ENGINE

Engine - Repair

1100 ENGINE, GENERAL

00 DANGER OF POISONING IF OIL IS INGESTED/ABSORBED THROUGH THE SKIN

Danger of poisoning!

Ingesting oil or absorbing through the skin may cause poisoning!

Possible symptoms are:

- Headaches
- Dizziness
- Stomach aches
- Vomiting
- Diarrhoea
- Cramps/fits
- Unconsciousness

Protective measures/rules of conduct

- Pour oil only into appropriately marked containers
- Do **not** pour oil into drinking vessels (drinks bottles, glasses, cups or mugs)
- Observe country-specific safety regulations

First aid measures

- Do not induce vomiting.

  If the person affected is still conscious, he/she must rinse out their mouth with water, drink plenty of water and consult a doctor immediately.

  If the person affected is unconscious, do not administer anything by mouth, place the person in the recovery position and seek immediate medical attention.

ENGINE IDENTIFICATION

Punch engine numbers at marked surface with number punch.

Magnesium crankcase with sticker

M47/M47TU/M47T2

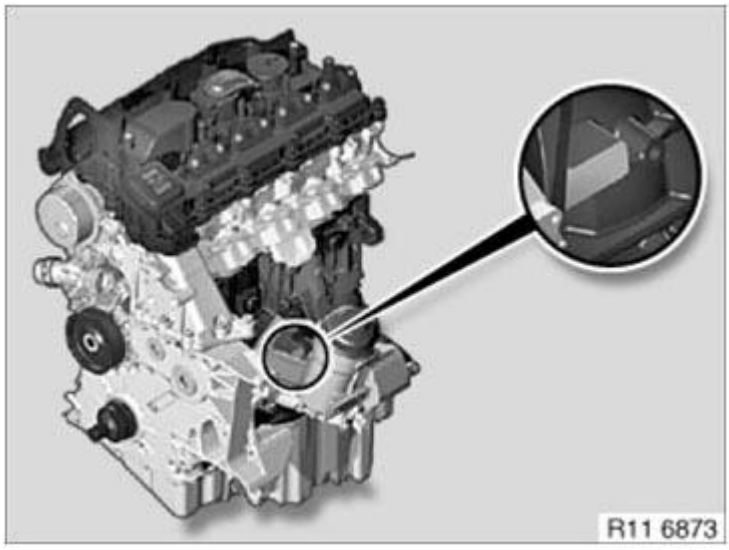


Fig. 1: Identifying Engine Identification Numbers Location (M47/M47TU/M47T2)
Courtesy of BMW OF NORTH AMERICA, INC.

M57/M57TU/M57T2

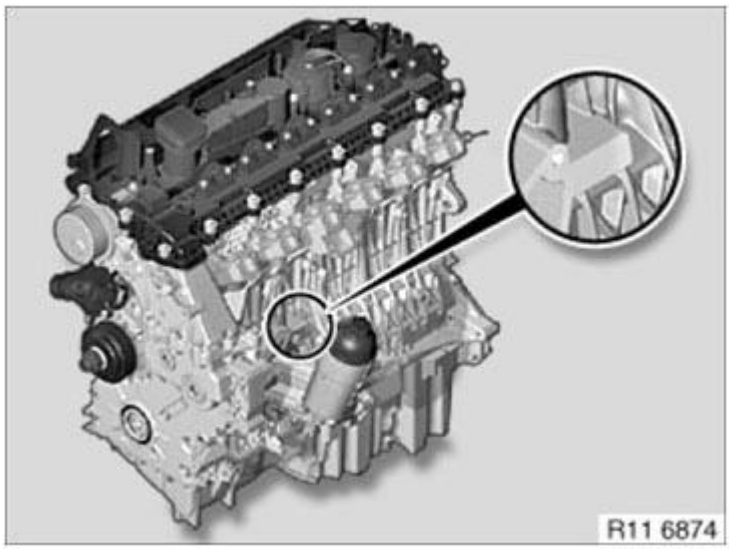


Fig. 2: Identifying Engine Identification Numbers Location - M57/M57TU/M57T2
Courtesy of BMW OF NORTH AMERICA, INC.

M67/M67TU

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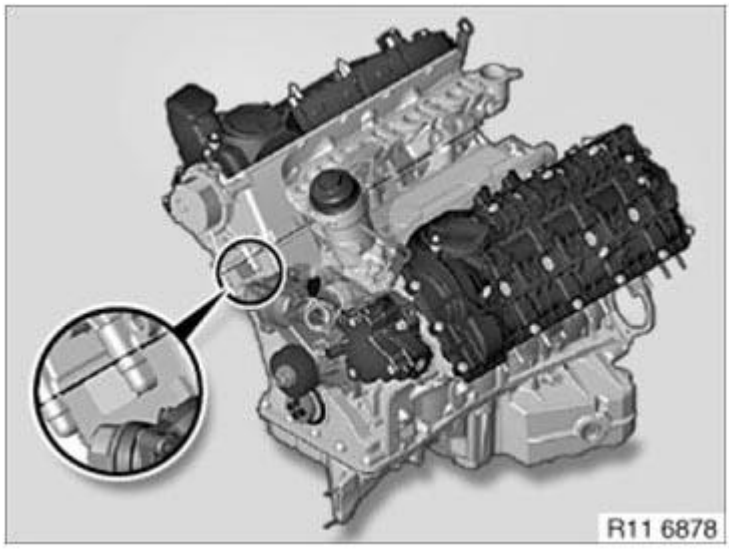


Fig. 3: Identifying Engine Identification Numbers Location - M67/M67TU
Courtesy of BMW OF NORTH AMERICA, INC.

N47/N47S/N47C/N57 N57S

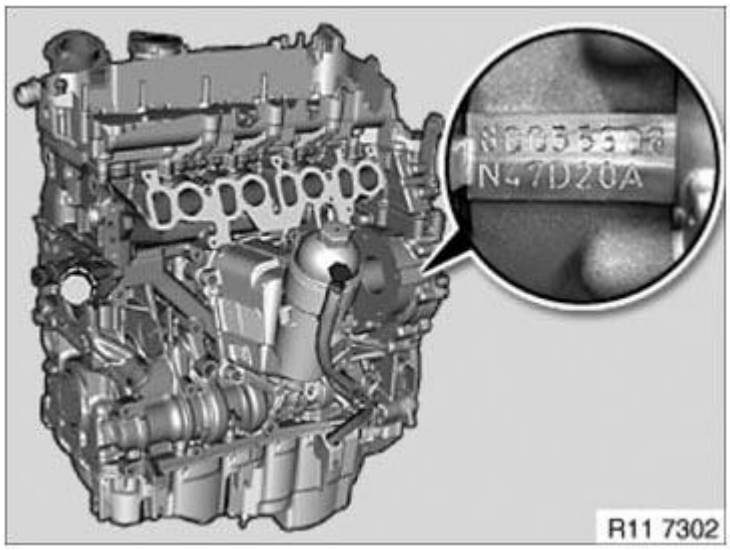


Fig. 4: Identifying Engine Identification Numbers Location - N47/N47S/N47C/N57 N57S
Courtesy of BMW OF NORTH AMERICA, INC.

M52/M52TU

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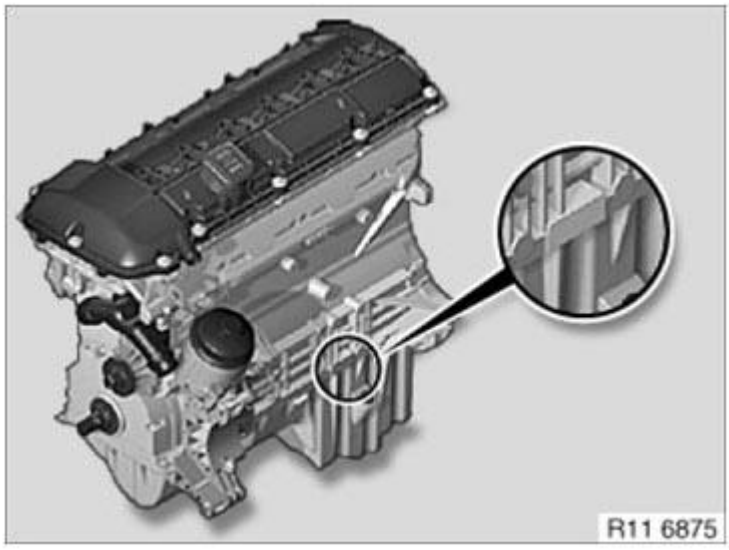


Fig. 5: Identifying Engine Identification Numbers Location (M52 / M52TU)
Courtesy of BMW OF NORTH AMERICA, INC.

M54

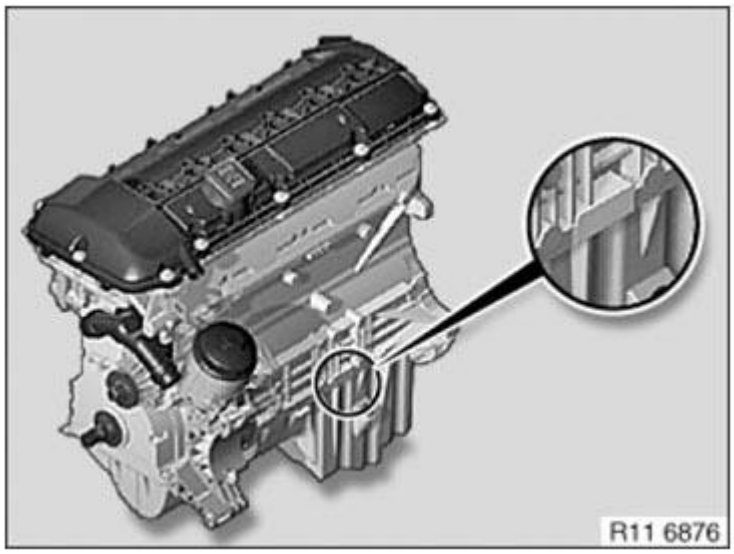


Fig. 6: Identifying Engine Identification Numbers Location (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

M56

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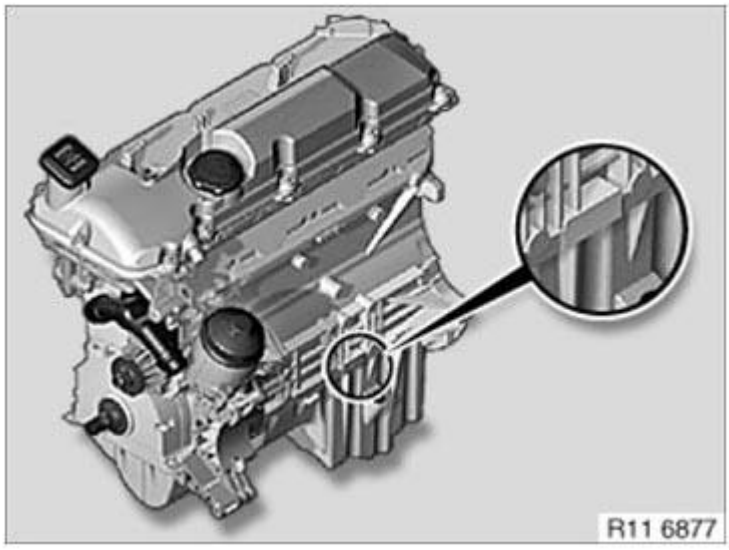


Fig. 7: Identifying Engine Identification Numbers Location - M56
Courtesy of BMW OF NORTH AMERICA, INC.

N40/N45/N45T/N43

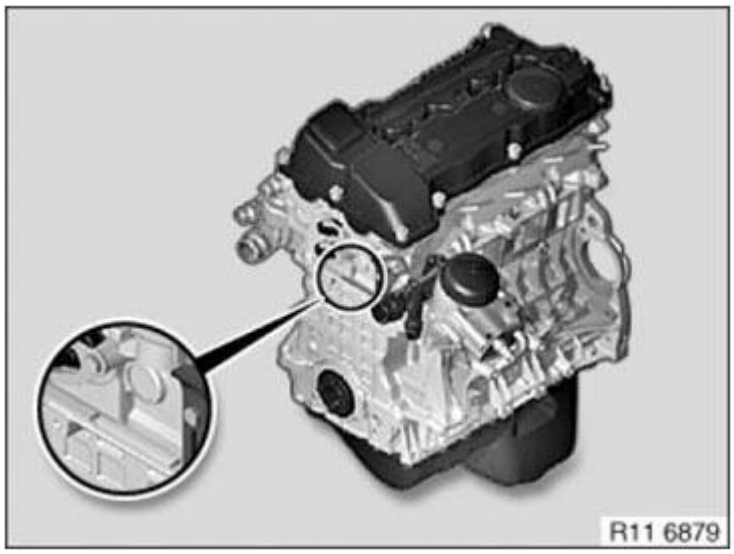


Fig. 8: Identifying Engine Identification Numbers Location - N40/N45/N45T/N43
Courtesy of BMW OF NORTH AMERICA, INC.

N42/N46/N46T

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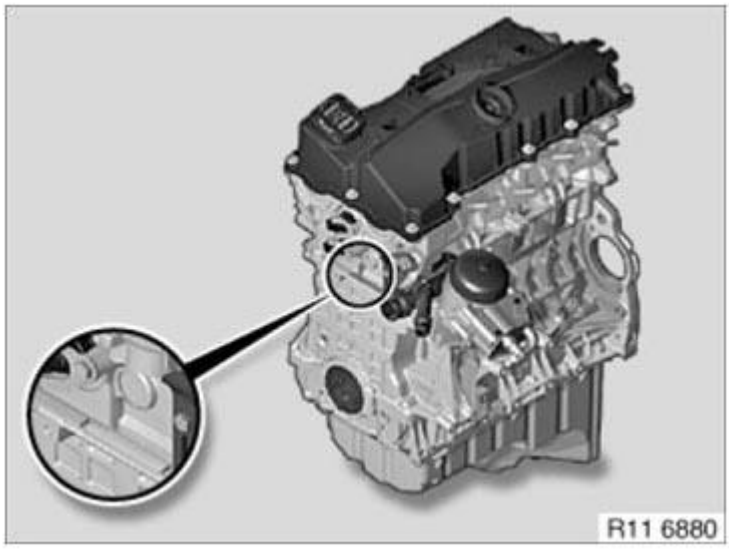


Fig. 9: Identifying Engine Identification Numbers Location - N42/N46/N46T
Courtesy of BMW OF NORTH AMERICA, INC.

N51/N52/N52K/N52T/N53/N54/N55

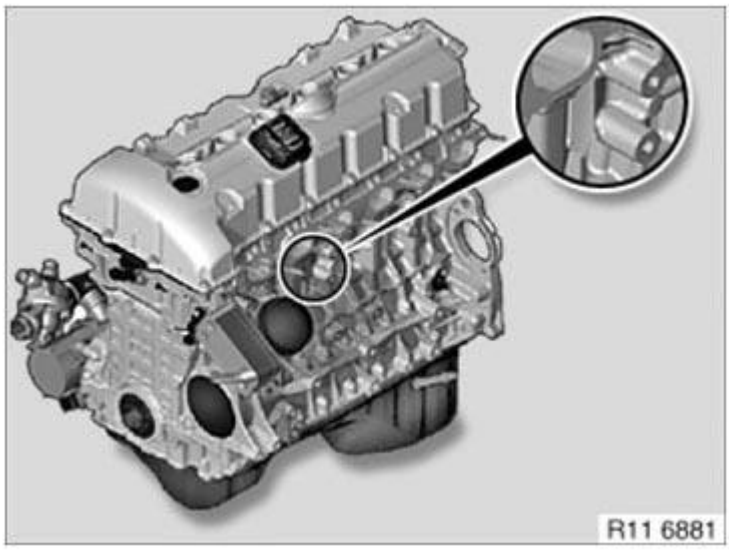


Fig. 10: Identifying Engine Identification Numbers Location - N51/N52/N52K/N52T/N53/N54/N55
Courtesy of BMW OF NORTH AMERICA, INC.

N62/N62TU

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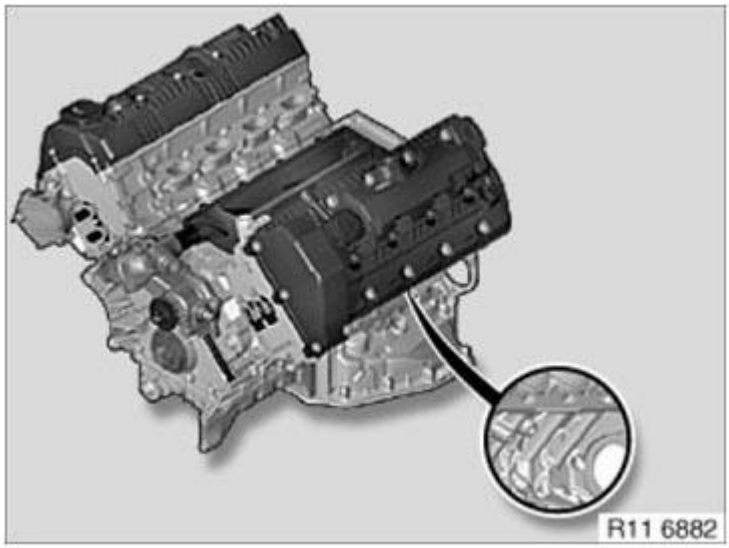


Fig. 11: Identifying Engine Identification Numbers Location - N62/N62TU
Courtesy of BMW OF NORTH AMERICA, INC.

N73

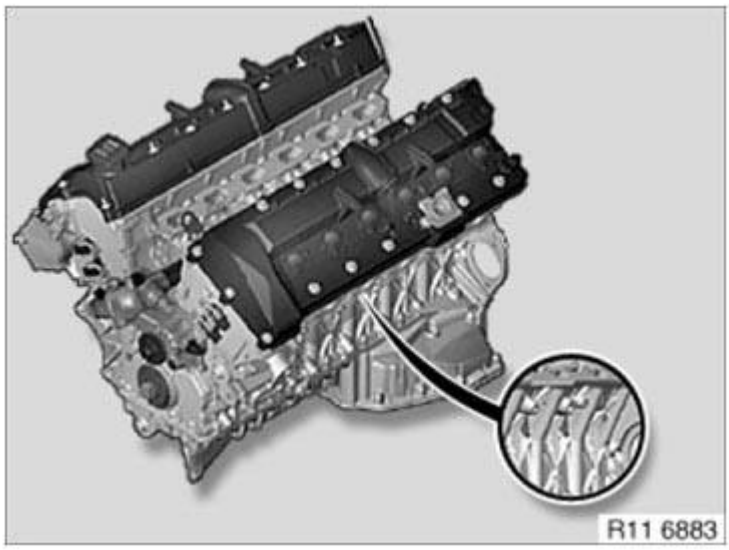


Fig. 12: Identifying Engine Identification Numbers Location - N73
Courtesy of BMW OF NORTH AMERICA, INC.

S54

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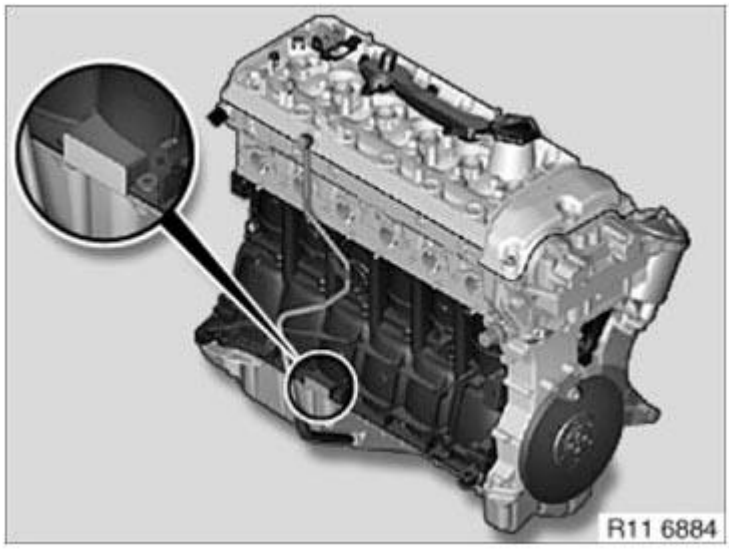


Fig. 13: Identifying Engine Identification Numbers Location - S54
Courtesy of BMW OF NORTH AMERICA, INC.

S85/S65

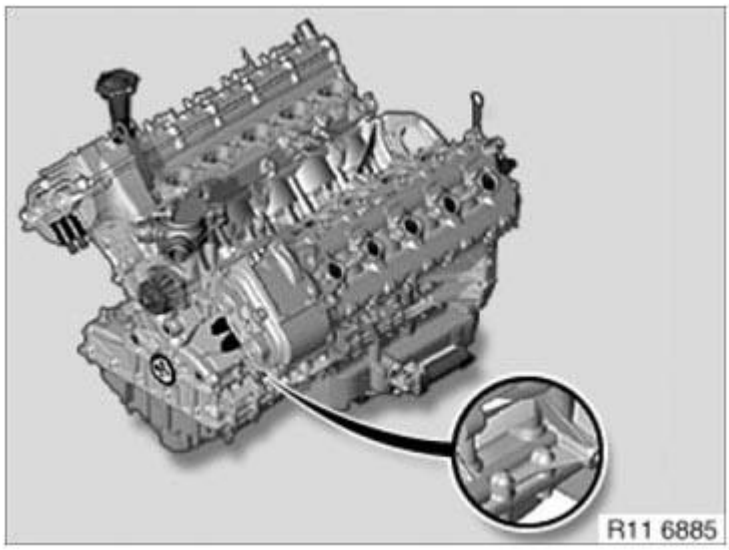


Fig. 14: Identifying Engine Identification Numbers Location - S85/S65
Courtesy of BMW OF NORTH AMERICA, INC.

W10/W11

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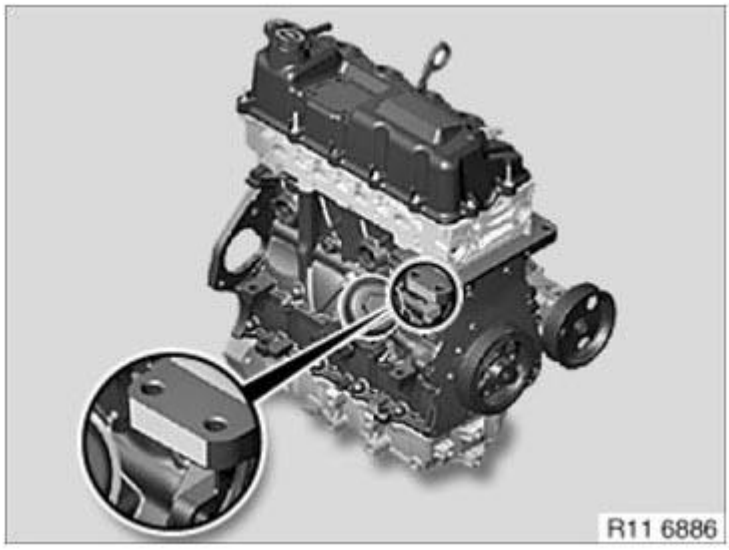


Fig. 15: Identifying Engine Identification Numbers Location - W10/W11
Courtesy of BMW OF NORTH AMERICA, INC.

N12/N14/N16/N18



Fig. 16: Identifying Engine Identification Numbers Location - N12/N14/N16/N18
Courtesy of BMW OF NORTH AMERICA, INC.

W17

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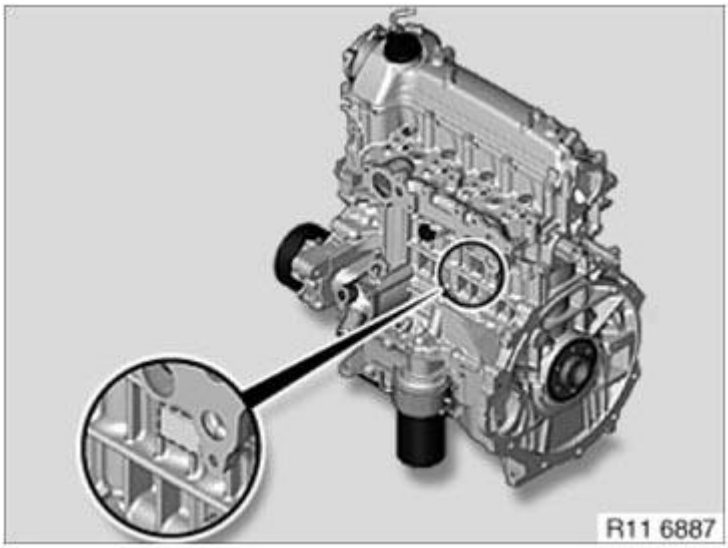


Fig. 17: Identifying Engine Identification Numbers Location - W17
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1100... OVERVIEW OF CONSUMABLE (ELECTRONIC PARTS CATALOGUE)

1.0 Sealing compound for injection

SEALING COMPOUND FOR INJECTION

	Repair instructions (engine)	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
1.1	N40, N42, N45, N46, N43, N45N, N46N	Loctite 171000 primer	83 19 7 515 683	For hardening Loctite 128367 sealing compound
1.2	N40, N42, N45, N46, N43, N45N, N46N	Loctite 128357 liquid gasket	83 19 7 536 051	Sealing between crankcase upper and lower halves
1.3	N51, N52, N53, N54, N52N, N55	Loctite 171000 primer	83 19 7 515 683	For hardening Loctite 193140 sealing compound
1.4	N51, N52, N53, N54, N52N, N55	Loctite 193140 liquid gasket	83 19 0 439 030	Sealing between crankcase upper and lower halves
1.5	S65, S85	Loctite 171000 primer	83 19 7 515 683	For hardening Loctite 193140 sealing compound
1.6	S65, S85	Loctite 193140 liquid gasket	83 19 0 439 030	Sealing between crankcase upper and

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				lower halves

2.0 Sealing compound for application

SEALING COMPOUND FOR APPLICATION

	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
2.1	M41, M47, M47TU, M47T2, M50, M51, M52, M52TU, M54, M57, M57TU, M57T2, M60, M62 N40, N42, N45, N45N, N46, N46N, N43, N47, N47top, N47C N47D1 N51, N52, N52N, N53, N54, N55, N57, N57S N62, N62TU, N63, N73, N73H, N74 S14, S38, S50, S52, S54, S62, S65, S85 N12, N14, N16, N18	Drei Bond 1209 liquid gasket	07 58 9 062 376	For sealing separation points on crankcase
2.2	N12, N14, N16, N18 W16, N47top, N47D1, N47C1 N57D1,	Loctite 5970 liquid gasket	83 19 0 404 517 83 19 0 404 517	Sealing between crankcase upper and lower sections. Sealing of gear case cover, oil sump, coolant pump, component carrier.
2.3	N12, N14, N16, N18 W16	Loctite 648 liquid gasket	07 58 9 067 732	Sealing between cover sleeve and crankcase

3.0 Cleaning agent

CLEANING AGENT REFERENCE CHART

	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
3.1	N45, N46, N45T, N46T, N43, N51, N52, N52Kp,	Cold cleaner (chlorine free)	83 19 0 026 956	Cleaning assemblies, washing engine

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	N52TU, N53, N55, N63, N63S, N63Hyprid, N74			

4.0 Lubricant for application

LUBRICANT FOR APPLICATION

	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
4.1	N20, N42, N46, N46TU, N51, N52, N52KP, N52TU, N55, N62, N62TU, N73	Lubricating grease Longtime PD1	83 19 2 160 340	For greasing the splined shaft on actuator drive/gearing of intermediate shaft.
4.2	M47, M47TU, M47T2, M57, M57TU, M57T2,	High temperature paste	83 19 2 152 323	For greasing the threads on the exhaust turbocharger.
4.3	N12, N14, N16, N18 N40, N42, N45, N45TU N46, N46TU, N43. N51, N52, N52Kp, N52TU, N53, N54, N55. N62, N62TU, N63, N73, N73H, N74. S65, S85.	High temperature paste (NEVER-SEEZ compound)	83 23 0 140 233	For greasing the threads on the oxygen sensors.
4.4	N47, N47O1 N47C1, N47T N47D1 N57 N57D1	Copper paste	81 22 9 400 794	For greasing the double hex head bolt on the exhaust turbocharger.

5.0 Lubricants to loosen locked screw connections

LUBRICANTS TO LOOSEN LOCKED SCREW CONNECTIONS

	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
5.1	M47, M47TU, M47TU2, M57, M57TU, M57TU2. N47, N47C, N47D1, N57, N57D1, W16, W17,	Brunox lubricating grease	83 23 0 445 529	For releasing the glow elements

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1100 REMOVING AND INSTALLING/REPLACING ACOUSTIC COVER (N63)

Remove acoustic cover (1) in following steps:

- Raise
- Remove in direction of travel

Installation:

Insert acoustic cover (1) into existing rubber guides.

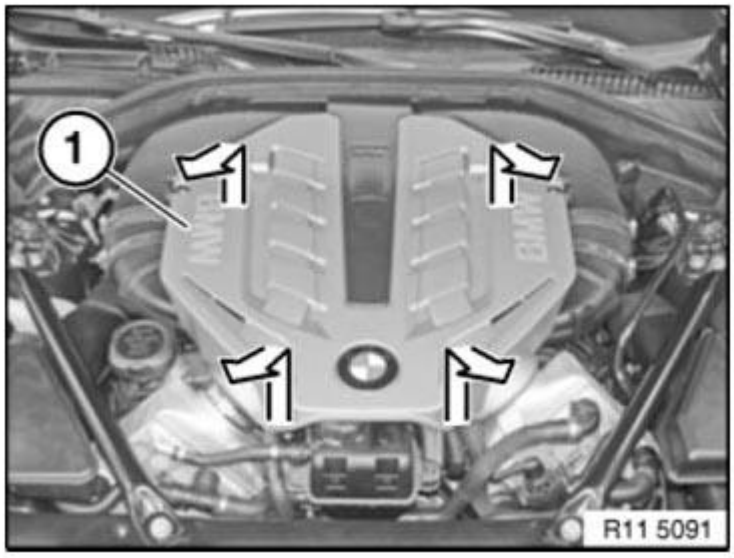


Fig. 18: Identifying Acoustic Cover
Courtesy of BMW OF NORTH AMERICA, INC.

1100050 REMOVING AND INSTALLING/REPLACING ENGINE (N63)

Necessary preliminary work

- Move **ENGINE COMPARTMENT LID** into service position
- Drain **COOLANT**
- Disconnect battery positive lead from terminal
- Drain off **AIR CONDITIONING SYSTEM**
- Remove right **SUSPENSION CROSS-BRACE** .
- Remove **RADIATOR**
- Remove both **INTAKE SILENCER HOUSINGS**
- Disconnect coolant hoses from engine
- Disconnect coolant hoses from charge air cooler
- Disconnect line from tank vent valve

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- Detach power steering pump from holder. See **POWER STEERING PUMP FOR HYDRAULIC STEERING GEAR WITH DYNAMIC DRIVE (N63) or POWER STEERING PUMP FOR POWER STEERING GEAR WITH ACTIVE FRONT STEERING (N63)** .
- Remove **UNIVERSAL JOINT**
- Remove **GEARBOX**

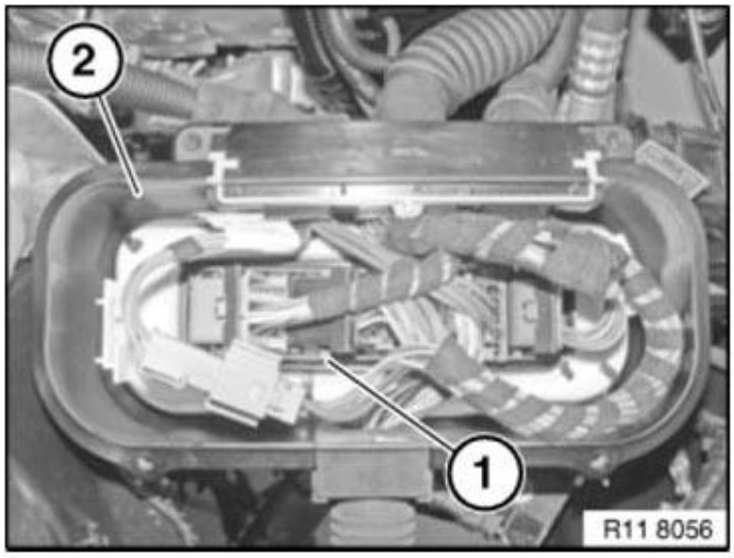
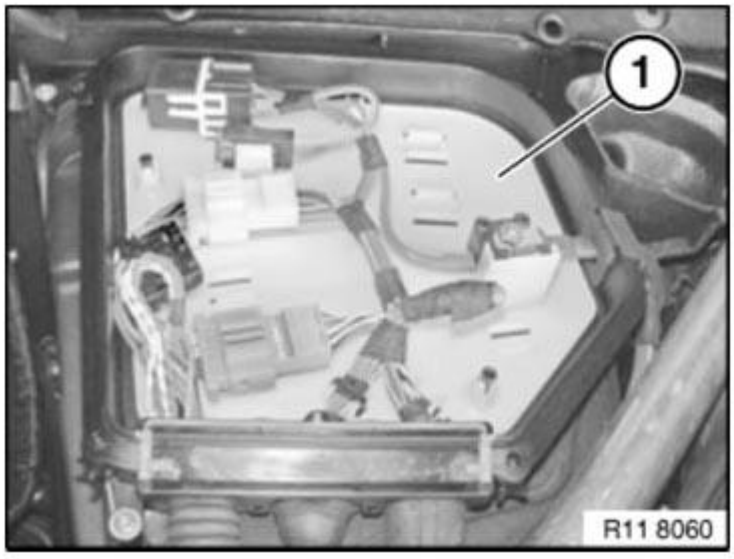


Fig. 19: Identifying Wiring Harness And Electronics Box
Courtesy of BMW OF NORTH AMERICA, INC.

Release wiring harness (1) from electronics box (2) and secure on engine against falling off.

Release wiring harness from supplementary electronics box (1) and secure on engine against falling off.



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Fig. 20: Identifying Supplementary Electronics Box
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Remove battery earth lead (2).

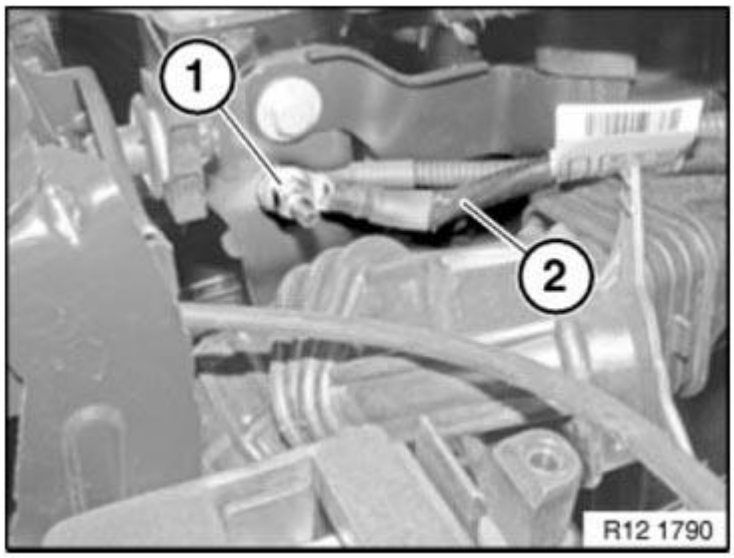


Fig. 21: Identifying Slacken Nut And Battery Earth Lead
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and detach vacuum line (1) from vacuum pump.

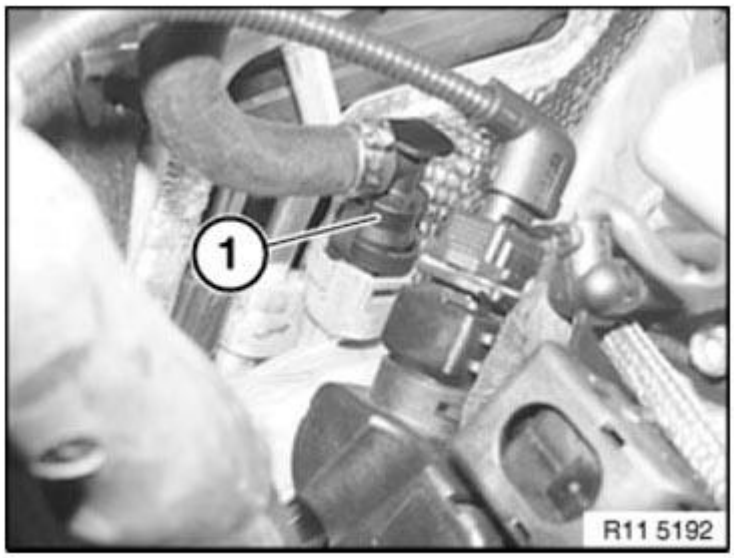


Fig. 22: Identifying Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

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Release screw (1).

Remove air conditioning line (2).

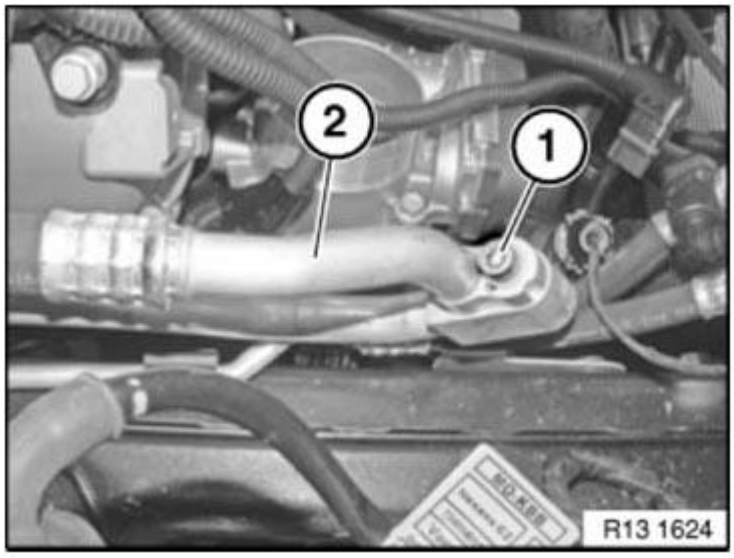


Fig. 23: Identifying Screw And Air Conditioning Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release and disconnect coolant hoses (1).

Illustration shows N57

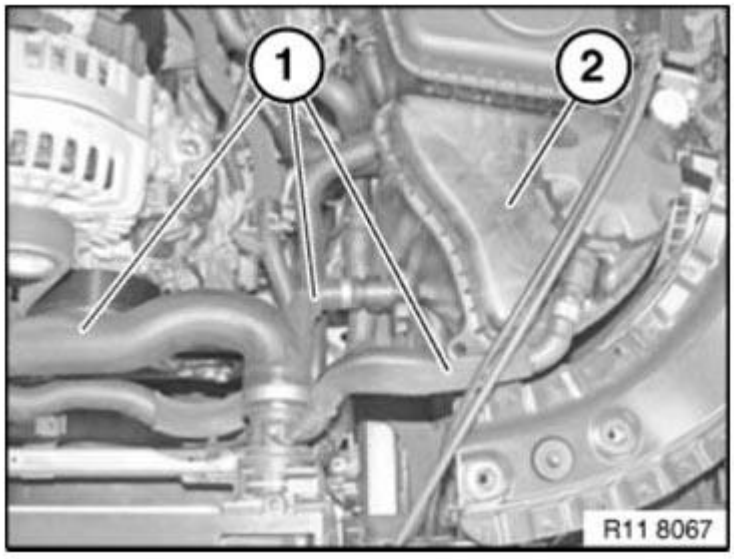


Fig. 24: Identifying Coolant Hoses
Courtesy of BMW OF NORTH AMERICA, INC.

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Unfasten hose clip (1).

Release screw (2).

Press off oil line from oil reservoir to intake pipe section with special tool to prevent oil from escaping.

Installation note:

Replace hose clamp.

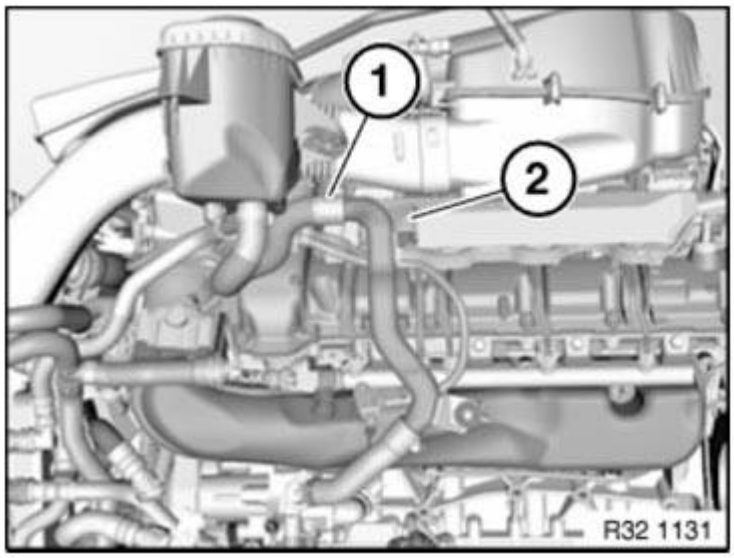


Fig. 25: Identifying Oil Reservoir Hose Clip And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Remove intake pipe section (1) in direction of arrow from holder (2).

Remove intake pipe in upward direction.

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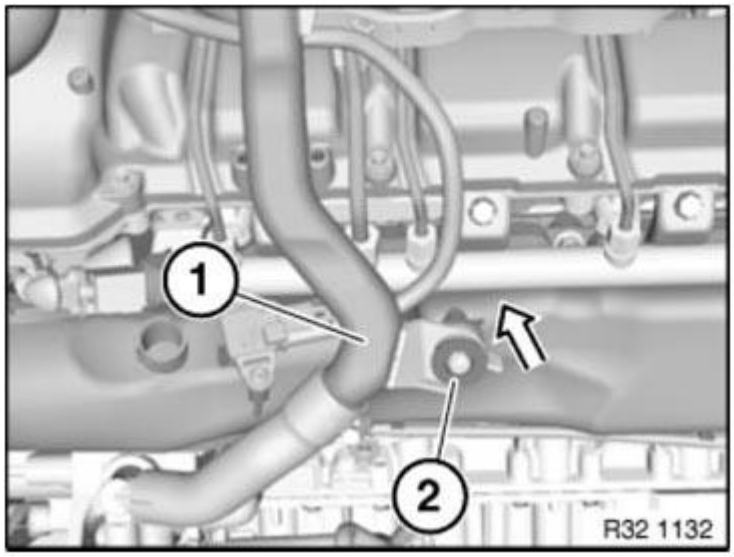


Fig. 26: Removing Intake Pipe Section In Direction Of Arrow From Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten hose clip (1).

Detach coolant hose from water valve.

Release hose clamp and detach coolant hose (2).

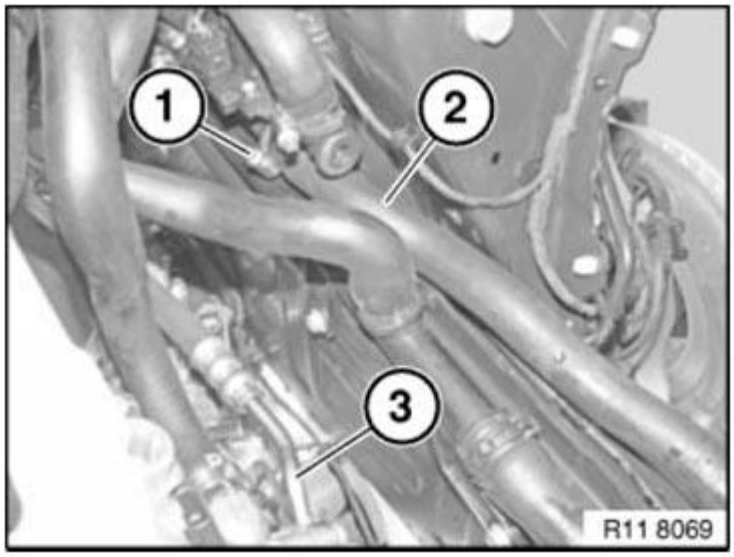


Fig. 27: Identifying Hose Clip And Coolant Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and disconnect fuel delivery line (1), seal off with special tool 13 5 160.

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Seal off fuel delivery line (2) with special tool 13 5 162.

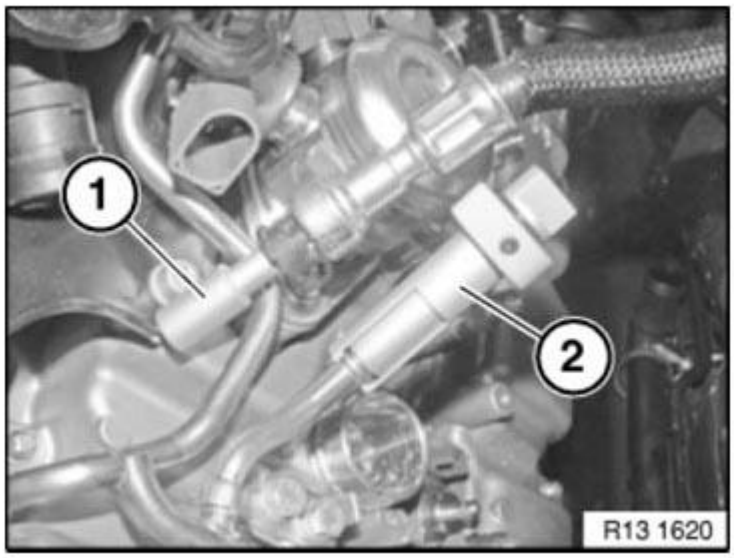


Fig. 28: Identifying Fuel Delivery Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1). Tightening torque **17 22 4AZ** .

Detach oil lines from oil filter housing.

Catch and dispose of emerging oil.

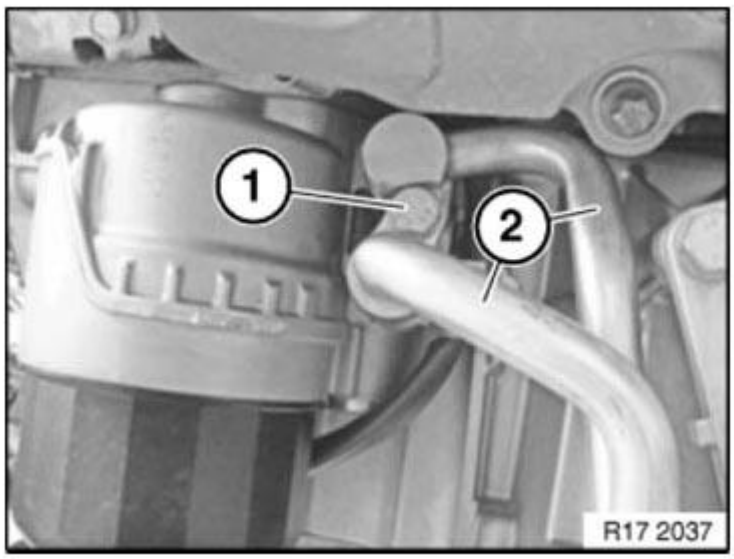


Fig. 29: Identifying Oil Pipes Screw
Courtesy of BMW OF NORTH AMERICA, INC.

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Release screws (1) on **ENGINE MOUNT** on left and right.

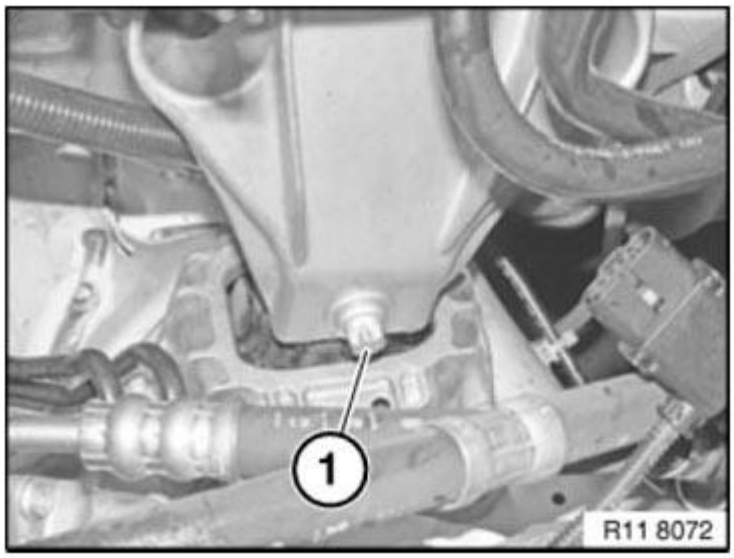


Fig. 30: Identifying Screws On Engine Mount On Left And Right
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before lifting the engine, the lifting lugs must be checked for damage (cracks) and to ensure they are seated securely.

Suspend special tool from lifting eyes (1) at front and rear.

11 0 020 Lift out engine with special tool.

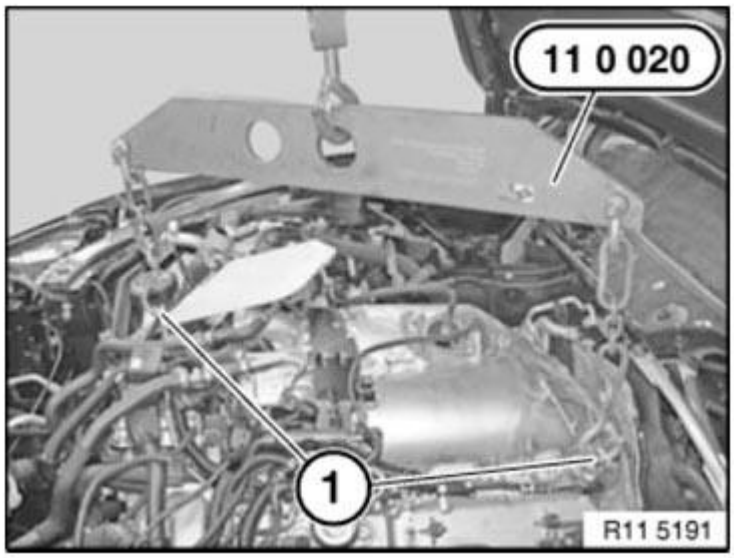


Fig. 31: Lifting Out Engine With Special Tool (11 0 020)
Courtesy of BMW OF NORTH AMERICA, INC.

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Mount engine on assembly stand.

Assemble engine.

Top up **COOLANT** and vent cooling system.

Check **COOLING SYSTEM** for leaks.

00 RISK OF INJURY IF OIL COMES INTO CONTACT WITH EYES AND SKIN

Danger of injury!

Contact with eyes or skin may result in injury!

Possible symptoms are:

- Impaired sight
- Irritation of the eyes
- Reddening of the skin
- Rough and cracked skin

Protective measures/rules of conduct

- Wear safety goggles
- Wear oil-resistant protective gloves
- Observe country-specific safety regulations

First aid measures

- **Eye contact:** Rinse eyes immediately with plenty of water for at least 15 minutes; if available, use an eye-rinsing bottle. If irritation of the eyes persists, consult a doctor.
- **Skin contact:** Wash off with soap and water immediately. If irritation persists, consult a doctor.

NOTE: Do not use solvents/thinners.

00 SAFETY INFORMATION FOR WORKING ON VEHICLES WITH AUTOMATIC ENGINE START-STOP FUNCTION (MSA)

WARNING: If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.
An automatic engine start is possible.

Observe safety precautions when working on MSA vehicles

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Before carrying out practical work on the engine, always ensure that the MSA functionality is deactivated so as to prevent automatic engine starting while work is being carried out in the engine compartment.

MSA function is deactivated by

- Deactivate MSA by means of button (1) in passenger compartment
- Open seat belt buckle and driver's door

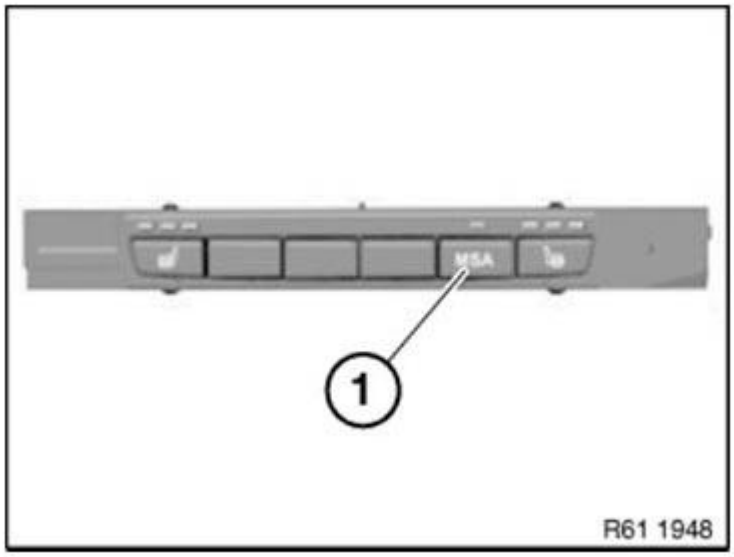


Fig. 32: Identifying MSA Switch In Passenger Compartment
Courtesy of BMW OF NORTH AMERICA, INC.

- Open engine bonnet/hood and ensure that engine hood/bonnet contact is not in workshop mode
  - Workshop mode

    A = 10 mm

  - Basic setting (engine hood/bonnet open)

    B = 7 mm

  To make sure that the engine hood/bonnet contact is at the basic setting, if necessary press the hood/bonnet contact up to the limit position before starting work and slowly release.

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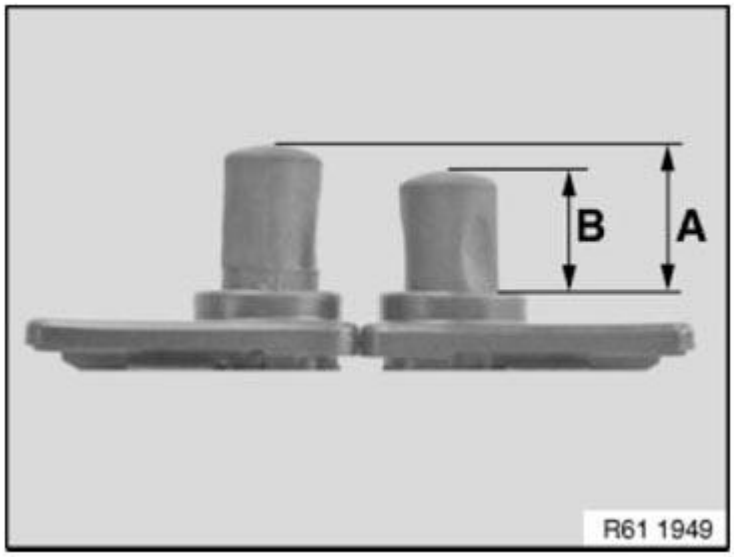


Fig. 33: Identifying Engine Hood/Bonnet Basic Setting And Workshop Mode
Courtesy of BMW OF NORTH AMERICA, INC.

When working with diagnosis tools

- Observe instructions in diagnosis tool

00 SAFETY INSTRUCTIONS FOR HANDLING OIL

WARNING: DANGER OF POISONING if oil is ingested/absorbed through the skin!
RISK OF INJURY if oil comes into contact with eyes and skin!

Recycling

Observe country-specific waste disposal regulations.

Measures if oil is unintentionally released

- **Personal precautionary measures:** Danger of slipping! Keep non-involved persons away from the work area. Wear personal protective clothing/equipment.
- **Environmental protection measures:** Prevent oil from draining into drain channels, sewerage systems, pits, cellars, water and the ground.
- **Limiting spread:** Use oil blocks to prevent the surface spread of oil.
- **Cleaning procedure:** Bind and dispose of escaped oil with nonflammable absorbents.

NOTE: Do not flush oil away with water or aqueous cleaning agents.

1100670 SECURING ENGINE IN INSTALLATION POSITION (N63)

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Notes

WARNING: Danger of injury!
Observe following instructions relating to special tool:

1. **Prior to each use, check the special tools for defects, modifications and operational reliability.**
2. **Damaged/modified special tools must not be used!**
3. **No changes or modifications may be made to the special tools!**
4. **Keep special tools dry, clean and free of grease.**

IMPORTANT: Before lifting the engine, check the lifting lugs for damage (cracks) and to ensure they are seated securely.

NOTE:

- **Numbering system for special tools has been re-encoded.**

IMPORTANT: Special tool 00 6 000 must not be fitted when transverse member (1) is installed!

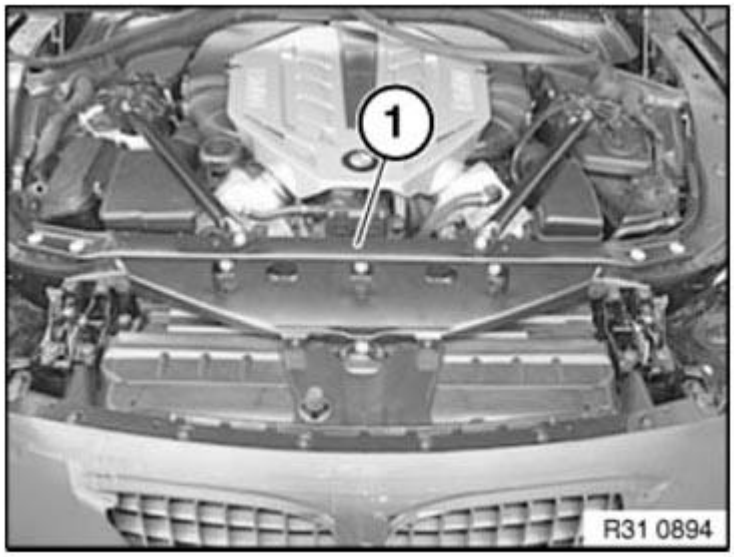


Fig. 34: Identifying Transverse Member
Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary work

- Secure **engine compartment lid** in service position. See **5100... SERVICE POSITION OF ENGINE COMPARTMENT LID** or **5100... ENGINE COMPARTMENT LID SERVICE POSITION (ACTIVE)** .
- Remove **PANEL** for engine compartment lid at side

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- Remove left **INTAKE SILENCER HOUSING**
- Remove **UNDERBODY PROTECTION** at front and rear

Assemble transverse member 00 6 000 with special tools 00 6 002 00 6 004, 00 6 010, **00 6 050** .

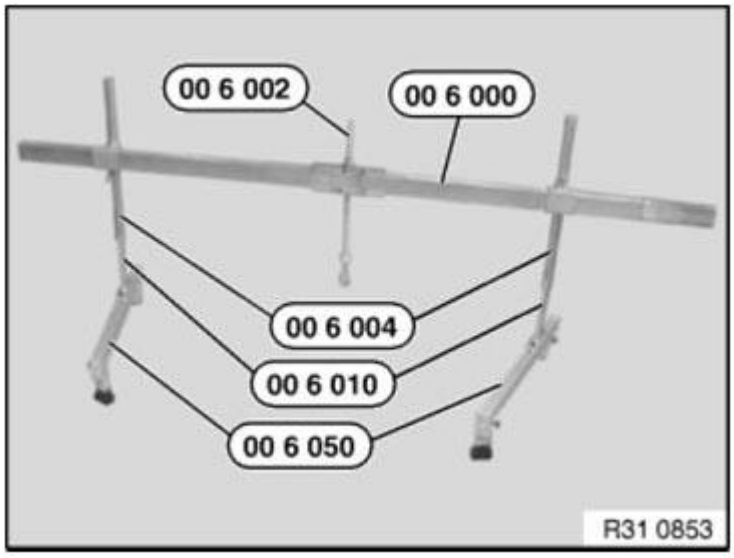


Fig. 35: Identifying Special Tools (00 6 002 00 6 004, 00 6 010)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Contact points (1) for special tool 00 6 050 are pictured.

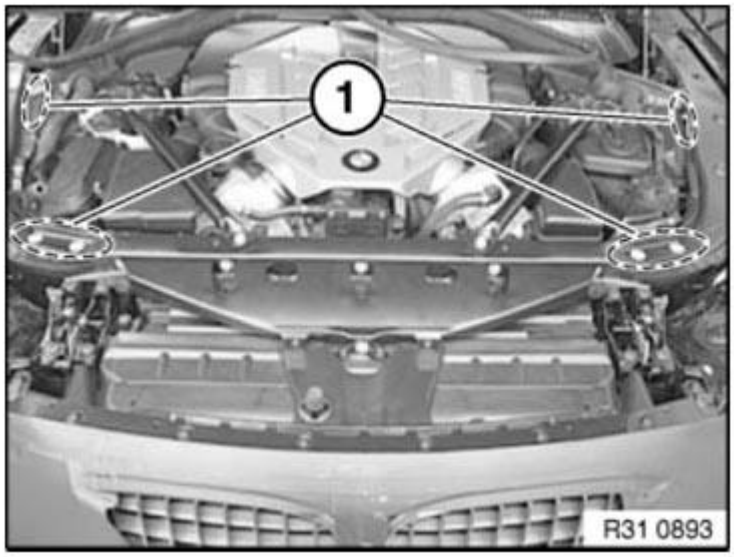


Fig. 36: Identifying Contact Points Of Special Tool 00 6 050
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: Risk of damage!
Position transverse member 00 6 000 with a 2nd person helping on contact points (1).

Secure special tool **11 0 000** to spindle 00 6 002.

Attach suitable chains to special tool **11 0 000** and suspend from both engine suspension lugs.

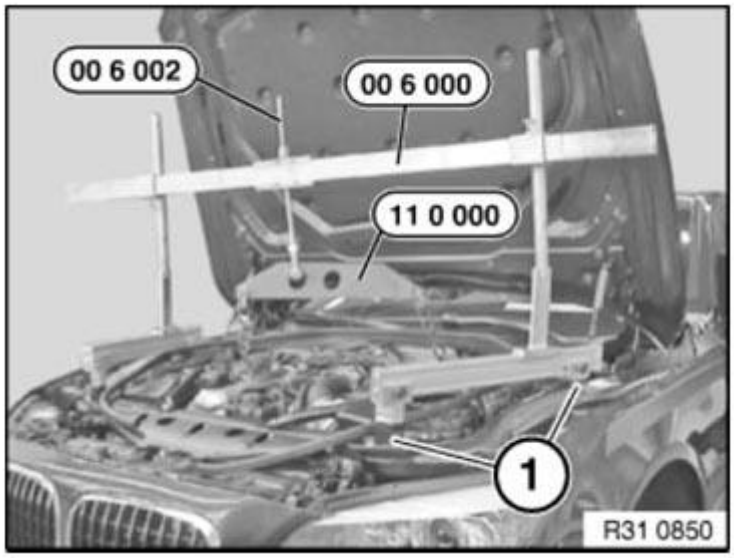


Fig. 37: Identifying Transverse Member 00 6 000 And Contact Points
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Avoid a change of engine position in the transverse or longitudinal direction.
Always make sure there is sufficient clearance between the engine (or its add-on parts) and the body.

WARNING: Danger of injury!
Tighten down all screws and nuts on transverse member 00 6 000.

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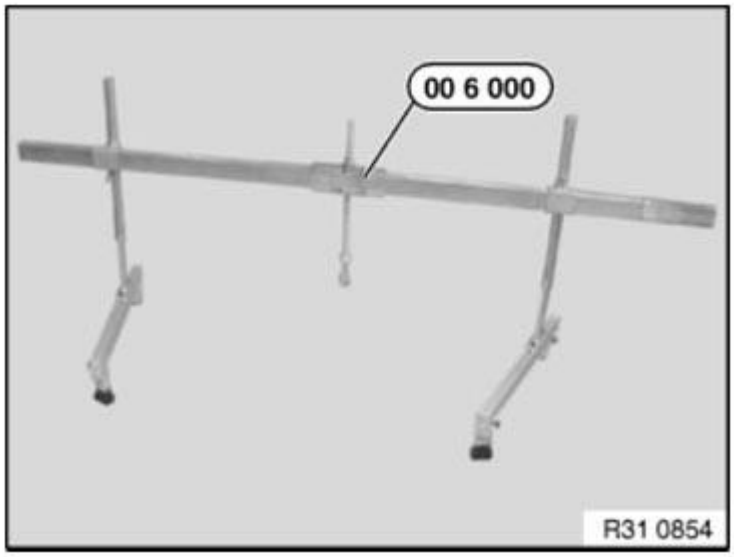


Fig. 38: Identifying Transverse Member 00 6 000
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **22 11 1AZ** .

NOTE: (Four-wheel drive only)
Remove vibration absorber on left front axle support.

Raise engine approx. 10 mm with crossmember.

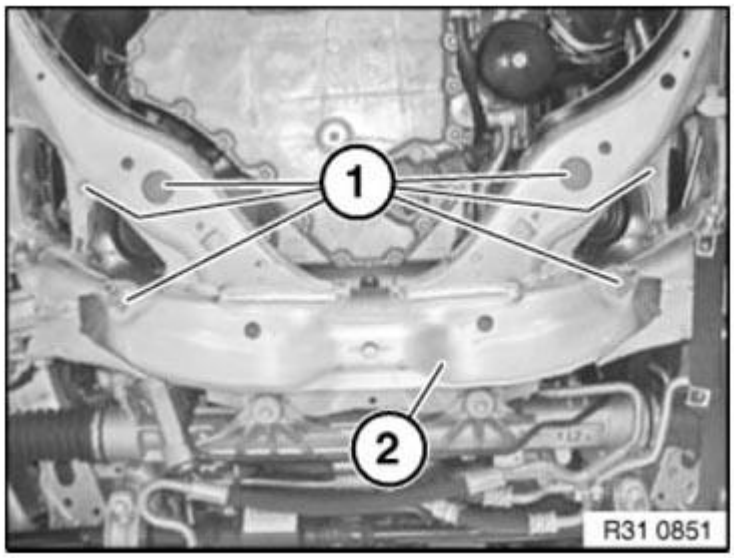


Fig. 39: Identifying Screws And Vibration Absorber
Courtesy of BMW OF NORTH AMERICA, INC.

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1100... SERVICE - ENGINE OIL (N63)

WARNING: Risk of scalding!
Carry out work on the vehicle only when wearing oil- and heat-resistant protective gloves incl. forearm protection, face guard and protective apron.

IMPORTANT: Carry out the engine oil service only when the engine is at operating temperature.
Observe the exact engine oil filling capacity.
Overfilling the engine with engine oil will result in engine damage.
Checking and drip-off times (at least 10 minutes) must be observed.

Recycling:

Catch and dispose of drained engine oil in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Release screw plug (1) on oil filter cap.

Remove screw plug (2) from oil sump and drain engine oil.

Graphic E71.

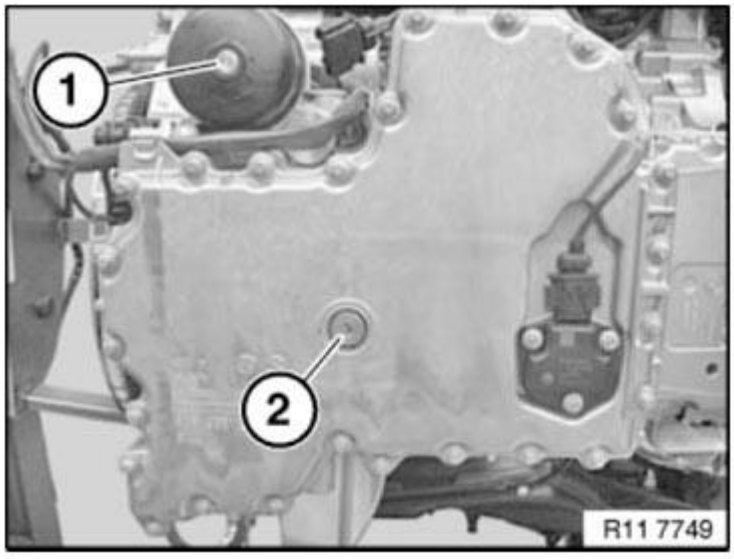


Fig. 40: Identifying Screw Plug Of Oil Filter Cap And Oil Sump
Courtesy of BMW OF NORTH AMERICA, INC.

Release oil filter cover (1) with special tool **11 9 240** .

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Graphic E71.

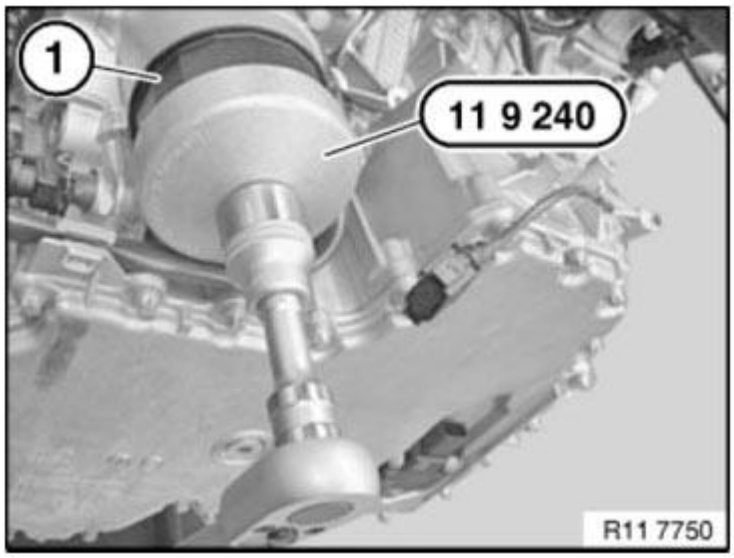


Fig. 41: Removing Oil Filter Cover With Special Tool 11 9 240
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace oil filter element (3) and sealing rings (1 and 2)

Moisten sealing ring (2) with engine oil.

Insert oil filter element (3) into oil filter cover.

Installation note:

Oil filter element (3) must snap audibly into place.

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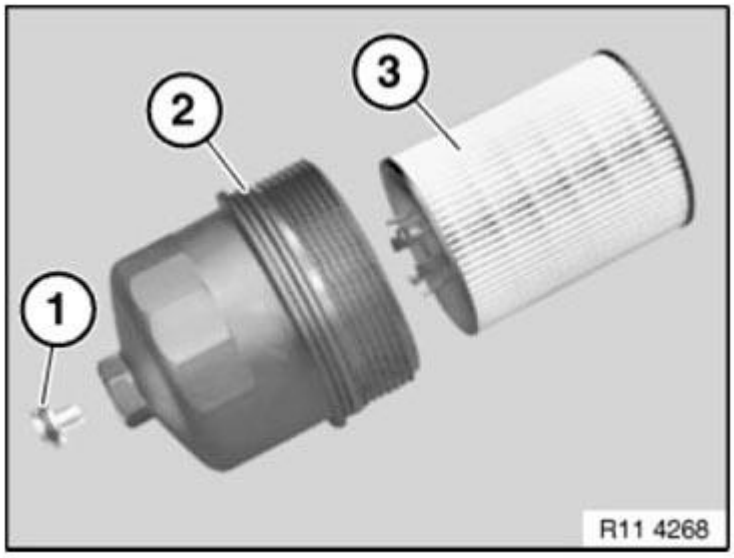


Fig. 42: Identifying Sealing Ring And Oil Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Presentation: without underbody protection and reinforcement plate.

Graphic E71.

Installation note:

Replace sealing rings.

Insert screw plug (2) for oil sump and tighten down.

Tightening torque **11 13 1AZ** .

Insert screw plug (1) for oil filter cap and tighten down.

Tightening torque **11 42 2AZ** .

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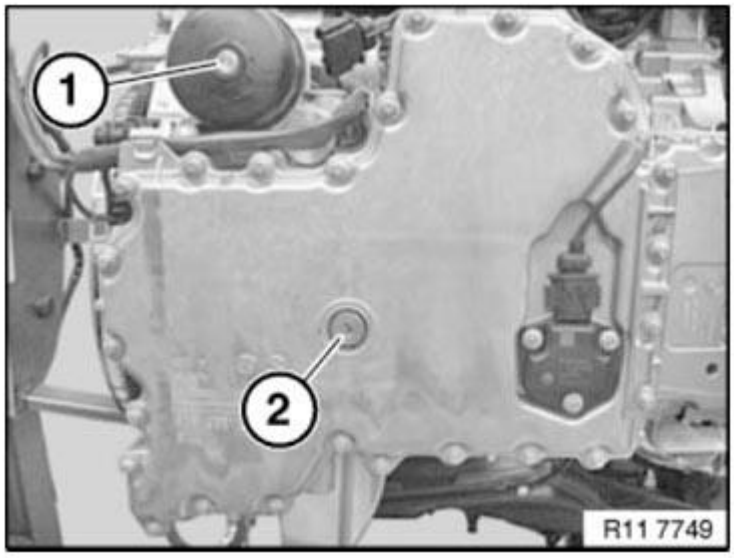


Fig. 43: Identifying Screw Plug Of Oil Filter Cap And Oil Sump
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Pour in ENGINE OIL .**
Start engine and run at idle until oil pressure indicator light goes out.
Switch off engine
Check oil filter cap and screw plugs (1 and 2) for oil filter cap and oil sump for leaks.
Assemble engine.

Checking engine oil level:

- Park vehicle on a horizontal surface
- Allow engine to run at operating temperature for three minutes with increased engine speed (approx. 1100 RPM)
- Read off engine oil level in instrument panel or on Control Display
- Top up engine oil if necessary

1112 CYLINDER HEAD WITH COVER

1112729 CHECKING CYLINDER HEAD FOR WATERTIGHTNESS (N63)

Necessary preliminary work

- Remove **LEFT CYLINDER HEAD**.
- Remove **RIGHT CYLINDER HEAD**.
- Remove **ALL VALVES**.

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NOTE: **Set of special tools 11 8 080 can be used for cylinder bank 1 to 4 and cylinder bank 5 to 8.**

Position special tool 11 8 081 on cylinder head.

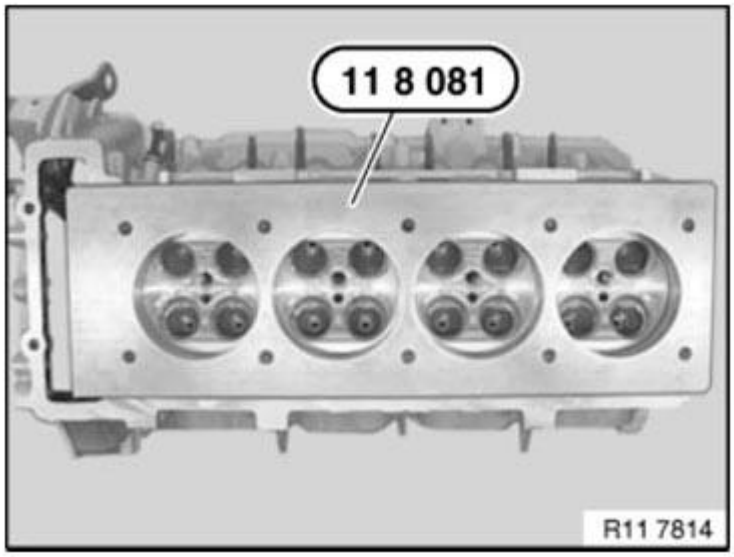


Fig. 44: Positioning Special Tool 11 8 081 On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Insert special tool 11 8 083 and tighten in sequence (1 to 10) in several steps.

Tightening torque: **25 Nm**

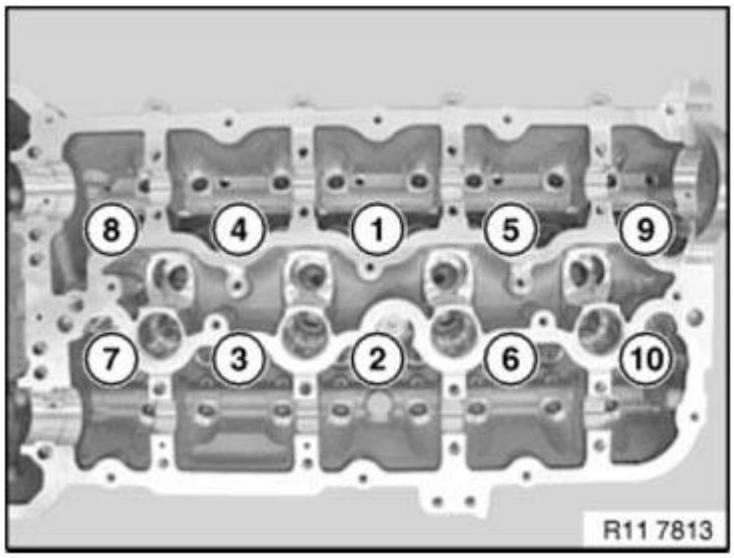


Fig. 45: Identifying Special Tool 11 8 083 Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

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Remove vent screw (1).

Tightening torque: **11 12 8AZ** .

Installation note:

Replace sealing ring.

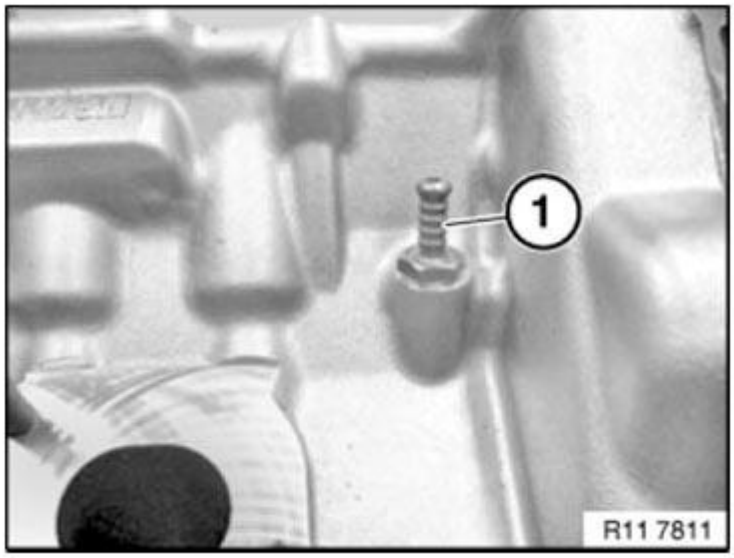


Fig. 46: Identifying Vent Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Max: 0.8 Nm.
Screw in special tool 11 8 082 with suitable tool and special tool 00 9 250 to 0.8 Nm.
Connect compressed air hose with pressure gauge.
Immerse cylinder head in a water bath. Inspection pressure 4.0 bar.
Check cylinder head for escaping air (cracks).

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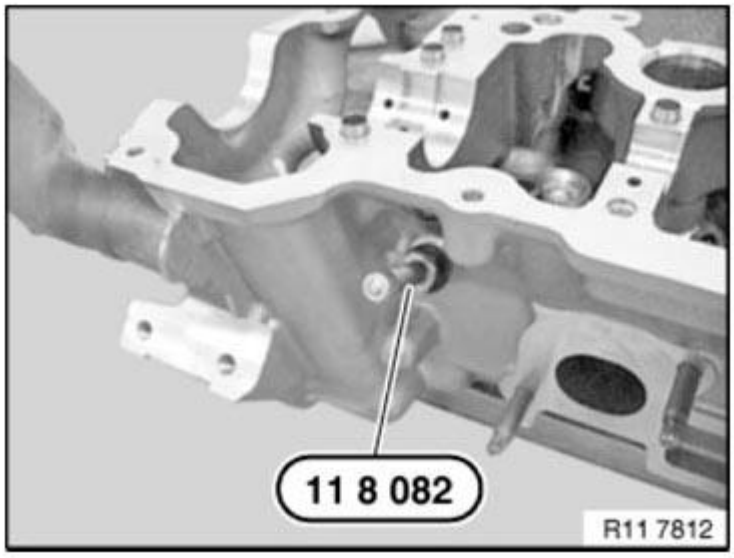


Fig. 47: Identifying Special Tool 11 8 082 Location
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: If necessary, add cleaning agent to water bath. Assemble engine.

1112719 GRINDING CYLINDER HEAD SEALING SURFACE (N63)

Necessary preliminary work

- Remove cylinder head. See **LEFT CYLINDER HEAD** and **RIGHT CYLINDER HEAD**.

Cylinder head disassembled

Check evenness of cylinder head lower face with a standard straightedge (1).

NOTE: Maximum deviation from flatness: longitudinal 0.10 mm.

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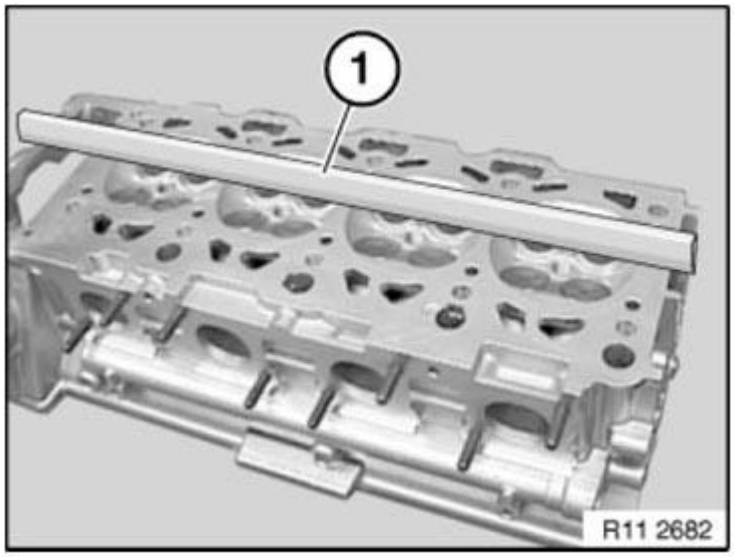


Fig. 48: Checking Evenness Of Cylinder Head Lower Face With Standard Straightedge - Longitudinal
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Maximum deviation from flatness: transversal 0.05 mm.

- **Machining limit:** See **CYLINDER HEAD WITH VALVE SEAT COVER** or **CYLINDER HEAD WITH COVER**

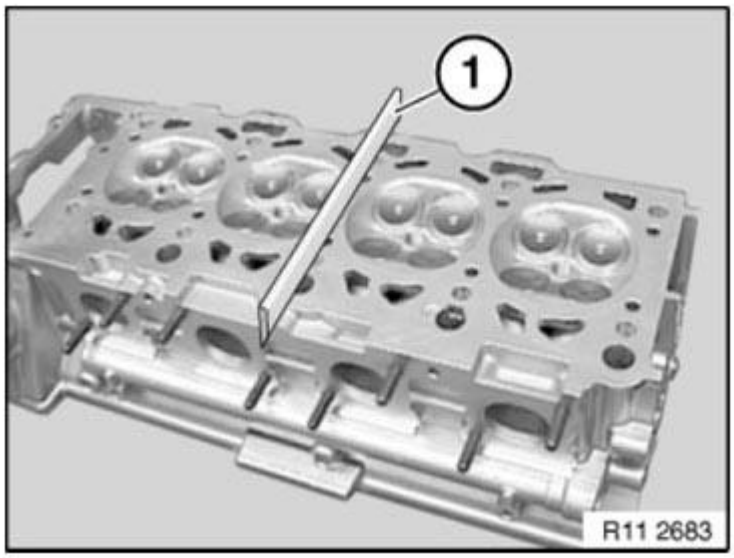


Fig. 49: Checking Evenness Of Cylinder Head Lower Face With Standard Straightedge - Transversal
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: A cylinder head gasket (+REP) 0.3 mm thicker than usual can be obtained for machined (resurfaced) cylinder heads.

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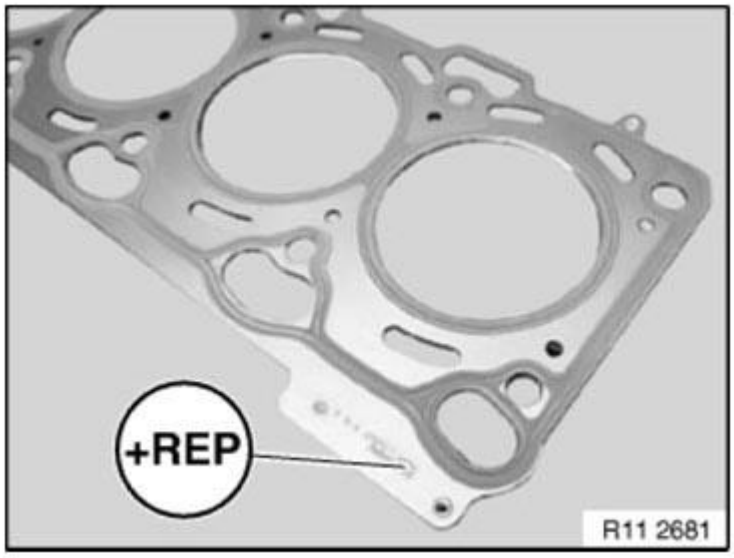


Fig. 50: Identifying Cylinder Head Gasket (+REP)
Courtesy of BMW OF NORTH AMERICA, INC.

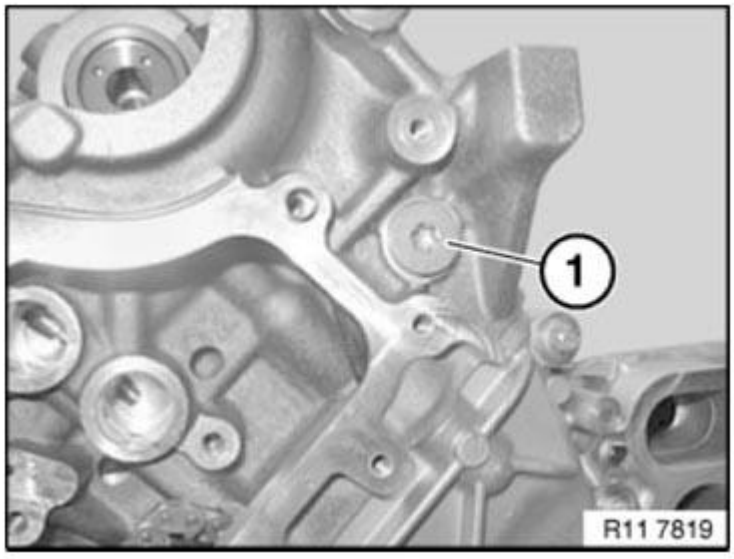
1112105 REMOVING AND INSTALLING LEFT CYLINDER HEAD (N63)

Necessary preliminary work

- Check **TIMING**
- Remove left **INLET AND EXHAUST ADJUSTMENT UNIT**

Release screw (1).

NOTE: Guide rail is loose from cylinder head.



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Fig. 51: Identifying Screw Of Guide Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1) at front from cylinder head.

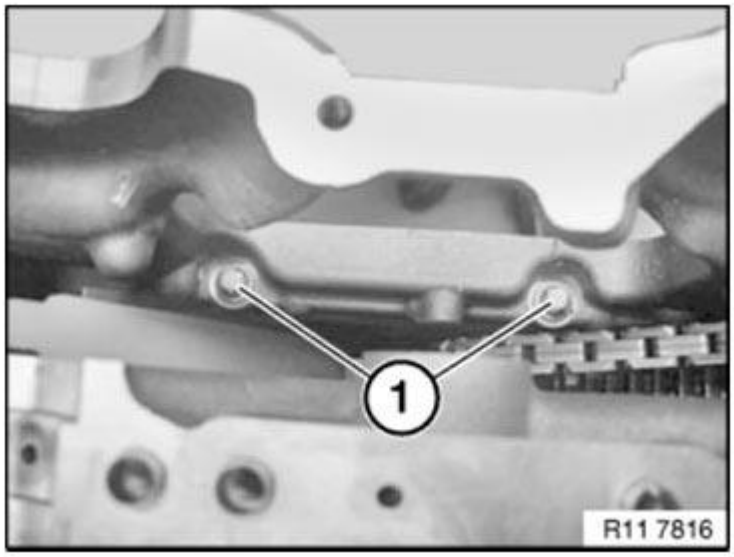
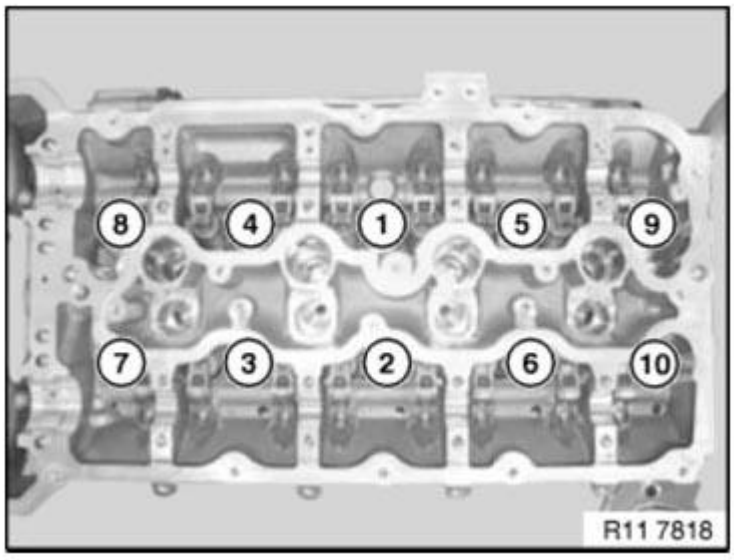


Fig. 52: Identifying Bolt On Front Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Release cylinder head bolts in sequence (10 to 1).

Remove all cylinder head bolts with washers.

NOTE: For purposes of clarity, the graphic shows the camshafts removed.



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Fig. 53: Identifying Cylinder Head Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Clean sealing faces of cylinder head and engine block; if necessary, remove gasket debris compound with special tool **11 4 470** . Make sure no gasket remnants drop into oil and cooling channels.

IMPORTANT: Risk of cracking!
Threaded bores in engine block must be free of dirt and oil

Check **CYLINDER HEAD** for leaks.

Check **CYLINDER HEAD SEALING FACE** for surface evenness.

Coat joint between engine block and timing case cover with Drei Bond 1209 (refer to BMW Parts Service).

NOTE: Graphic shows an N62 engine by way of example.

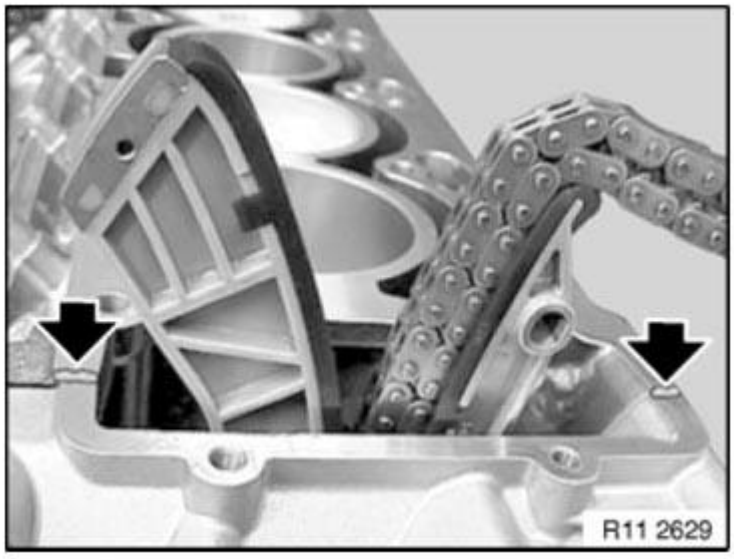


Fig. 54: Locating Drei Bond 1209 At Joint Between Engine Block And Timing Case Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Check fitting sleeves (1) for damage and correct installation position.

Installation note:

Renew cylinder head gasket (2)

Fit new cylinder head gasket (2).

NOTE: Graphic corresponds to cylinders 1-4.

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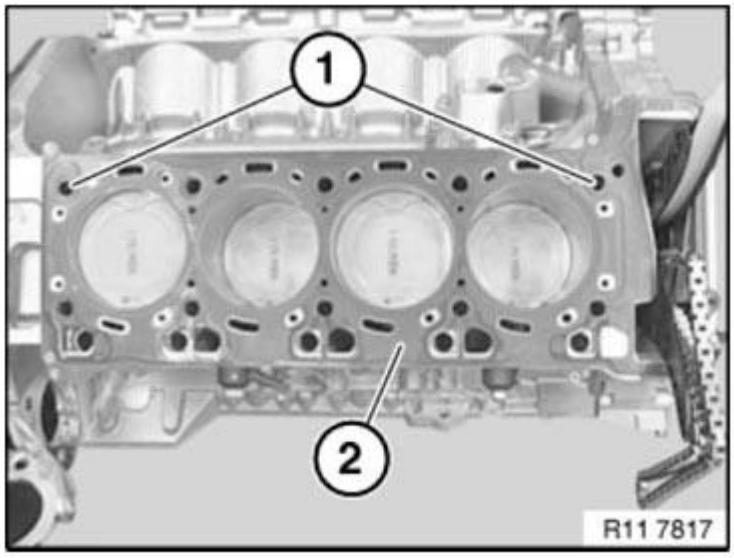


Fig. 55: Identifying Fitting Sleeves And Cylinder Head Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Put the cylinder head on.

Do not wash off bolt coating.

Installation note:

Fit new cylinder head bolts

Insert new cylinder head bolts and initially tighten so that they are free of play.

Tighten down cylinder head bolts in sequence 1 - 10.

Tightening torque **11 12 1AZ** .

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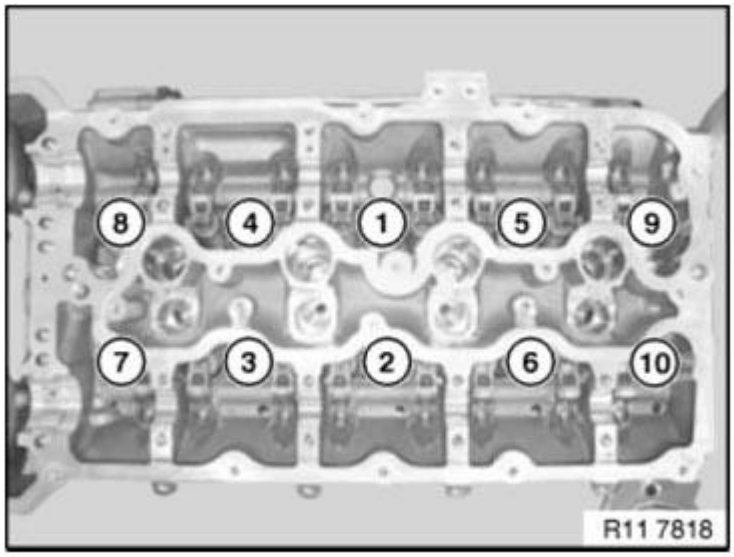


Fig. 56: Identifying Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Install and tighten down bolts (1) between cylinder head and timing case cover.

Tightening torque **11 12 2AZ** .

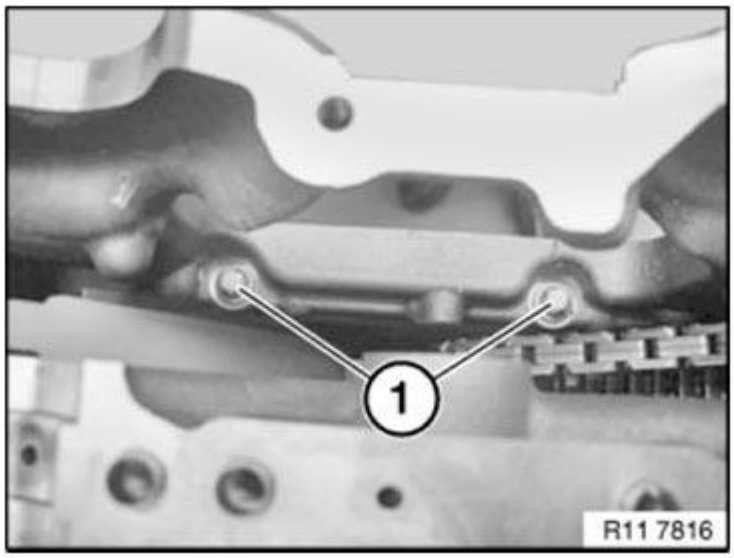


Fig. 57: Identifying Bolts Between Cylinder Head And Timing Case Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Insert screw (1) of guide rail and tighten down.

Tightening torque **11 31 3AZ** .

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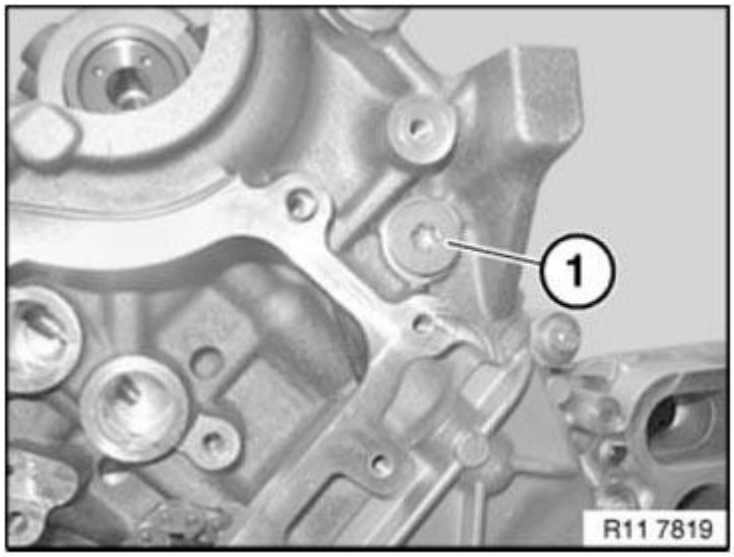


Fig. 58: Identifying Screw Of Guide Rail
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, install **camshafts** . See **1131036 REMOVING AND INSTALLING/REPLACING LEFT EXHAUST CAMSHAFT (N63)** and **1131032 REMOVING AND INSTALLING/REPLACING LEFT INLET CAMSHAFT (N63)**.

Install left **INLET AND EXHAUST ADJUSTMENT UNITS** .

Assemble engine.

1112106 REMOVING AND INSTALLING RIGHT CYLINDER HEAD (N63)

Necessary preliminary work

- Check **TIMING** .
- Remove **INLET AND EXHAUST ADJUSTMENT UNIT ON RIGHT SIDE** .

Release screw (1).

NOTE: Guide rail is loose from cylinder head.

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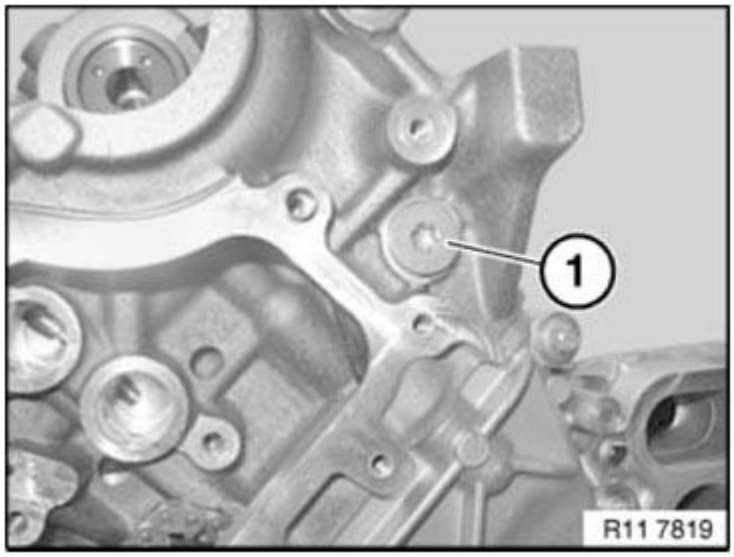


Fig. 59: Identifying Screw Of Guide Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1) at front from cylinder head.

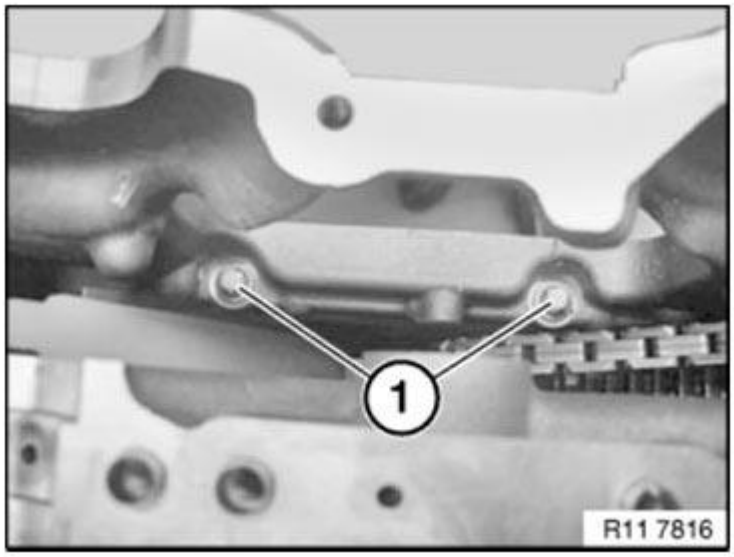


Fig. 60: Identifying Bolts At Front From Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Release cylinder head bolts in sequence (10 to 1).

Remove all cylinder head bolts with washers.

NOTE: Shown without camshafts for purposes of clarity.

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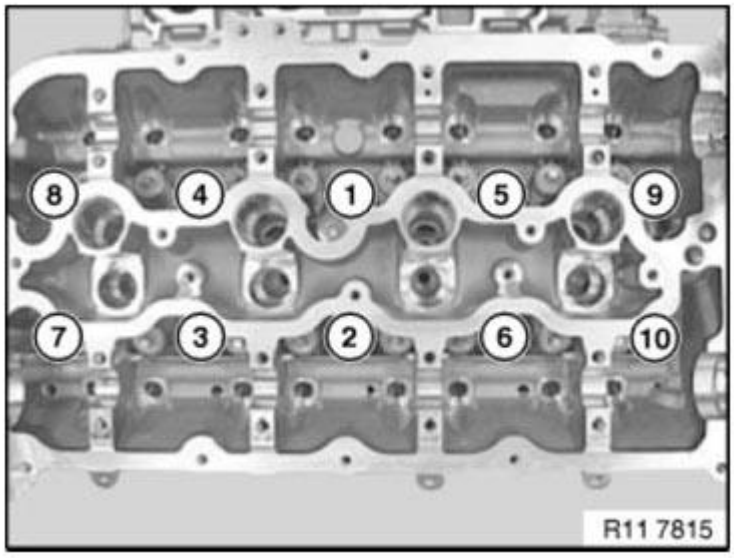


Fig. 61: Identifying Cylinder Head Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Clean sealing faces of cylinder head and engine block; if necessary, remove gasket debris compound with special tool **11 4 470** . Make sure no gasket debris drops into the oil and coolant ducts.

Threaded bores in engine block must be free of dirt and oil **(risk of cracking).**

Check **CYLINDER HEAD FOR LEAKS** .

Check **CYLINDER HEAD SEALING FACE** for surface evenness.

Coat joint between engine block and timing case cover with Drei Bond 1209 (refer to BMW Parts Service).

NOTE: Illustrations show N62.

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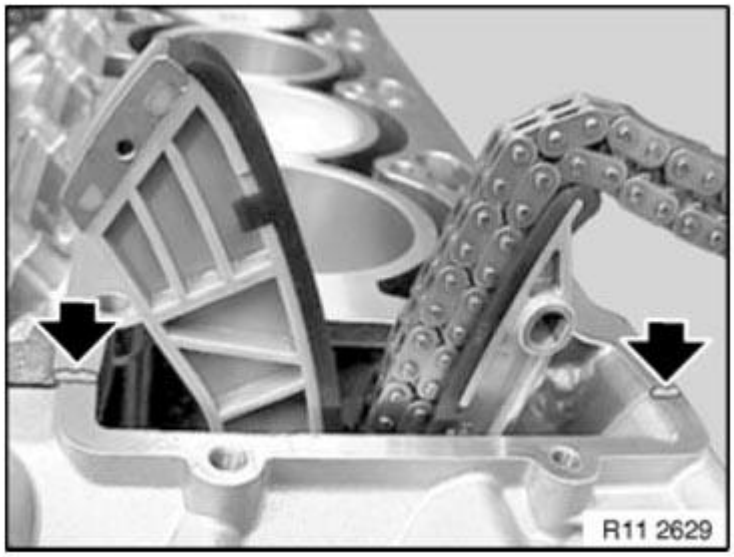


Fig. 62: Locating Drei Bond 1209 At Joint Between Engine Block And Timing Case Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Check fitting sleeves (1) for damage and correct installation position.

Fit new cylinder head gasket (2).

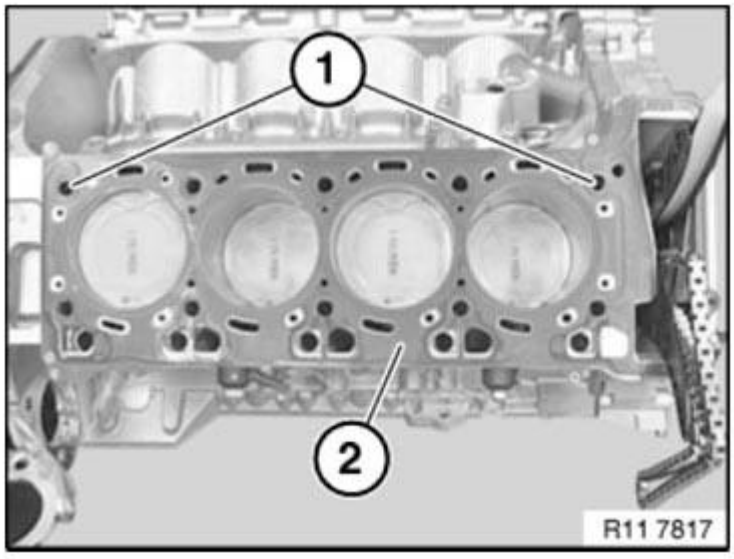


Fig. 63: Identifying Fitting Sleeves And Cylinder Head Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Put the cylinder head on.

Do not wash off bolt coating.

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Insert new cylinder head bolts and initially tighten so that they are free of play.

Tighten down the cylinder-head bolts in order 1... 10.

Tightening torque: **11 12 1AZ** .

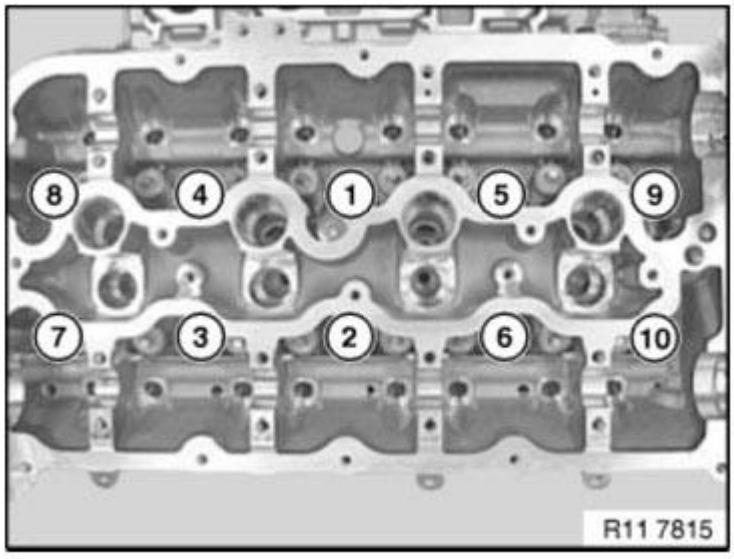


Fig. 64: Identifying Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Install and tighten down bolts (1) between cylinder head and timing case cover.

Tightening torque: **11 12 2AZ** .

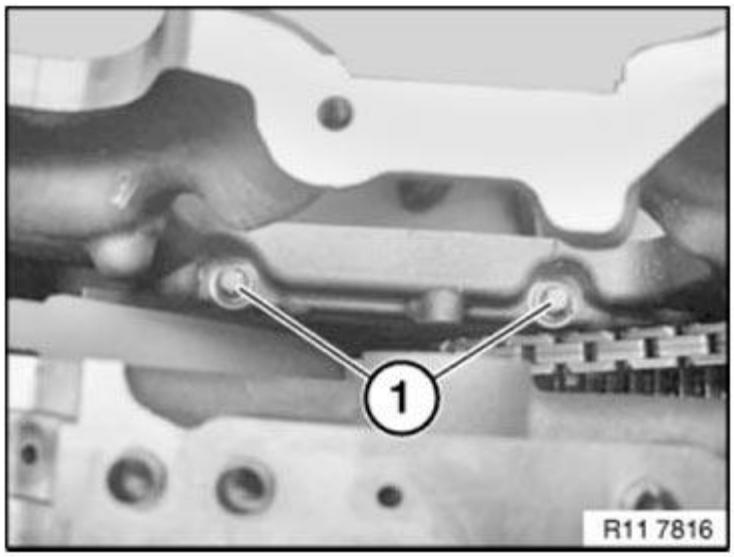


Fig. 65: Identifying Bolts Between Cylinder Head And Timing Case Cover

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Courtesy of BMW OF NORTH AMERICA, INC.

Insert screw (1) of guide rail and tighten down.

Tightening torque: **11 31 3AZ** .

