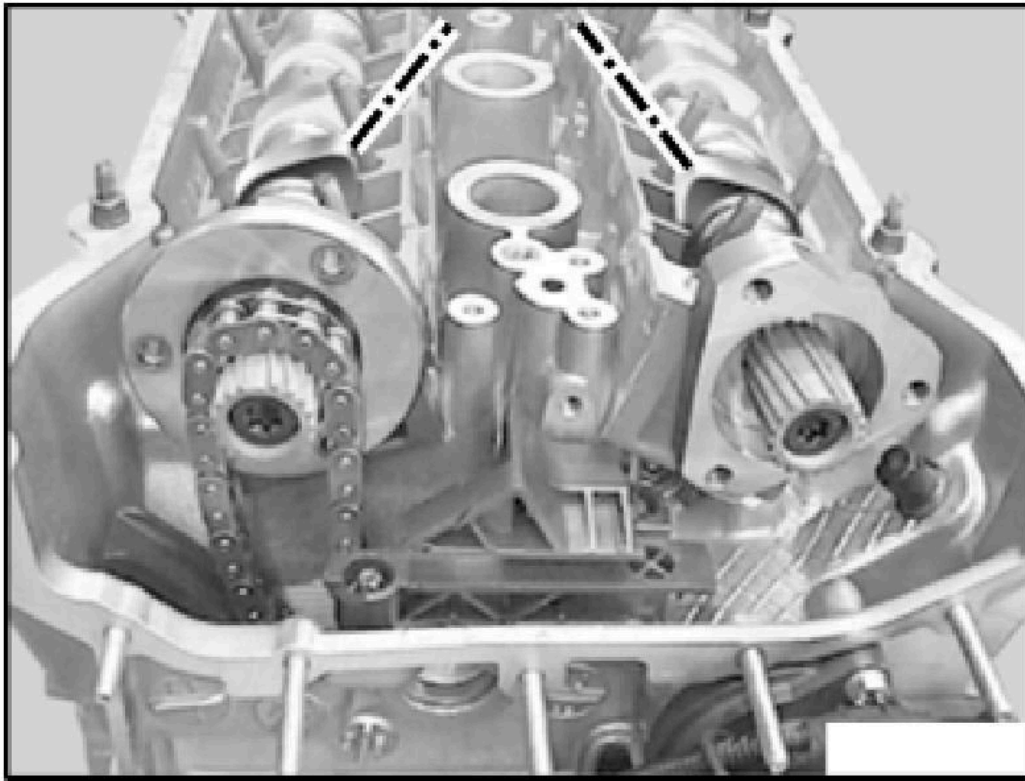


G03178112

**Fig. 195: Positioning Timing Chain On Exhaust Camshaft**  
Courtesy of BMW OF NORTH AMERICA, INC.

Install camshafts so that cam tips on inlet and exhaust valves on 1st cylinder face one another. Refer to **11 31 001 REPLACING CAMSHAFT (M52TU / M54 / M56)**.



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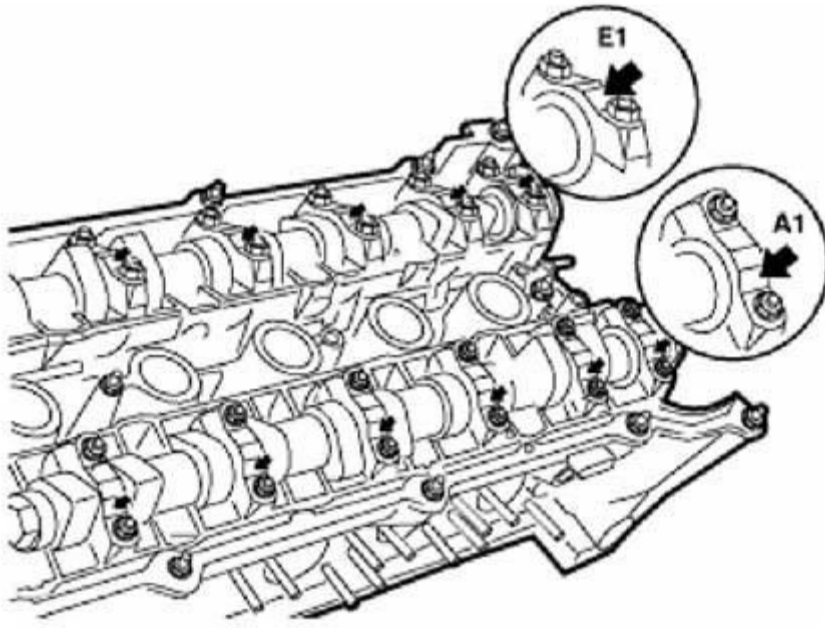
**Fig. 196: Installing Camshafts**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Fit bearing cover.

**NOTE: Bearing caps are marked from exhaust side:**

A1 ... A7 for exhaust side.

