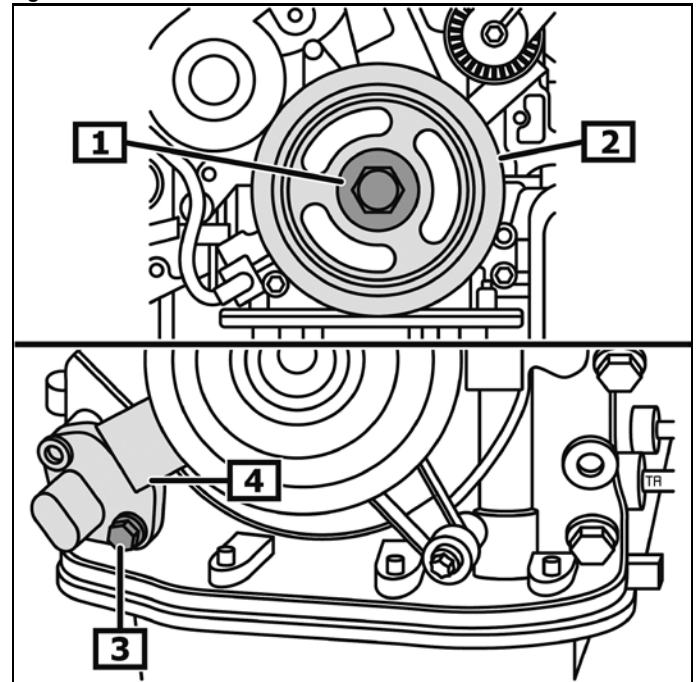


1 Flywheel blocking tool

Remove vibration damper cover.  
 Unscrew vibration damper screw(s). **(1)**  
 Remove vibration damper. **(2)**  
**(see figure 5)**

Remove flywheel blocking tool. **(1)**  
**(see figure 4)**

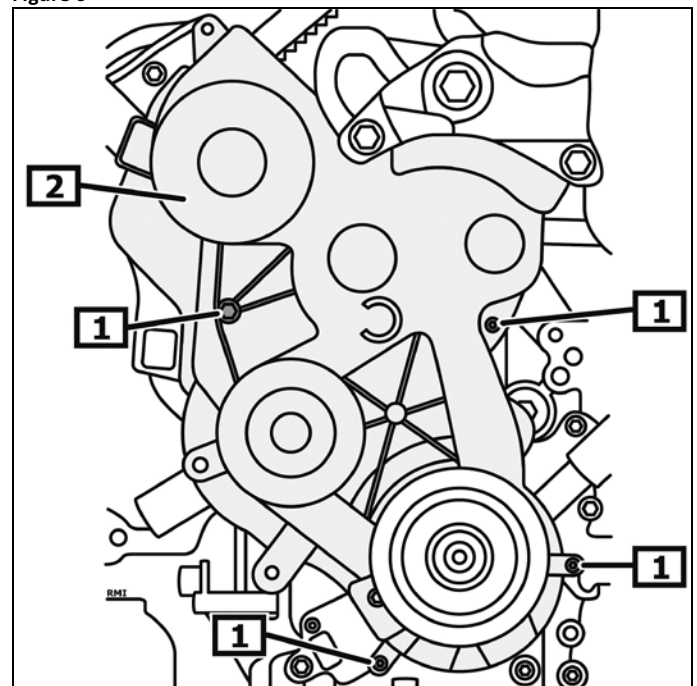
**Figure 5**



- |                              |                     |
|------------------------------|---------------------|
| 1 Vibration damper screw(s)  | 2 Vibration damper  |
| 3 Crankshaft sensor screw(s) | 4 Crankshaft sensor |

Unscrew toothed belt guard screws, bottom. **(1)**  
 Remove toothed belt guard at the bottom. **(2)**  
**(see figure 6)**

**Figure 6**



- |                                     |                                    |
|-------------------------------------|------------------------------------|
| 1 Toothed belt guard screw(s) lower | 2 Toothed belt guard at the bottom |
|-------------------------------------|------------------------------------|



**Do not damage crankshaft sensor pulse-generator wheel.**  
 Screw in vibration damper screw finger tight. **(1)**  
 Rotate engine in direction of rotation till the locking tools can be inserted.  
 Insert crankshaft locating pin. **(2)**  
 Insert camshaft(s) locating pin(s). **(3)**

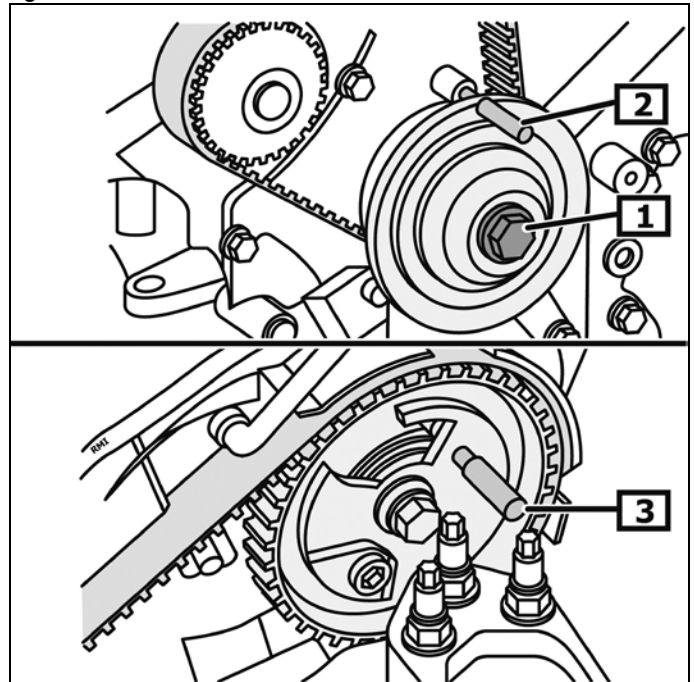
**Required special tools**  
 Crankshaft locating pin **(2)** OE **(303-732)**  
 Camshaft(s) locating pin(s) **(3)** OE **(303-735)**  
**(see figure 7)**

Unscrew and remove crankshaft sensor screw(s). **(3)**  
 Demount crankshaft sensor. **(4)**  
**(see figure 5)**

Position workshop crane with wooden block under sump.  
 Support engine with workshop car jack.

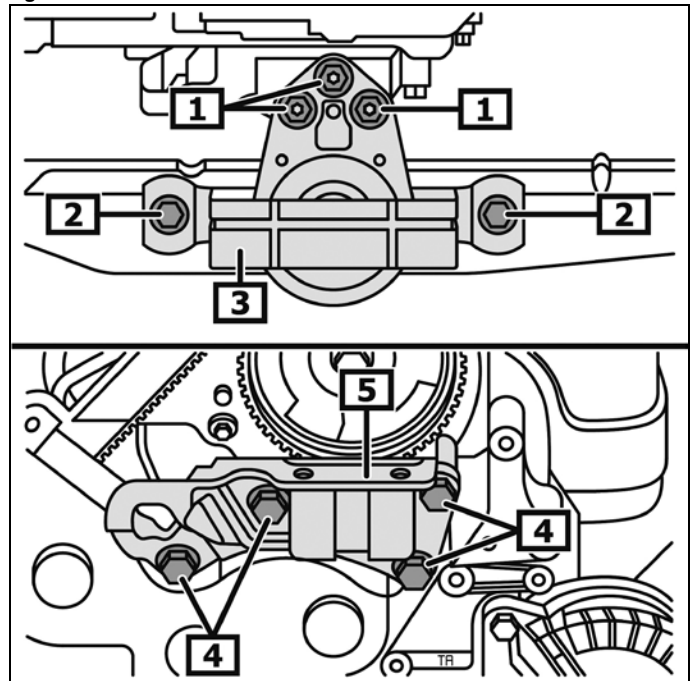
Unscrew engine mounting nut(s). **(1)**  
 Unscrew engine mounting bolt(s). **(2)**  
 Remove engine mounting. **(3)**  
 Unscrew engine bracket screw(s). **(4)**  
 Remove engine bracket. **(5)**  
**(see figure 8)**

Figure 7



- 1 Vibration damper screw(s)
- 2 Crankshaft locating pin
- 3 Camshaft(s) locating pin(s)

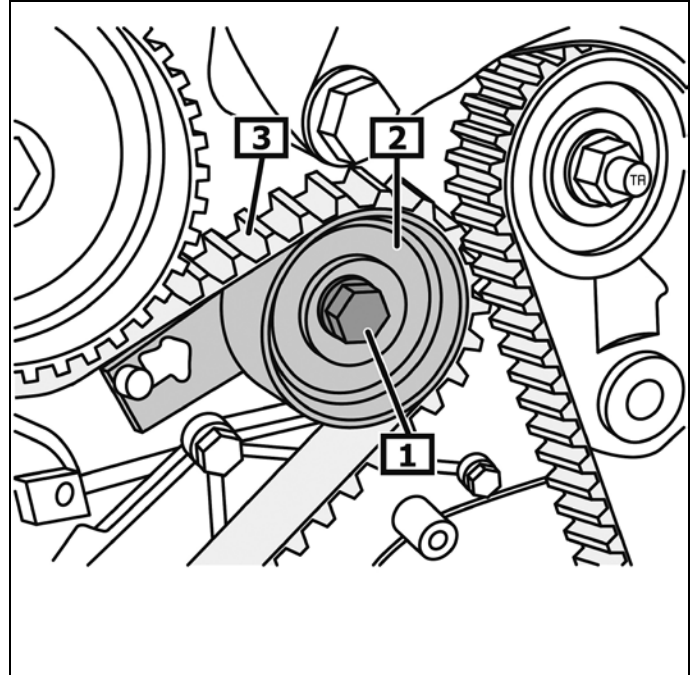
Figure 8



- 1 Engine mounting nut(s)
- 2 Engine mount screw(s)
- 3 Engine mounting
- 4 Engine bracket screw(s)
- 5 Engine bracket

Slacken tensioning roller screw(s) by one turn. **(1)**  
 Take off toothed belt. **(3)**  
 Unscrew and remove tensioning roller screw. **(1)**  
 Remove the toothed belt tensioning roller. **(2)**  
**(see figure 9)**

**Figure 9**



1 Tensioning roller screw

2 Toothed belt tensioning roller

3 Toothed belt

Unscrew deflection pulley nut. **(2)**  
 Remove the toothed belt deflection pulley. **(3)**  
**(see figure 10)**

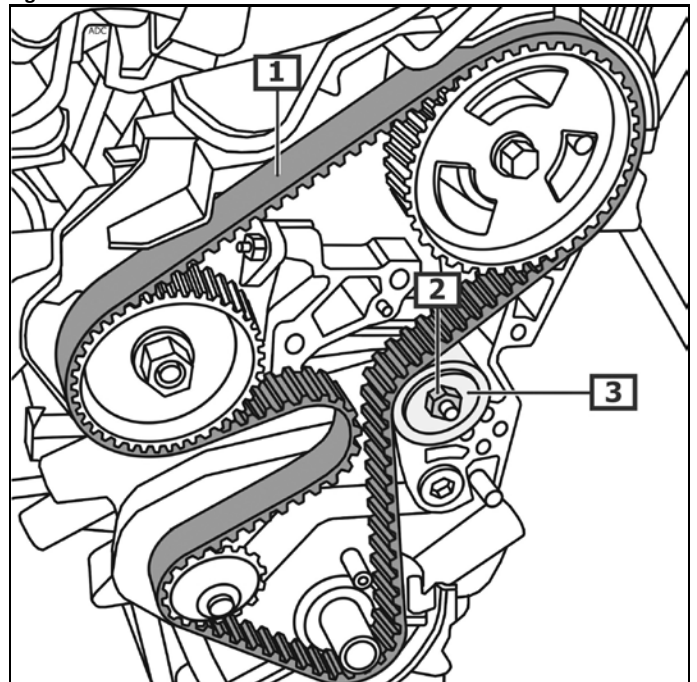
## **Install**

**Install new tensioning roller and deflection pulley(s).**

Install toothed belt deflection pulley. **(3)**  
 Tighten deflection pulley screw(s). **(2)**  
**(see figure 10)**

Install tension roller for toothed belt. **(2)**  
 Retighten firmly the tightening disc screw(s). **(1)**  
**(see figure 9)**

**Figure 10**



1 Toothed belt

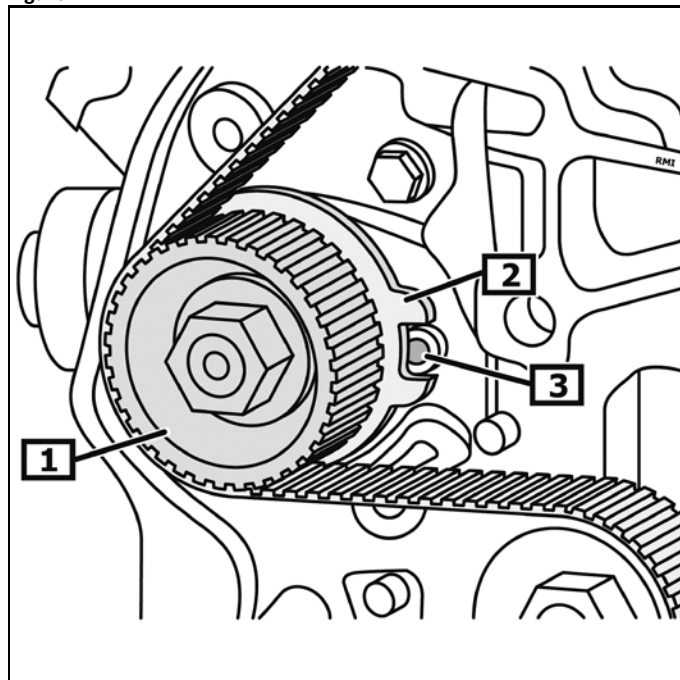
2 Deflection pulley nut

3 Toothed belt deflection pulley

High-pressure pump impeller must allow being pinned using a drill bit with  $\varnothing$  5 mm. (1) - (3)  
(see figure 11)

Fit toothed belt to crankshaft pulley starting anti-clockwise. (1)  
(see figure 10)

**Figure 11**



1 High-pressure pump pulley

2 Cut-out(s)

3 Bore

Turn tensioning roller eccentric anti-clockwise using an Allen key until the indicator stops in the middle of the rectangular recess. (1) - (4)  
Tighten tensioning roller screw(s). (5)  
Hold eccentric while retightening the tensioning roller using an Allen key. (1)(2)  
(see figure 12)

Install engine bracket. (5)  
Tighten engine bracket screw(s). (4)  
Install engine mounting. (3)  
Tighten engine-bearing nut(s). (1)  
Tighten engine mounting bolt(s). (2)  
(see figure 8)

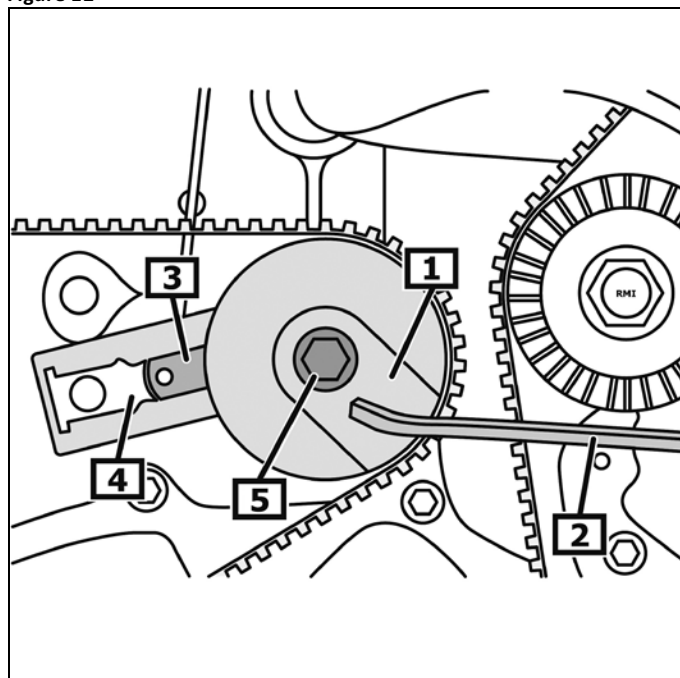
Remove jack.

Remove crankshaft locating pin. (2)  
Remove camshaft(s) locating pin(s). (3)  
(see figure 7)

Remove drill.  
(see figure 11)

Install crankshaft sensor. (4)  
Tighten crankshaft sensor screw. (3)  
(see figure 5)

**Figure 12**



1 Tensioning roller eccentric

2 Allen key

3 Pointer

4 Cut-out(s)

5 Tensioning roller screw

## **Check engine timing**

**Adjust valve timing if fixing tools cannot be inserted.  
There can be engine failure with wrong engine timing!**

Rotate engine ten times in the direction of engine revolutions.

Insert crankshaft locating pin. **(2)**  
Insert camshaft(s) locating pin(s). **(3)**  
**(see figure 7)**

High-pressure pump impeller must allow being pinned using a drill bit with  $\varnothing$  5 mm. **(1) - (3)**  
**(see figure 11)**

## **When engine timings check**

Remove camshaft(s) locating pin(s). **(3)**  
Remove crankshaft locating pin. **(2)**  
Unscrew vibration damper screw(s). **(1)**  
Discard screw(s). **(1)**  
**(see figure 7)**

**Continue assembly in reverse order of removal.**

**Install the starter.**

**Fit accessory drive belt.**

**Connect battery.**

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

### FORD Focus II (DA\_, HCP), 1.8 TDCi, 85 kW



#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

Do not use camshaft retainers as a support while removing or attaching the camshaft pulley.

When turning the camshaft, the crankshaft must not be at TDC.

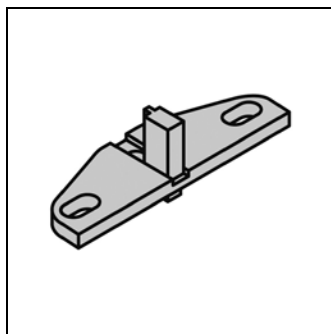
The toothed belt must not come into contact with oil or coolant!

Adjustment work on the toothed belt must only be carried out with a cold engine.

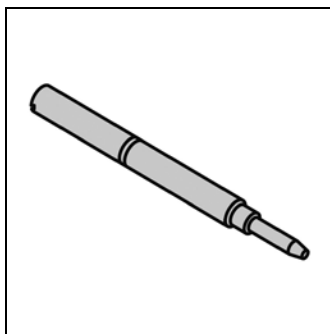
Note radio code.

It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

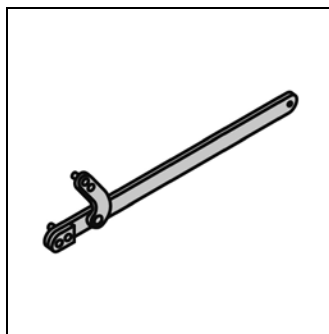
#### **Required special tools**



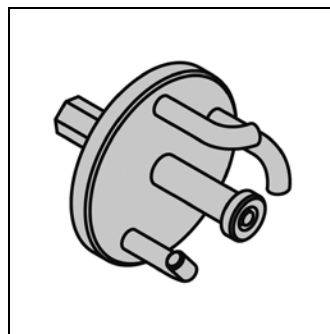
Flywheel blocking tool  
OE (303-393A)



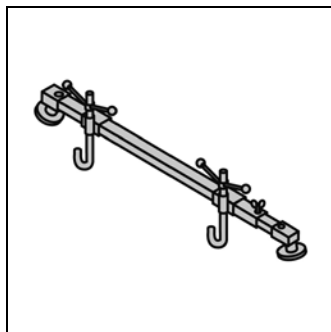
Crankshaft locating pin  
OE (303-193)



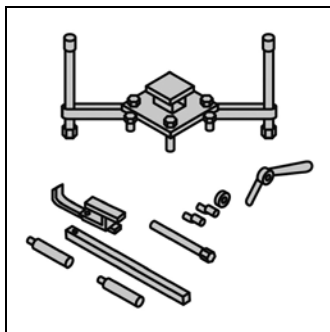
Counter support  
OE (205-072)



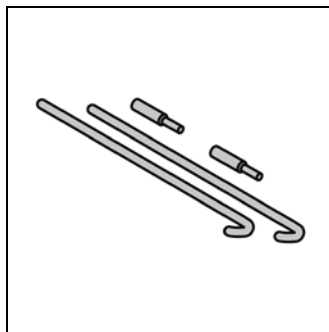
Heavy-duty puller  
OE (303-651)



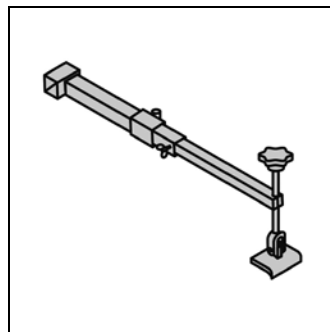
Engine bridge  
OE (303-290B)



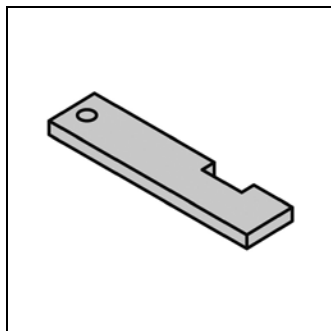
Engine support extension set  
OE (303-290A-15)



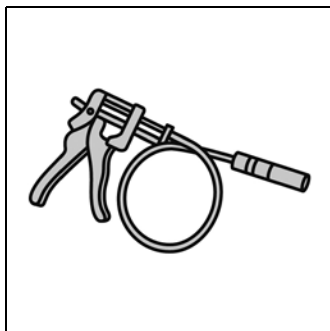
Engine support extension set  
OE (303-290-13)



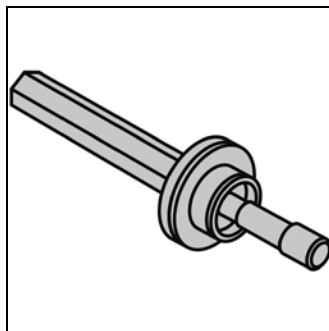
Engine bridge additional support  
OE (303-290-03A)



Camshaft(s) locking tool  
OE (303-376)



Spring clamp pliers with Bowden cable  
OE (303-397)



Centring tool  
OE (303-652)

## Required Labour times/torques

### Scheduled times

Replace toothed belt	up to 2007/12 2,40 h
Replace the timing chain.	up to 2007/12 3,60 h
Replace toothed belt at the top	from 2008/01 2,40 h
Replace toothed belt at the bottom	from 2008/01 3,70 h <sup>(2)</sup>

<sup>(2)</sup>Reference value

### Tightening torques

Self-locking screws and nuts must always be replaced.

Starter screw(s) (1)	(see figure 5)		35 Nm
Engine mounting (3)	(see figure 8)		on engine bracket 80 Nm; on chassis 48 Nm
Engine bracket (4)	(see figure 8)		on the engine block 28 Nm; Stud bolt 13 Nm
Tensioning roller screw(s) (1)	(see figure 10)		50 Nm
Camshaft pulley bolt(s) (4)	(see figure 10)		50 Nm
Bolt(s), high-pressure pump impeller (1)	(see figure 11)	Apply sealing compound.	42 Nm
Timing case cover (1)	(see figure 14)	Replace seal(s).	M6 10 Nm; M8 23 Nm
High-pressure pump drive chain chain tensioner (1)	(see figure 15)		65 Nm
High-pressure pump drive wheel screw(s) (2)	(see figure 15) (see figure 16)		24 Nm
Toothed belt tightener (1)	(see figure 16)		65 Nm
Coolant pump pulley			23 Nm
Vibration damper		Use new screw(s)	01 stage 100 Nm; 02 stage 180°
Valve cover			5 Nm
Toothed belt guard			7 Nm

## Remove

**Disconnect battery (negative terminal).**

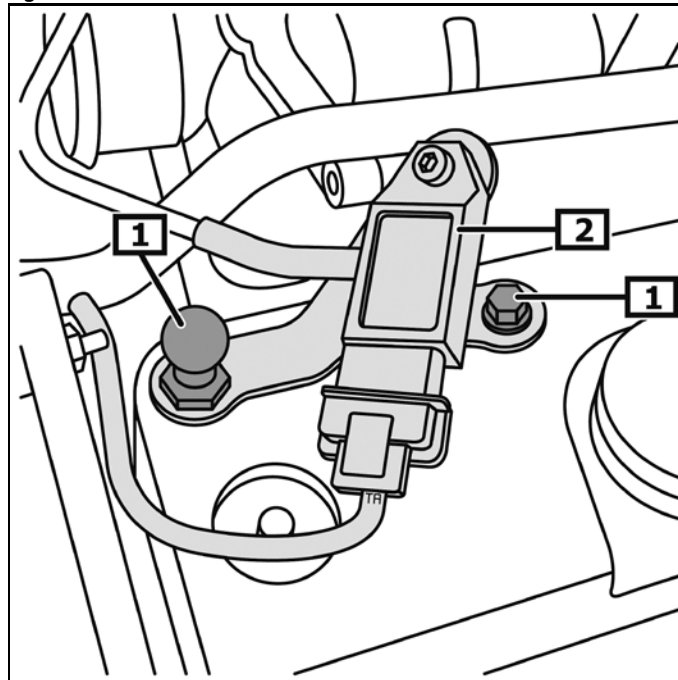
Remove engine cover(s).

Unscrew screw(s). **(1)**

Put charge-air pressure aside. **(2)**

**(see figure 1)**

**Figure 1**



1 Screw(s)

2 Charge air pressure sensor

Remove fuel line(s). **(1)**

Disconnect the crankcase ventilation hoses from the valve cover. **(2)**

**(3)**

Disconnect camshaft sensor plug. **(4)**

### Required special tools

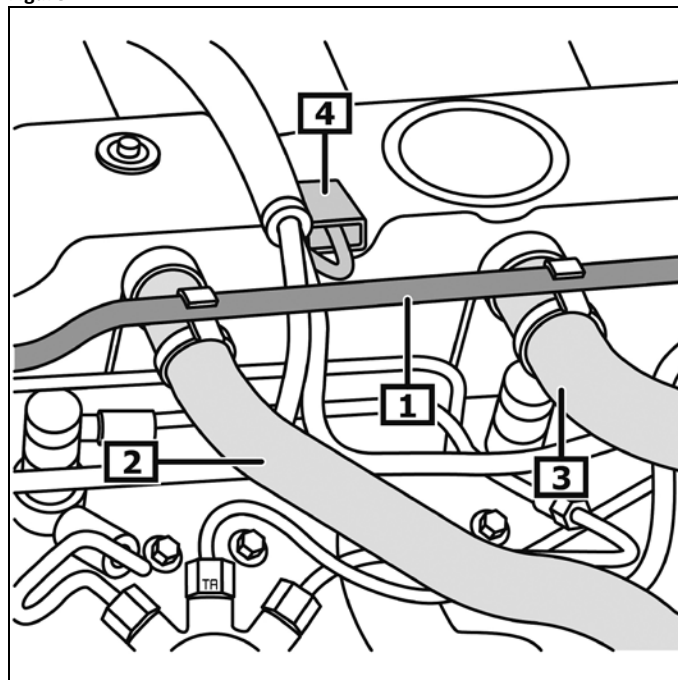
Spring clamp pliers with Bowden cable **OE (303-397)**

**(see figure 2)**

Bolt(s) - unscrew and remove valve cover.

Remove valve cover.

**Figure 2**



1 Fuel line

2 Hose - crankcase ventilation

3 Hose - crankcase ventilation

4 Camshaft position sensor plug

Dismantle crankcase vent hoses from oil separator.

Unscrew and remove oil separator screws. **(1)**

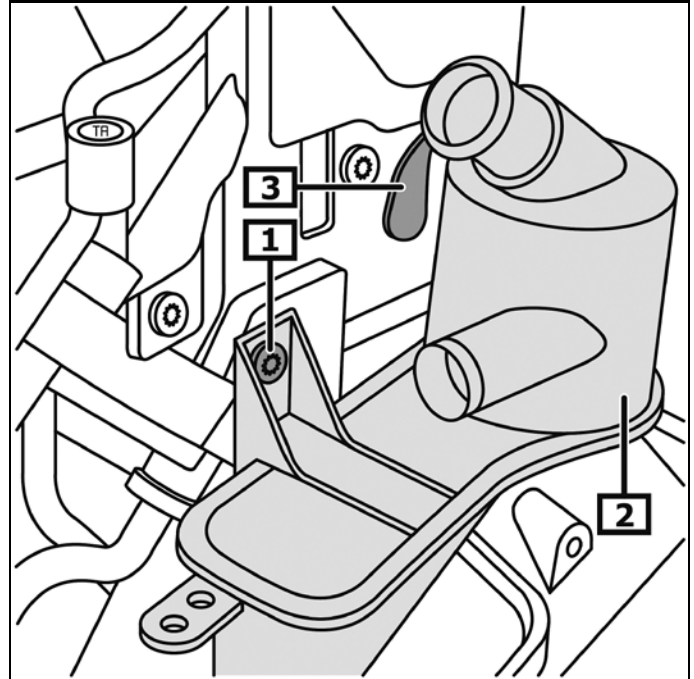
Remove oil separator. **(2)**

**(see figure 3)**

Loosen coolant expansion reservoir and put it aside.

**Lines remain connected.**

**Figure 3**



1 Oil separator screws

2 Oil separator

3 Retaining bracket

Remove fixing clip(s). **(1)**

Unscrew and remove charge-air tube(s) nut(s). **(Arrow)**

Disconnect charge pressure sensor plug. **(2)**

Remove the hose clamp(s). **(3)**

Remove charge air pipe(s). **(4)**

**(see figure 4)**

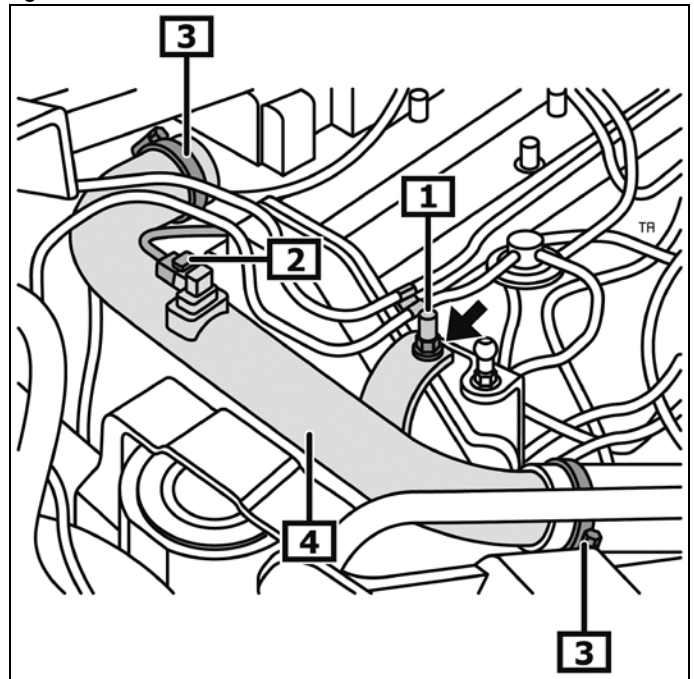
Clean the immediate area around the components.

Remove fuel filter housing

Set crankshaft to 5° before TDC.

**Remove accessory drive belt.**

**Figure 4**



1 Fixing clip(s)

2 Charge pressure sensor plug

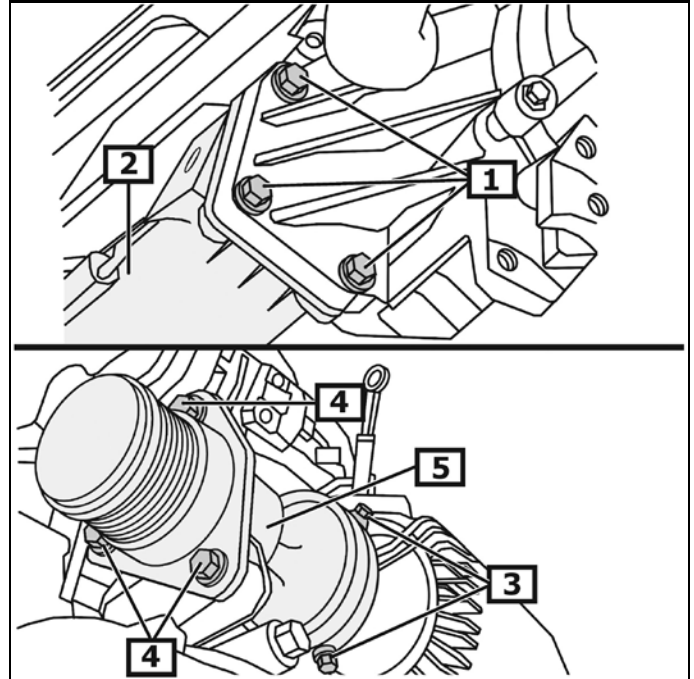
3 Hose clamp(s)

4 Charge air pipe(s)



Unscrew starter screw(s). **(1)**  
 Remove starter and fasten laterally to car body. **(2)**  
 Unscrew vibration damper screw(s). **(3)**  
 Unscrew intermediate bearing screw(s). **(4)**  
 Remove alternator drive shaft. **(5)**  
**(see figure 5)**

**Figure 5**



- |                             |                                 |
|-----------------------------|---------------------------------|
| 1 Starter screw(s)          | 2 Starter                       |
| 3 Vibration damper screw(s) | 4 Intermediate bearing screw(s) |
| 5 Alternator drive shaft    |                                 |

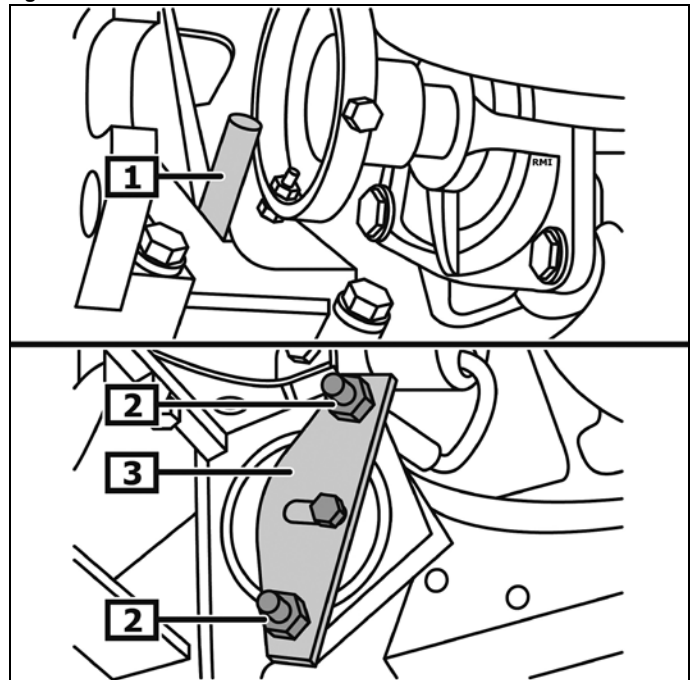
**The crankshaft locating pin locks the crankshaft in engine running direction.**

Remove stopper on engine block.  
 Insert crankshaft locating pin. **(1)**  
 Slowly rotate crankshaft in direction of engine rotation until crankshaft comes into contact with the crankshaft locating pin.  
 Use blocking tool flywheel. **(3)**

**Required special tools**

Crankshaft locating pin **(1)** OE (303-193)  
 Flywheel blocking tool **(2)** OE (303-393)  
**(see figure 6)**

**Figure 6**



- |                           |          |
|---------------------------|----------|
| 1 Crankshaft locating pin | 2 Nut(s) |
| 3 Flywheel blocking tool  |          |

Attach engine arresting device under the engine. (1) - (4)

**Required special tools**

Engine bridge (1) OE (303-290B)

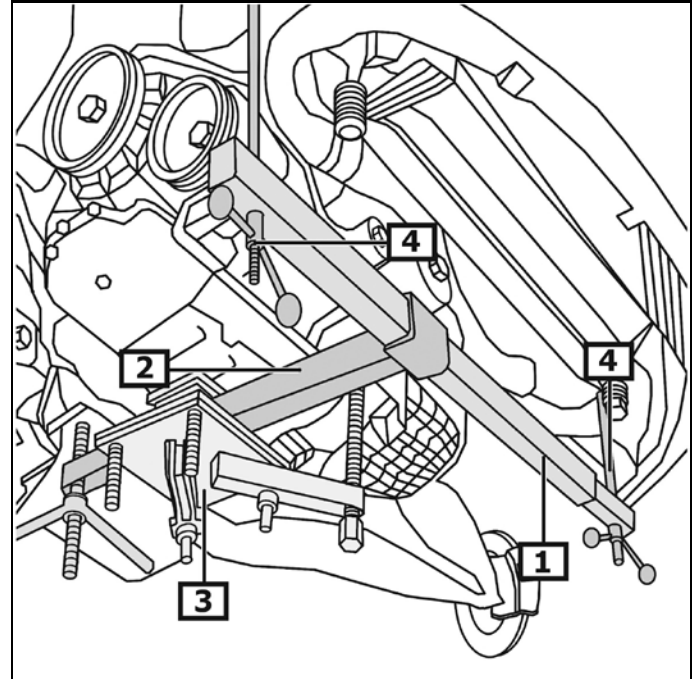
Engine bridge additional support (2) OE (303-290-03A)

Engine support extension set (3) OE (303-290-13)

Engine support extension set (4) OE (303-290A-15)

(see figure 7)

**Figure 7**



1 Engine bridge

2 Engine bridge additional support

3 Engine support extension set

4 Engine support extension set

Remove engine mounting nut(s). (1)

Unscrew engine mounting bolt(s). (2)

Remove engine mounting. (3)

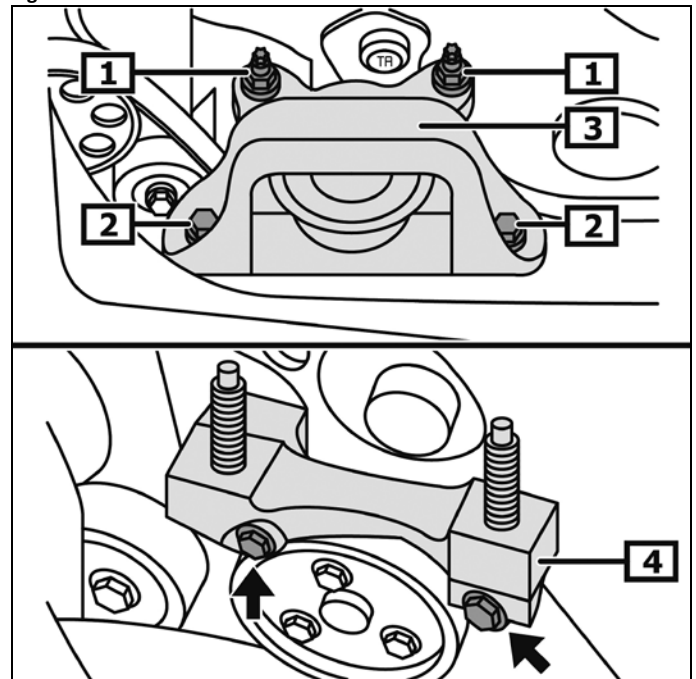
Unscrew engine bracket screw(s). (Arrows)

Remove engine bracket. (4)

(see figure 8)

Remove toothed belt guard.

**Figure 8**



1 Engine mounting nut(s)

2 Engine mount screw(s)

3 Engine mounting

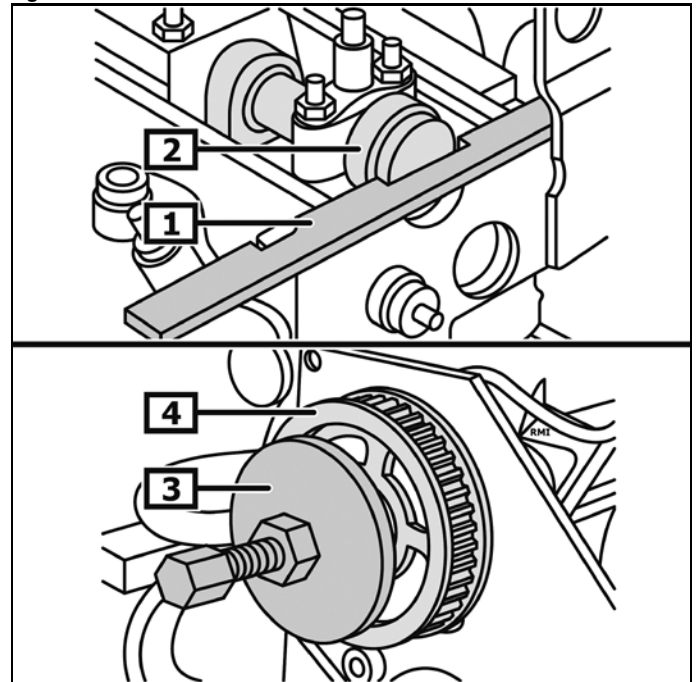
4 Engine bracket

Insert camshaft(s) locking tool. (1)

**Required special tools**

Camshaft(s) locking tool (1) OE (303-376)  
(see figure 9)

Figure 9



1 Camshaft(s) locking tool

2 Camshaft(s)

3 Heavy-duty puller

4 Camshaft timing gear

Unscrew and remove tensioning roller screw. (1)  
Remove the toothed belt tensioning roller. (2)  
Take off toothed belt.  
Position counter support. (3)  
Loosen camshaft screw(s) by about 5 revolutions. (4)

**Required special tools**

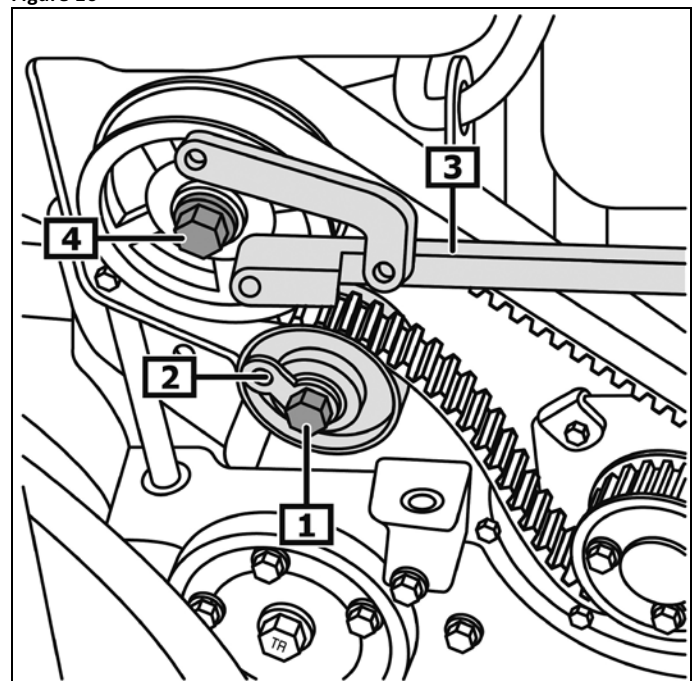
Counter support (3) OE (205-072)  
(see figure 10)

Unscrew camshaft pulley from camshaft cone using suitable tool. (3)  
(4)  
Do not completely remove camshaft pulley. (4)

**Required special tools**

Heavy-duty puller (3) OE (303-651)  
(see figure 9)

Figure 10



1 Tensioning roller screw

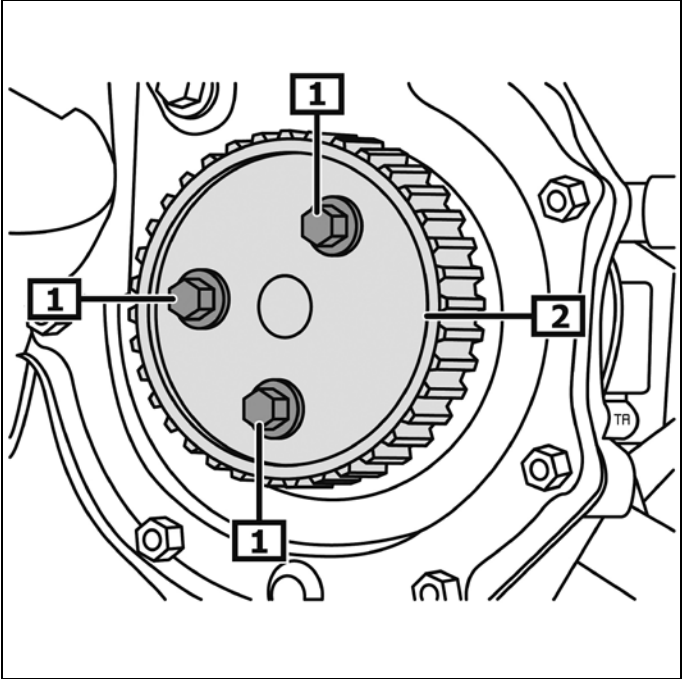
2 Toothed belt tensioning roller

3 Counter support

4 Camshaft pulley bolt(s)

Unscrew high-pressure pump impeller screw(s). **(1)**  
 Remove high-pressure pump impeller. **(2)**  
 Remove remains of sealant.  
**(see figure 11)**

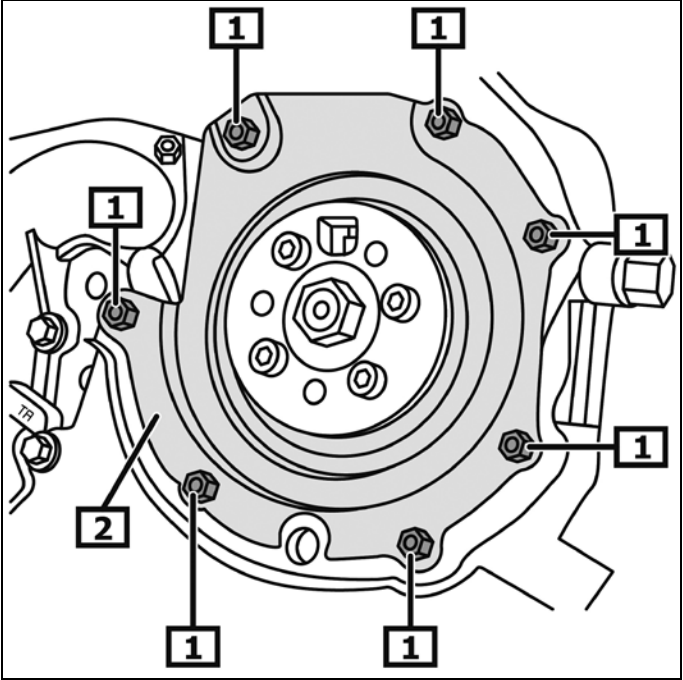
**Figure 11**



1 Bolt(s), high-pressure pump impeller      2 High-pressure pump pulley

Unscrew nut(s). **(1)**  
 Remove seal. **(2)**  
**(see figure 12)**

**Figure 12**



1 Nut(s)      2 Seal

Unscrew and remove toothed-belt protection screw(s) at the rear. (1)  
Remove rear toothed belt guard. (2)  
(see figure 13)

Remove coolant pump pulley.

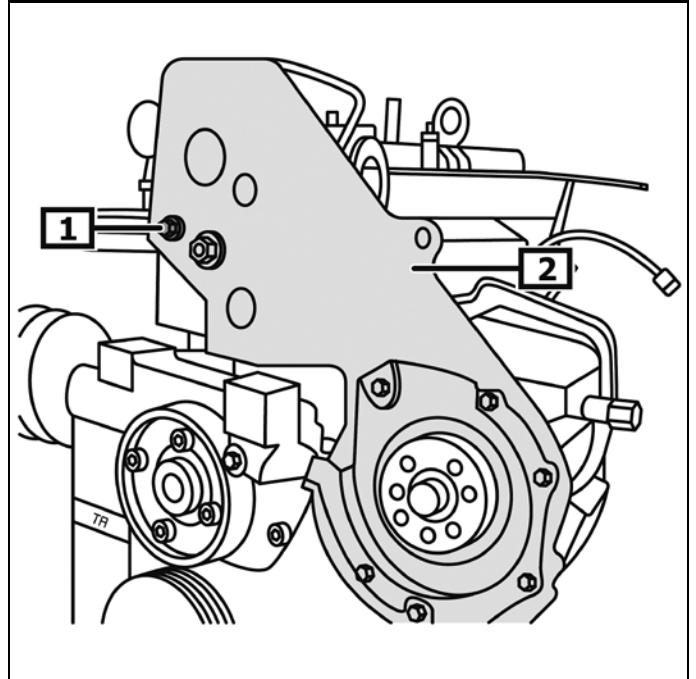
**Required special tools**

Counter support OE (205-072)

Remove vibration damper.

Remove coolant pump. (If required)

**Figure 13**

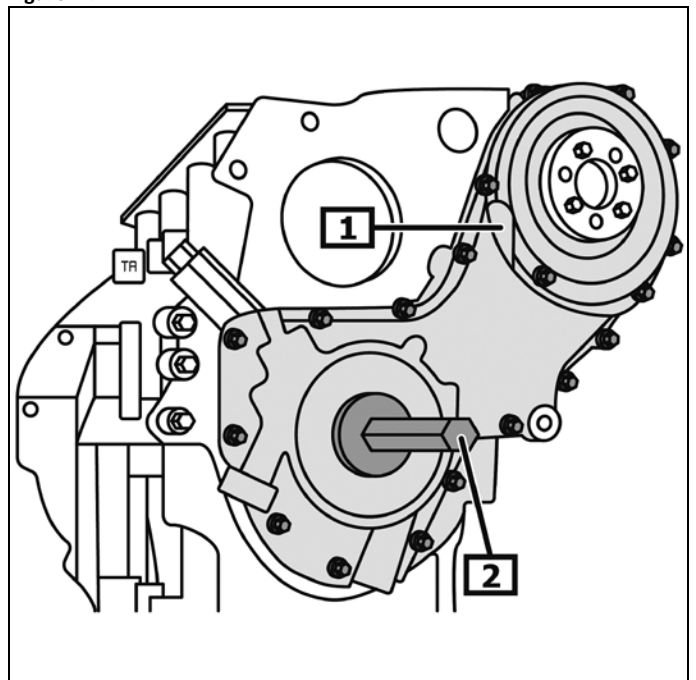


1 Screw(s) – rear toothed belt guard

2 Toothed belt guard, rear

Remove housing cover of control unit. (1)  
(see figure 14)

**Figure 14**



1 Timing case cover

2 Centring tool

**up to 2007/12**

Remove the chain-tensioner. **(1)**

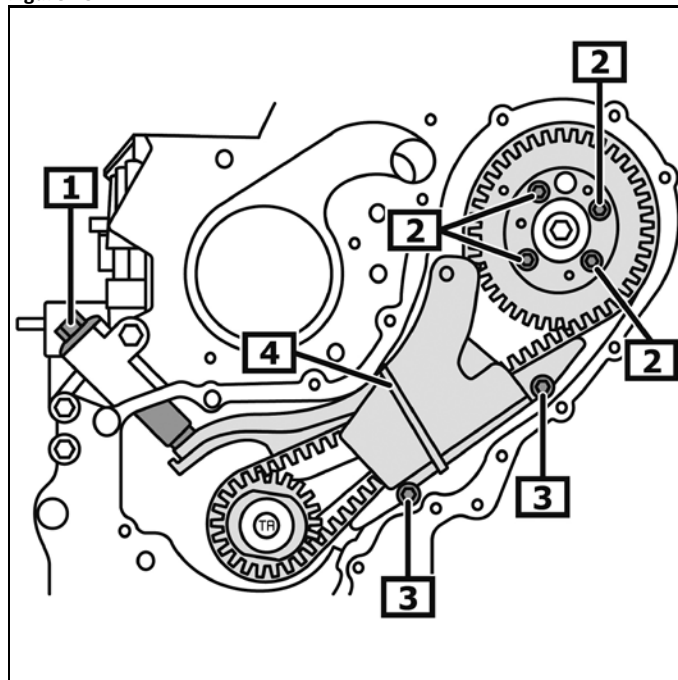
Unscrew and remove high pressure pump drive wheel screw(s). **(2)**

Unscrew and remove guide rail(s) screw(s). **(3)**

Remove timing chain together with the sprocket wheels and guide rails. **(4)**

(see figure 15)

**Figure 15**



1 High-pressure pump drive chain chain tensioner

2 High-pressure pump drive wheel screw(s)

3 Guide rail(s) screw(s)

4 High-pressure pump timing chain

**from 2008/01**

Remove toothed belt tensioner. **(1)**

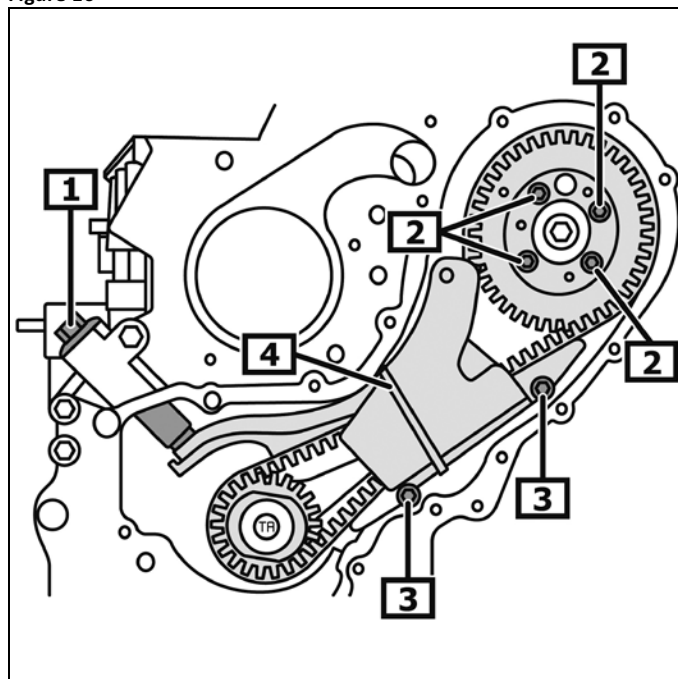
Unscrew and remove high pressure pump drive wheel screw(s). **(2)**

Unscrew and remove guide rail(s) screw(s). **(3)**

Remove toothed belts together with the timing belt sprockets and the guide rails. **(4)**

(see figure 16)

**Figure 16**



1 Toothed belt tightener

2 High-pressure pump drive wheel screw(s)

3 Guide rail(s) screw(s)

4 High pressure pump toothed belt

**Install**

Installation in reverse order of removal.

Install control unit housing. **(1)**

**Required special tools**

Centring tool **(2)** OE (303-652)

(see figure 14)

Continue assembly in reverse order of removal.

**Use only toothed belts approved by the manufacturer.**  
**Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.**

Set the tensioning roller to installation position and tighten the screw manually.

Set eccentric hexagonal opening to 3 o'clock position. **(4)**

Fit toothed belt.

Tighten the camshaft pulley until it can still just be turned without tilting onto the cone.

Turn tensioning roller eccentric anti-clockwise using an Allen key until the indicator stops in the middle of the rectangular recess. **(3)(4)**

**(see figure 17)**

Tighten tensioning roller screw(s).

Hold eccentric while retightening the tensioning roller using an Allen key.

Tighten camshaft pulley screw(s).

Remove camshaft(s) locking tool. **(1)**

**(see figure 9)**

Remove flywheel blocking tool. **(3)**

Remove crankshaft locating pin. **(1)**

**(see figure 6)**

Rotate crankshaft by six turns in direction of engine.

Set camshaft to OT cylinder 1.

Insert crankshaft locating pin. **(1)**

Slowly rotate crankshaft in direction of engine rotation until crankshaft comes into contact with the crankshaft locating pin.

Use blocking tool flywheel. **(3)**

**(see figure 6)**

Check the position of tensioning roller indicator. **(3)(4)**

If the indicator is not in the middle of the recess, repeat the setting.

