

ENGINE PERFORMANCE

Fuel System - Repair Instructions - X6

FUEL PUMP WITH DRIVE AND LINE

13 31 ... NOTES ON FUEL PRESSURE CHECK (REFERENCE PRESSURE: ENVIRONMENT)

Feature of this version with ambient pressure

The connection for the vacuum hose of the fuel pressure regulator is located between the throttle and the air cleaner or on the air cleaner.

Test precondition

The correct fuel pressure regulator is fitted.

- Using the EPC, check whether the fuel pressure regulator suitable for the car is fitted:

Connect test adapter.

Description of operation

The control function of the fuel pressure regulator must be guaranteed under all operating conditions. The fuel pump must always be able to generate a higher fuel pressure than the pressure regulated by the pressure regulator.

The injection rate is adjusted by means of the injection time; the injection time is controlled by the DME.

Description of operation: fuel return line

When the engine is at a standstill and the ignition key is in position 0, the fuel return line after the pressure regulator is at zero pressure.

Description of operation: pressure retaining function

The pressure regulator closes when the engine is at a standstill and the ignition key is in position 0. The fuel pressure in the delivery line is retained over an extended period. A non-return valve closes in the fuel pump. These measures help to retain the fuel pressure in the fuel system. Extended starting times are thus avoided.

Complaint: drive characteristic faults, lack of power

- Run engine at idle speed and measure fuel pressure.

If the measured value is less than the nominal value - 0.2 bar:

- Line cross-sections in fuel feed are constricted or fuel filter is clogged,

or

- Fuel pump voltage supply is not O.K.: e.g. as a result of high contact resistance (corrosion) in plug connection between wiring harness and fuel pump.

If the measured value is greater than the nominal value + 0.2 bar:

- Turn off engine stop and then observe measured value.
- If measured value drops to nominal value, then line cross-sections in fuel return are constricted or clogged.
- Check the fuel lines for kinks.

If no kinks are visible:

- Replace return lines

If measured value remains too high, then pressure regulator is in all probability faulty.

IMPORTANT: With less likelihood, the return line may be completely blocked. When the pressure regulator is removed, fuel could escape under pressure!

- **Have a cleaning cloth ready and catch and dispose of escaping fuel.**
- **Replace the return line but not the pressure regulator.**

Complaint: starting problems

- Run engine briefly at idle speed and switch off.
- Note down measured value while engine is stopped.
- Read off measured value again after approx. 20 to 30 minutes while engine is stopped.

Special tool 13 3 010 (hose clamp) is required for the following test.

If the measured value has dropped by more than 0.5 bar:

- Start engine and wait briefly for a stable pressure increase.
- Switch off the engine and immediately pinch off the delivery line just before the pressure gauge with the special tool 13 3 010.
- Note down measured value
- Read off measured value again after approx. 20 to 30 minutes while engine is stopped

If the measured value has now dropped by less than 0.5 bar, the following faults can be present:

- Fault in delivery lines
- Fault in in-tank delivery hose

- Faulty pressure-holding non-return valve in fuel pump

Check components. Replace faulty components.

If the measured value has dropped by more than 0.5 bar again:

- Replace pressure regulator

NOTE:

- **All the fuel hoses and hose clips which were detached within the framework of the checks must be replaced.**
- **Interrogate fault memory of DME control unit. Check stored fault messages. Rectify faults. Now clear the fault memory.**

13 31 029 CHECKING FUEL FEED PRESSURE (N54)

Special tools required:

- **13 5 270**

Necessary preliminary tasks:

- Connect BMW diagnosis system.

IMPORTANT: Fuel lines are under pressure.

IMPORTANT: Lines are under pressure!

Wear protective goggles and gloves.

Fuel can emerge spontaneously at high velocity when the fuel line is released!

Recycling:

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste-disposal regulations.

Disconnect quick-connect coupling (1) from feed line in engine compartment at front left.

Insert special tool **13 5 270** between lines.

Connect pressure sensor (2) of BMW diagnosis system.

Switch on ignition. Read off fuel feed pressure at BMW diagnosis system.

Fuel pressure, refer to **FUEL SYSTEM - TECHNICAL DATA** .

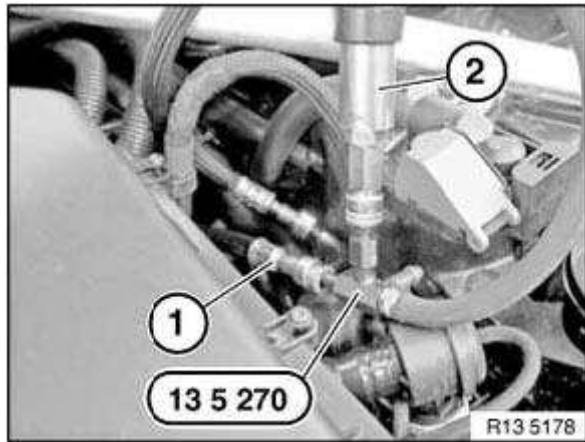


Fig. 1: Disconnecting Quick-Connect Coupling From Feed Line In Engine Compartment Front Left
Courtesy of BMW OF NORTH AMERICA, INC.

INJECTOR PUMP, REGULATOR, MIXTURE REGULATOR

13 51 017 REMOVING AND INSTALLING OR REPLACING HIGH-PRESSURE FUEL PUMP (N54, N53)

Special tools required:

- **11 8 610**
- **13 5 020**
- **13 5 281**
- **13 5 282**
- **32 1 270**

WARNING: Observe warning on cylinder head cover.

Disconnect **BATTERY NEGATIVE TERMINAL** (risk of fire due to short-circuiting on removal).

Electric fuel pump starts up automatically each time door is opened!

Carry out installation work on fuel system only with coolant temperature below 40°C.

IMPORTANT: Wear full face guard and protective gloves.

Fuel can emerge spontaneously at high velocity when the high-pressure line is released!

IMPORTANT: Adhere to conditions of absolute cleanliness when working on the high-pressure fuel system.

Introduced contaminants can cause malfunctions in the system!

- Do not allow any dirt particles or foreign bodies to get into the system.
- Remove all traces of dirt before removing pipes or individual components.
- Use only fluff-free cloths.
- Seal all fuel system openings with protective caps or plugs.

Necessary preliminary tasks:

- Remove **INTAKE AIR MANIFOLD**

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

N53 only:

Lay exhaust gas recirculation (1) upwards to one side. Do **not** remove.

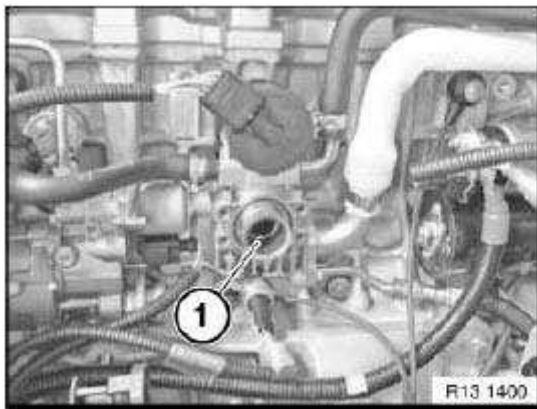


Fig. 2: Identifying Exhaust Gas Recirculation
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock plug (1) and remove.

Unlock and detach fuel line (2).

Catch and dispose of escaping fuel.

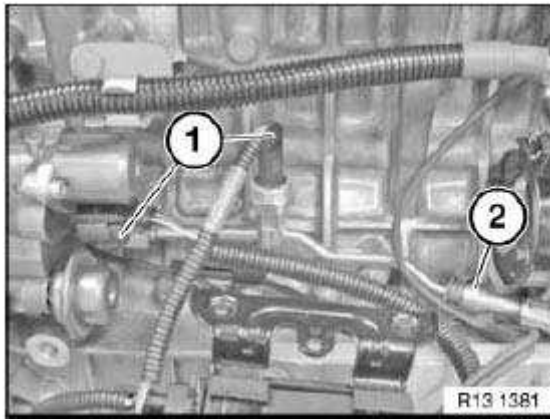


Fig. 3: Detaching Fuel Line

Courtesy of BMW OF NORTH AMERICA, INC.

Seal fuel lines with special tools 13 5 281 and 13 5 282.

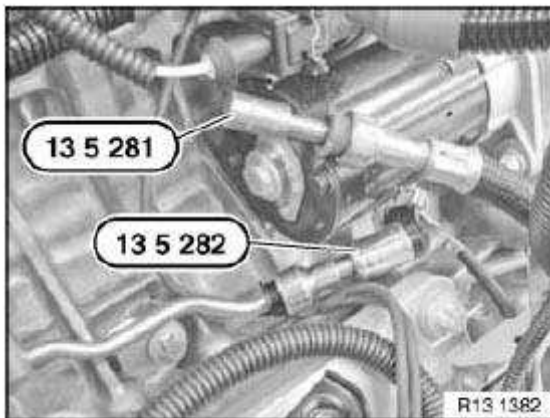


Fig. 4: Identifying Special Tools (13 5 281 And 13 5 282)

Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Release screw (2).

Installation:

- Replace aluminum screw.

Remove feed line (3).

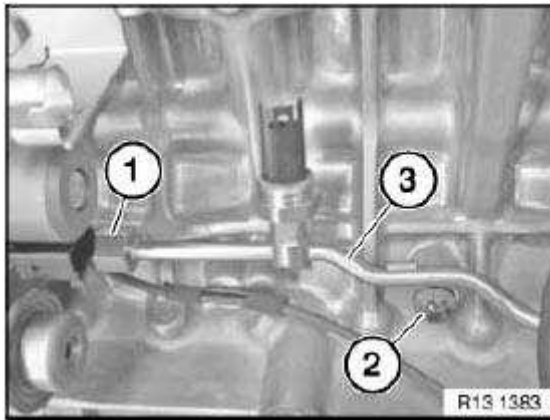


Fig. 5: Identifying Feed Line Screw And Nut
 Courtesy of BMW OF NORTH AMERICA, INC.

Seal feed line with matching plug from special tool kit **32 1 270** .

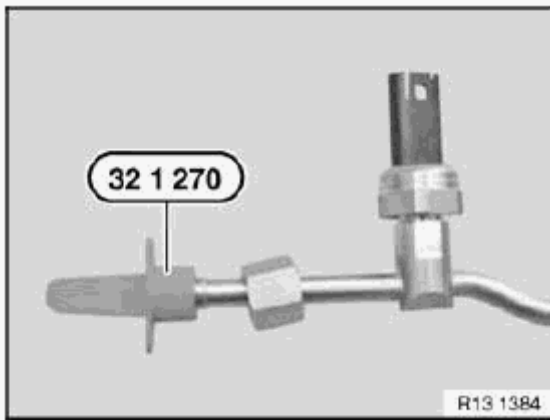


Fig. 6: Identifying Special Tool Kit (32 1 270)
 Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: Wear full face guard and protective gloves.

Slacken nut (1).

Slacken nut (2).

Release screw (3).

Disconnect high-pressure line (4).

Seal connections of high-pressure line (4) with matching plugs from special tool kit **32 1 270**.

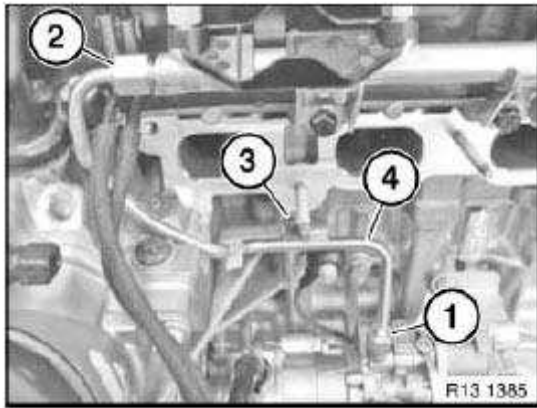


Fig. 7: Identifying High-Pressure Line With Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Seal fuel line connections of high-pressure pump (1) with matching plugs from special tool kit 32 1 270.

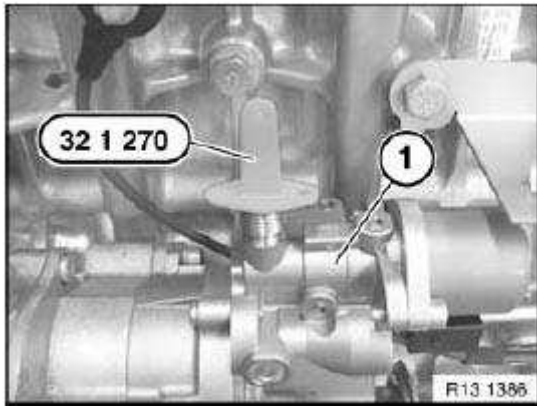


Fig. 8: Identifying High-Pressure Pump And Special Tool Kit (32 1 270)
 Courtesy of BMW OF NORTH AMERICA, INC.

Release screws with special tool 11 8 610.

Detach high-pressure pump (1) and remove.

Engine oil can escape when pump is detached; have a cleaning cloth ready.

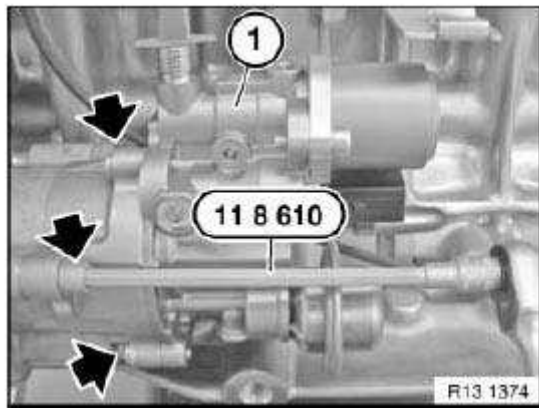


Fig. 9: Detaching High-Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installing high-pressure pump

Installation of high-pressure pump is described separately from removal.

Replace sealing ring (1).

Clean contact faces.

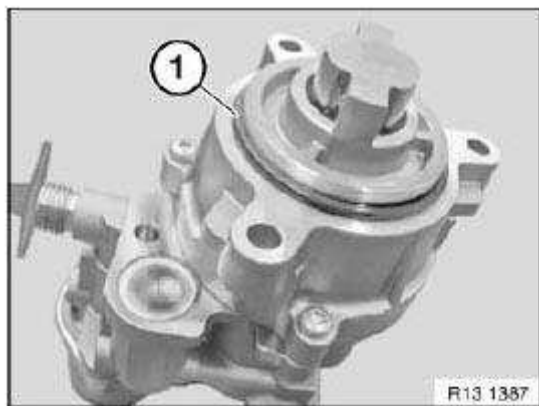


Fig. 10: Identifying Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

When installing, turn high-pressure pump (1) if necessary in direction of arrow until bores for screws are flush.

