

**Special tools required:**

- 00 9 120
- 00 9 250
- 11 4 280
- 11 4 281
- 11 4 282
- 11 4 285
- 11 4 290
- 11 9 340

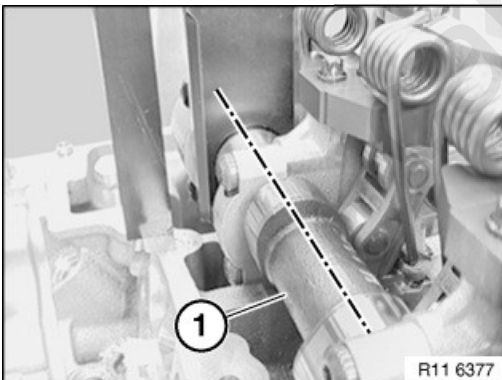
**Attention!**

For the positioning of the special tool 11 4 281 on the mounting flats of the intake camshaft, a collision with the cylinder throttle return spring 1 can occur.

Rework special tool 11 4 281 on the basis of the following description.

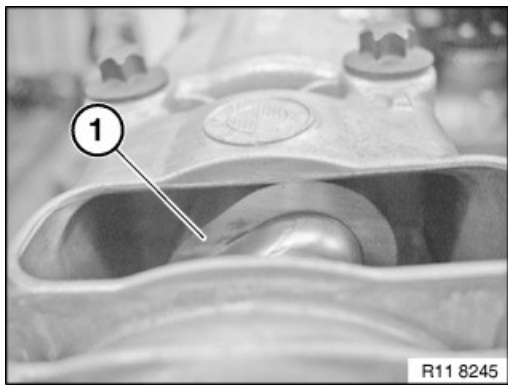
**Necessary preliminary tasks:**

- Remove cylinder head cover.
- Check timing.

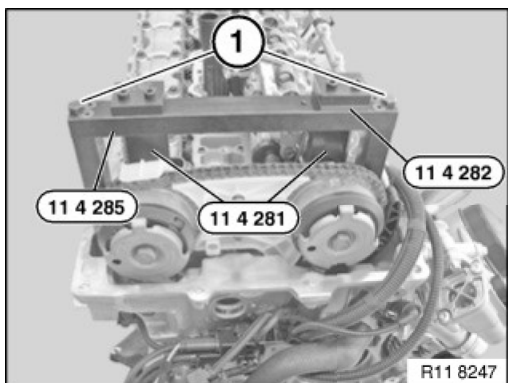


With 1st cylinder in TDC firing position, cams of intake camshaft (1) at 1st cylinder point upwards at an angle.





With 1st cylinder in TDC firing position, cams of the exhaust camshaft (1) point upwards at an angle.



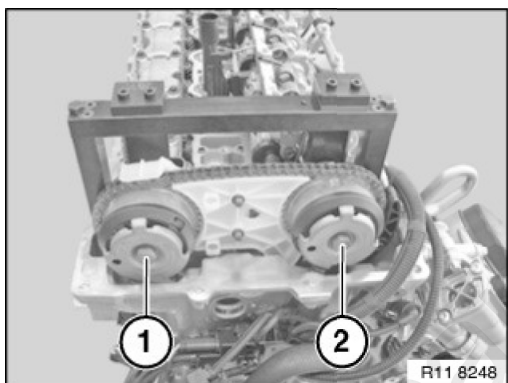
Secure special tool 11 4 285 with bolts (1) to cylinder head.

Note:

Fit special tool 11 4 282 underneath on side of intake camshaft.

Mount reworked special tool 11 4 281 on the intake camshaft.

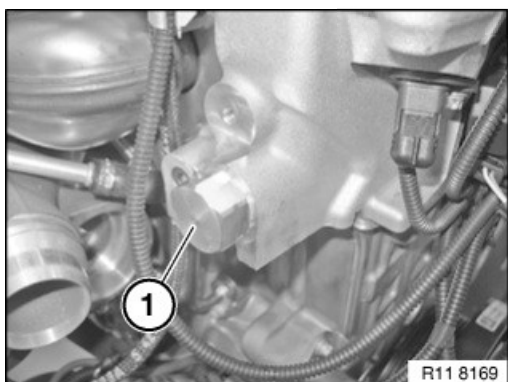
Mount special tool 11 4 281 on the exhaust camshaft.



Attention!

Only use special tool 11 4 280 to loosen central bolts (1 and 2) of VANOS unit.

Release central bolts (1 and 2).



Release chain tensioner (1).

Tightening torque 11 31 7AZ.

Attention!

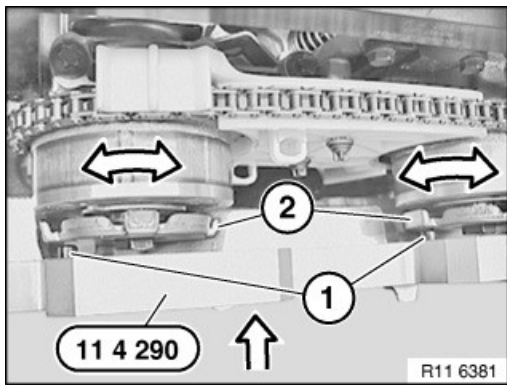
Have a cleaning cloth ready. A small quantity of engine oil will emerge after the screw connection has been released.

Make sure no engine oil runs onto belt drive.

Installation note:

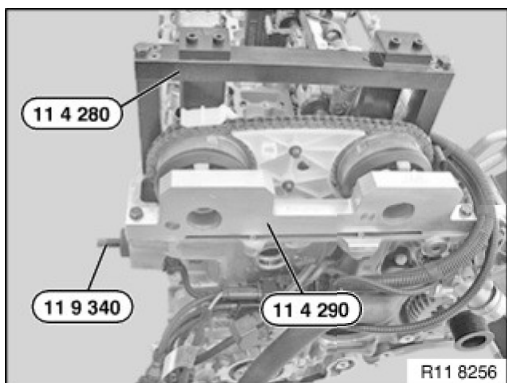
Renew the sealing ring.





Turn increment wheel (2) in direction of arrow until retaining pins (1) on special tool 11 4 290 match up.

11 4 290 Slide on special tool in direction of arrow.



Use bolts to fasten special tool 11 4 290 .

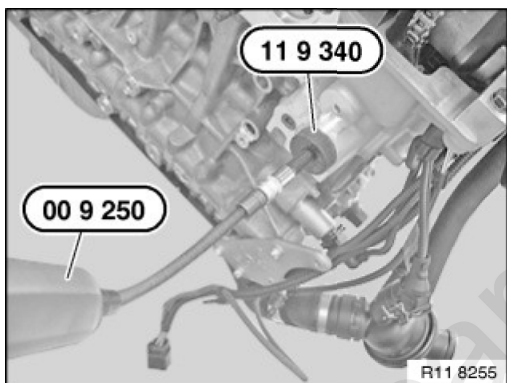
Installation note:

Replace both central bolts.

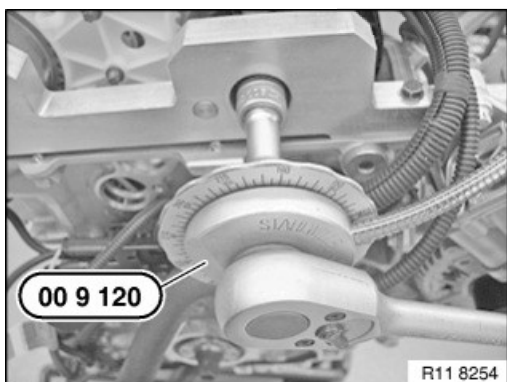
Screw in both central bolts.

Release both central bolts 90°.

11 9 340 Screw special tool into cylinder head.



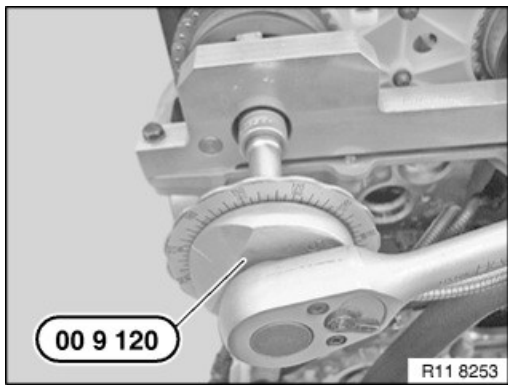
Pretension timing chain with special tool 11 9 340 00 9 250 **0,6 Nm**



Use special tool 00 9 120 to tighten central bolts of intake adjuster.

Tightening torque 11 36 1AZ.





Use special tool 00 9 120 to tighten central bolts of exhaust camshaft adjuster.

Tightening torque 11 36 1AZ.



Remove all special tools.

Crank engine on the central bolt twice in the direction of engine rotation and check the timing.

Assemble engine.

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**Special tools required:**

- 11 0 300
- 11 4 281
- 11 4 282
- 11 4 285

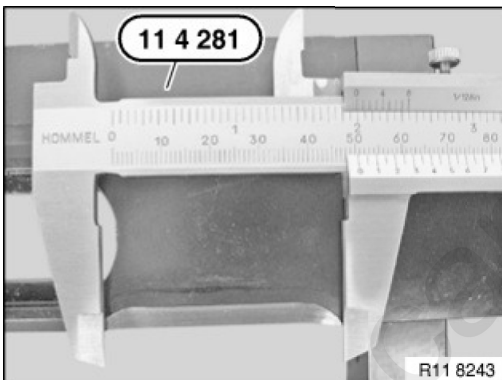
**Attention!**

When the engine is stopped, the intake and exhaust camshaft adjusters are normally locked in their initial setting. In order to avoid incorrect timing adjustment, it is essential to check the locking of the camshaft adjuster and if necessary perform locking by rotating the camshafts.

**Attention!**

For the positioning of the special tool 11 4 281 on the mounting flats of the intake camshaft, a collision with the cylinder throttle return spring 1 can occur.

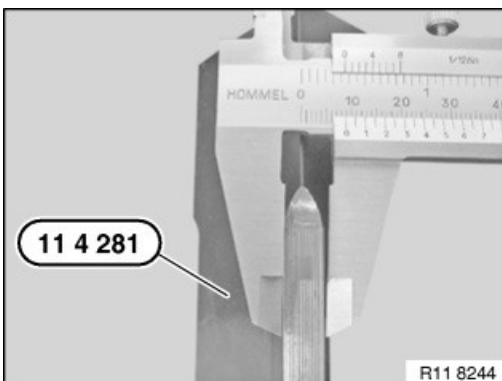
Special tool 11 4 281 reconditions at following description.



