ENGINE

Engine - Repair Instructions - X6 (N54)

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.

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:

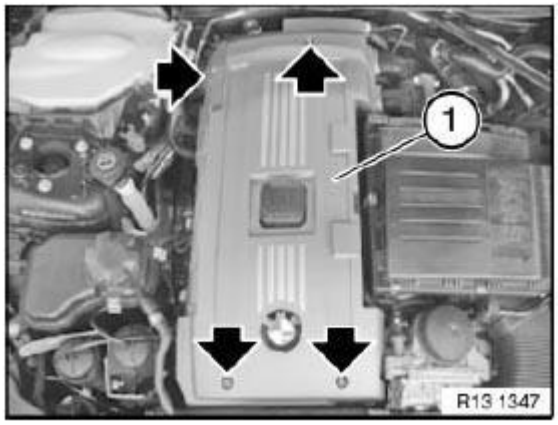

Fig. 4: Identifying Ignition Coil Cover
Courtesy of BMW OF NORTH AMERICA, INC.

11 00 REMOVING AND INSTALLING/REPLACING REAR IGNITION COIL COVER (N54)

Necessary preliminary tasks:

- Remove front **ignition coil cover.**
- Remove **CLEAN AIR PIPE** .

Release screws.

Tightening torque **11 12 7AZ** , see **CYLINDER HEAD**

Remove rear ignition coil cover (1) towards top.

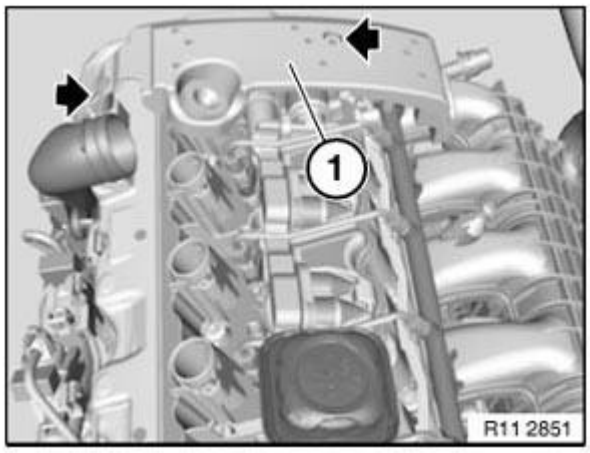

Fig. 5: Identifying Rear Ignition Coil Cover
Courtesy of BMW OF NORTH AMERICA, INC.

11 00... OVERVIEW OF CONSUMABLES

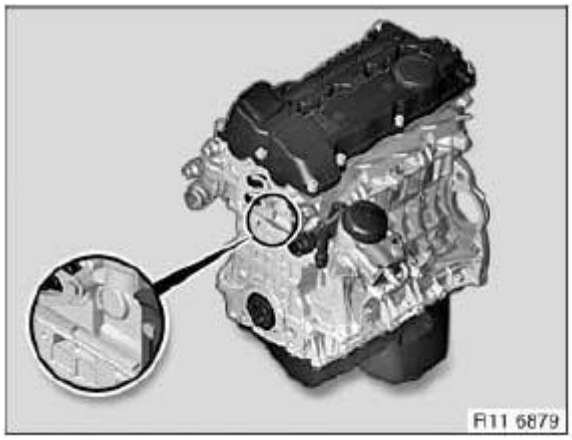

Fig. 36: Identifying Engine Numbers - N40/N45/N45T/N43
Courtesy of BMW OF NORTH AMERICA, INC.

N42/N46/N46T

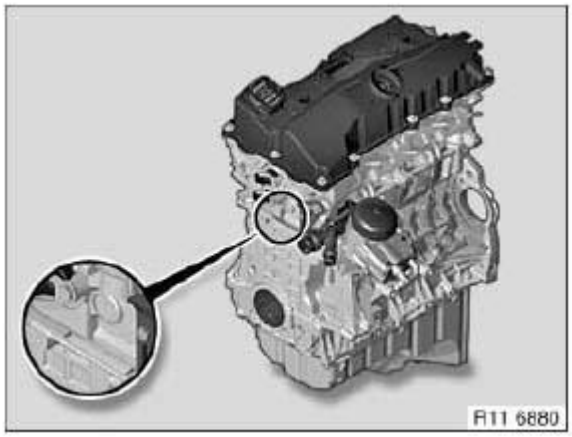

Fig. 37: Identifying Engine Numbers - N42/N46/N46T
Courtesy of BMW OF NORTH AMERICA, INC.