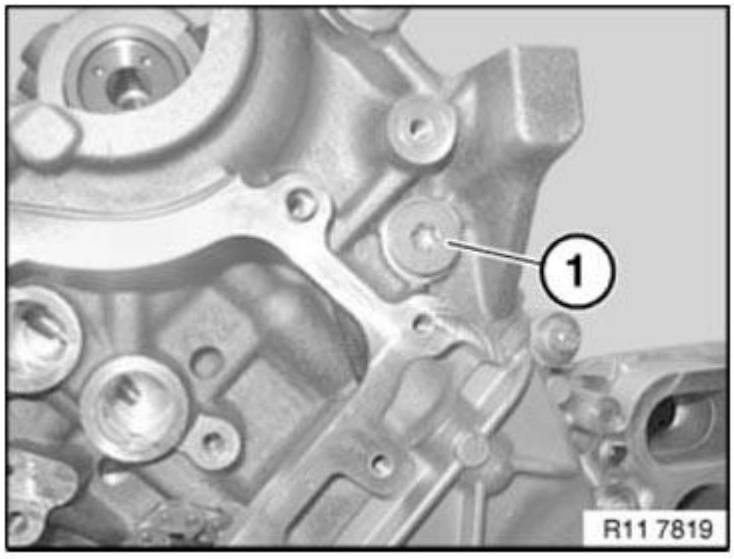


Fig. 66: Identifying Screw Of Guide Rail
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, install **camshafts** . See **1131034 REMOVING AND INSTALLING/REPLACING RIGHT INLET CAMSHAFT (N63)** and **1131038 REMOVING AND INSTALLING/RENEWING RIGHT EXHAUST CAMSHAFT (N63)**.

Install **INLET AND EXHAUST ADJUSTMENT UNIT ON LEFT SIDE** .

Assemble engine.

1112005 REMOVING AND INSTALLING/SEALING LEFT CYLINDER HEAD COVER (N63)

Necessary preliminary work

- Remove **ACOUSTIC COVER**
- Disconnect **NEGATIVE BATTERY TERMINAL**
- Remove left **CHARGE AIR COOLER**
- Remove **INTAKE FILTER HOUSING**
- Remove **EXPANSION TANK** .
- Remove coolant pipe from cylinder head cover (E71 only)
- Remove coolant valve for heater feed line
- Disconnect **FUEL FEED LINE**

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- Detach wiring harness for injectors and lay to one side
- Remove **IGNITION COILS** , cylinders 5-8
- Remove **INJECTORS** , cylinders 5-8
- Remove **HIGH-PRESSURE PUMP**

Release bolts in sequence (17 to 1).

Remove cylinder head cover.

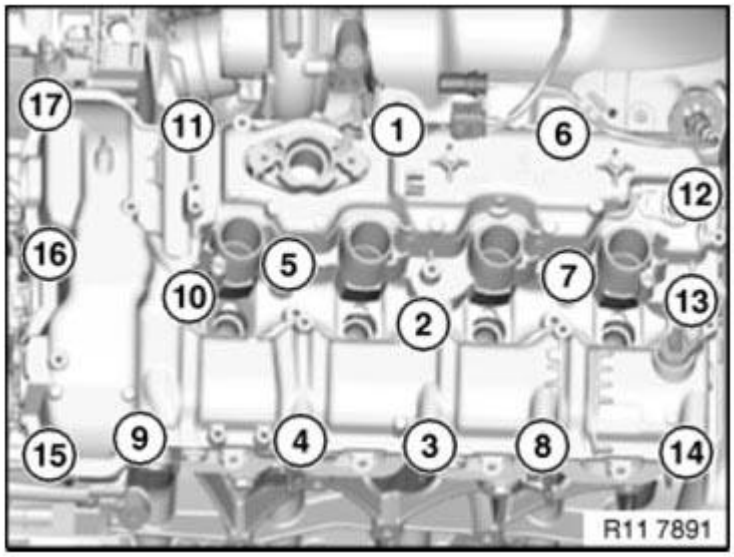


Fig. 67: Identifying Cylinder Head Cover Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Clean sealing surface (1) with special tool **11 4 470** .

Installation note:

Replace gasket (2)

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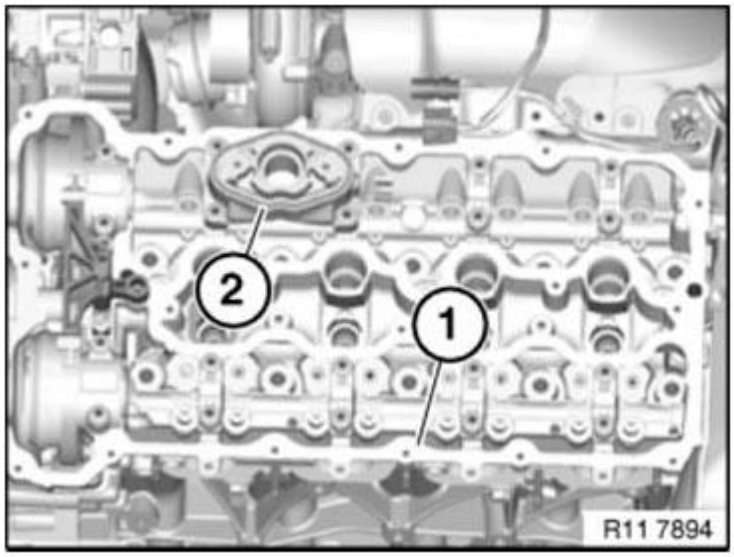


Fig. 68: Identifying Sealing Surface And Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Renew profile seal of cylinder head cover

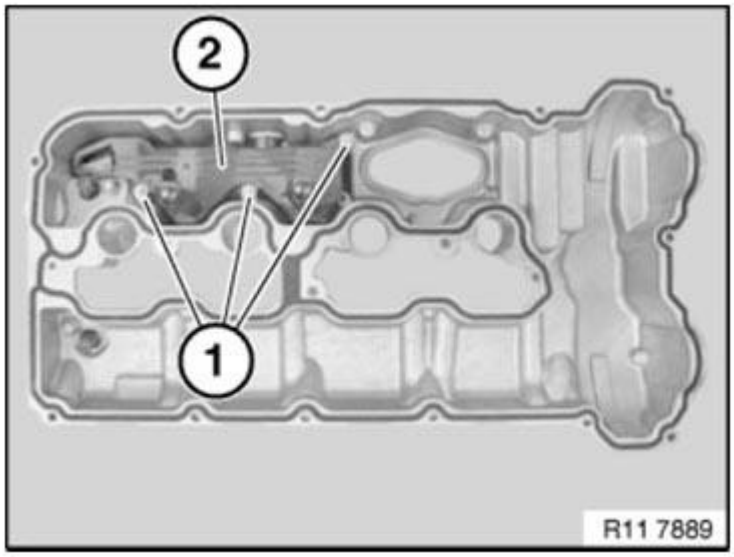


Fig. 69: Identifying Profile Seal Of Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

It is important to join screw (1) for exact positioning of the camshaft sensors.

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Fit cylinder head cover.

Position screw (1).

Release screw (1) by 90°.

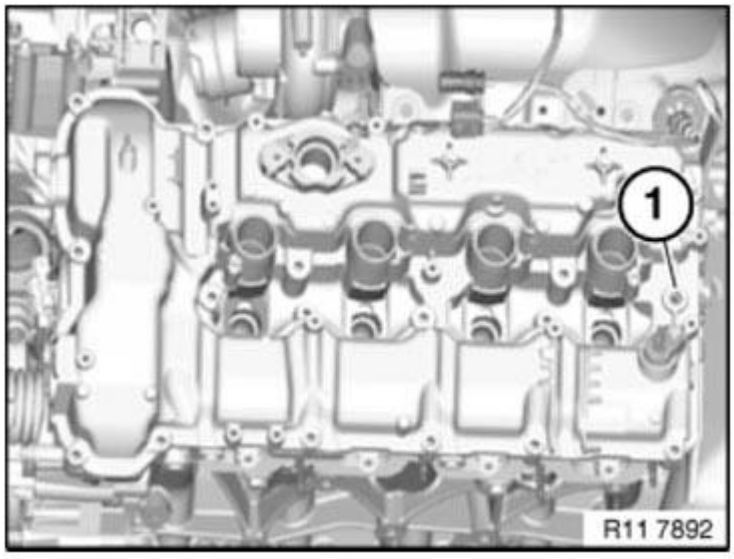


Fig. 70: Identifying Screw Of Camshaft Sensors
Courtesy of BMW OF NORTH AMERICA, INC.

Secure cylinder head cover in sequence (1 to 17) in two work steps.

Tightening torque **11 12 3AZ** .

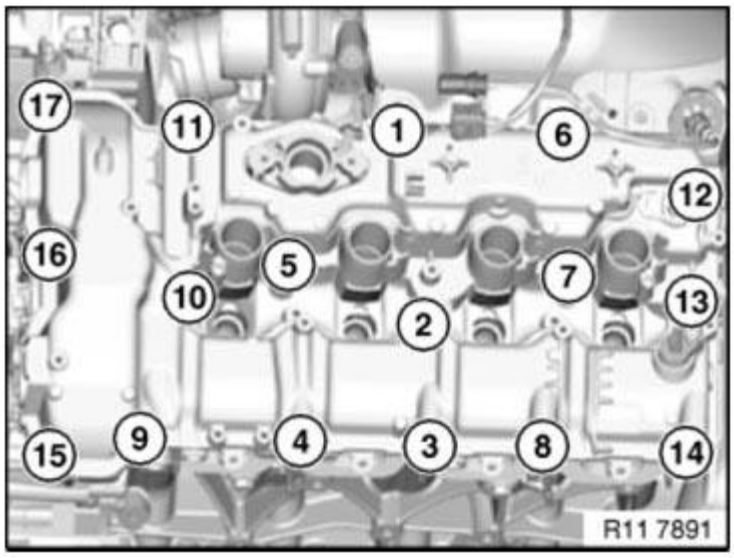


Fig. 71: Identifying Cylinder Head Cover Bolts Releasing Sequence

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Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1112006 REMOVING AND INSTALLING/SEALING RIGHT CYLINDER HEAD COVER (N63)

Necessary preliminary work

- Remove **ACOUSTIC COVER**
- Disconnect **NEGATIVE BATTERY TERMINAL**
- Release battery positive terminal
- Remove right **INTERCOOLER**
- Remove **INTAKE FILTER HOUSING**
- Disconnect **FUEL FEED LINE**
- Detach wiring harness for injectors and lay to one side
- Remove **IGNITION COILS** , cylinders 1-4
- Remove **INJECTORS** , cylinders 1-4
- Remove **HIGH-PRESSURE PUMP**

Release screws (1).

Tightening torque **11 12 9AZ** .

Remove oil filler neck (2).

Installation note:

Replace sealing ring

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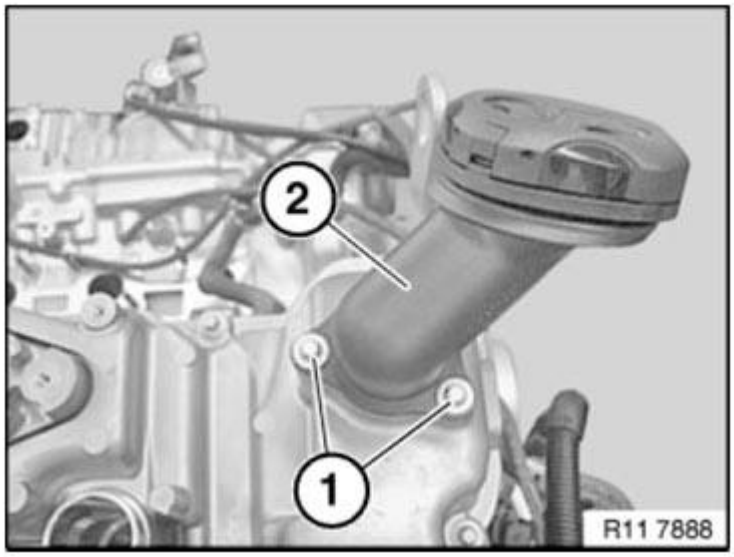


Fig. 72: Identifying Oil Filler Neck And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts in sequence (17 to 1).

Remove cylinder head cover.

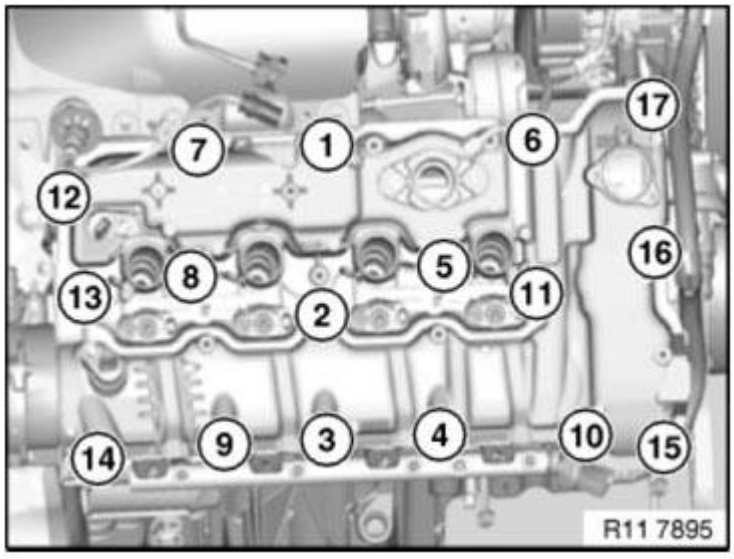


Fig. 73: Identifying Cylinder Head Cover Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Clean sealing surface (1) with special tool **11 4 470** .

Installation note:

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Replace gasket (2)

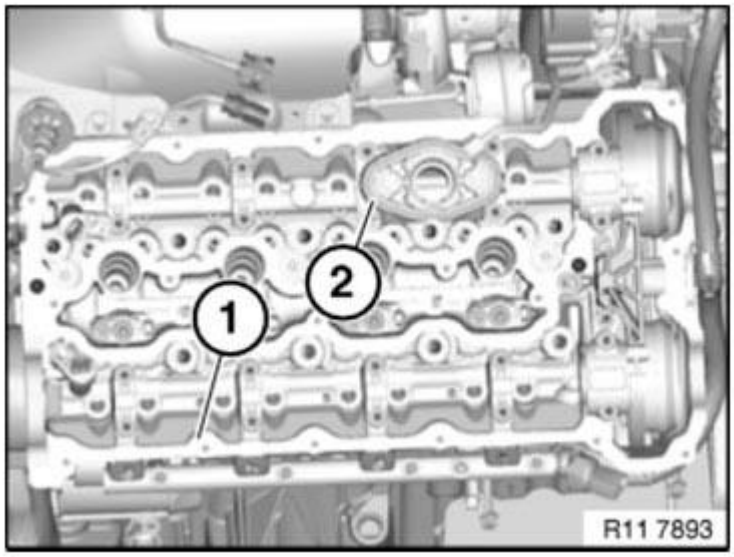


Fig. 74: Identifying Sealing Surface And Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Renew profile seal of cylinder head cover

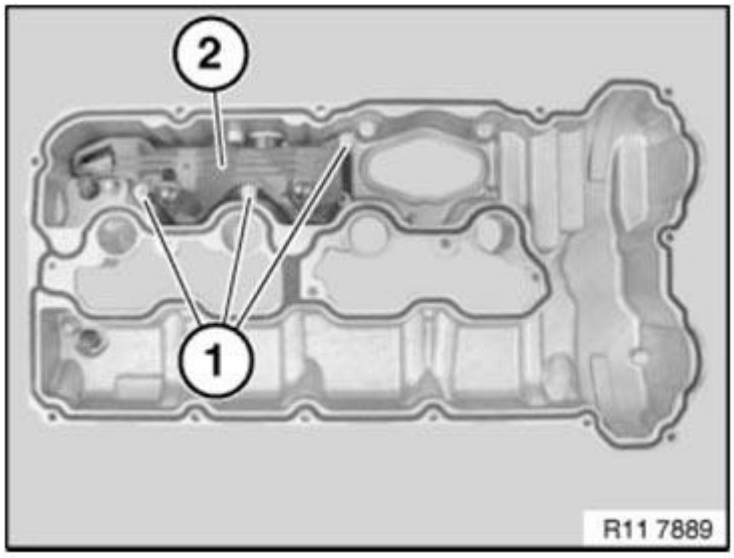


Fig. 75: Identifying Profile Seal Of Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

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It is important to join screw (1) for exact positioning of the camshaft sensors.

Fit cylinder head cover.

Position screw (1).

Release screw (1) by 90°.

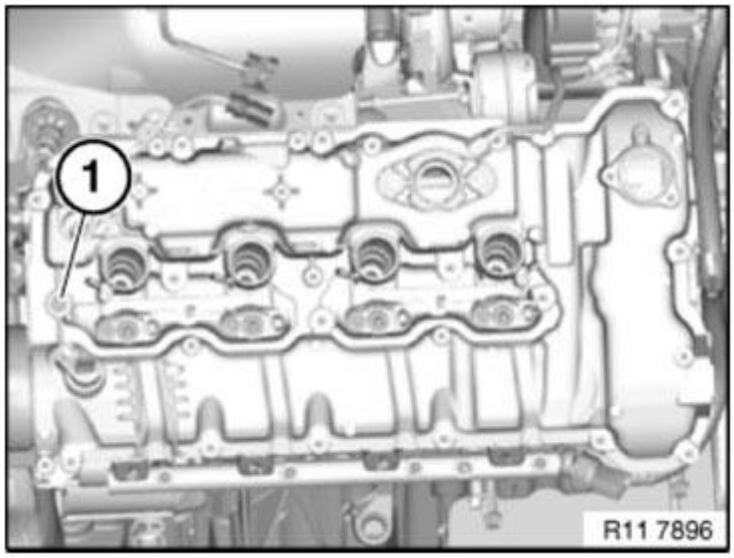


Fig. 76: Identifying Screw Of Camshaft Sensors
Courtesy of BMW OF NORTH AMERICA, INC.

Secure cylinder head cover in sequence (1 to 17) in two work steps.

Tightening torque **11 12 3AZ** .

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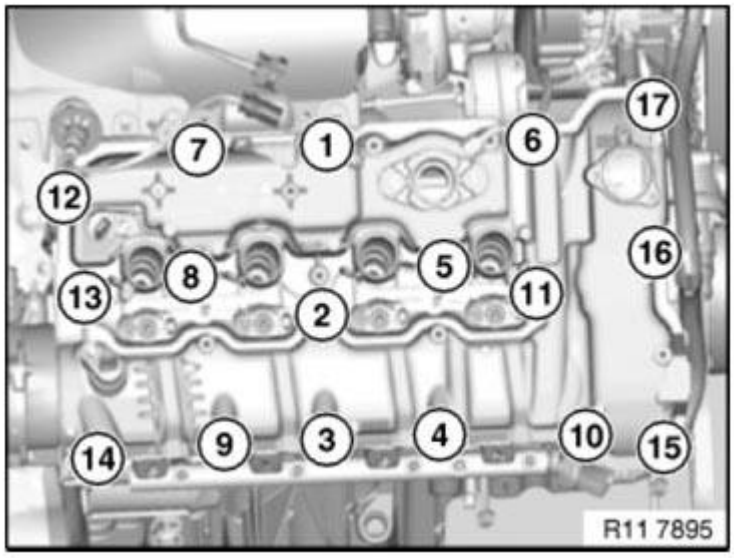


Fig. 77: Identifying Cylinder Head Cover Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1112112 REPLACING BOTH CYLINDER HEAD GASKETS (N63)

Necessary preliminary work

- Remove **LEFT CYLINDER HEAD**
- Remove **RIGHT CYLINDER HEAD**

INSTALLATION NOTE:

The cylinder head gasket (2) for cylinders 1-4 and cylinders 5-8 are identical.

There is no marking (TOP).

Cylinder head gasket (2) must depending on its styling be correctly positioned on the timing chain case.

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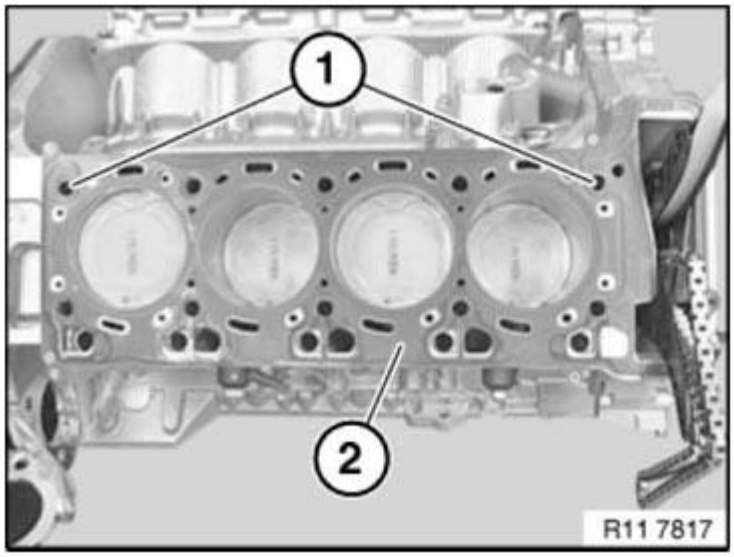


Fig. 78: Identifying Fitting Sleeves And Cylinder Head Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Repair gasket (+REP) is 0.3 mm thicker.

Check **cylinder head** for surface evenness. See **1112719 GRINDING CYLINDER HEAD SEALING SURFACE (N63)**.

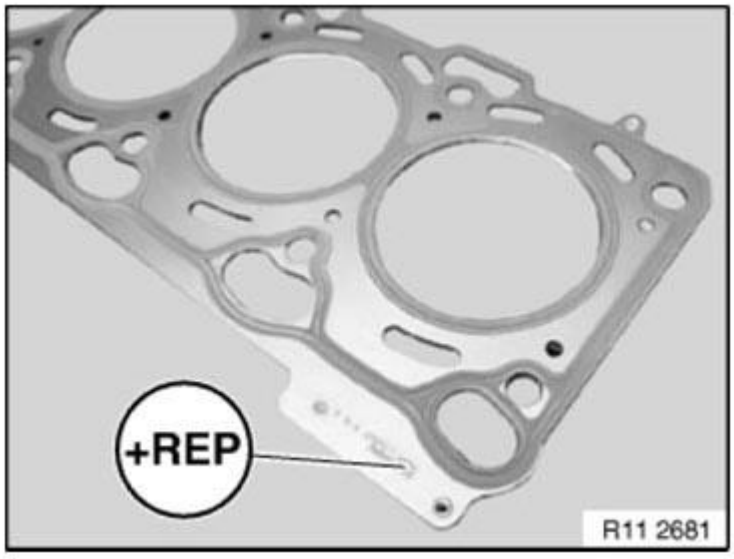


Fig. 79: Identifying Cylinder Head Gasket (+REP)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1113 OIL SUMP

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1113020 REMOVING AND INSTALLING/REPLACING LOWER OIL SUMP SECTION (N63)

Necessary preliminary work

- Remove underbody protection at front and rear. See **FRONT UNDERBODY PROTECTION** and **REAR UNDERBODY PROTECTION** .
- Release oil drain plug and drain engine oil. See **SERVICE - ENGINE OIL**.

Unlock plug connection (1) on oil level sensor and disconnect.

Release screws (2) along line.

Tightening torque **11 13 3AZ** .

Remove lower oil sump section (3).

Installation note:

Clean sealing surfaces.

Replace gasket.

Replace screws.

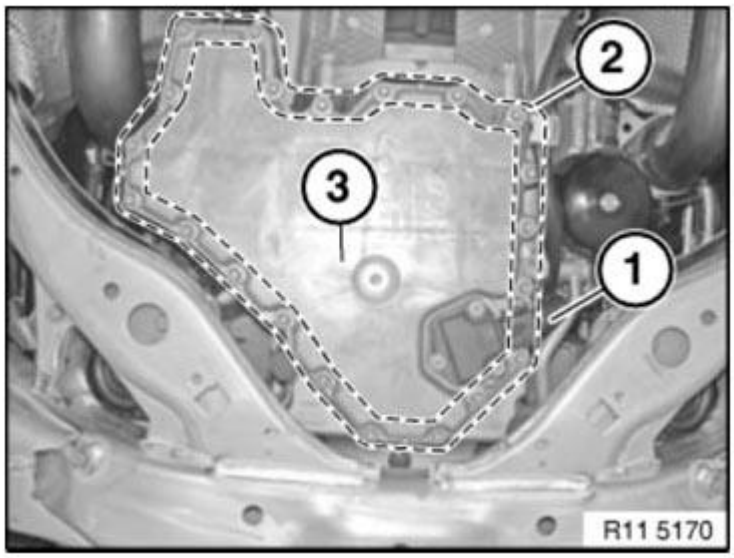


Fig. 80: Identifying Plug Connection On Oil Level Sensor And Lower Oil Sump Section
Courtesy of BMW OF NORTH AMERICA, INC.

When replacing lower oil sump section:

Convert oil level sensor.

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Replace sealing ring.

NOTE:

Procedure with four-wheel drive

Unlock plug connection (1) on oil level sensor and disconnect.

Release screws (2) along line.

Tightening torque **11 13 3AZ** .

Remove lower oil sump section (3).

Installation note:

Clean sealing surfaces.

Replace gasket.

Replace screws.

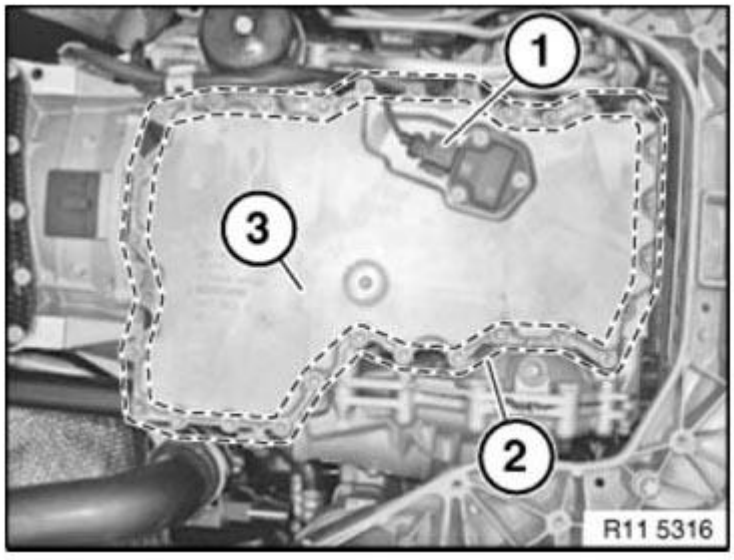


Fig. 81: Identifying Plug Connection On Oil Level Sensor And Lower Oil Sump Section
Courtesy of BMW OF NORTH AMERICA, INC.

When replacing lower oil sump section:

Convert oil level sensor.

Replace sealing ring.

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1113010 REMOVING AND INSTALLING/REPLACING UPPER OIL SUMP SECTION (N63)

Necessary preliminary work

- Drain **ENGINE OIL** .
- Secure engine in **INSTALLATION POSITION** .
- Lower **FRONT AXLE** .
- Remove **LOWER OIL SUMP SECTION** .
- Unclip wiring harness on oil sump.

Remove oil filter cover with oil filter (1) with special tool **11 9 240** .

Tightening torque: **11 42 1AZ** .

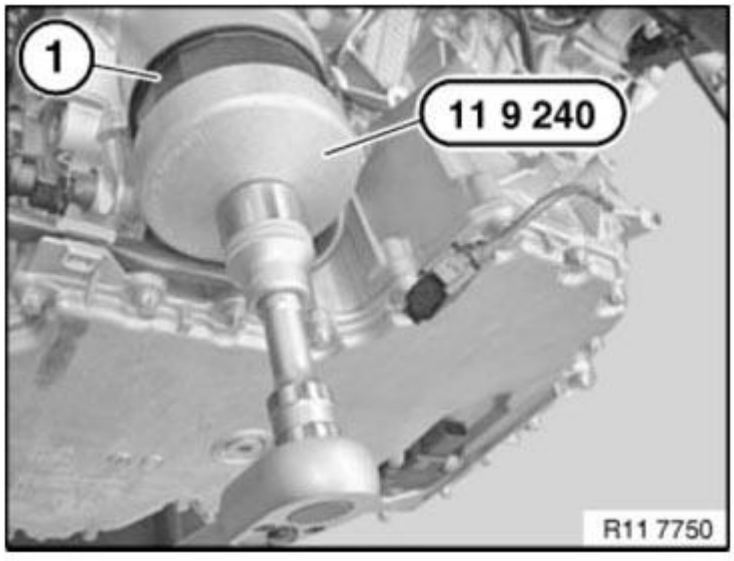


Fig. 82: Removing Oil Filter Cover With Special Tool 11 9 240
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolt (1). Remove oil pipes (2) from oil filter housing.

Release holders of supply/return lines on oil sump

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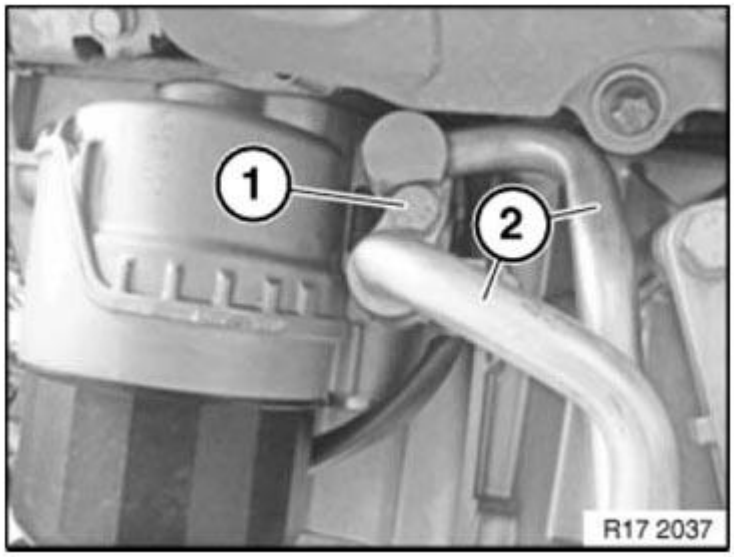


Fig. 83: Identifying Oil Pipes Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws (2).

Tightening torque: **11 41 1AZ** .

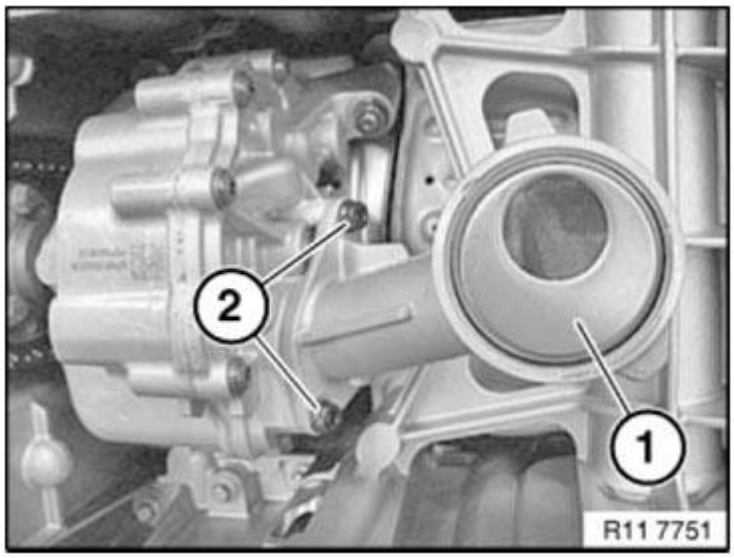


Fig. 84: Identifying Intake Pipe And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

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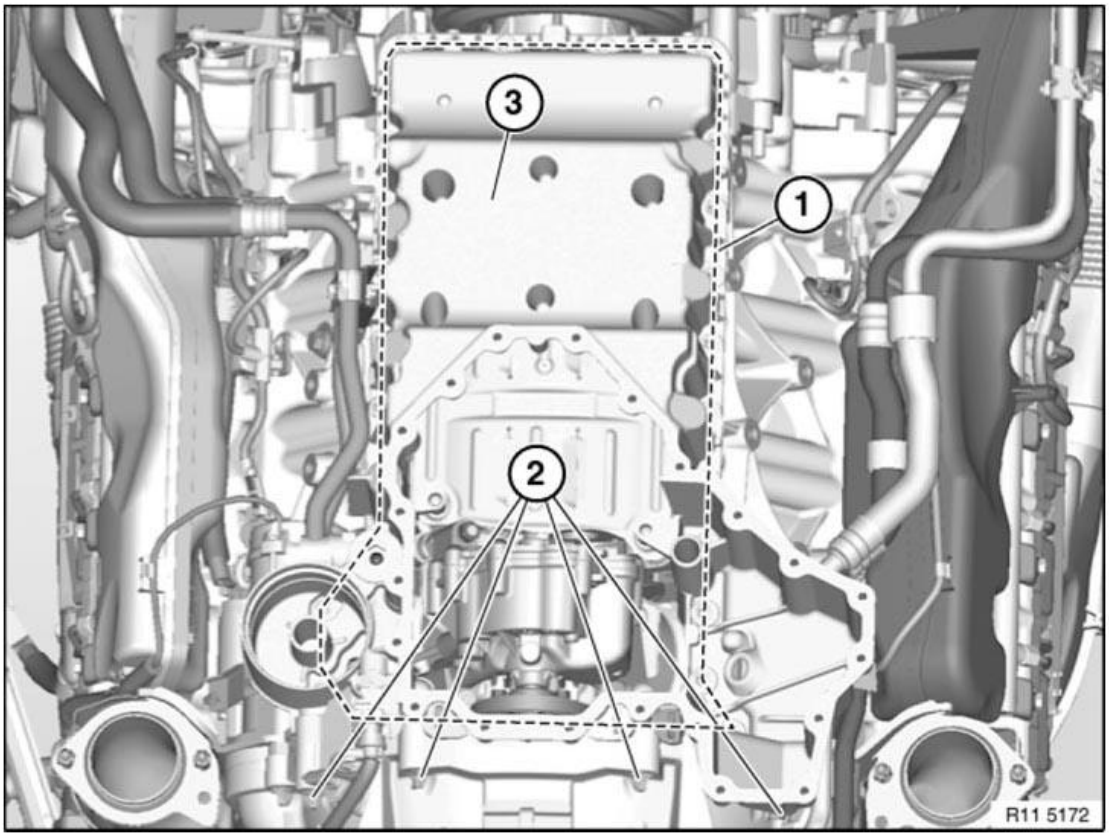


Fig. 85: Identifying Transmission End Screws And Upper Oil Sump Section
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws in area of line (1).

Tightening torque **11 13 2AZ** .

Release screws (2) on transmission end **24 00 1AZ** .

Remove upper oil sump section (3).

Installation note:

Free sealing surfaces of seal debris and clean.

Replace gasket.

Modify oil pressure switch if replacing oil sump.

Assemble engine.

1114 HOUSING COVER

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1114110 REMOVING AND INSTALLING LOWER TIMING CASE COVER (N63)

Necessary preliminary work

- Remove **ENGINE**
- Remove both cylinder head covers. See **LEFT CYLINDER HEAD COVER** and **RIGHT CYLINDER HEAD COVER**
- Remove **LOWER OIL SUMP SECTION**
- Remove **UPPER OIL SUMP SECTION**
- Remove alternator **BELT TENSIONER**
- Remove **VIBRATION DAMPER**
- Remove **COOLANT PUMP**
- Remove **ALTERNATOR**
- Remove **A/C COMPRESSOR**
- Remove hub for **VIBRATION DAMPER**

Release screws along lines (1).

Remove timing case cover (2) towards front.

Clean sealing surfaces with special tool **11 4 470** .

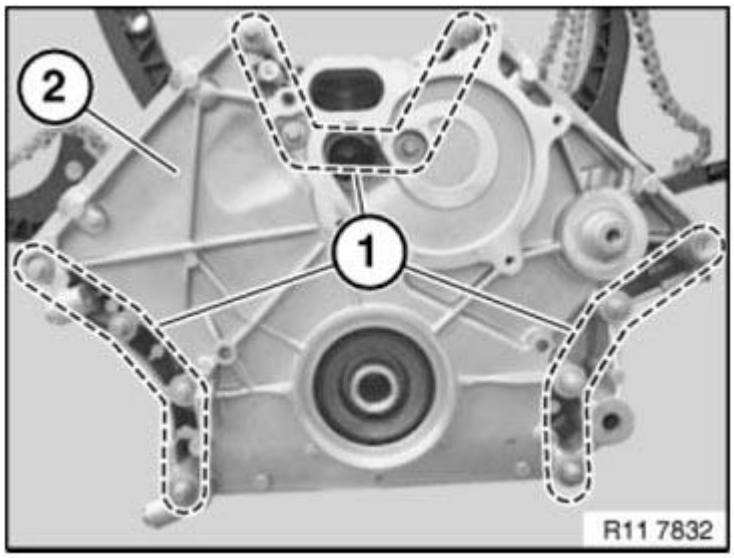


Fig. 86: Identifying Screws Along Lines And Timing Case Cover
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Check jump guard for damage.

Release screw (1).

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Tightening torque **11 14 1AZ** .

Remove jump guard (2).

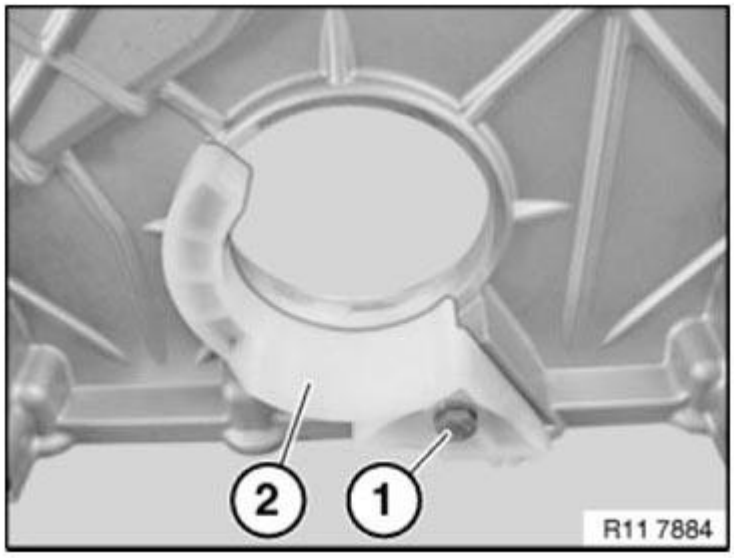


Fig. 87: Identifying Jump Guard And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Clean sealing surfaces with special tool **11 4 470** .

Installation note:

Preposition all bolts in timing case cover.

Replace beaded metal gaskets (1, 2 and 3)

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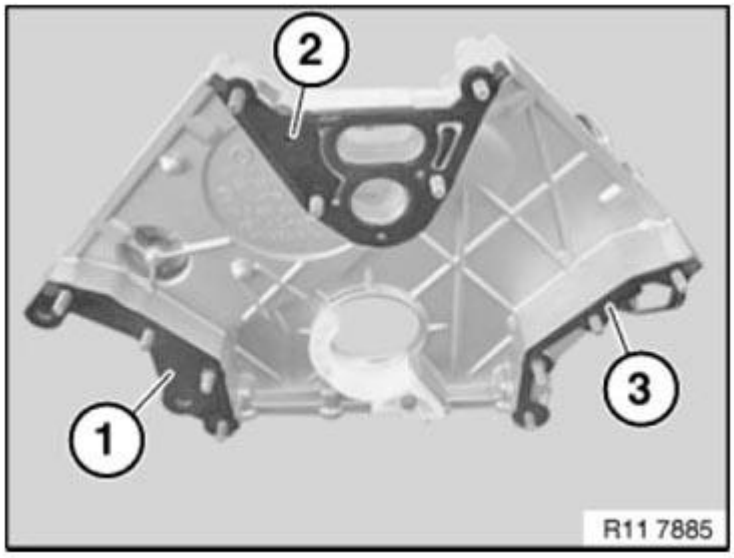


Fig. 88: Identifying Beaded Metal Gaskets
Courtesy of BMW OF NORTH AMERICA, INC.

Fit timing case cover (2).

Initially tighten all bolts to approx. 5 Nm.

Fully tighten all bolts in alternate sequence.

Tightening torque **11 14 2AZ** .

Installation note:

Wait for PU material to emerge at sealing joints.

Carefully wipe off protruding PU material.

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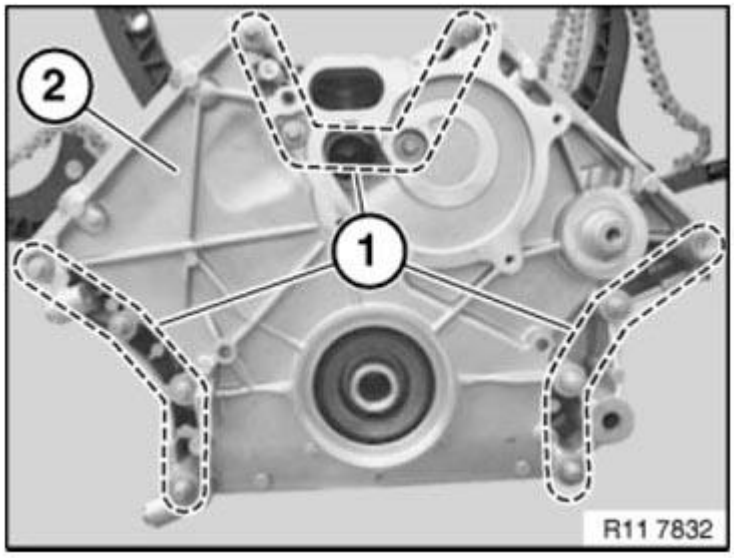


Fig. 89: Identifying Screws Along Lines And Timing Case Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Replace **RADIAL SHAFT SEAL** **in gear case cover at bottom.**

Assemble engine.

1114080 REMOVING AND INSTALLING TIMING CASE COVER, TOP LEFT (N63)

Timing case cover, cylinders 5-8

Necessary preliminary work

- Remove both **SOLENOID VALVES** on left side

Release screws (1).

Tightening torque **11 14 3AZ** .

Remove timing case cover (2).

Installation note:

Replace gasket

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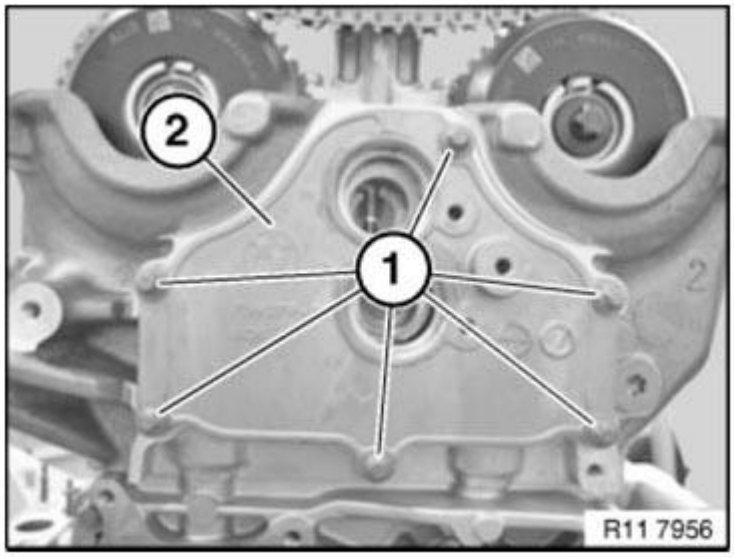


Fig. 90: Identifying Timing Case Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1114085 REMOVING AND INSTALLING TIMING CASE COVER, TOP RIGHT (N63)

Gear case cover, cylinders 1-4

Necessary preliminary work

- Remove both **SOLENOID VALVES** on right side

Release screws (1).

Tightening torque **11 14 3AZ** .

Remove timing case cover (2).

Installation note:

Replace gasket

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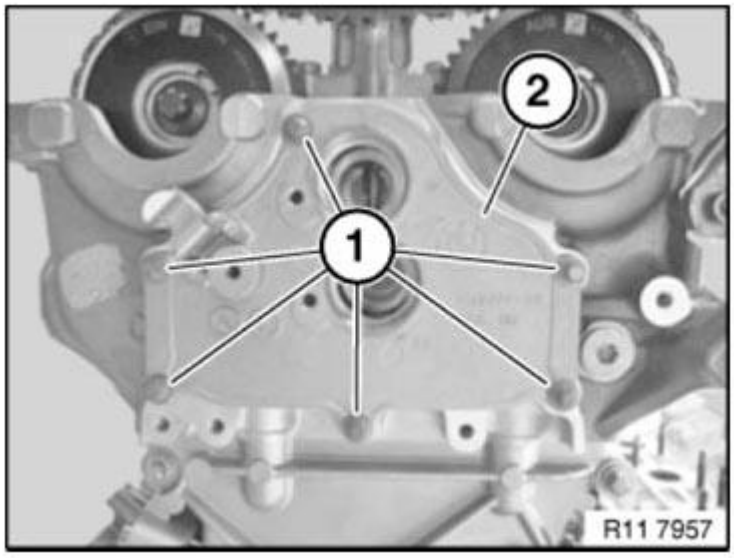


Fig. 91: Identifying Timing Case Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1114250 REMOVING AND INSTALLING/SEALING REAR COOLANT END COVER (N63)

Notes

WARNING: **Risk of scalding!**
Only perform this work after engine has cooled down.

Recycling

Catch and dispose of drained coolant in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Necessary preliminary work

- Remove **FLYWHEEL**
- Drain **COOLANT**

Release all screws in area (1).

Tightening torque **11 14 5AZ** .

Remove end cover.

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NOTE: Clean sealing surfaces with special tool 11 4 470 .

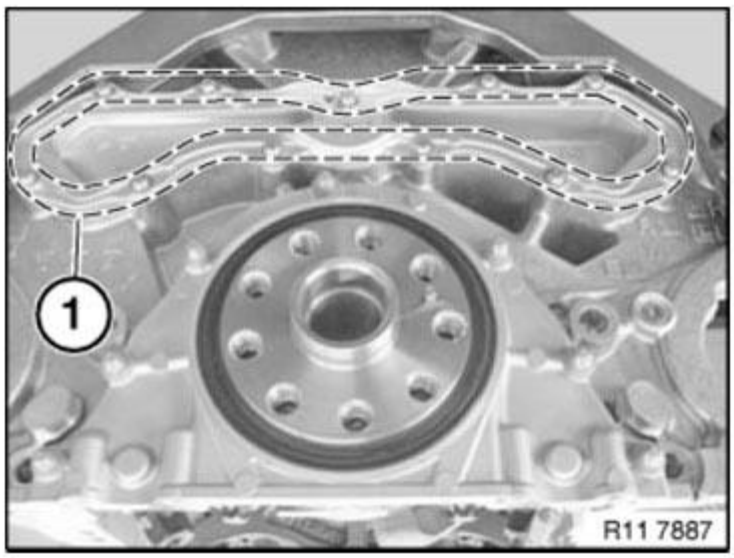


Fig. 92: Identifying End Cover Screws Area
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace profile seal (1)

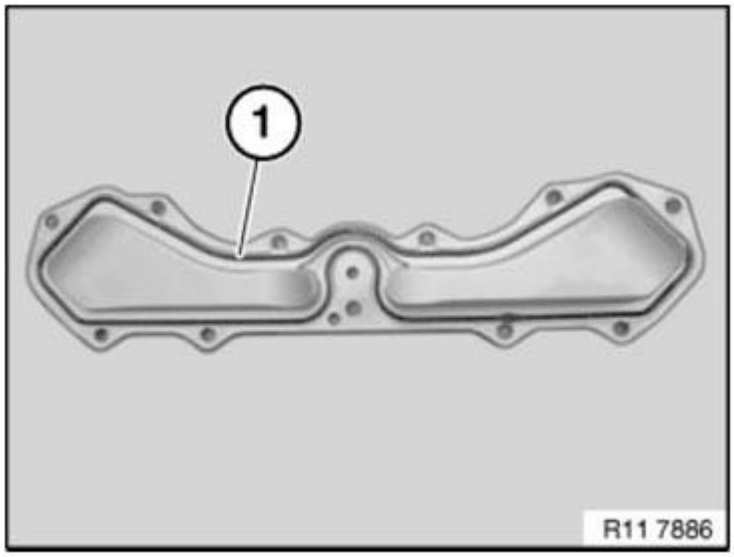


Fig. 93: Identifying Profile Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

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1114151 REPLACING CRANKSHAFT RADIAL SEAL ON TRANSMISSION SIDE (N63)

IMPORTANT: The radial crankshaft seal can only be replaced completely with the end cover. The radial crankshaft seal is an integral part of the end cover and can not be replaced individually.

Necessary preliminary work

- Drain off engine oil. See **SERVICE - ENGINE OIL**
- Remove **FLYWHEEL**

Release screws (1).

Unfasten screws (2).

Carefully remove end cover with radial crankshaft seal.

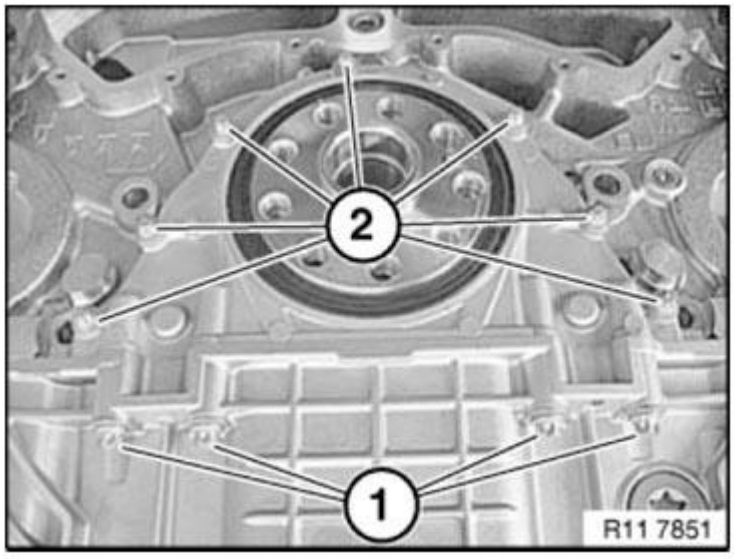


Fig. 94: Identifying Radial Crankshaft Seal End Cover Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Support bush (2) is included in delivery specification.
If the radial crankshaft seal (1) is stored for more than six months without the support bush (2), its operational reliability will no longer be guaranteed.
Radial crankshaft seal (1) must not be reused in this eventuality!
Support bush (2) remains in the radial crankshaft seal (1) and is used as a slip bush during described installation described below.

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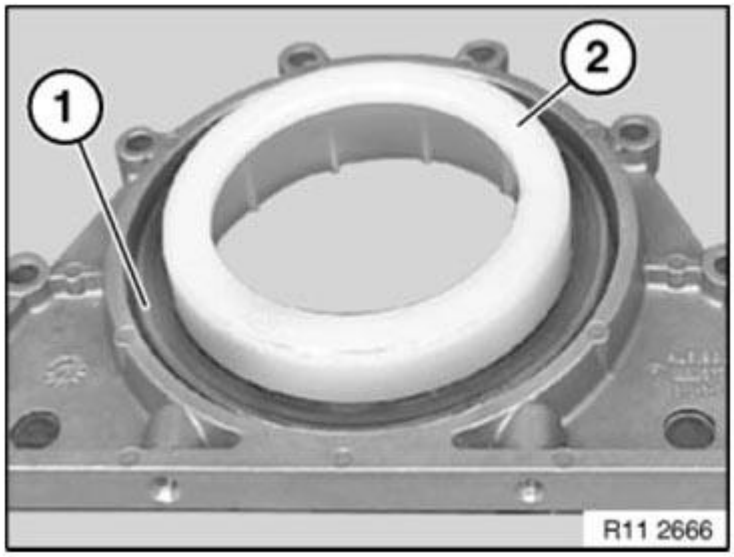


Fig. 95: Identifying Support Bush And Radial Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The sealing lip of the radial crankshaft seal (1) is highly sensitive and must not be kinked.
Do not touch the sealing lip with your fingers.

IMPORTANT: Special tool 11 2 390 must not be used.

When the radial crankshaft seal is installed, only the support bush included in the delivery specification may be used as a slip bush.

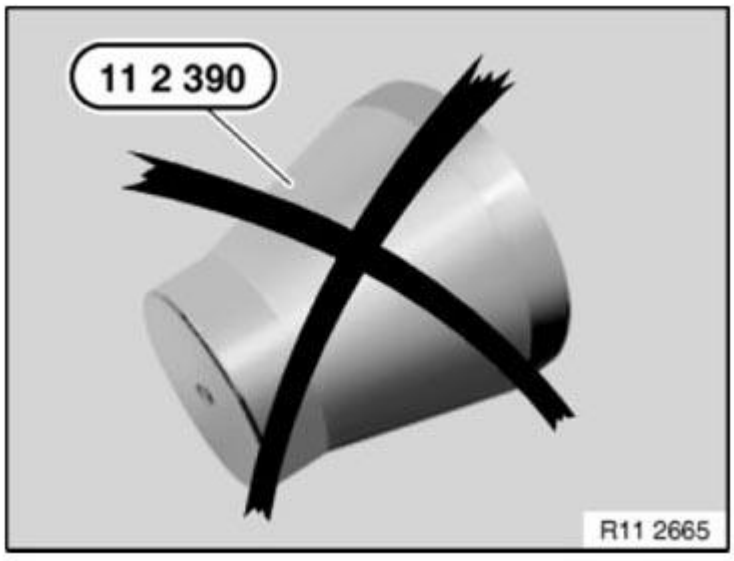


Fig. 96: Precaution - Special Tool 11 2 390 Must Not Be Used

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Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check fitting sleeves (1) for damage and correct installation position.

Clean sealing surface (2) so that it is free from oil and grease.

Coat contact points on joint along oil sump (see arrows) with Drei Bond 1209.

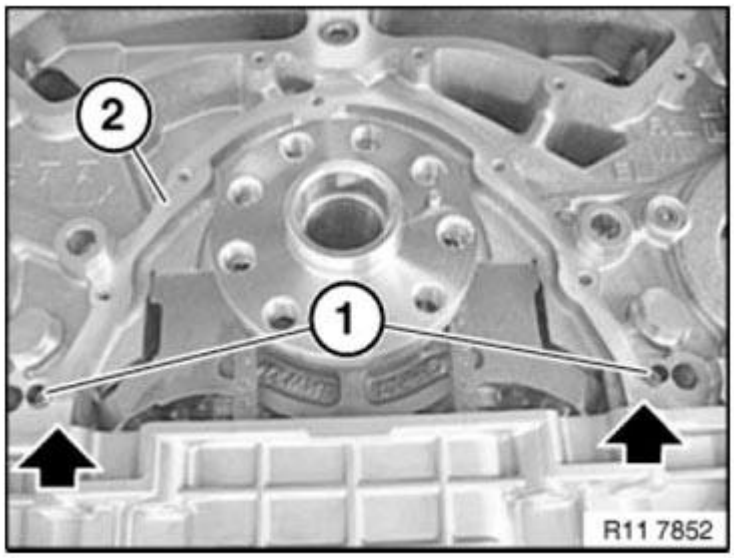


Fig. 97: Identifying Fitting Sleeves And Sealing Surface
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Lightly oil running surface of crankshaft.

Fit end cover (1) with support bush (2) on crankshaft and push on carefully.

NOTE: Illustration shows (N62TU).

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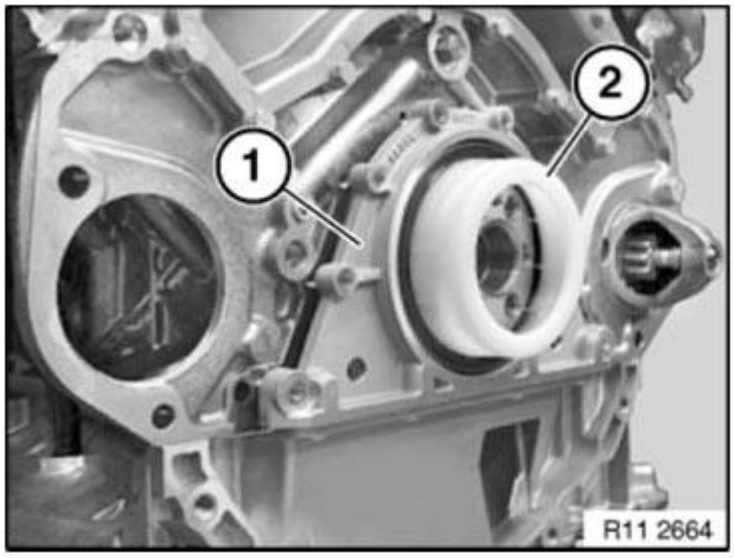


Fig. 98: Identifying End Cover And Support Bush
Courtesy of BMW OF NORTH AMERICA, INC.

Insert screws (2) and initially tighten without play.

Insert screws (1) and initially tighten without play.

Tighten down bolts (2) from inside outwards.

Tighten down screws (1) from inside outwards.

Tightening torque **11 14 4AZ** .

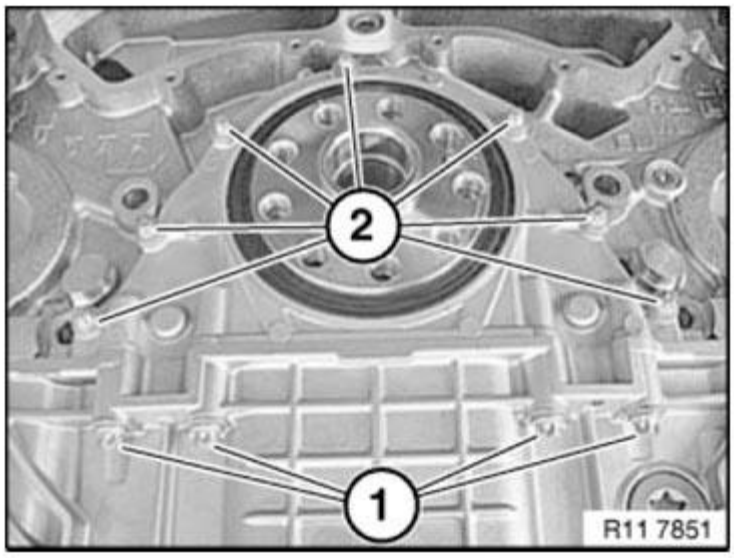


Fig. 99: Identifying Radial Crankshaft Seal End Cover Screws

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Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1114141 REPLACING RADIAL SHAFT SEAL IN LOWER TIMING CASE COVER (N63)

Necessary preliminary work

- Removing **VIBRATION DAMPER**

Position all levers (2) horizontally to pull off radial shaft seal (1).

Turn back spindle of special tool **11 9 410** until all levers (2) can be positioned on sealing lip.

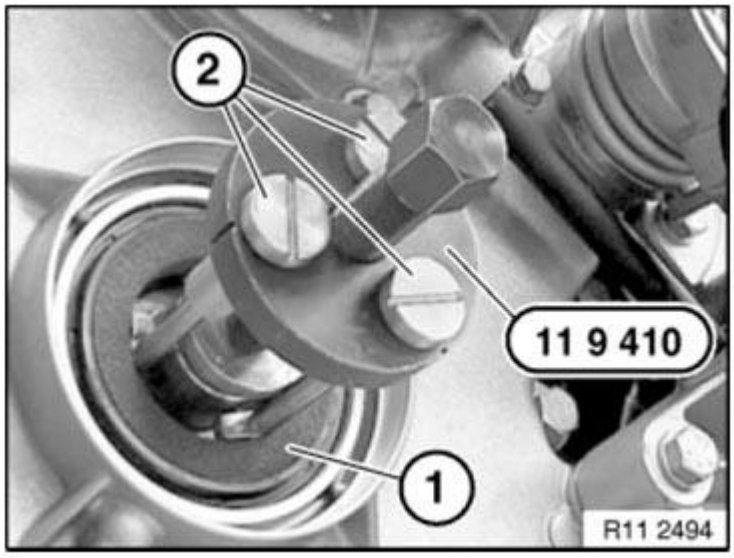


Fig. 100: Positioning All Levers Horizontally To Pull Off Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Turn all levers (2) so that they grip behind radial shaft seal (1).

Turn spindle (3) on special tool **11 9 410** to remove radial shaft seal (1).

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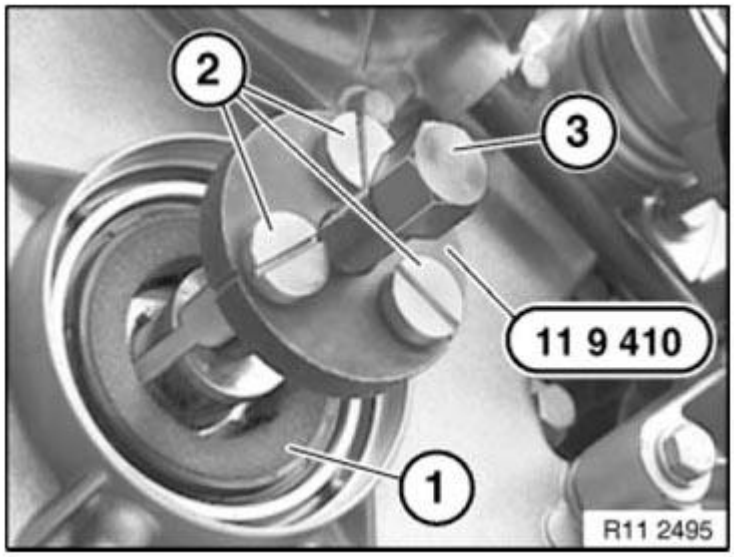


Fig. 101: Turning Spindle On Special Tool 11 9 410 To Remove Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Radial shaft seal (1) may only be supported with "support sleeve" (2).

If the radial shaft seal (1) is stored for more than six months without the support sleeve (2), its operational reliability will no longer be guaranteed.

Radial shaft seal (1) must not be reused in this case!

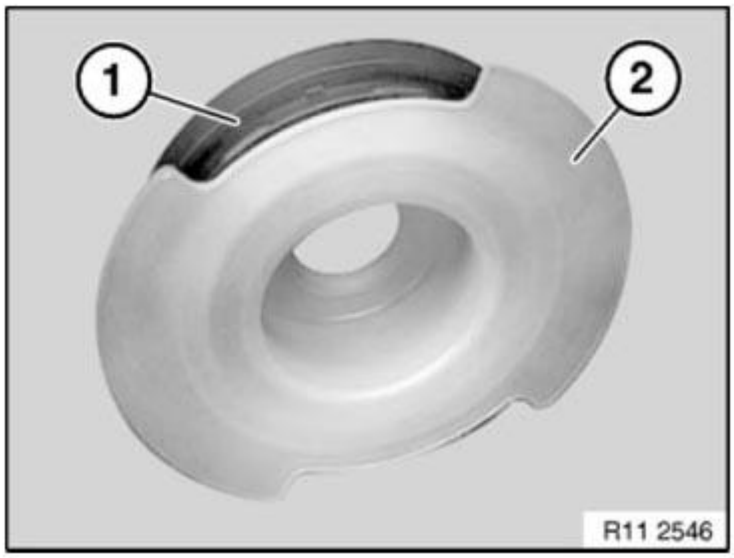


Fig. 102: Identifying Radial Shaft Seal And Support Sleeve
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The sealing lip of the radial shaft seal (1) is highly sensitive and must not be

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kinked under any circumstances.
Do not touch the sealing lip with your fingers.

Remove support sleeve (2) from radial shaft seal (1).

Fit radial shaft seal (1) on lower gear case cover.

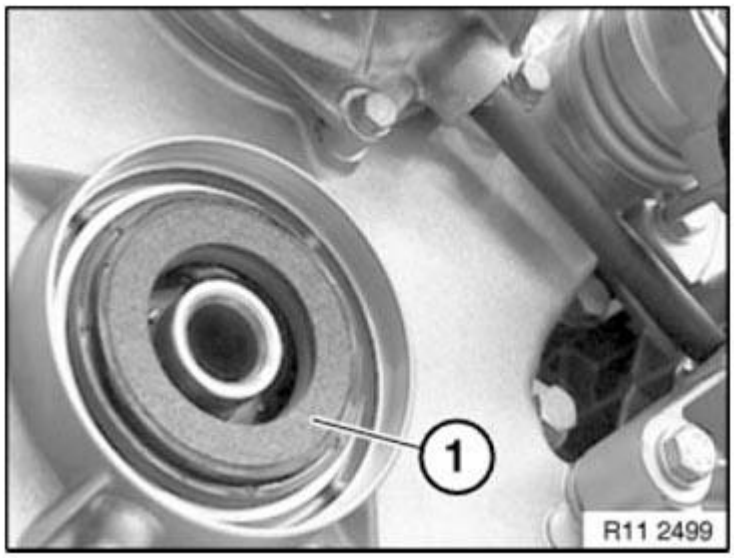


Fig. 103: Identifying Radial Shaft Seal On Lower Gear Case Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Using special tool **11 9 420** and central bolt (3), screw radial shaft seal into lower gear case cover until flush.

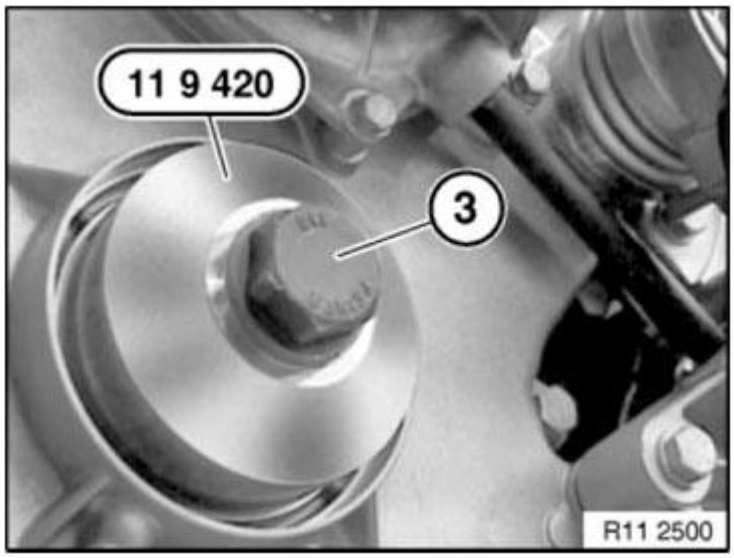


Fig. 104: Identifying Special Tool And Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

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Assemble engine.

1121 CRANKSHAFT WITH BEARING

1121531 REPLACING ALL CRANKSHAFT MAIN BEARING SHELLS (N63) WITHOUT HYBRID DRIVE

Notes

IMPORTANT: Risk of injury from sharp edge of housing.

IMPORTANT: If a crankcase or a crankshaft is replaced, old and new identifications can be used.

A mixed installation is permissible.

Example:

An old crankcase with an old crankcase designation and a new crankshaft with a new crankshaft designation.

An old crankshaft with an older crankshaft designation and a new crankcase with a new crankcase designation.

Or a new crankcase with a new crankshaft with new identifications.

Necessary preliminary work

- Remove **CRANKSHAFT**

NOTE: The main bearing caps 1 to 5 are marked with numbers.

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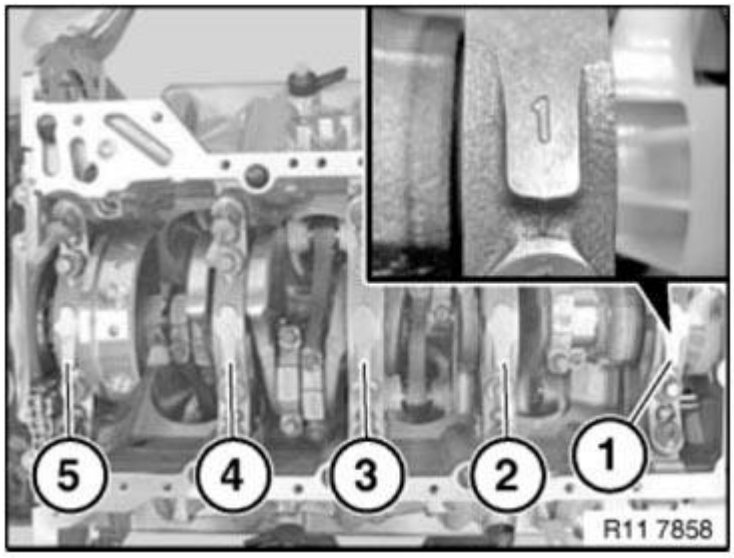


Fig. 105: Identifying Main Bearing Caps Marked Numbers
Courtesy of BMW OF NORTH AMERICA, INC.

Observe crankshaft construction stage:

S: Series

B: Repair stage 1

C: Repair stage 2

The letters denote the bearing shell classification for the relevant bearing position from 1 to 5 (main bearing cap).

The first letter on the left applies to the first bearing position at the front on the timing chain drive.

Color assignment on crankshaft 1 to 5

Y= yellow

G= green

V= violet

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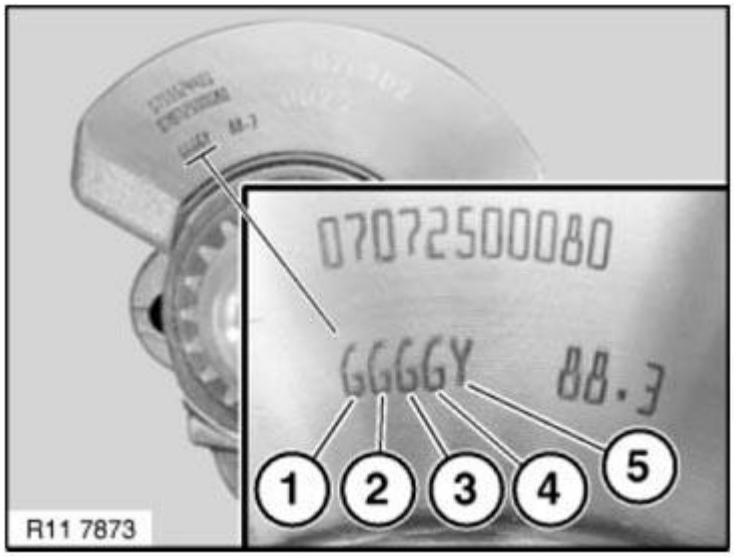


Fig. 106: Identifying Color Assignment On Crankshaft 1 To 5
Courtesy of BMW OF NORTH AMERICA, INC.

The letters denote the bearing shell classification for the relevant bearing position from 1 to 5 in the crankcase and is located on the transmission side in the Vee. The first letter on the left applies to the first bearing position at the front on the timing chain drive.

Color assignment in crankcase 1 to 5.

Y= yellow

G= green

V= violet

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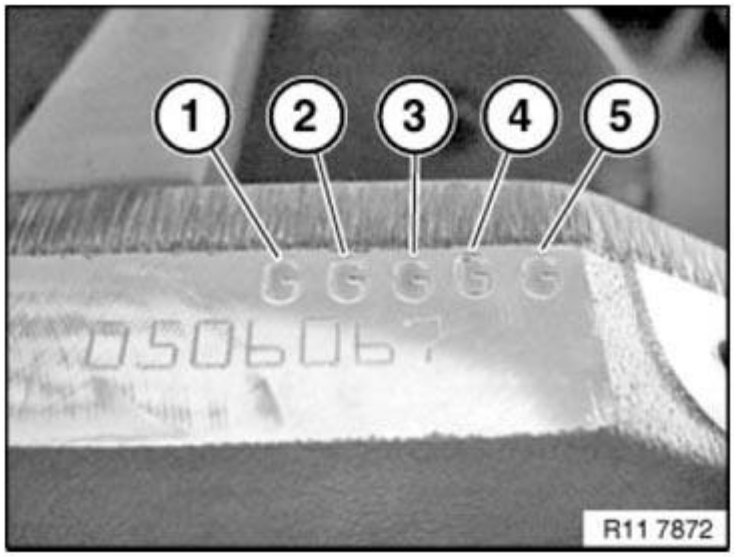


Fig. 107: Identifying Color Assignment In Crankcase 1 To 5
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: New bearing shell classification.

The letters denote the bearing shell classification for the relevant bearing position from 1 to 5 (main bearing cap).

The first letter on the left applies to the first bearing position at the front on the timing chain drive.

Color assignment on crankshaft 1 to 5

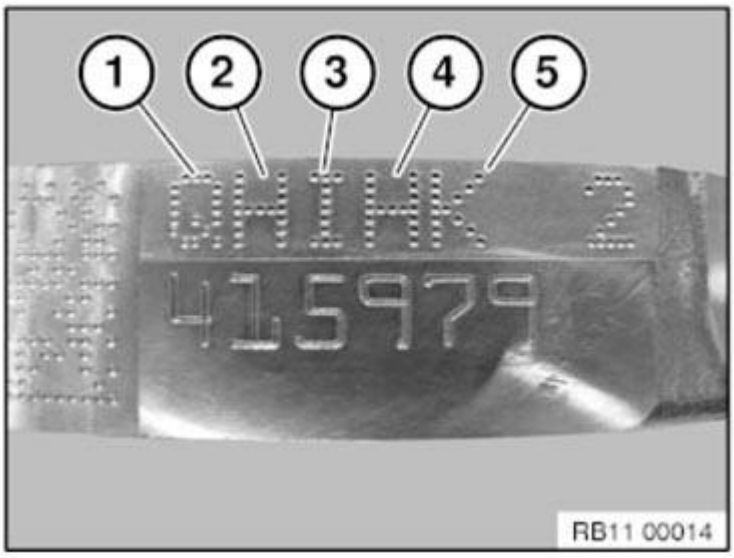


Fig. 108: Identifying Color Assignment On Crankshaft 1 To 5
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: Changed bearing classification:
Bearing position 1, 2, 3, 4 and 5

BEARING SHELL CLASSIFICATION LETTER WITH CODE

Code letter	Color code
New (A to H)	Yellow
Old Y	Yellow
New (I to R)	Green
Old G	Green
New (S is Z) Old V	Violet

TOLERANCE CLASSES AND BEARING SHELL COVERS COLOR CODE REFERENCE CHART

	Tolerance classes	Bearing shell covers
Crankcase	A B C D E G H	Yellow Yellow
Crankcase	I C M N P q R	Green Green
Crankcase	S T U W X Z	Violet

Installation note:

Install main bearing shells (1) with lubrication groove in crankcase.

Install main bearing shells (2) without lubrication groove in the main bearing caps.

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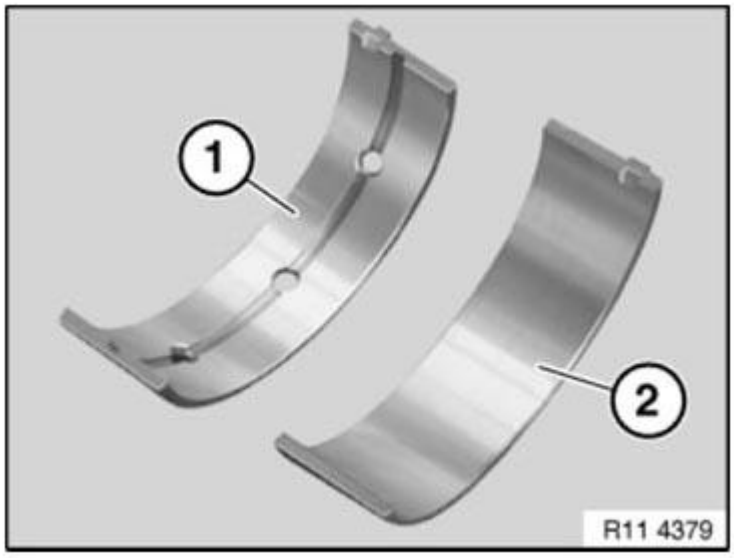


Fig. 109: Identifying Main Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Main bearing cap number 3 can be identified by the surfaces (1) for the thrust washers of the thrust bearing.

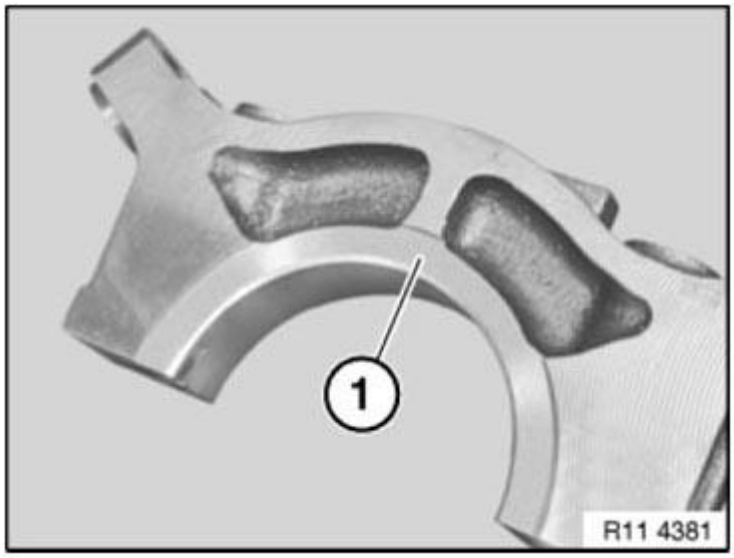


Fig. 110: Identifying Main Bearing Cap Thrust Washers Surfaces
Courtesy of BMW OF NORTH AMERICA, INC.

Turn back thread support bushing into main bearing cap.

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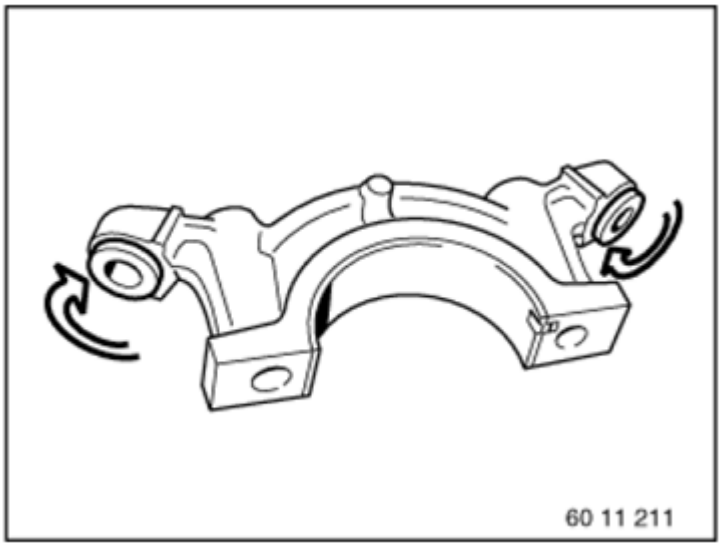


Fig. 111: Turning Back Thread Support Bushing Into Main Bearing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Checking main bearing clearance

To check crankshaft bearing play, use the existing main bearing bolts.

IMPORTANT: Risk of cracking!
No oil is permitted in the blind holes.

Do not twist crankshaft.

Place special tool **00 2 590**

(Plastigage model PG 1) onto the oil-free crankshaft (see arrow).

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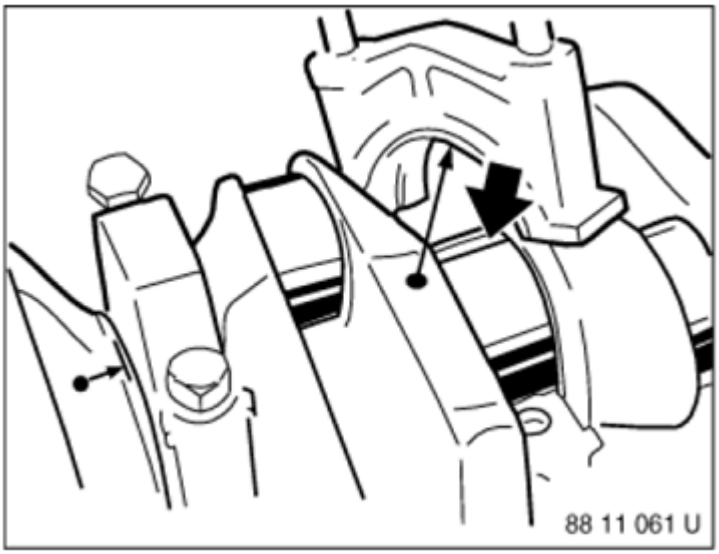


Fig. 112: Identifying Main Bearing Clearance On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down all collar bolts (M11) of main bearing caps in sequence 1 to 5 to jointing torque.

Tightening torque **11 11 1AZ** .

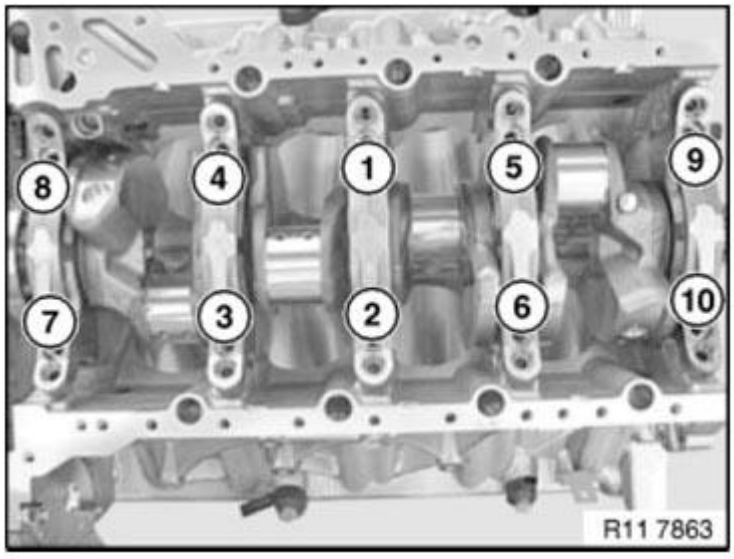


Fig. 113: Identifying Main Bearing Caps Collar Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down all collar bolts (M11) of main bearing caps with special tool **00 9 120** with angle of rotation.

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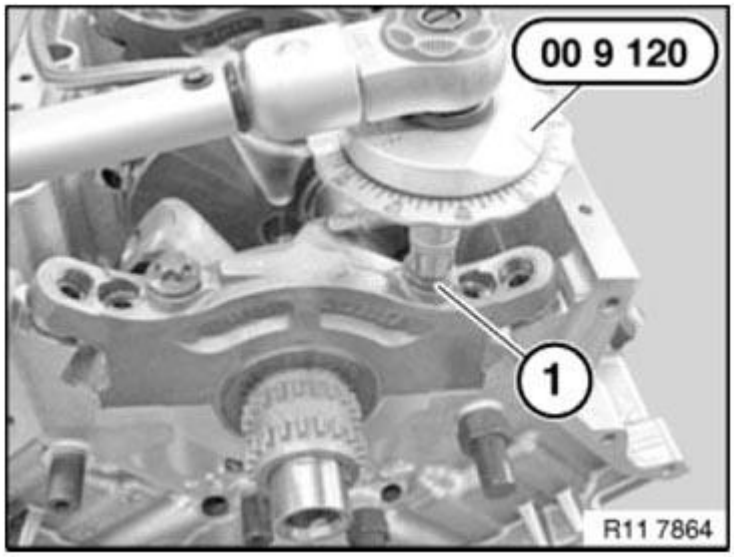


Fig. 114: Tightening Collar Bolts (M11) Of Main Bearing Caps With Special Tool 00 9 120 With Angle Of Rotation
Courtesy of BMW OF NORTH AMERICA, INC.

Remove main bearing cap.

Read off main bearing clearance at width of flattened plastic thread with assistance of measurement scale.

Main bearing clearance: See **CRANKSHAFT AND BEARINGS** or **CRANKSHAFT AND BEARINGS** .

- Remove plastic thread
- Apply a coat of oil to new bearing shells and crankshaft

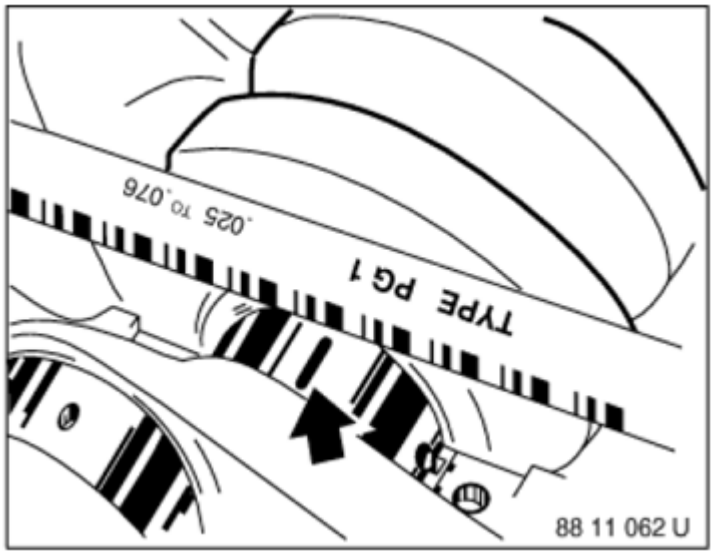


Fig. 115: Measuring Main Bearing Clearance

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Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Always replace main bearing bolts in main bearing caps with new bolts. Do not wash off bolt coating.

IMPORTANT: Risk of cracking! No oil is permitted in the blind holes.

Install **CRANKSHAFT** .

Carefully strike back and front of crankshaft with a plastic hammer to center guide bearing (do not damage crankshaft).

Secure special tool 11 6 252 with magnetic foot on crankcase.

Position special tool 11 6 251.

Tightening specifications for main bearing:

Check **SIDE CLEARANCE** .

Check guide bearing shell, crankshaft and crankcase if necessary.

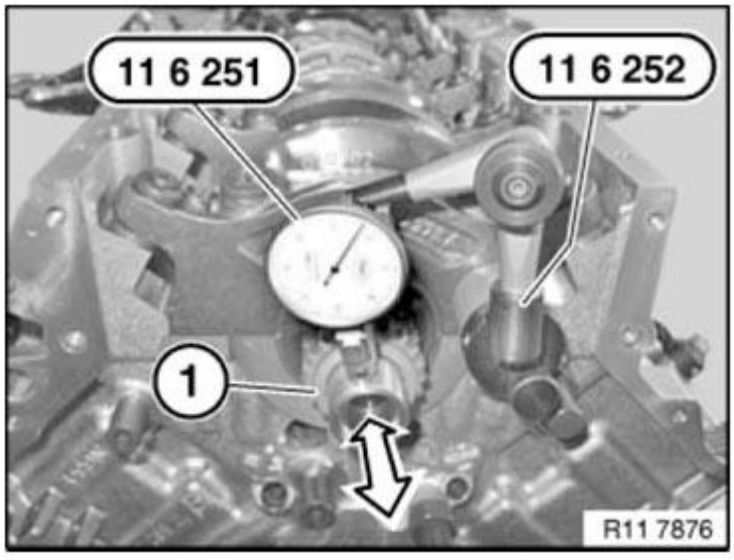


Fig. 116: Checking Side Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1121500 REPLACING CRANKSHAFT (N63)

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Notes

IMPORTANT: Weight of crankshaft is approx. 20 kg.
Risk of injury from sharp edge of housing.

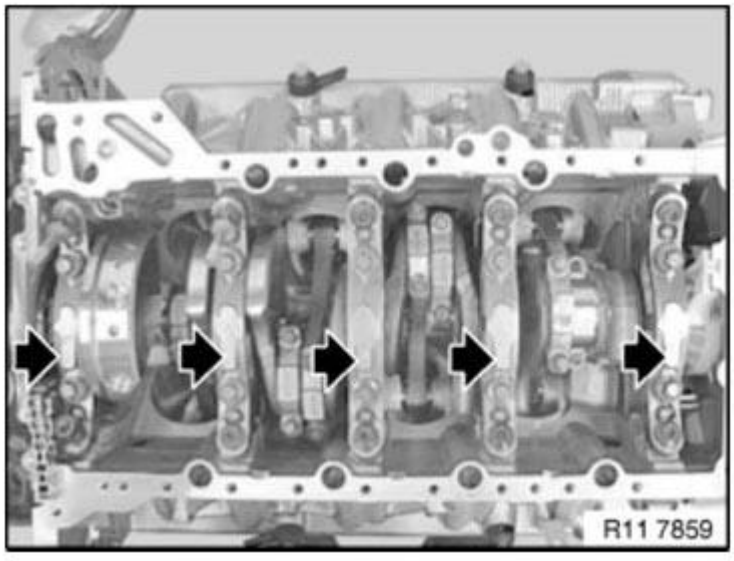
Necessary preliminary work

- Remove **ENGINE**
- Mount engine on assembly stand
- Remove cylinder head. See **LEFT CYLINDER HEAD** and **RIGHT CYLINDER HEAD**.
- Remove **HUB FOR VIBRATION DAMPER**
- Removing **LOWER TIMING CASE COVER**
- **Removing oil pan** See **1113020 REMOVING AND INSTALLING/REPLACING LOWER OIL SUMP SECTION (N63)** and **1113010 REMOVING AND INSTALLING/REPLACING UPPER OIL SUMP SECTION (N63)**
- Remove **OIL PUMP**
- Removing **PISTON**
- Remove **FLYWHEEL**
- Remove radial shaft seals. See **RADIAL SHAFT SEAL IN LOWER TIMING CASE COVER** and **CRANKSHAFT RADIAL SEAL ON TRANSMISSION SIDE**
- Remove **TIMING CHAINS**

Installation note:

Layout of main bearing caps.

All numbers must be read from the cylinder bank (5 to 8) (see arrows).



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Fig. 117: Locating Main Bearing Caps Numbers
Courtesy of BMW OF NORTH AMERICA, INC.

Main bearing caps (1 to 5) opposite the output end on the timing chain drive.

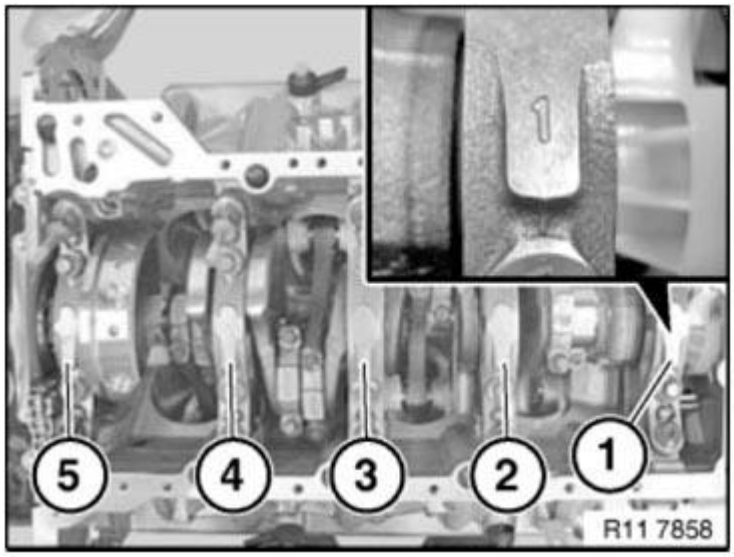


Fig. 118: Identifying Main Bearing Caps Numbers
Courtesy of BMW OF NORTH AMERICA, INC.

Release oil pump spacer bolts (1) with special tool **13 5 020** .

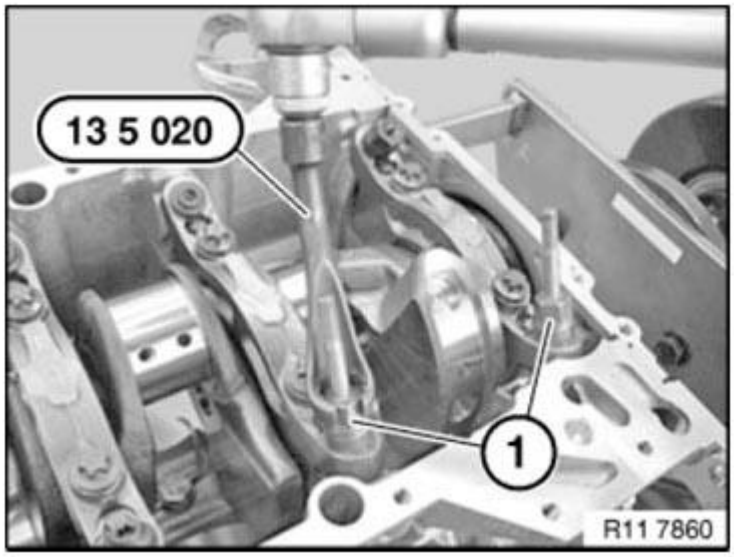


Fig. 119: Removing Oil Pump Spacer Bolts With Special Tool 13 5 020
Courtesy of BMW OF NORTH AMERICA, INC.

Release main bearing taper screw connection (1).

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Release oil pump spacer pins (2).

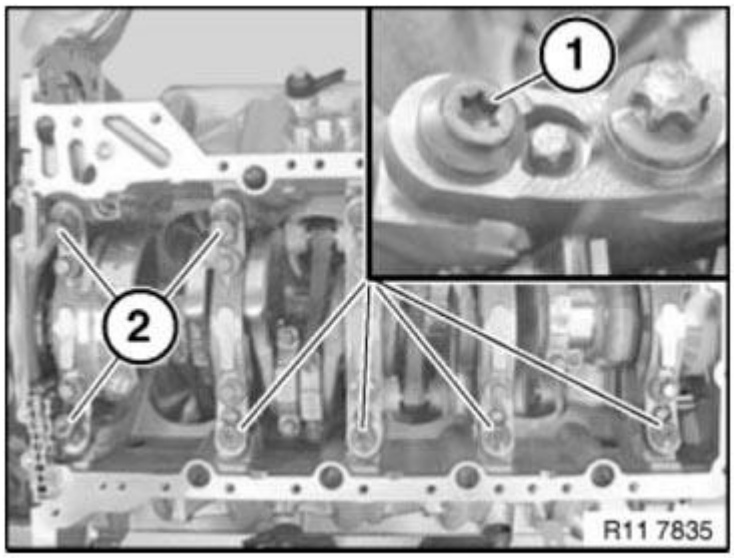


Fig. 120: Identifying Main Bearing Taper Screw Connection And Oil Pump Spacer Pins
Courtesy of BMW OF NORTH AMERICA, INC.

Release all threaded support sleeves (1).

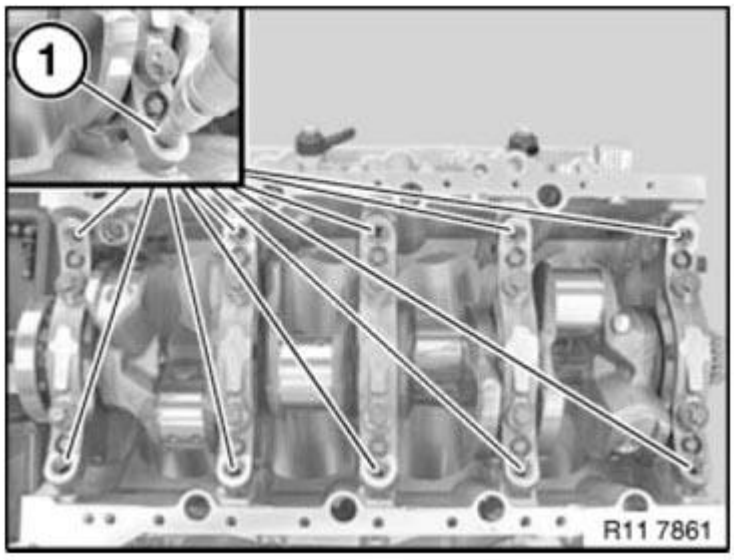


Fig. 121: Removing Threaded Support Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

Release collar bolts (M8) in sequence 10 to 1.

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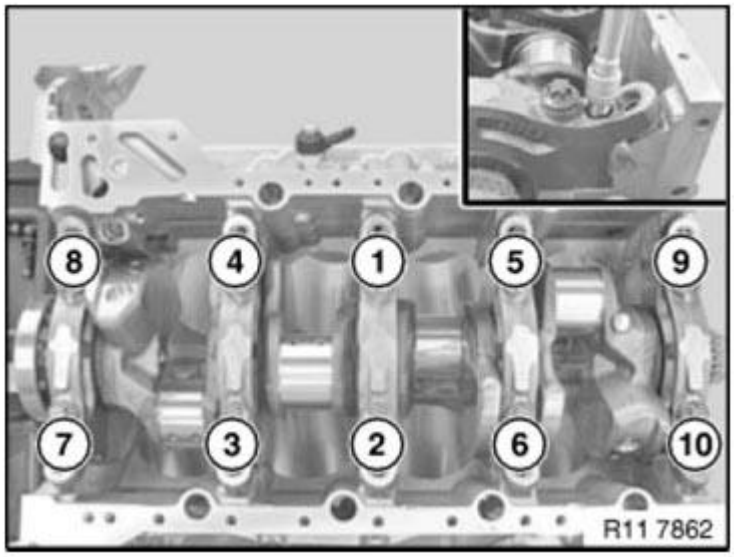


Fig. 122: Identifying Collar Bolts (M8) Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Release collar bolts (M11) in sequence 10 to 1.

Remove main bearing caps 1 to 5.

IMPORTANT: Remove crankshaft with a 2nd person, weight approx. 25 kg.

Lift out crankshaft and set down safely (secure against turning).

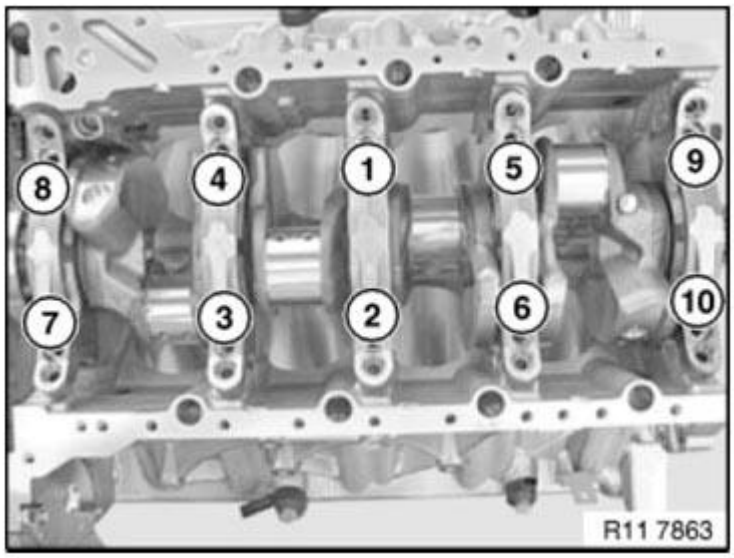


Fig. 123: Identifying Collar Bolts (M11) Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

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Release screw for oil nozzle (1).

Tightening torque: **11 11 8 AZ** .

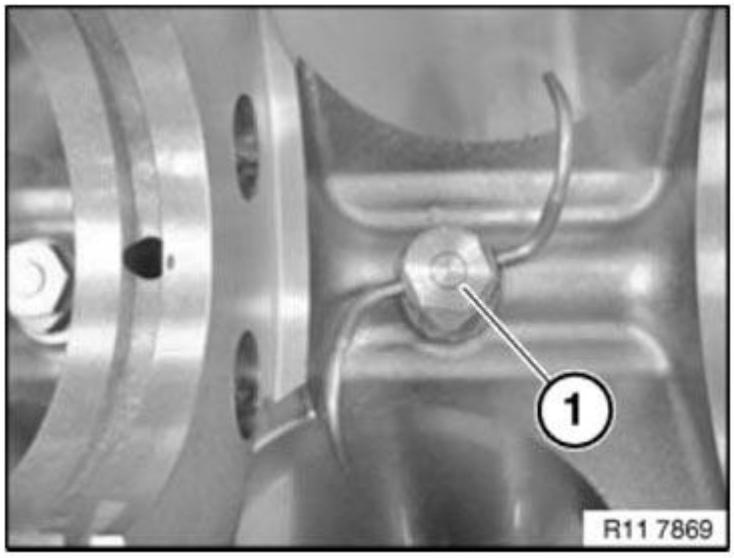


Fig. 124: Identifying Oil Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check oil nozzle (1) for clear passage with compressed air.

Observe fastening on oil nozzle.

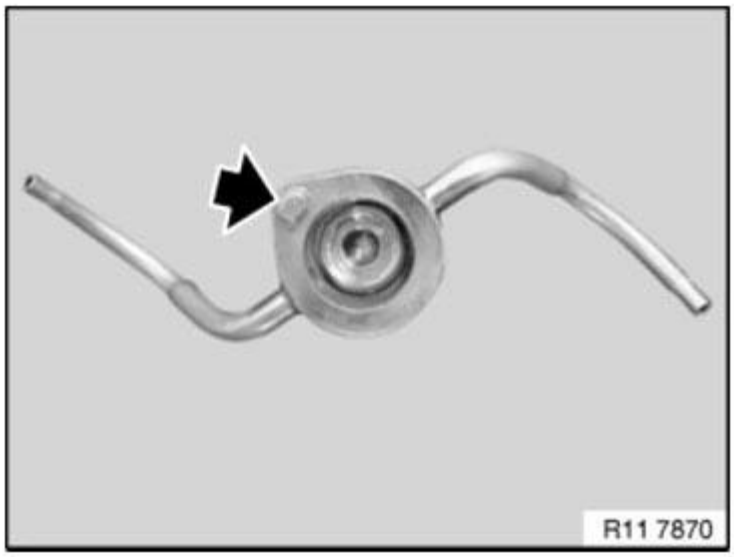


Fig. 125: Locating Fastening On Oil Nozzle

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Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Observe fastening in crankcase.

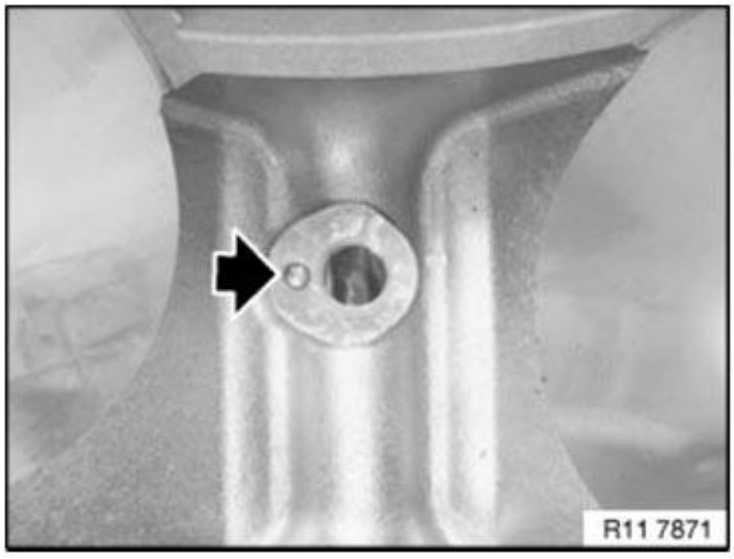


Fig. 126: Locating Fastening In Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Replace **CRANKSHAFT MAIN BEARING SHELLS** .

Installation note:

Observe arrangement of main bearing caps.

All numbers must be read from the cylinder bank (5 to 8) (see arrows).

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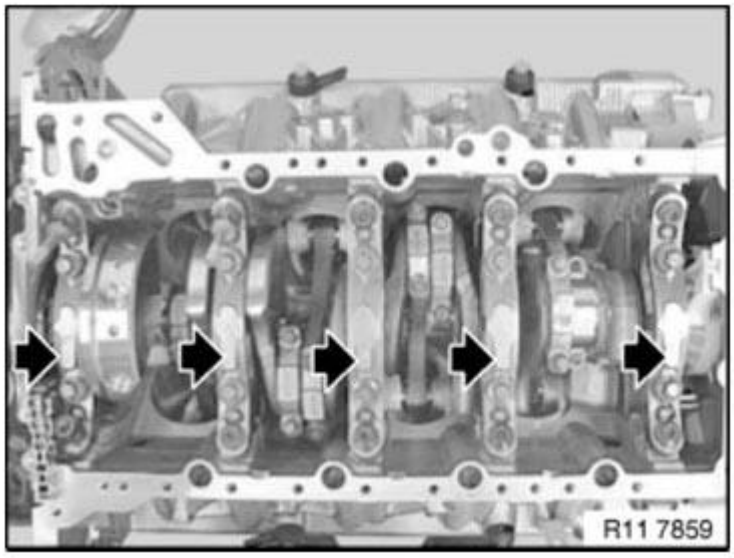


Fig. 127: Locating Main Bearing Caps Numbers
Courtesy of BMW OF NORTH AMERICA, INC.

Main bearing caps (1) is opposite the output end on the timing chain drive.

Turn back all threaded support sleeves hand-tight.

Installation note:

Coat all bearing positions with engine oil.

IMPORTANT: Install crankshaft with a 2nd person, weight approx. 25 kg.

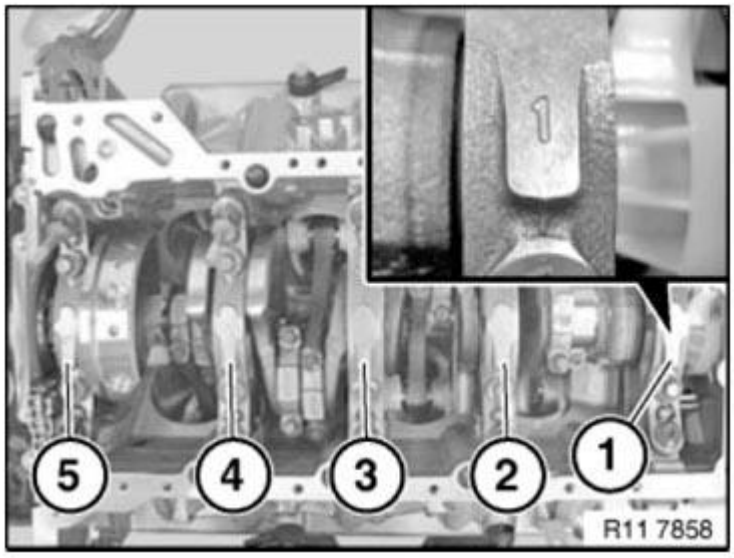


Fig. 128: Identifying Main Bearing Caps Numbers

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Courtesy of BMW OF NORTH AMERICA, INC.

Install crankshaft.

Fit bearing caps (1 to 5).

Set down bearing caps positioned from 1 to 5.

Insert all collar bolts (M11) hand-tight.

Secure collar bolts (M11) in sequence (1 to 10).

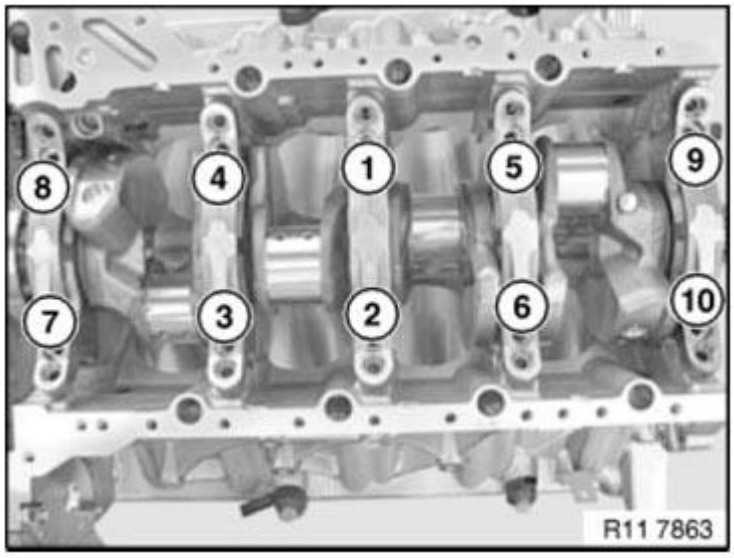


Fig. 129: Identifying Collar Bolts (M11) Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

For a better overview of the screw connection quality, mark the head of all collar bolts after joining with a line (1) using an oil-proof marker pen.

Check angle tightening.

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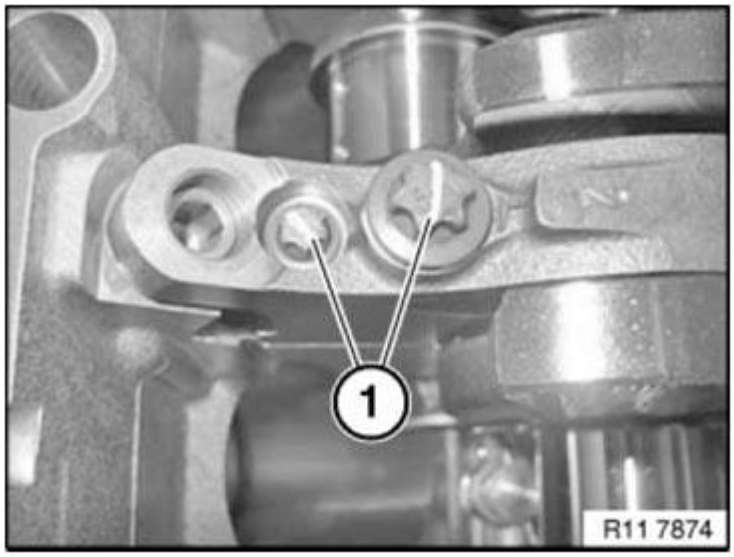


Fig. 130: Identifying Collar Bolts Head Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Secure collar bolt (1) with special tool **00 9 120** .

Tightening torque: **11 11 1AZ** .