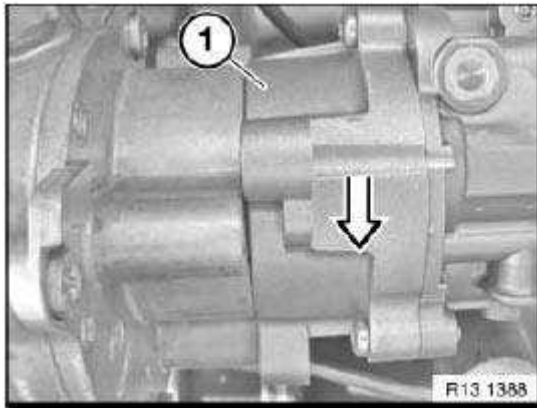


Fig. 11: Turning High-Pressure Pump
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Tighten screws of high-pressure pump (1) with special tool 11 8 610 hand-tight only.
 It must still be possible to turn the high-pressure pump at the flange!
 This prevents twisting when high-pressure line (4) (Fig. 7) is tightened.

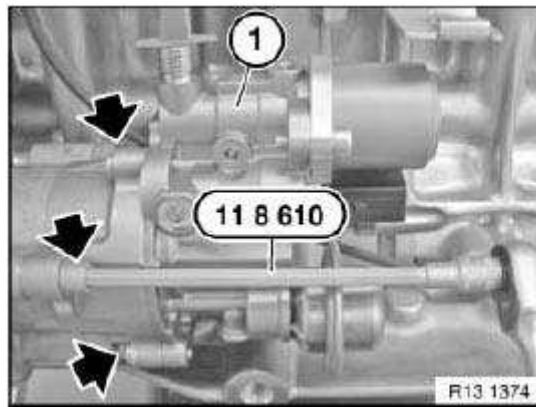


Fig. 12: Detaching High-Pressure Pump
 Courtesy of BMW OF NORTH AMERICA, INC.

Copper seals that may be fitted on the high-pressure line are no longer needed and must be removed. If reusing pressure line, lightly grease threads of pressure connections. Threads of new pressure lines are already coated.
 Pre-install high-pressure line (4).

In so doing, tighten screw connections (Fig. 7) hand-tight only (it must still be possible to move the high-pressure line at the holder).

Only when high-pressure pump (1) has if necessary turned into position and is thus pre-installed without twisting with high pressure-line (4) should screws of high-pressure pump (1) be tightened down with special tool 11 8 610.

Tightening torque 13 51 1AZ .

IMPORTANT: Follow sequence of screw connections:

1. Tighten down nut (1) with special tool 13 5 020. Tightening torque 13 53 7AZ .
2. Tighten nut (2). Tightening torque 13 53 7AZ .
3. Tighten down screw (3) for holder. Tightening torque 13 53 2AZ .

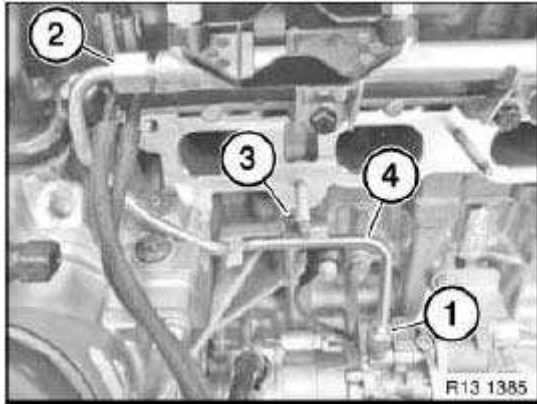


Fig. 13: Identifying High-Pressure Line With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Feed lines with soldered holder must be replaced by new version with elastomer clamp holder. Observe installation position of fuel low-pressure sensor. Lines for solenoid switches are laid behind fuel line.

Install feed line (3).

In so doing, tighten screw connection **hand-tight only**

IMPORTANT: Follow sequence of screw connections:

1. Tighten down nut (1) with special tool 13 5 020. Tightening torque 13 53 6AZ .
2. Tighten screw (2). Replace aluminum screw. Tightening torque 13 53 9AZ .

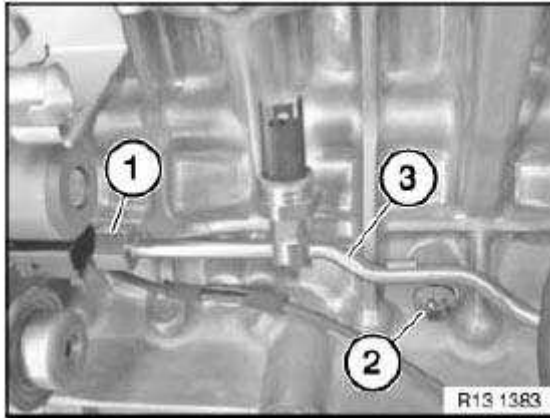


Fig. 14: Identifying Feed Line Screw And Nut
 Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for leaks.

Check function of DME.

INJECTION NOZZLE AND LINES

13 53 158 REMOVING AND INSTALLING/REPLACING HIGH-PRESSURE RAIL (N54, N53)

Special tools required:

- 37 1 151

WARNING: Observe warning on cylinder head cover.

Disconnect BATTERY NEGATIVE TERMINAL (risk of fire due to short-circuiting on removal).

Electric fuel pump starts up automatically each time door is opened!

Carry out installation work on fuel system only with coolant temperature below 40°C.

IMPORTANT: Wear full face guard and protective gloves.

Fuel can emerge spontaneously at high velocity when the high-pressure line is released!

IMPORTANT: Adhere to conditions of absolute cleanliness when working on the high-pressure fuel system.

Introduced contaminants can cause malfunctions in the system!

- Do not allow any dirt particles or foreign bodies to get into the system.

- Remove all traces of dirt before removing pipes or individual components.
- Use only fluff-free cloths.
- Seal all fuel system openings with protective caps or plugs.

IMPORTANT: When working on the oil, coolant or fuel circuit, you must protect the alternator against contamination.
Cover alternator with suitable materials.
Failure to comply with this procedure may result in an alternator malfunction.

Necessary preliminary tasks:

- **REMOVE PRESSURE LINES**
- N54 only: **REMOVE INTAKE FILTER HOUSING**

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

Unlock plug (1) and remove.

Pull connector holder off high-pressure rail.

Remove all holders for wiring harness from high-pressure rail.

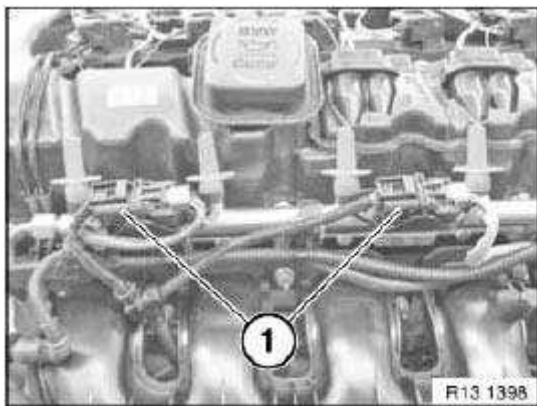


Fig. 15: Identifying Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock plug (1) and remove.

Slacken nut (2).

Release screws (3) and remove high-pressure rail (4).

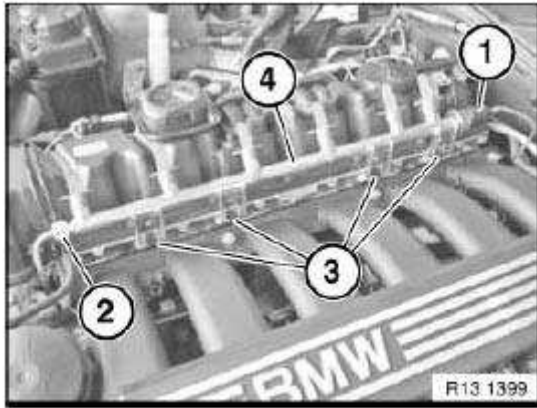


Fig. 16: Identifying High-Pressure Rail, Plug With Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Installing high-pressure rail:

Installation of high-pressure rail is described separately from removal.

Install high-pressure rail (4); in so doing, tighten screws (3) and nut (2) hand-tight only.

NOTE:

- It must still be possible for the high-pressure rail to slide on the cylinder head.
- Nut (2) must be able to be screwed on easily by hand.

Push on plug for high-pressure sensor (1).

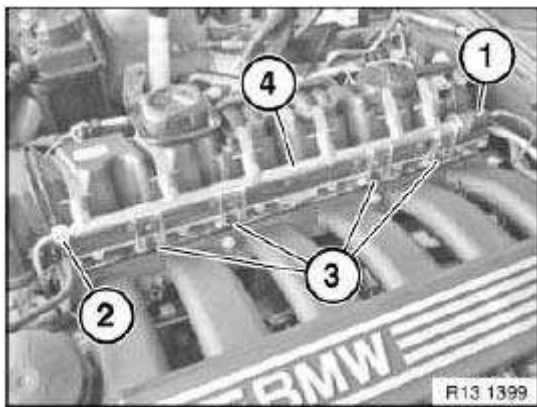


Fig. 17: Identifying High-Pressure Rail, Plug With Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Fitting pressure lines:

(Same procedure for all pressure lines)

Connect pressure line (1), tightening nuts hand-tight only in the process.

IMPORTANT: Connect pressure line (1) without tension only.

To ensure distortion-free installation of the pressure line and to avoid damaging the thread, it must be possible for both nuts to be screwed on easily by hand!

If the nuts cannot be easily screwed on by hand, the injector must be turned into the installation position.

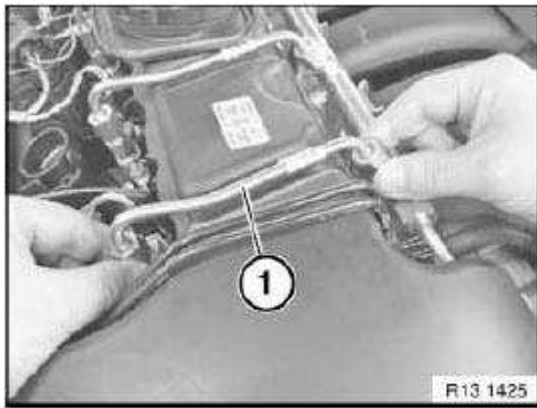


Fig. 18: Connecting Pressure Line

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Description of "Turning injector into installation location" in the following work step.

Only if one injector has to be turned into installation position:

- Release screw a few turns until holding-down element (1) is slackened.
- Turn injector (2) in direction of arrow until nuts on pressure line can be easily screwed on by hand.
- To do so, engage wrench on hexagon head of injector (2) if necessary.
- Tighten nuts on pressure line hand-tight.

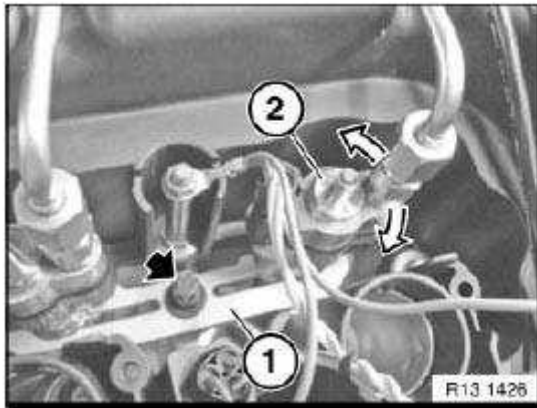


Fig. 19: Turning Injector

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not under any circumstances pull injector out of bore!

If the injector is pulled out of the bore hole, the PTFE sealing ring must be replaced!

Replacing PTFE sealing ring, refer to 13 53 310 Removing and installing or replacing an injector (N54, N53).

Tighten down screws (1).

Tightening torque 13 53 1AZ .

Tighten nut (2).

Tightening torque 13 53 7AZ .

Tighten down screw for holding-down element (1).

Tightening torque 13 53 5AZ .

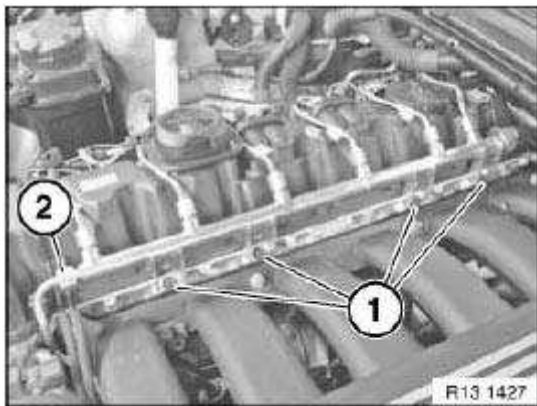


Fig. 20: Identifying Screws With Nut

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: This work step is only necessary if one of the holding-down elements has been slackened beforehand.

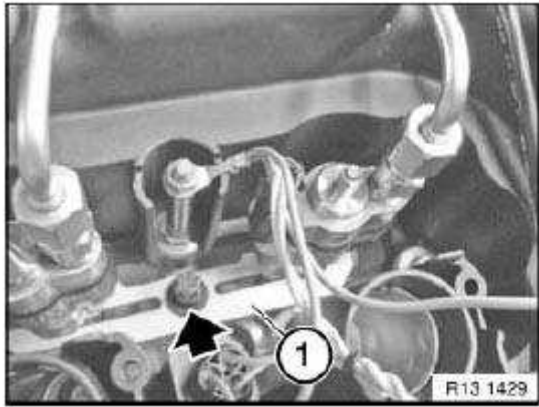


Fig. 21: Tightening Down Screw For Holding-Down Element
Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening sequence:

- First tighten down nut (1) on injector.
- Then tighten down nut (2) on high-pressure rail.

When tightening nut (1) on injector, grip hexagon head of injector with wrench (3).

Tighten down nuts with special tool **37 1 151**.

Tightening torque **13 53 8AZ** .

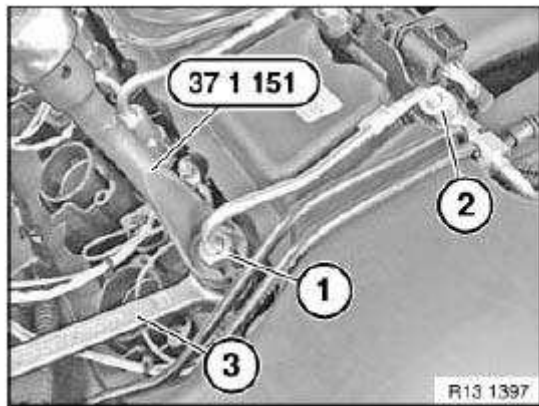


Fig. 22: Tightening Nut On Injector
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for leaks.