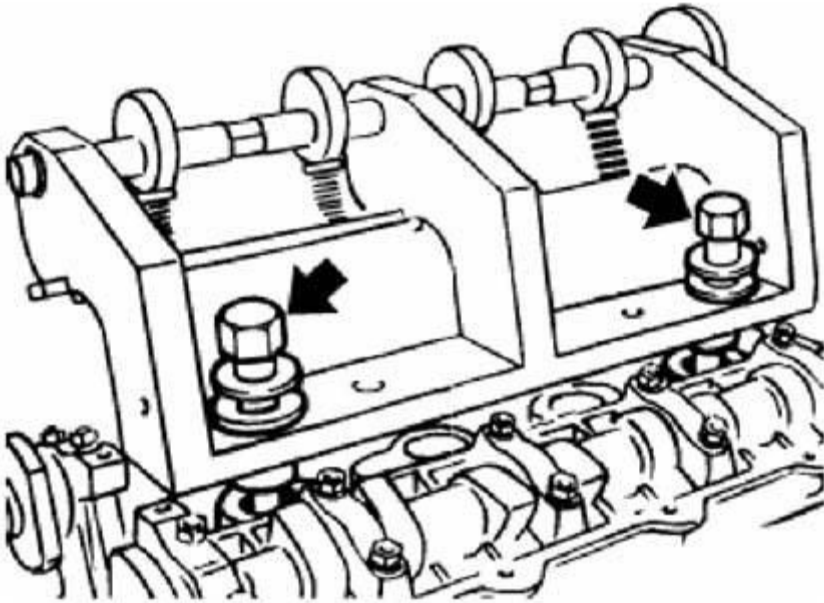
E1 ... E7 for inlet side.



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**Fig. 197: Identifying Bearing Caps**  
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 3 260 to cylinder head and screw into spark plug threads in cylinders 1 and 4.



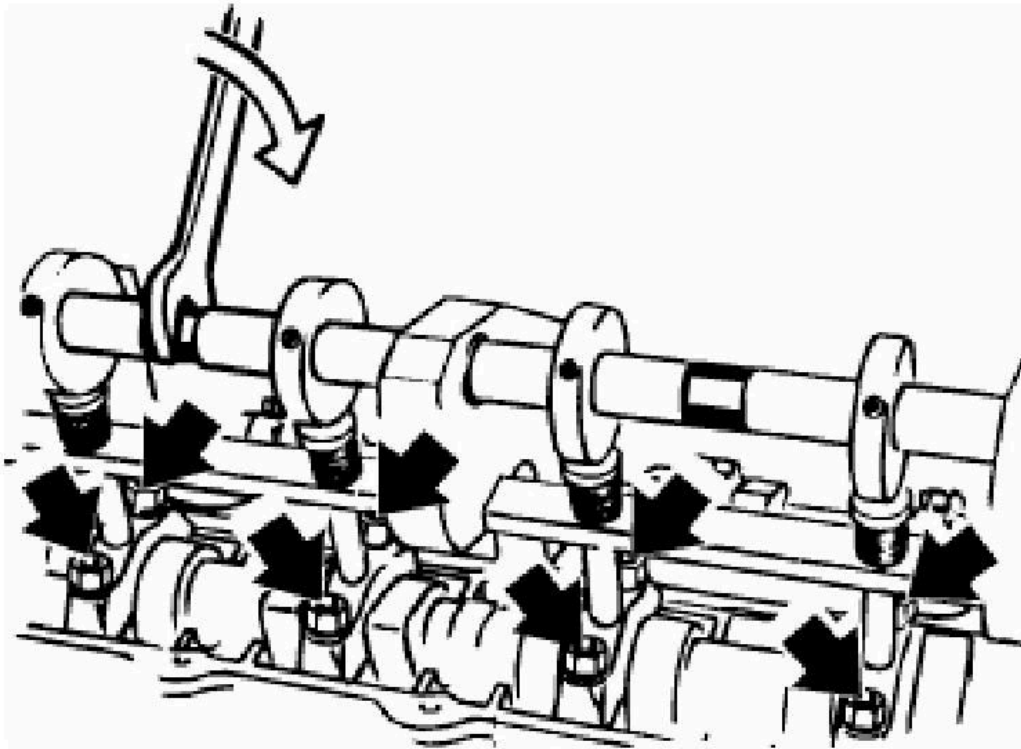
G03178115

**Fig. 198: Fitting Special Tool 11 3 260 Into Spark Plug Threads**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Turn the eccentric shaft to tension the bearing caps.

Tighten down bearing cover.

Tightening torque, refer to 11 31 1AZ in **CAMSHAFT** .