Check for freedom of movement of return spring at intermediate lever cylinder 1.

Recondition special tool 11 4 281 .

Rework chamfer on special tool 11 4 281 as shown in the range of 50 millimetres long and 8.5 millimetres wide.



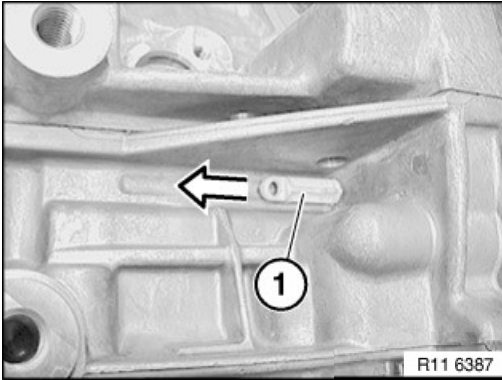
Rework chamfer on special tool 11 4 281 to 8.5 millimetres (see figure).



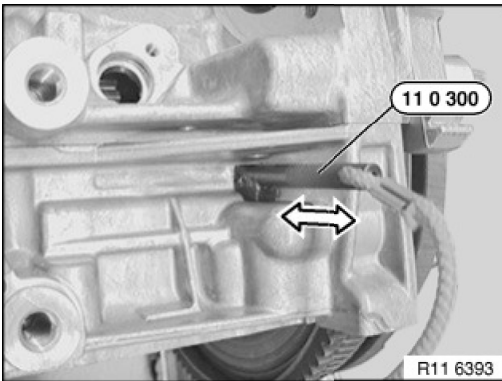


Necessary preliminary work:

- Remove cylinder head cover.
- Remove underbody protection
- Remove fan cowl. (**Not E70, E71, F25**)
- Remove bracing plate (**all-wheel drive vehicles only**)



Remove fastener (1) in direction of arrow. *Installation note:*
Install fastener (1) with bore facing outwards.

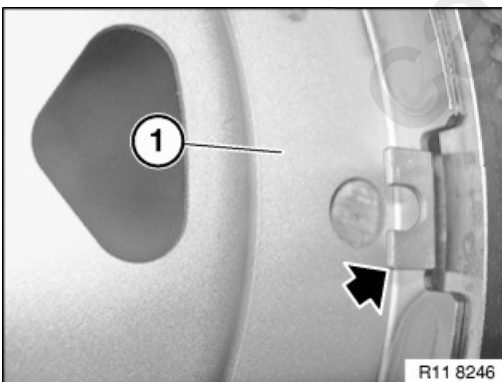


Rotate crankshaft at central bolt into TDC setting.

Slide special tool 11 0 300 in direction of arrow into dowel hole and secure crankshaft.

Attention!

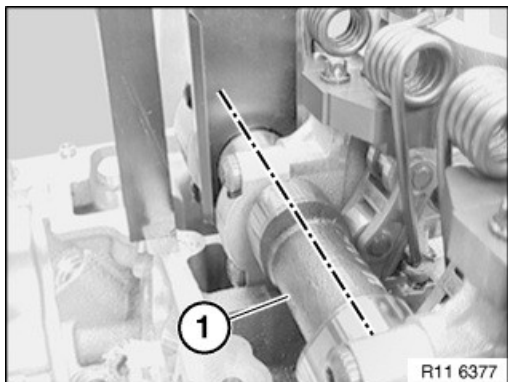
If the flywheel is secured in the correct dowel hole with special tool 11 0 300, the engine can no longer be moved at the central bolt.



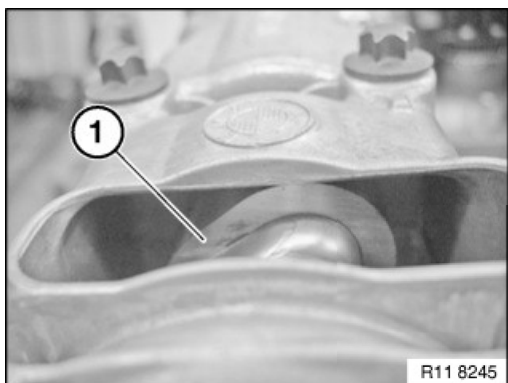
Note:

Vehicles with automatic transmission can only be secured to the specified position on flywheel (1) (see arrow).

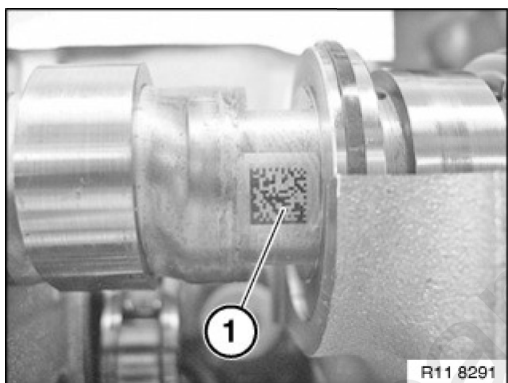




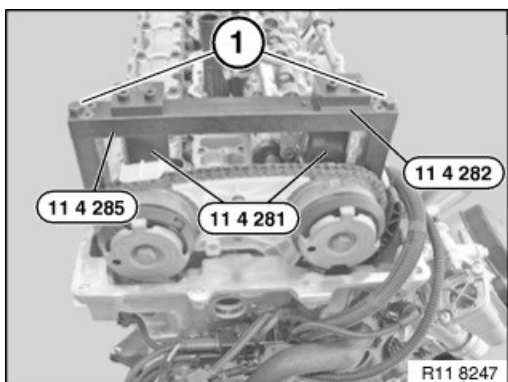
With 1st cylinder in TDC firing position, cams of intake camshaft (1) point upward at an angle.



With 1st cylinder in TDC firing position, cams of the exhaust camshaft (1) point upwards at an angle.



The timings are correct when the part numbers or read code (1) and the intake and exhaust camshafts point upwards.



Special tools are included in set 11 4 280.

Secure special tool 11 4 285 with bolts (1) to cylinder head.

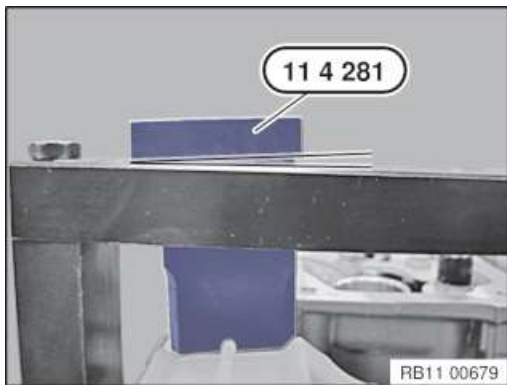
Note:

Fit special tool 11 4 282 underneath on side of intake camshaft.

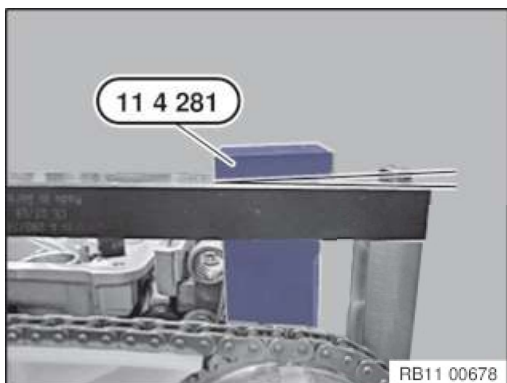
Mount reworked special tool 11 4 281 on the intake camshaft.

Mount special tool 11 4 281 on the exhaust camshaft.

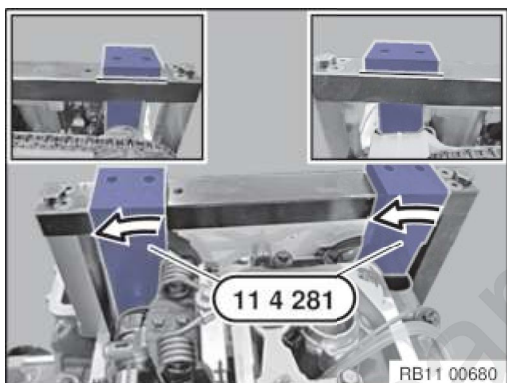




The exhaust camshaft timing is correct when special tool 11 4 281 is slightly in contact to intake side.



The intake camshaft timing is correct when special tool 11 4 281 is slightly in contact to intake side.



Twist special tools 11 4 281 by hand in direction of arrow up to limit position.

Both gauges must lie flat on special tool 11 4 285 .



If necessary, adjust valve timing.

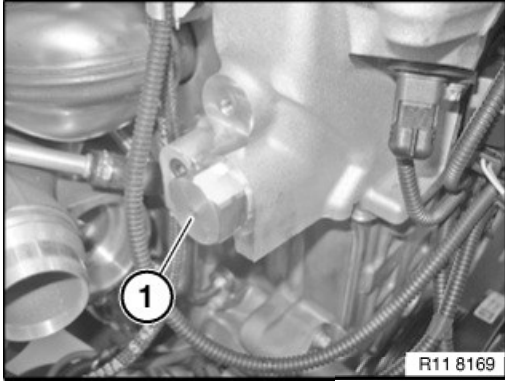
Assemble engine.





Necessary preliminary tasks:

- Remove air duct



Release chain tensioner (1).

Tightening torque 11 31 7AZ.

Important!

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

Make sure no engine oil runs onto belt drive.

Installation note:

Replace sealing ring.



If the chain tensioner is used again, the oil must be drained out of the chain tensioner. Place chain tensioner on a level support and slowly compress.

Repeat process twice.



Assemble engine.



