

11 28 020 Removing and installing/replacing belt tensioner for alternator (N57 D30 U/O/T 1)



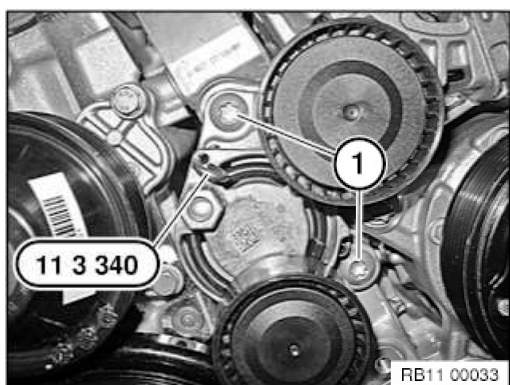
Special tools required:

- [11 3 340](#)



Necessary preliminary tasks:

- Remove [alternator drive belt](#).



Release screws (1).

Tightening torque [11 28 1AZ](#).

Remove belt tensioner (2) with roller and deflecting element.



Assemble engine.

If the tensioning device is no longer needed, special tool [11 3 340](#) must be removed using a vice.



Special tools required:

- [11 3 340](#)



Important!

Check drive belt for coolant and oil residues, replace if necessary.

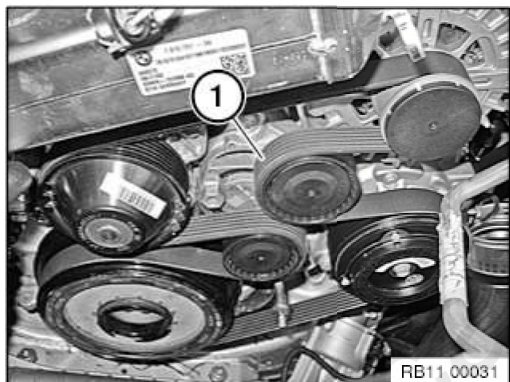
The drive belt must be replaced if it is contaminated with hydraulic fluid.

If the drive belt is to be reused, mark direction of travel and reinstall drive belt in same direction of rotation. Before removing, note how the drive belt is routed.



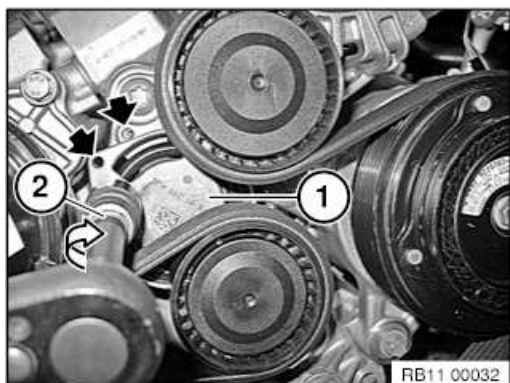
Necessary preliminary work:

- Remove front [acoustic cover](#) (not F25)
- Remove [fan cowl](#)



Important!

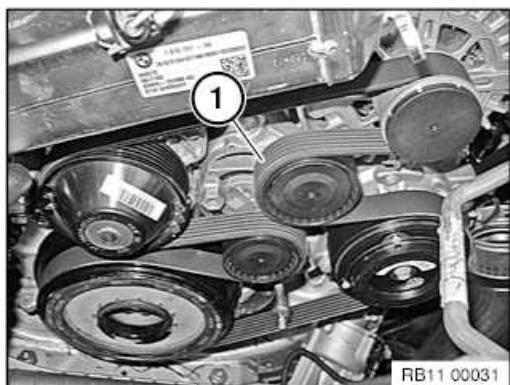
Belt tensioner (1) is preloaded.



Increase preload on tensioning pulley (1) with tool (2) until special tool can be positioned on tensioning pulley [11 3 340](#) (1).

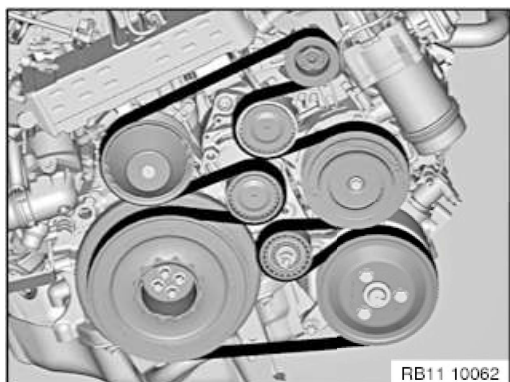
Preload belt tensioner (1).

Both bore holes, see arrow, must be flush.



Routing of drive belt without Dynamic Drive

Remove drive belt.



Routing of drive belt with Dynamic Drive

Remove drive belt.



Assemble engine. *Installation note:*

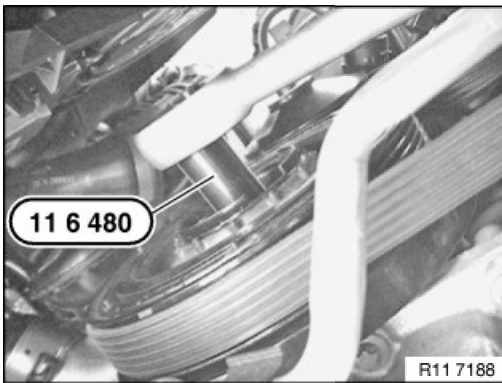
Check drive belt for correct installation position and, if reusing, observe direction of travel. **Risk of damage.**

**Special tools required:**

- [11 4 480](#)
- [11 5 320](#)
- [11 6 480](#)
- [11 8 760](#)

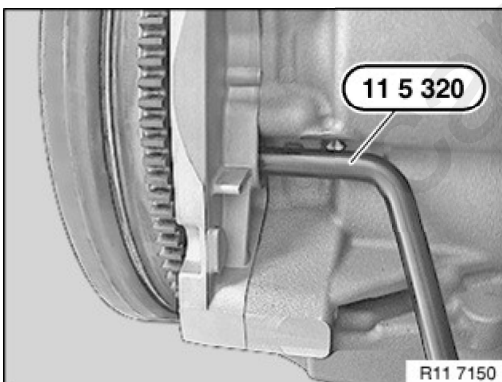
**Necessary preliminary tasks:**

- Remove [underbody protection](#)
- Remove [cylinder head cover](#).
- Remove [stiffening plate](#) (only all-wheel drive vehicles).



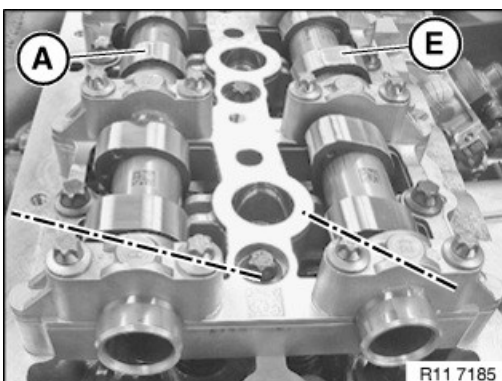
Crank engine at central bolt with special tool [11 6 480](#) **Important!**
Do not crank the engine back!

Special tool [11 6 480](#) must be removed before start-up of engine!



Remove protective cap of gear case cover.

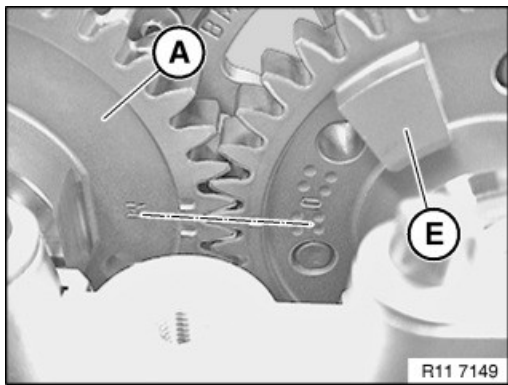
Block crankshaft with cylinder no. 1 in TDC firing position with special tool [11 5 320](#).



It must be possible to read the part number on the exhaust and intake camshafts (E and A) from above.

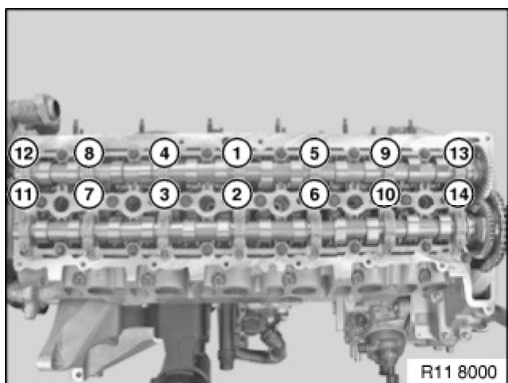
The cam on the intake camshaft (E) points obliquely upwards at cylinder No. 1.

The cam on the exhaust camshaft (A) points obliquely outward to the left at cylinder No. 1.



The marking on exhaust sprocket wheel (A) must be aligned with the marking on intake sprocket wheel (E). *Note:*
See illustration.

The exhaust camshaft must be removed if the marks do not agree (are not aligned).

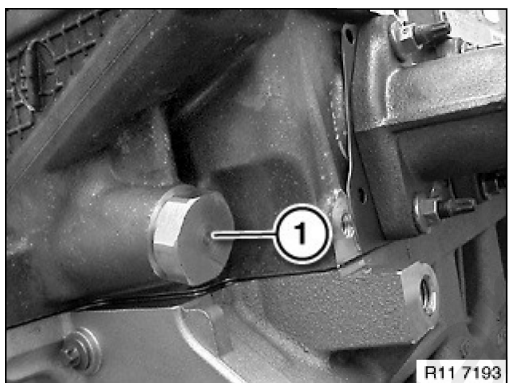


Release all bolts of bearing caps A1 to A7 working from the outside inwards.

Tightening torque: [11 31 2AZ](#).

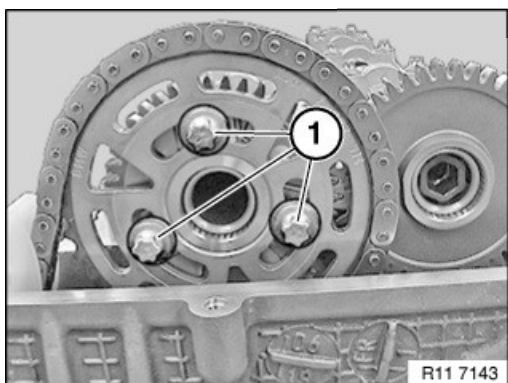
Remove exhaust camshaft in upward direction.

Place all components on special tool [11 4 480](#) in a tidy and orderly fashion.



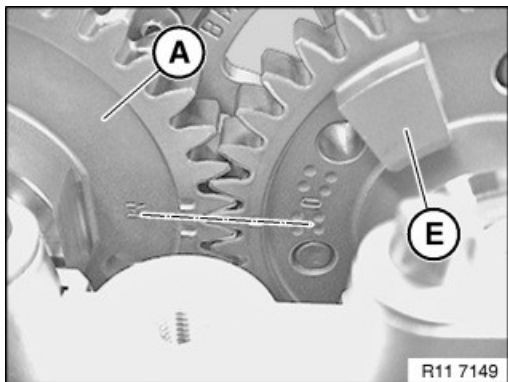
Release [chain tensioner](#) (1).

Tightening torque: [11 12 2AZ](#).



Remove camshaft bolts (1) and detach camshaft sprocket.

Tightening torque: [11 31 1AZ](#).



Position intake camshaft (E).

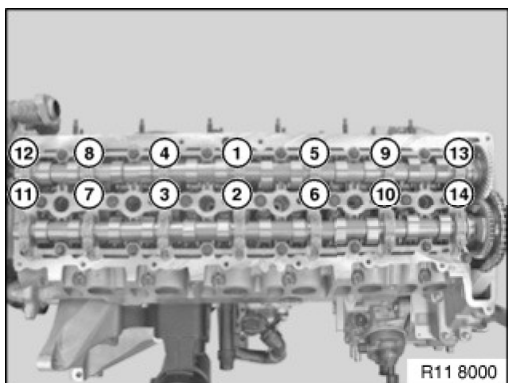
Installation note:

Note installation position of roller cam follower.