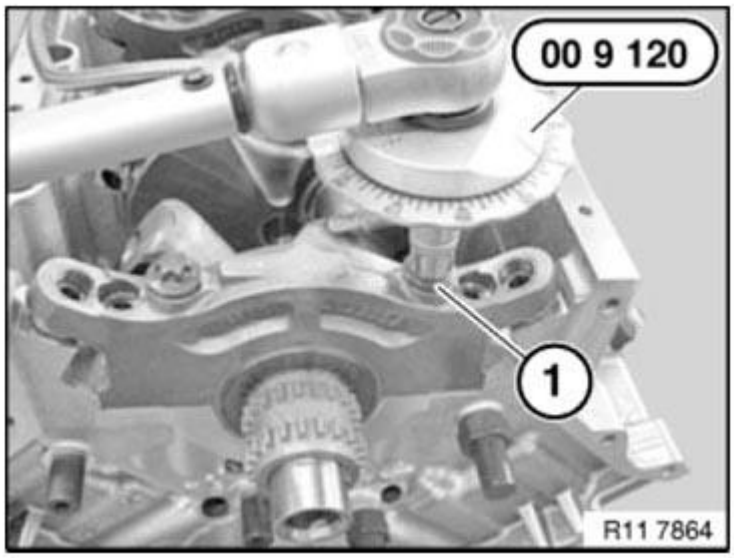


Fig. 131: Securing Collar Bolt With Special Tool 00 9 120
Courtesy of BMW OF NORTH AMERICA, INC.

Insert all collar bolts (M8) hand-tight.

Secure collar bolts (M8) in sequence (1 to 10).

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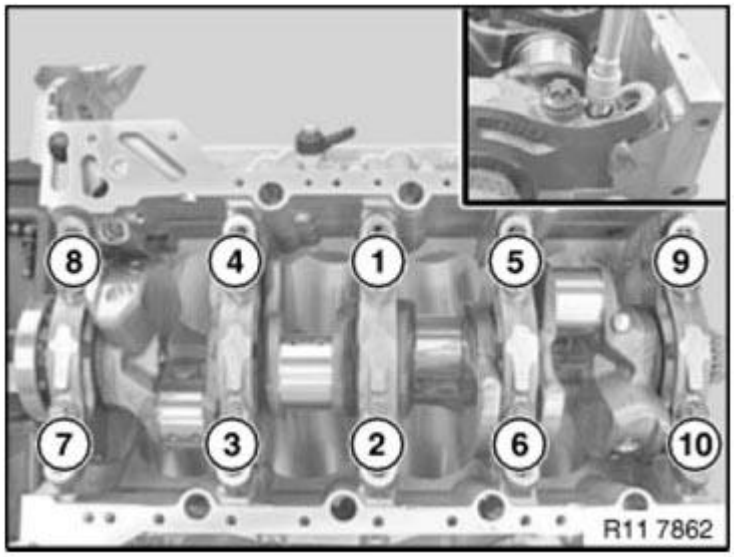


Fig. 132: Identifying Collar Bolts (M8) Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

For a better overview of the screw connection quality, mark the head of all collar bolts after joining with a line (1) using an oil-proof marker pen.

Check angle tightening.

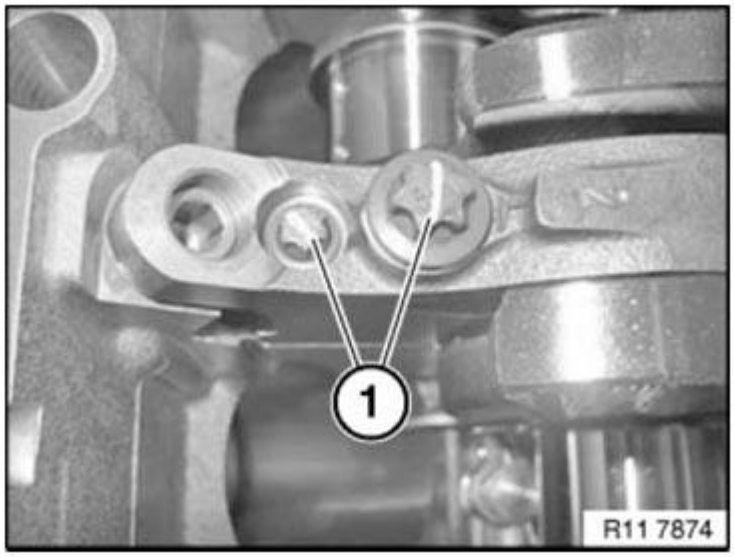


Fig. 133: Identifying Collar Bolts Head Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Secure collar bolt (1) with special tool **00 9 120** .

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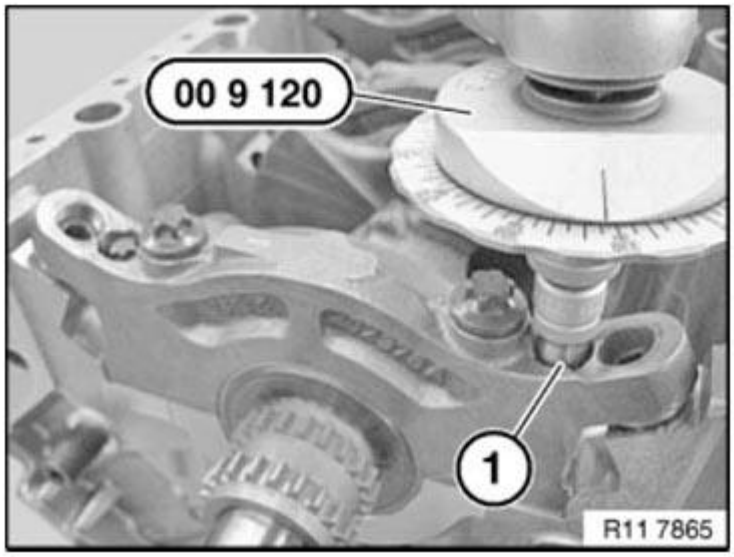


Fig. 134: Securing Collar Bolt With Special Tool 00 9 120
Courtesy of BMW OF NORTH AMERICA, INC.

Secure all threaded support sleeves (1) with special tool 11 4 350.

Tightening torque: **11 11 3 AZ** .

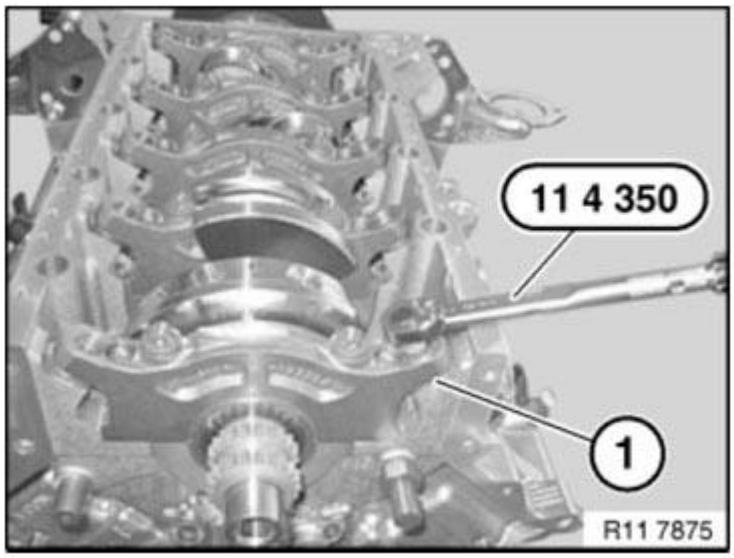


Fig. 135: Securing All Threaded Support Sleeves With Special Tool 11 4 350
Courtesy of BMW OF NORTH AMERICA, INC.

Secure main bearing taper screw connection (1).

Tightening torque: **11 11 4 AZ** .

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Secure oil pump spacer pins (2).

Tightening torque: **11 11 5 AZ** .

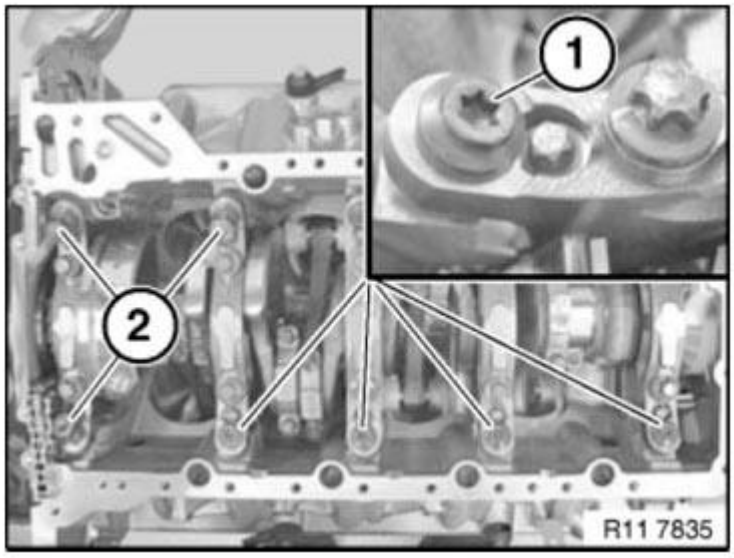


Fig. 136: Identifying Main Bearing Taper Screw Connection And Oil Pump Spacer Pins
Courtesy of BMW OF NORTH AMERICA, INC.

Check crankshaft **COEFFICIENT OF FRICTION** .

Determine crankshaft **breakaway torque** with special tool **00 2 010** .

Rotate crankshaft at central bolt using special tool **00 2 010** .

If the breakaway torque is too high, it will be necessary to correct the **bearing clearance** . See **CRANKSHAFT AND BEARINGS** .

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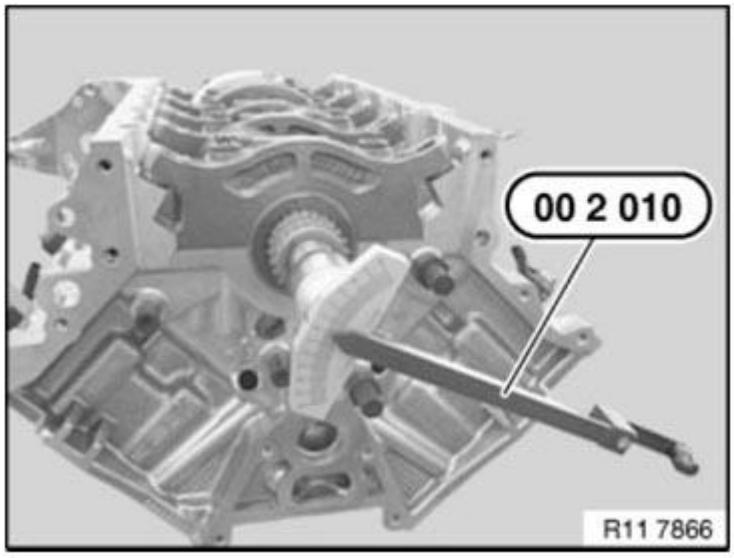


Fig. 137: Checking Crankshaft Breakaway Torque With Special Tool 00 2 010
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool 11 6 252 to crankcase with magnetic base.

Slide crankshaft in direction of arrow forwards as far as it will go.

Set special tool 11 6 251 to zero.

Slide crankshaft (1) in direction of arrow towards rear and determine value.

Check **axial play** . See **ENGINE - TECHNICAL DATA -- 750LI** .

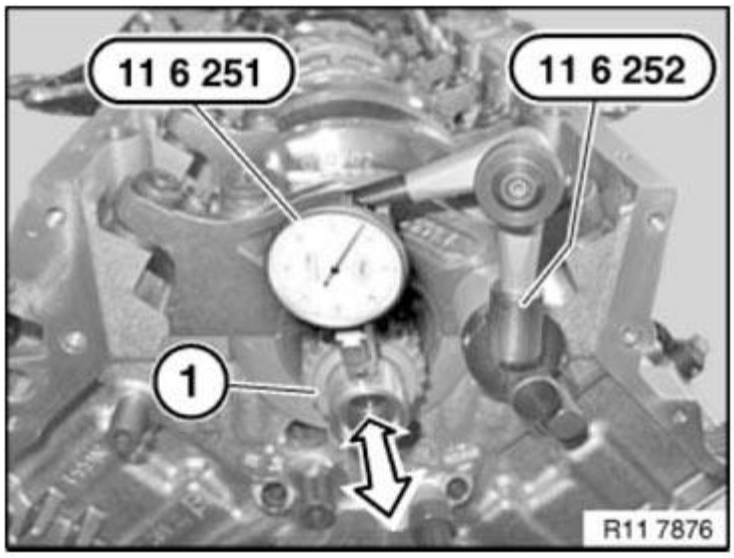


Fig. 138: Checking Axial Play

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Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1122 FLYWHEEL

1122000 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N63)

Necessary preliminary tasks

- Remove **AUTOMATIC TRANSMISSION**
- Remove manual transmission
- Remove clutch

Secure flywheel (1) with special tool **11 9 260** .

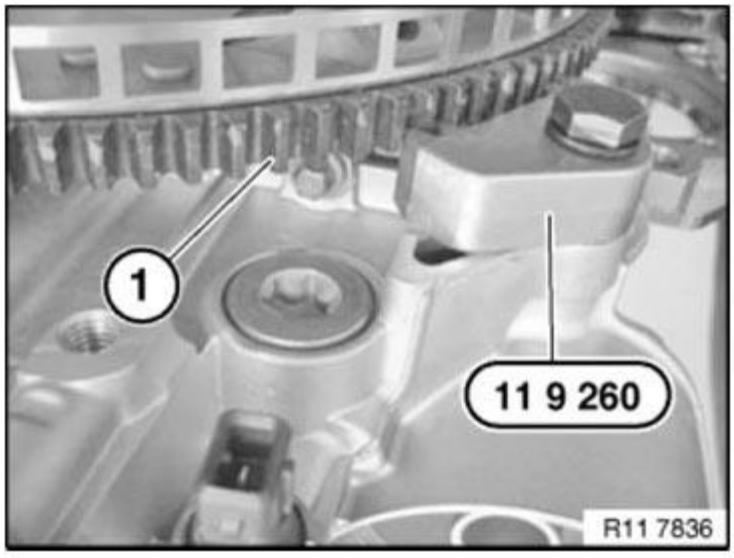


Fig. 139: Securing Flywheel With Special Tool 11 9 260
Courtesy of BMW OF NORTH AMERICA, INC.

Release flywheel screws in area (1).

Remove flywheel (2).

Installation:

Clean threads on flywheel screws in crankshaft.

Flywheel (2) is secured with an alignment pin.

Fit flywheel (2).

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Fit new flywheel screws

Tightening torque **11 22 1AZ** .

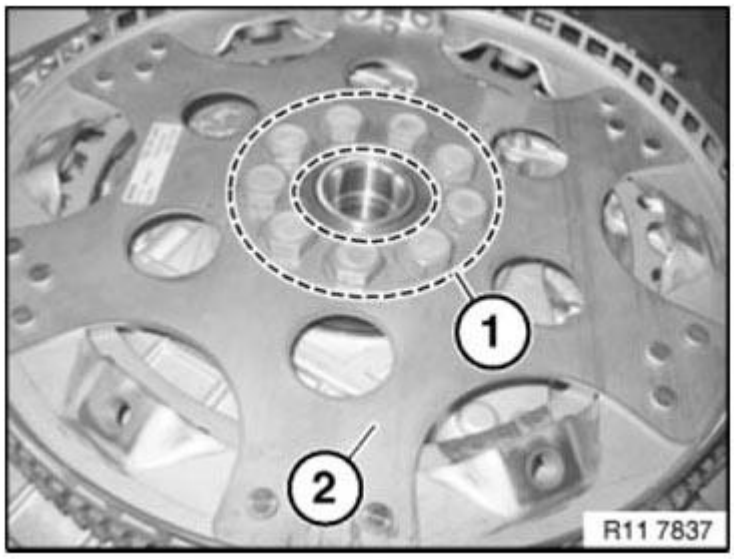
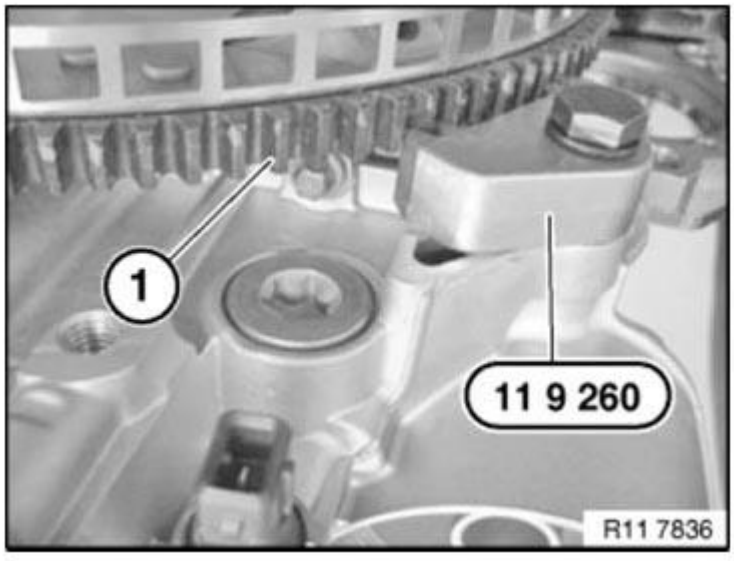


Fig. 140: Identifying Flywheel Screws
Courtesy of BMW OF NORTH AMERICA, INC.

1122510 REMOVING AND INSTALLING/REPLACING FLYWHEEL (TRANSMISSION REMOVED - N63)

Notes

Secure flywheel (1) with special tool **11 9 260** .



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Fig. 141: Securing Flywheel With Special Tool 11 9 260
Courtesy of BMW OF NORTH AMERICA, INC.

Release flywheel screws in area (1).

Remove flywheel (2).

Installation:

Clean threads on flywheel screws in crankshaft.

Flywheel (2) is secured with an alignment pin.

Fit flywheel (2).

Fit new flywheel screws

Tightening torque **11 22 1AZ** .

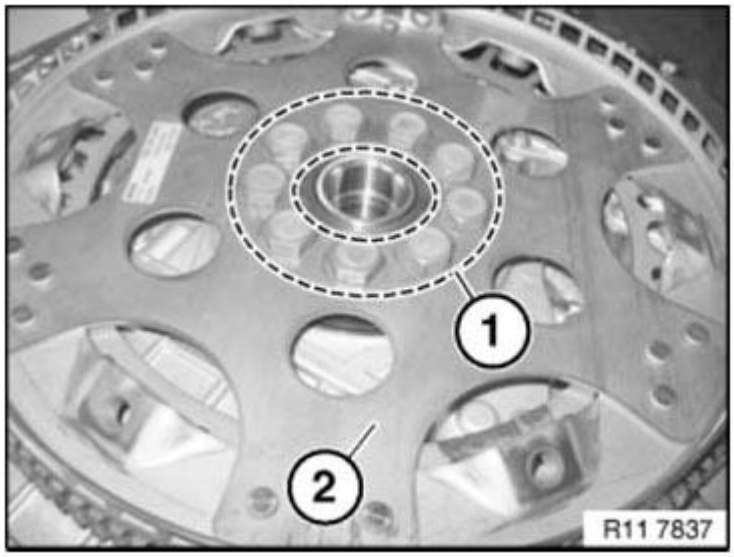


Fig. 142: Identifying Flywheel Screws
Courtesy of BMW OF NORTH AMERICA, INC.

1122513 REPLACING ROLLER BEARING FOR DUAL-MASS FLYWHEEL (N63)

Notes

NOTE: FLYWHEEL removed!

Using hydraulic press (1) and special tool 21 2 051, press roller bearing out of dual-mass flywheel downwards on engine side.

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IMPORTANT: Risk of damage:
Roller bearing must not be driven out.

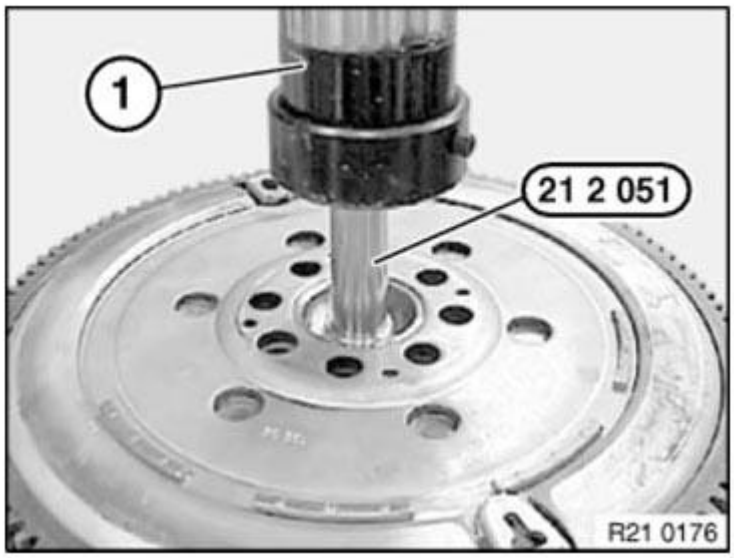


Fig. 143: Pressing Roller Bearing Out Of Dual-Mass Flywheel Downwards On Engine Side
Courtesy of BMW OF NORTH AMERICA, INC.

Push roller bearing (2) onto special tool 21 2 052.

Using hydraulic press (1), press roller bearing into dual-mass flywheel as far as it will go on clutch side.

IMPORTANT: Risk of damage:
Observe press-in instruction:

- **Roller bearing must not be driven in.**
- **Roller bearing mounting force/travel monitored:**

  Min. 2000 N 1 mm before end of pressing in.

  Max. 15, 000 N during entire press-in procedure.

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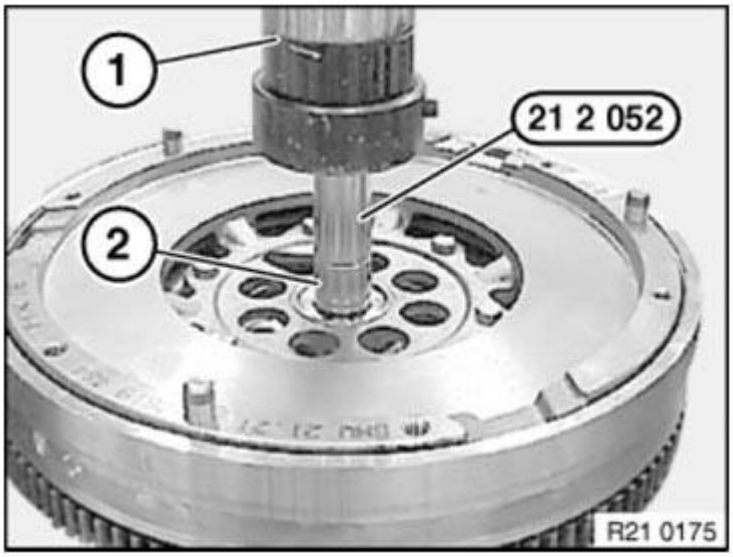


Fig. 144: Pressing Roller Bearing Into Dual-Mass Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.

1123 VIBRATION DAMPER

1123010 REMOVING AND INSTALLING/RENEWING VIBRATION DAMPER (N63)

Necessary preliminary work

- Remove **FAN COWL**
- Remove A/C compressor **DRIVE BELT**
- Remove alternator **DRIVE BELT**
- Remove belt pulley for A/C system

Release screw (1).

Tightening torque **11 28 1AZ** .

Remove belt tensioner with idler pulley (2).

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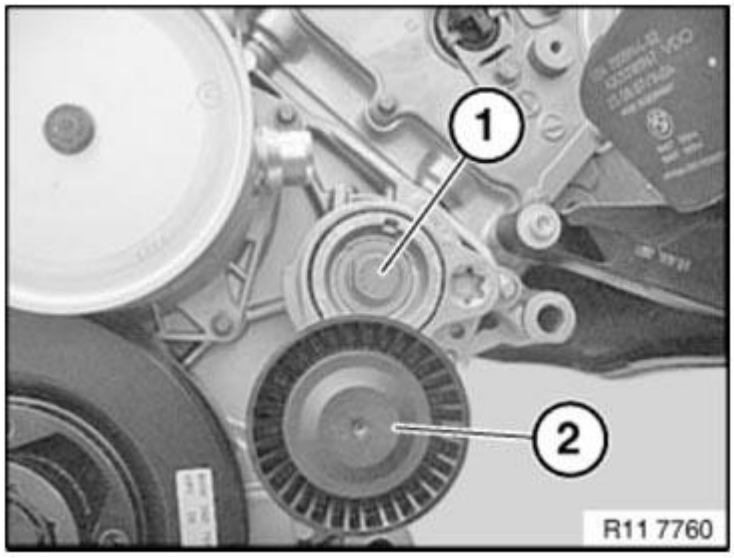


Fig. 145: Identifying Screw And Idler Pulley
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 8 090** with three screws (1) to vibration damper.

Secure special tool **11 8 090** with belt tensioner bolt (2) to timing case cover.

Tightening torque **11 28 1AZ** .

NOTE: A 3/4 inch tool is needed to release the central bolt.

Release central bolt on vibration damper.

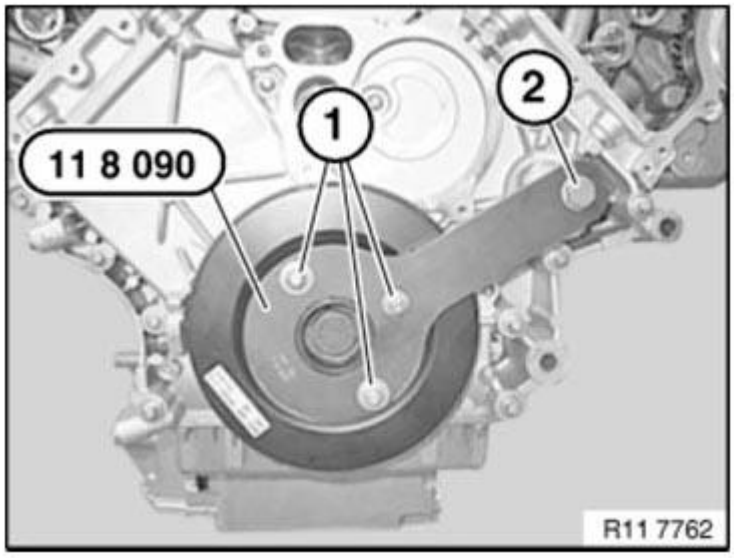


Fig. 146: Securing Special Tool 11 8 090 With Belt Tensioner Bolt To Timing Case Cover

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Courtesy of BMW OF NORTH AMERICA, INC.

Secure central bolt with special tool **00 9 140** or **11 3 460** .

Position special tool **11 3 460** on special tool **11 8 090** .

Adjust special tool 11 9 453 on special tool 11 9 454 using clamping screw to 0° on scale.

Tightening torque **11 23 1AZ** .

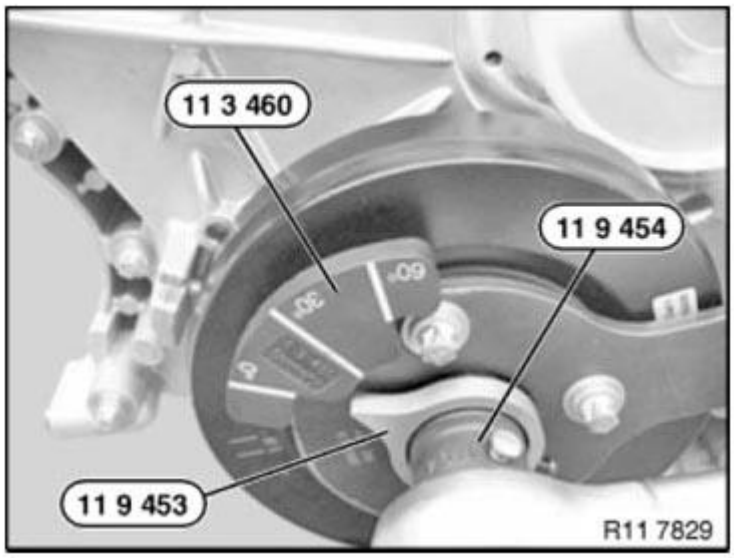


Fig. 147: Adjusting Special Tool 11 9 453 On Special Tool 11 9 454 Using Clamping Screw To 0° On Scale
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1124 CONNECTING ROD WITH BEARING

1124571 REPLACING ALL CONNECTING ROD BEARINGS (N63)

Notes

IMPORTANT: Note grinding stages on crankshaft . See CRANKSHAFT AND BEARINGS .

Necessary preliminary work

- Removing all **PISTONS**

Install new connecting rod bearing shells.

Install one blue bearing shell (1) and one red bearing shell (2) in each connecting rod.

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Install **PISTON** .

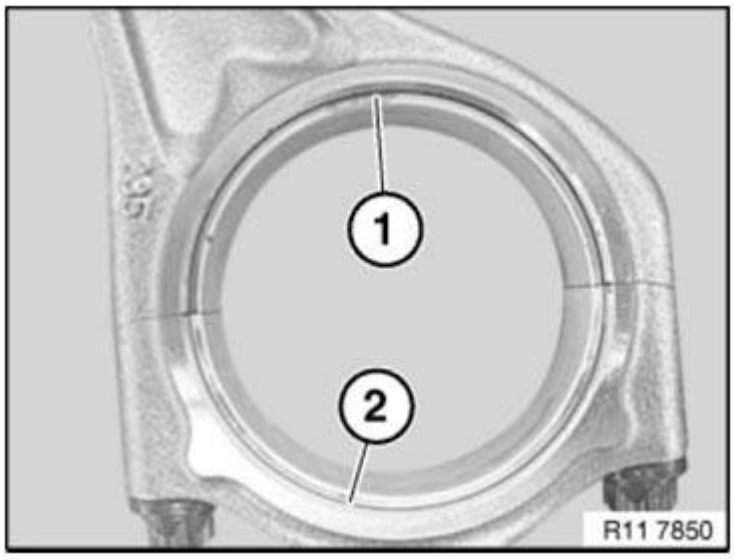


Fig. 148: Identifying Blue Bearing Shell And Red Bearing Shell
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The bearing shells on the connecting rod are coded.

Connecting rod bearing cap (1): the red bearing shell is fitted and the fastening notches are on the left and right sides of the bearing shell (see arrows).

Connecting rod (2): the blue bearing shell is fitted and the fastening notches are one side of the bearing shell (see arrows).

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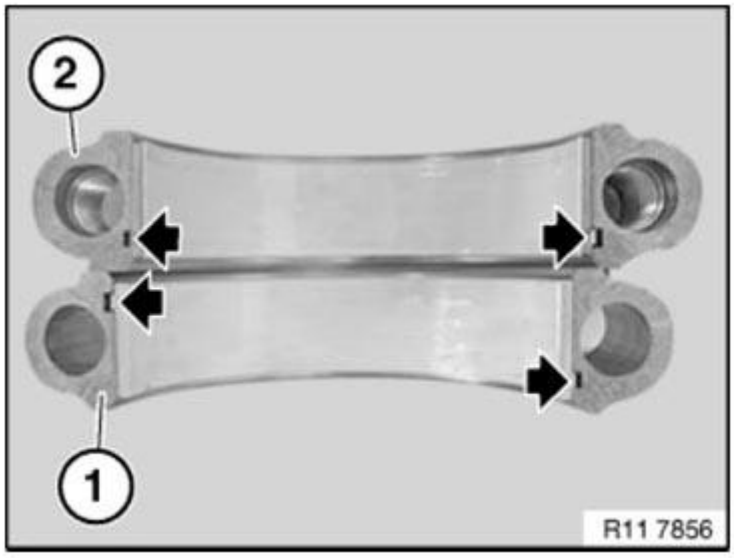


Fig. 149: Locating Red Bearing Shell Fastening Notches And Blue Bearing Shell Fastening Notches
Courtesy of BMW OF NORTH AMERICA, INC.

Check connecting-rod bearing play

Piston in BDC position.

Fit special tool **00 2 590** (Plastigage type PG 1) to oil-free crankshaft.

Fit bearing caps so that matching numbers match up.

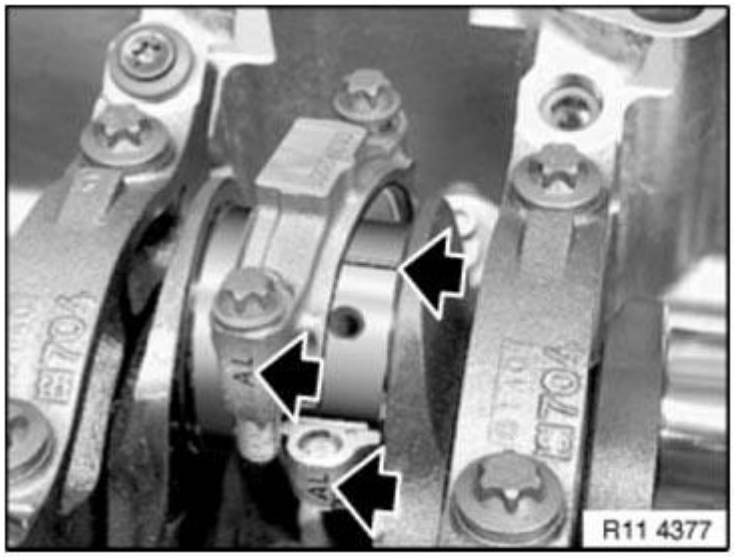


Fig. 150: Locating Special Tool 00 2 590
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: Do not distort connecting rods or crankshaft.

Use connecting rod bolts to check connecting-rod bearing play.

Connecting rod bolts with special tool **00 9 120** .

Tightening torque **11 24 1AZ** .

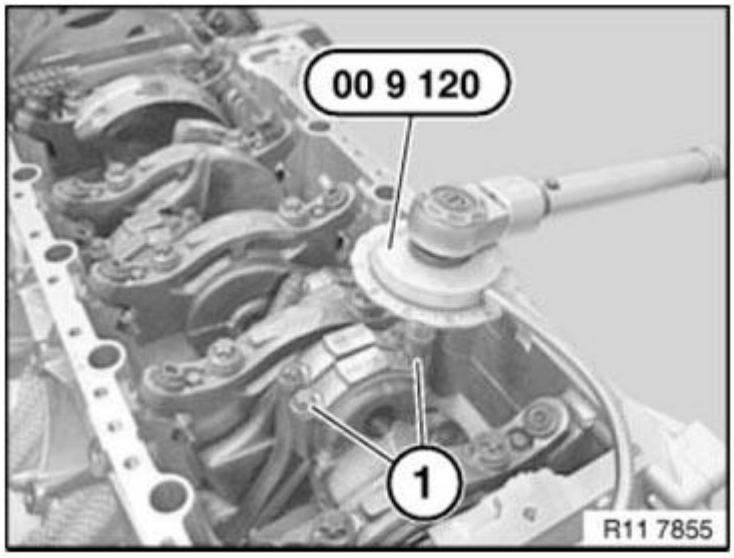


Fig. 151: Checking Connecting-Rod Bearing Play
Courtesy of BMW OF NORTH AMERICA, INC.

Remove bearing cap and read off bearing play at width of flattened plastic thread with assistance of measuring scale.

CONNECTING-ROD BEARING PLAY .

- Remove plastic thread.
- Lubricate crankshaft and bearing shells.
- Install new connecting rod bolts.

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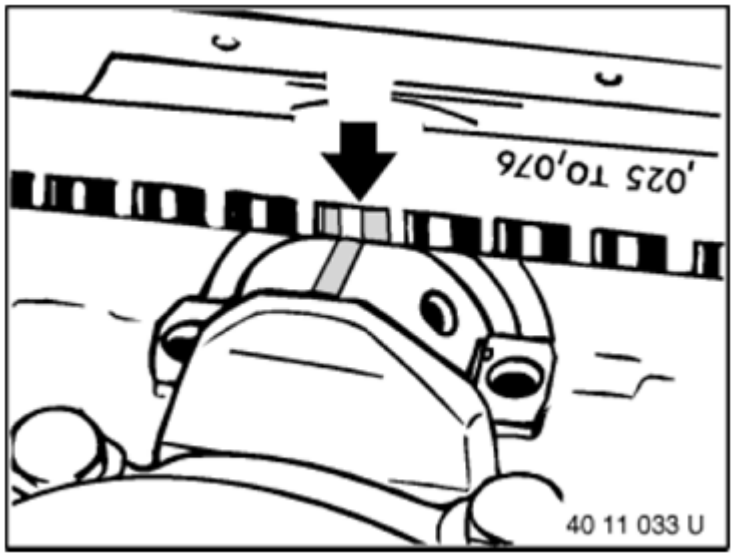


Fig. 152: Checking Connecting-Rod Bearing Play
Courtesy of BMW OF NORTH AMERICA, INC.

Secure connecting rod bolts with special tool **00 9 120** .

Tightening torque **11 24 1AZ** .

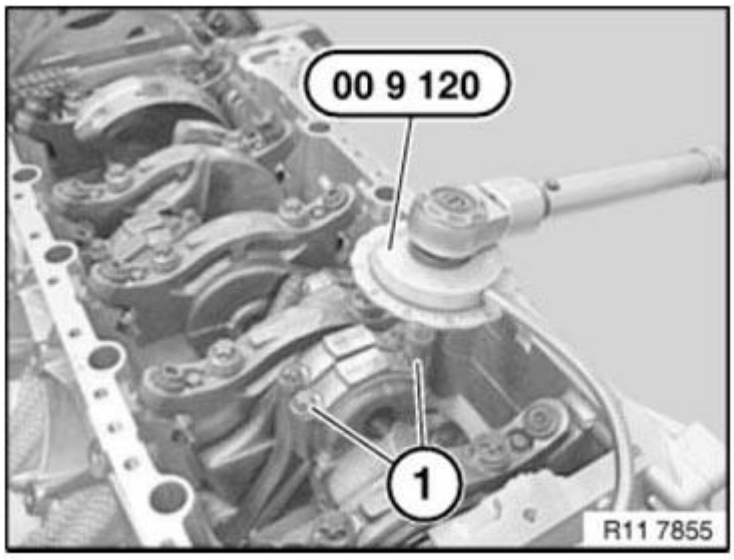


Fig. 153: Securing Connecting Rod Bolts With Special Tool 00 9 120
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1125 PISTON WITH RINGS AND PIN

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1125530 REMOVING AND INSTALLING/REPLACING ALL PISTONS (N63) UP TO 3/2011

Notes

WARNING: Protective goggles must be worn when working on the gudgeon pin circlip.

IMPORTANT: If pistons and connecting rods are reused, they must be reinstalled in the same places.
Piston and piston pin are matched to each other and can only be replaced as a pair.
Conrod and conrod bearing cap are cracked.
Identification is effected by means of identical pairing letters on the connecting rod big end.
Mixing up the components will result in engine damage.
Conrod bearings must always be replaced.

Necessary preliminary tasks

- Remove **ENGINE**
- Install engine on assembly stand
- Remove **LEFT CYLINDER HEAD**.
- Remove **RIGHT CYLINDER HEAD**.
- Removing oil pan. See **LOWER OIL SUMP SECTION** and **UPPER OIL SUMP SECTION**
- Remove **OIL PUMP**

Unscrew connecting rod bearing cap.

NOTE: Connecting rods and connecting rod bearing caps are denoted with the same pairing letters.
The stamped dates are always arranged in opposite directions.
Set down conrod bearing caps in order.

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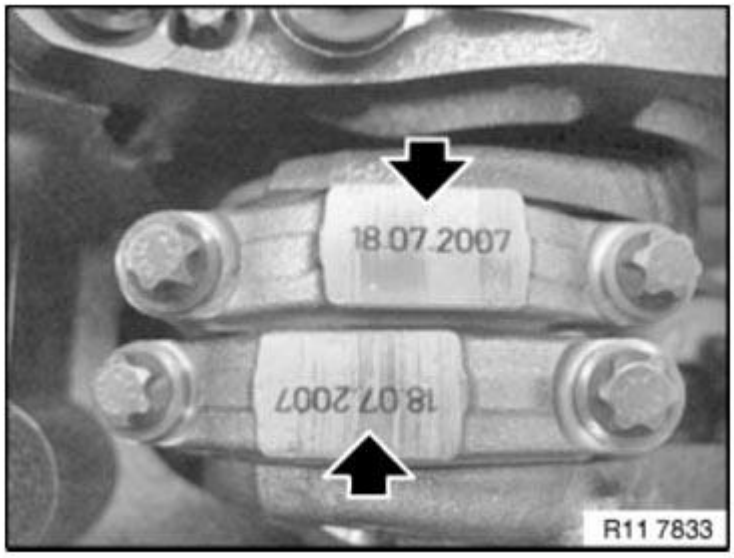


Fig. 154: Locating Connecting Rod Bearing Caps Stamped Dates
Courtesy of BMW OF NORTH AMERICA, INC.

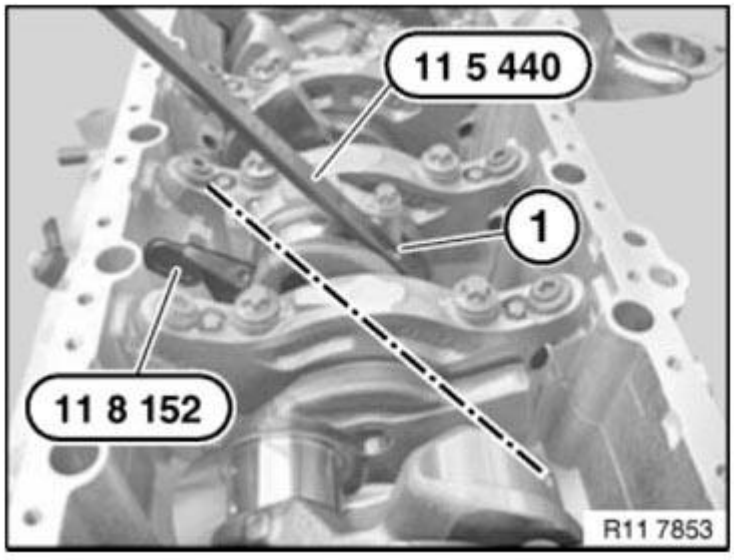
NOTE: To install and remove the conrods, it is essential for the crankshaft to be exactly in alignment with the cylinder bore (see dashed line).

Position crankshaft at central bolt.

Insert special tool 11 8 152 into conrod.

Screw special tool **11 5 440** into conrod with bolt (1).

Remove conrod with piston from cylinder head side.



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Fig. 155: Removing Conrod With Piston From Cylinder Head Side
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Piston and piston bolts are paired and must not be fitted individually.

Lift out retaining ring and press out piston pin.

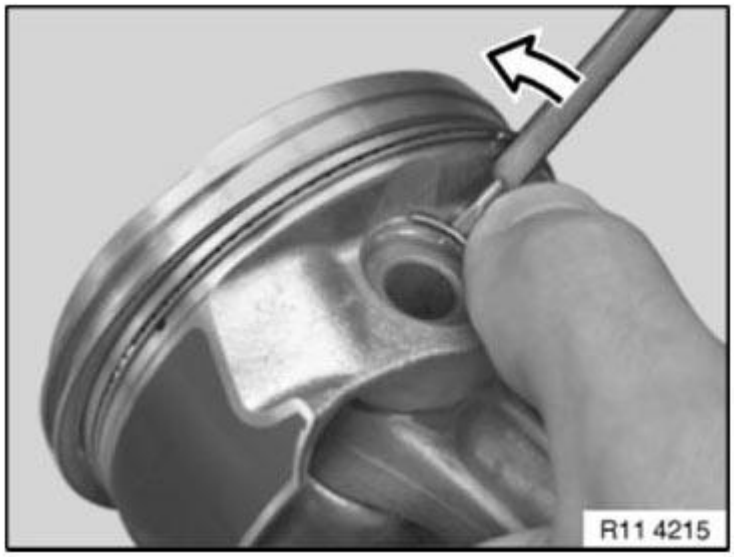


Fig. 156: Removing Retaining Ring From Piston
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, replace connecting rods.

NOTE: The conrods can also be replaced individually.
The gudgeon pin must be able to be pressed through the liner by hand with little force and must not display any significant play.

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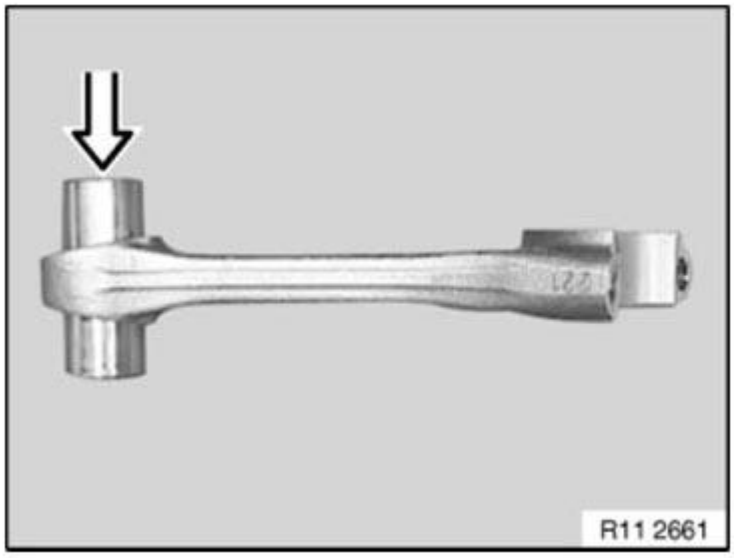


Fig. 157: Installing Gudgeon Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Prior to installation, measure piston installation clearance: Measure piston diameter with micrometer at measuring point A from lower edge of piston and offset by 90° to piston pin axis.

Refer to **MEASURING POINT A** .

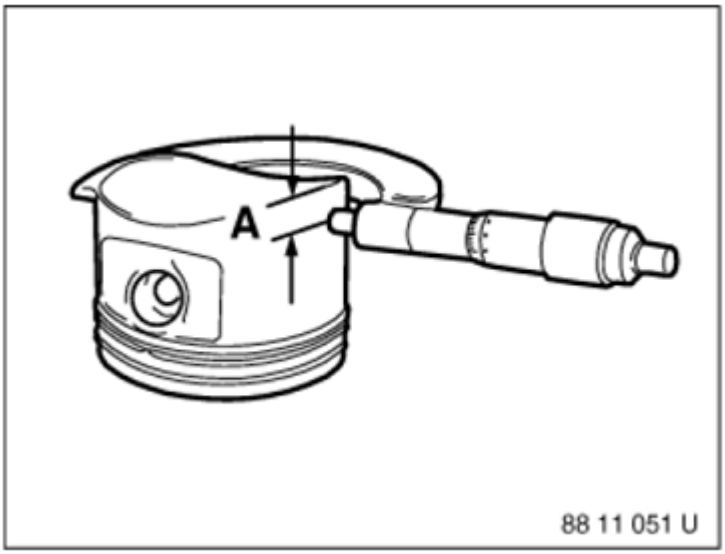


Fig. 158: Measuring Piston Diameter
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust micrometer to cylinder bore of engine block. Set internal calliper on micrometer to zero. Measure bottom, center and top of cylinder bore in direction of travel and direction of engine rotation.

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Refer to:

- **DIAMETER OF CYLINDER BORE**
- **PISTON INSTALLATION CLEARANCE**
- **TOTAL PERMISSIBLE WEAR CLEARANCE**

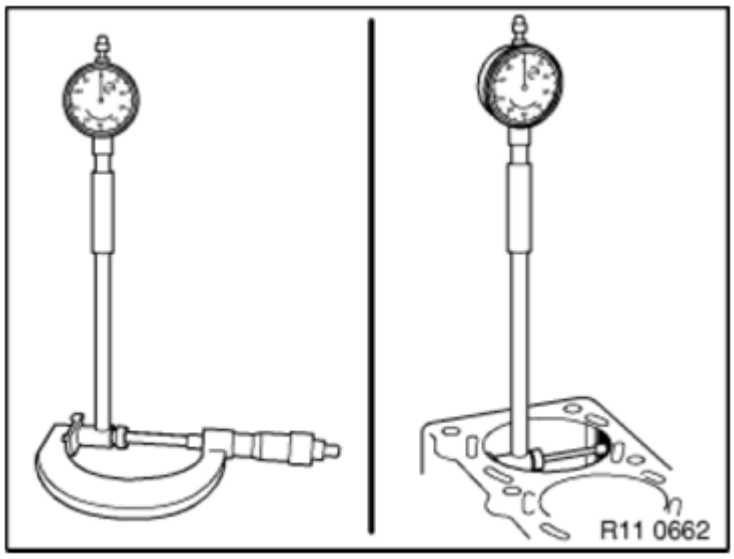


Fig. 159: Checking Diameter Of Cylinder Bore
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The conrods of cylinder banks 1 to 4 and 5 to 8 are mounted to the pistons differently.

NOTE: The pistons and conrods of cylinders 1 to 8 are identical.

Arrow on piston crown (cyl. 1 to 4) points upwards, bolt connection on conrod points at an angle to right.

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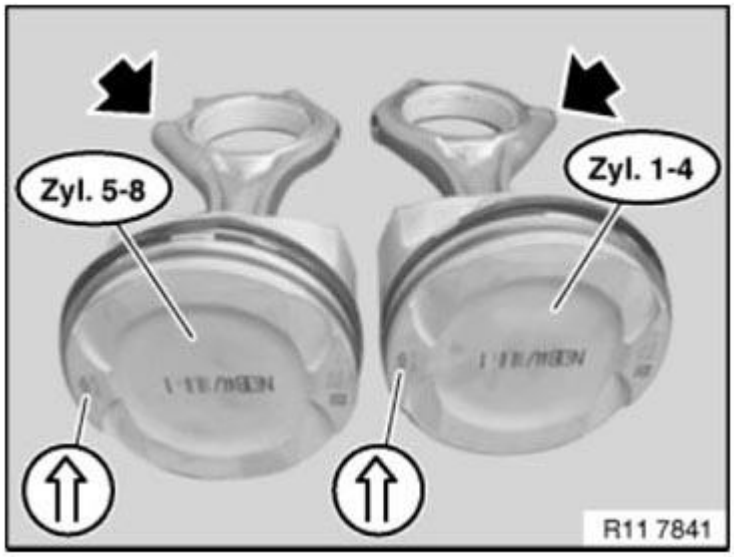


Fig. 160: Identifying Arrow On Piston Crown
Courtesy of BMW OF NORTH AMERICA, INC.

Arrow on piston crown (cyl. 5 to 8) points upwards, bolt connection on conrod points at an angle to left.

NOTE: For purposes of clarity, pistons are shown removed.

The conrods are correctly mounted on the piston when the bolt connections on the conrods are parallel to each other (see arrow).

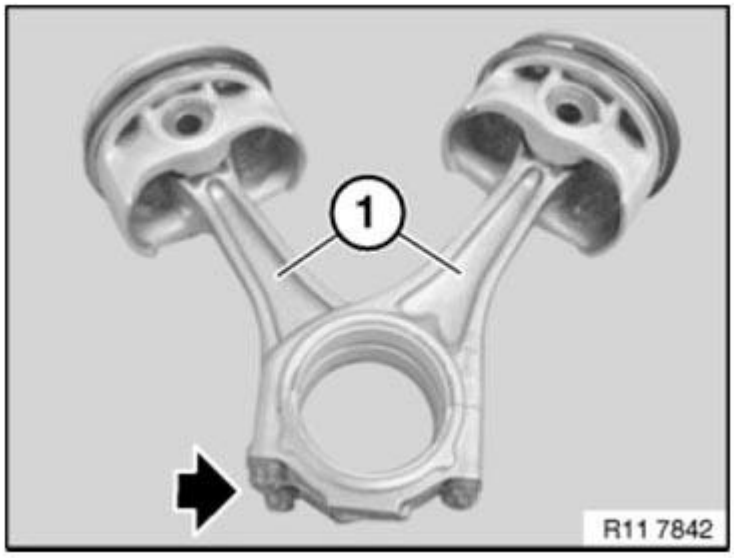


Fig. 161: Identifying Bolt Connections On Conrods Are Parallel To Each Other
Courtesy of BMW OF NORTH AMERICA, INC.

Install retaining ring.

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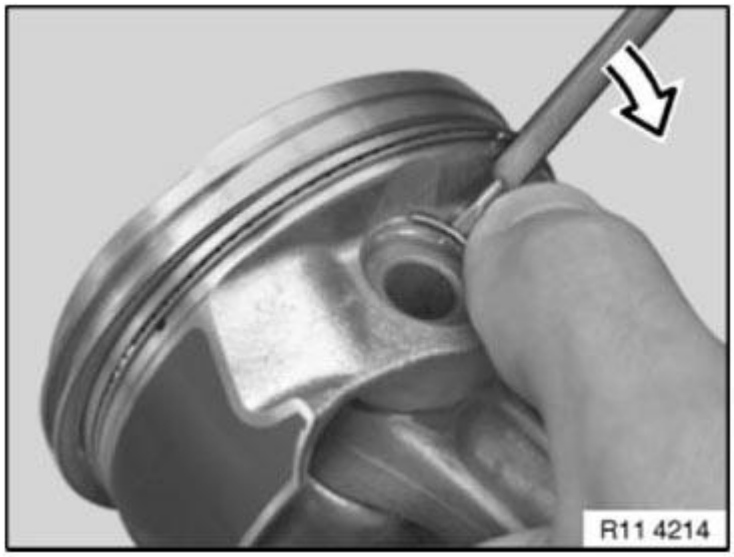


Fig. 162: Installing Retaining Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Piston circlip (1) is correctly installed when the opening points upwards.

See illustration.

It must still be possible for the piston pin to moved easily.

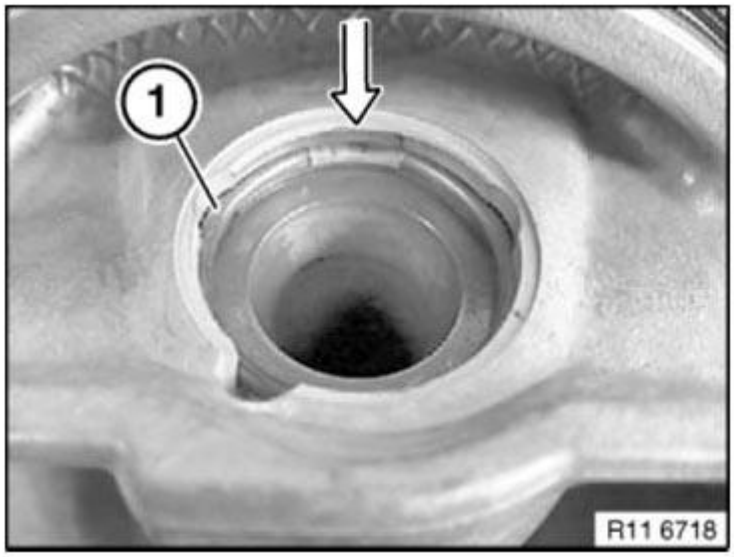


Fig. 163: Locating Piston Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

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Insert special tools 11 8 151 and 11 8 152 into conrod.

INSTALL CONNECTING ROD BEARING .

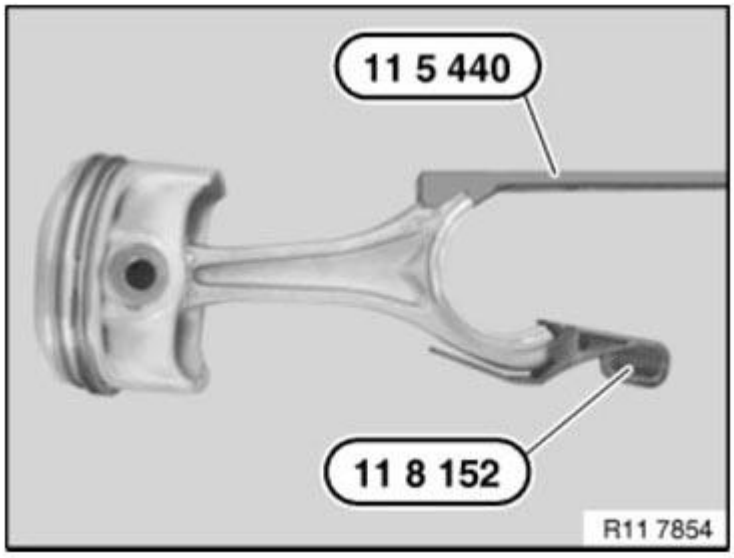
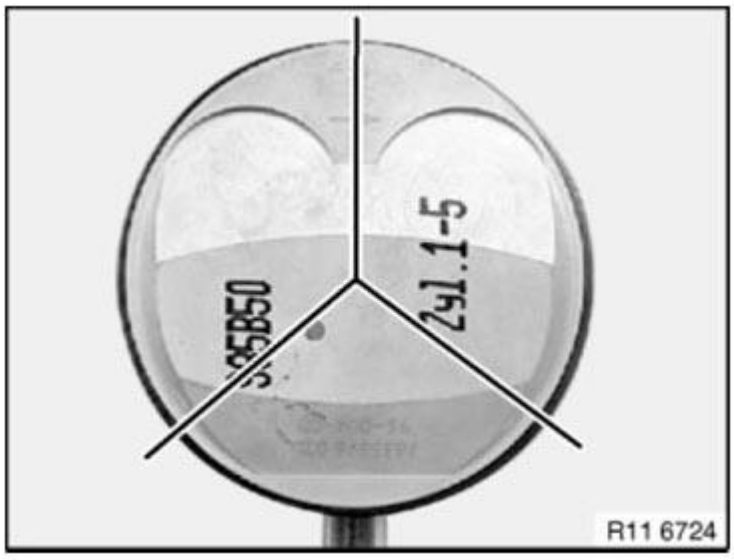


Fig. 164: Inserting Special Tools 11 8 151 And 11 8 152 Into Conrod
Courtesy of BMW OF NORTH AMERICA, INC.

Lightly coat pistons and piston rings with oil.

Offset the contact points of the piston rings by approx. 120° to each other but do not position above the piston pin boss.

NOTE: Illustration shows S85.



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Fig. 165: Identifying Piston Rings Offset Contact Points
Courtesy of BMW OF NORTH AMERICA, INC.

Keep piston rods compressed with special tool **11 7 280** .

Install piston so that arrow points to camshaft drive.

IMPORTANT: Danger of piston ring failure.

Press in piston only with finger force (do not knock in!).

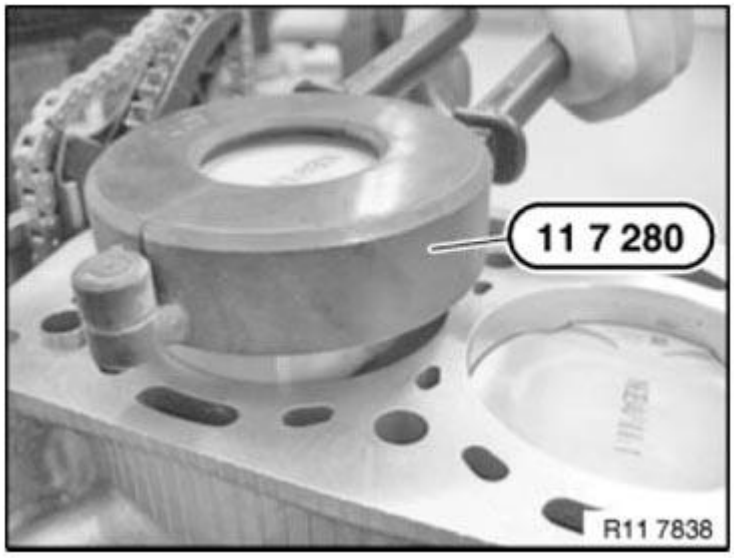


Fig. 166: Compressing Piston Rods With Special Tool 11 7 280
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Danger of piston ring failure.

Press in piston (1) only with finger force (do not knock in!).

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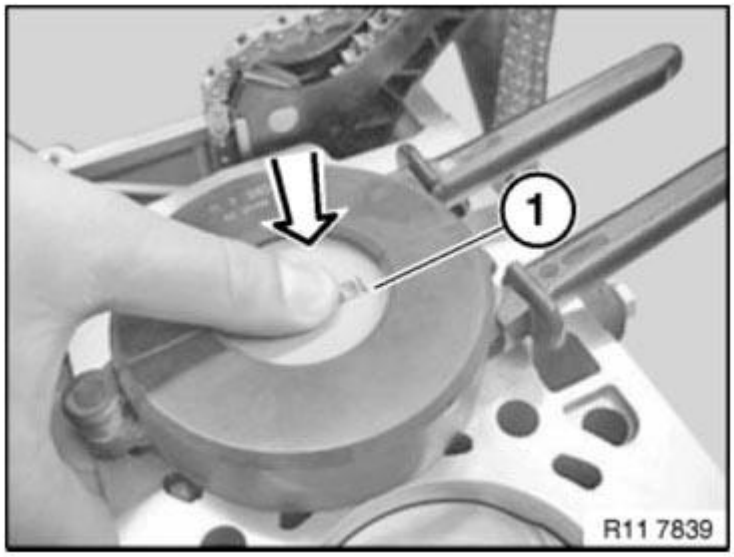


Fig. 167: Pressing In Piston Only With Finger Force
Courtesy of BMW OF NORTH AMERICA, INC.

The direction arrow on the piston crown must point to the camshaft drive (direction of travel towards front).

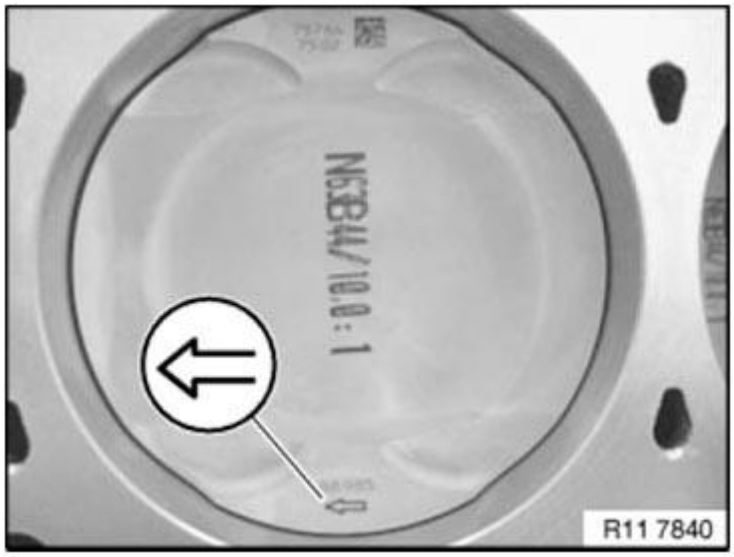


Fig. 168: Identifying Arrow Direction On Piston Crown Must Point To Camshaft Drive (Direction Of Travel Towards Front)
Courtesy of BMW OF NORTH AMERICA, INC.

Attach crankshaft journal to connecting rod.

Remove special tools **11 5 440** and 11 8 152.

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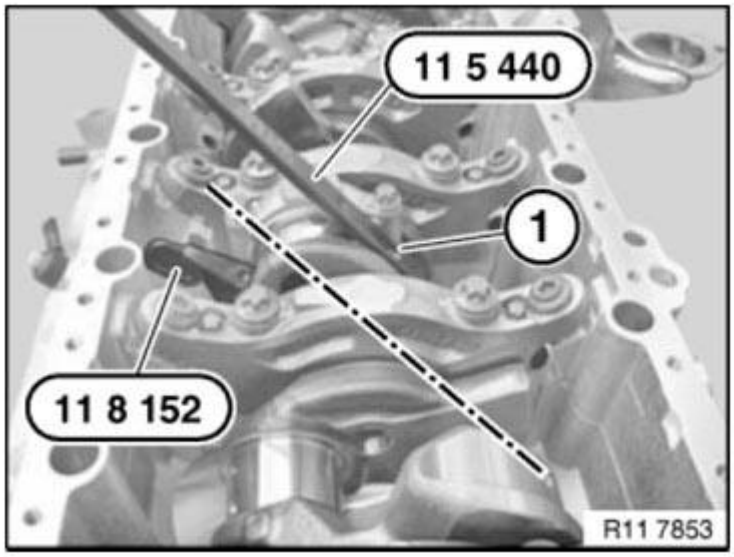


Fig. 169: Attaching Crankshaft Journal To Connecting Rod
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **For purposes of clarity, the pairing letters (1) are shown on the removed conrod.**

IMPORTANT: **Conrods and conrod bearing caps are denoted with the same pairing letters (1), do not mix them up.**
Fit bearing cap so that pairing letters match up.

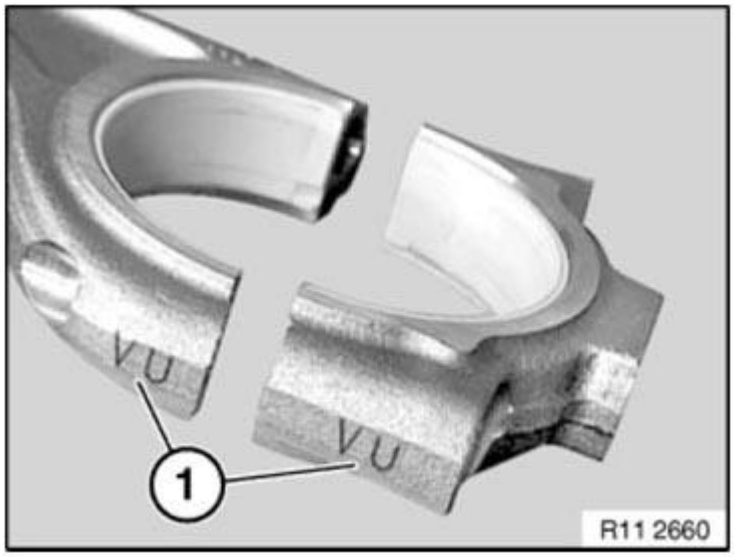


Fig. 170: Identifying Conrods And Conrod Bearing Caps Pairing Letters
Courtesy of BMW OF NORTH AMERICA, INC.

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Apply light coat of oil to connecting-rod bearing shells.

Fit bearing cap so that pairing letters match up.

Install new conrod bolts.

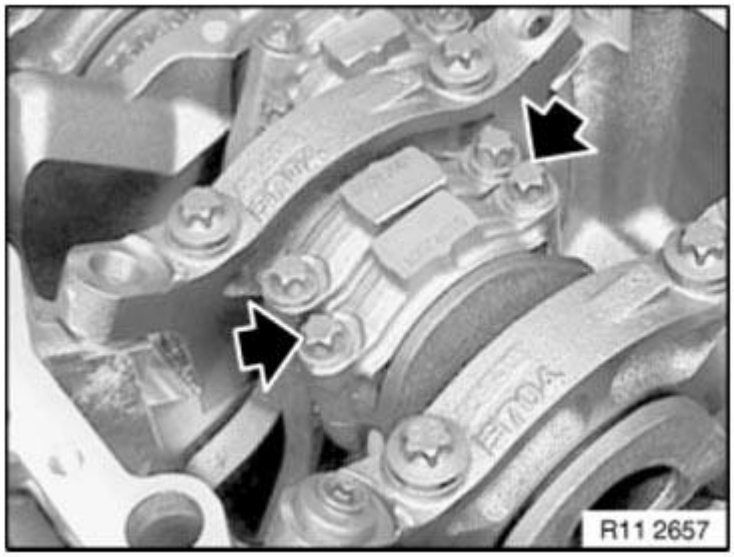


Fig. 171: Locating Conrod Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down connecting rod bolts (1) with special tool **00 9 120** .

Tightening torque **11 24 1 AZ** .

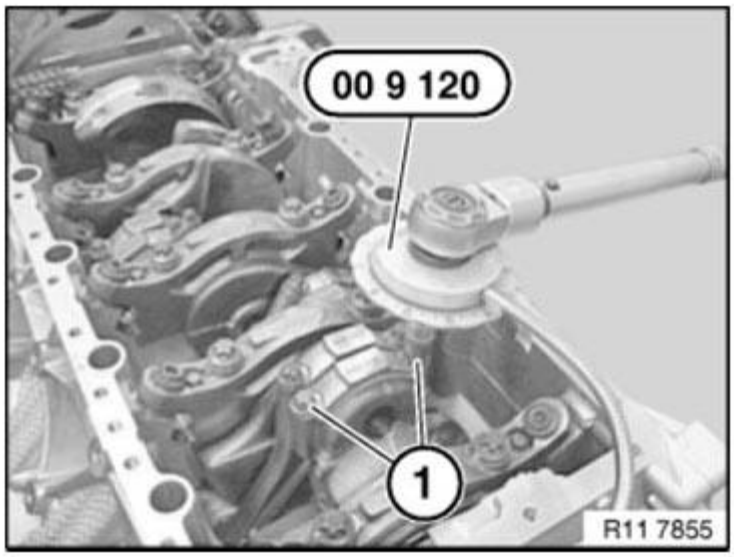


Fig. 172: Tightening Down Connecting Rod Bolts With Special Tool 00 9 120

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Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 25 530 REMOVING AND INSTALLING/REPLACING ALL PISTONS (N63) FROM 3/2011

Notes

WARNING: Protective goggles must be worn when working on the gudgeon pin circlip.

IMPORTANT: If pistons and connecting rods are reused, they must be reinstalled in the same places.
Piston and piston pin are matched to each other and can only be replaced as a pair.
Conrod and conrod bearing cap are cracked.
Identification is effected by means of identical pairing letters on the connecting rod big end.
Mixing up the components will result in engine damage.
Conrod bearings must always be replaced.

Necessary preliminary tasks

- Fully remove front axle together with engine.
- Remove **ENGINE** from front axle.
- Install engine on assembly stand.
- Remove **LEFT CYLINDER HEAD**.
- Remove **RIGHT CYLINDER HEAD**.
- Removing oil sump. See **LOWER OIL SUMP SECTION** and **UPPER OIL SUMP SECTION**.
- Remove **OIL PUMP**.

To release the connecting rod bolts (1), the crankshaft (2) must be moved to a suitable position.

Release connecting rod bolts (1).

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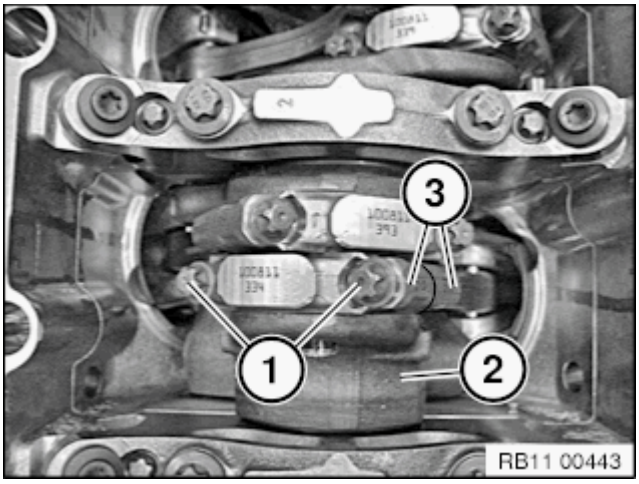


Fig. 173: Identifying Connecting Rod Bolts And Crankshaft

Screw the special tool 2 249 164 (assembly tool) into the connecting rod.

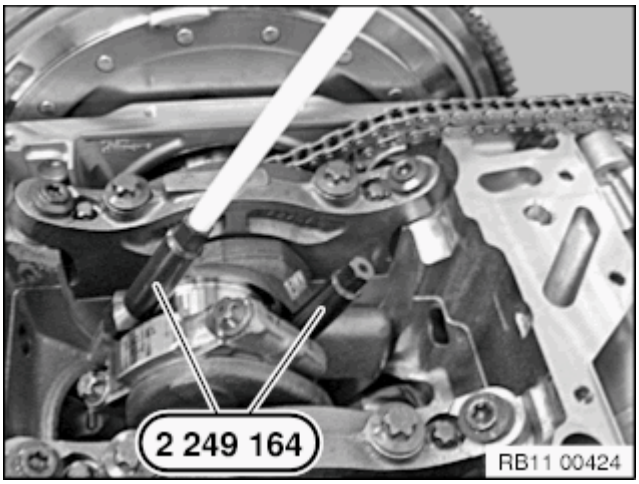


Fig. 174: Identifying Special Tool 2 249 164 Secured To Connecting Rod

NOTE: For installation and dismantling of the connecting rods, it is essential for the crankshaft to be exactly in alignment with the cylinder bore.

Position crankshaft at central bolt.

Insert special tool 11 8 152 into conrod.

Press out the connecting rod and piston with special tool 22 49 164 towards the cylinder head side.

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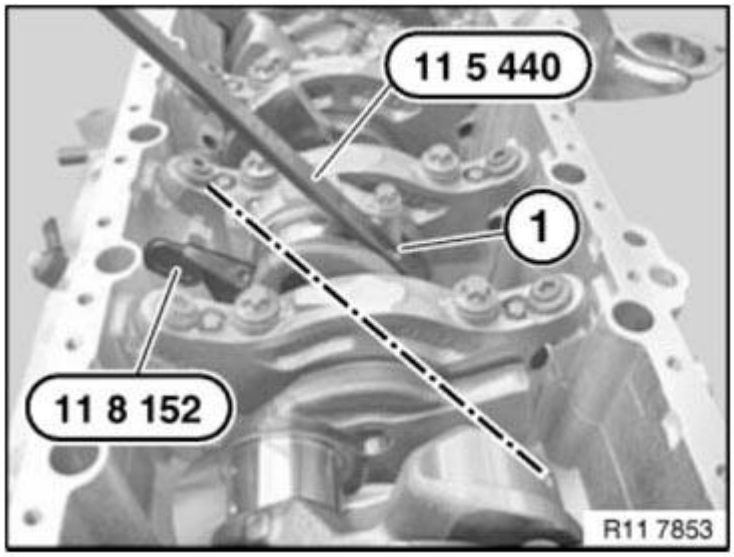


Fig. 175: Removing Conrod With Piston From Cylinder Head Side
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Pistons and gudgeon pins are paired and must not be fitted individually.

Lift out circlip and press out piston pin.

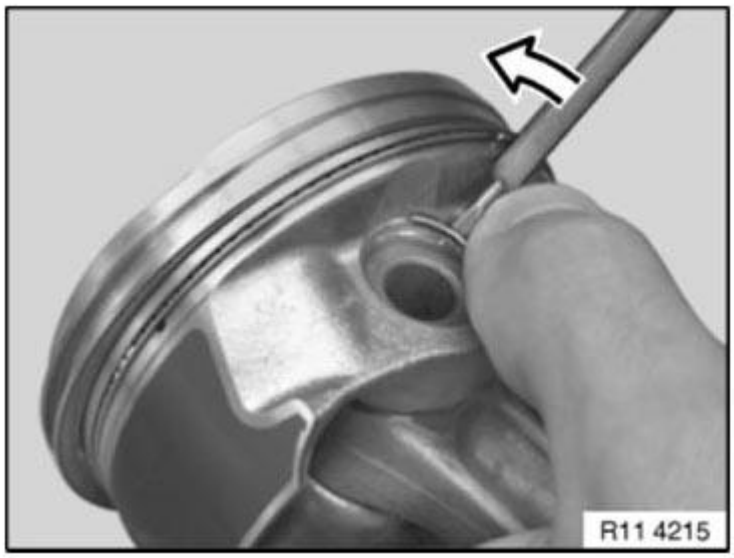


Fig. 176: Removing Retaining Ring From Piston
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, replace connecting rods.

NOTE: The connecting rod can also be replaced individually.

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The gudgeon pin must be able to be pressed through the bush by hand with little force and must not display any significant play.

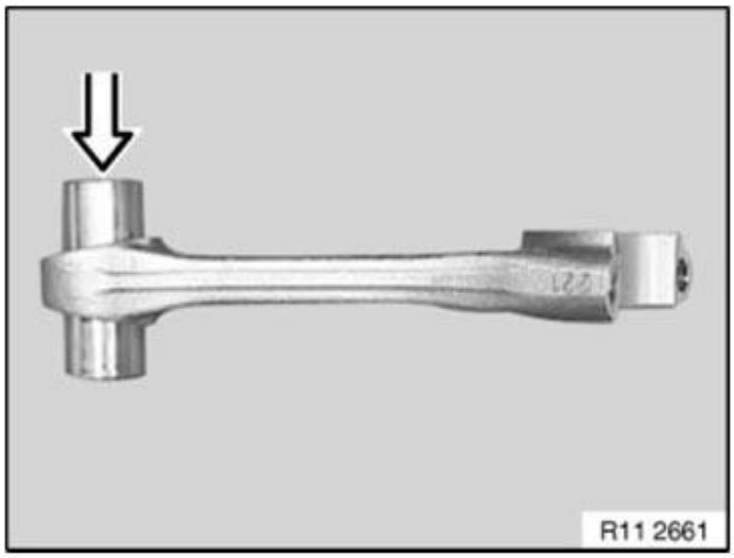


Fig. 177: Installing Gudgeon Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Prior to installation, measure piston installation clearance: Measure piston diameter with micrometer at measuring point A from lower edge of piston and offset at 90° to the axis of the gudgeon pin.

Refer to **MEASURING POINT A** .

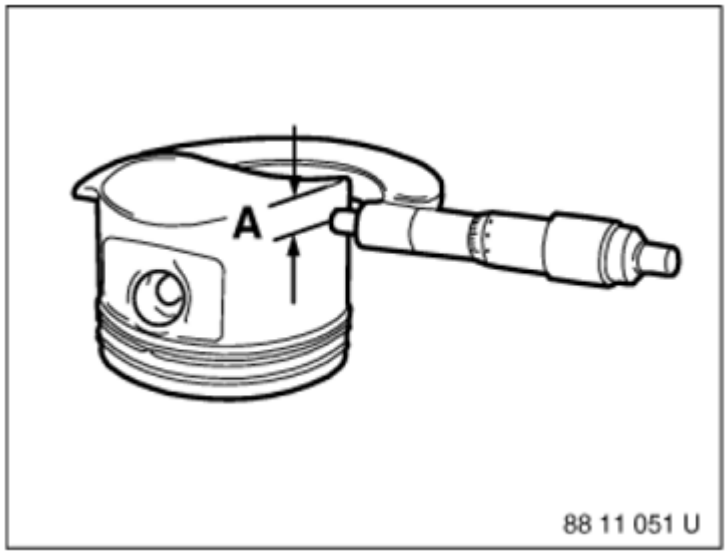


Fig. 178: Measuring Piston Diameter
Courtesy of BMW OF NORTH AMERICA, INC.

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Adjust micrometer to cylinder bore of engine block. Set internal calliper on micrometer to zero. Measure bottom, center and top of cylinder bore in direction of travel and direction of engine rotation.

Refer to:

- **DIAMETER OF CYLINDER BORE**
- **PISTON INSTALLATION CLEARANCE**
- **TOTAL PERMISSIBLE WEAR CLEARANCE**

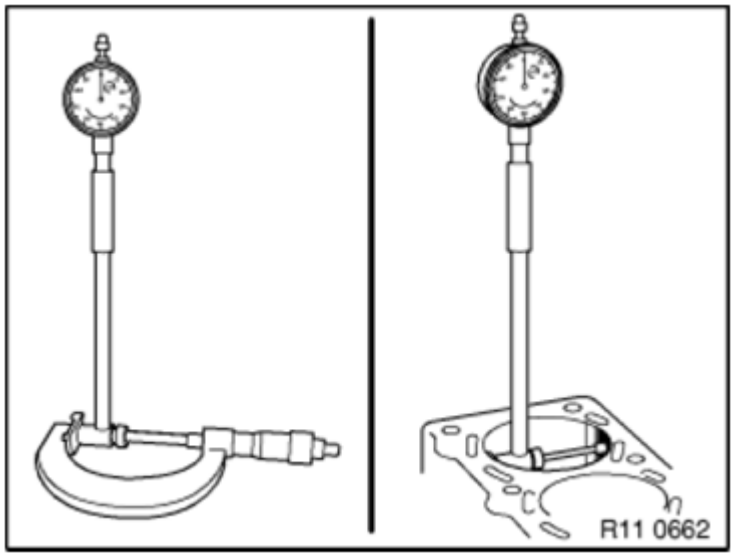


Fig. 179: Checking Diameter Of Cylinder Bore
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Piston circlip (1) is correctly installed when the opening points upwards.

See illustration.

It must still be possible for the gudgeon pin to be moved easily.

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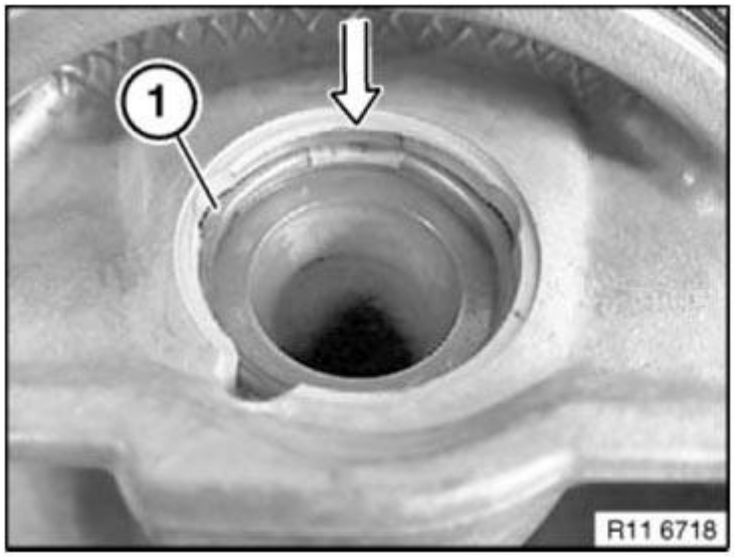


Fig. 180: Locating Piston Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

Insert the special tools 22 49 164 (assembly tool) into the connecting rod.

Install **CONNECTING ROD BEARING**.

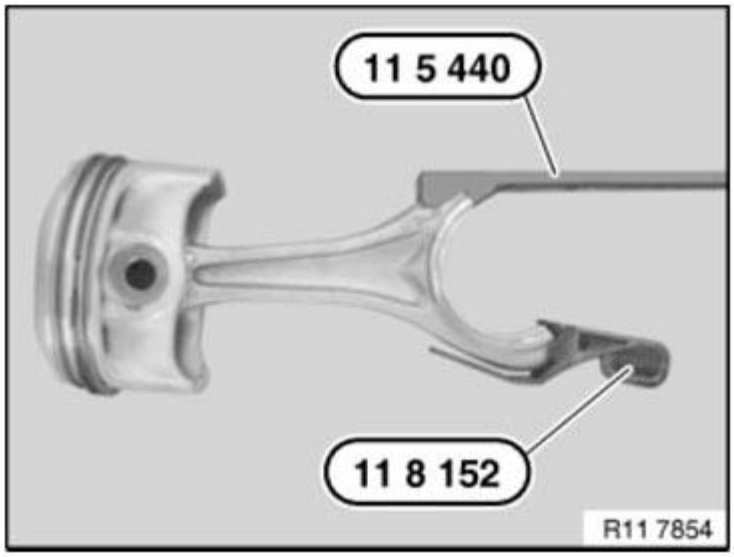


Fig. 181: Inserting Special Tools 11 8 151 And 11 8 152 Into Conrod
Courtesy of BMW OF NORTH AMERICA, INC.

Lightly coat pistons and piston rings with oil.

Offset the contact points of the piston rings by approx. 120° to each other but do not position above the piston pin boss.

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NOTE: Illustration shows S85.

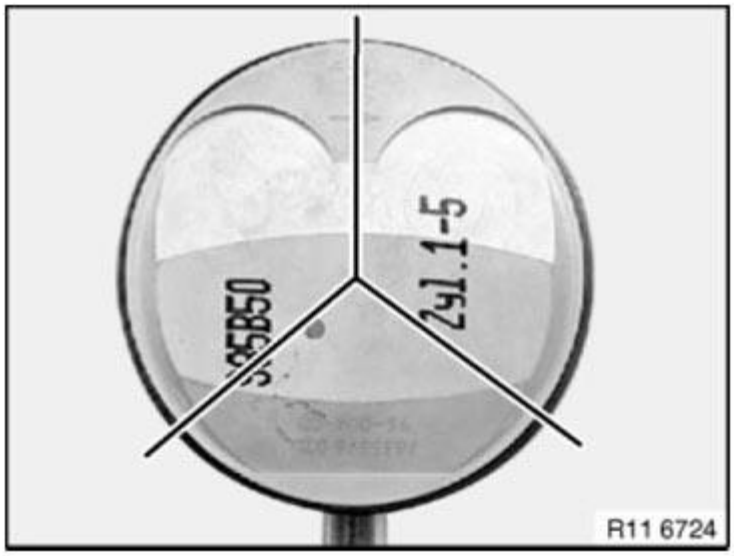


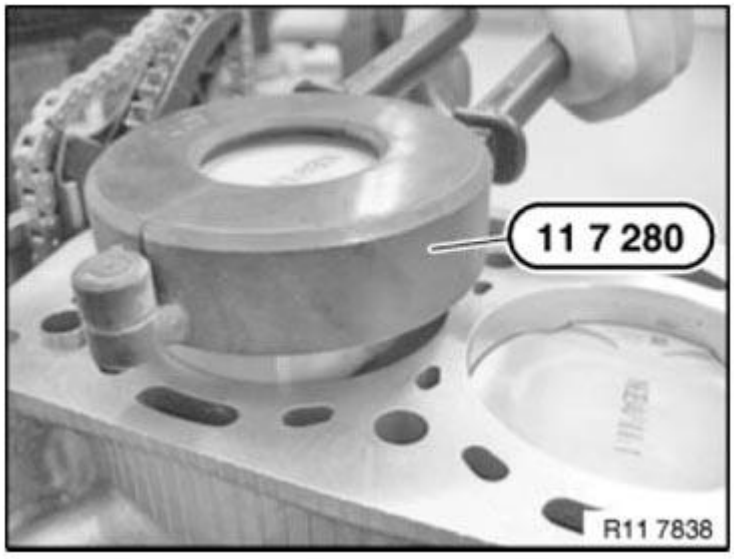
Fig. 182: Identifying Piston Rings Offset Contact Points
Courtesy of BMW OF NORTH AMERICA, INC.

Keep piston rods compressed with special tool **11 7 280** .

Install piston so that arrow points to camshaft drive.

IMPORTANT: Risk of piston ring breakage.

Press in piston only with finger force (do not knock in!).



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Fig. 183: Compressing Piston Rods With Special Tool 11 7 280
Courtesy of BMW OF NORTH AMERICA, INC.

The direction arrow on the piston crown must point to the camshaft drive (direction of travel towards front).

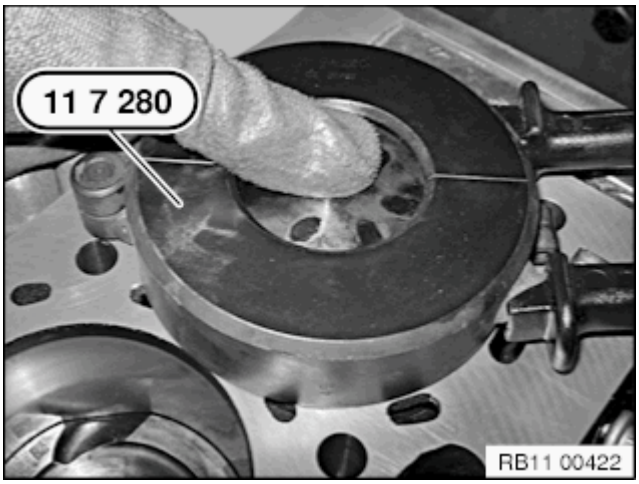


Fig. 184: Identifying Piston Crown Direction

Connect the crankshaft journal to connecting rod.

Remove special tools 22 49 164.

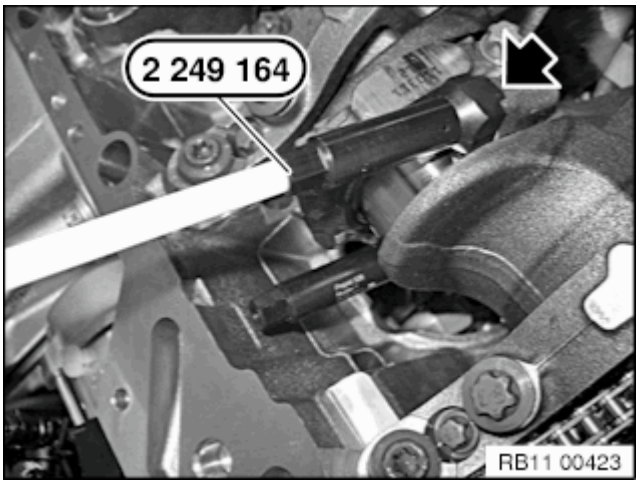


Fig. 185: Connecting Crankshaft Journal And Connecting Rod And Removing Special Tools 22 49 164

NOTE: For purposes of clarity, the pairing letters (1) are shown on the removed connecting rod.

IMPORTANT: Connecting rods and connecting rod bearing caps are denoted with the same pairing letters (1), do not mix them up.
Fit bearing cap so that pairing letters match up.

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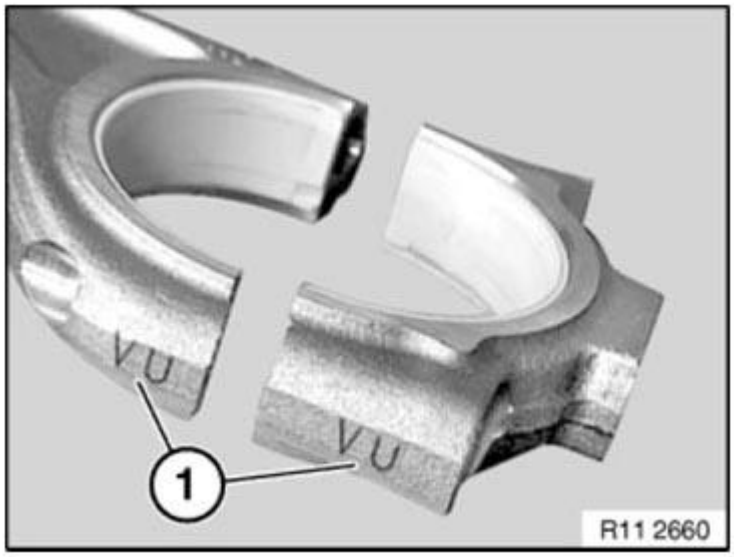


Fig. 186: Identifying Conrods And Conrod Bearing Caps Pairing Letters
Courtesy of BMW OF NORTH AMERICA, INC.

Apply light coat of oil to connecting rod bearing shells.

Fit bearing cap so that pairing letters match up.

Install new connecting rod bolts.

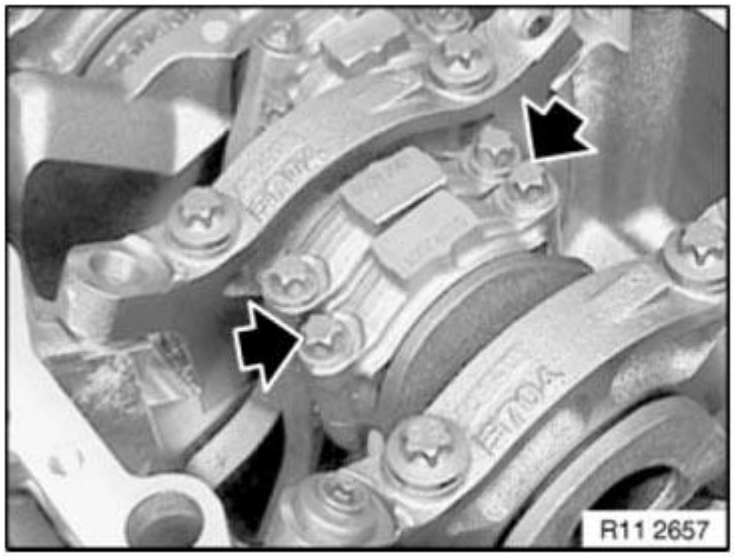


Fig. 187: Locating Conrod Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down connecting rod bolts (1) with special tool **00 9 120** .

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Tightening torque **11 24 1 AZ** .

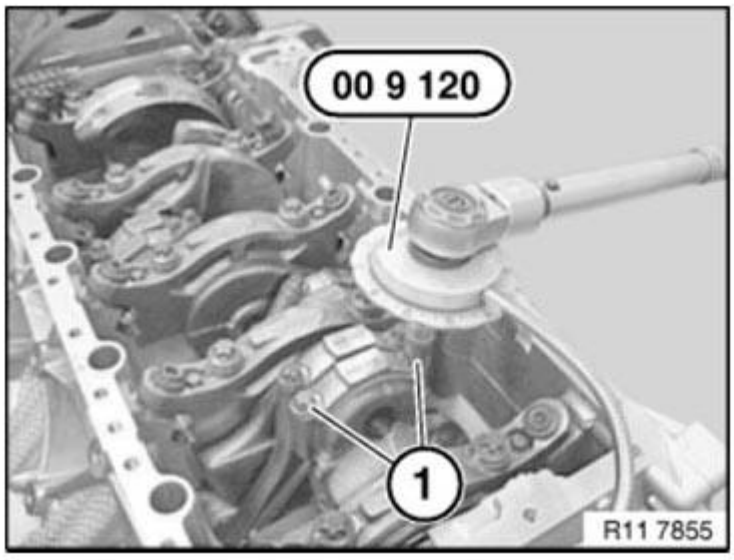


Fig. 188: Tightening Down Connecting Rod Bolts With Special Tool 00 9 120
Courtesy of BMW OF NORTH AMERICA, INC.

1128 V-RIBBED BELT W.TENS./DEFLECT

1128050 REPLACING A/C COMPRESSOR DRIVE BELT WITH BELT TENSIONER (N63)

IMPORTANT: Risk of damage!
Release screws (1) on vibration absorber only if removal position is adjusted.
If contaminated with hydraulic fluid:
Replace drive belt.
Crank engine at central bolt in direction of engine rotation.

Installation note:

If the drive belt is to be reused, mark direction of travel and reinstall drive belt in same direction of rotation.

Necessary preliminary work

- Remove **DRIVE BELT** for alternator.

NOTE:

Observe direction of engine rotation

Crank engine at central bolt until marking (see arrow) is reached on vibration absorber.

Release screws (1).

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Tightening torque **11 28 2AZ** .

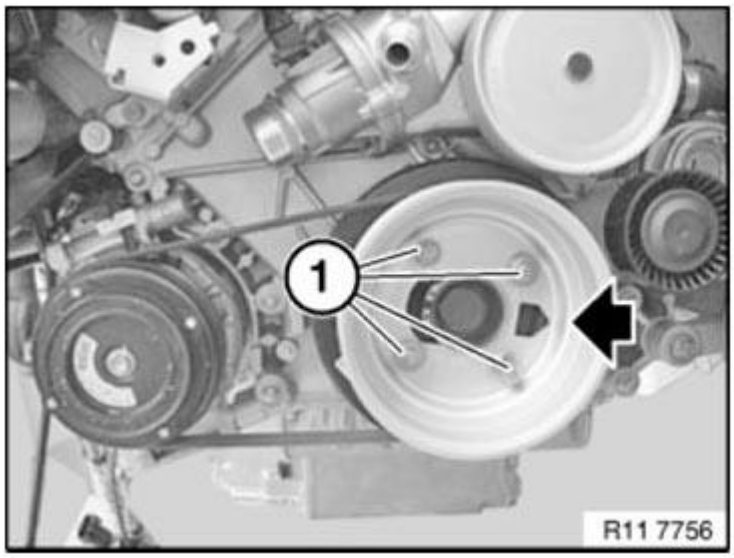
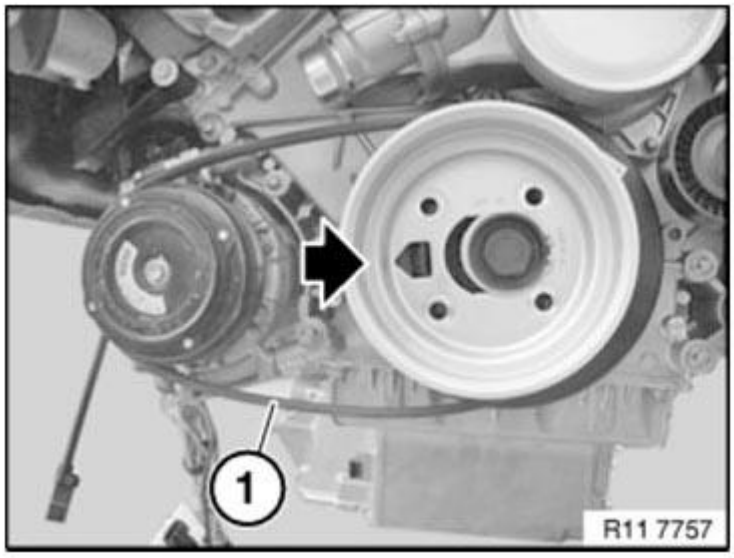


Fig. 189: Identifying Crank Pulley Screws And Marking
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Belt pulley is pretensioned.
Belt pulley tension is relieved abruptly during the cranking process!

NOTE: Crank engine at central bolt until marking (see arrow) is reached on vibration absorber.
Remove elasto-belt.

Observe direction of engine rotation



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Fig. 190: Identifying Marking Reached On Vibration Absorber
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1128010 REPLACING DRIVE BELT FOR ALTERNATOR (N63)

Notes

IMPORTANT: If contaminated with hydraulic fluid:
Replace drive belt.

Installation note:

If the drive belt is to be reused, mark direction of travel and reinstall drive belt in same direction of rotation.

Necessary preliminary work

- Remove **FAN COWL** .
- Release **EXPANSION TANK** for charge air cooler from mounting and press forwards.

Coolant hoses do not need to be released!

IMPORTANT: Belt tensioner is under high initial spring preload.

Slowly and carefully pre-tension belt tensioner (1) in direction of arrow up to stop.

Secure special tool 11 3 340 in dowel hole (2).

Belt tensioner in installation position.

Remove drive belt.

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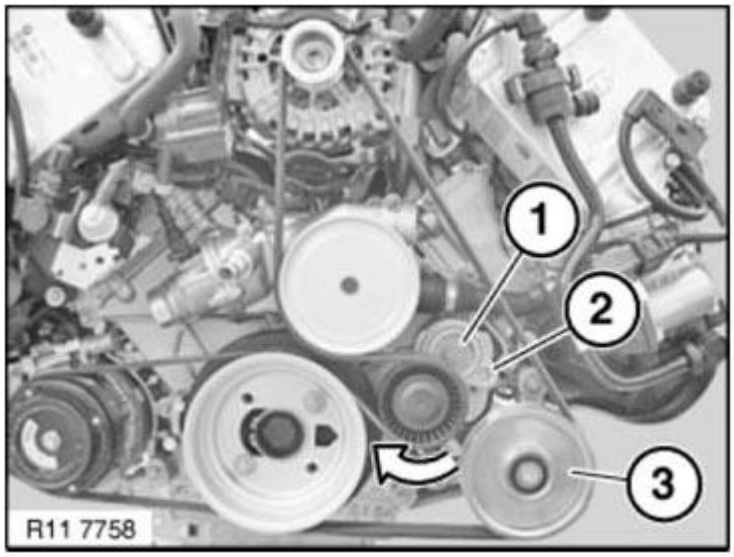


Fig. 191: Identifying Belt Tensioner Tensioning Direction
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: On vehicles which do not have a power steering pump, a deflecting element (3) is fitted in place of the power steering pump.

IMPORTANT: Belt tensioner is under high initial spring preload.

Put on the drive belt.

Remove special tool 11 3 340 from dowel hole (2).

Slowly relieve tension on belt tensioner (1).

Installation note:

Make sure drive belt is in correct installation position.

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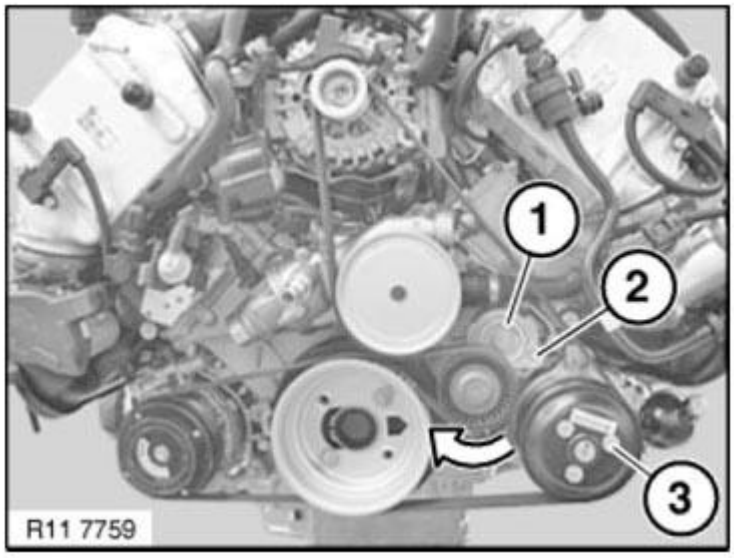


Fig. 192: Identifying Belt Tensioner Tensioning Direction
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1128020 REPLACING TENSIONING DEVICE FOR ALTERNATOR DRIVE BELT (N63)

Necessary preliminary work

- Remove alternator **DRIVE BELT**

If necessary, remove special tool **11 0 390** .

Release screw (1).

Tightening torque **11 28 1AZ** .

Remove belt tensioner with idler pulley (2).

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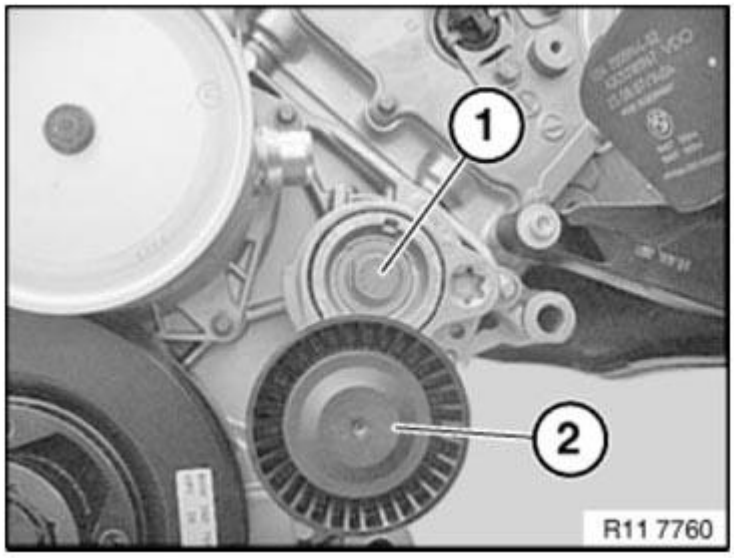


Fig. 193: Identifying Screw And Idler Pulley
Courtesy of BMW OF NORTH AMERICA, INC.

1131 CAMSHAFT

1131573 ADJUSTING CAMSHAFT TIMING ON LEFT SIDE (N63)

Notes

IMPORTANT: Release central bolts on adjuster only with special tool 11 9 890 .
Risk of damage to timing drive.
If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshaft.

(cylinder bank 5 to 8)

Necessary preliminary work

- Remove **LEFT GEAR CASE COVER**
- **CHECK CAMSHAFT TIMING ON LEFT SIDE**

Get set of special tools **11 9 890** ready for securing camshafts.

NOTE: Special tool 11 9 891 Knurled screw.
Special tool 11 9 892 Press-down bar.
Special tool 11 9 893 Gap gauge for intake and exhaust camshafts.
Special tool 11 9 894 spacer.

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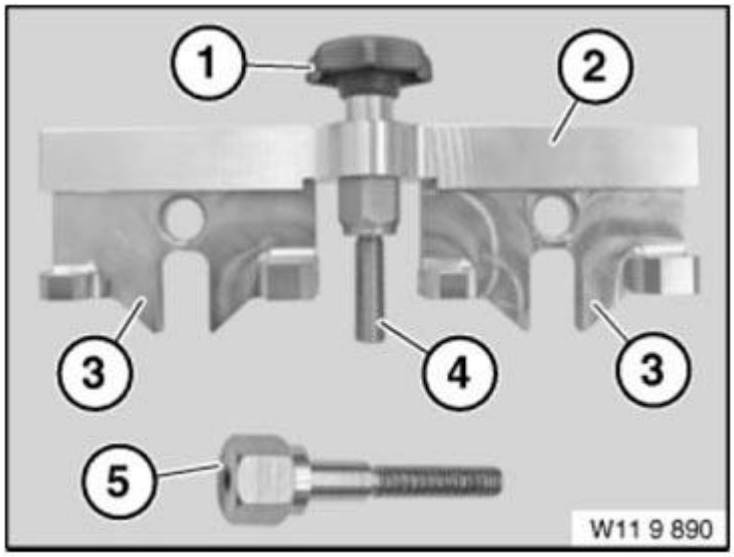


Fig. 194: Identifying Set Of Special Tools 11 9 890
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshaft.

Release central bolts (1 and 2) of intake and exhaust camshaft adjusters.

Installation note:

Replace central bolts after releasing.

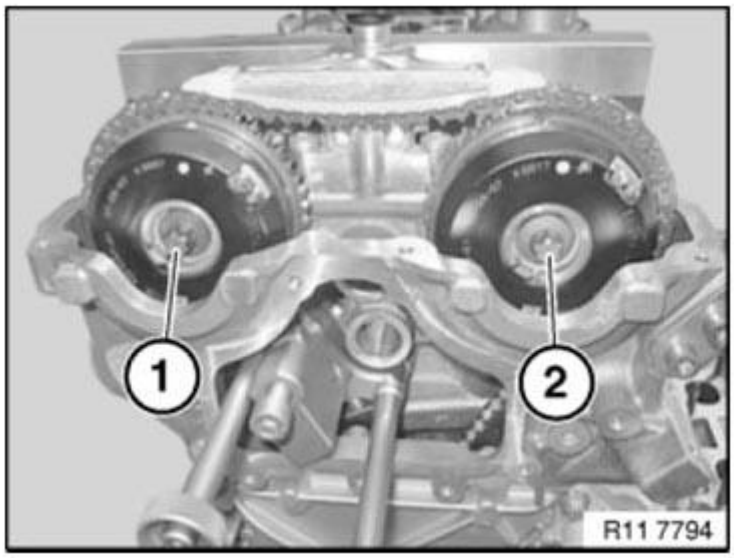


Fig. 195: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: Check whether head of central bolt (1) is greased (see arrow). If no grease can be seen on the bolt head of central bolt (1), the ADJUSTER must be replaced for safety reasons.

Installation note:

Coat contact surface of new central bolt (1) with copper paste.

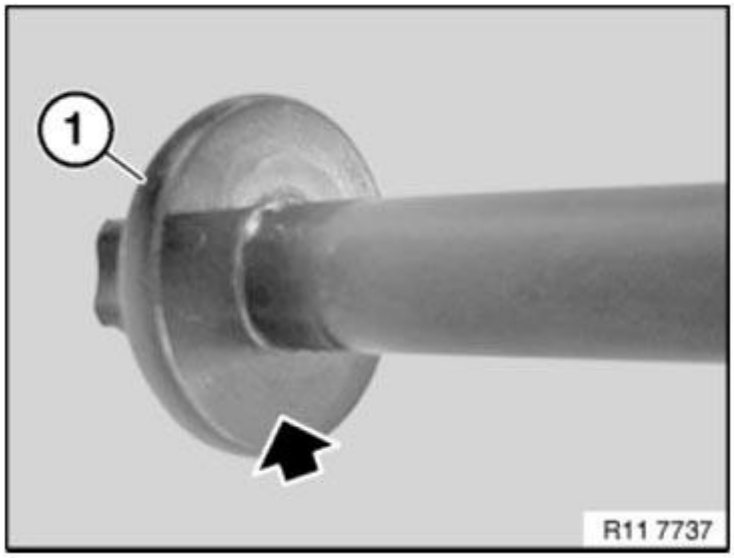


Fig. 196: Checking Head Of Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 893 on intake camshaft and exhaust camshaft.

The special tool 11 9 893 must rest **without a gap** on cylinder head; if necessary, adjust camshaft at hexagon heads.

Screw special tool 11 9 894 into cylinder head.

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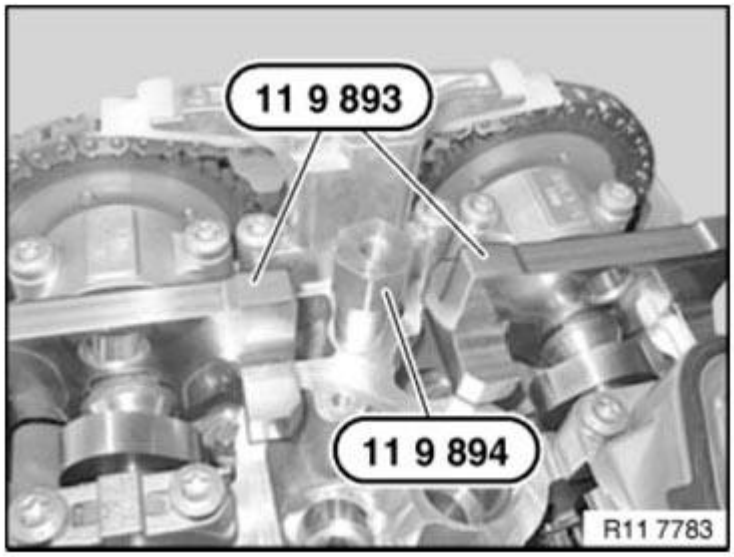


Fig. 197: Positioning Special Tool 11 9 893 On Intake Camshaft And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 892 on special tool 11 9 893.