Check function of DME.

13 53 192 REMOVING AND INSTALLING OR REPLACING A HIGH-PRESSURE LINE (N54, N53)

Special tools required:

- 32 1 270
- 37 1 151

WARNING: Observe warning on cylinder head cover.

Clamp off BATTERY NEGATIVE TERMINAL (risk of fire due to short-circuiting on removal).

Electric fuel pump starts up automatically when door is opened!

Carry out installation work on fuel system only with coolant temperature below 40°C.

WARNING: Wear full face guard and protective gloves.

Fuel can emerge spontaneously at high velocity when the high-pressure line is released!

IMPORTANT: Adhere to conditions of absolute cleanliness when working on the high-pressure fuel system.

Introduced contaminants can cause malfunctions in the system!

- Do not allow any dirt particles or foreign bodies to get into the system.
- Remove all traces of dirt before removing pipes or individual components.
- Use only fluff-free cloths.
- Seal all fuel system openings with protective caps or plugs.
- High-pressure lines may be rescrewed a maximum of 10 times.

Necessary preliminary tasks:

- Remove IGNITION COIL of corresponding cylinder

NOTE:

- Ignition coils must not be fouled by fuel!

The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail! Cloths/rags must therefore be used to prevent fuel from getting into the spark plug slots!

- Before installing ignition coils, clean spark plug slots with compressed air.
- Make sure the spark plug slot is absolutely clean.

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste-disposal regulations.

WARNING: Wear full face guard and protective gloves.

**Fuel can emerge spontaneously at high velocity from the fuel injectors!
To reduce the fuel pressure, place rag over fuel injector and carefully tap
against the fuel injector with a spanner.**

There is a risk of injury if the fuel pressure is not reduced!

NOTE: The following description applies to all pressure lines.

First release rail pressure lines to reduce existing fuel pressure if necessary. Fuel must not get into the spark plug slot. Then release pressure line on injector.

Release nuts (1), gripping the injector with a wrench (2) in so doing.

Disconnect pressure line (3).

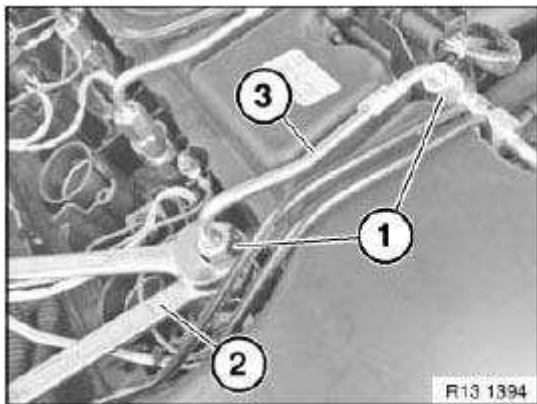


Fig. 23: Disconnecting Pressure Line

Courtesy of BMW OF NORTH AMERICA, INC.

**IMPORTANT: If several pressure lines are removed, ensure that each pressure line is
reinstalled in its original location (cylinder).
Mark pressure lines.**

Close off injector with protective cap (1).

Protective caps are available from BMW Parts Service.

Seal high-pressure rail with a matching plug from special tool kit **32 1 270**.

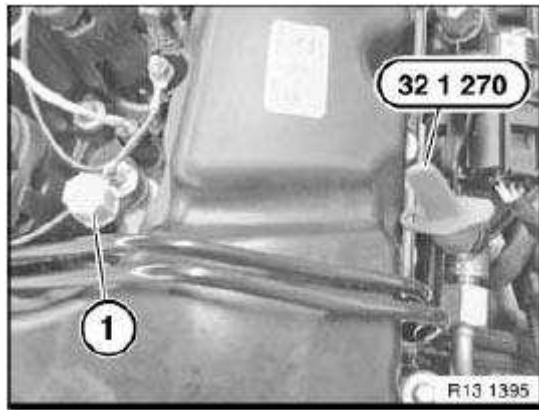


Fig. 24: Identifying Protective Cap With Special Tool Kit (32 1 270)
Courtesy of BMW OF NORTH AMERICA, INC.

Seal pressure line (1) with a matching plug from special tool kit **32 1 270**.

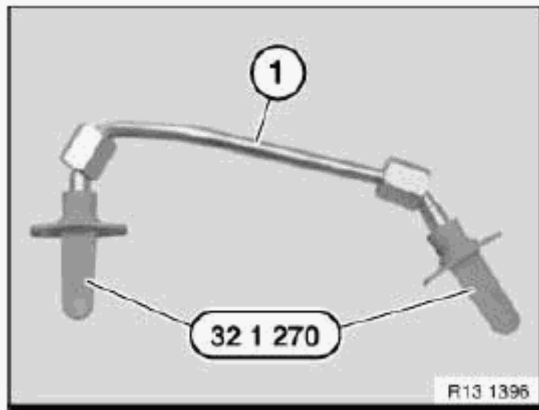


Fig. 25: Identifying Pressure Line With Special Tool Kit (32 1 270)
Courtesy of BMW OF NORTH AMERICA, INC.

Installing pressure line

Installation of pressure rail is described separately from removal.

Same procedure for all pressure lines.

Copper seals that may be fitted (1) are no longer needed and must be removed.

If using the pressure line, apply a light coating of gear oil to the thread. New pressure lines are already coated.

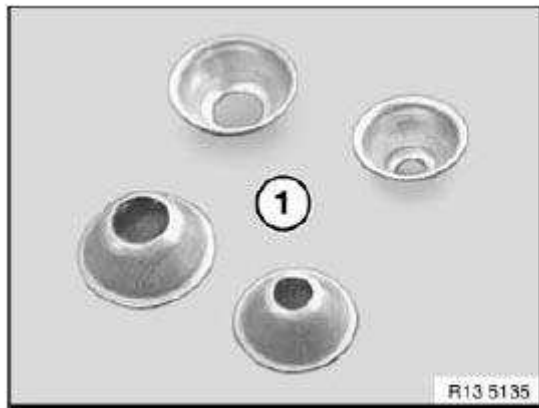


Fig. 26: Identifying Copper Seals

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Connect pressure line (1) without tension only.

To ensure distortion-free installation of the pressure line and to avoid damaging the thread, it must be possible for both nuts to be screwed on easily by hand!

If the nuts cannot be easily screwed on by hand, the injector must be turned into the installation position!

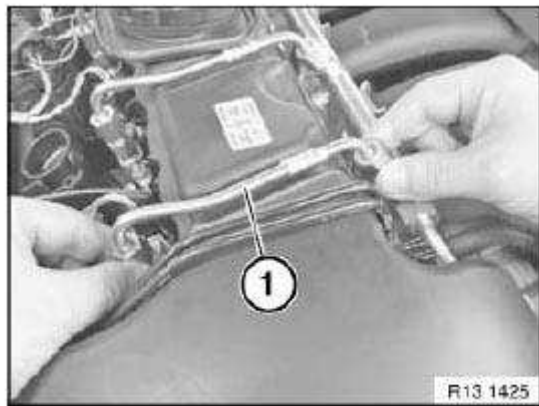


Fig. 27: Connecting Pressure Line

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Description of "Turning injector into installation position" in the following two work steps.

Only if injector has to be turned into installation position:

- Release bolt a few turns until holding-down element (1) is slackened.
- Turn injector (2) in direction of arrow until nuts on pressure line can be easily screwed on by hand.
- To do so, engage wrench on hexagon head of injector if necessary.
- Tighten nuts on pressure line hand-tight.

IMPORTANT: Do not under any circumstances pull injector out of bore!

If the injector is pulled out of the bore hole, the PTFE sealing ring must be replaced! Replacing PTFE sealing ring, refer to 13 53 310 Removing and installing or replacing an injector (N54, N53).

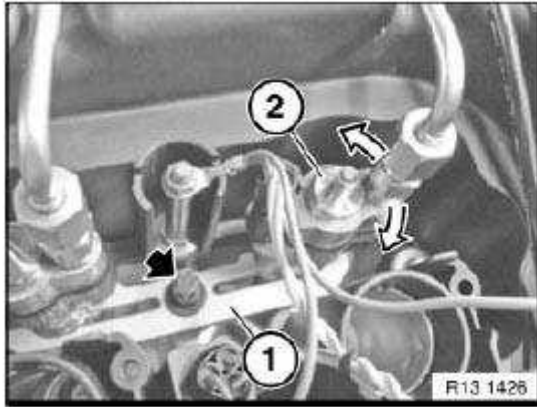


Fig. 28: Turning Injector

Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down screw for holding-down element (1).

Tightening torque 13 53 5AZ .

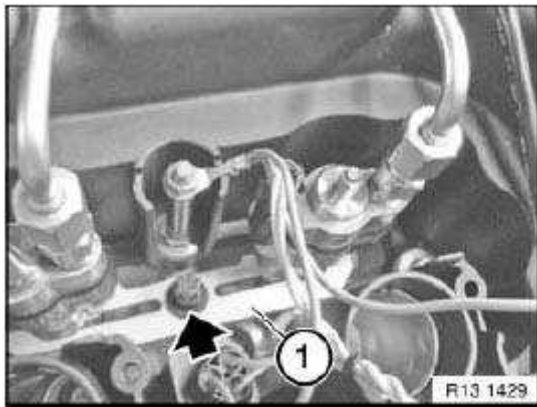


Fig. 29: Tightening Down Screw For Holding-Down Element

Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening sequence:

- First tighten down nut (1) on injector.
- Then tighten down nut (2) on high-pressure rail.

When tightening nut (1) on injector, grip hexagon head of injector with wrench (3).

Tighten down nuts with special tool **37 1 151**.

Tightening torque **13 53 8AZ** .

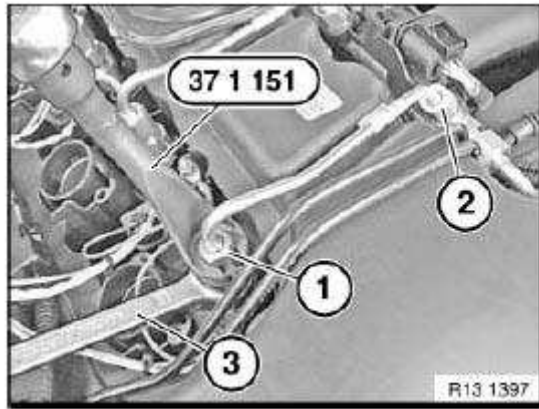


Fig. 30: Tightening Nut On Injector

Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for leaks.

Check function of DME.

13 53 310 REMOVING AND INSTALLING OR REPLACING AN INJECTOR (N54, N53)

Special tools required:

See **FUEL SYSTEM - SPECIAL TOOLS**

- **13 0 180**
- **13 0 191**
- **13 0 192**
- **13 0 193**
- **13 0 194**
- **13 0 195**
- **13 5 250**
- **37 1 151**

WARNING: Observe warning on cylinder head cover.

Disconnect **BATTERY NEGATIVE TERMINAL** (risk of fire due to short-circuiting on removal).

Electric fuel pump starts up automatically when door is opened!

Carry out installation work on fuel system only with coolant temperature

below 40°C.

WARNING: Wear full face guard and protective gloves.

Fuel can emerge spontaneously at high velocity from the fuel injectors!
To reduce the fuel pressure, place rag over fuel injector and carefully tap against the fuel injector with a spanner.

There is a risk of injury if the fuel pressure is not reduced!

IMPORTANT: When assembling, it is essential to adhere to screwing sequences and tightening torques!

Failure to comply with this requirement may result in leaks!

IMPORTANT: Adhere to conditions of absolute cleanliness when working on the high-pressure fuel system.

Introduced contaminants can cause malfunctions in the system!

- Do not allow any dirt particles or foreign bodies to get into the system.
- Remove all traces of dirt before removing pipes or individual components.
- Use only fluff-free cloths.
- Seal all fuel system openings with protective caps or plugs.
- High-pressure lines may be rescrewed a maximum of 10 times.

IMPORTANT: Injectors are not waterproof!

Carry out engine cleaning/washing only with ignition coil cover fitted.

Necessary preliminary tasks:

- Remove IGNITION COIL of corresponding cylinder

NOTE:

- Ignition coils must not be fouled by fuel!

The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail! Cloths/rags must therefore be used to prevent fuel from getting into the spark plug slots!

- Before installing ignition coils, clean spark plug slots with compressed air.
- Make sure the spark plug slot is absolutely clean.
- Remove PRESSURE LINE of corresponding cylinder

NOTE: The following description applies to all injectors.

Unlock plug (1) and remove.

Release screw and remove holding-down element (2).

Remove injector (3).

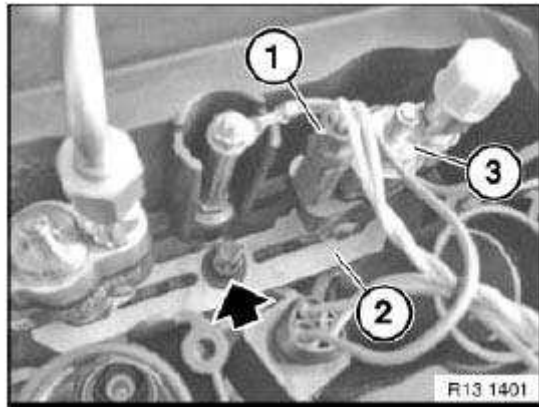


Fig. 31: Identifying Holding-Down Element And Plug
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: If several injectors are removed, ensure that each injector is reinstalled in its original location (cylinder).

Mark injectors.

Procedure in event of stuck injector

Mount special tool **13 0 180** on injector (1).

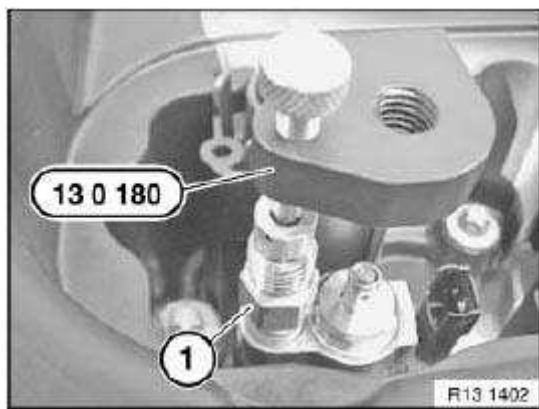


Fig. 32: Identifying Special Tool (13 0 180) On Injector
Courtesy of BMW OF NORTH AMERICA, INC.

Mount special tool **13 5 250**.

Carefully knock out injector (1) with special tools **13 0 180** and **13 5 250**.