Fit exhaust camshaft (A) in such a way that both marks are aligned.

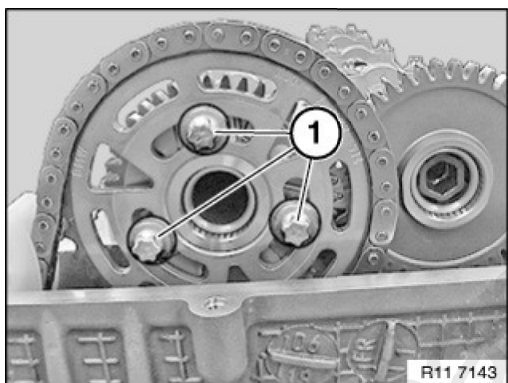
Note:

See illustration.



Tighten all bearing caps A1 to A7 working from the inside outwards.

Tightening torque: [11 31 2AZ](#).

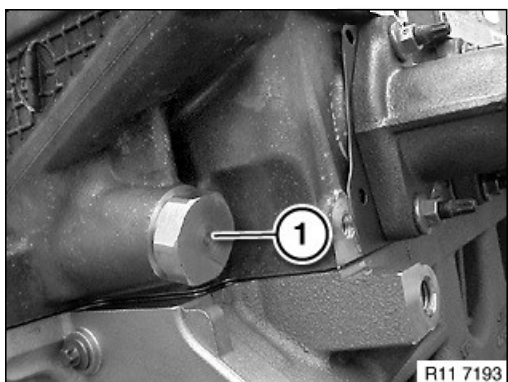


Place the camshaft sprocket with timing chain on the intake camshaft such that bolts (1) are located in the centre of the slots.

Insert bolts (1).

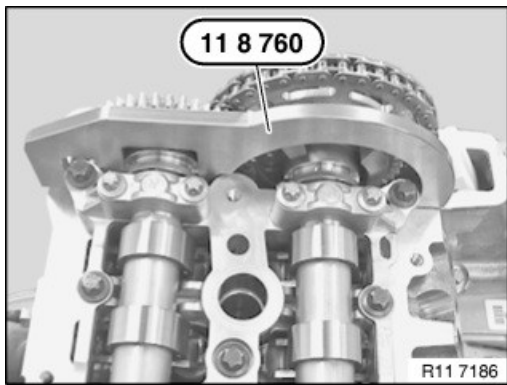
Join bolts (1) to 10 Nm.

Release bolts (1) again by a 90° turn.

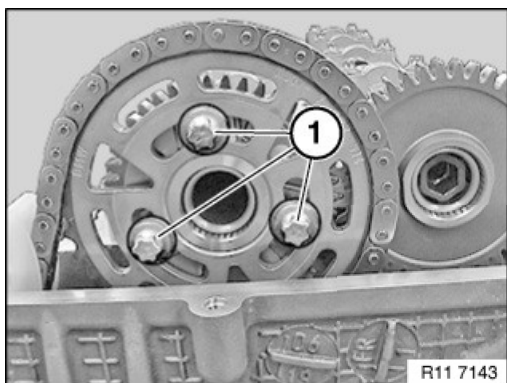


Install chain tensioner (1).

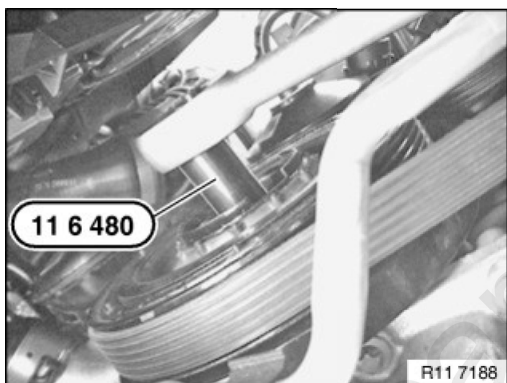
Tightening torque: [11 12 2AZ](#).



Place special tool [11 8 760](#) on exhaust camshaft. **Note:**
Special tool [11 8 760](#) must lie flush on cylinder head.



Tighten down screws (1).
Tightening torque: [11 31 1AZ](#).



Crank engine twice in direction of rotation with special tool [11 6 480](#) up to TDC firing position of cylinder no. 1.

Check [camshaft adjustment](#).

Important!

Do not crank the engine back!



Assemble engine.
Turn over engine twice.
Check timing.

Important!

Special tool [11 5 320](#) must be removed before starting engine.

11 31 544 Check the timing chain for elongation and replace the timing chain above (N57)



Special tools required:

- [2 354 985](#)
- [2 409 647](#)
- [11 5 320](#)
- [11 6 480](#)
- [11 8 760](#)
- [2 353 281](#)



Installation note:

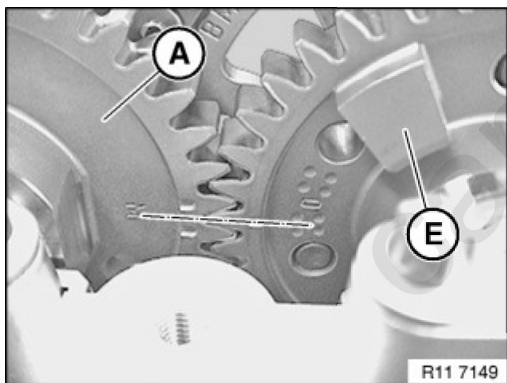
The removal and installation of the timing chain require the use of special tool [2 354 985](#) and [2 409 647](#).

All tools shown are available in tool set [2 354 985](#) and [2 409 647](#).

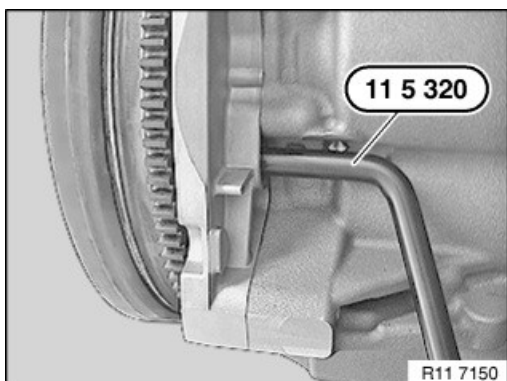


Necessary preliminary tasks:

- [Check top timing chain](#)
- [Remove cylinder head cover.](#)



The marking on exhaust sprocket wheel (A) must be aligned with the marking on intake sprocket wheel (E). *Note:* See illustration.



Installation note:

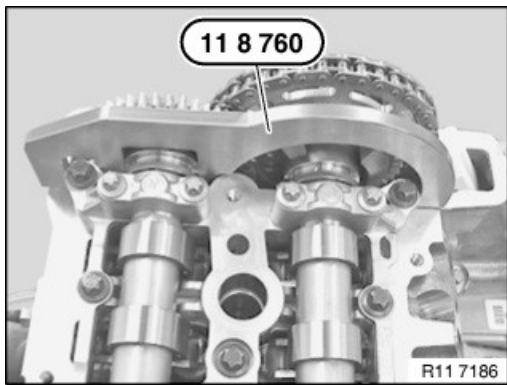
Do not turn the engine in reverse as this will distort the measured values.

Special tool [11 5 320](#) must be exactly in the alignment position.

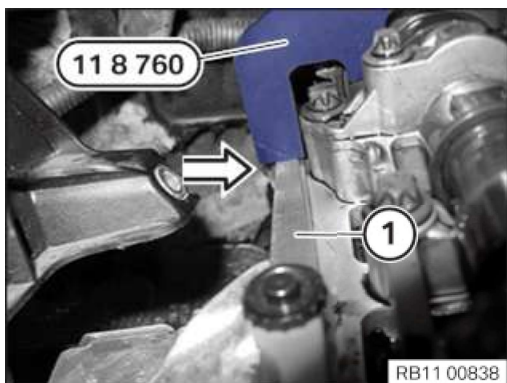
Remove protective cap of timing case cover.

Turn engine with special tool [11 6 480](#).

Use special tool [11 5 320](#) to block the crankshaft in the TDC firing position Cylinder 1



Place special tool [11 8 760](#) on exhaust camshaft.



Determine gap dimension.

Slide the feeler gauge (1) between the cylinder head and the special tool [11 8 760](#) without jamming (see arrow).

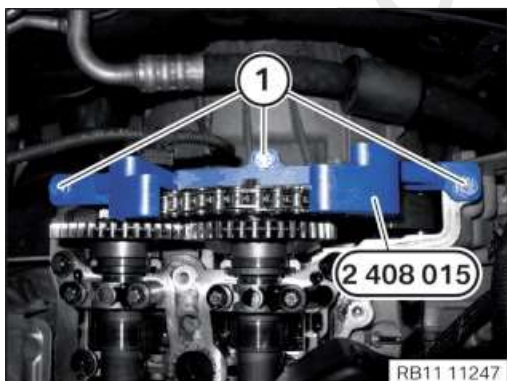


Follow diagnosis instruction.



Attention!

Loose chain sections can fall into the engine!

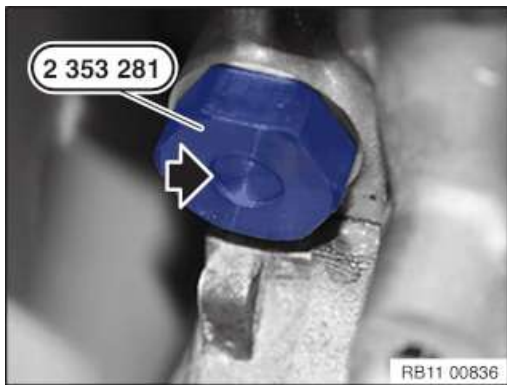


Attention!

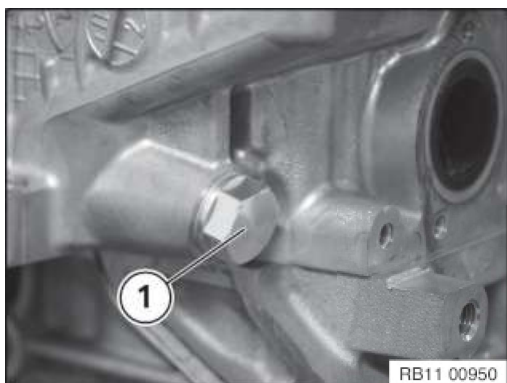
Screws (1) can fall into the chain drive **risk of damage!**

Secure the special tool 2 408 015 on the cylinder head with the bolts (1).

Tightening torque [11 00 2AZ](#).



Remove special tool [2 353 281](#) .

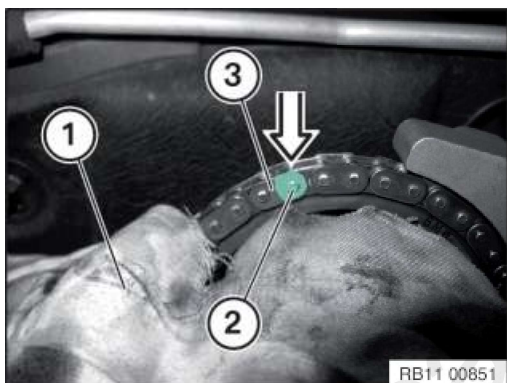


Installation note:

Install chain tensioner with part number 8 576 201 (AF 24).

Renew the sealing ring.

Tightening torque [11 12 2AZ](#).



Cover cylinder head (1) at chain drive with a suitable cleaning cloth.

Mark right rivet (2) at cover tab (3) (see arrow).