N51/N52/N52K/N53/N54

Attach special tool **11 8 510** to bolt connection on main bearing and secure with bolt (1).

Installation:

Oil nozzle must be located precisely in groove of special tool **11 8 510** .

If necessary, adjust oil nozzle.

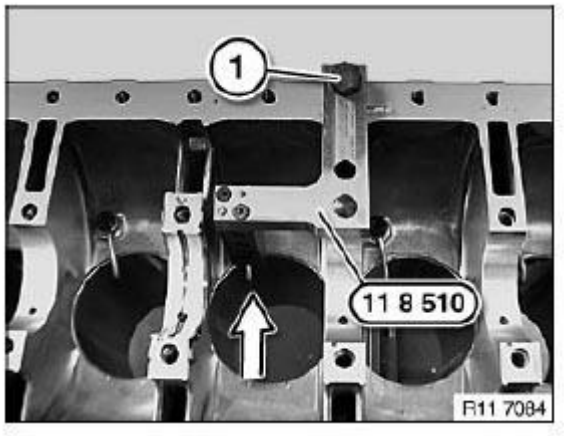

Fig. 133: Identifying Special Tool 11 8 510 And Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust oil nozzle.

Release screw (1).

Tightening torque **11 11 5AZ** , see **11 11 ENGINE BLOCK**

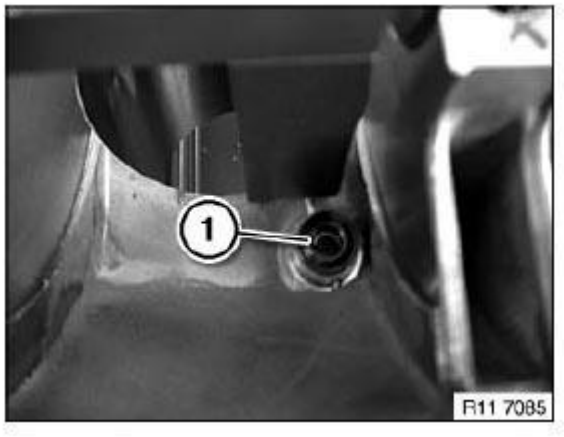

Fig. 134: Identifying Screw (1)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove bearing shells (2) and (3).

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not distort conrods or crankshaft.

Use the old conrod bolts to check conrod clearance.

Tighten down conrod bolts with special tool **00 9 120** .

Tightening torque **11 24 1AZ** , see **11 24 CONNECTING RODS AND BEARINGS**

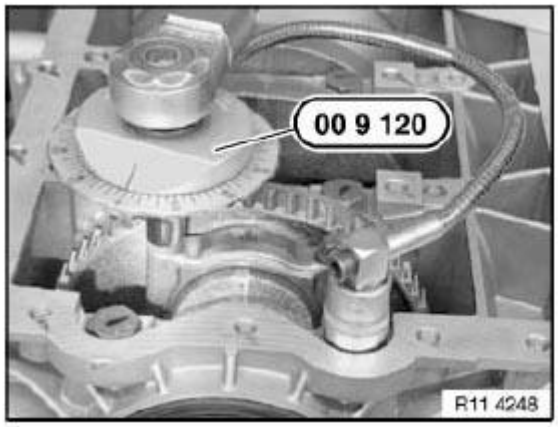

Fig. 194: Tightening Down Conrod Bolts With Special Tool 00 9 120
Courtesy of BMW OF NORTH AMERICA, INC.

Remove bearing cap. Read off bearing clearance at width of crushed plastic thread with aid of measuring scale.