**(see figure 11)**

Insert camshaft(s) locking tool. **(1)**

If camshaft scale cannot be inserted, repeat setting.

**(see figure 9)**

#### **When engine timings check**

Remove camshaft(s) locking tool.

Remove crankshaft locating pin.

**Continue assembly in reverse order of removal.**

Ensure correct retaining bracket(s) seating. **(3)**

**(see figure 3)**

**Fit accessory drive belt.**

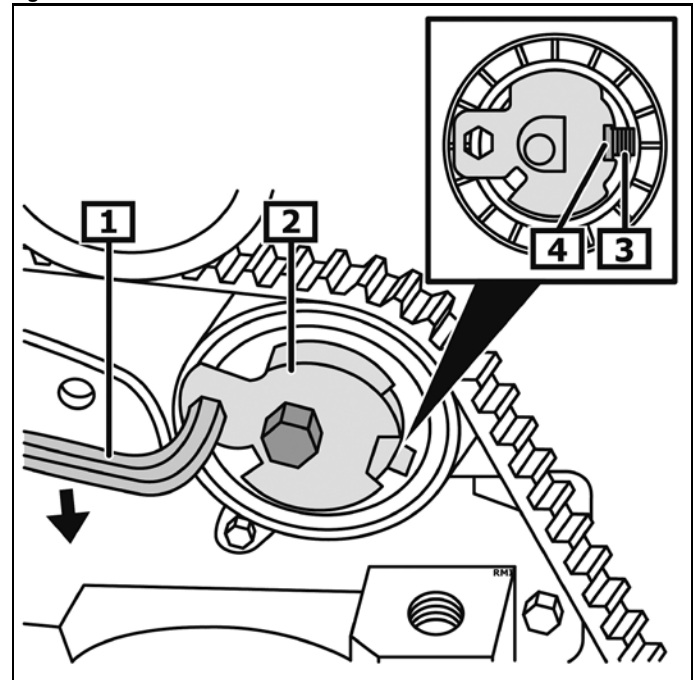
**Connect battery negative pole.**

Start engine and check function.

Carry out a test drive.

Document toothed belt change.

**Figure 17**



1 Allen key

2 Eccentric

3 Pointer

4 Recess

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

## Remove/install timing belt

### HYUNDAI i10 (PA), 1.1, 51 kW with tensioning roller eccentric



#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

The toothed belt must not come into contact with oil or coolant!

Adjustment work on the toothed belt must only be carried out with a cold engine.

Note radio code. Disconnect battery (negative terminal).

It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

#### **Required Labour times/torques**

##### **Scheduled times**

Replace toothed belt	1,90 h
----------------------	--------

##### **Tightening torques**

Self-locking screws and nuts must always be replaced.

Engine mounting (1)(2)	(see figure 1)	49 - 64 Nm
Crankshaft central screw (2)	(see figure 3)	01 stage 49 Nm; 02 stage 50°
Tensioning roller screw (1)	(see figure 5)	22 - 29 Nm
Crankshaft sensor screw(s) (3)	(see figure 5)	8 - 10 Nm
Toothed belt guard		10 - 12 Nm
Wheel attachment		90 - 110 Nm



## **Remove**

Remove spoiler trim.  
Remove cowl paneling.  
Remove windshield wiper motor.  
Remove the right front wheel.  
Remove wheel arch liner(s).  
Remove underbody panelling front right.  
Support engine with workshop car jack.

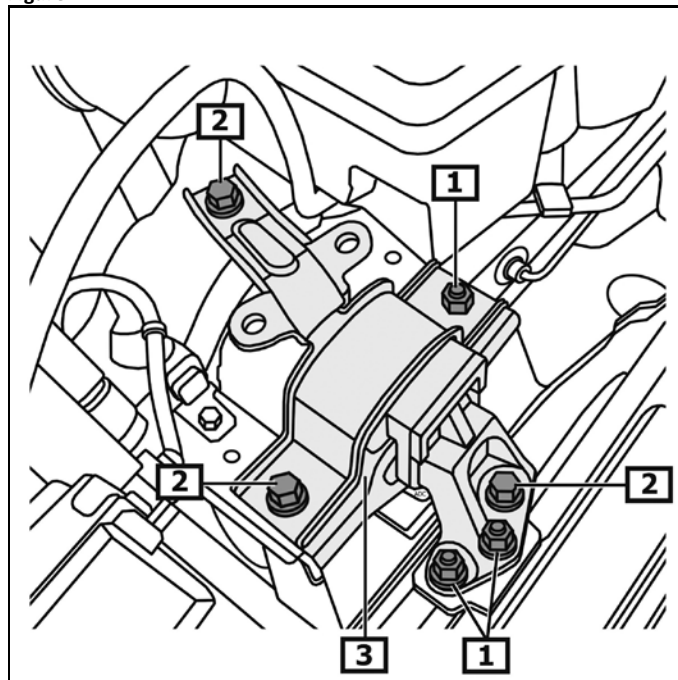
Unscrew engine mounting nut(s). **(1)**  
Unscrew and remove engine mount screw(s). **(2)**  
Remove engine mounting. **(3)**  
**(see figure 1)**

### **Remove accessory drive belt.**

Unscrew and remove coolant pump pulley screw(s).  
Remove coolant pump pulley.  
Remove dipstick.  
Remove toothed belt guard at the top.

Set camshaft to OT cylinder 1.  
Marks must align. **(1)(2)**  
**(see figure 2)**

**Figure 1**

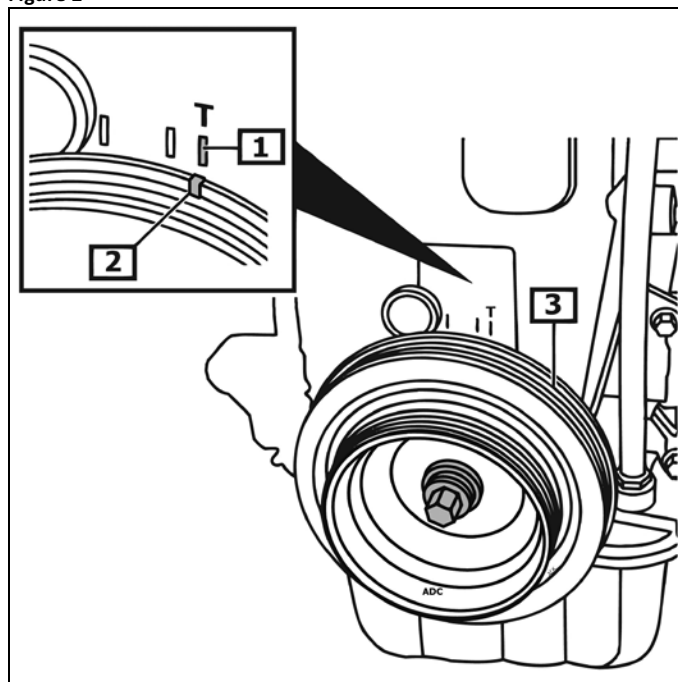


1 Engine mounting nut(s)

2 Engine mount screw(s)

3 Engine mounting

**Figure 2**



1 Reference mark(s)

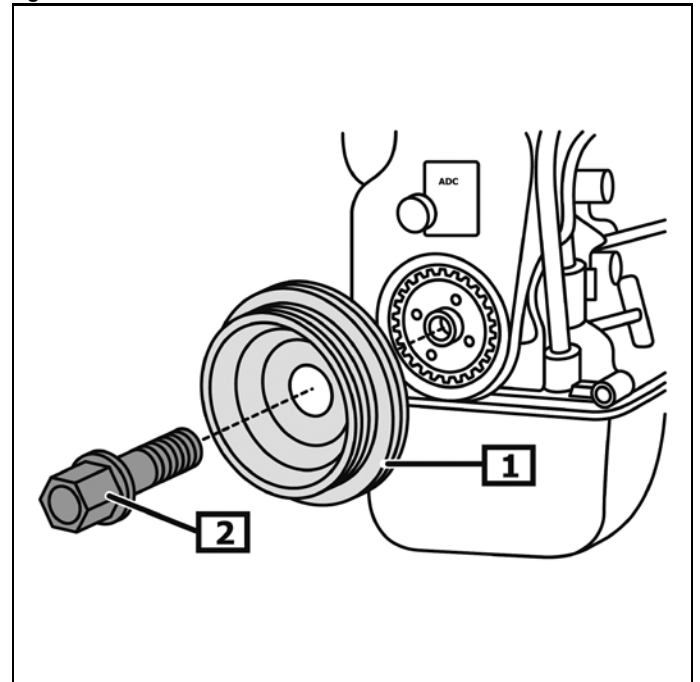
2 TDC marking(s)

3 Crankshaft pulley

Unscrew the central crankshaft screw. **(2)**  
Remove crankshaft pulley. **(1)**  
**(see figure 3)**

Remove the lower toothed belt cover.

**Figure 3**



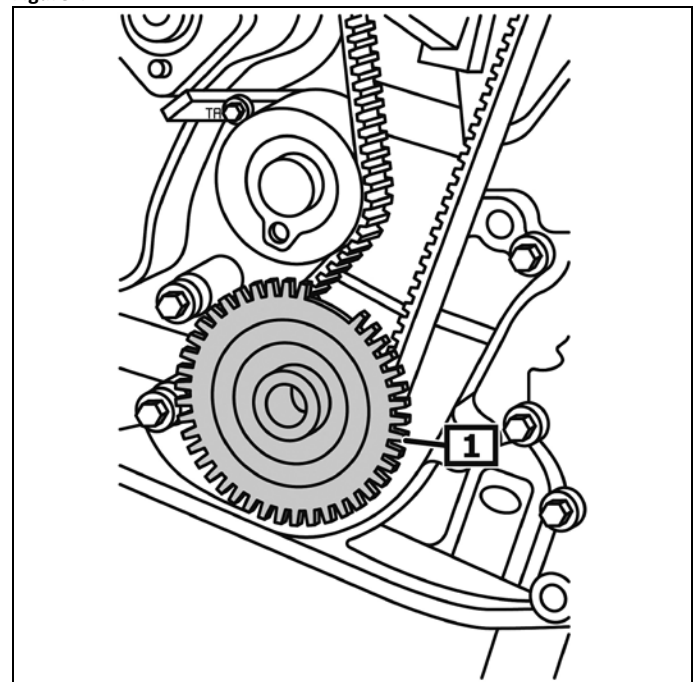
1 Crankshaft pulley

2 Crankshaft central screw

Remove crankshaft sensor wheel. **(1)**  
**(see figure 4)**

Set engine to TDC cylinders 1. Marks must align. **(1)(2)**  
**(see figure 6)**

**Figure 4**



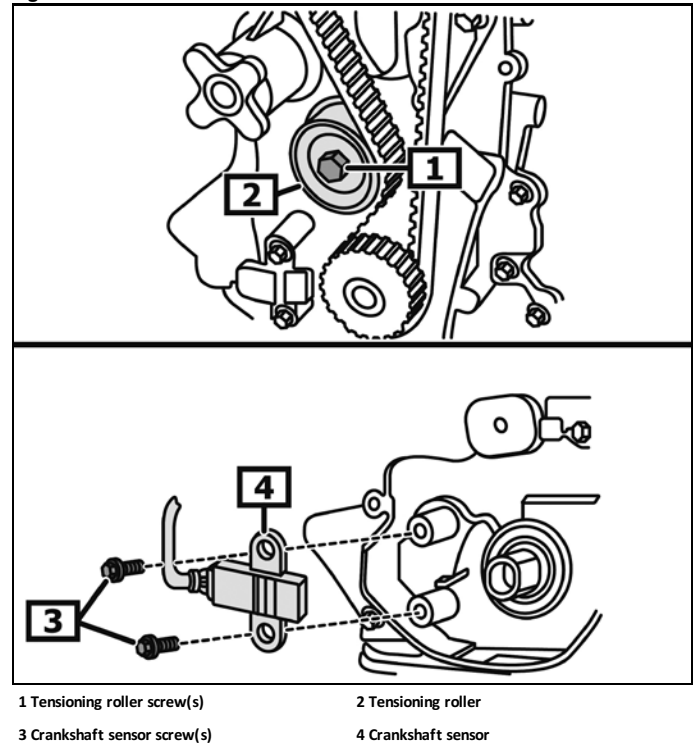
1 Crankshaft sensor wheel

Unscrew and remove tensioning roller screw. **(1)**  
 Remove tensioning roller. **(2)**  
 Unscrew and remove crankshaft sensor screw(s). **(3)**  
 Demount crankshaft sensor. **(4)**  
**(see figure 5)**

Remove toothed belt.  
 Remove crankshaft pulley.

**Check crankshaft gear for damage.**

**Figure 5**



## **Install**

**Check tensioning roller for leaks and smooth running and replace, if required.**

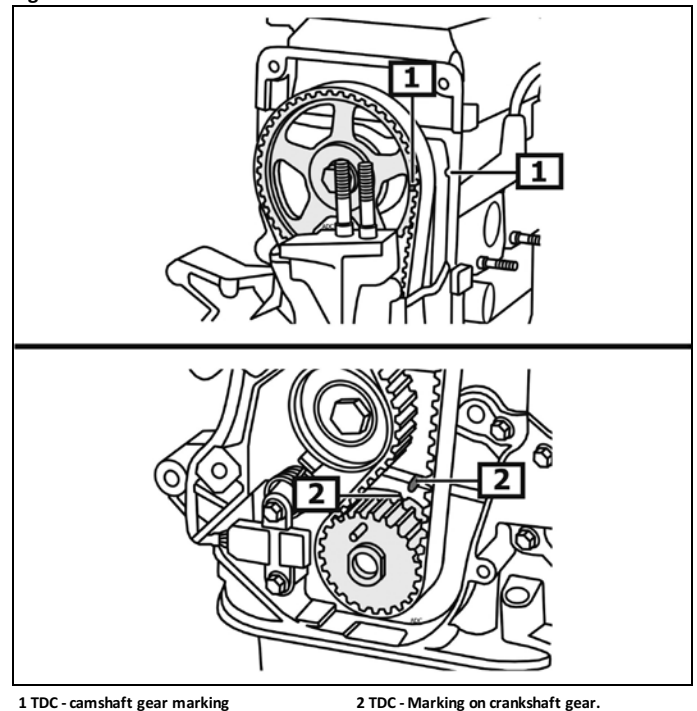
Install crankshaft pulley.

Check the TDC marking(s). **(1)(2)**  
**(see figure 6)**

Install the tensioning roller. **(2)**  
 Retighten firmly the tightening disc screw(s). **(1)**  
**(see figure 5)**

Put on toothed belt in the order crankshaft timing gear, camshaft timing gear and tension roller.

**Figure 6**



Using the Allen key, turn tensioning roller eccentric anti-clockwise until the pointer is in alignment with the reference mark. **(1)(2)**  
**(see figure 7)**

Tighten tensioning roller screw(s). **(1)**  
**(see figure 5)**

Turn crankshaft by two revolutions in running direction of the engine.

Check the TDC marking(s). **(1)(2)**  
**(see figure 6)**

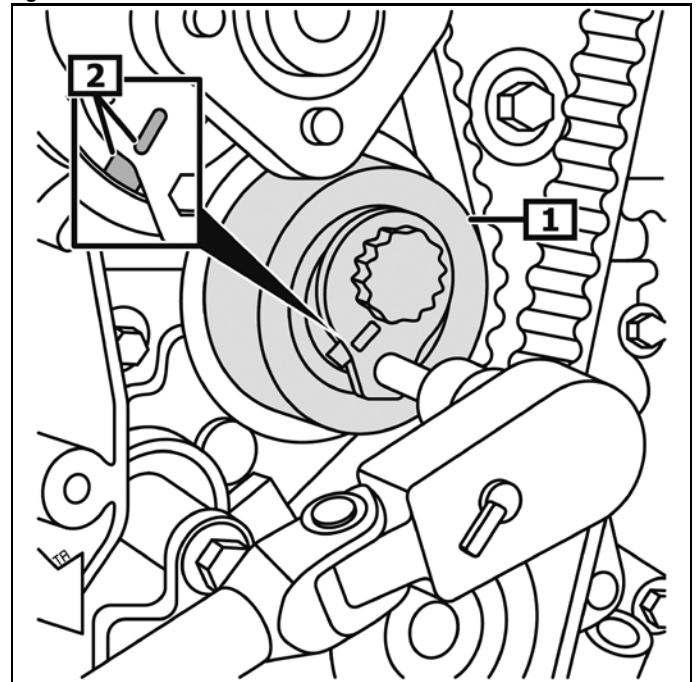
TDC - Markings must be flush with the reference marks.  
Check whether reference mark and tension pulley flush otherwise repeat tensioning process.  
Install the crankshaft sensor pulley. **(1)**  
**(see figure 4)**

**Continue assembly in reverse order of removal.**

**Fit accessory drive belt.**

Decode radio, program volatile memories.  
Start engine and check function.  
Carry out a test drive.  
Document toothed belt change.

**Figure 7**



1 Tensioning roller

2 Reference mark(s)

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

## Remove/install timing belt

### IVECO Daily V Box Body / Estate, 29L15 V, 35C15L V, 40C15L V, 50C15L V, 107 kW



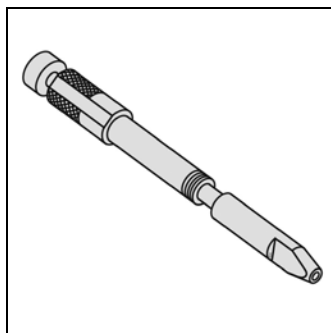
#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

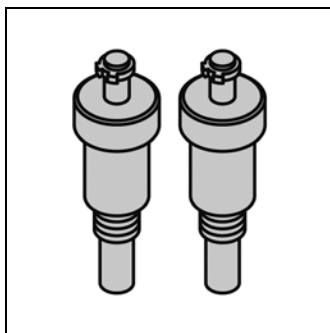
#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
The toothed belt must not come into contact with oil or coolant!  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
Note radio code. Disconnect battery (negative terminal).  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

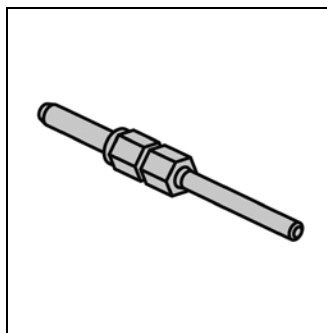
#### **Required special tools**



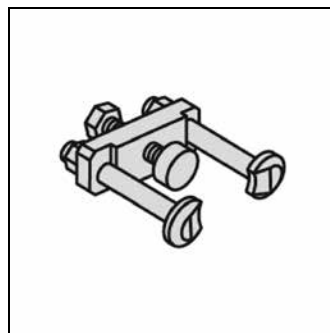
Crankshaft blocking pin(s)  
OE (99360615)



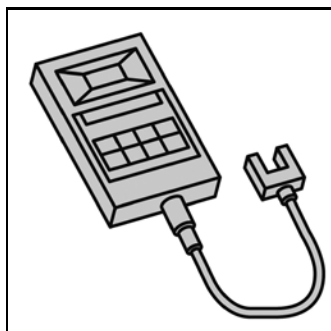
Camshaft(s) blocking pin(s)  
OE (99360614)



Camshaft setting bolt  
OE (99360608)



Heavy-duty puller  
OE (99340028)



Belt tension tester  
OE (99395849)

#### **Required times/torques**

##### **Scheduled times**

Replace toothed belt	3,30 h
----------------------	--------

##### **Tightening torques**

Self-locking screws and nuts must always be replaced.

Crankshaft pulley screw(s) (6)	(see figure 1)	30 Nm
Accessory drive belt deflection pulley (7)	(see figure 1)	25 Nm
Accessory drive belt tensioning roller (8)	(see figure 1)	25 Nm
Toothed belt guard (1)	(see figure 2)	M6 7.5 Nm
Camshaft pulley bolt(s) (5)	(see figure 6)	with solid camshaft 90 Nm; with hollow camshaft 130 Nm
Tensioning roller screw(s) (1)	(see figure 7) / (see figure 8)	32 - 40 Nm

## Remove

Disconnect battery.

Remove bumper.

Drain coolant.

Remove cooler with condenser, charge air cooler and cooler fan.

Remove fan wheel.

Remove accessory drive belt.

Disconnect line(s). (1)

Disconnect electrical connection(s). (2)

Unscrew screw(s). (3)(4)

Remove the fan clutch. (5)

Unscrew screw(s). (6)

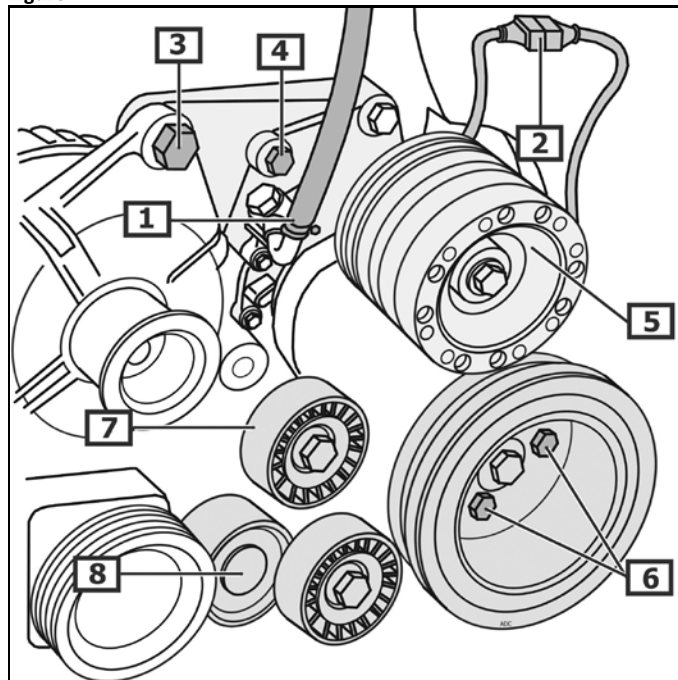
Remove belt pulley(s).

Remove accessory drive belt deflection pulley. (7)

Remove accessory drive belt tensioning roller. (8)

(see figure 1)

Figure 1



1 Line(s)

3 Screw(s)

5 Fan clutch

7 Accessory drive belt deflection pulley

2 Electrical connection(s)

4 Holder screw(s)

6 Pulley screw(s)

8 Accessory drive belt tensioning roller

Loosen cable harness from toothed belt guard.

Remove oil filler cover.

Remove engine cover(s).

Remove toothed belt guard. (1)

Pull off the hoses. (2)

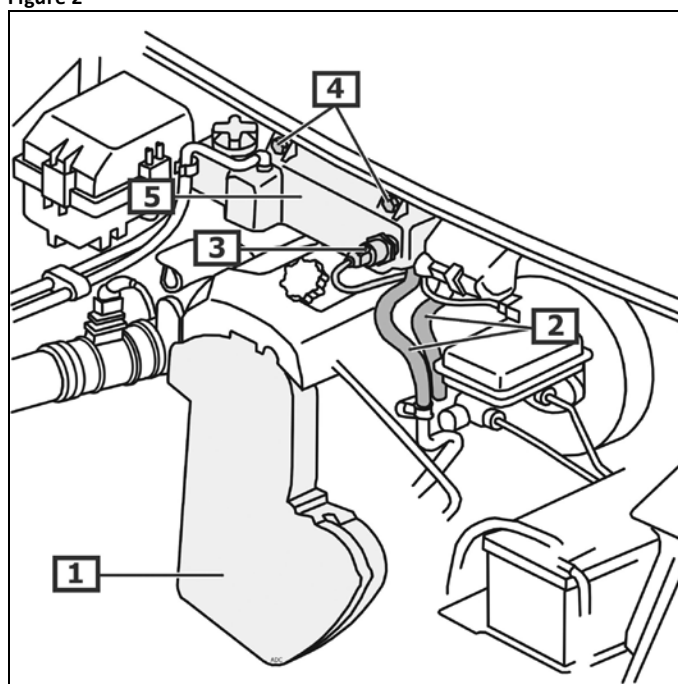
Disconnect electrical connection(s). (3)

Unscrew the coolant compensation tank screw(s). (4)

Remove the coolant reservoir. (5)

(see figure 2)

Figure 2



1 Toothed belt guard

3 Electrical connection(s)

5 Coolant expansion reservoir

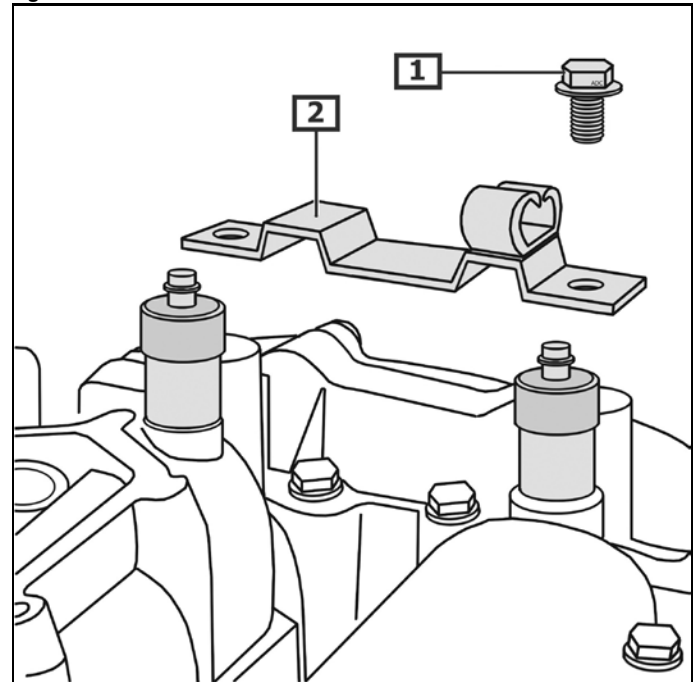
2 Hoses

4 Coolant compensation tank screw(s)

Unscrew retaining clamp screw(s). **(1)**  
Remove retaining bracket. **(2)**  
**(see figure 3)**

Unscrew and remove valve cover locking screw(s).

**Figure 3**



1 Retaining bracket screw(s)

2 Retaining clamp

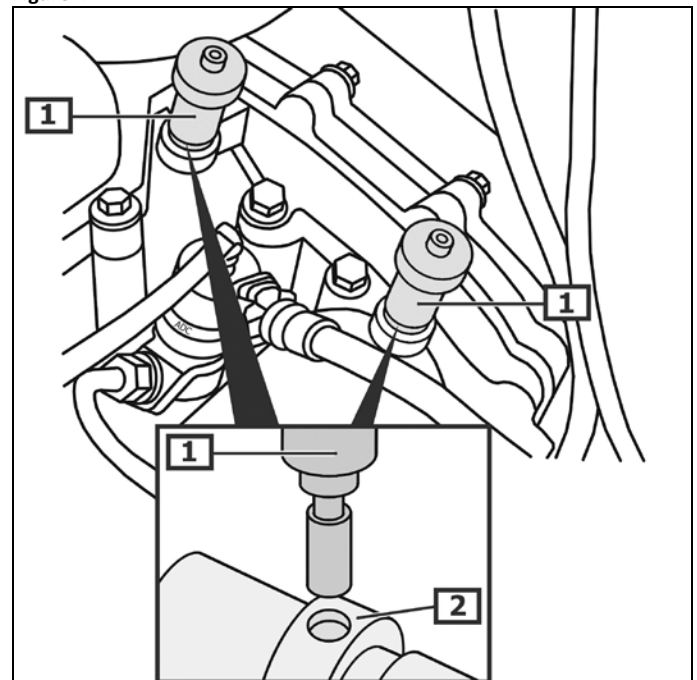
Rotate engine in direction of rotation until the camshaft locking tool can be inserted.

Insert camshaft blocking pin(s). **(1)(2)**

**Required special tools**

Camshaft(s) blocking pin(s) **(1)** OE **(99360614)**  
**(see figure 4)**

**Figure 4**



1 Locking tool – camshaft(s)

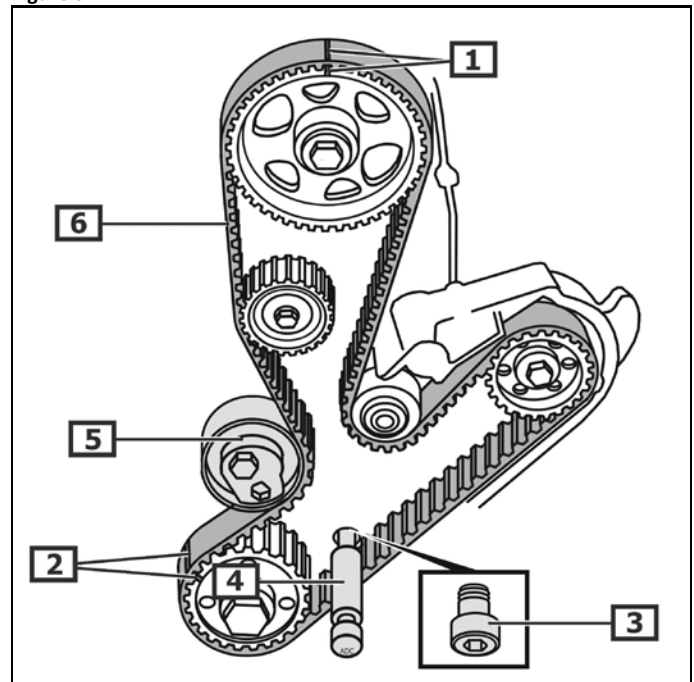
2 Bore - Camshaft

Remove plug. (3)  
 Insert the crankshaft blocking pin(s). (4)  
 Unscrew tensioning roller screw(s).  
 Release tensioning roller. (5)  
 Take off toothed belt. (6)

#### Required special tools

Crankshaft blocking pin(s) (4) OE (99360615)  
 (see figure 5)

Figure 5



- |                                  |                                    |
|----------------------------------|------------------------------------|
| 1 TDC - camshaft gear marking    | 2 TDC - crankshaft gear marking(s) |
| 3 Sealing plug                   | 4 Crankshaft blocking pin(s)       |
| 5 Toothed belt tensioning roller | 6 Toothed belt                     |

## Install

Use only toothed belts approved by the manufacturer.  
 Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

#### with solid camshaft

Unscrew camshaft pulley from camshaft cone using suitable tool.  
 The camshaft pulley must be able to be turned by hand without tilting.

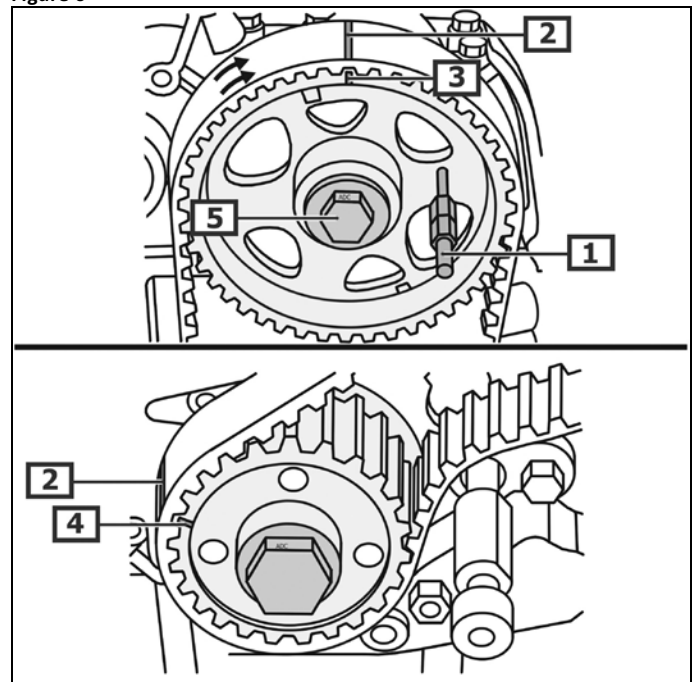
#### Continuation for all vehicles

Adjusting pin – insert camshaft. (1)  
 Tighten camshaft pulley screw(s) manually. (5)  
 Fit toothed belt.  
 Observe installation position! (Arrows)  
 The camshaft pulley and crankshaft pulley marking(s) must be aligned with the markings on the drive belt. (2)(3)(4)

#### Required special tools

Camshaft(s) locating pin(s) (1) OE (99360608)  
 Heavy-duty puller OE (99340028)  
 (see figure 6)

Figure 6



- |                               |                                |
|-------------------------------|--------------------------------|
| 1 Camshaft(s) locating pin(s) | 2 Toothed belt markings        |
| 3 Camshaft pulley marking(s)  | 4 Crankshaft pulley marking(s) |
| 5 Camshaft pulley bolt(s)     |                                |



Hold screw(s) in place. **(1)**  
 Rotate tensioning roller eccentric counterclockwise until the reference mark is partly covered. **(2)(3)**  
 Tighten tensioning roller screw. **(1)**  
**(see figure 7)**

Remove camshaft(s) locating pin(s). **(1)**  
 Tighten camshaft pulley screw(s). **(2)**  
**(see figure 6)**

Remove blocking tool.

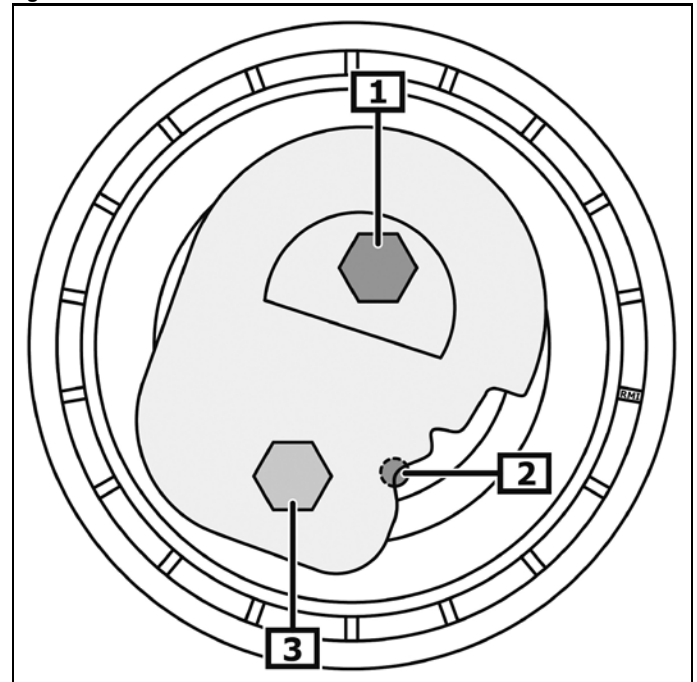
**Rotate engine eight times in the direction of engine revolutions.**

Insert camshaft blocking pin(s). **(1)(2)**  
**(see figure 4)**

Insert the crankshaft blocking pin(s). **(4)**  
**(see figure 5)**

Marks must align. **(1)(2)**  
**(see figure 5)**

**Figure 7**



1 Tensioning roller screw

2 Reference hole

3 Hexagon socket

Unscrew tensioning roller screw(s). **(1)**  
 Hold screw(s) in place. **(1)**  
 Rotate tension roller eccentric clockwise using a hexagon socket spanner until recess is above reference hole. **(2)(3)**  
 Tighten tensioning roller screw. **(1)**  
**(see figure 8)**

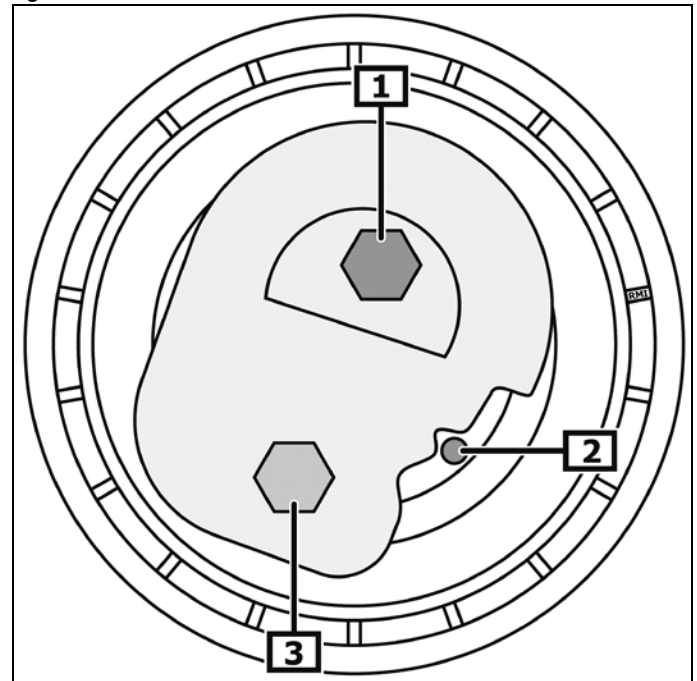
Remove blocking tool.

**Rotate engine two revolutions in the engine rotating direction.**

Insert the crankshaft blocking pin(s). **(4)**  
**(see figure 5)**

Tension roller recess should be above reference hole otherwise repeat tensioning process.  
**(see figure 8)**

**Figure 8**



1 Tensioning roller screw

2 Reference hole

3 Hexagon socket

Check toothed belt tension between camshaft timing gear wheel and deflection pulley. (1)  
Check toothed-belt tension between deflection and tensioning roller pulley. (2)

**Required special tools**  
Belt tension tester OE (99395849)  
(see figure 9)

Installation in reverse order of removal.

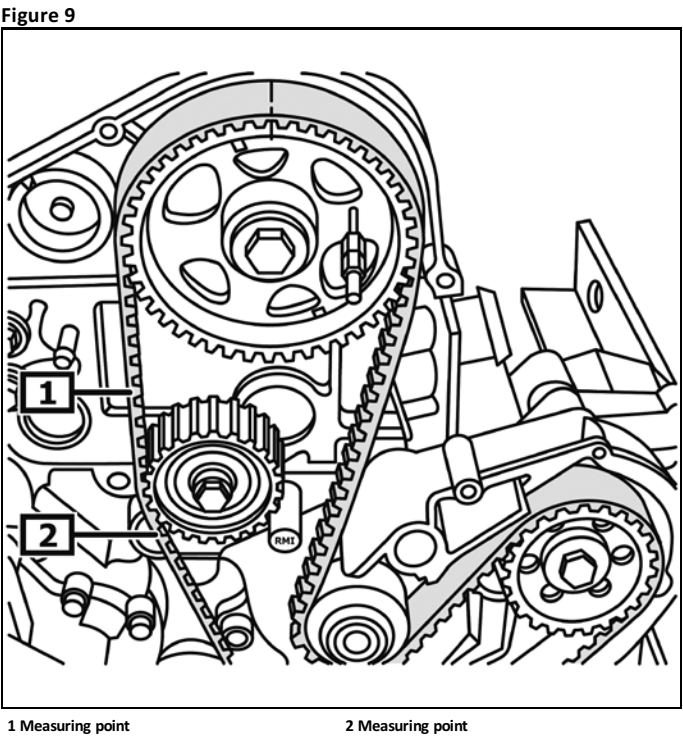
Start engine and check function.

Carry out a test drive.

Document toothed belt change.

**Test value**

Measuring point	Toothed belt tension
1	200 - 224 Hz
2	168 - 188 Hz



Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

## LAND ROVER Freelander 2 (L359), 2.2 TD4 4x4, 118 kW



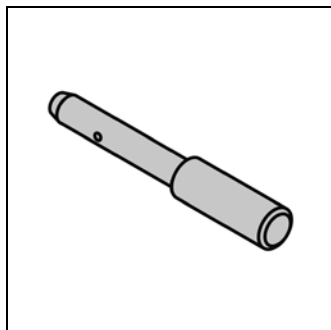
### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

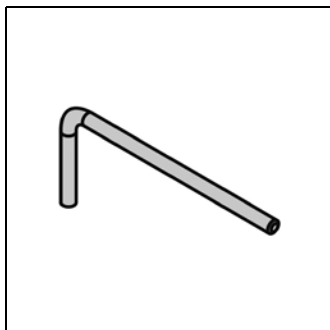
### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
Note radio code.  
Minimum bend radius should not be less than 35 mm when fitting the toothed belt.  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

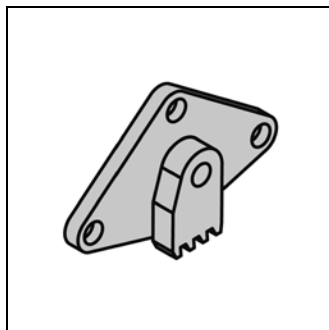
### **Required special tools**



Camshaft(s) blocking pin(s)  
OE (303-1277)



Crankshaft blocking pin(s)  
OE (303-1270)



Flywheel blocking tool  
OE (303-1272)

### **Required Labour times/torques**

#### Scheduled times

Replace toothed belt	2,60 h
----------------------	--------

#### Tightening torques

Self-locking screws and nuts must always be replaced.

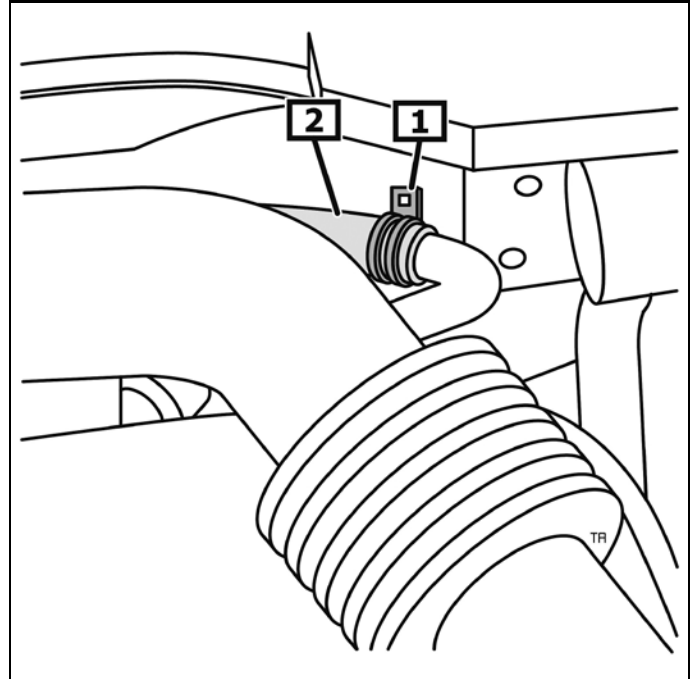
Starter (1)	(see figure 6)		40 Nm
Crankshaft central screw (1)	(see figure 9)	Use new screw(s).	01 stage 70 Nm; 02 stage 82°
Toothed belt guard at the top (6)	(see figure 7)		7 Nm
Toothed belt guard at the bottom (2)	(see figure 13)		6 Nm
Tensioning roller screw(s) (1)	(see figure 14)	Use new screw(s).	25 Nm

## Remove

**Disconnect battery.**  
**Lift vehicle.**

Remove clamp(s). **(1)**  
Pull hose from crankcase ventilation. **(2)**  
**(see figure 1)**

**Figure 1**

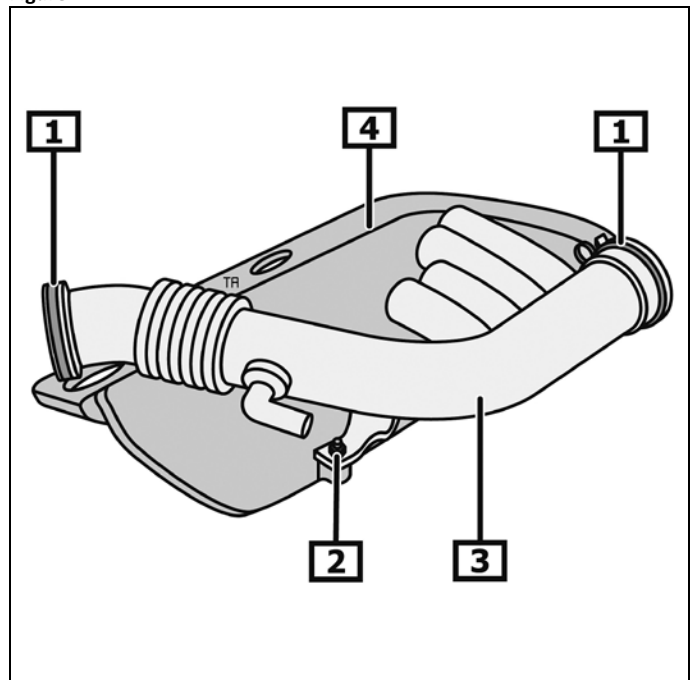


1 Clamp(s)

2 Hose - crankcase ventilation

Remove clamp(s). **(1)**  
Unscrew air induction tube nut(s). **(2)**  
Remove air intake pipe. **(3)**  
Remove engine cover(s). **(4)**  
**(see figure 2)**

**Figure 2**



1 Clamp(s)

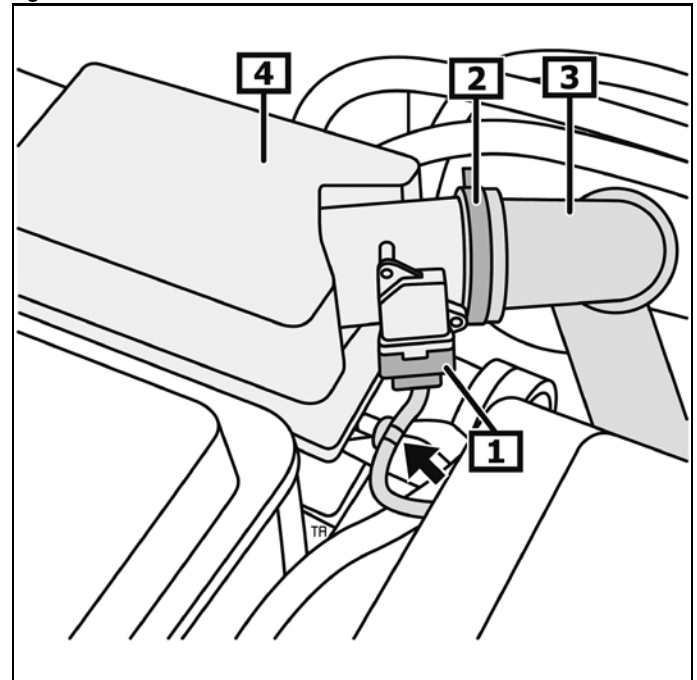
2 Air induction tube nut(s)

3 Air intake pipe

4 Engine cover

Disconnect air mass meter electric plug connection(s). **(1)**  
 Detach electric line(s) from the air-filter housing. **(Arrow)**  
 Remove clamp(s). **(2)**  
 Remove air intake pipe. **(3)**  
 Remove air filter housing upper part screw(s).  
 Remove air filter housing upper part. **(4)**  
 Remove air filter.  
**(see figure 3)**

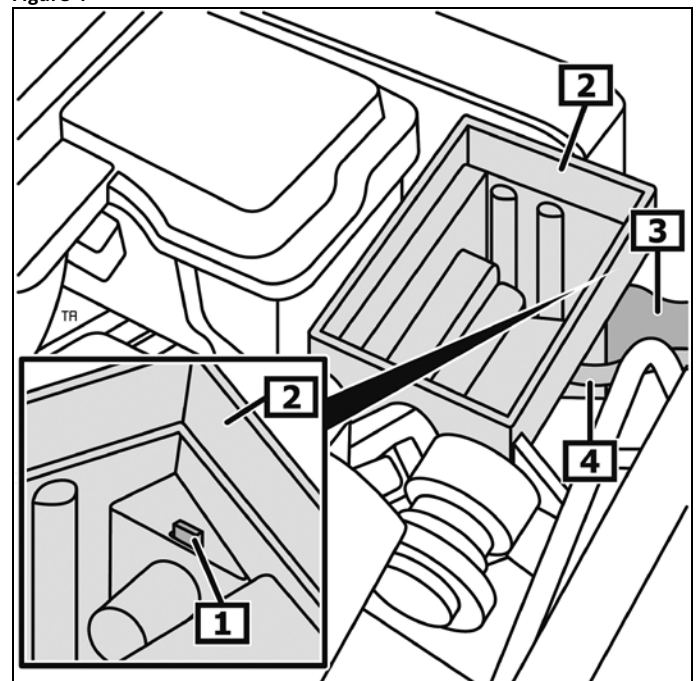
**Figure 3**



- |  |                                 |
|--|---------------------------------|
| 1 Air mass meter electric plug connection(s) | 2 Clamp(s)                      |
| 3 Air intake pipe                            | 4 Air filter housing upper part |

Beware of the retaining lug(s). **(1)**  
 Loosen air filter housing from holder(s). **(2)**  
 Loosen intake air duct from air filter housing. **(3)**  
 Pull off the hose. **(4)**  
 Remove the air filter housing upward. **(2)**  
**(see figure 4)**

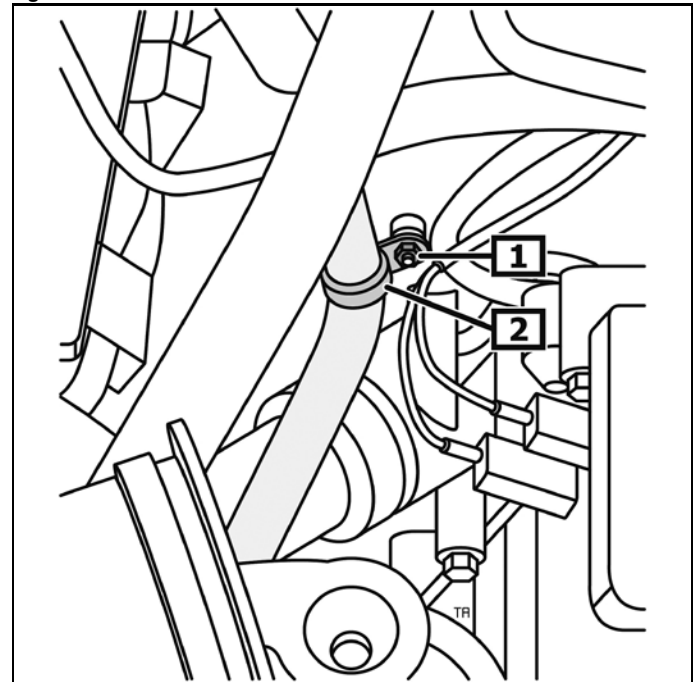
**Figure 4**



- |                    |                      |
|--------------------|----------------------|
| 1 Retaining lug(s) | 2 Air filter housing |
| 3 Intake air duct  | 4 Hose               |

Unscrew and remove bracket nut(s) for positive cable(s). **(1)**  
Remove the holder. **(2)**  
**(see figure 5)**

### Figure 5

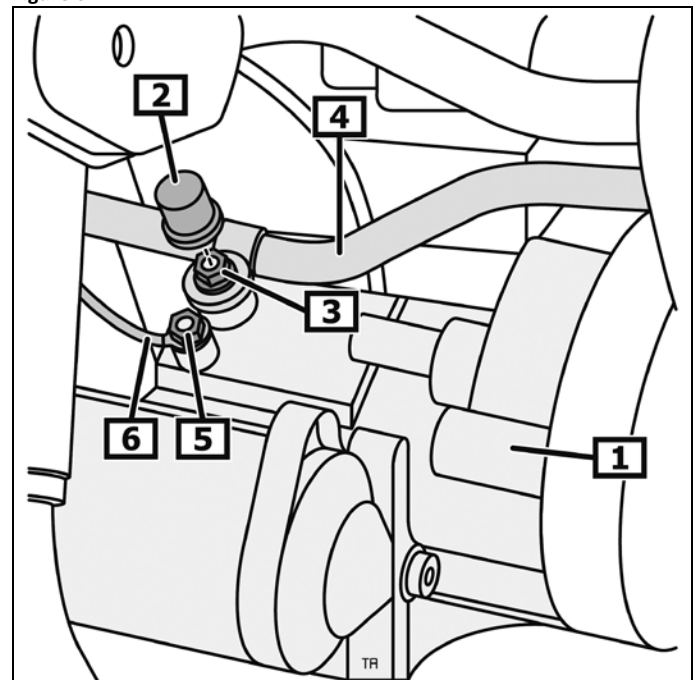


1 Holder nut(s)

## 2 Support

Support starter. **(1)**  
Remove the cap(s). **(2)**  
Unscrew and remove battery positive line nut(s) on the starter. **(3)**  
Take off the lines. **(4)**  
Unscrew and remove electric line(s) nut(s) on starter. **(5)**  
Take off the lines. **(6)**  
Unscrew starter screw(s).  
Remove starter. **(1)**  
**(see figure 6)**

**Figure 6**



### 1 Starter

2 Cover cap(s)

**3 Battery positive line nut(s)**

4 Line(s)

5 Electric line(s) nut(s)

6 Line(s)

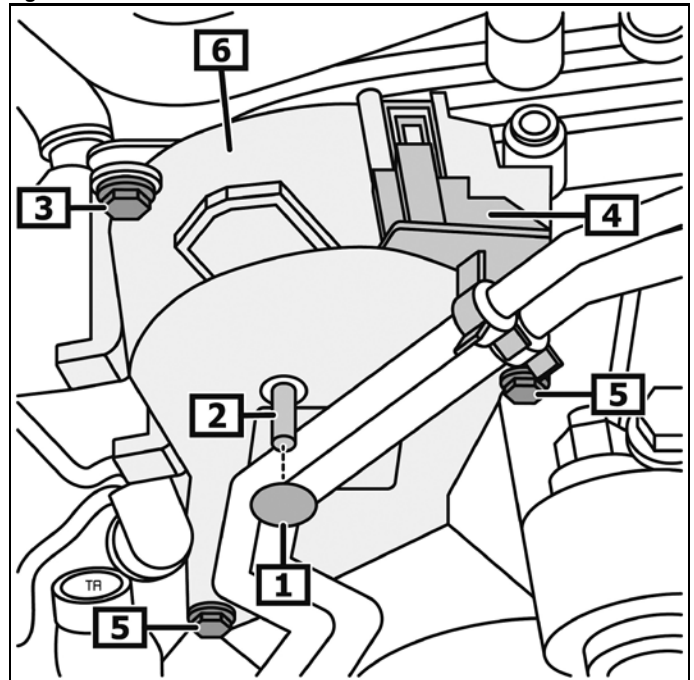
### Remove accessory drive belt.