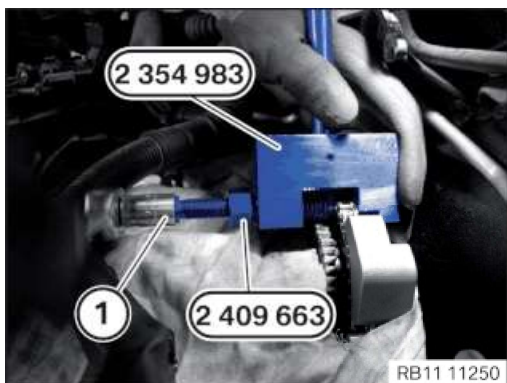
Prepare special tool 2 354 983:

Insert the special tool 2 409 663 with push-out bolts (1) into the special tool 2 354 983.



Note:
Bore hole (centring aid)

Turn back the pressing-off bolt on special tool 2 409 663 up to short length (arrow).



Opening the timing chain:

Attention!

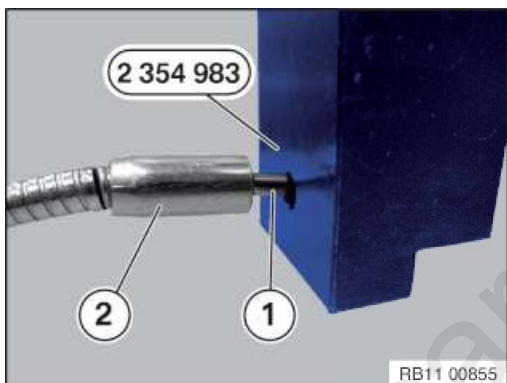
Loose rivet can fall in the engine compartment.

Seal bore hole on special tool 2 354 983 with suitable auxiliary materials.

Position special tool 2 354 983 on timing chain (rivet) (centre).

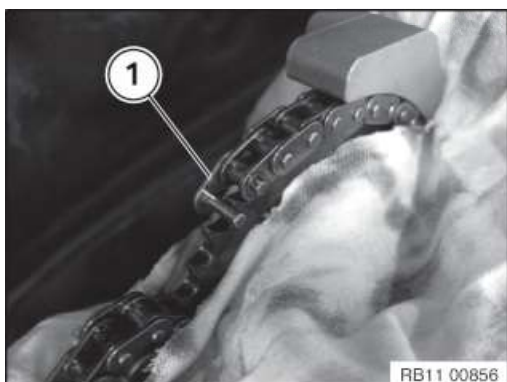
Pretension spindle 2 409 663 up to bolt/limit position of timing chain by hand.

Press off the rivet with the pressing-off bolt (1) and screw in the special tool up to limit position.



Remove rivet (1) from special tool 2 354 983 with a magnet (2).

Remove special tool 2 354 983.



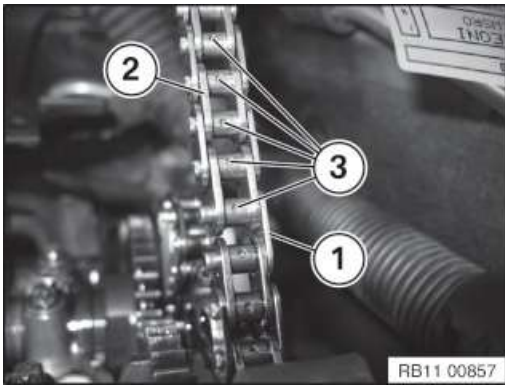
Installation note:

Coat ends of chain lock (1) with grease.

Tightening the timing chain:

Attach chain lock (1) in the open timing chain.

Check camshaft sprocket for wear.



Attention!

Observe direction of installation!

Oil holes (3) must be visible from the outside.

Attach timing chain (2) in the chain lock (1).

Both timing chains must be aligned with each other.

Outer tab on lock (1) must be aligned with the outer tabs of the timing chains (see graphic).

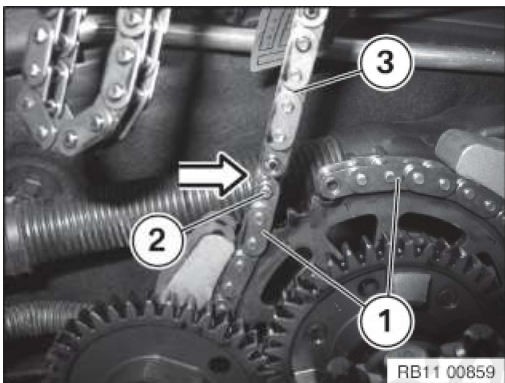


Note:

Turn engine in direction of engine rotation until the run-through timing chain can be removed.

Keep timing chains (1) under tension.

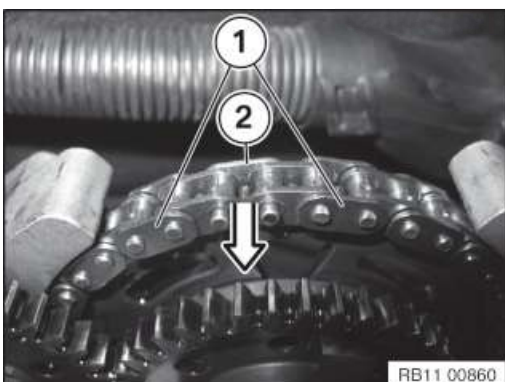
Do not crank engine too far under any circumstances.



Attention!

Loose components can fall into the chain drive **risk of damage!**

Remove timing chain (3) with chain lock (2).



Pressing in the timing chain:

Attention!

Loose components can fall into the chain drive **risk of damage!**

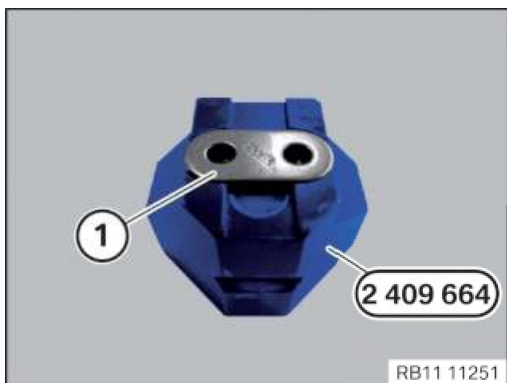
Press in both end of timing chain (1) on camshaft sprocket.

Insert chain lock (2) from the rear through both ends of new timing chain (1).



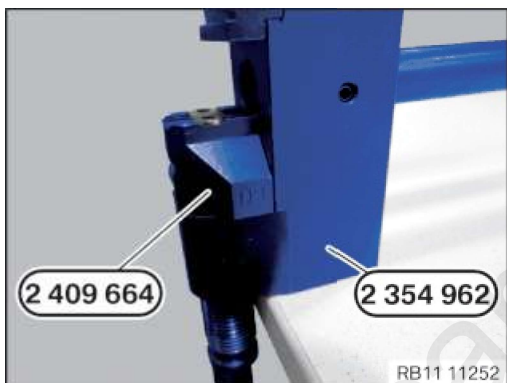
Installation note:

Rounded sides (2) of cover tab (1) must point towards timing chain.



Prepare the special tool 2 409 664 with the cover tab (1) using the rounded side (see graphic).

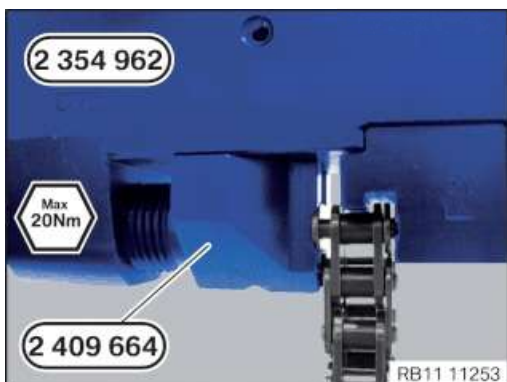
Fasten the cover tab (1) on the magnet of the special tool 2 409 664.



Attention!

Loose components.

Prepare the special tool 2 409 664 with the cover tab on the special tool 2 354 962.



Attention!

Maximum 20 Nm

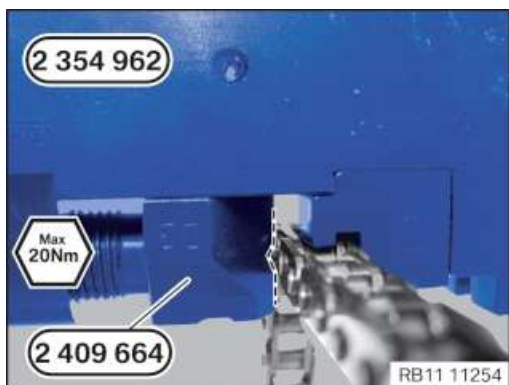
Do not increase the torque, because of risk of damage on the chain lock.

Manually join cover tab on chain lock to spindle on special tool 2 354 962.

Make sure chain locks and special tool 2 409 664 are positioned exactly **risk of damage!**

Press on cover tabs with 20 Nm.

Graphic shows removed chain drive.



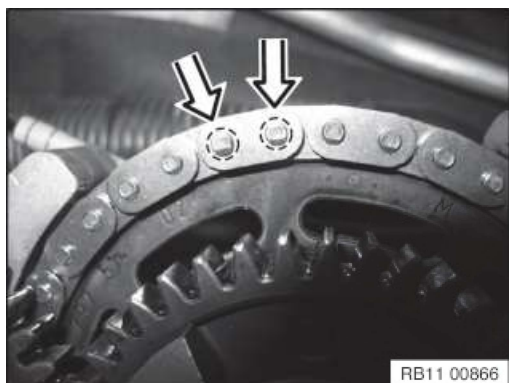
Attention!

Do not exceed maximum **20 Nm** torque on chain lock not **risk of damage!**

For safety purposes, the chain lock must be pressed in again.

Remount the special tool 2 409 664 on special tool 2 354 962 (see graphic).

Press in both rivets individually on chain lock with special tool 2 354 962 to maximum **20 Nm**.



Check both rivets (see graphic).



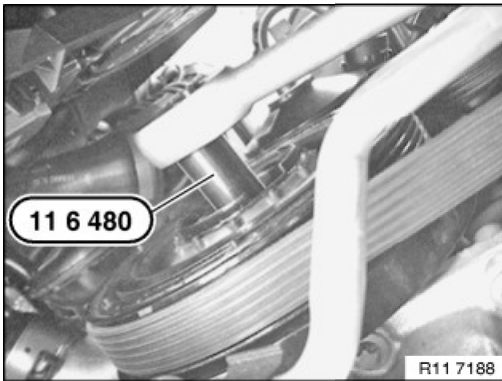
Follow diagnosis instruction.

**Special tools required:**

- [11 5 320](#)
- [11 6 480](#)
- [11 8 760](#)

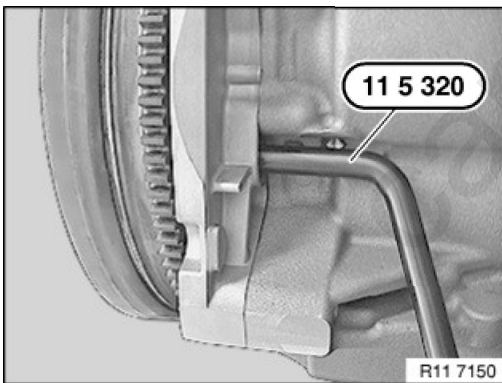
**Necessary preliminary tasks:**

- Remove [underbody protection](#).
- Remove [cylinder head cover](#).
- Remove [stiffening plate](#) (only four-wheel drive).



Crank engine with special tool [11 6 480](#) to TDC firing position of first cylinder. **Important!**

Do not crank engine back.



Remove protective cap of gear case cover.