Both special tools11 9 891 are secured with special tool 11 9 893.

NOTE: Tighten down special tool 11 9 891 by hand.

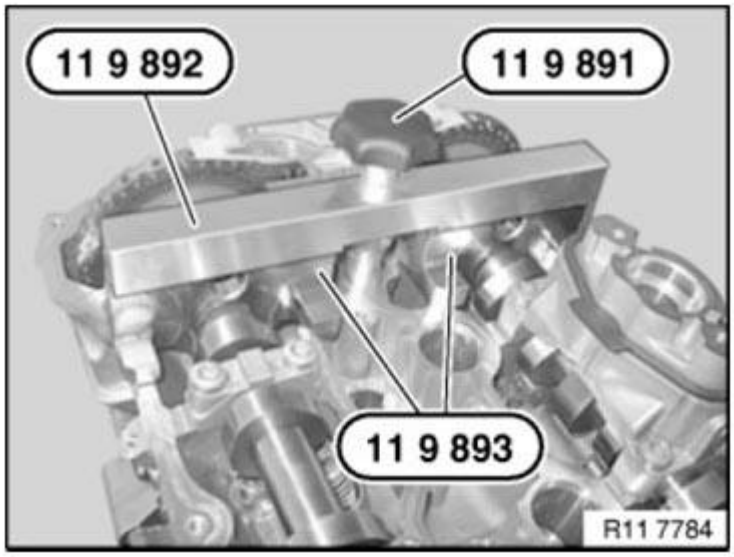


Fig. 198: Positioning Special Tool 11 9 892 On Special Tool 11 9 893
Courtesy of BMW OF NORTH AMERICA, INC.

Secure central bolt (1) of intake camshaft adjuster with special tool **00 9 120** .

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Secure central bolt (2) of exhaust camshaft adjuster with special tool **00 9 120** .

Tightening torque: **11 36 1AZ** .

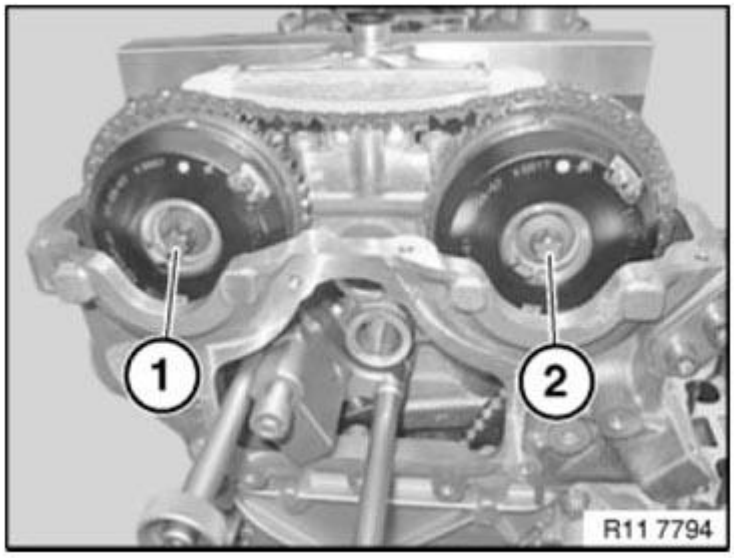
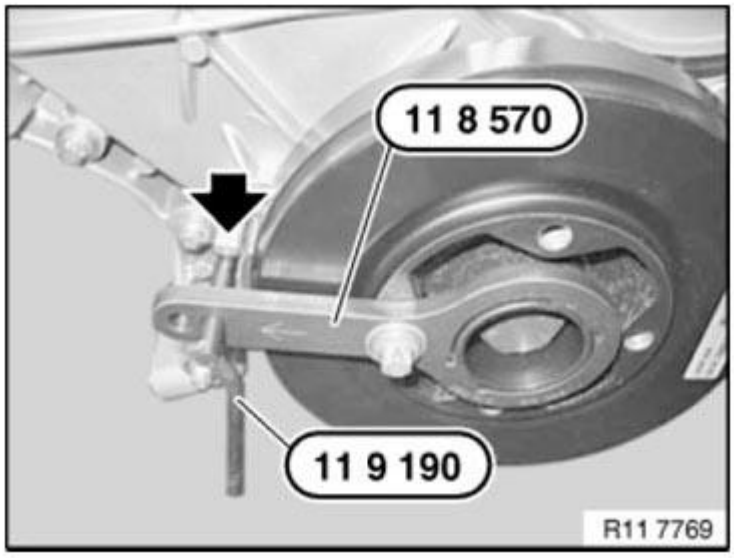


Fig. 199: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Remove special tools **11 9 190** and **11 8 570** .

Crank engine at central bolt twice in direction of engine rotation until engine returns to **150° before cylinder no. 1 firing TDC position.**

Secure vibration damper with special tool **11 9 190** at **150° before cylinder no. 1 firing TDC position 1.**



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Fig. 200: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool11 9 893 on the exhaust camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

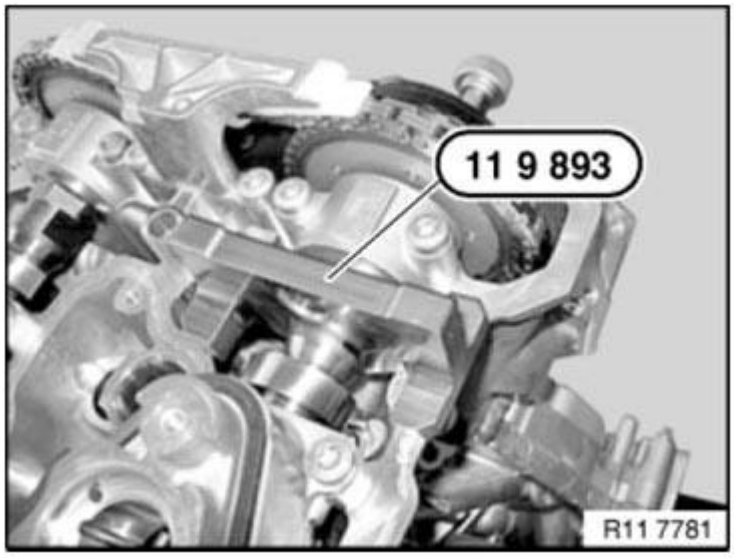


Fig. 201: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

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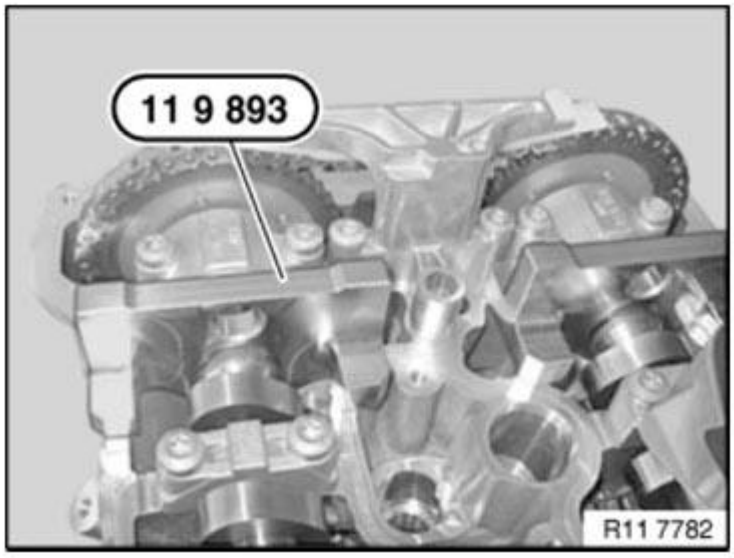


Fig. 202: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

1131574 ADJUSTING CAMSHAFT TIMING ON RIGHT SIDE (N63)

Notes

IMPORTANT: Release central bolts on adjuster only with special tool 11 9 890 .
Risk of damage to timing drive.
If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshaft.

(cylinder bank 1 to 4)

Necessary preliminary work

- Remove **RIGHT-HAND GEAR CASE COVER**
- **CHECK CAMSHAFT TIMING ON RIGHT SIDE** .

Get set of special tools **11 9 890** ready for securing camshafts.

NOTE: Special tool 11 9 891 Knurled screw.
Special tool 11 9 892 Press-down bar.
Special tool 11 9 893 Gap gauge for intake and exhaust camshafts.
Special tool 11 9 894 spacer.

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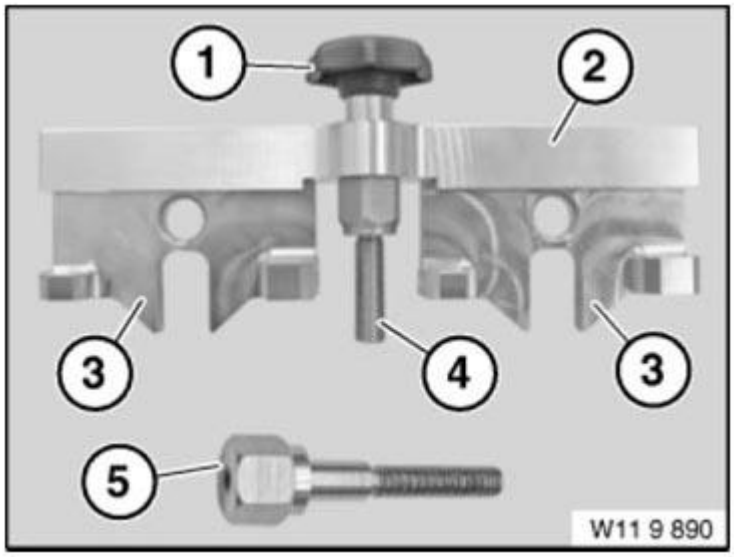


Fig. 203: Identifying Set Of Special Tools 11 9 890
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshaft.

Release central bolts (1 and 2) of intake and exhaust camshaft adjusters.

Installation note:

Replace central bolts after releasing.

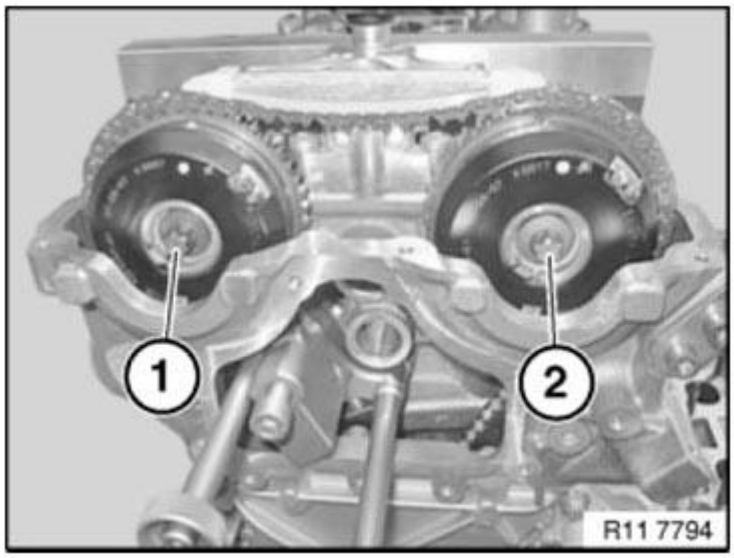


Fig. 204: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: Check whether head of central bolt (1) is greased (see arrow). If no grease can be seen on the bolt head of central bolt (1), the ADJUSTER must be replaced for safety reasons.

Installation note:

Coat contact surface of new central bolt (1) with copper paste.

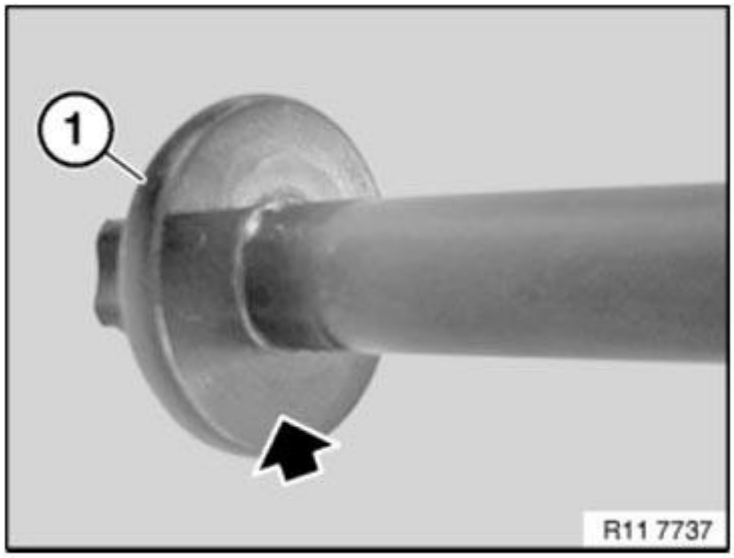


Fig. 205: Checking Head Of Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 893 on intake camshaft and exhaust camshaft.

The special tool 11 9 893 must rest **without a gap** on cylinder head; if necessary, adjust camshaft at hexagon heads.

Screw special tool 11 9 894 into cylinder head.

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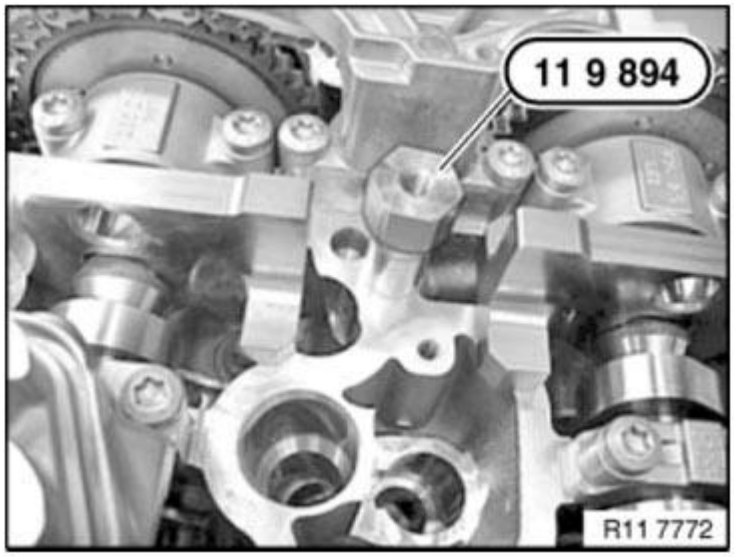


Fig. 206: Identifying Special Tool 11 9 893 On Intake Camshaft And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 892 on special tool 11 9 893.

Both special tools11 9 891 are secured with special tool 11 9 893.

NOTE: Tighten down special tool 11 9 891 by hand.

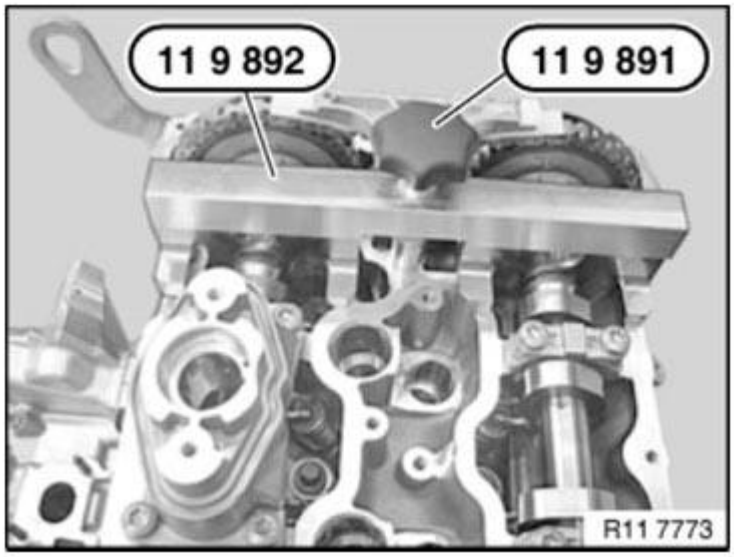


Fig. 207: Positioning Special Tool 11 9 892 On Special Tool 11 9 893
Courtesy of BMW OF NORTH AMERICA, INC.

Secure central bolt (1) of intake camshaft adjuster with special tool **00 9 120** .

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Secure central bolt (2) of exhaust camshaft adjuster with special tool **00 9 120** .

Tightening torque: **11 36 1AZ** .

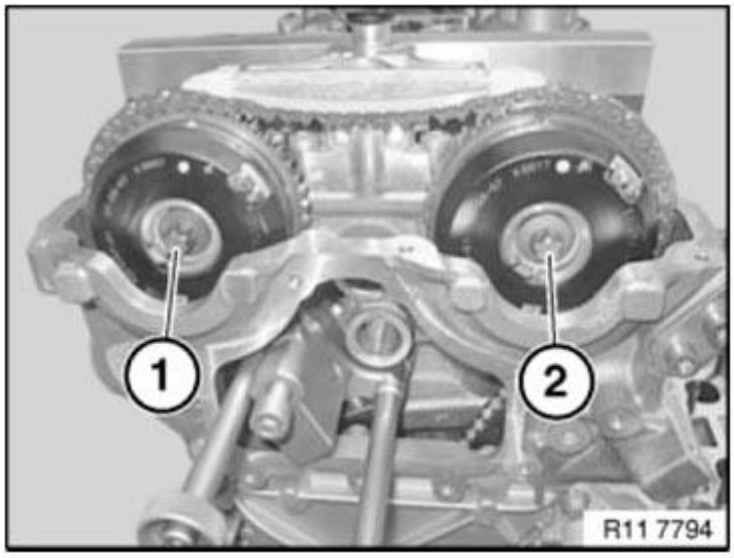
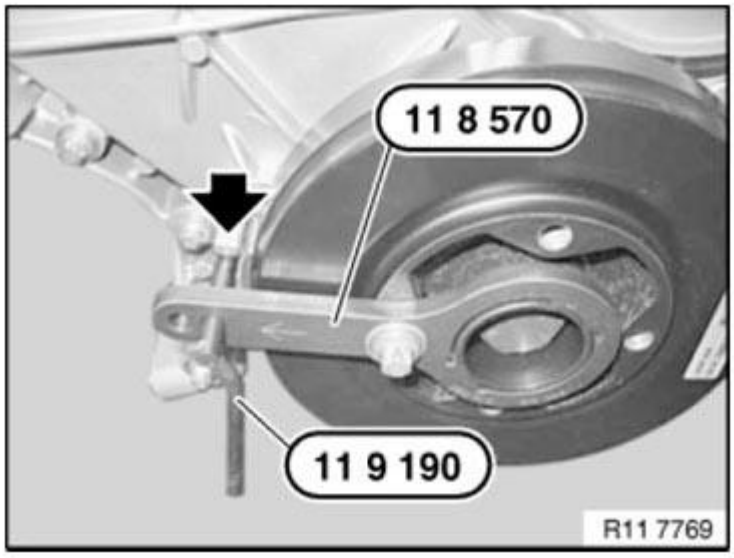


Fig. 208: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Remove special tools **11 9 190** and **11 8 570** .

Crank engine at central bolt twice in direction of engine rotation until engine returns to **150° before cylinder no. 1 firing TDC position.**

Secure vibration damper with special tool **11 9 190** at **150° before cylinder no. 1 firing TDC position 1.**



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Fig. 209: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool11 9 893 on the exhaust camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

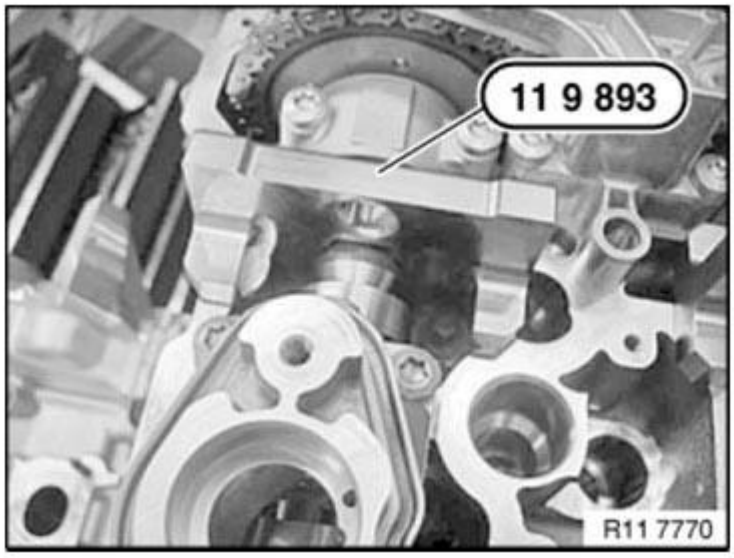


Fig. 210: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

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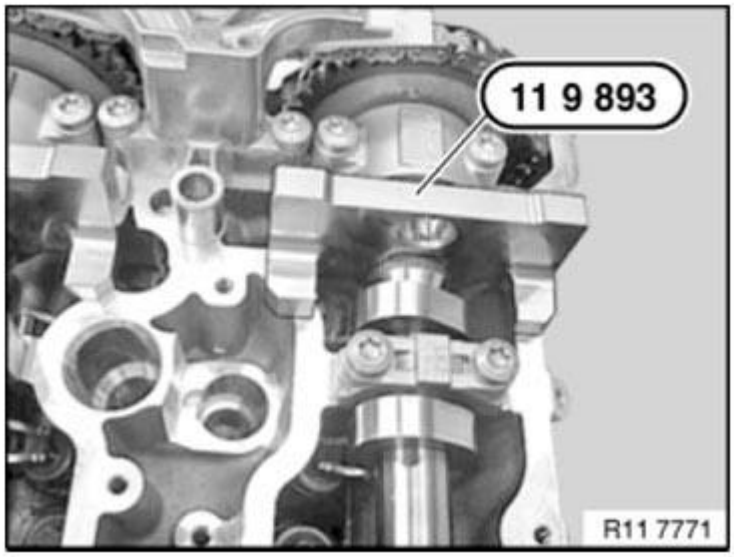


Fig. 211: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

1131070 CHECKING CAMSHAFT TIMING ON LEFT SIDE (N63)

Notes

IMPORTANT: The timing can only be checked with special tool 11 9 900 .
The timing may be misinterpreted if it is checked without special tool 11 9 900 .

Cylinders 5-8:

Necessary preliminary work

- Remove left **CYLINDER HEAD COVER**
- Remove **FAN COWL** with electric fan
- Remove **BELT PULLEY** for air conditioning system
- Remove left **CHAIN TENSIONER**

Mount special tool **11 9 900** at position of chain tensioner.

Preload hexagon socket screw with special tool **00 9 250** to **0.6 Nm.**

NOTE: Graphic corresponds to cylinders 1-4.

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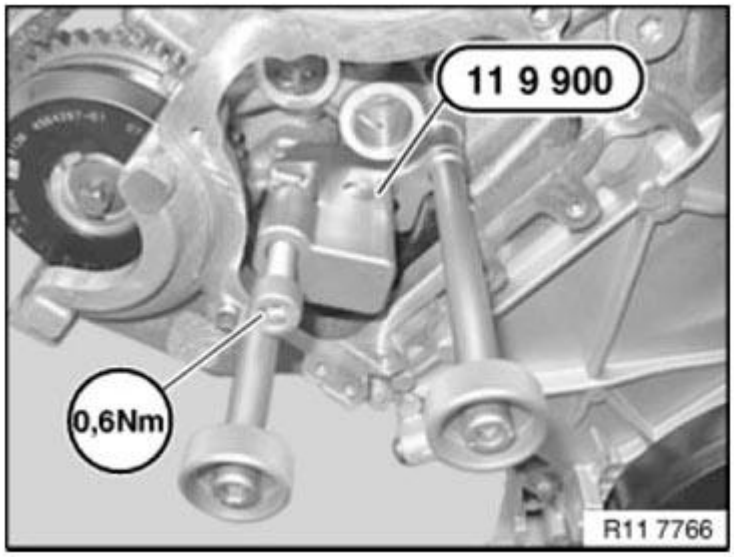


Fig. 212: Preloading Hexagon Socket Screw With Special Tool 00 9 250 To 0.6 Nm
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Marking (MP = Mounting Position) is important for installing special tool 11 8 570 .

MP = 150° before cylinder no. 1 firing TDC position

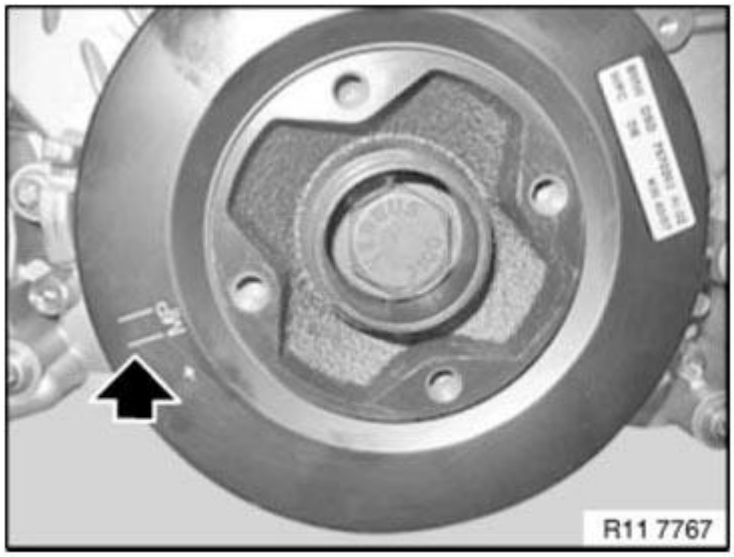


Fig. 213: Identifying Mounting Position Of Special Tool 11 8 570
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 8 570** with dihedron on vibration damper in such a way that it can be secured with bolt (1) at the MP marking.

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NOTE: Setting groove on crankcase, see arrow.

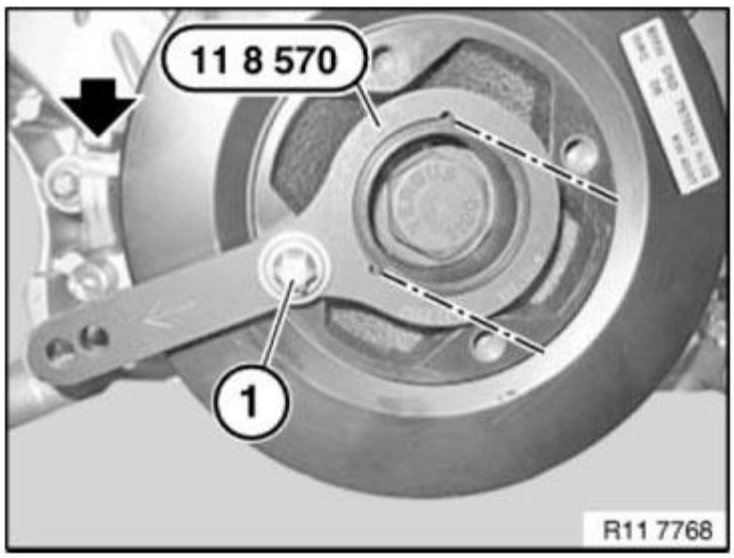


Fig. 214: Positioning Special Tool 11 8 570 With Dihedron On Vibration Damper
Courtesy of BMW OF NORTH AMERICA, INC.

Crank engine at central bolt.

Secure vibration damper with special tools **11 8 570** and **11 9 190** at **150° before cylinder no. 1 firing TDC position.**

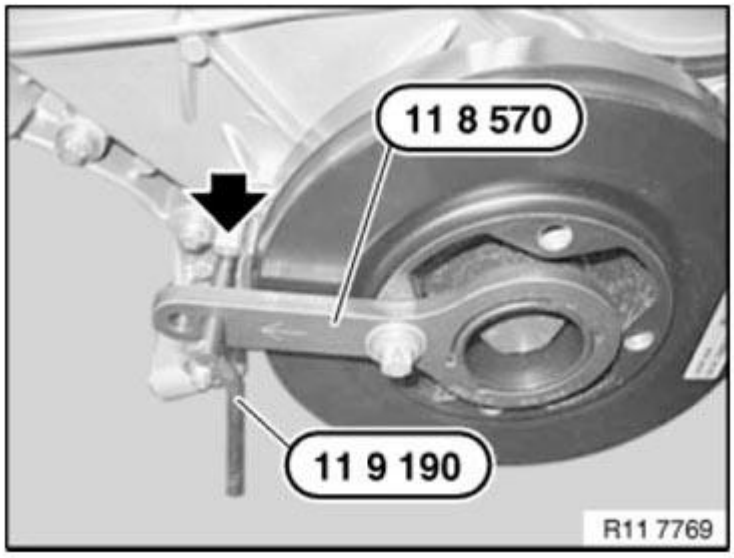


Fig. 215: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

With cylinder no. 1 at 150° before firing TDC position, cams on exhaust camshaft (A) at cylinder no. 5 point at

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an angle to the left.

Cams on inlet camshaft (E) point at an angle downwards.

NOTE: For purposes of clarity, the graphic shows the inlet and exhaust adjustment units removed.

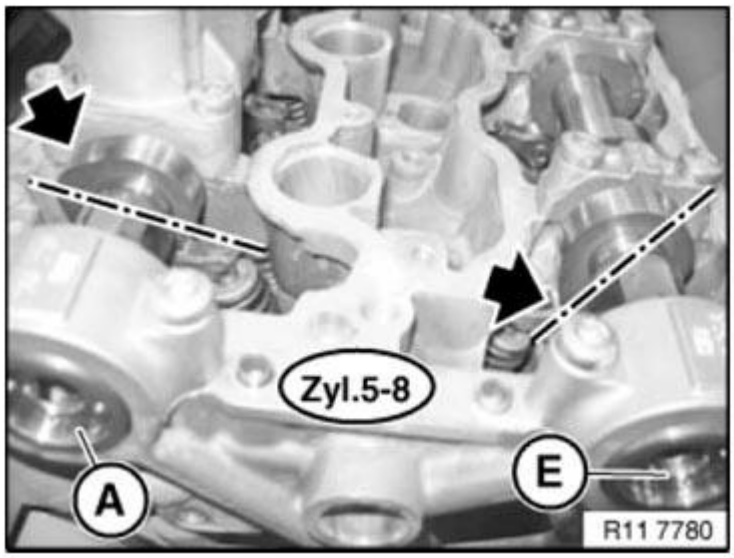


Fig. 216: Identifying Cams On Inlet Camshaft Point At An Angle Downwards
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: When the engine is shut down, the inlet and exhaust adjustment units are normally locked in their initial position.
The situation may arise in some individual cases where this initial position is not reached and the camshaft can continue to be rotated in the adjustment range of the camshaft adjuster.
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.

Checking locking of intake and exhaust camshaft adjusters in initial setting:

Gripping hexagon head (2) of camshafts with a fork wrench (1), carefully try to rotate camshafts against direction of rotation.

The intake and exhaust camshaft adjusters are locked in the initial setting when the camshafts are non-positively connected to the adjusters.

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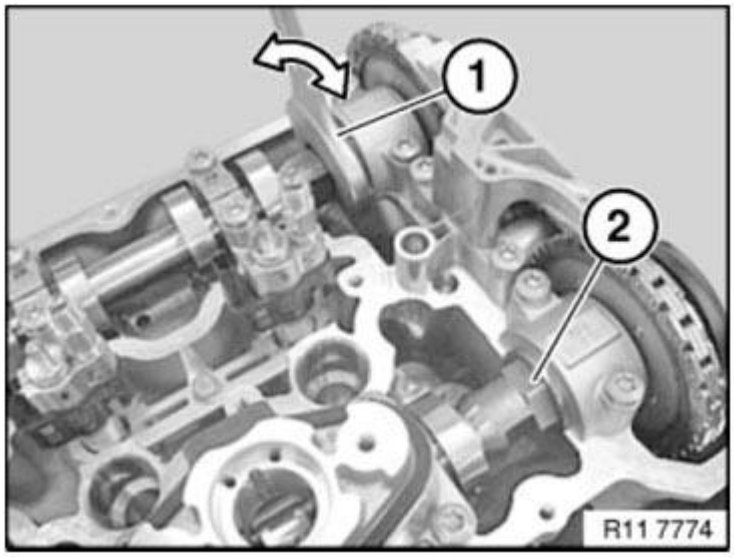


Fig. 217: Gripping Hexagon Head Of Camshafts With Fork Wrench
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If the intake or exhaust camshaft adjusters of the camshafts "cannot" be locked as described, the adjuster is faulty and must be replaced.

Place special tool 11 9 893 on the exhaust camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

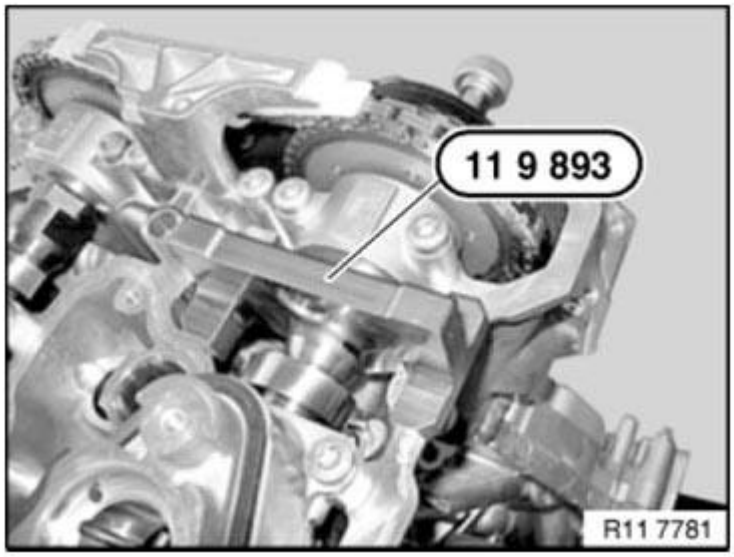


Fig. 218: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

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Fit special tool 11 9 893 on intake camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

If necessary, adjust camshaft **TIMING** on left side.

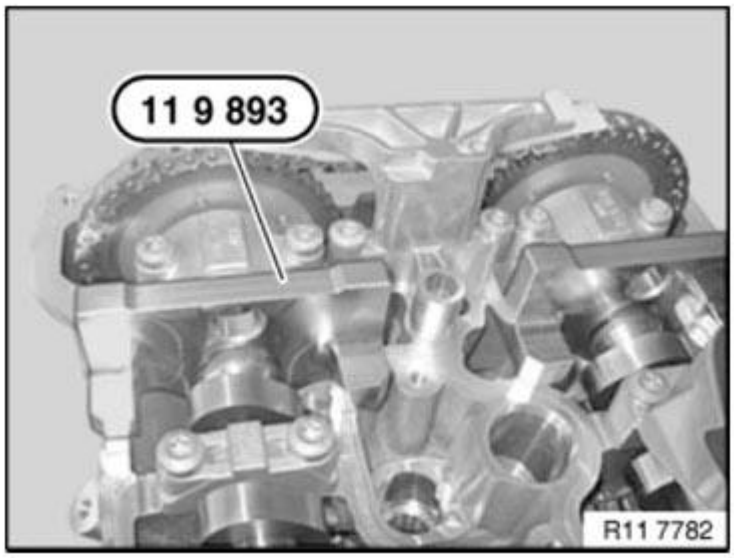


Fig. 219: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

1131071 CHECKING CAMSHAFT TIMING ON RIGHT SIDE (N63)

Notes

IMPORTANT: The timing can only be checked with special tool 11 9 900 .
The timing may be misinterpreted if it is checked without special tool 11 9 900 .

Cylinders 1-4:

Necessary preliminary work

- Remove right **CYLINDER HEAD COVER**
- Remove **FAN COWL** with electric fan
- Remove **BELT PULLEY** for air conditioning system
- Remove right **CHAIN TENSIONER**

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Mount special tool **11 9 900** at position of chain tensioner.

Preload hexagon socket screw with special tool **00 9 250** to **0.6 Nm.**

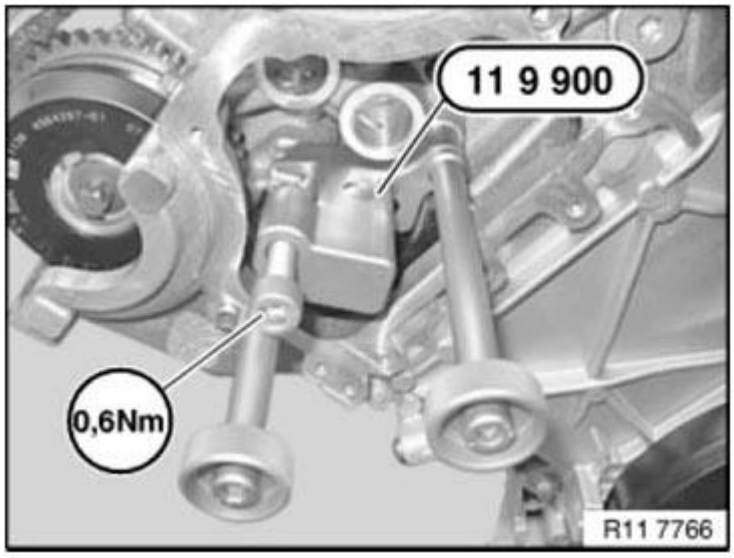


Fig. 220: Preloading Hexagon Socket Screw With Special Tool 00 9 250 To 0.6 Nm
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Marking (MP = Mounting Position) is important for installing special tool 11 8 570 .

MP = 150° before cylinder no. 1 firing TDC position

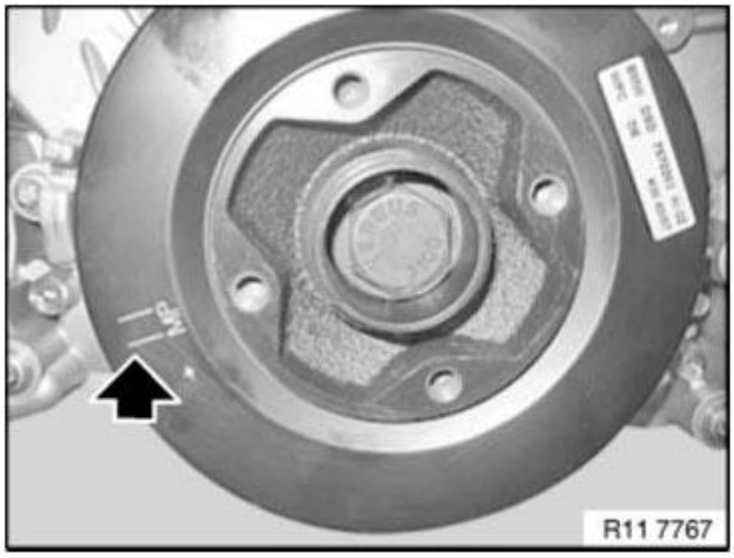


Fig. 221: Identifying Mounting Position Of Special Tool 11 8 570
Courtesy of BMW OF NORTH AMERICA, INC.

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Position special tool **11 8 570** with dihedron on vibration damper in such a way that it can be secured with bolt (1) at the MP marking.

NOTE: Setting groove on crankcase, see arrow.

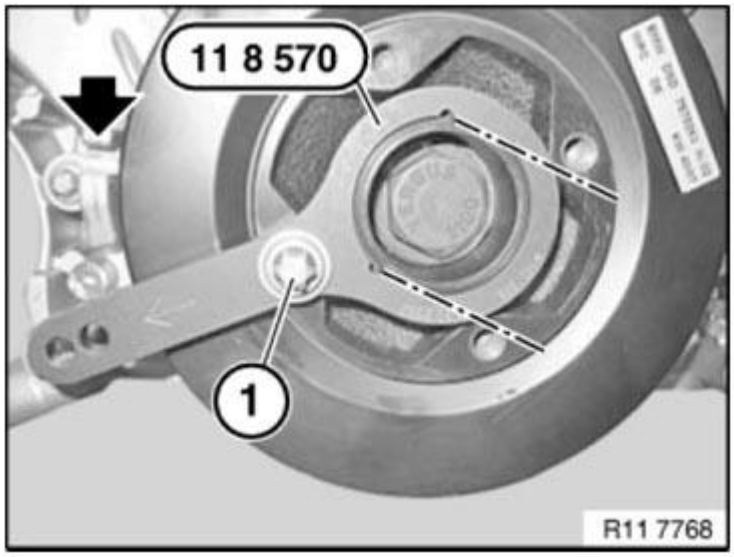


Fig. 222: Positioning Special Tool 11 8 570 With Dihedron On Vibration Damper
Courtesy of BMW OF NORTH AMERICA, INC.

Crank engine at central bolt.

Secure vibration damper with special tools **11 8 570** and **11 9 190** at **150° before cylinder no. 1 firing TDC position.**

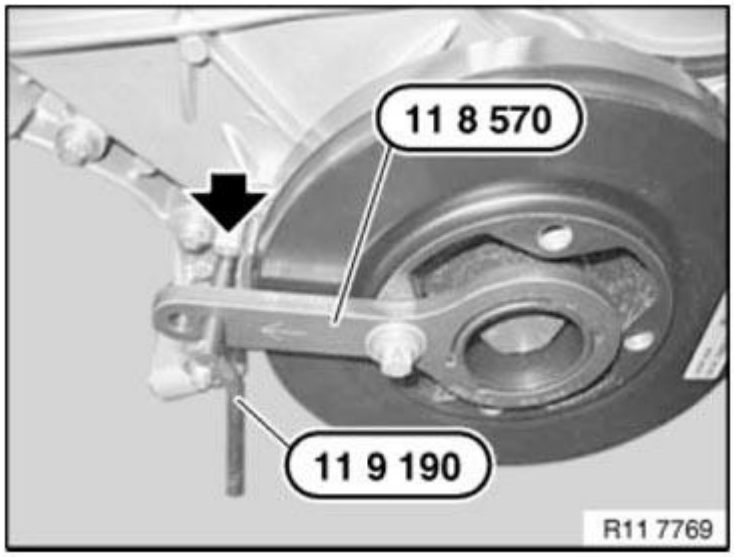


Fig. 223: Securing Vibration Damper With Special Tool 11 9 190

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Courtesy of BMW OF NORTH AMERICA, INC.

With cylinder no. 1 at 150° before firing TDC position, cams on exhaust camshaft (A) at cylinder no. 1 point at an angle upwards.

Cams on inlet camshaft (E) point at an angle downwards.

NOTE: For purposes of clarity, the graphic shows the inlet and exhaust adjustment units removed.

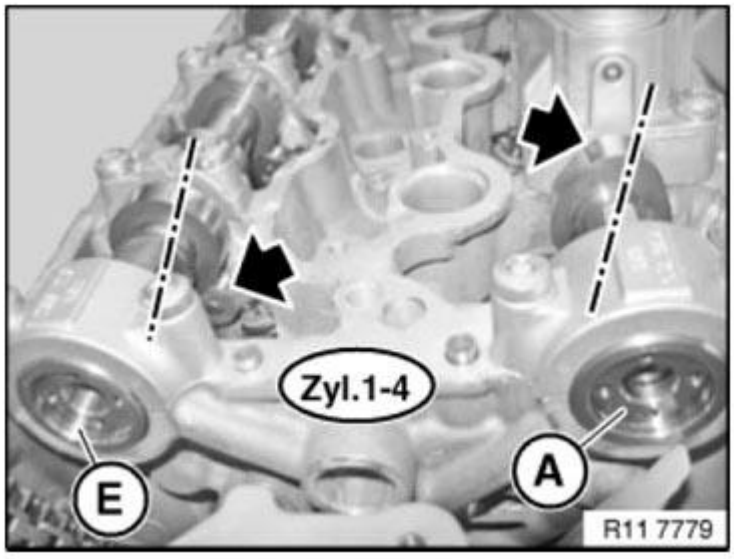


Fig. 224: Identifying Cams On Inlet Camshaft Point At An Angle Downwards
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: When the engine is shut down, the intake and exhaust camshaft adjusters are normally locked in their initial position.
The situation may arise in some individual cases where this initial position is not reached and the camshaft can continue to be rotated in the adjustment range of the camshaft adjuster.
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.

Checking locking of intake and exhaust camshaft adjusters in initial setting:

Gripping hexagon head (2) of camshafts with an open-end spanner (1), carefully try to rotate camshafts against direction of rotation.

The intake and exhaust camshaft adjusters are locked in the initial setting when the camshafts are non-positively connected to the adjusters.

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NOTE: Graphic corresponds to cylinders 5-8.

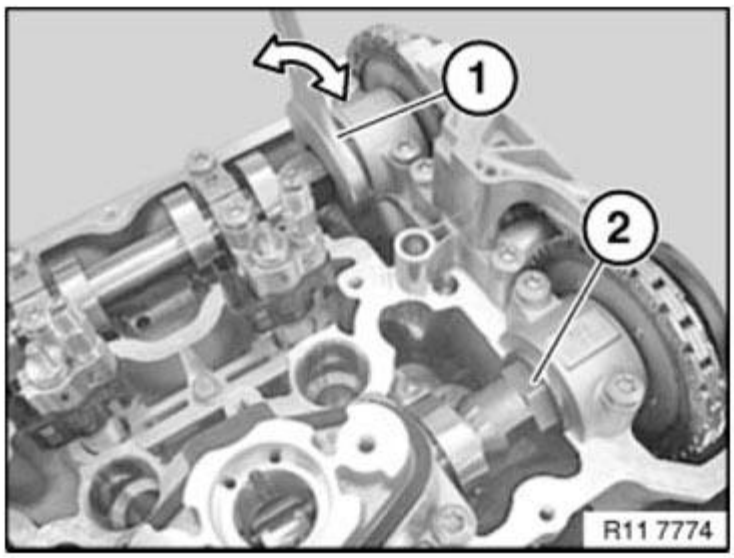
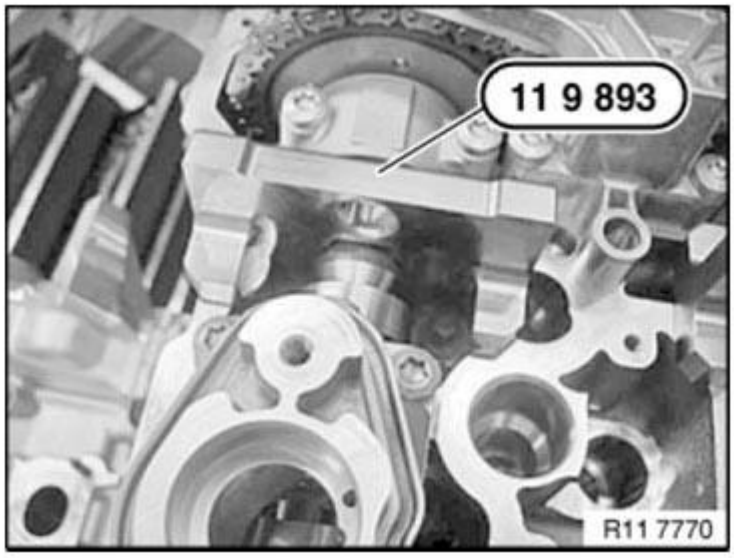


Fig. 225: Gripping Hexagon Head Of Camshafts With Fork Wrench
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If the intake or exhaust camshaft adjusters of the camshafts "cannot" be locked as described, the adjuster is faulty and must be replaced.

Place special tool 11 9 893 on the exhaust camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.



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Fig. 226: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

If necessary, adjust camshaft **TIMING** on right side.

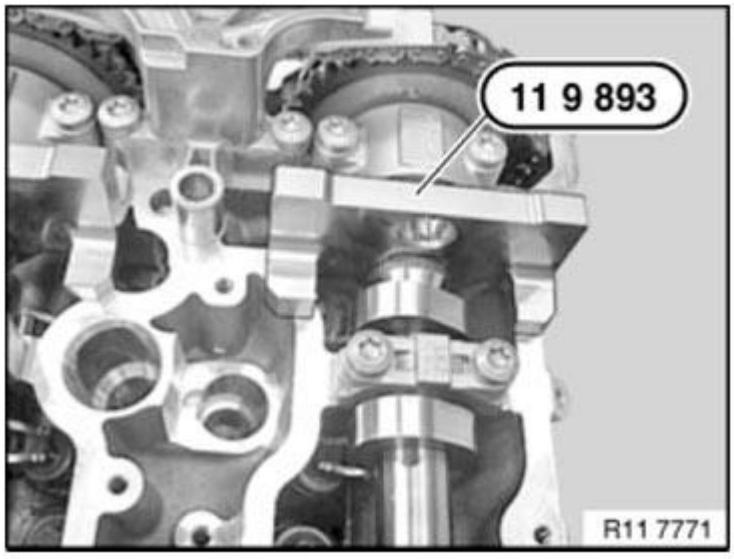


Fig. 227: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

1131038 REMOVING AND INSTALLING/RENEWING RIGHT EXHAUST CAMSHAFT (N63)

Notes

Cylinders 1-4:

IMPORTANT: Risk of damage!
The exhaust camshaft must first be rotated in such a way that the camshaft is free from tension when the bearing caps are released.

Necessary preliminary work

- Remove right **HIGH-PRESSURE PUMP**

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- Remove right **CYLINDER HEAD COVER**
- Remove right **EXHAUST CAMSHAFT ADJUSTER**

IMPORTANT: No cam on the exhaust camshaft is permitted to press directly onto a roller cam follower.
With cylinder no. 1 at 150° before TDC firing position there is no piston in the TDC position.

Rotate exhaust camshaft (2) at dihedron with a fork wrench into a suitable position.

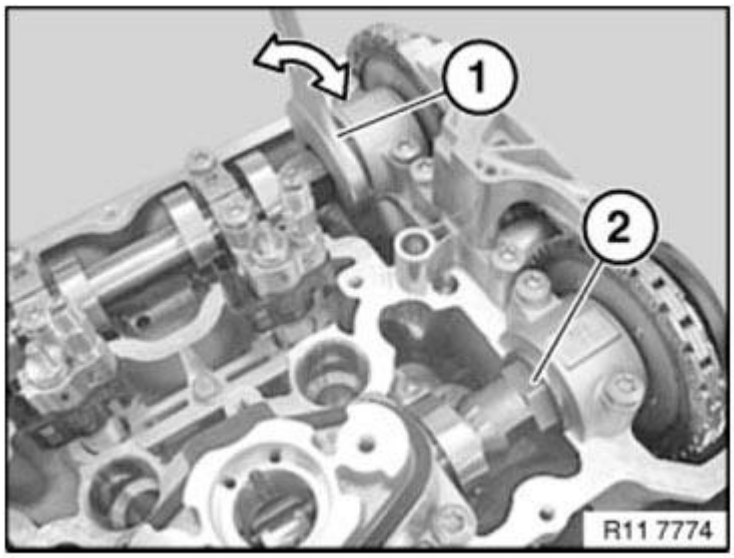


Fig. 228: Rotating Exhaust Camshaft At Dihedron With Fork Wrench Into Suitable Position
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The intake camshaft of cylinder bank 5-8 is marked "E 5-8".

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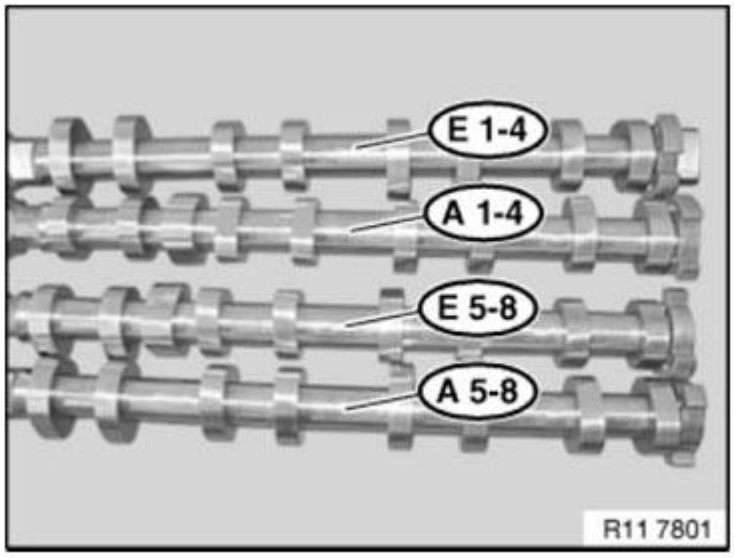


Fig. 229: Identifying Camshaft Of Cylinder Bank Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts of camshaft bearings in sequence (10 to 1) in 1/2 turns.

Set all bearing caps down in special tool **11 4 480** in a neat and orderly fashion.

Remove roller tappet from bearing caps (2 and 3) of high pressure pump and lay down in special tool **11 4 480** .

Remove left exhaust camshaft and lay down in special tool **11 4 480** .

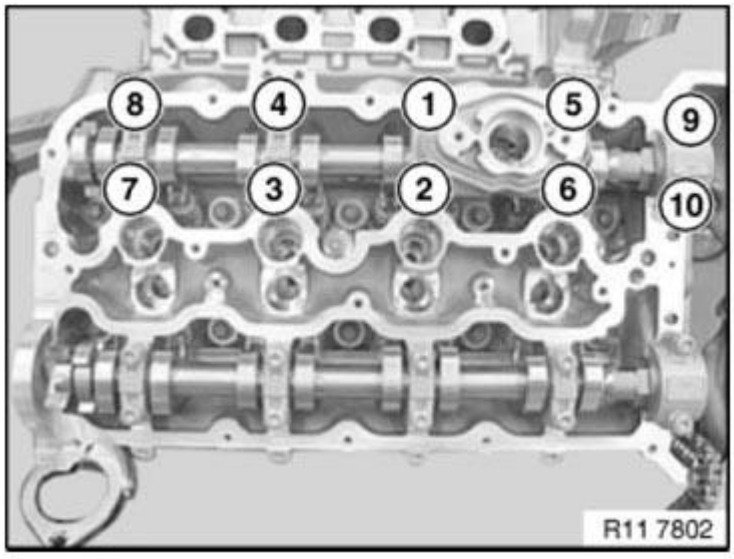


Fig. 230: Identifying Camshaft Bearings Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: Rocker arms (1) of can slip slightly when inlet camshaft is fitted. Make sure rocker arms (1) are secured as illustrated on hydraulic valve clearance compensating elements and on valves.

Align all rocker arms (1) straight.

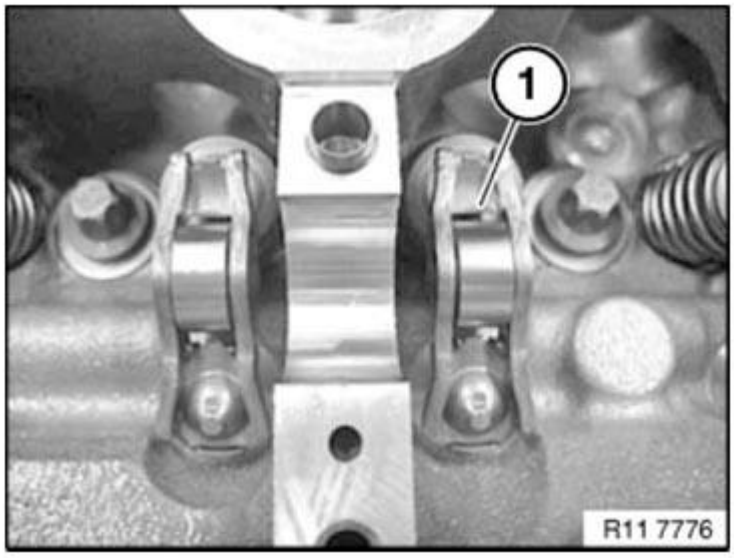


Fig. 231: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Plain compression rings (1) can easily break.

If necessary, replace plain compression rings (1).

Press compression ring (1) on one side into groove, pull up on other side and remove latch mechanism.

Carefully pull compression ring (1) apart and remove towards front.

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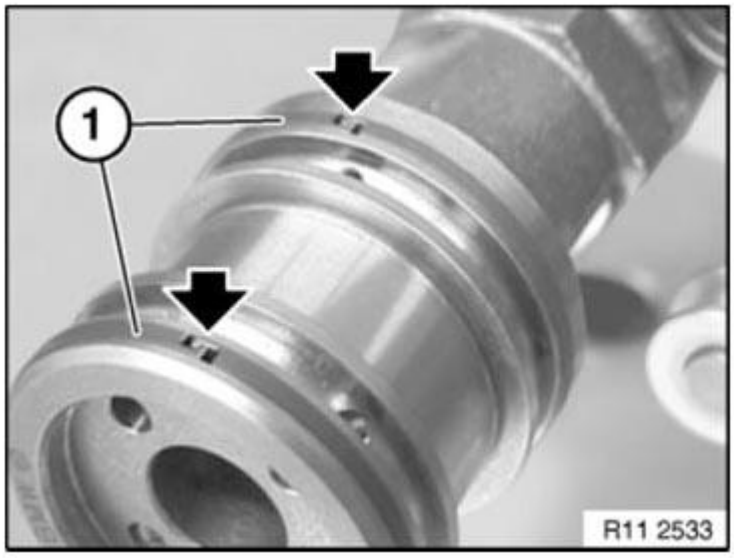


Fig. 232: Locating Compression Ring End
Courtesy of BMW OF NORTH AMERICA, INC.

Ends of compression rings (1) point upwards.

Make sure compression rings (1) are engaged at ends.

Coat all bearing positions with engine oil.

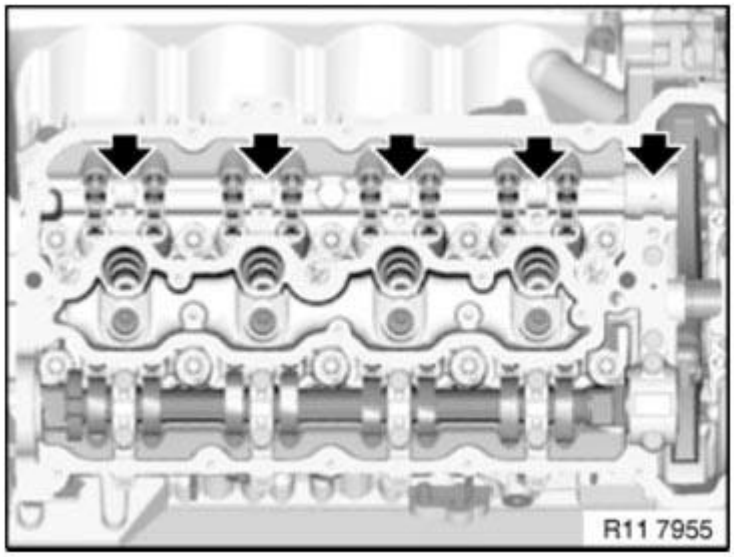


Fig. 233: Locating Bearing Positions
Courtesy of BMW OF NORTH AMERICA, INC.

Install exhaust camshaft (1).

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Turn exhaust camshaft (1) until cams point to side at cylinder no. 1 as shown in graphic.

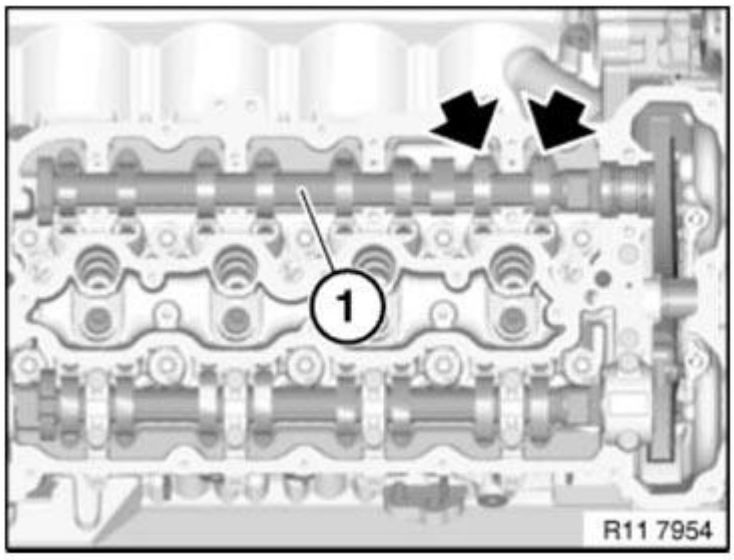


Fig. 234: Identifying Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Bearing caps of cylinders 1-4 and cylinders 5-8 must not be interchanged. All bearing caps are coded and can only be installed in one position.

All bearing caps are marked with letters and numbers:

L= Cylinder bank 1-4.

R= Cylinder bank 5-8.

E= Intake side

A= Exhaust side

1= Marking, bearing point, from 1 to 5

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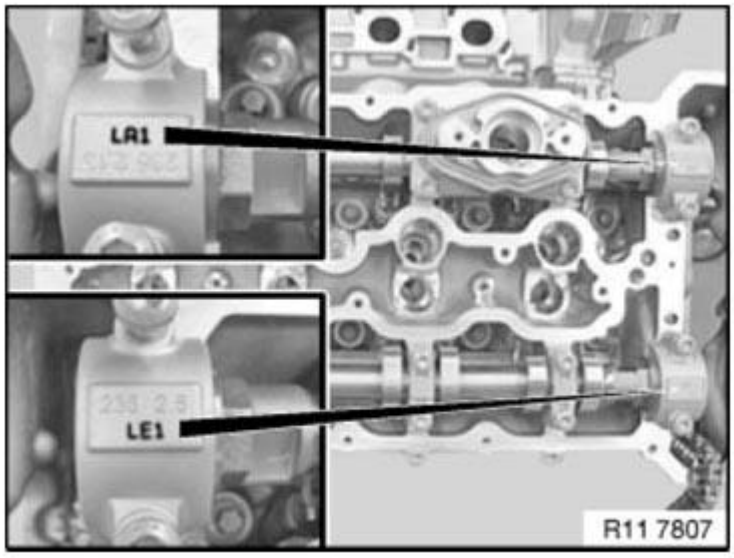


Fig. 235: Identifying Bearing Caps Marks
Courtesy of BMW OF NORTH AMERICA, INC.

Insert all bolts.

Tighten down bolts in sequence (1 to 10) in 1/2 turns.

Tightening torque **11 31 6AZ** .

Tightening torque **11 31 7AZ** .

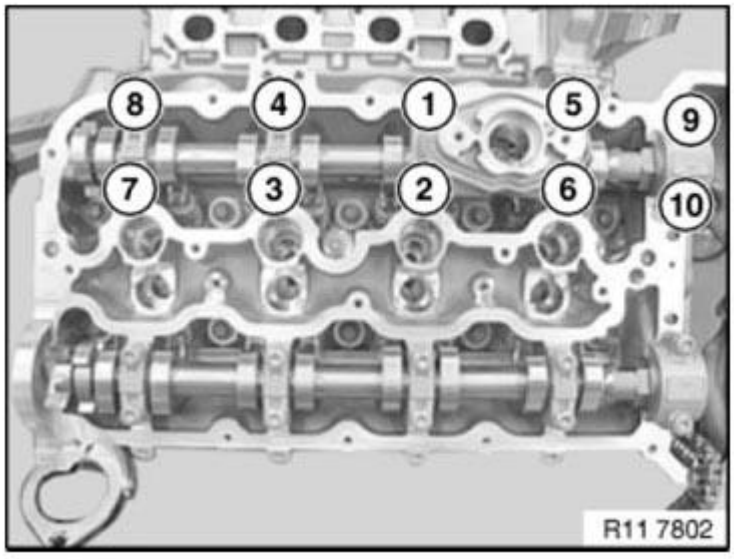


Fig. 236: Identifying Camshaft Bearings Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

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Install right **INLET AND EXHAUST CAMSHAFT ADJUSTERS** .

Adjust **VALVE TIMING** .

Assemble engine.

1133054 REMOVING AND INSTALLING/RENEWING ROCKER ARMS ON RIGHT SIDE (N63)

Necessary preliminary work

(cylinder bank 1 to 4)

- Remove **INLET AND EXHAUST ADJUSTMENT UNIT** on right side.
- Remove right **INLET CAMSHAFT** .
- Remove right **EXHAUST CAMSHAFT** .

IMPORTANT: Used rocker arms (1) may only be reused in the same position. Tolerance classes are not required.

Remove rocker arm (1) and set down in neat order in special tool **11 4 480** .

Install rocker arm (1).

Align all rocker arms (1) straight.

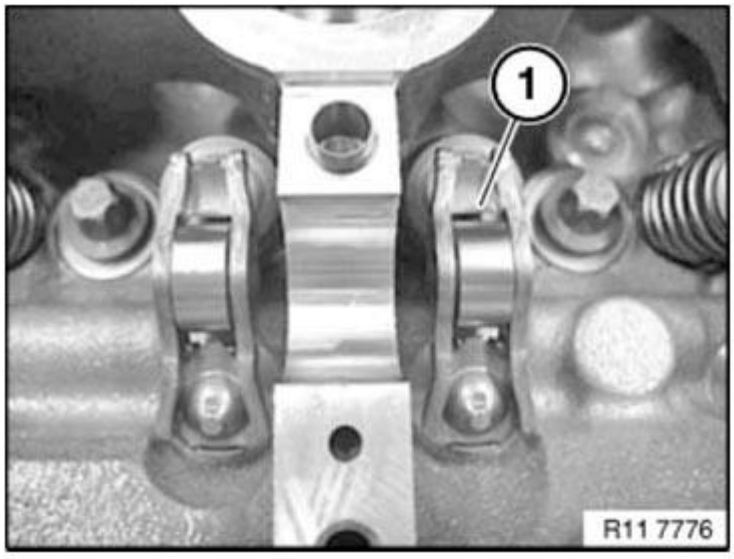


Fig. 237: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

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1133052 REMOVING AND INSTALLING/REPLACING ALL ROCKER ARMS ON LEFT SIDE (N63)

Necessary preliminary work

(cylinder bank 5 to 8)

- Remove **LEFT INLET CAMSHAFT** .
- Remove left **EXHAUST CAMSHAFT** .

IMPORTANT: Used rocker arms (1) may only be reused in the same position. Tolerance classes are not required.

Remove rocker arm (1) and set down in neat order in special tool **11 4 480** .

Install rocker arm (1).

Align all rocker arms (1) straight.

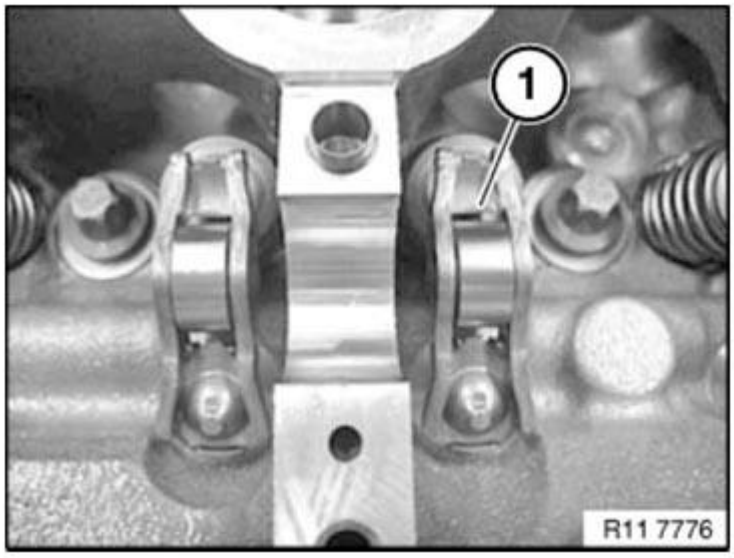


Fig. 238: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1131036 REMOVING AND INSTALLING/REPLACING LEFT EXHAUST CAMSHAFT (N63)

Necessary preliminary work

(cylinder bank 5 to 8)

IMPORTANT: The exhaust camshaft must first be rotated in such a way that the camshaft is

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free from tension when the bearing caps are released risk of damage.

- Remove **LEFT CYLINDER HEAD COVER** .
- Check **TIMING** .
- Remove **LEFT INLET ADJUSTMENT UNIT** .

IMPORTANT: No cam on the exhaust camshaft is permitted to press directly onto a roller cam follower.
With cylinder no. 1 at 150° before firing TDC there is no piston in the TDC position.

Rotate exhaust camshaft (2) at dihedron with a fork wrench into a suitable position.

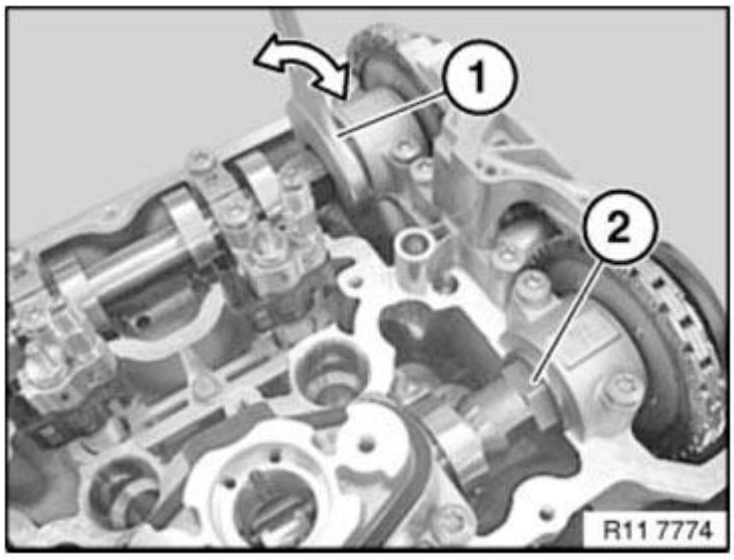


Fig. 239: Rotating Exhaust Camshaft At Dihedron With Fork Wrench Into Suitable Position
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts of camshaft bearings in sequence (10 to 1) in 1/2 turns.

Set down all bearing caps in a tidy and orderly fashion on special tool **11 4 480** .

Remove roller tappet from bearing cap (2 and 3) of high pressure pump and set down on special tool **11 4 480** .

Remove left exhaust camshaft and set down on special tool **11 4 480** .

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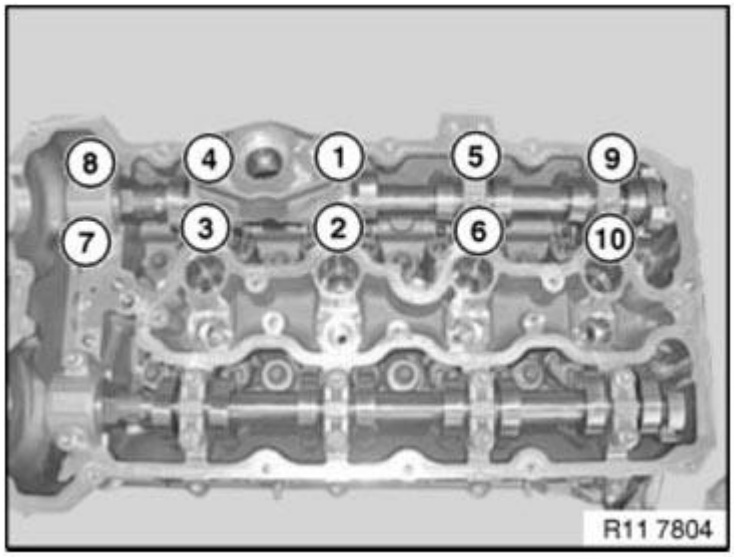


Fig. 240: Identifying Camshaft Bearings Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Used rocker arms (1) may only be reused in the same position.

NOTE: Rocker arms (1) are freely accessible after exhaust camshaft has been removed. Do "not" remove rocker arms (1) on exhaust side.

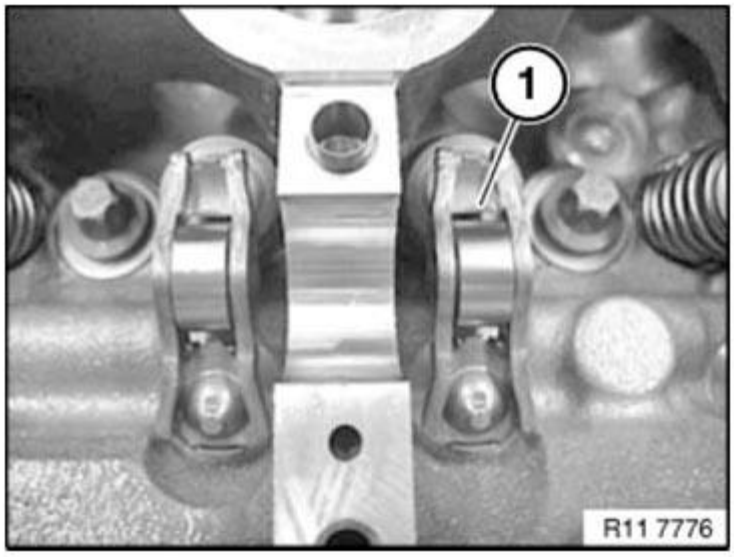


Fig. 241: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Plain compression rings (1) can easily break.

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If necessary, replace plain compression rings (1).

Press compression ring (1) on one side into groove, pull up on other side and remove catch.

Carefully pull compression ring (1) apart and remove towards front.

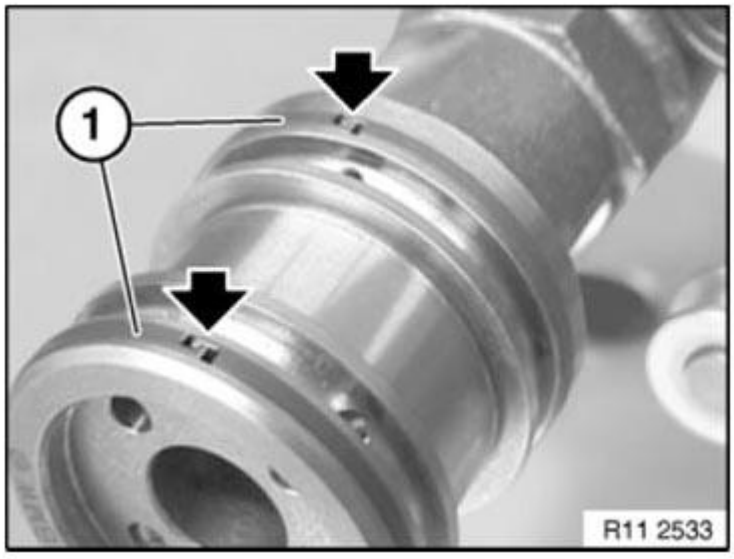


Fig. 242: Locating Compression Ring End
Courtesy of BMW OF NORTH AMERICA, INC.

Ends of compression rings (1) point upwards.

Make sure compression rings (1) are engaged at ends.

NOTE: Exhaust camshaft of cylinder bank 5 to 8 is marked with "A 5-8".

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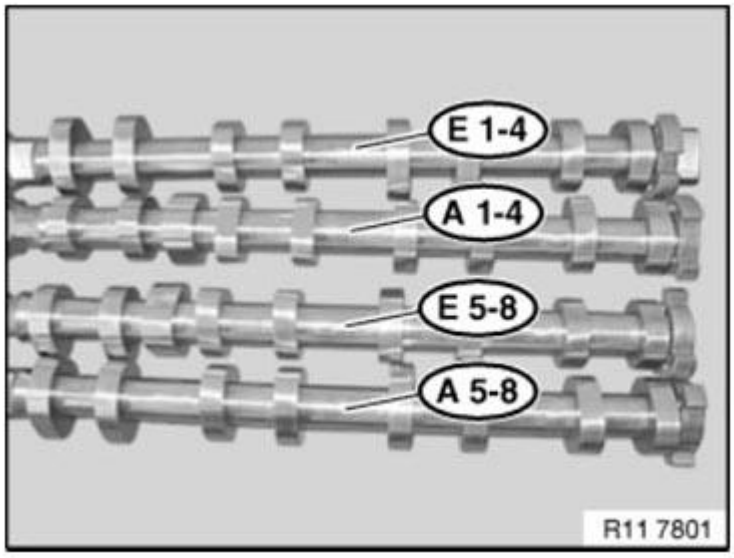


Fig. 243: Identifying Camshaft Of Cylinder Bank Mark
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Rocker arms (1) slip slightly when exhaust camshaft is fitted. Make sure rocker arms (1) are secured as illustrated on hydraulic valve clearance compensating elements and on valves.

Align all rocker arms (1) straight.

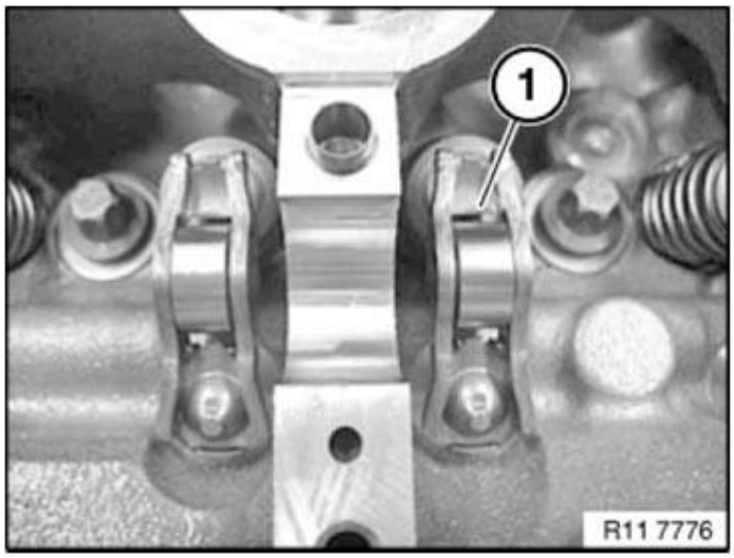


Fig. 244: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Coat all bearing positions with engine oil.

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Install exhaust camshaft (1).

Insert exhaust camshaft (1) so that cams point to side at cylinder 5 as shown in picture.

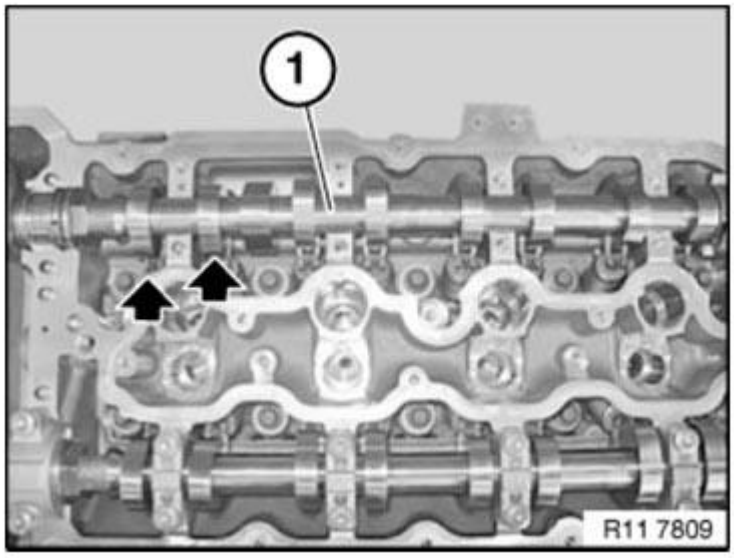


Fig. 245: Identifying Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not mix up the bearing caps of cylinders 1 to 4 and 5 to 8. All bearing caps are coded and can only be installed in one position.

All bearing caps are marked:

L= Cylinders 1 - 4.

R= Cylinders 5 - -8.

E= Intake side

A= Exhaust side

1= designation from 1 to 5

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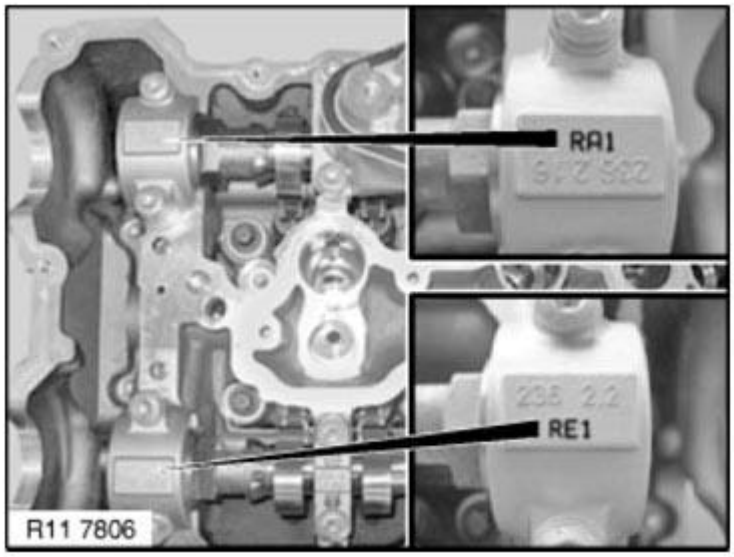


Fig. 246: Identifying Bearing Caps Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Insert all bolts.

Tighten down bolts in sequence (1 to 10) in 1/2 turns.

Tightening torque: **11 31 6AZ** .

Tightening torque: **11 31 7AZ** .

Insert tappets for high-pressure pump.

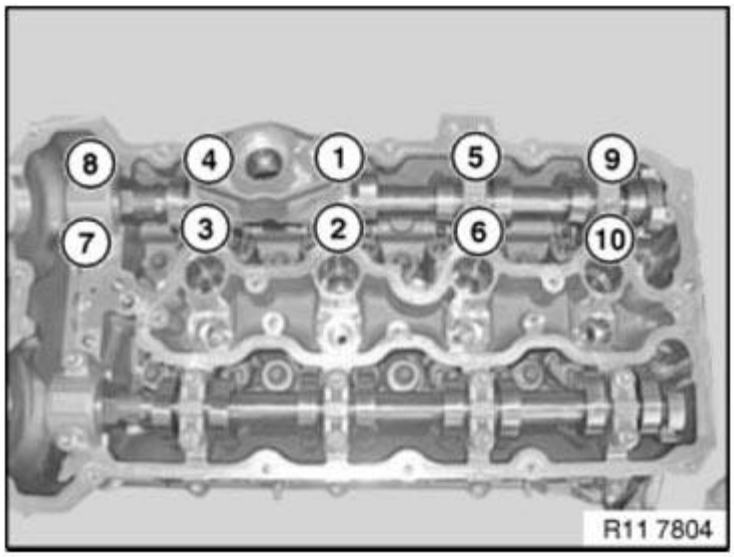


Fig. 247: Identifying Camshaft Bearings Bolts Tightening Sequence

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Courtesy of BMW OF NORTH AMERICA, INC.

Install **INLET ADJUSTMENT UNITS** .

Adjust **VALVE TIMING** .

Assemble engine.

1131032 REMOVING AND INSTALLING/REPLACING LEFT INLET CAMSHAFT (N63)

Necessary preliminary work

(cylinder bank 5 to 8)

IMPORTANT: The intake camshaft must first be rotated in such a way that the camshaft is free from tension when the bearing caps are released (risk of damage).

- Remove **LEFT CYLINDER HEAD COVER** .
- Check **TIMING** .
- Remove **LEFT INLET ADJUSTMENT UNIT** .

IMPORTANT: No cam on the inlet camshaft is permitted to press directly onto a roller cam follower.
With cylinder no. 1 at 150° before firing TDC there is no piston in the TDC position.

Rotate left inlet camshaft at dihedron with a fork wrench (1) into a suitable position.

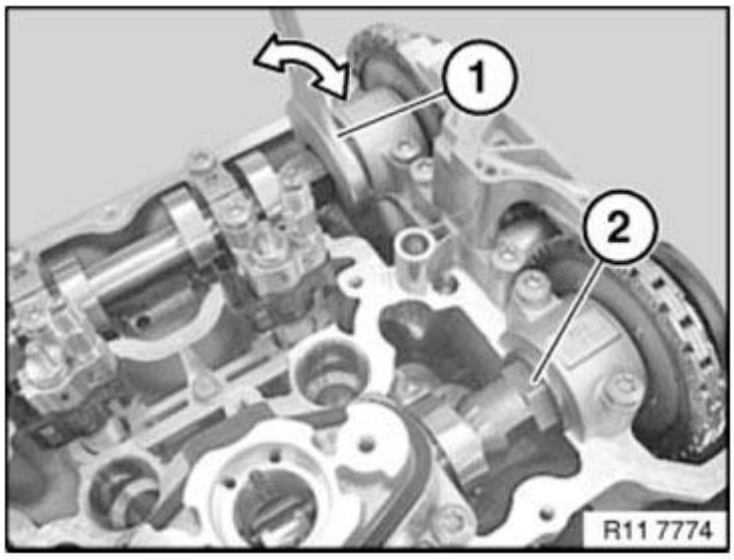


Fig. 248: Rotating Left Inlet Camshaft At Dihedron With Fork Wrench

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Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts of camshaft bearings in sequence (10 to 1) in 1/2 turns.

Set down all bearing caps in a tidy and orderly fashion on special tool **11 4 480** .

Intake camshaft

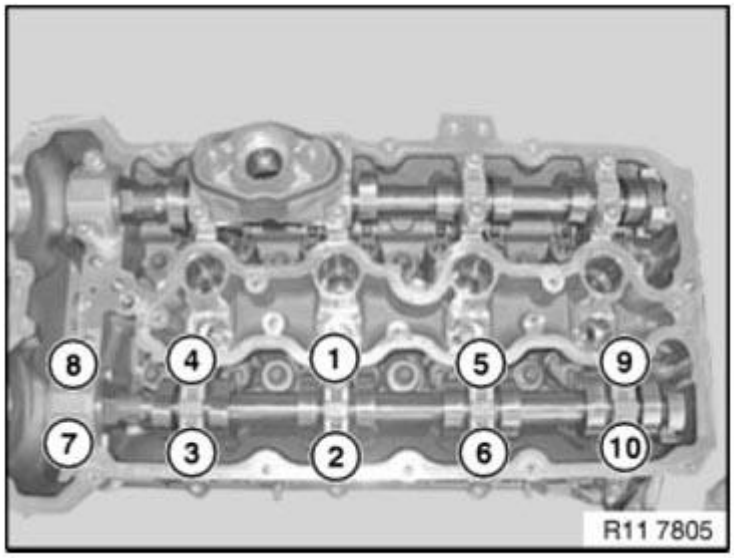


Fig. 249: Identifying Camshaft Bearings Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Used rocker arms (1) may only be reused in the same position.

NOTE: Rocker arms (1) are freely accessible after inlet camshaft has been removed. Do "not" remove rocker arm (1) on intake side.

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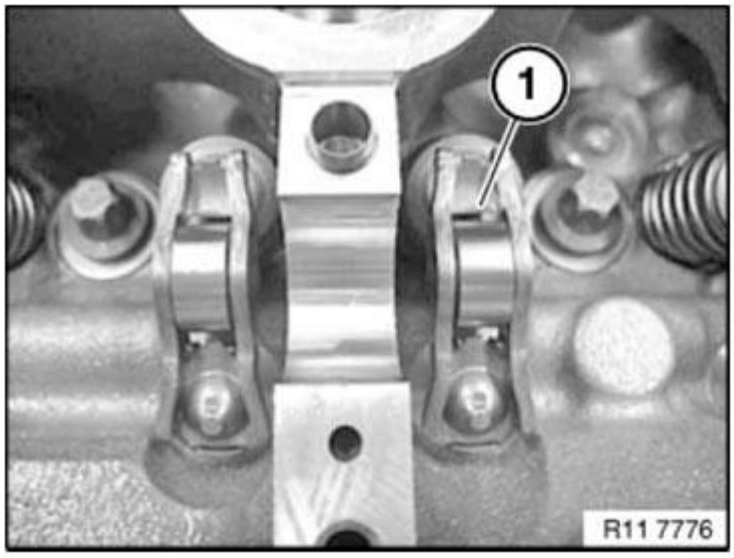


Fig. 250: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Plain compression rings (1) can easily break.

If necessary, replace plain compression rings (1).

Press compression ring (1) on one side into groove, pull up on other side and remove catch.

Carefully pull compression ring (1) apart and remove towards front.

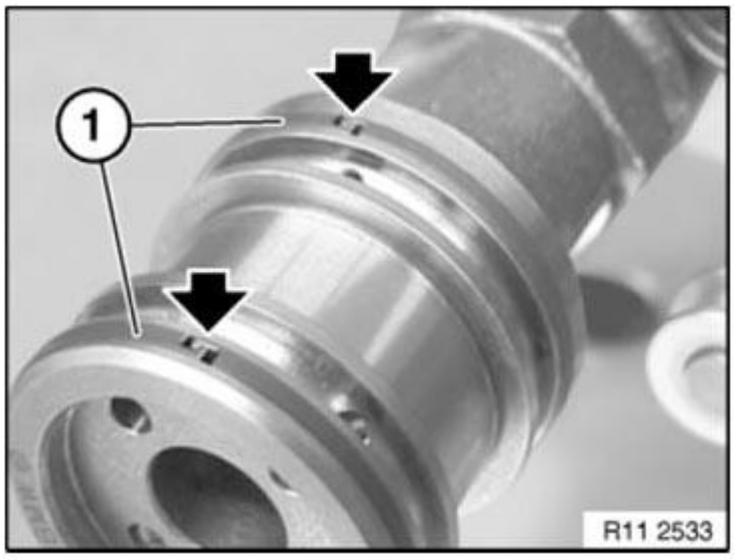


Fig. 251: Locating Compression Ring End
Courtesy of BMW OF NORTH AMERICA, INC.

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Ends of compression rings (1) point upwards.

Make sure compression rings (1) are engaged at ends.

NOTE: The intake camshaft of cylinder bank 5 to 8 is marked with "E 5-8".

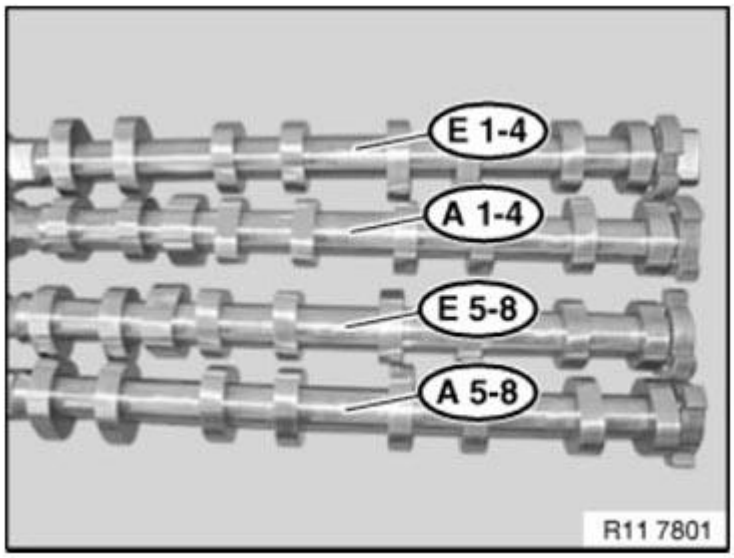


Fig. 252: Identifying Camshaft Of Cylinder Bank Mark
Courtesy of BMW OF NORTH AMERICA, INC.

**IMPORTANT: Rocker arms (1) slip slightly when inlet camshaft is fitted.
Make sure rocker arms (1) are secured as illustrated on hydraulic valve clearance compensating elements and on valves.**

Align all rocker arms (1) straight.

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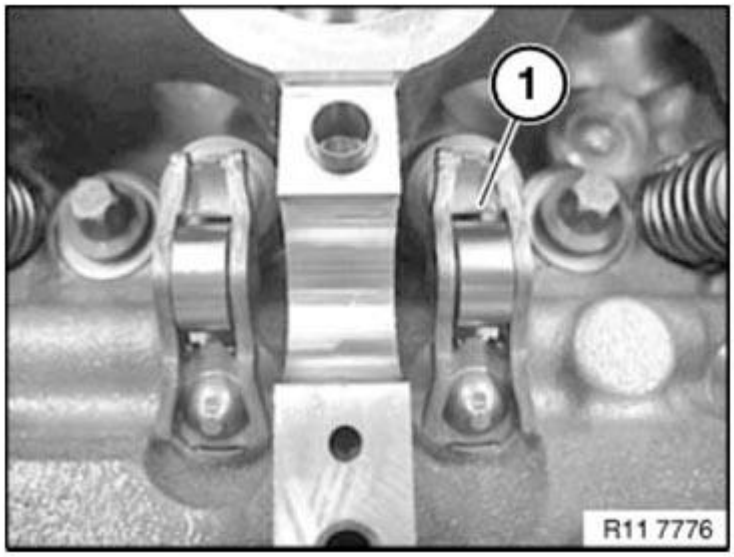


Fig. 253: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Coat all bearing positions with engine oil.

Insert intake camshaft.

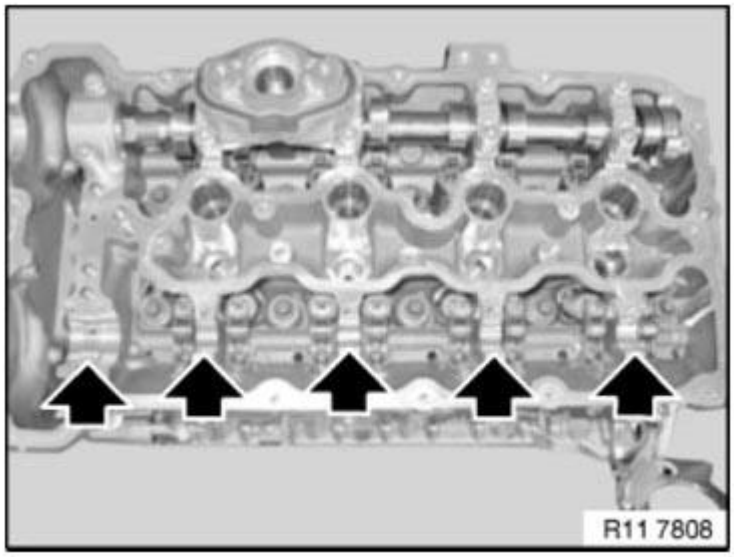


Fig. 254: Locating Bearing Positions
Courtesy of BMW OF NORTH AMERICA, INC.

Insert inlet camshaft (1) so that cams point to side at cylinder 5 as shown in picture.

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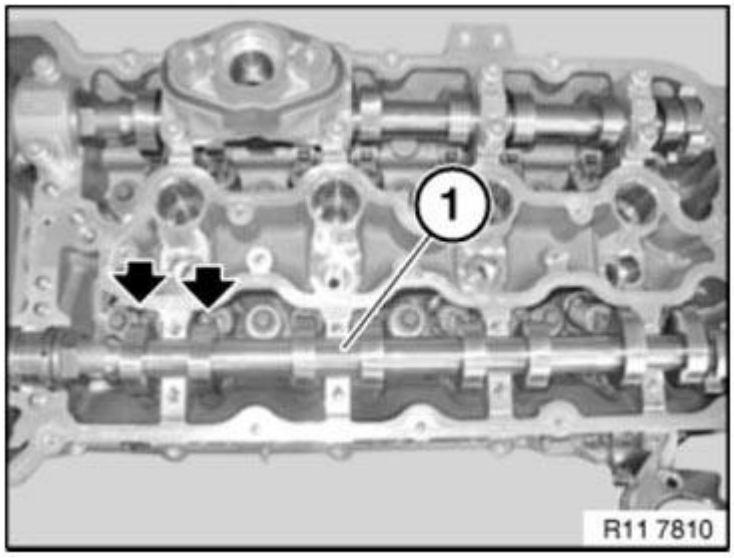


Fig. 255: Positioning Inlet Camshaft So That Cams Point To Side At Cylinder 5
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not mix up the bearing caps of cylinders 1 to 4 and 5 to 8.

All bearing caps are coded and can only be installed in one position.

All bearing caps are marked:

L= Cylinders 1 - 4.

R= Cylinders 5 - 8.

E= Intake side

A= Exhaust side

1= designation from 1 to 5

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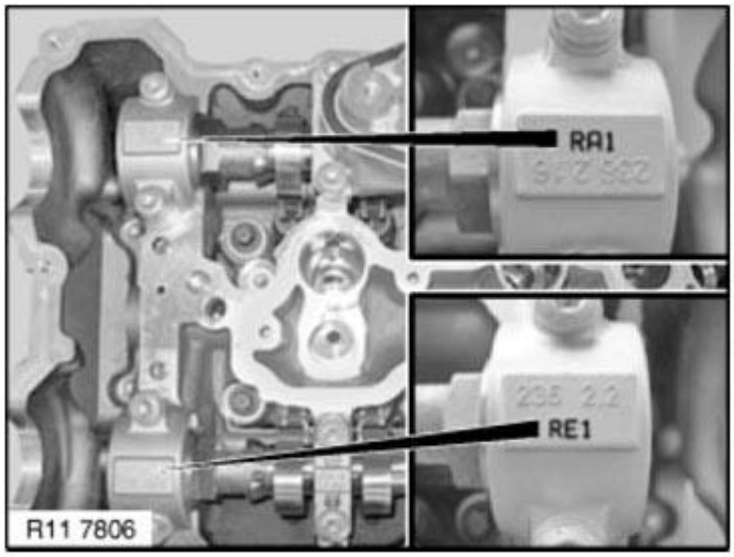


Fig. 256: Identifying Bearing Caps Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Insert all bolts.

Tighten down bolts in sequence (1 to 10) in 1/2 turns.

Tightening torque: **11 31 6AZ** .

Tightening torque: **11 31 7AZ** .

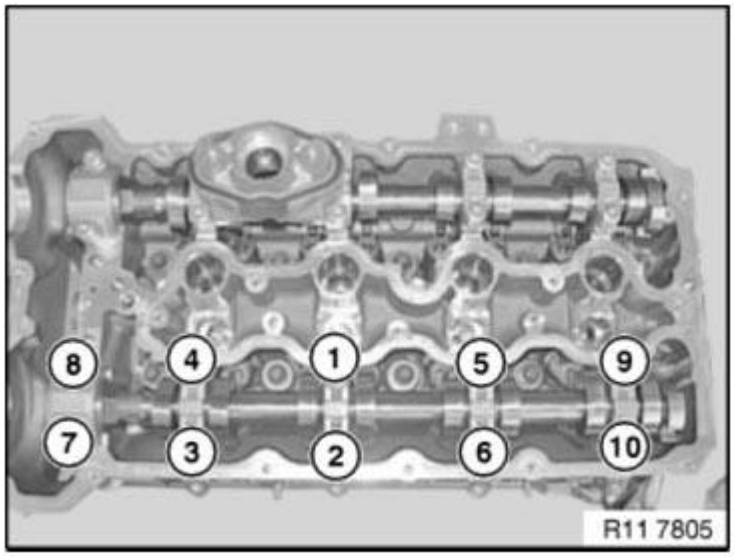


Fig. 257: Identifying Camshaft Bearings Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

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Install **INLET ADJUSTMENT UNITS** .

Adjust **VALVE TIMING** .

Assemble engine.

1131034 REMOVING AND INSTALLING/REPLACING RIGHT INLET CAMSHAFT (N63)

Necessary preliminary work

(cylinder bank 1 to 4)

IMPORTANT: The intake camshaft must first be rotated in such a way that the camshaft is free from tension when the bearing caps are released (risk of damage).

- Remove right **CYLINDER HEAD COVER** .
- Check **TIMING** .
- Remove **RIGHT INLET ADJUSTMENT UNIT** .

IMPORTANT: No cam on the inlet camshaft is permitted to press directly onto a roller cam follower.
With cylinder no. 1 at 150° before firing TDC there is no piston in the TDC position.

Rotate right inlet camshaft (2) at dihedron with a fork wrench (1) into a suitable position.

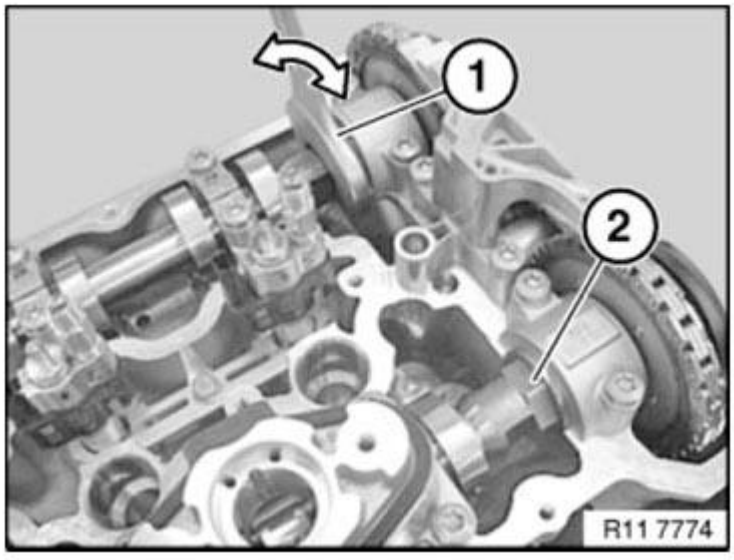


Fig. 258: Rotating Exhaust Camshaft At Dihedron With Fork Wrench Into Suitable Position
Courtesy of BMW OF NORTH AMERICA, INC.

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NOTE: Illustration shows cyl. 5 to 8.

Release bolts of camshaft bearings in sequence (10 to 1) in 1/2 turns.

Set down all bearing caps in a tidy and orderly fashion on special tool **11 4 480** .

Intake camshaft

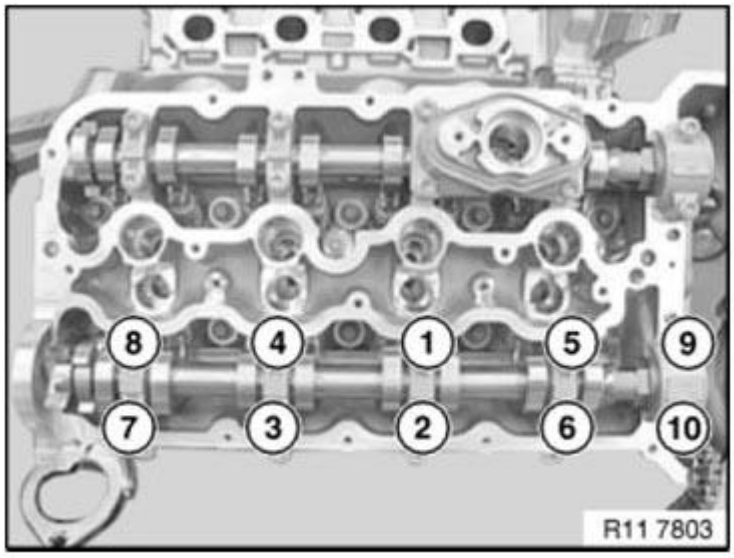


Fig. 259: Identifying Camshaft Bearings Bolts Releasing Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Used rocker arms (1) may only be reused in the same position.

NOTE: Rocker arms (1) are freely accessible after inlet camshaft has been removed. Do "not" remove rocker arm (1) on intake side.

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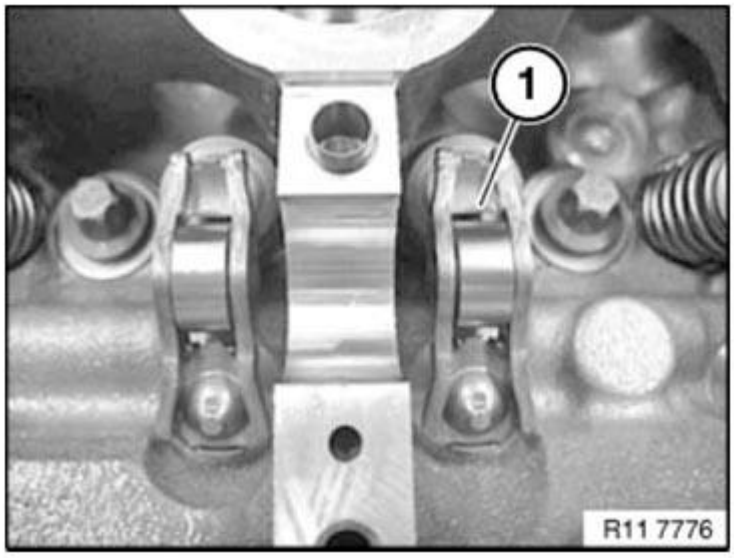


Fig. 260: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Plain compression rings (1) can easily break.

If necessary, replace plain compression rings (1).

Press compression ring (1) on one side into groove, pull up on other side and remove catch.

Carefully pull compression ring (1) apart and remove towards front.

Ends of compression rings (1) point upwards.

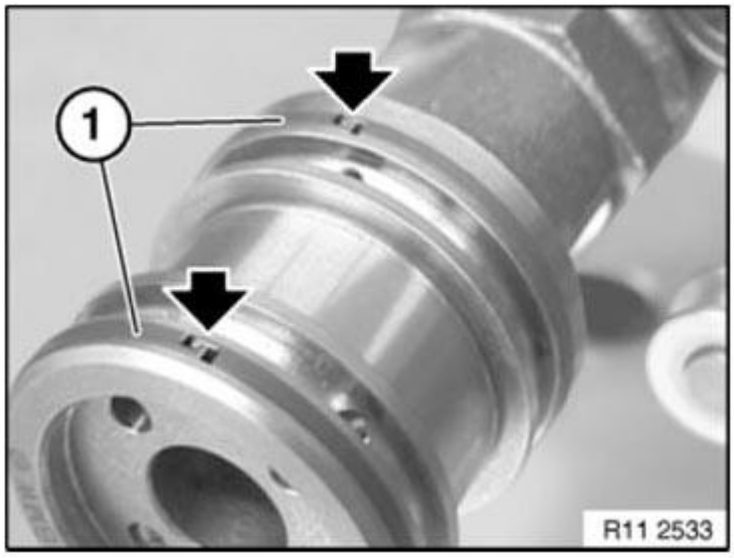


Fig. 261: Locating Compression Ring End

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Courtesy of BMW OF NORTH AMERICA, INC.

Make sure compression rings (1) are engaged at ends.

NOTE: The intake camshaft of cylinder bank 5 to 8 is marked with "E 5-8".

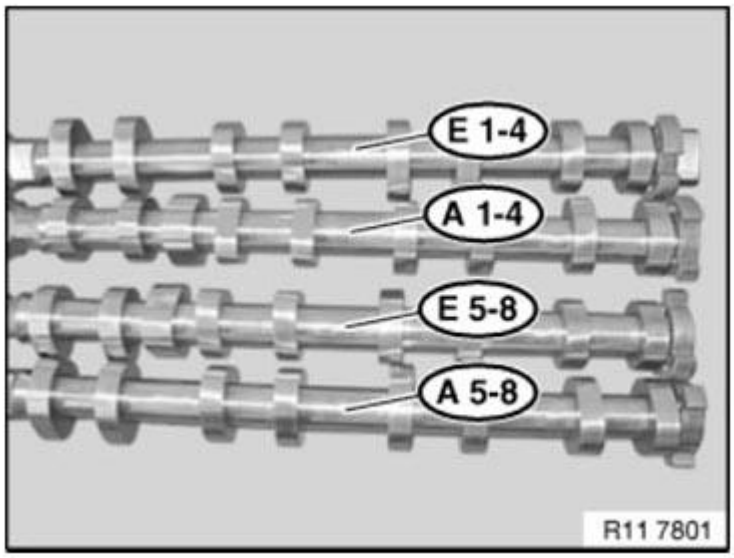


Fig. 262: Identifying Camshaft Of Cylinder Bank Mark
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Rocker arms (1) slip slightly when inlet camshaft is fitted.
Make sure rocker arms (1) are secured as illustrated on hydraulic valve clearance compensating elements and on valves.

Align all rocker arms (1) straight.

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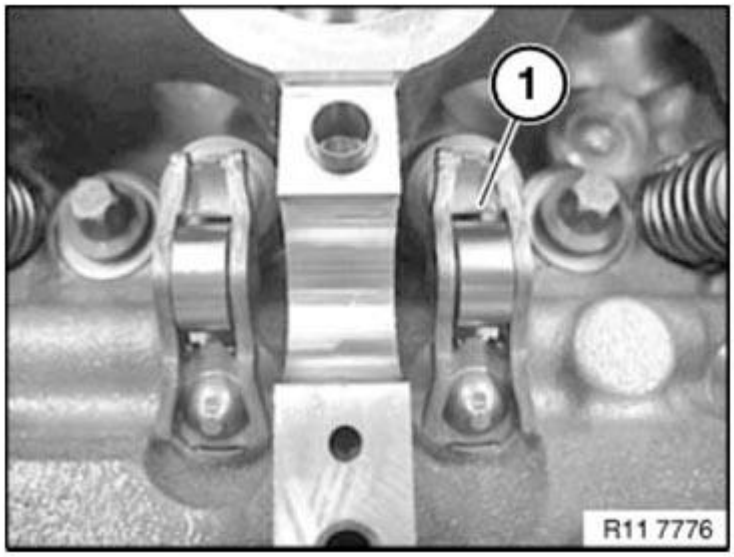


Fig. 263: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Coat all bearing positions with engine oil.