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**Fig. 199: Tightening Down Bearing Cover**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

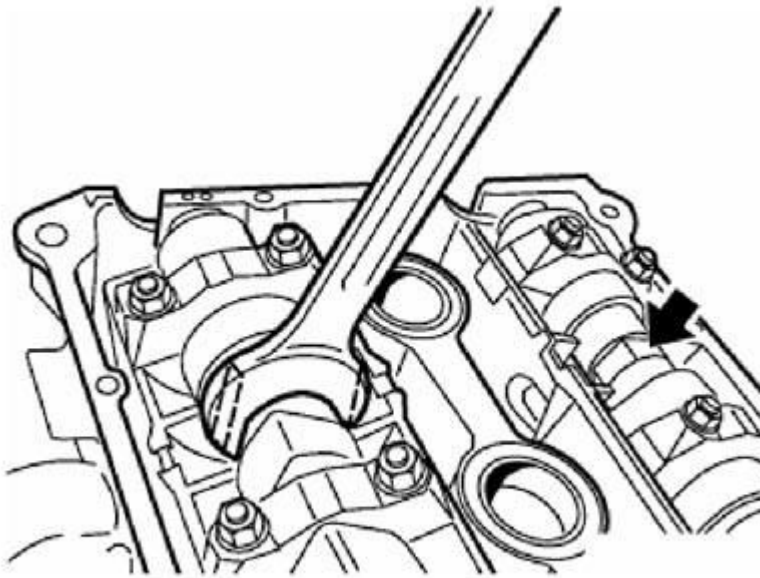
Remove special tool 11 3 260.

**Important!**

Do not damage the cylinder head.

If necessary, machine open-end wrench accordingly.

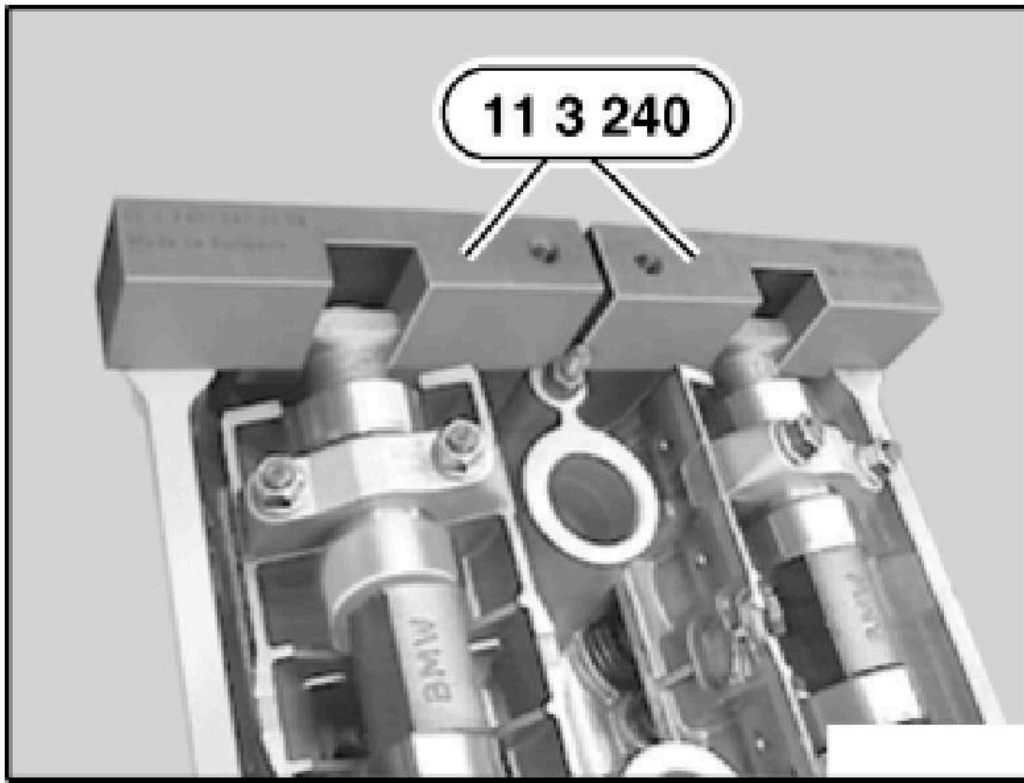
Align camshafts with open-end wrench.



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**Fig. 200: Aligning Camshafts With Open-End Wrench**  
Courtesy of BMW OF NORTH AMERICA, INC.