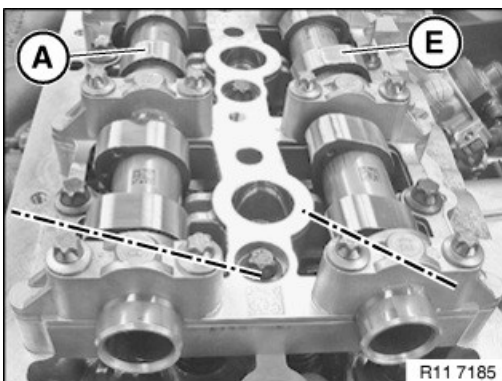
Crank engine at central bolt with special tool [11 6 480](#)

Use special tool [11 5 320](#) to block the crankshaft in the TDC firing position Cylinder 1

Important!

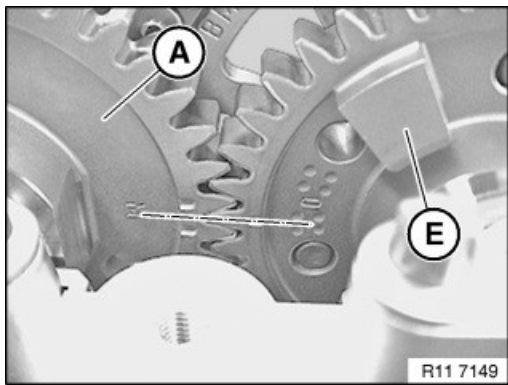
Do not turn the engine back.

Special tool [11 6 480](#) must be removed before starting engine.

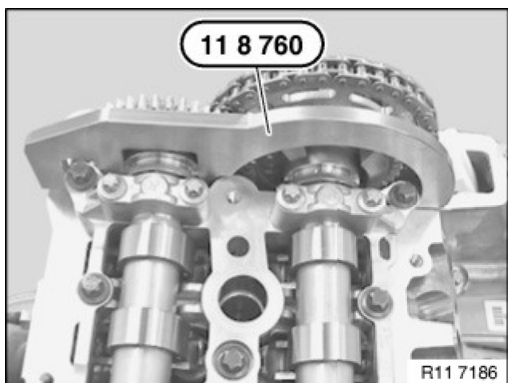


The cam on the intake camshaft (E) points obliquely upwards at cylinder No. 1.

The cam on the exhaust camshaft (A) points obliquely outward to the left at cylinder No. 1.



The marking on exhaust sprocket wheel (A) must be aligned with the marking on intake sprocket wheel (E). *Note:* See graphic.



Place special tool [11 8 760](#) on exhaust camshaft.

Note:

Special tool [11 8 760](#) must lie flush on cylinder head.

If necessary, adjust [camshaft timing](#).



Assemble engine. **Important!**

Special tool [11 5 320](#) must be removed before starting engine.

11 31 540 Checking timing chain for elongation and replacing chain tensioner (N57)



Special tools required:

- [2 353 281](#)
- [11 6 480](#)



Attention!

Measurement of timing chain is only possible during manual cranking (dynamic).

An engine start is **not** permissible.

Cranking the engine is only permissible with a special tool (chain tensioner) installed.

Attention!

Do not crank engine against direction of rotation, apply mark to vibration absorber.



Necessary preliminary tasks:

- [Remove the chain tensioner](#) and remove the sealing ring
- Start diagnosis test module in:

Activities

Information search

Function structure

Power train

Digital Diesel Electronics

Engine mechanics

Timing chain

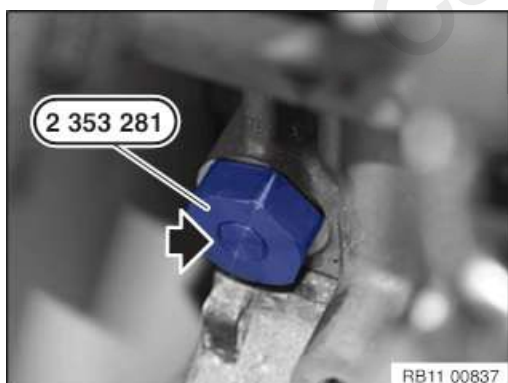
Attention!

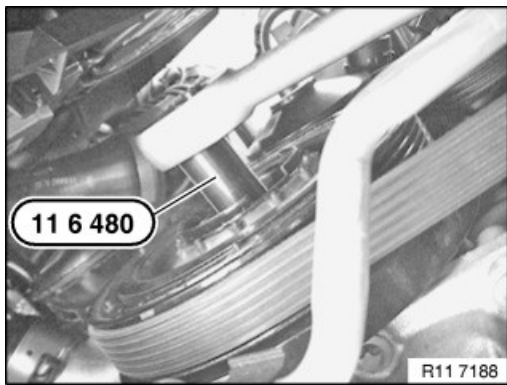
Cranking the engine is only permissible with a special tool (chain tensioner) installed.

Install special tool [2 353 281](#) **without** sealing ring.

Install special tool [2 353 281](#) **without** shim.

Tightening torque: 70 Nm.





Attention!

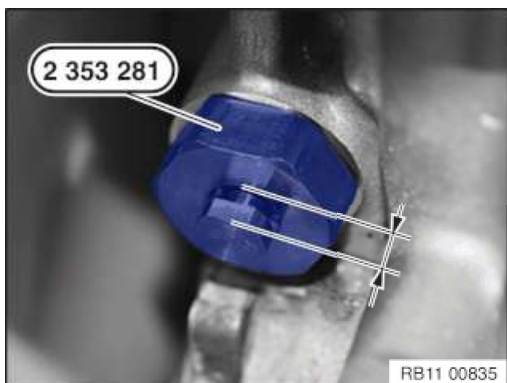
Do not crank engine against direction of rotation, apply mark to vibration absorber.

Crank engine with special tool [11 6 480](#) .

Measurement of timing chain.

Crank the engine at a constant speed in direction of rotation **4 times**.

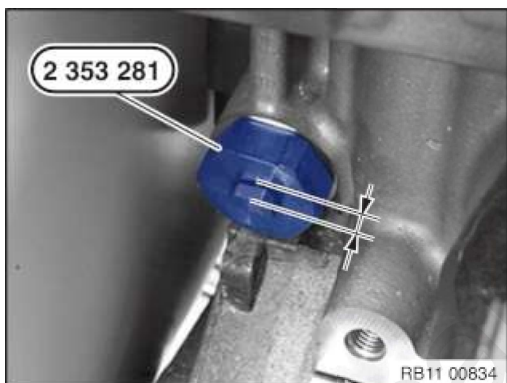
Determine minimum dimension on special tool [2 353 281](#) with the aid of a second person.



Determine protrusion or short length of the measuring pin on special tool [2 353 281](#) (see graphic).

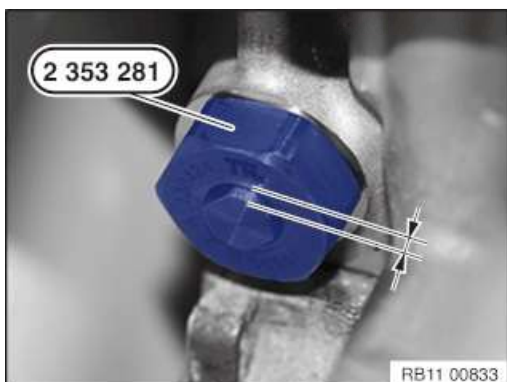
Graphic: **A**

Minimum protrusion greater than 4 mm (indentation visible).



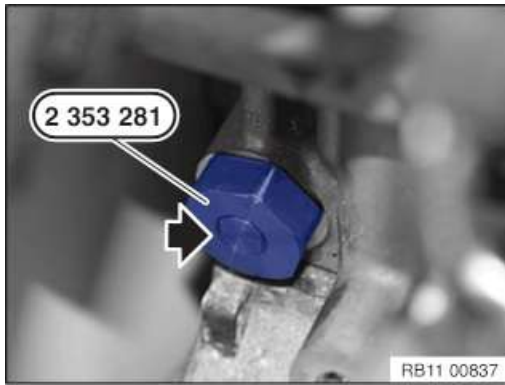
Graphic: **B**

Minimum protrusion 4 mm (indentation not visible).



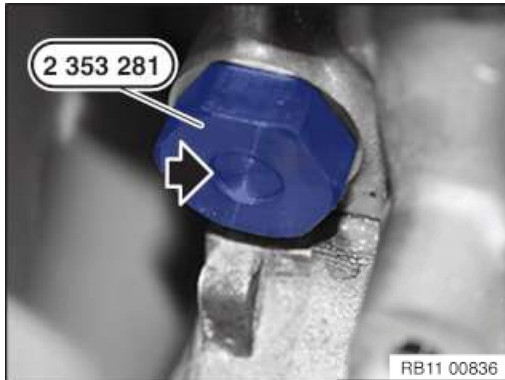
Graphic: **C**

Minimum protrusion 2 mm.



Graphic: **D**

Measuring pin flush with reference surface (see arrow).



Graphic: **E**

Short length to reference surface (see arrow).



Installation note:
Follow diagnosis instruction.

11 14 110 Removing and installing, sealing / replacing rear gear case cover (N57 D30 U/O/T 0/1)



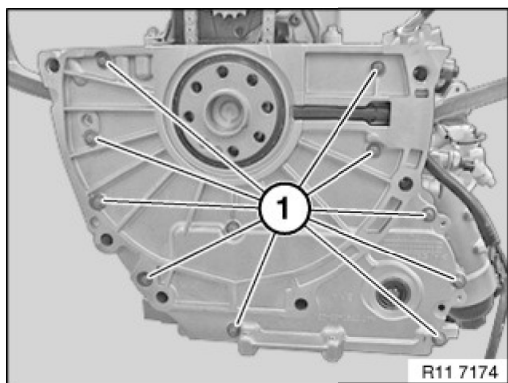
Special tools required:

- [00 9 120](#)
- [11 8 815](#)
- [11 4 470](#)

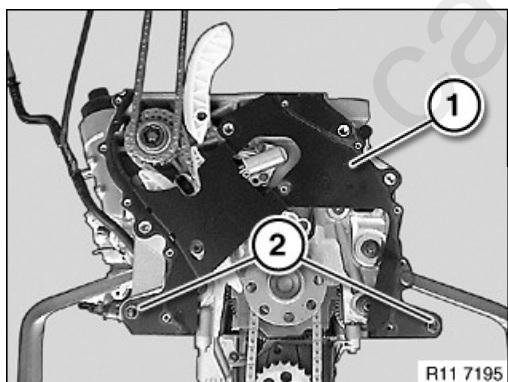


Necessary preliminary work:

- Remove [engine](#).
- Mount engine on assembly stand.
- Remove [flywheel](#).
- Remove [cylinder head](#).
- Removing [oil sump](#).



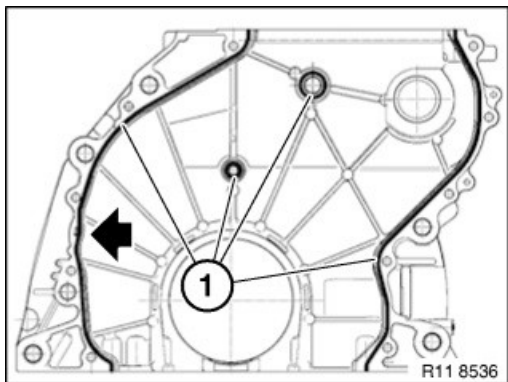
Release bolt holding high pressure pump.
Release screws (1).



On engines N57 and up to 03/2011.

Remove beaded metal gasket (1).

Check fitting sleeves (2) for damage, replace if necessary.



On engines N57 from 03/2011.