Conrod bearing clearance.

- Remove plastic thread.
- Coat crankshaft and bearing shells with oil.
- Install new conrod bolts and tighten down with special tool **00 9 120** .

Tightening torque **11 24 1AZ** , see **11 24 CONNECTING RODS AND BEARINGS**

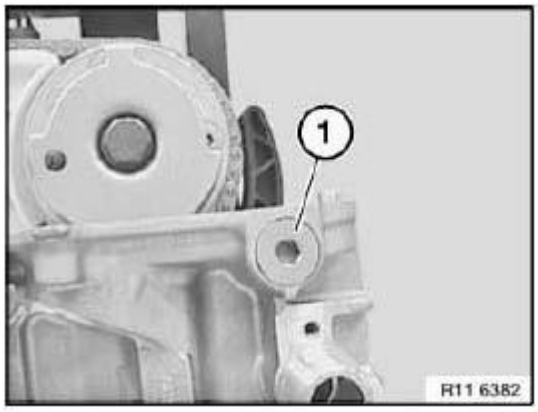

Fig. 276: Identifying Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Open plug (1).

Tightening torque **11 31 6AZ** , see **11 31 CAMSHAFT**

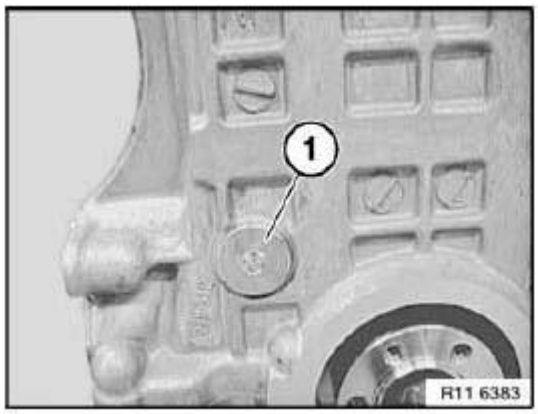

Fig. 277: Identifying Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) on chain drive at top.

Tightening torque **11 31 2AZ** , see **11 31 CAMSHAFT**

Assemble engine.

11 42 198 REMOVING AND INSTALLING OIL FEED LINE FOR EXHAUST TURBOCHARGER (N54)

Remove **exhaust turbocharger (1-3) or turbocharger (4-6)**

Release screw (2). Tightening torque **11 42 9AZ.**

Important! Where necessary, to release the oil feed line (3), do not place pliers on the pipe. Risk of damage!

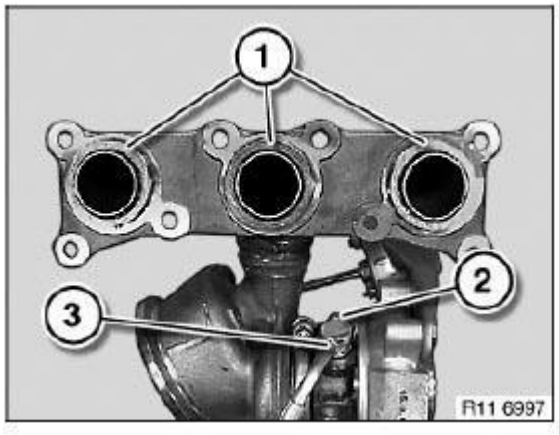

Fig. 347: Identifying Oil Feed Line
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, release oil feed line (3) with suitable pliers at connection and remove.

Installation note: Replace O-rings.

Assemble engine.

11 42 250 REMOVING AND INSTALLING OIL RETURN LINE FOR EXHAUST TURBOCHARGER (N54)

Remove both **CATALYTIC CONVERTERS** .

Remove right engine support arm.