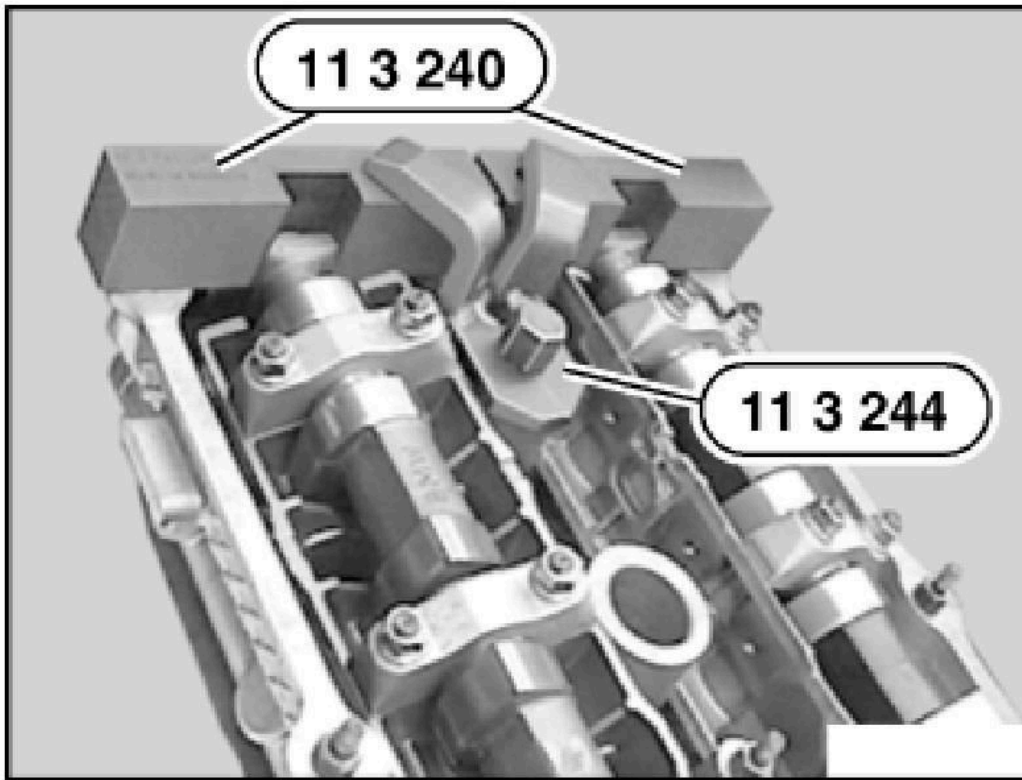
Fit special tool 11 3 240 to camshafts on cylinder 6. Align camshafts so that special tool 11 3 240 rests without gaps on cylinder head.



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**Fig. 201: Fitting Special Tool 11 3 240 To Camshafts**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Attach special tool 11 3 244 to special tool 11 3 240 and locate by way of spark plug thread.

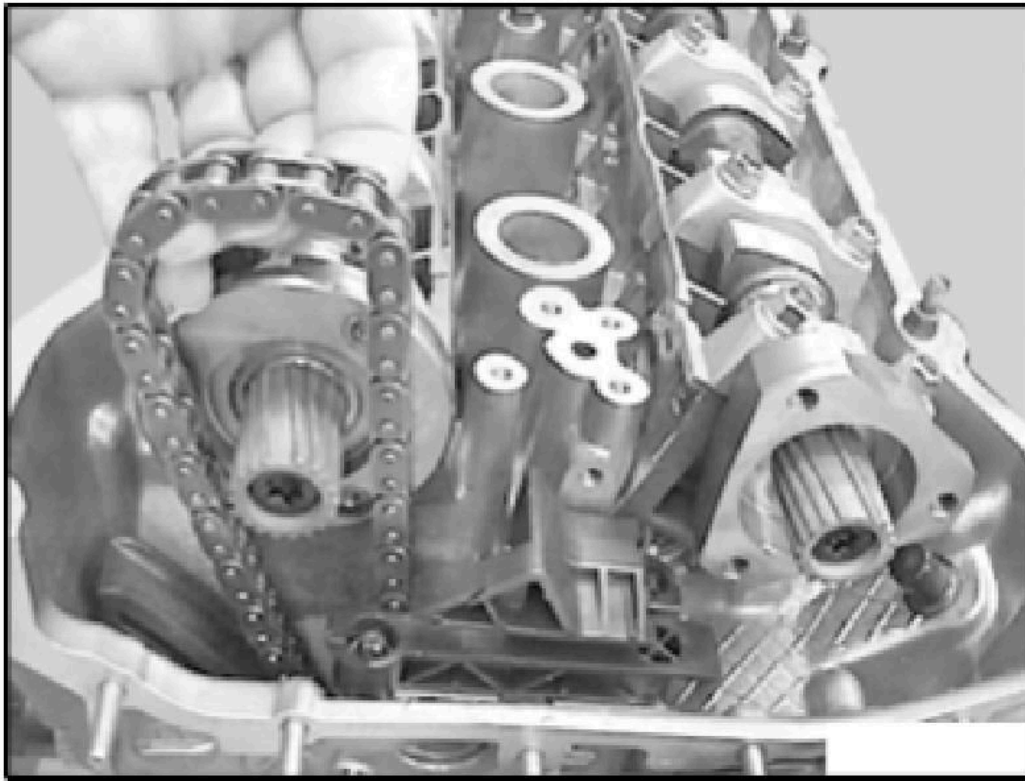


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**Fig. 202: Attaching Special Tool 11 3 244 To Special Tool 11 3 240**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Lift timing chain and hold under tension.