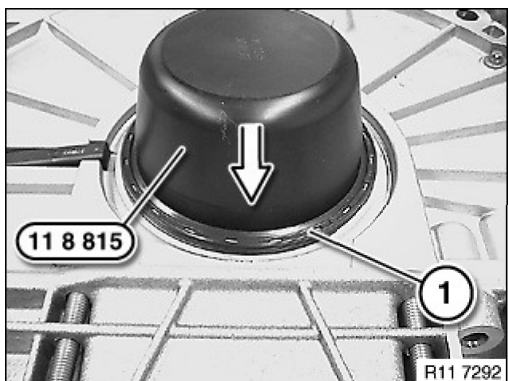
Installation note:

Application time of sealing bead (1) max. 12 min.

Remove gasket remnants with special tool [11 4 470](#).

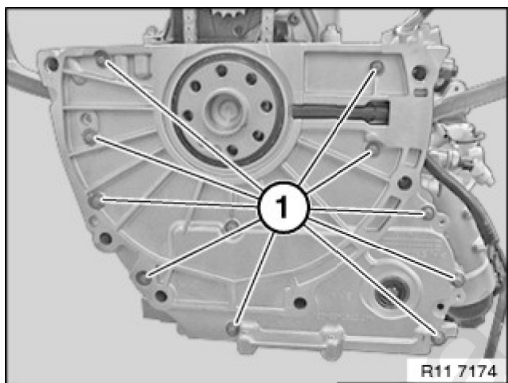
Apply sealing bead (1) at marked points.

Thickness of [sealing bead](#): **1.5 to 2.0 mm.**

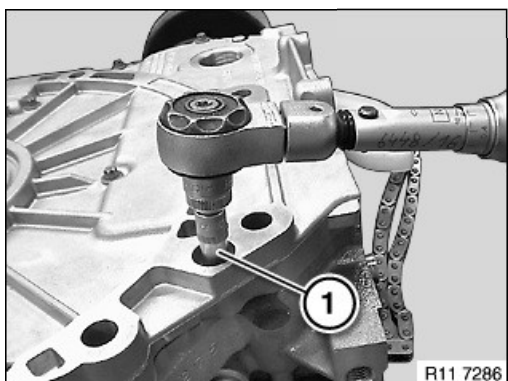


Preassemble special tool [11 8 815](#) on crankshaft.

Fit accelerator pedal module ring (1) with end cover dry and without lubricant.

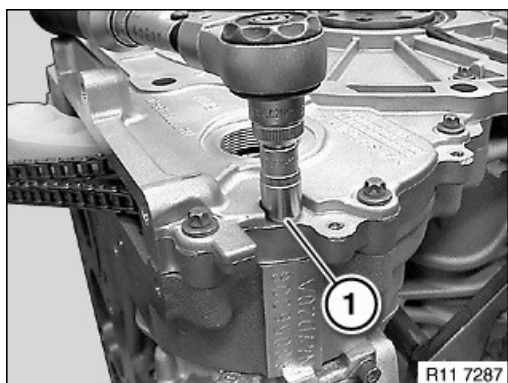


Insert bolts (1).



Secure special tool [00 9 120](#) with bolts (1).

Tightening torque: [11 14 2AZ](#).



Insert screw (1) of high pressure pump (if fitted).



Assemble engine.

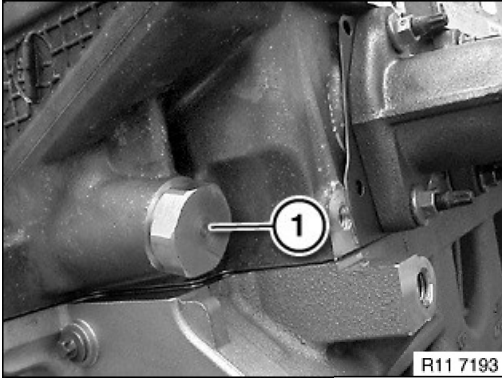
cardiagn.com

11 31 090 Removing and installing/replacing chain tensioner piston (N57 D30 U/O/T 0/1)



Necessary preliminary work:

- Remove [acoustic cover](#)
- Remove [air filter housing](#).



Release chain tensioner (1).

Tightening torque: [11 12 2AZ](#).

Important!

Have a cleaning cloth ready. A small quantity of engine oil will emerge after the screw connection has been released.

Make sure no oil runs into the clutch housing.

Installation note:

Replace sealing ring.



If the chain tensioner is reused, its oil chamber must be drained. Place chain tensioner on a level support and slowly compress.

Repeat process twice.



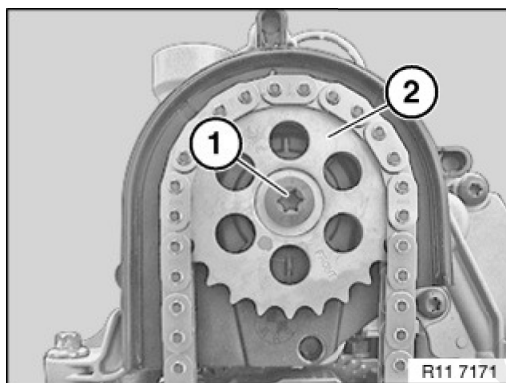
Assemble engine.

**Special tools required:**

- [11 3 340](#)
- [11 4 320](#)
- [11 5 320](#)
- [11 8 740](#)
- [11 9 260](#)

**Necessary preliminary work:**

- Remove [engine](#).
- Mount engine on [assembly stand](#).
- Remove [cylinder head](#).
- Removing [oil sump](#).
- Remove [gear case](#).



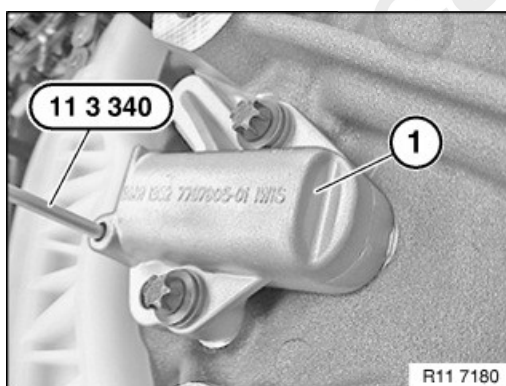
Secure crankshaft with special tool 11 4 320 for bracing.

Important!

Left-hand threads.

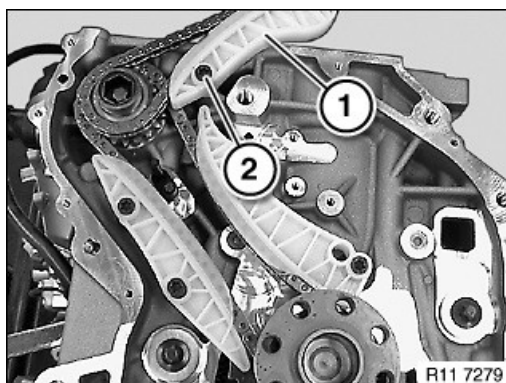
Release central bolt (1).

Remove camshaft sprocket (2) with timing chain of oil pump.

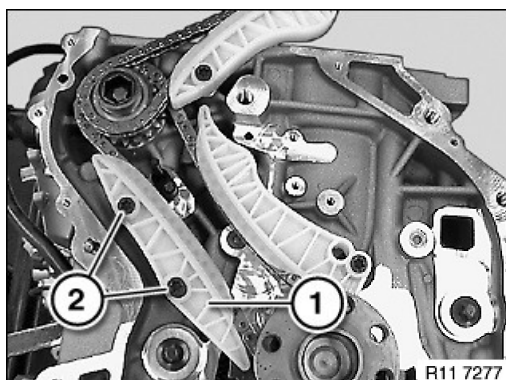


Lock chain tensioner (1) at bottom with special tool [11 3 340](#).

Remove chain tensioner (1).

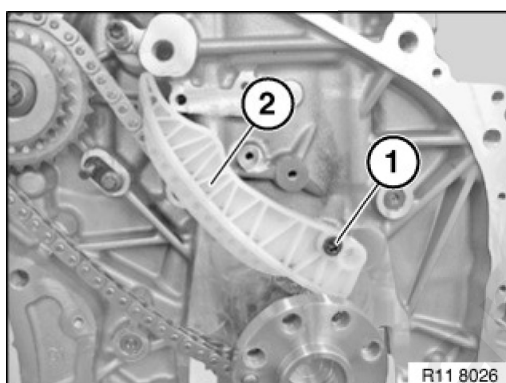


Remove tensioning rail (1) from bearing pin (2).
Remove timing chain for the cylinder head.
(Picture shows N47).

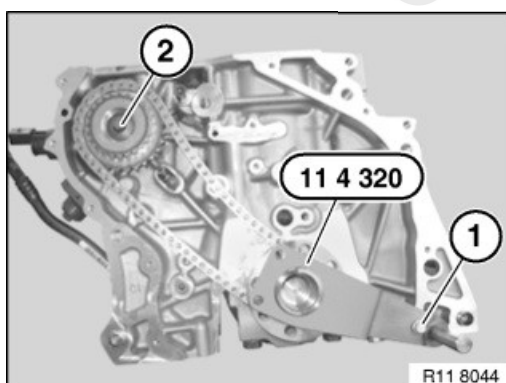


Unfasten screws (2).
Remove slide rail (1).
Installation note:
Tightening torque: [11 11 3AZ](#).

(Picture shows N47).

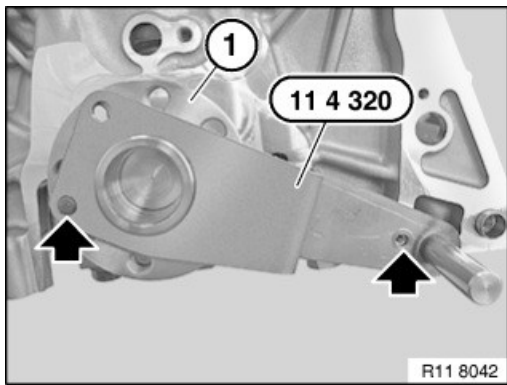


Release screw (1).
Remove tensioning rail (2).



Note:
To release high pressure pump central bolt (2), use special tool [11 4 320](#) to secure crankshaft from rotating.

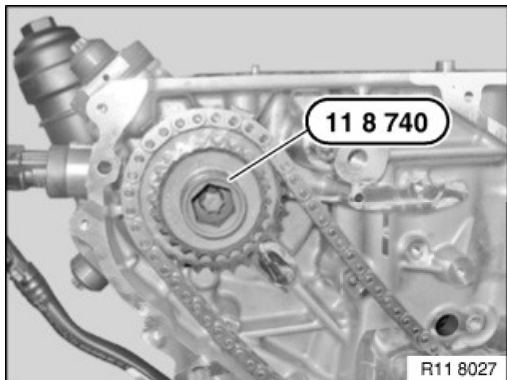
Position special tool [11 4 320](#) and secure to crankcase with bolt (1).



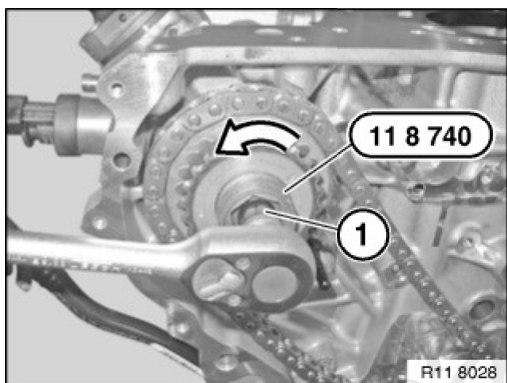
Installation note:

Pay attention to dowel pin on crankshaft (1).

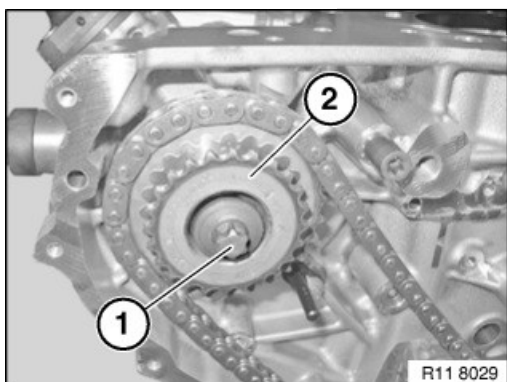
Secure special tool [11 4 320](#) to the crankcase with a screw M6.