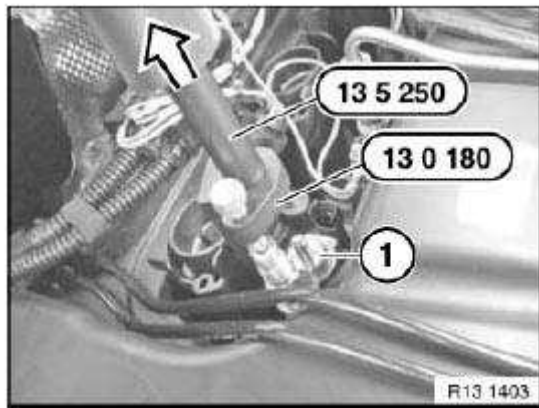


Fig. 33: Identifying Knock Out Injector With Special Tools (13 0 180 And 13 5 250)
Courtesy of BMW OF NORTH AMERICA, INC.

After removing, fit protective caps (1 and 3) to injector tip and fuel line connection.

Protective caps are available from BMW Parts Service.

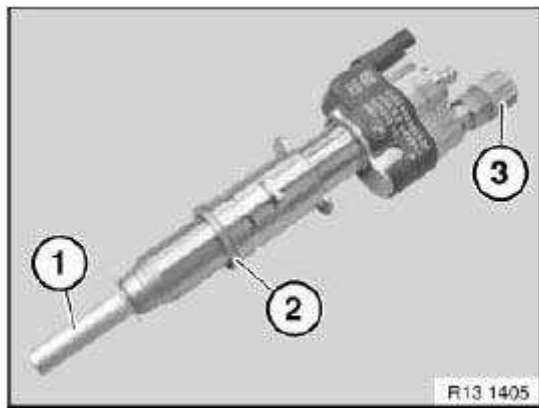


Fig. 34: Identifying Protective Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

When reusing fuel injector:

- Replace uncoupling element (2).
- Replace PTFE sealing ring (1).

A PTFE seal which has been heated once by engine operation must be replaced before the fuel injector is reinstalled.

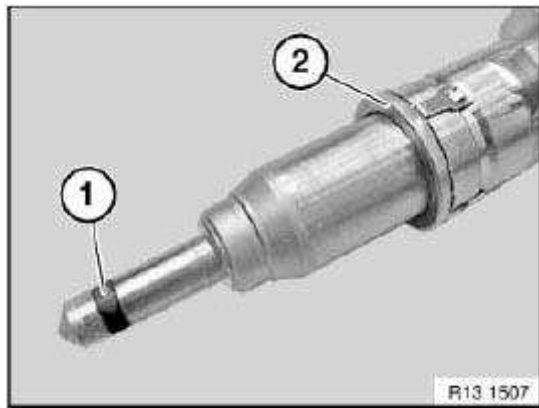


Fig. 35: Identifying Element And Sealing Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

When installing a new injector:

- Use a new uncoupling element (2).
- Remove protective cap (1) from injector tip max. 10 min. before installation (PTFE sealing ring swells up).

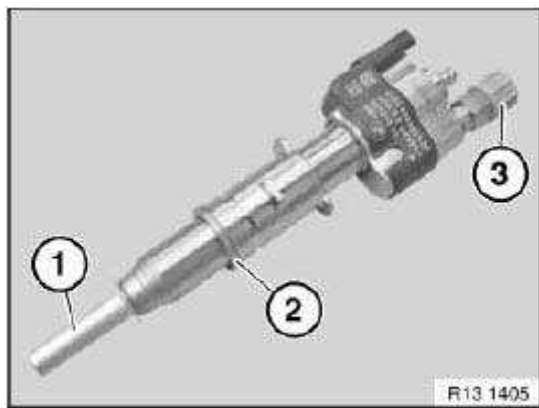


Fig. 36: Identifying Protective Caps And Element
 Courtesy of BMW OF NORTH AMERICA, INC.

Replacing PTFE sealing ring

Before replacing PTFE sealing ring (1), make sure hands and work surface are clean and free of oil.

Avoid mechanical contact with injector tip (2).

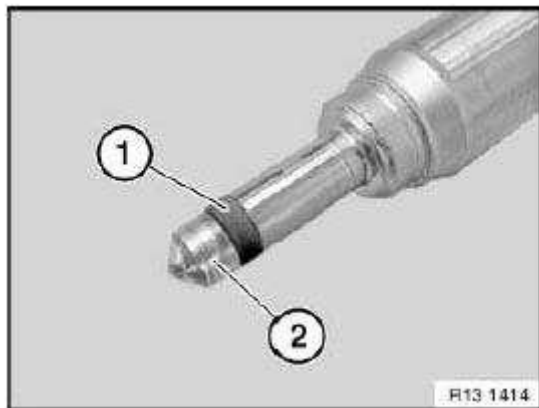


Fig. 37: Identifying PTFE Sealing Ring And Injector Tip
 Courtesy of BMW OF NORTH AMERICA, INC.

Remove PTFE sealing ring (1) with special tool **13 0 191** from injector (2).

Use a fluff-free cloth only to remove combustion residues from cylindrical part of injector tip (do not use ultrasound or other tools/agents).

Do not clean injector tip.

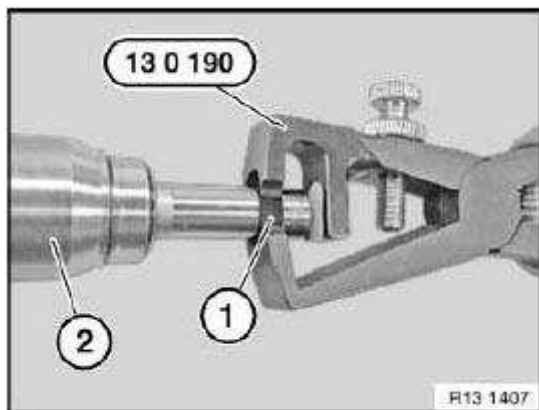


Fig. 38: Removing PTFE Sealing Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

Slide new PTFE sealing ring (1) onto mounting taper **13 0 195**.

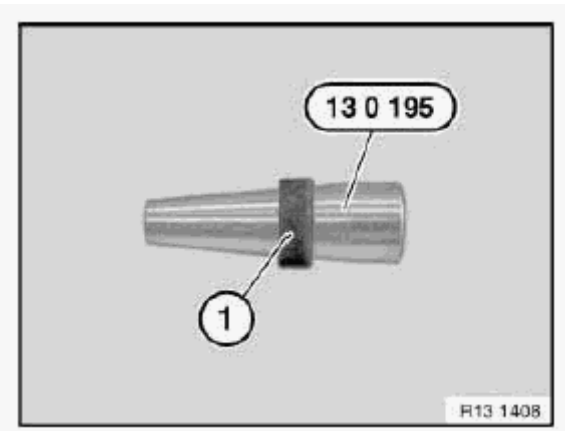


Fig. 39: Sliding PTFE Sealing Ring Onto Mounting Taper (13 0 195)
 Courtesy of BMW OF NORTH AMERICA, INC.

Use fingers and mounting taper 13 0 195 to slide PTFE sealing ring (1) onto injector (2).

NOTE:

- Do not use fingernails to slide PTFE sealing ring on.
- Do not use any lubricating agents.
- The sealing ring is expanded when slid on.

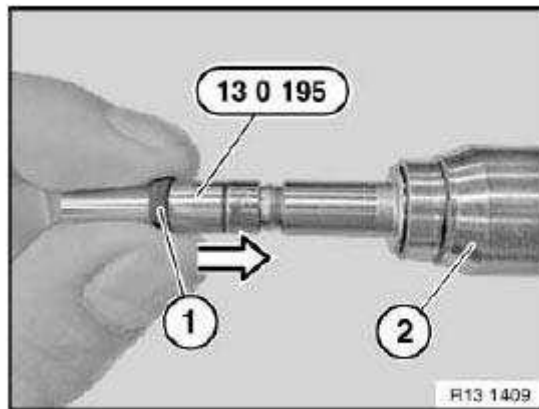


Fig. 40: Sliding PTFE Sealing Ring Onto Injector
 Courtesy of BMW OF NORTH AMERICA, INC.

To bring the expanded PTFE sealing ring to its installation dimension, slide three mounting sleeves with decreasing diameters onto the injector.

Slide mounting sleeve (1) with large opening first onto injector (1).

Do not use any lubricating agents.

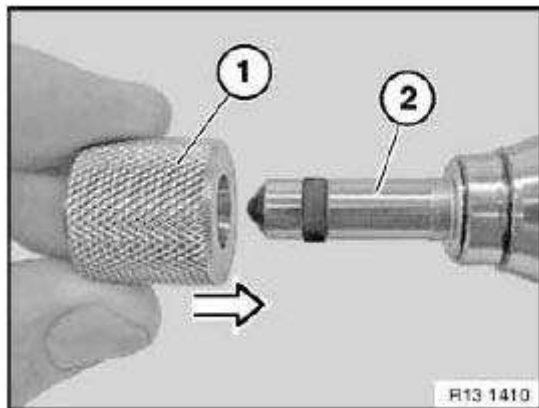


Fig. 41: Sliding Mounting Sleeve With Large Opening First Onto Injector
 Courtesy of BMW OF NORTH AMERICA, INC.

First slide mounting sleeve 13 0 192 (large diameter) onto injector (1).

Then slide mounting sleeve 13 0 193 (medium diameter) onto injector (1).

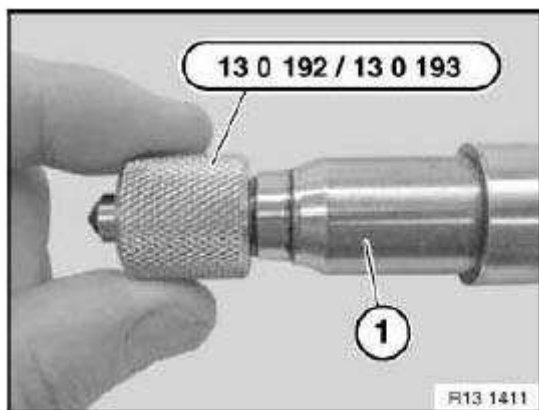


Fig. 42: Sliding Mounting Sleeve (13 0 193) (Medium Diameter) Onto Injector
 Courtesy of BMW OF NORTH AMERICA, INC.

Finally, press injector (1) into mounting sleeve 13 0 194 (small diameter).

Installation:

Install injector within 10 minutes or slide on protective cap (**Fig. 36**) (PTFE sealing ring swells up).

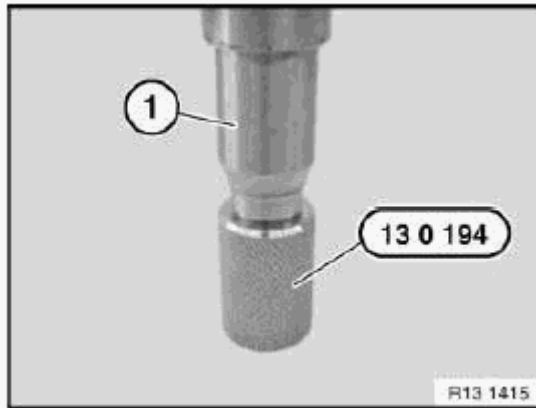


Fig. 43: Pressing Injector Into Mounting Sleeve (13 0 194)
 Courtesy of BMW OF NORTH AMERICA, INC.

Installing injector

Installation of injector is described separately from removal.

Before installing injector in engines that have been run:

- Check injector bore for dirt.
- Clean **only dirty** injector bores.

Important - do not damage injector!

- Clean injector bore: To do so, preferably slide injector without uncoupling element (2) but with new PTFE sealing ring (1) in and out of injector bores several times.

The PTFE sealing ring must then be replaced.

- Clean contact surfaces of uncoupling elements (2) in cylinder head.
- Replace uncoupling element (2).

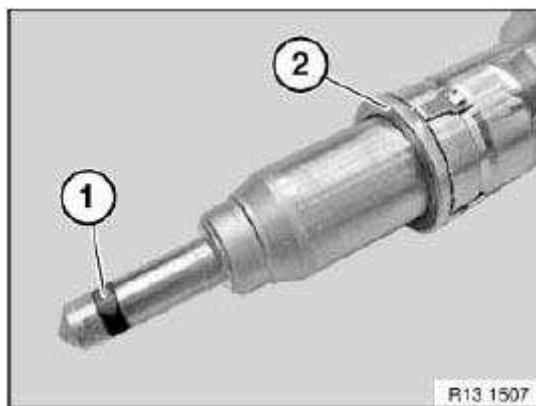


Fig. 44: Identifying Element And Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Injector adjustment!

An injector adjustment must be carried out if an injector is replaced or changed on the cylinder side.

Injector adjustment is carried out with the aid of a so-called adjustment value.

The adjustment value is printed in two blocks of three digits on the injector.

The adjustment value must be read off **before** installation!

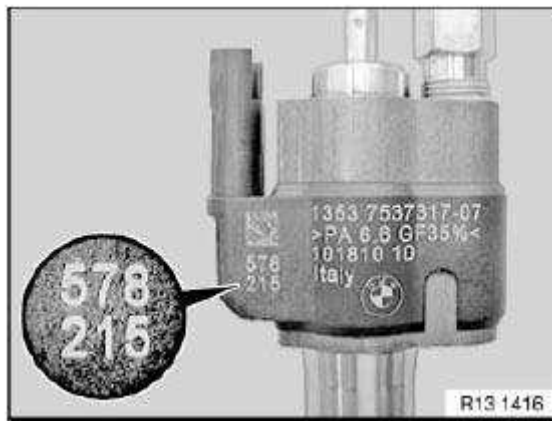


Fig. 45: Identifying Adjustment Value Printed In Two Blocks Of Three Digits On Injector
Courtesy of BMW OF NORTH AMERICA, INC.

Enter the adjustment value according to the installation position (cylinder) of the injector.

If injector adjustment is not carried out, the engine may run roughly or fail to start.

Description of injector adjustment at end of instruction.



Fig. 46: Identifying Injector Installation Position
Courtesy of BMW OF NORTH AMERICA, INC.

Installing injector:

Install injector (3).

Install holding-down element (2).

IMPORTANT: Tighten screw hand-tight only so that holding-down element (2) is slack and if necessary injector can still be turned.

Connect contact plug (1).