**Special tools required:**

- 00 9 120
- 11 4 350
- 11 4 461
- 11 7 100
- 11 8 550
- 11 8 552
- 11 8 553
- 11 9 000
- 2 409 248

**Attention!**

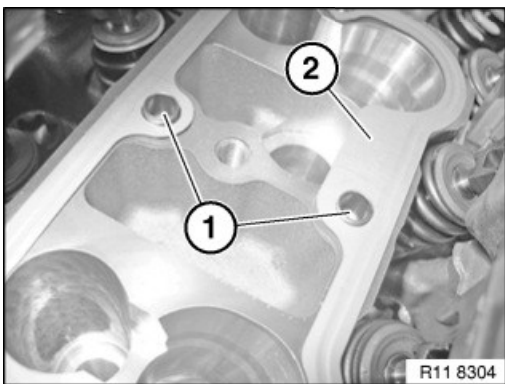
It is absolutely essential to follow an exact procedure for removing and installing the exhaust camshaft.

Risk of damage!

The upper and lower bearing strips must be preloaded with a total of six special tools 11 8 550 .

**Necessary preliminary tasks:**

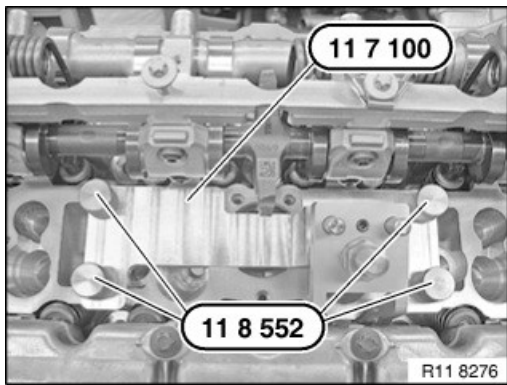
- Remove cylinder head cover.
- Remove all ignition coils and injector shafts.
- Remove servomotor for eccentric shaft.
- Remove exhaust camshaft adjuster
- Adjust valve timing.



Remove fitting bushes (1). *Installation note:*

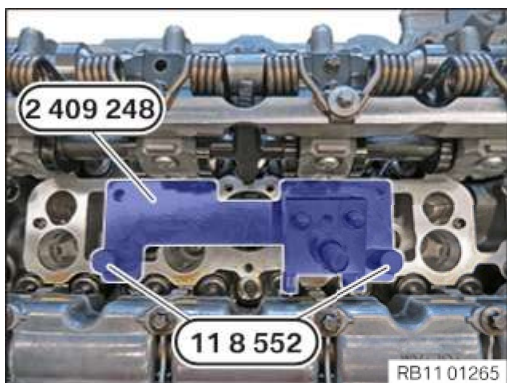
Check fitting bushes (1) for damage and replace if necessary.





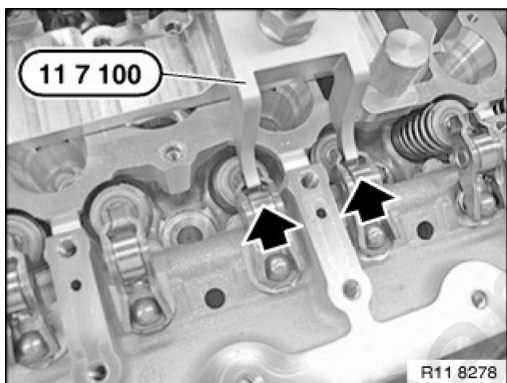
Installation note:
up until 1/2011

Position special tool 11 7 100 on cylinder 2.
Hand-tighten special tool 11 7 100 with special tool 11 8 552 .



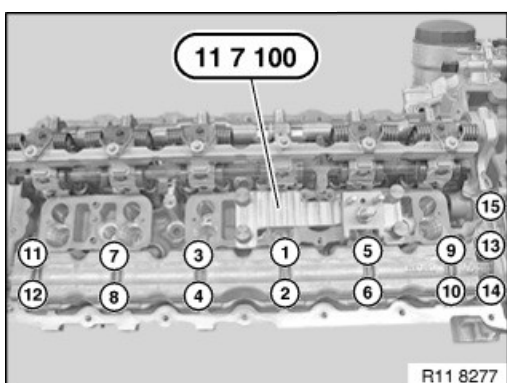
Installation note:
from 1/2011

Position special tool 2 409 248 on cylinder 2.
Hand-tighten special tool 2 409 248 with special tool 11 8 552 .



Note:
Graphic without bearing strip.

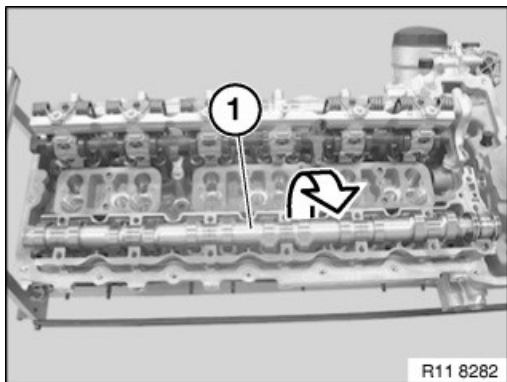
Screw in roller cam follower at 2nd cylinder using spindle nut of special tool 11 7 100 to end stop.



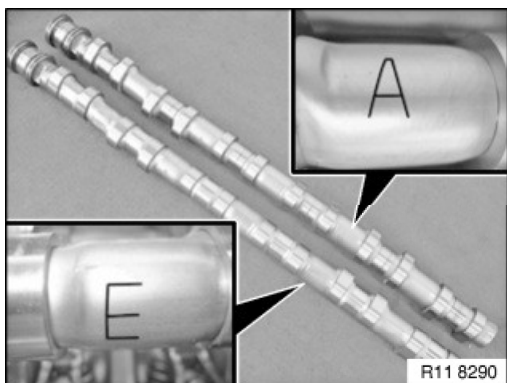
Release screw connection on bearing strip in sequence from 15 to 1.
Remove upper bearing strip (1).

Note:
The upper and lower bearing strips (1) can also be lifted out completely with exhaust camshaft.





Remove exhaust camshaft (1) from bearing strip in direction of arrow.
Set down exhaust camshaft (1) on special tool.



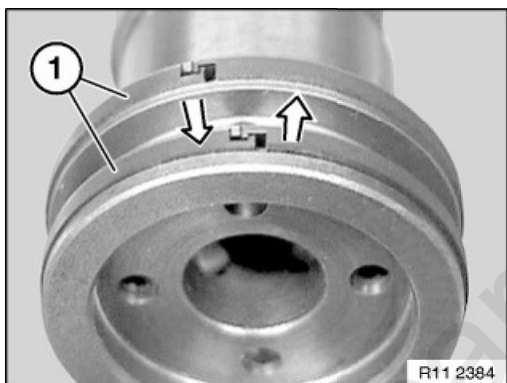
Attention!

Marks of intake and exhaust camshafts are different.

Mixing up the intake and exhaust camshaft will result in **engine damage**.

A = Exhaust camshaft.

E = Intake camshaft



Metal plain rectangular compression ring:

Attention!

Plain rectangular compression rings (1) can easily break.

Only renew plain rectangular compression rings (1) when they are broken.

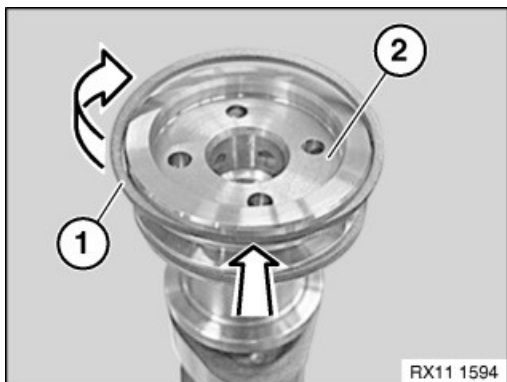
The plain rectangular compression rings have catches at the joint.

Press plain rectangular compression rings (1) apart upwards and downwards and removed towards front.

Make sure plain rectangular compression rings (1) can move freely.

Installation note:

When exhaust camshafts are inserted, no joint must point to a separating joint.



Plastic plain rectangular compression ring:

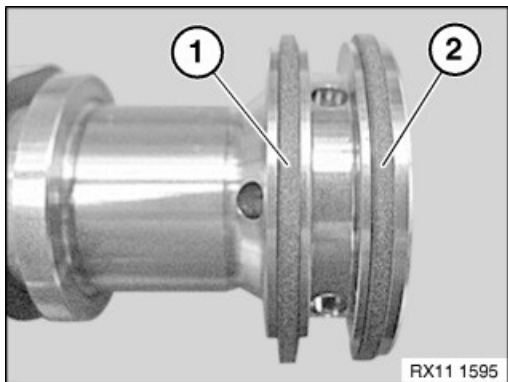
Installation note:

The plastic plain rectangular compression ring is maintenance free and does not have to be replaced.

Insert plastic rectangular compression ring (1) into groove of exhaust camshaft (2) (see arrow).

Lightly oil plastic rectangular compression ring (1) and rotate in direction of arrow until compression ring (1) is positioned on the exhaust camshaft.





Check plastic plain rectangular compression ring (1 and 2) for freedom of movement.

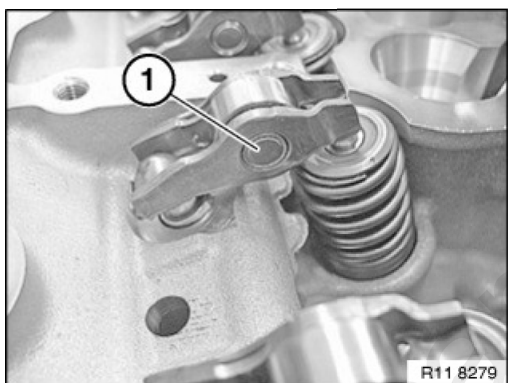
Attention!

Removal on engine:

Set engine to ignition TDC at cylinder No. 1.

Removed cylinder head:

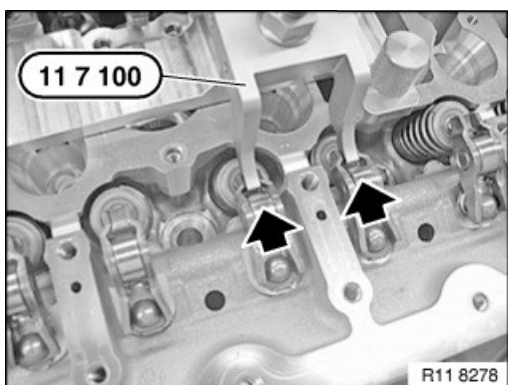
When using special tool 11 9 000 , it will be necessary to remove the aluminium strip.