Hand-tighten special tool [11 8 740](#) in secondary sprocket wheel of high-pressure pump.



Twist out central bolt (1) of high pressure pump in direction of arrow until impeller has detached from taper of high pressure pump.

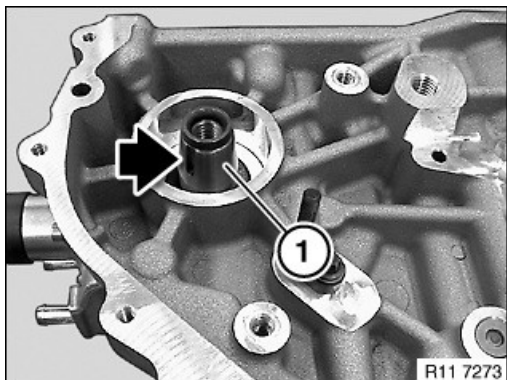


Remove special tool [11 8 740](#) .

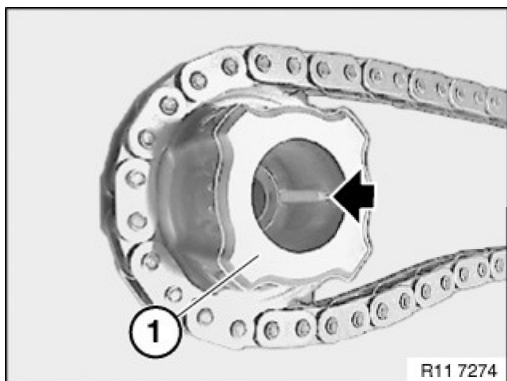
Remove central bolt (1).

Remove special tool [11 4 320](#) .

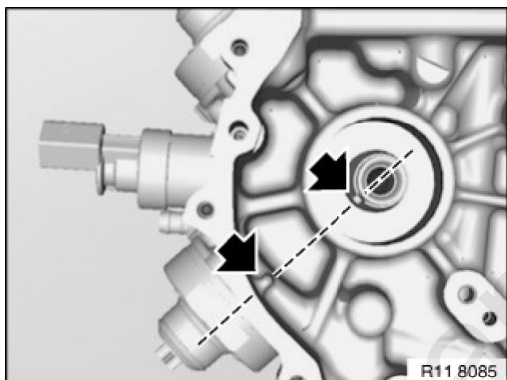
Remove secondary sprocket wheel (2) with timing chain.



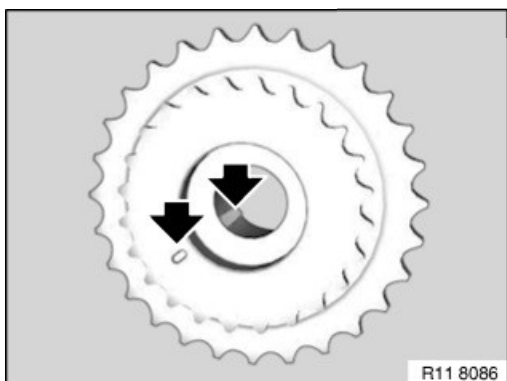
Installation note:
Pay attention to spline groove on high pressure pump (1).



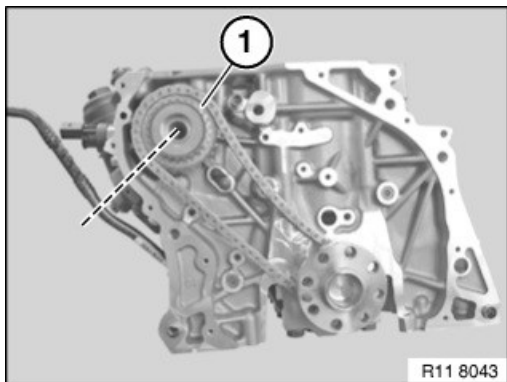
Installation note:
Pay attention to lug for spline groove on camshaft sprocket (1) of high pressure pump.



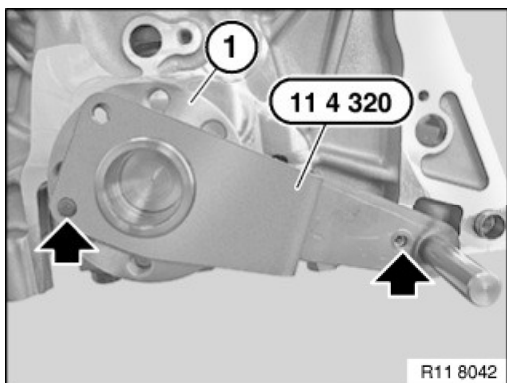
Installation note:
Marking on crankcase (cast lug) and groove on high pressure pump must be in line.



Installation note:
Groove and marking (0) on pinion are on a single plane.



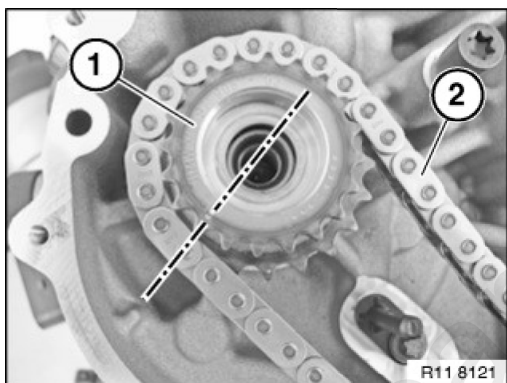
Place timing chain with impeller (1) on crankshaft gear.



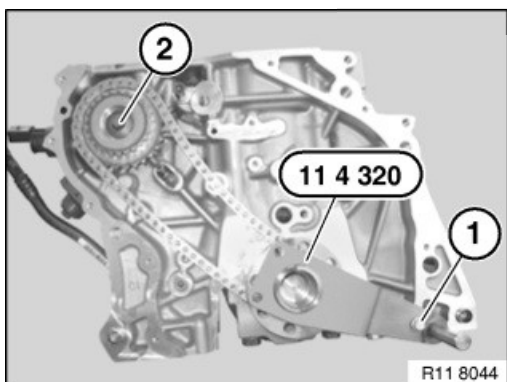
Important!

High pressure pump and crankshaft must be positioned towards each other.

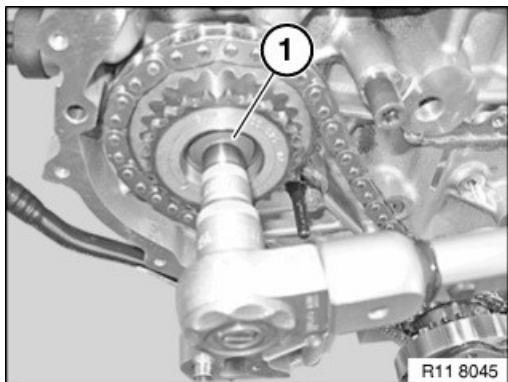
Secure crankshaft (1) to crankcase at firing TDC, cylinder no. 1, with special tool [11 4 320](#).



Position impeller (1) with timing chain (2) on high pressure pump.
Marking (0) and cast lug must be in line.



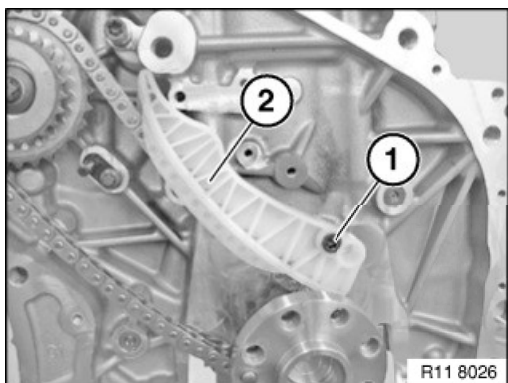
Secure special tool [11 4 320](#) with a M6x15 screw (1).
Screw in central bolt (2) of high pressure pump.



Secure central bolt (1) of high pressure pump.

Tightening torque: [13 52 1 AZ](#).

Remove special tool [11 4 320](#).



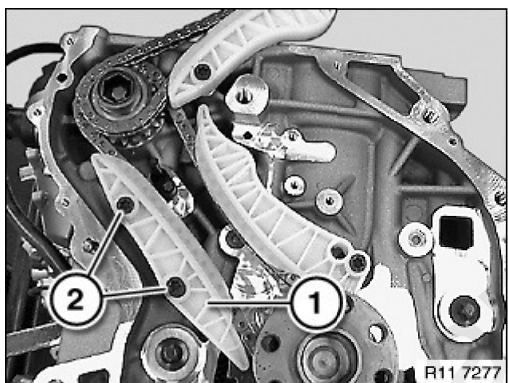
Important!

Clean all threads of bearing journals.

Position tensioning rail (2).

Screw in bearing journals (1).

Tightening torque: [11 11 3AZ](#).



Important!

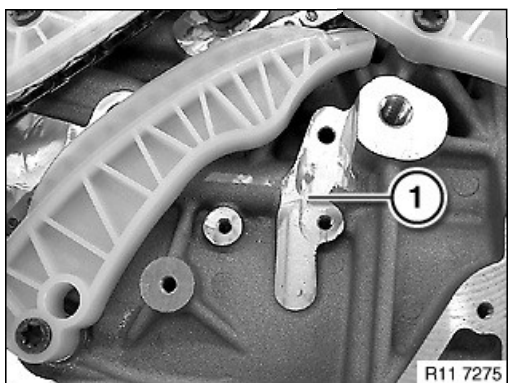
Clean all threads of bearing journals.

Position guide rail (1).

Screw in bearing journals (2).

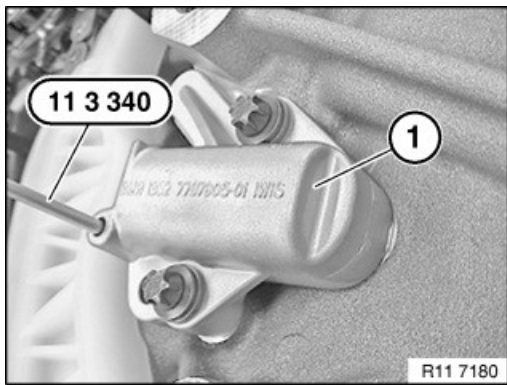
Tightening torque: [11 11 3AZ](#).

(Picture shows N47).



Important!

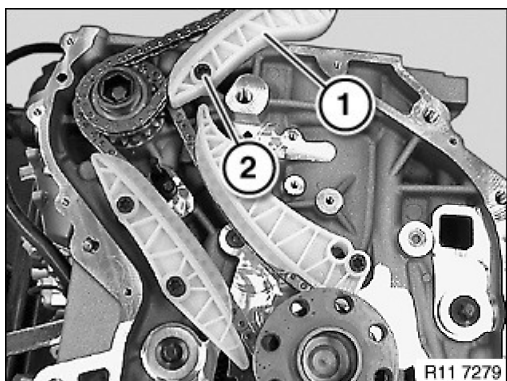
Clean sealing surfaces (1) with compressed air.



Secure hydraulic chain tensioner (1) at bottom with two screws.

Tightening torque: [11 11 4AZ](#).

Remove special tool [11 3 340](#).

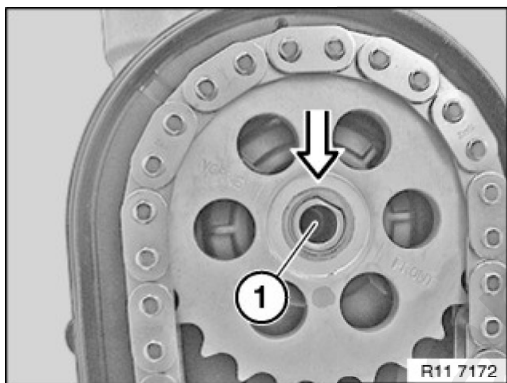


Position tensioning rail (1) for cylinder head.