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**Fig. 203: Lifting Timing Chain**

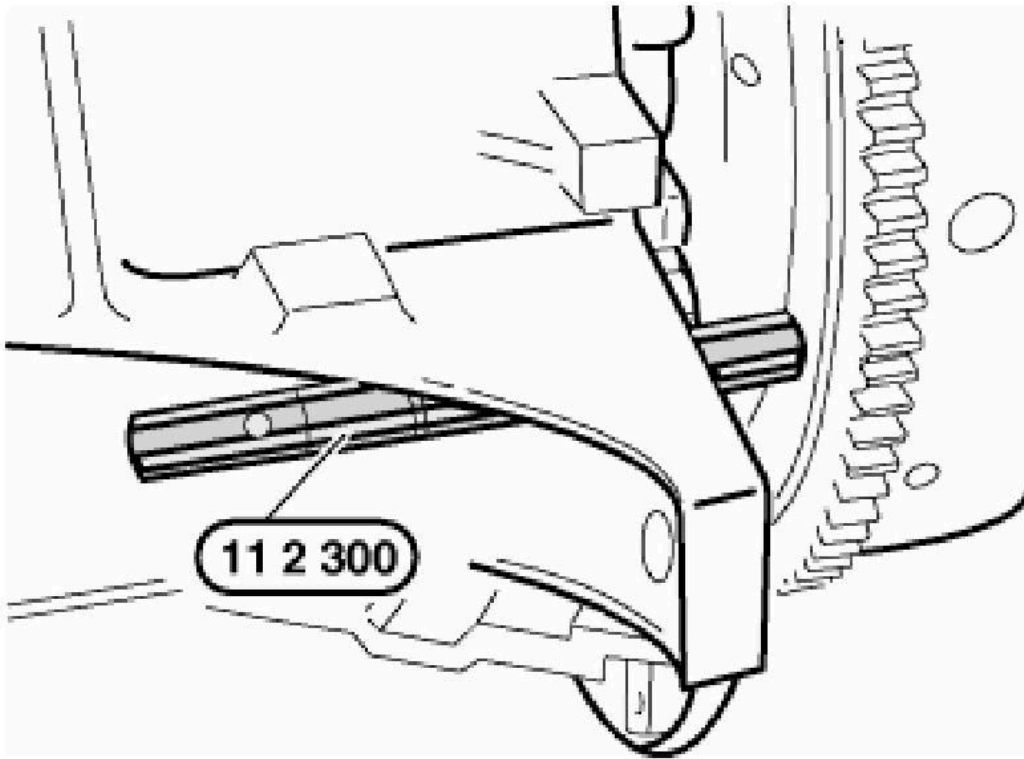
**Courtesy of BMW OF NORTH AMERICA, INC.**

Turn engine from 30° before TDC position in direction of rotation as far as TDC position.

Secure crankshaft in firing TDC position with special tool 11 2 300.

**Important!**

Remove special tool 11 2 300 before starting engine.



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**Fig. 204: Securing Crankshaft In Firing TDC Position With Special Tool 11 2 300**

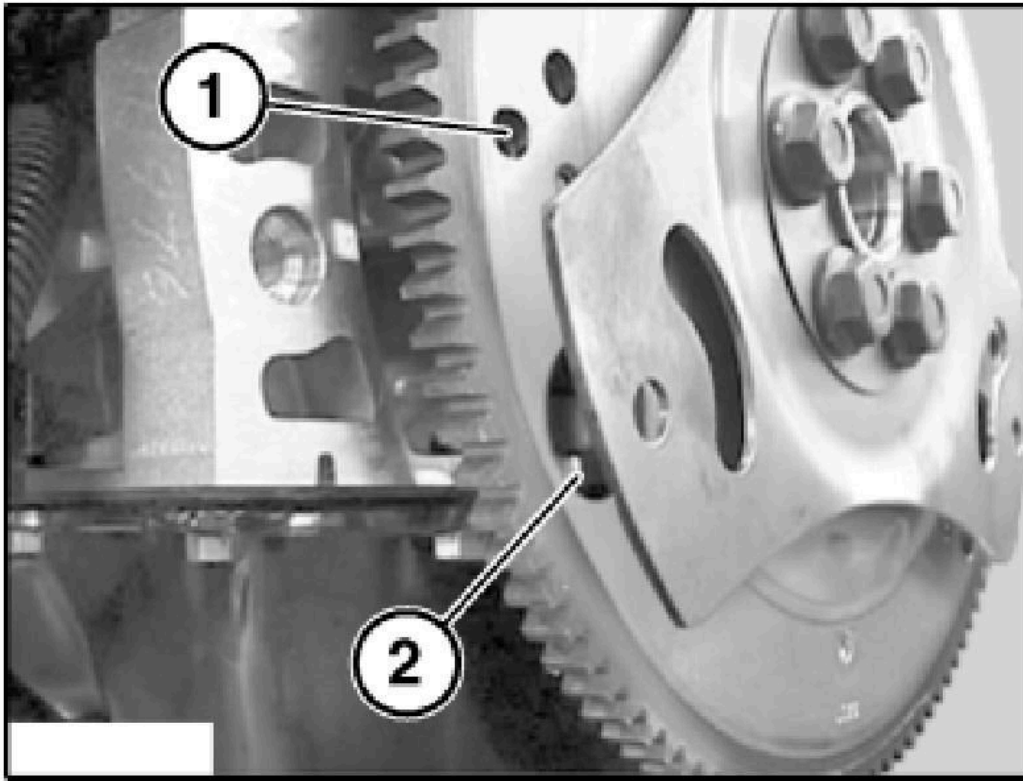
**Courtesy of BMW OF NORTH AMERICA, INC.**

**Automatic Transmissions Only:**

Illustration does not show automatic transmission.