Remove plug from toothed belt guard. (1)  
Set engine to TDC cylinders 1.  
Insert camshaft blocking pin(s). (2)

#### Required special tools

Camshaft(s) blocking pin(s) (2) OE (303-1277)  
(see figure 7)

Figure 7



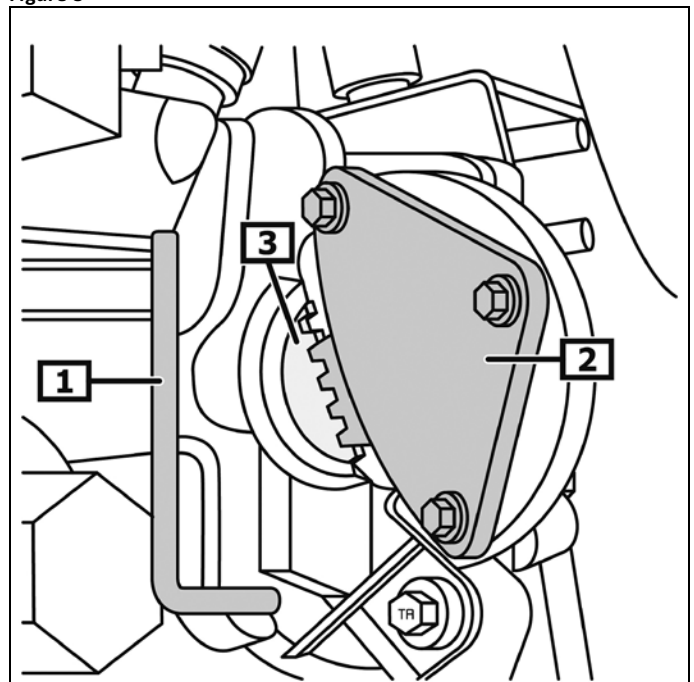
- |                                      |                                 |
|--------------------------------------|---------------------------------|
| 1 Sealing plug                       | 2 Camshaft(s) blocking pin(s)   |
| 3 Upper toothed belt guard screw(s). | 4 Fuel line(s) holder           |
| 5 Upper toothed belt guard screw(s). | 6 Toothed belt guard at the top |

Insert the crankshaft blocking pin(s). (1)  
Use blocking tool flywheel. (2)

#### Required special tools

Crankshaft blocking pin(s) (1) OE (303-1270)  
Flywheel blocking tool (2) OE (303-1272)  
(see figure 8)

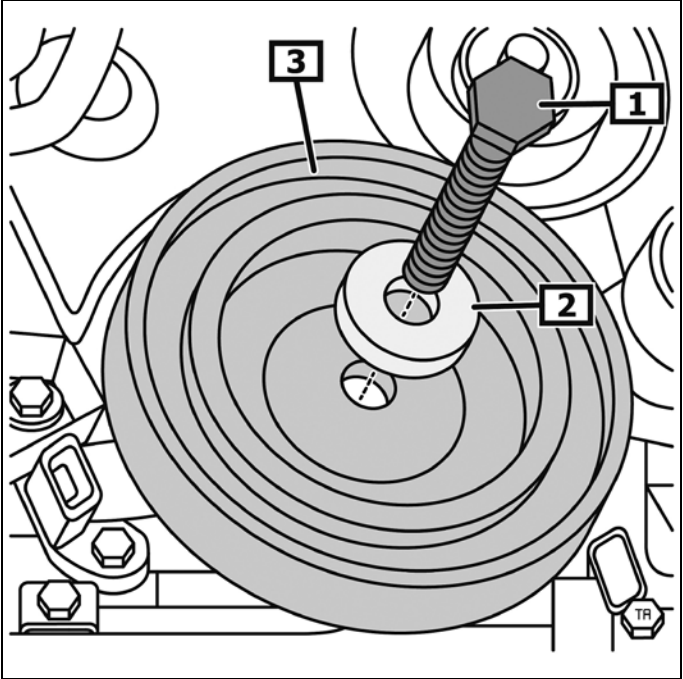
Figure 8



- |                              |                          |
|------------------------------|--------------------------|
| 1 Crankshaft blocking pin(s) | 2 Flywheel blocking tool |
| 3 Flywheel                   |                          |

Unscrew the central crankshaft screw. (1)  
 Remove vibration damper. (3)  
 (see figure 9)

Figure 9



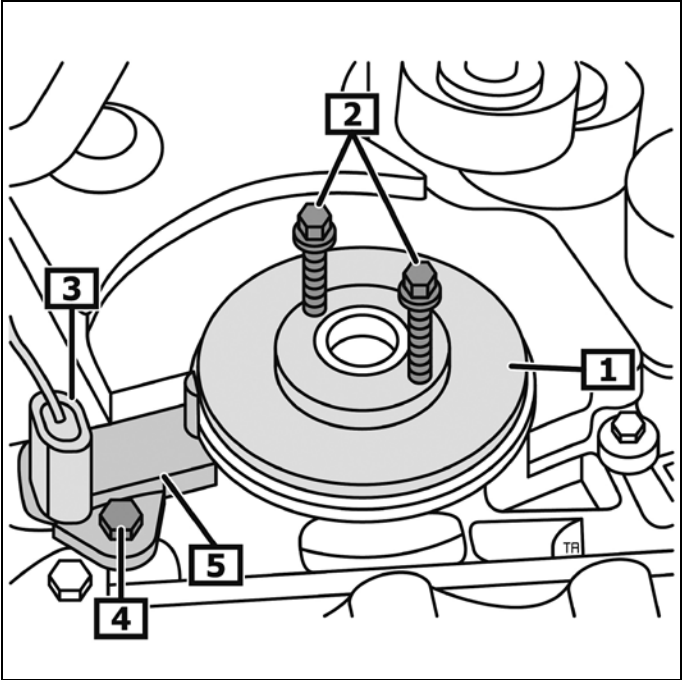
- 1 Crankshaft central screw
- 2 Disc (pane)
- 3 Vibration damper

Mark the installation position.

Remove reluctor. (1)

If the reluctor does not come away, two M6 screws can be screwed in for the purpose of extraction. (2)  
 (see figure 10)

Figure 10



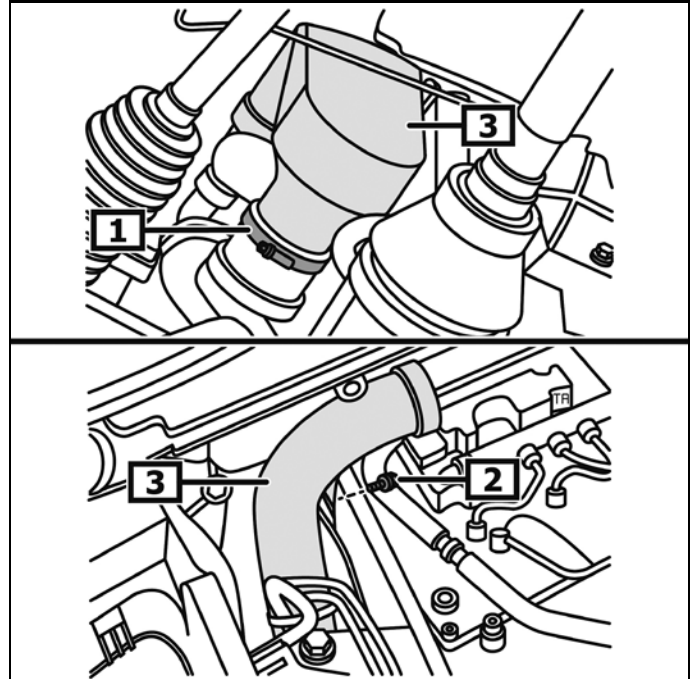
- 1 Trigger wheel
- 2 Screw(s) M6
- 3 Electric plug connection(s), crankshaft sensor
- 4 Crankshaft sensor screw(s)
- 5 Crankshaft sensor



Remove clamp(s). **(1)**  
 Unscrew air intake pipe screw(s). **(2)**  
 Remove air intake pipe. **(3)**  
**(see figure 11)**

Loosen line(s) from toothed belt guard.

**Figure 11**



1 Clamp(s)

2 Air intake pipe screw(s)

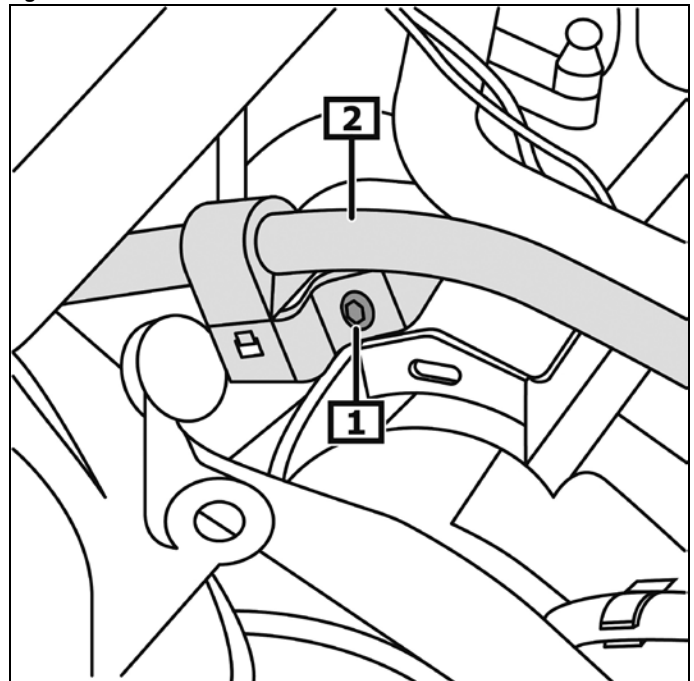
3 Air intake pipe

Unscrew screw(s). **(1)**  
 Detach power steering line(s) and put aside. **(2)**  
**(see figure 12)**

Disconnect fuel line(s) holder. **(4)**  
 Unscrew and remove the screw(s) for the upper toothed belt cover. **(5)**  
 Remove toothed belt guard at the top. **(6)**  
**(see figure 7)**

Disconnect crankshaft sensor electric plug connection(s). **(3)**  
 Unscrew and remove crankshaft sensor screw(s). **(4)**  
 Demount crankshaft sensor. **(5)**  
**(see figure 10)**

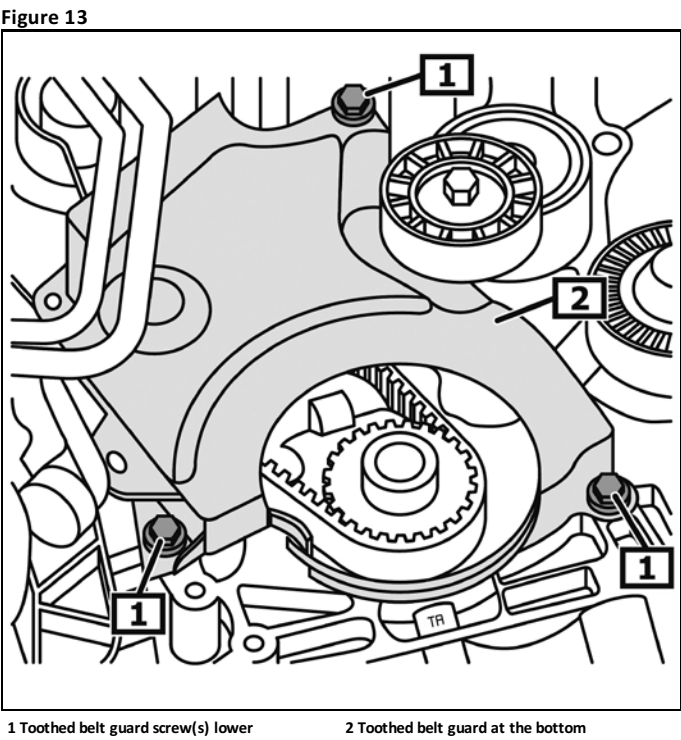
**Figure 12**



1 Screw

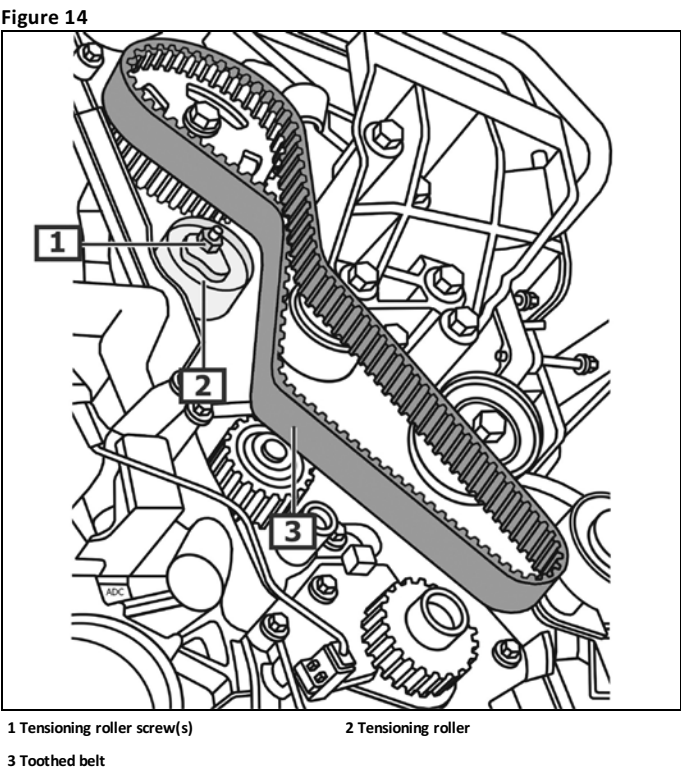
2 Power steering line(s)

Unscrew toothed belt guard screws, bottom.  
Mount toothed belt guard at the bottom.  
(see figure 13)



Unscrew tensioning roller screw(s). (1)  
Loosen the tensioning roller clockwise using a suitable tool. (2)  
Remove toothed belt. (3)  
(see figure 14)

Check tension pulley and deflection pulley and replace, if necessary.  
Check the coolant pump.

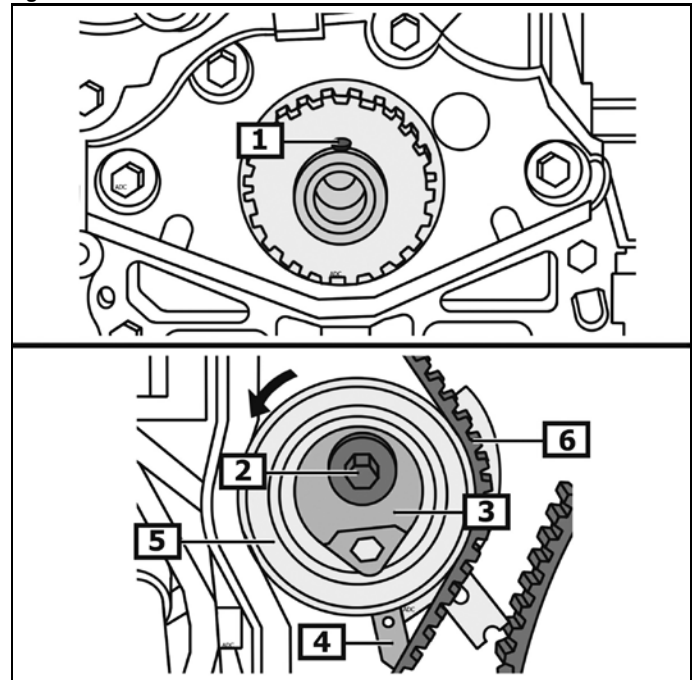


## Install

Use only toothed belts approved by the manufacturer.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
Minimum bend radius should not be less than 35 mm when fitting the toothed belt.

Groove on crankshaft to be between the notchings. (1)  
Fit toothed belt clockwise starting with camshaft pulley. (6)  
Tighten the tensioning roller screw(s) slightly. (2)  
Set tensioning roller eccentric anti-clockwise to the maximum position using an Allen key. (3)(4)  
Tighten tensioning roller screw(s). (2)  
(see figure 15)

Figure 15



- |                               |                              |
|-------------------------------|------------------------------|
| 1 Groove on crankshaft        | 2 Tensioning roller screw(s) |
| 3 Tensioning roller eccentric | 4 Pointer                    |
| 5 Tensioning roller           | 6 Toothed belt               |

Install reluctor. (1)  
(see figure 10)

Install vibration damper. (3)  
Tighten the central crankshaft screw to 70 Nm. (1)  
(see figure 9)

Remove flywheel blocking tool. (2)  
Remove crankshaft pulley blocking pin(s). (1)  
(see figure 8)

Remove camshaft(s) blocking pin(s). (1)  
(see figure 16)

Rotate engine ten times in the direction of engine revolutions.

Insert crankshaft pulley blocking pin(s). (1)

**Required special tools**  
Crankshaft blocking pin(s) (1) OE (303-1270)  
(see figure 8)

Insert camshaft blocking pin(s). (1)

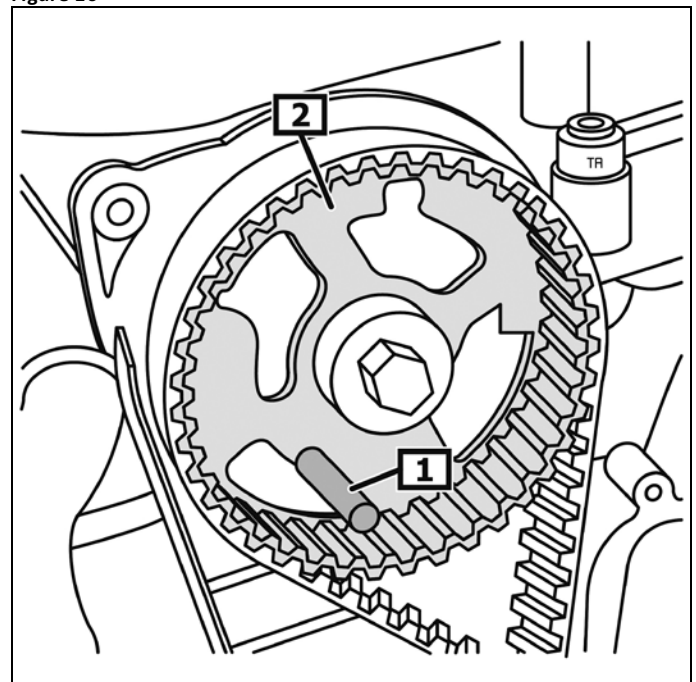
**Required special tools**  
Camshaft(s) blocking pin(s) (2) OE (303-1277)  
(see figure 16)

Use blocking tool flywheel. (2)

**Required special tools**  
Flywheel blocking tool (2) OE (303-1272)  
(see figure 8)

Loosen the central crankshaft screw by approx. one turn. (1)  
(see figure 9)

Figure 16



- |                               |                        |
|-------------------------------|------------------------|
| 1 Camshaft(s) blocking pin(s) | 2 Camshaft timing gear |
|-------------------------------|------------------------|

Unscrew tensioning roller screw(s). (1)  
 Rotate tension roller eccentric clockwise using an Allan wrench till pointer is in recess center. (2)(3)(4)  
 Tighten tensioning roller screw(s). (1)  
 (see figure 17)

Tighten the central crankshaft screw to 70 Nm. (1)  
 (see figure 9)

Remove flywheel blocking tool. (2)  
 Remove crankshaft pulley blocking pin(s). (1)  
 (see figure 8)

Remove camshaft(s) blocking pin(s). (1)  
 (see figure 16)

Rotate engine two revolutions in the engine rotating direction.

**Check whether pointer is facing recess centrally otherwise repeat adjustment. (4)**  
 (see figure 17)

Insert crankshaft pulley blocking pin(s). (1)  
 Use blocking tool flywheel. (2)

**Required special tools**  
 Crankshaft blocking pin(s) (1) OE (303-1270)  
 Flywheel blocking tool (2) OE (303-1272)  
 (see figure 8)

Insert camshaft blocking pin(s). (1)

**Required special tools**  
 Camshaft(s) blocking pin(s) (2) OE (303-1277)  
 (see figure 16)

Unscrew the central crankshaft screw. (1)  
 Remove vibration damper. (3)  
 (see figure 9)

Remove reluctor. (1)

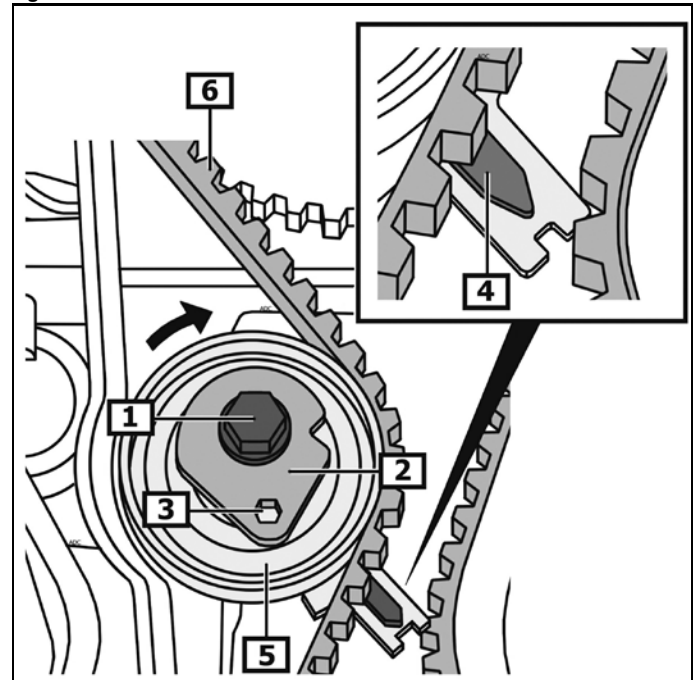
**Replace impulse sensor wheel. (1)**  
 (see figure 10)

**Installation in reverse order of removal.**

**Fit accessory drive belt.**

Decode radio, program volatile memories.  
 Start engine and check function.

**Figure 17**



- |                              |                               |
|------------------------------|-------------------------------|
| 1 Tensioning roller screw(s) | 2 Tensioning roller eccentric |
| 3 Hexagon socket             | 4 Pointer                     |
| 5 Tensioning roller          | 6 Toothed belt                |

### MITSUBISHI Lancer VII (CS\_A, CT\_A), 2.0 16V EVO VIII, 195 kW



#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

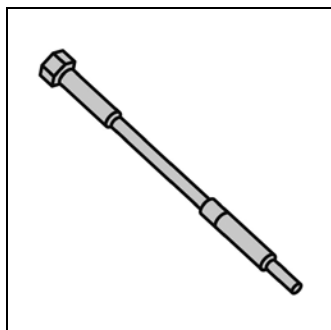
The toothed belt must not come into contact with oil or coolant!

Adjustment work on the toothed belt must only be carried out with a cold engine.

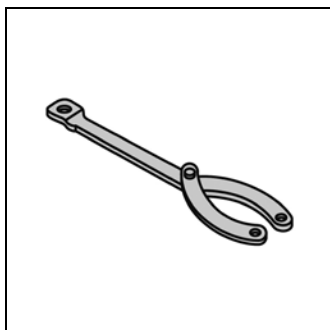
Note radio code. Disconnect battery (negative terminal).

It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

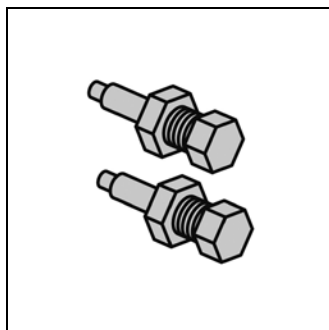
#### **Required special tools**



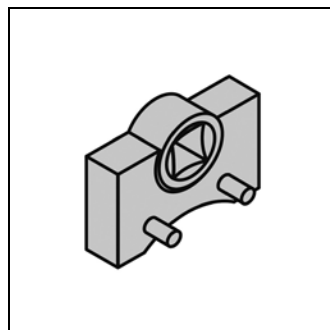
Adjusting screw  
OE (MD998738)



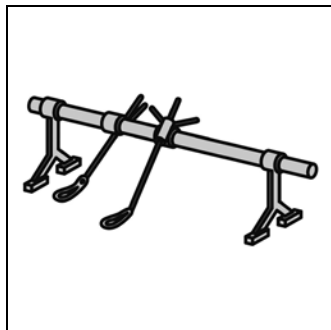
Counter support  
OE (MB991367)



Bolt  
OE (MB991385)



Tensioning device  
OE (MD998767)



Engine bridge

## Required times/torques/settings

### Scheduled times

Replace toothed belt	1,60 h
----------------------	--------

### Tightening torques

Self-locking screws and nuts must always be replaced.

Crankshaft pulley screw(s) (1)	(see figure 1)		21 - 29 Nm
Pulley screw(s) (3)	(see figure 1)		8 - 10 Nm
Deflection pulley screw(s) (5)	(see figure 1)		74 - 84 Nm
Tensioning device screw(s) (7) (8)	(see figure 1)		bottom 18 - 26 Nm; Centre 34 - 54 Nm
Engine mounting nut(s) (1) (2)	(see figure 2)		on engine bracket 60 - 74 Nm; on chassis 88 - 108 Nm
Heat protection plate(s) (5)	(see figure 2)		18 - 26 Nm
Servo steering pump screw(s). (6) (7)	(see figure 2)		at holder 20 - 28 Nm; top 35 - 45 Nm
Holder screw(s) (9)	(see figure 2)		40 - 58 Nm
Deflection pulley (5)	(see figure 3)		29 - 41 Nm
Tensioning roller screw(s) (3)	(see figure 5)		43 - 53 Nm
Tensioning device screw(s) (6)	(see figure 5)		20 - 26 Nm
Crankshaft central screw (1)	(see figure 6)	Grease bolt(s).	167 Nm
Tensioning roller screw(s) (6)	(see figure 6)		16 - 22 Nm

### Test values and settings

#### **Balance shaft toothed belt**

Belt deflection	(see figure 6)	Pressure at measuring point (Arrow) : 100 N	5 - 7 mm
-----------------	----------------	--	----------

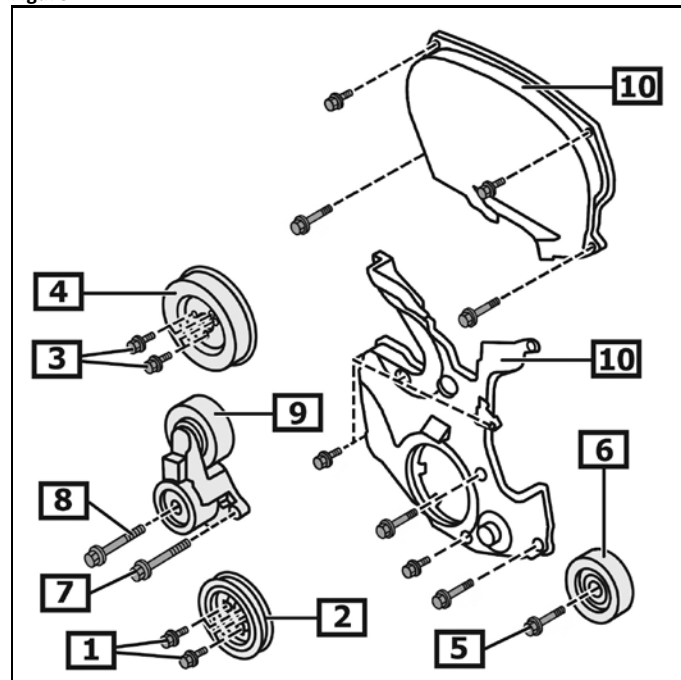
## Remove

### Remove accessory drive belt.

Remove the cross strut(s) from subframe.  
Remove front exhaust pipe.

Unscrew crankshaft pulley screw(s). **(1)**  
Remove crankshaft pulley. **(2)**  
Unscrew and remove coolant pump pulley screw(s). **(3)**  
Remove coolant pump pulley. **(4)**  
Remove deflection pulley screw(s). **(5)**  
Remove accessory drive belt deflection pulley. **(6)**  
Unscrew screw(s). **(7) (8)**  
Remove accessory drive belt tensioning device. **(9)**  
Remove toothed belt guard. **(10)**  
(see figure 1)

Figure 1

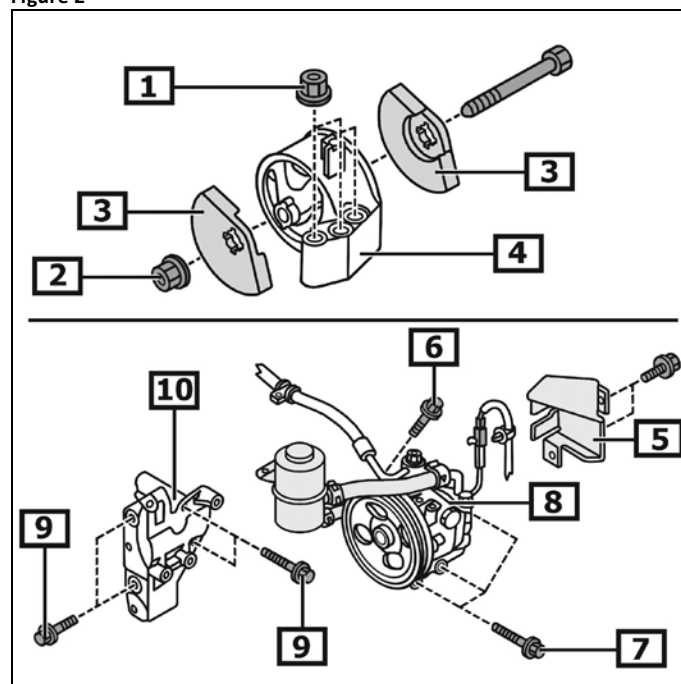


- |  |                              |
|--|------------------------------|
| 1 Pulley screw(s)                        | 2 Crankshaft pulley          |
| 3 Pulley screw(s)                        | 4 Coolant pump pulley        |
| 5 Deflection pulley screw(s)             | 6 Deflection pulley          |
| 7 Tensioning device screw(s)             | 8 Tensioning device screw(s) |
| 9 Accessory drive belt tensioning device | 10 Toothed belt guard        |

Install engine bridge.  
Support engine.

Disconnect servo steering line(s) at engine mounting.  
Remove engine mounting nut(s). **(1) (2)**  
Remove screw(s).  
Remove stop. **(3)**  
Remove engine mounting. **(4)**  
Remove heat protection plate(s). **(5)**  
Disconnect the pressure switch plug.  
Unscrew screw(s). **(6) (7)**  
Dismantle servo steering and equalising reservoir. **(8) (place aside)**  
**Lines remain connected.**  
Unscrew holder screw(s). **(9)**  
Remove servo pump bracket. **(10)**  
(see figure 2)

Figure 2



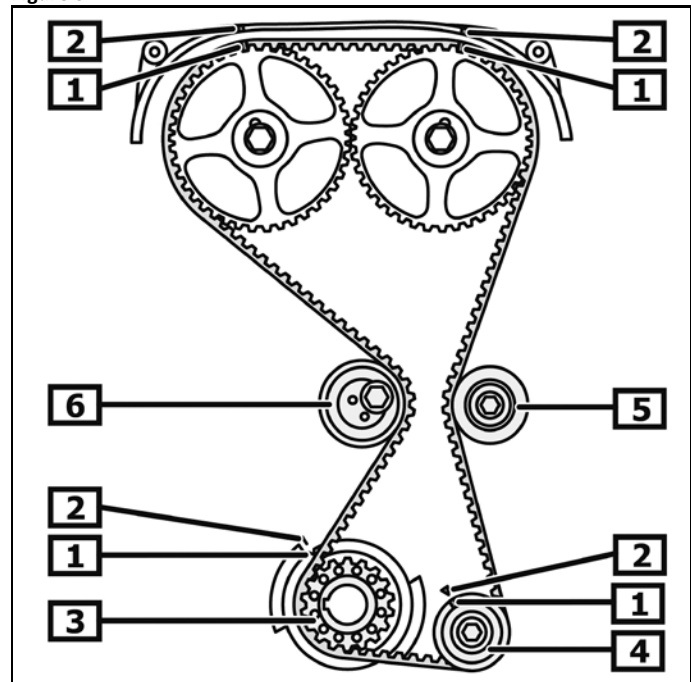
- |                                 |                                 |
|---------------------------------|---------------------------------|
| 1 Engine mounting nut(s)        | 2 Engine mounting nut(s)        |
| 3 Stop                          | 4 Engine mounting               |
| 5 Heat protection plate(s)      | 6 Servo steering pump screw(s). |
| 7 Servo steering pump screw(s). | 8 Power steering pump           |
| 9 Holder screw(s)               | 10 Holder - power steering pump |

### Engine control toothed belt

Set engine to TDC cylinders 1.

**Rotate engine in the direction of rotation only by the crankshaft pulley.**  
Marks must align. (1) (2)  
(see figure 3)

Figure 3



- |                     |                        |
|---------------------|------------------------|
| 1 TDC marking(s)    | 2 Reference mark(s)    |
| 3 Crankshaft pulley | 4 Oil pump drive wheel |
| 5 Deflection pulley | 6 Tensioning roller    |

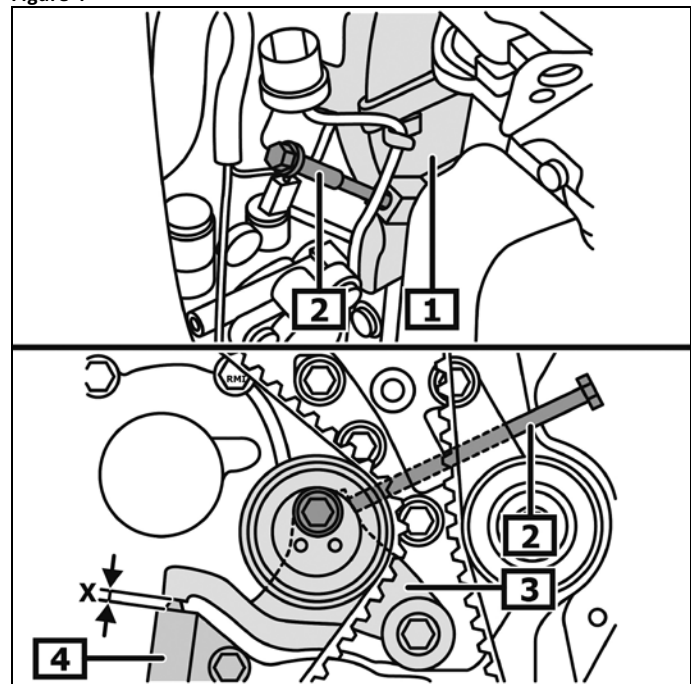
Remove plug from toothed belt guard. (at the rear) (1)

Insert the adjusting screw. (2)

OE (MD998738)

Screw in the screw(s) gradually. (30° per second) (Risk of damage)  
(see figure 4)

Figure 4



- |                                    |                     |
|------------------------------------|---------------------|
| 1 Toothed belt guard (at the rear) | 2 Adjusting screw   |
| 3 Tensioning lever                 | 4 Tensioning device |
| Dimension X 3,8 - 4,5 mm           |                     |



Bores must be in alignment. (1)  
 Insert locking pin(s). (2)  
 (see figure 5)

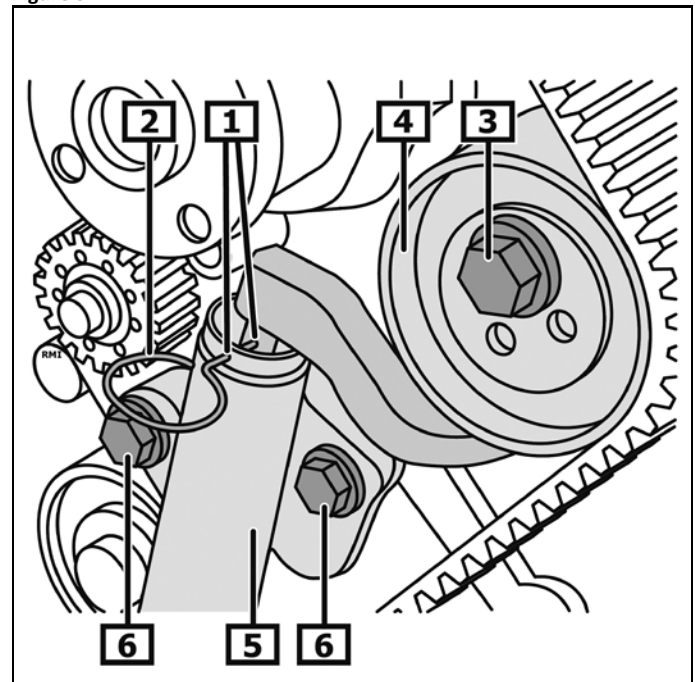
Remove screw(s). (2)  
 (see figure 4)

Unscrew tensioning roller screw(s). (3)  
 (see figure 5)

Remove toothed belt.

Remove deflection pulley(s). (5)  
 (see figure 3)

Figure 5



- |                              |                              |
|------------------------------|------------------------------|
| 1 Bores                      | 2 Locking pin(s)             |
| 3 Tensioning roller screw(s) | 4 Tensioning roller          |
| 5 Tensioning device          | 6 Tensioning device screw(s) |

#### **Balance shaft toothed belt**

Remove crank angle sensor.

Unscrew crankshaft pulley screw(s). (1)  
 Use special tool.

**Counter support OE (MB991367)**  
**Bolt OE (MB991385)**

Remove crankshaft pulley. (2)

Remove crankshaft sensor wheel. (3)

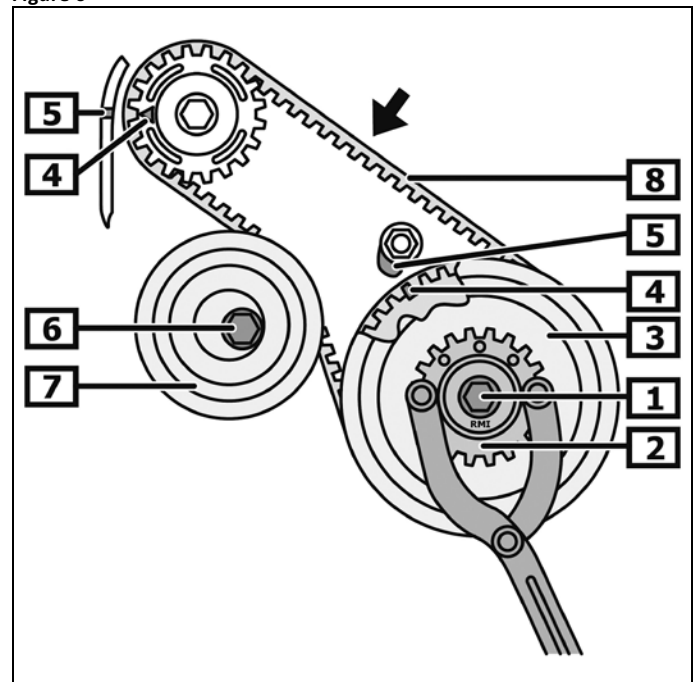
**Check the TDC marking(s).**

Marks must align. (4) (5)

Unscrew tensioning roller screw(s). (6)

Remove toothed belt. (8)  
 (see figure 6)

Figure 6



- |                            |                              |
|----------------------------|------------------------------|
| 1 Crankshaft central screw | 2 Crankshaft pulley          |
| 3 Crankshaft sensor wheel  | 4 TDC marking(s)             |
| 5 Reference mark(s)        | 6 Tensioning roller screw(s) |
| 7 Tensioning roller        | 8 Balance shaft toothed belt |

## Install

### Balance shaft toothed belt

Check tensioning roller for leaks and smooth running and replace, if required.

Check the TDC marking(s). (4) (5)  
(see figure 6)

Fit toothed belt.

**Toothed belt must be tensioned between balance shaft and crankshaft pulley.**

Turn tensioning roller clockwise. (7)

Set toothed belt tension to specified value.

Tighten tensioning roller screw(s). (6)

(see figure 6)

**Check belt suspension.**

Install the crankshaft sensor pulley. Install crankshaft pulley.

**Clean components. Degrease the parts. Observe installation position!**

### Engine control toothed belt

Check tensioning roller for leaks and smooth running and replace, if required.

Check the TDC marking(s). (1) (2)  
(see figure 3)

Remove stopper on engine block. (1)

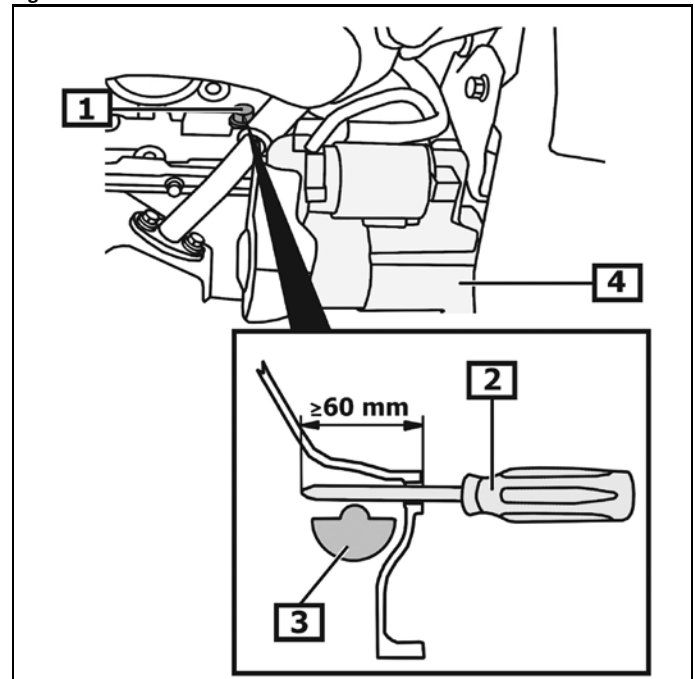
Use the screwdriver. Length  $\geq 60$  mm  $\varnothing 8$  mm (2)

(see figure 7)

Fit toothed belt to crankshaft pulley starting anti-clockwise.

**Toothed belt must be tensioned between camshaft timing gear wheels, deflection pulley, oil-pump gear and crankshaft gear.**

Figure 7



1 Locking screw

2 Screwdriver

3 Balance shaft

4 Starter

Tension the tensioning roller anti-clockwise. (1)  
**Tensioning device OE (MD998767)**  
Tighten the tensioning roller screw(s) slightly. (2)  
(see figure 8)

Remove screwdriver. (2)  
Screw in closing screw. (1)  
(see figure 7)  
Insert the adjusting screw. (2)  
(see figure 4)

Screw in the screw until the pin in the tensioning device can be moved.  
(2)  
(see figure 5)  
Rotate the crankshaft anti-clockwise until the piston of cylinder 1. is at  
about 90° before TDC.  
Set engine to TDC mark of first cylinder.

Unscrew tensioning roller screw(s). (2)  
Tension tensioning roller anticlockwise. (Arrow)  
**Tensioning torque : 3,5 Nm**  
Tighten tensioning roller screw(s). (2)  
(see figure 8)

Remove locking pin(s). (2)  
(see figure 5)

Remove screw(s). (2)  
(see figure 4)

Rotate engine two revolutions in the engine rotating direction.  
Set engine to TDC cylinders 1.  
Marks must align.  
**Observe the following waiting time: 15 Minute(s)**

Check "X" overfill.  
**If the measured value varies from the specification, the setting must be repeated.**  
(see figure 4)

Align engine mounting stops. (3)  
**Observe installation position!**  
(see figure 2)

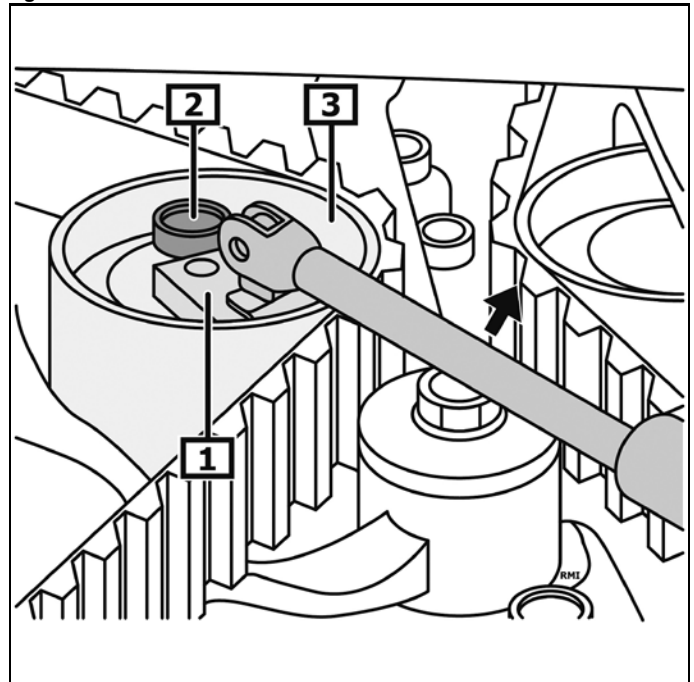
Continue assembly in reverse order of removal.

#### **Fit accessory drive belt.**

Decode radio, program volatile memories.  
Start engine and check function.  
Carry out a test drive.  
Document toothed belt change.

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

**Figure 8**



1 Tensioning device

2 Tensioning roller screw(s)

3 Tensioning roller

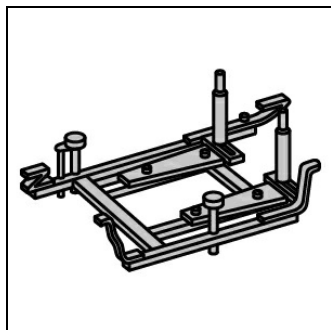
## OPEL Astra H (L48), 1.9 CDTI, 88 kW

**WARNING**

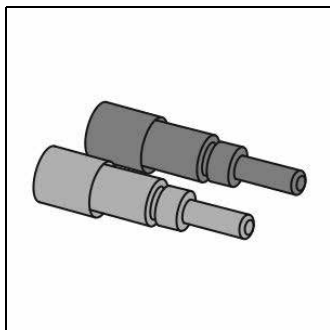
Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

**NOTE**

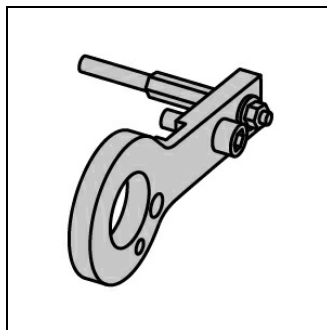
Rotate engine in the direction of rotation only by the crankshaft pulley.  
When turning the camshaft, the crankshaft must not be at TDC.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
The toothed belt must not come into contact with oil or coolant!  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
Note radio code.  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

**Required special tools**

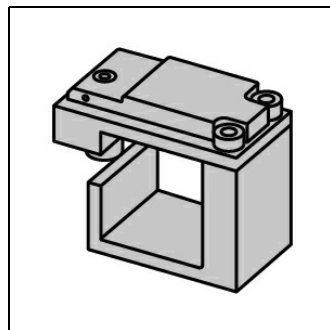
Engine mount  
OE (KM-6001-A)



Camshaft(s) blocking pin(s)  
OE (EN-46789)



Crankshaft blocking tool  
OE (EN-46788)



Engine mount  
OE (KM-6397)

**Required Labour times/torques****Scheduled times**

Replace toothed belt	1,40 h
----------------------	--------

**Tightening torques**

Self-locking screws and nuts must always be replaced.

Engine mount screw(s) (4)	(see figure 4)		on chassis 35 Nm; on engine bracket 55 Nm
Engine bracket (1)	(see figure 5)		M8 25 Nm; M10 50 Nm
Toothed belt tensioning roller (1)	(see figure 7)	Use new screw(s) and screw-locking compound.	25 Nm
Accessory drive belt deflection pulley		Use new screw(s).	25 Nm
Toothed belt deflection pulley		Use new screw(s).	50 Nm
Toothed belt guard			M6 9 Nm; M8 25 Nm
Vibration damper screw(s)		Use new screw(s).	M8 25 Nm
Wheel attachment			110 Nm

## **Remove**

Remove engine cover(s).  
Remove air filter housing.

### **Lift vehicle.**

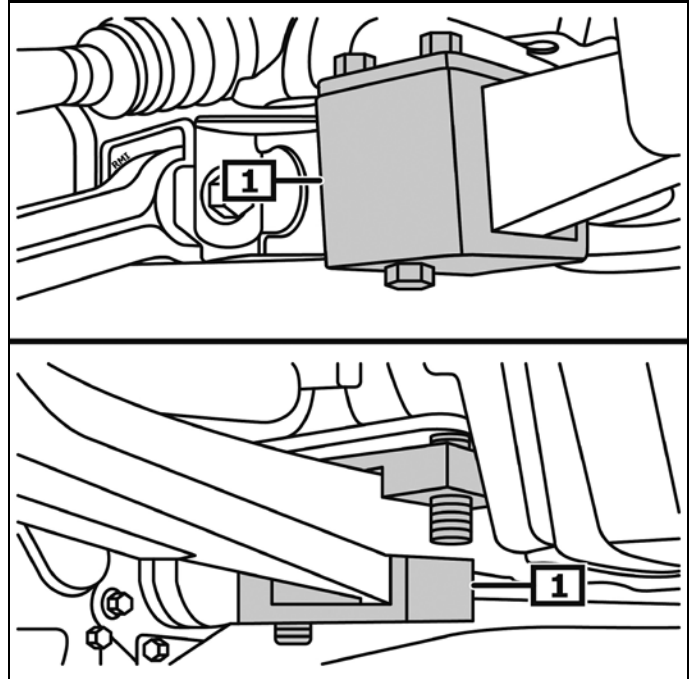
Remove the right front wheel.  
Remove front wheel arch liner front right.  
Remove underdrive guard.

Insert engine support into guide bores of the front axle carrier. (1)

### **Required special tools**

Engine mount (1) OE (KM-6397)  
(see figure 1)

**Figure 1**



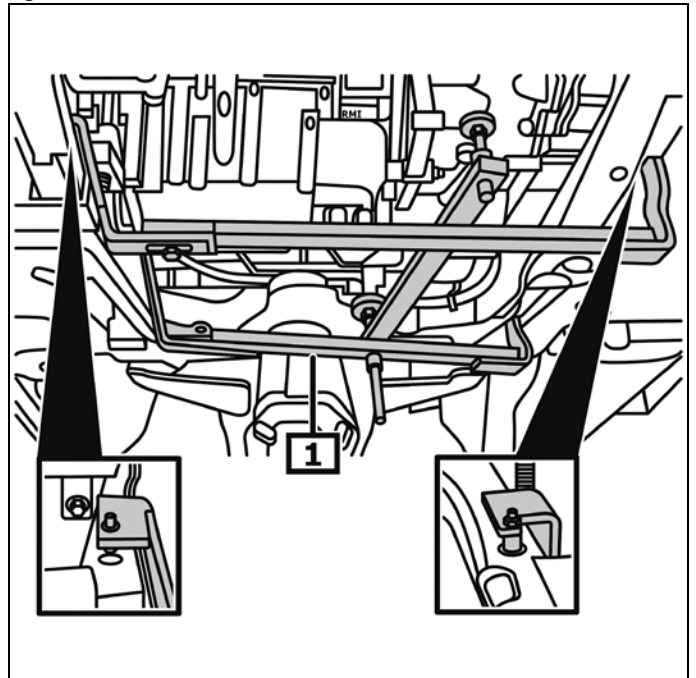
1 Engine mount

Insert engine support into guide bores of the front axle carrier. (1)

### **Required special tools**

Engine mount (1) OE (KM-6001-A)  
(see figure 2)

**Figure 2**

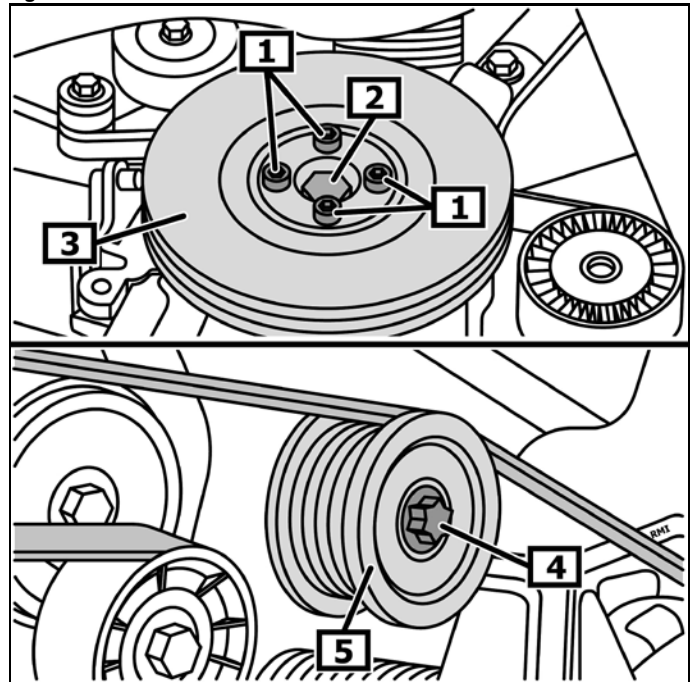


1 Engine mount

### Remove the accessory drive belt.

Unscrew vibration damper screw(s). **(1)**  
Hold up against crankshaft central screw using appropriate tool. **(2)**  
Remove vibration damper. **(3)**  
Unscrew and remove deflection pulley screw(s). **(4)**  
Remove accessory drive belt deflection pulley. **(5)**  
**(see figure 3)**

Figure 3

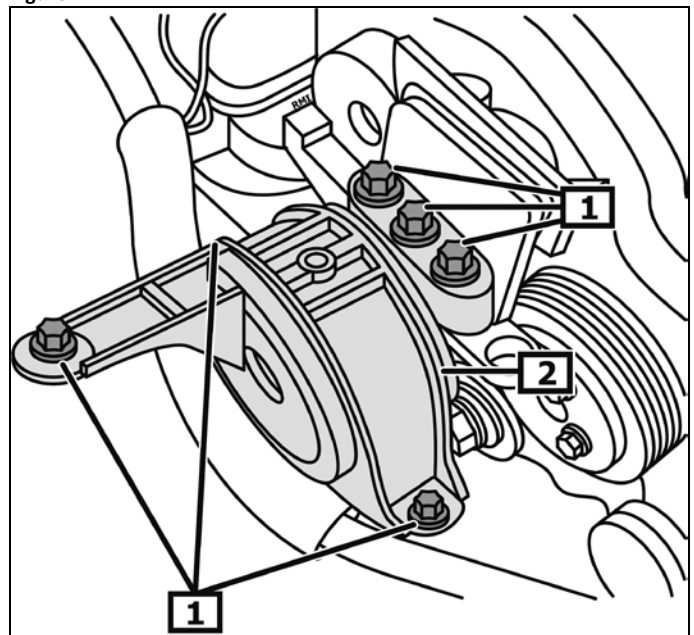


- |                             |                              |
|-----------------------------|------------------------------|
| 1 Vibration damper screw(s) | 2 Crankshaft central screw   |
| 3 Vibration damper          | 4 Deflection pulley screw(s) |
| 5 Deflection pulley         |                              |

Unscrew engine mounting bolt(s). **(1)**  
Remove engine mounting.  
**(see figure 4)**

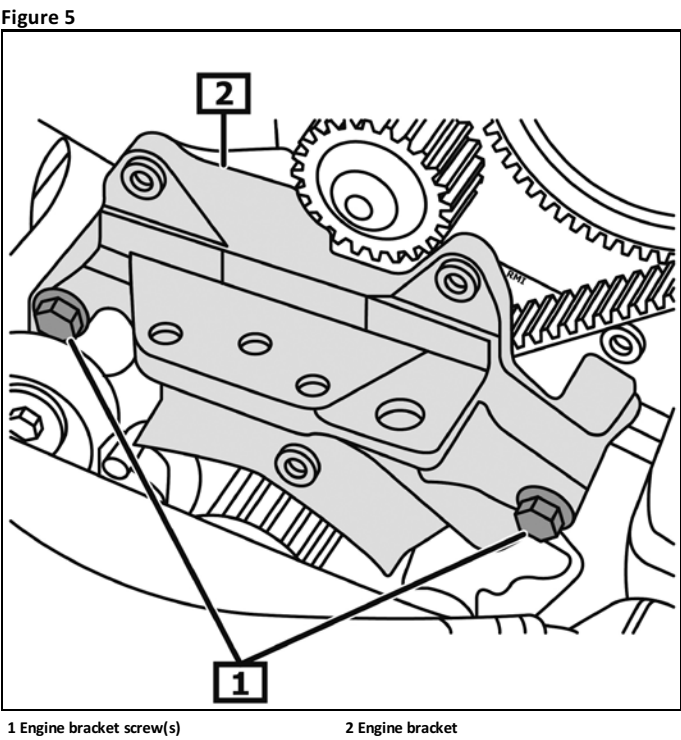
Remove the upper toothed belt cover.

