

2007-08 ENGINE**Fuel Supply System - Repair Instructions - X5****00 FUEL PICK-UP, CLEANING****16 00 GENERAL FUNCTION DESCRIPTION FOR FUEL SUPPLY SYSTEMS****Fuel supply systems, spark-ignition engines****Fuel system**

The electric fuel pump in the fuel tank generates the pressure in the fuel system which is set by the pressure regulator to a specific level.

Tank venting system

The tank venting system is an enclosed system which is vented via a carbon canister. The carbon is incorporated in the carbon canister as granulate. The large surface of the carbon stores the fuel vapors which occur in the fuel tank. The carbon canister must be regenerated on a regular basis so as to be able to continue storing fuel vapors. Regeneration is performed by way of purging with fresh air via the intake manifold. This process is controlled by the engine control unit.

Fuel supply systems, diesel engines**Fuel system**

The electric fuel pump in the fuel tank supplies the engine with fuel. Two types of high-pressure pump are used for cylinder injection.

1. The distributor injection pump supplies each cylinder directly with fuel via the corresponding injection nozzle.
2. The high-pressure pump for the common rail systems generates in the fuel rail the necessary pressure for all the injection nozzles.

In common rail systems, a further pump (inline pump, M57/gear pump, M67) is connected between the high - pressure pump and the electric fuel pump. This pump supports the fuel pump in the fuel tank in the event of a high fuel demand.

Tank venting system

Diesel fuel is non-volatile and therefore a carbon canister is not required. The fuel tank is vented directly to atmosphere.

16 00 ... OVERVIEW OF FUEL SUPPLY SYSTEM (PETROL/GASOLINE)

1. Draw off fuel. See **16 00 005 Draining and Filling Fuel Tank**
2. Dust filter with tube. See **16 14 060 Removing and Installing/Replacing Dust Filter for Tank Leak Diagnosis Module (DMTL)**
3. Leak diagnosis pump. See **16 13 015 Removing and Installing/Replacing Tank Leak Diagnosis Module (petrol/Gasoline Cars with US DMTL version)**
4. Carbon canister for DMTL (USA). See **16 12 010 Removing and Installing/Replacing Carbon Canister (US Version with DMTL)**
5. Fuel pump and right fuel gauge sensor. See **16 14 010 Removing and Installing/Replacing Fuel Pump (Petrol/Gasoline Vehicles)**
6. Fuel filler pipe. See **16 11 060 Removing and Installing Or Replacing Fuel Filler Pipe**
7. Carbon canister. See **16 12 010 Removing and Installing/Replacing Carbon Canister**
8. Control unit, electric fuel pump. See **16 14 500 Removing and Installing or Replacing Control Unit For Electric Fuel Pump**
9. Left fuel gauge sensor. See **16 12 001 Removing and Installing or Replacing Fuel Gauge Sensor (Petrol/Gasoline, Left)**
10. Fuel tank. See **16 11 030 Removing and Installing/Replacing Fuel Tank**
11. Clamping bands. See **16 11 ... Replacing Left Or Right Clamping Band For Fuel Tank**
12. Testing. See **16 00 100 Checking Fuel Tank And Tank Ventilation System For Leaks, 16 00 102 Checking Fuel Tank And Tank Venting System For Leaks With Tank Leakage Diagnosis Module (DM-TL), 16 00 510 Conducting Leak Test On Fuel Tank And Tank Ventilation System, 16 11 130 Checking Filler Cap Pressure Relief Valve**

16 00 005 DRAINING AND FILLING FUEL TANK

Special tools required:

- 16 1 080 **16 1 080 HOSE GUIDE**

IMPORTANT: Observe country-specific safety regulations.

Ensure adequate ventilation in the place of work!

Connect the exhaust and extraction systems to the exhaust tailpipe.

The electric fuel pump must not operate without fuel! After completing repairs but before starting the engine for the first time, fill the fuel tank with min. 5 l fuel through the fuel filler pipe.

Do not damage non-return flap when pulling out extraction hose.

Diesel vehicles:

Before starting the engine for the first time, if the tank has been run dry or drawn off, fill with diesel fuel and turn on ignition for approx. 1 minute. The fuel circuit is thus filled and vented, which results in the engine firing more quickly.

Drawing off fuel:

Start engine and allow to run.

The electric fuel pump runs.

In this way, the fuel is repumped through the suction jet pump from the left to the right side of the fuel tank.

NOTE: Fuel can be drawn out of left and right sides of tank through filler neck, leaving only a small residue. The residual quantity is drawn off through the service opening (on right/left).

Insert special tool **16 1 080 HOSE GUIDE** into filler neck.

Special tool **16 1 080 HOSE GUIDE** has two different diameters for petrol/gasoline and diesel vehicles!