Screw in bearing journals (2).

Tightening torque: [11 11 3AZ](#).

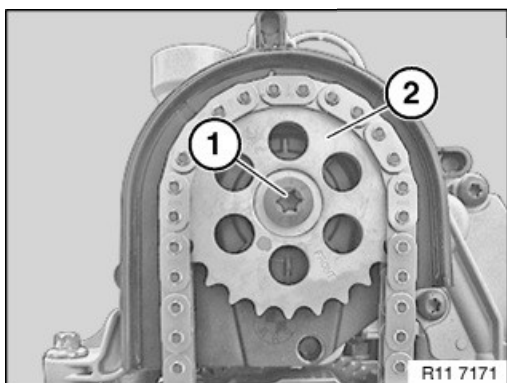
(Picture shows N47).



Position timing chain with secondary sprocket wheel for oil pump. *Installation note:*

Pay attention to mounting flats on oil pump shaft (1) (see arrow).

Fit special tool [11 4 320](#).



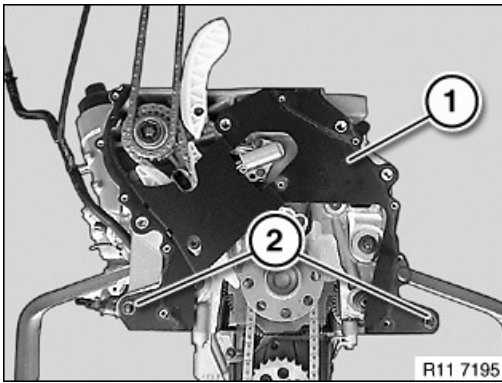
Important!

Left-hand threads.

Insert screw (1).

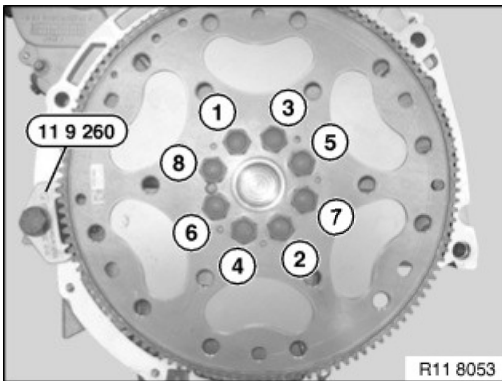
Tightening torque: [11 41 2AZ](#).

Remove special tool [11 4 320](#).



Installation note:
Check fitting sleeves (2) for damage.

Position beaded metal gasket (1).

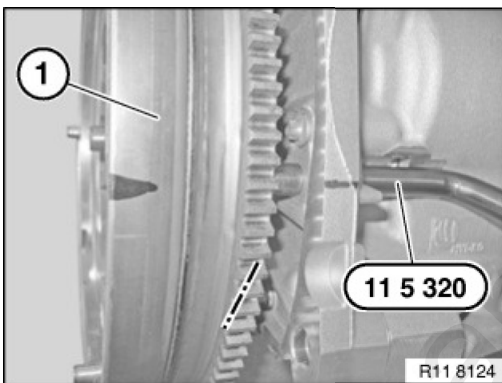


Installation note:
Flywheel must be installed to determined TDC.

Position flywheel.

Secure [flywheel](#) with special tool [11 9 260](#) .

(Picture shows automatic transmission).



Turn flywheel (1) back.

Use special tool [11 5 320](#) to block the crankshaft in the TDC firing position
Cylinder 1



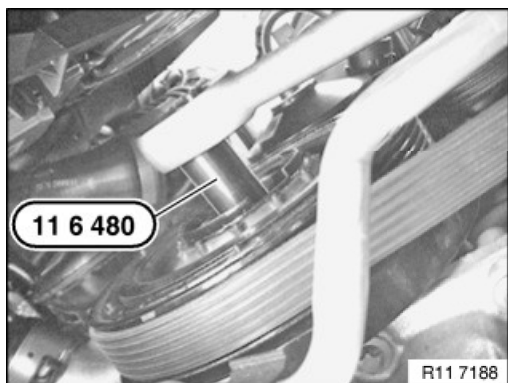
Assemble engine.

**Special tools required:**

- [11 6 480](#)

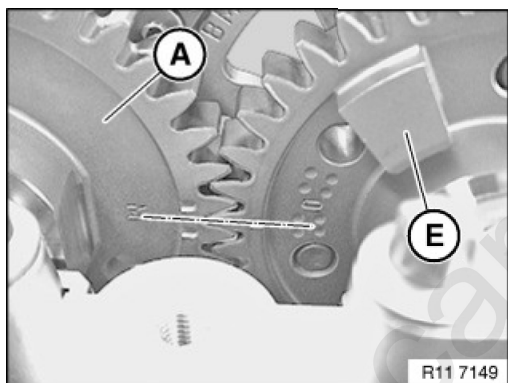
**Necessary preliminary tasks:**

- Remove [cylinder head cover](#).

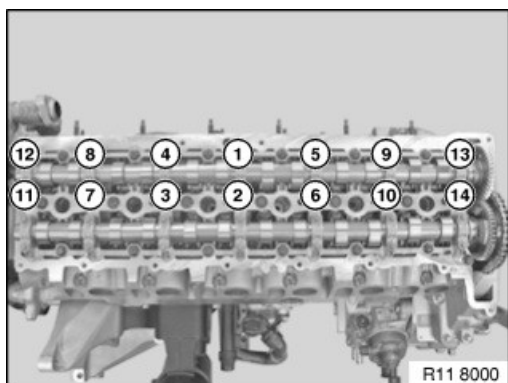


Crank engine with special tool [11 6 480](#) to firing TDC position of cylinder no. 1. **Important!**

Do not turn the engine back.



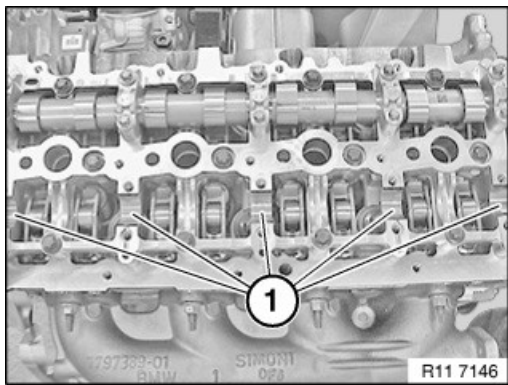
Check position of exhaust and intake camshafts (see graphic).

**Remove exhaust camshaft.****Note:**

It is not necessary to adjust the engine timing in order to remove the exhaust camshaft.

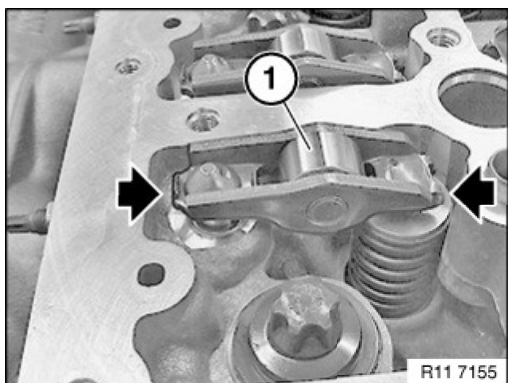
Release bearing caps A1 to A7 by 1/2 a turn at a time, working from the outside inwards.

Feed exhaust camshaft upwards to remove.

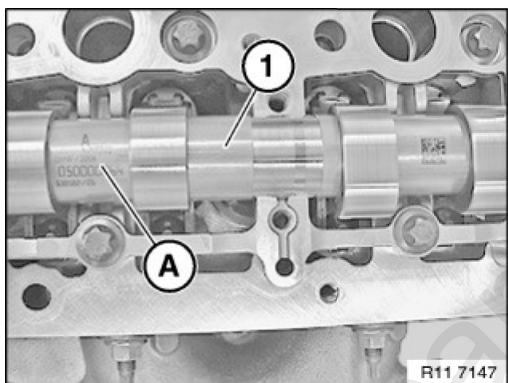


Preparation for installation:

Oil all bearing positions (1).

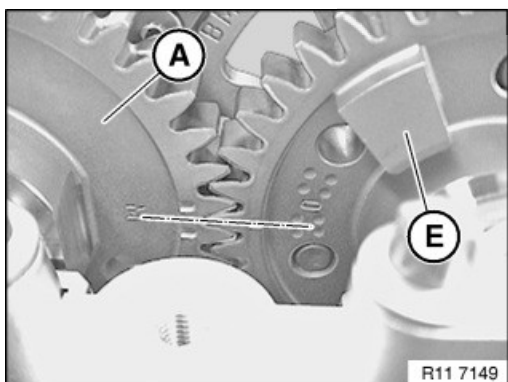


Check installation position of the roller cam followers **(risk of damage!)**.

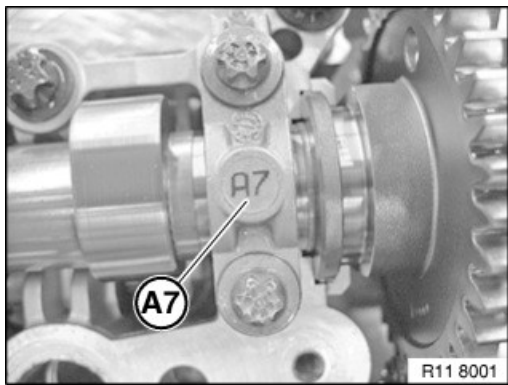


Install exhaust camshaft:

Insert exhaust camshaft (1) marked with (A).

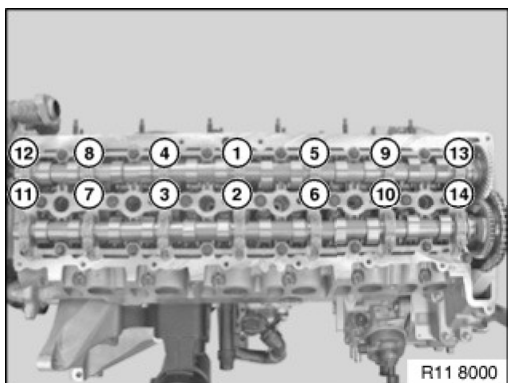


The marks on both camshafts (A and E) must agree when installing exhaust camshaft (A) (see graphic).



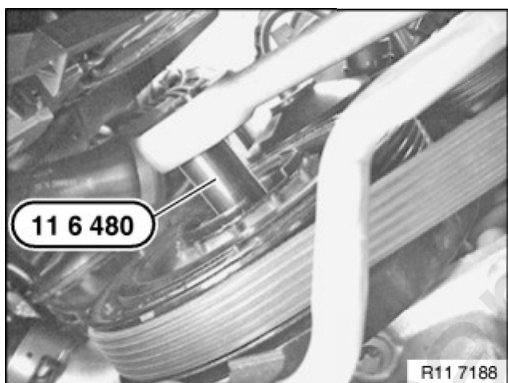
Fit all bearing caps A1 to A7.

The bearing caps can be read from the intake side.



Tighten bearing caps A1 to A7 by 1/2 a turn at a time on the camshaft carrier, working from the inside outwards.

Tightening torque: [11 31 2AZ](#).



Using special tool [11 6 480](#) , crank engine twice in direction of rotation until cylinder no.1 is back in TDC firing position.

Check [camshaft adjustment](#).

Important!

Do not turn the engine back.