Figure 4

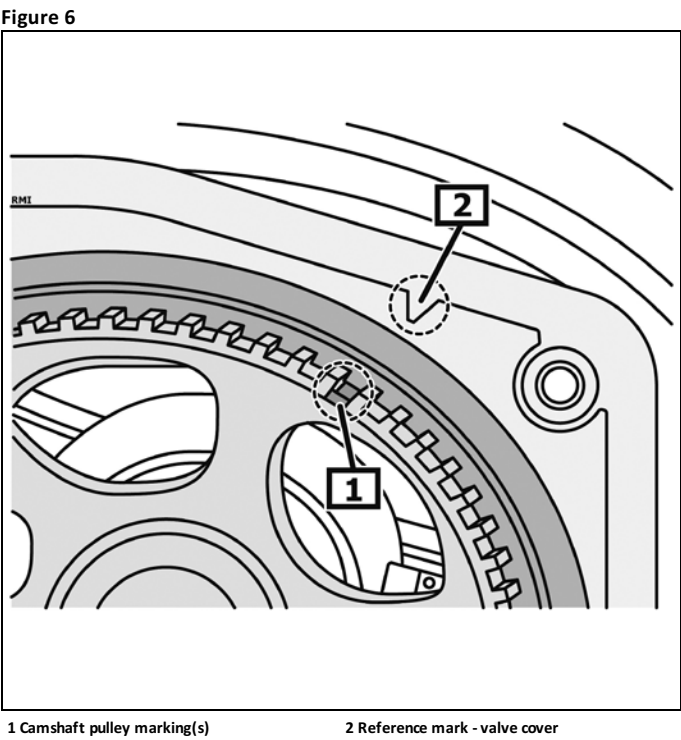


- |                           |                   |
|---------------------------|-------------------|
| 1 Engine mounting bolt(s) | 2 Engine mounting |
|---------------------------|-------------------|

Unscrew engine bracket screw(s). **(1)**  
Remove engine bracket. **(2)**  
(see figure 5)



Set engine to ignition TDC of the 1. cylinder.  
Marking - camshaft timing gear wheel must check with reference mark on valve cover. **(1)(2)**  
(see figure 6)



Unscrew tensioning roller screw(s). (1)  
(see figure 7)

Remove toothed belt.

## Install

Fit toothed belt.

Screw in screw(s). (commercially available) (5)

Use the screwdriver. (6)

Push tensioning device in the direction of arrow.

Indicator must be opposite the reference mark, otherwise repeat toothed belt tensioning. (2)(3)

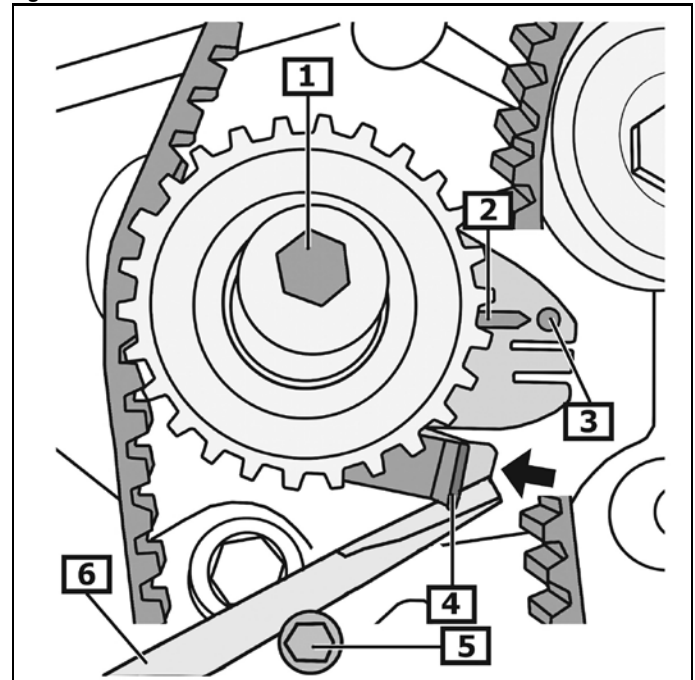
Tighten tensioning roller screw(s). (1)

### Required special tools

Screw(s) (5) (commercially available)

(see figure 7)

Figure 7



1 Tensioning roller screw(s)

2 Pointer

3 Reference mark(s)

4 Setting lever

5 Screw(s)

6 Screwdriver

Screw(s) – remove oil pump. (1)

Screw in stud bolt. (5)

Insert crankshaft blocking tool. (3)

### Required special tools

Crankshaft blocking tool (3)(5) OE (EN-46788)

(see figure 8)

If it is not possible to insert the blocking tools, adjust the valve timing.

Remove blocking tool.

Rotate the crankshaft 2 turns clockwise.

Marking - camshaft timing gear wheel must check with reference mark on valve cover. (1)(2)

(see figure 6)

Insert crankshaft blocking tool.

(see figure 8)

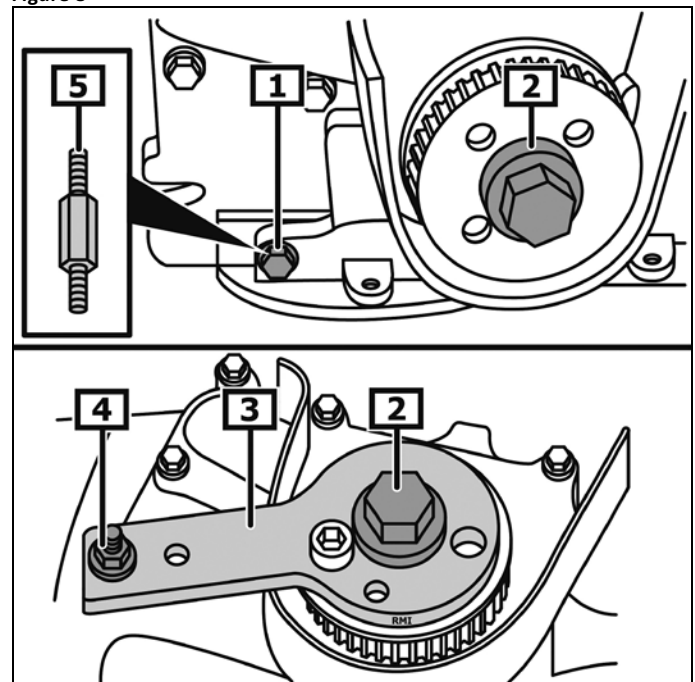
If it is not possible to insert the blocking tools, adjust the valve timing.

Installation in reverse order of removal.

Install the accessory drive belt.

Carry out a test drive

Figure 8



1 Screw(s) - oil pump

2 Screw(s) Crankshaft pulley

3 Fastening tool

4 Bore

5 Stud bolt

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.



### OPEL Vectra C GTS, 3.2 V6, 155 kW



#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

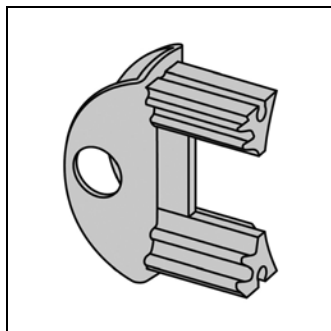
#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley.  
When turning the camshaft, the crankshaft must not be at TDC.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
The toothed belt must not come into contact with oil or coolant!  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
Note radio code. Disconnect battery (negative terminal).  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

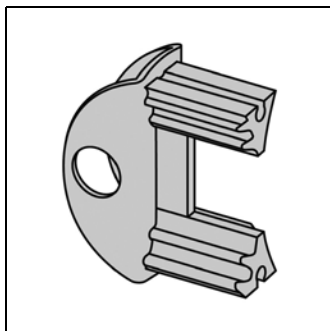
#### **Follow the instructions!**

Carefully note the marking(s) on the toothed built during installation. If one of the markings cannot be seen, the toothed belt must be replaced.  
The corresponding tensioning roller with baseplate must be installed with every toothed belt (note code letter).  
The toothed belt must not be removed until the camshaft pulleys and toothed belt sprocket are locked at TDC using KM-800.  
Moving toothed belt by even one tooth may lead to engine damage.

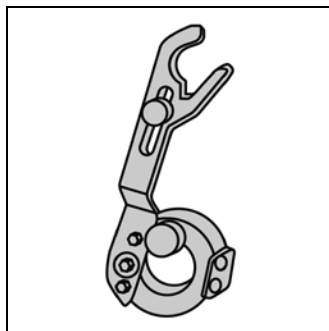
#### **Required special tools**



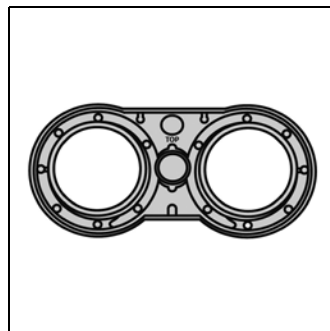
Crankshaft timing gear fixing tool  
OE (KM-800-1) Red



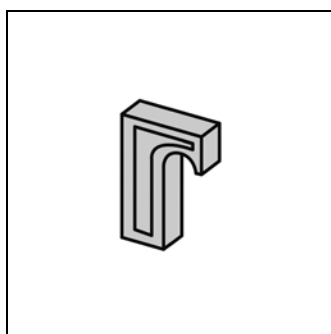
Crankshaft timing gear fixing tool  
OE (KM-800-2) Green



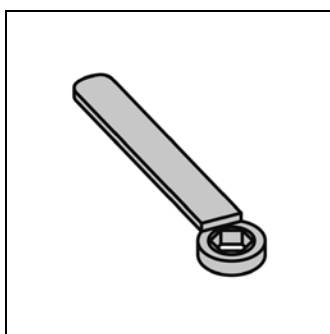
Crankshaft locking tool  
OE (KM-800-10)



Test gauge  
OE (KM-800-20)



Wedge  
OE (KM-800-30)



Tensioning spanner  
OE (MKM-6038)

## Required Labour times/torques

### Scheduled times

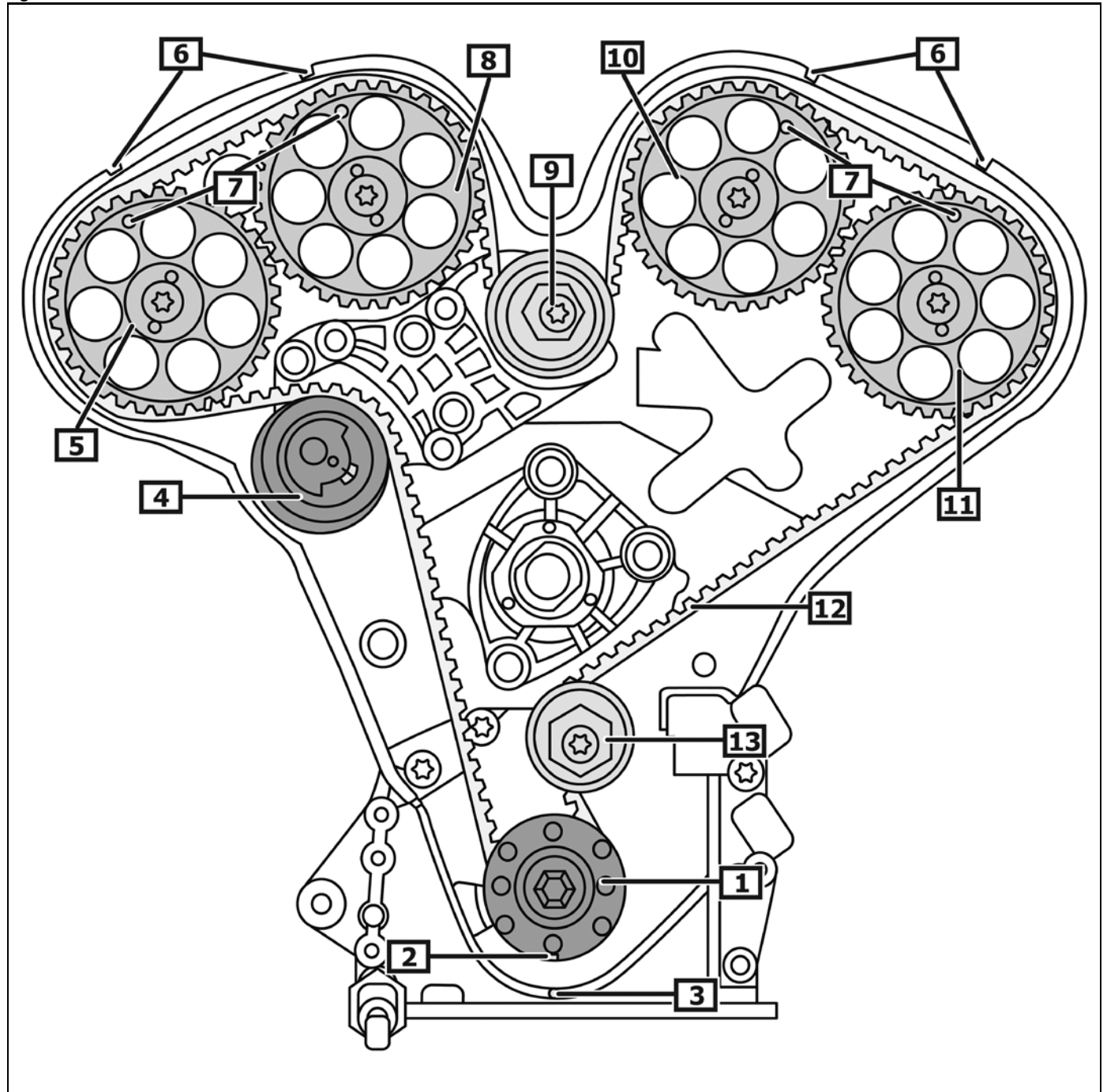
Replace toothed belt	2,20 h
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### Tightening torques

Self-locking screws and nuts must always be replaced.

Coolant pump pulley (1)	(see figure 2) / (see figure 3)	8 Nm + 30° + 15°
Servo pump pulley (2)	(see figure 2) / (see figure 3)	01 stage 8 Nm; 02 stage 30°; 03 stage 30°
Vibration damper (3)	(see figure 2) / (see figure 3)	20 Nm
Toothed belt guard (4)	(see figure 2) / (see figure 3)	8 Nm
Deflection pulley screw(s) (3) (5)	(see figure 8)	40 Nm
Tensioning roller screw(s) (1)	(see figure 9)	20 Nm

Figure 1



1 Crankshaft pulley

5 Outlet camshaft wheel

9 Toothed belt deflection pulley (Top)

13 Toothed belt deflection pulley (bottom)

2 Mark(s)

6 Reference mark(s)

10 Inlet camshaft wheel

3 Reference mark(s)

7 Mark(s)

11 Outlet camshaft wheel

4 Tensioning roller

8 Inlet camshaft wheel

12 Toothed belt

## Remove

### **Lift vehicle.**

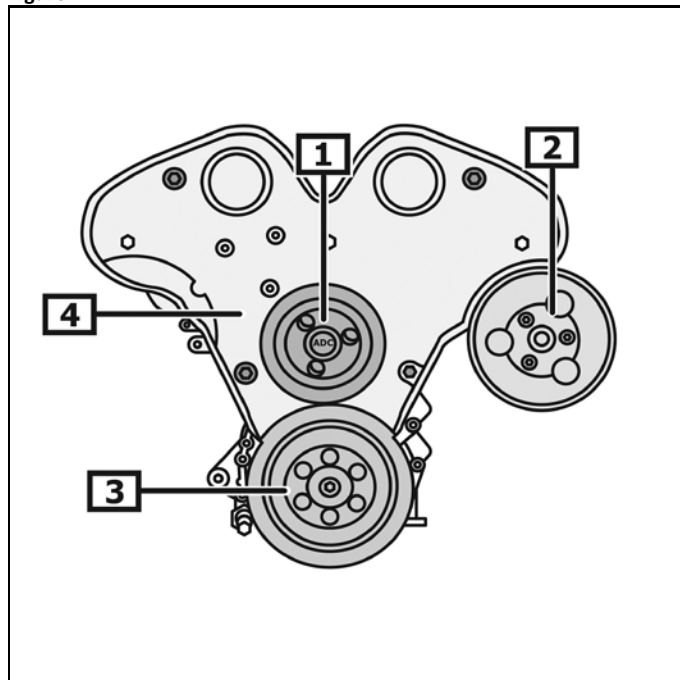
Remove engine cover(s).  
Remove battery.  
Remove windscreen wiper arms. Remove windscreen wiper linkage.  
Remove front suspension cross-brace.  
Remove windscreen washer tank.

### **Accessory drive belt removal**

#### Vehicles up to model year 1999

Remove accessory drive belt tensioning roller.  
Remove coolant pump pulley. **(1)**  
Remove servo pump pulley. **(2)**  
Remove vibration damper. **(3)**  
Remove toothed belt guard. **(4)**  
**(see figure 2)**

**Figure 2**



1 Coolant pump pulley

2 Servo pump pulley

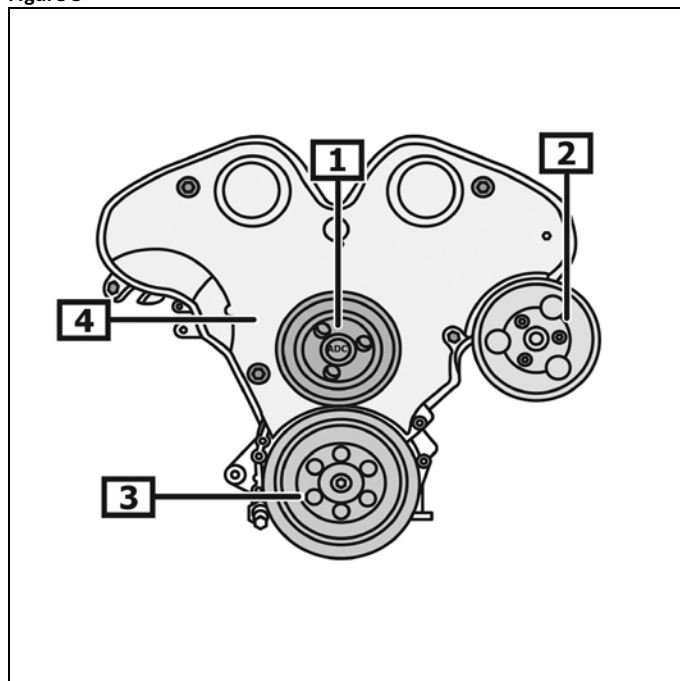
3 Vibration damper

4 Toothed belt guard

#### Vehicles from model year 1999

Remove accessory drive belt tensioning roller.  
Remove coolant pump pulley. **(1)**  
Remove servo pump pulley. **(2)**  
Remove vibration damper. **(3)**  
Remove toothed belt guard. **(4)**  
**(see figure 3)**

**Figure 3**



1 Coolant pump pulley

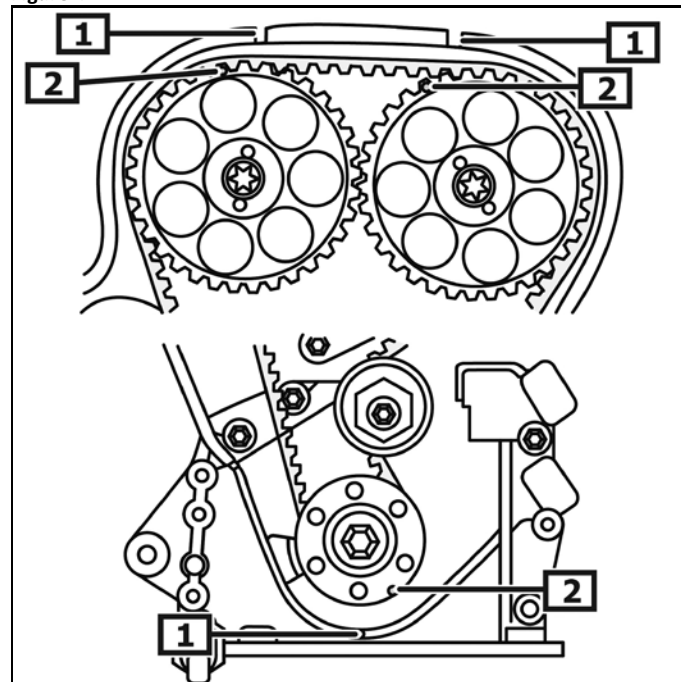
2 Servo pump pulley

3 Vibration damper

4 Toothed belt guard

Rotate engine in the direction of rotation only by the crankshaft pulley.  
Set TDC marking slightly before reference mark. **(1) (2)**  
**(see figure 4)**

Figure 4



1 Reference mark(s)

2 Mark(s)

Insert the crankshaft locking tool. **(11)**  
Tighten setting screw(s). **(10)**  
Carefully rotate crankshaft until setting tool comes into contact with the coolant pump flange.  
Tighten setting screw(s). **(8)**  
**(see figure 5)**

The camshaft pulley markings must align with the reference marks. **(1) (2)**  
Crankshaft TDC marking must flush with the reference mark. **(1) (2)**  
**(see figure 4)**

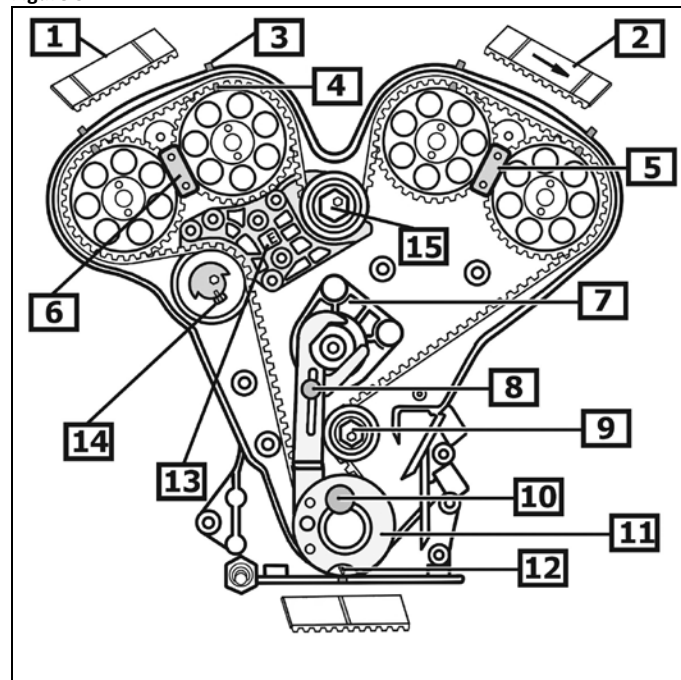
Insert setting tool. **Observe installation position! (5) (6)**  
If setting tool does not lock into place, carefully turn deflection pulley.  
**Green (5) (6)**  
If setting tool does not lock into place, carefully turn deflection pulley.  
**Red (6) (15)**  
Loosen the tensioning roller clockwise using a suitable tool. **(14)**  
Unscrew toothed belt deflection pulley screw. **(9) (15)**  
**(see figure 5)**

Take off toothed belt.

#### Required special tools

Crankshaft locking tool **OE (KM-800-10)**  
Crankshaft timing gear fixing tool **OE (KM-800-1) Red**  
Crankshaft timing gear fixing tool **OE (KM-800-2) Green**  
Tensioning spanner **OE (MKM-6038)**

Figure 5



1 Toothed belt markings

2 Toothed belt running direction

3 Reference mark(s)

4 Mark(s)

5 Crankshaft timing gear fixing tool

6 Crankshaft timing gear fixing tool

7 Coolant pump

8 Setting screw(s)

9 Toothed belt deflection pulley (bottom)

10 Setting screw(s)

11 Crankshaft locking tool

12 TDC marking(s)

13 Toothed belt tensioning device code letter

14 Tensioning roller

15 Toothed belt deflection pulley (Top)

## Install

Carefully note the marking(s) on the toothed belt during installation.

(1)

Note running direction of toothed belt. (2)

(see figure 5)

Fit toothed belt.

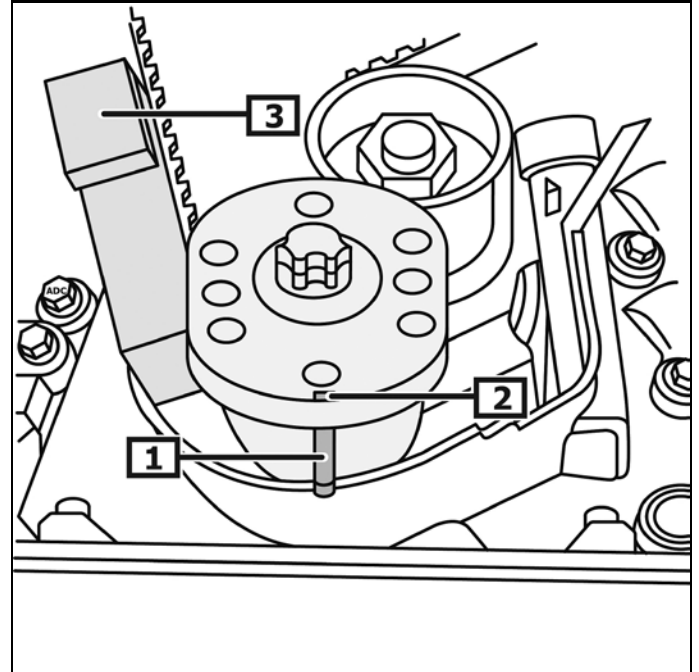
The markings on the toothed belt must be in alignment with the markings on the camshaft gear and driving wheel of the crankshaft. (1)

(2)

Insert taper key.

(see figure 6)

Figure 6



1 Toothed belt markings

2 Reference mark(s)

3 Wedge

### Version 1

With tensioning roller code letter "D" (1)

(see figure 7)

Fit the toothed belt anti-clockwise starting at the deflection pulley. (9)  
Toothed belt should not be able to be deflected between toothed belt deflection pulley and outlet camshaft pulley - cylinder bank on the right side by more than 1 cm.

Markings on toothed belt must align with the markings and reference marks on the engine. (1) (3) (4) (12)

(see figure 5)

### Version 2

With tensioning roller code letter "E - EA" (1)

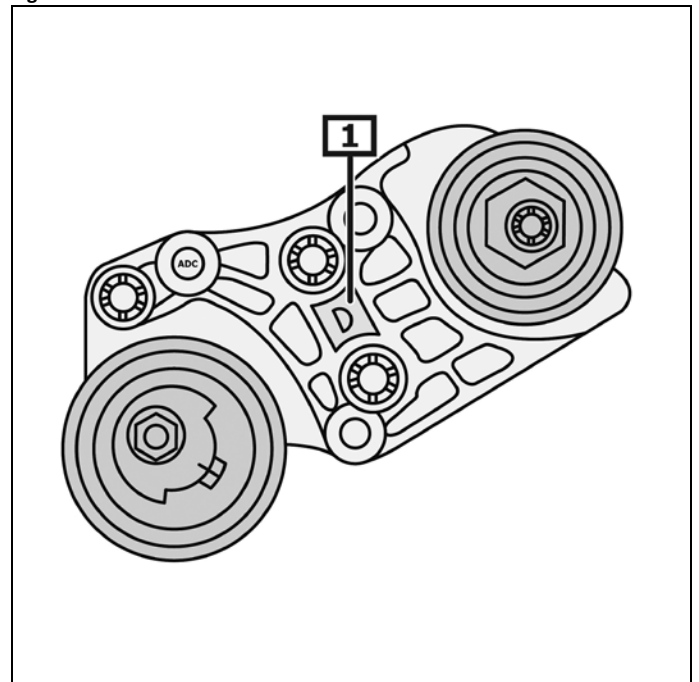
(see figure 7)

Fit the toothed belt clockwise starting at the tensioning roller. (14)  
Toothed belt should not be able to be deflected between toothed belt deflection pulley and outlet camshaft pulley - cylinder bank on the right side by more than 1 cm.

Markings on toothed belt must align with the markings and reference marks on the engine. (1) (3) (4) (12)

(see figure 5)

Figure 7



1 Toothed belt tensioning device code letter

The adjustment of the toothed belt tension always begins at the toothed belt deflection pulley. (1)

Turn deflection pulley eccentric anti-clockwise using a suitable tool. (2)

The tip of the eccentric deflection pulley should be at the 2 'o'clock position. (2)

Tighten toothed belt deflection pulley screw. (3)

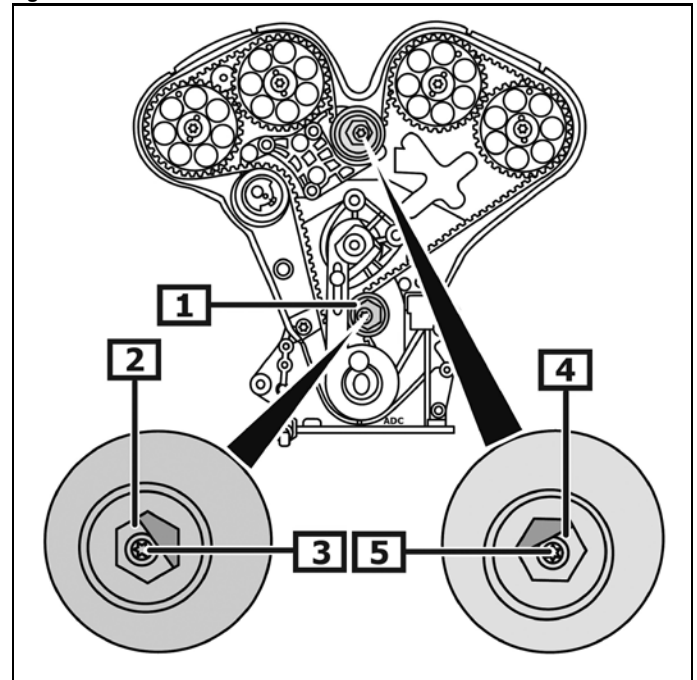
Turn deflection pulley eccentric anti-clockwise using a suitable tool. (4)

The tip of the eccentric deflection pulley should be at the 11 'o'clock position. (4)

Tighten toothed belt deflection pulley screw. (5)

(see figure 8)

Figure 8



1 Toothed belt deflection pulley

2 Eccentric deflection pulley

3 Deflection pulley screw(s)

4 Eccentric deflection pulley

5 Deflection pulley screw(s)

Unscrew tensioning roller screw(s). (1)

Rotate tensioning roller anti-clockwise in the direction of the stop.

Turn tensioning roller anti-clockwise using suitable tool.

Adjust the dimension A.

**Dimension A: about 1 mm**

Tighten tensioning roller screw(s).

(see figure 9)

Remove all fixing tools.

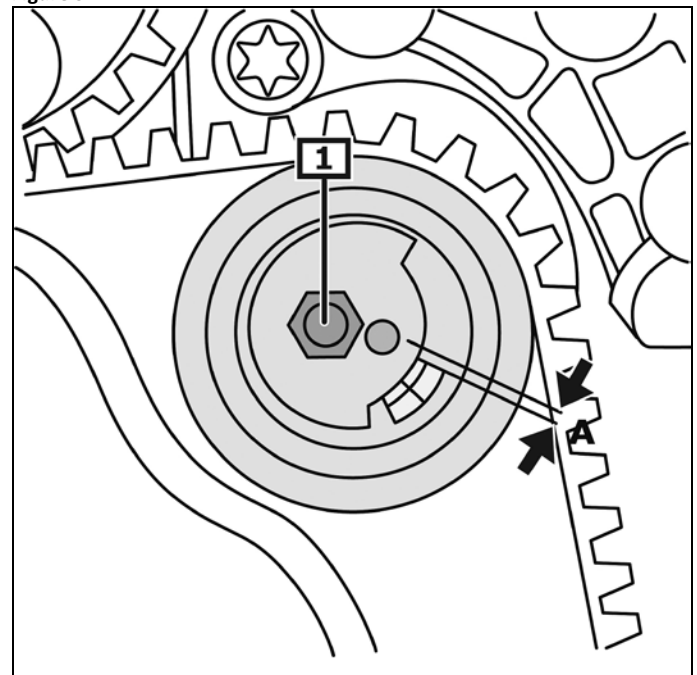
Rotate engine two revolutions in the engine rotating direction.

Rotate engine in the direction of rotation only by the crankshaft pulley.

Set TDC marking slightly before reference mark. (1) (2)

(see figure 4)

Figure 9



1 Tensioning roller screw(s)

Dimension A

The camshaft pulley markings must be slightly in front of the reference marks.  
 Insert the crankshaft locking tool. **(11)**  
 Tighten setting screw(s). **(10)**  
 Carefully rotate crankshaft until setting tool comes into contact with the coolant pump flange.  
 Tighten setting screw(s). **(8)**  
**(see figure 5)**

The camshaft pulley markings must align with the reference marks.  
 Crankshaft TDC marking must flush with the reference mark.

#### **Required special tools**

Crankshaft locking tool **OE (KM-800-10)**

Place test gauge on camshaft pulleys of right cylinder bank. **Observe installation position! (1)**  
 The markings on the camshaft pulleys must be slightly in front of the markings on the test gauge.  
 Turn deflection pulley eccentric anti-clockwise using a suitable tool.  
 The markings on the camshaft pulleys must align with the markings on the test gauge. **(2)**  
 The tip of the eccentric deflection pulley should be at the 12 'o'clock position.  
 Tighten toothed belt deflection pulley screw.  
 Remove test gauge.  
**(see figure 10)**

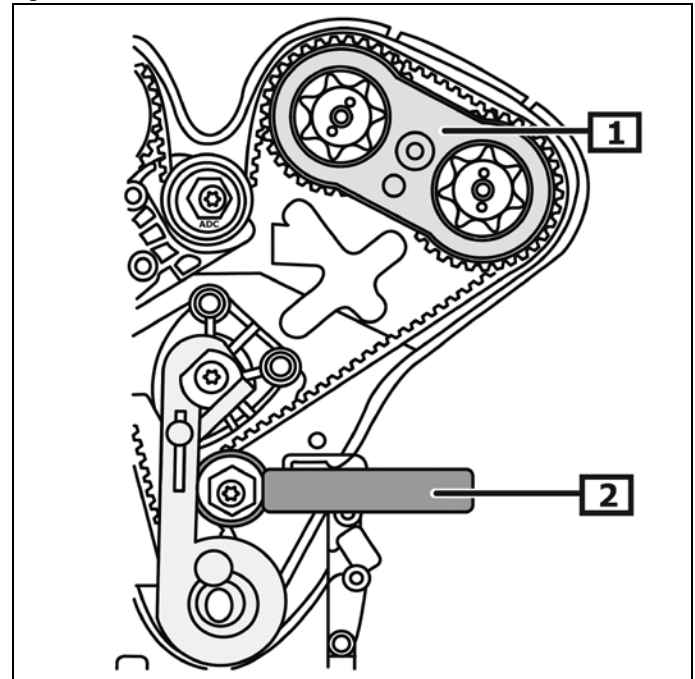
**The camshaft pulleys of the right cylinder bank must be precisely set before setting the camshaft pulleys of the left cylinder bank.**

#### **Required special tools**

Test gauge **OE (KM-800-20)**

Tensioning spanner **OE (MKM-6038)**

**Figure 10**



1 Test gauge

2 Tensioning spanner

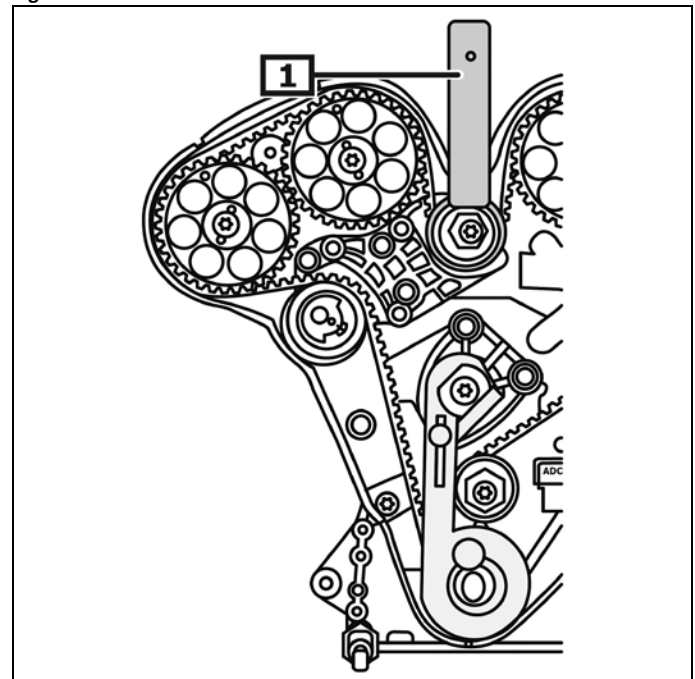
Place test gauge on camshaft pulleys of left cylinder bank. **Observe installation position!**  
 The markings on the camshaft pulleys must be slightly in front of the markings on the test gauge.  
 Turn deflection pulley eccentric anti-clockwise using a suitable tool.  
**(1)**  
 The markings on the camshaft pulleys must align with the markings on the test gauge.  
 The tip of the eccentric deflection pulley should be at the 9 'o'clock position.  
 Tighten toothed belt deflection pulley screw.  
 Remove test gauge.  
**(see figure 11)**

#### **Required special tools**

Test gauge **OE (KM-800-20)**

Tensioning spanner **OE (MKM-6038)**

**Figure 11**



1 Tensioning spanner



Unscrew tensioning roller screw(s). (1)  
Rotate tensioning roller anti-clockwise in the direction of the stop.  
Turn tensioning roller anti-clockwise using suitable tool.  
Adjust the dimension B.

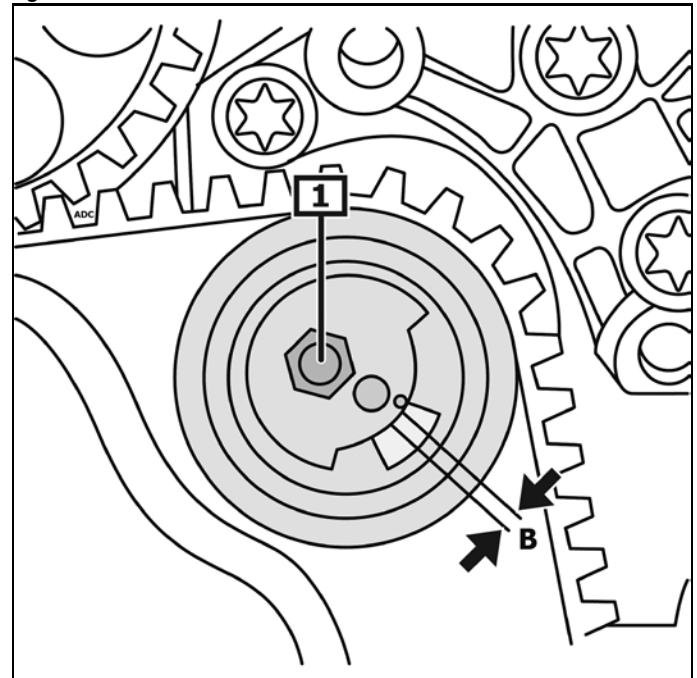
**Dimension B: 3 - 4 mm**

Tighten tensioning roller screw(s). (1)  
(see figure 12)

Tighten deflection pulley screw(s).  
Remove all fixing tools. Remove test gauge.

Rotate engine two revolutions in the engine rotating direction.  
The camshaft pulley markings must be slightly in front of the reference marks.  
Insert the crankshaft locking tool.  
Tighten setting screw(s).  
Carefully rotate crankshaft until setting tool comes into contact with the coolant pump flange.  
Tighten setting screw(s).  
The camshaft pulley markings must align with the reference marks.

**Figure 12**



1 Tensioning roller screw(s)

Dimension B

**Follow the instructions!**

The markings on the toothed belt no longer match with the reference marks after one or more engine revolutions. Markings on the toothed belt are for assembly purposes only.

Crankshaft TDC marking must flush with the reference mark.  
Place test gauge consecutively on the pair of pulleys of the right and left cylinder banks.  
TDC - Check markings, adjust if necessary.  
If the target value is not achieved, the setting procedure must be repeated completely.

Continue assembly in reverse order of removal.

**Fit accessory drive belt.**

**Required special tools**

Crankshaft locking tool OE (KM-800-10)  
Test gauge OE (KM-800-20)

Decode radio, program volatile memories.  
Start engine and check function.

Interrogate error log. Carry out a test drive.  
Document toothed belt change.

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

## Remove/install timing belt

PEUGEOT 307 (3A/C), 2.0, 105 kW

from organisation number 09653, Engine EW10J4



### **WARNING**

Electric radiator fan can start even with the engine cut!

Rotating components can result in cuts and squashing!

Disconnect plug connection on electric radiator fan.

### **Note(s)**

Rotate engine in the direction of rotation only by the crankshaft pulley.

Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

Adjustment work on the toothed belt must only be carried out with a cold engine.

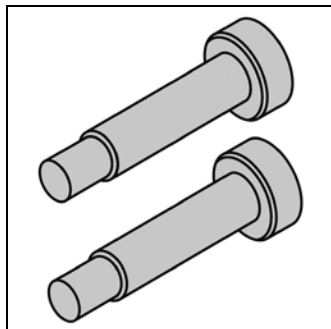
Note radio code.

It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

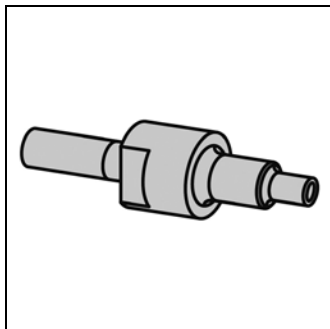
Toothed belt does not need to be after disassembly.

### **Required special tools**

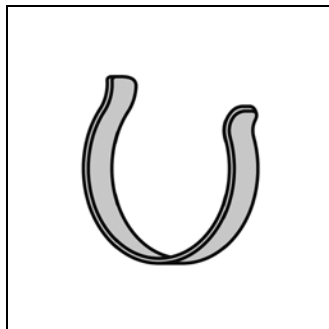
Workshop crane (commercially available)



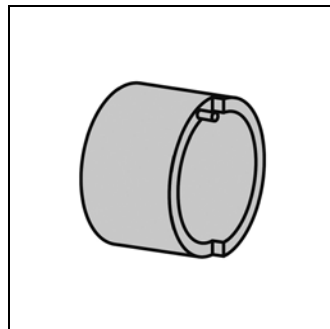
Camshaft(s) blocking pin(s)  
OE (0189-A)



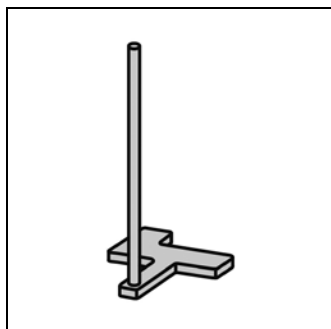
Crankshaft blocking pin(s)  
OE (0189-R)



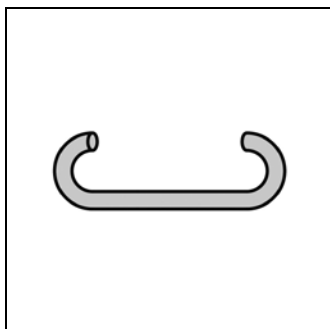
Fitting clamp(s)  
OE (0189-K)



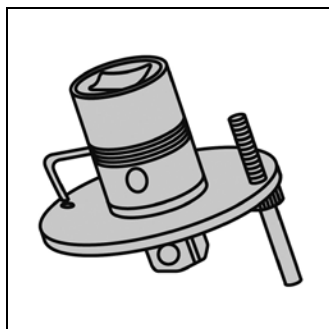
Tensioning device  
OE (0189-S1)



Tensioning roller blocking tool  
OE (0189-S2)



Hook  
OE (0102-J)



Torque angle indicator  
OE (Facom D.360)

## Required Labour times/torques

### Scheduled times

Replace toothed belt	3,90 h
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### Tightening torques

Self-locking screws and nuts must always be replaced.

Engine mounting (3)	(see figure 1)		60 Nm
Crankshaft central screw (3)	(see figure 3)	Use new screw(s).	Engine EW10J4, 01 stage 40 Nm; Engine EW10J4, 02 stage 53°
Tensioning roller screw(s) (4)	(see figure 5)		up to organisation number 09652, Engine EW10J4 20 Nm; from organisation number 09653, Engine EW10J4 19 - 23 Nm
Toothed belt deflection pulley (7)	(see figure 5)		up to organisation number 09652, Engine EW10J4 35 Nm; from organisation number 09653, Engine EW10J4, 01 stage 15 Nm; from organisation number 09653, Engine EW10J4, 02 stage 37 Nm
Wheel attachment			Steel rim(s) 90 Nm; Aluminium rim(s) 100 Nm

## **Remove**

**Disconnect battery (negative terminal).**

**Lift vehicle.**

Remove the right front wheel.

Remove wheel arch liner at front right.

**Remove accessory drive belt.**

Lift engine by engine suspension eyes until engine mounting is unloaded. **(3)**

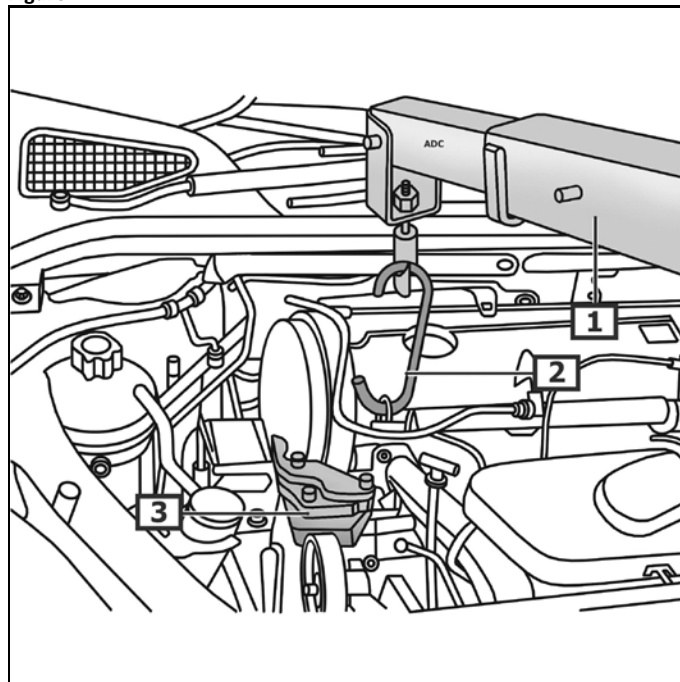
### **Required special tools**

Workshop crane **(1)** (commercially available)

Hook **(2)** OE (0102-J)

(see figure 1)

**Figure 1**



1 Workshop crane

2 Hook

3 Engine mounting

Unscrew and remove the hydraulic line(s) holder nuts(s). **(1)**

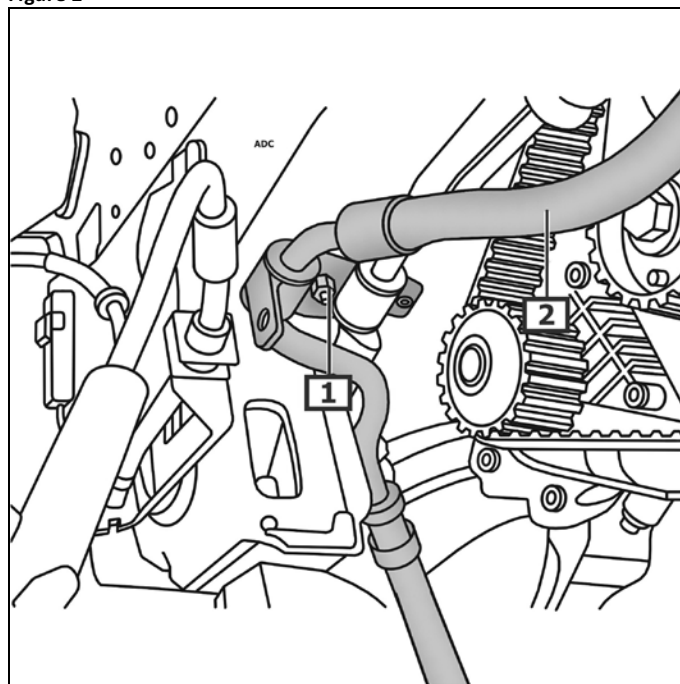
Loosen power steering hydraulic line(s) from bracket(s).

(see figure 2)

Remove engine mounting. **(3)**

(see figure 1)

**Figure 2**

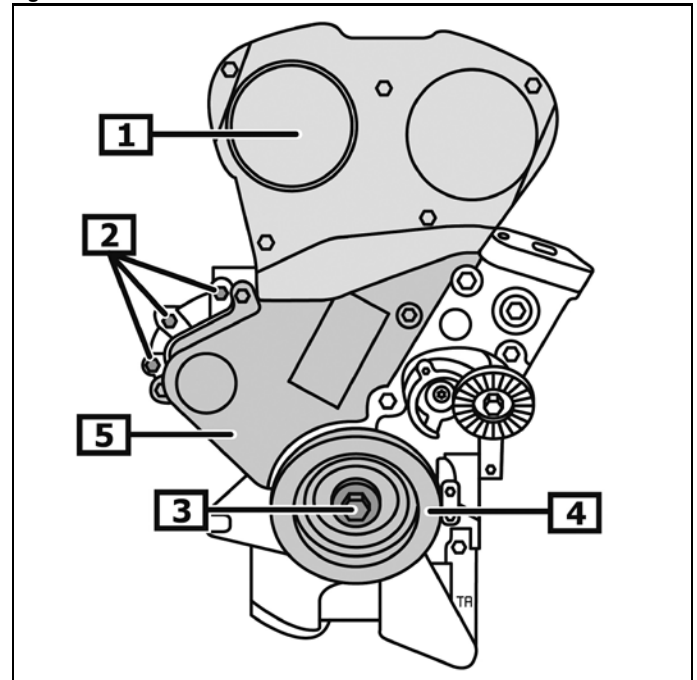


1 Hydraulic line(s) holder nut(s)

Remove toothed belt guard at the top. (1)

Do not loosen the coolant pump screw(s). (2)  
(see figure 3)

Figure 3



1 Toothed belt guard at the top

2 Coolant pump screw(s)

3 Crankshaft central screw

4 Crankshaft pulley

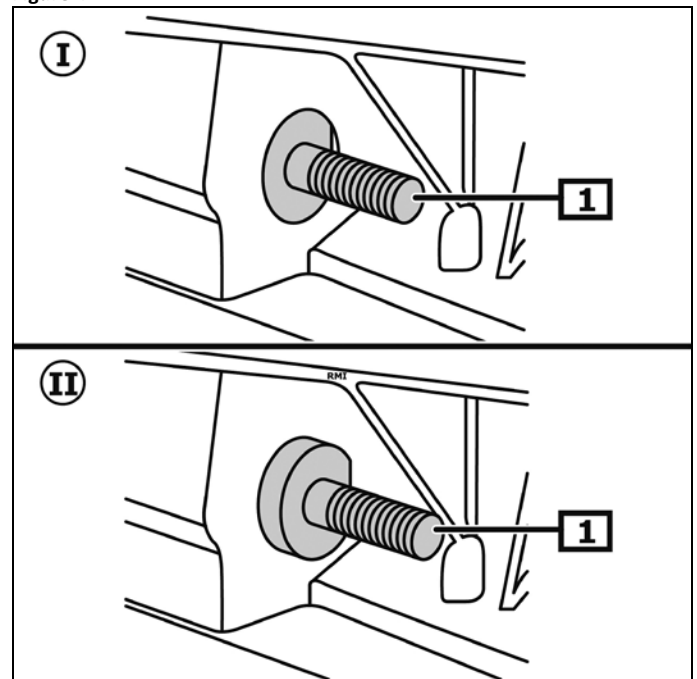
5 Toothed belt guard at the bottom

Turned the engine to the TDC position.  
Insert the crankshaft blocking pin(s). (1)

**Required special tools**

Crankshaft blocking pin(s) (1) OE (0189-R)  
(see figure 4)

Figure 4



1 Crankshaft blocking pin(s)

I Blocking for manual gearbox

II Blocking for automatic gearbox

Insert camshaft blocking pin(s). (1)(2)(3)

**Required special tools**

Camshaft(s) blocking pin(s) (1) OE (0189-A)  
(see figure 5)

**Remove crankshaft pulley not until crankshaft and camshaft have been blocked.**

Unscrew the central crankshaft screw. (3)

Remove crankshaft pulley. (4)

Mount toothed belt guard at the bottom. (5)

(see figure 3)

Unscrew tensioning roller screw(s). (4)

Loosen the tensioning roller clockwise using a suitable tool. (5)

Remove toothed belt. (6)

(see figure 5)

**Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.**

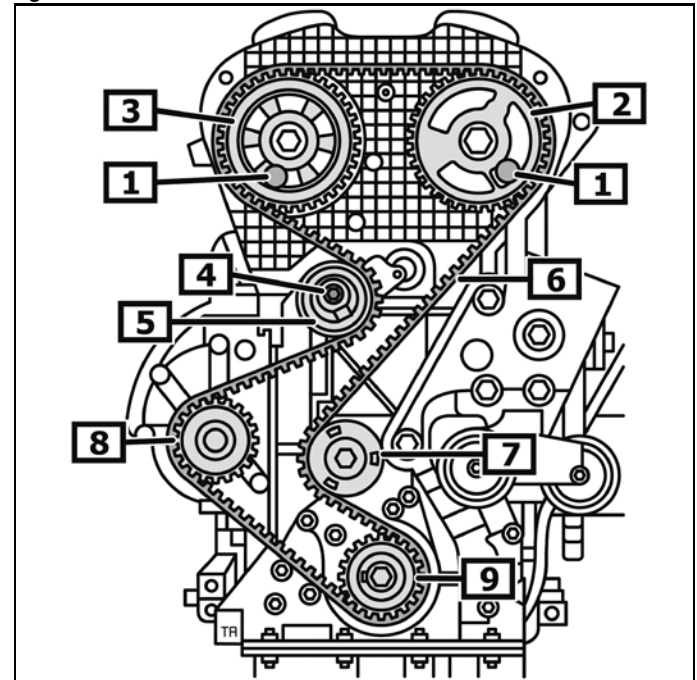
Check toothed belt tension pulley and deflection pulley and replace, if necessary. (5)(7)

Check coolant pump for tightness and light moving and replace, if necessary. (8)

(see figure 5)

**Toothed belt does not need to be after disassembly.**

Figure 5



1 Camshaft(s) blocking pin(s)

2 Inlet camshaft wheel

3 Outlet camshaft wheel

4 Tensioning roller screw(s)

5 Tensioning roller

6 Toothed belt

7 Toothed belt deflection pulley

8 Coolant pump

9 Crankshaft pulley

## Install

Using the tensioning tool, turn tension roller clockwise until pointer exceeds reference mark. **(1)(2)(3)**  
Install tensioning roller blocking tool. **(4)**  
Remove tensioning tool. **(1)**

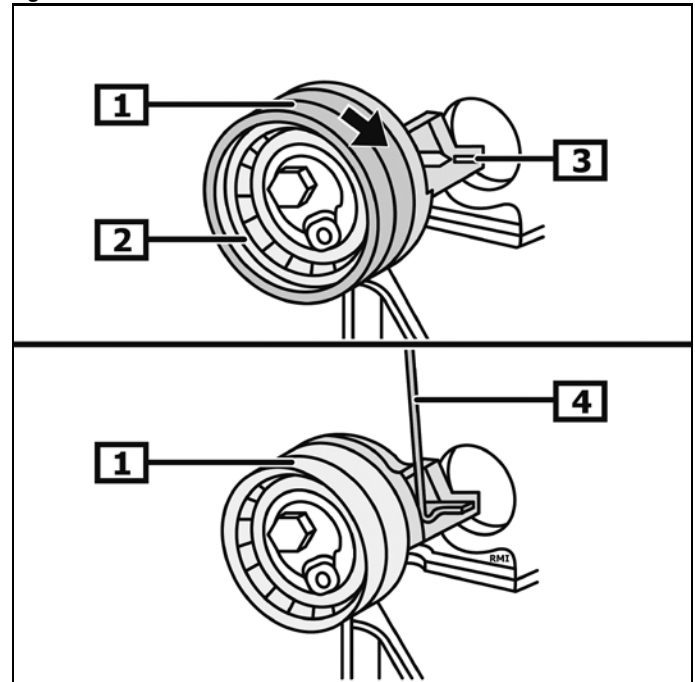
### Required special tools

Tensioning device **(1) OE (0189-S1)**

Tensioning roller blocking tool **(4) OE (0189-S2)**

(see figure 6)

Figure 6



1 Tensioning device

2 Tensioning roller

3 Reference mark(s)

4 Tensioning roller blocking tool

Place the toothed belt on the crankshaft pulley and fix in place using the retaining clip. **(1)(2)(3)**

### Required special tools

Fitting clamp(s) **(3) OE (0189-K)**

(see figure 7)

Fit the toothed belt in the following order: deflection pulley, camshaft pulley, coolant pump pulley and tensioning roller.