Installation note:

Before mounting the exhaust camshaft, ensure the correct fit of the rocker arm (1) on the hydraulic valve clearance compensating element and the valve.

See "Removing and installing/replacing all roller cam followers".



Mounting bearing strip:

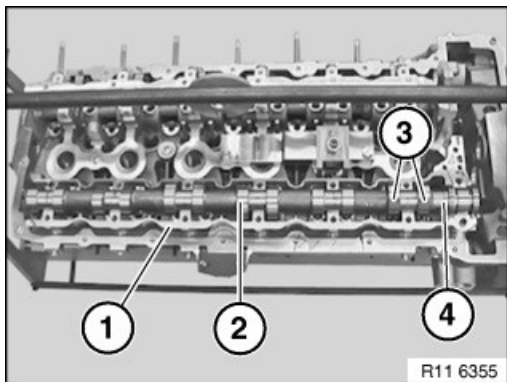
Pre-install special tool 11 7 100 on cylinder no. 2.

Attention!

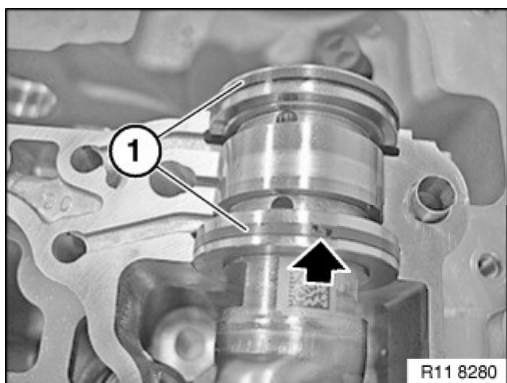
Special tool 11 8 552 is a special screw.

Press down rocker arms (3) on cylinder no. 2 with spindle nut (2) of special tool 11 7 100 .

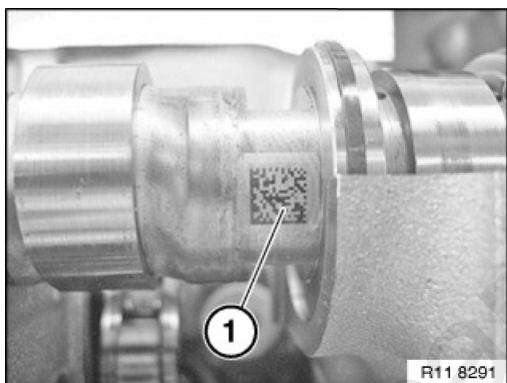




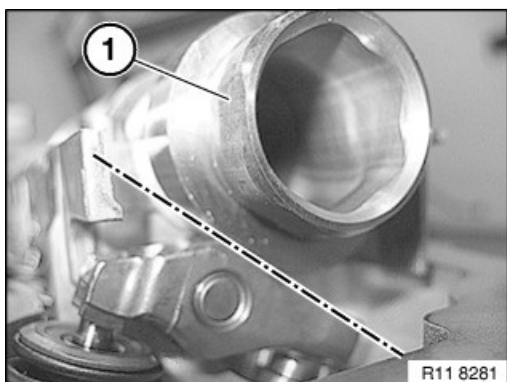
Position lower bearing strip (1) with exhaust camshaft (2) on rocker arms.
Align exhaust camshaft (2).
Cylinder nos. 2 and 4 are at valve overlap.
Cams (3) on cylinder no. 1 point upwards at an angle.
Part number (4) on mounting flats of exhaust camshaft (2) points upwards.



Insert exhaust camshaft so that none of the latching mechanisms for the plain rectangular compression rings (1) point to a bearing cap joint.
Centre latch mechanism of the plain rectangular compression rings with the bearing cap.

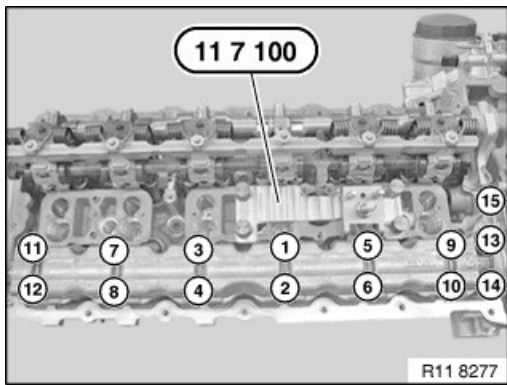


Insert exhaust camshaft so that the data code (1) on the mounting flats faces up. *Note:*
Graphic of intake camshaft.



The cam (1) at cylinder 6 points downward at an angle.





Attention!

There must be no oil residues in the cylinder head threaded holes.

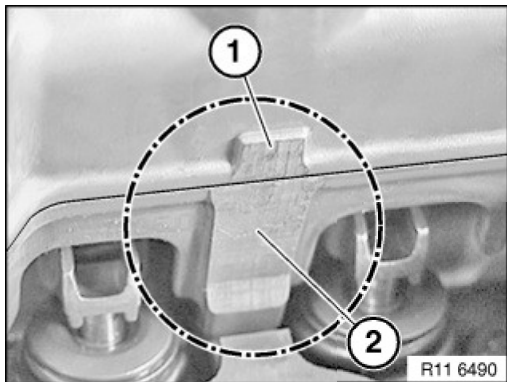
Clean threaded holes.

Fit upper bearing strip (1).

Insert bolts dry.

Join exhaust camshaft to lower and upper bearing strips (1) with torque wrench (2) to **8 Nm** in sequential order from 1 to 15.

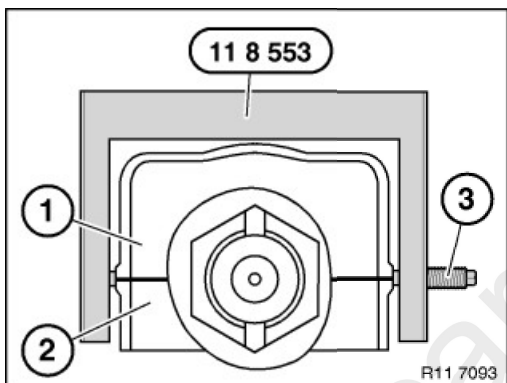
Release all screws of upper bearing strip (1) from outside inwards by 90°.



Installation note:

Upper and lower bearing strips must be aligned to each other at ground surfaces (1 and 2).

Make sure that the synchronising key and the shanks of special tools 11 4 461 rest on the milled surfaces.



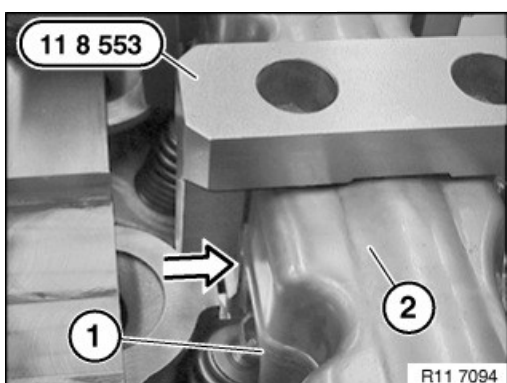
Note:

Schematic diagram of special tool 11 8 553 at upper bearing strip (1) and lower bearing strip (2).

Preload all special tools 11 8 553 with special tool 11 4 350 only.

Attention!

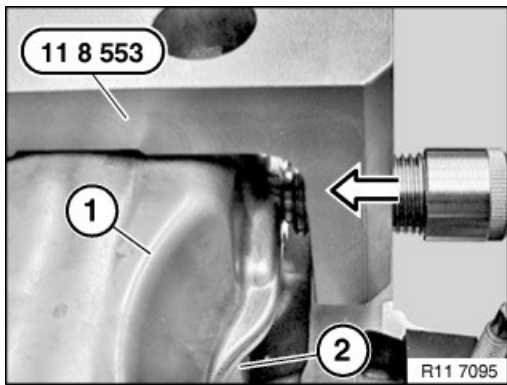
Tighten screw (3) on synchronising key to 2 Nm. **Risk of damage!**



Position special tool 11 8 553 over screw connection of bearing strips.

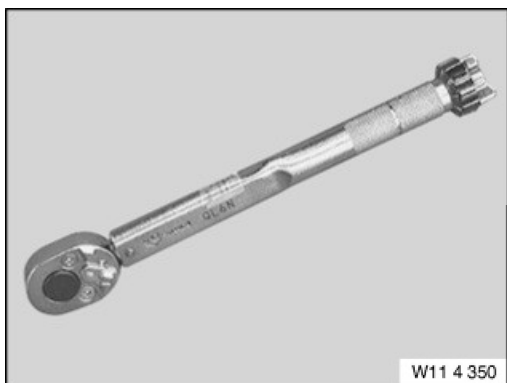
Make sure that the shanks rest exactly on the ground surfaces of the upper bearing strip (2) and lower bearing strip (1).





Initially tighten screw of special tool 11 8 553 to ground surfaces of upper bearing strip (1) and lower bearing strip (2). **Attention!**

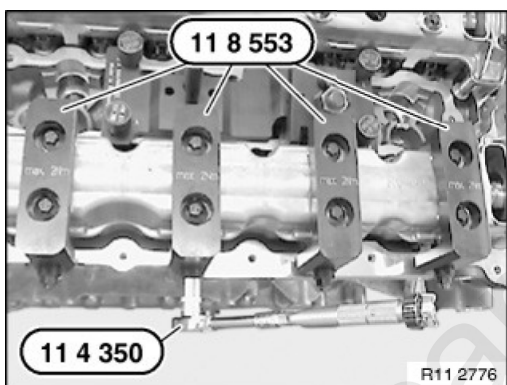
Tighten screws on synchronising key to 2 Nm. **Risk of damage!**



Attention!

Set special tool 11 8 553 to 2 Nm.

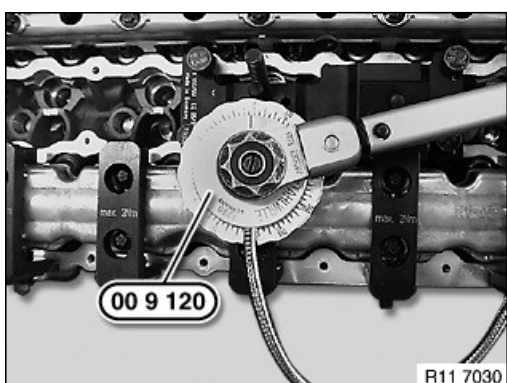
Preload all special tools 11 8 553 with special tool 11 4 350 only.