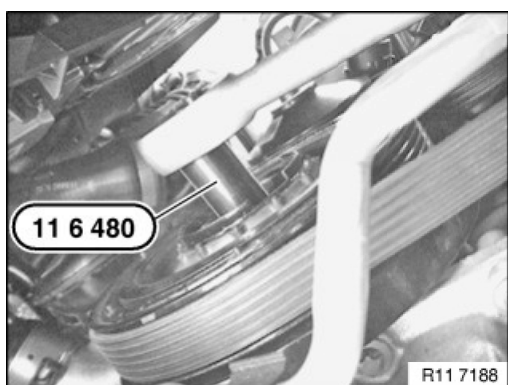
Assemble engine.

**Special tools required:**

- [11 5 320](#)
- [11 6 480](#)
- [11 8 760](#)

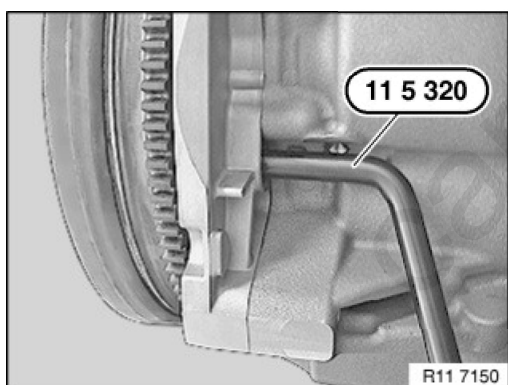
**Necessary preliminary work:**

- Remove [cylinder head cover](#).
- Remove [engine splash guard](#).



Crank engine with special tool [11 6 480](#) to TDC firing position of first cylinder. **Important!**

Do not crank the engine back.

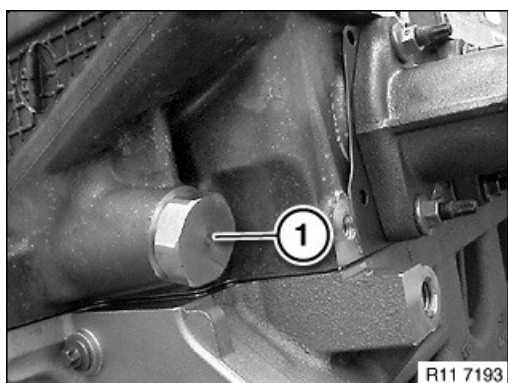


Remove protective cap of gear case cover.

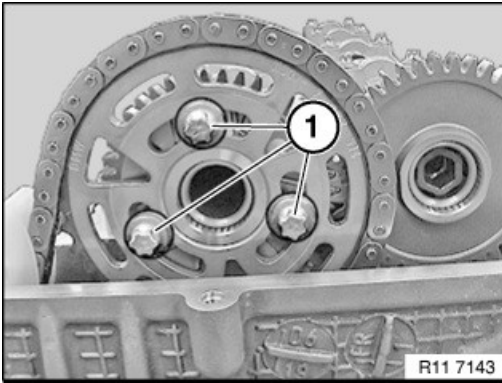
Block crankshaft with cylinder no. 1 in TDC firing position with special tool [11 5 320](#).

Important!

Do not turn the engine back.

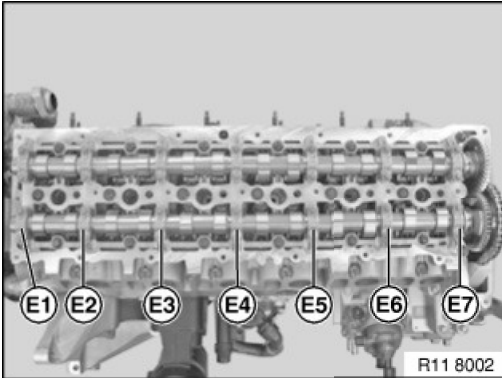


Release [chain tensioner](#) (1).



Release screws (1).

Remove camshaft sprockets from camshaft and feed out of timing chain.
Secure timing chain against falling out.



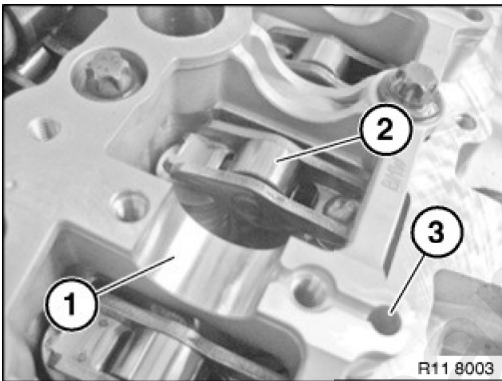
Remove intake camshaft.

Note:

It is necessary to adjust the engine timing in order to remove the intake camshaft.

Release bearing caps E1 to E5 by 1/2 a turn at a time, working from the outside inwards.

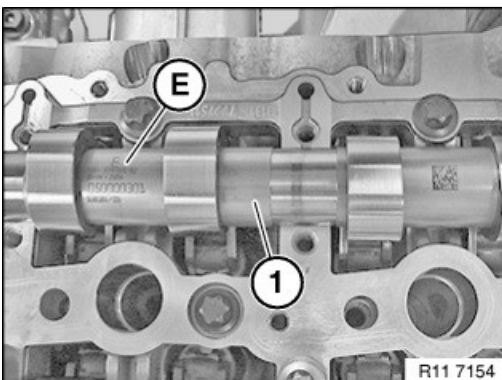
Pull intake camshaft upwards to remove.



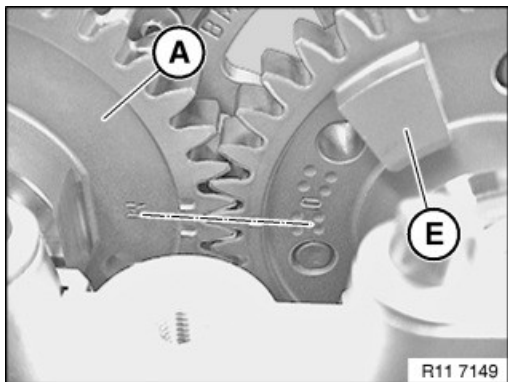
Moisten all bearing positions (1) with engine oil.

Check installation position of roller cam followers (2) **(risk of damage!)**.

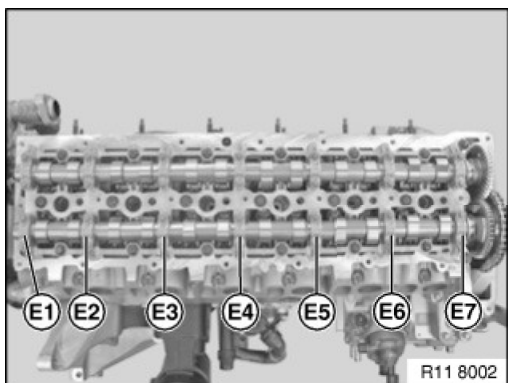
Check all engine oil feed bores (3) for cleanness.



Insert intake camshaft (1) marked with (E).



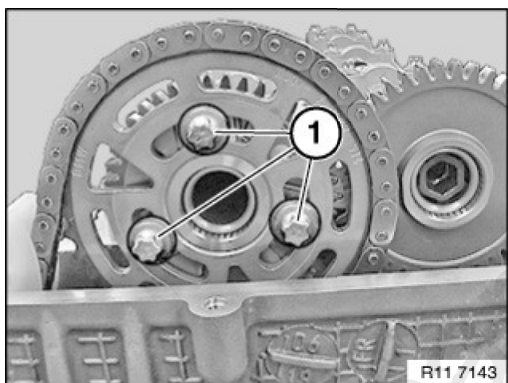
The marks on both camshafts (A and E) must agree when installing intake camshaft (E) (see graphic).



Install intake camshaft.

Tighten bearing caps E1 to E7 by 1/2 a turn at a time on the camshaft carrier, working from the inside outwards.

Tightening torque: [11 31 2AZ](#).

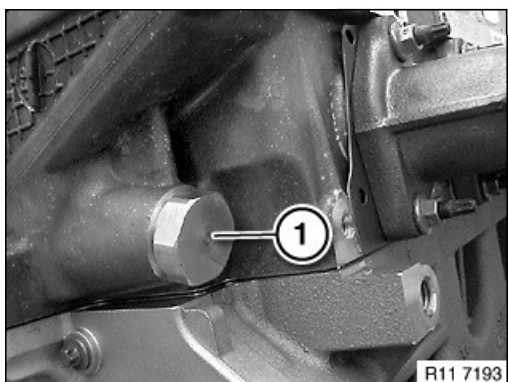


Place the camshaft sprocket with timing chain on the intake camshaft such that bolts (1) are located in the centre of the elongated holes.

Insert bolts (1).

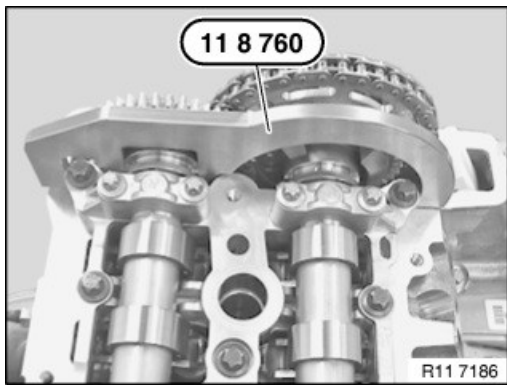
Join bolts (1) to 10 Nm.

Release bolts (1) again by a 90° turn.

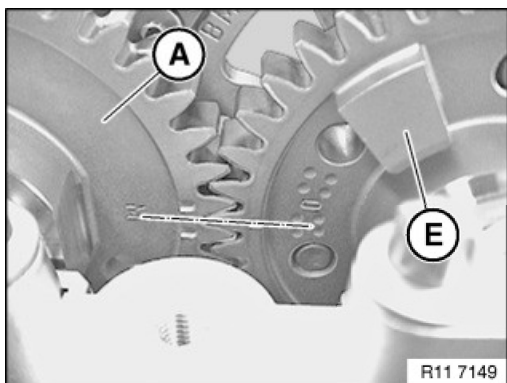


Install chain tensioner (1).

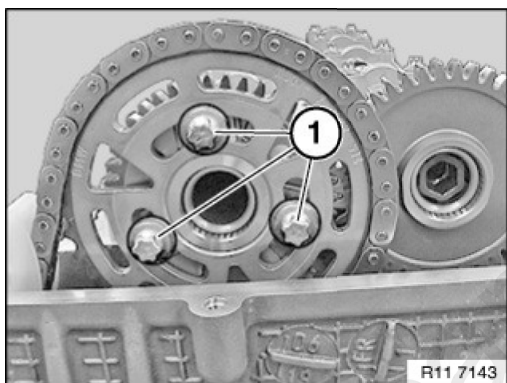
Tightening torque: [11 12 2AZ](#).



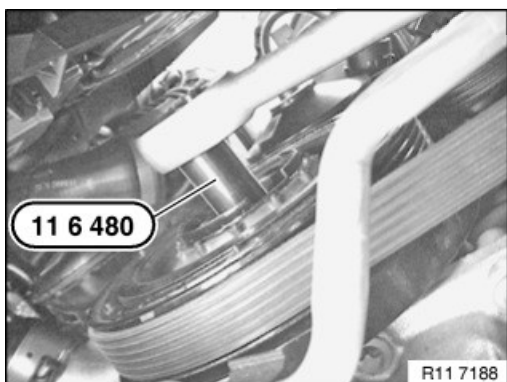
Place special tool [11 8 760](#) on exhaust camshaft. **Note:**
Special tool [11 8 760](#) must lie flush on cylinder head.



Marks on both camshafts (A and E) must agree (be aligned) (see graphic).



Tighten camshaft bolts (1).
Tightening torque: [11 31 1AZ](#).



Remove all special tools.
Crank engine twice in direction of rotation with special tool [11 6 480](#) up to firing TDC position of cylinder no. 1.

Check [camshaft adjustment](#).

Important!

Do not crank the engine back.



Assemble engine.