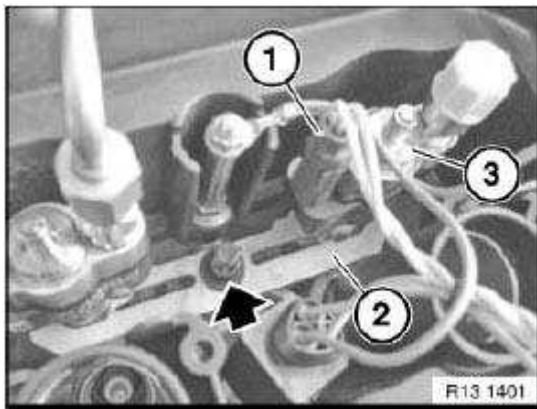


Fig. 47: Identifying Holding-Down Element And Plug
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Make sure holding-down element (1) is correctly seated.

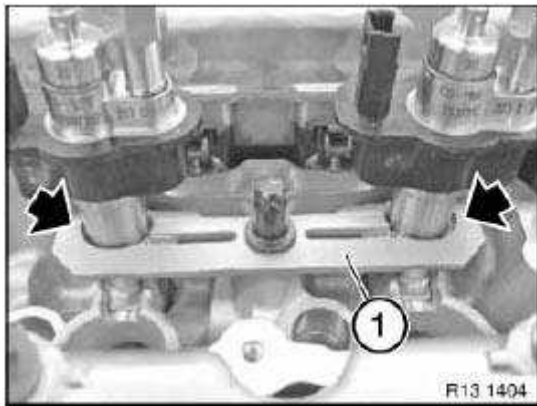


Fig. 48: Identifying Holding-Down Element Correct Installation Position
Courtesy of BMW OF NORTH AMERICA, INC.

Copper seals (1) that may be fitted on the pressure lines are no longer needed and must be removed.

If using the pressure line, apply a light coating of gear oil to the thread. New lines are already pretreated.

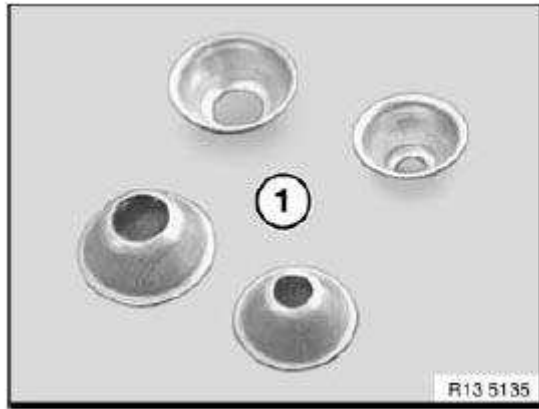


Fig. 49: Identifying Copper Seals

Courtesy of BMW OF NORTH AMERICA, INC.

Connect pressure line (1), tightening nuts hand-tight only in the process.

IMPORTANT: Connect pressure line (1) without tension only.

To ensure distortion-free installation of the pressure line and to avoid damaging the thread, it must be possible for both nuts to be screwed on easily by hand!

If the nuts cannot be screwed on easily by hand, the injector must if necessary be turned a little.

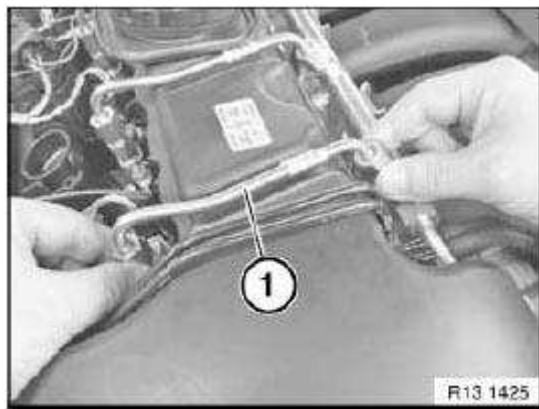


Fig. 50: Connecting Pressure Line

Courtesy of BMW OF NORTH AMERICA, INC.

Turn injector (2) if necessary in direction of arrow until nuts on pressure line can be easily screwed on by hand.

Tighten nuts on pressure line hand-tight.

Then tighten down bolt for holding-down element (1).

Tightening torque **13 53 5AZ** .

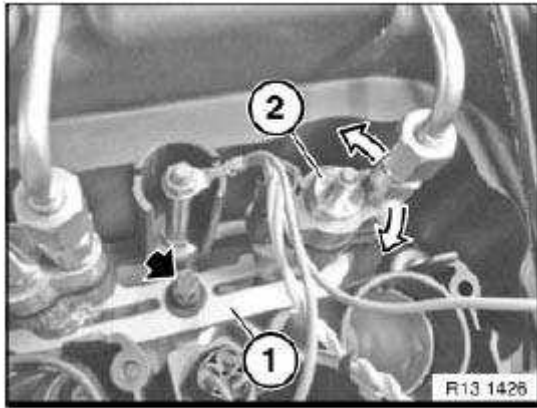


Fig. 51: Turning Injector

Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening sequence:

- First tighten down nut (1) on injector.
- Then tighten down nut (2) on rail.

When tightening nut (1) on injector, grip hexagon head of injector with wrench (3).

Tighten down nuts with special tool **37 1 151**.

Tightening torque **13 53 8AZ** .

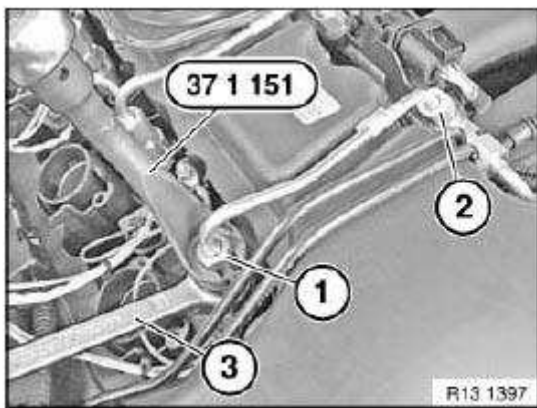


Fig. 52: Tightening Nut On Injector

Courtesy of BMW OF NORTH AMERICA, INC.

Carrying out injector adjustment

- Connect DIS Tester
- Identify car
- Select "Function selection"
- Select "Service functions"
- Select "Engine electronics"
- Select "Adjustment programs"
- Select "Adjust injectors"
- Change "Test schedule"
- For each replaced injector, the adjustment value must be entered according to the installation position (cylinder).

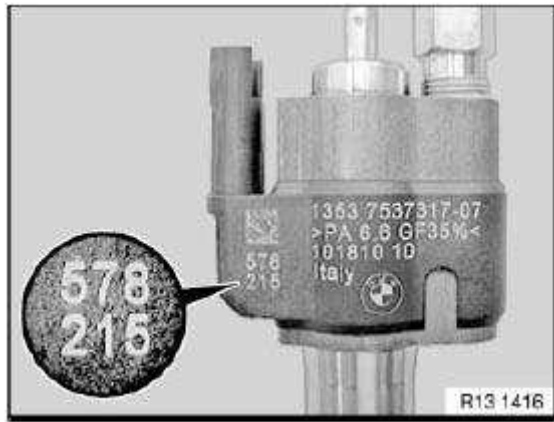


Fig. 53: Identifying Adjustment Value Printed In Two Blocks Of Three Digits On Injector
 Courtesy of BMW OF NORTH AMERICA, INC.

Clean spark plug slot.

Assemble engine.

Check fuel system for leaks.

Check function of DME.

13 53 332 REMOVING AND INSTALLING/REPLACING FEED LINE (N54, N53)

Special tools required:

- **13 5 020**
- **13 5 281**
- **13 5 282**
- **32 1 270**

WARNING: Disconnect BATTERY NEGATIVE TERMINAL (risk of fire due to short-circuiting on removal).
Electric fuel pump starts up automatically each time door is opened!
Carry out installation work on fuel system only with coolant temperature below 40°C.

Wear protective goggles.

IMPORTANT: Adhere to conditions of absolute cleanliness when working on the high-pressure fuel system.

Introduced contaminants can cause malfunctions in the system!

- Do not allow any dirt particles or foreign bodies to get into the system.
- Remove all traces of dirt before removing pipes or individual components.
- Use only fluff-free cloths.
- Seal all fuel system openings with protective caps or plugs.

Necessary preliminary tasks:

- Remove INTAKE AIR MANIFOLD

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste-disposal regulations.

N53 only:

Lay exhaust gas recirculation (1) upwards to one side. Do **not** remove.

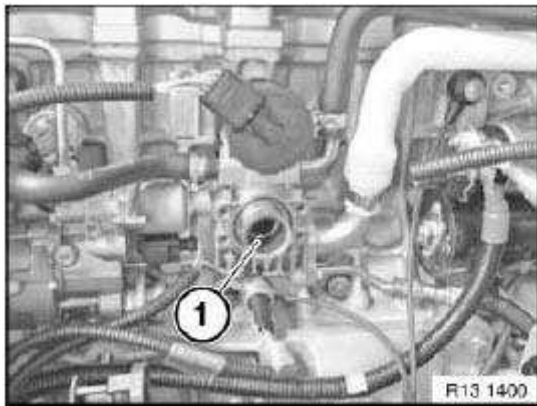


Fig. 54: Identifying Exhaust Gas Recirculation
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock plug (1) and remove.

Unlock and detach fuel line (2).

Catch and dispose of escaping fuel.

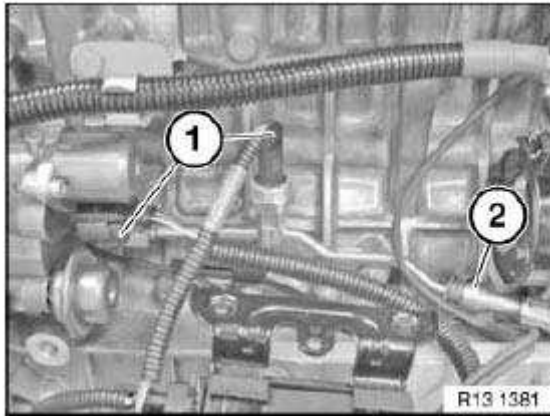


Fig. 55: Detaching Fuel Line
Courtesy of BMW OF NORTH AMERICA, INC.

Seal fuel lines with special tools 13 5 281 and 13 5 282.

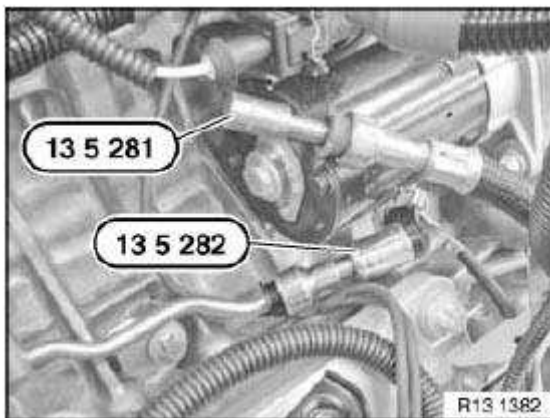


Fig. 56: Identifying Special Tools (13 5 281 And 13 5 282)
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Release screw (2).

Remove feed line (3).

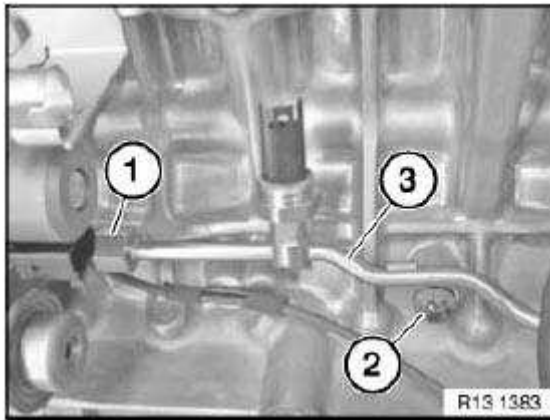


Fig. 57: Identifying Feed Line Screw And Nut
 Courtesy of BMW OF NORTH AMERICA, INC.

Close off feed line and high-pressure pump with a matching plug from special tool kit 32 1 270.

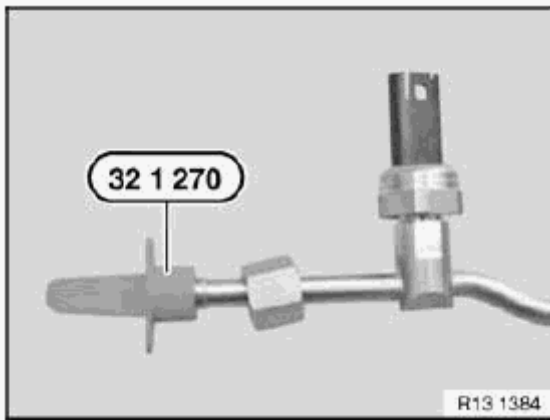


Fig. 58: Identifying Special Tool Kit (32 1 270)
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Feed lines with soldered holder must be replaced by new version with elastomer clamp holder. Observe installation position of fuel low-pressure sensor. Lines for solenoid switches are laid **behind** fuel line.

Install feed line (3).

In so doing, tighten screw connection **hand-tight only**

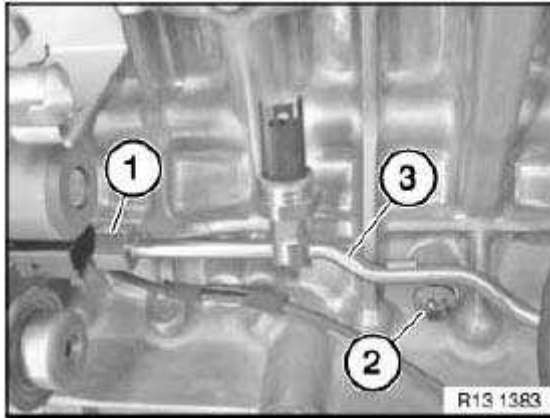


Fig. 59: Identifying Feed Line Screw And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Follow sequence of screw connections:

1. Tighten down nut (1) with special tool 13 5 020. Tightening torque 13 53 6AZ .
2. Tighten screw (2). Replace aluminum screw - use only screws with yellow locking paint.

Tightening torque 13 53 9AZ .

Assemble engine.

Check fuel system for leaks.

Check function of DME.

13 53 334 REMOVING AND INSTALLING/REPLACING PRESSURE LINE (N54, N53)

Special tools required:

- 11 8 610
- 13 5 020
- 32 1 270

WARNING: Observe warning on cylinder head cover.

Disconnect BATTERY NEGATIVE TERMINAL (risk of fire due to short-circuiting on removal).

Electric fuel pump starts up automatically each time door is opened!

Carry out installation work on fuel system only with coolant temperature below 40°C.

IMPORTANT: Wear full face guard and protective gloves.
Fuel can emerge spontaneously at high velocity when the high-pressure line is released!

IMPORTANT: Adhere to conditions of absolute cleanliness when working on the high-pressure fuel system.
Introduced contaminants can cause malfunctions in the system!