Mount special tools 11 8 553 to inside of cylinder head with pressure bolt.

Mount special tool 11 8 553 on cylinder no. 2 with pressure bolt facing outward.

Position special tools 11 8 553 so that screw connections (2) of bearing strip are easily accessible.



Tighten top and bottom bearing strip with special tool 00 9 120 .

Tightening torque 11 31 1AZ.

Attention!

Remove special tool 11 8 553 only when exhaust camshaft screw connection is completed.



Assemble engine.

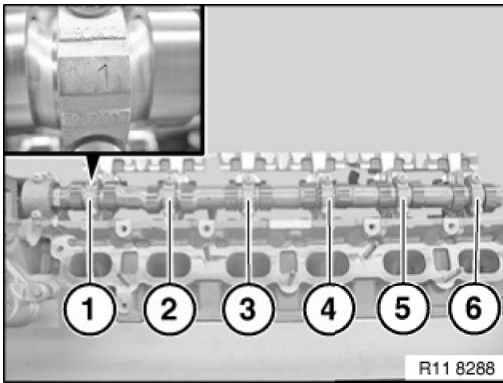


**Special tools required:**

- 11 4 481

**Necessary preliminary tasks:**

- Remove cylinder head cover.
- Remove intake adjuster.
- Remove intermediate lever.
- Adjust valve timing.

**Note:**

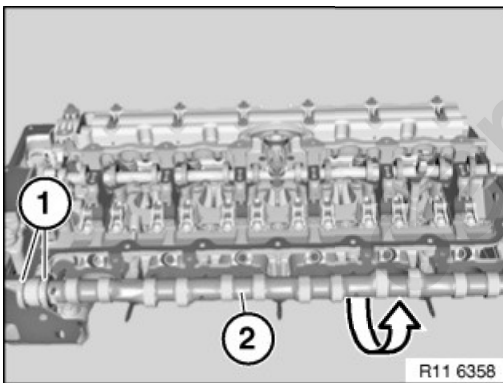
All bearing caps are identified with numbers from 1 to 6.

The front bearing cap is a thrust bearing and does not have an identification.

Release screws on thrust bearing cover.

Release screws on all bearing caps 1 to 6.

Set all bearing caps down in special tool 11 4 481 in a neat and orderly fashion.



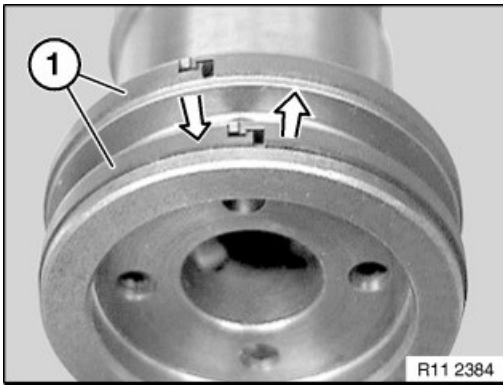
Remove intake camshaft (2) towards top.

Installation note:

Clean all bearing positions and lubricate with oil.

Check plain rectangular compression rings (1) for damage.





Metal plain rectangular compression ring:

Attention!

Plain rectangular compression rings (1) can easily break.

Only replace plain rectangular compression rings (1) when they are broken.

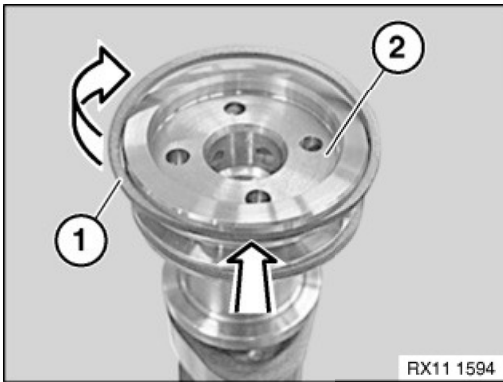
The plain rectangular compression rings have catches at the joint.

Press plain rectangular compression rings (1) apart upwards and downwards and removed towards front.

Make sure plain rectangular compression rings (1) can move freely.

Installation note:

When intake camshafts are inserted, no joint must point to a separating joint.



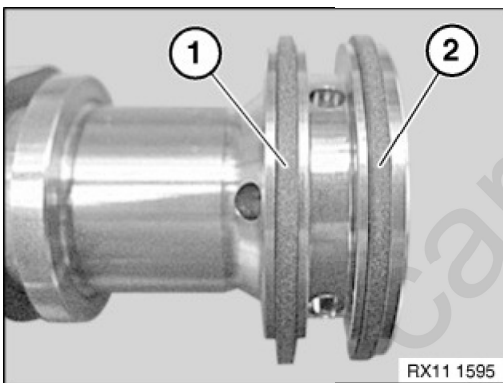
Plastic plain rectangular compression ring:

Installation note:

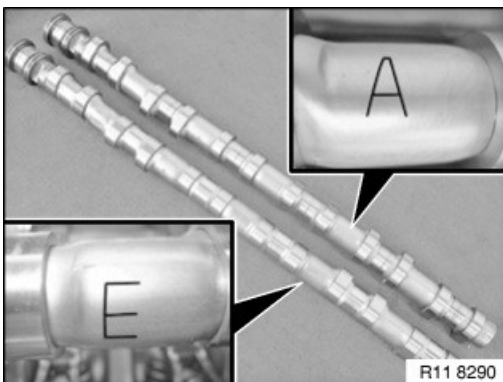
The plastic plain rectangular compression ring is maintenance free and does not have to be replaced.

Insert plastic plain rectangular compression ring (1) into groove of intake camshaft (2) (see arrow).

Lightly oil plastic plain rectangular compression ring (1) and rotate in direction of arrow until plastic plain rectangular compression ring (1) is positioned on the intake camshaft.



Check plastic plain rectangular compression ring (1 and 2) for freedom of movement.



Attention!

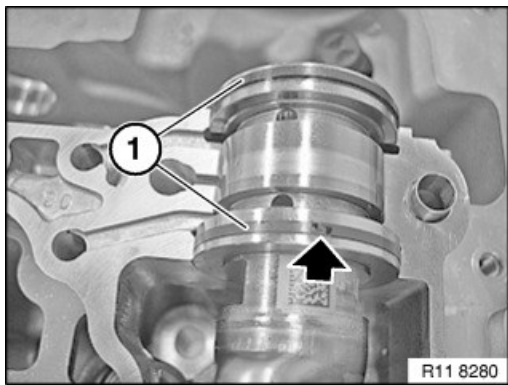
Marks of intake and exhaust camshafts are different.

Mixing up the intake and exhaust camshaft will result in **engine damage**.

A Exhaust camshaft.

E Intake camshaft



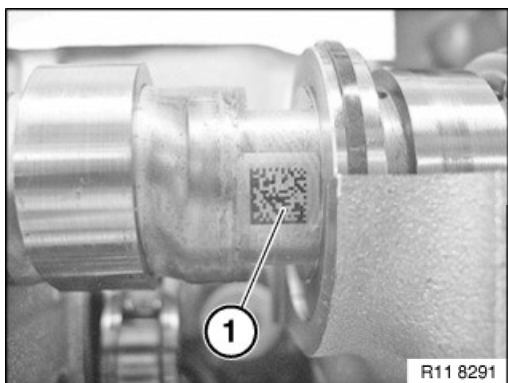


Install intake camshaft so that the latch mechanism of the plain rectangular compression rings (1) does not point to a contact point of the bearing cap

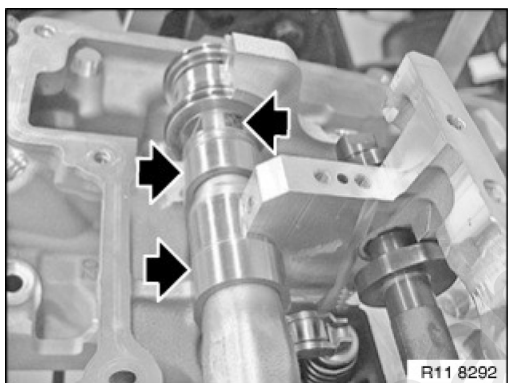
Centre latch mechanism of the plain rectangular compression rings with the bearing cap.

Note:

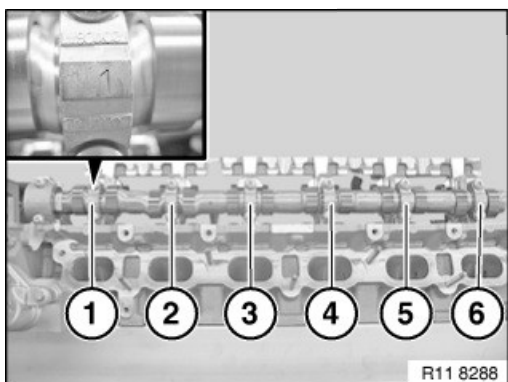
Image of the exhaust camshaft.



Insert intake camshaft so that data code (1) on mounting flats points upwards.



Position intake camshaft so that the cams point diagonally upwards to the left.



Note:

All bearing caps are identified with numbers from 1 to 6.

The front bearing cap is a thrust bearing and does not have an identification.

Insert screws on all bearing caps 1 to 6.

Insert screws on thrust bearing cover.

Tightening torque 11 31 3AZ.



Assemble engine.