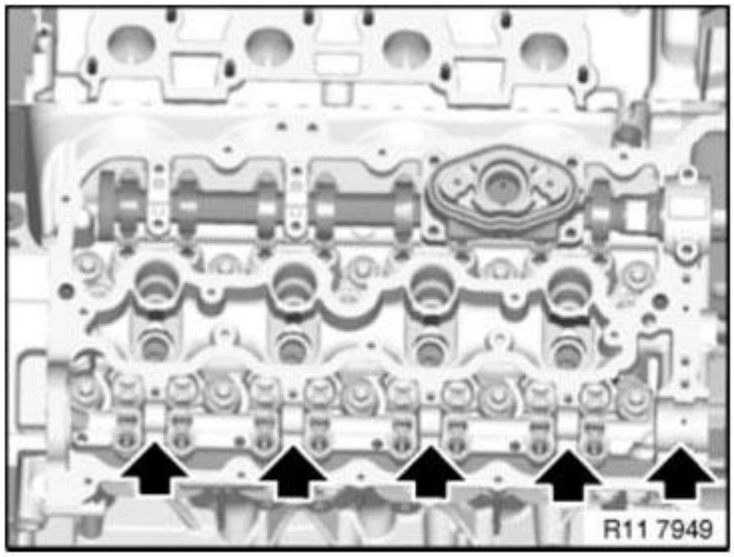


Fig. 264: Locating Bearing Positions
Courtesy of BMW OF NORTH AMERICA, INC.

Insert intake camshaft.

Insert inlet camshaft (1) so that cams point to side at cylinder 1 as shown in picture.

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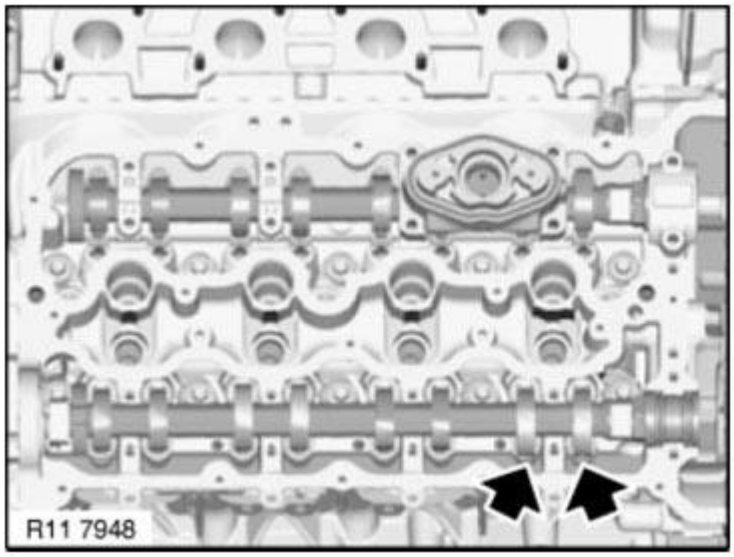


Fig. 265: Positioning Inlet Camshaft So That Cams Point To Side At Cylinder 1
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not mix up the bearing caps of cylinders 1 to 4 and 5 to 8. All bearing caps are coded and can only be installed in one position.

All bearing caps are marked with letters and numbers:

L= Cylinder bank 1-4.

R= Cylinder bank 5-8.

E= Intake side

A= Exhaust side

1= designation, bearing point, from 1 to 5

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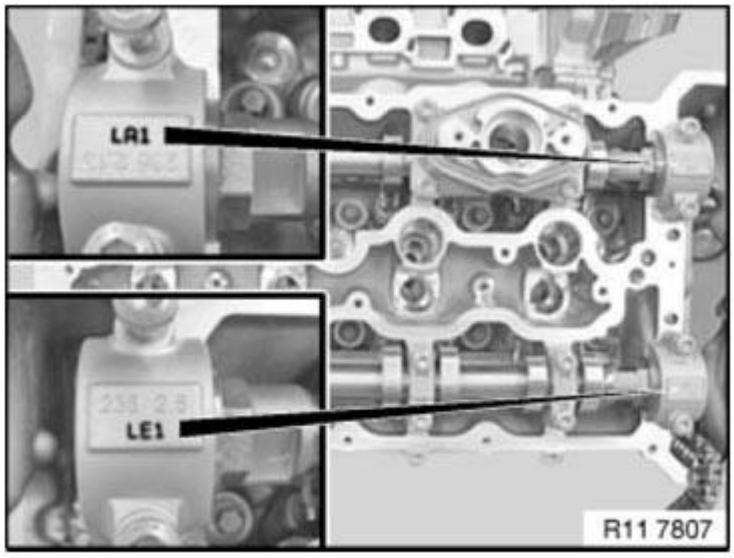


Fig. 266: Identifying Bearing Caps Marks
Courtesy of BMW OF NORTH AMERICA, INC.

Insert all bolts.

Tighten down bolts in sequence (1 to 10) in 1/2 turns.

Tightening torque: **11 31 6 AZ** .

Tightening torque: **11 31 7 AZ** .

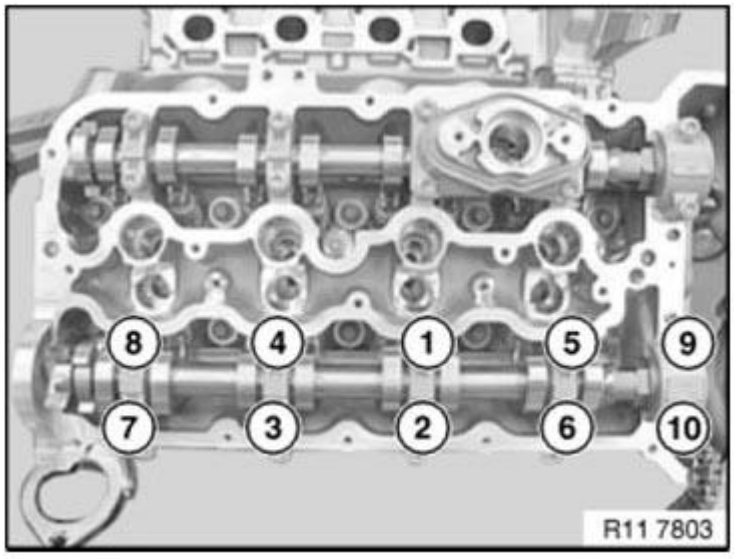


Fig. 267: Identifying Camshaft Bearings Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

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Install **INLET ADJUSTMENT UNITS** .

Adjust **VALVE TIMING** .

Assemble engine.

1131094 REMOVING HYDRAULIC CHAIN TENSIONER FOR TIMING CHAINS ON LEFT SIDE (N63)

Notes

WARNING: Chain tensioner is pre-tensioned.
Release lock pin only in installed state.
Danger of injury!

IMPORTANT: Risk of damage!
The engine must not be cranked when the chain tensioner is removed.
The timing chain may jump.

Necessary preliminary work

- Remove **TIMING CASE COVER** at top left

Crank engine back at central bolt (1) against direction of engine rotation by approx. 90°.

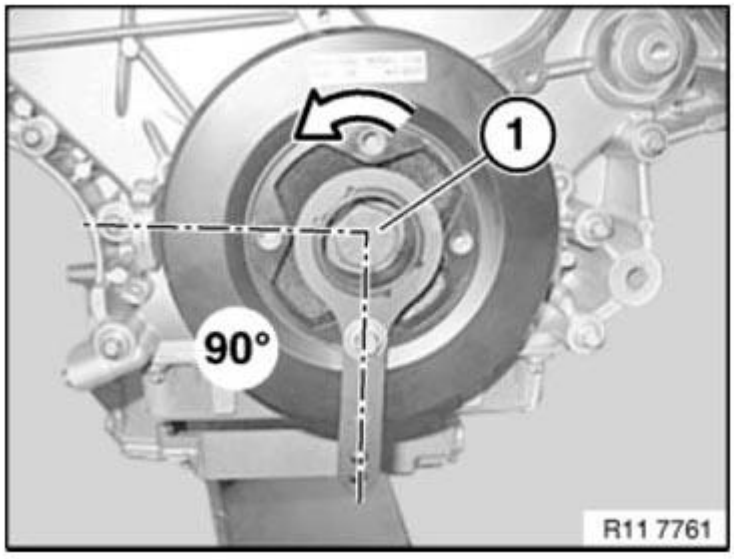


Fig. 268: Cranking Engine Back At Central Bolt Against Direction Of Engine Rotation By Approx. 90°
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The timing chain on the chain tensioner becomes the tight end on cranking back.

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Do not crank engine without chain tensioner or special tool 11 9 900 .

Piston (1) of chain tensioner must be pressed in against oil pressure in housing (see arrow).

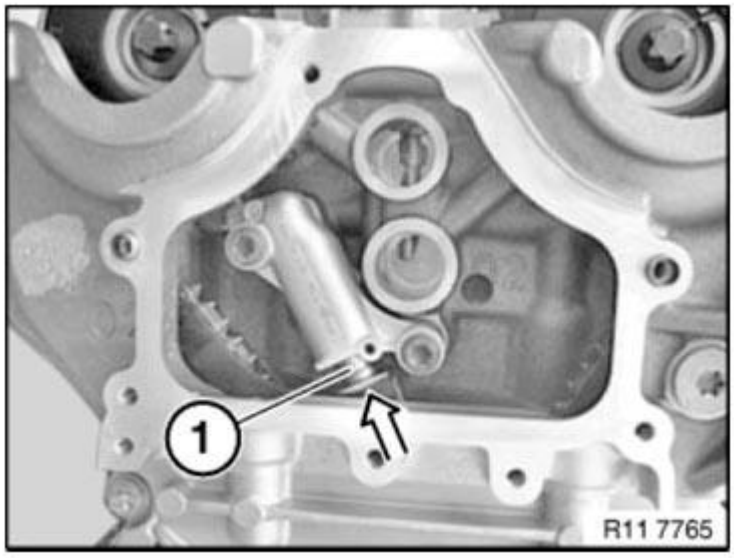


Fig. 269: Identifying Piston Of Chain Tensioner Pressed In Against Oil Pressure In Housing
Courtesy of BMW OF NORTH AMERICA, INC.

If the chain tensioner piston is retracted over its full length, a 3.5 mm drill bit or a suitable lock pin must be positioned.

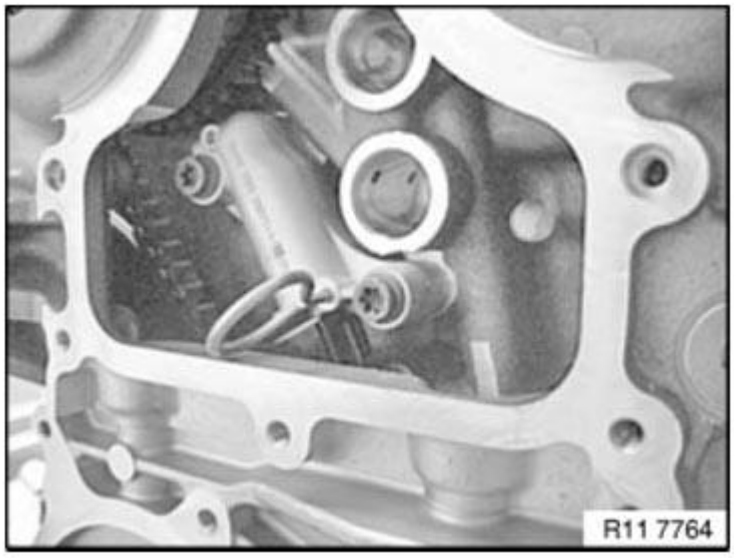


Fig. 270: Identifying Chain Tensioner Piston Retracted Over Its Full Length
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

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Tightening torque **11 31 5AZ** .

Remove chain tensioner (2).

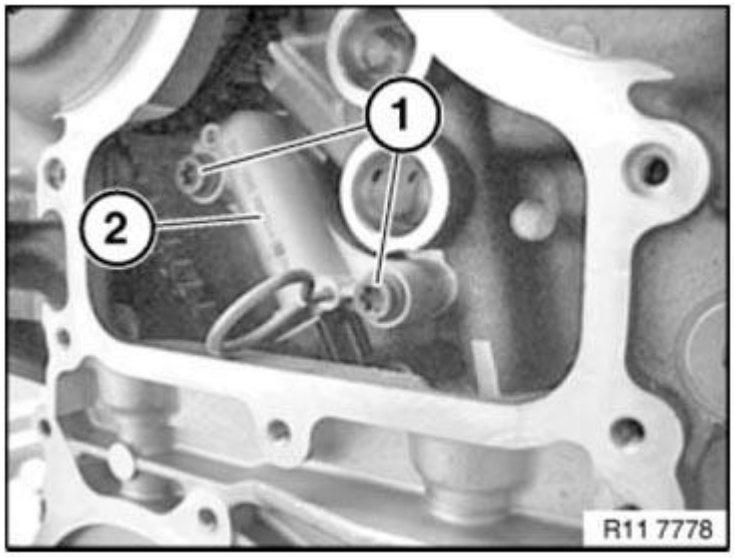


Fig. 271: Identifying Chain Tensioner And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Danger of injury!
Chain tensioner is under high preload force.

Chain tensioner arrangement:

- Piston
- Expansion element
- Compression spring
- Housing

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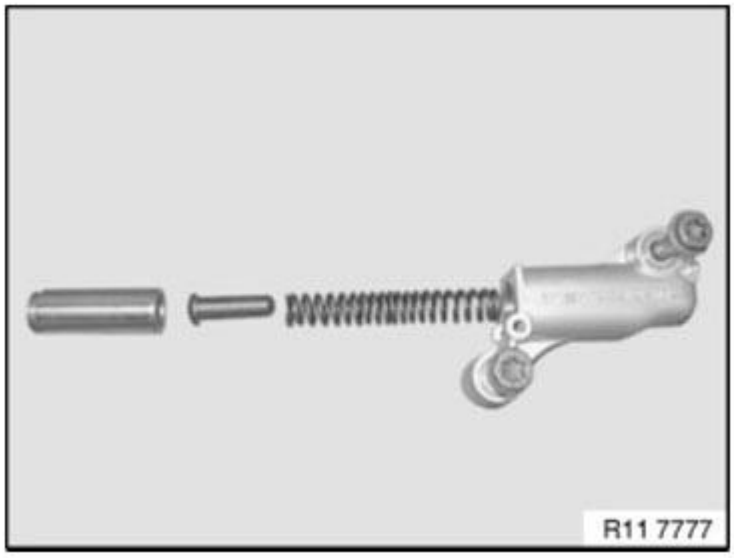


Fig. 272: Identifying Chain Tensioner Arrangement
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all gaskets and sealing rings

Assemble engine.

1131095 REMOVING HYDRAULIC CHAIN TENSIONER FOR TIMING CHAINS ON RIGHT SIDE (N63)

Notes

WARNING: Chain tensioner is pre-tensioned.
Release lock pin only in installed state.
Danger of injury!

IMPORTANT: Risk of damage!
The engine must not be cranked when the chain tensioner is removed.
The timing chain may jump.

Necessary preliminary work

- Remove **TIMING CASE COVER** at top right

Crank engine back at central bolt (1) against direction of engine rotation by approx. 180°.

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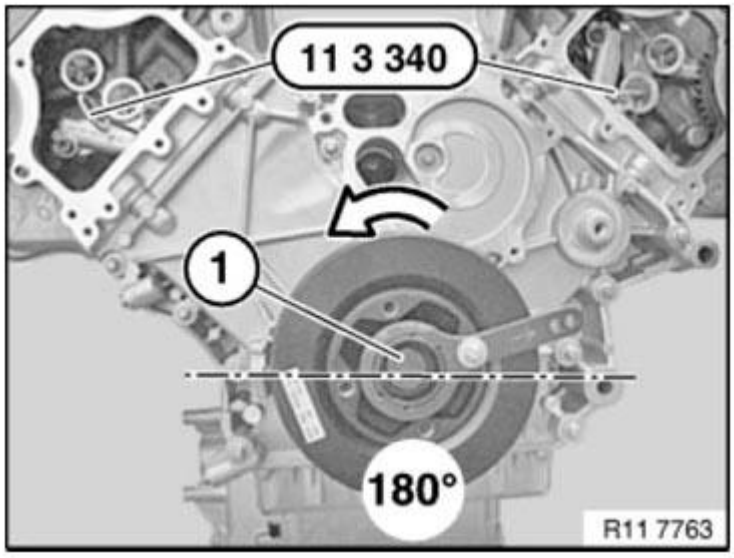


Fig. 273: Cranking Engine Back At Central Bolt Against Direction Of Engine Rotation By Approx. 180°
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The timing chain on the chain tensioner becomes the tight end on cranking back.
Do not crank engine without chain tensioner or special tool 11 9 900 .

Piston (1) of chain tensioner must be pressed in against oil pressure in housing (see arrow).

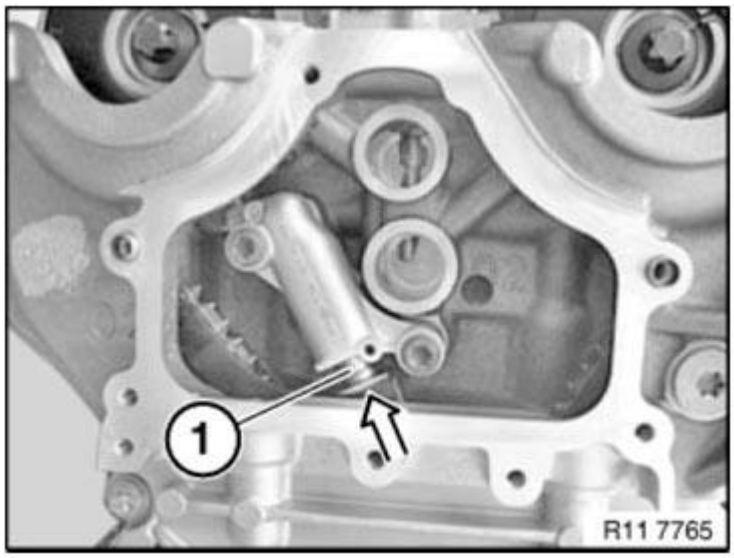


Fig. 274: Identifying Piston Of Chain Tensioner Pressed In Against Oil Pressure In Housing
Courtesy of BMW OF NORTH AMERICA, INC.

If the chain tensioner piston is retracted over its full length, a 3.5 mm drill bit or a suitable lock pin must be positioned.

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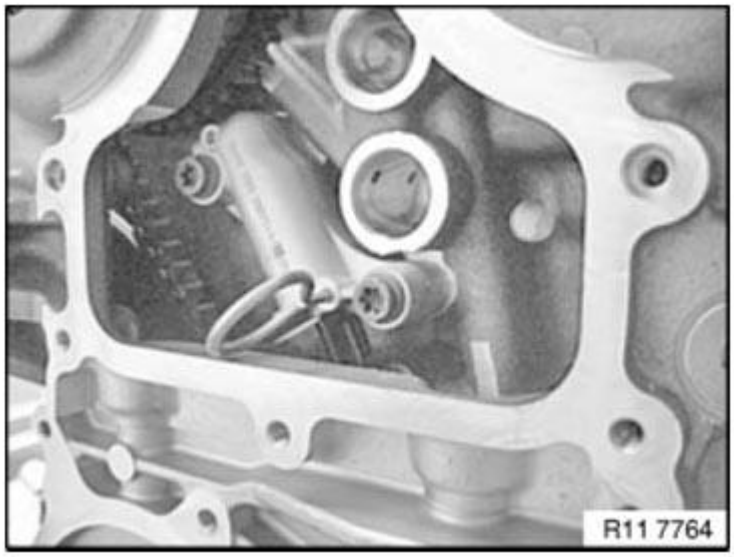


Fig. 275: Identifying Chain Tensioner Piston Retracted Over Its Full Length
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **11 31 5AZ** .

Remove chain tensioner (2).

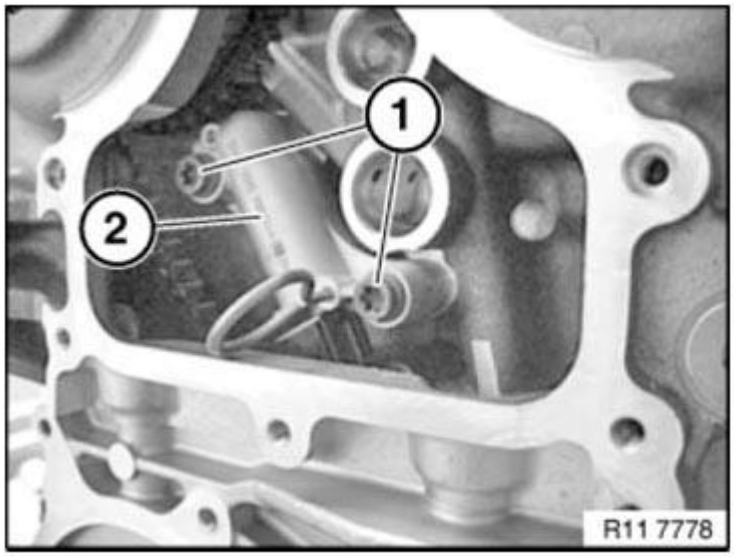


Fig. 276: Identifying Chain Tensioner And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Danger of injury!
Chain tensioner is under high preload force.

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Chain tensioner arrangement:

- Piston
- Expansion element
- Compression spring
- Housing

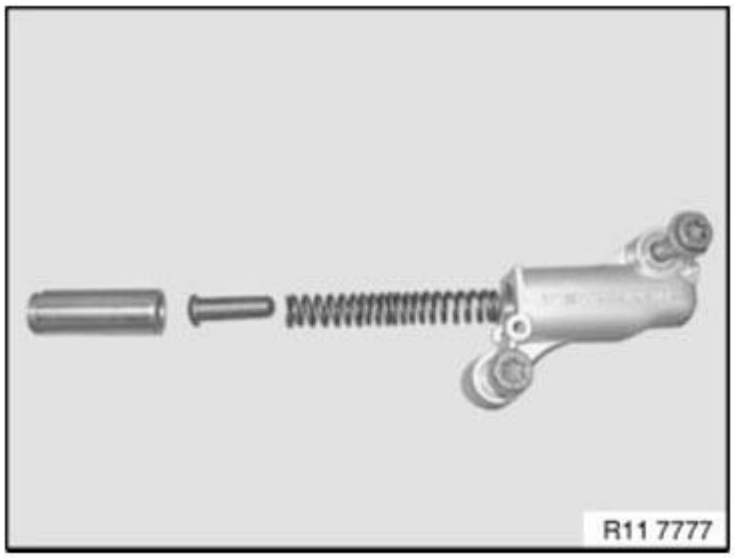


Fig. 277: Identifying Chain Tensioner Arrangement
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all gaskets and sealing rings

Assemble engine.

1131052 REPLACING BOTH TIMING CHAINS (N63)

Notes

WARNING: **Burning hazard! Wear gloves.**

Necessary preliminary work

- Remove lower **TIMING CASE COVER**
- To facilitate removal and installation of timing chains, turn engine over with special tool **00 2 300** .

Timing drive, cylinders 1 to 4

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Remove guide rail (5) from bearing bolt.

Remove timing chain (3) with tensioning rail (4) from bearing bolt.

Timing drive, cylinders 5 to 8

Remove guide rail (1) from bearing bolt.

Remove timing chain (2) with tensioning rail (6) from bearing bolt.

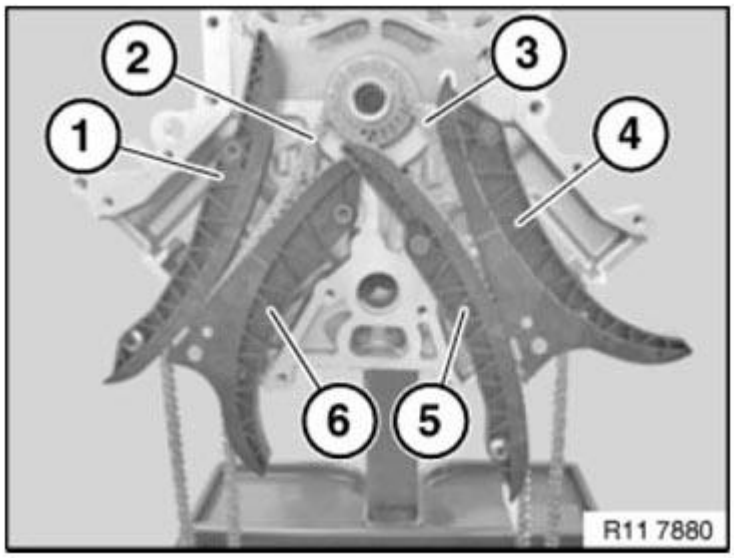


Fig. 278: Identifying Guide Rail, Timing Chain And Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Timing drive, cylinders 1 to 4

Release bearing bolts (2) with a suitable tool.

Tightening torque: **11 31 1AZ** .

Timing drive, cylinders 5 to 8

Release bearing bolts (1).

Tightening torque: **11 31 2AZ** .

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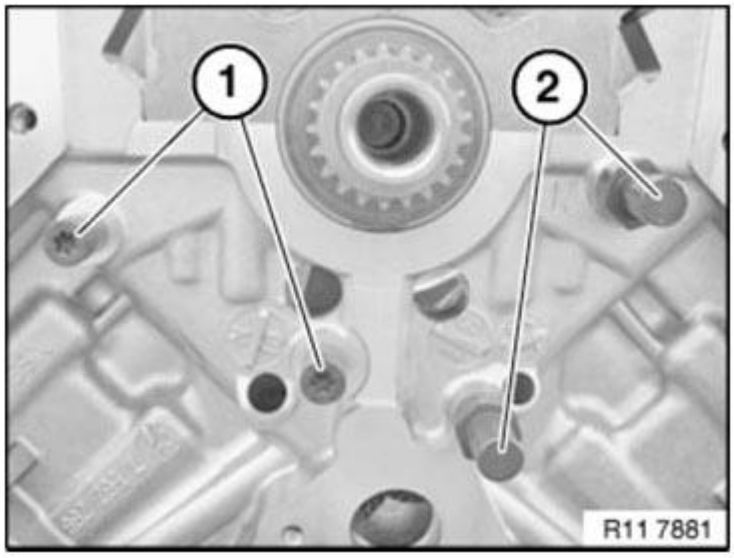


Fig. 279: Identifying Bearing Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Attach special tools 11 2 001 and 11 2 002 to the crankshaft.

Insert special tool 11 2 007 and remove sprocket wheel with special tool 11 2 003.

Installation note:

Check sprocket wheels for wear, replace if necessary.

Heat sprocket wheel to **60°C.**

WARNING: Burning hazard! Wear gloves.

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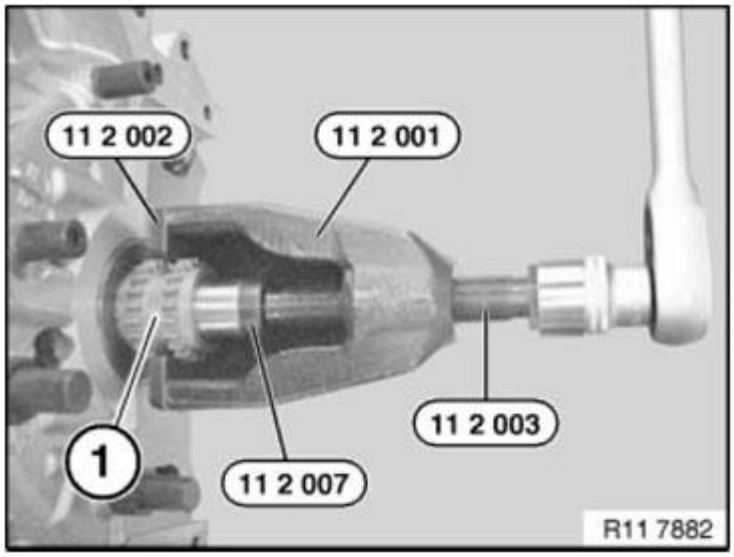


Fig. 280: Removing Sprocket Wheel With Special Tool 11 2 003
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Make sure Woodruff key (1) is installed in correct position in crankshaft (2).

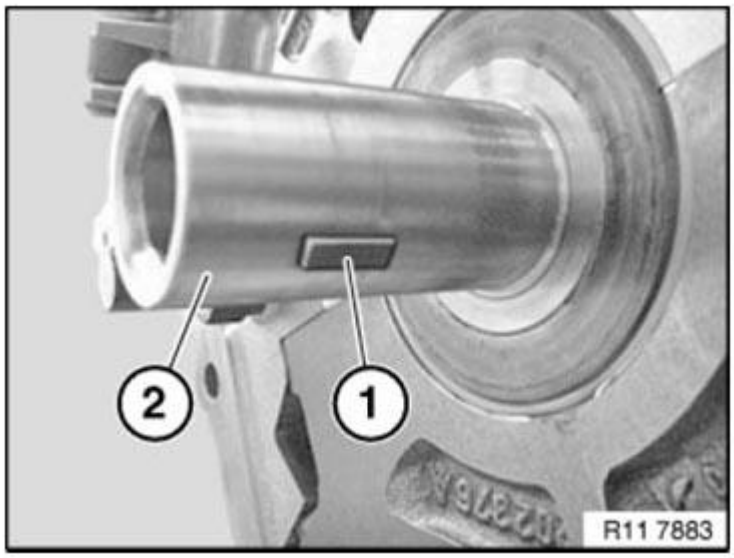


Fig. 281: Identifying Woodruff Key Installed In Correct Position In Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Maintain tension of timing chains when installing timing case cover.

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Observe sparking protection on timing case cover.

Make sure timing chain (1) is correctly installed when placing it in guide rail (3).

Assemble engine.

1133 ROCKER ARM WITH BEARING MOUNT

1133054 REMOVING AND INSTALLING/RENEWING ROCKER ARMS ON RIGHT SIDE (N63)

Necessary preliminary work

(cylinder bank 1 to 4)

- Remove **INLET AND EXHAUST ADJUSTMENT UNIT** on right side.
- Remove right **INLET CAMSHAFT** .
- Remove right **EXHAUST CAMSHAFT** .

IMPORTANT: Used rocker arms (1) may only be reused in the same position. Tolerance classes are not required.

Remove rocker arm (1) and set down in neat order in special tool **11 4 480** .

Install rocker arm (1).

Align all rocker arms (1) straight.

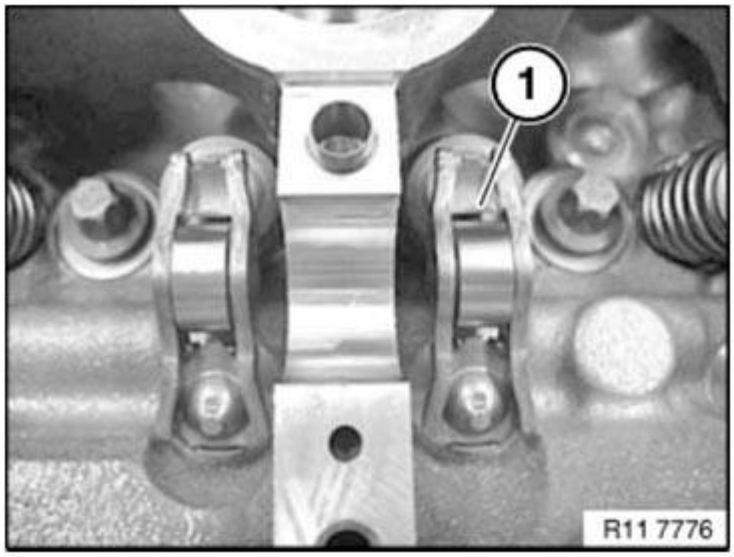


Fig. 282: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

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Assemble engine.

1133052 REMOVING AND INSTALLING/REPLACING ALL ROCKER ARMS ON LEFT SIDE (N63)

Necessary preliminary work

(cylinder bank 5 to 8)

- Remove **LEFT INLET CAMSHAFT** .
- Remove left **EXHAUST CAMSHAFT** .

IMPORTANT: Used rocker arms (1) may only be reused in the same position. Tolerance classes are not required.

Remove rocker arm (1) and set down in neat order in special tool **11 4 480** .

Install rocker arm (1).

Align all rocker arms (1) straight.

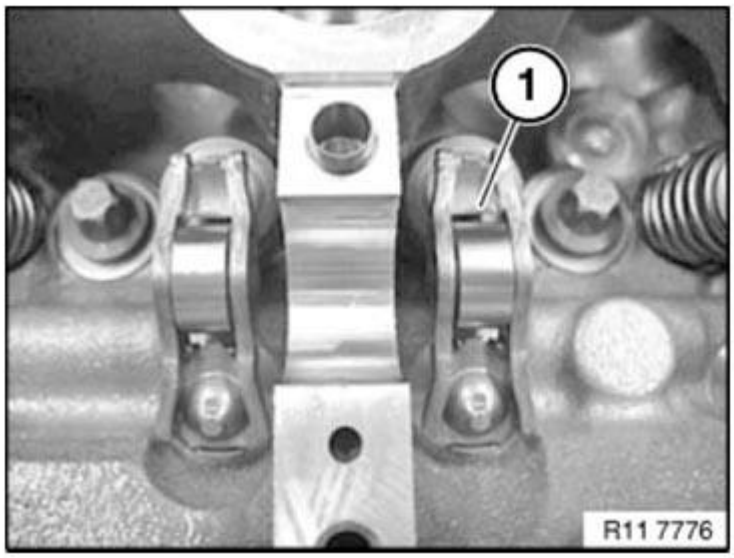


Fig. 283: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1134 VALVES WITH SPRINGS

1134552 REMOVING AND INSTALLING/REPLACING ALL VALVES (N63)

Necessary preliminary work

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- Remove **LEFT CYLINDER HEAD**.
- Remove **RIGHT CYLINDER HEAD**.
- Remove camshafts. See **LEFT INLET CAMSHAFT**; **RIGHT INLET CAMSHAFT**; **LEFT EXHAUST CAMSHAFT**; and **RIGHT EXHAUST CAMSHAFT**.

Mount cylinder head (1) on special tool **11 9 000** .

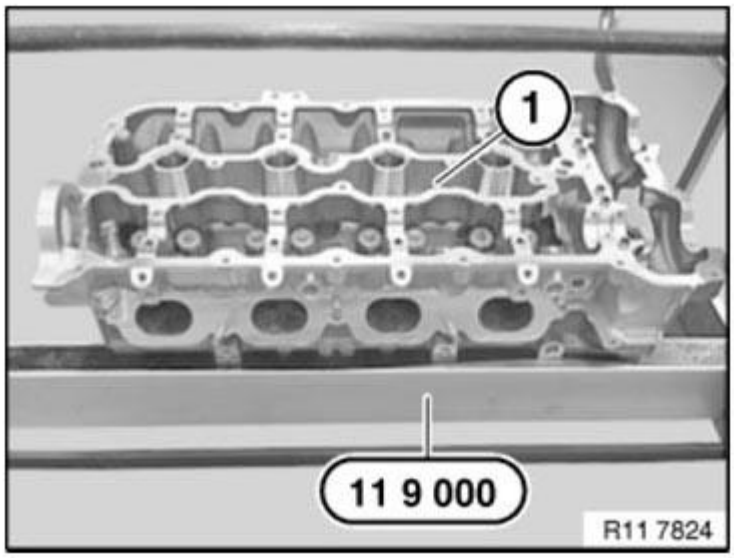


Fig. 284: Mounting Cylinder Head On Special Tool 11 9 000
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare special tool 11 9 008 on special tool 11 9 006.

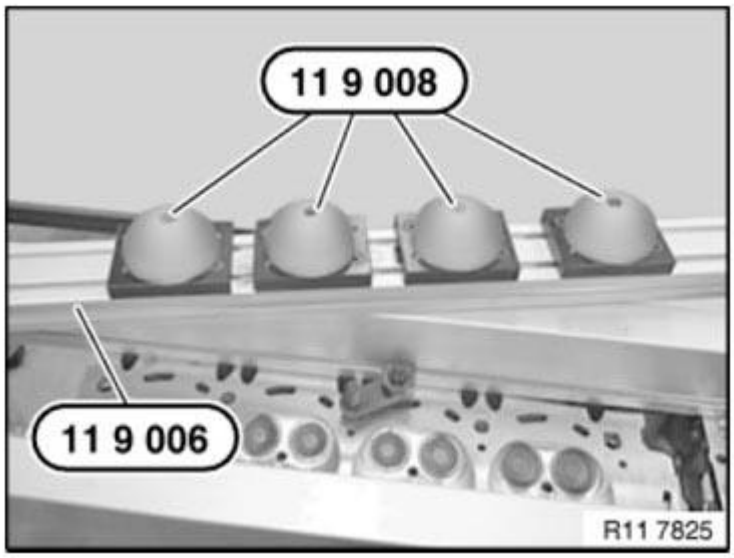


Fig. 285: Preparing Special Tool 11 9 008 On Special Tool 11 9 006

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Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 006 with silicone cushion on cylinder head.

Slide locks (1) in direction of arrow and pretension with eccentric shaft.

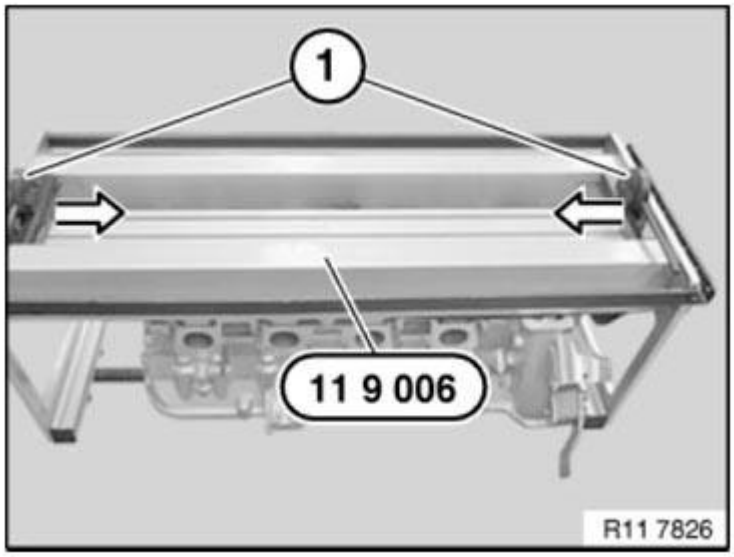


Fig. 286: Sliding Locks In Direction Of Arrow And Pretension With Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Press down valve spring with special tool **11 8 840** .

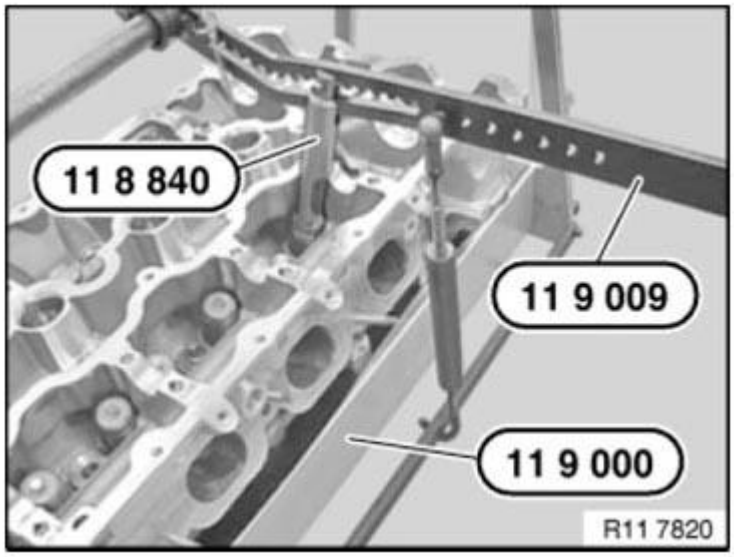


Fig. 287: Pressing Down Valve Spring With Special Tool 11 8 840
Courtesy of BMW OF NORTH AMERICA, INC.

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Remove valve cotters (1) with a magnet.

Place valve springs and valve keys on special tool **11 4 480** in an orderly manner.

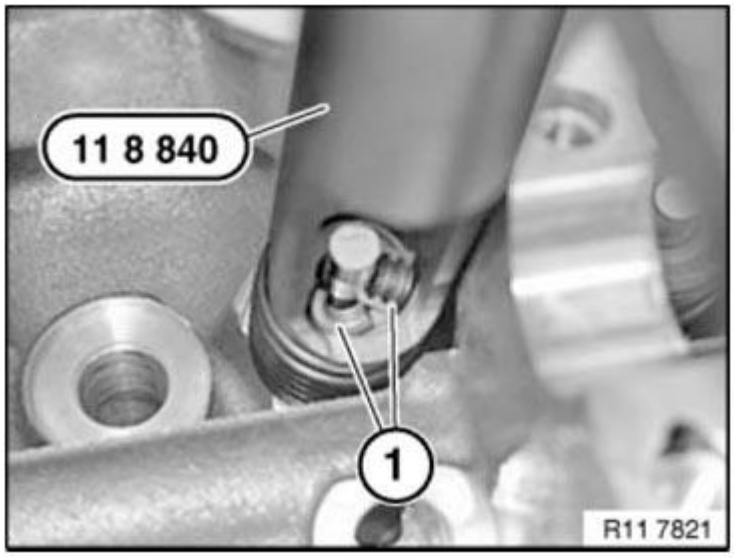


Fig. 288: Identifying Valve Cotters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Incorrect assembly possible.
Incorrect assembly will result in valve spring breakage.
Color marking (1) is normally on lower end of valve spring.
Only the diameter is decisive for the correct installation of the valve springs.
Install valve spring so that larger diameter points to spring plate at bottom.

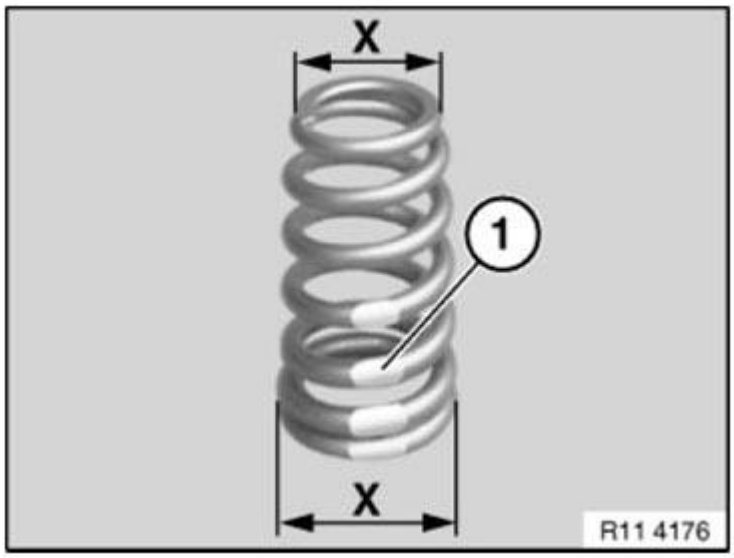
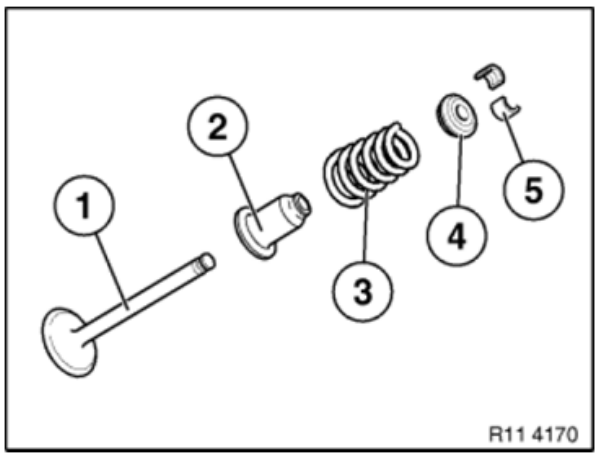


Fig. 289: Dimensions Of Valve Spring

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Courtesy of BMW OF NORTH AMERICA, INC.

Arrangement:



(1) Valve
(2) Valve stem seal with spring cup, bottom
(3) Valve spring
(4) Top spring cup
(5) Valve keys

Fig. 290: Exploded View Of Valve Assembly
Courtesy of BMW OF NORTH AMERICA, INC.

Release special tool 11 9 006 from cylinder head.

Remove all valves and place on special tool **11 4 480** in an orderly manner.

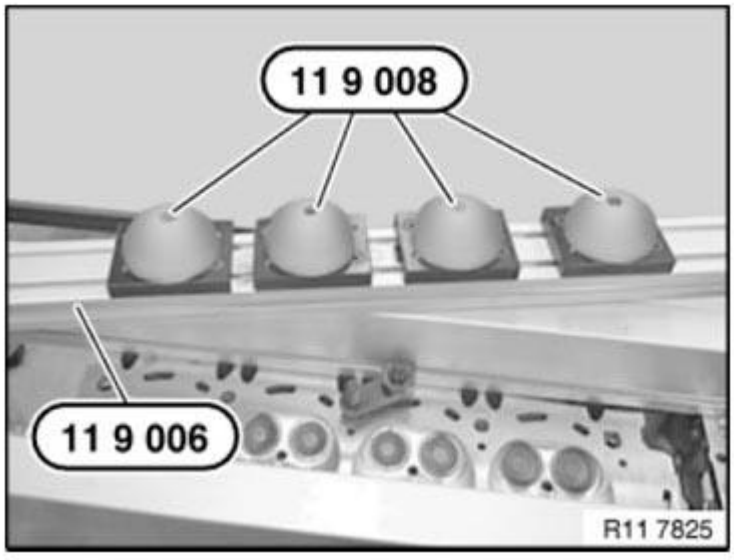


Fig. 291: Preparing Special Tool 11 9 008 On Special Tool 11 9 006
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1134715 REPLACING ALL VALVE SPRINGS (N63)

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Necessary preliminary work

- Remove **LEFT CYLINDER HEAD**.
- Remove **RIGHT CYLINDER HEAD**.
- Remove camshafts. See **LEFT INLET CAMSHAFT**; **RIGHT INLET CAMSHAFT**; **LEFT EXHAUST CAMSHAFT**; and **RIGHT EXHAUST CAMSHAFT**.

Mount cylinder head (1) on special tool **11 9 000** .

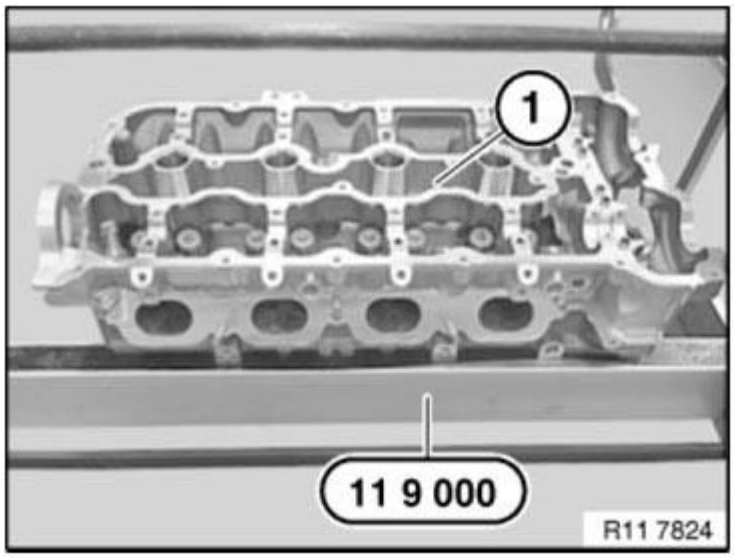
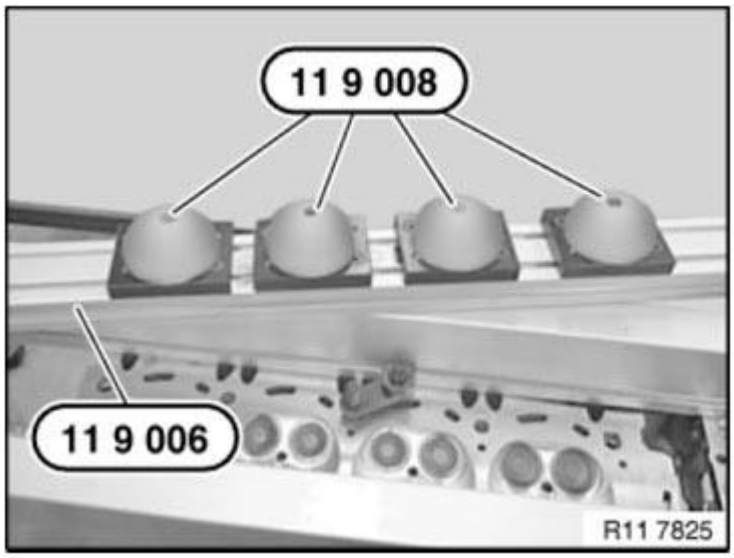


Fig. 292: Mounting Cylinder Head On Special Tool 11 9 000
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare special tool 11 9 008 on special tool 11 9 006.



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Fig. 293: Preparing Special Tool 11 9 008 On Special Tool 11 9 006
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 006 with silicone cushion on cylinder head.

Slide locks (1) in direction of arrow and pretension with eccentric shaft.

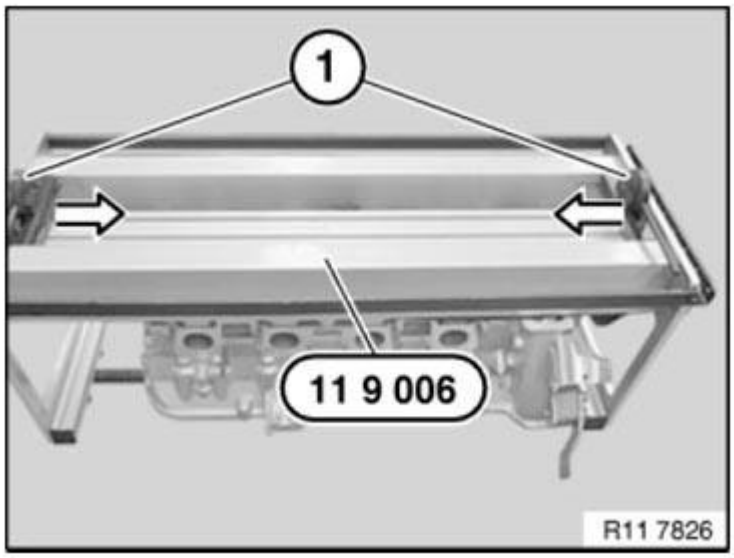


Fig. 294: Sliding Locks In Direction Of Arrow And Pretension With Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Press down valve spring with special tool **11 8 840** .

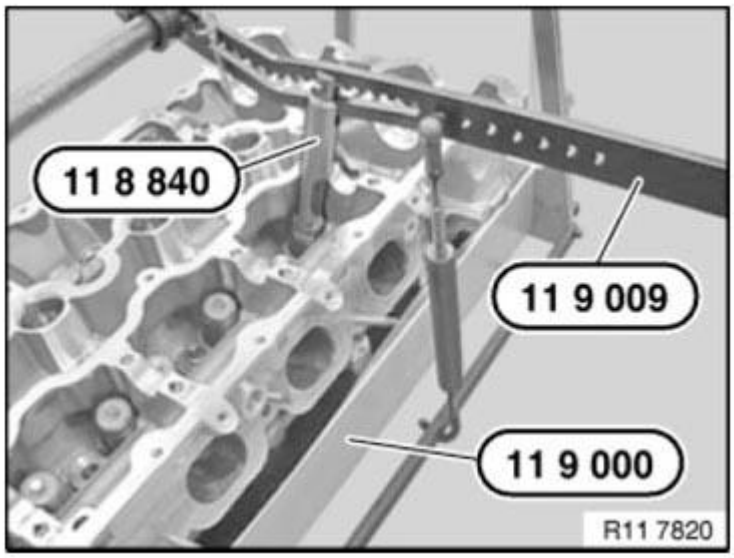


Fig. 295: Pressing Down Valve Spring With Special Tool 11 8 840
Courtesy of BMW OF NORTH AMERICA, INC.

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Remove valve cotters (1) with a magnet.

Place valve springs and valve keys on special tool **11 4 480** in an orderly manner.

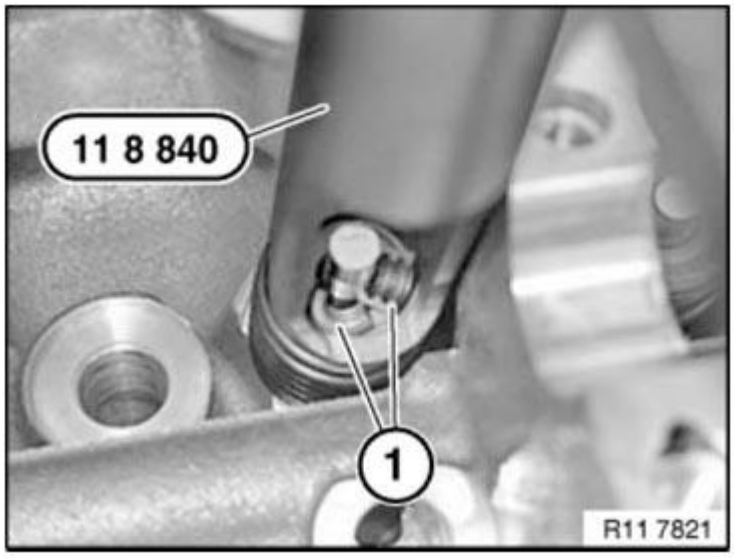


Fig. 296: Identifying Valve Cotters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Incorrect assembly possible.
Incorrect assembly will result in valve spring breakage.
Color marking (1) is normally on lower end of valve spring.
Only the diameter is decisive for the correct installation of the valve springs.
Install valve spring so that larger diameter points to spring plate at bottom.

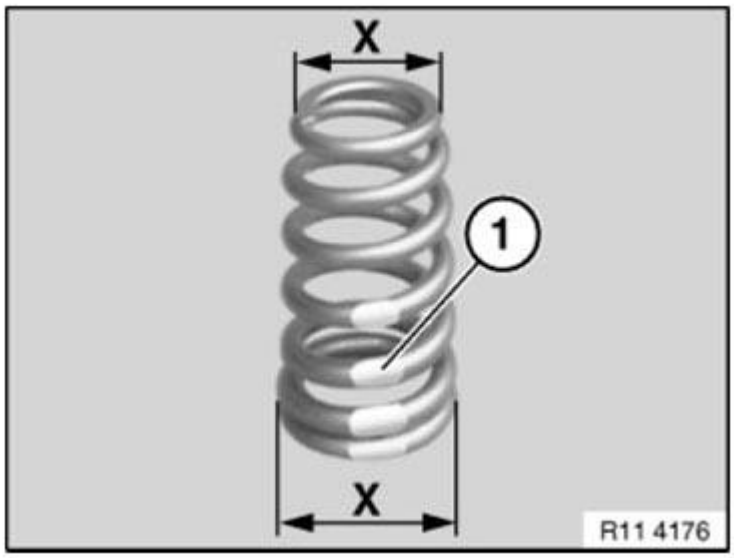
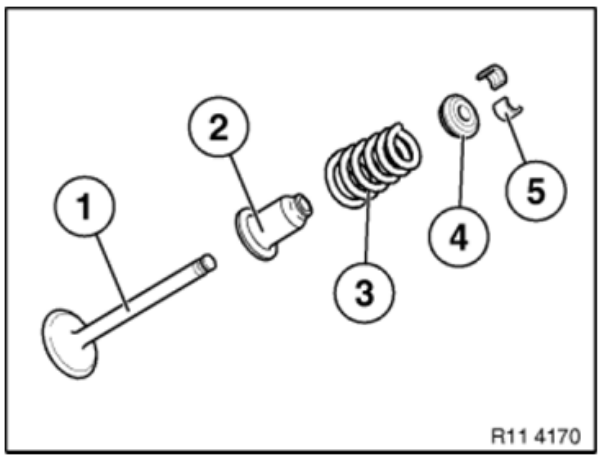


Fig. 297: Dimensions Of Valve Spring

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Courtesy of BMW OF NORTH AMERICA, INC.

Arrangement:



(1) Valve
(2) Valve stem seal with spring cup, bottom
(3) Valve spring
(4) Top spring cup
(5) Valve keys

Fig. 298: Exploded View Of Valve Assembly
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1134560 REPLACING ALL VALVE STEM SEALS (N63)

Notes

IMPORTANT: Risk of damage to sealing lip on valve stem seal.
Fit new valve stem seals only when all valves have been installed.

Necessary preliminary work

- Remove all **VALVE SPRINGS** .

Press special tool **11 6 370** onto the valve stem seal.

Withdraw valve stem seal by turning and simultaneously unscrewing special tool **11 6 370** .

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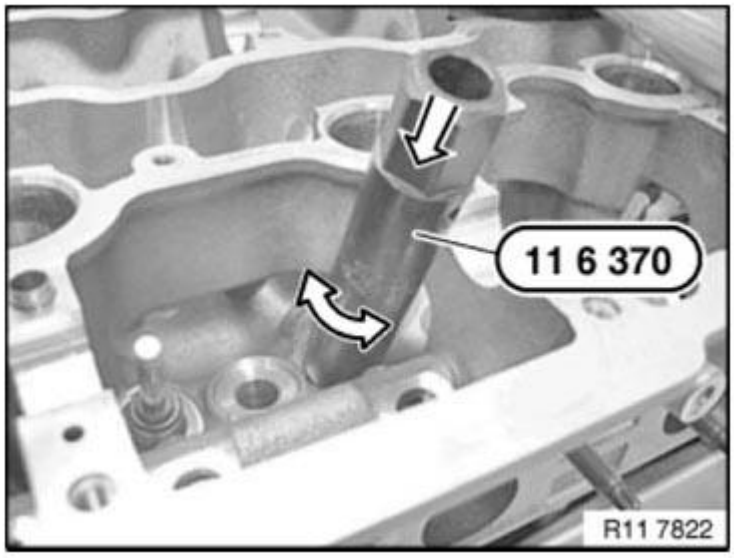


Fig. 299: Pressing Special Tool 11 6 370 Onto Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Lubricate valve stem with oil and insert valve.

Installation sleeve **116380** is included in the delivery specification for the valve stem seals.

Fit special tool **116380** .

Coat new valve stem seal (1) with oil and install.

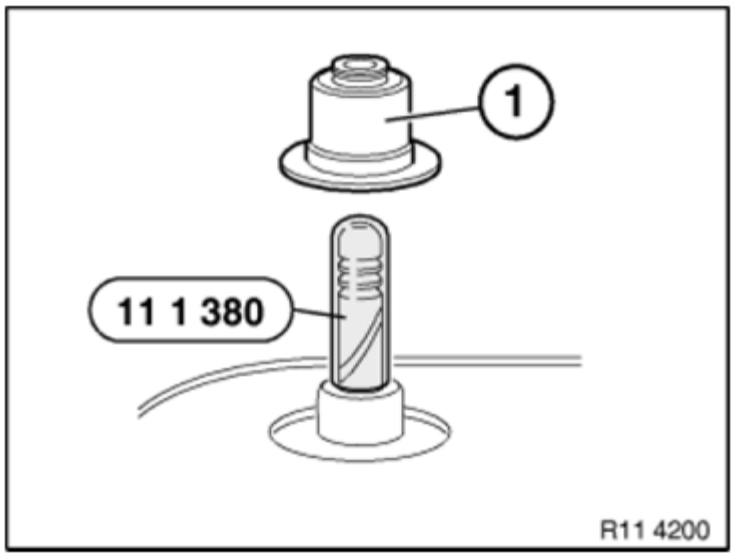


Fig. 300: Identifying Valve Stem Seal And Special Tool 11 6 380

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Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: For use on the N63 engine, the special tool 11 6 380 must be remachined according to the sketch with a 6.2 mm drill bit dia. to a depth of A = approx. 45 mm.
This modification has already been taken into account for reordering.

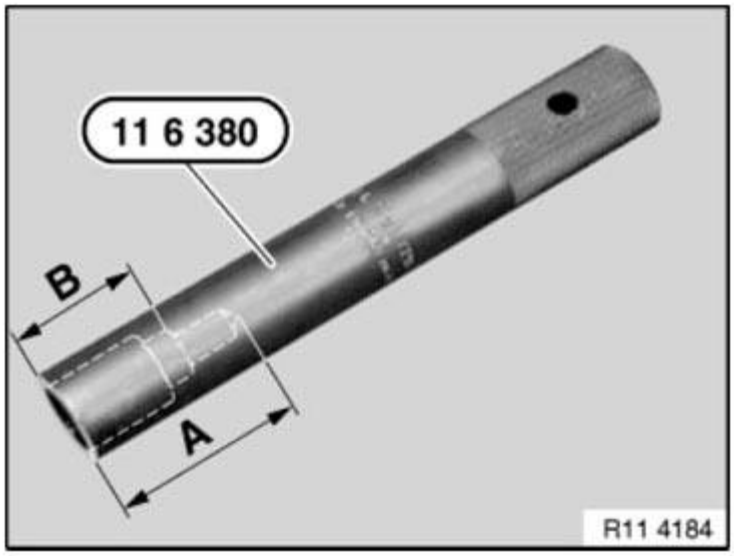


Fig. 301: Identifying Special Tool (11 6 380)
Courtesy of BMW OF NORTH AMERICA, INC.

Manually press on valve stem seal as far as it will go with special tool **11 6 380** .

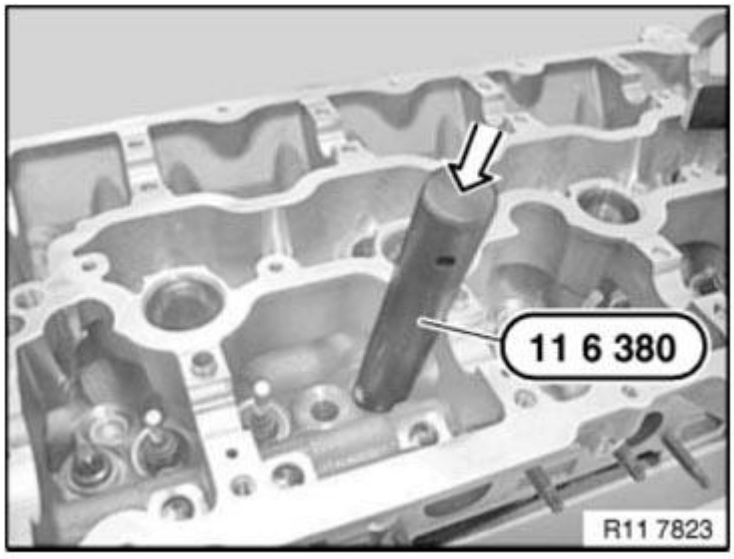


Fig. 302: Pressing On Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

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Assemble engine.

1136 VARIABLE CAMSHAFT TIMING

1131573 ADJUSTING CAMSHAFT TIMING ON LEFT SIDE (N63)

Notes

IMPORTANT: Release central bolts on adjuster only with special tool 11 9 890 .
Risk of damage to timing drive.
If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshaft.

(cylinder bank 5 to 8)

Necessary preliminary work

- Remove **LEFT GEAR CASE COVER**
- **CHECK CAMSHAFT TIMING ON LEFT SIDE**

Get set of special tools **11 9 890** ready for securing camshafts.

NOTE: Special tool 11 9 891 Knurled screw.
Special tool 11 9 892 Press-down bar.
Special tool 11 9 893 Gap gauge for intake and exhaust camshafts.
Special tool 11 9 894 spacer.

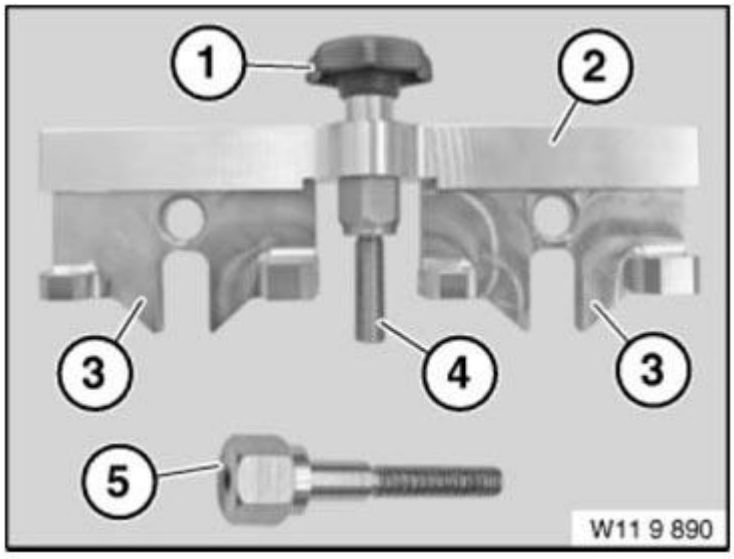


Fig. 303: Identifying Set Of Special Tools 11 9 890
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshaft.

Release central bolts (1 and 2) of intake and exhaust camshaft adjusters.

Installation note:

Replace central bolts after releasing.

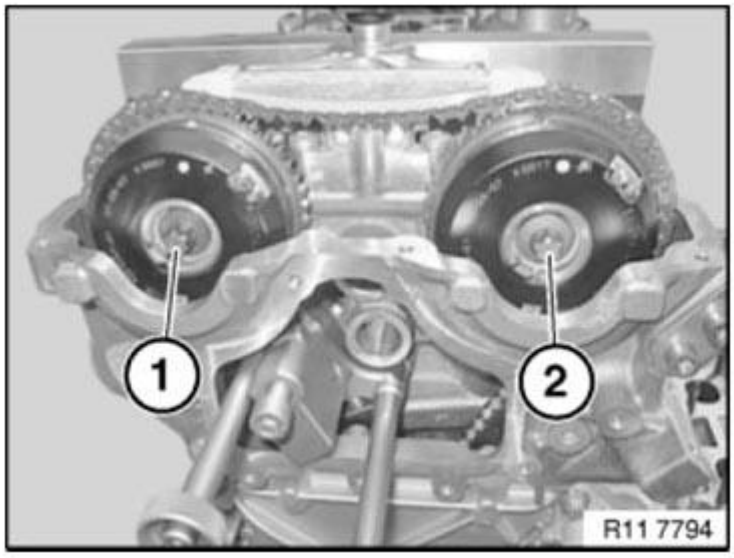


Fig. 304: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Check whether head of central bolt (1) is greased (see arrow).
If no grease can be seen on the bolt head of central bolt (1), the ADJUSTER must be replaced for safety reasons.

Installation note:

Coat contact surface of new central bolt (1) with copper paste.

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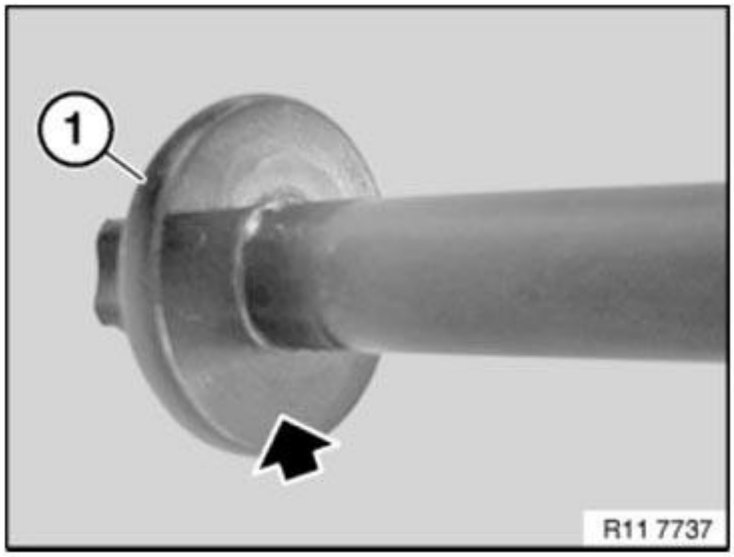


Fig. 305: Checking Head Of Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 893 on intake camshaft and exhaust camshaft.

The special tool 11 9 893 must rest **without a gap** on cylinder head; if necessary, adjust camshaft at hexagon heads.

Screw special tool 11 9 894 into cylinder head.

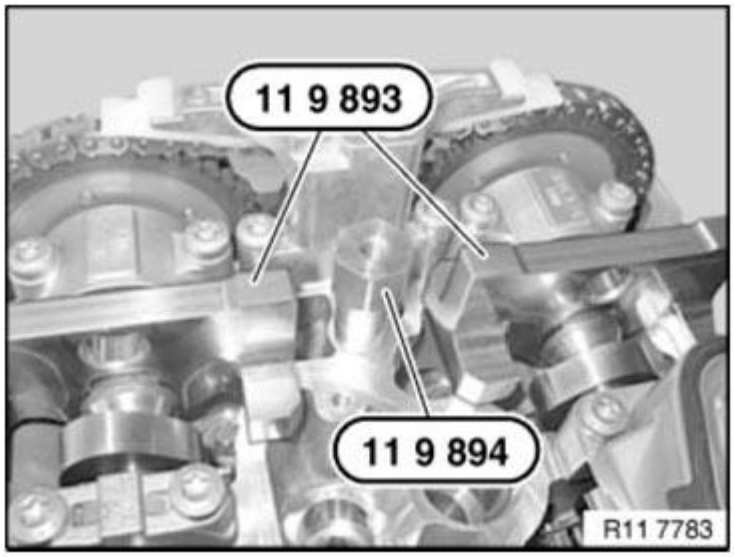


Fig. 306: Positioning Special Tool 11 9 893 On Intake Camshaft And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 892 on special tool 11 9 893.

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Both special tools11 9 891 are secured with special tool 11 9 893.

NOTE: Tighten down special tool 11 9 891 by hand.

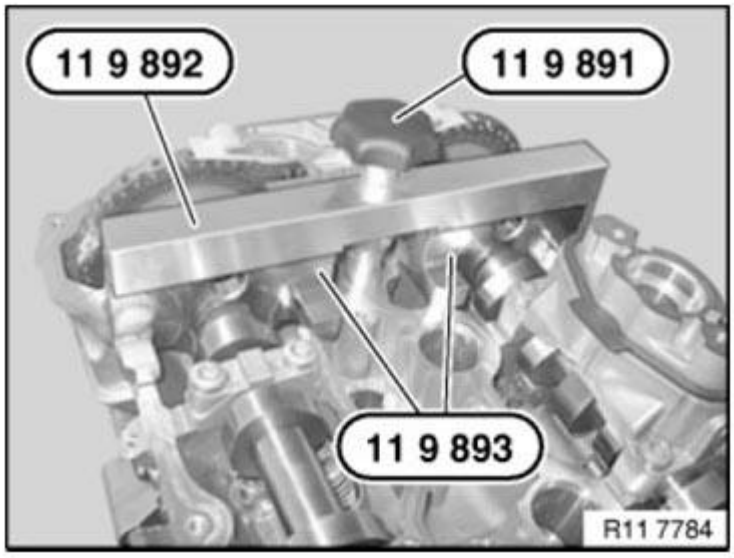


Fig. 307: Positioning Special Tool 11 9 892 On Special Tool 11 9 893
Courtesy of BMW OF NORTH AMERICA, INC.

Secure central bolt (1) of intake camshaft adjuster with special tool **00 9 120** .

Secure central bolt (2) of exhaust camshaft adjuster with special tool **00 9 120** .

Tightening torque: **11 36 1AZ** .

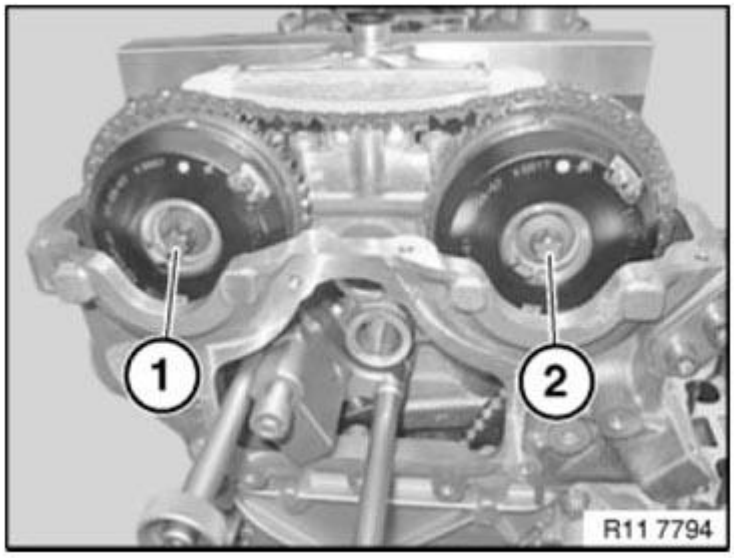


Fig. 308: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters

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Courtesy of BMW OF NORTH AMERICA, INC.

Remove special tools **11 9 190** and **11 8 570** .

Crank engine at central bolt twice in direction of engine rotation until engine returns to **150° before cylinder no. 1 firing TDC position.**

Secure vibration damper with special tool **11 9 190** at **150° before cylinder no. 1 firing TDC position 1.**

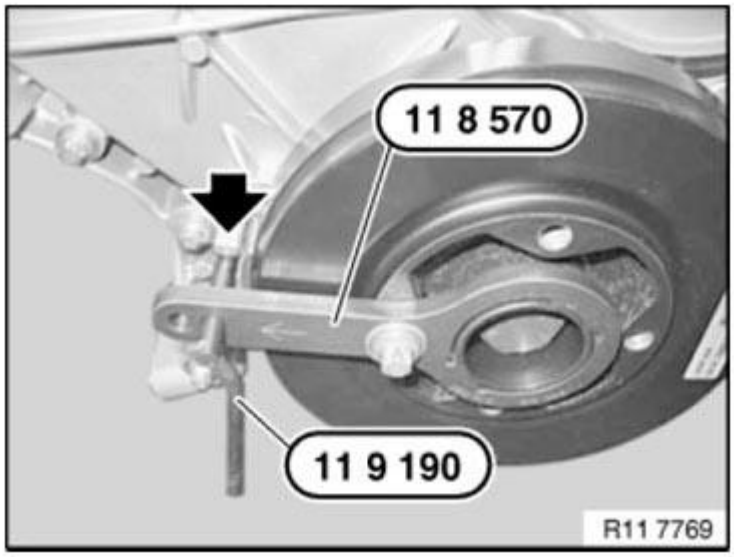


Fig. 309: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool11 9 893 on the exhaust camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

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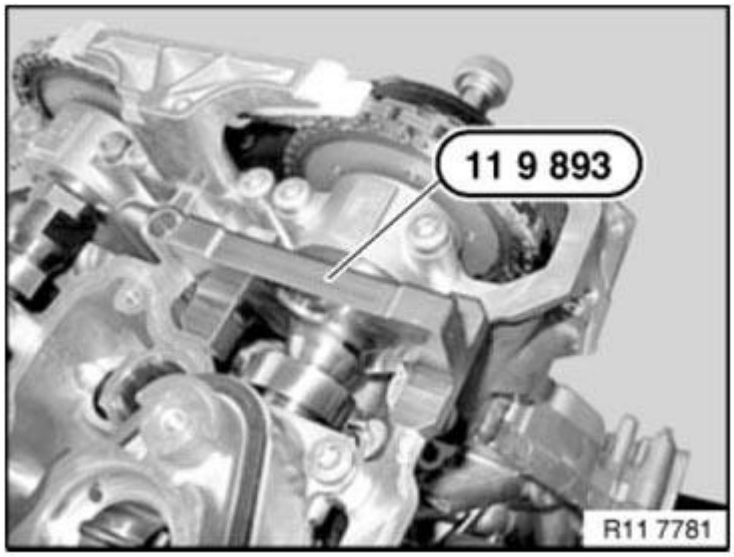


Fig. 310: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

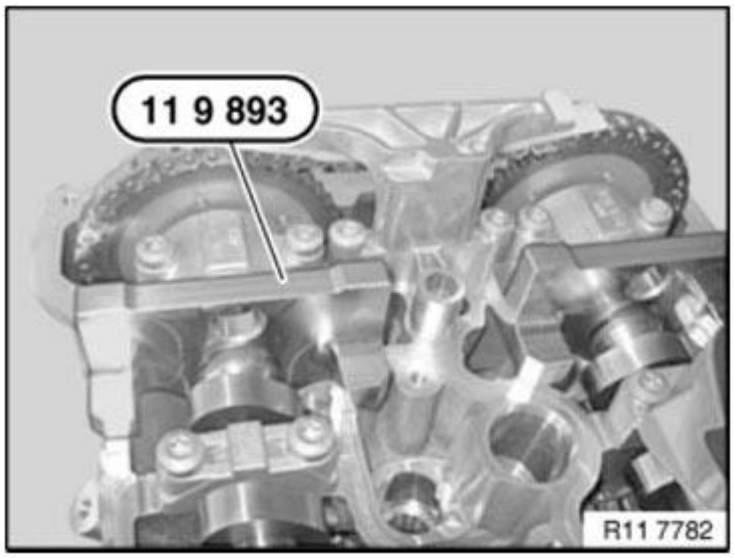


Fig. 311: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

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1131574 ADJUSTING CAMSHAFT TIMING ON RIGHT SIDE (N63)

Notes

IMPORTANT: Release central bolts on adjuster only with special tool 11 9 890 .
Risk of damage to timing drive.
If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshaft.

(cylinder bank 1 to 4)

Necessary preliminary work

- Remove **RIGHT-HAND GEAR CASE COVER**
- **CHECK CAMSHAFT TIMING ON RIGHT SIDE** .

Get set of special tools **11 9 890** ready for securing camshafts.

NOTE: Special tool 11 9 891 Knurled screw.
Special tool 11 9 892 Press-down bar.
Special tool 11 9 893 Gap gauge for intake and exhaust camshafts.
Special tool 11 9 894 spacer.

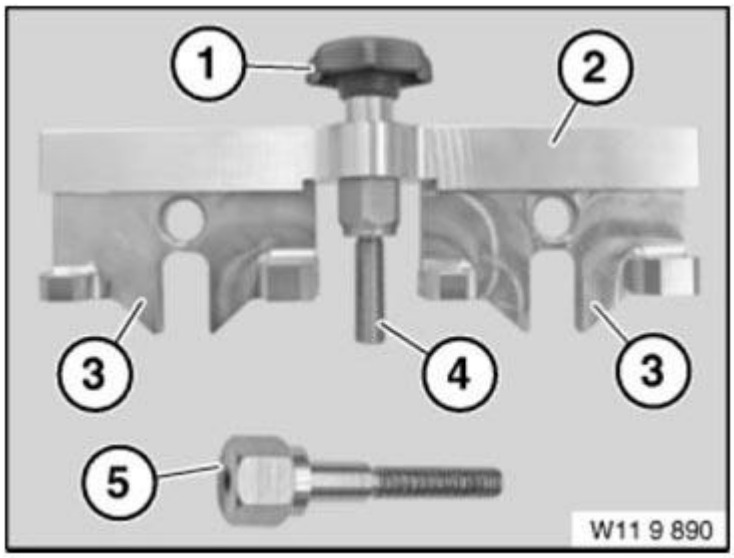


Fig. 312: Identifying Set Of Special Tools 11 9 890
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshaft.

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Release central bolts (1 and 2) of intake and exhaust camshaft adjusters.

Installation note:

Replace central bolts after releasing.

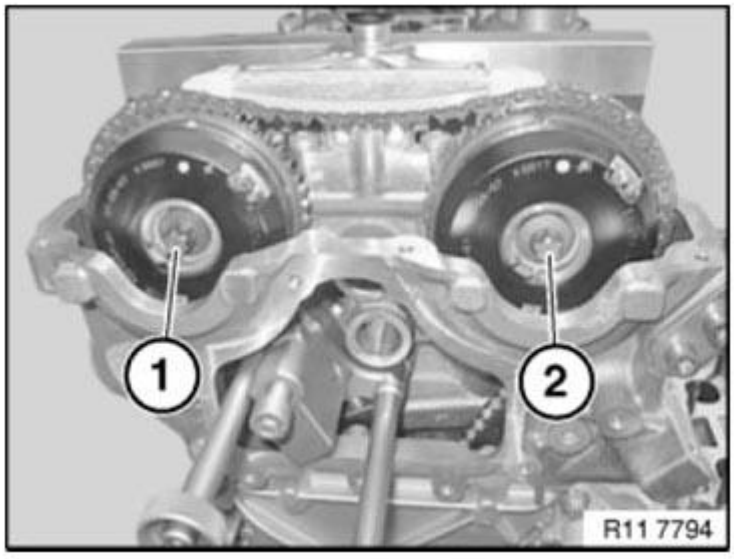


Fig. 313: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Check whether head of central bolt (1) is greased (see arrow).

If no grease can be seen on the bolt head of central bolt (1), the **ADJUSTER** must be replaced for safety reasons.

Installation note:

Coat contact surface of new central bolt (1) with copper paste.

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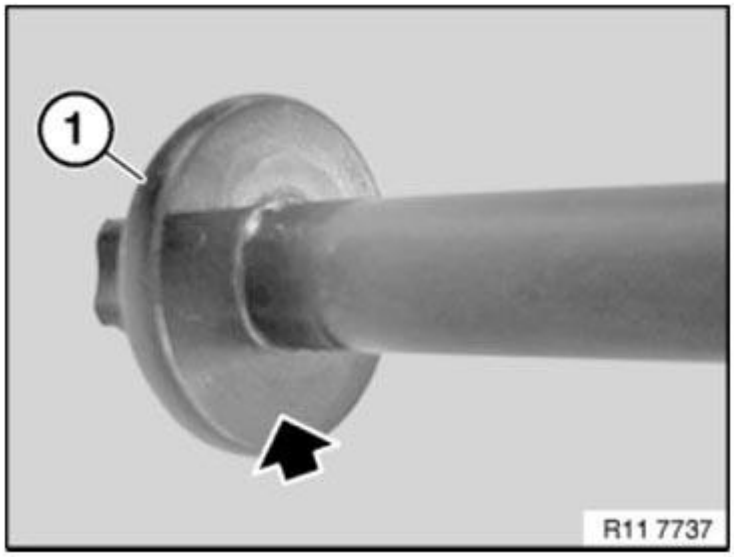


Fig. 314: Checking Head Of Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 893 on intake camshaft and exhaust camshaft.

The special tool 11 9 893 must rest **without a gap** on cylinder head; if necessary, adjust camshaft at hexagon heads.

Screw special tool 11 9 894 into cylinder head.

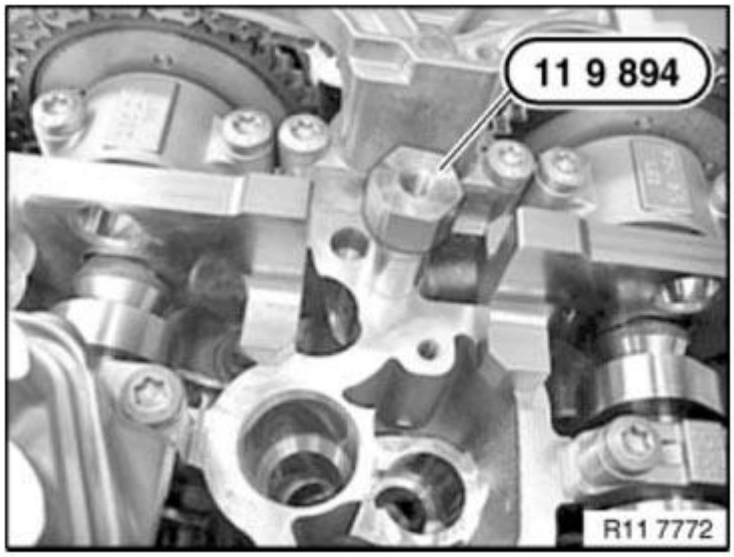


Fig. 315: Identifying Special Tool 11 9 893 On Intake Camshaft And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 892 on special tool 11 9 893.

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Both special tools11 9 891 are secured with special tool 11 9 893.

NOTE: Tighten down special tool 11 9 891 by hand.

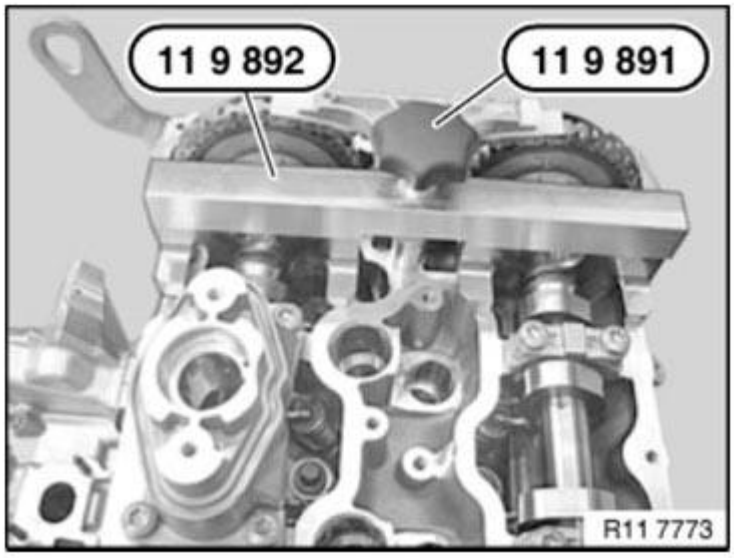


Fig. 316: Positioning Special Tool 11 9 892 On Special Tool 11 9 893
Courtesy of BMW OF NORTH AMERICA, INC.

Secure central bolt (1) of intake camshaft adjuster with special tool **00 9 120** .

Secure central bolt (2) of exhaust camshaft adjuster with special tool **00 9 120** .

Tightening torque: **11 36 1AZ** .

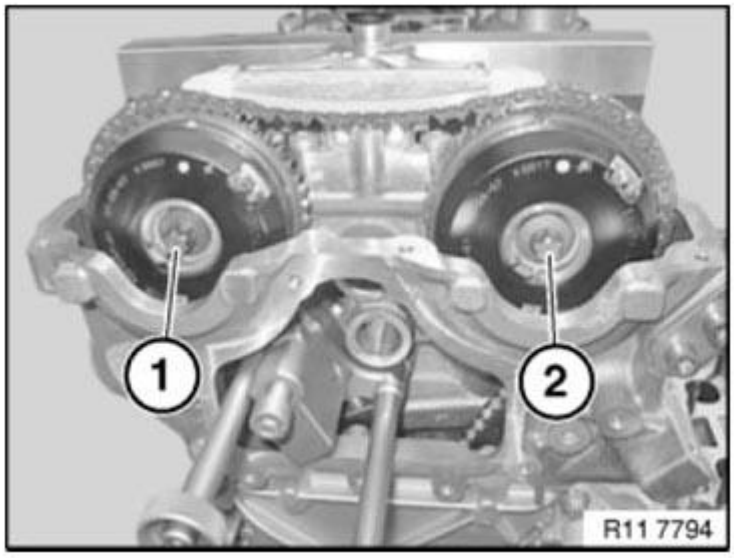


Fig. 317: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters

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Courtesy of BMW OF NORTH AMERICA, INC.

Remove special tools **11 9 190** and **11 8 570** .

Crank engine at central bolt twice in direction of engine rotation until engine returns to **150° before cylinder no. 1 firing TDC position.**

Secure vibration damper with special tool **11 9 190** at **150° before cylinder no. 1 firing TDC position 1.**

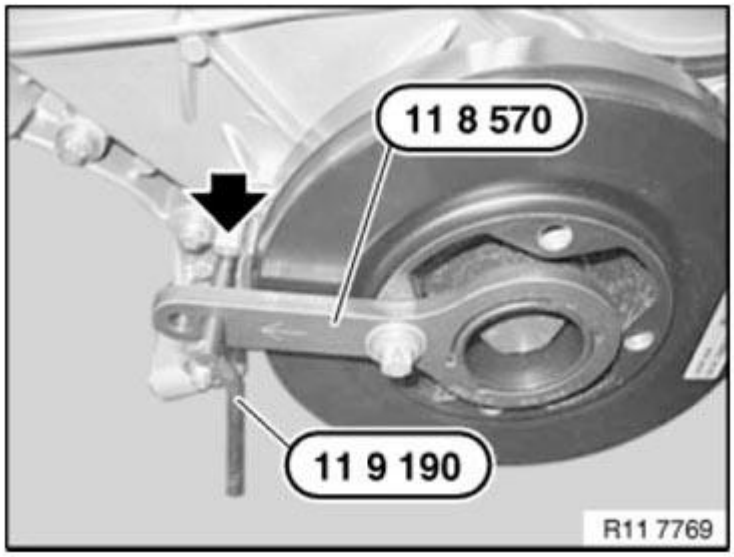


Fig. 318: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool11 9 893 on the exhaust camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

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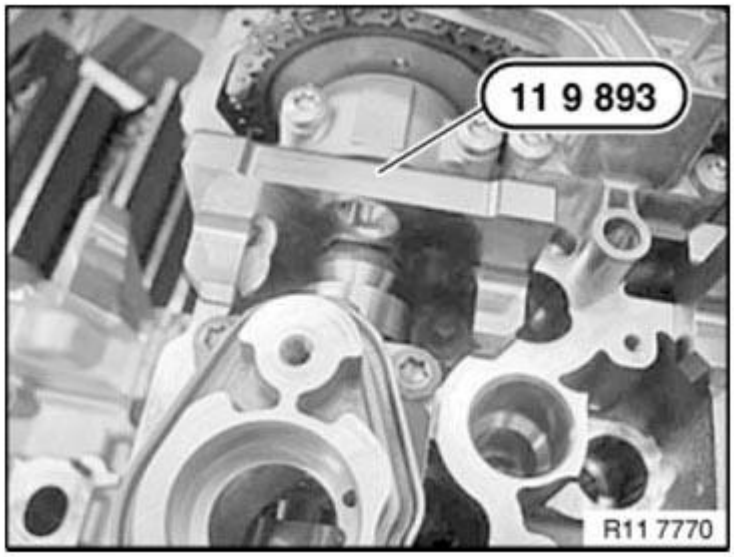


Fig. 319: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

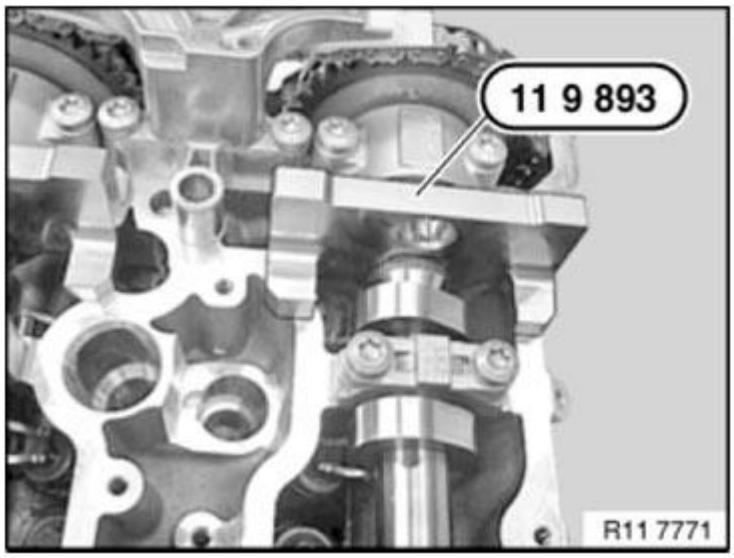


Fig. 320: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

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1131070 CHECKING CAMSHAFT TIMING ON LEFT SIDE (N63)

Notes

IMPORTANT: The timing can only be checked with special tool 11 9 900 .
The timing may be misinterpreted if it is checked without special tool 11 9 900 .

Cylinders 5-8:

Necessary preliminary work

- Remove left **CYLINDER HEAD COVER**
- Remove **FAN COWL** with electric fan
- Remove **BELT PULLEY** for air conditioning system
- Remove left **CHAIN TENSIONER**

Mount special tool **11 9 900** at position of chain tensioner.

Preload hexagon socket screw with special tool **00 9 250** to **0.6 Nm.**

NOTE: Graphic corresponds to cylinders 1-4.

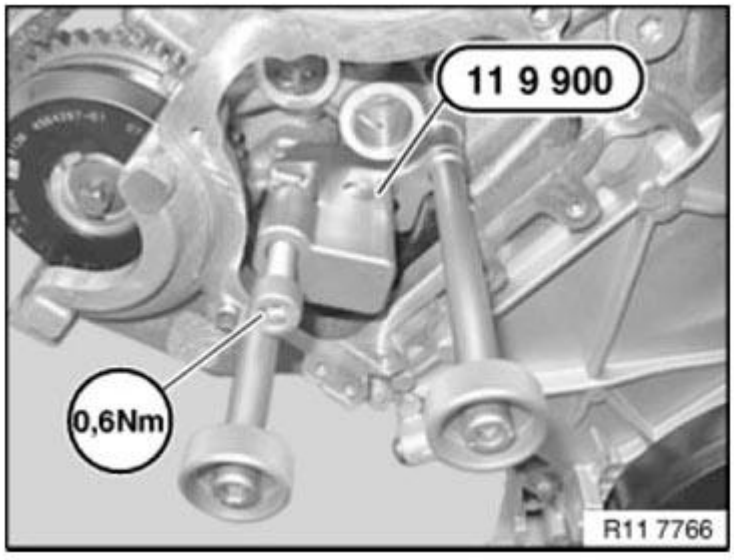


Fig. 321: Preloading Hexagon Socket Screw With Special Tool 00 9 250 To 0.6 Nm
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Marking (MP = Mounting Position) is important for installing special tool 11 8 570 .

MP = 150° before cylinder no. 1 firing TDC position

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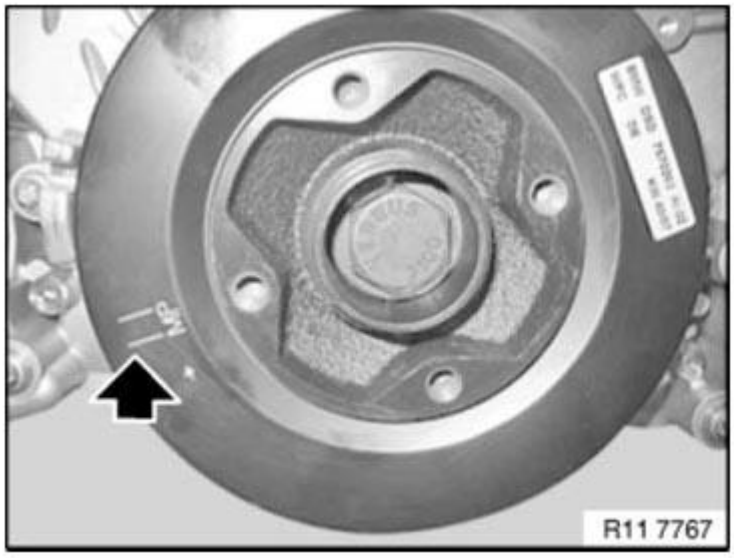


Fig. 322: Identifying Mounting Position Of Special Tool 11 8 570
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 8 570** with dihedron on vibration damper in such a way that it can be secured with bolt (1) at the MP marking.

NOTE: Setting groove on crankcase, see arrow.

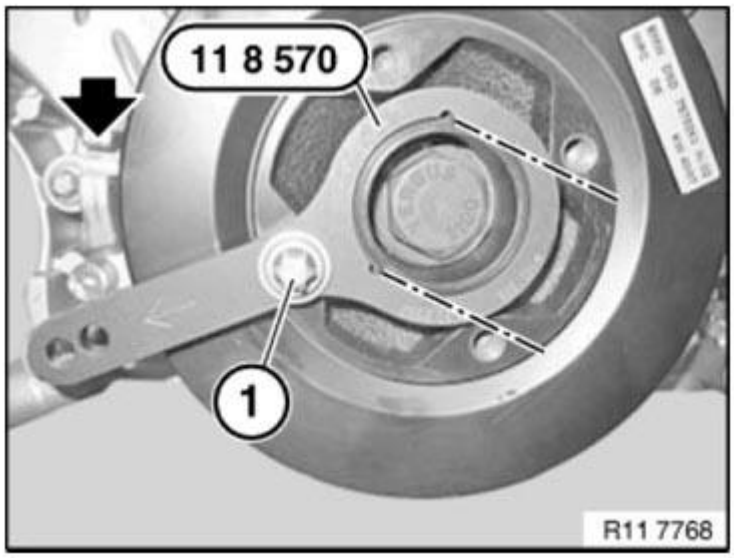


Fig. 323: Positioning Special Tool 11 8 570 With Dihedron On Vibration Damper
Courtesy of BMW OF NORTH AMERICA, INC.

Crank engine at central bolt.

Secure vibration damper with special tools **11 8 570** and **11 9 190** at **150° before cylinder no. 1 firing TDC**

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position.

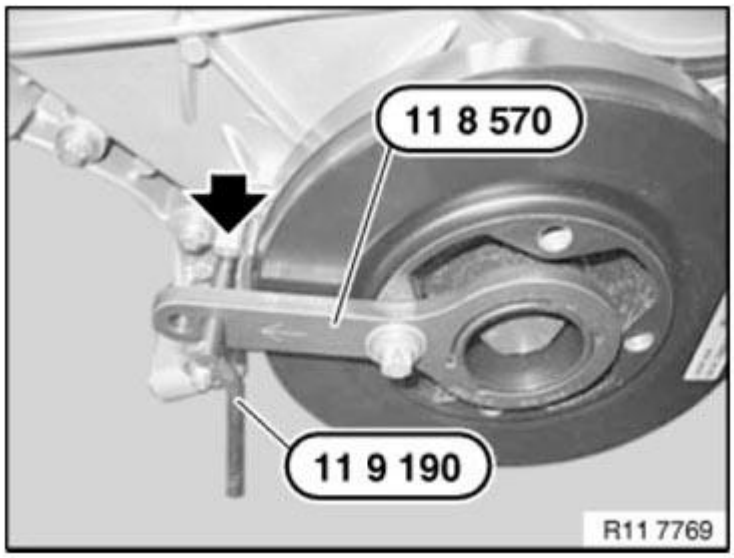


Fig. 324: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

With cylinder no. 1 at 150° before firing TDC position, cams on exhaust camshaft (A) at cylinder no. 5 point at an angle to the left.

Cams on inlet camshaft (E) point at an angle downwards.

NOTE: For purposes of clarity, the graphic shows the inlet and exhaust adjustment units removed.

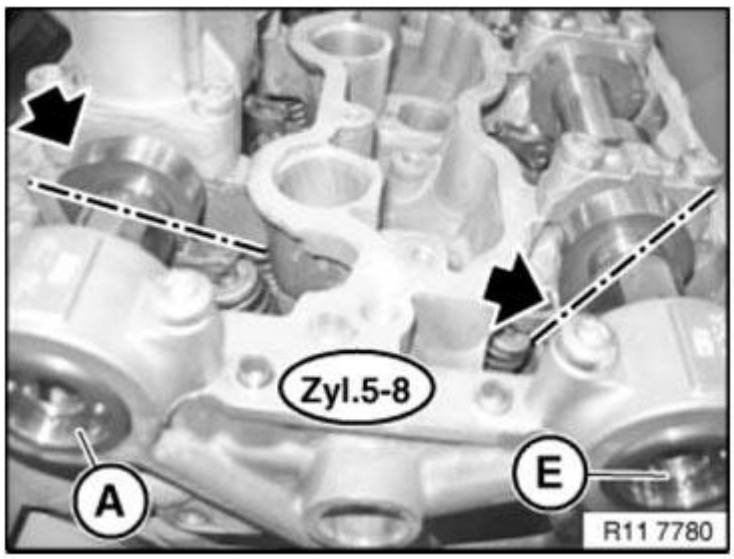


Fig. 325: Identifying Cams On Inlet Camshaft Point At An Angle Downwards

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Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: When the engine is shut down, the inlet and exhaust adjustment units are normally locked in their initial position.
The situation may arise in some individual cases where this initial position is not reached and the camshaft can continue to be rotated in the adjustment range of the camshaft adjuster.
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.

Checking locking of intake and exhaust camshaft adjusters in initial setting:

Gripping hexagon head (2) of camshafts with a fork wrench (1), carefully try to rotate camshafts against direction of rotation.

The intake and exhaust camshaft adjusters are locked in the initial setting when the camshafts are non-positively connected to the adjusters.

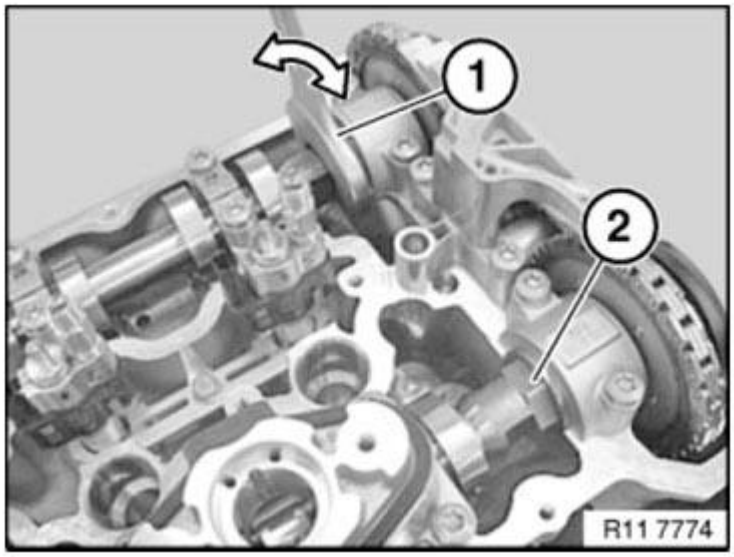


Fig. 326: Gripping Hexagon Head Of Camshafts With Fork Wrench
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If the intake or exhaust camshaft adjusters of the camshafts "cannot" be locked as described, the adjuster is faulty and must be replaced.

Place special tool 11 9 893 on the exhaust camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

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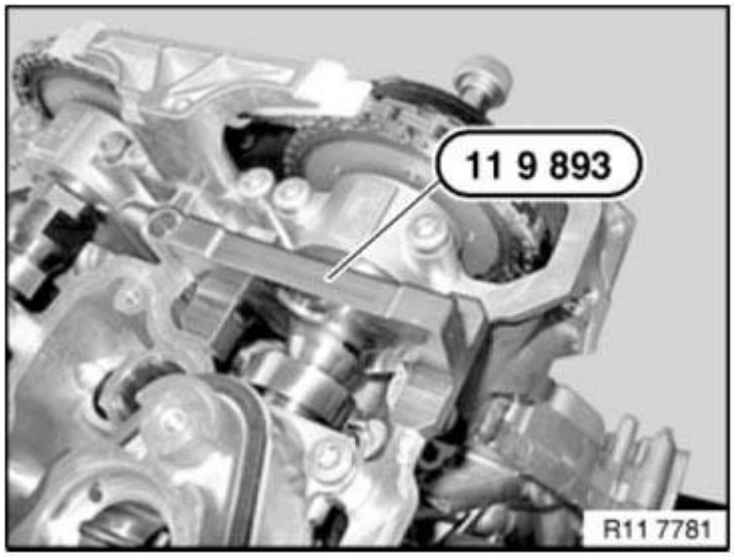


Fig. 327: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

If necessary, adjust camshaft **TIMING** on left side.

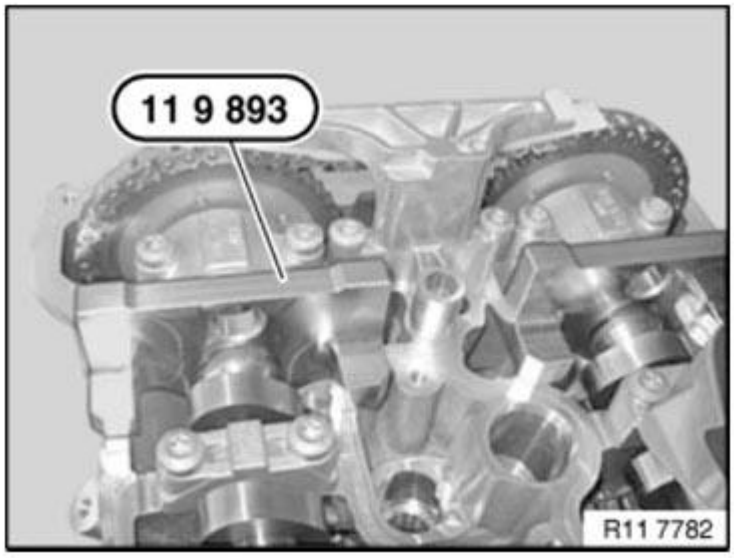


Fig. 328: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

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Assemble engine.

1131071 CHECKING CAMSHAFT TIMING ON RIGHT SIDE (N63)

Notes

IMPORTANT: The timing can only be checked with special tool 11 9 900 .
The timing may be misinterpreted if it is checked without special tool 11 9 900 .

Cylinders 1-4:

Necessary preliminary work

- Remove right **CYLINDER HEAD COVER**
- Remove **FAN COWL** with electric fan
- Remove **BELT PULLEY** for air conditioning system
- Remove right **CHAIN TENSIONER**

Mount special tool **11 9 900** at position of chain tensioner.

Preload hexagon socket screw with special tool **00 9 250** to **0.6 Nm.**

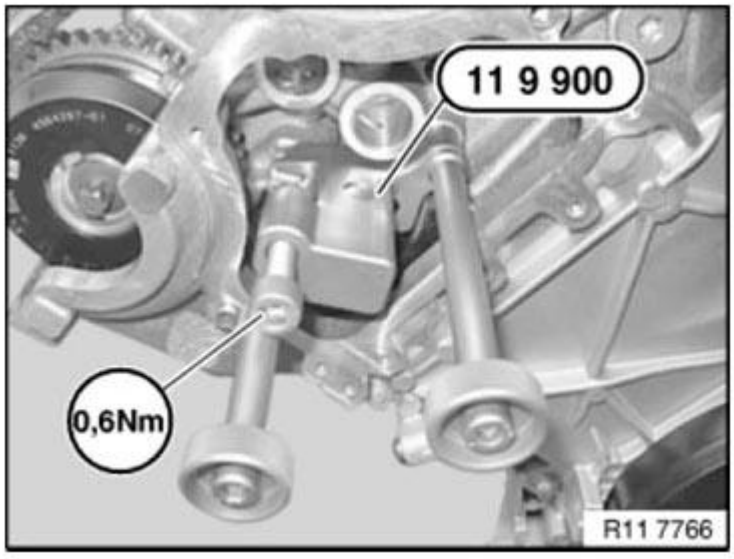


Fig. 329: Preloading Hexagon Socket Screw With Special Tool 00 9 250 To 0.6 Nm
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Marking (MP = Mounting Position) is important for installing special tool 11 8 570 .

MP = 150° before cylinder no. 1 firing TDC position

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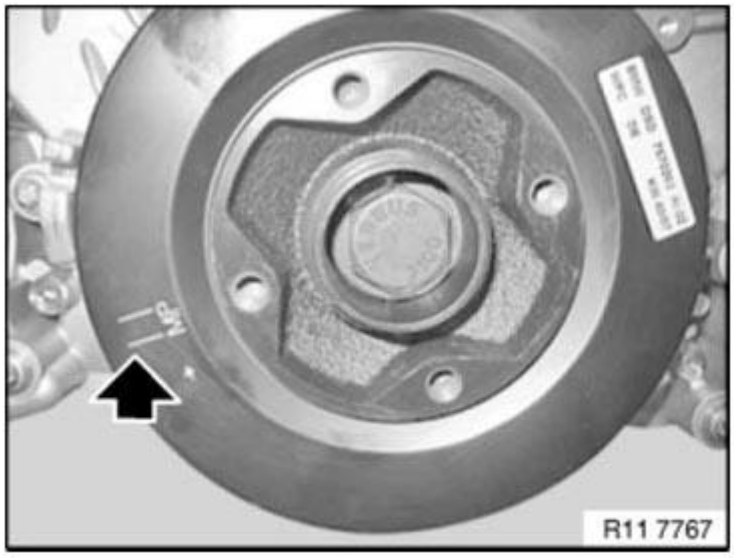


Fig. 330: Identifying Mounting Position Of Special Tool 11 8 570
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 8 570** with dihedron on vibration damper in such a way that it can be secured with bolt (1) at the MP marking.

NOTE: Setting groove on crankcase, see arrow.

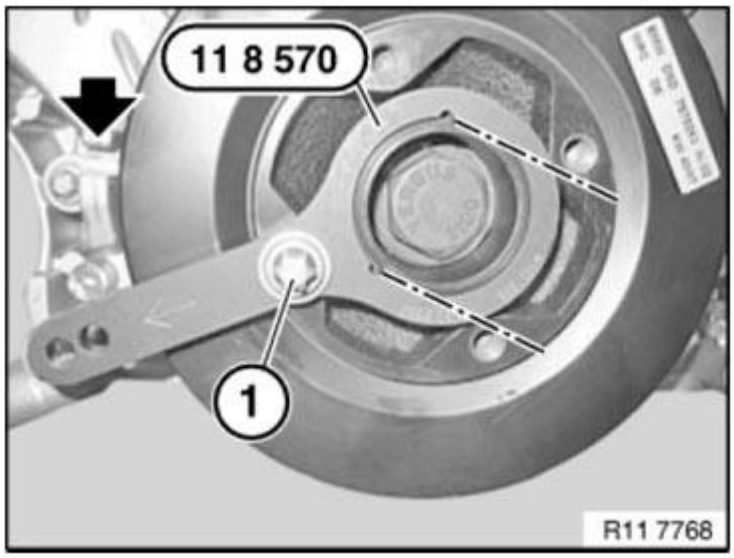


Fig. 331: Positioning Special Tool 11 8 570 With Dihedron On Vibration Damper
Courtesy of BMW OF NORTH AMERICA, INC.

Crank engine at central bolt.

Secure vibration damper with special tools **11 8 570** and **11 9 190** at **150° before cylinder no. 1 firing TDC**

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position.