Undo screws (1 and 2)

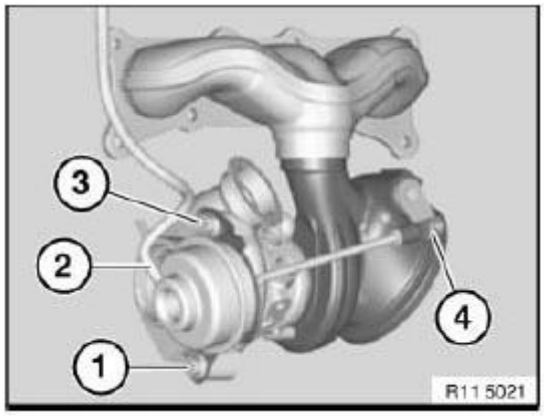

Fig. 428: Identifying Screws, Vacuum Hose And Locking Clip
Courtesy of BMW OF NORTH AMERICA, INC.

Adjusting vacuum unit (wastegate valve) linkage

Initial position of vacuum unit (wastegate valve) linkage depressurized.

Connect red vacuum line (1) to vacuum unit (wastegate valve).

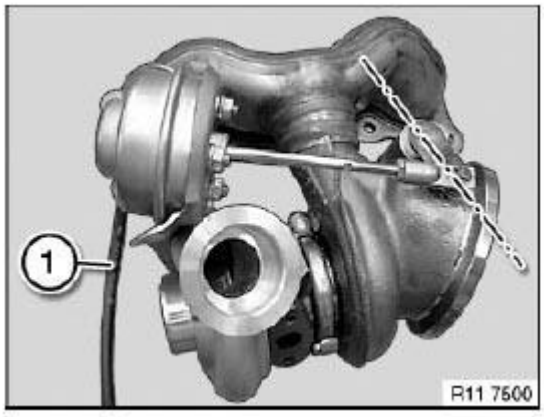

Fig. 429: Identifying Red Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

Vacuum pressure measurement

Prepare BMW diagnosis system on vacuum diagnosis unit.

1. Screw in pressure sensor.
2. Connect 12V battery cables (2) to vehicle battery positive and negative.
3. Connect 12V battery cables (3) to vehicle battery positive and negative **(pump operation max. 3 mins.).**
4. Controller for vacuum connection.
5. Vacuum connection (Red).

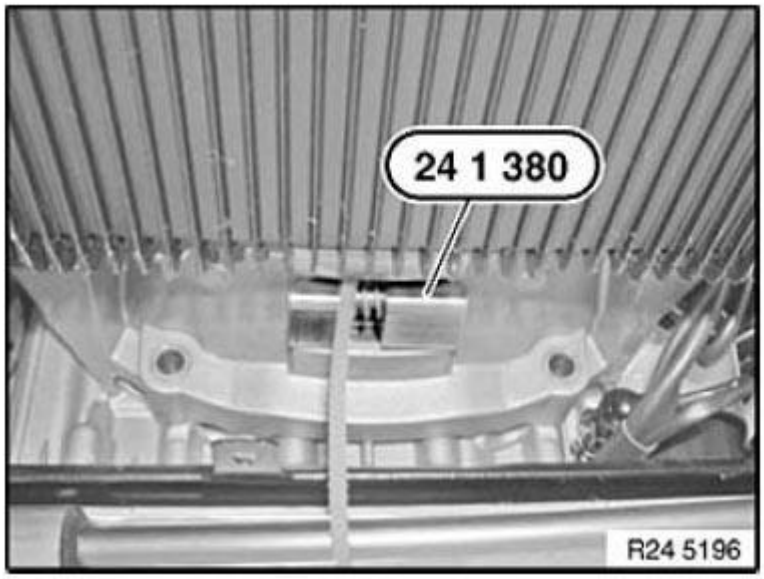

Fig. 32: Fixing Converter (6Hp26 Transmission)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1). Release hydraulic lines (2).

Installation note: Replace sealing rings.