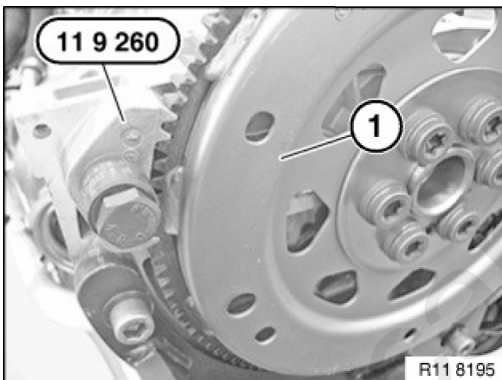


**Special tools required:**

- 11 0 300
- 11 4 280
- 11 8 180
- 11 8 660
- 11 9 260

**Necessary preliminary tasks:**

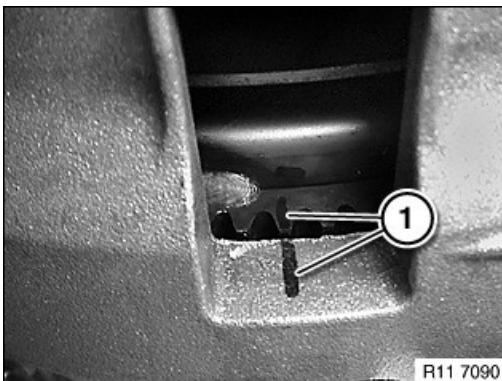
- Remove cylinder head cover.
- Remove all spark plugs.
- Remove crankshaft seal at front
- Remove tensioning device for drive belt.
- Remove vibration damper.
- Check timing.
- Remove sealing cover for vacuum pump.
- Remove sealing cap of chain tensioner for oil pump.

**Engine removed:**

Block crankshaft with special tool 11 9 260 .

Important!

To release central bolt (1), remove special tool 11 0 300 .

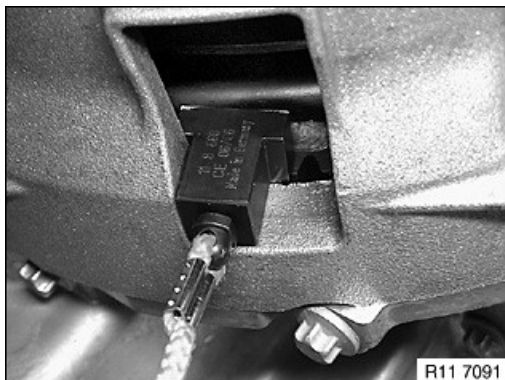
**Important!**

When central bolt of crankshaft is released, there is no longer a secure connection to timing drive.

Mark position of crankshaft using a coloured mark (1).

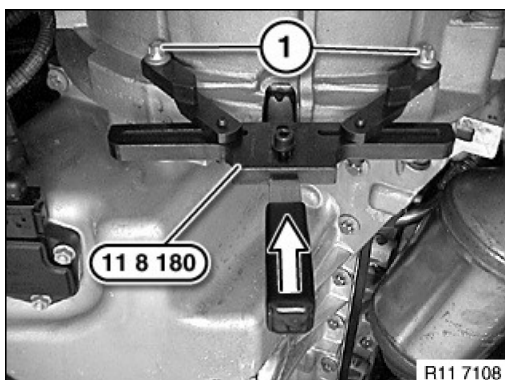
This will make future insertion of special tool 11 0 300 easier.





Vehicles with automatic transmission:

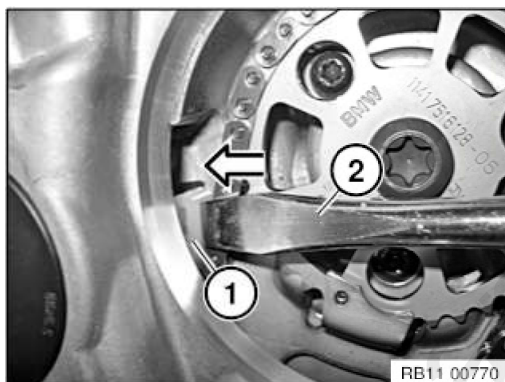
Block crankshaft with special tool 11 8 660 .



Vehicles with manual gearbox:

Attach special tool 11 8 180 to manual transmission with existing transmission bolts (1).

Block crankshaft in direction of arrow with special tool.



Important!

Before releasing the central bolt, the hydraulic chain tensioner must be drained.

Carefully press tensioning rail (1) with a suitable screwdriver (2) in direction of arrow.

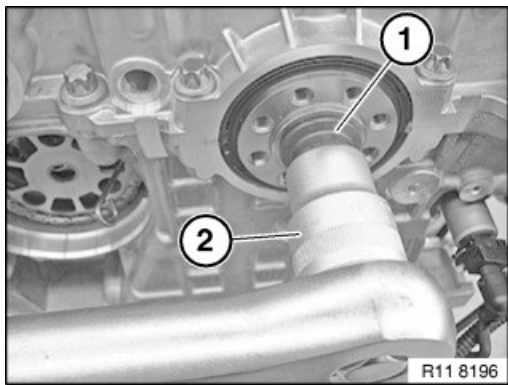
As the oil pressure in the chain tensioner can only be drained pulsating, the tensioning rail (1) must be pressed several times.



Press the tensioning rail (1) and hold down.

Fix chain tensioner piston in position with a suitable lock pin (2).





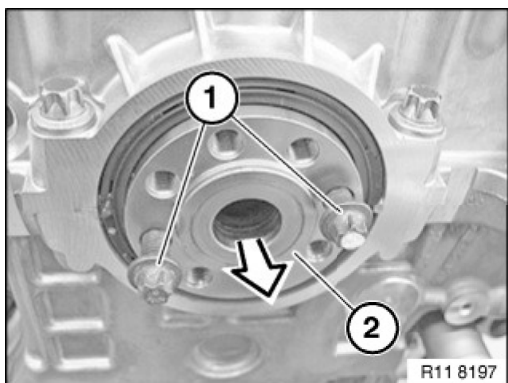
Important!

Breakaway torque of the central bolt > 600 Newton metres

A 3/4-inch tool (large powered square) is required to release central bolt.

Release central bolt (1) with 3/4-inch tool (2).

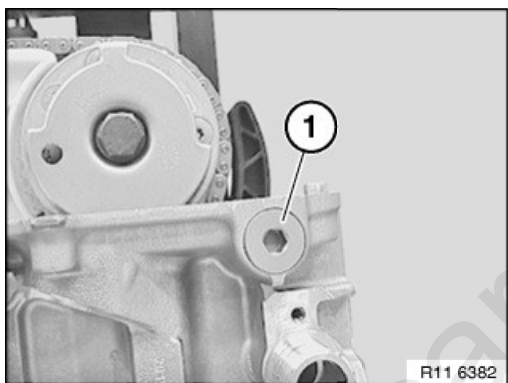
Tightening torque 11 21 1AZ.



Remove chain tensioner.

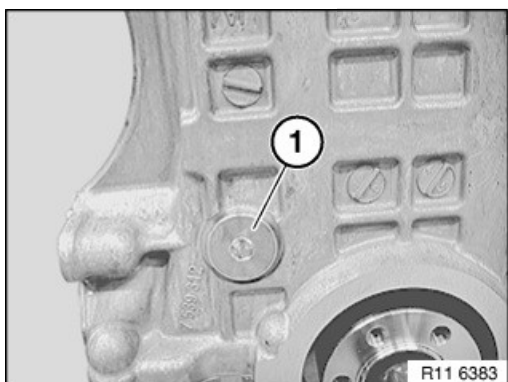
Screw in vibration absorber screws (1).

Move hub (2) on crankshaft forward in direction of arrow to remove.



Open screw plug (1).

Tightening torque 11 31 8AZ.



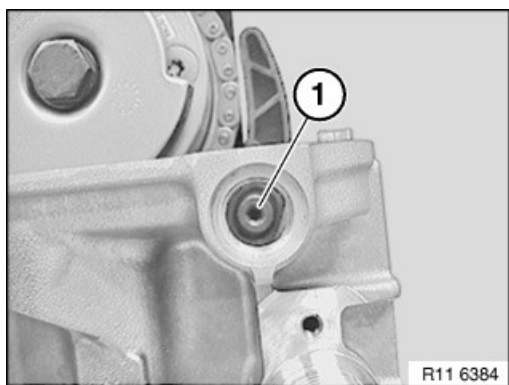
Open screw plug (1).

Tightening torque 11 11 7AZ.

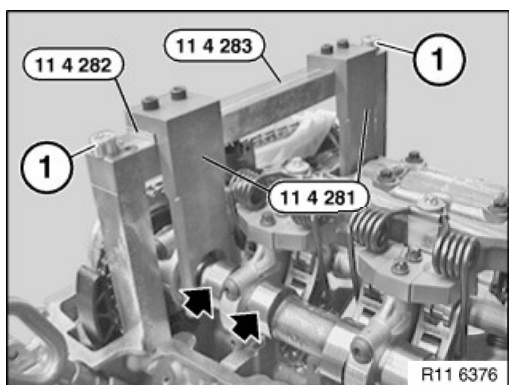
Installation note:

Replace aluminium screws.





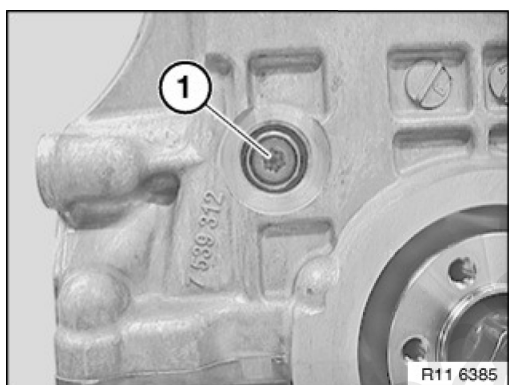
Release bearing journal (1) from timing chain module on cylinder head.
Tightening torque 11 31 6AZ.



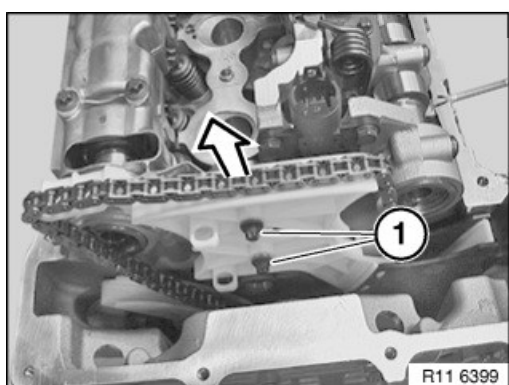
Important!

Install special tool 11 4 280 to release the central bolts on the intake and exhaust camshaft adjusters.

Remove intake and exhaust camshaft adjusters.



Release bearing journal (1) from timing chain module on crankcase.
Tightening torque 11 31 5AZ.