Remove mounting clamp(s). **(3)**

(see figure 7)

Remove the outlet camshaft locking tool. **(1)(3)**

(see figure 5)

Remove tensioning roller blocking tool. **(4)**

(see figure 6)

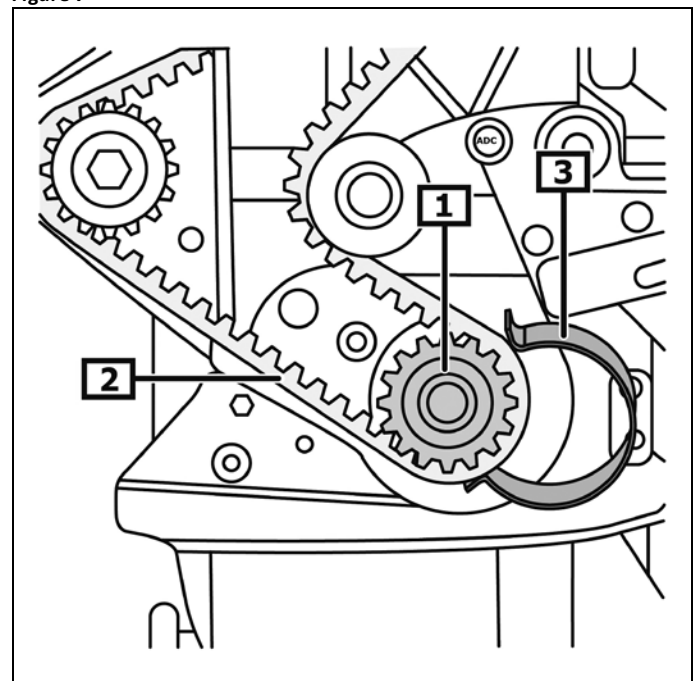
Install the lower toothed belt guard. **(5)**

Install crankshaft pulley. **(4)**

Tighten the crankshaft central screw. **(3)**

(see figure 3)

Figure 7



1 Crankshaft pulley

2 Toothed belt

3 Fitting clamp(s)

**Adjustment work on the toothed belt must only be carried out with a cold engine.**

Turn the tensioning roller eccentric anti-clockwise using the Allen key until the pointer passes the reference mark. **(2)(3)(4) (A)(B)**

**Indicator must exceed reference mark by at least 10°. (3) (A)(B) (see figure 8)**

**If required angle value is not achieved, replace tensioning roller and toothed belt, as required.**

Using the Allen key, turn tensioning roller eccentric clockwise until the pointer is in alignment with the reference mark. **(2)(3)(4)**

**Reference mark must not be exceeded, otherwise repeat toothed belt tensioning.**

Tighten tensioning roller screw(s). **(5)**  
Hold the tensioning roller eccentric in position.

**Tensioning roller must not rotate while tightening. (see figure 8)**

The hexagonal drive must be at least 15° below sealing surface of cylinder head. **(2)(6)**

**If required angle value is not achieved, replace tensioning roller and toothed belt, as required. (see figure 8)**

Remove inlet camshaft locking tool. **(1)(2)**  
**(see figure 5)**

Remove crankshaft blocking pin(s). **(1)**  
**(see figure 4)**

Rotate engine ten times in the direction of engine revolutions.

**Do not turn the engine backwards.**

Insert inlet camshaft locking tool. **(1)(2)**  
**(see figure 5)**

Check toothed belt tension.  
Indicator must be opposite the reference mark, otherwise repeat toothed belt tensioning. **(3)(4)**  
**(see figure 8)**

Remove blocking tool.

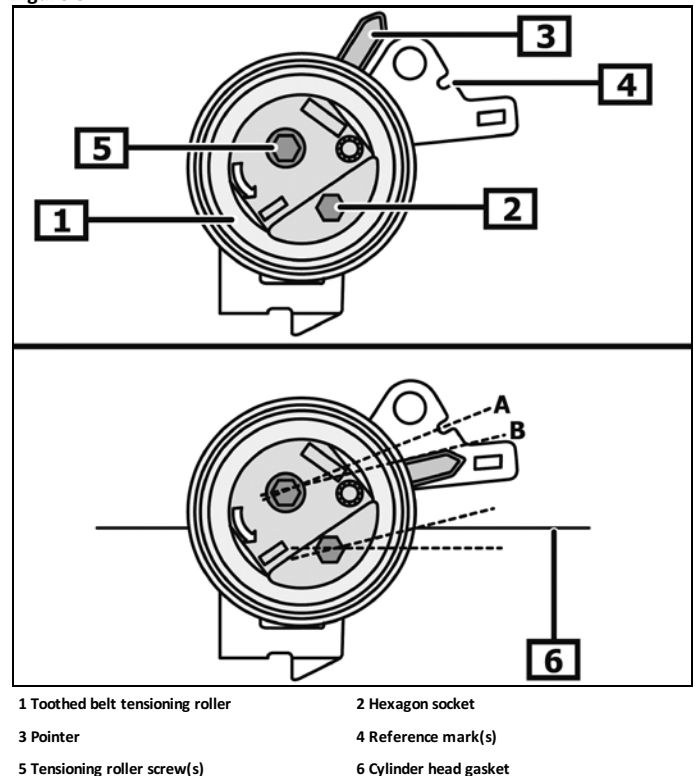
**Installation in reverse order of removal.**

**Fit accessory drive belt.**

Decode radio, program volatile memories.  
Start engine and check function.

Interrogate error log.  
Carry out a test drive.  
Document toothed belt change.

**Figure 8**





## Remove/install timing belt

### RENAULT Captur (J5\_, H5\_), 1.5 dCi 90, 66 kW



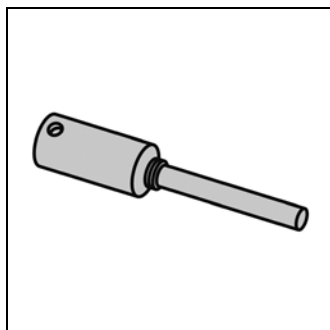
#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

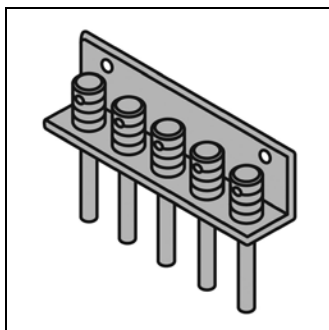
#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
The toothed belt must not come into contact with oil or coolant!  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
The used toothed belt must not be installed again.  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

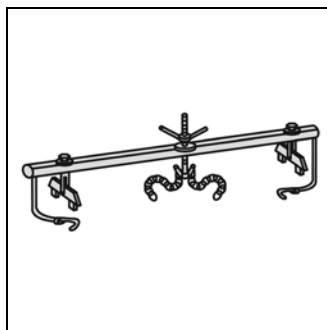
#### **Required special tools**



Crankshaft blocking pin(s)  
OE (Mot. 1489)



Locking pin(s) – camshaft(s)/crankshaft.  
OE (Mot. 1430)



Engine bridge  
OE (Mot. 1453)

#### **Required Labour times/torques**

##### Scheduled times

Replace toothed belt	2,90 h
----------------------	--------

##### Tightening torques

Self-locking screws and nuts must always be replaced.

Engine mount screw(s) (2)	(see figure 1)		62 Nm
Engine bracket screw(s) (1)	(see figure 2)		62 Nm
Engine block closure screw (1)	(see figure 4)		25 Nm
Camshaft timing gear wheel screw (5)(6)	(see figure 5)		14 Nm; Central camshaft screw, 01 stage 25 Nm; Central camshaft screw, 02 stage 54 - 66°
Tensioning roller screw (2)	(see figure 6)		27 Nm
Crankshaft pulley		Use new screw.	M12, 01 stage 60 Nm; M12, 02 stage 90 - 110°; M14, 01 stage 120 Nm; M14, 02 stage 80 - 110°
Wheel attachment			01 stage 30 Nm; 02 stage 105 Nm

## Remove

Lift vehicle

Disconnect battery.

Remove front wheels.

Remove front bumper cover.

Remove engine cover(s).

Remove accessory drive belt.

Remove crankshaft pulley.

Screw in crankshaft pulley screw(s) incl. spacing piece.

Hang engine to engine bridge.

### Required special tools

Engine bridge OE (Mot. 1453)

Unscrew engine mounting bolt(s). (2)

Remove engine mounting. (1)

(see figure 1)

Remove the upper toothed belt cover.

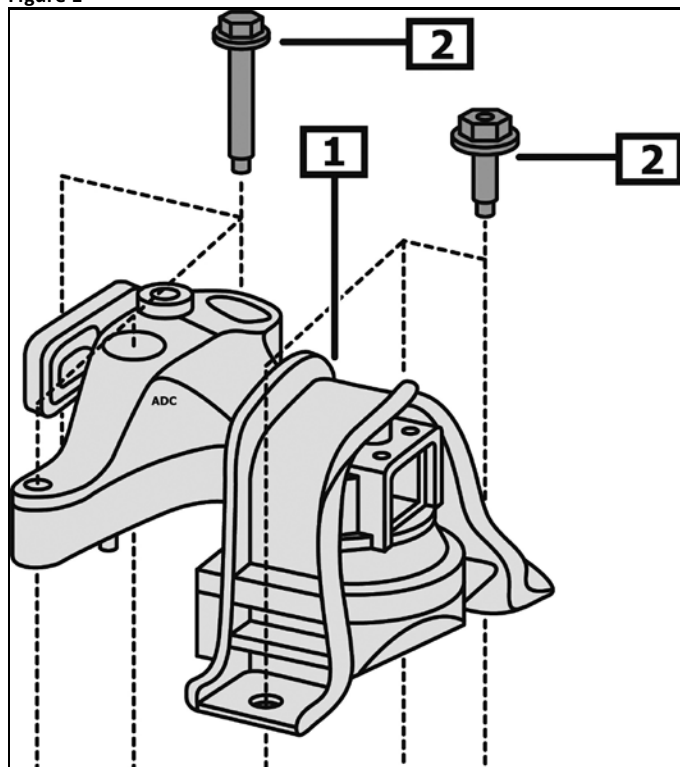
Remove the lower toothed belt cover.

Unscrew engine bracket screw(s). (1)

Remove engine bracket. (2)

(see figure 2)

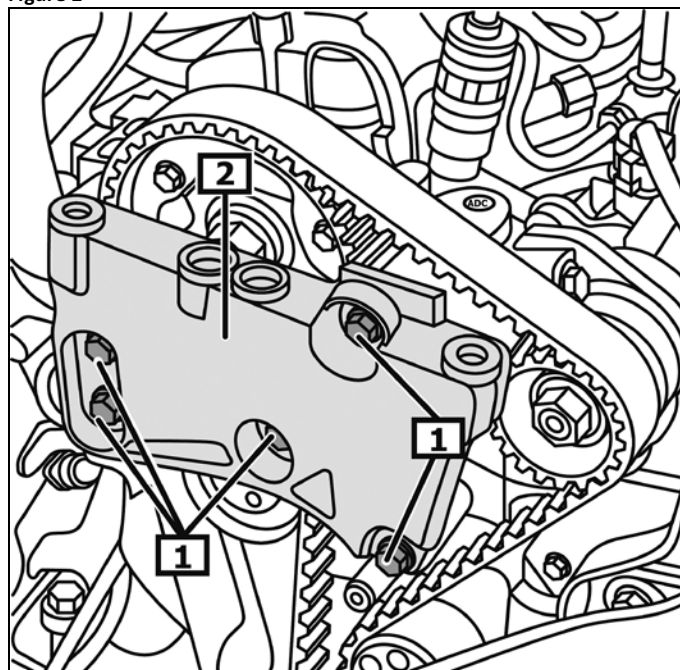
Figure 1



1 Engine mounting

2 Engine mount screw(s)

Figure 2

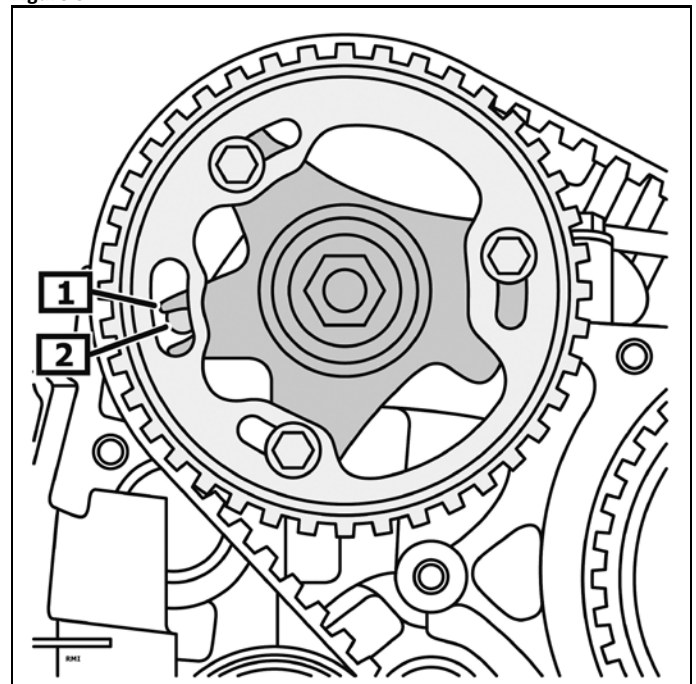


1 Engine bracket screw(s)

2 Engine bracket

Place cylinder head bore shortly in front of cylinder head bore. (1)(2)  
(see figure 3)

Figure 3



1 Camshaft(s) recess(es)

2 Bore

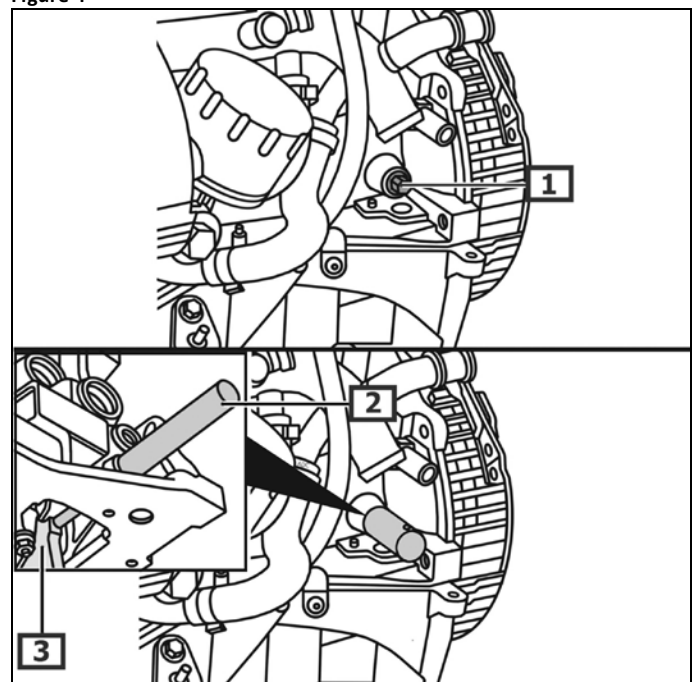
Unscrew and remove engine block locking screw. (1)  
Turn crankshaft clockwise until 1. cylinder is shortly before TDC.  
Insert crankshaft blocking tool. (2)  
Turn camshaft slowly clockwise until crank web contacts the blocking tool. (2)(3)

**Required special tools**

Crankshaft blocking pin(s) (2) OE (Mot. 1489)  
(see figure 4)

Do not use locking pin(s) as counterholder.

Figure 4



1 Engine block closure screw

2 Crankshaft blocking tool

3 Crankshaft

Insert camshaft blocking pin(s). (1)  
 Unscrew tensioning roller screw(s). (2)  
 Loosen toothed belt.  
 Remove toothed belt.  
 Unscrew and remove tensioning roller screw. (2)  
 Remove tensioning roller. (3)

#### Required special tools

Locking pin(s) – camshaft(s)/crankshaft. (1) OE (Mot. 1430)  
 (see figure 5)

### Install

**Replace the tension pulley when replacing the toothed belt.**  
**Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.**

Install tension roller for toothed belt. (3)

**The tensioning roller lug must sit correctly in the groove. (3)(4)**

Unscrew and remove lower camshaft gear screw. (5)  
 Loosen camshaft timing gear wheel screw(s) by approx. one turn. (6)  
 Crankshaft groove must show upward.  
 Position high pressure pump TDC marking to show vertically upward.  
 (7)  
 (see figure 6)

**Check to see whether the locking pin abuts the crankshaft.**

Place toothed belt on crankshaft wheel starting clockwise.

Crankshaft groove must show upward.  
 Position high pressure pump TDC marking to show vertically upward.  
 Offset the high-pressure pump impeller marking by one tooth to the right.  
 The markings on the toothed belt must be in alignment with the markings on the camshaft gear, the high-pressure pump impeller, and driving wheel of the crankshaft.  
 (see figure 6)

#### Note:

In case the toothed belt is correctly placed, exactly 20 spaces between the teeth must be between the camshaft timing gear wheel mark and the high-pressure pump impeller mark.

Turn the tensioning roller eccentric anti-clockwise using the Allen key until the pointer passes the reference mark. (1)(2)  
 (see figure 7)

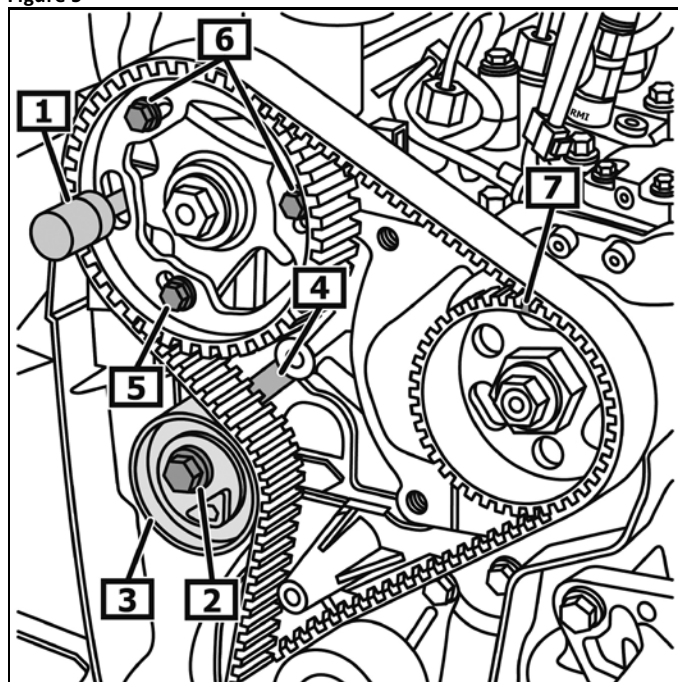
Screw in camshaft pulley screw(s).  
 Tighten camshaft pulley screw(s).  
 Remove all blocking tool(s).  
 Turn crankshaft by two revolutions in running direction of the engine.

Turn crankshaft clockwise until 1. cylinder is shortly before TDC.  
 Insert crankshaft blocking tool. (2)  
 Turn camshaft slowly clockwise until crank web contacts the blocking tool. (2)(3)  
 (see figure 4)

Insert blocking pin(s) for crankshaft timing gear. (2)  
 (see figure 5)

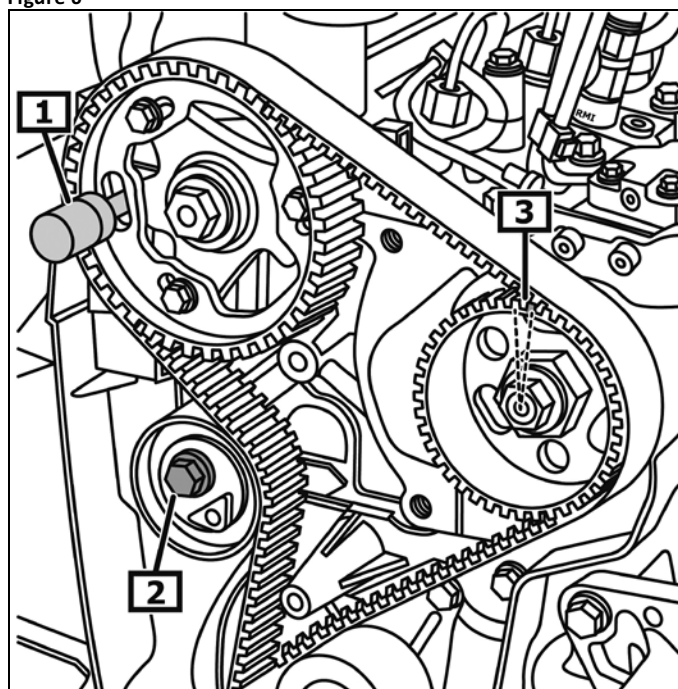
The tensioning roller pointer can assume two positions after the two turns.

Figure 5



- |  |                              |
|--|------------------------------|
| 1 Locking pin(s) – camshaft(s)/crankshaft. | 2 Tensioning roller screw(s) |
| 3 Toothed belt tensioning roller           | 4 Groove                     |
| 5 Camshaft pulley bolt(s)                  | 6 Camshaft pulley bolt(s)    |
| 7 Marking(s), high-pressure pump impeller  |                              |

Figure 6

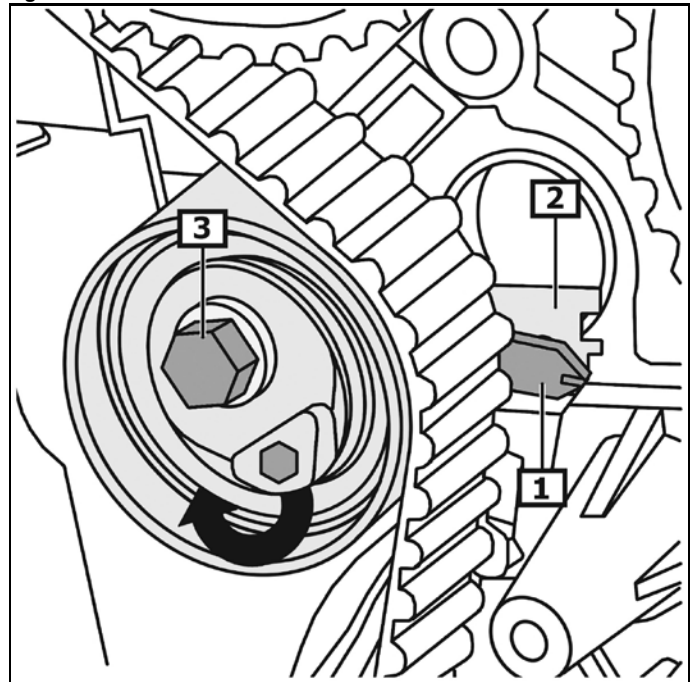


- |  |                              |
|--|------------------------------|
| 1 Locking pin(s) – camshaft(s)/crankshaft. | 2 Tensioning roller screw(s) |
| 3 Marking(s), high-pressure pump impeller  |                              |

### 1 position

Turn tensioning roller eccentric counterclockwise using suitable special tool.  
(see figure 7)

Figure 7



1 Pointer

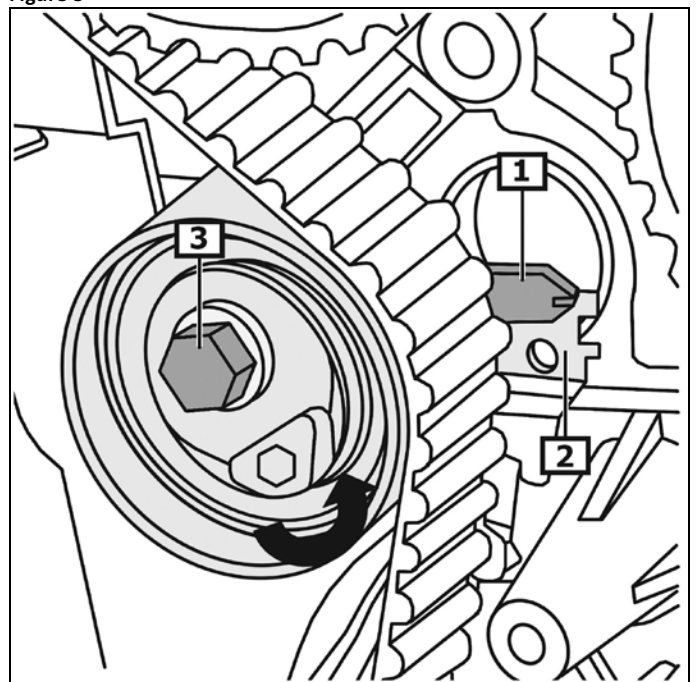
2 Reference mark(s)

3 Tensioning roller screw(s)

### 2 position

Turn excenter of tensioning roller clockwise using suitable special tool.  
(see figure 8)

Figure 8



1 Pointer

2 Tensioning roller screw(s)

2 Tensioning roller screw(s)

Screw(s) –loosen camshaft timing gear wheel max. one turn.

Unscrew tensioning roller screw(s). **(3)**

Tighten tension pulley until pointer and reference mark align. **(1)(2)**

Tighten tensioning roller screw(s) to specified torque. **(3)**  
**(see figure 9)**

Tighten camshaft pulley screw(s).

Remove all blocking tool(s).

Turn crankshaft by two revolutions in running direction of the engine.

Turn crankshaft clockwise until 1. cylinder is shortly before TDC.

Insert crankshaft blocking tool. **(2)**

Turn camshaft slowly clockwise until crank web contacts the blocking tool. **(2)(3)**  
**(see figure 4)**

Insert blocking pin(s) for crankshaft timing gear. **(2)**  
**(see figure 5)**

**The timing marks must be in alignment.**  
Repeat adjustment procedure.

**Installation in reverse order of removal.**

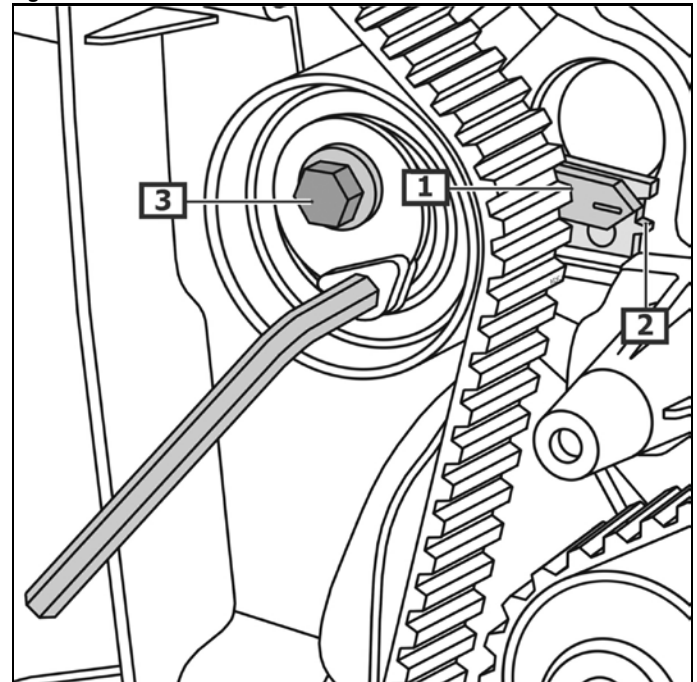
**Fit accessory drive belt.**

**Connect battery**

Start engine and check function.

Carry out a test drive

**Figure 9**



1 Pointer

2 Reference mark(s)

3 Tensioning roller screw(s)

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

## Remove/install timing belt

### RENAULT Clio III (BR0/1, CR0/1), 1.2 16V, 55 kW (BR02, BR0J, BR11, CR02, CR0J, CR11)



#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

The toothed belt must not come into contact with oil or coolant!

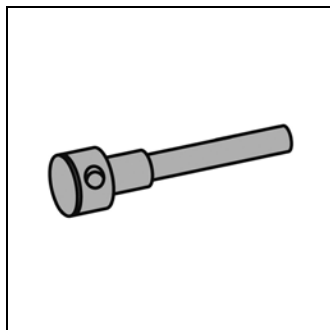
Adjustment work on the toothed belt must only be carried out with a cold engine.

Note radio code. Disconnect battery (negative terminal).

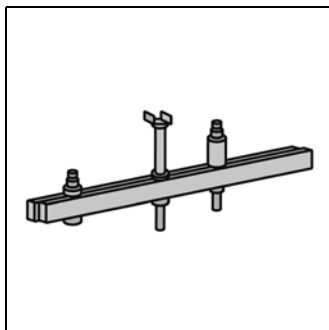
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

The used toothed belt must not be installed again.

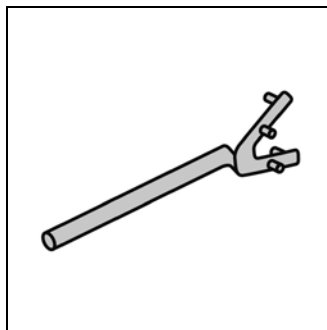
#### **Required special tools**



Crankshaft blocking pin(s)  
OE (Mot. 1054)



Engine mount  
OE (Mot. 1672)



Counter support  
OE (Mot. 799-01)

#### **Required Labour times/torques**

##### Scheduled times

Replace toothed belt	3,00 h
----------------------	--------

##### Tightening torques

Self-locking screws and nuts must always be replaced.

Nut(s) – engine mounting holder (1)(2)	(see figure 2)		62 Nm
Engine bracket screw(s) (1)	(see figure 3)		33 Nm
Screw(s) – center of toothed belt guard (3)	(see figure 3)		10 Nm
Toothed belt guard screw(s) lower (5)	(see figure 3)		10 Nm
Tensioning roller nut(s) (3)	(see figure 5)		24 Nm
Crankshaft pulley screw(s)		Use new screw(s)	40 Nm + 119°-131°
Wheel attachment			105 Nm

## **Remove**

### **Disconnect battery.**

Remove the right front wheel.  
Remove engine cover(s).  
Remove lower floor panelling.  
Remove wheel arch liner at front right.

### **Remove accessory drive belt.**

### **Remove bumper.**

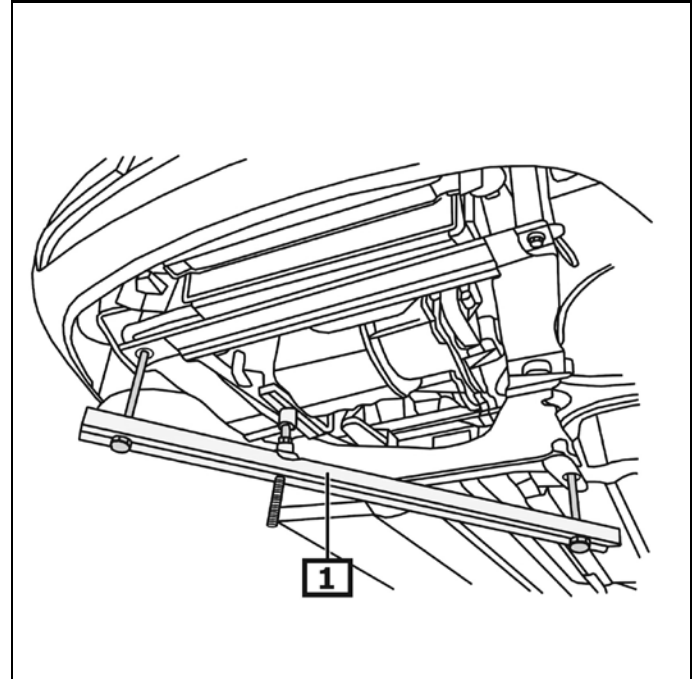
Mount engine support. **(1)**  
**(see figure 1)**

Remove crankshaft pulley.

### **Mark engine mounting installation position.**

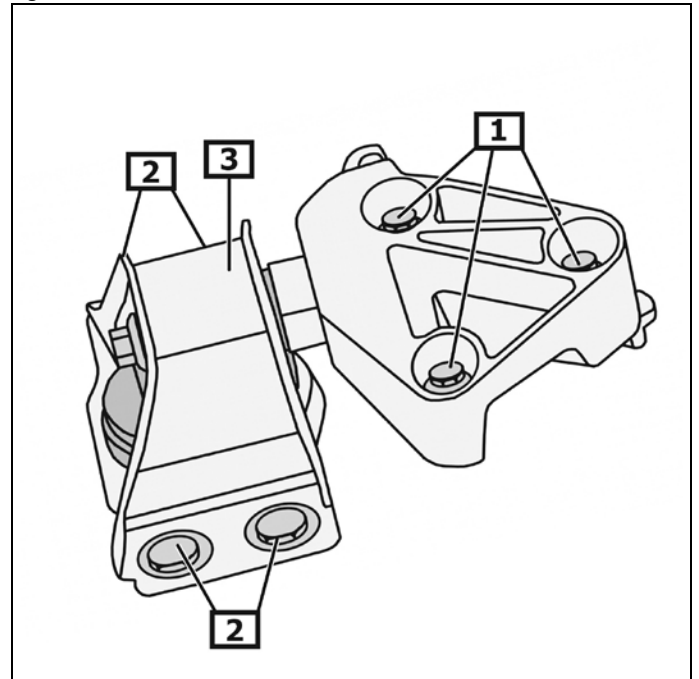
Unscrew engine mounting bolt(s). **(1)(2)**  
Remove engine mounting. **(3)**  
**(see figure 2)**

**Figure 1**



**1 Engine mount**

**Figure 2**



**1 Engine mount screw(s)**

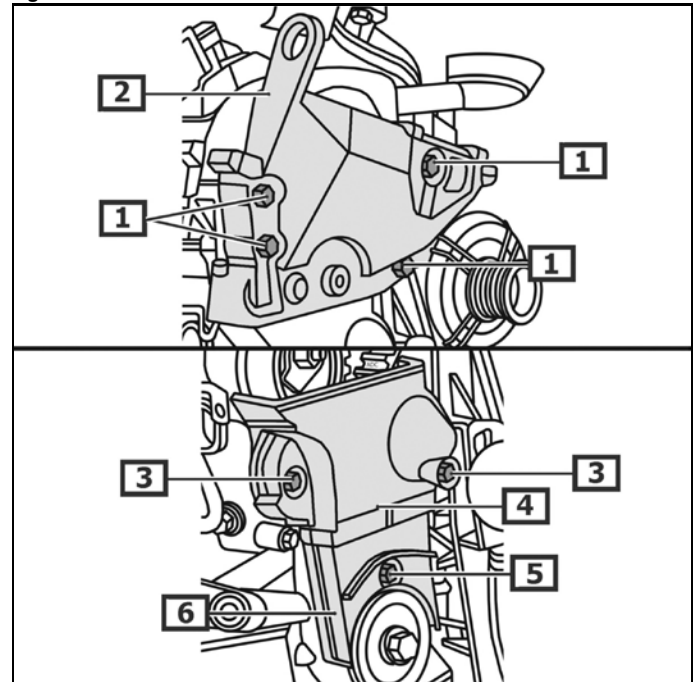
**2 Engine mount screw(s)**

**3 Engine mounting**



Unscrew engine bracket screw(s). **(1)**  
 Remove engine bracket. **(2)**  
 Unscrew and remove the toothed belt guard middle screw(s). **(3)**  
 Remove the central toothed belt guard. **(4)**  
 Unscrew toothed belt guard screws, bottom. **(5)**  
 Remove toothed belt guard at the bottom. **(6)**  
**(see figure 3)**

**Figure 3**



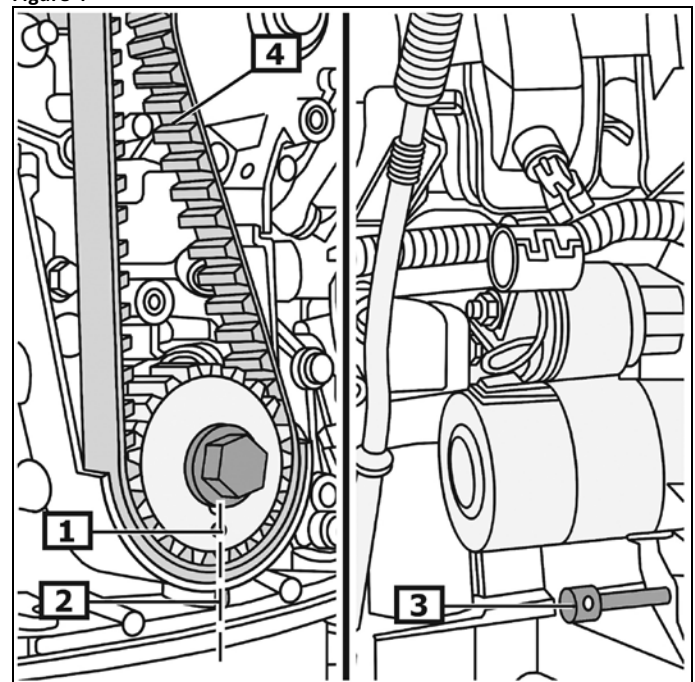
- |   |                                    |
|---|------------------------------------|
| 1 Engine bracket screw(s)                 | 2 Engine bracket                   |
| 3 Screw(s) – center of toothed belt guard | 4 Toothed belt guard center        |
| 5 Toothed belt guard screw(s) lower       | 6 Toothed belt guard at the bottom |

Install crankshaft pulley.  
 Rotate the crankshaft clockwise until the TDC marking is half a tooth before the marking on the engine block. **(1)(2)**  
 Insert the crankshaft blocking pin(s). **(3)**  
 Carefully rotate crankshaft until setting tool engages.

**Required special tools**

Crankshaft blocking pin(s) **(3)** OE (Mot. 1054)  
**(see figure 4)**

**Figure 4**



- |                              |                  |
|------------------------------|------------------|
| 1 TDC marking(s)             | 2 TDC marking(s) |
| 3 Crankshaft blocking pin(s) | 4 Toothed belt   |

TDC - check the marking(s) on the camshaft. **(1)(2)**  
 Loosen tensioning roller nut(s). **(3)**  
 Release tensioning roller.  
 Locking pin(s) – inserting tension pulley. **(6)**  
 Take off toothed belt of engine control.  
**(see figure 5)**

## Install

**Replace the tension pulley and deflection pulley(s) when replacing the toothed belt.**

Ensure correct seating of the retaining lug(s). **(4)(5)**  
 Fit toothed belt.

**Marking(s) of the camshaft timing gear wheel and crankshaft gear must check with the toothed belt markings.**  
**(see figure 4)**

## Tension the toothed belt.

### 1. stage

Remove crankshaft blocking pin(s). **(3)**  
**(see figure 4)**

Remove tensioning roller blocking pin(s). **(6)**  
**(see figure 5)**

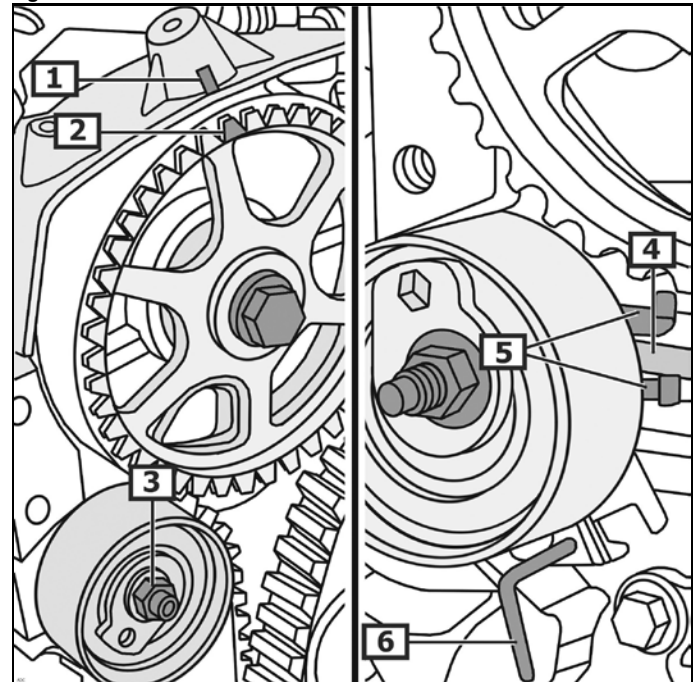
Set tensioning roller eccentric anti-clockwise to position 1 using an Allen key. **(1)(2)**  
 Tighten the tensioning roller nut(s) to the specified torque. **(3)**  
**(see figure 6)**

Rotate crankshaft by six turns in direction of engine.  
 Turned the engine to the TDC position.

Insert the crankshaft blocking pin(s). **(3)**  
**(see figure 4)**

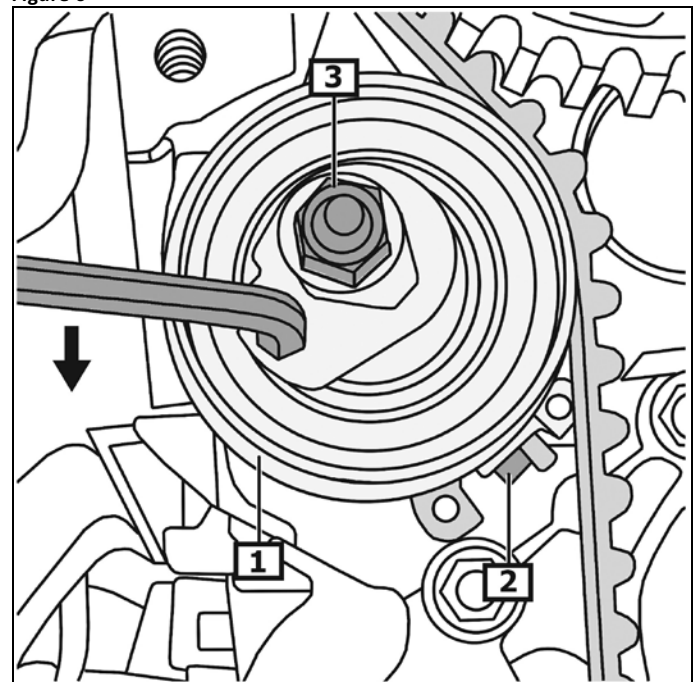
TDC - Markings must be flush with the reference marks.

Figure 5



- |                               |                                     |
|-------------------------------|-------------------------------------|
| 1 TDC - camshaft gear marking | 2 TDC - camshaft gear marking       |
| 3 Tensioning roller screw(s)  | 4 Cut-out(s)                        |
| 5 Retaining lug(s)            | 6 Tensioning roller blocking pin(s) |

Figure 6



- |                            |           |
|----------------------------|-----------|
| 1 Tensioning roller        | 2 Pointer |
| 3 Tensioning roller nut(s) |           |

## 2. stage

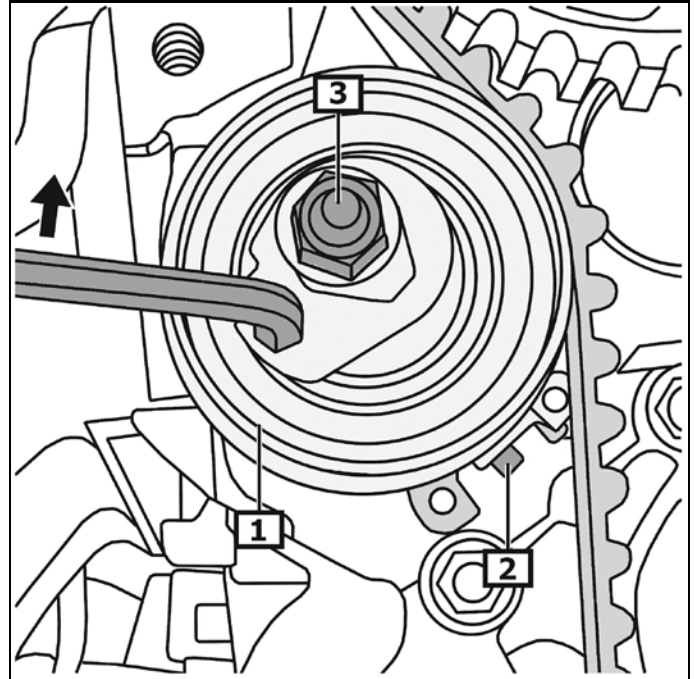
Remove blocking pin(s). **(3)**  
(see figure 3)

Nut(s) - slacken tension pulley by max. 1 turn.

Set tensioning roller eccentric clockwise to position 2 using an Allen key. **(1)(2)**

Tighten the tensioning roller nut(s) to the specified torque. **(3)**  
(see figure 7)

Figure 7



1 Tensioning roller

2 Pointer

3 Tensioning roller nut(s)

Ensure that the tensioning roller does not come into contact with the cylinder head. **(1)**  
(see figure 8)

### Otherwise:

Turned the engine to the TDC position.

Remove tensioning roller.

Take off toothed belt of engine control.

Locking pin(s) – inserting tension pulley.

Repeat installation and tensioning of the toothed belt.

### Install the accessory drive belt.

Continue assembly in reverse order of removal.

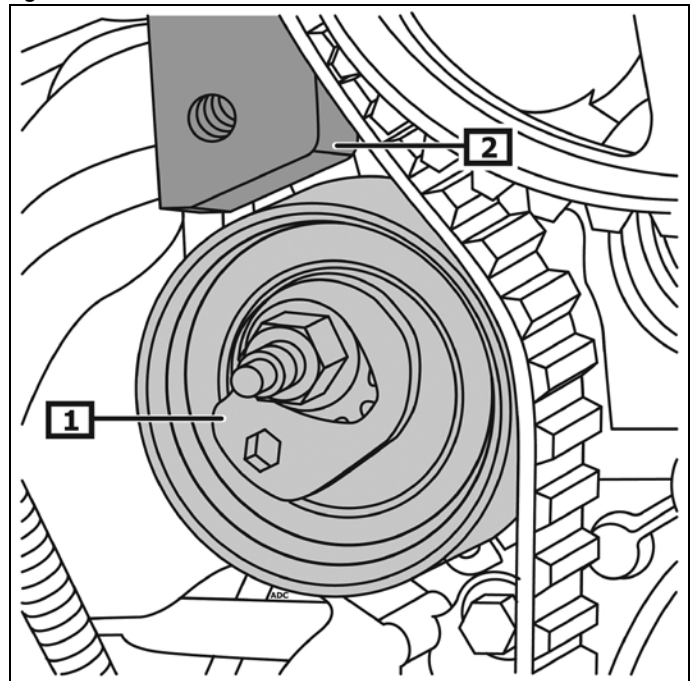
Decode radio, program volatile memories.

Start engine and check function.

Carry out a test drive.

Document toothed belt change.

Figure 8



1 Tensioning roller

2 Cylinder head

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

SEAT Ibiza IV (6J5, 6P1), 1.4, 63 kW

Engine BXW, Engine CGGB



### **WARNING**

Electric radiator fan can start even with the engine cut!

Rotating components can result in cuts and squashing!

Disconnect plug connection on electric radiator fan.

### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

When turning the camshaft, the crankshaft must not be at TDC.

The toothed belt must not come into contact with oil or coolant!

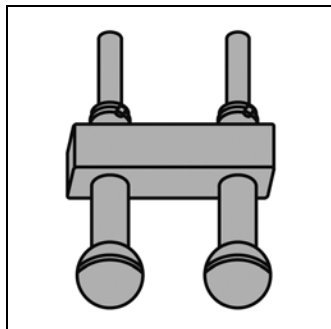
Adjustment work on the toothed belt must only be carried out with a cold engine.

Install gearbox mounting in parallel to gearbox support.

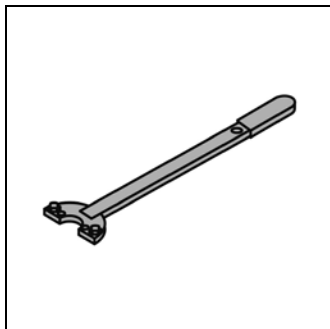
Note radio code. Disconnect battery (negative terminal).

It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

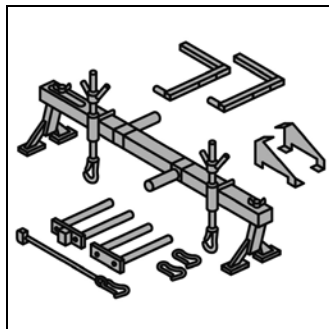
### **Required special tools**



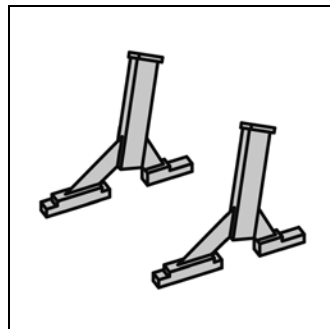
Camshaft(s) locking tool(s)  
OE (T10016)



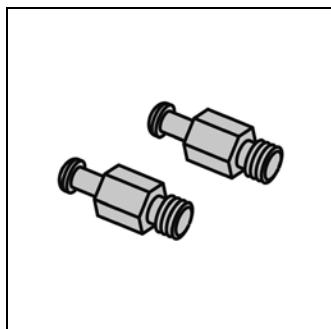
Counter support kit  
OE (3415)



Engine bridge set  
OE (10-222 A)



Engine bridge support(s)  
OE (10-222 A/1)



Counter support bolt  
OE (3415/1)

## **Required Labour times/torques**

### **Scheduled times**

Replace toothed belt	1,80 h
----------------------	--------

### **Tightening torques**

**Self-locking screws and nuts must always be replaced.**

Tensioning roller screw(s) (5)	(see figure 2)		20 Nm
Engine mount screw(s) (1)(2)	(see figure 4)	Use new screws.	on chassis 20 Nm + 90°; on engine bracket 30 Nm + 90°
Crankshaft pulley screw(s) (3)	(see figure 5)		01 stage 90 Nm; 02 stage 90°; with threaded screw head, 01 stage 150 Nm; with threaded screw head, 02 stage 180°
Tensioning roller screw(s) (1)	(see figure 9)		20 Nm
Engine bracket screw(s)		Use new screws.	on the engine block 50 Nm
Toothed belt guard screw(s) lower			10 Nm

## Remove

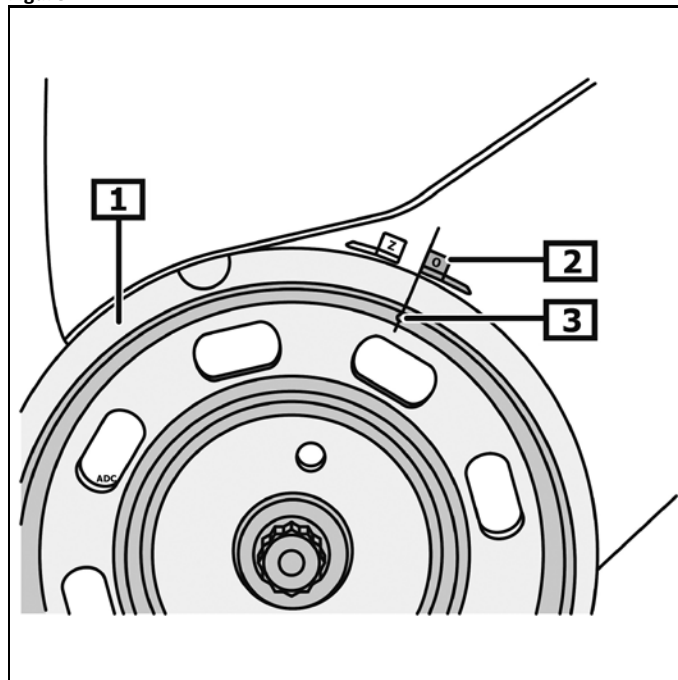
### **Lift vehicle**

Remove underide guard.  
Remove toothed belt guard at the top.  
Remove wheel arch liner at front right.

### **Remove accessory drive belt.**

Set engine to TDC cylinders 1.  
Observe marking(s). (2)(3)  
(see figure 1)

Figure 1



1 Crankshaft pulley

2 TDC marking(s)

3 Mark(s)

Insert camshaft(s) blocking tool. (6)

Insert setting dowels until the stop, endings of setting dowels must be at the same height.

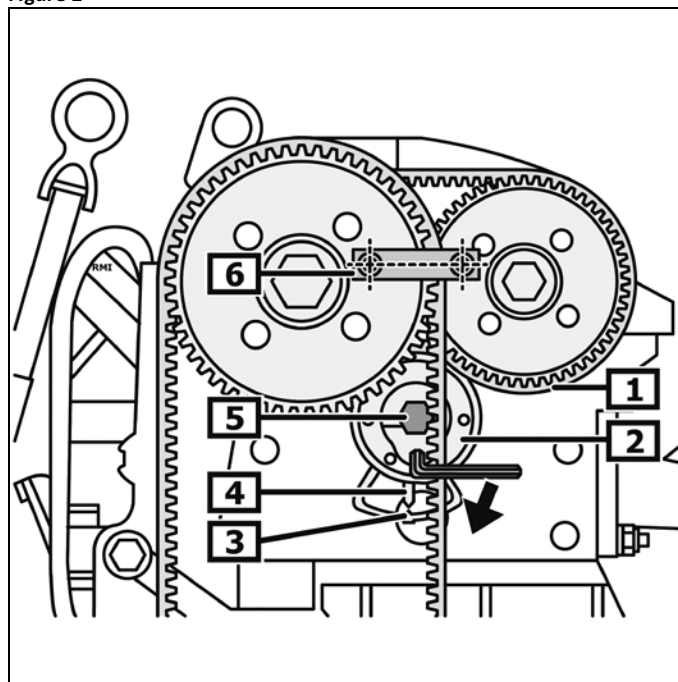
### **Required special tools**

Camshaft(s) locking tool(s) OE (T10016)

(see figure 2)

Turn crankshaft further by one revolution if camshaft retainer cannot be inserted.

Figure 2



1 Coupling drive toothed belt

2 Tensioning roller

3 Lug(s)

4 Pointer

5 Tensioning roller screw(s)

6 Camshaft(s) locking tool(s)

Position completed engine bridge in place. **(1)(2)**  
Slightly pretension engine at the suspension lugs, do not lift it. **(3)**

**Required special tools**

Engine bridge set **(1) OE (10-222 A)**

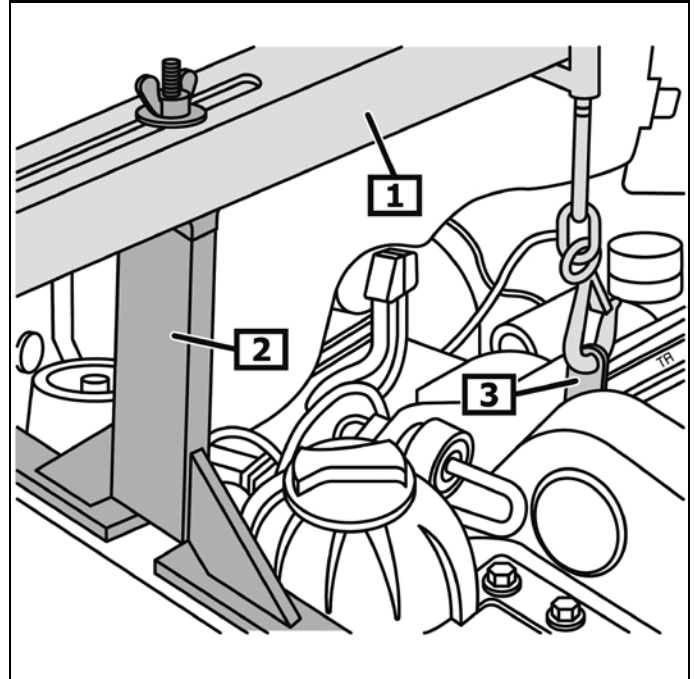
Engine bridge support(s) **(2) OE (10-222 A/1)**

**(see figure 3)**

Loosen coolant expansion reservoir and put it aside.