- Do not allow any dirt particles or foreign bodies to get into the system.
- Remove all traces of dirt before removing pipes or individual components.
- Use only fluff-free cloths.
- Seal all fuel system openings with protective caps or plugs.
- High-pressure lines may be rescrewed a maximum of 10 times.

IMPORTANT: Ignition coils must not be fouled by fuel.
The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail!
Cover ignition coil with suitable means.

Necessary preliminary tasks:

- Remove **INTAKE AIR MANIFOLD**

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste-disposal regulations.

Release nuts (1 and 2).

Unscrew bolt (3).

Disconnect high-pressure line (4).

Seal connections of high-pressure line (4) with matching plugs from special tool kit **32 1 270**.

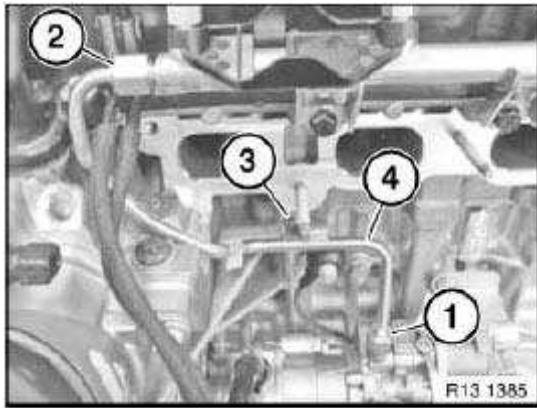


Fig. 60: Identifying High-Pressure Line With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Seal fuel line connection of high-pressure pump (1) and high-pressure rail with matching plugs from special tool kit 32 1 270.

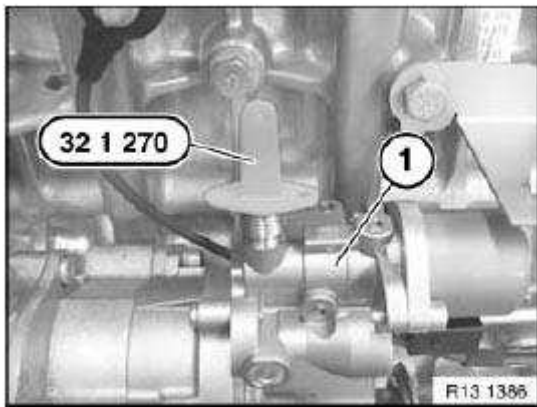


Fig. 61: Identifying High-Pressure Pump And Special Tool Kit (32 1 270)
Courtesy of BMW OF NORTH AMERICA, INC.

Installing pressure line

Installation of pressure rail is described separately from removal.

Copper seals that may be fitted (1) are no longer needed and must be removed.

If reusing the pressure line, apply a light coating of gear oil to threads of pressure connections. New pressure lines are already coated.

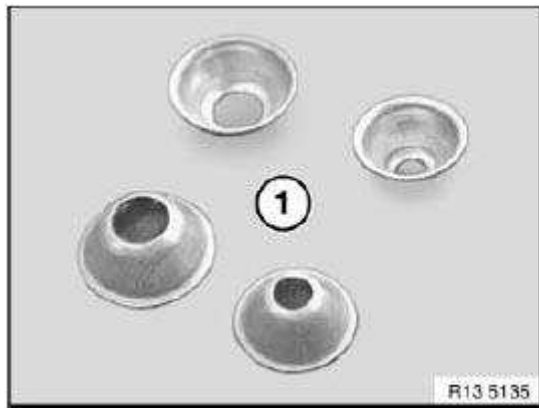


Fig. 62: Identifying Copper Seals
 Courtesy of BMW OF NORTH AMERICA, INC.

Install delivery line (4).

In so doing, tighten screw connections (1 to 3) hand-tight only.

IMPORTANT: Connect pressure line (4) without tension only.

To ensure distortion-free installation of the pressure line and to avoid damaging the thread, it must be possible for both nuts (1 and 2) to be screwed on easily by hand!

If the nuts cannot be screwed on easily by hand, the high-pressure pump must be slackened.

This operation is described in the following section.

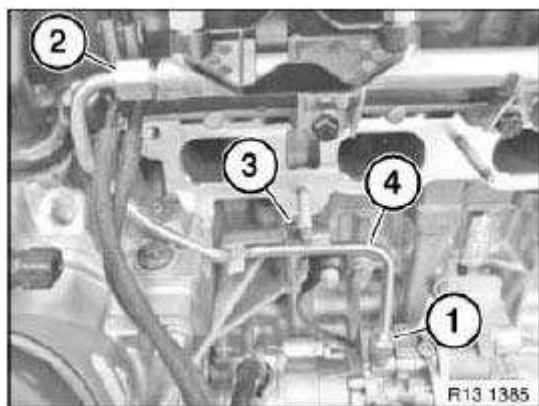


Fig. 63: Identifying High-Pressure Line With Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Only if high-pressure pump has to be slackened:

Slacken screws with special tool 11 8 610.

Turn high-pressure pump (1) on flange so that nuts of high pressure line can be easily screwed on by hand.

Tighten down screws. Tightening torque 13 51 1AZ .

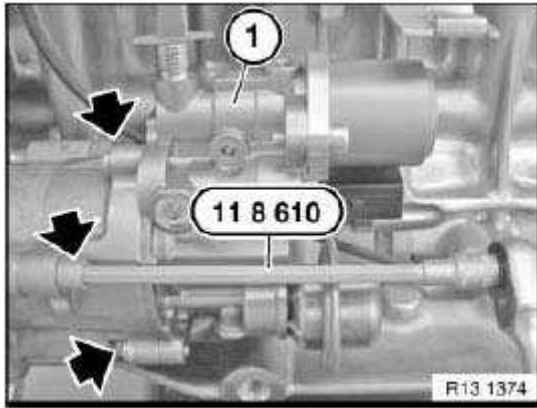


Fig. 64: Detaching High-Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Follow sequence of screw connections:

1. Tighten down nut (1) with special tool 13 5 020. Tightening torque 13 53 7AZ .
2. Tighten nut (2). Tightening torque 13 53 7AZ .
3. Tighten down screw (3) for holder. Tightening torque 13 53 2AZ .

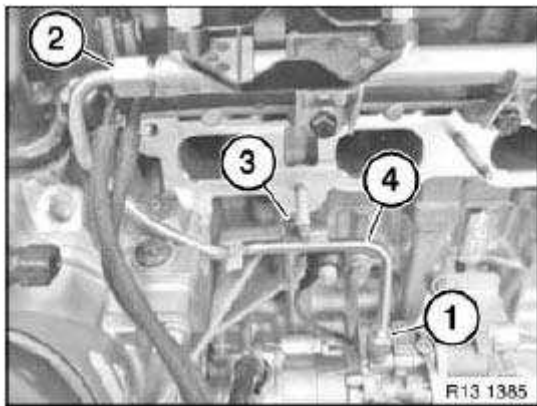


Fig. 65: Identifying High-Pressure Line With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for leaks.

Check function of DME.

13 53 594 REPLACING LOW-PRESSURE FUEL SENSOR (N54, N53)

Special tools required:

- 32 1 270

WARNING: Disconnect BATTERY NEGATIVE TERMINAL (risk of fire due to short-circuiting on removal).
Electric fuel pump starts up automatically each time door is opened!
Carry out installation work on fuel system only with coolant temperature below 40°C.

Wear protective goggles.

IMPORTANT: Adhere to conditions of absolute cleanliness when working on the high-pressure fuel system.

Introduced contaminants can cause malfunctions in the system!

- Do not allow any dirt particles or foreign bodies to get into the system.
- Remove all traces of dirt before removing pipes or individual components.
- Use only fluff-free cloths.
- Seal all fuel system openings with protective caps or plugs.

Necessary preliminary tasks:

- Remove INTAKE AIR MANIFOLD

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste-disposal regulations.

N53 only

Lay exhaust gas recirculation (1) upwards to one side. Do **not** remove.

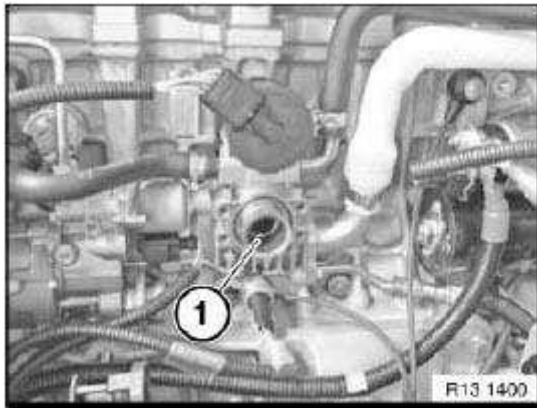


Fig. 66: Identifying Exhaust Gas Recirculation
 Courtesy of BMW OF NORTH AMERICA, INC.

Unlock plug (1) and remove.

Release low-pressure sensor (2).

Tightening torque **13 53 4AZ** .

IMPORTANT: When releasing and tightening down sensor, grip at width across flats of low-pressure line (3).

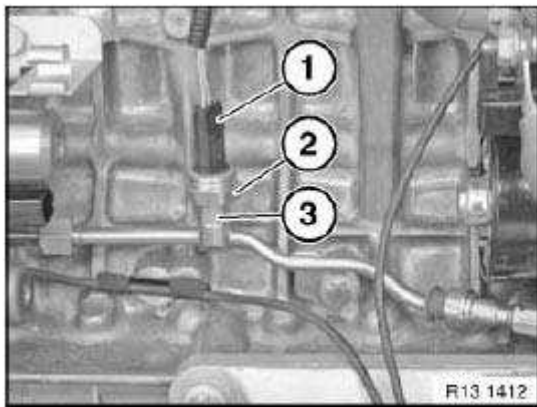


Fig. 67: Identifying Low-Pressure Sensor And Plug
 Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Seal low-pressure line (3) if necessary with a matching plug from special tool kit 32 1 270.

Assemble engine.

Check fuel system for leaks.

Check function of DME.

13 53 596 REPLACING HIGH-PRESSURE FUEL SENSOR (N54, N53)

Special tools required:

- 32 1 270
- 32 2 100

WARNING: Observe warning on cylinder head cover.

Disconnect BATTERY NEGATIVE TERMINAL (risk of fire due to short-circuiting on removal).

Electric fuel pump starts up automatically each time door is opened!

Carry out installation work on fuel system only with coolant temperature below 40°C.

IMPORTANT: Wear full face guard and protective gloves.

Fuel can emerge spontaneously at high velocity when the high-pressure line is released!

IMPORTANT: Adhere to conditions of absolute cleanliness when working on the high-pressure fuel system.

Introduced contaminants can cause malfunctions in the system!

- Do not allow any dirt particles or foreign bodies to get into the system.
- Remove all traces of dirt before removing pipes or individual components.
- Use only fluff-free cloths.
- Seal all fuel system openings with protective caps or plugs.

Necessary preliminary tasks:

- Remove acoustic cover. See 11 00 REMOVING AND INSTALLING/REPLACING FRONT IGNITION COIL COVER (N54) and 11 00 REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N54) .

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste-disposal regulations.

Unlock plug (1) and remove.

Release high-pressure sensor (2) and remove.

Tightening torque **13 53 3AZ** with special tool **32 2 100**.

Seal high-pressure rail (3) if necessary with a matching plug from special tool kit **32 1 270**.

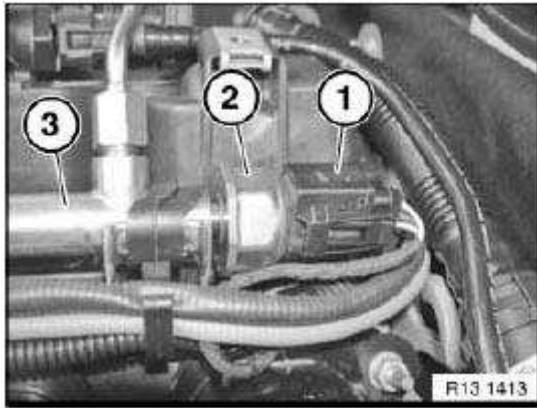


Fig. 68: Identifying High-Pressure Sensor And High-Pressure Rail With Plug
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If reusing:

The high-pressure sensor may only be screwed back in 3 times!
Therefore mark the sensor with a blue dot each time it is screwed back in.

Assemble engine.

Check fuel system for leaks.

Check function of DME.

THROTTLE AND OPERATION

11 61 365 REPLACING FRONT CHARGE-AIR DUCT (N54)

Special tools required:

- **11 8 670**

Necessary preliminary tasks:

- Remove **FAN COWL**
- Remove front **UNDERBODY PROTECTION**

IMPORTANT: Coat sealing rings of quick-connect couplings with antiseize agent.
Pressure pipes with quick-connect couplings cannot be fitted without antiseize

agent.

Unlock quick-connect coupling.

Detach charge-air duct (1) from intercooler (2).

Installation:

- Coat sealing rings of quick-connect couplings with antiseize agent.
- Pressure pipes must audibly snap into place.

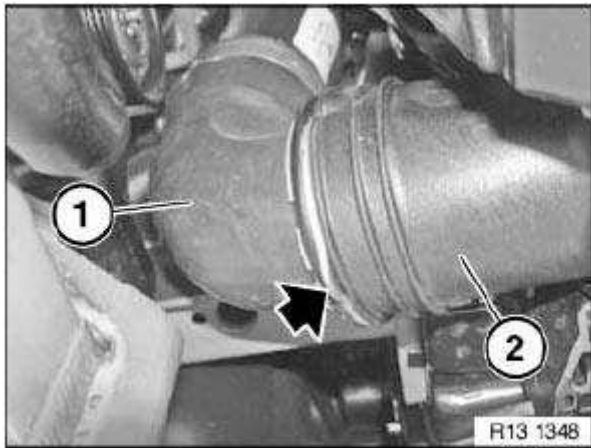


Fig. 69: Detaching Charge-Air Duct From Intercooler
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage! to sealing rings.
Special tool 11 8 670 is essential.
Attach charge-air duct (1) with special tool 11 8 670 to intercooler (2).

Installation:

Texts refer to and illustrations show the right side.

The procedure is identical for the left side.