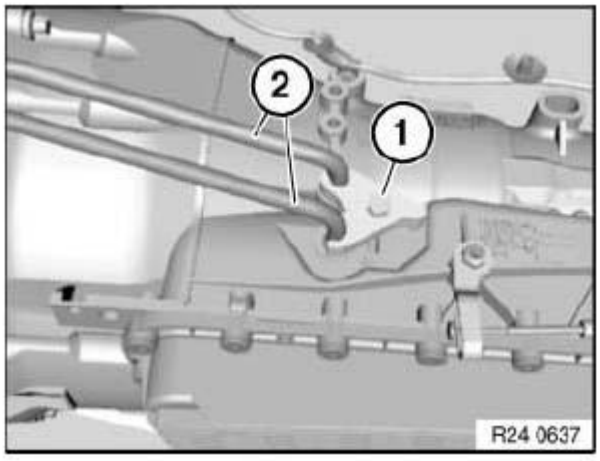

Fig. 33: Identifying Hydraulic Lines To Transmission Fluid Cooler
Courtesy of BMW OF NORTH AMERICA, INC.

Recycling: Catch and dispose of escaping oil with auxiliary materials.

Release screw (1). Lay ground strap (2) to one side.

- Remove left **cylinder head**
- Remove right **cylinder head**

Installation:

The cylinder head gaskets (2) for cylinders 1-4 and 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.

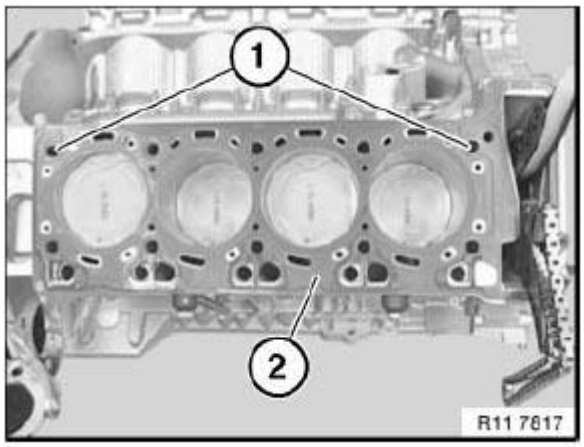

Fig. 90: Identifying Cylinder Head Gasket And Dowel Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

Repair gasket (+REP) is 0.3 mm thicker.

Check **cylinder head** for surface evenness.

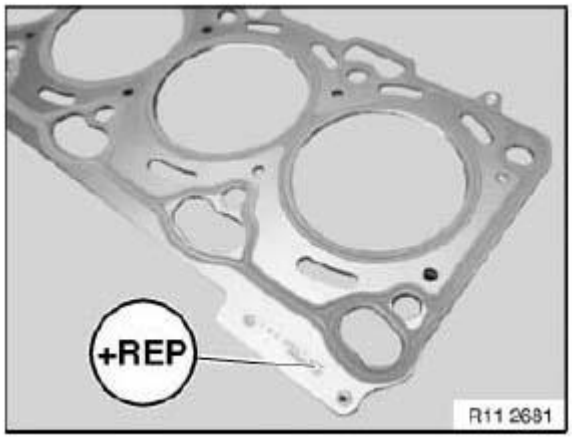

Fig. 91: Identifying Gasket (+REP)
Courtesy of BMW OF NORTH AMERICA, INC.

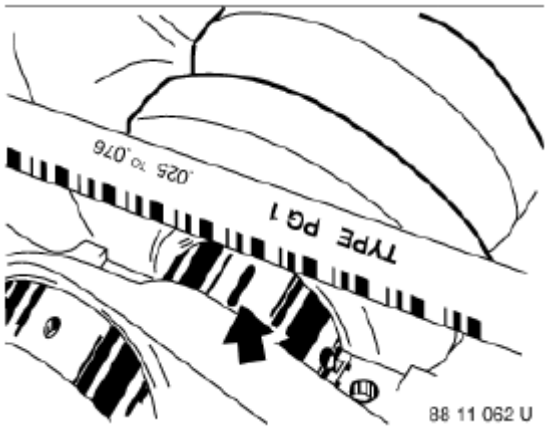

Fig. 156: Checking Main Bearing Play
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Always replace bolts in main bearing caps with new bolts.

Do not wash off bolt coating.

IMPORTANT: Danger of cracking!

No oil is permitted in the blind bores.

Install **crankshaft** .

Carefully strike back and front of crankshaft with a plastic hammer to center thrust 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 (**axial play**).