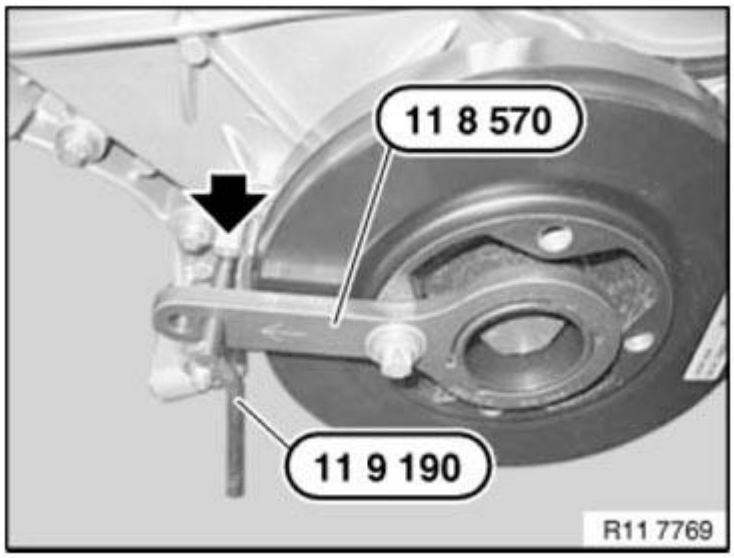


Fig. 332: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

With cylinder no. 1 at 150° before firing TDC position, cams on exhaust camshaft (A) at cylinder no. 1 point at an angle upwards.

Cams on inlet camshaft (E) point at an angle downwards.

NOTE: For purposes of clarity, the graphic shows the inlet and exhaust adjustment units removed.

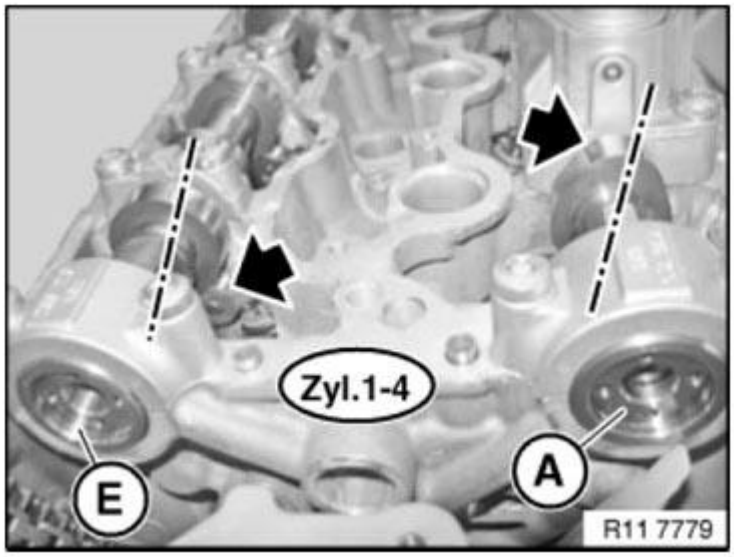


Fig. 333: Identifying Cams On Inlet Camshaft Point At An Angle Downwards

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Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: When the engine is shut down, the intake and exhaust camshaft adjusters are normally locked in their initial position.
The situation may arise in some individual cases where this initial position is not reached and the camshaft can continue to be rotated in the adjustment range of the camshaft adjuster.
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.

Checking locking of intake and exhaust camshaft adjusters in initial setting:

Gripping hexagon head (2) of camshafts with an open-end spanner (1), carefully try to rotate camshafts against direction of rotation.

The intake and exhaust camshaft adjusters are locked in the initial setting when the camshafts are non-positively connected to the adjusters.

NOTE: Graphic corresponds to cylinders 5-8.

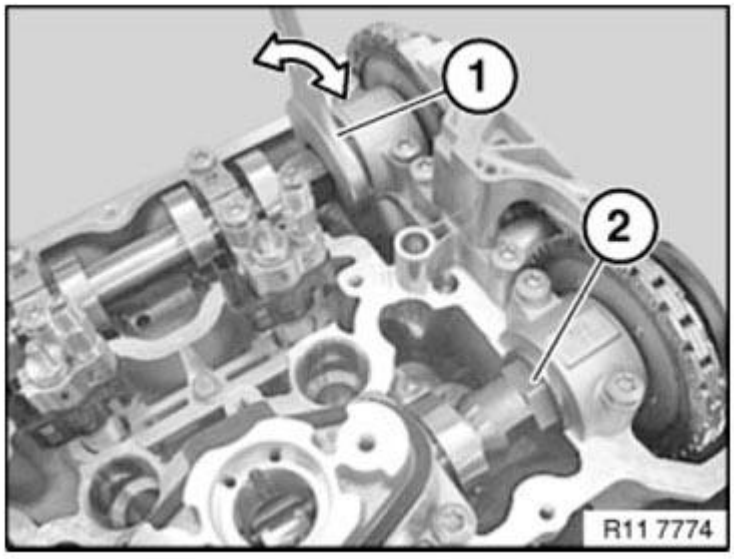


Fig. 334: Gripping Hexagon Head Of Camshafts With Fork Wrench
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If the intake or exhaust camshaft adjusters of the camshafts "cannot" be locked as described, the adjuster is faulty and must be replaced.

Place special tool 11 9 893 on the exhaust camshaft and check timing adjustment.

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NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.

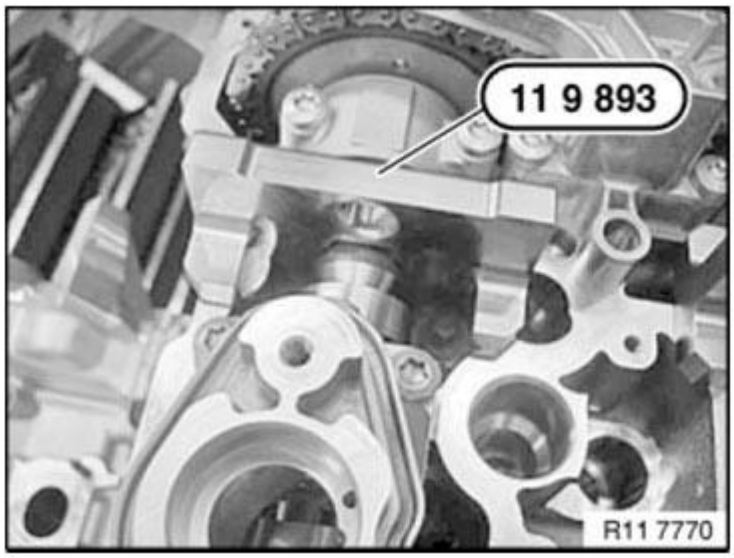


Fig. 335: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft and check timing adjustment.

NOTE: Timing is correctly adjusted when special tool 11 9 893 rests without a gap on cylinder head.
If necessary, adjust camshaft TIMING on right side.

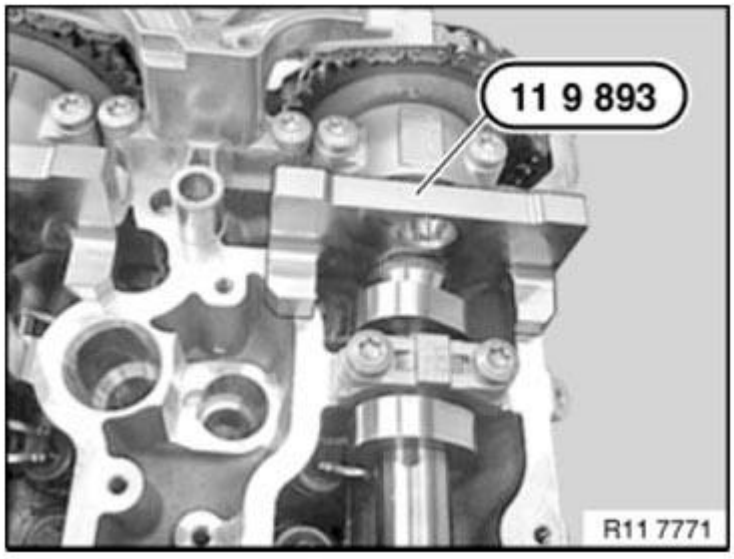


Fig. 336: Identifying Special Tool 11 9 893 On Intake Camshaft

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Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

1136720 REMOVING AND INSTALLING/RENEWING BOTH SOLENOID VALVES ON RIGHT SIDE (N63)

IMPORTANT: Always check that the solenoid valves are clean during removal and installation.
Possible malfunctions if valves are contaminated:

- **Irregular operation**
- **OBD incorrect entry**
- **Poor exhaust gas values**
- **Low engine performance**

IMPORTANT: Risk of damage!
Do not clean solenoid valves with compressed air.

Solenoid valves, cylinders 1-4:

Necessary preliminary work

- Read out fault memory in DME control unit
- Switch off ignition
- Remove right **INTERCOOLER**
- Release holder for electropneumatic pressure converter (EPPC) and carefully press to one side

NOTE: Solenoid valve (4) controls the inlet adjustment unit.
Solenoid valve (2) controls the exhaust adjustment unit.

Unlock plug connections of solenoid valves (2 and 4) and disconnect.

Installation note:

Plug connections must snap audibly into place!

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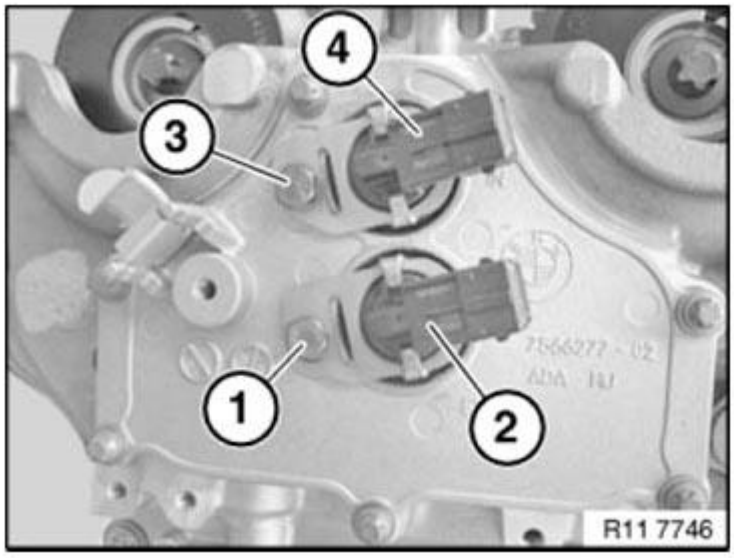


Fig. 337: Identifying Solenoid Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws (1 and 3).

Tightening torque **11 36 3AZ** .

Pull out solenoid valves (2 and 4).

Installation note:

Replace O-rings (1 and 2) on solenoid valve

Installation note:

To install solenoid valves, coat both O - rings with engine oil.

If the solenoid valve is to be reused, the filter strainer (see arrow) must be cleaned.

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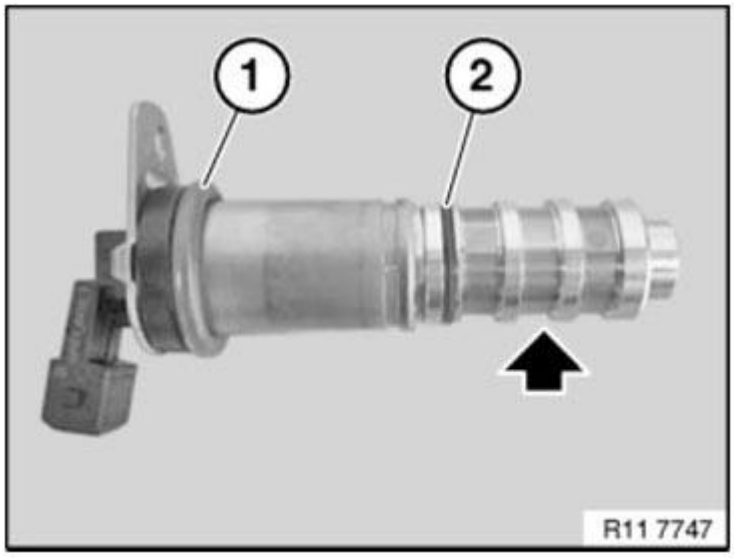


Fig. 338: Identifying O-Rings On Solenoid Valve
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: If a filter element is clogged with dirt, the filter element (filter strainer) may be removed.

Release filter elements (1) at contact edges.

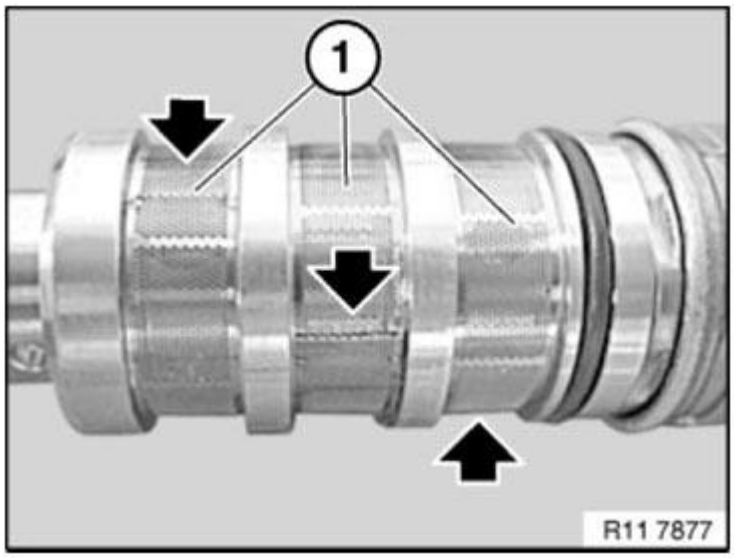


Fig. 339: Identifying Filter Elements At Contact Edges
Courtesy of BMW OF NORTH AMERICA, INC.

Bend open welding spots on filter element (1) with a screwdriver (2) in direction of arrow until welding spots are opened.

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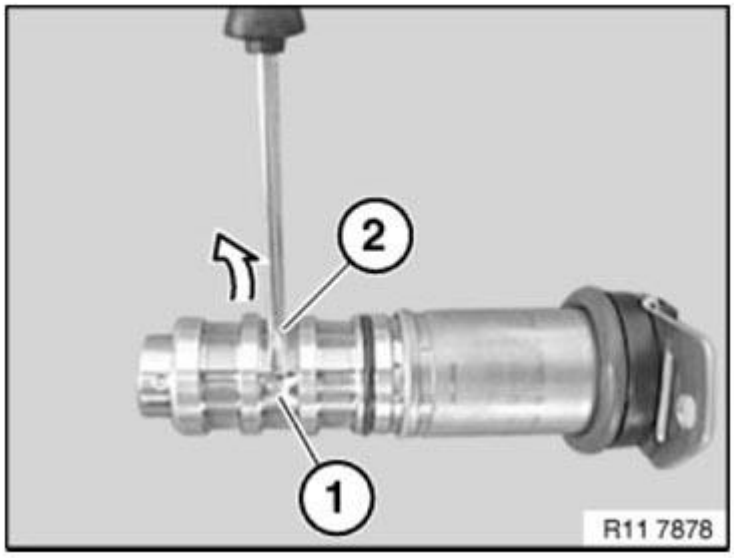


Fig. 340: Bending Open Welding Spots On Filter Element With Screwdriver
Courtesy of BMW OF NORTH AMERICA, INC.

Avoid damaging, e.g. notches or scratches, the solenoid valve housing (see arrows).

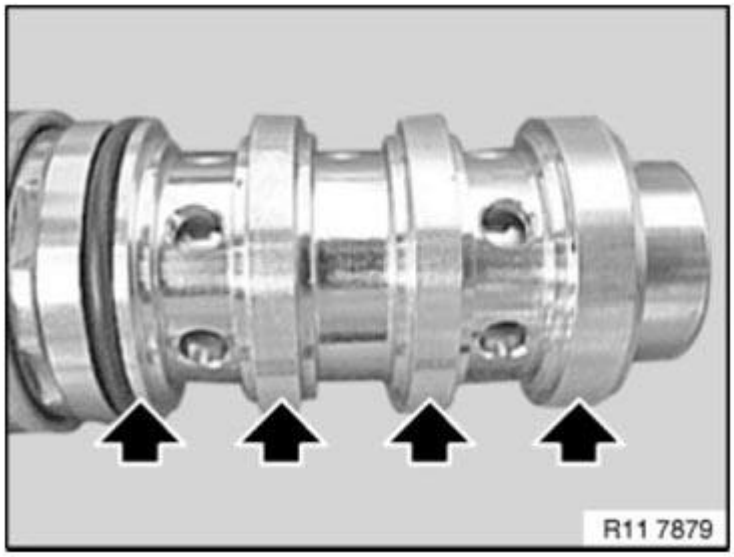


Fig. 341: Inspecting Notches Or Scratches For Solenoid Valve Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully insert solenoid valves (2 and 4) up to stop.

Ensure correct installation position.

Insert screws (1 and 3) and tighten down.

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Tightening torque **11 36 3AZ** .

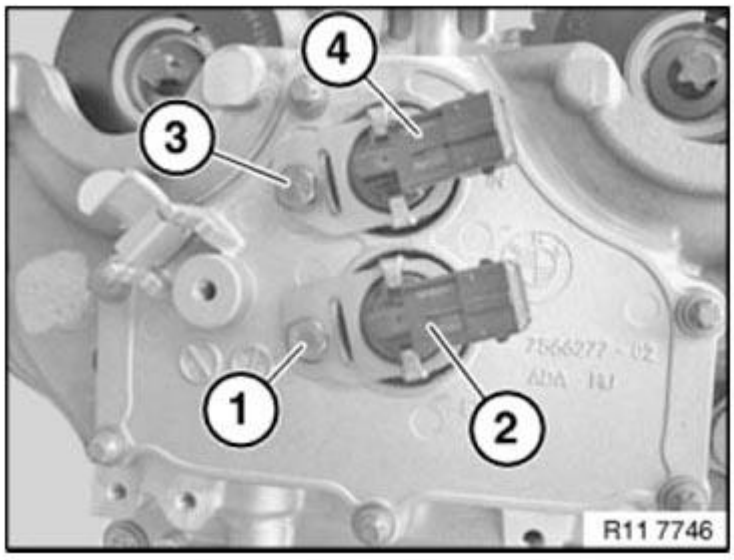


Fig. 342: Identifying Solenoid Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Delete fault memory.

Check function of DME control unit.

1136047 REMOVING AND INSTALLING/RENEWING INLET AND EXHAUST ADJUSTMENT UNITS ON LEFT SIDE (N63)

Notes

IMPORTANT: When the engine is shut down, the inlet and exhaust camshaft adjuster is normally locked in its initial position.
The situation may arise in some individual cases where this initial position is not reached and the camshaft can continue to be rotated in the adjustment range of the camshaft adjuster.
Where central bolts are not greased at the bolt contact points up to engine number 20024295 , the camshaft adjuster must be renewed due to safety reasons.
The central bolts is greased from engine number 20024296.

(cylinder bank 5 to 8)

Necessary preliminary work

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- **Read fault memory and make a documentary record**
- Remove **LEFT CYLINDER HEAD COVER**
- Remove **LEFT TIMING CASE COVER**
- Check **timing** See **1131070 CHECKING CAMSHAFT TIMING ON LEFT SIDE (N63)** or **1131071 CHECKING CAMSHAFT TIMING ON RIGHT SIDE (N63)**.

To release central bolts, use special tool **11 9 890** or grip at hexagon head of camshaft.

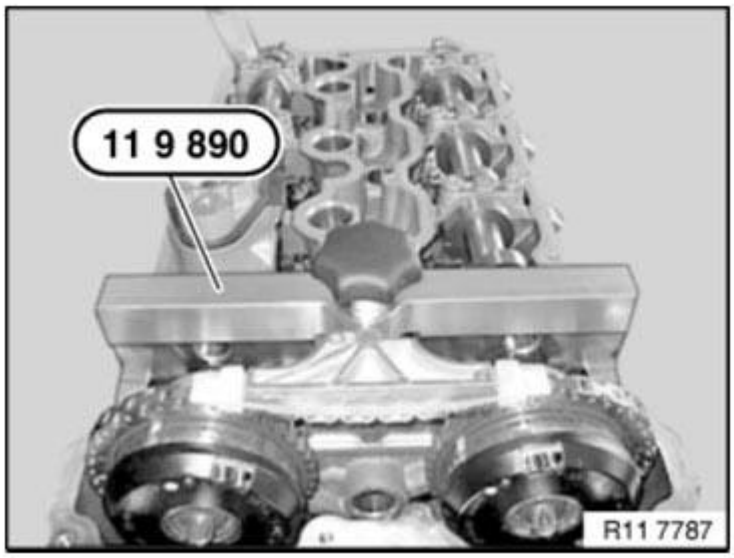


Fig. 343: Identifying Special Tool 11 9 890
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshafts.

Release central bolts (1 and 2) of intake and exhaust camshaft adjusters.

Installation note:

Replace central bolts after releasing.

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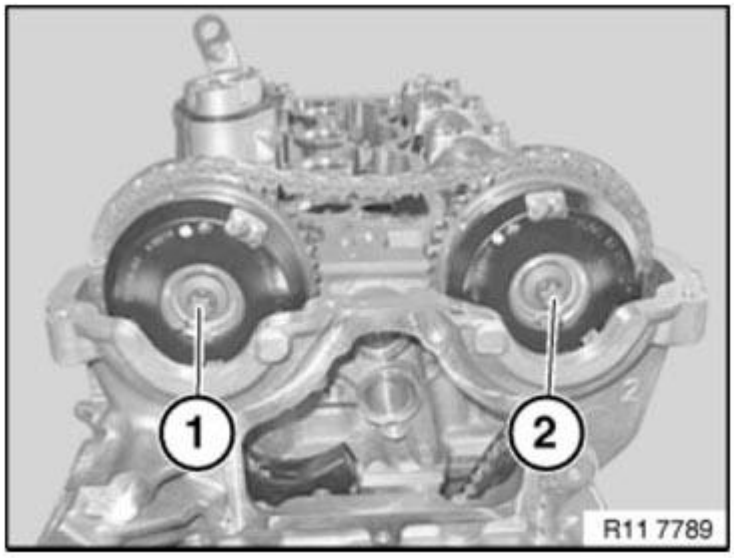


Fig. 344: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Check whether head of central bolt (1) is greased (see arrow). If no grease can be seen on the bolt head of central bolt (1), the intake and exhaust camshaft adjuster must be renewed due to safety reasons.

Installation note:

Coat contact face of central bolt (1) with copper paste.

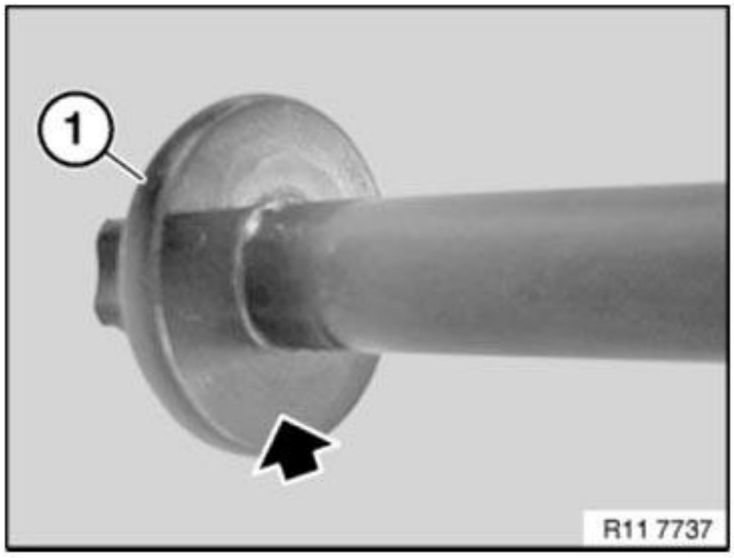


Fig. 345: Checking Head Of Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

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Release hexagon socket screw.

Release special tool **11 9 900** at knurled screws and remove.

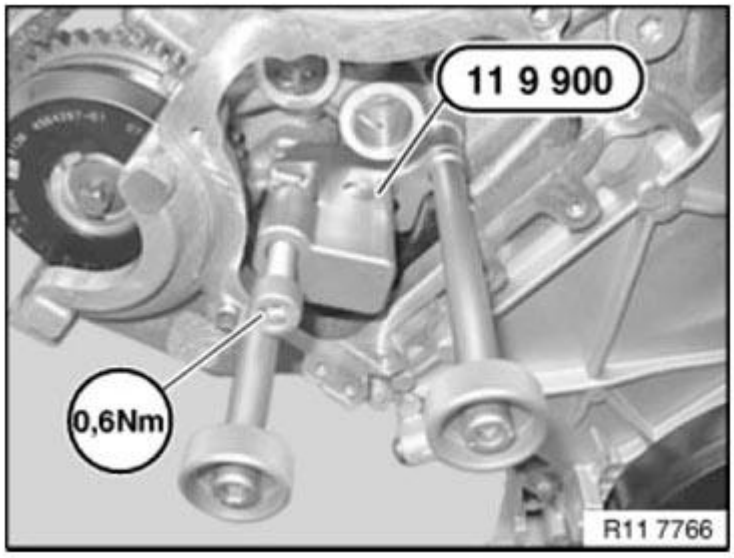


Fig. 346: Preloading Hexagon Socket Screw With Special Tool 00 9 250 To 0.6 Nm
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove upper tensioning rail (2).

NOTE: Shown without special tools for purposes of clarity.

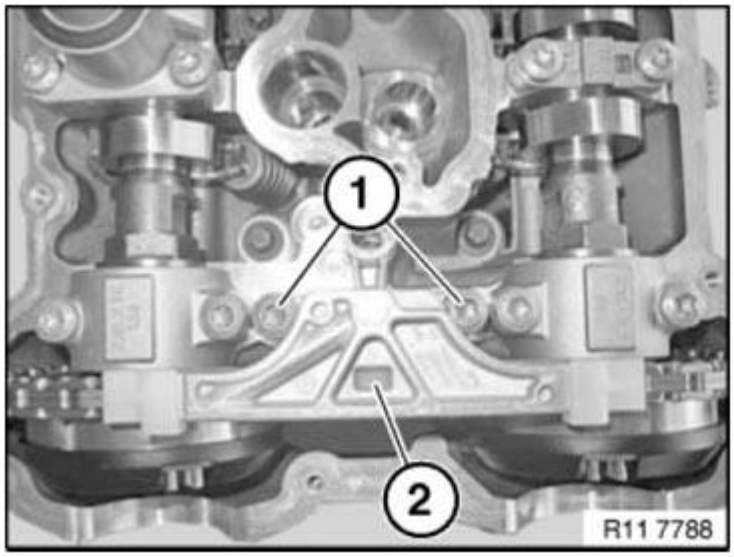


Fig. 347: Identifying Upper Tensioning Rail And Screws

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Courtesy of BMW OF NORTH AMERICA, INC.

Remove central bolt (2) of inlet adjustment unit.

Installation note:

Replace central bolts after releasing.

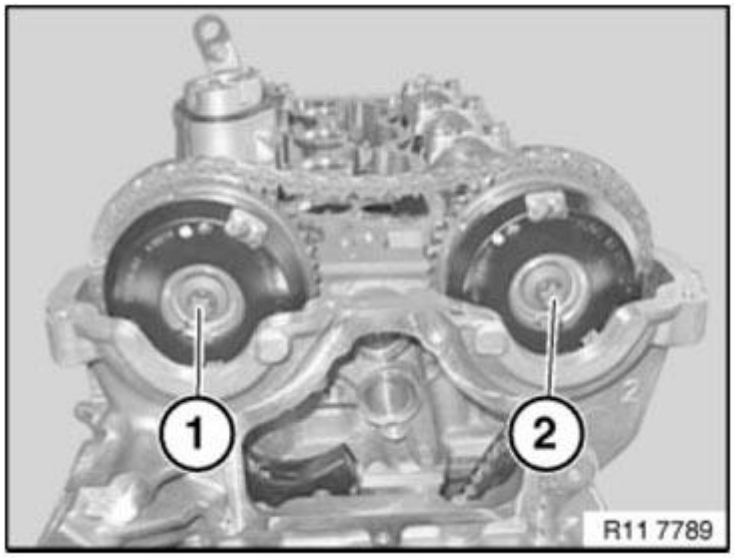


Fig. 348: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Detach inlet adjustment unit (1) in direction of arrow from inlet camshaft.

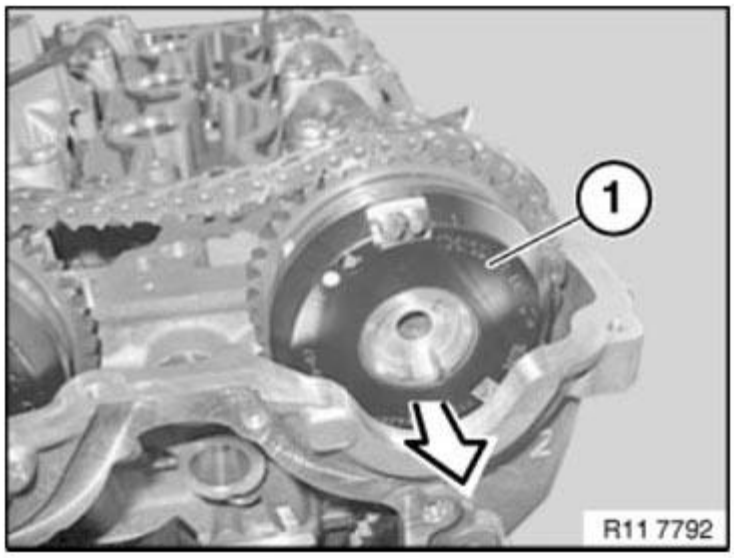


Fig. 349: Identifying Inlet Adjustment Unit

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Courtesy of BMW OF NORTH AMERICA, INC.

Feed out inlet adjustment unit (2) from timing chain (1).

Lift out inlet adjustment unit (2).

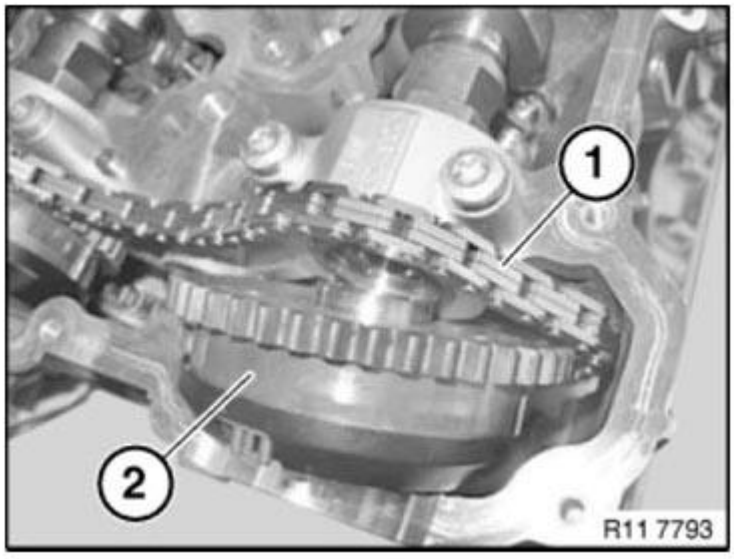


Fig. 350: Identifying Inlet Adjustment Unit And Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Remove central bolt (1) of exhaust adjustment unit.

Installation note:

Replace central bolts after releasing.

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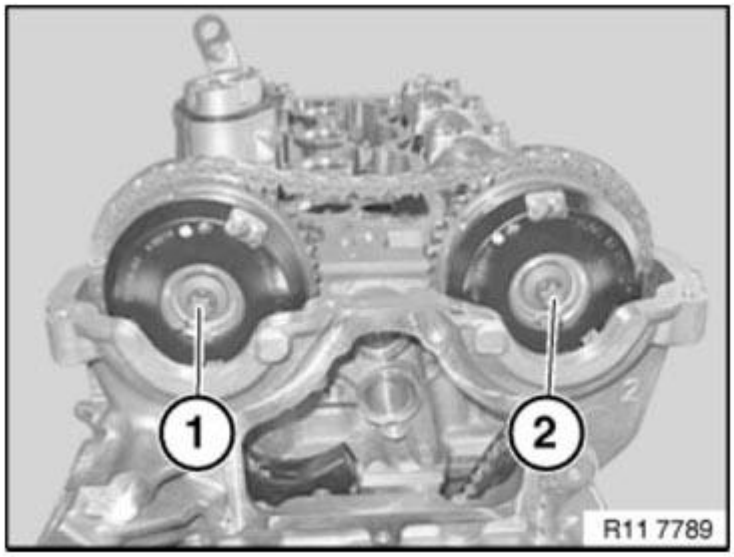


Fig. 351: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Detach exhaust adjustment unit (1) in direction of arrow from exhaust camshaft.

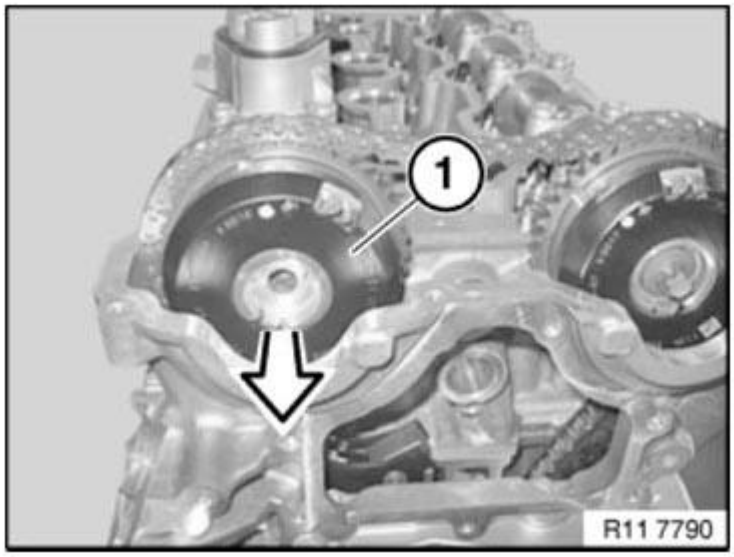


Fig. 352: Identifying Exhaust Adjustment Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Feed out exhaust adjustment unit (2) from timing chain (1).

Lift out exhaust adjustment unit (2).

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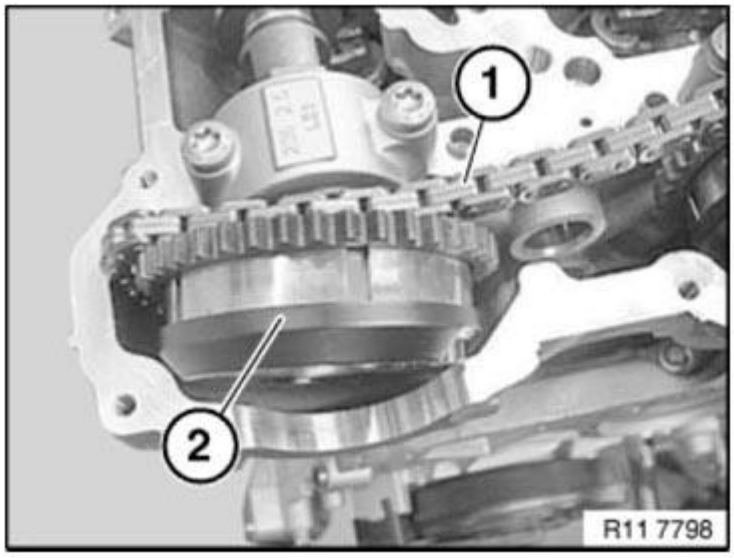


Fig. 353: Identifying Exhaust Adjustment Unit And Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Danger of mix-up:

Intake and exhaust camshaft adjusters are different.

Mixing up the inlet and exhaust adjustment units will cause damage to the engine.

1. Intake camshaft adjuster (1) is marked **IN**
2. Exhaust camshaft adjuster (2) is marked **OUT**

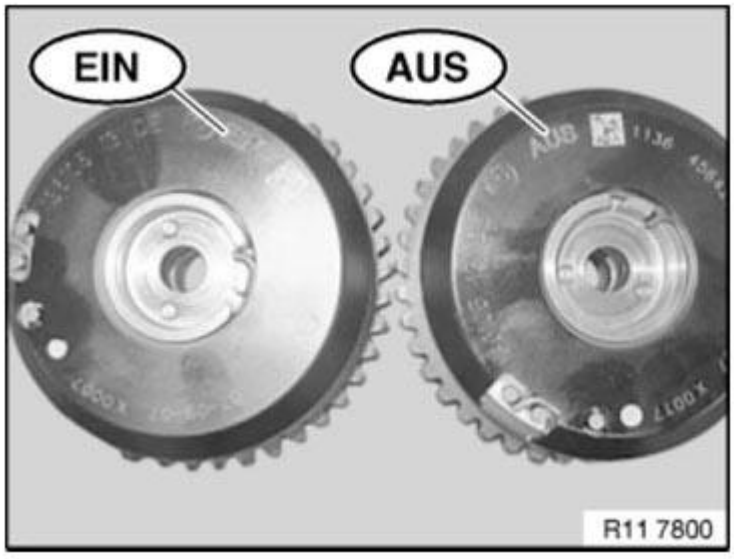


Fig. 354: Identifying Intake And Exhaust Camshaft Adjusters Mark

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Installation note:

Coat contact face of central bolt (1) with copper paste.

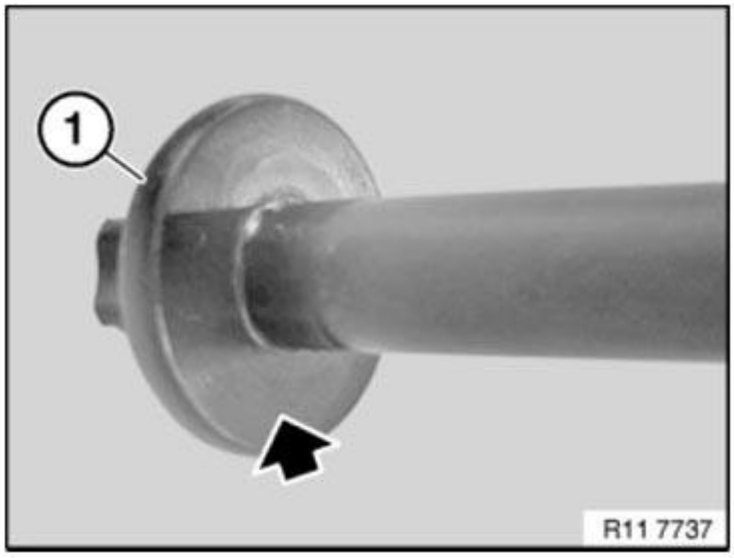


Fig. 355: Checking Head Of Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Position of adjustment units in relation to timing chain can be freely selected.

Feed adjuster into timing chain and position on camshafts.

Insert central bolts (1 and 2) on adjustment units without gaps.

Release central bolts (1 and 2) by **90°.**

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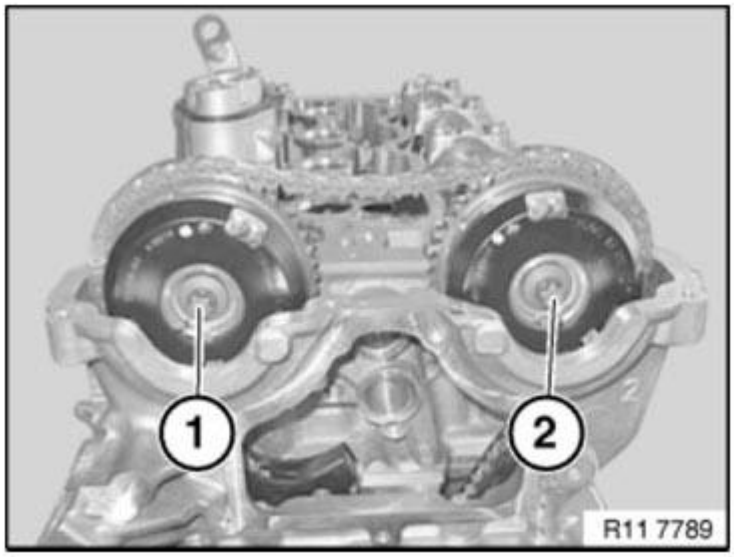


Fig. 356: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Fit sliding rail (2) and secure with screws (1).

Tightening torque: **11 31 4AZ** .

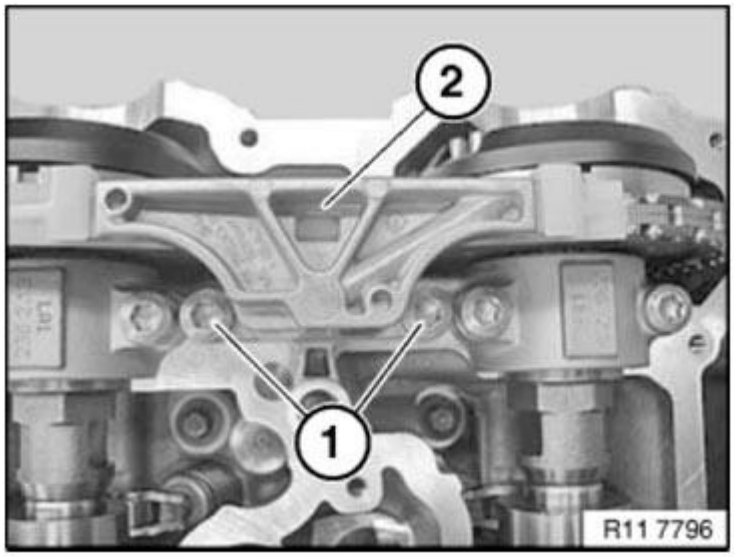


Fig. 357: Identifying Sliding Rail And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Get set of special tools **11 9 890** ready for securing camshafts.

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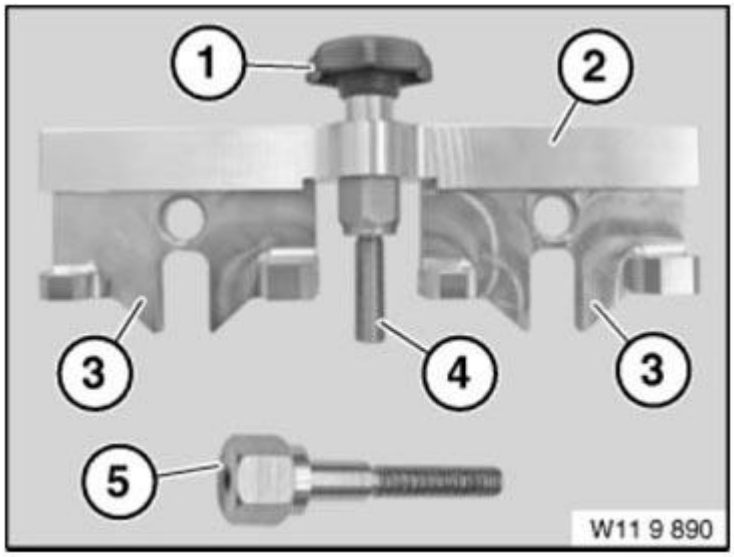


Fig. 358: Identifying Set Of Special Tools 11 9 890
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool 11 9 893 on exhaust camshaft.

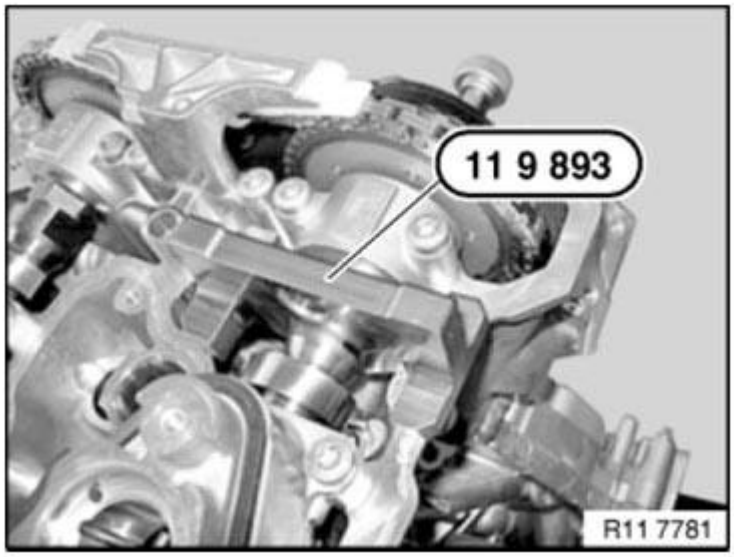


Fig. 359: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft.

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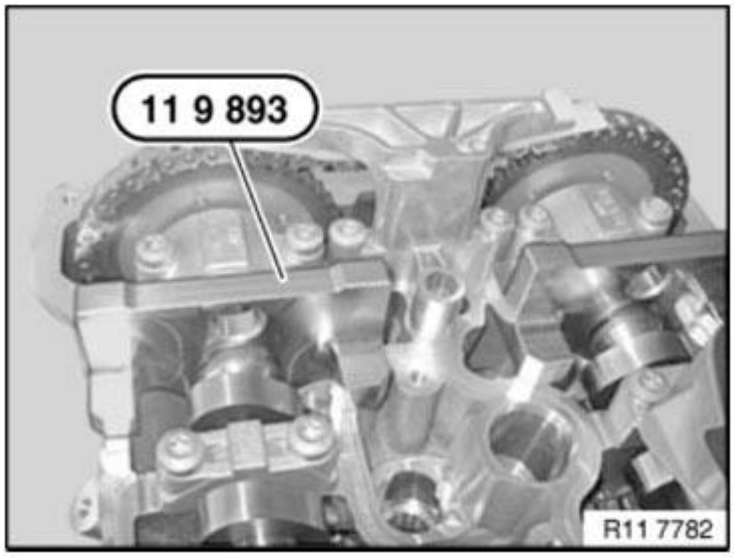


Fig. 360: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Align exhaust and intake camshafts so that special tools 11 9 893 lie on the cylinder head without any gap.

Screw special tool 11 9 894 into cylinder head.

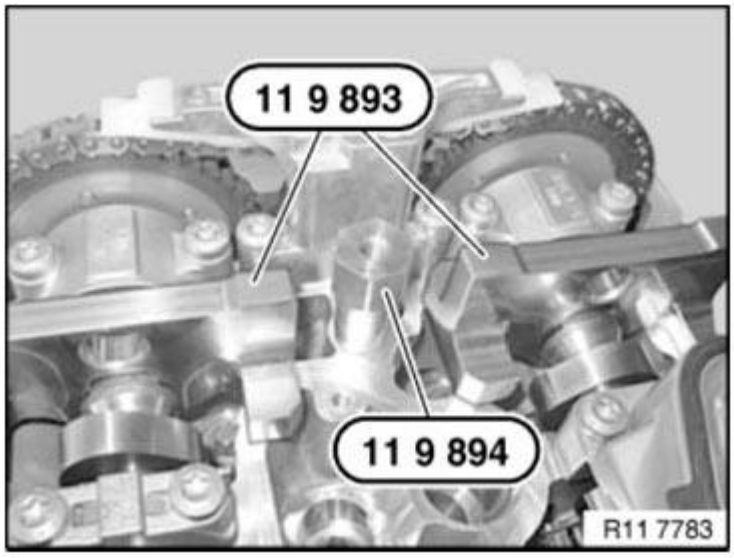


Fig. 361: Positioning Special Tool 11 9 893 On Intake Camshaft And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Press special tool 11 9 892 down with special tool 11 9 891.

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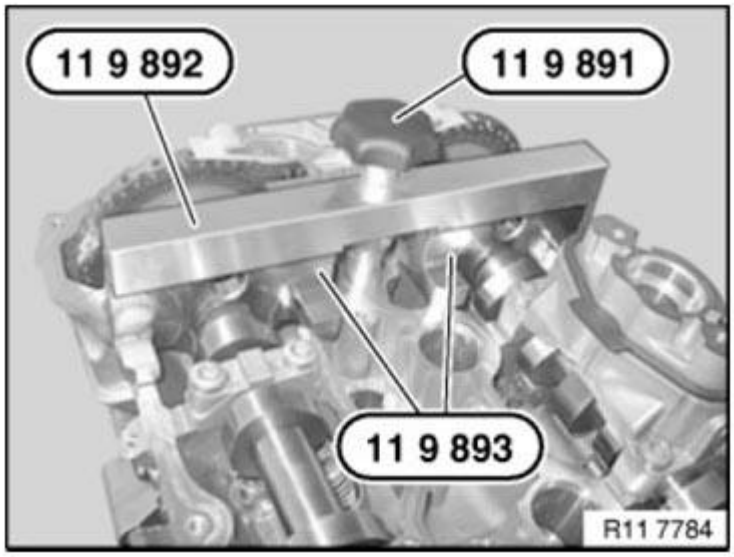


Fig. 362: Positioning Special Tool 11 9 892 On Special Tool 11 9 893
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in special tool **11 9 900** .

Pretension timing chain with special tool **11 9 900** .

Preload hexagon socket screw with special tool **00 9 250** to **0.6 Nm.**

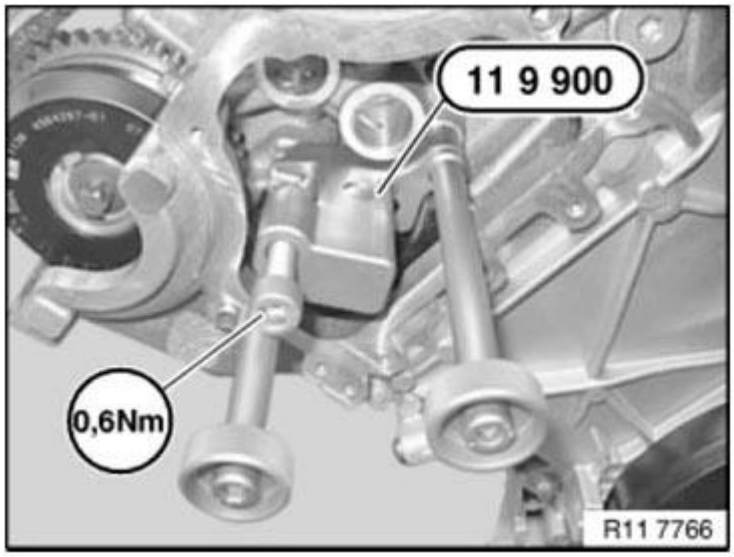


Fig. 363: Preloading Hexagon Socket Screw With Special Tool 00 9 250 To 0.6 Nm
Courtesy of BMW OF NORTH AMERICA, INC.

Check special tools **11 9 190** for correct seating.

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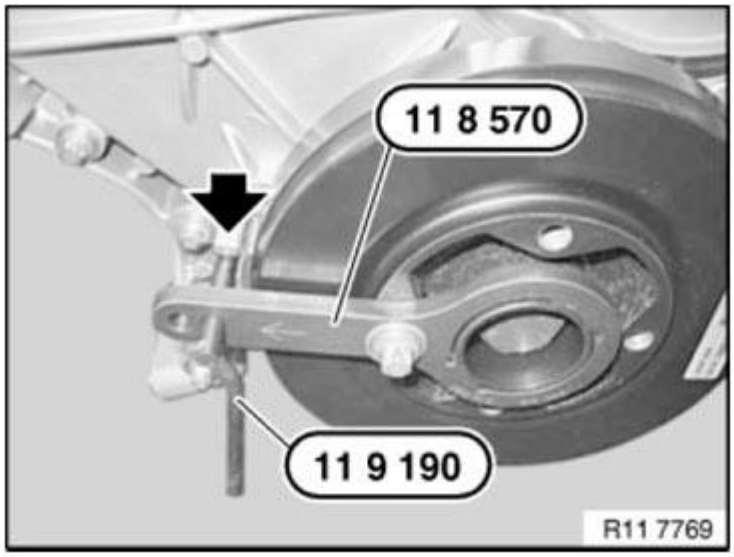


Fig. 364: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down central screw (1 and 2) of the adjustment units with special tool **00 9 120** .

Tightening torque **11 36 1AZ** .

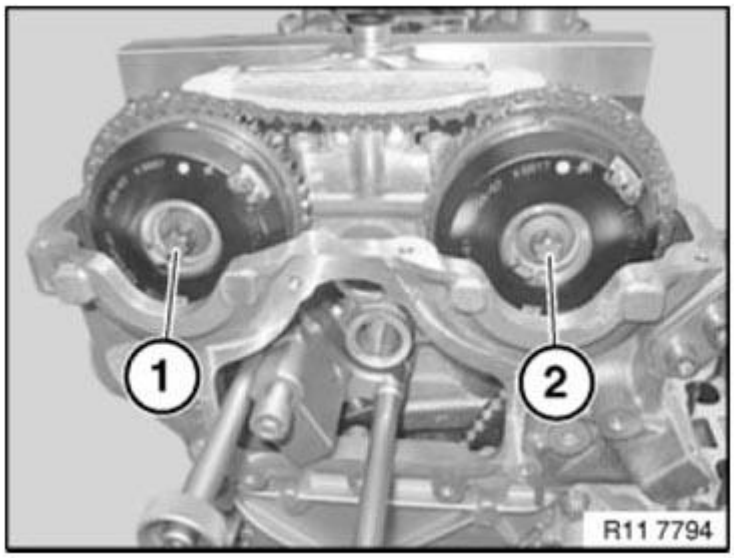


Fig. 365: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Remove special tools **11 9 190** and **11 8 570** .

Crank engine at central bolt twice in direction of rotation until engine is in the **150° firing TDC position cylinder 1** again.

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Mount special tool **11 8 570** on vibration damper with a bolt.

Secure special tool **11 9 190** in **150° firing TDC position cylinder 1.**

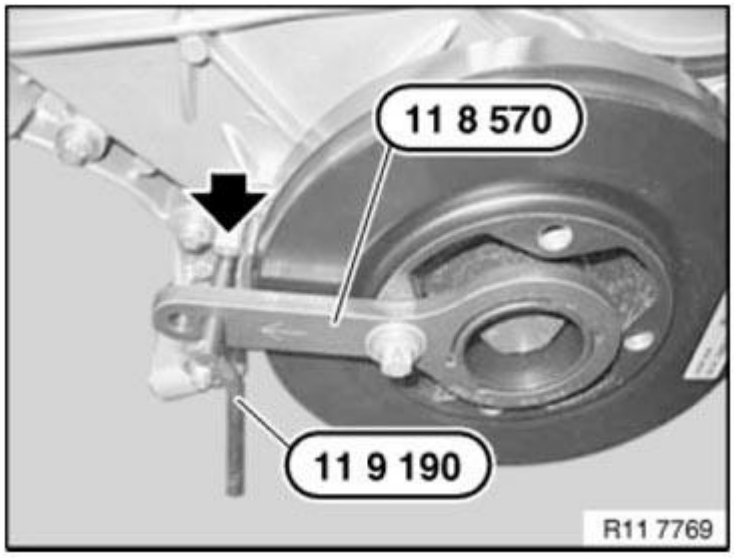


Fig. 366: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

Check timing again. See **1131070 CHECKING CAMSHAFT TIMING ON LEFT SIDE (N63)**.

Remove all special tools.

1136715 REMOVING AND INSTALLING/REPLACING BOTH SOLENOID VALVES ON LEFT SIDE (N63)

IMPORTANT: Always check that the solenoid valves are clean during removal and installation.
Possible malfunctions if valves are contaminated:

- **Irregular operation**
- **OBD incorrect entry**
- **Poor exhaust gas values**
- **Low engine performance**

IMPORTANT: Risk of damage!
Do not clean solenoid valves with compressed air.

Solenoid valves, cylinders 5-8:

Necessary preliminary work

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- Read out fault memory in DME control unit
- Switch off ignition
- Unlock hose on tank venting valve and disconnect
- Remove left **CHARGE AIR COOLER**
- Carefully press pipe to one side

NOTE: Solenoid valve (2) controls the intake adjuster.
Solenoid valve (4) controls the exhaust adjustment unit.

Unlock plug connections of solenoid valves (2 and 4) and disconnect.

Installation note:

Plug connections must snap audibly into place!

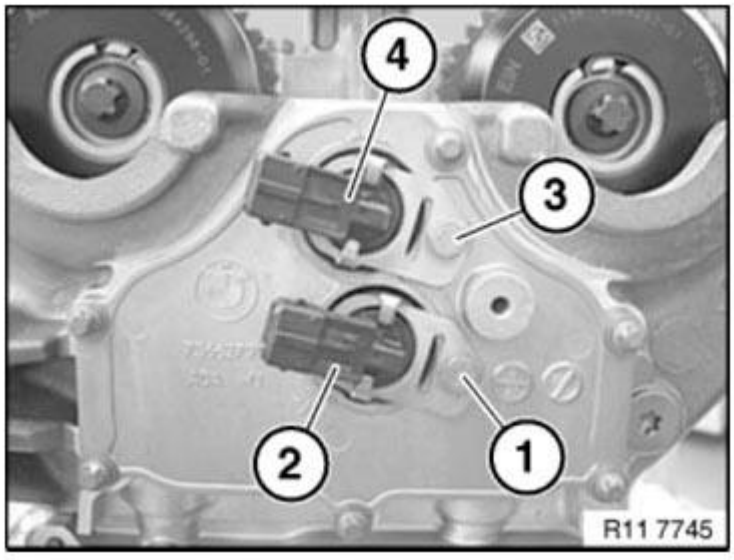


Fig. 367: Identifying Solenoid Valves
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws (1 and 3).

Tightening torque **11 36 3AZ** .

Pull out solenoid valves (2 and 4).

Installation note:

Replace O-rings (1 and 2) on solenoid valve

Installation note:

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To install solenoid valves, coat both O - rings with engine oil.

If the solenoid valve is to be reused, the filter strainer (see arrow) must be cleaned.

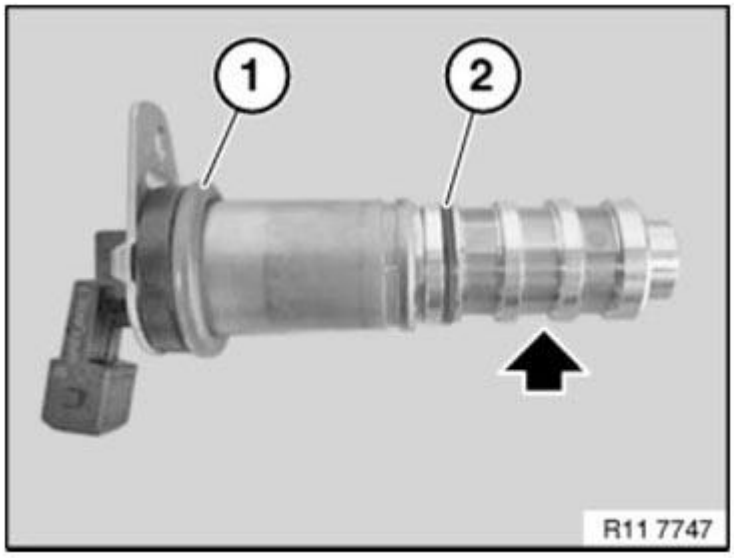


Fig. 368: Identifying O-Rings On Solenoid Valve
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: If a filter element is clogged with dirt, the filter element (filter strainer) may be removed.

Release filter elements (1) at contact edges.

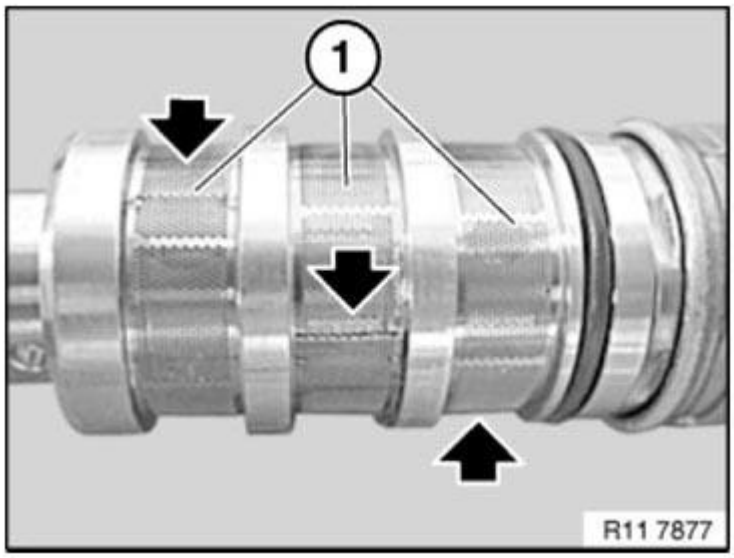


Fig. 369: Identifying Filter Elements At Contact Edges
Courtesy of BMW OF NORTH AMERICA, INC.

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Bend open welding spots on filter element (1) with a screwdriver (2) in direction of arrow until welding spots are opened.

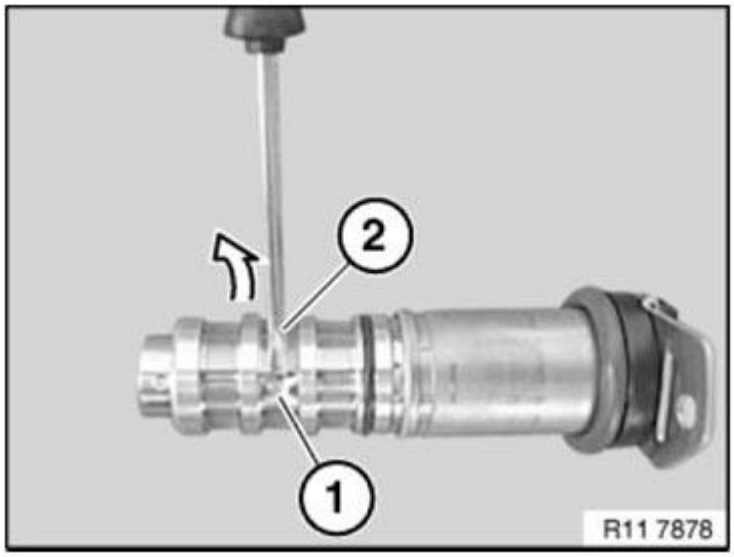


Fig. 370: Bending Open Welding Spots On Filter Element With Screwdriver
Courtesy of BMW OF NORTH AMERICA, INC.

Avoid damaging, e.g. notches or scratches, the solenoid valve housing (see arrows).

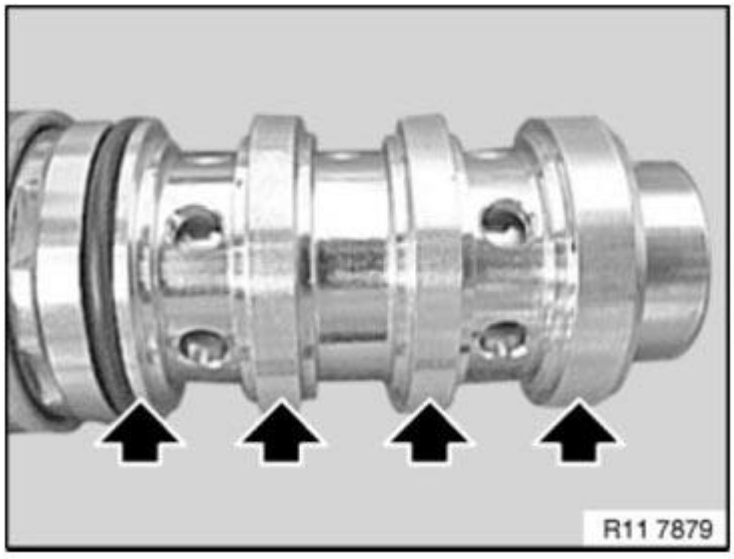


Fig. 371: Inspecting Notches Or Scratches For Solenoid Valve Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully insert solenoid valves (2 and 4) up to stop.

Ensure correct installation position.

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Insert screws (1 and 3) and tighten down.

Tightening torque **11 36 3AZ** .

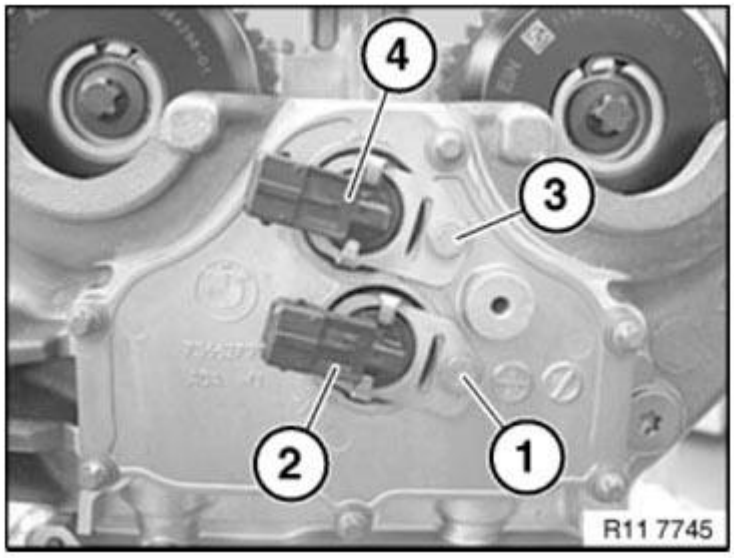


Fig. 372: Identifying Solenoid Valves
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Delete fault memory.

Check function of DME control unit.

1136048 REMOVING AND INSTALLING/REPLACING INLET AND EXHAUST ADJUSTMENT UNITS ON RIGHT SIDE (N63)

Notes

IMPORTANT: When the engine is shut down, the inlet and exhaust camshaft adjuster is normally locked in its initial position.
The situation may arise in some individual cases where this initial position is not reached and the camshaft can continue to be rotated in the adjustment range of the camshaft adjuster.
Where central bolts are not greased at the bolt contact points up to engine number 20024295 , the adjustment gear must be replaced for safety reasons.
The central bolts is greased from engine number 20024296.

(cylinder bank 1 to 4)

Necessary preliminary work

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- **Read fault memory and make a documentary record**
- Remove **RIGHT CYLINDER HEAD COVER**
- Remove **RIGHT GEAR CASE COVER**
- Check **TIMING** .

To release central bolts, use special tool **11 9 890** or grip at hexagon head of camshaft.

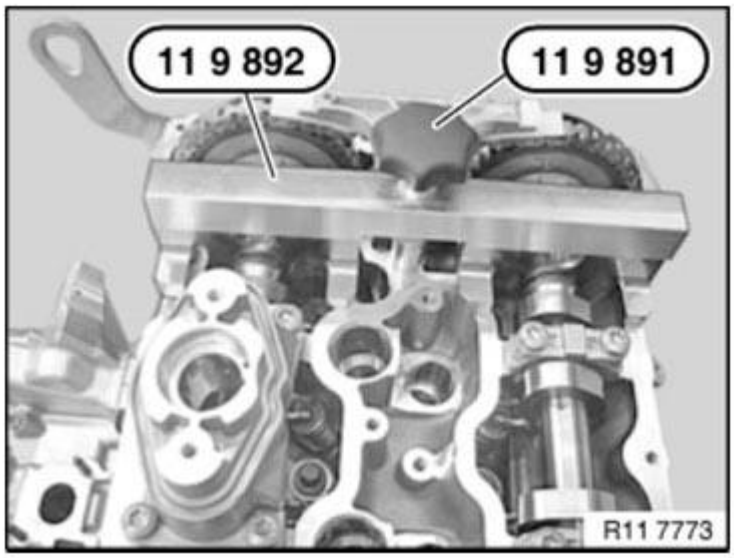


Fig. 373: Positioning Special Tool 11 9 892 On Special Tool 11 9 893
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If special tool 11 9 890 can not be fitted, it is necessary when releasing the central bolt to grip the hexagon head of the respective camshafts.

Release central bolts (1 and 2) of intake and exhaust camshaft adjusters.

Installation note:

Replace central bolts after releasing.

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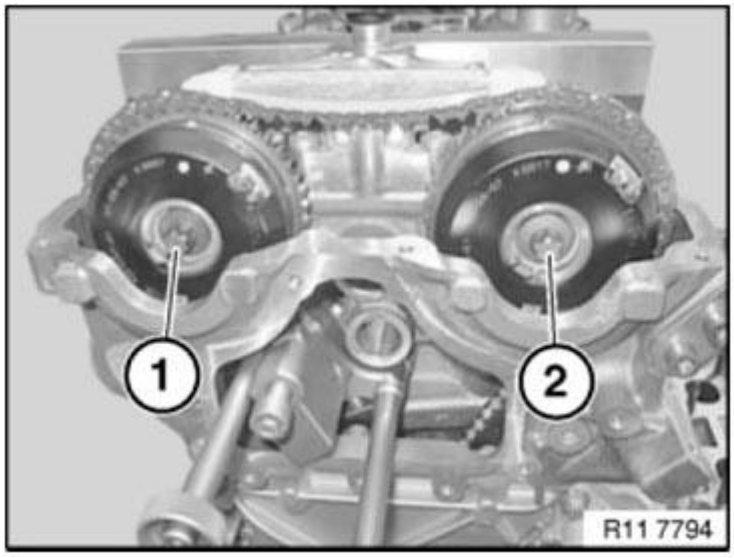


Fig. 374: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Check whether head of central bolt (1) is greased (see arrow). If no grease can be seen on the bolt head of central bolt (1), the inlet and exhaust adjustment unit must be replaced for safety reasons.

Installation note:

Coat contact face of central bolt (1) with copper paste.

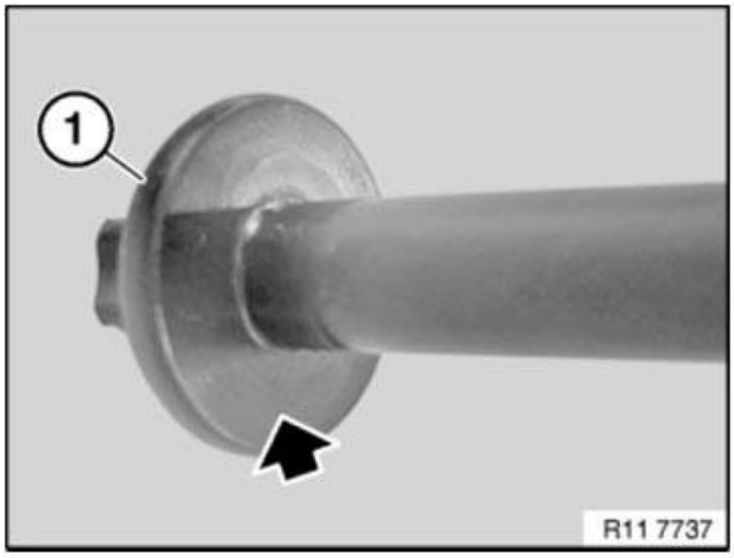


Fig. 375: Checking Head Of Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

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Release hexagon socket screw.

Release special tool **11 9 900** at knurled screws and remove.

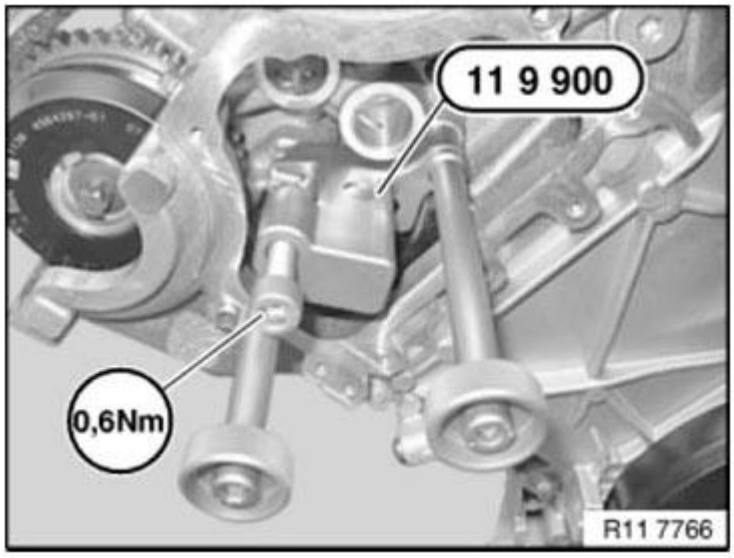


Fig. 376: Preloading Hexagon Socket Screw With Special Tool 00 9 250 To 0.6 Nm
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove upper tensioning rail (2).

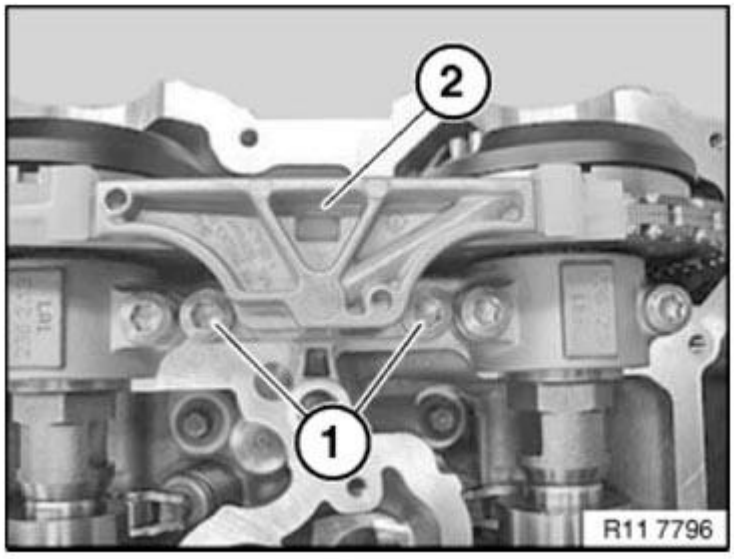


Fig. 377: Identifying Sliding Rail And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

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Remove central bolt (1) of exhaust adjustment unit.

Installation note:

Replace central bolts after releasing.

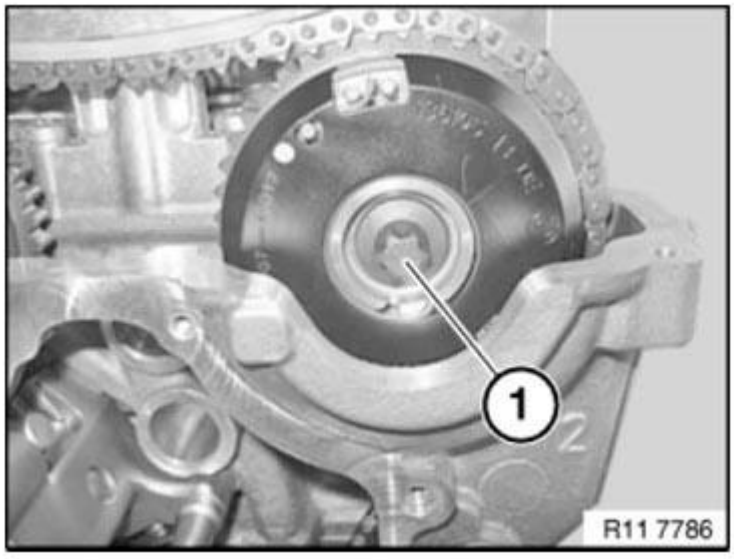


Fig. 378: Identifying Central Bolt Of Exhaust Adjustment Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Detach exhaust adjustment unit (1) in direction of arrow from exhaust camshaft.

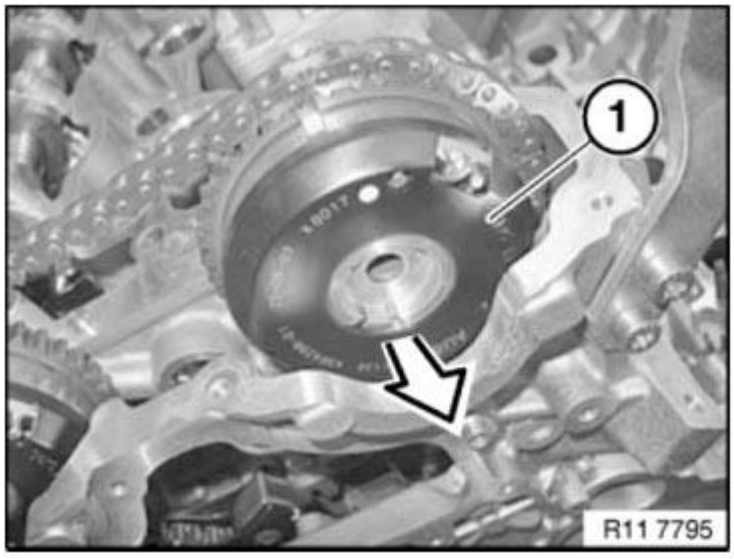


Fig. 379: Identifying Exhaust Adjustment Unit
Courtesy of BMW OF NORTH AMERICA, INC.

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Feed out exhaust adjustment unit (2) from timing chain (1).

Lift out exhaust adjustment unit (2).

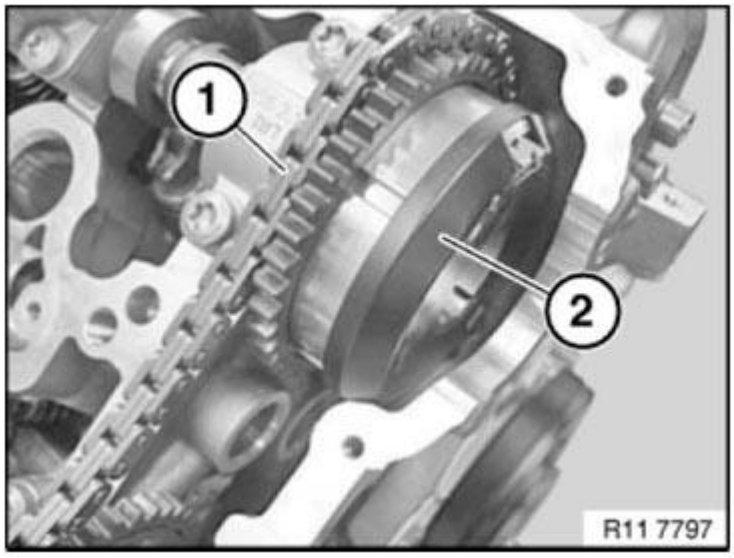


Fig. 380: Identifying Exhaust Adjustment Unit And Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Remove central bolt (1) of inlet adjustment unit.

Installation note:

Replace central bolts after releasing.

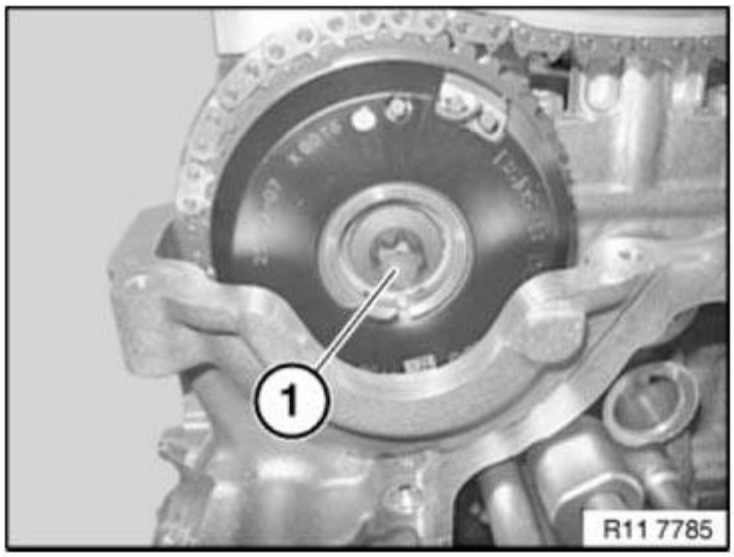


Fig. 381: Identifying Central Bolt Of Inlet Adjustment Unit

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Courtesy of BMW OF NORTH AMERICA, INC.

Detach inlet adjustment unit (1) in direction of arrow from inlet camshaft.

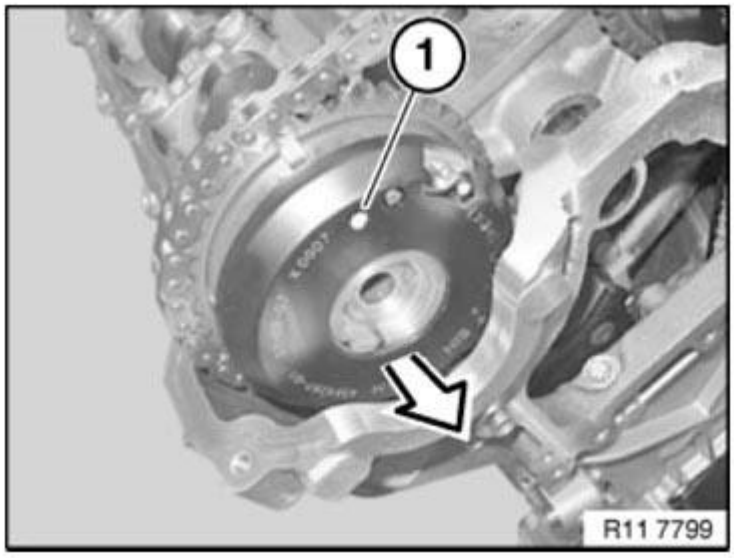


Fig. 382: Identifying Inlet Adjustment Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Feed out inlet adjustment unit (2) from timing chain (1).

Lift out inlet adjustment unit (2).

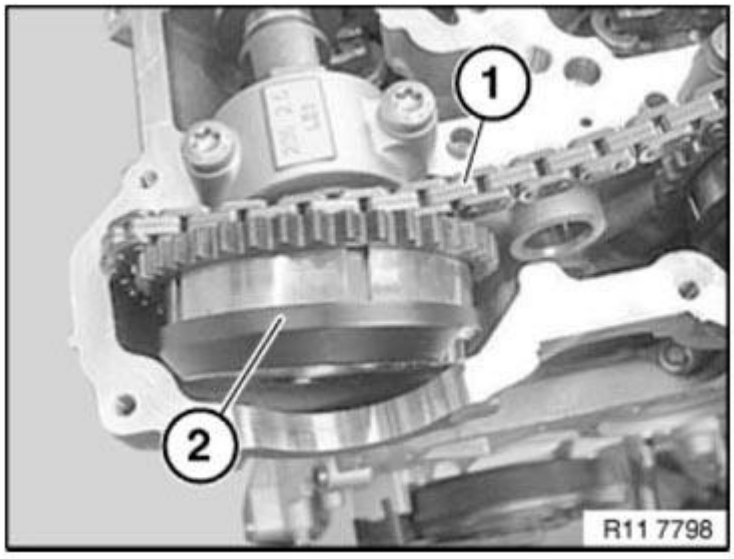


Fig. 383: Identifying Exhaust Adjustment Unit And Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: Danger of mix-up:

Intake and exhaust camshaft adjusters are different.

Mixing up the inlet and exhaust adjustment units will cause damage to the engine.

1. Intake camshaft adjuster (1) is marked **IN**
2. Exhaust camshaft adjuster (2) is marked **OUT**

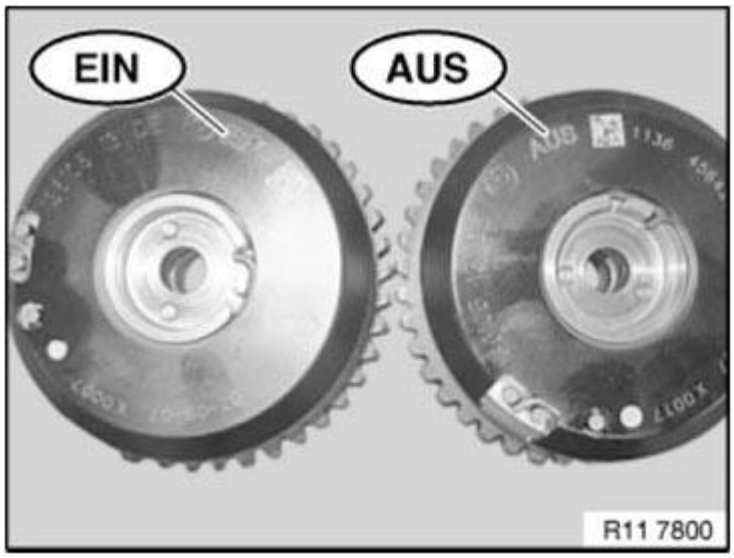


Fig. 384: Identifying Intake And Exhaust Camshaft Adjusters Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Coat contact face of central bolt (1) with copper paste.

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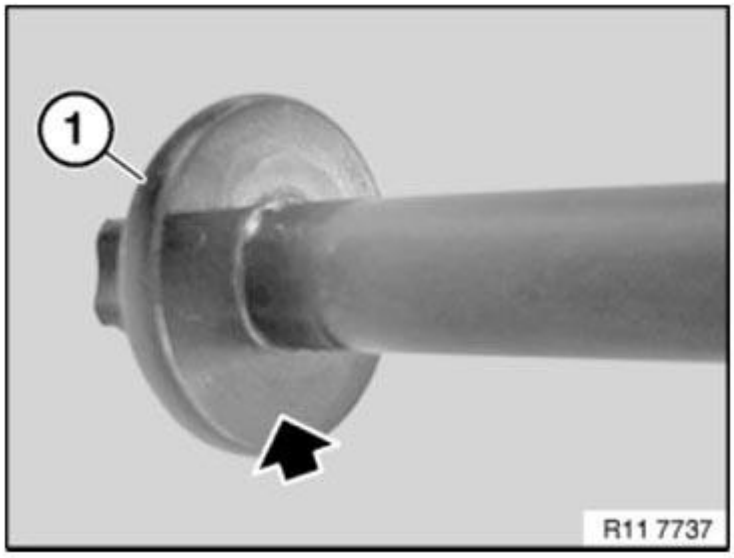


Fig. 385: Checking Head Of Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Position of adjustment units in relation to timing chain can be freely selected.

Feed adjuster into timing chain and position on camshafts.

Insert central bolts (1 and 2) on adjustment units without gaps.

Release central bolts (1 and 2) by **90°.**

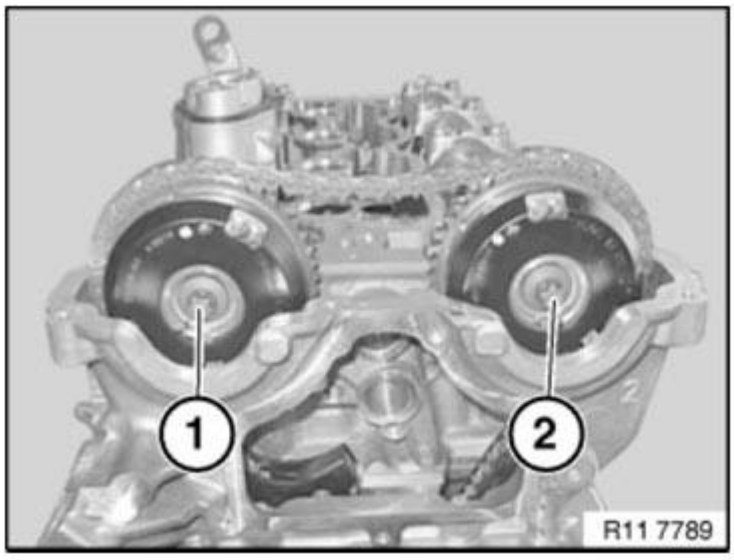


Fig. 386: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

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Fit sliding rail (2) and secure with screws (1).

Tightening torque: **11 31 4AZ** .

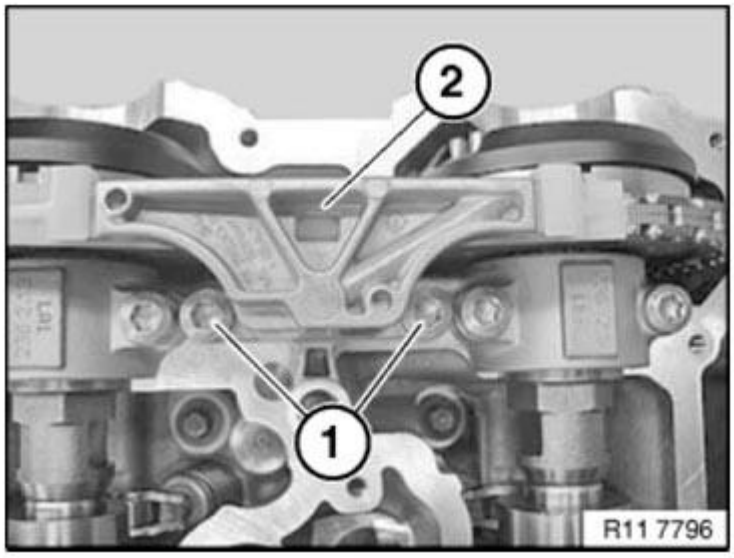


Fig. 387: Identifying Sliding Rail And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Get set of special tools **11 9 890** ready for securing camshafts.

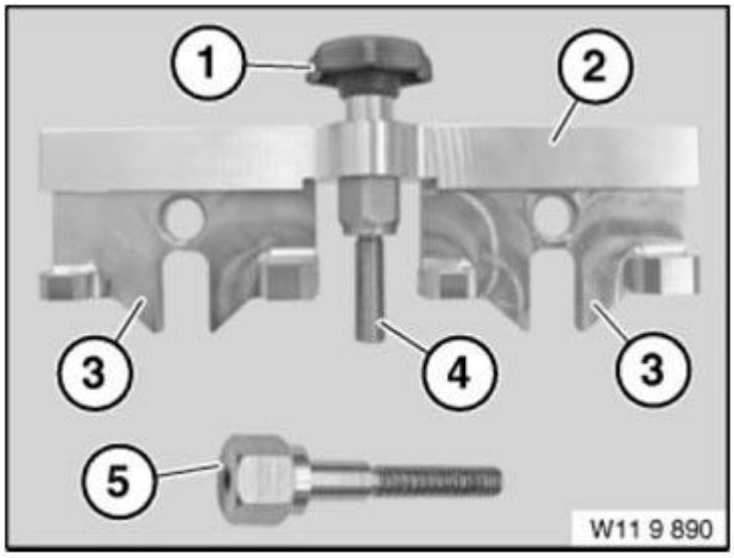


Fig. 388: Identifying Set Of Special Tools 11 9 890
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool 11 9 893 on exhaust camshaft.

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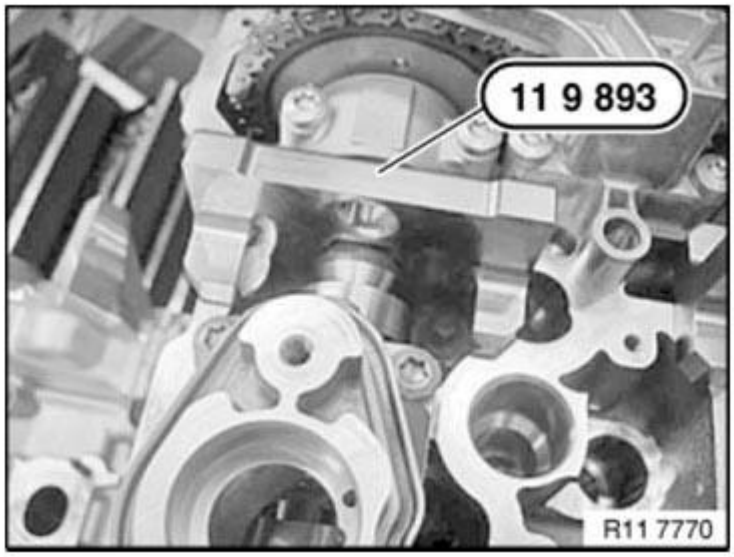


Fig. 389: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 9 893 on intake camshaft.

Installation note:

Align exhaust and intake camshafts so that special tools 11 9 893 lie on the cylinder head without any gap.

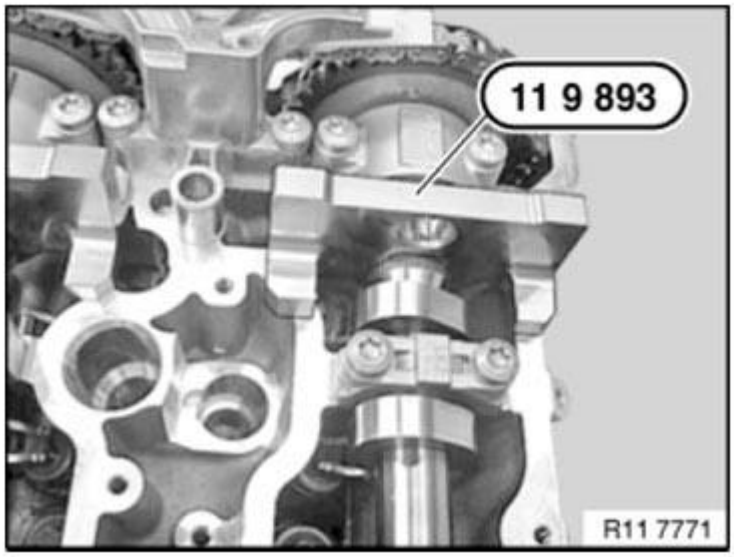


Fig. 390: Identifying Special Tool 11 9 893 On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool 11 9 894 into cylinder head.

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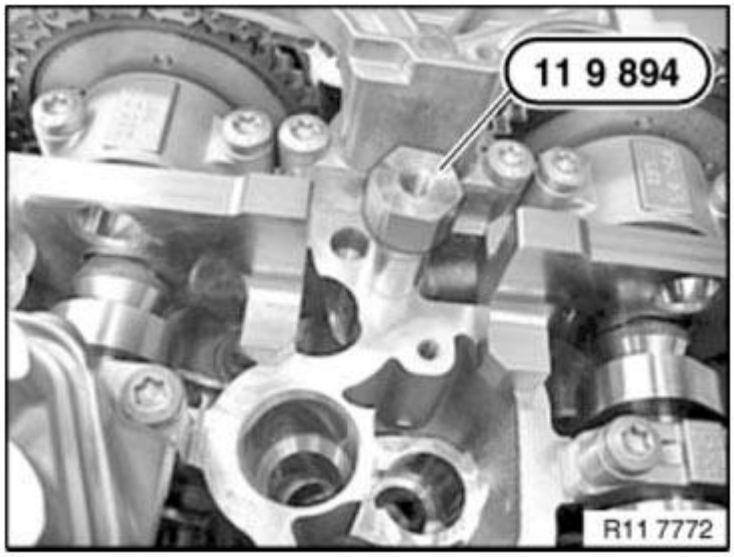


Fig. 391: Identifying Special Tool 11 9 893 On Intake Camshaft And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Press special tool 11 9 892 down with special tool 11 9 891.

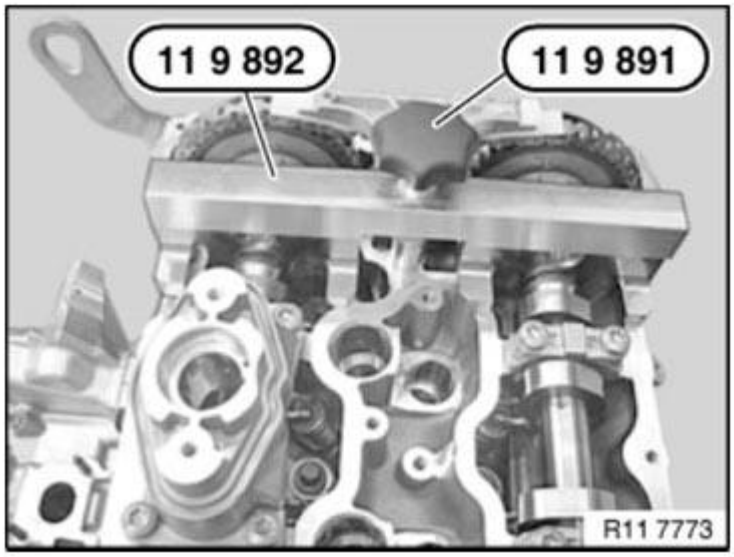


Fig. 392: Positioning Special Tool 11 9 892 On Special Tool 11 9 893
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in special tool **11 9 900** .

Pretension timing chain with special tool **11 9 900** .

Preload hexagon socket screw with special tool **00 9 250** to **0.6 Nm.**

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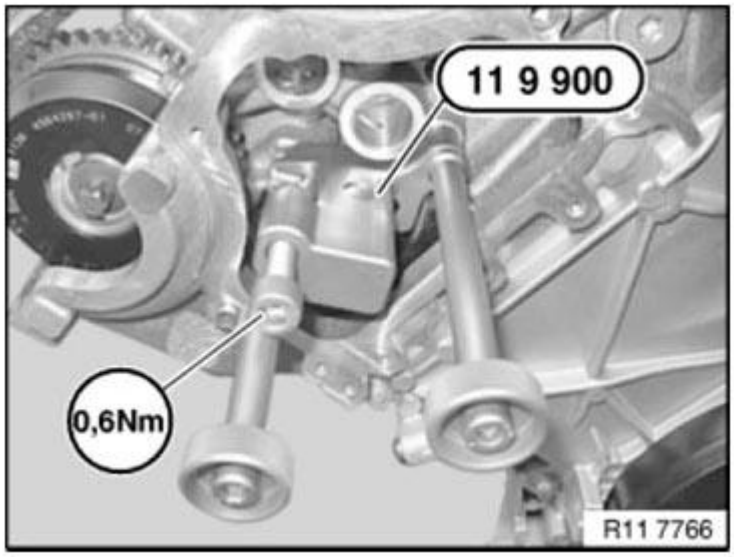


Fig. 393: Preloading Hexagon Socket Screw With Special Tool 00 9 250 To 0.6 Nm
Courtesy of BMW OF NORTH AMERICA, INC.

Check special tools **11 9 190** for correct seating.

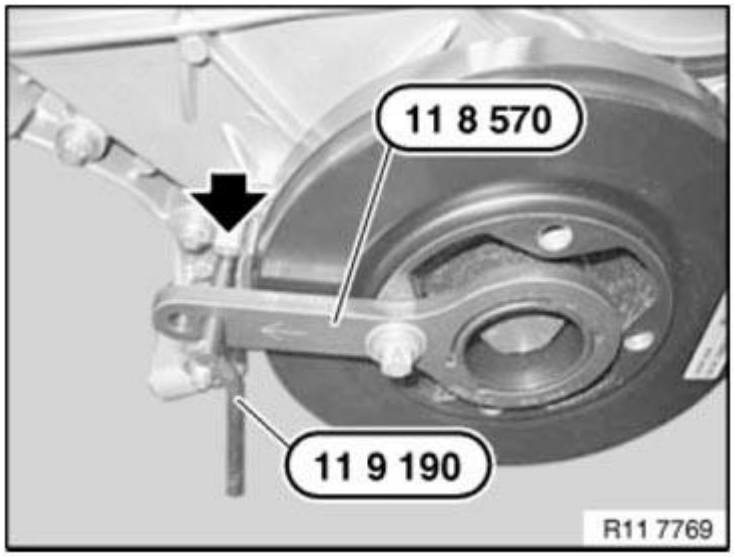


Fig. 394: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down central screw (1 and 2) of the adjustment units with special tool **00 9 120** .

Tightening torque **11 36 1AZ** .

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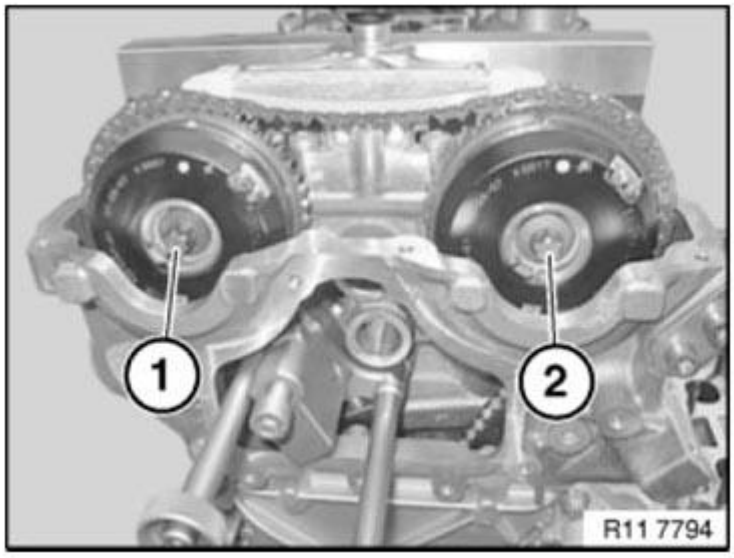


Fig. 395: Identifying Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Remove special tools **11 9 190** and **11 8 570** .

Crank engine at central bolt twice in direction of rotation until engine is in the **150° firing TDC position cylinder 1** again.

Mount special tool **11 8 570** on vibration damper with a bolt.

Secure special tool **11 9 190** at **150° before cylinder no. 1 firing TDC position.**

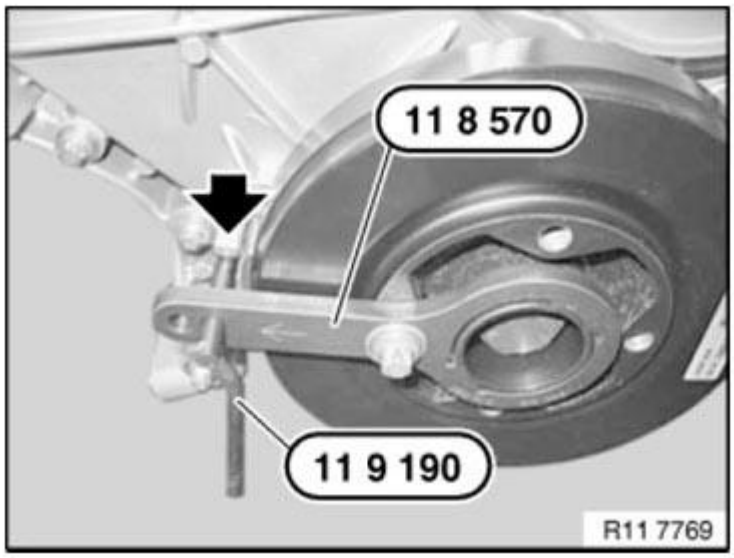


Fig. 396: Securing Vibration Damper With Special Tool 11 9 190
Courtesy of BMW OF NORTH AMERICA, INC.

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Check timing again. See **1131071 CHECKING CAMSHAFT TIMING ON RIGHT SIDE (N63)**.

Remove all special tools.

1140 OIL SUPPLY

1140000 CHECKING ENGINE OIL PRESSURE

Notes

WARNING: Risk of scalding!

NOTE: To check the engine oil pressure, remove the oil pressure switch and install and connect the special tool.

NOTE: A small amount of engine oil emerges when the oil pressure switch is removed.

Have a cleaning cloth ready.

Necessary preliminary work

- Follow BMW diagnosis instruction
- Remove **OIL PRESSURE SWITCH**

Special tool **11 4 050** is equipped with a sealing ring (1).

IMPORTANT: Tightening torque of special tool 11 4 050 max. 20 Nm.

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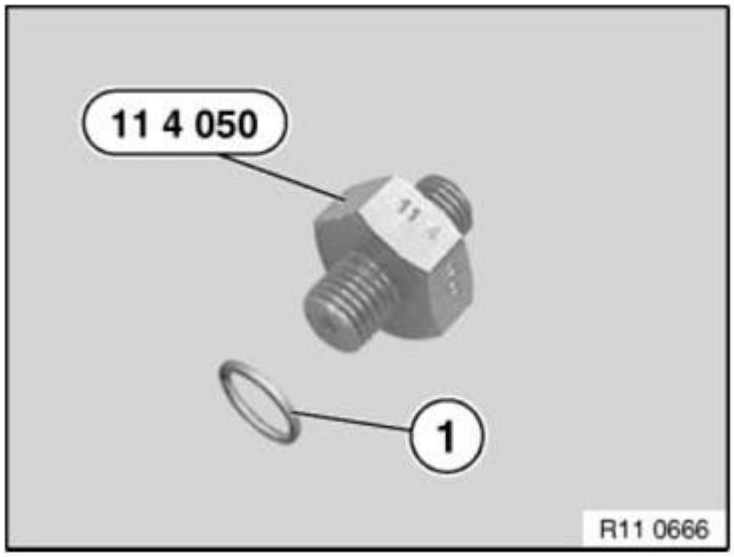


Fig. 397: Identifying Special Tool (11 4 050) And Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 4 050** into crankcase to max. 20 Nm.

Secure union nut (1) of special tool 13 3 063 to max. 15 Nm.

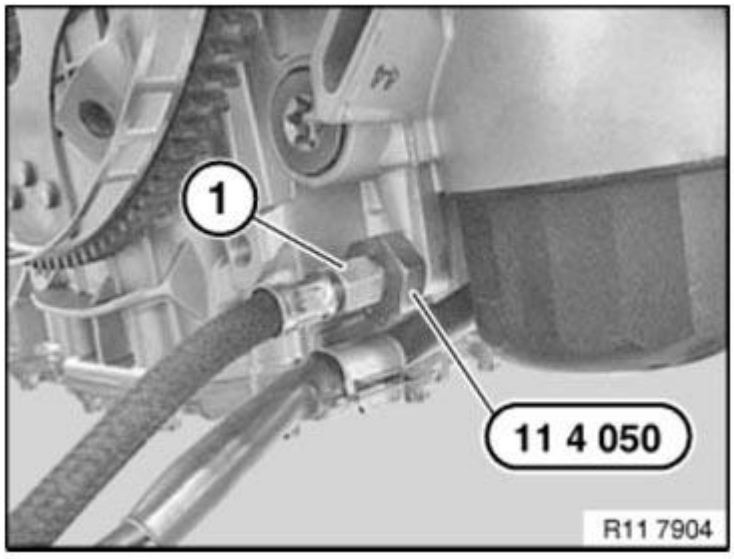


Fig. 398: Identifying Union Nut And Special Tool 11 4 050
Courtesy of BMW OF NORTH AMERICA, INC.

Checking engine oil pressure with DIS Tester

Screw special tool 13 6 054 with sealing ring (1) into special tool 13 6 051 and connect to DIS tester.

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Checking engine oil pressure with pressure gauge

Connect special tool 13 3 063 with special tool 13 3 061 (pressure gauge).

Start engine and check engine oil pressure.

SPECIFIED VALUE .

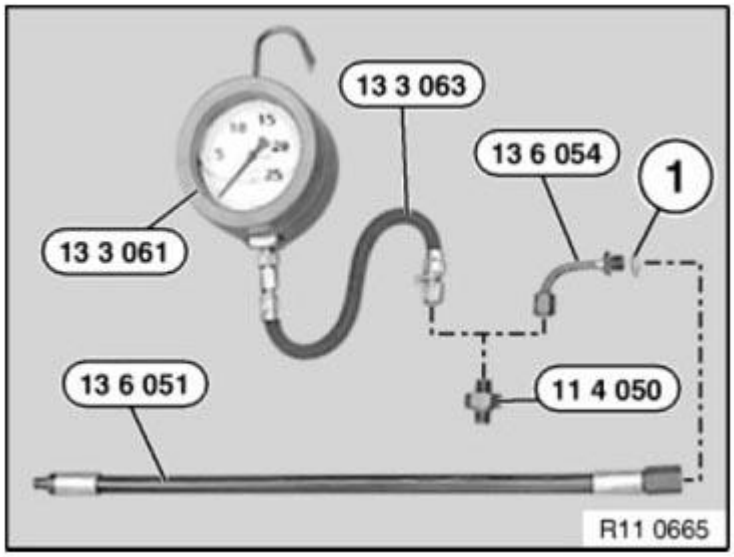


Fig. 399: Checking Engine Oil Pressure
Courtesy of BMW OF NORTH AMERICA, INC.

1141 OIL PUMP WITH FILTER AND DRIVE

1141000 REMOVING AND INSTALLING/REPLACING OIL PUMP (N63)

Notes

IMPORTANT: All adjusting procedures on the chain drive must be observed.
A timing chain which is tensioned too tautly can cause noises in the chain drive.
A timing chain that is too slack can cause the timing chain to jump.
Risk of damage in oil pump drive.

Necessary preliminary work

- **DRAIN ENGINE OIL** .
- **REMOVE UPPER OIL SUMP SECTION** .

Unscrew nuts (2).

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Tightening torque: **11 41 1AZ** .

Remove intake pipe (1).

Installation note:

Replace O-ring.

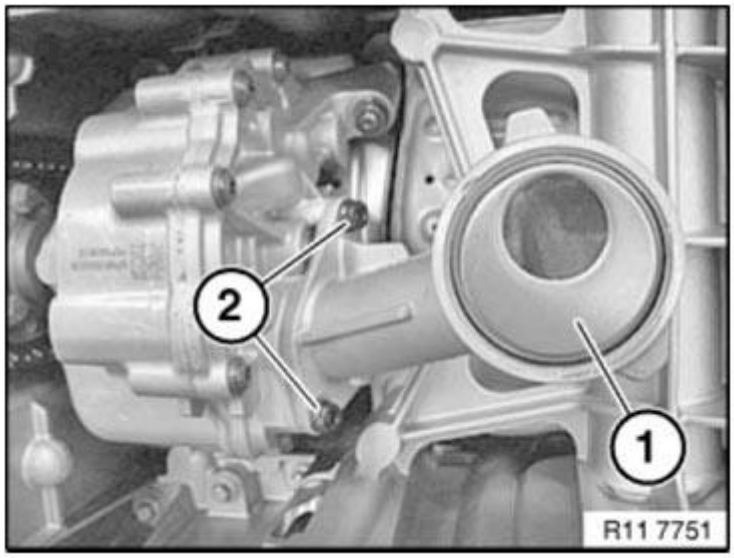


Fig. 400: Identifying Intake Pipe And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release all nuts (1) using special tool 11 7 201.