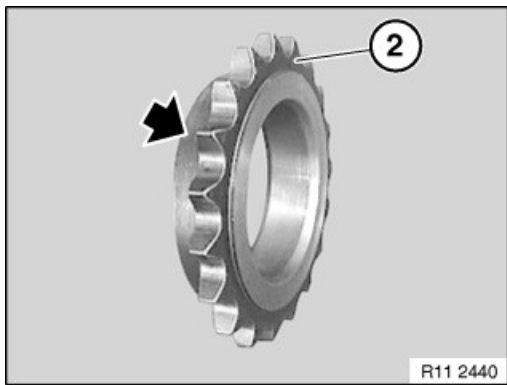


Release bolts (1) from timing chain module on cylinder head.
Tightening torque 11 31 4AZ.

Remove chain module with timing chain and camshaft sprocket upwards in direction of arrow.

Note:
Graphic N52.



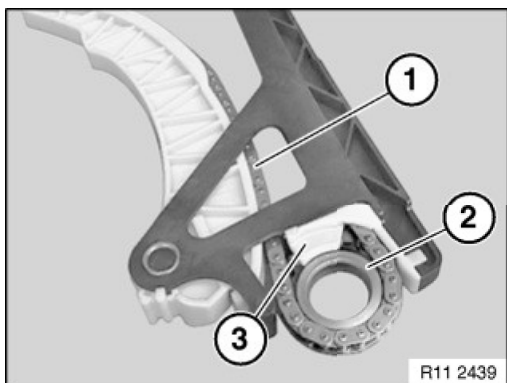


Important!

Note direction of installation of camshaft sprocket (2).

Collar (see arrow) on camshaft sprocket (2) points to **engine**.

Incorrect assembly will result in **engine damage**.

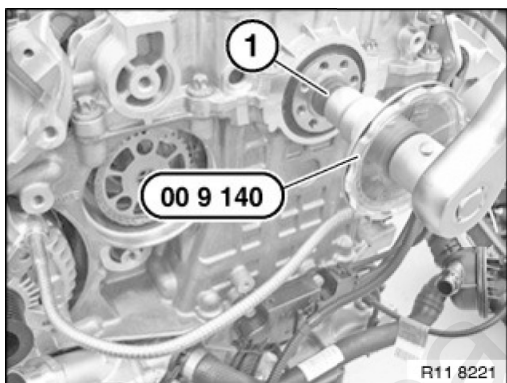


Pull timing chain (1) upwards until camshaft sprocket (2) engages chain guide (3).

Install timing chain (1) and sprocket (2) in this position.

Installation note:

Always hold timing chain (1) under tension. Timing chain (1) may jam on chain guide (3).



Insert central bolt (1) with hub for crankshaft.

Tighten down central bolt (1).

Tightening torque 11 21 1AZ.

Install intake and exhaust camshaft adjusters.

Install chain tensioner.



Crank engine twice.

Check timing.

If necessary, adjust valve timing.

Replace front crankshaft seal.

Assemble engine.

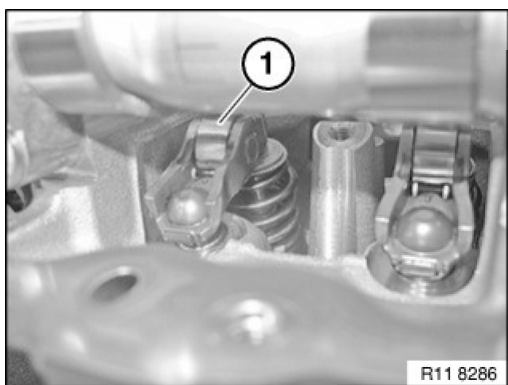


**Special tools required:**

- 11 4 481
- 11 4 482

**Necessary preliminary tasks:**

- Remove cylinder head cover.
- Remove intermediate lever.
- Remove exhaust camshaft.

**Important!**

Roller cam followers (1) on intake side are divided into bearing classes.

The tolerance classes are marked according to the graphic in numbers from 1 to 5.

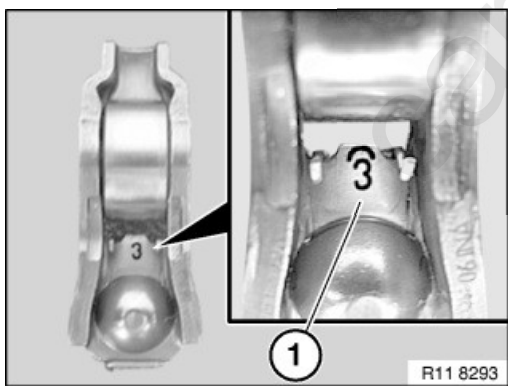
Already used roller cam followers (1) may only be reused in the same position.

Loosen and remove roller cam followers (1) from hydraulic valve clearance compensating element.

Place all roller cam followers (1) in neat order on special tool 11 4 481 .

Installation note:

Prior to installation of intermediate levers, ensure proper installation position of roller cam followers (1).

**Classification of roller cam follower intake.**

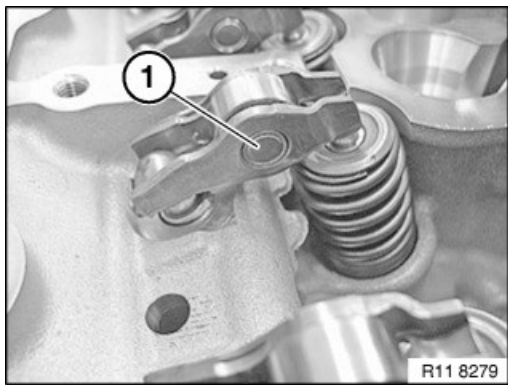
Standard: Number 3. standard.
 Number 2. slow idle.
 Number 4. fast idle.

In case of repair: rough idling speed.

Repair: 1

Number 1. slow speed in idle.
 Number 5. high speed in idle.



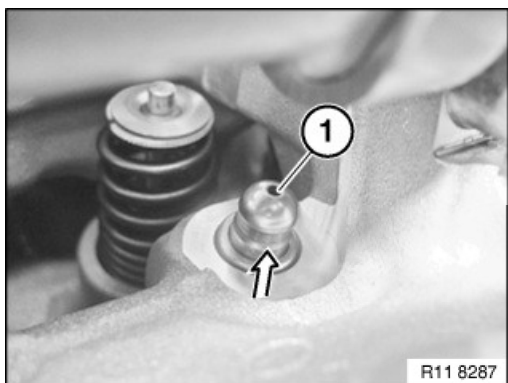


Loosen and remove roller cam followers (1) on exhaust side from hydraulic valve clearance compensating element.

Place all roller cam followers (1) in neat order on special tool 11 4 482 .

Installation note:

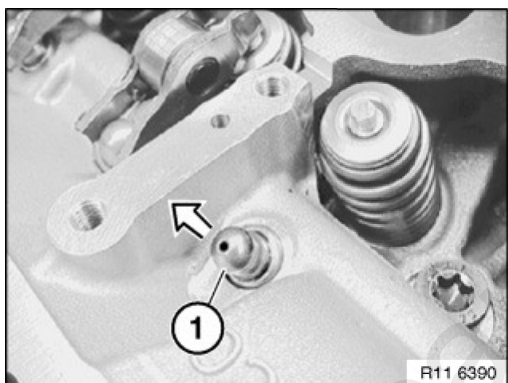
Prior to installation of exhaust camshaft, ensure proper installation position of roller cam followers (1).



Remove hydraulic valve clearance compensating element (1) on intake side in direction of arrow.

Installation note:

If hydraulic valve clearance compensating elements (1) are reused, they must be placed together with rocker arms in neat order in special tool 11 4 481 .



Remove hydraulic valve clearance compensating element (1) on exhaust side in direction of arrow.

Installation note:

If hydraulic valve clearance compensating elements (1) are reused, they must be placed together with rocker arms in neat order in special tool 11 4 482 .



Assemble engine.

Check function of DME; if necessary, readjust uniform mixture distribution.

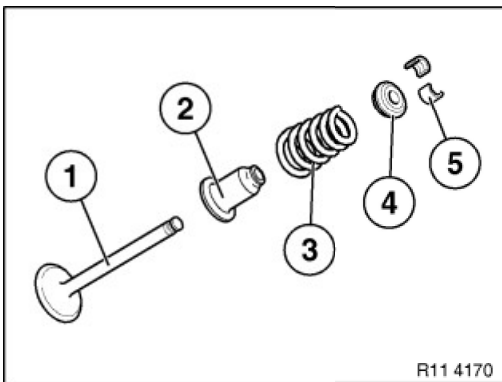


**Special tools required:**

- 11 4 481
- 11 4 482

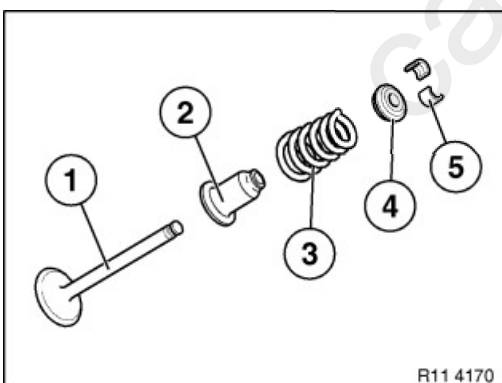
**Necessary preliminary tasks:**

- Remove cylinder head.
- Remove intermediate lever.
- Remove eccentric shaft.
- Remove intake camshaft.
- Remove exhaust camshaft.
- Remove rocker arm.
- Remove valve springs.
- Remove valve stem seals.

**Arrangement:**

- 1) Intake valve 5 mm dia.
- 2) Valve stem seal with lower spring cup
- 3) Valve spring
- 4) Upper spring cup
- 5) Valve keys

If the valves are to be reused, they must be placed in neat order in special tool 11 4 481 .

**Arrangement:**

- 1) Discharge valve 6 mm dia.
- 2) Valve stem seal with lower spring cup
- 3) Valve spring
- 4) Upper spring cup
- 5) Valve keys

If the valves are to be reused, they must be placed in neat order in special tool 11 4 482 .

**Assemble engine.**

Check function of Digital Engine Electronics; if necessary, readjust uniform mixture distribution.