**Lines remain connected.**

**Figure 3**



1 Engine bridge set

2 Engine bridge support(s)

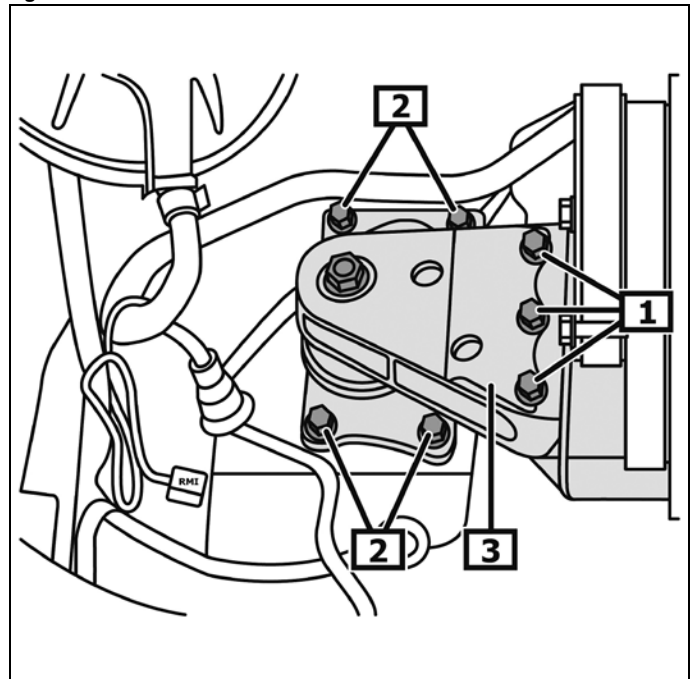
3 Suspension lug

Unscrew and remove engine bracket screw(s) to engine mount. **(1)**  
Unscrew and remove engine mount screw(s) to car body. **(2)**  
Remove engine mounting. **(3)**  
**(see figure 4)**

Remove engine bracket.

Lower engine so that the pulley can be removed.

**Figure 4**



1 Engine bracket screw(s) to engine mount

2 Engine mount to car body screw(s)

3 Engine mounting

Attach counter support to crankshaft pulley. (1)(2)  
Unscrew crankshaft pulley screw(s). (3)  
Remove crankshaft pulley. (4)

#### **Required special tools**

Counter support kit (1) OE (3415)  
Counter support bolt (2) OE (3415/1)  
(see figure 5)

#### **Toothed belt main drive**

Unscrew tensioning roller screw(s). (1)  
Turn Allen key anti-clockwise. (opposite to the direction of the arrow)  
(3)  
Remove toothed belt.  
(see figure 8)

#### **Coupling drive toothed belt**

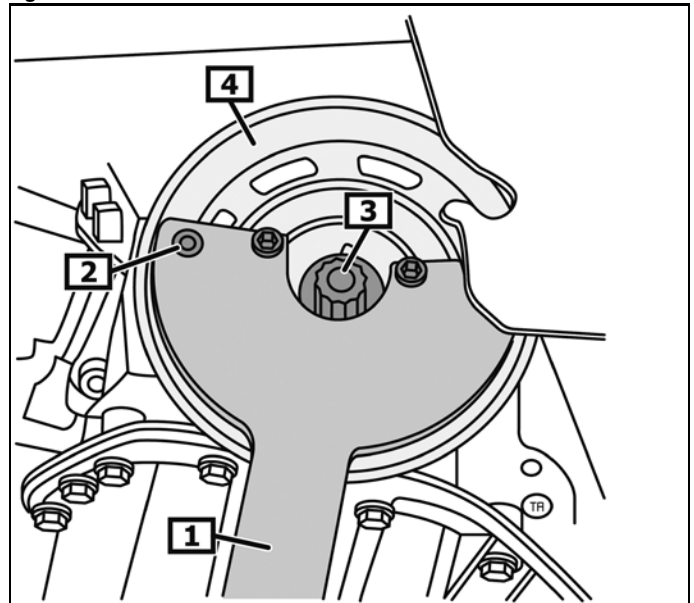
Unscrew tensioning roller screw(s). (5)  
Turn Allen key clockwise. (in the direction of the arrow)  
Remove coupling pinion of tension pulley. (2)  
Remove toothed belt. (1)  
(see figure 2)

## **Install**

When turning the camshaft, the crankshaft must not be at TDC.  
To secure the crankshaft pulley, screw one of the screws back in with  
two shims.  
TDC - Check markings, adjust if necessary.  
Marks must align. (2)(3)  
(see figure 6)

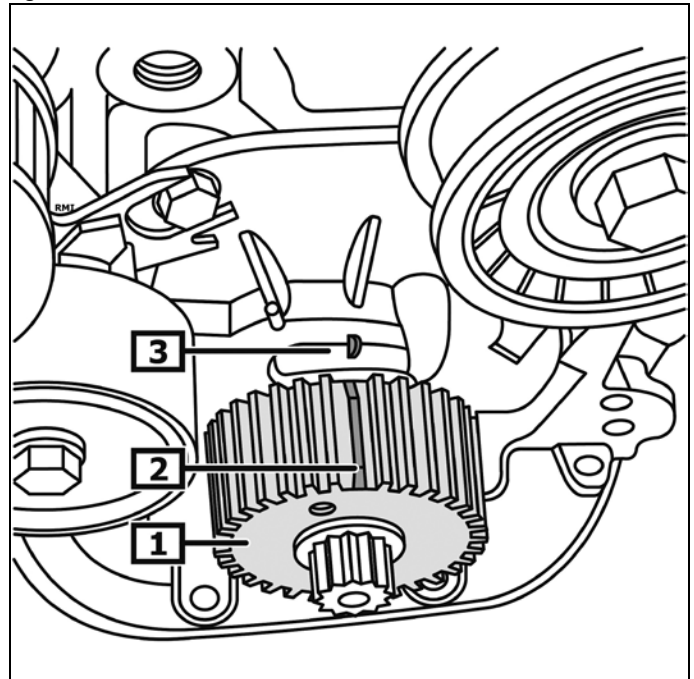
Employ camshaft(s) blocking tool(s). (6)  
(see figure 2)

Figure 5



- |                              |                        |
|------------------------------|------------------------|
| 1 Counter support kit        | 2 Counter support bolt |
| 3 Crankshaft pulley screw(s) | 4 Crankshaft pulley    |

Figure 6



- |                          |           |
|--------------------------|-----------|
| 1 Crankshaft pulley      | 2 Mark(s) |
| 2 Sealing flange marking |           |



### Coupling drive toothed belt

Put on toothed belt first on the inlet camshaft wheel, then on the outlet camshaft wheel.

Loose part of toothed belt is at the bottom.

Install coupling pinion of tension pulley.

Turn Allen key clockwise. **(Arrow)**

Eccentric must be above baseplate window. **(6)(7)**

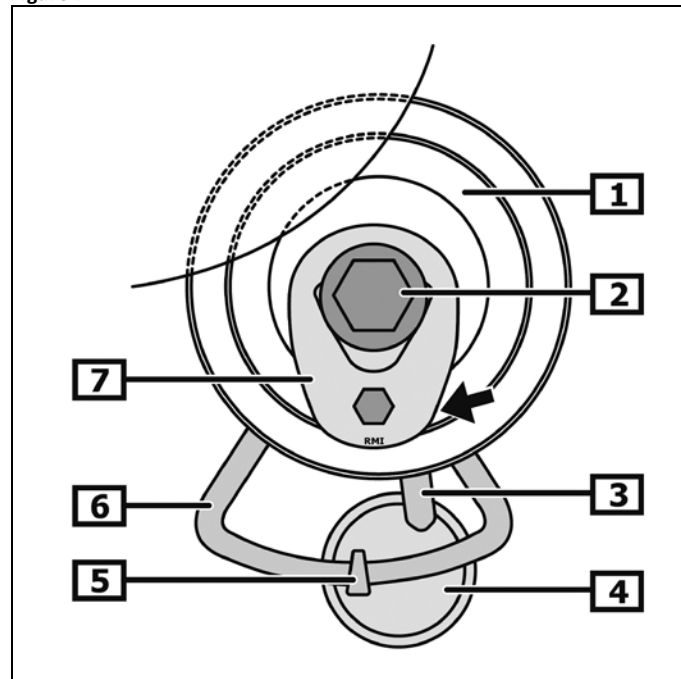
Push the lower part of the toothed belt coupling drive with the tensioning roller upwards.

Tighten screw(s) but not all the way. **(2)**

The baseplate lug must be in the bore. **(4)(5)**

(see figure 7)

Figure 7



1 Tensioning roller

2 Tensioning roller screw(s)

3 Pointer

4 Bore

5 Lug(s)

6 Baseplate

7 Eccentric

### Coupling drive toothed belt

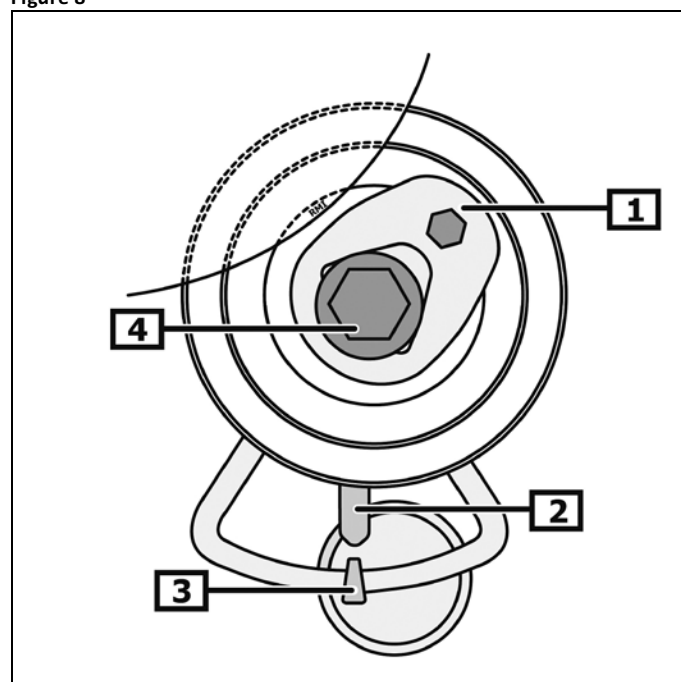
Turn Allen key anti-clockwise.

Indicator must align with baseplate marking (lug). **(2)(3)**

Tighten tensioning roller screw(s). **(4)**

(see figure 8)

Figure 8



1 Tensioning roller eccentric

2 Pointer

3 Lug(s)

4 Tensioning roller screw(s)

### **Toothed belt main drive**

Employ camshaft(s) blocking tool(s).

Set tensioning roller eccentric to the ten 'o'clock' position turning anti-clockwise using an Allen key.

Screw in screw(s) by hand. **(1)**

Screw at cylinder head must align with the recess in the baseplate. **(4)**  
**(5)**

**(see figure 9)**

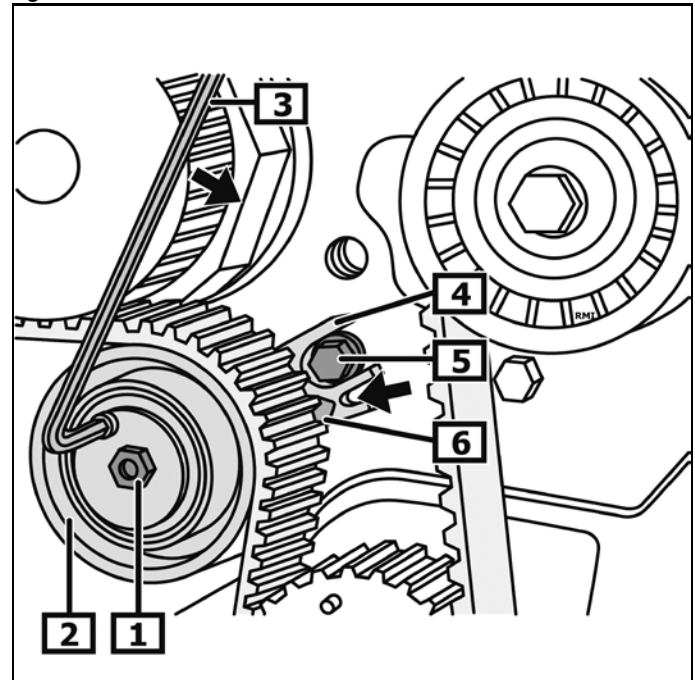
Fit toothed belt in the order: coolant pump, tensioning roller, crankshaft pulley, deflection pulley and inlet camshaft pulley.  
Turn Allen key clockwise.

Indicator must align with the recess in the baseplate. **(6) (Arrow)**

Tighten tensioning roller screw(s). **(1)**

**(see figure 9)**

**Figure 9**



1 Tensioning roller screw(s)

2 Tensioning roller

3 Hexagon socket

4 Baseplate

5 Screw(s)

6 Pointer

Remove camshaft blocking tool.

Rotate engine two revolutions in the engine rotating direction.

Set engine to TDC cylinders 1. **(2)(3)**

**(see figure 6)**

Employ camshaft(s) blocking tool(s). **(6)**

**(see figure 2)**

Insert setting dowels until the stop, endings of setting dowels must be at the same height.

If it is not possible to insert the blocking tools, adjust the valve timing.

Check toothed belt tension again.

**Continue assembly in reverse order of removal.**

**Install the accessory drive belt.**

Start engine and check function.

Carry out a test drive.

Interrogate error log.

Document toothed belt change.

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

SKODA Citigo, 1.0, 55 kW  
from 2012/06



**WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

**NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

Do not use camshaft retainers as a support while removing or attaching the camshaft pulley.

When turning the camshaft, the crankshaft must not be at TDC.

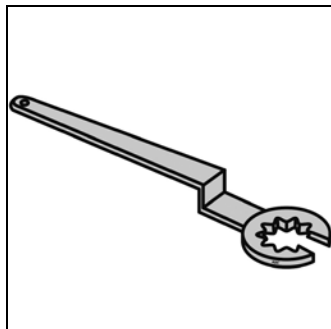
The toothed belt must not come into contact with oil or coolant!

Adjustment work on the toothed belt must only be carried out with a cold engine.

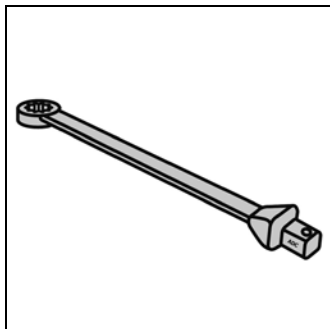
Note radio code. Disconnect battery (negative terminal).

It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

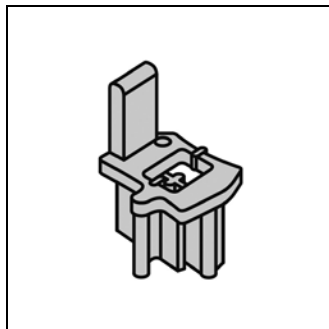
**Required special tools**



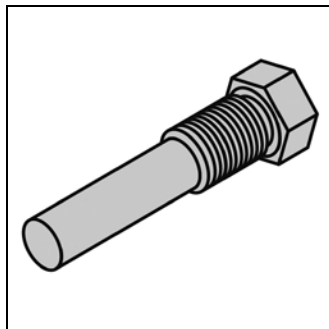
Tensioning spanner  
OE (T10499)



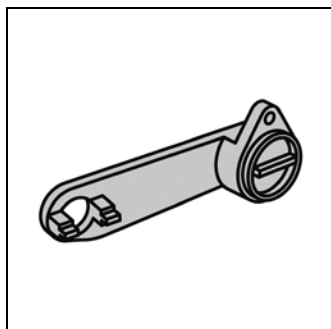
Ring wrench insert  
OE (T10500)



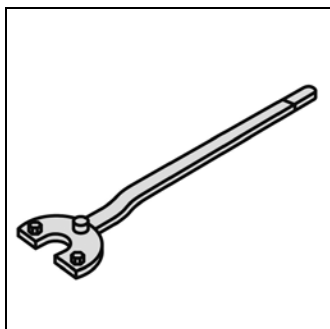
Camshaft(s) locking tool(s)  
OE (T10476 A)



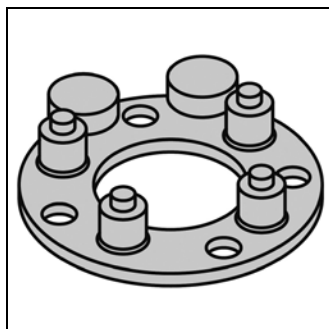
Crankshaft locating pin  
OE (T10340)



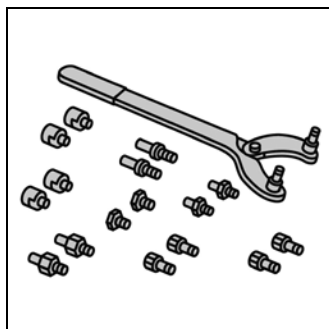
Camshaft(s) locking tool(s)  
OE (T10477)



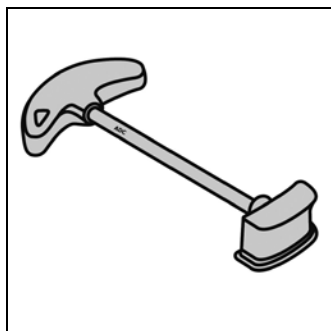
Counter support  
OE (T10475)



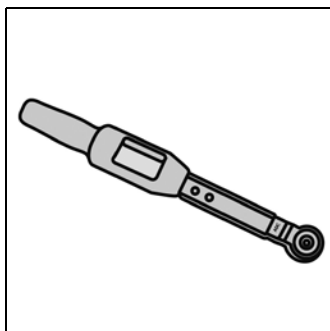
Counter support kit  
OE (T10554)



Counter support kit  
OE (T10172)



Installation tool  
OE (T10487)



Torque wrench  
OE (VAS 6583)

## Required Labour times/torques

### Scheduled times

Replace toothed belt	2,50 h
----------------------	--------

### Tightening torques

Self-locking screws and nuts must always be replaced.

Toothed belt guard at the top (5)	(see figure 1)		8 Nm
Alternator screw(s) (1)	(see figure 5)		20 Nm
Screw(s) - camshaft adjuster (4)	(see figure 6)	Use new screw(s)	Central bolt 50 Nm + 90°; Cap 20 Nm
Outlet camshaft screw(s) (1)	(see figure 7)	Use new screw(s)	01 stage 50 Nm; 02 stage 90°
Tensioning roller screw(s) (1)	(see figure 8)		25 Nm
Vibration damper screw(s) (1)	(see figure 9)	Use new screw(s)	01 stage 150 Nm; 02 stage 180°
Bolt(s), deflection pulley, toothed belt (3)	(see figure 9)		45 Nm
Toothed belt guard at the bottom (5)	(see figure 9)		8 Nm
Spark plugs			25 Nm

## Remove

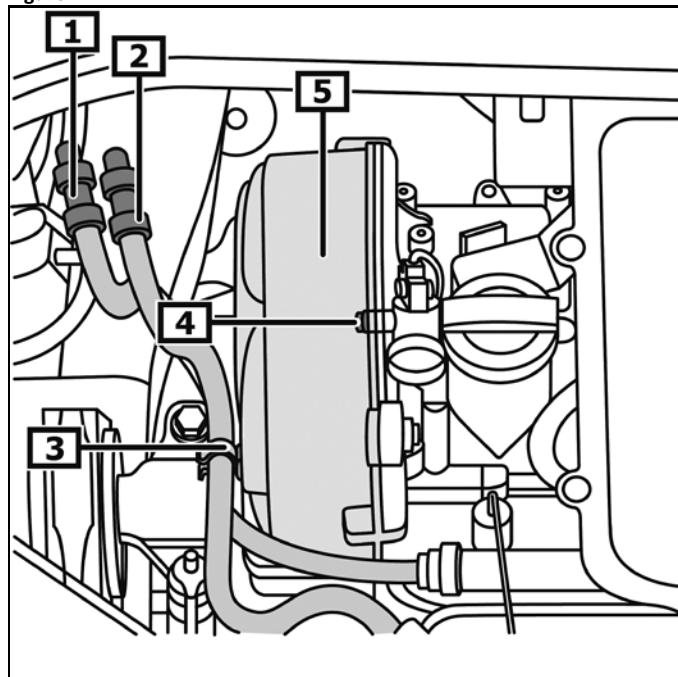
Remove air filter housing.  
Disconnect fuel line(s). **(1)(2)**  
Close fuel line(s) with plug.  
Remove fuel pipe(s) from holder. **(3)**  
**(see figure 1)**

### **Notes:**

The fuel system is pressurized.  
Wear protective gloves and safety goggles.  
Collect any leaking fuel.

Screw(s) – unscrew top toothed belt guard **(4)**  
Remove toothed belt guard at the top. **(5)**  
**(see figure 1)**

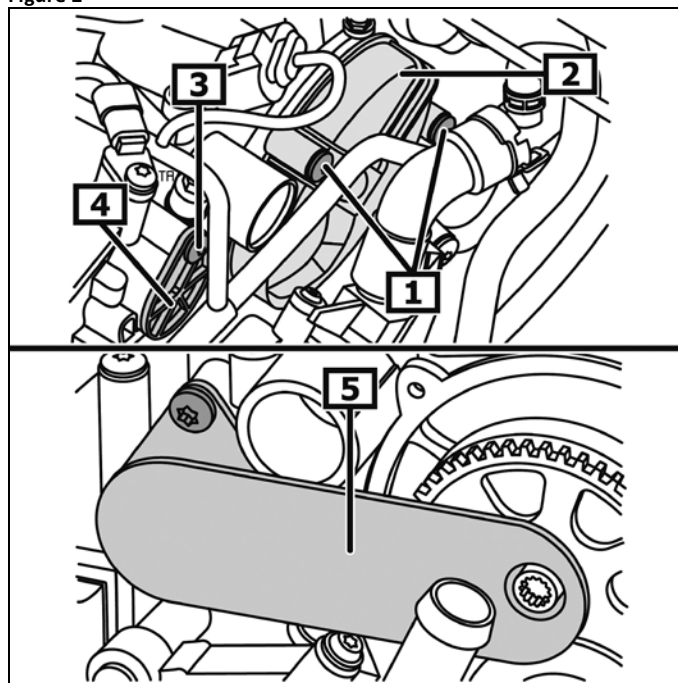
Figure 1



- |                                 |                                      |
|---------------------------------|--------------------------------------|
| 1 Fuel line                     | 2 Fuel line                          |
| 3 Fuel line(s) holder           | 4 Upper toothed belt guard screw(s). |
| 5 Toothed belt guard at the top |                                      |

Unscrew and remove the screw(s) for the rear toothed belt cover. **(1)**  
Remove the rear toothed belt cover. **(2)**  
Unscrew cover screw(s). **(3)**  
Remove cover(s). **(4)**  
**(see figure 2)**

Figure 2



- |                                    |                            |
|------------------------------------|----------------------------|
| 1 Rear toothed belt cover screw(s) | 2 Toothed belt guard, rear |
| 3 Cover screw(s)                   | 4 Cover                    |
| 5 Camshaft(s) locking tool         |                            |

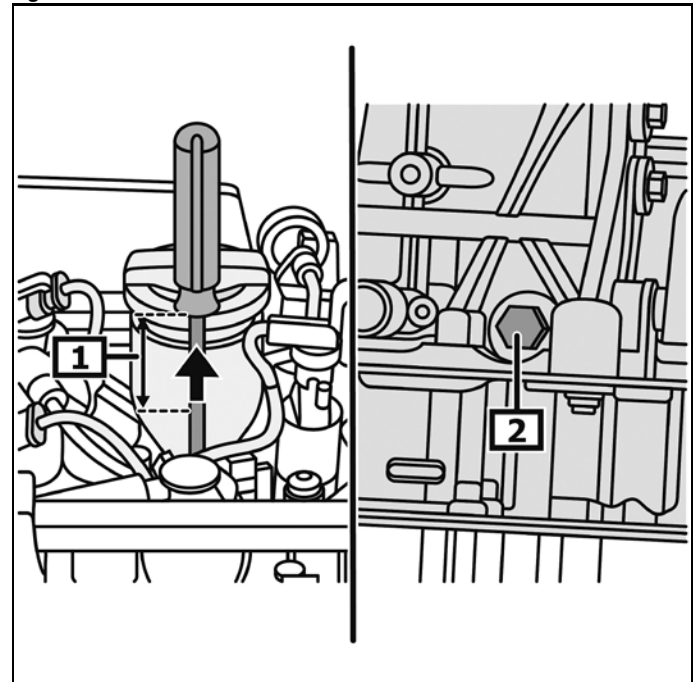
Remove spark plug for 1. cylinder.  
Insert screwdriver with min. 250 mm shank length into the 1. cylinder spark-plug hole down to the piston head.

Slowly turn crankshaft in engine running direction until piston is at BDC.  
Slowly turn crankshaft in engine running direction until screwdriver has moved by 30 mm. **(Arrow) (1)**  
**(see figure 3)**

Unscrew and remove engine block locking screw.  
Screw in and tighten crankshaft blocking tool. **(2)**  
Tighten crankshaft blocking tool using 30 Nm.

**Required special tools**  
Crankshaft locating pin OE (T10340)  
**(see figure 3)**

**Figure 3**



1 Dimension

2 Crankshaft locating pin

Rotate camshaft slowly clockwise until crank web adheres comes into contact with crankshaft locating pin.

**Blocking tool arrests crankshaft in engine running direction only.**  
**Crankshaft not in correct position if blocking tool cannot be screwed in as far as it would go.**  
**Risk of engine failure in case of non-observance.**

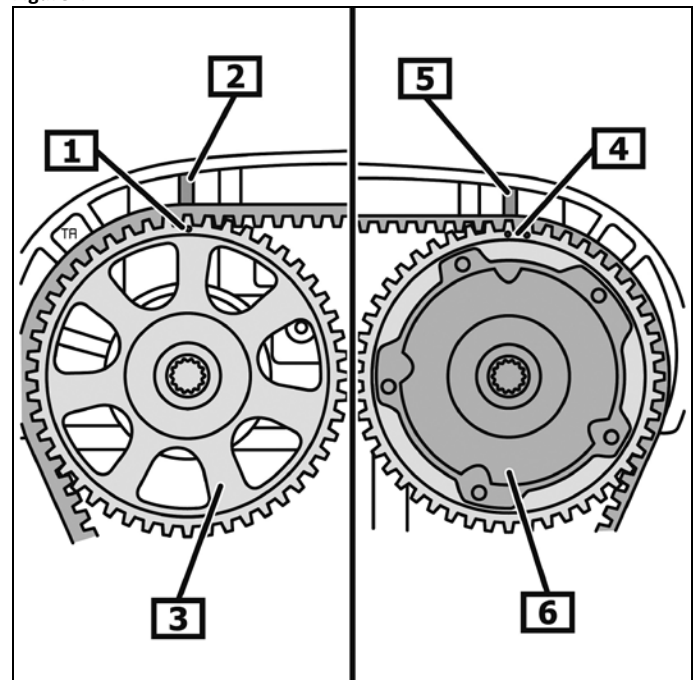
Markings must align. **(1)(2)**  
Markings must align. **(4)(5)**  
**(see figure 4)**

Insert camshaft(s) locking tool. **(5)**  
Fix camshaft(s) locking tool with a screw.  
Inserting the camshaft(s) locking tool should be easy.

**Required special tools**  
Camshaft(s) locking tool (5) OE (T10477)  
**(see figure 2)**

Remove accessory drive belt.

**Figure 4**



1 TDC marking(s)

2 TDC marking(s)

3 Outlet camshaft wheel

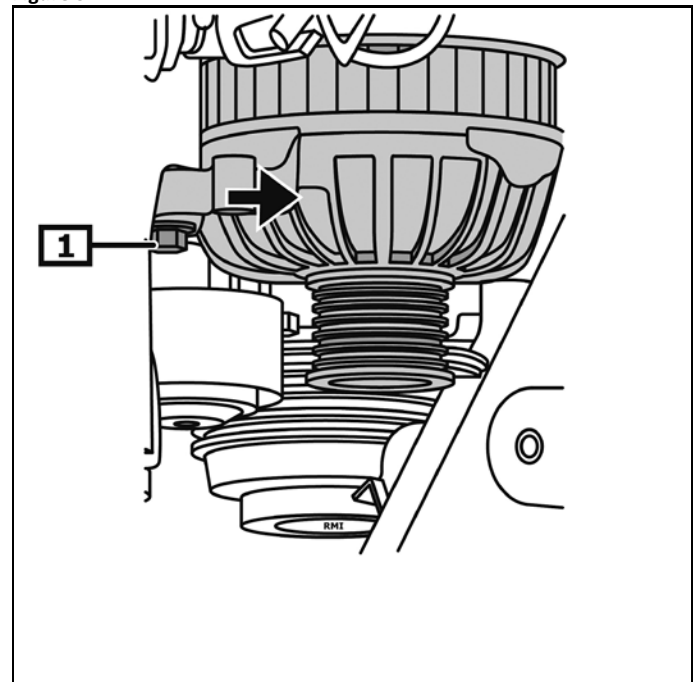
4 TDC marking(s)

5 TDC marking(s)

6 Camshaft adjuster

Unscrew and remove alternator screw(s). (1)  
 Rotate alternator downward. (in the direction of the arrow)  
 (see figure 5)

Figure 5



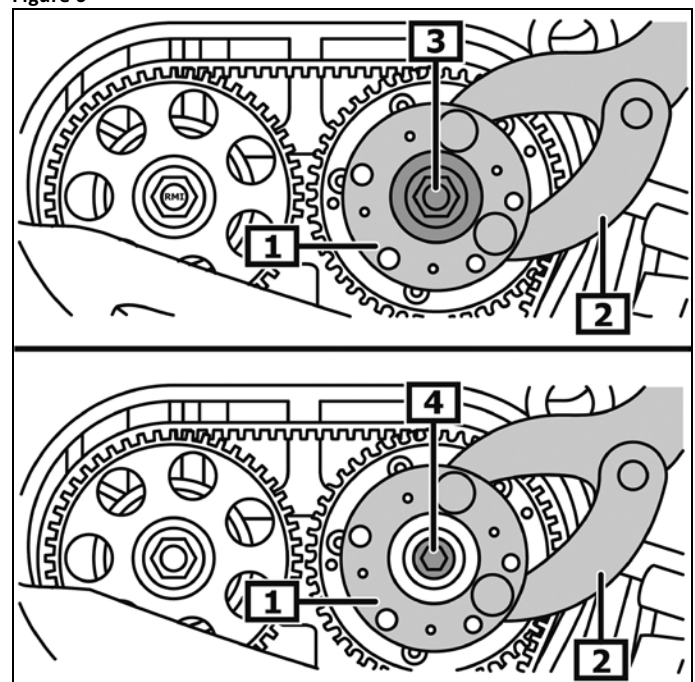
1 Alternator screw(s)

**Do not use camshaft(s) locking tool as a support while removing or attaching the camshaft timing gear wheel.**

Attach counterholder. (1)(2)  
 Unscrew closing screw. (3)  
 Loosen camshaft adjuster screw(s). (4)

**Required special tools**  
 Counter support kit (1) OE (T10554)  
 Counter support kit (2) OE (T10172)  
 (see figure 6)

Figure 6



1 Counter support kit

2 Counter support kit

3 Locking screw

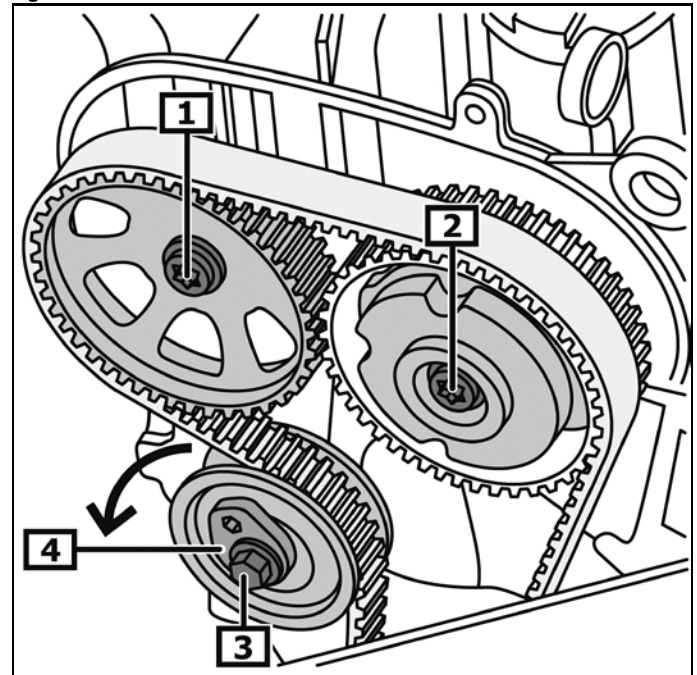
4 Screw(s) - camshaft adjuster

Attach counterholder.  
Loosen outlet camshaft wheel screw(s). (1)

**Required special tools**

Counter support kit OE (T10172)  
- Counter support bolt OE (T10172/1)  
- Counter support bolt OE (T10172/2)  
(see figure 7)

Figure 7



- |                              |                               |
|------------------------------|-------------------------------|
| 1 Outlet camshaft screw(s)   | 2 Inlet camshaft screw(s)     |
| 3 Tensioning roller screw(s) | 4 Tensioning roller eccentric |

Unscrew tensioning roller screw(s). (1)(3)  
Hold the tensioning roller eccentric in position. (2)(4)  
Release tensioning roller. (2)(4)

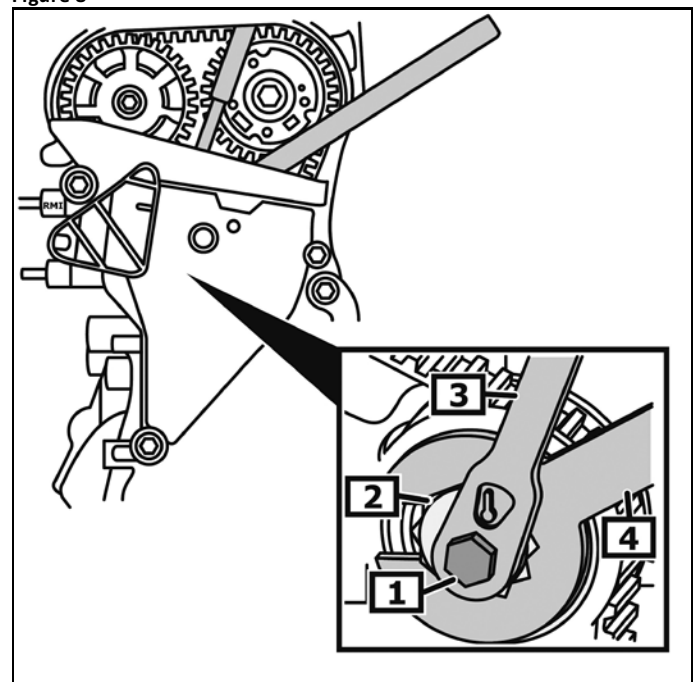
**Required special tools**

Ring wrench insert OE (T10500)  
Wrench for tension pulley OE (T10499)  
(see figure 8)

The tensioning roller can only be removed with the engine bracket removed.

Remove toothed belt from camshaft pulleys.

Figure 8



- |                              |                               |
|------------------------------|-------------------------------|
| 1 Tensioning roller screw(s) | 2 Tensioning roller eccentric |
| 3 Ring wrench insert         | 4 Wrench for tension pulley   |



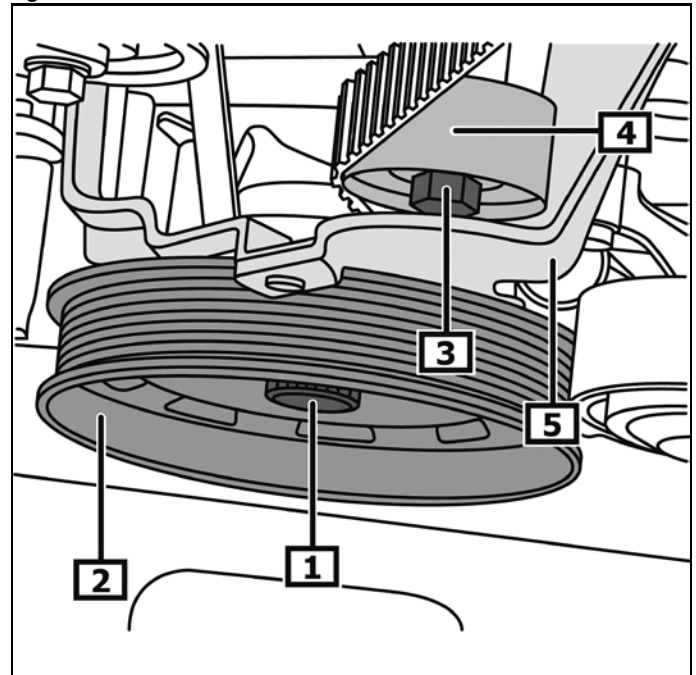
Attach counterholder.  
Unscrew vibration damper screw(s). **(1)**  
Remove vibration damper. **(2)**  
Unscrew toothed belt guard screws, bottom.  
Remove toothed belt guard at the bottom. **(5)**

**Required special tools**

Counter support OE **(T10475)**  
**(see figure 9)**

Remove toothed belt incl. crankshaft pulley.

**Figure 9**

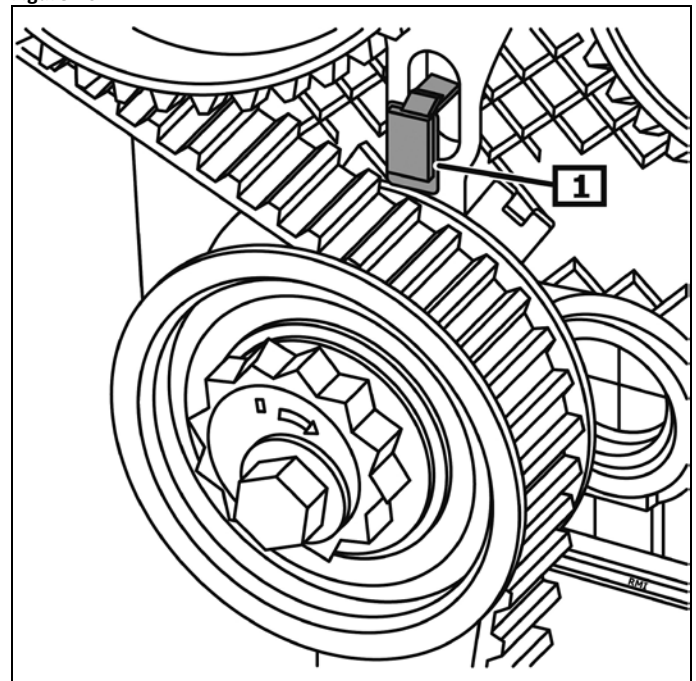


- |  |                                     |
|--|-------------------------------------|
| 1 Vibration damper screw(s)                | 2 Vibration damper                  |
| 3 Bolt(s), deflection pulley, toothed belt | 4 Toothed belt deflection pulley(s) |
| 5 Toothed belt guard at the bottom         |                                     |

**Install**

Ensure correct seating of the tensioning roller retaining lug(s). **(1)**  
**(see figure 10)**

**Figure 10**



- 1 Retaining lug(s)

Install crankshaft pulley. (1)  
 Crankshaft pulley wedge must engage in crankshaft groove. (3)  
 (see figure 11)

Place toothed belt onto crankshaft timing gear.

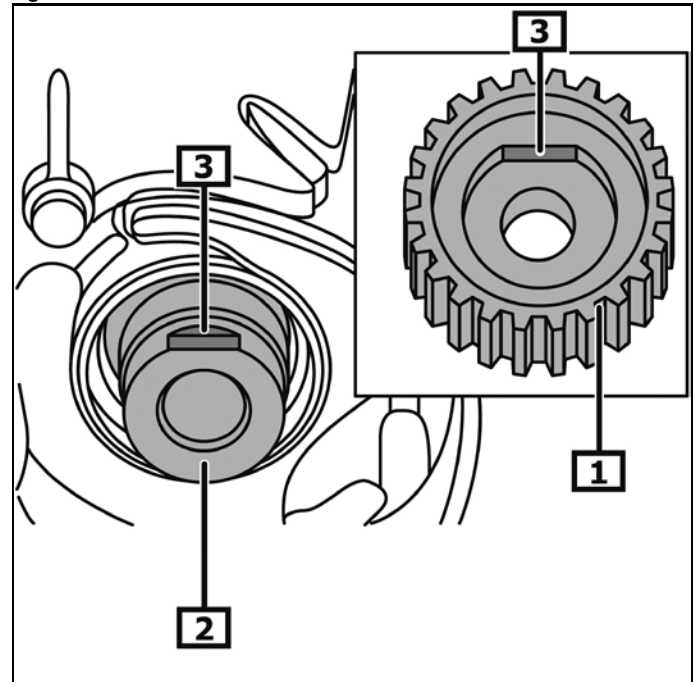
Install the lower toothed belt guard. (5)  
 Install vibration damper. (2)  
 Tighten the vibration damper screw(s). (1)  
 Use holder.

**Required special tools**

Counter support OE (T10475)  
 (see figure 9)

Screw(s) – unscrew camshaft timing gear wheels.  
 Screw(s) – replace the camshaft timing gear wheels.  
 Tighten the camshaft pulleys until they can still just be turned without  
 tilting onto the cone.

**Figure 11**



1 Crankshaft pulley

2 Crankshaft journal

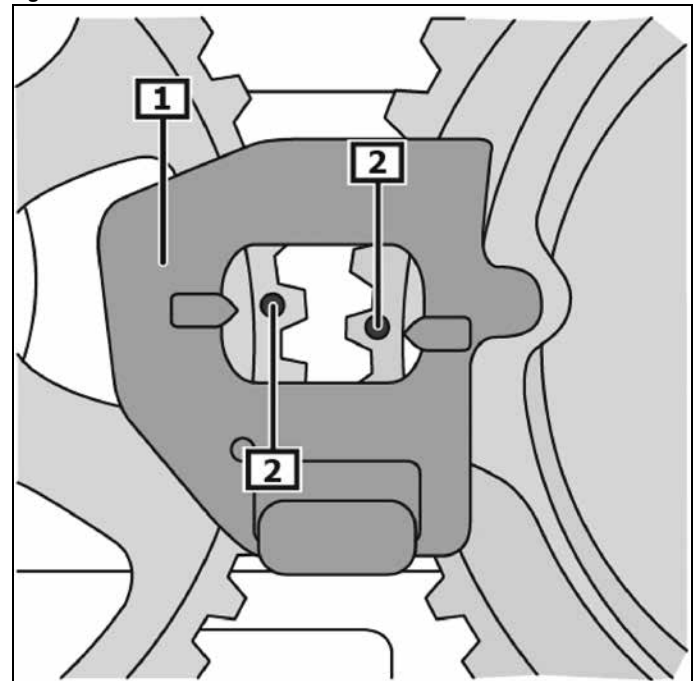
3 Grooves

Markings on the camshaft pulleys must be opposite each other. (2)  
 Insert camshaft(s) locking tool. (1)

**Required special tools**

Camshaft(s) locking tool OE (T10476 A)  
 (see figure 12)

**Figure 12**



1 Camshaft(s) locking tool

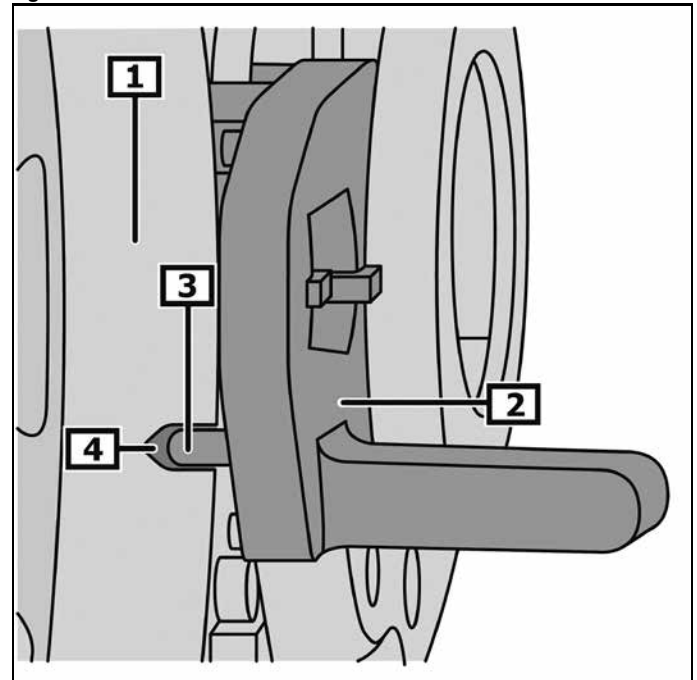
2 Marking(s) - camshaft timing gear wheels

Observe special tool fitting position. (3)(4)  
(see figure 13)

Ensure correct seating of the tensioning roller retaining lug(s). (1)  
(see figure 10)

Check to see whether crankshaft contacts crankshaft locating pin. (2)  
(see figure 3)

Figure 13



1 Outlet camshaft wheel

2 Camshaft(s) locking tool

3 Mandrel

4 Groove

**Fit toothed belt in following order:**

Crankshaft toothed belt sprocket (1)

Tensioning roller (3)

Outlet camshaft wheel (4)

Inlet camshaft wheel (5)

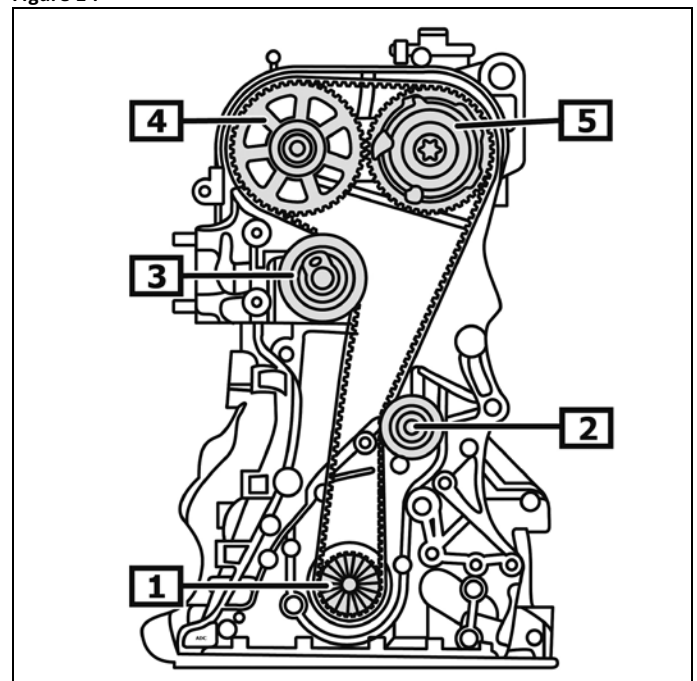
Deflection pulley (2)

(see figure 14)

Remove camshaft(s) locking tool. (1)

(see figure 13)

Figure 14



1 Crankshaft toothed belt sprocket

2 Deflection pulley

3 Tensioning roller

4 Outlet camshaft wheel

5 Inlet camshaft wheel

Turn eccentric clockwise until tensioning roller pointer is about 10 mm to the right of the setting window. (2)(3)(4)  
 Turn back eccentric in counterclockwise direction until tensioning roller pointer is exactly in the setting window. (2)(3)(4)  
 Tighten tensioning roller screw. (1)

**Required special tools**

Wrench for tension pulley OE (T10499)  
 Ring wrench insert OE (T10500)  
 Torque wrench OE (VAS 6583)  
 (see figure 15)

Tighten camshaft timing gear wheel screw(s) using a pre-torque of 50 Nm. (1)(2)  
 Use holder.

**Required special tools**

Counter support kit OE (T10554)  
 Counter support kit OE (T10172)  
 - Counter support bolt OE (T10172/1)  
 - Counter support bolt OE (T10172/2)  
 (see figure 7)

Remove crankshaft locating pin. (2)  
 (see figure 3)

Remove camshaft(s) locking tool. (5)  
 (see figure 2)

Turn crankshaft by two revolutions in running direction of the engine.  
 Screw in and tighten crankshaft locating pin.  
 Rotate camshaft slowly clockwise until crank web adheres comes into contact with crankshaft locating pin.  
 (see figure 3)

Insert camshaft(s) locking tool.  
 Fix camshaft(s) locking tool with a screw.  
**Inserting the camshaft(s) locking tool should be easy.**  
 (see figure 2)

**Proceed as follows in case the camshaft(s) fixing tool cannot be inserted:**

Depress toothed belt between the camshaft timing gear wheels using installation tool.  
**Second fitter required.**

**Required special tools**

Installation tool OE (T10487)

If it is not possible to insert the blocking tools, adjust the valve timing.

**When engine timings check**

Tighten screw(s) for camshaft timing gear using 90°. (1)(2)  
 (see figure 7)

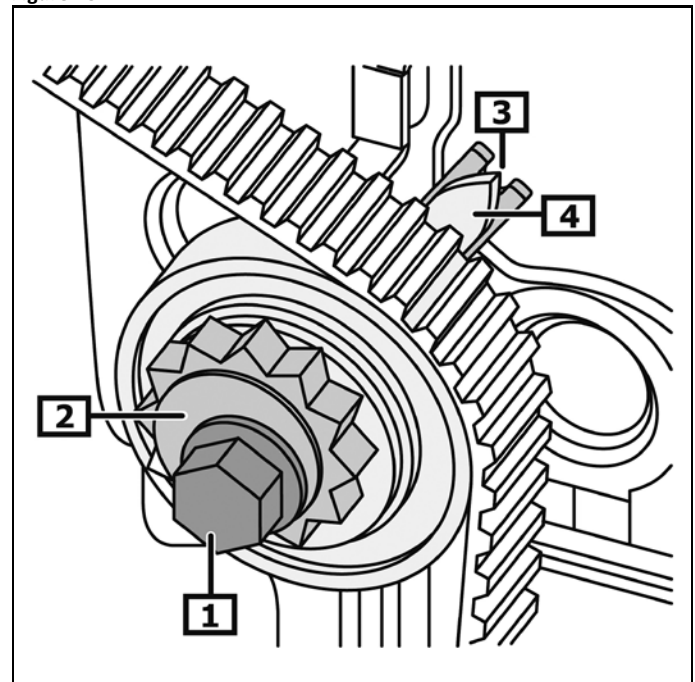
Screw in closing screw. (3)  
 (see figure 6)

Remove crankshaft locating pin. (2)  
 (see figure 3)

**Continue assembly in reverse order of removal.**

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

**Figure 15**



1 Tensioning roller screw

2 Tensioning roller eccentric

3 Setting window

4 Pointer

## Remove/install timing belt

SUZUKI Grand Vitara II (JT, TE, TD), 1.9 DDiS All-wheel Drive, 95 kW (JT419, TD44, JB419WD, JB419XD) - from exhaust emission standard EURO 5



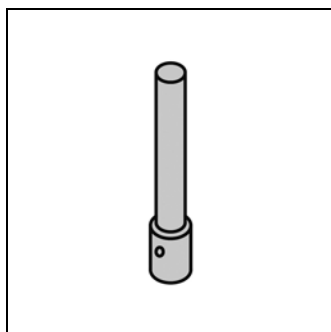
### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

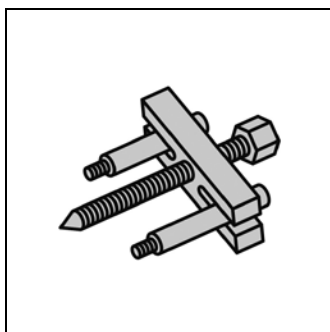
### **NOTE**

Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
The toothed belt must not come into contact with oil or coolant!  
The toothed belt must not be kinked or twisted.  
Do not block flywheel at the crankshaft sensor sensor ring.  
Replace the tension pulley when replacing the toothed belt.  
Replace crankshaft pulley when replacing the toothed belt.  
Only turn the high-pressure pump impeller clockwise in order to avoiding any damage to the high-pressure pump.  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

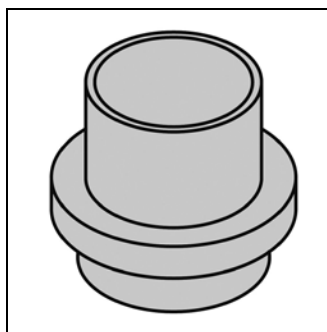
### **Required special tools**



Crankshaft blocking pin(s)  
OE (09912-46510)



Heavy-duty puller  
OE (09926-37610)



Thrust piece(s)  
OE (09919-76510)

### **Required Labour times/torques**

#### **Scheduled times**

Replace toothed belt	1,60 h
----------------------	--------

#### **Tightening torques**

Self-locking screws and nuts must always be replaced.