Tightening torque **11 41 5 AZ** .

Remove oil pump drive gear.

NOTE: Illustration shows engine removed.

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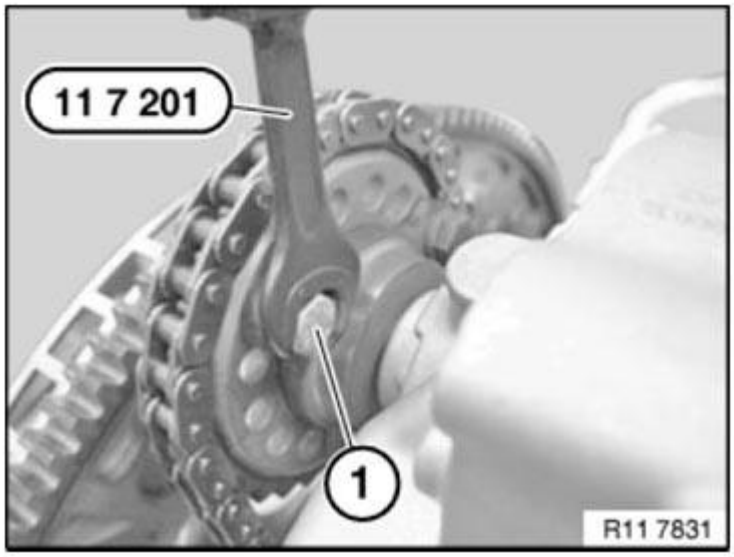


Fig. 401: Removing Nuts Using Special Tool 11 7 201
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Release screws, remove oil pump (1) with aid of a second person.

Installation note:

Replace screws.

Tightening torque **11 41 2AZ** .

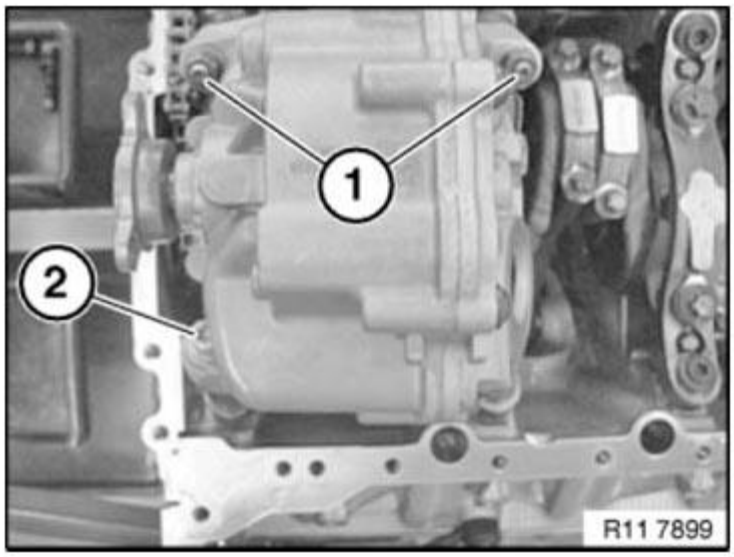


Fig. 402: Identifying Oil Pump And Nuts

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Courtesy of BMW OF NORTH AMERICA, INC.

Detach oil lines (1) upwards in direction of arrow.

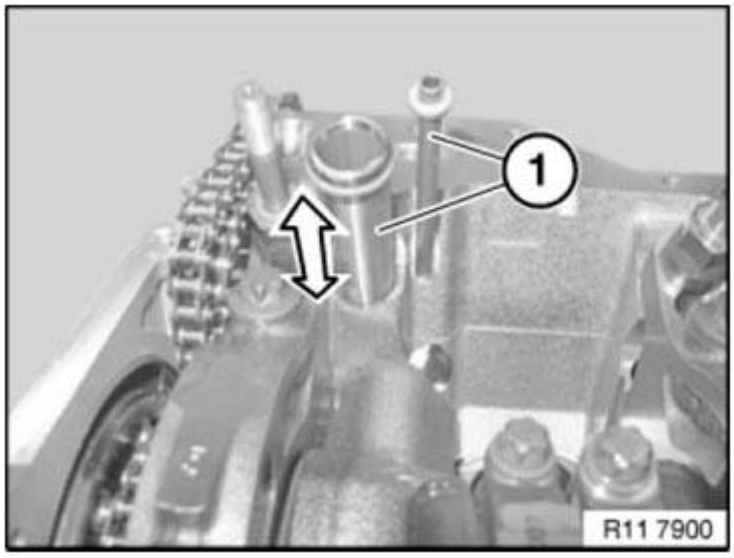


Fig. 403: Detaching Oil Lines Upwards In Direction Of Arrow
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace sealing rings (1).

Apply light coat of oil to sealing ring (1).

Coat sealing ring (2) with suitable lubricant.

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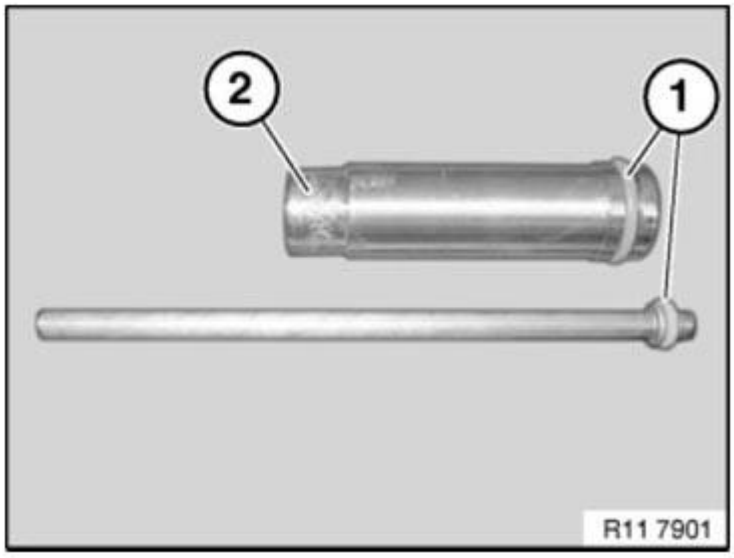


Fig. 404: Identifying Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace O-ring (1) for oil feed line.

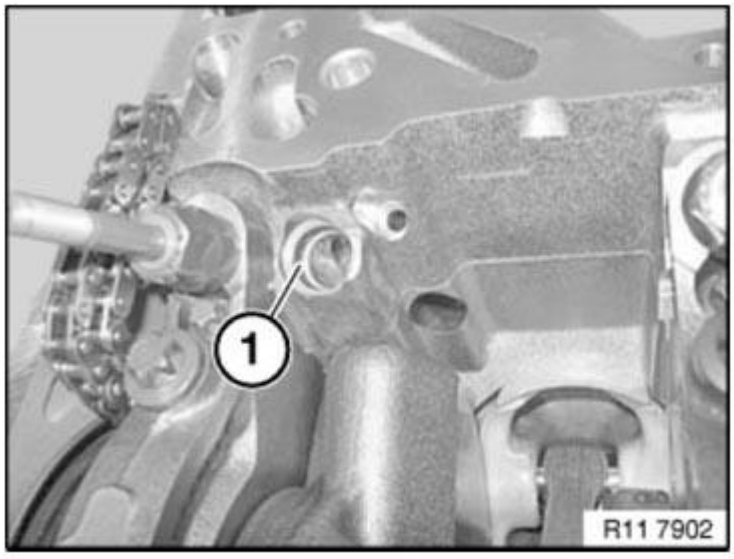


Fig. 405: Identifying O-Ring Of Oil Feed Line
Courtesy of BMW OF NORTH AMERICA, INC.

Fit oil lines (1) in direction of arrow.

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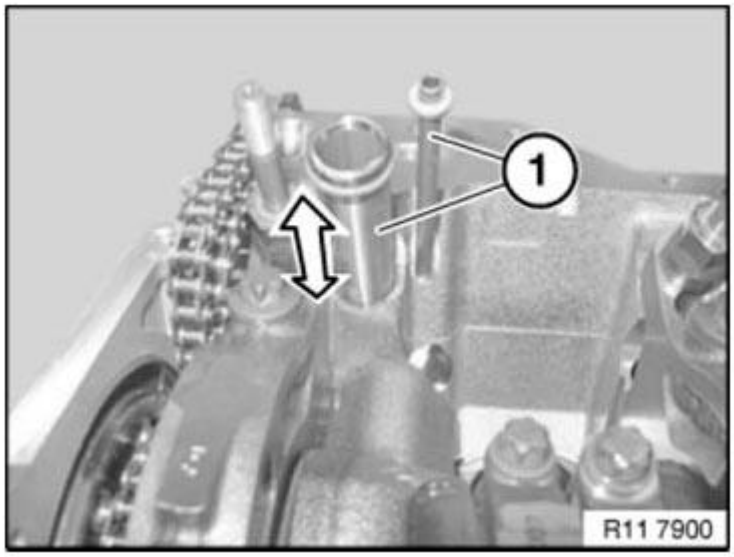


Fig. 406: Fitting Oil Lines In Direction Of Arrow
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

If the oil pump is renewed, the oil deflector must be converted.

Release screws (1).

Tightening torque: **11 41 6 AZ** .

Modify oil deflector (2).

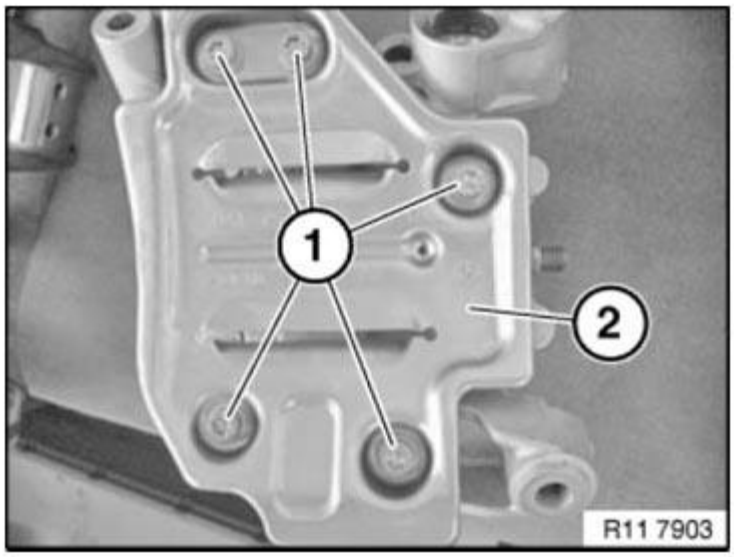


Fig. 407: Identifying Oil Deflector And Screws

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Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool **11 8 920** on special tool **11 9 280** .

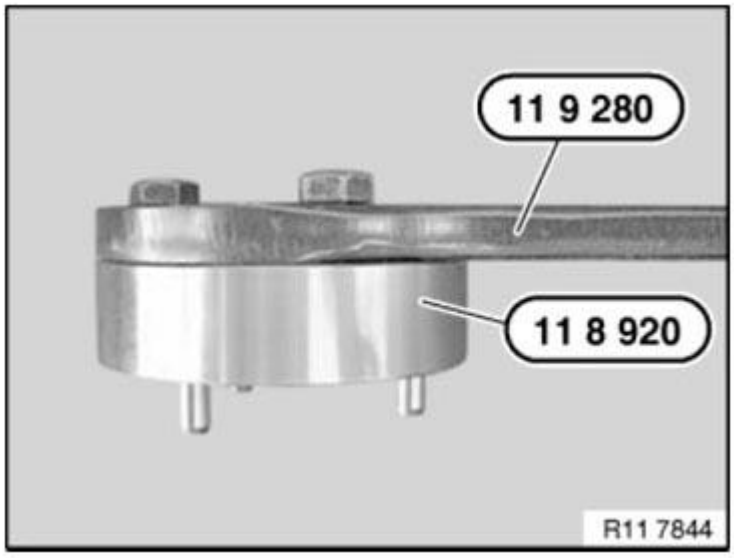


Fig. 408: Fitting Special Tool 11 8 920 On Special Tool 11 9 280
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Left-hand thread on oil pump screw connection.
Do not grip oil pump drive with a pair of pliers risk of damage.

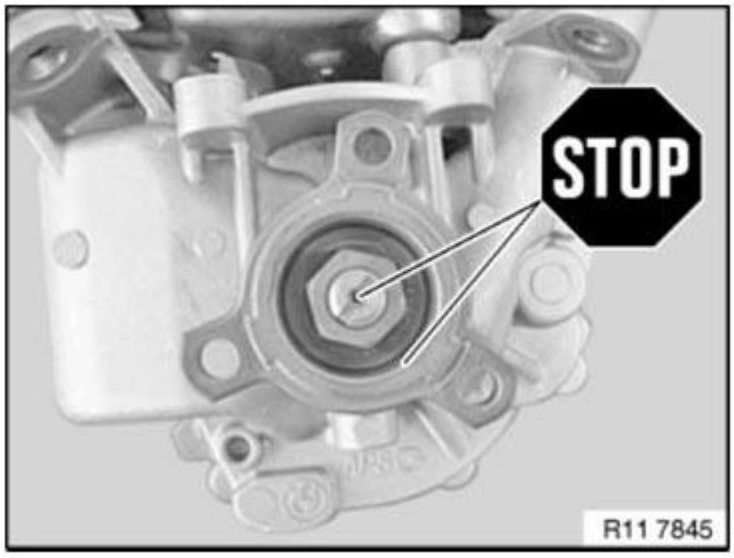


Fig. 409: [Caution - Do Not Grip Oil Pump Drive With Pair Of Pliers Risk Of Damage]
Courtesy of BMW OF NORTH AMERICA, INC.

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IMPORTANT: Nut (1) has left-hand thread.

Position special tool **11 8 920** on sprocket.

Slacken nut (1).

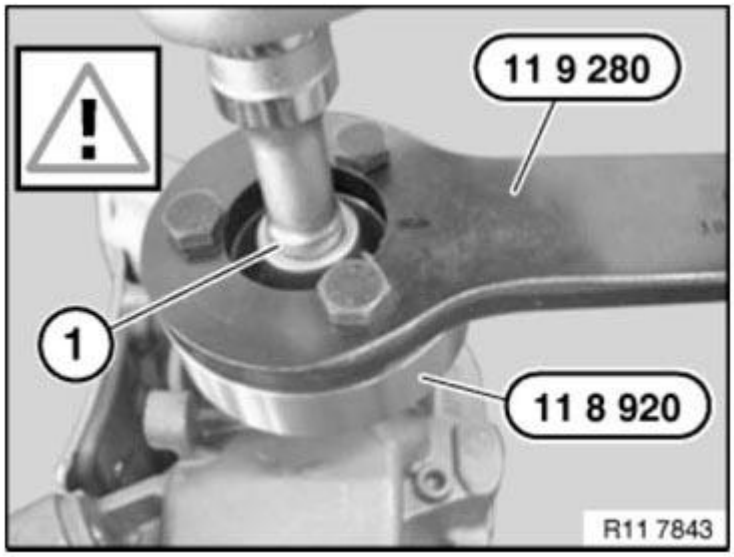


Fig. 410: Positioning Special Tool 11 8 920 On Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check mounting flats on pump shaft (1) for damage.

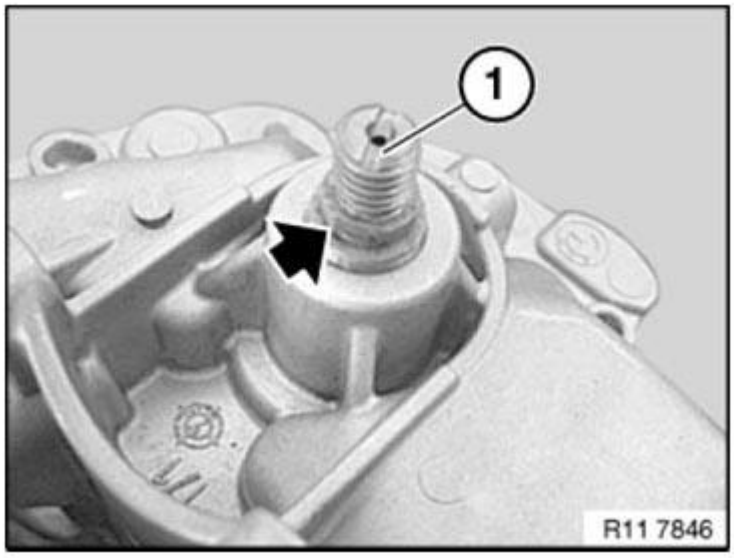


Fig. 411: Checking Mounting Flats On Pump Shaft For Damage

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Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Nut (1) has left-hand thread.

Grip pump with assistance of a second person.

Secure nut (1) with special tool **00 9 120** .

Tightening torque: **11 41 4**

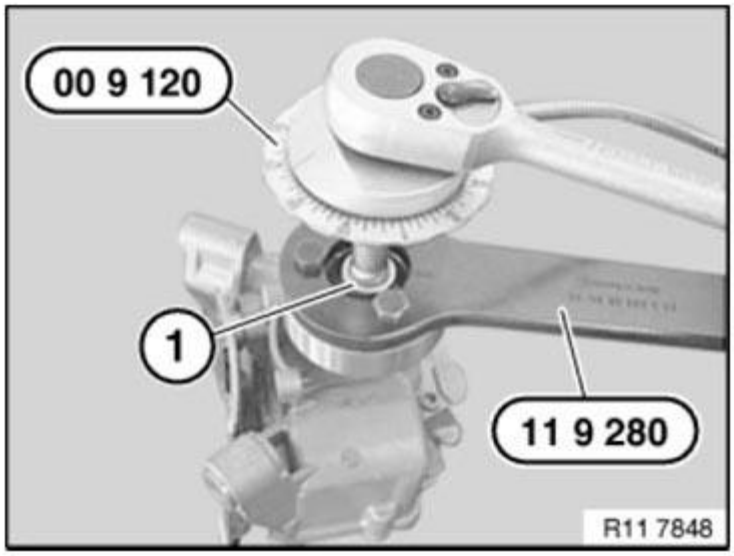


Fig. 412: Securing Nut With Special Tool 00 9 120
Courtesy of BMW OF NORTH AMERICA, INC.

Join and secure nuts (1).

Tightening torque **11 41 2 AZ** .

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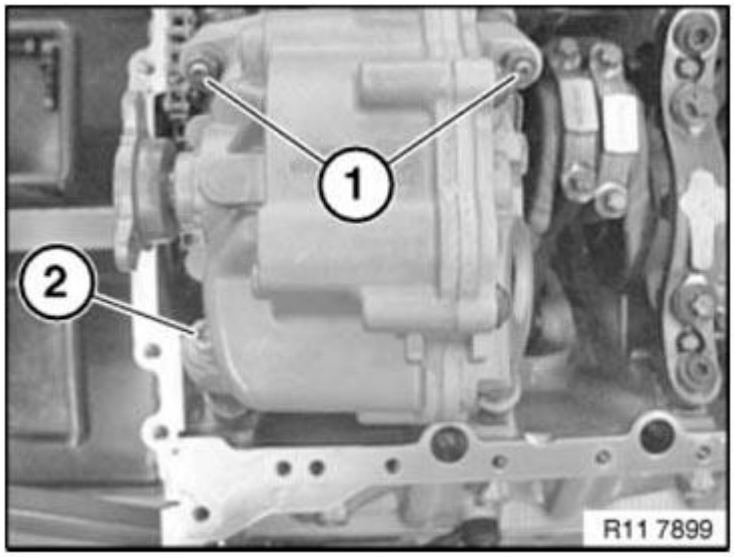


Fig. 413: Identifying Oil Pump And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Install oil pump drive gear.

Secure all nuts (1) with special tool 11 7 201.

Tightening torque **11 41 5 AZ** .

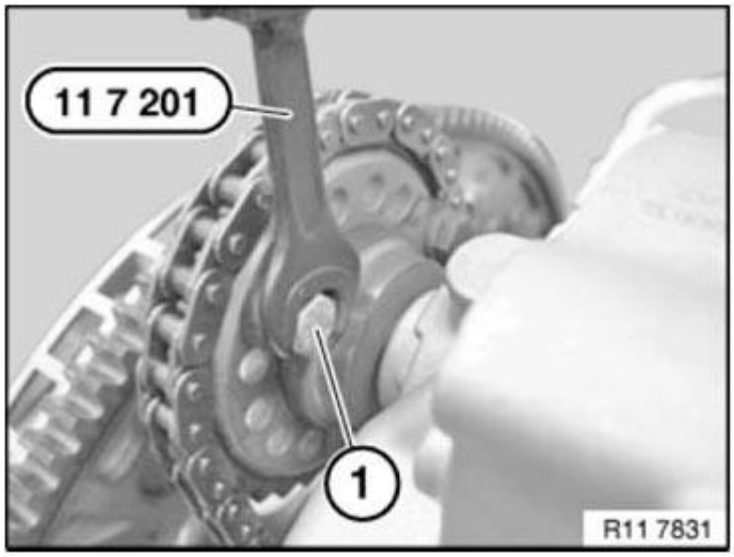


Fig. 414: Tightening Nuts Using Special Tool 11 7 201
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust oil pump timing chain

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Pretension oil pump adjusting sleeve (1) with a hexagon socket wrench.

Adjustment value **10 mm +2.**

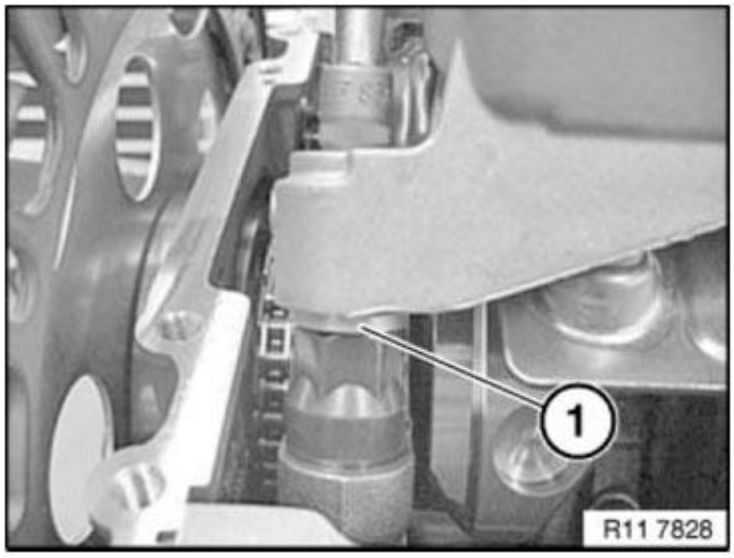


Fig. 415: Pretensioning Oil Pump Adjusting Sleeve With Hexagon Socket Wrench
Courtesy of BMW OF NORTH AMERICA, INC.

Minimally preload timing chain (1) with special tool 51 0 342.

Read off measured value A on special tool 51 0 342 and note down.

IMPORTANT: Do not use force to preload timing chain (1).

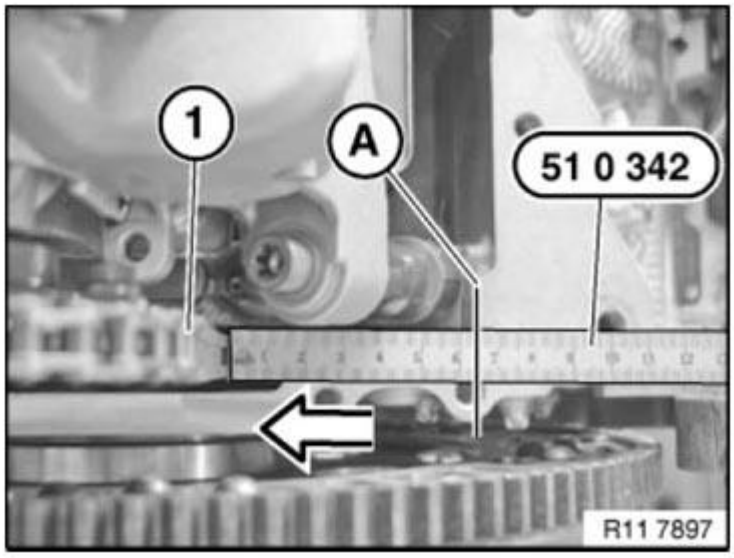


Fig. 416: Measuring Value A On Special Tool 51 0 342

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Courtesy of BMW OF NORTH AMERICA, INC.

Using a screwdriver (1), preload timing chain to minimal extent in direction of arrow.

Read off measured value B on special tool 51 0 342 and note down.

IMPORTANT: Do not use force preload timing chain.

Measured value **A** minus measured value **B** results in the adjustment value.

Adjustment value **10 mm +2.**

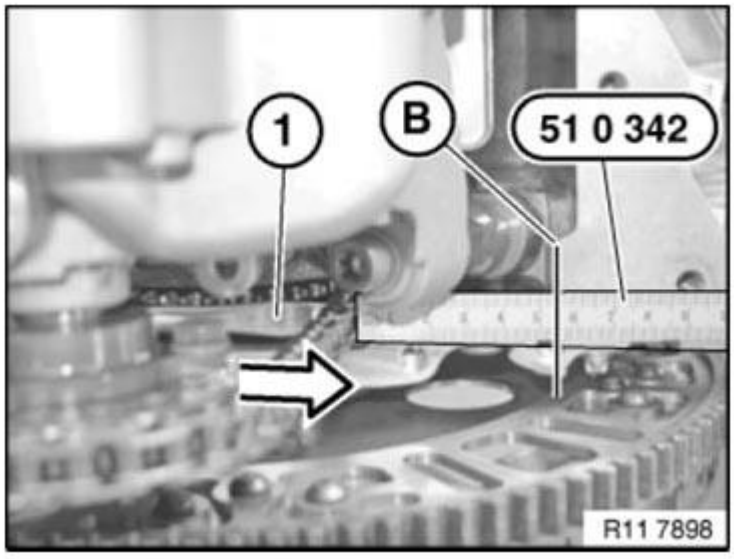


Fig. 417: Measuring Value B On Special Tool 51 0 342
Courtesy of BMW OF NORTH AMERICA, INC.

Join and secure screw (2).

Tightening torque **11 41 2 AZ** .

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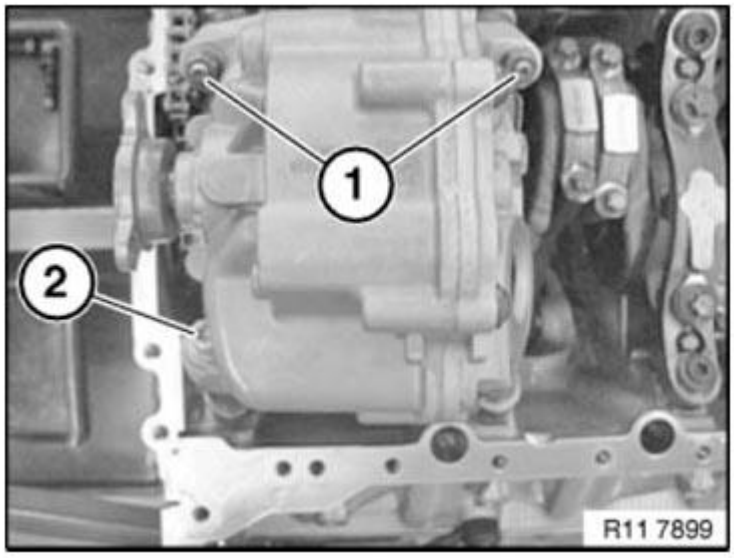


Fig. 418: Identifying Oil Pump And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 150 REMOVING AND INSTALLING/REPLACING ROLLER CHAIN FOR OIL PUMP DRIVE (N63)

Special tools required:

- **11 7 201**
- **22 13 485**

See **MAINTENANCE AND GENERAL INFORMATION - SPECIAL TOOLS** .

See **ENGINE AND GEARBOX SUSPENSION - SPECIAL TOOLS** .

Necessary preliminary tasks:

- Drain **engine oil**.
- Remove **flywheel**.
- Remove **bottom of oil sump**.

NOTE: Support bush (2) is included in delivery specification.

If the crankshaft seal (1) is stored for more than six months without the support sleeve (2), its operational reliability will no longer be guaranteed. **Crankshaft seal (1) must not be reused in this case!** Support bush (2) remains in the crankshaft seal (1) and is used as a slip bush during described installation described below.

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IMPORTANT: The sealing lip of the crankshaft seal (1) is very sensitive and must not be kinked.

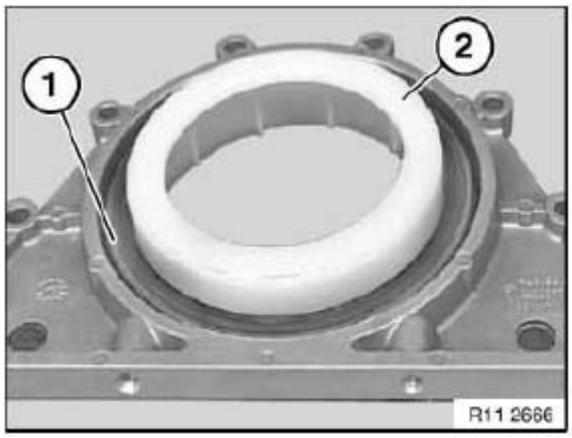


Fig. 419: Identifying Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (2). Tightening torque: 10 Nm. Remove intake pipe (1).

Installation note: Replace O-ring.

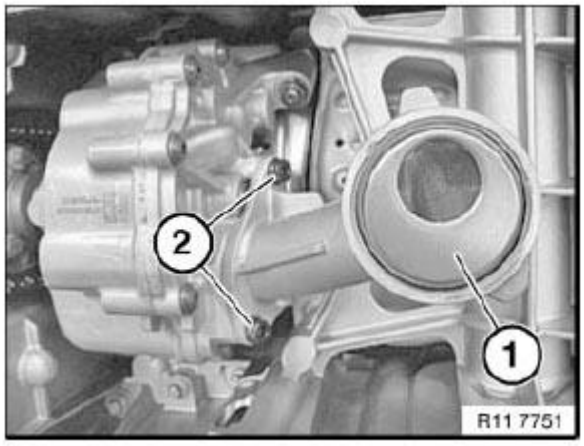


Fig. 420: Identifying Intake Pipe Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release all nuts (1) using special tool 11 7 201. Tightening torque: 10 Nm. Remove oil pump drive gear.

NOTE: Graphic shows engine removed

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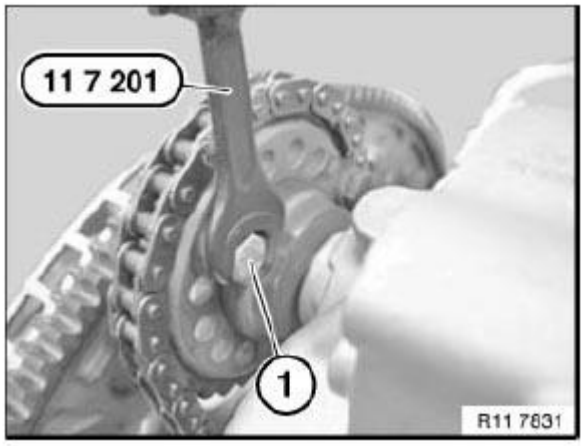


Fig. 421: Removing Oil Pump Sprocket Wheel Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1). Release screws, remove oil pump (1) with aid of a second person.

Installation note: Replace screws. Tightening torque: 24 Nm

NOTE: Graphic without top oil sump

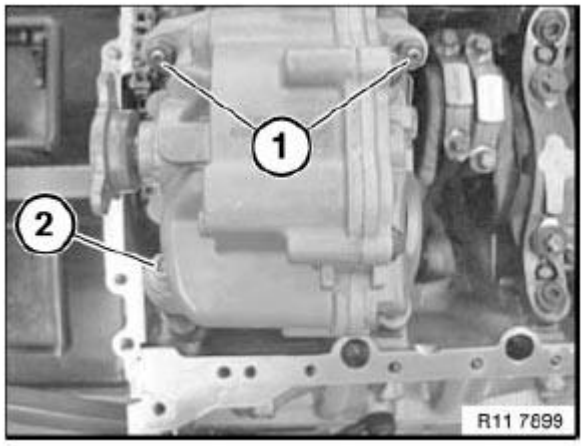


Fig. 422: Identifying Oil Pump With Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Pull off engine oil line (1) upwards in direction of arrow.

NOTE: Graphic without top oil sump

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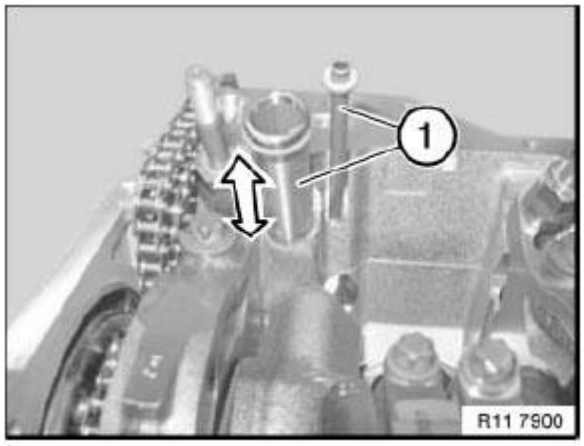


Fig. 423: Detaching Oil Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: Replace sealing rings (1). Lightly oil sealing ring 1 (1). Coat engine oil pipe (2) with suitable lubricant.

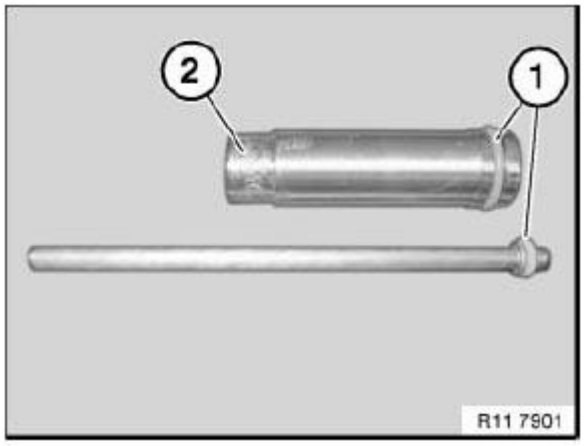


Fig. 424: Identifying Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: Replace O-ring (1) for oil feed line.

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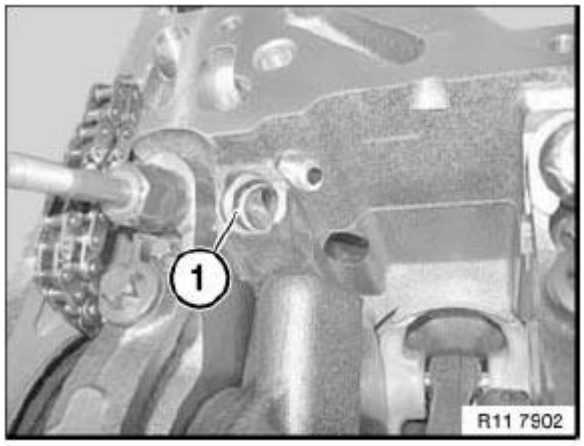


Fig. 425: Identifying O-Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Fit engine oil pipe (1) in direction of arrow.

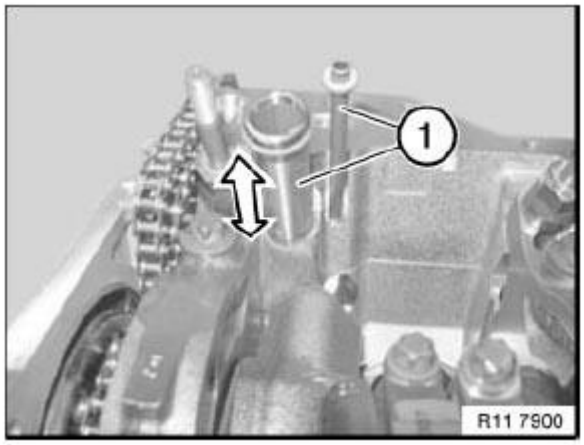


Fig. 426: Detaching Oil Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Feed out roller chain (1) via the crankshaft (2).

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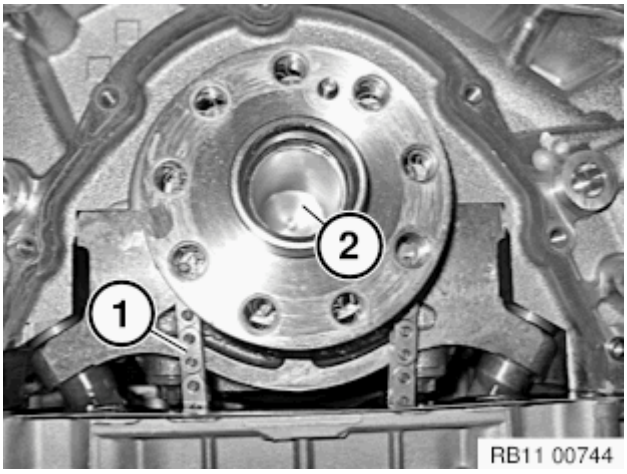


Fig. 427: Feeding Out Roller Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: Mount new roller chain (1). Install oil pump and adjust.

Procedure on installed engine:

Upper oil sump has been installed.

Position drag pointer (1) of special tool 2 213 485 on oil pump chain.

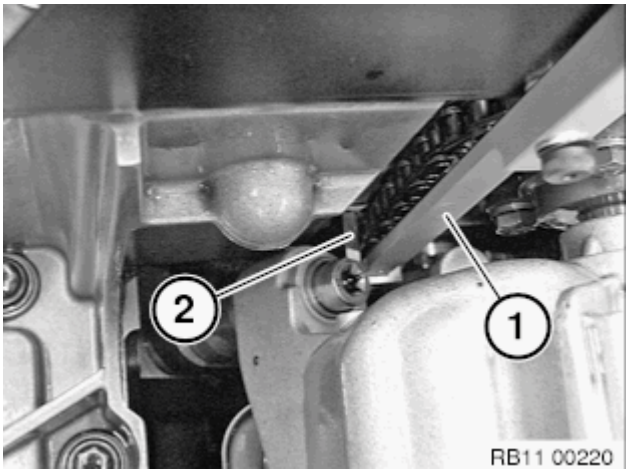


Fig. 428: Positioning Drag Pointer Of Special Tool (2 213 485)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: Attachment point (1) N63O0 / N63O1/S63O0. Attachment point (2) N74.

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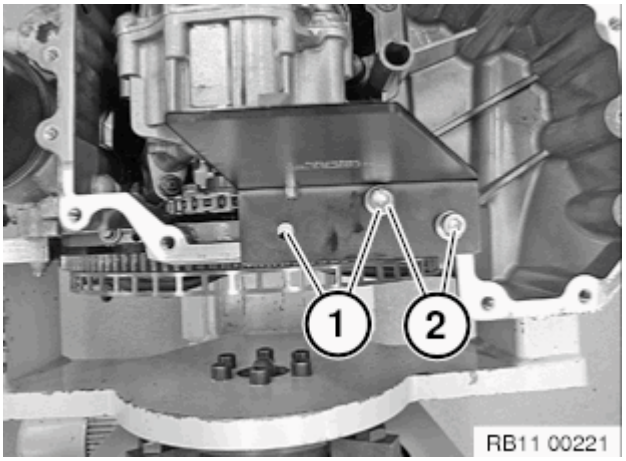


Fig. 429: Identifying Attachment Points
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not use force preload timing chain.

Push drag pointer (1) to the left and right until value has been determined. Adjustment value **10 mm +2** .

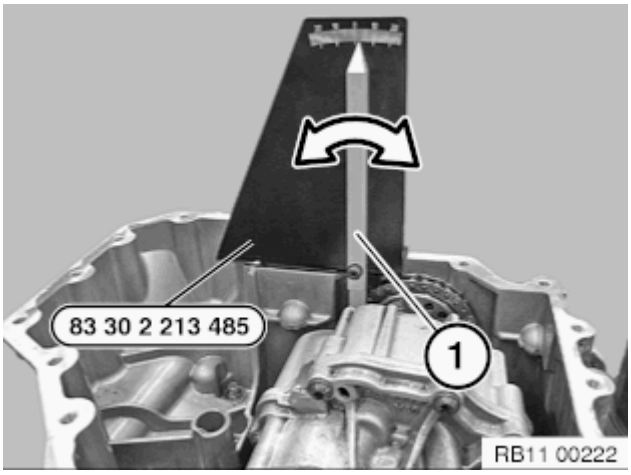


Fig. 430: Pushing Drag Pointer To Left
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust oil pump timing chain.

Pretension oil pump adjusting sleeve (1) with a hexagon socket wrench. Adjustment value **10 mm +2** .

NOTE: Graphic without top oil sump

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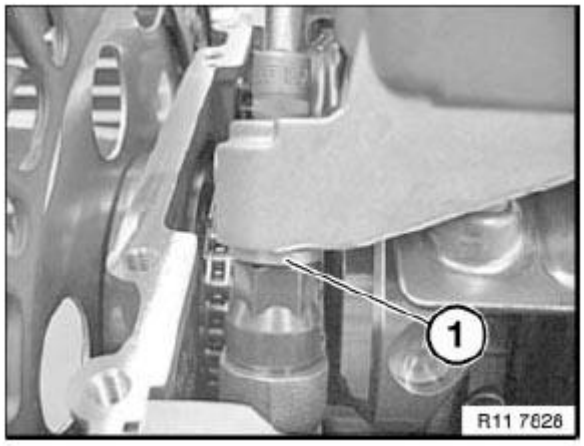


Fig. 431: Identifying Oil Pump Adjusting Sleeve
Courtesy of BMW OF NORTH AMERICA, INC.

Join and secure screw (2). Tightening torque: 24 Nm

NOTE: Graphic without top oil sump

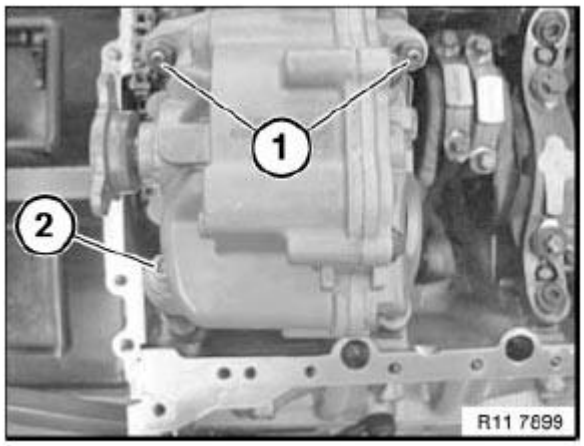


Fig. 432: Identifying Oil Pump With Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: Check fitting sleeves (1) for damage and correct installation position. Clean sealing surface (2) so that it is free from oil and grease. Coat contact edges on separating face along oil sump (see arrows) with Drei Bond 1209 2.1.

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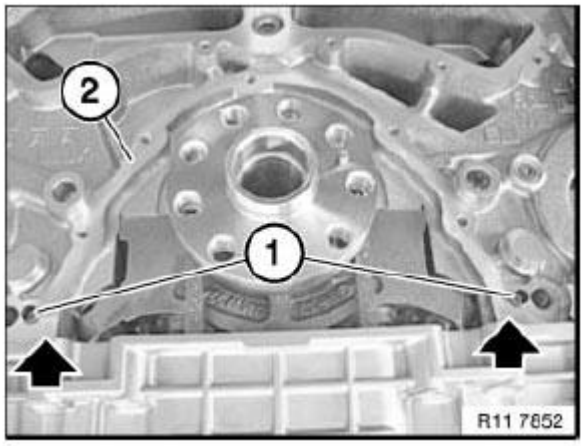


Fig. 433: Identifying dowel sleeves and sealing facex
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note: Lightly oil running surface of crankshaft.

Fit end cover (1) with support bush (2) on crankshaft and push on carefully.

NOTE: Graphic shows (N62TU).

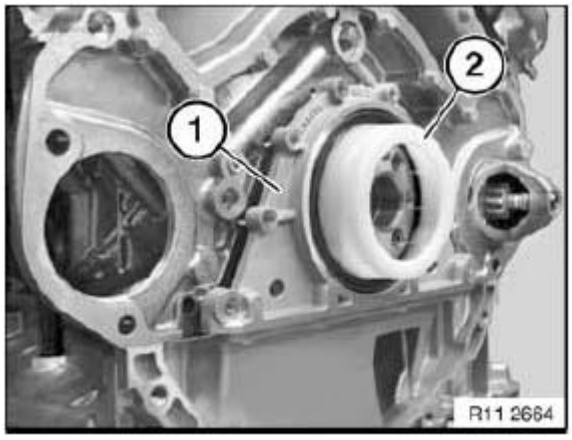


Fig. 434: Identifying Support Sleeve And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Insert screws (2) and initially tighten without play. Insert screws (1) and initially tighten without play. Tighten down bolts (2) from inside outwards.

Tightening torque: 10 Nm

Tighten down screws (1) from inside outwards.

Tightening torque: 25 Nm.

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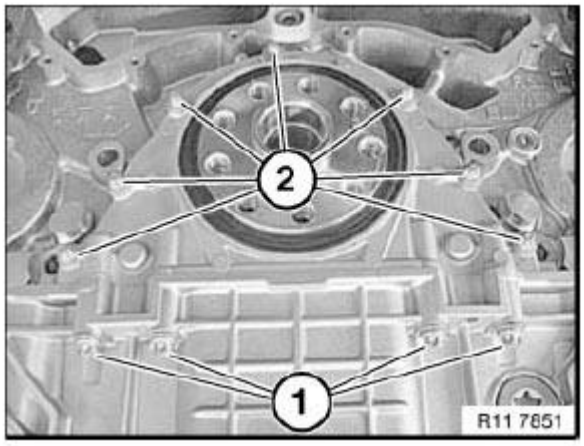


Fig. 435: Identifying Cover Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1142 OIL FILTER AND LINES

1142260 OIL RETURN COVER

IMPORTANT: Risk of fire.
In the event of oil leakage in the Vee, the leakage oil may be ignited on hot components.

Necessary preliminary work

- Remove both exhaust turbochargers. See **EXHAUST TURBOCHARGER, RIGHT, CYLINDERS 1-4** and **EXHAUST TURBOCHARGER, LEFT, CYLINDERS 5-8**
- Remove **HEAT SHIELD** at bottom.

Release banjo bolt (1).

Tightening torque: **11 42 10AZ** .

Release screws (3).

Tightening torque: **11 65 6AZ** .

Place vacuum reservoir (4) to one side.

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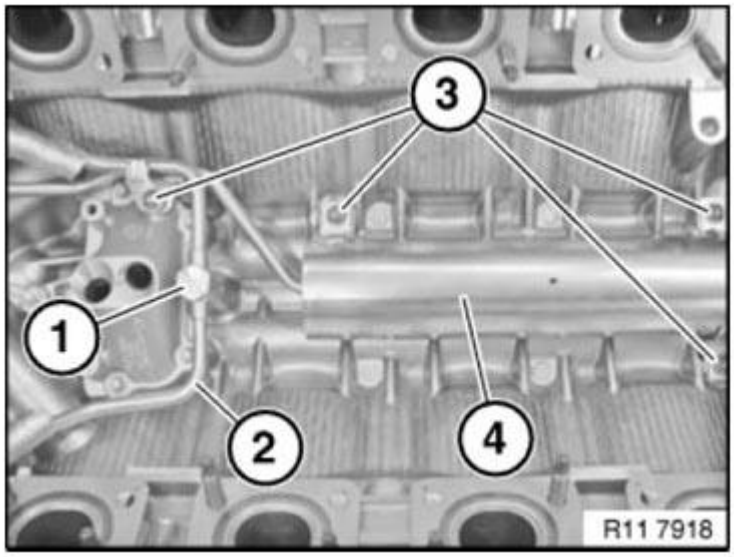


Fig. 436: Identifying Banjo Bolt, Screws And Vacuum Reservoir
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 42 8AZ** .

Remove oil return cover (2).

Installation note:

Replace oil return cover.

Replace both O-rings.

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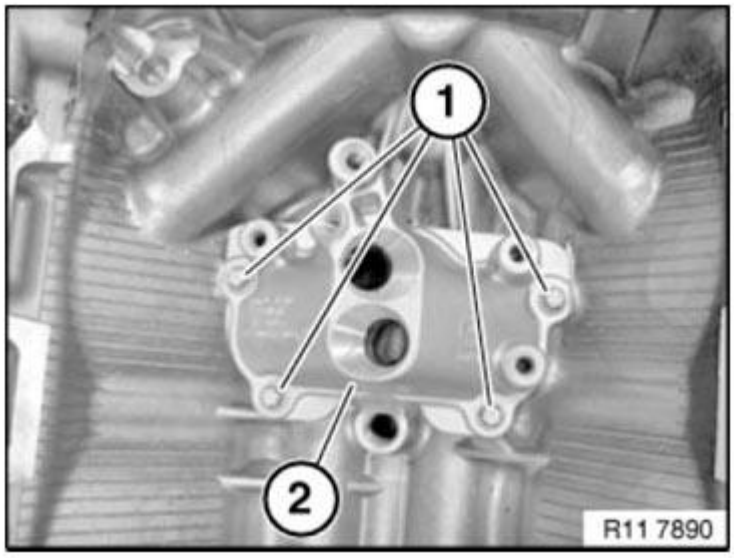


Fig. 437: Identifying Oil Return Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1151 WATER PUMP WITH DRIVE

1151000 REMOVING AND INSTALLING/RENEWING COOLANT PUMP (N63)

WARNING: Risk of scalding!
Only perform this work after engine has cooled down.

Recycling

Catch and dispose of drained coolant in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

IMPORTANT: If a coolant pump which has already been operated is reused, it must be filled immediately after being removed with coolant (mixture ratio 1:1/water: coolant).

Necessary preliminary work

- Drain **COOLANT**
- Remove intercooler **EXPANSION TANK**
- Remove alternator drive belt. See **REPLACING DRIVE BELT FOR ALTERNATOR**.

IMPORTANT: Risk of damage!

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Coolant emerges when the coolant hoses are detached from the coolant thermostat and coolant pump.
Cover surrounding components and plug connections with suitable apparatus

NOTE: For purposes of clarity, the graphic shows the auxiliary water pump removed.

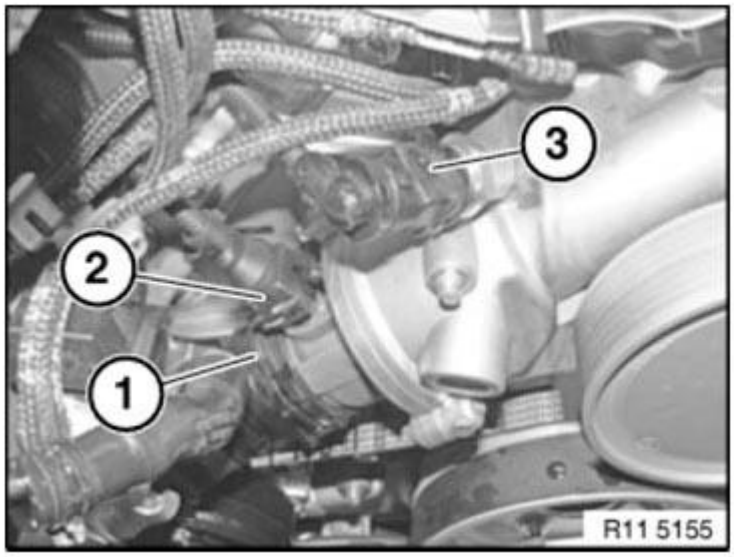


Fig. 438: Identifying Plug Connections
Courtesy of BMW OF NORTH AMERICA, INC.

Remove plug connections (2 and 3).

Installation note:

Plug connections (2 and 3) must snap audibly into place!

Unlock snap fastener on coolant hose (1).

Detach coolant hose (1) and lay to one side.

Release screw (4).

Tightening torque **11 51 3AZ** .

Detach pipe (3) and lay to one side.

Installation note:

Replace sealing ring

Unlock quick-release coupling on coolant hose (5).

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Detach coolant hose (5) and lay to one side.

Unfasten screws (2).

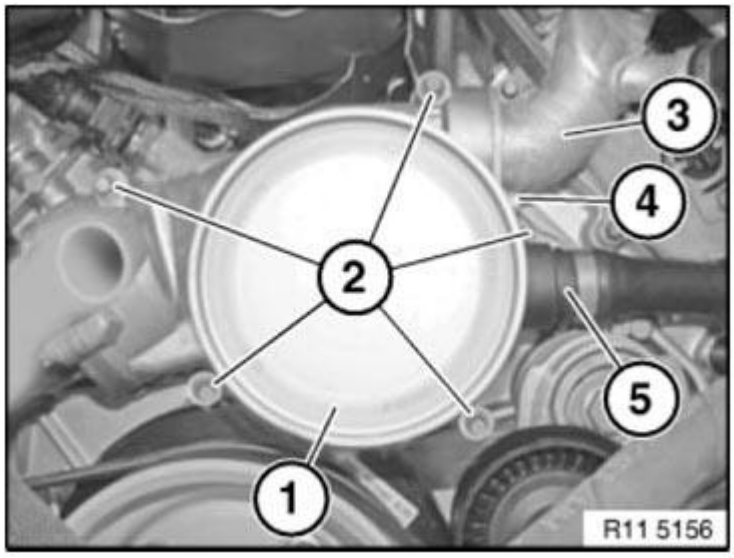


Fig. 439: Identifying Pipe, Screws And Coolant Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Tightening torque **11 51 1AZ** .

Remove coolant pump (1) in upward direction with a tilting motion.

Installation note:

Replace gasket

If reusing the coolant pump:

If a coolant pump is reused, it must be mechanically rotated once (breakaway torque at pump impellers).

One coolant pump rotation will be sufficient.

If replacing the coolant pump:

Release screws on coolant thermostat.

Tightening torque **11 53 1AZ** .

Remove coolant thermostat.

Installation note:

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Replace sealing ring

Assemble engine.

Top up **COOLANT** .

BLEEDING INSTRUCTIONS must be observed **without fail.**

1153 THERMOSTAT AND CONNECTIONS

1153000 REMOVING AND INSTALLING/REPLACING COOLANT THERMOSTAT (N63)

WARNING: Risk of scalding!
Only perform this work after engine has cooled down.

Recycling

Catch and dispose of drained coolant in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Necessary preliminary work

- Drain **COOLANT** .
- Remove **COOLANT PUMP** .
- Remove charge air cooler **EXPANSION TANK** .
- **REMOVE** fan cowl with electric fan.

IMPORTANT: Risk of damage!
Coolant emerges when the coolant hoses are detached from the coolant thermostat.
Cover surrounding components and plug connections with suitable apparatus

NOTE: For purposes of clarity, the graphic shows the auxiliary water pump removed.

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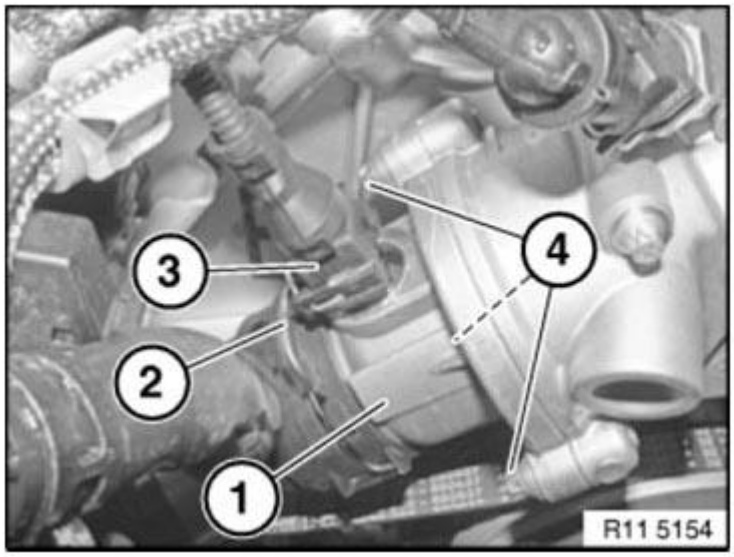


Fig. 440: Identifying Plug Connection, Coolant Hose And Coolant Thermostat
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (3).

Installation note:

Plug connection (3) must snap audibly into place!

Unlock snap fastener on coolant hose (2).

Detach coolant hose (2) and lay to one side.

NOTE: One of the screws is not shown and is located at the rear under the coolant thermostat (1).

Release screws (4).

Tightening torque **11 53 1AZ** .

Lift out coolant thermostat (1).

NOTE: The coolant thermostat is integrated in the housing cover. It can only be replaced as a complete unit!

Clean sealing surface.

Installation note:

Replace sealing ring (1)

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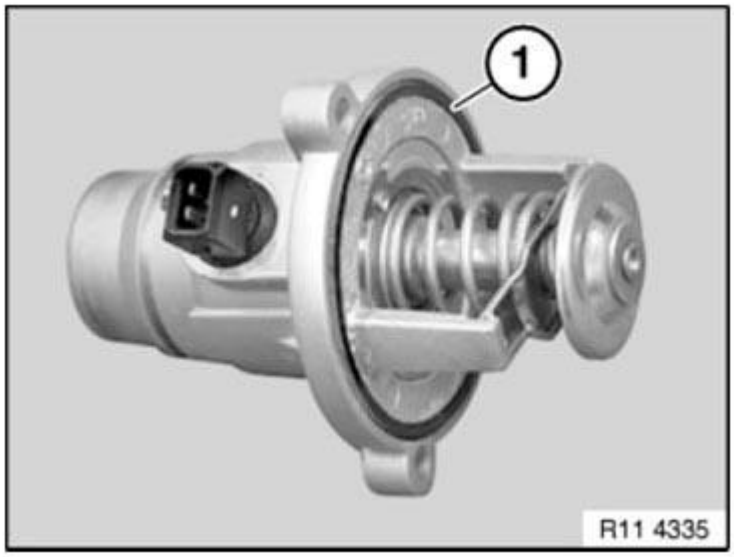


Fig. 441: Identifying Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Top up **COOLANT** .

BLEEDING INSTRUCTIONS must be observed **without fail.**

1153000 REMOVING AND INSTALLING/REPLACING SUPPLEMENTARY COOLANT PUMP FOR EXHAUST TURBOCHARGER (N63)

WARNING: Risk of scalding!
Only perform this work after engine has cooled down.

Recycling

Catch and dispose of drained coolant in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Necessary preliminary work

- Remove charge air cooler **EXPANSION TANK**

Unclip coolant hose (1) from bracket (3) and lay in direction of arrow to one side.

Unfasten screws (2).

Tightening torque **11 51 4AZ** .

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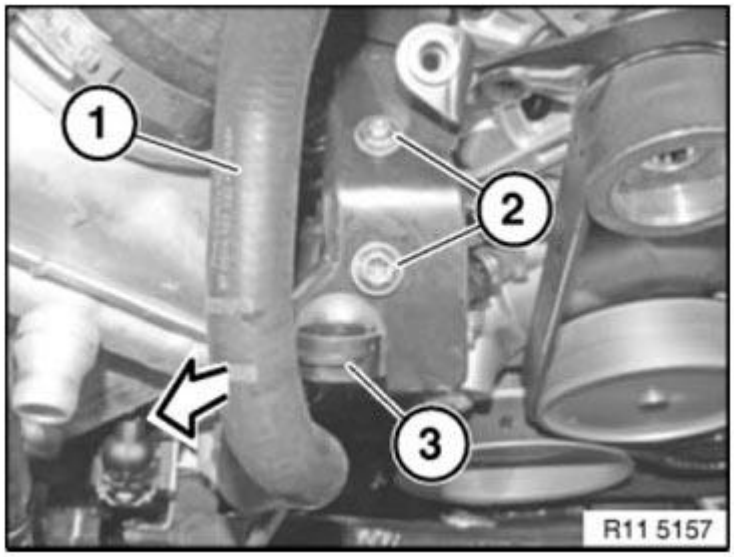


Fig. 442: Identifying Coolant Hose And Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!
Coolant emerges when the coolant hoses are detached from the auxiliary water pump (3).
Cover surrounding components and plug connections with suitable apparatus

Release hose clamp (5) with a suitable tool.

Installation note:

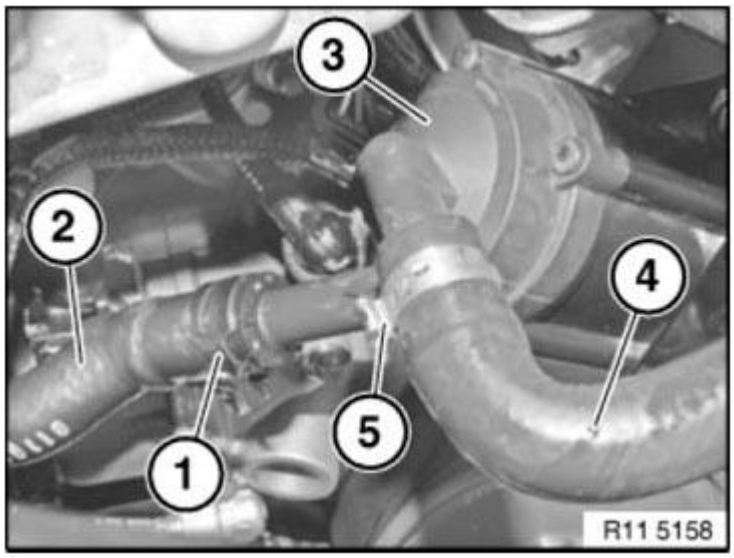


Fig. 443: Identifying Auxiliary Water Pump, Coolant Hose And Hose Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

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Replace hose clamp (5)

Detach coolant hose (4) and lay to one side.

Release hose clamp (1) with a suitable tool.

Detach coolant hose (2) and lay to one side.

Disconnect plug connection (2).

Installation note:

Plug connection (2) must snap audibly into place!

Lift out auxiliary water pump (1).

Release holder (3) from auxiliary water pump (1).

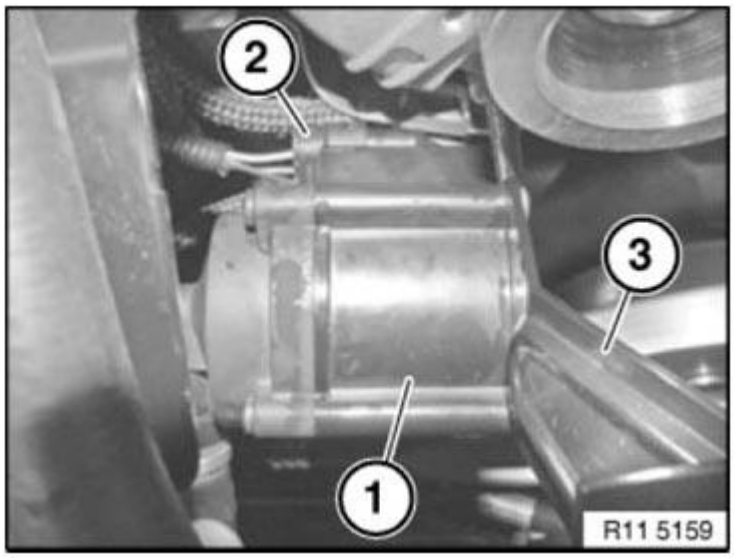


Fig. 444: Identifying Plug Connection, Holder And Auxiliary Water Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Top up **COOLANT** .

VENTING INSTRUCTIONS must be observed **without fail.**

1161 INTAKE MANIFOLD

1161730 CHECK BMW DIAGNOSIS SYSTEM FOR EXCESS PRESSURE AND VACUUM (N63)

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IMPORTANT: Excess pressure and vacuum lines are identified by the size of the connection fittings and color-coded red and blue and must not be mixed up with each other.
Build up pressure with Blue color.
Generate vacuum pressure with Red color.
Mixing up the functions will result in damage to the engine.

Necessary preliminary work

- Release upper section of intake air filter.
- Prepare BMW diagnosis system.
- Start diagnostic program.
    1. Power train
    2. Engine electronics
    3. Air supply
    4. Charging pressure control Oder Perception

  Lack of power

Note on ordering:

- Workshop equipment.
- Workshop planning.
- Workshop equipment catalogue.
- Measuring and test equipment.
- No. 81 29 0 426 464

Pressure measurement

Prepare BMW diagnosis system on excess pressure diagnosis unit.

1. Screw in pressure sensor.
2. Overpressure connection (Blue).
3. Connect stimuli cables (3) to positive and negative.
4. Connect 12V battery cables (4) to vehicle battery positive and negative.

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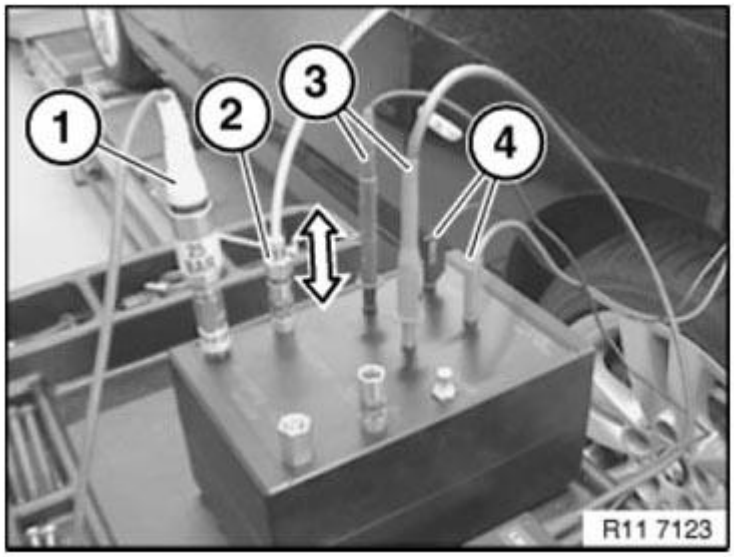


Fig. 445: Measuring Pressure
Courtesy of BMW OF NORTH AMERICA, INC.

Secure seal plug (1) with union nut (2) in intake port and seal.

NOTE: Twin-Turbo: both intake ports must be sealed.

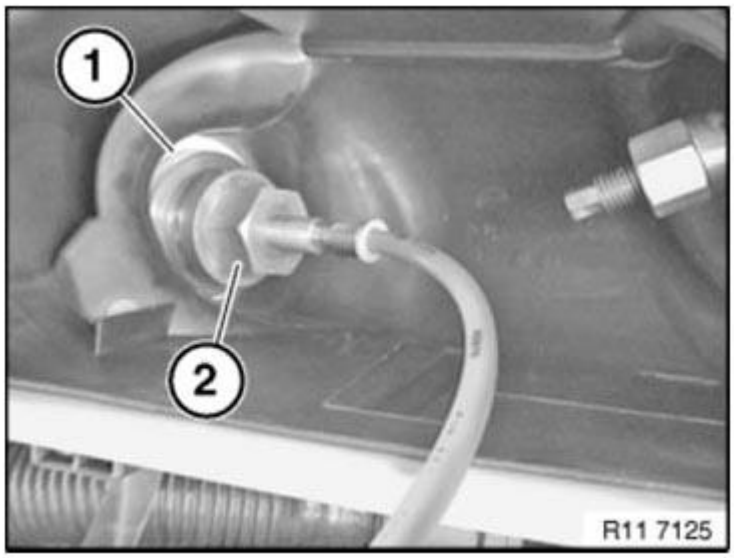


Fig. 446: Identifying Seal Plug And Union Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Insert Blue pneumatic hose (4) in pneumatic coupling (2) of sealing plug (1).

Seal plug (3) has no pneumatic coupling.

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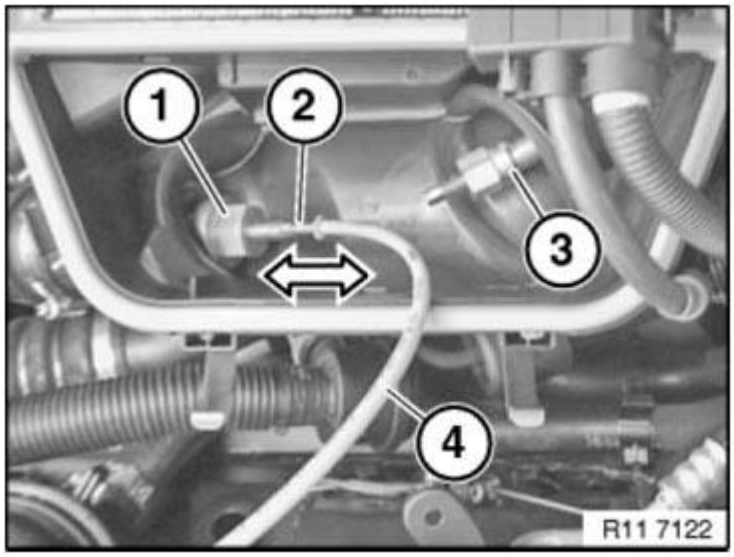
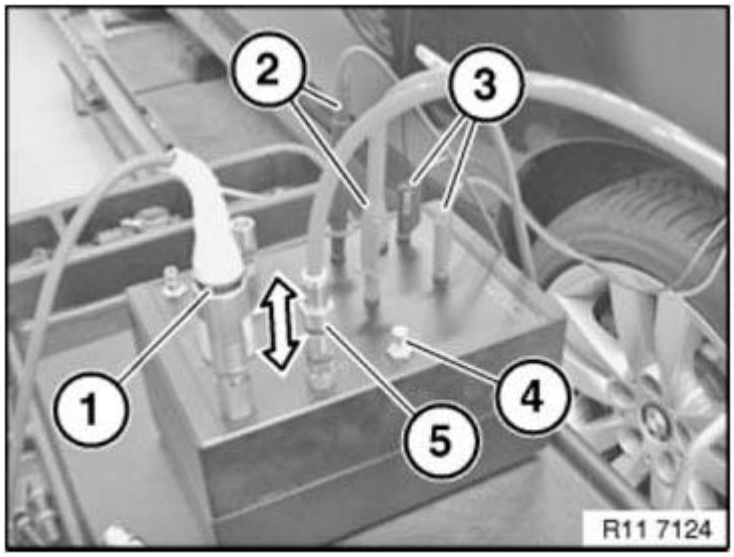


Fig. 447: Inserting Blue Pneumatic Hose In Pneumatic Coupling Of Sealing Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Vacuum pressure measurement

Prepare diagnosis tester on vacuum diagnosis unit.

1. Screw in pressure sensor.
2. Connect stimuli cables (2) to positive and negative.
3. Connect 12V battery cables (3) to vehicle battery positive and negative.
4. Controller for vacuum connection.
5. Vacuum connection (Red).



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Fig. 448: Measuring Vacuum Pressure
Courtesy of BMW OF NORTH AMERICA, INC.

Calibration for vacuum pressure measurement

Seal shutoff tap (2) in direction of arrow.

Release lock nut on controller (1).

Carry out pressure adjustment in accordance with BMW diagnosis instruction.

Secure controller (1) hand-tight against turning.

Open shutoff tap (2) again.

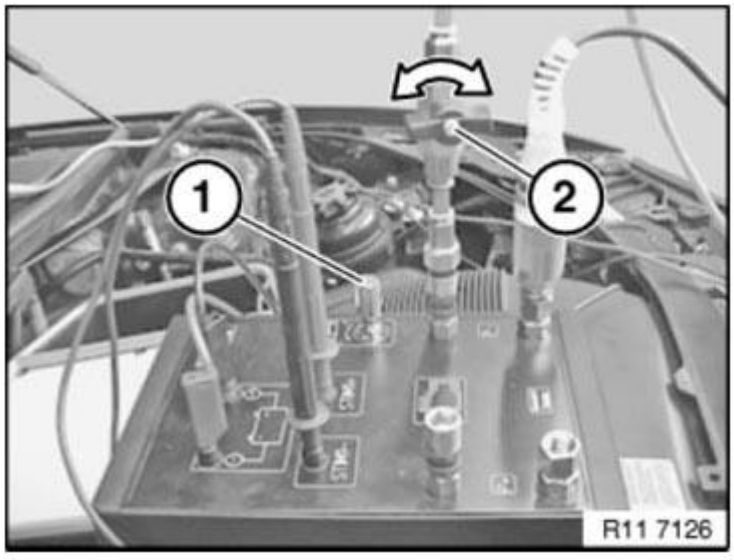


Fig. 449: Releasing Lock Nut On Controller
Courtesy of BMW OF NORTH AMERICA, INC.

Connections on EPPC

1. Connection (VAC) to vacuum reservoir.
2. Connection (OUT) with ring to exhaust turbocharger.

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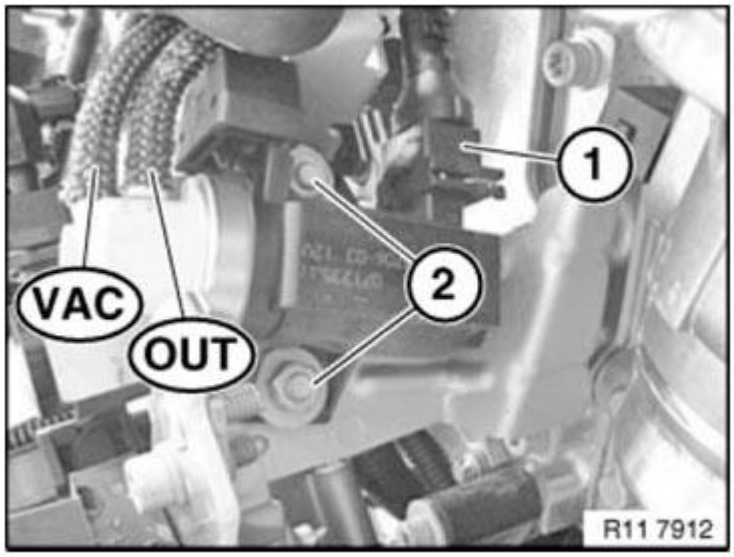


Fig. 450: Identifying Vacuum Reservoir Connection (VAC)
Courtesy of BMW OF NORTH AMERICA, INC.

Vacuum activation, cylinders 1-4

Detach red vacuum line from vacuum unit.

Prepare T-piece (5) with vacuum lines for measurement.

Connect red vacuum line (1) with vacuum unit (2) and quick-release coupling (3).

Open shutoff tap (4).

NOTE: Observe diagnosis instructions.

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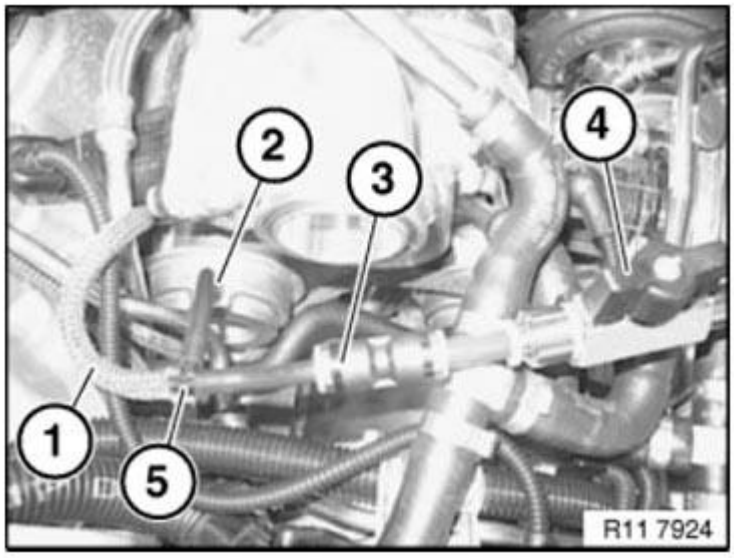


Fig. 451: Identifying Red Vacuum Line, Vacuum Unit And Quick-Release Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

Vacuum activation, cylinders 5-8

Detach blue vacuum line from vacuum unit.

Prepare T-piece (5) with vacuum lines for measurement.

Connect blue vacuum line (1) with vacuum unit (2) and quick-release coupling (3).

Open shutoff tap (4).

NOTE: Observe diagnosis instructions.

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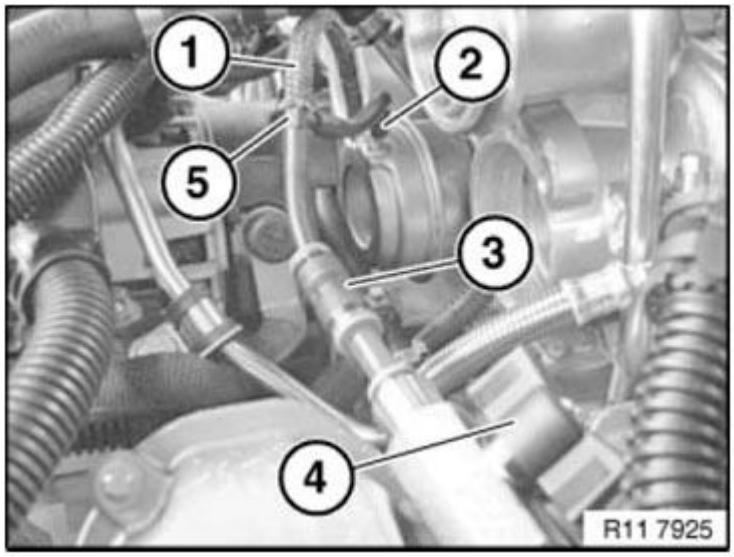


Fig. 452: Identifying Blue Vacuum Line, Vacuum Unit And Quick-Release Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

Exhaust turbocharger, cylinders 1-4

Initial position (1) of wastegate linkage depressurized.

Wastegate valve opened.

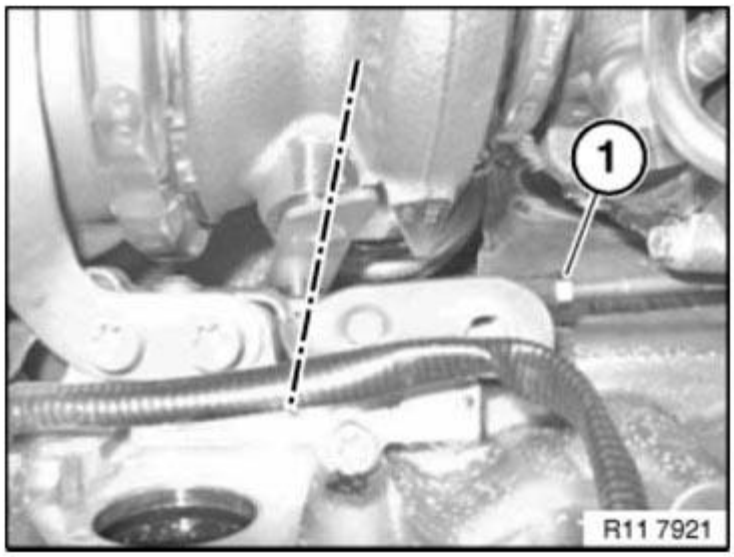


Fig. 453: Identifying Initial Position Of Wastegate Linkage Depressurized
Courtesy of BMW OF NORTH AMERICA, INC.

Initial position (1) of wastegate linkage with vacuum pressure.

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Wastegate valve closed.

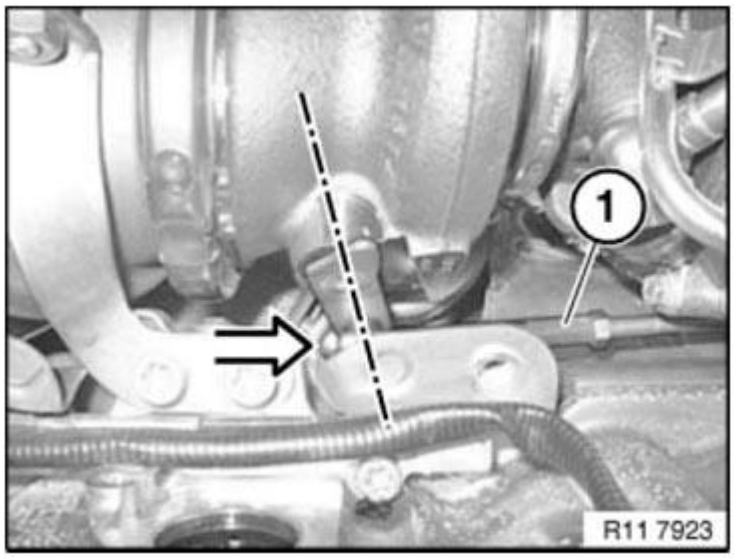


Fig. 454: Identifying Initial Position Of Wastegate Linkage With Vacuum Pressure
Courtesy of BMW OF NORTH AMERICA, INC.

Exhaust turbocharger, cylinders 5-8

Initial position (1) of wastegate linkage depressurized.

Wastegate valve opened.

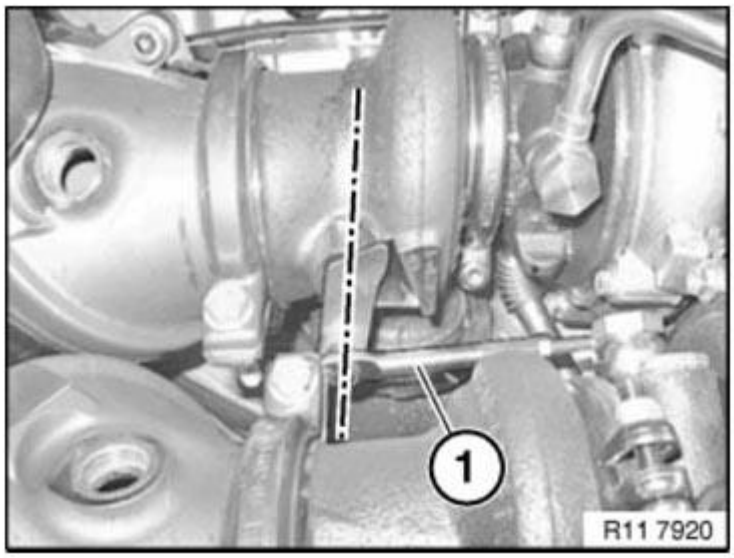


Fig. 455: Identifying Initial Position Of Wastegate Linkage Depressurized
Courtesy of BMW OF NORTH AMERICA, INC.

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Initial position (1) of wastegate linkage with vacuum pressure.

Wastegate valve closed.

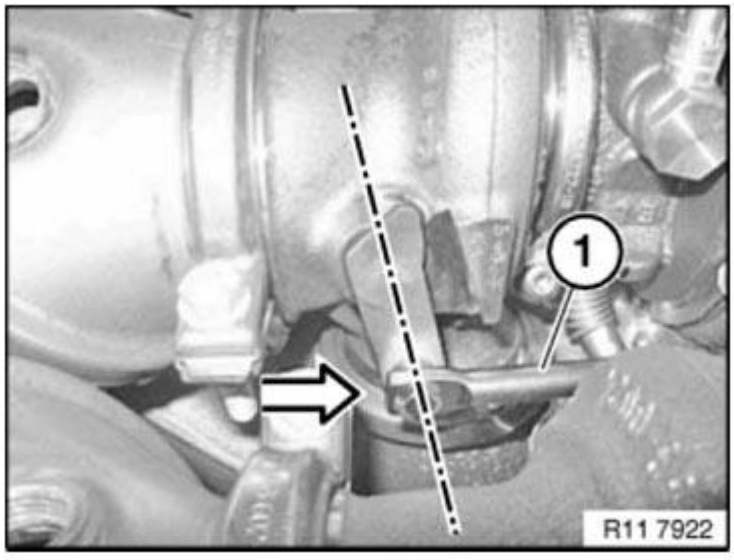


Fig. 456: Identifying Initial Position Of Wastegate Linkage With Vacuum Pressure
Courtesy of BMW OF NORTH AMERICA, INC.

Check wastegate valve with vacuum

Wastegate valves must be opened without vacuum.

The wastegate valves must close if a vacuum pressure is applied at the wastegate sockets (see BMW diagnosis system).

Check shaft on turbine wheel for rotatability.

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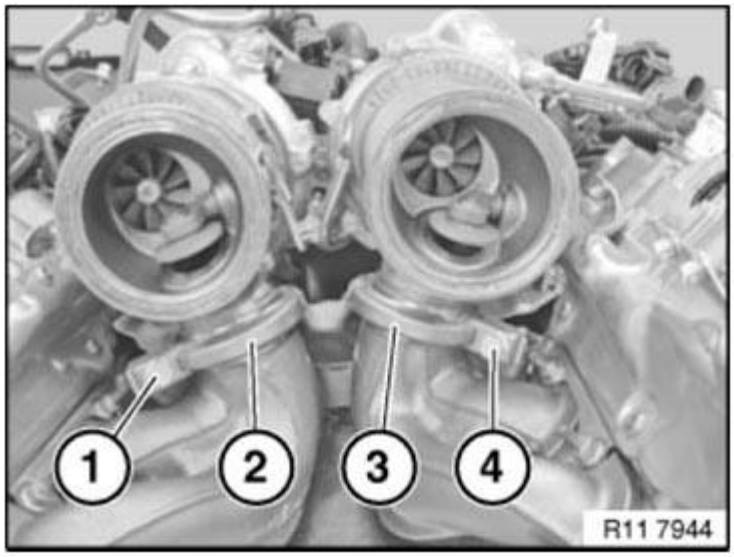


Fig. 457: Checking Wastegate Valve With Vacuum
Courtesy of BMW OF NORTH AMERICA, INC.

Follow diagnosis instructions.

1161065 REMOVING AND INSTALLING/REPLACING LEFT INTAKE PLENUM (N63)

Necessary preliminary work

- Remove left **INJECTION PIPE** .
- Remove **THROTTLE VALVE**
- Release screws on intake plenum from above without fail before lowering front axle.
- Secure **ENGINE** in installation position.
- Lower front axle, releasing screws on engine mount first. See **LOWERING/RAISING FRONT AXLE SUPPORT (UNIVERSAL LIFTER)** .
- Release power steering pump, if installed, and set aside. See **POWER STEERING PUMP FOR HYDRAULIC STEERING GEAR WITH DYNAMIC DRIVE (N63) or POWER STEERING PUMP FOR POWER STEERING GEAR WITH ACTIVE FRONT STEERING (N63)** .
- Remove **UNIVERSAL JOINT** with corrugated tubing.

Detach engine ventilation hose (1).

Disconnect connector.

Unscrew nuts (2).

Tightening torque: **11 61 1 AZ** .

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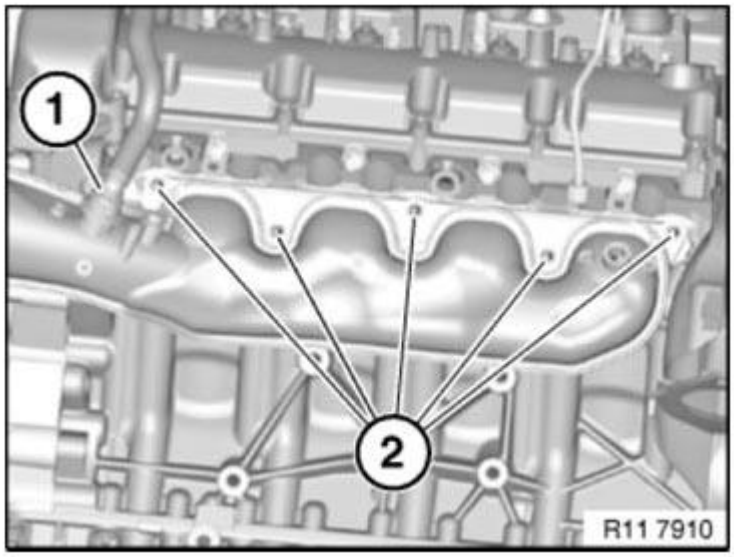


Fig. 458: Identifying Engine Ventilation Hose And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Release **THROTTLE VALVE** (1).

Release holder screw (2) on intake plenum.

Tightening torque: **11 61 2AZ** .

Feed out intake plenum towards rear.

Installation note:

Replace all profile seals.

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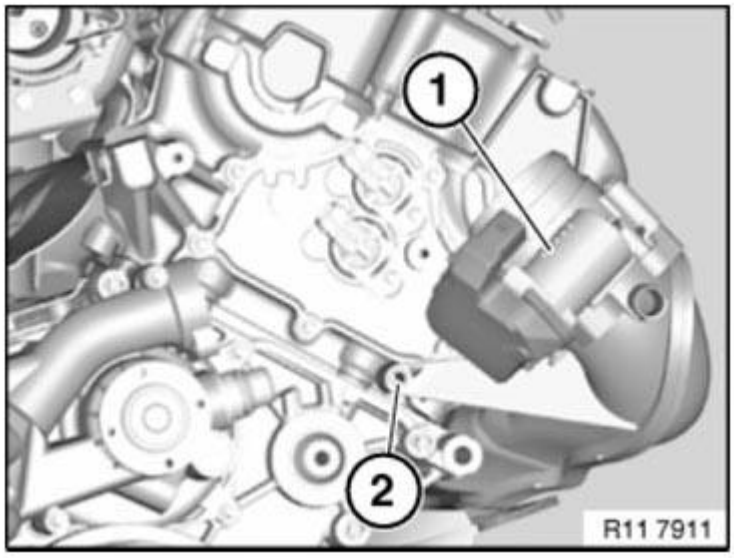


Fig. 459: Identifying Throttle Valve And Holder Screw On Intake Plenum
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine and vehicle and

Check air intake system for leaks.

1161068 REMOVING AND INSTALLING/REPLACING RIGHT INTAKE PLENUM (N63)

Necessary preliminary work

- Remove right **INJECTION PIPE** .
- Remove **THROTTLE VALVE**
- Release screws on intake plenum from above without fail before lowering front axle.
- Secure **ENGINE** in installation position.
- Lower **FRONT AXLE** , releasing screws on engine mount first
- Release A/C compressor and place to one side. See **REMOVING AND INSTALLING/REPLACING HEATING AND AIR CONDITIONING SYSTEM COMPRESSOR (N63, WITH DYNAMIC DRIVE)** .

Detach engine ventilation hose (1).

Disconnect connector.

Unscrew nuts (2).

Tightening torque: **11 61 1 AZ** .

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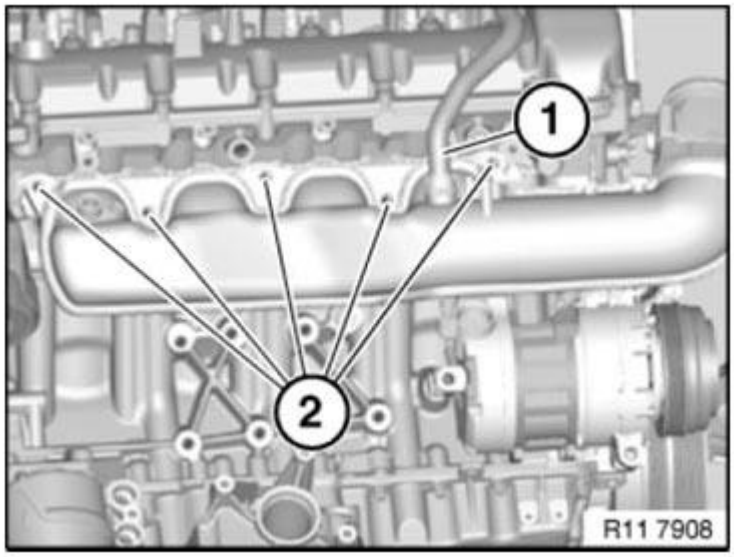


Fig. 460: Identifying Engine Ventilation Hose And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Remove **THROTTLE VALVE** (2).

Release screw (1).

Tightening torque: **11 61 2 AZ** .

Feed out intake plenum towards rear.

Installation note:

Replace all profile seals.

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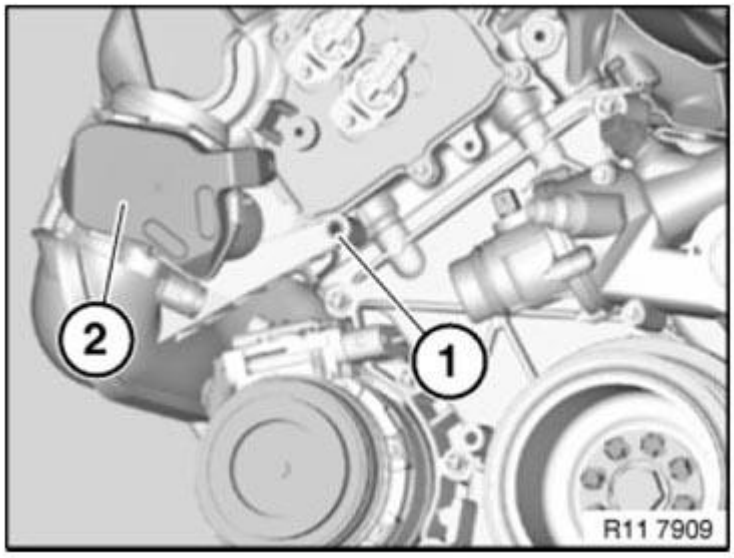


Fig. 461: Identifying Screw And Throttle Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine and vehicle.

Check air intake system for leaks.

1165 SUPERCHARGER WITH CONTROL

1165 CONNECTION DIAGRAM, VACUUM ACTIVATION (N63)

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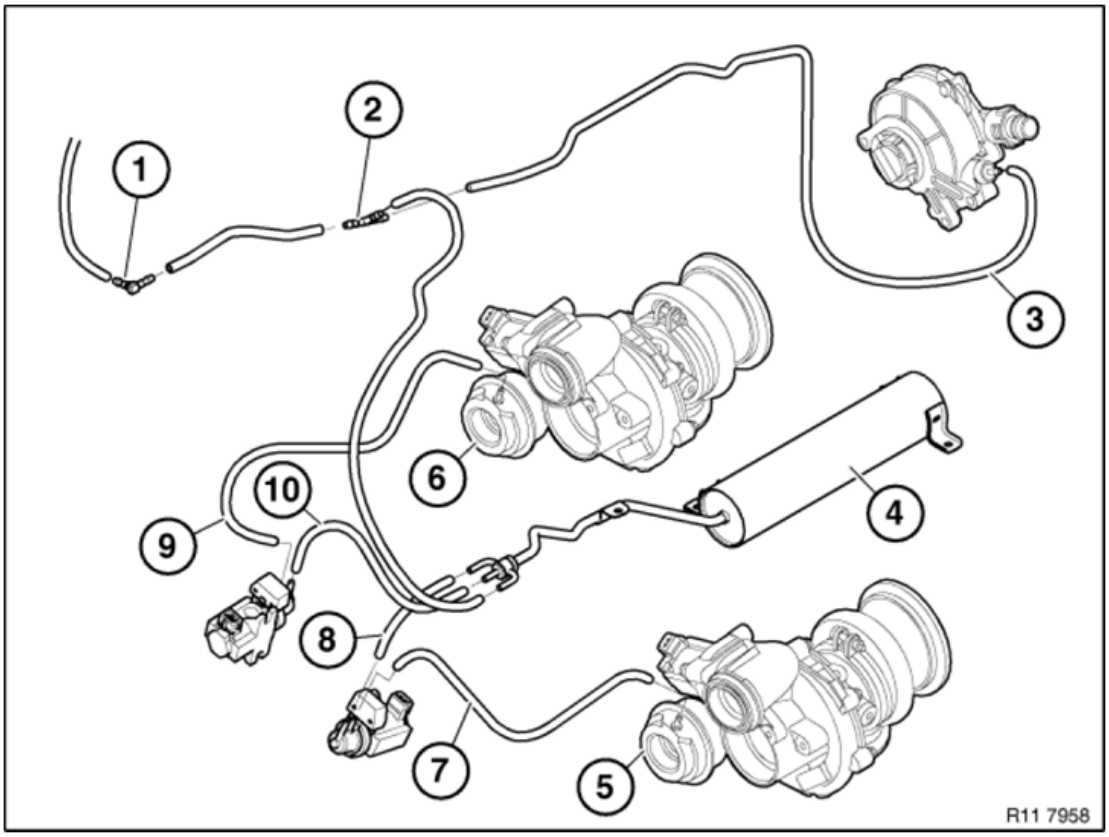


Fig. 462: Connection Diagram, Vacuum Activation (N63)
Courtesy of BMW OF NORTH AMERICA, INC.

1. Connection (1) Black to exhaust flaps.
2. Distribute element (2), vacuum pump/vacuum reservoir (4).
3. Vacuum line (3) black to vacuum pump.
4. Vacuum reservoir (4) with three connections.
5. Connection, vacuum unit (wastegate), bank 2, cylinders 5 to 8.
6. Connection, vacuum unit (wastegate), bank 1, cylinders 1 to 4.
7. Vacuum hose (7) black/blue to vacuum unit (5) connection to pressure converter (OUT) bank 2 cylinders 5 to 8.
8. Vacuum hose black to vacuum reservoir connection to pressure converter (VAC) bank 2 cylinders 5 to 8.
9. Vacuum hose (9) black/red to vacuum unit (6) to pressure convert (OUT) bank 1 cylinder 1 to 4.
10. Vacuum hose black to vacuum reservoir connection to pressure converter (VAC) bank 1 cylinders 1 to 4.

1165714 REMOVING AND INSTALLING/RENEWING ELECTRIC CHANGEOVER VALVE ON EXHAUST TURBOCHARGER, RIGHT (N63)

Necessary preliminary work

- Remove right **TURBOCHARGER** .

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Release screws (1).

Remove electric changeover valve (2).

Installation note:

Replace O-ring.

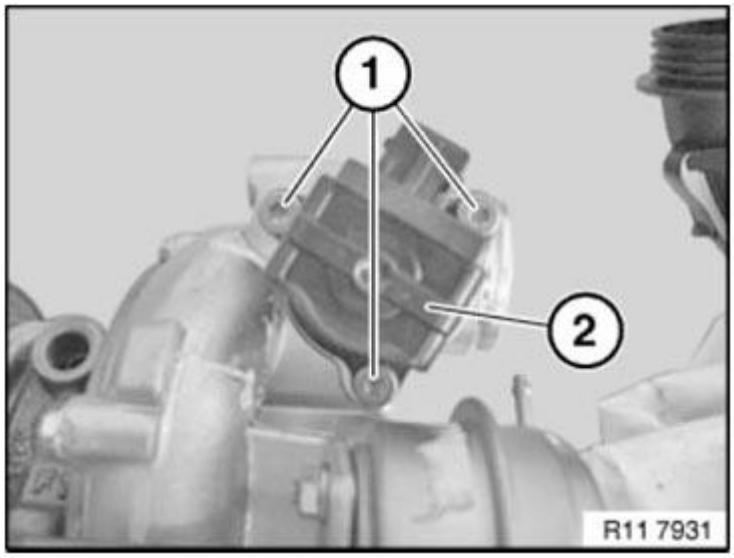


Fig. 463: Identifying Electric Changeover Valve And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Follow diagnosis instruction.

1. Complete vehicle
2. Powertrain
3. Engine electrical system
4. Air supply
5. Charging pressure control

1165185 REMOVING AND INSTALLING/RENEWING HEAT SHIELD AT BOTTOM (N63)

Necessary preliminary work

- Disconnect the **BATTERY CABLE FROM THE NEGATIVE TERMINAL** .
- Remove **FAN COWL** with electric fan.
- Remove the **ALTERNATOR** (not F04).
- Remove both exhaust turbochargers. See **EXHAUST TURBOCHARGER, RIGHT, CYLINDERS 1-4**

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and **EXHAUST TURBOCHARGER, LEFT, CYLINDERS 5-8**.

- Remove both exhaust manifolds. See **LEFT EXHAUST MANIFOLD** and **RIGHT EXHAUST MANIFOLD** .

Release screws (1).

Tightening torque **11 65 3AZ** .

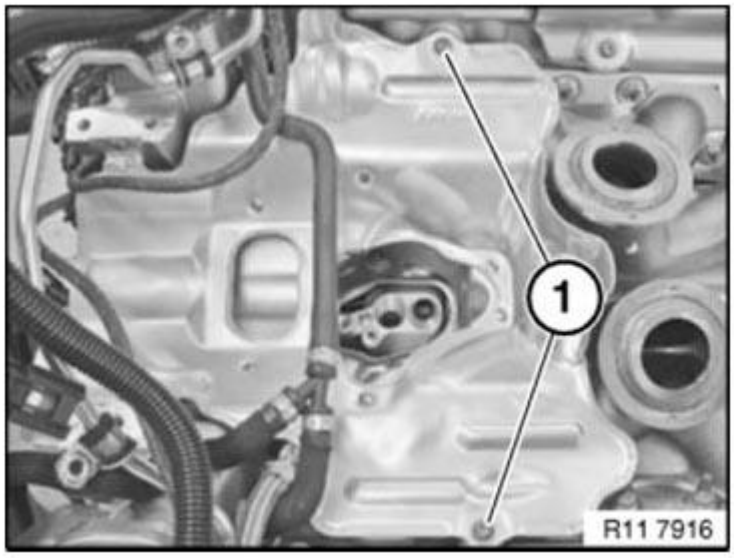


Fig. 464: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **11 65 3AZ** .

Remove heat shield (2) towards top.

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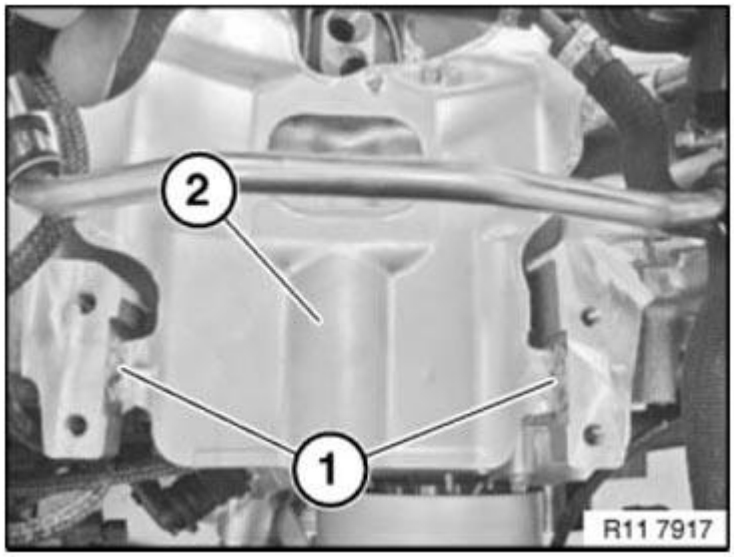


Fig. 465: Identifying Screws And Heat Shield
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **11 65 3AZ** .

IMPORTANT: Risk of interchange on replacement of the heat shield. Other shields are installed in the N63H and S63 engines.

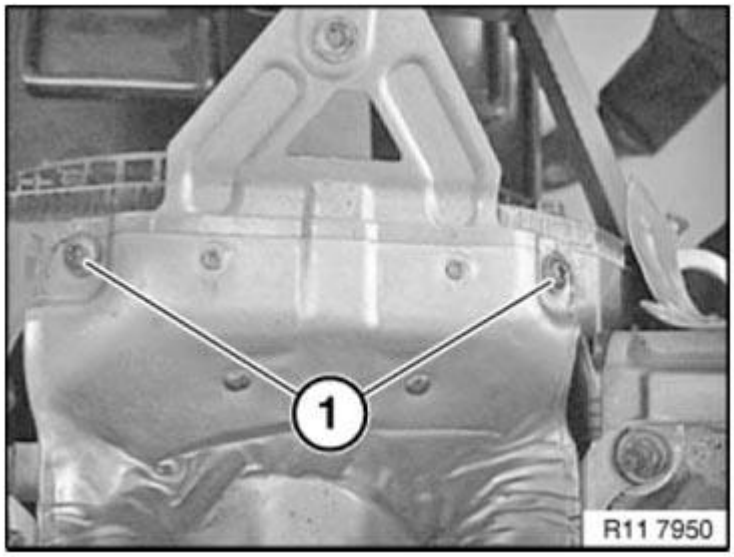


Fig. 466: Identifying Heat Shield Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release front screws on heat shield (1).

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Tightening torque **11 65 3AZ** .

Remove heat shield (1) towards top.

**IMPORTANT: Risk of interchange on replacement of the heat shield.
Other shields are installed in the N63H and S63 engines.**

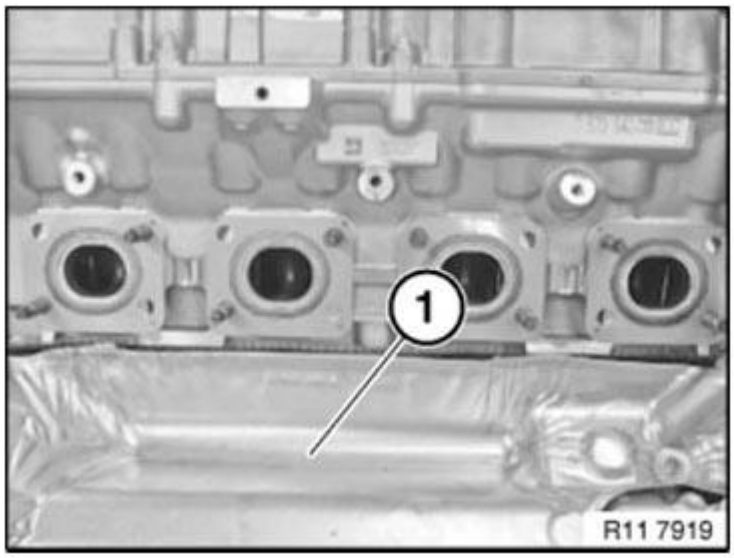


Fig. 467: Identifying Front Screws On Heat Shield
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1165180 REMOVING AND INSTALLING/RENEWING HEAT SHIELD AT TOP (N63)

Necessary preliminary work

- Remove both **INTAKE FILTER HOUSINGS** .
- Remove both control sensors. See **LEFT CONTROL SENSOR** and **RIGHT CONTROL SENSOR**.

Release screws (1).

Lift out holder.

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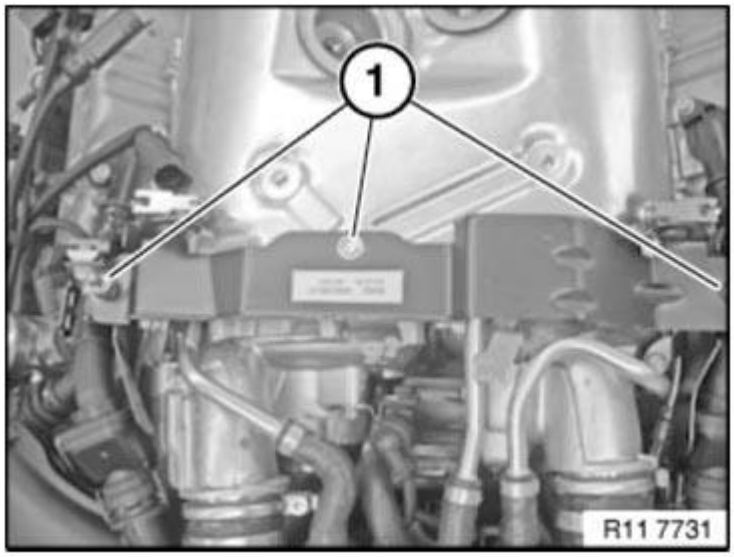


Fig. 468: Identifying Holder Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (2).

Tightening torque **11 65 3AZ** .

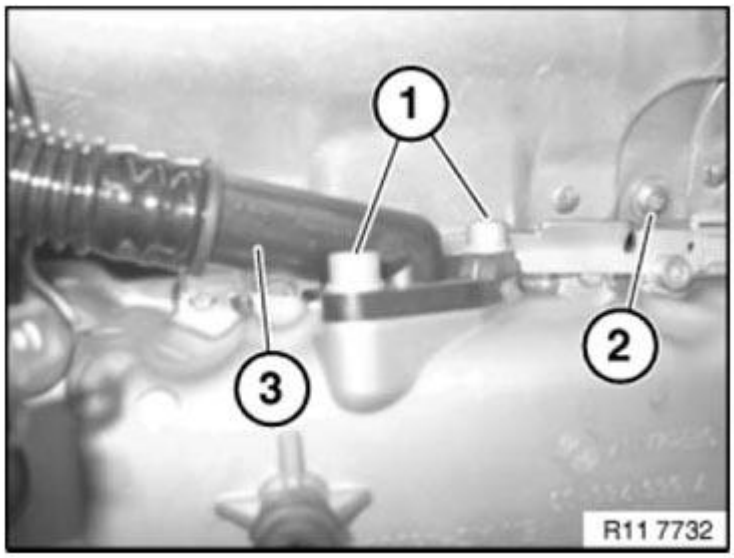


Fig. 469: Identifying Screws And Heat Shield
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (2).

Tightening torque **11 65 3AZ** .