**Important!**

On engines with automatic transmissions, there is shortly before the special tool bore (1) a large bore (2) which can be confused with the special tool bore.

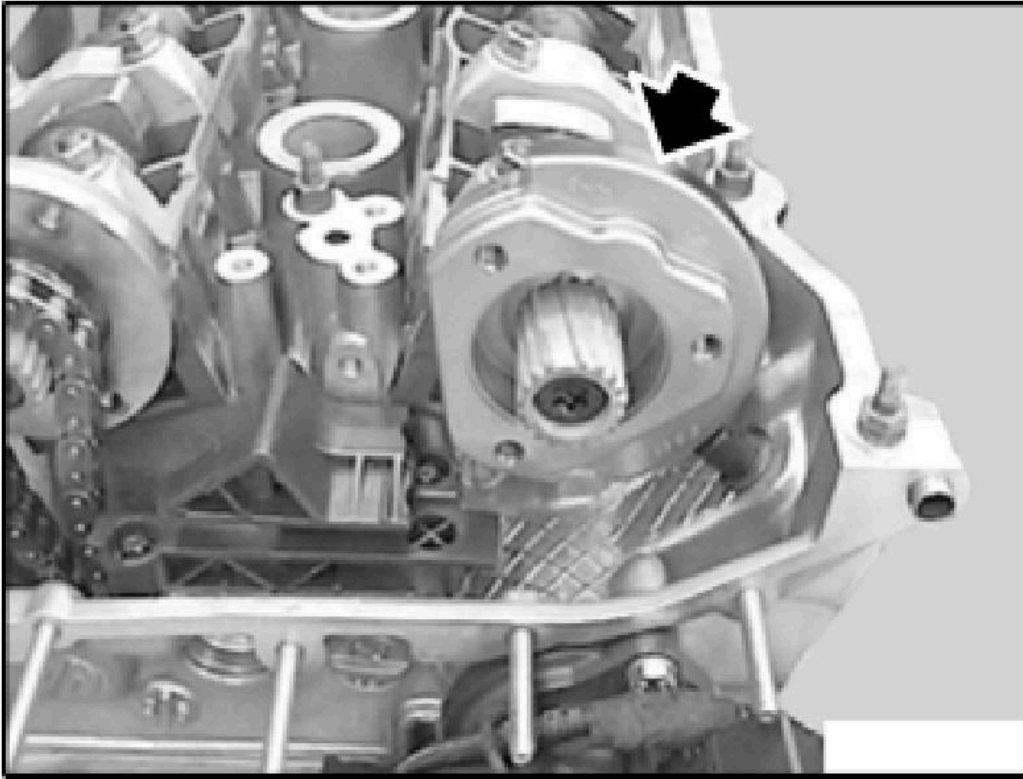


G03178122

**Fig. 205: Identifying Special Tool Bore And Large Bore**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

If special tool 11 2 300 is secured in the correct bore (1), the engine can no longer be cranked at the central bolt.

Position sensor gear on inlet camshaft.

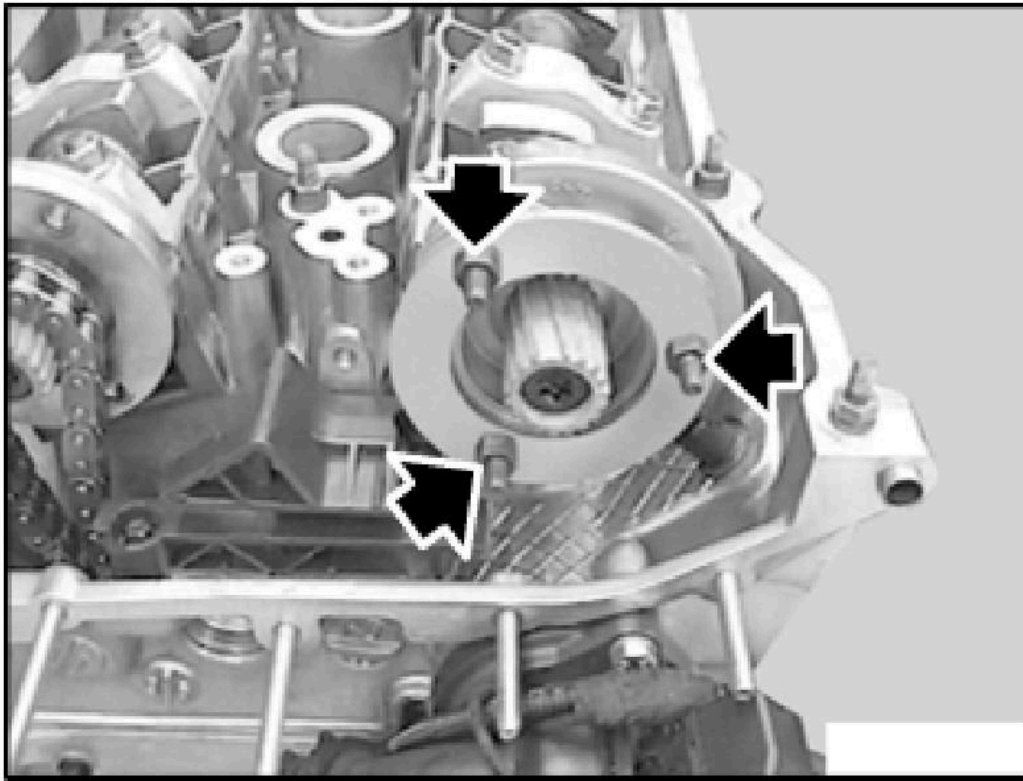


G03178123

**Fig. 206: Positioning Sensor Gear On Inlet Camshaft**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Fit thrust washer and tighten down with dowels.