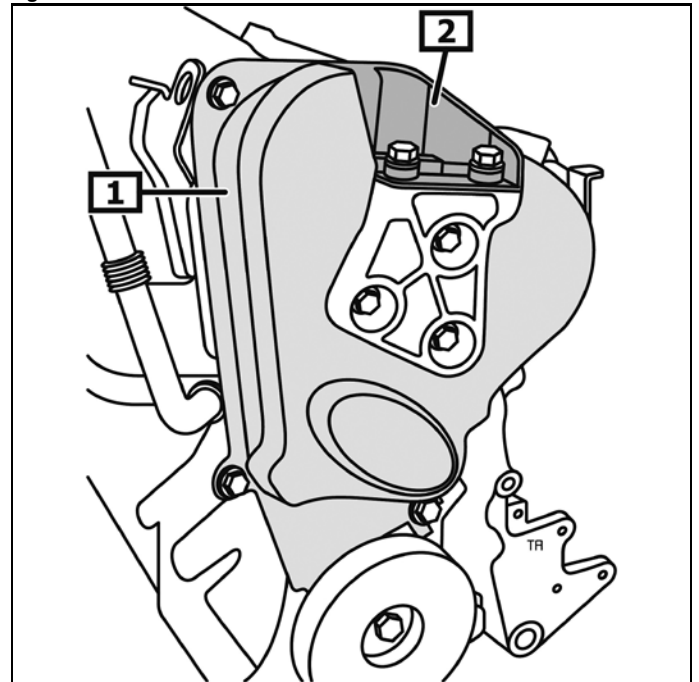
Toothed belt guard at the top (2)	(see figure 1)		Metal cap 55 Nm
Crankshaft central screw (1)	(see figure 3)	Use new screw.	01 stage 40 Nm; 02 stage 110°
Engine block closure screw (1)	(see figure 5)	Use sealant.	25 Nm
Support (2)	(see figure 7)		55 Nm
Toothed belt tensioning roller (2)	(see figure 8)		without exhaust emission standard EURO 5, Nut(s) 45 Nm; with exhaust gas norm EURO 5, Nut(s) 23 Nm; Screw(s) 10 Nm

## Remove

### Remove accessory drive belt.

Loosen line(s) from toothed belt guard.  
Remove toothed belt guard at the bottom. (1)  
Remove toothed belt guard at the top. (2)  
(see figure 1)

Figure 1



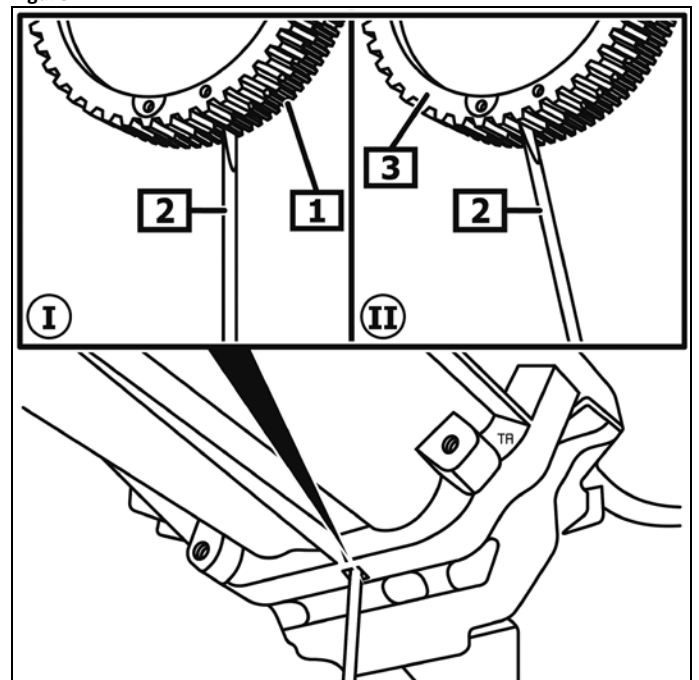
1 Toothed belt guard at the bottom

2 Toothed belt guard at the top

Block flywheel with screwdriver. (1)(2) (I)

Do not block flywheel at the crankshaft sensor sensor ring. (2)(3) (II)  
(see figure 2)

Figure 2



1 Flywheel

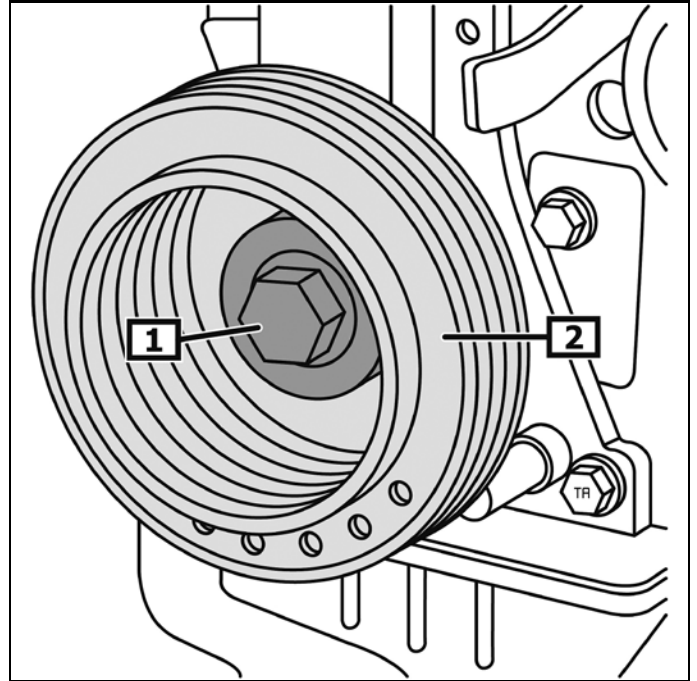
2 Screwdriver

3 Sensor ring

Unscrew the central crankshaft screw. **(1)**  
Remove vibration damper. **(2)**  
(see figure 3)

Remove screwdriver. **(2)**  
(see figure 2)

**Figure 3**

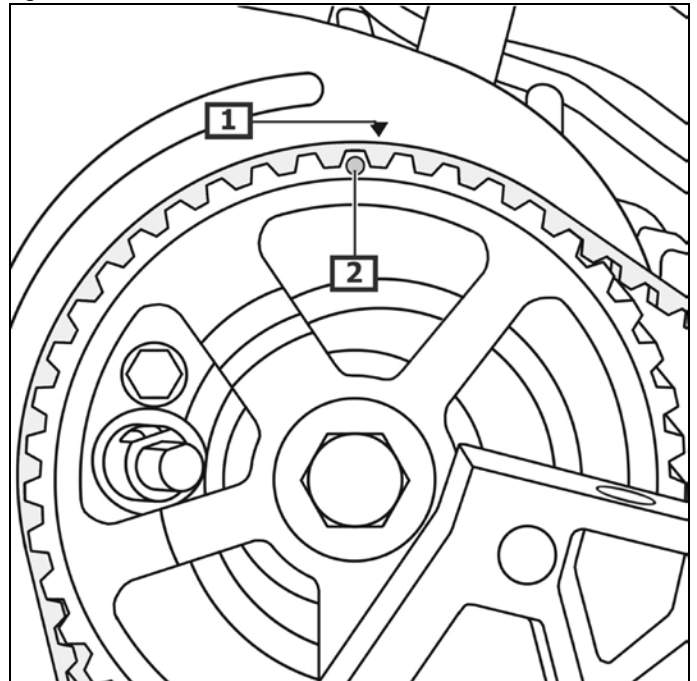


1 Crankshaft central screw

2 Vibration damper

Rotate crankshaft clockwise until TDC marking is one tooth before  
reference mark. **(1)(2)**  
(see figure 4)

**Figure 4**



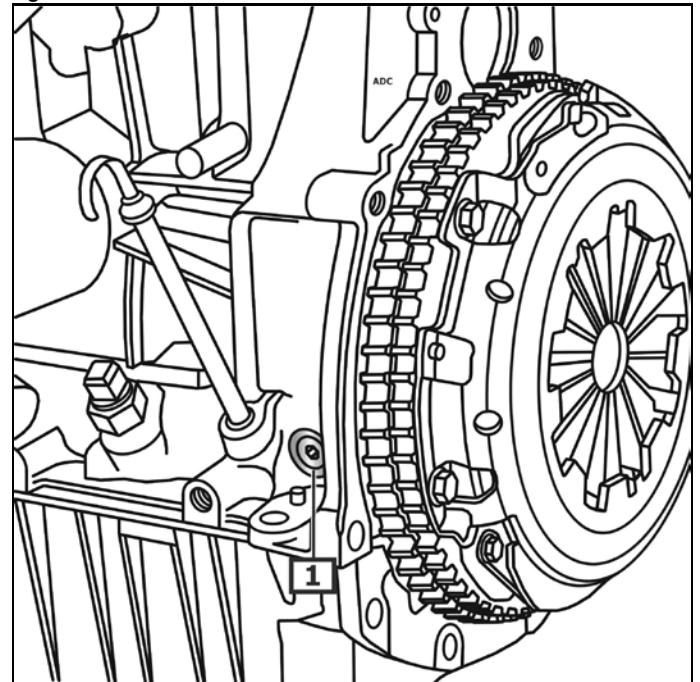
1 Reference mark(s)

2 TDC - camshaft gear marking

Unscrew and remove engine block locking screw(s). (1)  
 Insert the crankshaft blocking pin(s).  
 Slowly rotate crankshaft in direction of engine rotation until  
 crankshaft comes into contact with the crankshaft blocking pin(s).

**Required special tools**  
 Crankshaft blocking pin(s) OE (09912-46510)  
 (see figure 5)

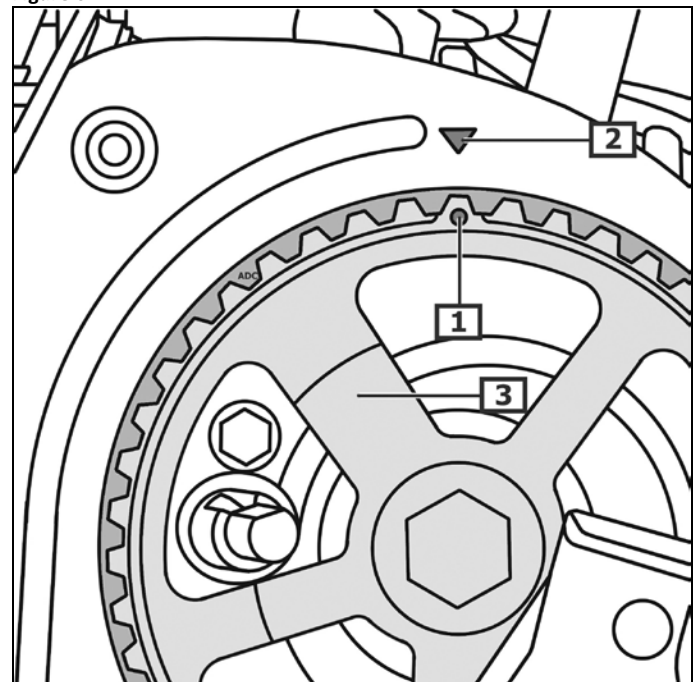
**Figure 5**



1 Engine block closure screw

The camshaft pulley marking must align with the reference mark on  
 the toothed belt guard. (1)(2)  
 (see figure 6)

**Figure 6**



1 Camshaft pulley marking(s)

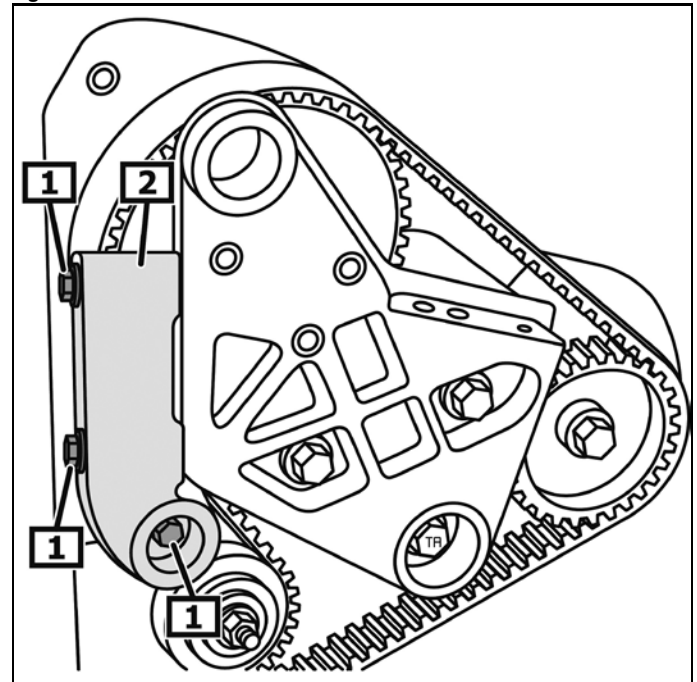
2 Reference mark(s)

3 Camshaft timing gear



Unscrew support(s) screw(s). **(1)**  
 Remove support(s). **(2)**  
 (see figure 7)

Figure 7

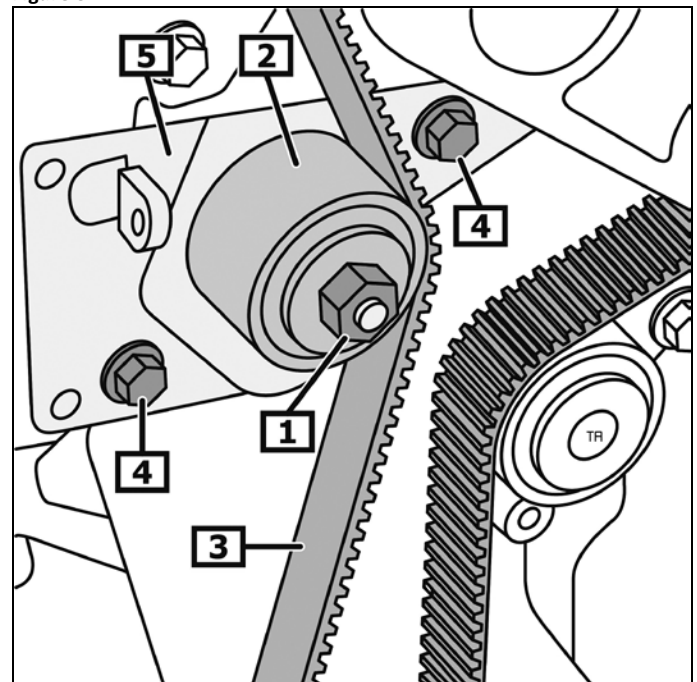


1 Support(s) screw(s)

2 Support(s)

Unscrew the tensioning roller nut(s). **(1)**  
 Remove the toothed belt tensioning roller. **(2)**  
 Take off toothed belt. **(3)**  
 Unscrew holder screw(s). **(4) (If required)**  
 Remove tension pulley holder. **(5) (If required)**  
 (see figure 8)

Figure 8



1 Tensioning roller nut(s)

2 Toothed belt tensioning roller

3 Toothed belt

4 Holder screw(s)

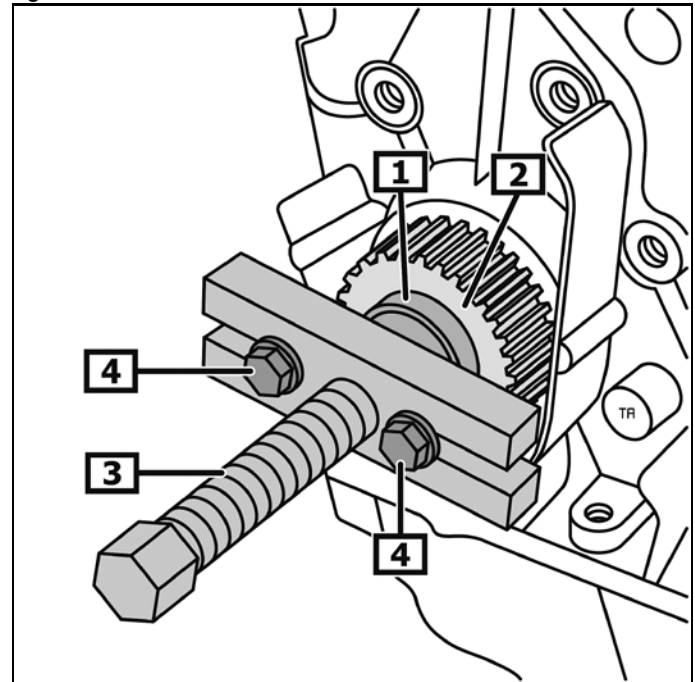
5 Holder - tension pulley

Insert pressure piece. (1)(2)  
 Screw on heavy-duty puller to the crankshaft pulley using M6x1.0 screws. (2)(3)(4)  
 Remove crankshaft pulley. (2)

#### **Required special tools**

Thrust piece(s) (1) OE (09919-76510)  
 Heavy-duty puller (3) OE (09926-37610)  
 (see figure 9)

**Figure 9**



- |                     |                     |
|---------------------|---------------------|
| 1 Thrust piece(s)   | 2 Crankshaft pulley |
| 3 Heavy-duty puller | 4 Screw(s)          |

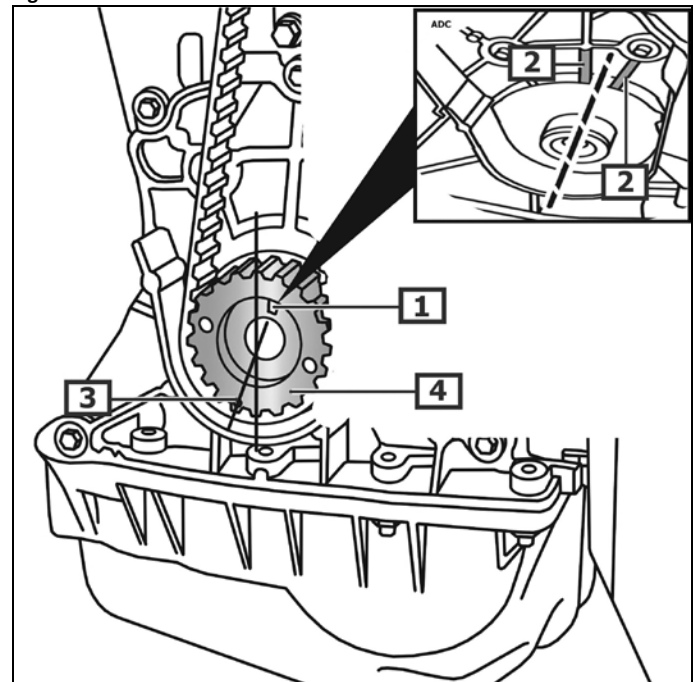
## **Install**

**Replace crankshaft pulley when replacing the toothed belt.**

Install crankshaft pulley. (4)  
 Crankshaft pulley wedge must engage in crankshaft groove.  
 Check to see whether the locking pin abuts the crankshaft.

Groove on the crankshaft to be between the reference markings. (1)(2)  
 Marking of crankshaft gear must be offset by one tooth to the left against the vertical axis. (3)  
 (see figure 10)

**Figure 10**



- |                                |                     |
|--------------------------------|---------------------|
| 1 Groove on crankshaft         | 2 Reference mark(s) |
| 3 Crankshaft pulley marking(s) | 4 Crankshaft pulley |

The camshaft pulley marking must align with the reference mark on the toothed belt guard. **(1)(2)**  
(see figure 6)

**Replace the tension pulley when replacing the toothed belt.**

Install tension pulley bracket. **(5)** (If required)  
Install tension roller for toothed belt. **(2)**  
Screw down tensioning roller nut(s) hand-tight. **(1)**  
(see figure 8)

Fit toothed belt. **(1)**

**Marking(s) of the camshaft timing gear wheel, injection pump wheel and crankshaft timing gear must check with the toothed belt markings. (2)(3)(4)**  
**Install toothed belt with impressed arrow direction such that it points to the running direction of the engine. (1)**  
(see figure 11)

Remove crankshaft blocking pin(s).

Rotate the tension pulley counterclockwise till the recess is in alignment with the reference marking. **(1)(2)(3)**  
(see figure 12)

**The tensioning roller nut must not turn during this process. (1)**

Nut(s) – tighten tension pulley. **(1)**  
(see figure 8)

Turn crankshaft by two revolutions in running direction of the engine. The camshaft pulley marking must align with the reference mark on the toothed belt guard. **(1)(2)**  
(see figure 6)

Check whether reference mark and tension pulley flush otherwise repeat tensioning process. **(2)(3)**  
(see figure 12)

Turn crankshaft by two revolutions in running direction of the engine. The camshaft pulley marking must align with the reference mark on the toothed belt guard. **(1)(2)**  
(see figure 6)

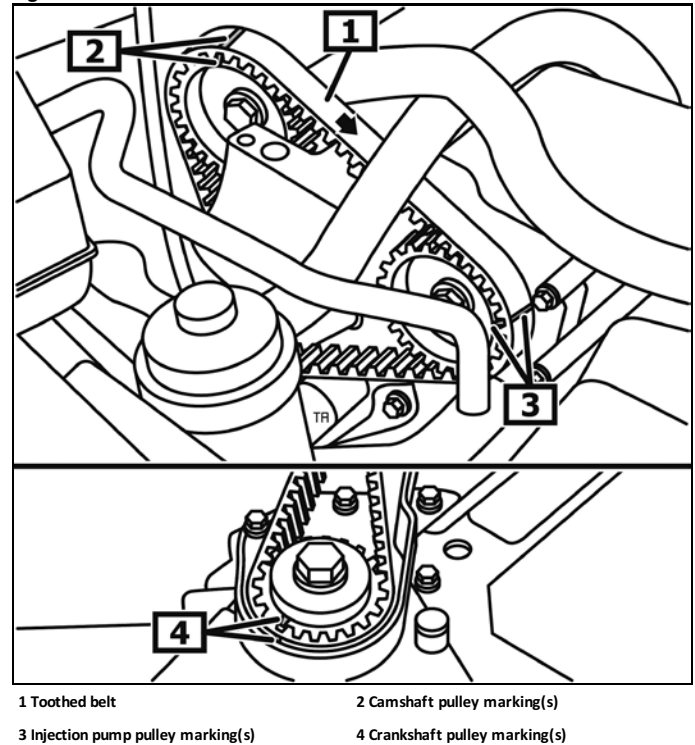
Groove on the crankshaft to be between the reference markings. **(1)(2)**  
Marking of crankshaft gear must be offset by one tooth to the left against the vertical axis. **(3)**  
(see figure 10)

Check whether the crankshaft locking pin can be inserted.  
Remove crankshaft blocking pin(s).

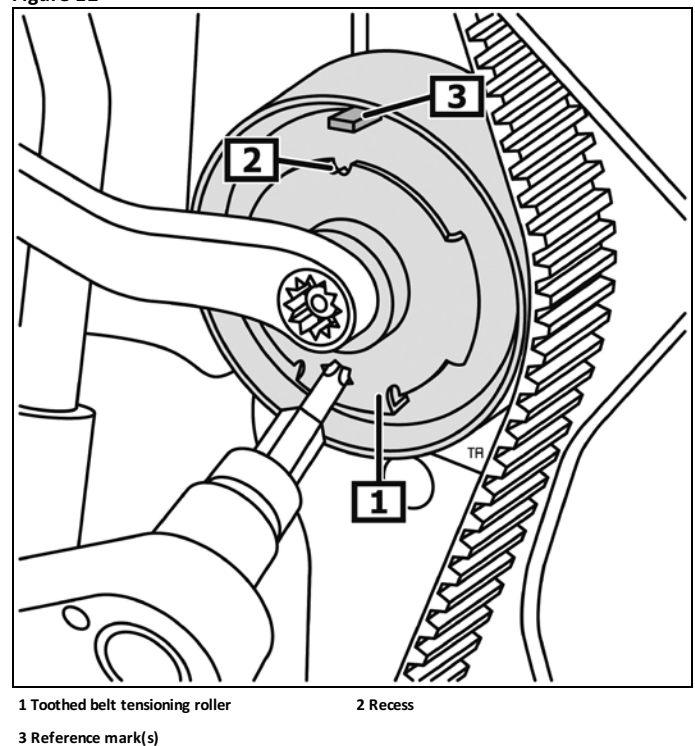
**Continue assembly in reverse order of removal.**

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

**Figure 11**



**Figure 12**





### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley. Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.

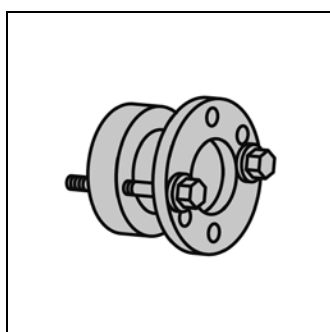
The toothed belt must not come into contact with oil or coolant!

Adjustment work on the toothed belt must only be carried out with a cold engine.

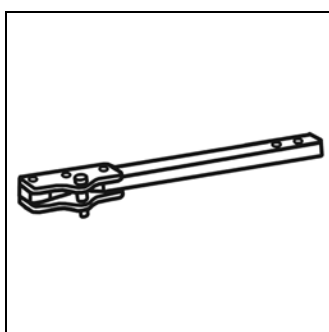
Note radio code. Disconnect battery (negative terminal).

It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

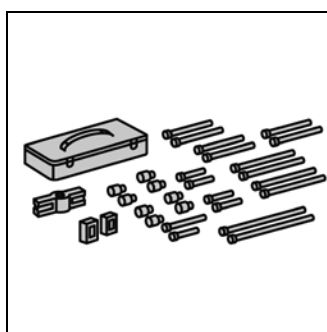
### **Required special tools**



Crankshaft blocking tool  
OE (09213-54015)



Counter support  
OE (09330-00021)



Set of pull-off tools  
OE (09950-50013)

### **Required Labour times/torques**

#### **Scheduled times**

Replace toothed belt	1,90 h
----------------------	--------

#### **Tightening torques**

Self-locking screws and nuts must always be replaced.

Engine mounting (6)	(see figure 1)	Screw(s) 52 Nm; Nut(s) 52 Nm
Engine bracket screw(s) (7)	(see figure 1)	M17 64 Nm; M14 37 Nm
Pulley screw(s) (1)	(see figure 2)	180 Nm
Tensioning roller screw(s) (3)	(see figure 2)	40 Nm
Toothed belt guard screw(s) (5)	(see figure 2)	7.5 Nm; with spacer 9 Nm
Distance washer(s) screw(s) (4)	(see figure 3)	7.5 Nm; with spacer 9 Nm
Tensioning device screw(s) (1)	(see figure 4)	21 Nm

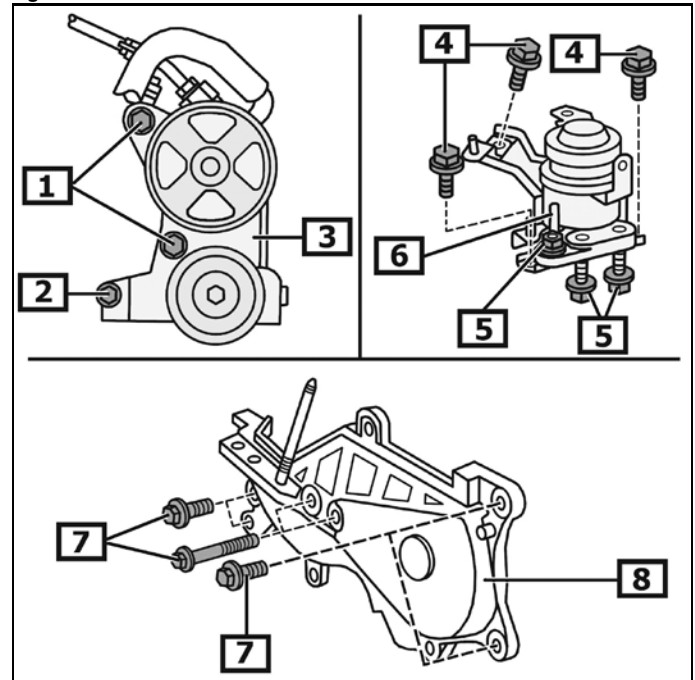
## Remove

Remove the right front wheel.  
 Remove underside guard.  
 Remove lock carrier cover(s).  
 Remove engine cover(s).  
 Disconnect engine control unit plug. Remove control unit.

### Remove accessory drive belt.

Unscrew screw(s). (1) (2)  
 Dismantle servo steering and support. (3) (place aside)  
**Lines remain connected.**  
 Support engine.  
 Unscrew engine mounting bolt(s). (4)  
 Unscrew nut(s). (5)  
 Remove engine mounting. (6)  
 (see figure 1)

Figure 1

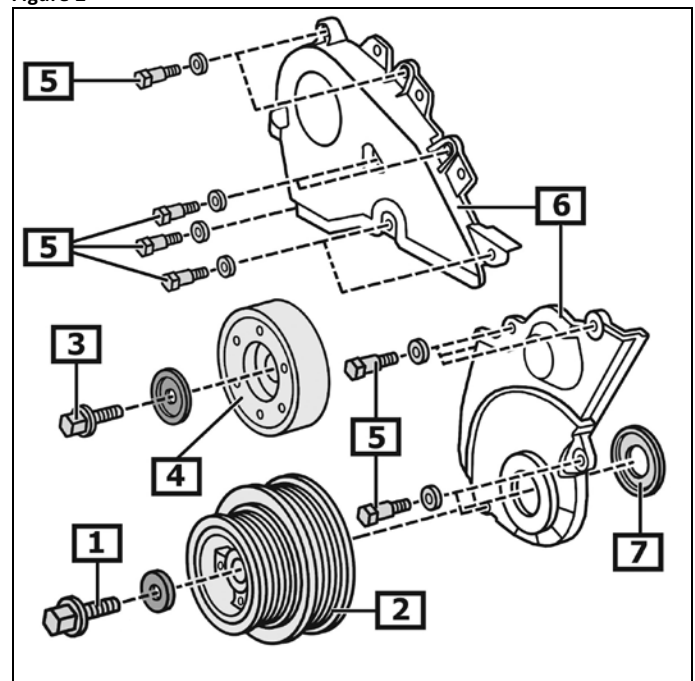


- |                                |                           |
|--------------------------------|---------------------------|
| 1 Holder screw(s)              | 2 Holder screw(s)         |
| 3 Holder - power steering pump | 4 Engine mounting bolt(s) |
| 5 Engine mounting nut(s)       | 6 Engine mounting         |
| 7 Engine bracket screw(s)      | 8 Engine bracket          |

Unscrew crankshaft pulley screw(s). (1)  
**Crankshaft blocking tool OE (09213-54015)**  
**Counter support OE (09330-00021)**  
 Remove crankshaft pulley. (2)  
**Use puller. OE (09950-50013)**  
 Unscrew tensioning roller screw(s). (3)  
 Remove tensioning roller. (4)  
 Unscrew screw(s). (5)  
 Remove toothed belt guard at the top. (6)  
 Remove toothed belt guard at the bottom. (6)  
 Remove toothed belt rail. (7)  
 (see figure 2)

Unscrew engine bracket screw(s). (7)  
 Remove engine bracket. (8)  
 (see figure 1)

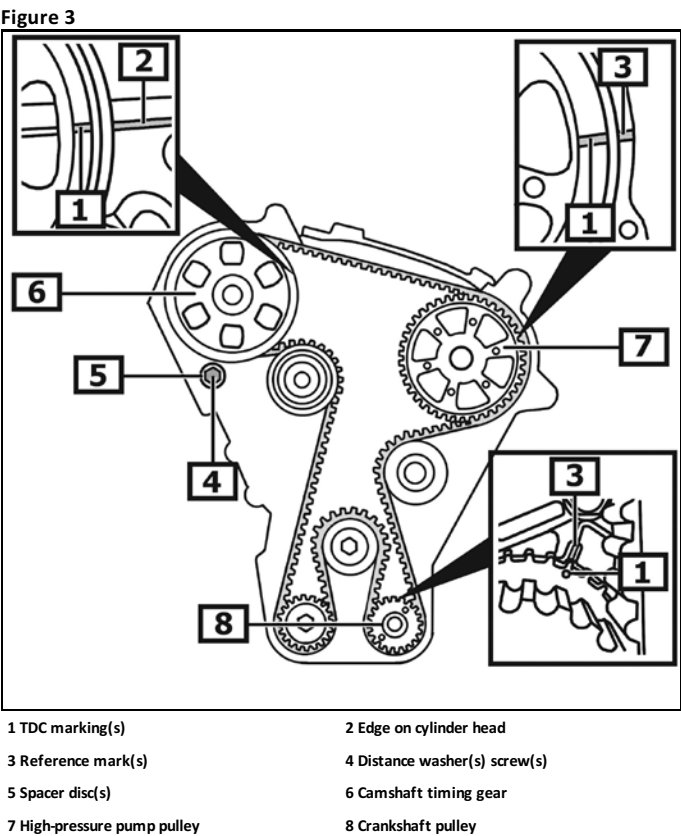
Figure 2



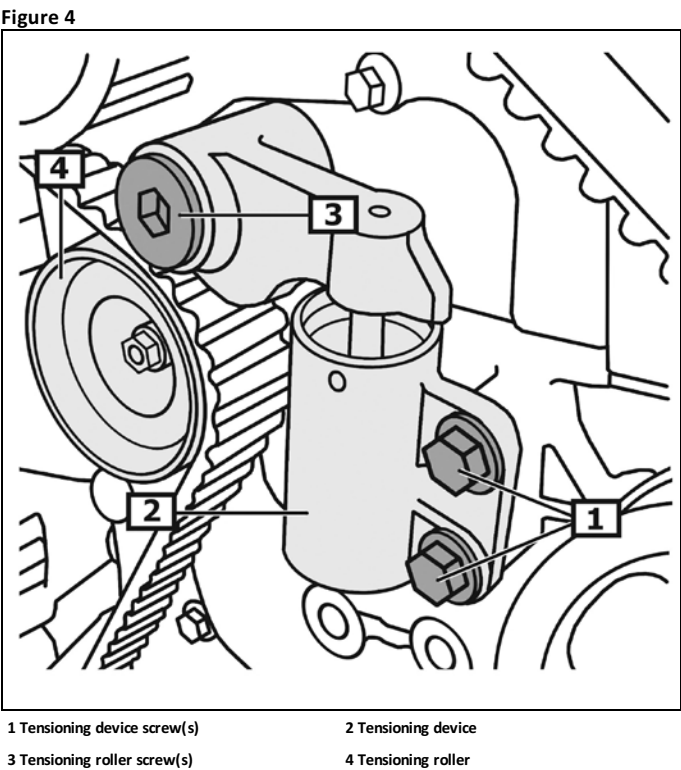
- |                               |  |
|-------------------------------|--|
| 1 Pulley screw(s)             | 2 Crankshaft pulley                      |
| 3 Tensioning roller screw(s)  | 4 Accessory drive belt tensioning roller |
| 5 Toothed belt guard screw(s) | 6 Toothed belt guard                     |
| 7 Toothed belt guide          |  |

Screw in crankshaft pulley screw(s).  
 Set engine to TDC cylinders 1. Marks must align. **(1) (2) (3)**  
 Unscrew screw(s). **(4)**  
 Remove spacer disc(s). **(5)**  
**(see figure 3)**

Rotate engine in the direction of rotation only by the crankshaft pulley.



Unscrew screw(s). **(1)**  
 Remove tensioning device. **(2)**  
 Remove toothed belt.  
**(see figure 4)**



## Install

Check tensioning roller for leaks and smooth running and replace, if required.

Check tensioning device for leaks and replace, if required. (1)

Push tappet downwards using press. (2)

Bores must be in alignment.

Insert Allen key. (3)

(see figure 5)

Relieve pressure of press.

TDC - Check markings, adjust if necessary. Marks must align. (1) (2) (3)

(see figure 3)

Fit toothed belt clockwise starting with camshaft pulley.

Push tensioning roller against toothed belt.

Fit tensioning device. (2)

Screw in screw(s). (1)

(see figure 4)

Remove Allen key. (3)

Toothed belt tightens itself.

(see figure 5)

Rotate engine two revolutions in the engine rotating direction.

Set engine to TDC cylinders 1.

Marks must align.

Unscrew crankshaft pulley screw(s).

Install toothed belt guide. (1)

Angled side must point outwards.

(see figure 6)

Continue assembly in reverse order of removal.

Install toothed belt guard.

Damaged seals must be replaced.

Fit accessory drive belt.

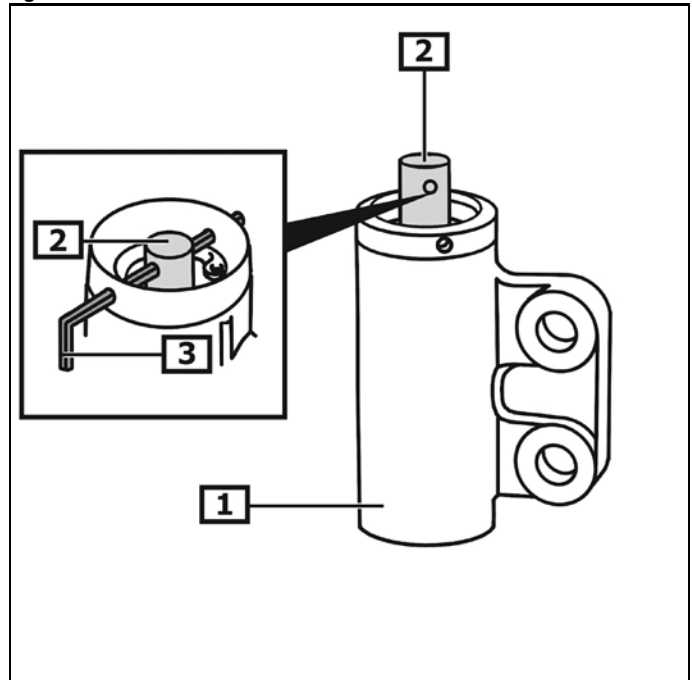
Decode radio, program volatile memories.

Start engine and check function.

Carry out a test drive.

Document toothed belt change.

Figure 5

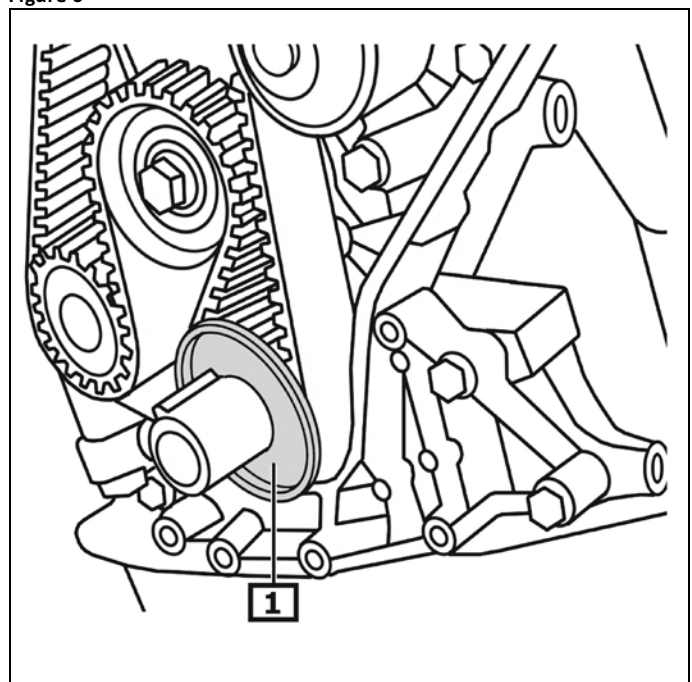


1 Tensioning device

2 Tappet

3 Allen key (1,27 mm)

Figure 6



1 Toothed belt guide

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

### VOLVO XC60 (156), D4, 133 kW



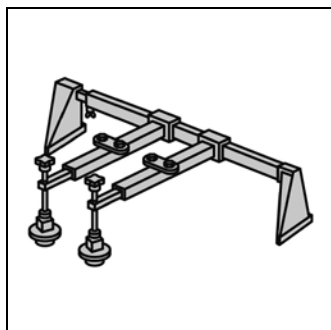
#### **WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

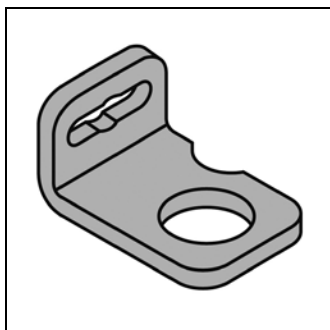
#### **NOTE**

Rotate engine in the direction of rotation only by the crankshaft pulley.  
When turning the camshaft, the crankshaft must not be at TDC.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
The toothed belt must not come into contact with oil or coolant!  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

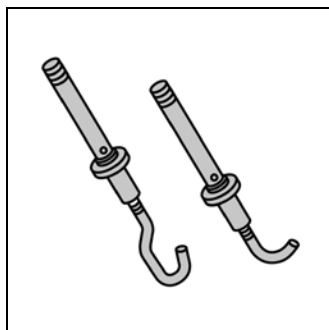
#### **Required special tools**



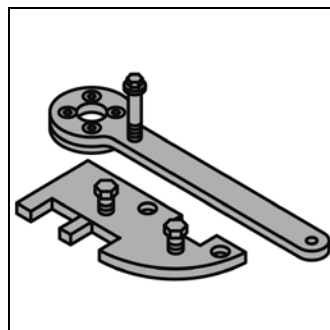
Engine bridge  
OE (9995716)



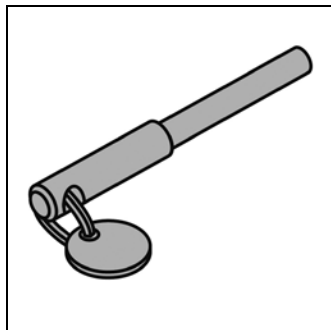
Lifting lug  
OE (9997503)



Engine bridge adapter  
OE (9995460)



Counter support  
OE (9997495)



Blocking pin(s)  
OE (9997233)



## **Required Labour times/torques**

### **Scheduled times**

Replace toothed belt	1,50 h
----------------------	--------

### **Tightening torques**

**Self-locking screws and nuts must always be replaced.**

Engine bracket screw(s) (1)	(see figure 2)	M12 80 Nm; at the cylinder head 48 Nm
Engine mounting bolt(s) (3)	(see figure 2)	on chassis, M12 80 Nm
Crankshaft central screw (2)	(see figure 3)	01 stage 110 Nm; 02 stage 90°
Bolt(s), high-pressure pump impeller (2)	(see figure 5)	central nut 85 Nm; 01 stage Tighten by hand; 02 stage 10 Nm
Tensioning roller screw (1)	(see figure 6)	01 stage 20 Nm; 02 stage 45°
Bolt(s), deflection pulley, toothed belt		M8 24 Nm; on console(s) 30 Nm; With deflection pulley: 65 Nm
Vibration damper screw(s)		01 stage 25 Nm; 02 stage 90°
Toothed belt guard screw(s)		M6 10 Nm
Wheels		01 stage 20 Nm; 02 stage 140 Nm

## Remove

Remove engine cover(s).  
Disconnect fuel hose(s) from toothed belt guard.  
Remove fuel line(s) from valve cover.  
**Do not disconnect the fuel hose(s).**  
Unscrew the front right engine bearing ground strap.

### **Remove accessory drive belt.**

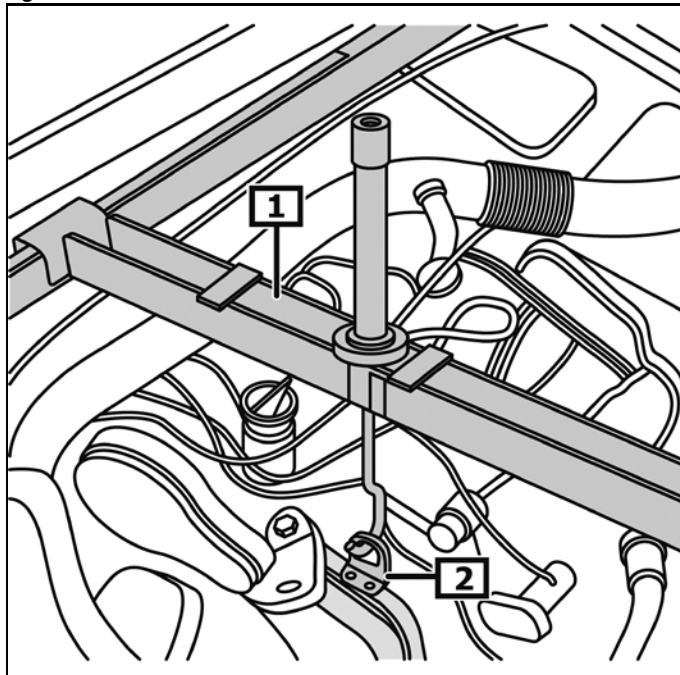
Install engine bridge. **(1)**  
Attach lifting lug. **(2)**

#### Required special tools

Engine bridge OE (9995716)  
Lifting lug OE (9997503)  
Engine bridge adapter OE (9995460)  
(see figure 1)

Unscrew engine bracket screw(s). **(1)**  
Remove engine bracket. **(2)**  
Unscrew engine mounting bolt(s). **(3)**  
Remove engine mounting. **(4)**  
(see figure 2)

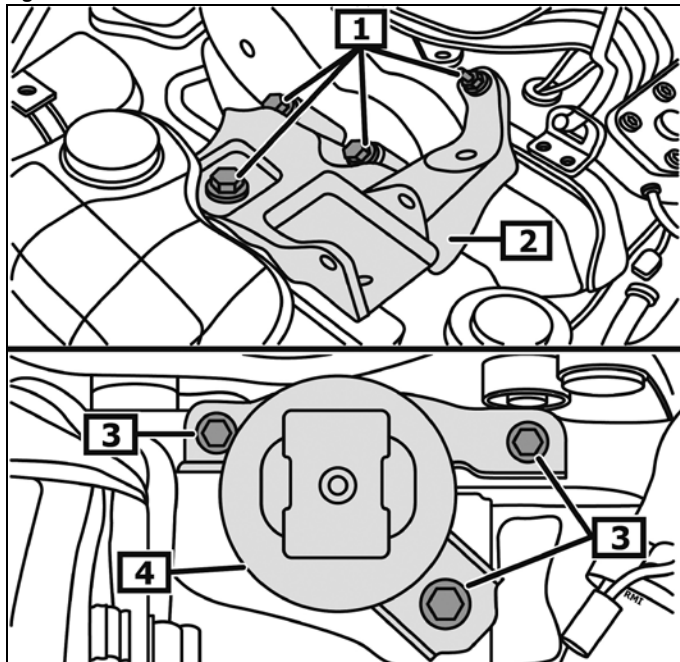
Figure 1



1 Engine bridge

2 Lifting lug

Figure 2



1 Engine bracket screw(s)

2 Engine bracket

3 Engine mounting bolt(s)

4 Engine mounting

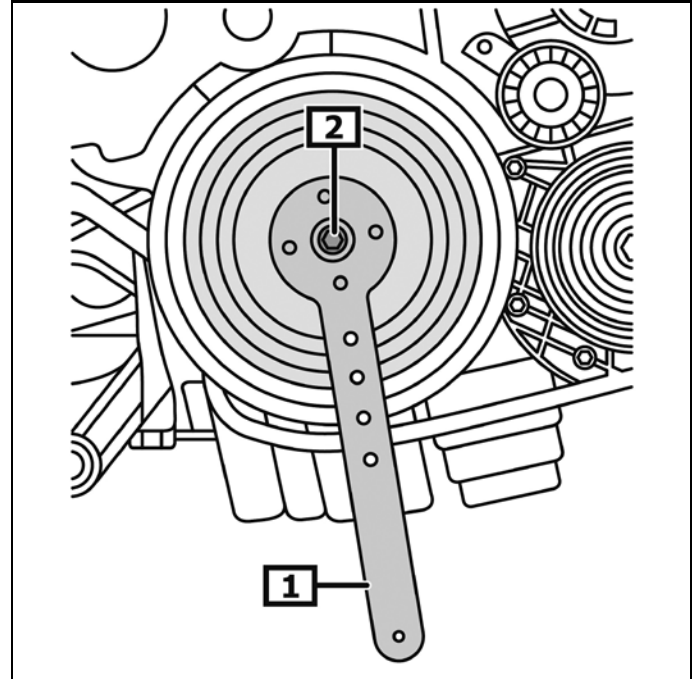
Use holder. **(1)**  
Unscrew the central crankshaft screw. **(2)**  
Unscrew vibration damper screw(s).

**Required special tools**

Counter support OE **(9997495)**  
**(see figure 3)**

Remove toothed belt guard.

**Figure 3**

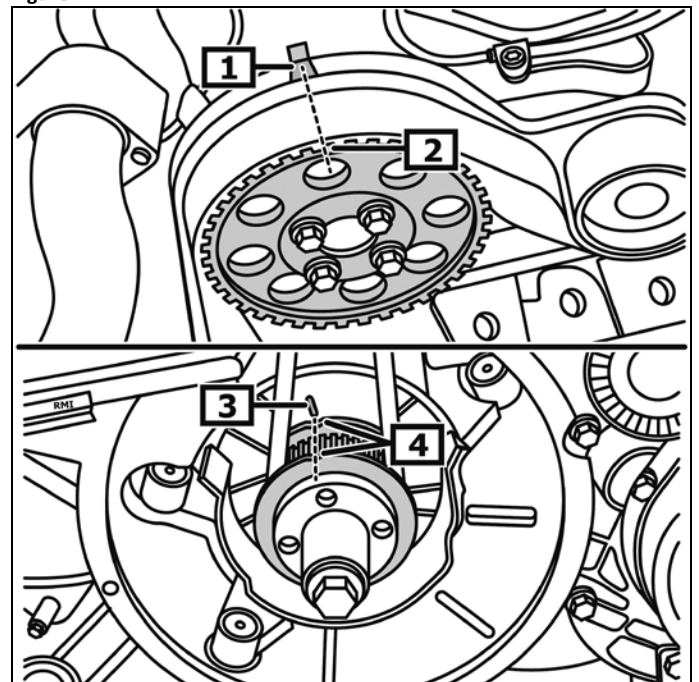


1 Counter support

2 Crankshaft central screw

Set engine to TDC mark of first cylinder.  
The camshaft pulley marking must align with the reference mark on the toothed belt guard. **(1)(2)**  
Crankshaft TDC marking must flush with the reference mark. **(3)(4)**  
**(see figure 4)**

**Figure 4**



1 Reference marking - toothed belt guard

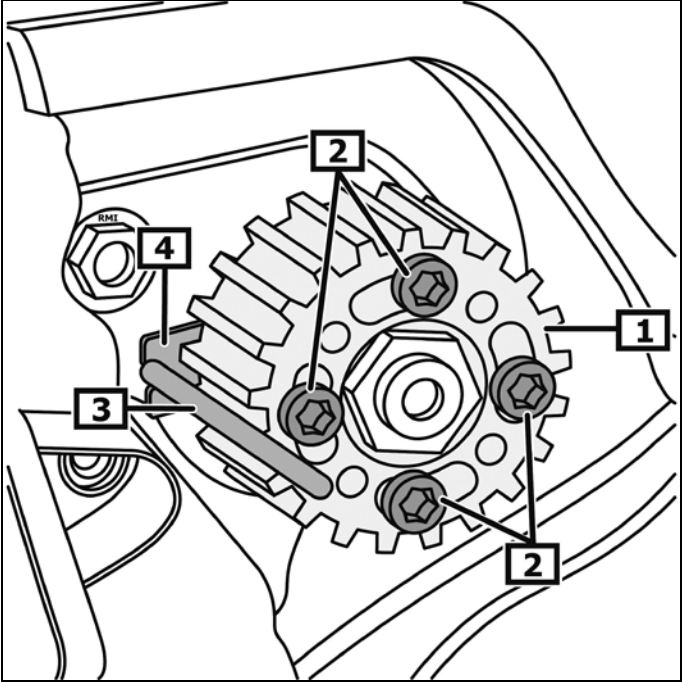
2 TDC - camshaft gear marking

3 Reference mark(s)

4 TDC - crankshaft gear marking(s)

Loosen bolt(s) from high-pressure pump impeller. (2)  
(see figure 5)

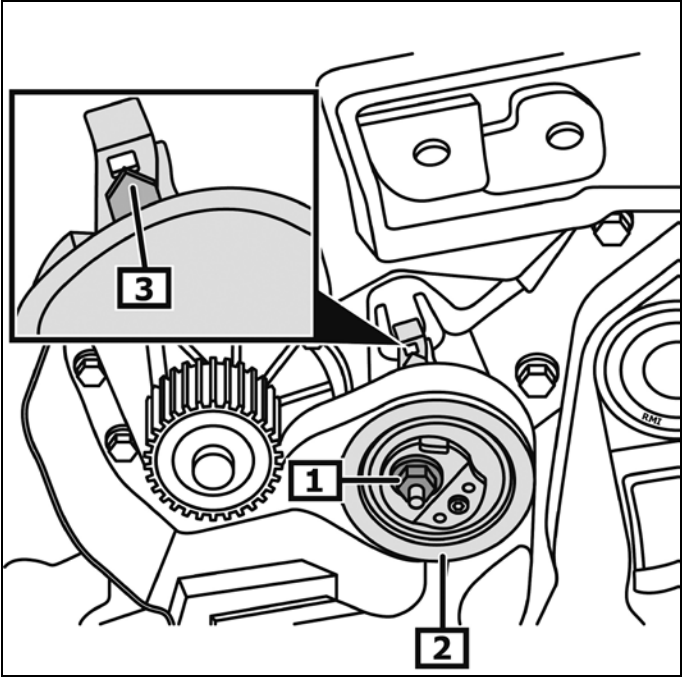
Figure 5



- 1 High-pressure pump pulley
- 2 Screw(s) - high-pressure pump
- 3 High-pressure pump pulley blocking pin(s)
- 4 High-pressure pump impeller locking device.

Slacken tensioning roller nut(s) by one turn. (1)  
Turn tensioning roller clockwise. (2)  
Take off toothed belt.  
Remove the toothed belt tensioning roller. (2)  
(see figure 6)

Figure 6



- 1 Toothed belt tensioning roller
- 2 Tensioning roller nut
- 3 Pointer

Unscrew and remove bracket screw(s). **(1)**  
Remove the holder. **(2)**  
**(see figure 7)**

Remove camshaft drive deflection pulley.

## **Install**

Insert high-pressure pump pulley blocking pin(s). **(3)(4)**

### **Required special tools**

Blocking pin(s) OE **(9997233)**  
**(see figure 5)**

Install camshaft drive deflection pulley.

Attach holder. **(2)**  
Tighten holder screw(s). **(1)**  
**(see figure 7)**

Install the tensioning roller. **(2)**  
Screw down tensioning roller nut(s) hand-tight. **(1)**  
**Look out for correct seat of the tension roller.**  
**(see figure 6)**

**Fit the toothed belt to the tensioning roller starting anti-clockwise.**

Using an Allen wrench, turn eccentric of tension roller counterclockwise until pointer is centrally located in the recess. **(3)**  
Nut(s) – tighten tension pulley. **(1)**  
**(see figure 6)**

Tighten high-pressure pump impeller screw(s). **(2)**  
Remove high-pressure pump pulley blocking pin(s). **(3)**  
**(see figure 5)**

Rotate engine two revolutions in the engine rotating direction.  
Check the control times. **(1) - (4)**  
**(see figure 4)**

Check toothed belt tension. **(3)**  
**(see figure 6)**

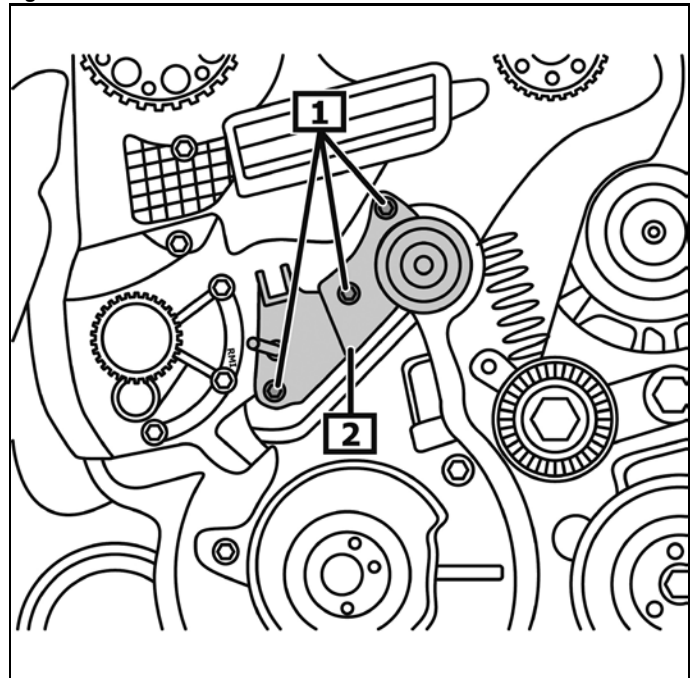
**If it is not possible to insert the blocking tools, adjust the valve timing.**

**Continue assembly in reverse order of removal.**

Carry out a test drive.  
Document toothed belt change.

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

**Figure 7**



1 Tension roller and deflection pulley holder      2 Holder screw(s)

VW Golf VII (5G1, BQ1, BE1, BE2), 1.6 TDI, 81 kW  
Engine CRKB, CXXB, DBKA



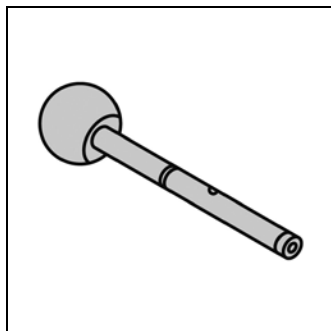
**WARNING**

Electric radiator fan can start even with the engine cut!  
Rotating components can result in cuts and squashing!  
Disconnect plug connection on electric radiator fan.

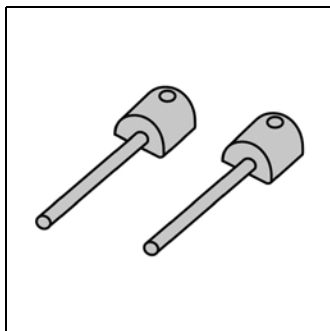
**NOTE**

The tensioning roller can only be removed with the engine bracket removed.  
Heed engine mounting fitting position.  
Note radio code. Disconnect battery (negative terminal).  
Rotate engine in the direction of rotation only by the crankshaft pulley.  
Ensure cleanliness when working on the fuel system.  
Remove locking pin(s) before loosening or fastening the central screw.  
When turning the camshaft, the crankshaft must not be at TDC.  
Crankshaft pulley and camshaft pulley must not be rotated completely with the toothed belt removed.  
The toothed belt must not come into contact with oil or coolant!  
Adjustment work on the toothed belt must only be carried out with a cold engine.  
It is advisable not to reuse the accessory drive belt(s) after removal, but always replace them!