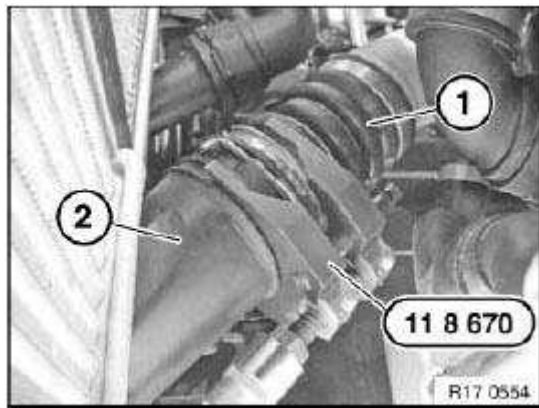


Fig. 70: Attaching Charge-Air Duct With Special Tool (11 8 670) To Intercooler
 Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Charge-air hoses with clamp fastenings must be installed dry and free from grease!
 If charge-air hoses with clamp fastenings are not installed dry and free from grease, this may result in turbocharger failure!

Unfasten clip.

Tightening torque **13 71 6AZ** .

Detach front charge-air duct (1) from charge-air duct (2).

Feed out front charge-air duct (1) towards top and remove.

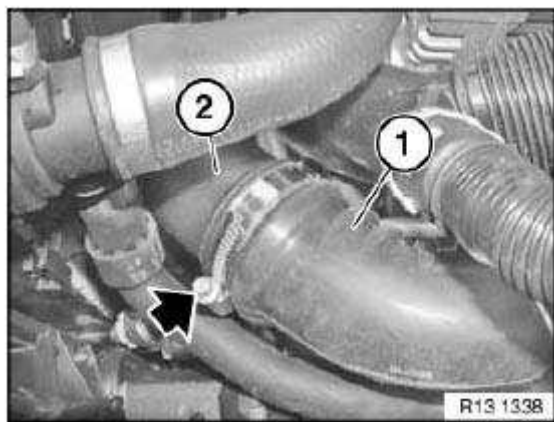


Fig. 71: Identifying Charge-Air Hose And Charge-Air Duct
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Install charge-air hose (charge-air duct) dry and free from grease.

11 61 362 REPLACING RIGHT CHARGE-AIR DUCT (N54)

Special tools required:

- **11 8 670**

Necessary preliminary tasks:

- Remove **COOLANT EXPANSION TANK**
- Remove **UNDERBODY PROTECTION**

IMPORTANT: Coat sealing rings of quick-connect couplings with antiseize agent.
Pressure pipes cannot be fitted without antiseize agent.

Mark vacuum hoses (1) and detach.

Unfasten bolts and nuts.

Tightening torque bolt **11 65 6AZ** .

Raise bracket (2) slightly.

Mark vacuum hoses on underside and detach.

Remove holder (2).

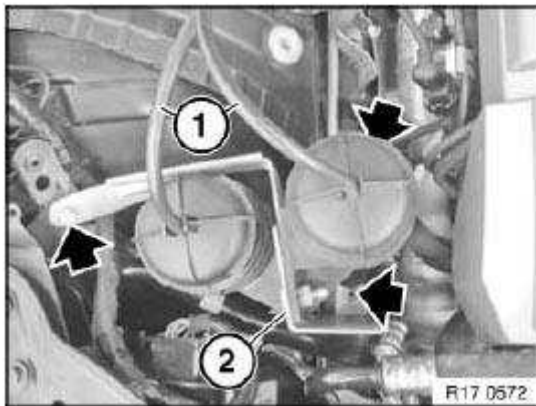


Fig. 72: Identifying Vacuum Hoses And Bracket Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts and remove heat shield.

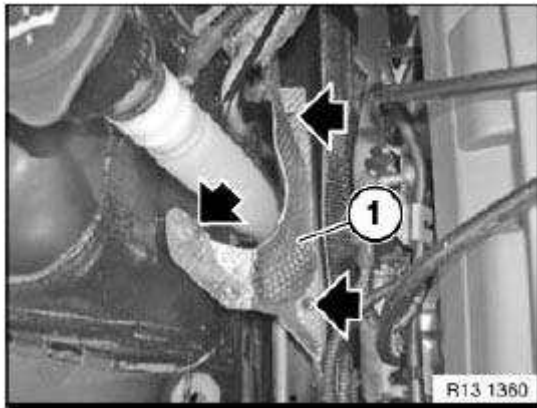


Fig. 73: Identifying Heat Shield
 Courtesy of BMW OF NORTH AMERICA, INC.

Release clamp and detach charge-air duct (1).

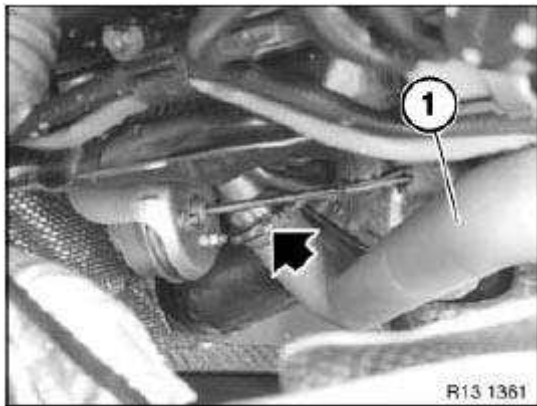


Fig. 74: Identifying Charge-Air Duct
 Courtesy of BMW OF NORTH AMERICA, INC.

Release clamp and detach charge-air duct (1).

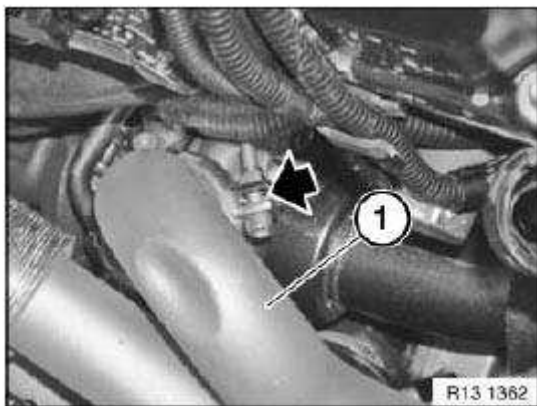


Fig. 75: Identifying Charge-Air Duct With Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Check O-rings and replace if necessary.

Prior to fitting, coat O-ring with suitable antiseize agent.



Fig. 76: Locating O-Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and detach coolant hose (1).

Unlock quick-connect coupling.

Detach charge-air duct (2) from intercooler (3) and remove.

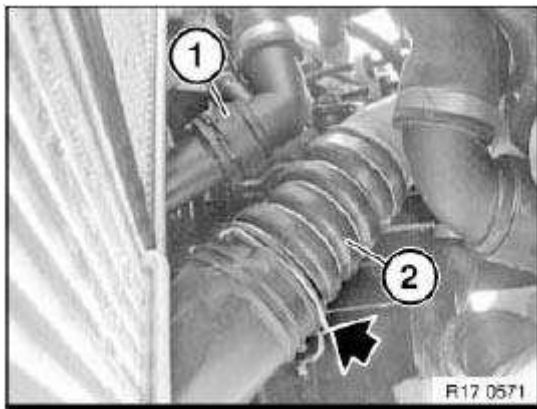


Fig. 77: Identifying Coolant Hose And Charge-Air Duct
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage! to sealing rings!

Special tool 11 8 670 is essential.

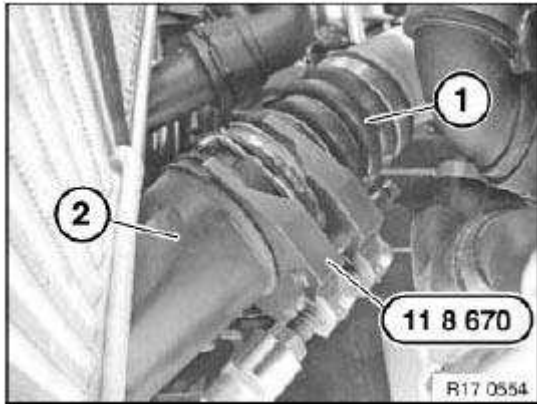


Fig. 78: Attaching Charge-Air Duct With Special Tool (11 8 670) To Intercooler
Courtesy of BMW OF NORTH AMERICA, INC.

Attach charge-air duct (1) with special tool **11 8 670** to intercooler.

Installation:

- Coat sealing rings of quick-connect couplings with antiseize agent.
- Pressure pipes must audibly snap into place

Assemble engine.

Check DME (turbocharger) for correct operation.

13 54 030 REMOVING AND INSTALLING/SEALING THROTTLE VALVE ASSEMBLY (N54)

IMPORTANT: Read and comply with notes on PROTECTION AGAINST ELECTROSTATIC DAMAGE (ESD PROTECTION) .

Necessary preliminary tasks:

- Switch off ignition
- Remove charge-air duct. See **11 61 368 REMOVING AND INSTALLING/REPLACING REAR LEFT CHARGE-AIR DUCT (N54)** and **11 61 368 REPLACING CHARGE-AIR DUCT (N54)** .

Unlock and disconnect line (1).

Unlock connector (2) and remove.

Release screws.

Tightening torque **13 54 1AZ** .

Remove throttle assembly (3).

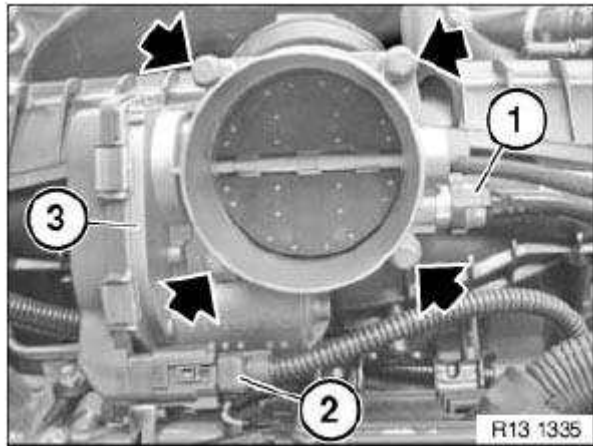


Fig. 79: Identifying Throttle Assembly With Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Installation

Replace sealing ring (1) of throttle assembly (2).

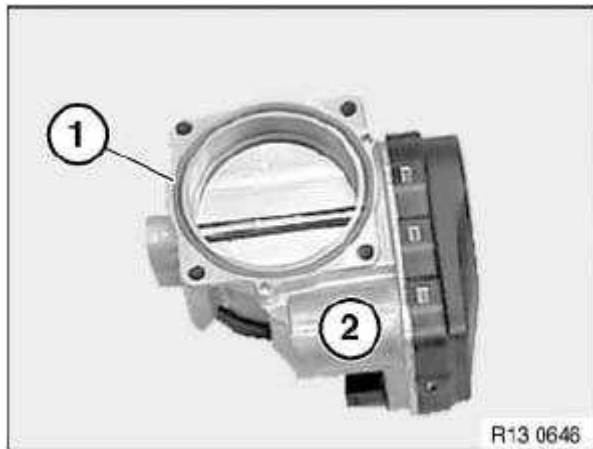


Fig. 80: Identifying Sealing Ring And Throttle Assembly
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Check stored fault messages.

Now clear the fault memory.

SENSOR FOR CONTROL UNIT

13 62 531 REPLACING COOLANT TEMPERATURE SENSOR (N54)

WARNING: Danger of scalding!

Only perform these tasks on an engine that has cooled down.

Recycling

Catch and dispose of escaping coolant.

Observe country-specific waste-disposal regulations.

Necessary preliminary tasks:

- Read out fault memory of DME control unit
- Switch off ignition
- **REMOVE ACOUSTIC COVER**

NOTE: Coolant temperature sensor is mounted on cylinder head at front.

Unlock plug (1) and remove.

Release temperature sensor (2).

Installation:

Tightening torque **13 62 1AZ** .

If necessary, top up coolant.

Check **COOLING SYSTEM** for leaks.

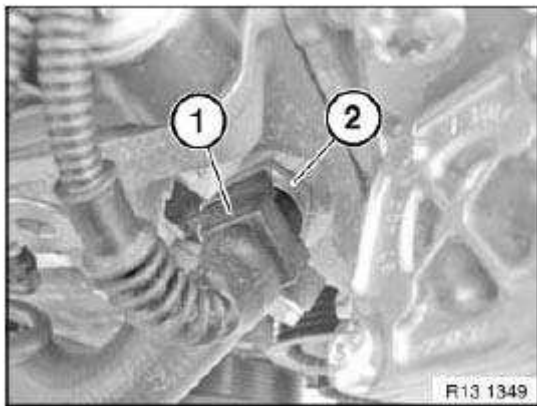


Fig. 81: Identifying Temperature Sensor And Plug
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Check stored fault messages.
Now clear the fault memory.

THROTTLE POTENTIOMETER, FUEL PUMP RELAY

13 63 558 REPLACING CHANGEOVER VALVE FOR POP-OFF VALVES (N54)

Necessary preliminary tasks:

- Read out fault memory of DDE control unit; if necessary, work through test schedules
- Switch off ignition

Unlock and detach connector (1). Carefully detach all vacuum lines from changeover valve (2).

Detach changeover valve (2) from lower section of intake filter housing and remove.

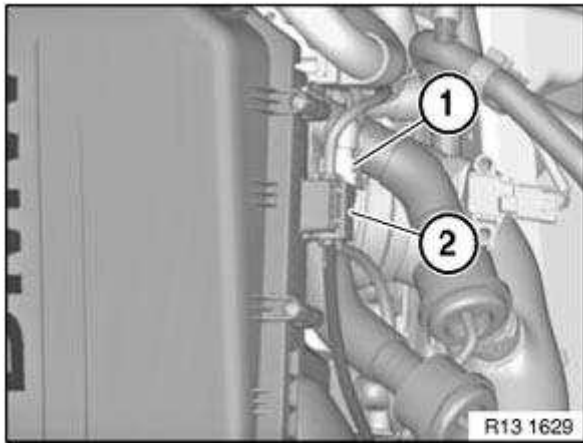


Fig. 82: Identifying Changeover Valve And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Now clear the fault memory.

INTAKE SILENCER

13 REMOVING INTAKE DUCT (N54)

Release expansion rivets (1).

Unlock intake duct (2) at front side and detach from air filter housing.

Remove intake duct.

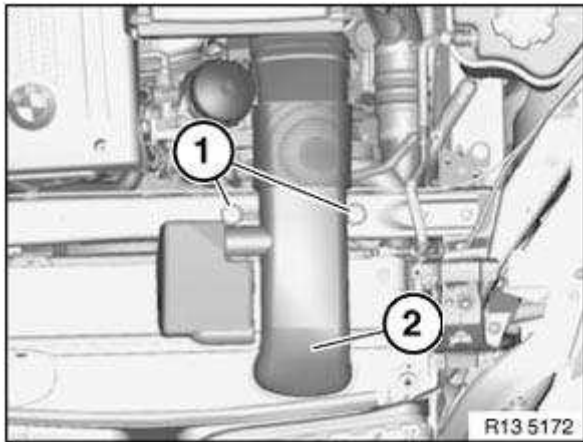


Fig. 83: Identifying Intake Duct

Courtesy of BMW OF NORTH AMERICA, INC.