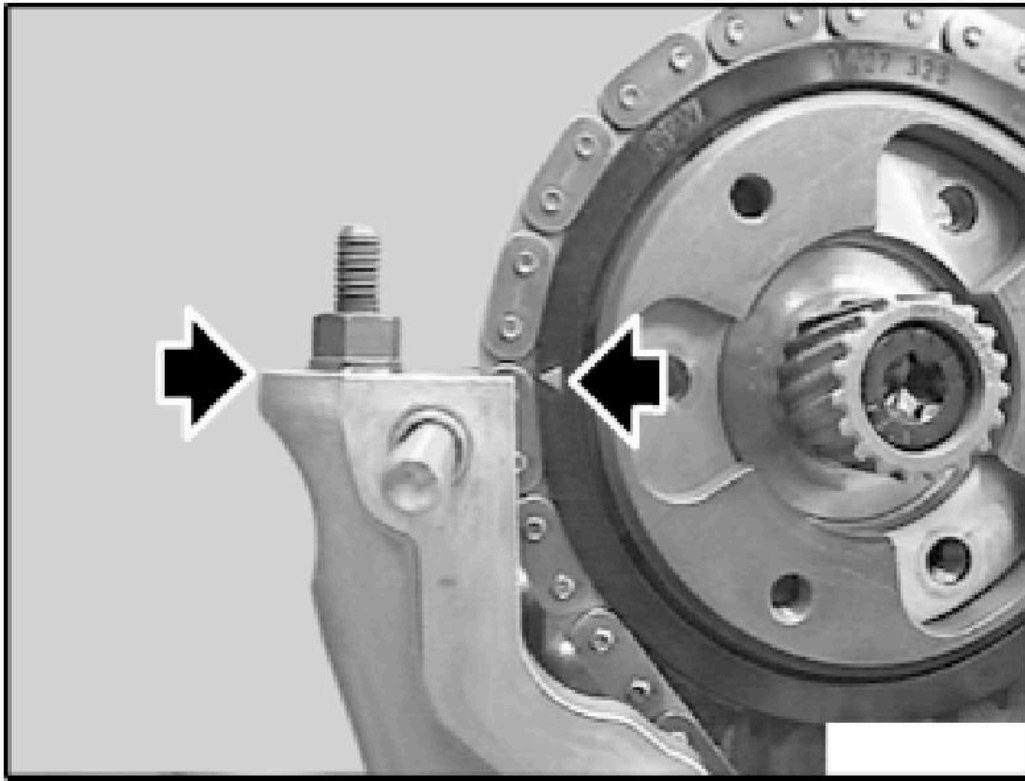
Tightening torque, refer to 11 31 1AZ in CAMSHAFT .



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**Fig. 207: Tightening Thrust Washer Dowels**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Feed chain wheel onto timing chain so that arrow on chain wheel faces separating face of upper side of cylinder head.