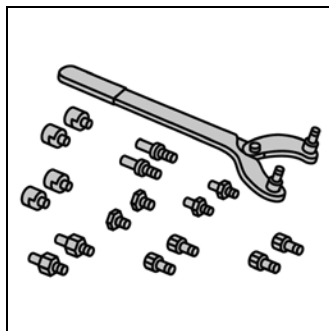
**Required special tools**



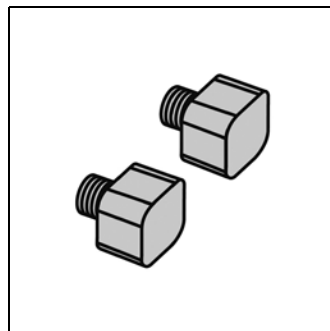
Blocking pin(s)  
OE (3359)



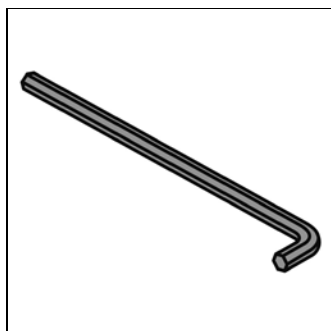
High pressure pump and camshaft locating  
pins  
OE (T10492)



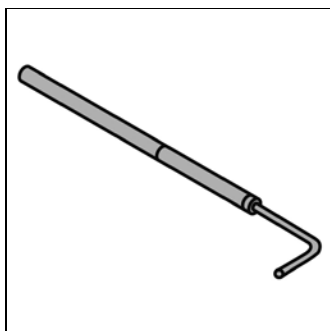
Counter support kit  
OE (T10172)



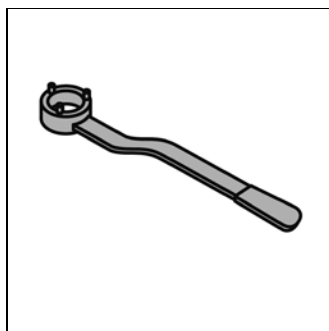
Counter support bolt  
OE (T10172/11)



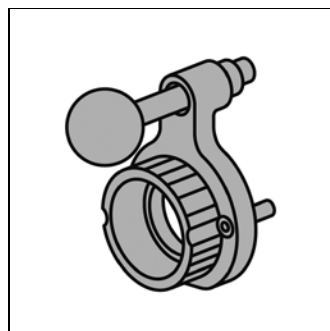
Allen key  
OE (T10264)



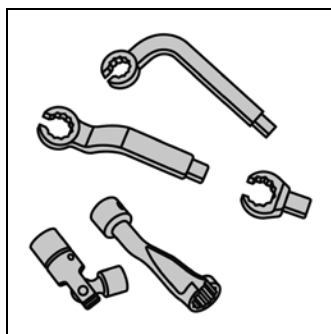
Tensioning roller blocking pin(s)  
OE (T10265)



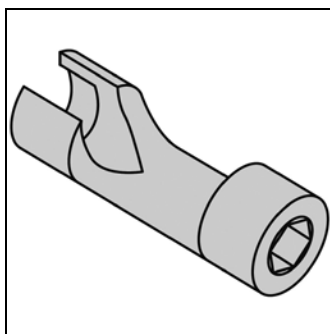
Counter support  
OE (T10051)



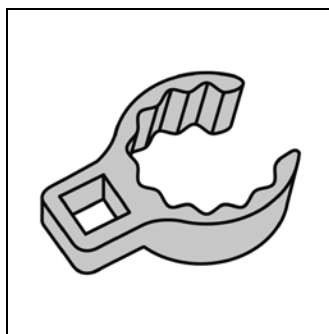
Crankshaft locking tool  
OE (T10490)



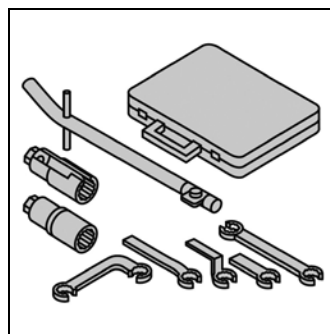
Socket wrench set  
OE (T10395)



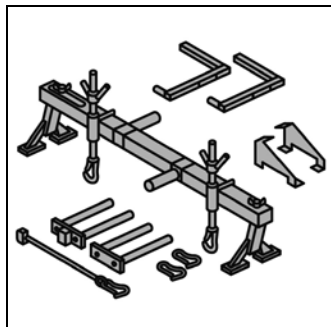
Wrench socket  
OE (T40055)



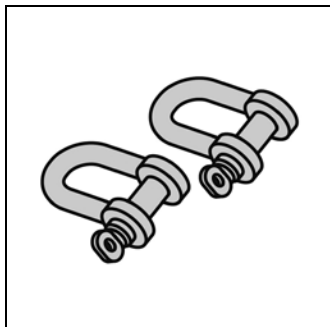
Open ring wrench socket  
OE (VAG 1331/10)



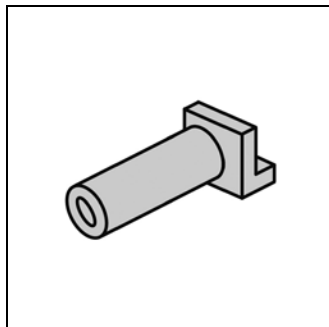
Socket wrench set  
OE (3337)



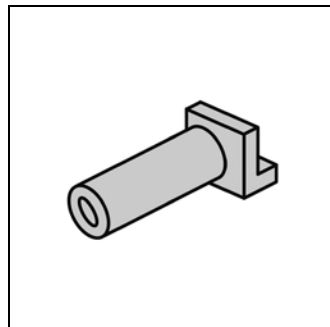
Engine bridge set  
OE (10-222 A)



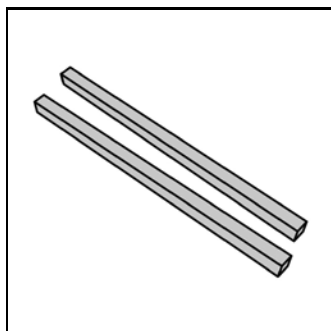
Shackle  
OE (10-222 A/12)



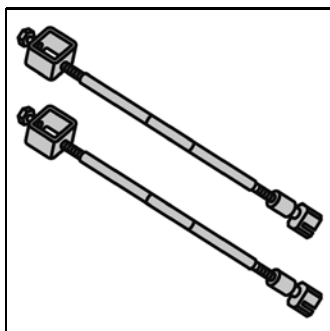
Engine bridge support(s)  
OE (10-222 A/31-1)



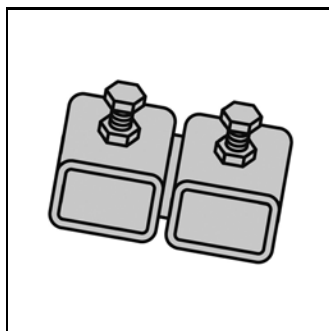
Engine bridge support(s)  
OE (10-222 A/31-2)



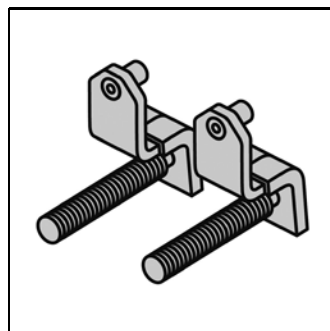
Engine bridge additional support  
OE (T40091/1)



Engine bridge support(s)  
OE (T40093/3)



Engine bridge frame auxiliary support  
connecting element(s)  
OE (T40091/3)



Engine bridge support(s)  
OE (T40093/3-6)

## Required Labour times/torques

### Scheduled times

Replace toothed belt	3,40 h
----------------------	--------

### Tightening torques

Self-locking screws and nuts must always be replaced.

Fuel filter bracket (2)(3)	(see figure 3)		8 Nm
Engine mounting (1)(2)	(see figure 8)	Use new screw(s).	on chassis, M8, Screw(s) 20 Nm + 90°; on chassis, M10, Screw(s) 40 Nm + 90°; on engine bracket 60 Nm + 90°
Engine bracket (1)	(see figure 9)	Use new screw(s).	40 Nm + 180°
Vibration damper screw(s) (2)	(see figure 10)		01 stage 10 Nm; 02 stage 90°
Camshaft timing gear (1)	(see figure 12)		Central bolt 100 Nm; Adjusting screw 9 Nm
High-pressure pump pulley (2)	(see figure 14)		95 Nm
Toothed belt tensioning roller (1)	(see figure 16)	Use new nut(s).	20 Nm + 45°
Wheel attachment			120 Nm

## **Remove**

**Lift vehicle.**

Dismantle under-engine under protection.

**Remove the accessory drive belt.**

Remove the engine cover.

Disconnect coolant expansion reservoir electric plug connection(s). **(1)**

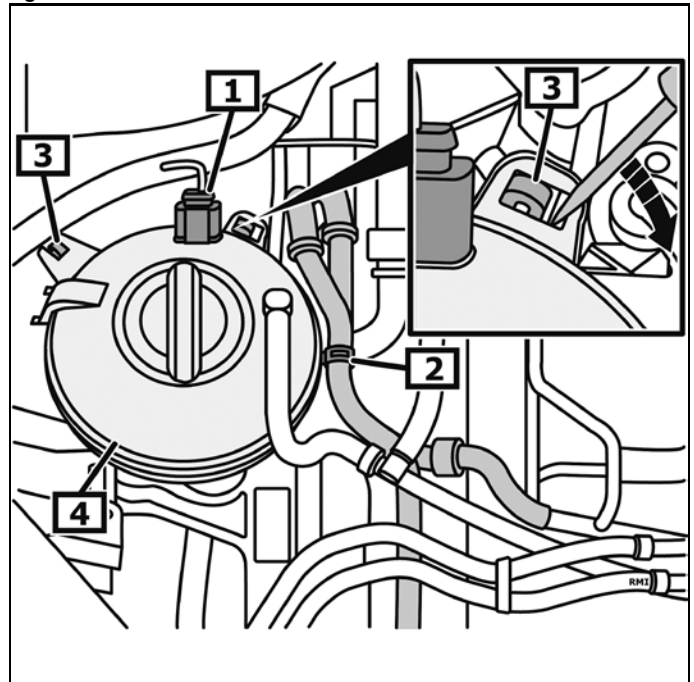
Disconnect fuel line(s) holder. **(2)**

Unlock catch mechanism(s). **(3)**

Loosen coolant expansion reservoir and put it aside. **(4)**  
(see figure 1)

**Coolant hoses remain connected!**

**Figure 1**



1 Electric plug connection(s)

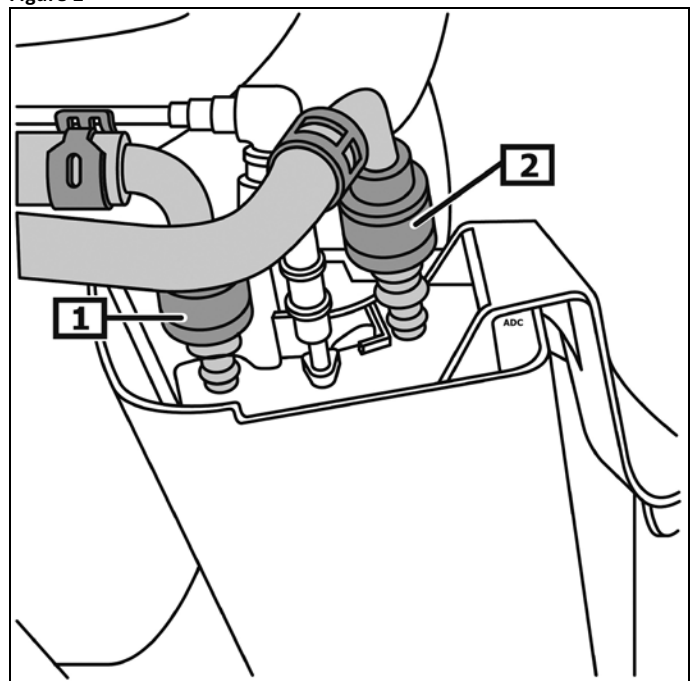
2 Fuel line(s) holder

3 Catch mechanism(s)

4 Coolant expansion reservoir

Disconnect fuel line(s) quick-coupling(s). **(1)(2)**  
(see figure 2)

**Figure 2**



1 Quick-coupling(s)

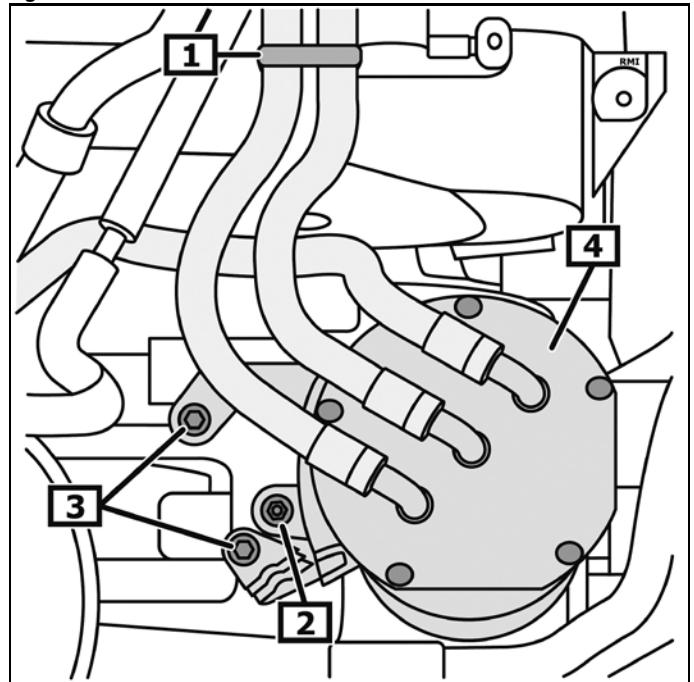
2 Quick-coupling(s)



Disconnect fuel line(s) holder. **(1)**  
 Unscrew and remove fuel filter bracket nut(s). **(2)**  
 Unscrew and remove fuel filter bracket screw(s). **(3)**  
 Loosen fuel filter and put it aside. **(4)**  
**(see figure 3)**

Lines remain connected.

**Figure 3**

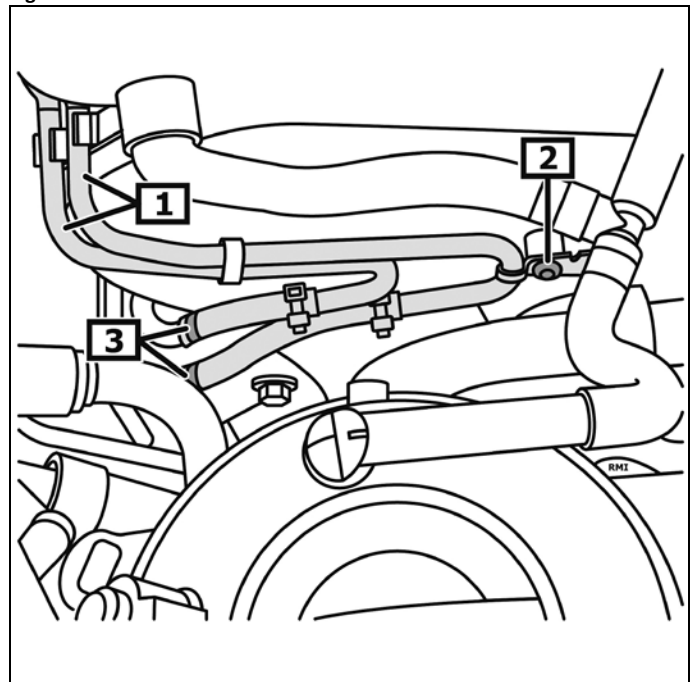


- |                                |                              |
|--------------------------------|------------------------------|
| 1 Coolant line(s) bracket      | 2 Fuel filter bracket nut(s) |
| 3 Fuel filter bracket screw(s) | 4 Fuel filter                |

**Vehicle with two differential-pressure sensor lines**

Loosen line(s) from toothed belt guard. **(1)**  
 Unscrew and remove differential-pressure sensor lines holder screw. **(2)**  
 Remove the hose clamp(s). **(3)**  
 Disconnect differential-pressure sensor lines.  
**(see figure 4)**

**Figure 4**

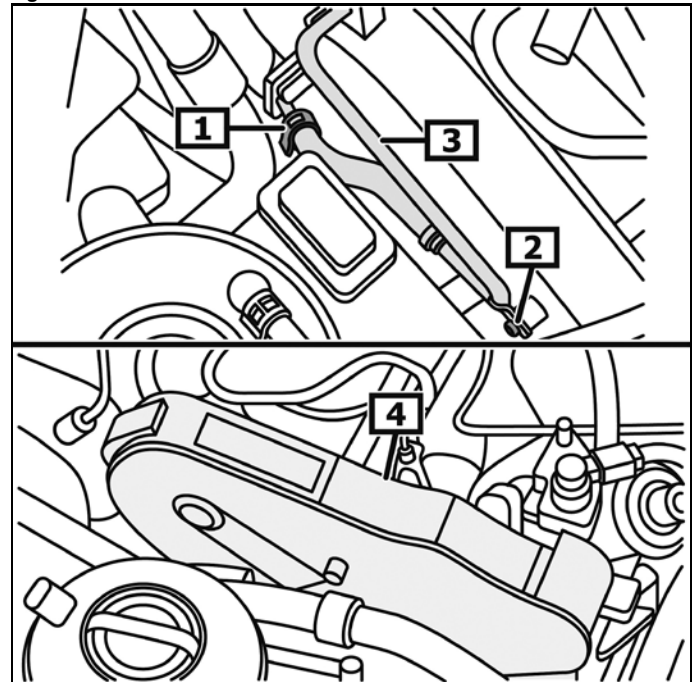


- |  |                   |
|--|-------------------|
| 1 Differential-pressure sensor line(s) | 2 Holder screw(s) |
| 3 Hose clamp(s)                        |                   |

### Vehicle with a differential-pressure sensor line

Remove the hose clamp(s). **(1)**  
Disconnect differential-pressure sensor lines.  
Unscrew and remove differential-pressure sensor lines holder screw. **(2)**  
Loosen line(s) from toothed belt guard. **(3)**  
**(see figure 5)**

Figure 5



- |  |                                 |
|--|---------------------------------|
| 1 Hose clamp(s)                        | 2 Holder screw(s)               |
| 3 Differential-pressure sensor line(s) | 4 Toothed belt guard at the top |

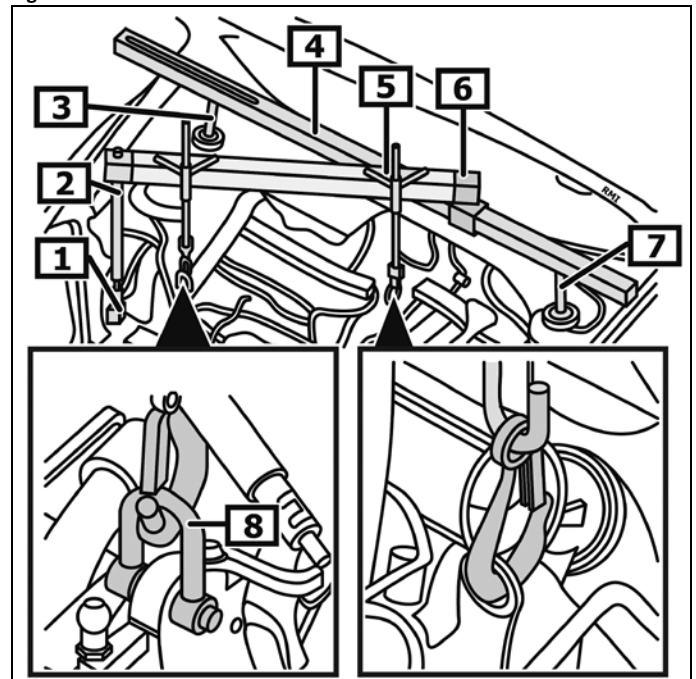
### Continuation for all vehicles

Install engine bridge together with the additional pieces. **(1) - (8)**  
Slightly pretension engine at the suspension lugs, do not lift it.

#### **Required special tools:**

Engine bridge set **(4)** OE **(10-222 A)**  
- Shackle **(8)** OE **(10-222 A/12)**  
- Engine bridge support(s) **(7)** OE **(10-222 A/31-1)**  
- Engine bridge support(s) **(3)** OE **(10-222 A/31-2)**  
Engine bridge additional support **(5)** OE **(T40091/1)**  
Engine bridge support(s) **(2)** OE **(T40093/3)**  
Engine bridge frame auxiliary support connecting element(s) **(6)** OE **(T40091/3)**  
**(see figure 6)**

Figure 6

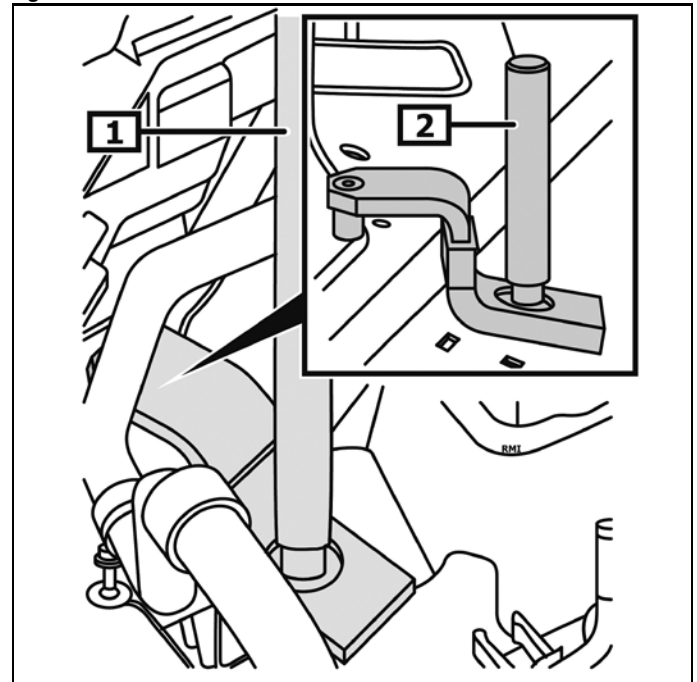


- |                                    |   |
|------------------------------------|---|
| 1 Engine bridge support(s)         | 2 Engine bridge support(s)                                    |
| 3 Engine bridge support(s)         | 4 Engine bridge set   |
| 5 Engine bridge additional support | 6 Engine bridge frame auxiliary support connecting element(s) |
| 7 Engine bridge support(s)         | 8 Shackle   |

Mount engine bridge support(s). **(1)(2)**  
Protect electric cables against damage.

**Required special tools:**  
Engine bridge support(s) **(1) OE (T40093/3)**  
Engine bridge support(s) **(2) OE (T40093/3-6)**  
**(see figure 7)**

**Figure 7**



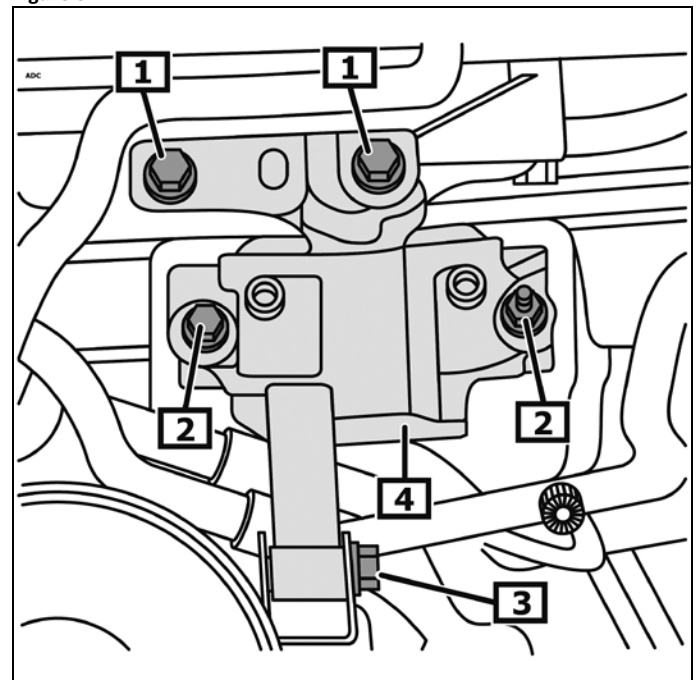
1 Engine bridge support(s)

2 Engine bridge support(s)

Screw(s) - screw on engine bracket. **(1)**  
Unscrew engine mounting bolt(s). **(2)(3)**  
Remove engine mounting. **(4)**  
**(see figure 8)**

Remove toothed belt guard at the top. **(4)**  
**(see figure 5)**

**Figure 8**



1 Engine bracket screw(s)

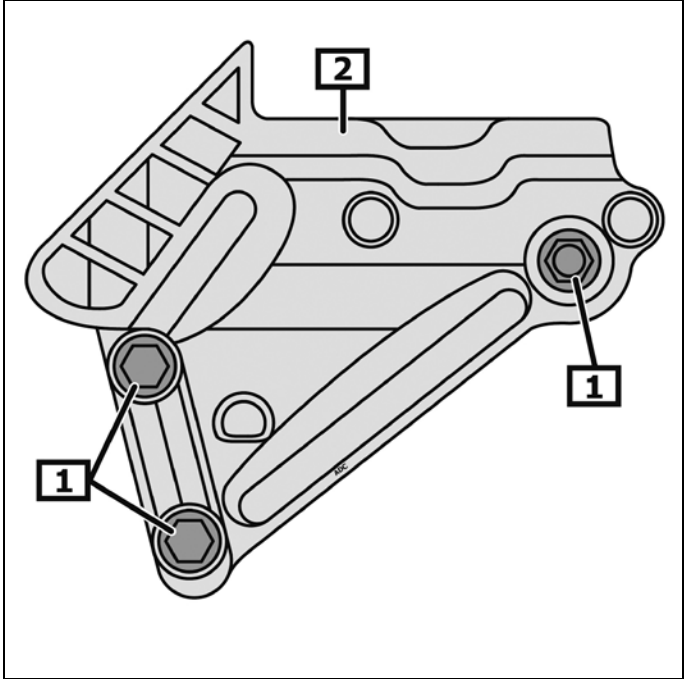
2 Engine mounting bolt(s)

3 Engine mount to car body screw(s)

4 Engine mounting

Lift or lower engine a bit for screwing on screw(s).  
 Unscrew engine support bolt(s). **(1)**  
 Mount engine support. **(2)**  
**(see figure 9)**

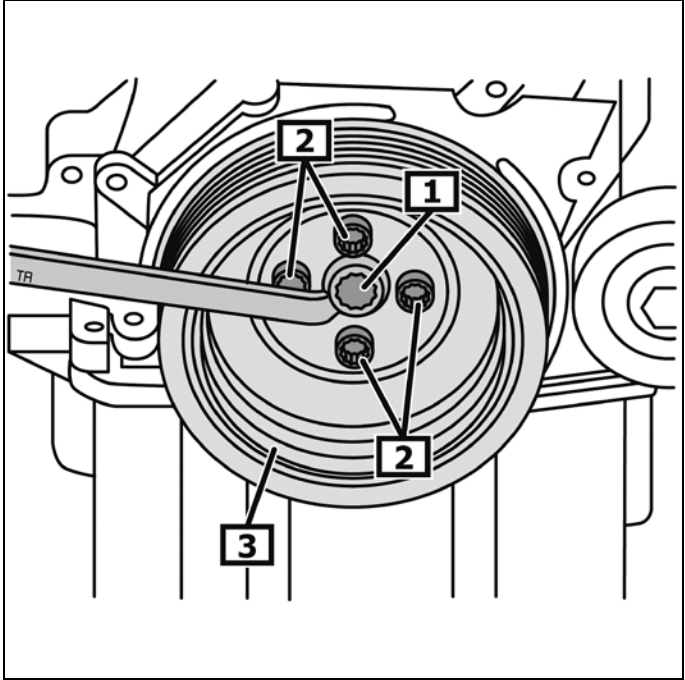
**Figure 9**



1 Engine support screw(s)                      2 Engine mount

Remove vibration damper cover.  
 Hold up against crankshaft central screw using appropriate tool. **(1)**  
 Unscrew vibration damper screw(s). **(2)**  
 Remove vibration damper. **(3)**  
**(see figure 10)**

**Figure 10**



1 Crankshaft central screw                      2 Vibration damper screw(s)  
 3 Vibration damper

### Toothed belt guard at the bottom

#### Old version:

Drill a hole with 8 mm diameter into X.  
Run screwdriver through the hole and break off locating tab.

Dimension A = 10 mm

Diameter X = 8 mm

#### New version:

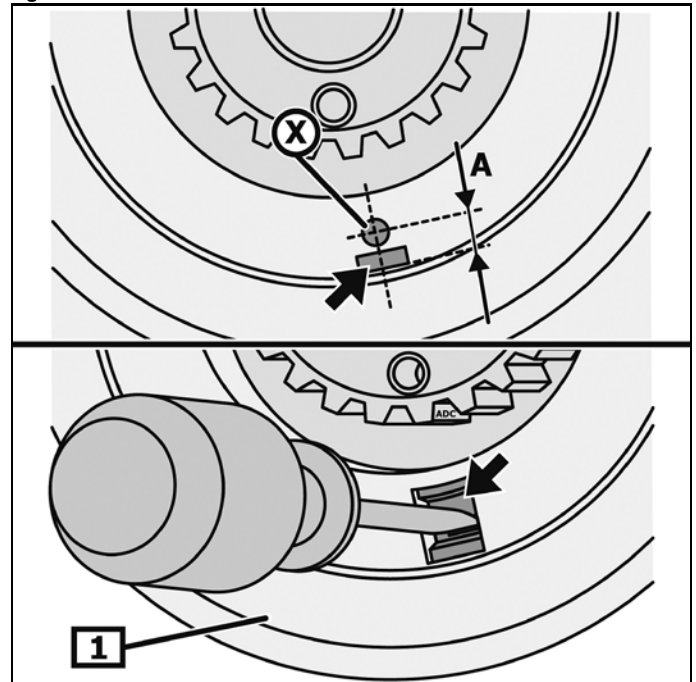
Run screwdriver through opening and break off locating tab. (Arrow)

Unscrew toothed belt guard screws, bottom.  
Remove toothed belt guard at the bottom. (1)

#### Note:

The locating tab has to be severed when a new toothed belt guard is being installed.  
(see figure 11)

Figure 11



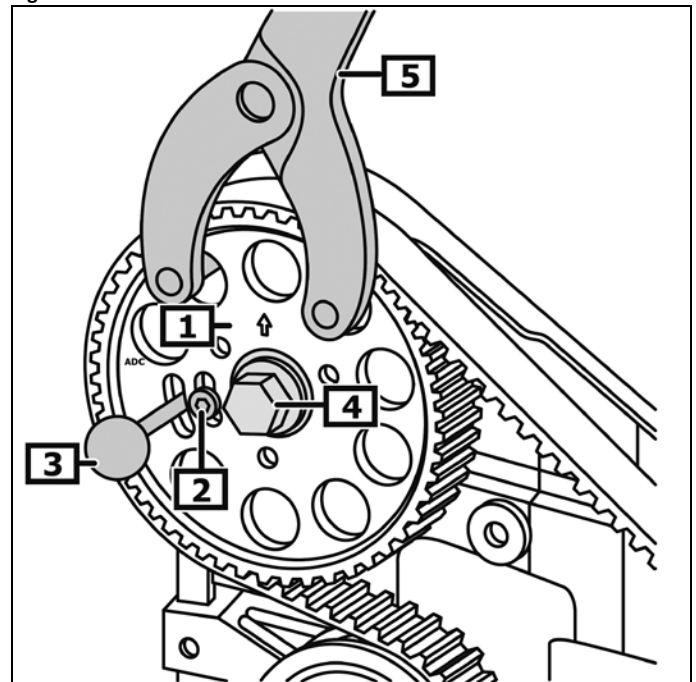
1 Toothed belt guard at the bottom

Set the camshaft(s) to TDC of the 1. cylinder.  
Insert blocking pin(s) for crankshaft timing gear. (3)  
Loosen locating screw(s) by half turn. (2)  
**Do not unscrew and remove locating screw(s)!**

#### Required special tools

Camshaft(s)/high-pressure pump locking pin(s) OE (3359)  
(see figure 12)

Figure 12



1 Camshaft timing gear

2 Fixing screw(s)

3 Blocking pin(s)

4 Camshaft pulley bolt(s)

5 Counter support

Insert the crankshaft locking tool. (2)  
**Crankshaft locking tool must engage in sealing flange hole.**

**Required special tools**

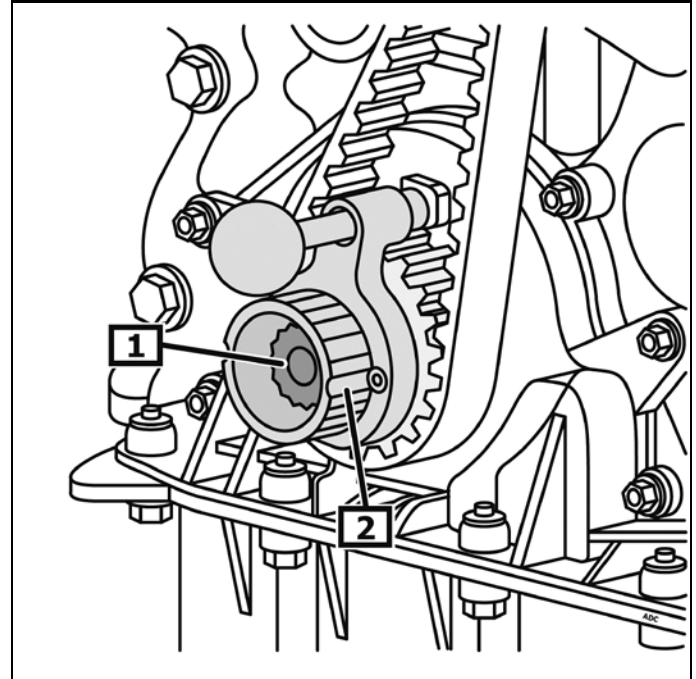
Crankshaft locking tool OE (T10490)  
(see figure 13)

Remove camshaft(s) blocking pin(s). (3)  
Screw(s) – loosen camshaft timing gear wheel 1/6 turn. (4)  
Use holder. (5)  
Insert camshaft blocking pin(s).  
Slacken camshaft timing gear wheel screw(s).  
Use holder. (5)

**Required special tools**

Counter support kit OE (T10172)  
- Counter support bolt OE (T10172/11)  
(see figure 12)

Figure 13



1 Crankshaft central screw

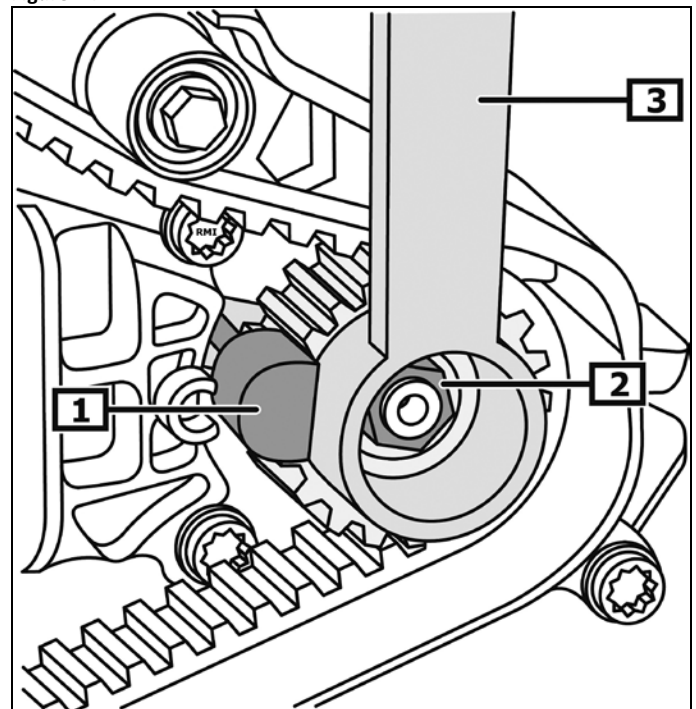
2 Crankshaft blocking tool

Insert high-pressure pump locating pin(s). (1)  
Mount arm bracket to high-pressure pump impeller. (3)  
Remove high pressure pump locating pin(s). (1)  
Slacken high pressure pump timing belt sprocket nut(s) by 1/6 turn. (2)  
Insert high-pressure pump locating pin(s). (1)  
Slacken high pressure pump timing belt sprocket nut(s) by approx. 90°. (2)

**Required special tools:**

High pressure pump and camshaft locating pins OE (T10492)  
Counter support OE (T10051)  
(see figure 14)

Figure 14



1 Blocking pin(s)

2 High-pressure pump impeller nut

3 Counter support

Consider different variants of tension rollers.

Engine timing adjustment and tensioning process is identical for both versions.

#### Version 1

The tension pulley cannot not be pegged with the locking pin.

#### Required special tools

Allen key OE (T10409)

(see figure 15)

#### Version 2

The tension pulley must be pegged using the locking pin and fixed up to the right stop. (2)

#### Required special tools

Allen key OE (T10264)

Tensioning roller blocking pin(s) OE (T10265)

(see figure 15)

Slacken tensioning roller nut(s) by one turn. (1)

Turn the tensioning roller anti-clockwise. (2)

Use Allen key. (2)

Unplug the tensioning roller using a rig pin. (3)

Using an Allan wrench, rotate tension pulley clockwise as far as it will go. (2)(4)

Screw down tensioning roller nut(s) hand-tight.

#### Required special tools:

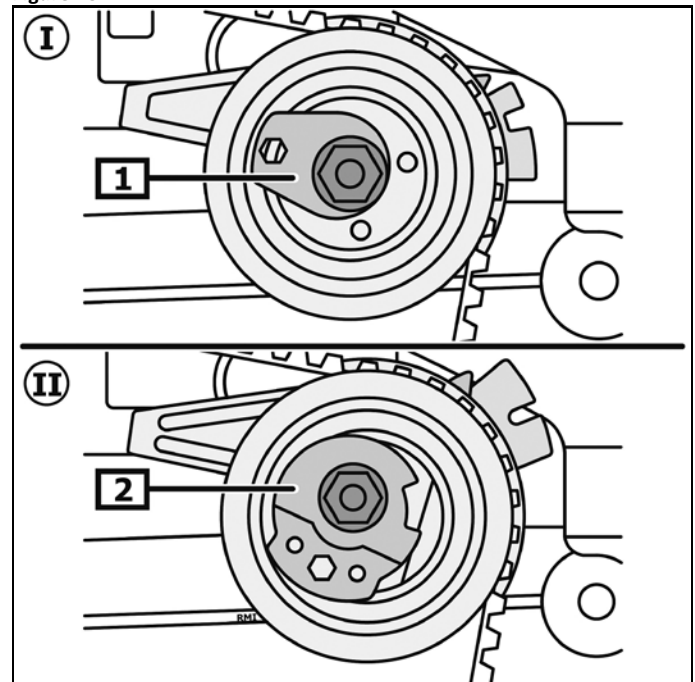
Allen key OE (T10264)

Marking pin OE (T10265)

(see figure 16)

Remove toothed belt first from coolant pump timing belt sprocket and then from the remaining timing belt sprockets.

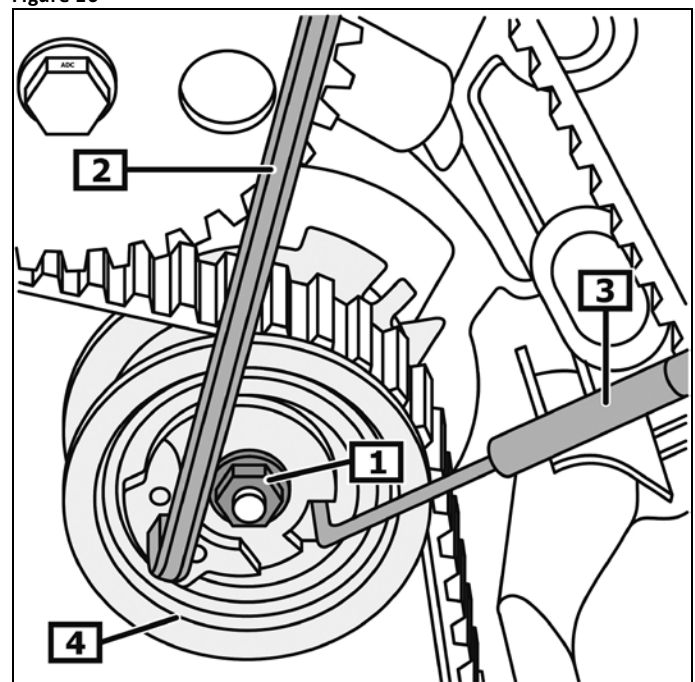
Figure 15



1 Eccentric without retaining device

2 Eccentric with retaining device

Figure 16



1 Tensioning roller nut

2 Allen key

3 Marking pin

4 Tensioning roller

## **Install**

Ensure correct seating of the tensioning roller retaining lug(s). **(Arrow)**  
**(see figure 17)**

Insert blocking pin(s) for crankshaft timing gear. **(1)(3)**  
The camshaft pulley must be able to be turned by hand without tilting.  
**(1)**

### **Required special tools**

Camshaft(s)/high-pressure pump locking pin(s) **OE (3359)**  
**(see figure 12)**

Insert the crankshaft locking tool. **(2)**

### **Required special tools**

Crankshaft locking tool **OE (T10490)**  
**(see figure 13)**

Insert high-pressure pump locating pin(s). **(1)**  
High-pressure pump impeller must be able to be turned by hand without tilting.

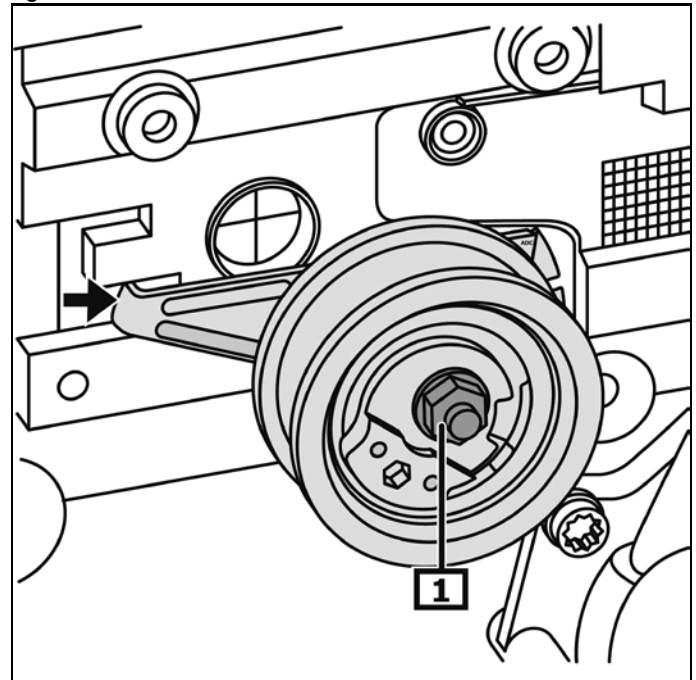
### **Required special tools**

High-pressure pump locating pin(s) **OE (T10492)**  
**(see figure 14)**

Turn both the crankshaft timing gear and the high-pressure pump impeller clockwise, in the oblong holes, up to the stop.

**Fit toothed belt in the order crankshaft pulley, tensioning pulley, camshaft timing gear wheel, deflection pulley and coolant pump wheel.**

**Figure 17**



**1 Tensioning roller nut**



Loosen tensioning roller nut(s). (1)  
Ensure correct seating of the tensioning roller retaining lug(s).  
(see figure 18)

Remove tensioning roller blocking pin(s). (3)  
(see figure 16)

The camshaft timing gear wheel locating screw must be centrally in the oblong hole. (2)  
(see figure 12)

**Proceed as follows if the camshaft timing gear wheel locating screw is not centrally in the oblong hole:**

Adjust camshaft timing gear wheel position clockwise by one tooth.  
Fit toothed belt.

#### **Continuation for all vehicles**

Rotate tension roller eccentric clockwise using an Allen wrench till pointer is in recess center. (2)(3)(4) (Arrow)  
**The tensioning roller nut must not turn during this process. (1)**  
Tighten tensioning roller nut(s). (1)

#### **Required special tools**

Allen key (2) OE (T10409)  
Allen key (2) OE (T10264)  
(see figure 18)

Position counter support. (5)  
Press the arm bracket counterclockwise keeping the camshaft timing gear wheel under pre-stress. (5)

#### **Required special tools**

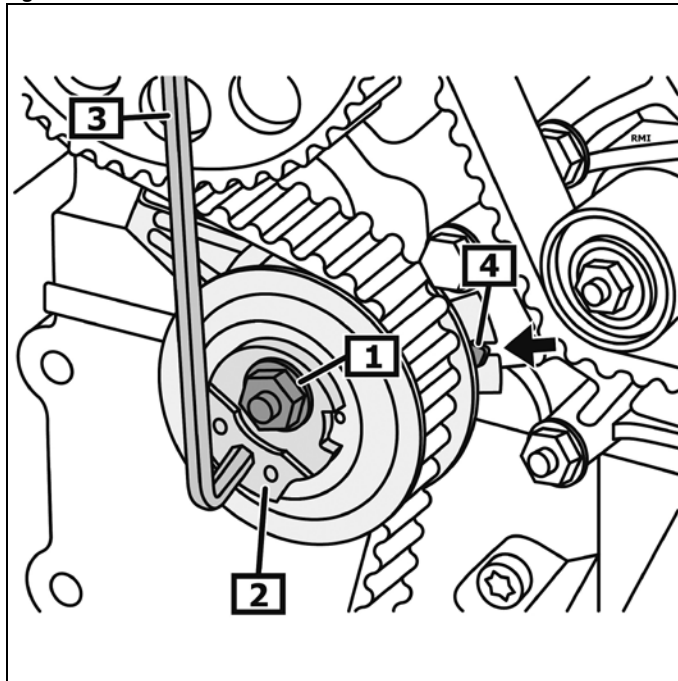
Counter support kit (5) OE (T10172)  
- Counter support bolt OE (T10172/11)  
(see figure 12)

Pre-tighten camshaft timing gear wheel screw(s) applying 10 Nm. (4)  
(see figure 12)

Pre-tighten high-pressure pump impeller nut(s) using 10 Nm. (2)  
(see figure 14)

Remove counter support.

Figure 18



1 Tensioning roller nut

2 Tensioning roller eccentric

3 Allen key

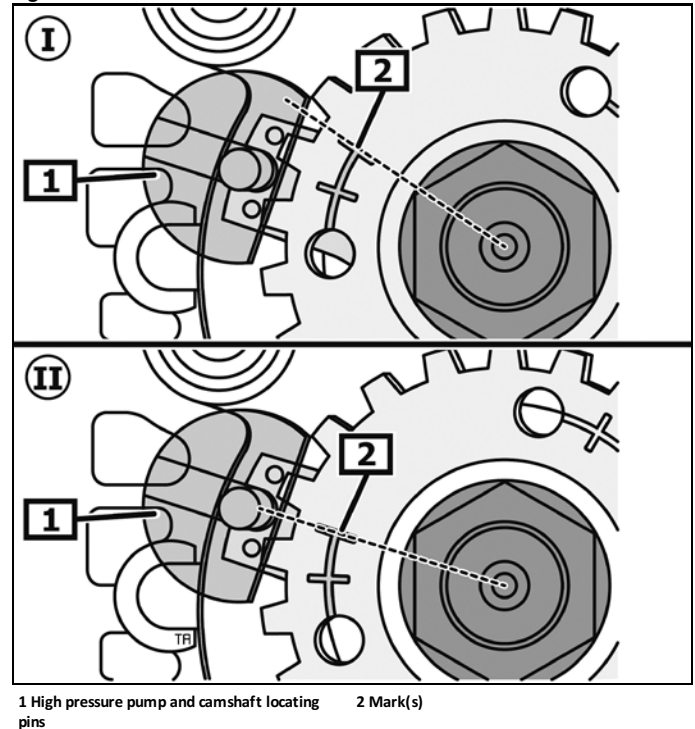
4 Pointer

Check high-pressure pump impeller position. **(1)(2)**  
 Mark should not be flush with the high-pressure pump locating pin. **(1)**  
**(2) (I)**

Refit toothed belt offset by one tooth if mark is flush with the high-pressure pump locating pin and the gear wheel is at the rotational range end stop. **(1)(2) (II)**  
**(see figure 19)**

Remove all blocking tool(s).  
 Remove all fixing tools.

**Figure 19**



## **Check engine timing**

Turn the engine at the crankshaft by two revolutions in the engine running direction until marking is shortly before TDC.  
 Turn engine in direction of rotation until crankshaft locking tool engages in the hole out of the rotary movement. **(2)**

**Engine must not be turned back to insert the crankshaft locking tool.**

### **Required special tools**

Crankshaft locking tool **(2) OE (T10490)**  
**(see figure 20)**

Check whether camshaft can be arrested using the locking tool. **(3)**  
 If it is not possible to insert the blocking tools, adjust the valve timing.

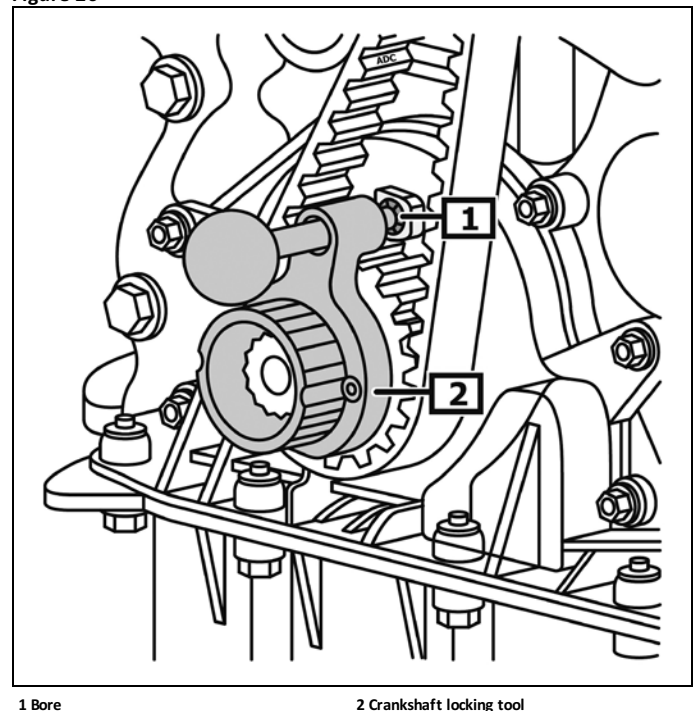
### **Required special tools**

Camshaft(s)/high-pressure pump locking pin(s) **(3) OE (3359)**  
**(see figure 12)**

Check high-pressure pump impeller position.  
 Minor deviation permissible between stop bore and hub on the high-pressure pump impeller.  
**(see figure 19)**

Tension roller pointer must be positioned in the middle of the base plate recess and an offset of max. 5 mm is permissible. **(4) (Arrow)**  
**(see figure 20)**

**Figure 20**



## **Correct timings**

Retract crankshaft locking tool until pin releases hole. **(1)(2)**

Turn crankshaft against the direction of engine rotation until 1st cylinder is shortly before TDC.

**(see figure 20)**

Turn crankshaft slowly in direction of engine rotation until camshaft locking pin can be inserted. **(3)**

Slacken camshaft timing gear wheel screw(s). **(4)**

### **Required special tools**

Camshaft(s)/high-pressure pump locking pin(s) **(3) OE (3359)**

**(see figure 12)**

### **Proceed as follows once the journal on the crankshaft locking tool is positioned just before the hole:**

Turn engine in direction of rotation until crankshaft locking tool engages in the hole out of the rotary movement. **(1)(2)**

**(see figure 20)**

Tighten camshaft timing gear wheel screw(s) using a pre-torque of 20 Nm. **(4)**

**(see figure 12)**

Check the control times.

### **Proceed as follows once the pin on the crankshaft locking tool is positioned right after the hole:**

Turn crankshaft against the direction of engine rotation until 1st cylinder is shortly before TDC.

Turn engine in direction of rotation until crankshaft locking tool engages in the hole out of the rotary movement. **(1)(2)**

**(see figure 20)**

Tighten camshaft timing gear wheel screw(s) using a pre-torque of 20 Nm. **(4)**

**(see figure 12)**

Check the control times.

## **When engine timings check**

Remove all fixing tools.

Remove all blocking tool(s).

**In no case transfer the occurring torque to the respective locking pin when loosening or tightening the screws on the camshaft.**

Tighten camshaft pulley screw(s). **(4)**

Use holder. **(5)**

### **Required special tools**

Counter support kit **(5) OE (T10172)**

- Counter support bolt **OE (T10172/11)**

**(see figure 12)**

Tighten high-pressure pump impeller nut(s). **(2)**

Use holder. **(3)**

**Required special tools**

Counter support (3) OE (T10051)  
(see figure 14)

Check the control times.

Screw down camshaft timing gear wheel locating screw(s).  
Remove all fixing tools.  
Remove all blocking tool(s).

Installation in reverse order of removal.

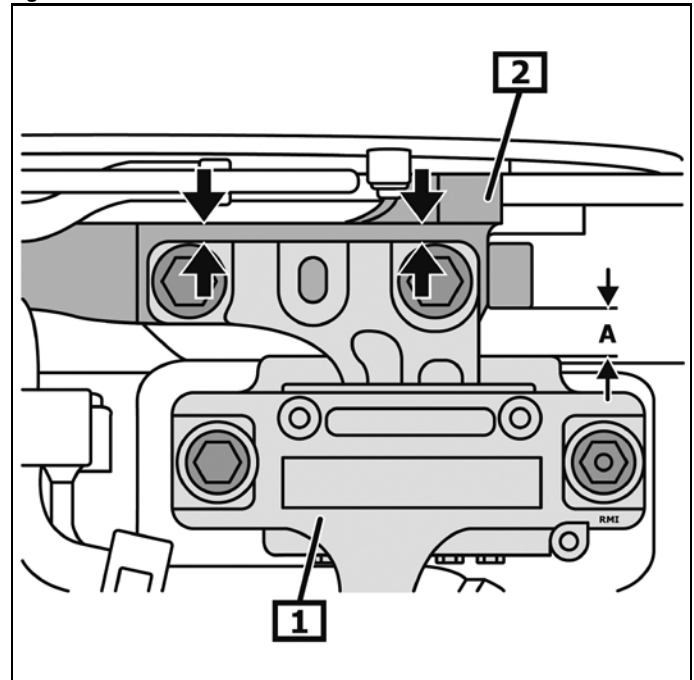
Engine mounting must be aligned in parallel to bracket of engine bearing. (1)(2) (Arrows)

Distance between engine mount and engine bracket must be 10 mm.  
(A)  
(see figure 21)

Install the accessory drive belt.

Further assembly in reverse order to dismantling.

**Figure 21**



1 Engine mounting

2 Engine bracket

A 10 mm

Repair/maintenance work have to be carried out by a specialist who has completed his training in the motor vehicle trade (e.g. car mechanic, car electrician, car mechatronics specialist). Alternatively, the repair can also be performed by a trained and experienced mechanic.

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