13 71 000 REMOVING AND INSTALLING/REPLACING INTAKE FILTER HOUSING (N54)

Necessary preliminary tasks:

- **REMOVE INTAKE DUCT**
- Remove top section of intake filter housing; for further information, refer to **CHANGING INTAKE FILTER ELEMENT**

Unlock and detach connector (1). Carefully detach all vacuum lines from changeover valve (2).

Detach changeover valve (2) from lower section of intake filter housing and remove.

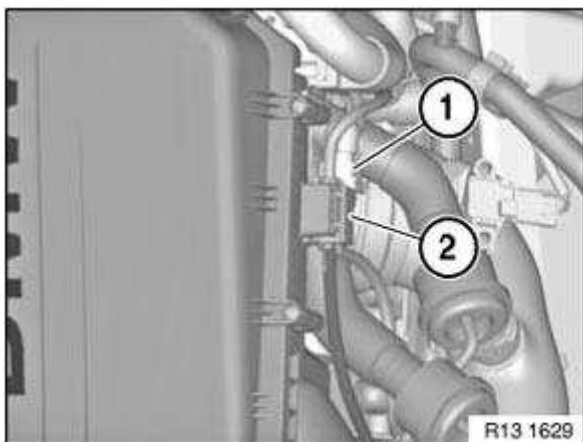


Fig. 84: Identifying Changeover Valve And Connector

Courtesy of BMW OF NORTH AMERICA, INC.

Detach line holder.

Pull intake filter housing upwards out of rubber mounts.

Disconnect overrun air line from intake filter housing.

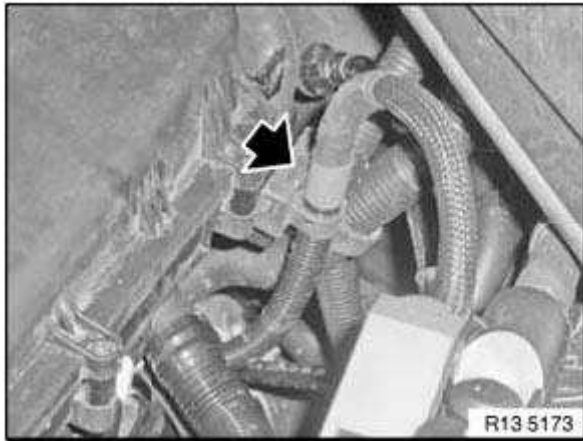


Fig. 85: Locating Overrun Air Line

Courtesy of BMW OF NORTH AMERICA, INC.

13 71 150 REMOVING CLEAN AIR PIPE (N54)

Necessary preliminary tasks:

REMOVE ACOUSTIC COVER

Release clamps (1).

Pull clean air pipe out of holder and remove.

Installation:

Tightening torque **13 71 12AZ** .

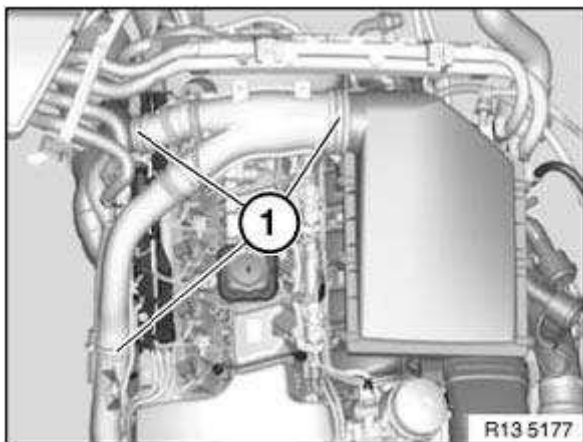


Fig. 86: Identifying Air Pipe Clamps

Courtesy of BMW OF NORTH AMERICA, INC.

13 71 160 REMOVING AND INSTALLING/REPLACING FRONT AIR DUCT (N54)

IMPORTANT: Risk of damage through lever action at the top on the air duct!
Bayonet lock on air duct may break!

Necessary preliminary tasks:

- Remove CLEAN-AIR PIPE.
- Remove FAN COWL .
- Remove SUCTION FILTER HOUSING.
- Remove front right WHEEL ARCH TRIM .

IMPORTANT: Release screw (1) at top on air duct.
Do not detach air duct in upward direction.
Risk of damage!
Lower bayonet lock on air duct may break!

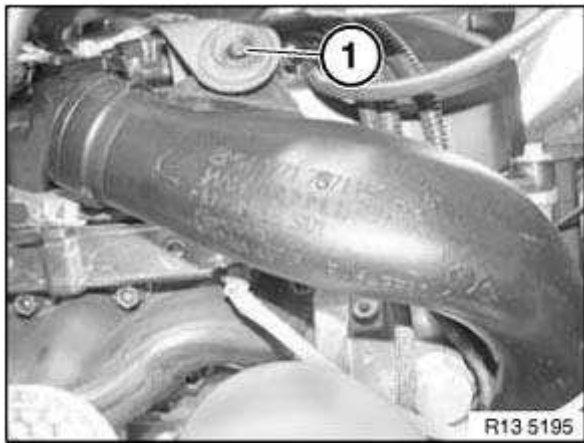


Fig. 87: Identifying Air Duct Screw

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Unlock air duct (1) in direction of arrow.
Detach air duct (1) first from turbocharger in direction of travel.
Feed out air duct and remove.

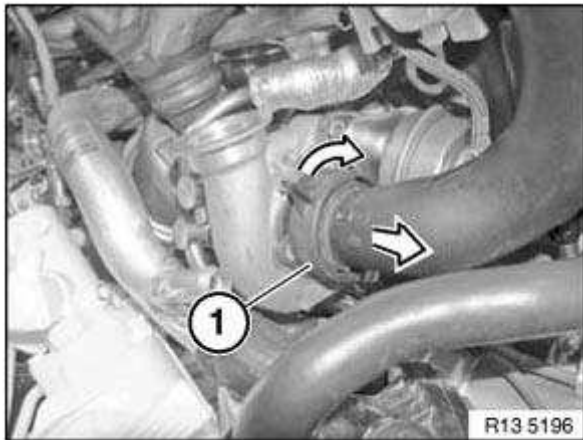


Fig. 88: Detaching Air Duct First From Turbocharger
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Check sealing ring (1) for damage.

Replace damaged sealing ring.

Make sure sealing ring (1) is correctly seated in turbocharger (2).

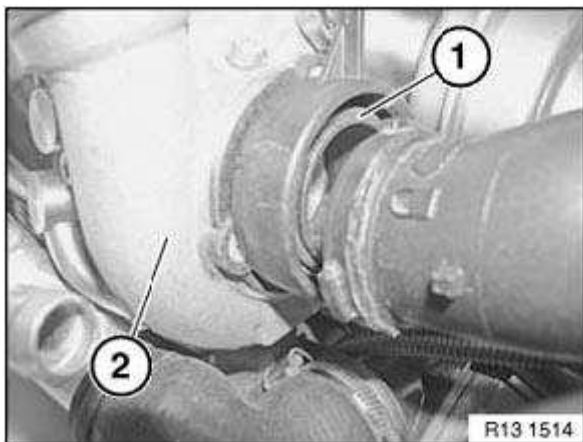


Fig. 89: Identifying Turbocharger And Sealing Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

13 71 170 REMOVING AND INSTALLING REAR AIR DUCT (N54)

IMPORTANT: Risk of damage through lever action at the top on the air duct!
Bayonet lock on air duct may break!

Necessary preliminary tasks:

- Remove front **AIR DUCT**
- Remove **CATALYTIC CONVERTER** for cylinders 4-6
- Remove right charge-air duct.

Unlock hose (1) and detach.

IMPORTANT: Release screw (2).
Do not detach air duct.
Risk of damage!
Bayonet lock on air duct may break!

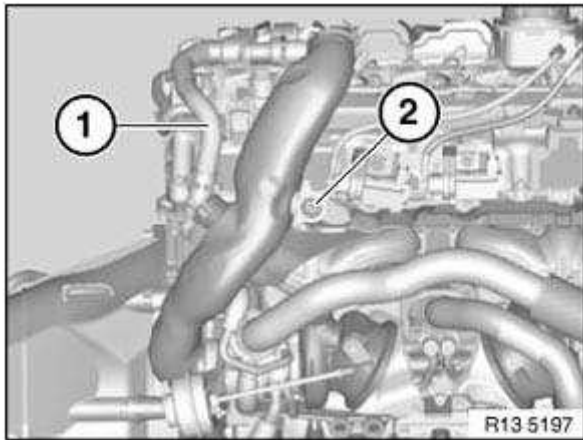


Fig. 90: Identifying Hose Screw
 Courtesy of BMW OF NORTH AMERICA, INC.

Remove **VACUUM UNIT** (1) on turbocharger for cylinders 4-6.

IMPORTANT: Unlock air duct (2) in clockwise direction.
Detach air duct (2) first from turbocharger towards rear.
Feed out air duct and remove.

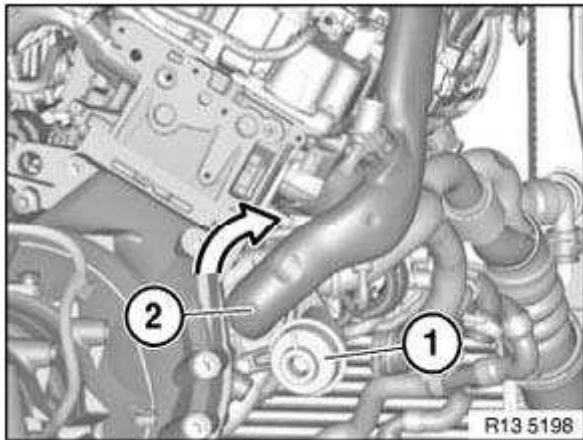


Fig. 91: Detaching Air Duct First From Turbocharger Towards Rear
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Check sealing ring (1) for damage.

Replace damaged sealing ring.

Make sure sealing ring (1) is correctly seated in turbocharger (2).

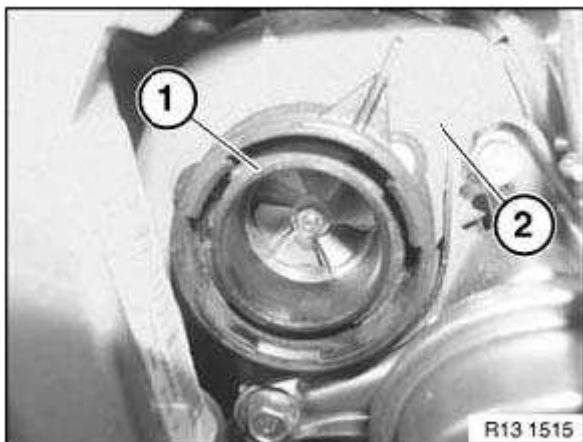


Fig. 92: Identifying Sealing Ring And Turbocharger
 Courtesy of BMW OF NORTH AMERICA, INC.

AIR CLEANER

13 72 001 REPLACING AIR FILTER ELEMENT (N54)

Necessary preliminary tasks:

Switch off ignition.

Release screws.

Release clamp (1) and detach air intake hose.

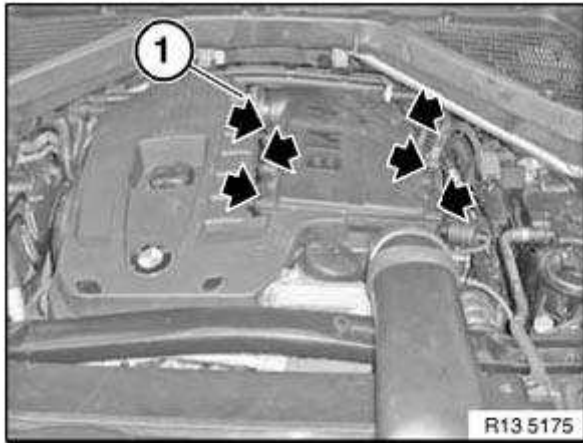


Fig. 93: Identifying Air Intake Hose Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not raise upper section (1) of intake filter housing more than 12 cm.
Blow-off hose on intake filter housing lower section could become detached unnoticed!
Remove air filter element (2).

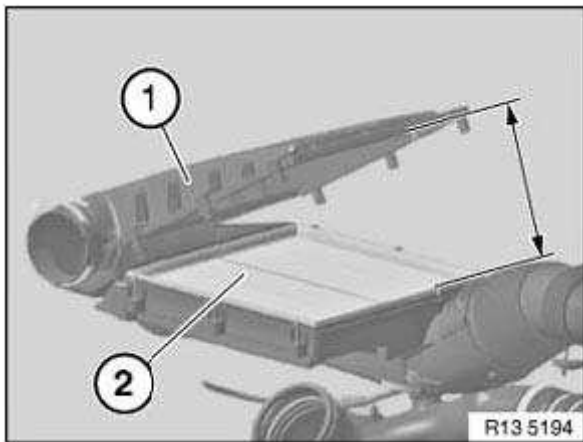


Fig. 94: Removing Air Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

Installation

Clean upper and lower sections of intake filter housing from inside.

Install new air filter element.

Check that blow-off hose is correctly seated on intake filter housing lower section.

Add final details to vehicle.

CARBON CANISTER VENTILATION

13 90 500 REPLACING TANK VENT VALVE (N54)

Necessary preliminary tasks:

- Check stored fault messages
- Switch off ignition
- **REMOVE INTAKE FILTER HOUSING**

Installation location:

The tank vent valve is located at the rear below the intake air manifold.

Unlock plug (1) and remove.

Unlock hose (2) and detach.

Unlock hose (3) on throttle valve assembly and disconnect.

Detach tank vent valve (4) from holder and remove.

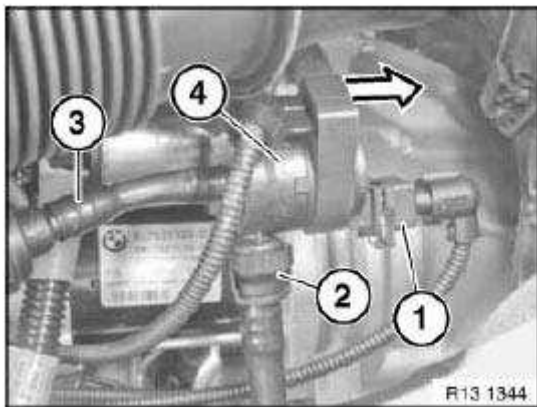


Fig. 95: Detaching Tank Vent Valve From Holder
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Read out fault memory of DME control unit.**

Now clear the fault memory.