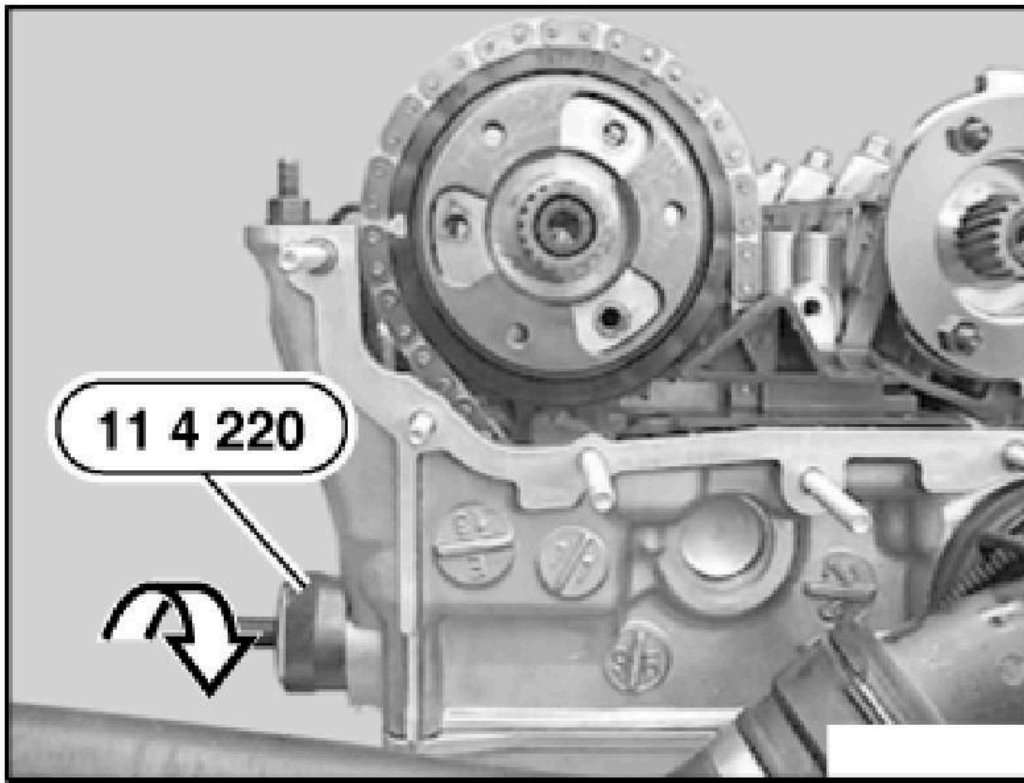


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**Fig. 208: Aligning Arrow On Timing Chain**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Insert special tool 11 4 220 in cylinder head and bring adjustment screw into contact with tensioning rail, but do not pretension timing chain yet.

Check arrow on chain wheel to separating face of upper side of cylinder head, reposition chain wheel if necessary.

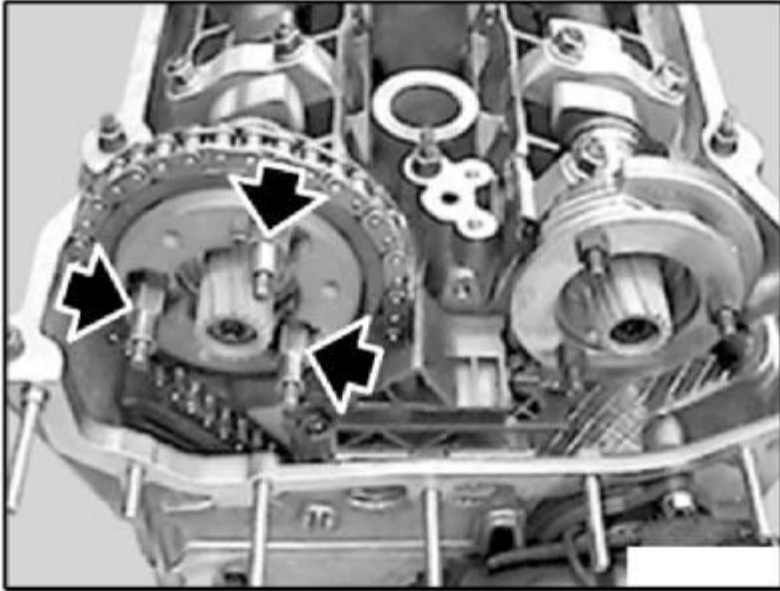


G03178126

**Fig. 209: Inserting Special Tool 11 4 220 In Cylinder Head**  
Courtesy of BMW OF NORTH AMERICA, INC.

Insert and tighten down screw-in pin.

Tightening torque, refer to 11 31 11AZ in CAMSHAFT .

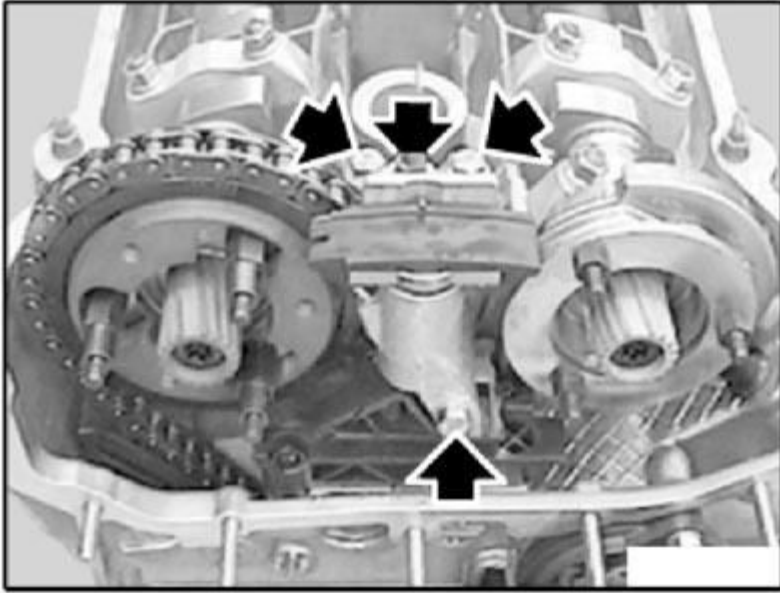


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**Fig. 210: Installing Screw-In Pin**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Install secondary chain tensioner.





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**Fig. 211: Installing Secondary Chain Tensioner**  
**Courtesy of BMW OF NORTH AMERICA, INC.**

Fit toothed sleeve (6) and align to toothed shaft in camshaft so that tooth gaps are opposed.