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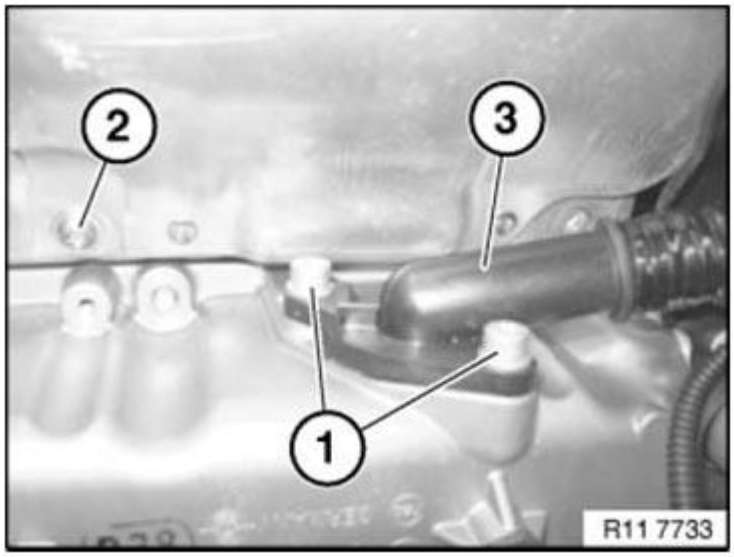


Fig. 470: Identifying Screws And Heat Shield
Courtesy of BMW OF NORTH AMERICA, INC.

Release retaining clip (1).

Detach wire ring (2) and set down behind oxygen sensor.

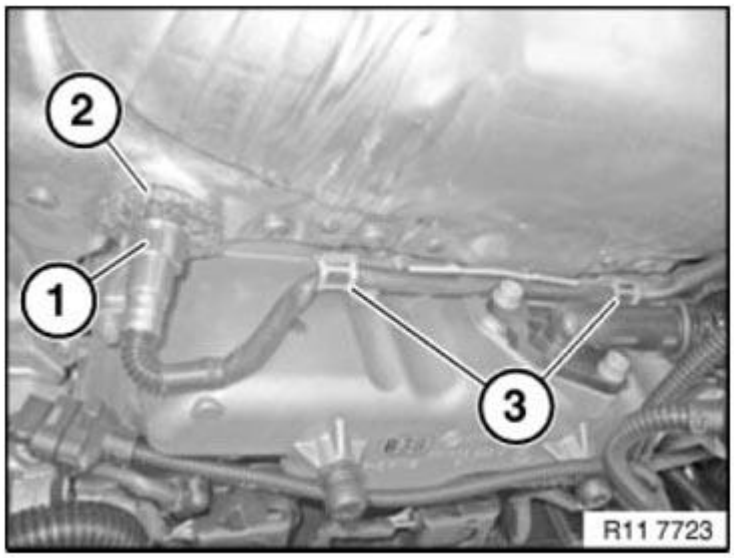


Fig. 471: Identifying Retaining Clip And Wire Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Release retaining clip (1).

Detach wire ring (2) and set down behind oxygen sensor.

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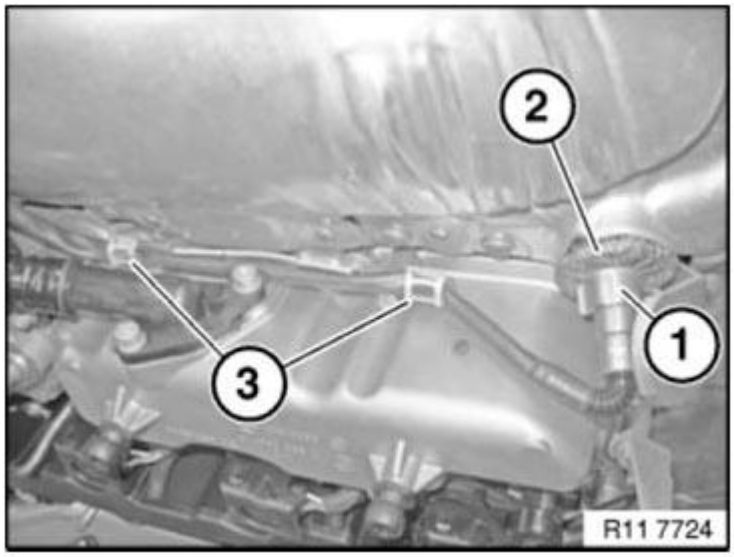


Fig. 472: Identifying Oxygen Sensor With Wire Ring And Retaining Clip
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **11 65 3AZ** .

NOTE: For purposes of clarity, the graphic shows the oxygen sensor removed.

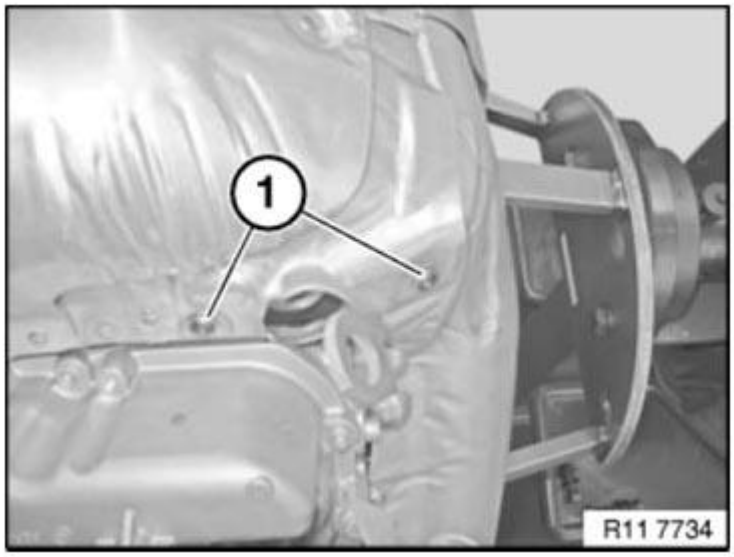


Fig. 473: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

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Tightening torque **11 65 3AZ** .

Lift out heat shield.

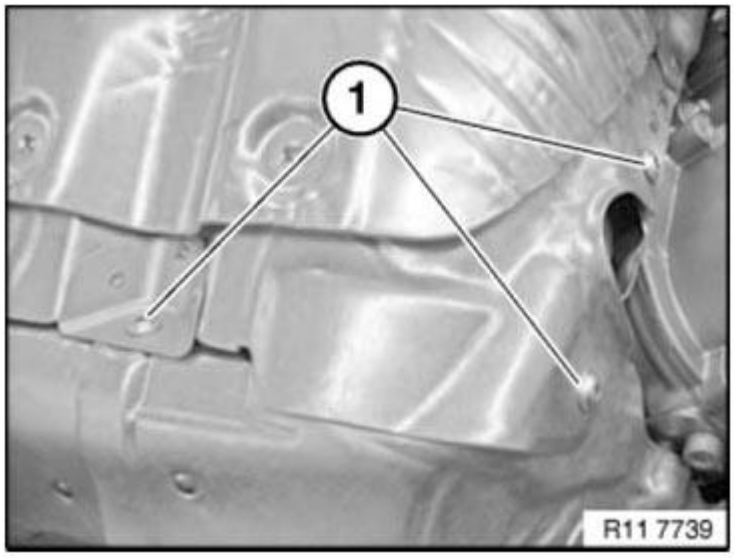


Fig. 474: Identifying Heat Shield Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

1165712 REMOVING AND INSTALLING/REPLACING ELECTRIC CHANGEOVER VALVE ON EXHAUST TURBOCHARGER, LEFT (N63)

Necessary preliminary work

- Remove left **TURBOCHARGER** .

Release screws (1).

Remove electric changeover valve.

Installation note:

Replace O-ring.

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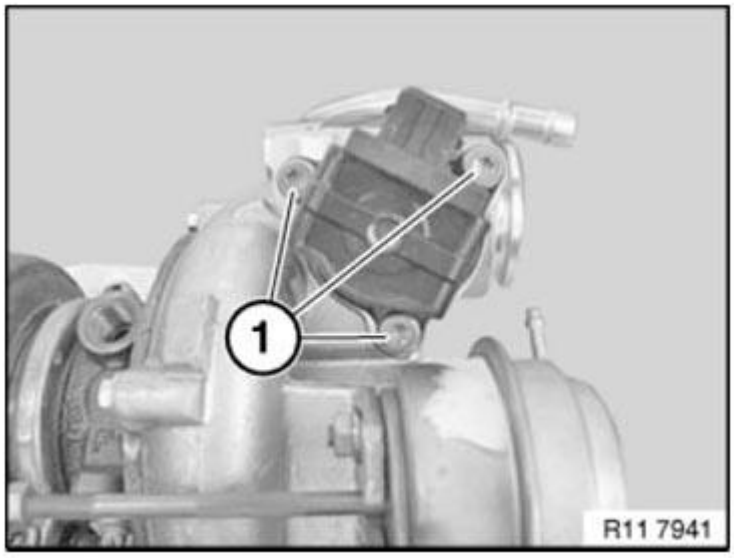


Fig. 475: Identifying Electric Changeover Valve Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Follow diagnosis instruction.

1. Complete vehicle
2. Powertrain
3. Engine electrical system
4. Air supply
5. Charging pressure control

1165030 REMOVING AND INSTALLING/REPLACING EXHAUST TURBOCHARGER, LEFT, CYLINDERS 5-8 (N63)

Notes

IMPORTANT: Risk of fire if oil lines are leaking.
Risk of mixing up vacuum hoses.

Necessary preliminary work

- Remove **CATALYTIC CONVERTER** , cylinders 5 - -8.

Disconnect plug connection (1) on electric changeover valve (2).

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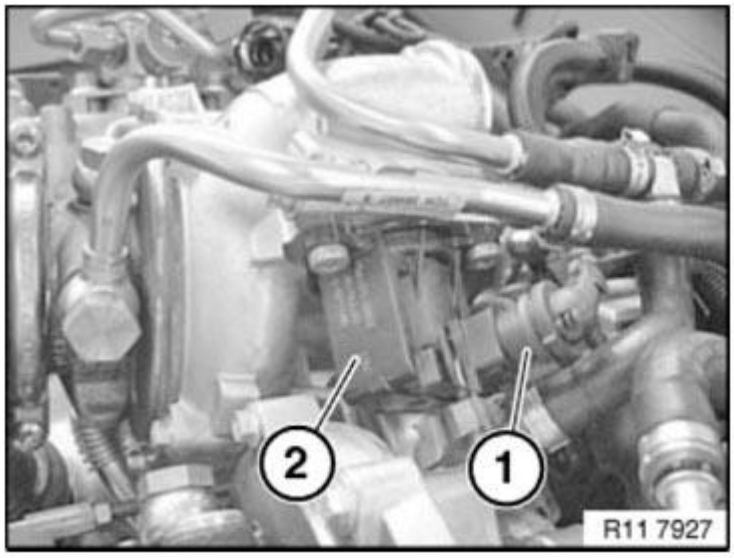


Fig. 476: Identifying Plug Connection On Electric Changeover Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 42 7AZ** .

Unfasten banjo bolt (2).

Tightening torque **11 42 4AZ** .

Lay oil line from turbocharger to side.

Installation note:

Replace all sealing rings

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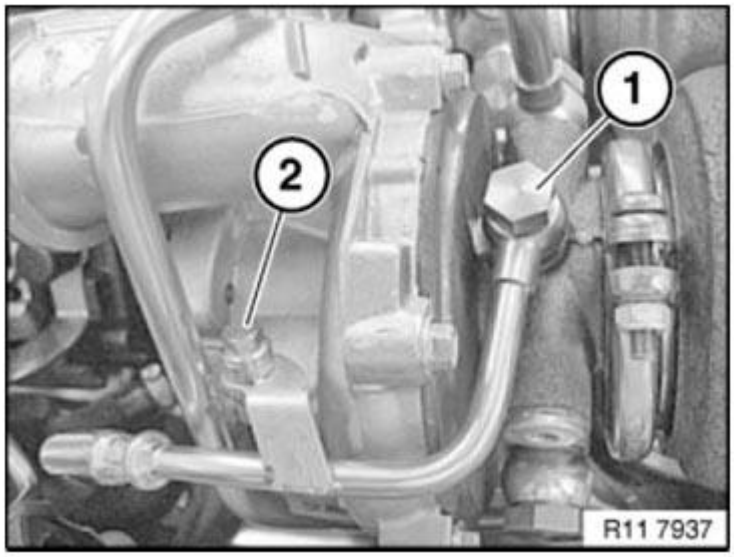


Fig. 477: Identifying Banjo Bolt With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 53 3AZ** .

Release banjo bolt (2).

Tightening torque **11 53 2AZ** .

Lay coolant return line to one side.

Installation note:

Replace all sealing rings

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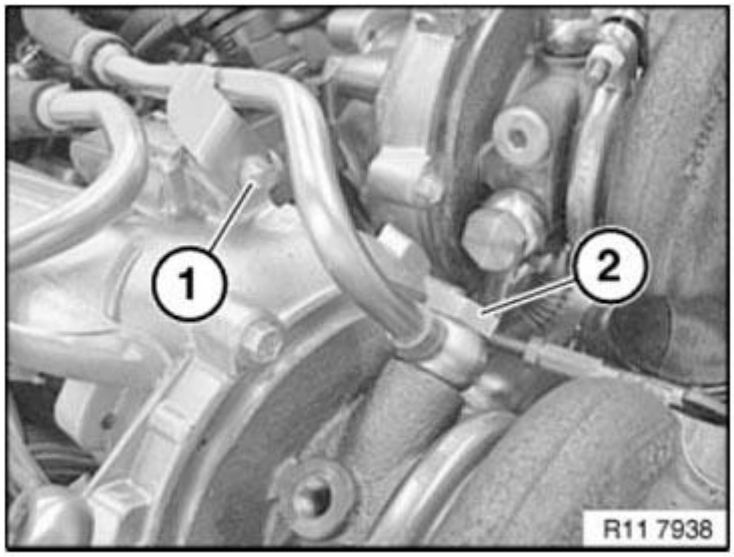


Fig. 478: Identifying Banjo Bolt And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Open hose clamp (1).

Detach coolant feed line (2).

Installation note:

Replace hose clamp (1)

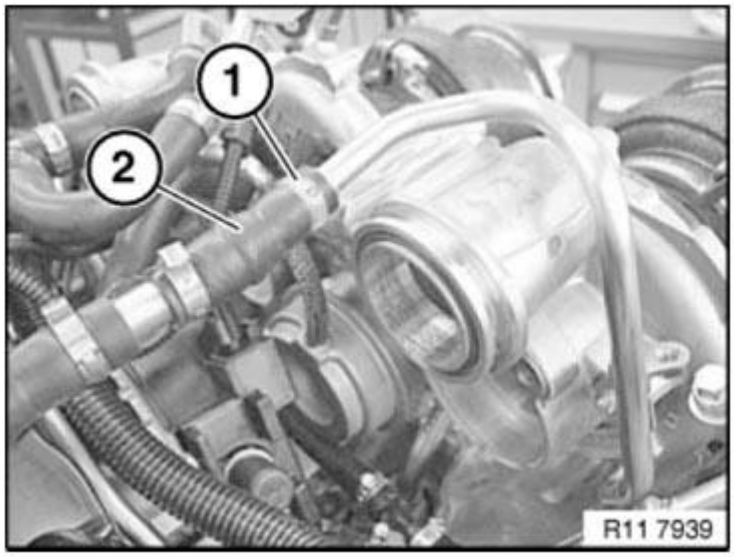


Fig. 479: Identifying Coolant Feed Line And Hose Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

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Release screw (4) with a suitable tool.

NOTE: Oil return pipe (3) can only be removed with turbocharger.

Tightening torque **11 42 10AZ** .

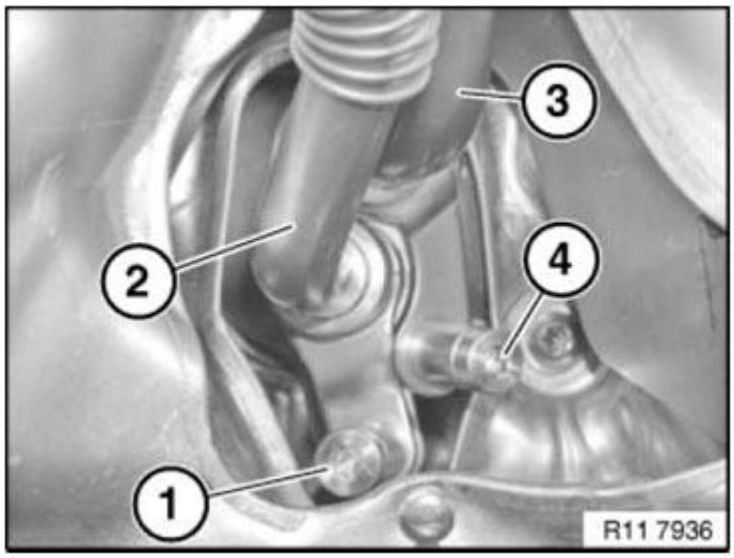


Fig. 480: Identifying Oil Return Pipe With Mounting Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Open V-band clamp (2).

IMPORTANT: Do not mechanically deform oil return line.

Remove turbocharger with oil return line in upward direction.

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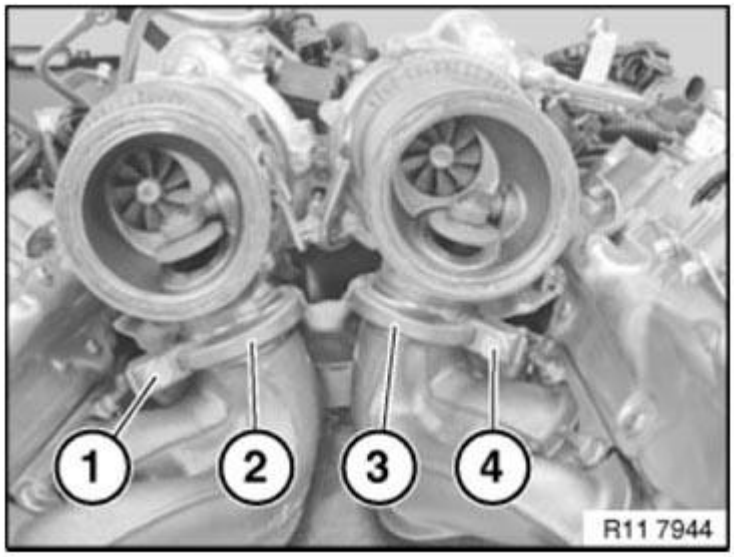


Fig. 481: Identifying V-Band Clamp With Mounting Screws
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, convert coolant feed line to new turbocharger.

Release banjo bolt (1).

Tightening torque **11 53 2AZ** .

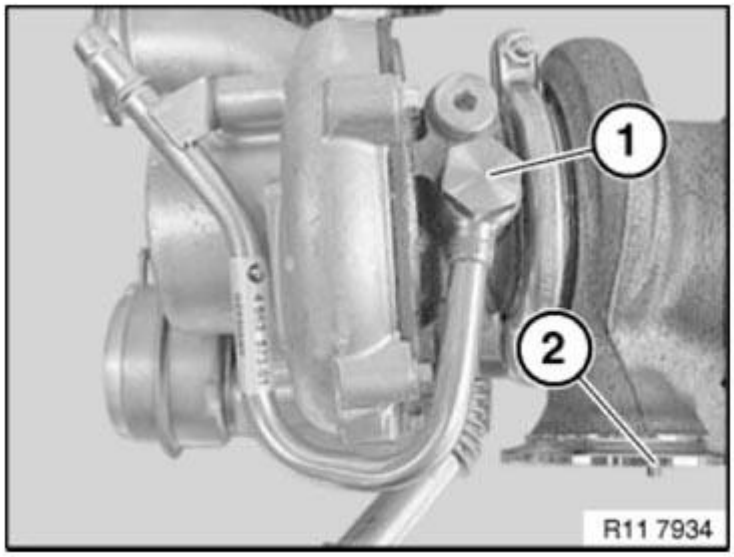


Fig. 482: Identifying Banjo Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

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Tightening torque **11 53 3AZ** .

Modify coolant feed line (2).

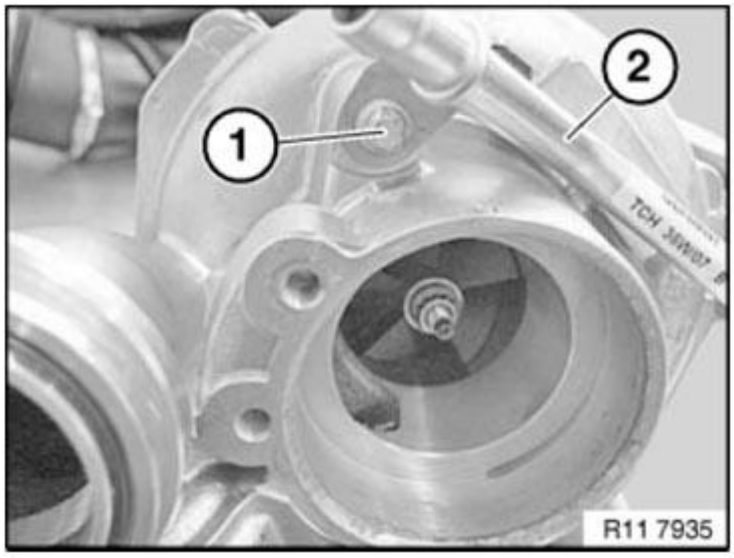


Fig. 483: Identifying Coolant Feed Line With Mounting Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **11 42 9AZ** .

Remove oil return pipe (2).

Installation note:

A new oil return pipe must always be fitted

Replace gasket.

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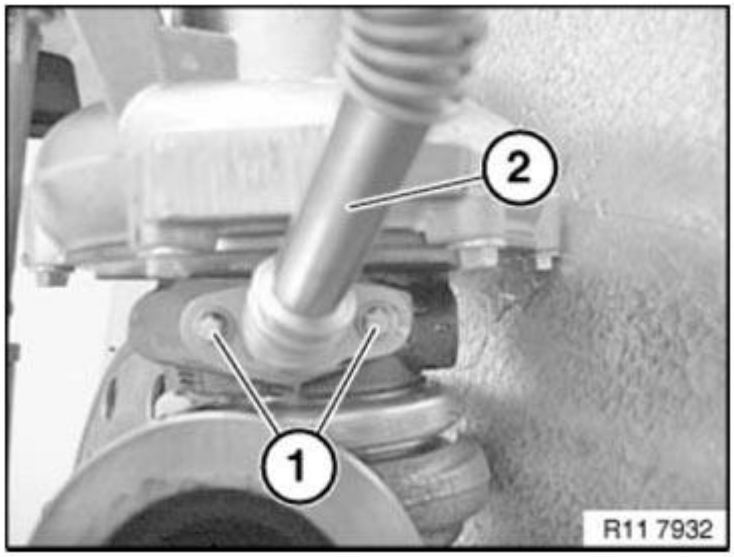


Fig. 484: Identifying Oil Return Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: A deformed oil return pipe can result in leaks.
Risk of fire if oil line is leaking.

The thermal linear compensators (see arrows) on the oil return pipe (1) must not be mechanically deformed.

Installation note:

Moisten oil return pipe at end with engine oil.

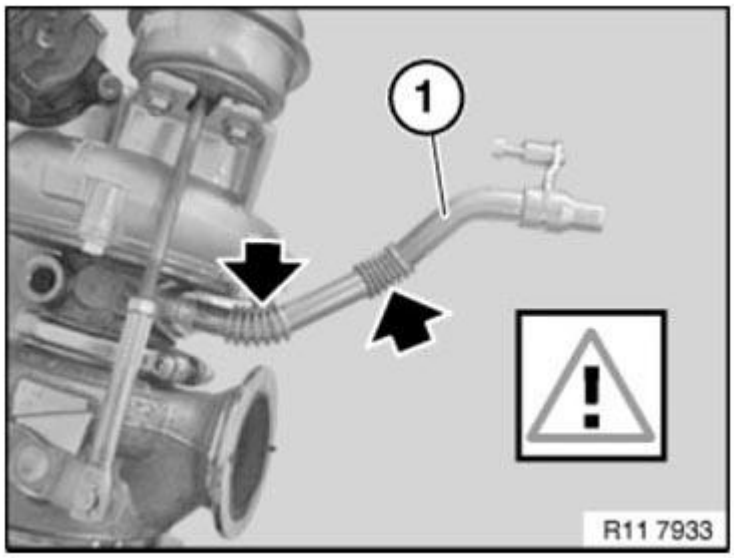


Fig. 485: Identifying Thermal Linear Compensators On Oil Return Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

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Illustration shows special tools.

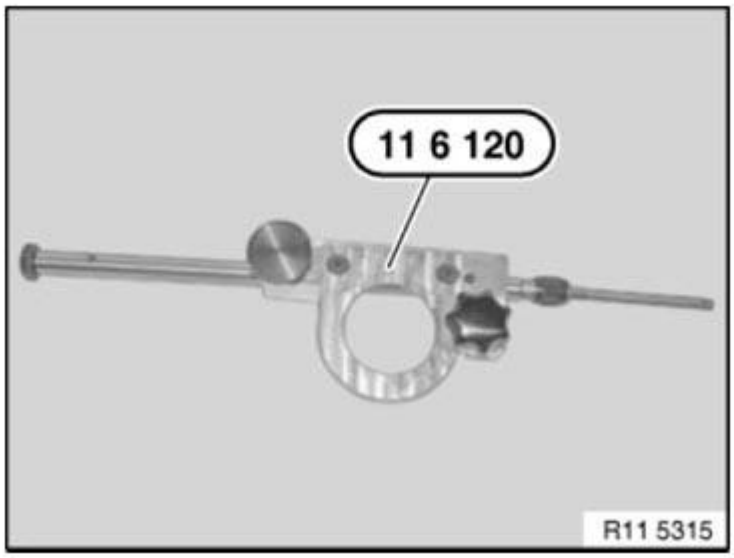


Fig. 486: Identifying Special Tool (11 6 120)
Courtesy of BMW OF NORTH AMERICA, INC.

To install the exhaust turbocharger, special tool 11 6 120, consisting of 11 6 121 and 11 6 123, can be used.

Place special tool (1) on turbocharger and secure with screw (2).

Slide in screw shaft (3) up to mounting bolt (4).

Secure screw shaft (3) with knurled screw (5).

NOTE: Oil return pipe must not be deformed.

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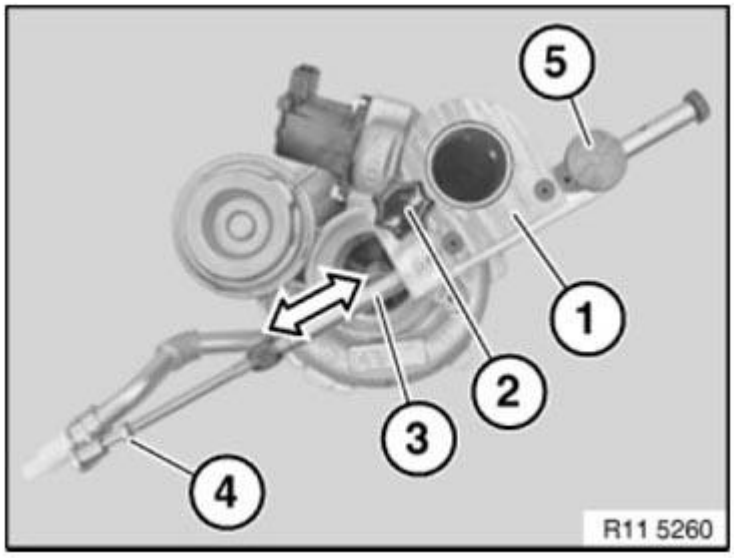


Fig. 487: Sliding Screw Shaft Up To Mounting Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Release knurled screw (5).

Screw oil return pipe to screw shaft (3).

Tightening torque **11 42 10AZ** .

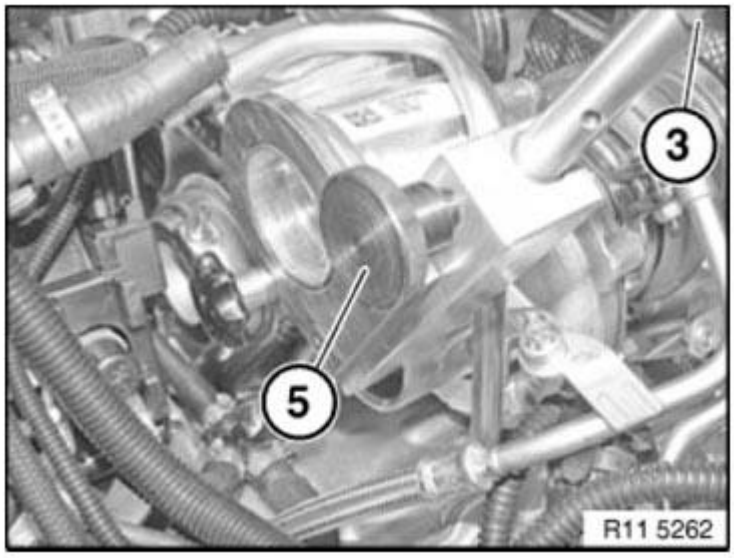


Fig. 488: Identifying Knurled Screw And Screw Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The O - rings can easily fall into the oil duct.

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Installation note:

Replace O-rings on oil return cover (2)

NOTE: Illustration shows turbocharger removed.

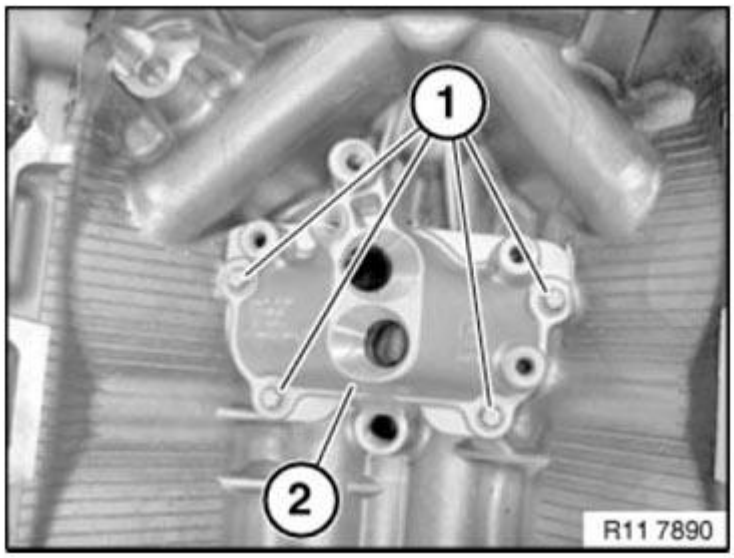


Fig. 489: Identifying Oil Return Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Replace gasket (1) on exhaust manifold.

Installation note:

Check locating apparatus on exhaust manifold.

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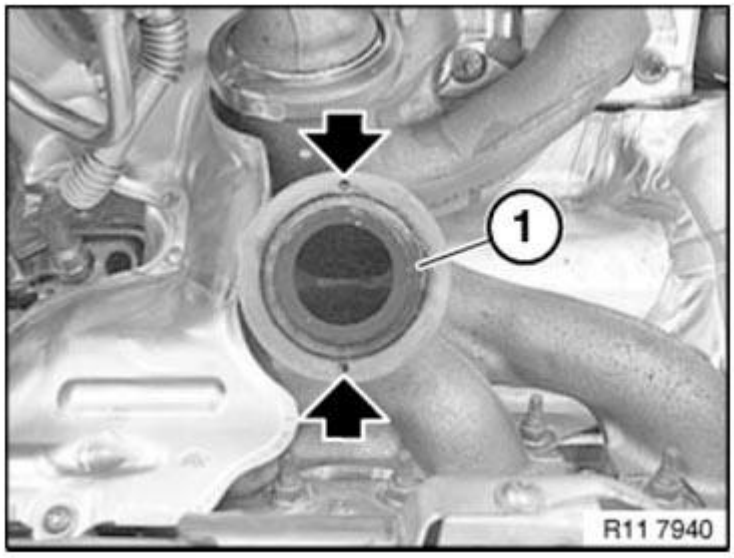


Fig. 490: Locating Apparatus On Exhaust Manifold
Courtesy of BMW OF NORTH AMERICA, INC.

Position turbocharger with oil return line on exhaust manifold.

Position V-band clamp (2).

Insert screw (1).

Tightening torque **11 65 1AZ** .

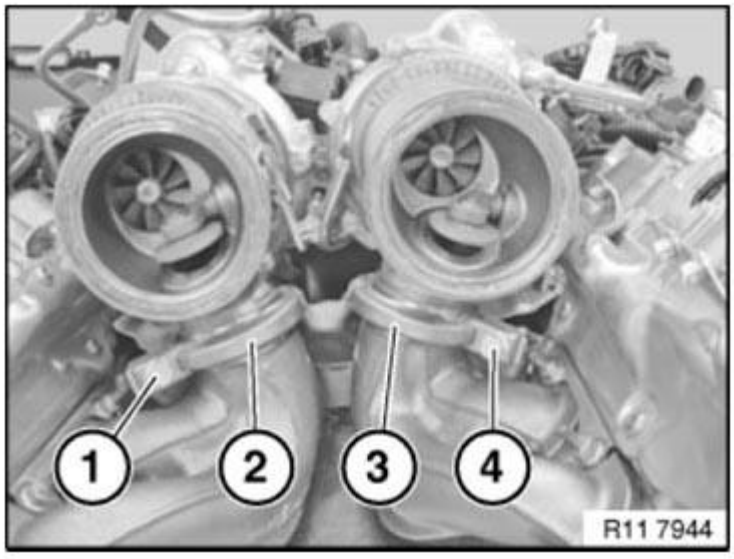


Fig. 491: Identifying V-Band Clamp With Mounting Screws
Courtesy of BMW OF NORTH AMERICA, INC.

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Installation note:

The ends of the V - band clamp must rest parallel to each other.

Tightening torque **11 65 1AZ** .

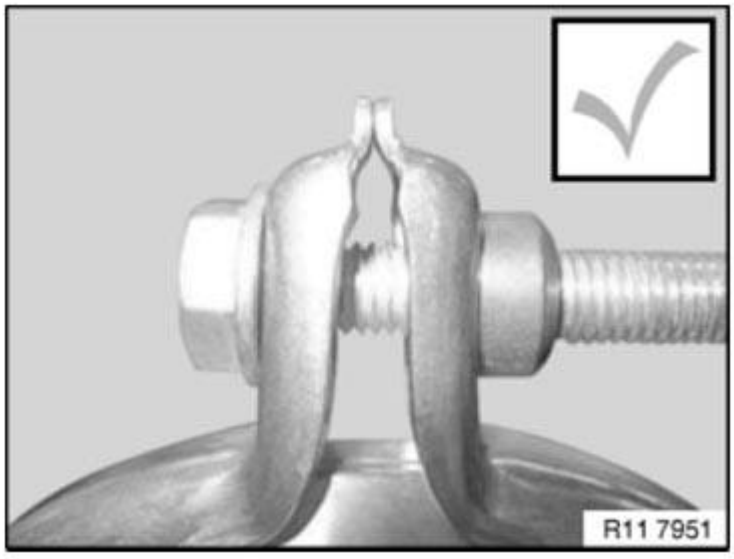


Fig. 492: Identifying V-Band Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Screw connection of V-band clamp is too loose:

If you can see a gap between the ends of the V-band clamps, release and then repeat the screw connection.

Tightening torque **11 65 1AZ** .

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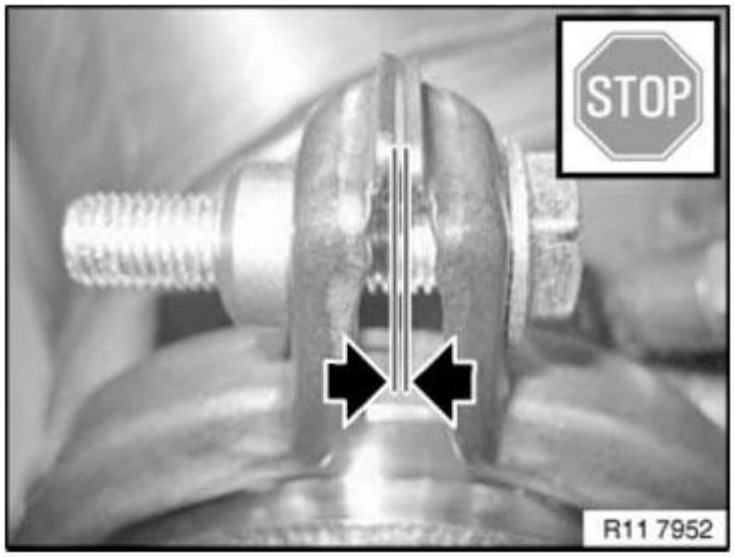


Fig. 493: Locating V-Band Clamp Gap
Courtesy of BMW OF NORTH AMERICA, INC.

Screw connection of V-band clamp is too tight:

If the ends of the V-band clamp are positioned under each other, release and then repeat the screw connection.

Tightening torque **11 65 1AZ** .

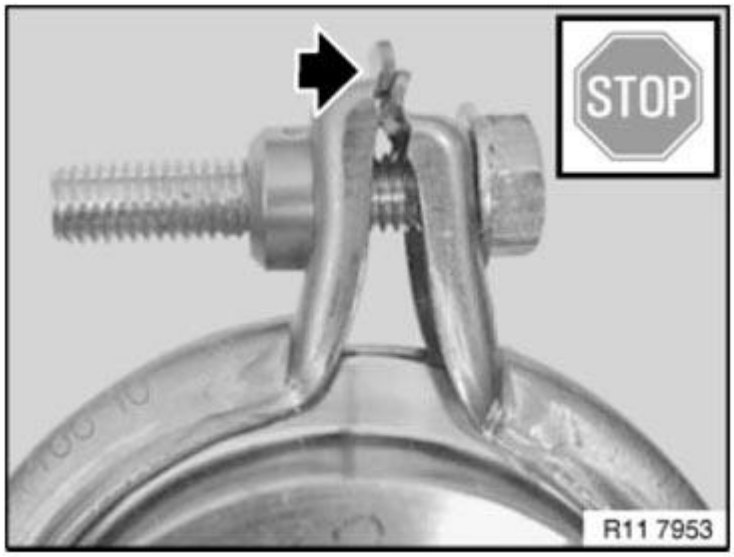


Fig. 494: Locating V-Band Clamps Position
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of mixing up vacuum hoses.

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Vacuum hose (1) for cylinders 5-8

Old version: black/blue

New version: black/yellow

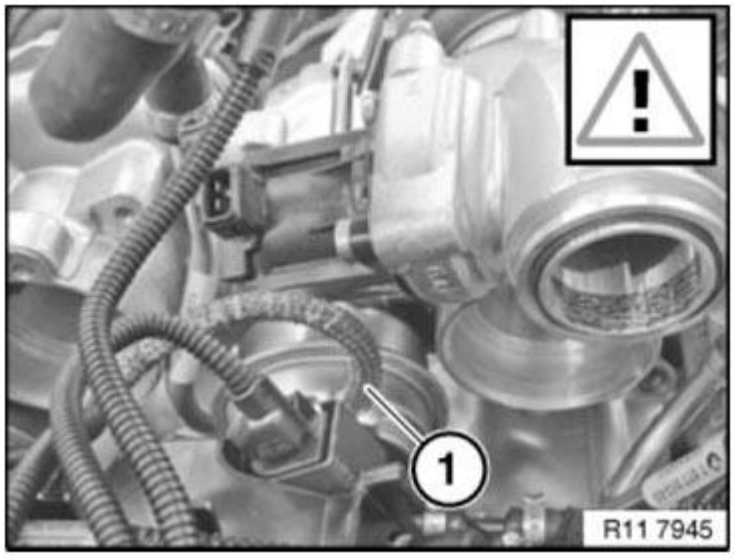


Fig. 495: Identifying Vacuum Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check **VACUUM CONNECTIONS** .

Observe BMW diagnosis instructions.

1. Complete vehicle
2. Powertrain
3. Engine electrical system
4. Air supply
5. Charging pressure control

1165025 REMOVING AND INSTALLING/REPLACING EXHAUST TURBOCHARGER, RIGHT, CYLINDERS 1-4 (N63)

Notes

IMPORTANT: Risk of fire if oil lines are leaking.
Risk of mixing up vacuum hoses.

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Necessary preliminary work

- Remove **CATALYTIC CONVERTER** , cylinders 1-4

Disconnect plug connection (1) on electric changeover valve (2).

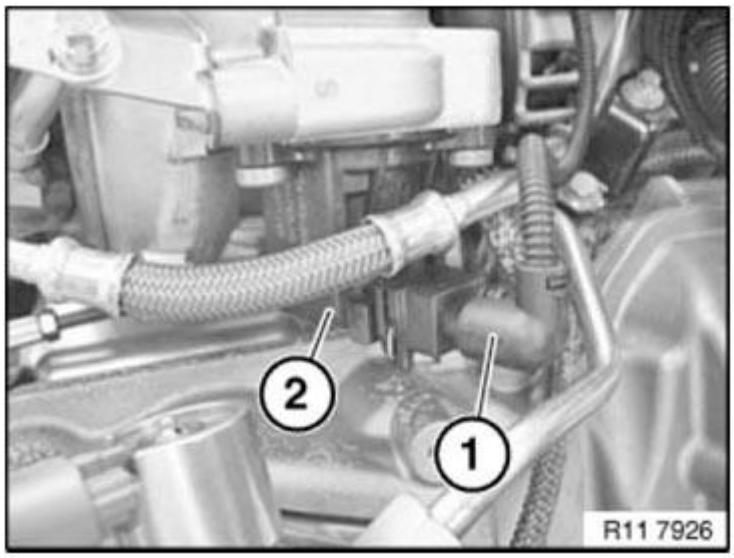


Fig. 496: Identifying Plug Connection On Electric Changeover Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 42 7AZ** .

Unfasten banjo bolt (2).

Tightening torque **11 42 4AZ** .

Lay oil line (3) from turbocharger to side.

Installation note:

Replace all sealing rings

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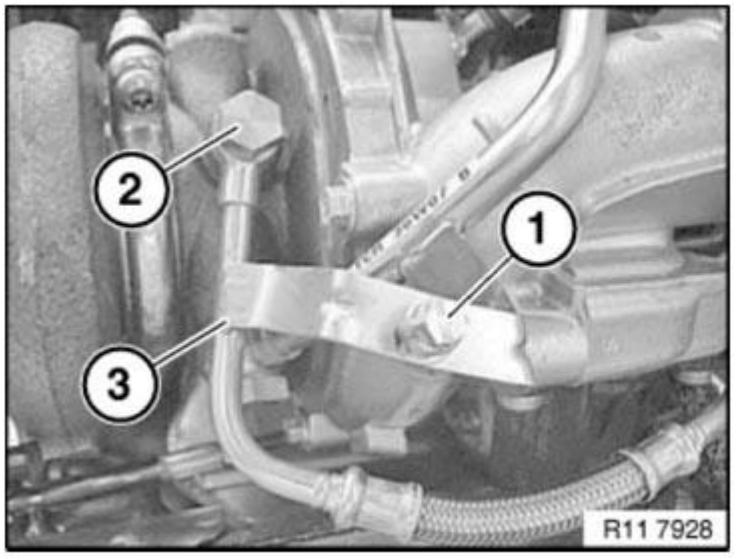


Fig. 497: Identifying Oil Line With Banjo Bolt And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 53 3AZ** .

Release banjo bolt (2).

Tightening torque **11 53 2AZ** .

Lay coolant return line (3) to one side.

Installation note:

Replace all sealing rings

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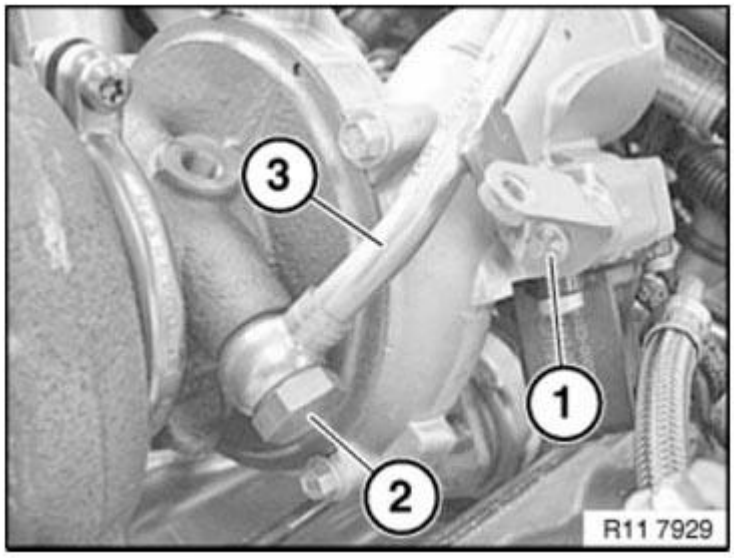


Fig. 498: Identifying Coolant Return Line With Banjo Bolt And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Open hose clamp (1).

Detach coolant feed line (2).

Installation note:

Replace hose clamp (1)

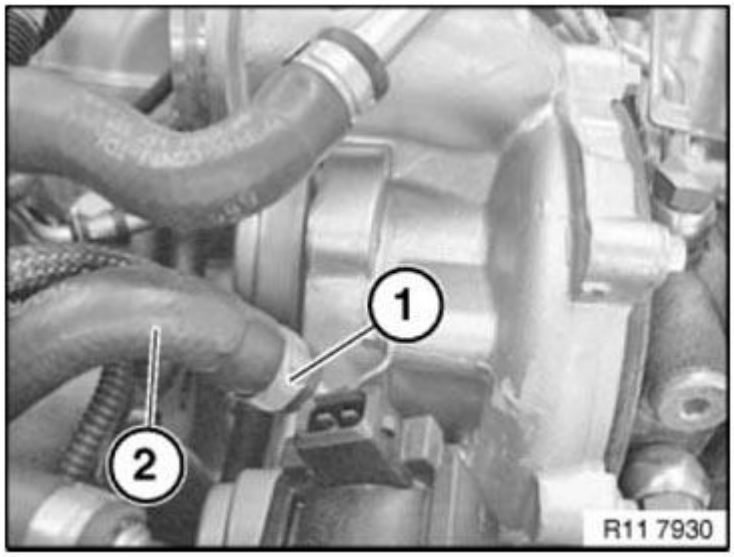


Fig. 499: Identifying Coolant Feed Line And Hose Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

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Release screw (1) with a suitable tool.

NOTE: Oil return pipe (2) can only be removed with turbocharger.

Tightening torque **11 42 10AZ** .

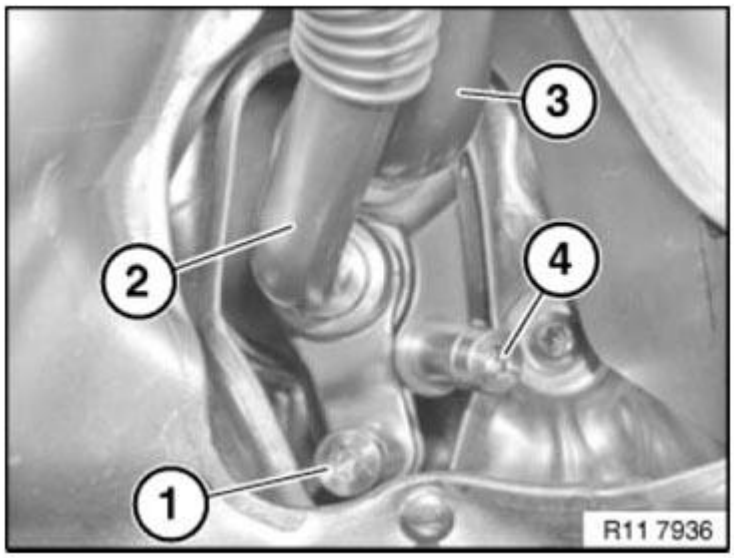


Fig. 500: Identifying Oil Return Pipe With Mounting Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (4).

Open V-band clamp (3).

IMPORTANT: Do not mechanically deform oil return line.

Remove turbocharger with oil return line in upward direction.

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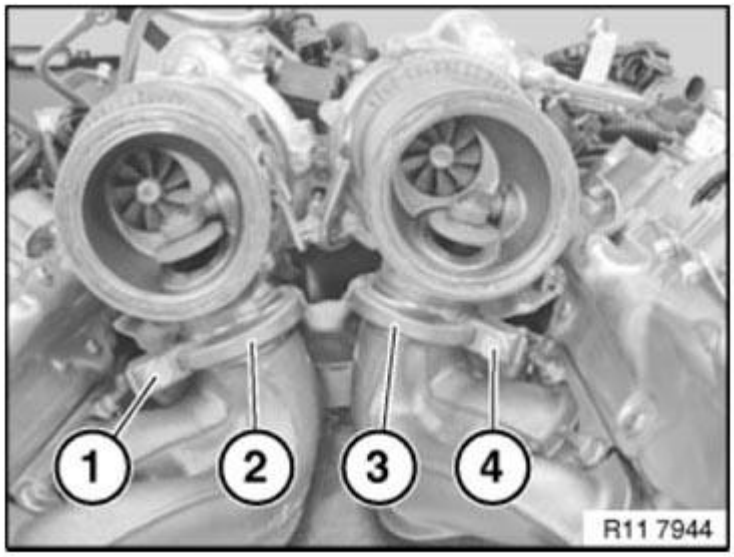


Fig. 501: Identifying V-Band Clamp With Mounting Screws
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, convert coolant feed line to new turbocharger.

Release banjo bolt (1).

Tightening torque **11 53 2AZ** .

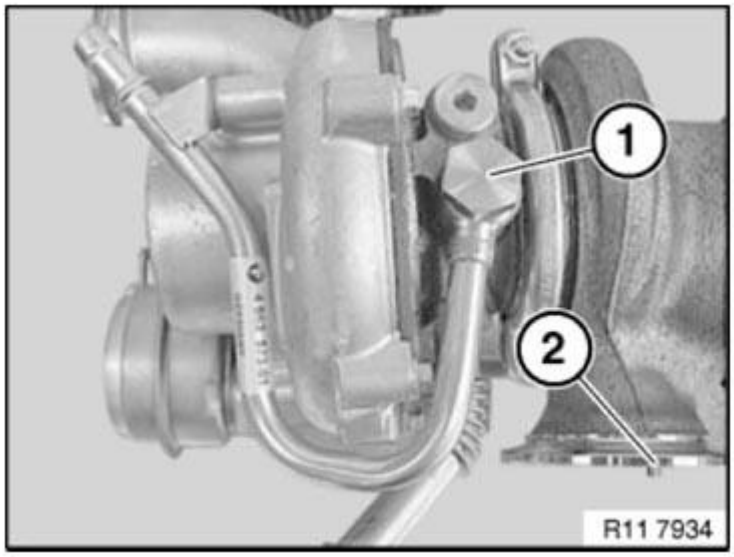


Fig. 502: Identifying Banjo Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

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Tightening torque **11 53 3AZ** .

Modify coolant feed line (2).

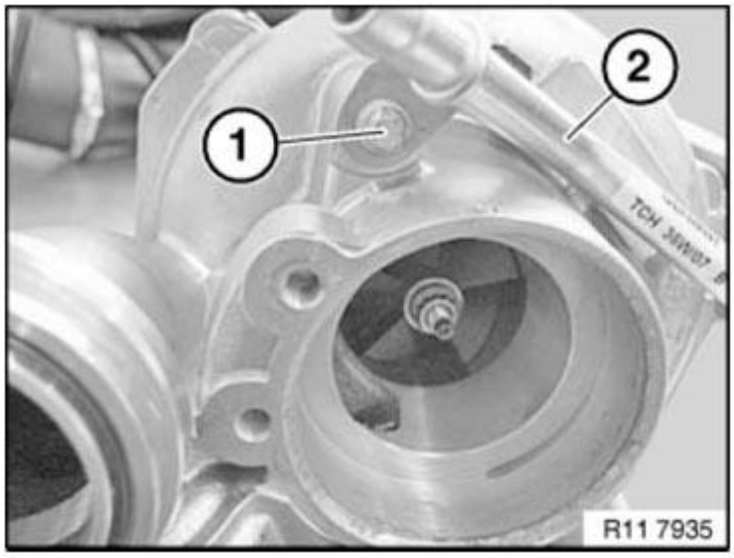


Fig. 503: Identifying Coolant Feed Line With Mounting Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **11 42 9AZ** .

Remove oil return pipe (2).

Installation note:

A new oil return pipe must always be fitted

Replace gasket.

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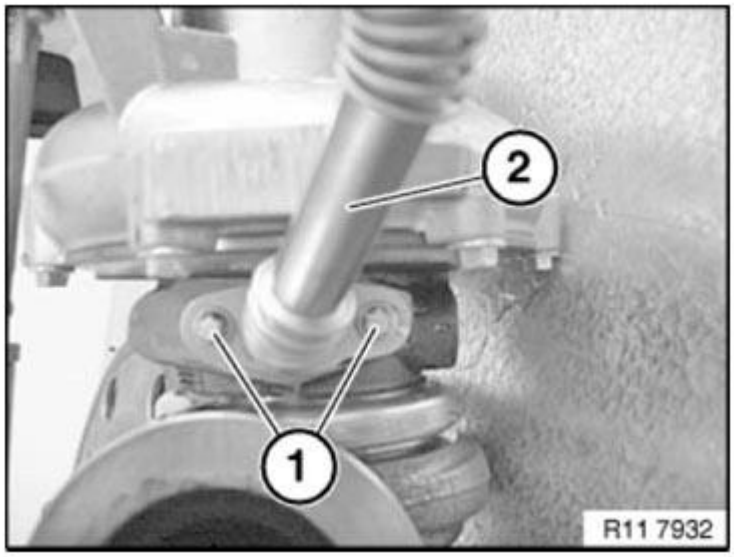


Fig. 504: Identifying Oil Return Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: A deformed oil return pipe can result in leaks.
Risk of fire if oil line is leaking.

The thermal linear compensators (see arrows) on the oil return pipe (1) must not be mechanically deformed.

Installation note:

Moisten oil return pipe at end with engine oil.

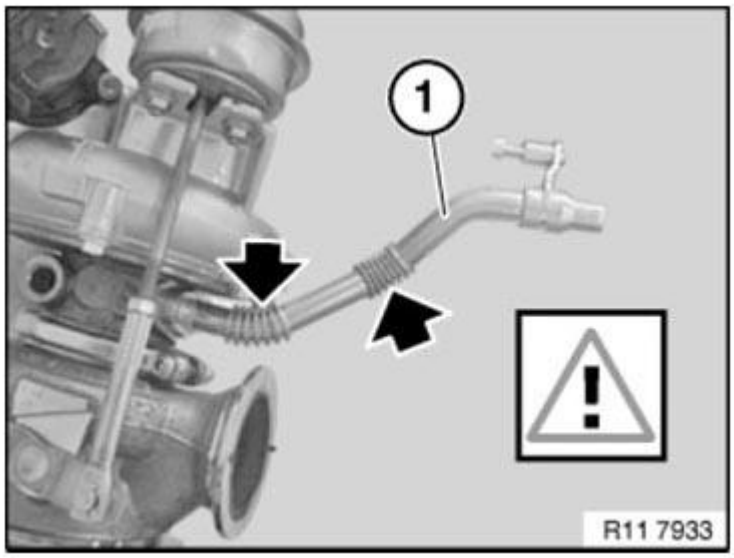


Fig. 505: Identifying Thermal Linear Compensators On Oil Return Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

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Illustration shows special tools.

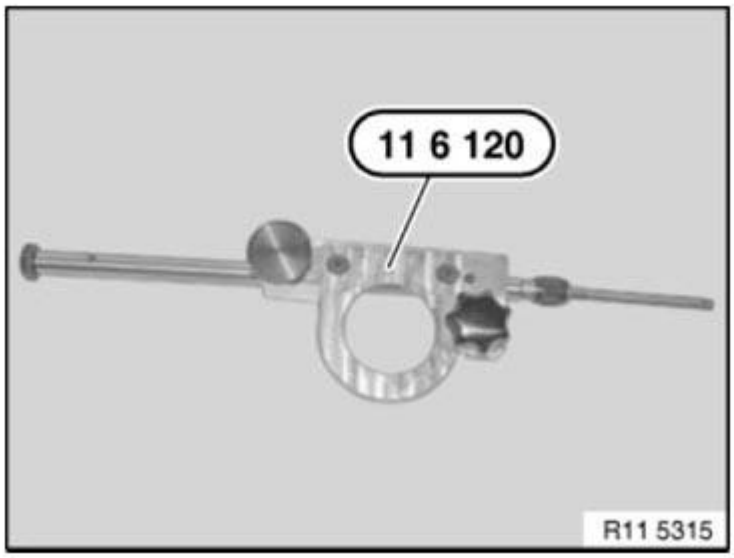


Fig. 506: Identifying Special Tool (11 6 120)
Courtesy of BMW OF NORTH AMERICA, INC.

To install the exhaust turbocharger, special tool 11 6 120, consisting of 11 6 122 and 11 6 123, can be used.

Place special tool (1) on turbocharger and secure with screw (2).

Slide in screw shaft (3) up to mounting bolt (4).

Secure screw shaft (3) with knurled screw (5).

NOTE: Pipe must not be deformed.

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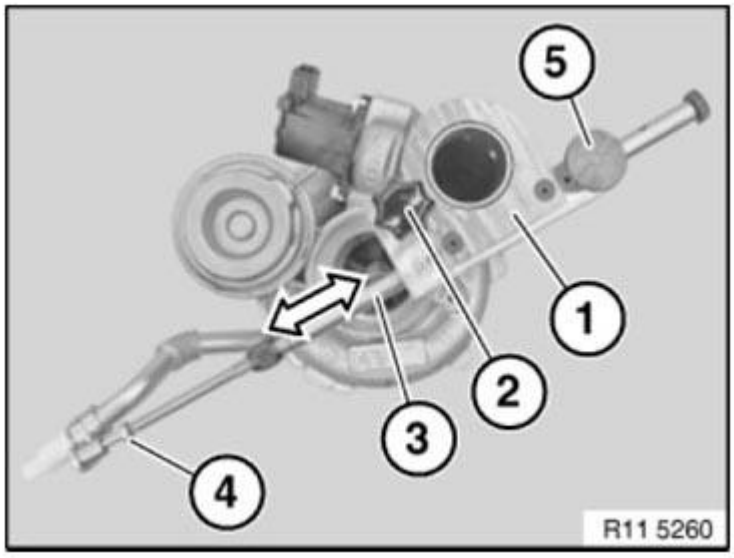


Fig. 507: Sliding Screw Shaft Up To Mounting Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

To screw the oil return pipe, it is necessary to release knurled screw (5) again.

Screw oil return pipe to screw shaft (3).

Tightening torque **11 42 10AZ** .

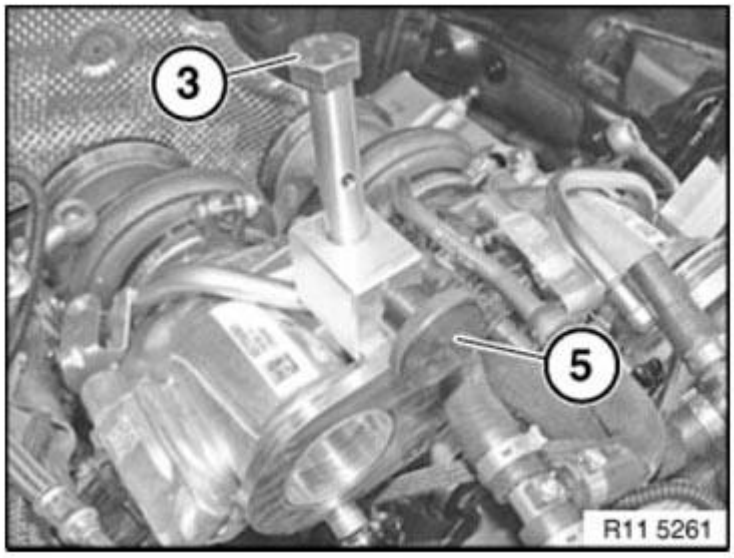


Fig. 508: Identifying Knurled Screw And Screw Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The O-rings can easily fall into the oil duct.

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Installation note:

Replace O-rings on oil return cover (2)

NOTE: Illustration shows turbocharger removed.

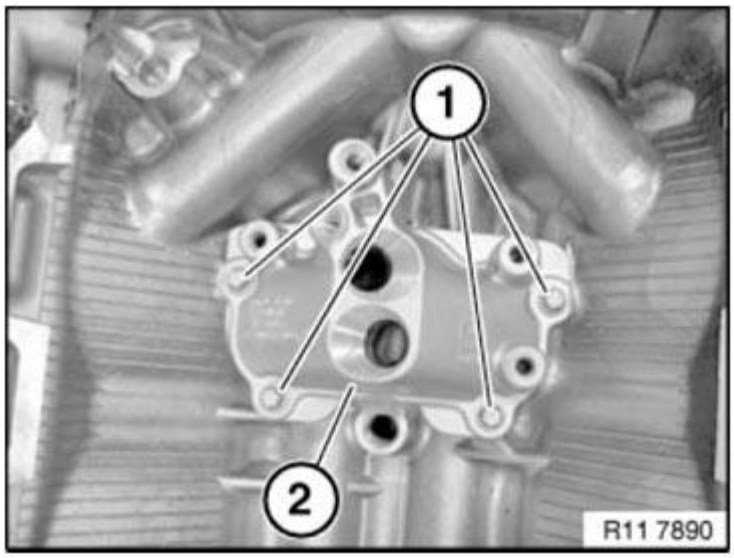


Fig. 509: Identifying Oil Return Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace gasket on exhaust manifold

Installation note:

Check locating apparatus on exhaust manifold.

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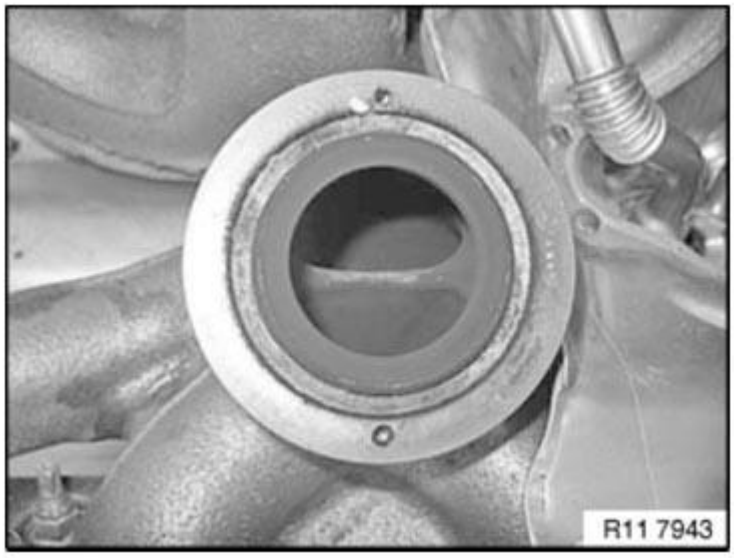


Fig. 510: Identifying Apparatus On Exhaust Manifold
Courtesy of BMW OF NORTH AMERICA, INC.

Position turbocharger with oil return line on exhaust manifold.

Position V-band clamp (3).

Insert bolt (4).

Tightening torque **11 65 1AZ** .

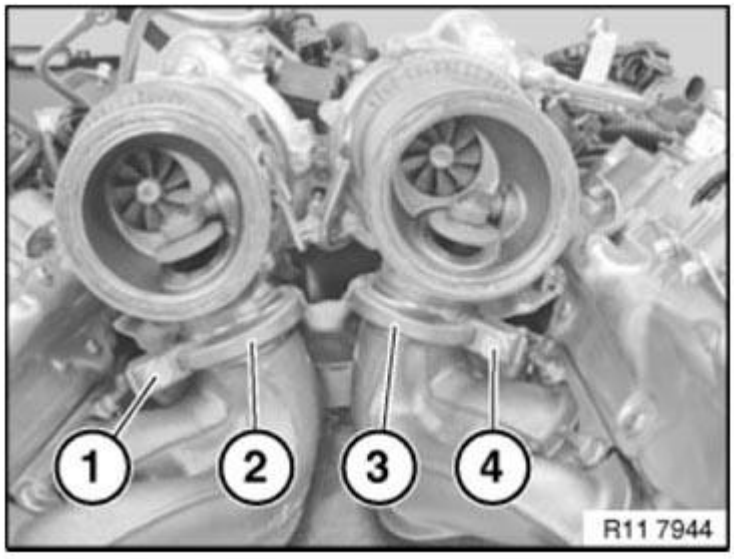


Fig. 511: Identifying V-Band Clamp With Mounting Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

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Installation note:

The ends of the V-band clamp must rest parallel to each other.

Tightening torque **11 65 1AZ** .

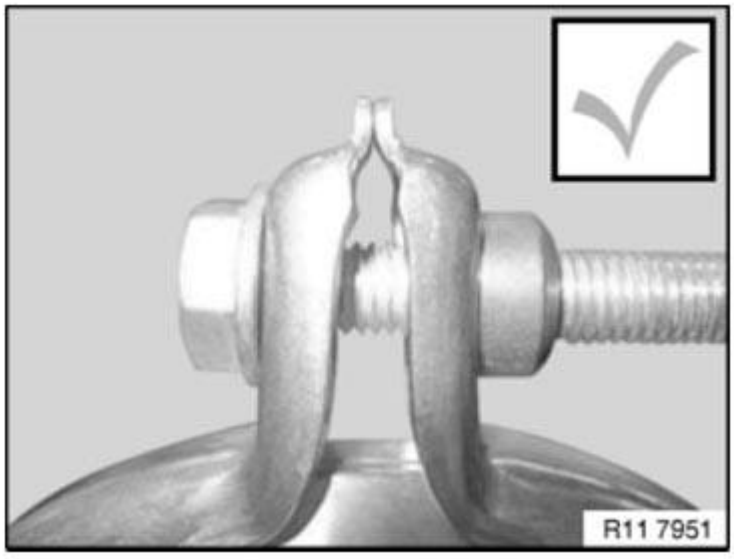


Fig. 512: Identifying V-Band Clamp Installation Position
Courtesy of BMW OF NORTH AMERICA, INC.

Screw connection of V-band clamp is too loose:

If you can see a gap between the ends of the V-band clamps, release and then repeat the screw connection.

Tightening torque **11 65 1AZ** .

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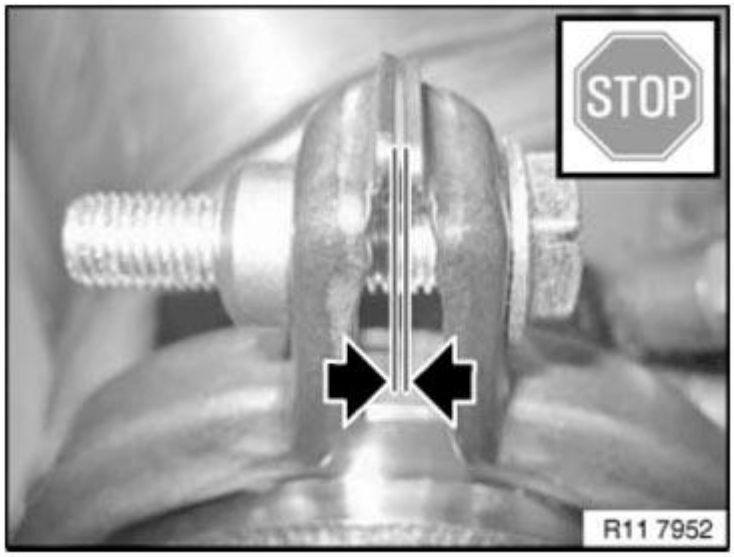


Fig. 513: Locating V-Band Clamp Gap
Courtesy of BMW OF NORTH AMERICA, INC.

Screw connection of V-band clamp is too tight:

If the ends of the V-band clamp are positioned under each other, release and then repeat the screw connection.

Tightening torque **11 65 1AZ** .

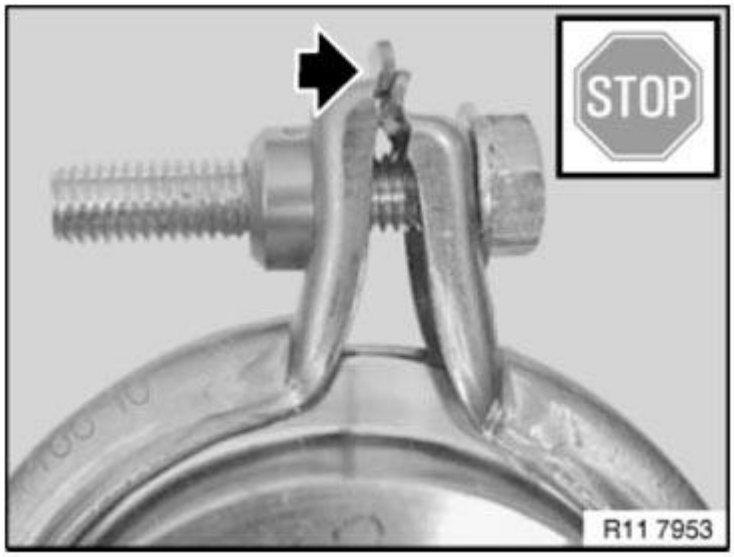


Fig. 514: Locating V-Band Clamp Position
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of mixing up vacuum hoses.

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Vacuum hose (1) black/red for cylinders 1-4.

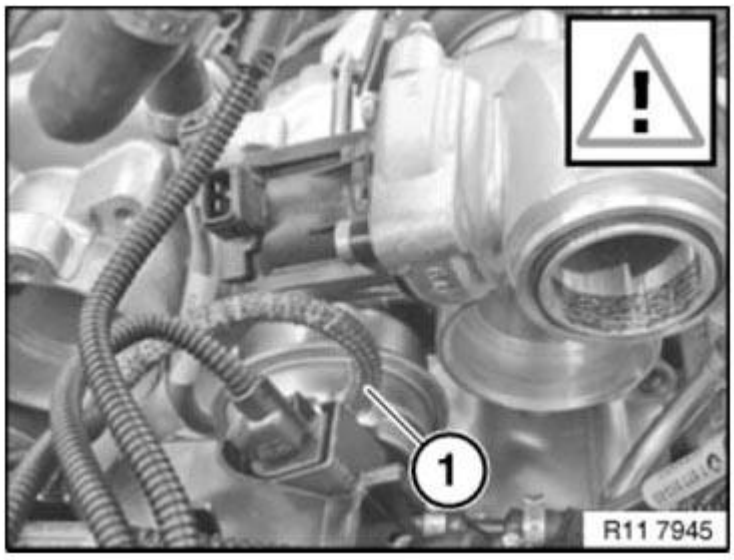


Fig. 515: Identifying Vacuum Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check **VACUUM CONNECTIONS** .

Observe BMW diagnosis instructions.

1. Complete vehicle
2. Powertrain
3. Engine electrical system
4. Air supply
5. Charging pressure control

1161065 REMOVING AND INSTALLING/REPLACING LEFT INTAKE PLENUM (N63)

Necessary preliminary work

- Remove left **INJECTION PIPE** .
- Remove **THROTTLE VALVE**
- Release screws on intake plenum from above without fail before lowering front axle.
- Secure **ENGINE** in installation position.
- Lower front axle, releasing screws on engine mount first. See **LOWERING/RAISING FRONT AXLE SUPPORT (UNIVERSAL LIFTER)** .
- Release power steering pump, if installed, and set aside. See **POWER STEERING PUMP FOR**

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HYDRAULIC STEERING GEAR WITH DYNAMIC DRIVE (N63) or **POWER STEERING PUMP FOR POWER STEERING GEAR WITH ACTIVE FRONT STEERING (N63)** .

- **UNIVERSAL JOINT** with corrugated tubing.

Detach engine ventilation hose (1).

Disconnect connector.

Unscrew nuts (2).

Tightening torque: **11 61 1 AZ** .

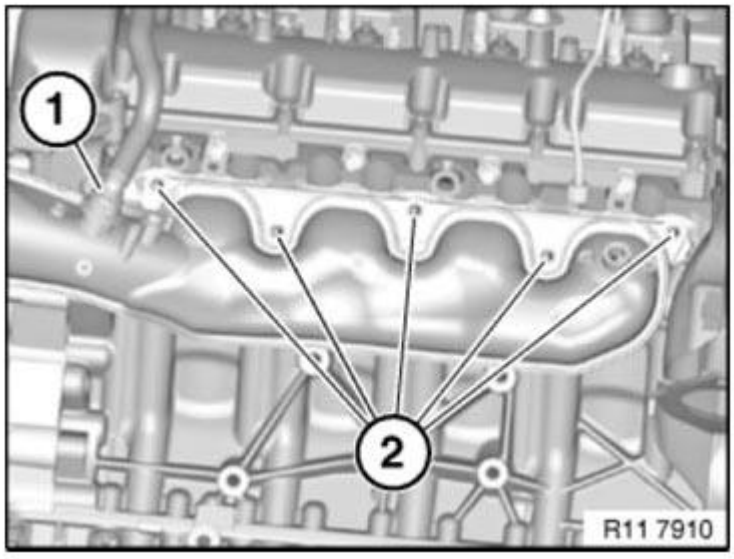


Fig. 516: Identifying Engine Ventilation Hose And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Release **THROTTLE VALVE** (1).

Release holder screw (2) on intake plenum.

Tightening torque: **11 61 2AZ** .

Feed out intake plenum towards rear.

Installation note:

Replace all profile seals.

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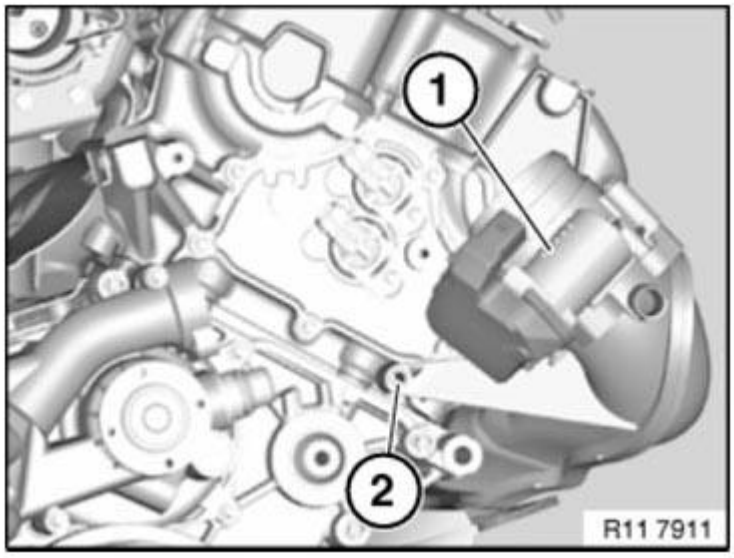


Fig. 517: Identifying Throttle Valve Assembly (N63) And Holder Screw On Intake Plenum
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine and vehicle and

Check air intake system for leaks.

1165010 REMOVING AND INSTALLING/REPLACING PRESSURE ACCUMULATOR (N63)

Necessary preliminary work

- Remove both exhaust turbochargers. See **EXHAUST TURBOCHARGER, RIGHT, CYLINDERS 1-4** and **EXHAUST TURBOCHARGER, LEFT, CYLINDERS 5-8**.
- Remove both exhaust manifolds. See **LEFT EXHAUST MANIFOLD** and **RIGHT EXHAUST MANIFOLD** .
- Remove **HEAT SHIELD** at bottom

Release banjo bolt (1).

Tightening torque **11 42 3AZ** .

Installation note:

Replace sealing ring

Release screw (3) on engine oil line.

Remove engine oil line (2).

Release screws (3) on vacuum reservoir (4).

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Tightening torque **11 65 6AZ** .

Remove vacuum reservoir (4).

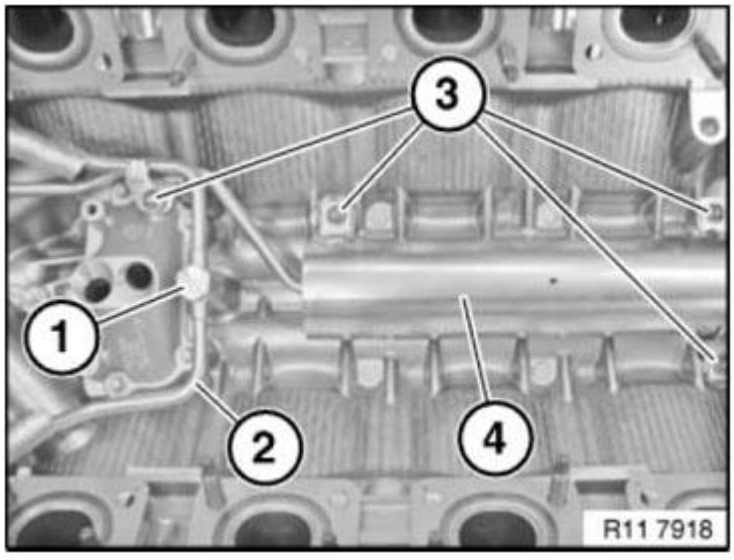


Fig. 518: Identifying Banjo Bolt, Screws And Vacuum Reservoir
Courtesy of BMW OF NORTH AMERICA, INC.

Check **VACUUM CONNECTIONS** for correct routing.

Check **VACUUM SYSTEM FOR LEAKS** .

Assemble engine.

1161068 REMOVING AND INSTALLING/REPLACING RIGHT INTAKE PLENUM (N63)

Necessary preliminary work

- Remove right **INJECTION PIPE** .
- Remove **THROTTLE VALVE**
- Release screws on intake plenum from above without fail before lowering front axle.
- Secure **ENGINE** in installation position.
- Lower **FRONT AXLE** , releasing screws on engine mount first
- Release A/C compressor and place to one side. See **REMOVING AND INSTALLING/REPLACING HEATING AND AIR CONDITIONING SYSTEM COMPRESSOR (N63, WITH DYNAMIC DRIVE)** .

Detach engine ventilation hose (1).

Disconnect connector.

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Unscrew nuts (2).

Tightening torque: **11 61 1 AZ** .

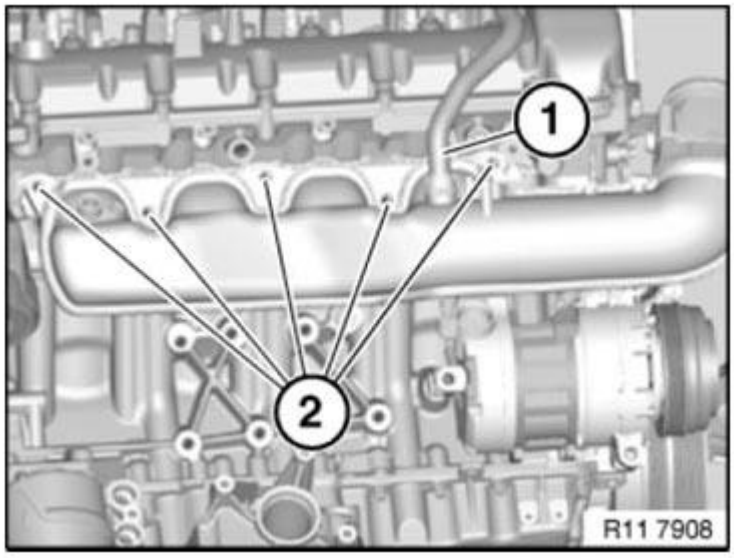


Fig. 519: Identifying Engine Ventilation Hose And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Remove **THROTTLE VALVE** (2).

Release screw (1).

Tightening torque: **11 61 2 AZ** .

Feed out intake plenum towards rear.

Installation note:

Replace all profile seals.

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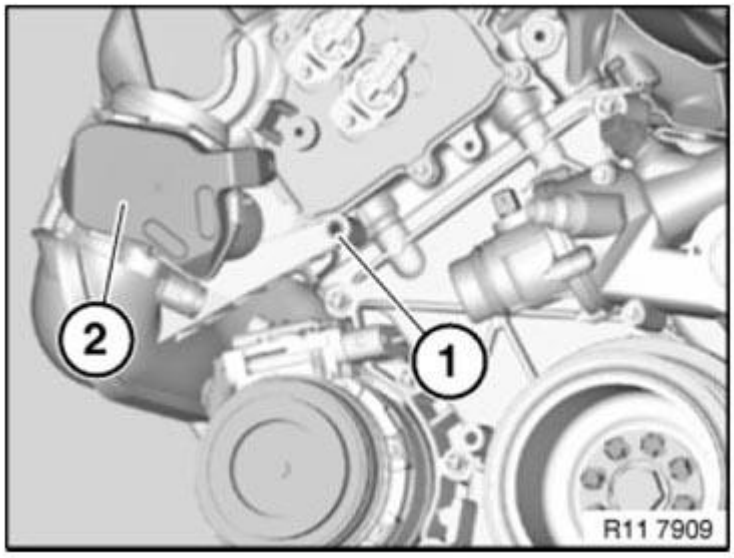


Fig. 520: Identifying Screw And Throttle Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine and vehicle.

Check air intake system for leaks.

1166 VACUUM PUMP

1166000 REMOVING AND INSTALLING/REPLACING VACUUM PUMP (N63)

IMPORTANT: Installation note:
Due to the risk of damage to the engine gaskets/seals and the lack of brake boosting, make sure before starting the engine that all the vacuum lines are connected.

Vacuum pump is fitted on cylinder head 1 to 4 at rear on intake camshaft.

Necessary preliminary work

- Press brake pedal several times in order to reduce vacuum pressure in brake booster.
- Remove right **CATALYTIC CONVERTER** .
- Remove right heat shield.
- Detach vacuum line from vacuum pump.

Release screws (1).

Remove heat shield (2).

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Remove vacuum hose.

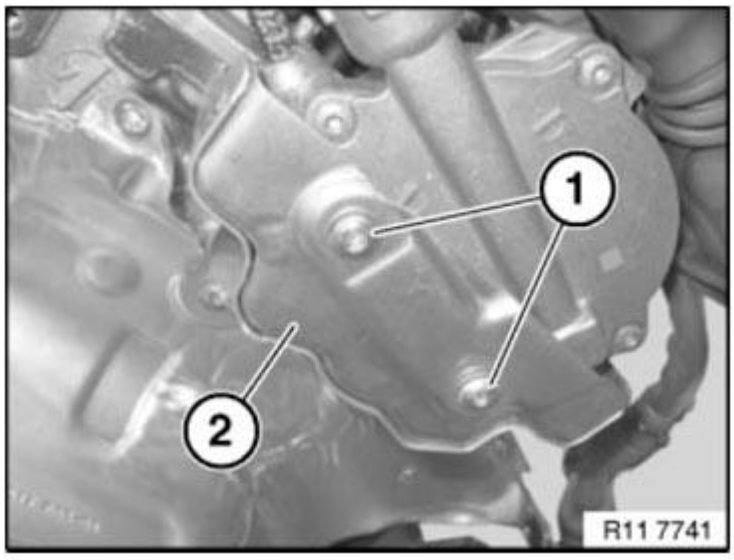


Fig. 521: Identifying Heat Shield With Mounting Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

NOTE: Bolts (1) are secured against falling out.

Release screw (2).

Remove vacuum pump (3).

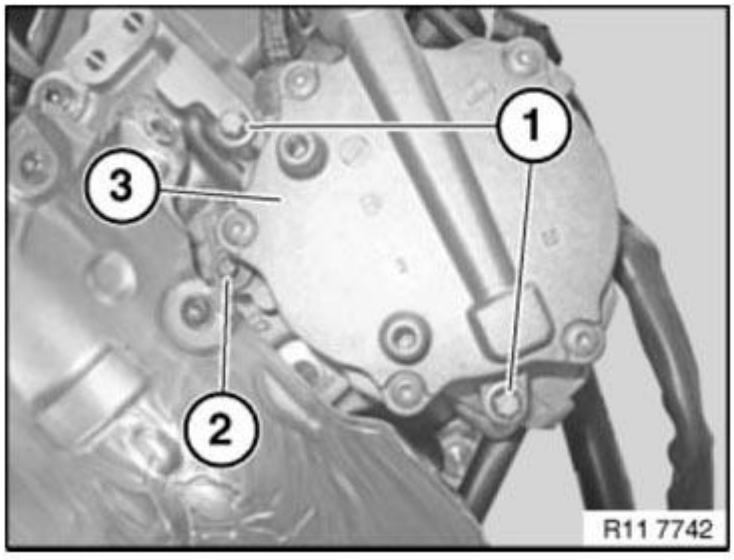


Fig. 522: Identifying Vacuum Pump With Mounting Bolts And Screws

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Courtesy of BMW OF NORTH AMERICA, INC.

Drive (1) must be rotated into correct position prior to installation.

Installation note:

Replace sealing ring (2) and coat with grease to facilitate fitting.

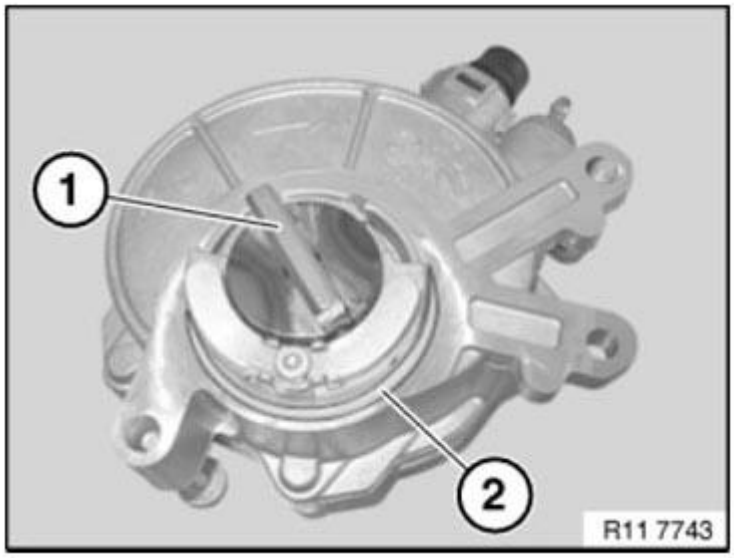


Fig. 523: Identifying Sealing Ring And Drive
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Align vacuum pump drive to groove (1) of intake camshaft.

Vacuum pump can best be installed when groove (1) is vertically aligned.

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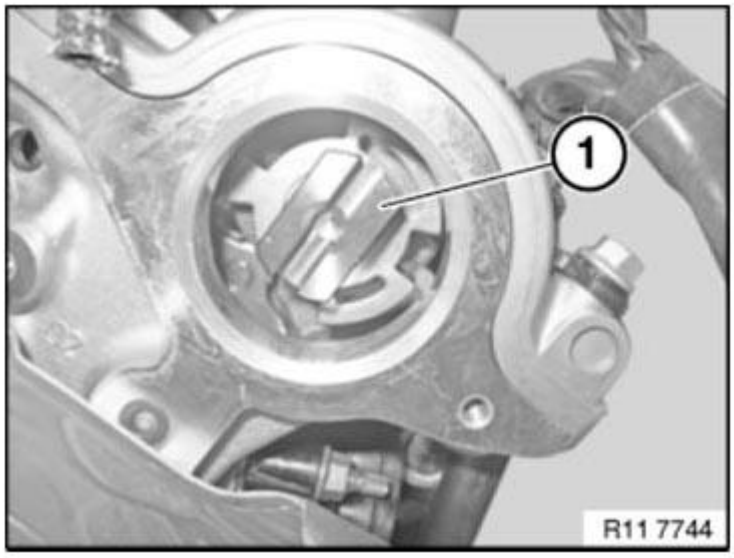


Fig. 524: Identifying Intake Camshaft Groove
Courtesy of BMW OF NORTH AMERICA, INC.

Check function of DME.

Check vacuum pump for leaks and correct operation.

1174 EL.VALVE FOR EXH. GAS RECIRCULATION

1174509 REPLACING BOTH PRESSURE CONVERTERS FOR TURBOCHARGER (N63)

Necessary preliminary work

- Partially release charge air cooler **EXPANSION TANK** .
- Partially release **AUXILIARY WATER PUMP** for exhaust turbocharger (not F04).
- Disconnect plug connection at **COOLANT THERMOSTAT** .

Pressure converter, cylinders 1-4

Disconnect plug connection (1) on pressure converter.

Installation note:

Plug connection (1) must snap audibly into place!

Disconnect black vacuum hose at connection (VAC = vacuum reservoir).

Disconnect black/red vacuum hose at connection (OUT= turbocharger vacuum unit).

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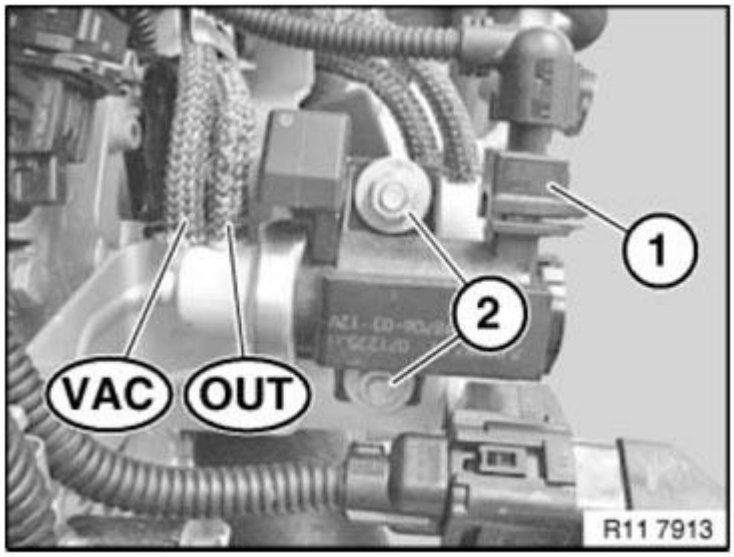


Fig. 525: Identifying Black/Red Vacuum Hose And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (2).

Tightening torque **11 65 8AZ** .

Remove pressure converter.

Pressure converter, cylinders 5-8

Disconnect plug connection (1) on pressure converter.

Installation note:

Plug connection (1) must snap audibly into place!

Disconnect black vacuum hose at connection (VAC = vacuum reservoir).

Disconnect black/blue vacuum hose at connection (OUT= turbocharger vacuum unit).

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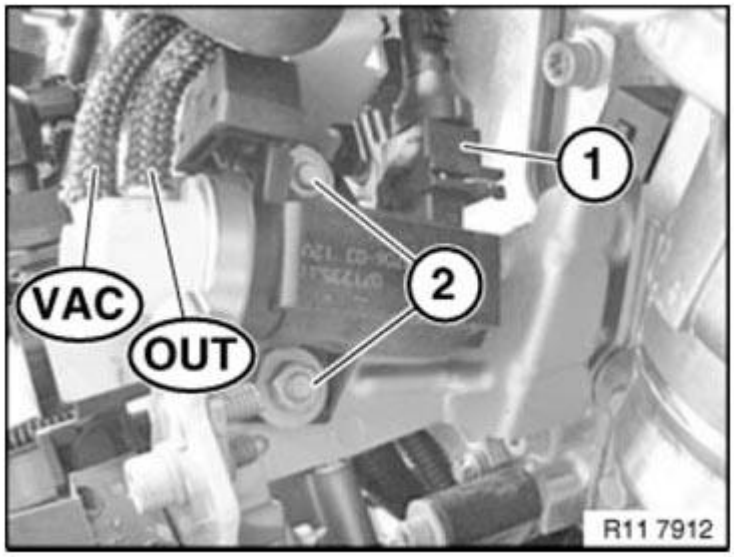


Fig. 526: Identifying Black/Blue Vacuum Hose Connection With Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (2).

Tightening torque **11 65 8AZ** .

Remove pressure converter.

Check activation via BMW diagnosis system.

1178 EMISSION CONTROL, OXYGEN SENSOR

1178530 REPLACING LEFT CONTROL SENSOR (N63)

Notes

WARNING: **Risk of burning!**
Only perform this work after engine has cooled down.

Necessary preliminary work

- Check function of DME control unit
- Switch off ignition
- Remove **AIR FILTER HOUSING**

Unlock plug connection and detach.

Unclip control sensor cable at retaining clips.

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Release control sensor with special tool **11 7 020** .

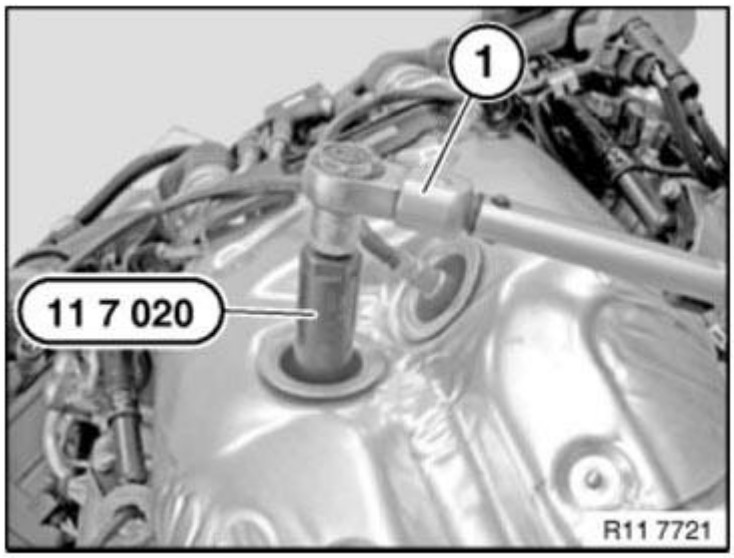


Fig. 527: Releasing Control Sensor Using Special Tool 11 7 020
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The threads of new lambda control/monitoring sensors are already coated with Never Seez Compound (refer to BMW Parts Department).

If a lambda control/monitoring sensor is to be reused, apply a thin and even coating of Never Seez Compound to the thread only.

The part of the lambda control/monitoring sensor which projects into the exhaust branch (sensor ceramics) must **not** be cleaned and **not** coated with lubricant.

Secure control sensor with special tool **11 7 020** and a torque wrench (1).

Tightening torque **11 78 1AZ** .

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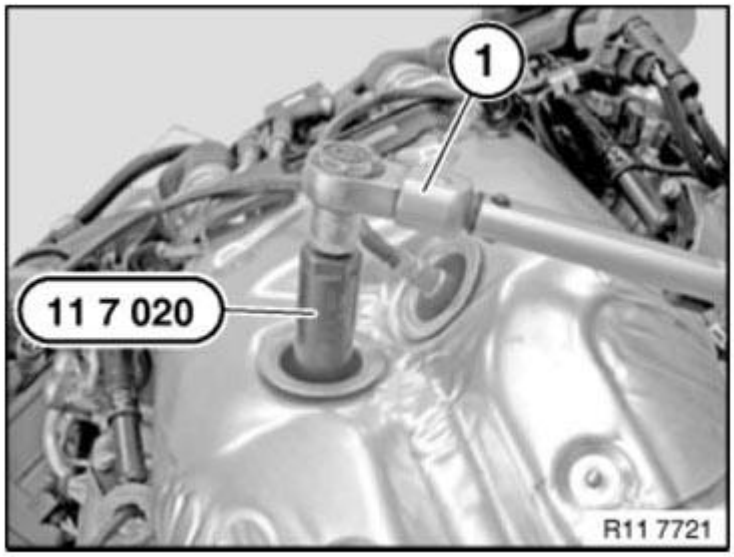


Fig. 528: Securing Control Sensor Using Special Tool 11 7 020 And Torque Wrench
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check function of DME control unit.

Pay attention to cable routing of control sensor.

1178540 REPLACING LEFT MONITOR SENSOR (N63)

Notes

WARNING: Risk of burning!
Only perform this work after engine has cooled down.

Necessary preliminary work

- Check function of DME control unit
- Switch off ignition
- Remove **AIR FILTER HOUSING**

Release retaining clip (1).

Remove heat shield wire ring (2) over oxygen sensor.

Detach oxygen sensor cable from retaining clips (3).

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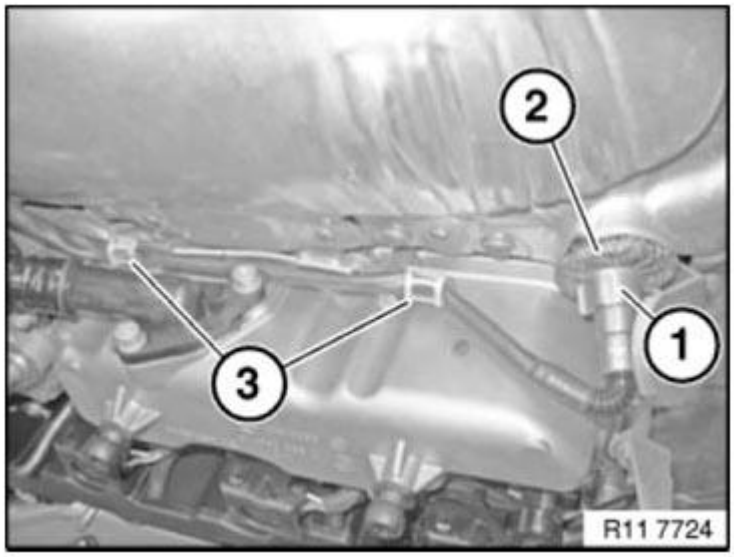


Fig. 529: Identifying Heat Shield Wire Ring And Retaining Clips
Courtesy of BMW OF NORTH AMERICA, INC.

Release monitoring sensor (1) with special tool **11 7 020** .

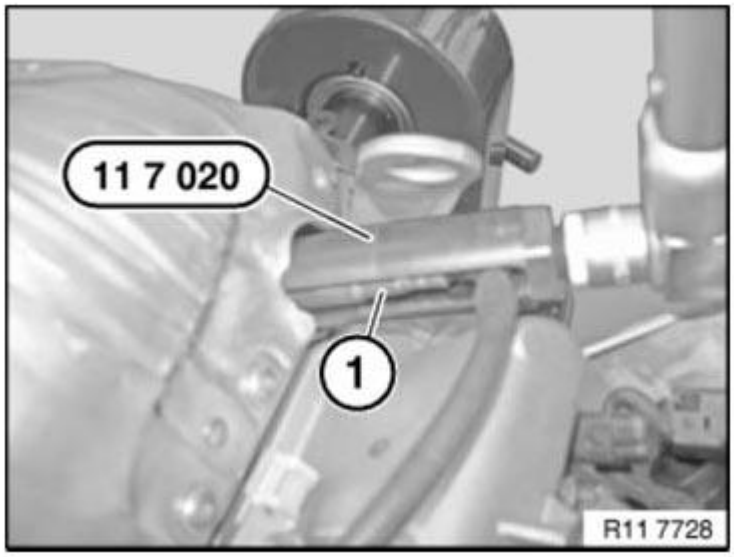


Fig. 530: Releasing Monitoring Sensor Using Special Tool 11 7 020
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The threads of new lambda control/monitoring sensors are already coated with Never Seez Compound (refer to BMW Parts Department).

If a lambda control/monitoring sensor is to be reused, apply a thin and even coating of Never Seez Compound

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to the thread only.

The part of the lambda control/monitoring sensor which projects into the exhaust branch (sensor ceramics) must **not** be cleaned and **not** coated with lubricant.

Fasten monitoring sensor (1) with special tool **11 7 020** .

Tightening torque **11 78 1AZ** .

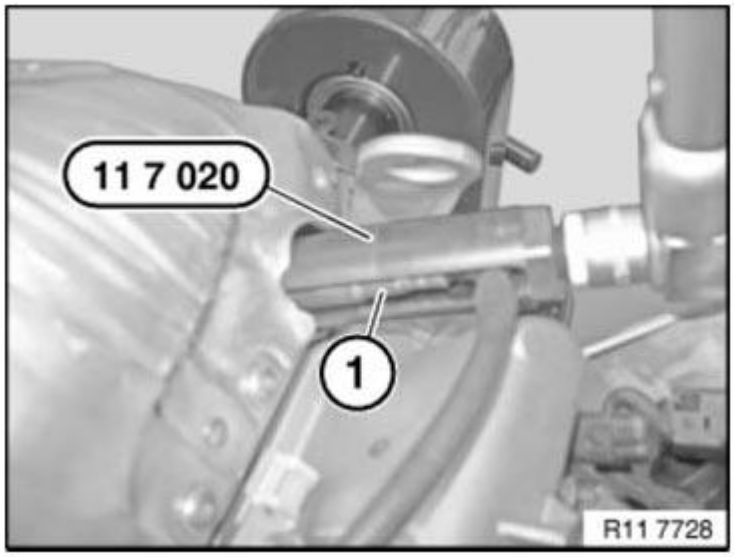


Fig. 531: Tightening Monitoring Sensor Using Special Tool 11 7 020
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check function of DME control unit.

Pay attention to cable routing of monitor sensor.

1178533 REPLACING RIGHT CONTROL SENSOR (N63)

Notes

WARNING: Risk of burning!
Only perform this work after engine has cooled down.

Necessary preliminary work

- Check function of DME control unit
- Switch off ignition

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- Remove **AIR FILTER HOUSING**

Unlock plug connection and detach.

Unclip control sensor cable from holder.

Release control sensor with special tool **11 7 020** .

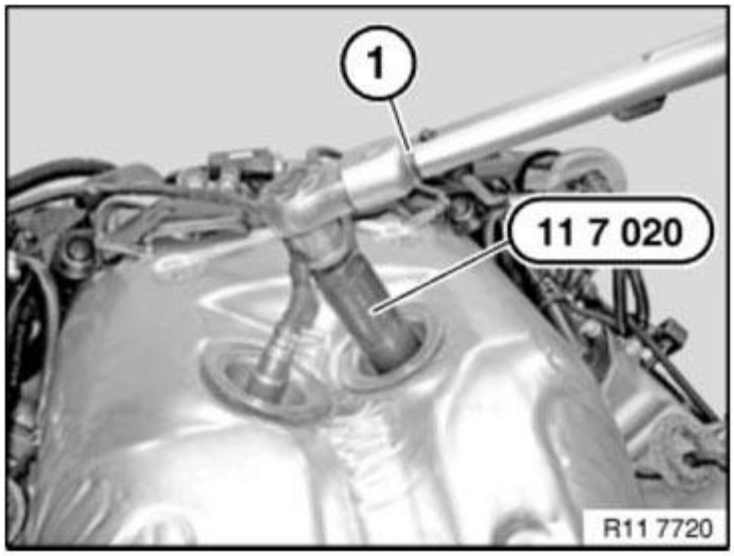


Fig. 532: Releasing Control Sensor Using Special Tool 11 7 020
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The threads of new lambda control/monitoring sensors are already coated with Never Seez Compound (refer to BMW Parts Department).

If a lambda control/monitoring sensor is to be reused, apply a thin and even coating of Never Seez Compound to the thread only.

The part of the lambda control/monitoring sensor which projects into the exhaust branch (sensor ceramics) must **not** be cleaned and **not** coated with lubricant.

Secure control sensor with special tool **11 7 020** and a torque wrench (1).

Tightening torque **11 78 1AZ** .

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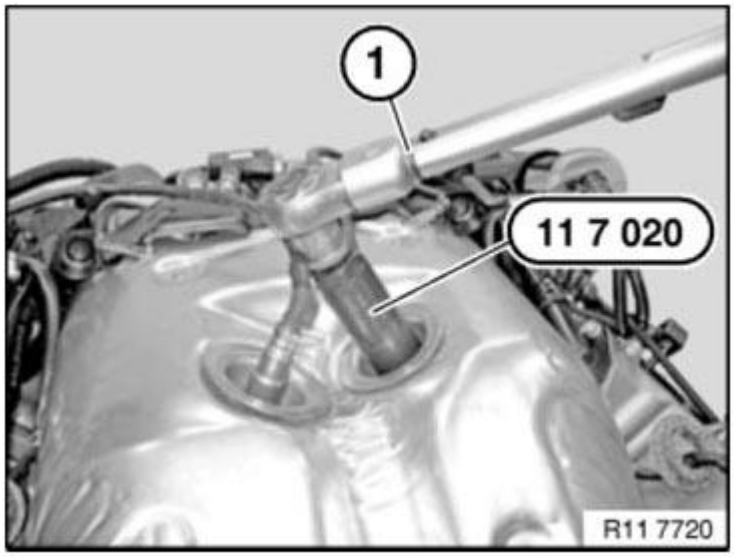


Fig. 533: Securing Control Sensor Using Special Tool 11 7 020 And Torque Wrench
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check function of DME control unit.

Pay attention to cable routing of control sensor.

1178543 REPLACING RIGHT MONITOR SENSOR (N63)

Notes

WARNING: Risk of burning!
Only perform this work after engine has cooled down.

Necessary preliminary work

- Check function of DME control unit
- Switch off ignition
- Remove **AIR FILTER HOUSING**

Release retaining clip (1).

Remove heat shield (2) over oxygen sensor.

Detach oxygen sensor cable from retaining clips (3).

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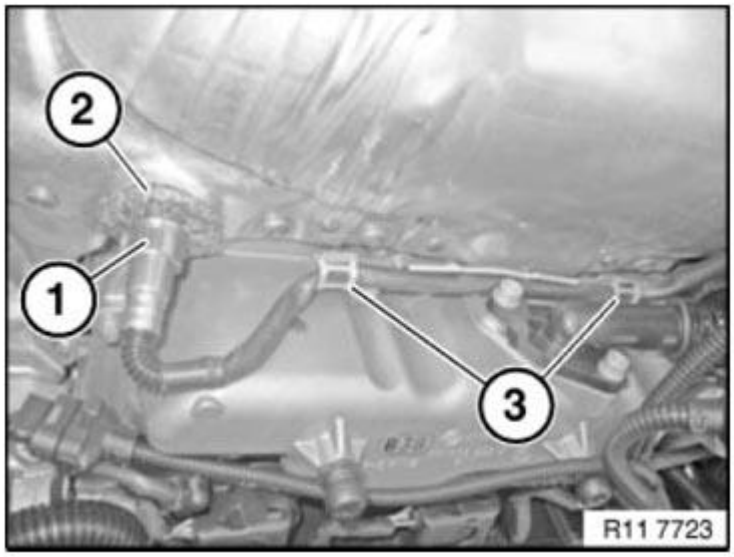


Fig. 534: Identifying Heat Shield And Retaining Clips
Courtesy of BMW OF NORTH AMERICA, INC.

Release monitoring sensor (1) with special tool **11 7 020** .

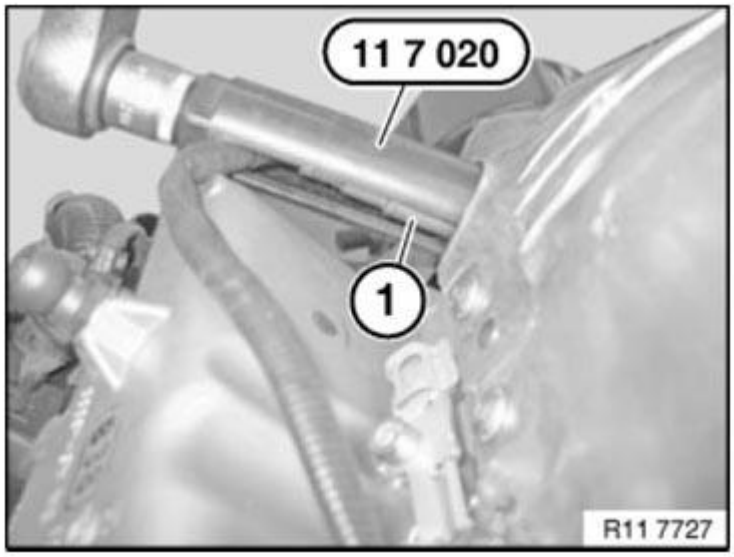


Fig. 535: Releasing Monitoring Sensor Using Special Tool 11 7 020
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The threads of new lambda control/monitoring sensors are already coated with Never Seez Compound (refer to BMW Parts Department).

If a lambda control/monitoring sensor is to be reused, apply a thin and even coating of Never Seez Compound

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to the thread only.

The part of the lambda control/monitoring sensor which projects into the exhaust branch (sensor ceramics) must **not** be cleaned and **not** coated with lubricant.

Fasten monitoring sensor (1) with special tool **11 7 020** .

Tightening torque **11 78 1AZ** .

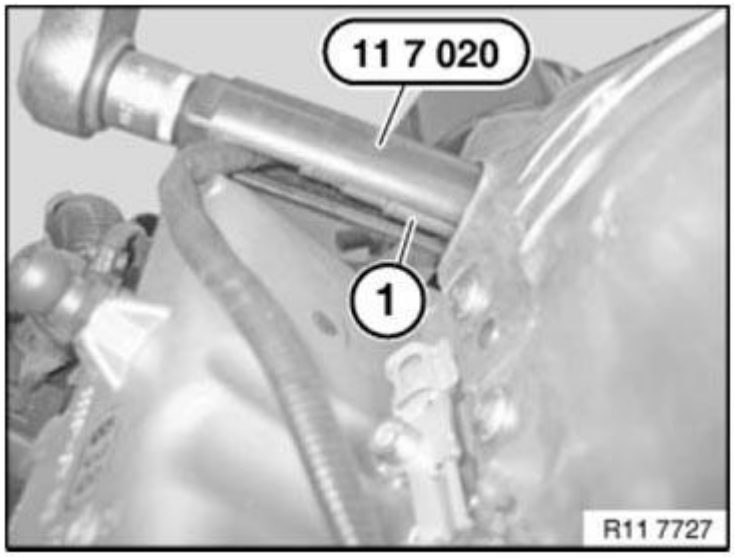


Fig. 536: Installing Monitoring Sensor Using Special Tool 11 7 020
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check function of DME control unit.

Pay attention to cable routing of monitor sensor.

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