Check guide bearing shell, crankshaft and crankcase if necessary.

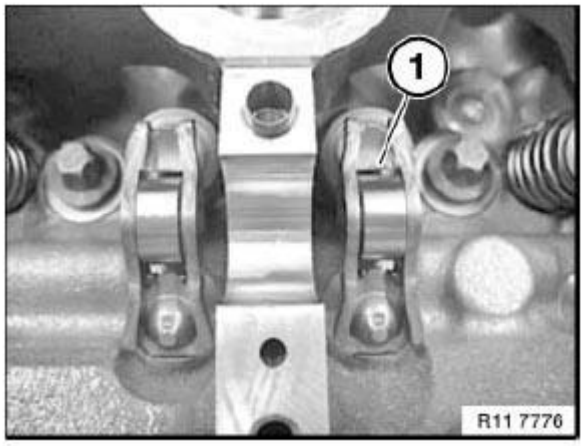

Fig. 238: Identifying Rocker Arms
Courtesy of BMW OF NORTH AMERICA, INC.

Coat all bearing points with engine oil.

Install exhaust camshaft (1).

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

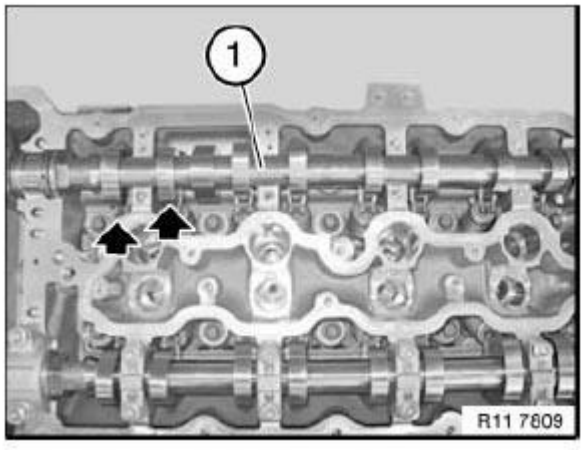

Fig. 239: Identifying Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

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.

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

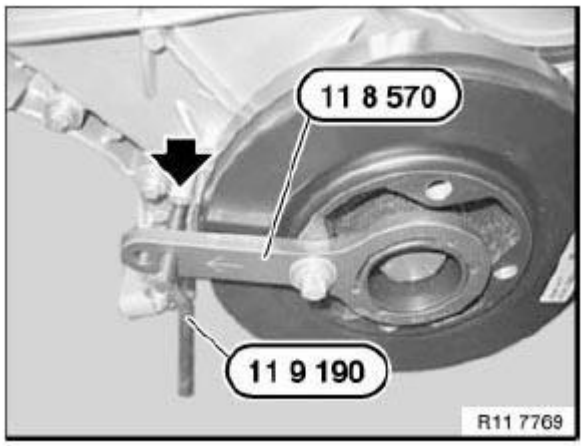

Fig. 287: Identifying Special Tools Position (11 8 570 And 11 9 190)
Courtesy of BMW OF NORTH AMERICA, INC.

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

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

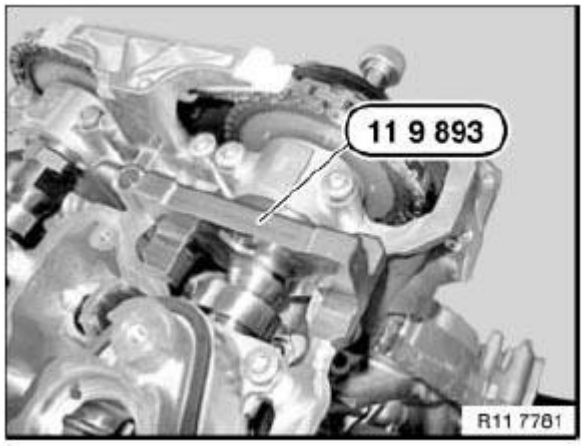

Fig. 288: Identifying Special Tool 11 9 893 On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