11 34 715 Replacing all valve springs (N55)



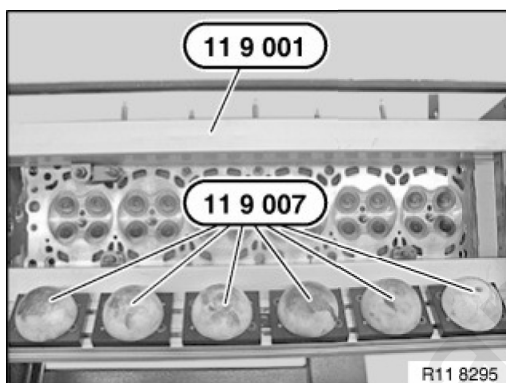
Special tools required:

- 11 4 481
- 11 4 482
- 11 8 841
- 11 8 842
- 11 9 000
- 11 9 007



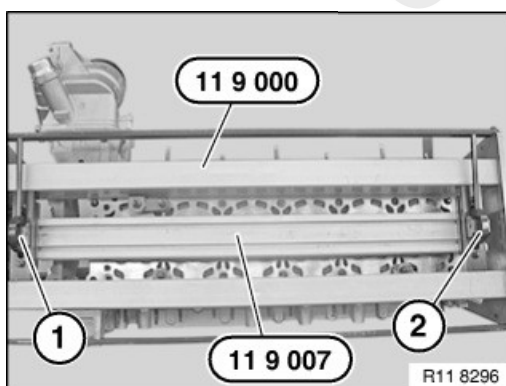
Necessary preliminary tasks:

- Remove cylinder head.
- Remove exhaust camshaft.
- Remove intermediate lever.
- Remove intake camshaft.
- Remove rocker arm.



Place cylinder head on special tool 11 9 000 .

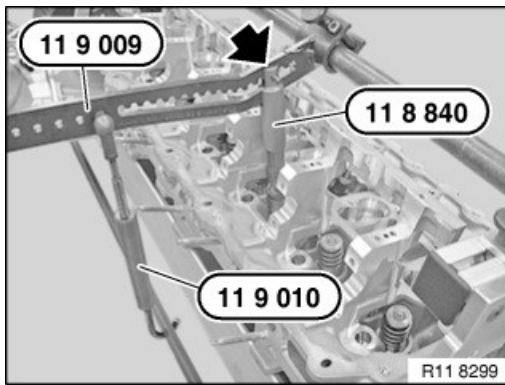
Align special tool 11 9 007 on particular combustion chamber.



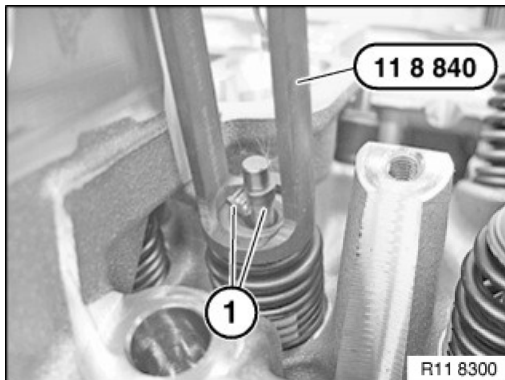
Position special tool 11 9 007 on cylinder head.

Push locks (1 and 2) toward inside and preload via eccentric shaft.





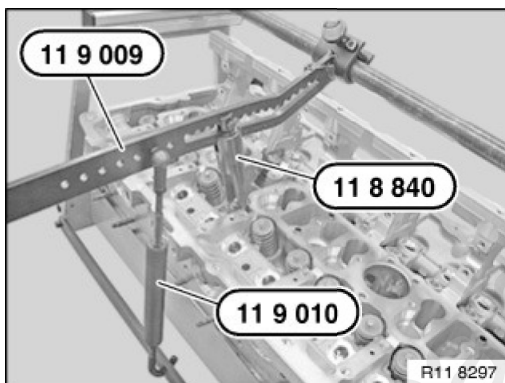
Press down **intake valve** with special tool 11 8 841 .



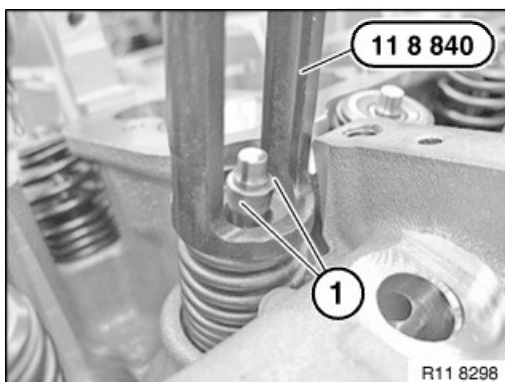
Remove valve key (1) with a magnet.

Remove valve spring with spring cups.

If individual components are to be reused, they must be placed in neat order in special tool 11 4 481 .



Press down **discharge valve** with special tool 11 8 842 .

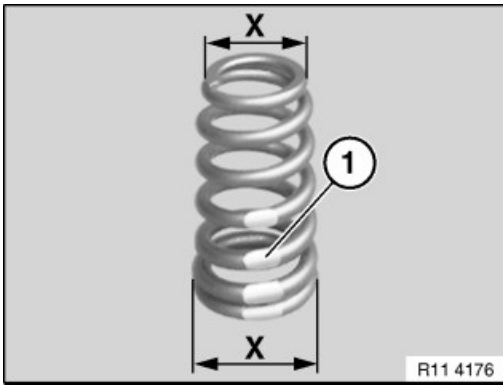


Remove valve key (1) with a magnet.

Remove valve spring with spring cups.

If individual components are to be reused, they must be placed in neat order in special tool 11 4 482 .





Important!

Incorrect assembly possible.

Incorrect installation will result in valve spring breakage.

Risk of mixing up the valve springs for the inlet and exhaust valves.

Valve springs are marked in colour (1).

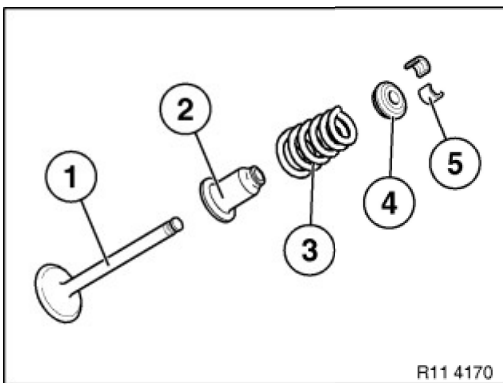
Colours for intake valves:

- Green/blue
- Yellow/Blue

Colours for discharge valves:

- Green/white
- Yellow/white

Install the valve spring so that the larger diameter points to the lower spring cup.



Arrangement:

- 1) Valve
- 2) Valve stem seal with lower spring cup
- 3) Valve spring
- 4) Upper spring cup
- 5) Valve keys



Assemble engine.

Check function of Digital Engine Electronics; if necessary, readjust uniform mixture distribution.

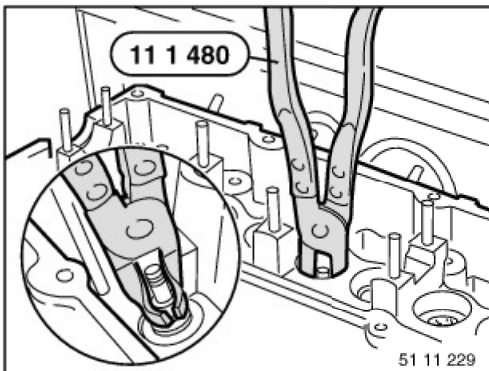


**Special tools required:**

- 11 1 480
- 11 6 380

**Necessary preliminary tasks:**

- Remove cylinder head.
- Remove intermediate lever.
- Remove eccentric shaft.
- Remove intake camshaft.
- Remove exhaust camshaft.
- Remove rocker arm.

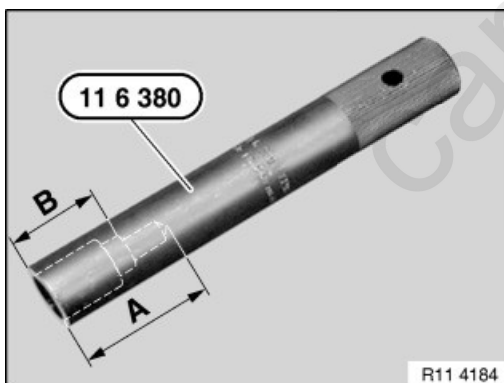


Press special tool 11 1 480 forcefully onto valve stem seals.

Detach valve stem seal from valve stem by turning and simultaneously pulling special tool 11 1 480.

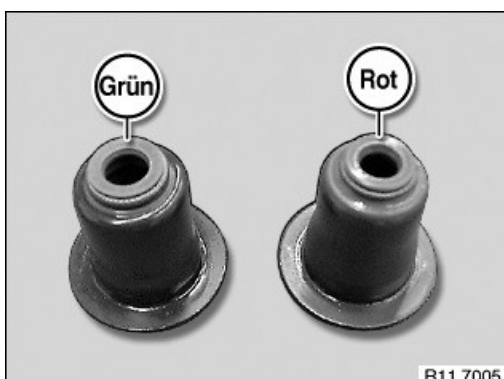
Installation note:

Insert all valves.

**Note:**

For use on the N55 engine, special tool 11 6 380 must be remachined according to the graphic with a 10 mm dia. drill bit to a depth of B = approx. 23 mm.

This modification has already been taken into account for reordering.

**Important!**

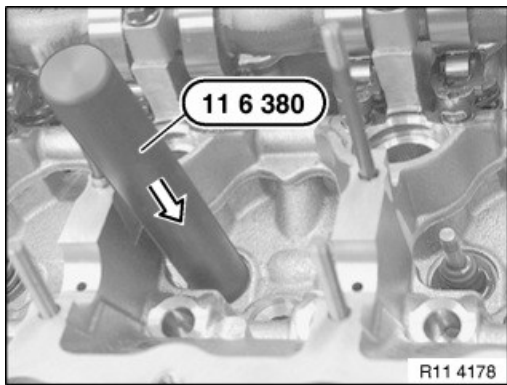
Different diameters at valve stem.

All valve stem seals are colour-coded.

For 5 mm dia. valves, the valve stem seal is marked red or brown.

For 6 mm dia. valves, the valve stem seal is marked green.





Installation note:

Fit the **mounting sleeves** (plastic sleeves) contained in the delivery specification on the valve stem end.

Lubricate assembly sleeve.

Press on valve stem seal by hand with special tool 11 6 380 as far as it will go. *Note:*
Graphic N42.



Assemble engine.

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