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

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

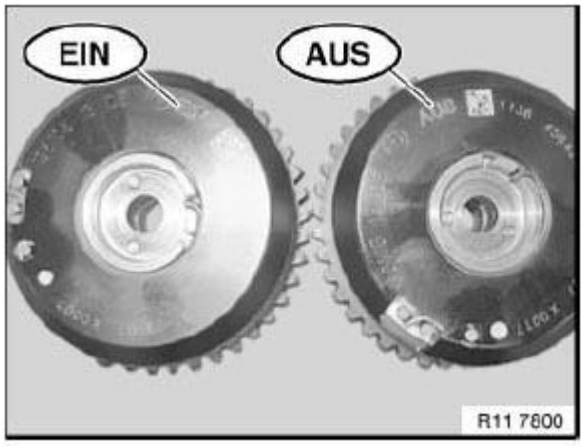

Fig. 331: Identifying Mark On Inlet And Exhaust Adjustment Units
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

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

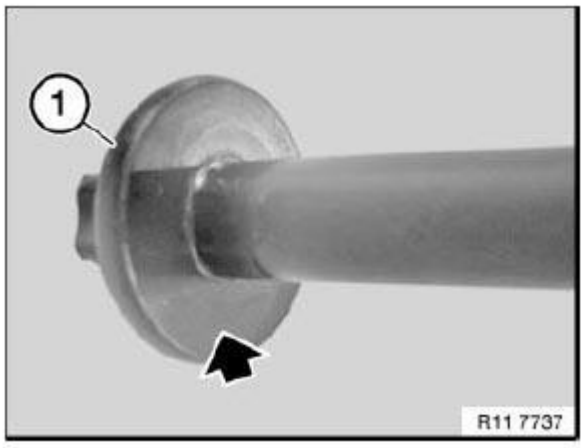

Fig. 332: Identifying Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Position of adjustment units in relation to timing chain can be freely selected.

Feed adjustment unit 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°** .

Detach coolant feed line (2).

Installation:

Replace hose clamp (1) .

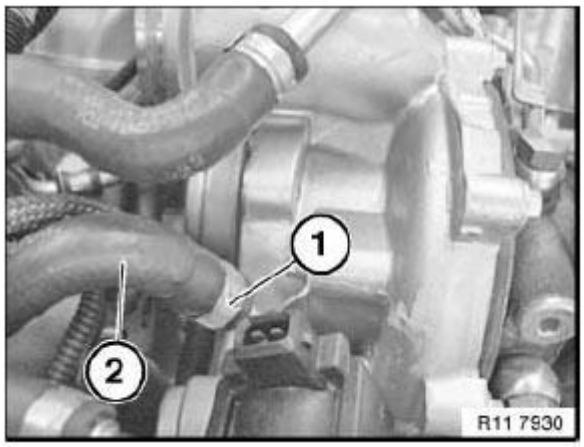

Fig. 459: Identifying Coolant Feed Line And Hose Clip
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) with a suitable tool.

NOTE: Oil return pipe (2) can only be removed with turbocharger.

Tightening torque 11 42 10AZ, see **11 42 OIL FILTER AND PIPES**

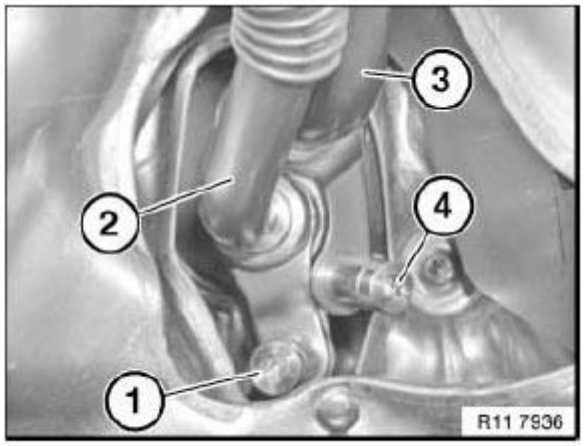

Fig. 460: Identifying Oil Return Pipe With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (4).