Slide extraction hose of extractor unit, refer to BMW Service Workshop Equipment and Planning Documentation, through special tool **16 1 080 HOSE GUIDE** into the fuel filler pipe, turning in the process if necessary.

Insertion length approx. 170 cm.

Draw off fuel with suction unit (refer to BMW Service Workshop Equipment) as far as possible.

Follow drawing off of fuel on fuel gauge in instrument cluster.

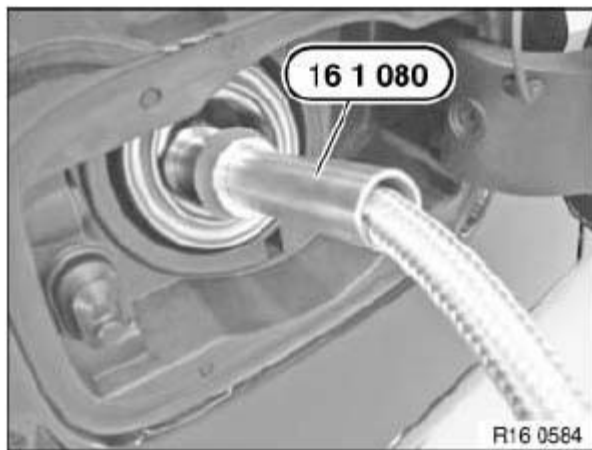


Fig. 1: Identifying Special Tool (16 1 080)

Courtesy of BMW OF NORTH AMERICA, INC.

Drawing off residual fuel quantity:

IMPORTANT: Ensure car interior is adequately ventilated.
Catch dripping fuel in a suitable container.

Remove left sensor unit. See **16 12 001 Removing and Installing or Replacing Fuel Gauge Sensor (Petrol/Gasoline, Left)**.

Remove right sensor unit. See **16 12 000 Removing and Installing or Replacing Fuel Gauge Sensor (Petrol/Gasoline, Right)**.

Draw off residual fuel quantity through service openings.

Fuel filling:

Insert special tool **16 1 080 HOSE GUIDE** into filler neck.

Special tool **16 1 080 HOSE GUIDE** has two different diameters for petrol/gasoline and diesel vehicles!

Slide extraction hose of extractor unit, refer to BMW Service Workshop Equipment and Planning Documentation, approx. 40 cm into fuel filler pipe.

Fill fuel from suction extractor unit.

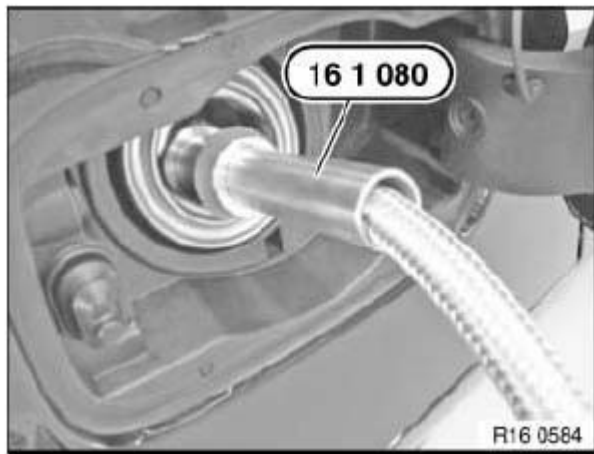


Fig. 2: Identifying Special Tool (16 1 080)

Courtesy of BMW OF NORTH AMERICA, INC.

Extracting fuel after a defect in the suction jet pump or fuel pump:

Draw off right half of tank completely through fuel filler pipe.

Remove left sensor unit. See **16 12 001 Removing and Installing or Replacing Fuel Gauge Sensor (Petrol/Gasoline, Left)**.

Insert extraction hose through service opening in tank, fuel (also residual quantity) can be drawn off.

16 00 100 CHECKING FUEL TANK AND TANK VENTILATION SYSTEM FOR LEAKS

Special tools required:

- 13 3 010**13 3 010 HOSE CLIP**
- 16 1 070**16 1 070 PLUG (CARBON CANISTER)**
- 16 1 171**16 1 170 TESTER WITH TEST ADAPTER**
- 16 1 174 **16 1 170 TESTER WITH TEST ADAPTER**

NOTE: The following procedure is only applicable to vehicles without the tank leak diagnosis module. Check tank venting system if a leak is suspected.

Observe safety instructions on raising the vehicle. See **00 LIFTING VEHICLE WITH A LIFTING PLATFORM**.

Comply with the following conditions in order to obtain plausible test results:

- Content of fuel tank:
 1. Max. 90% (approx. 79 l)
 2. Min. 13% (approx. 11 l, reserve warning lamp must not light up).
- Park the car in the workshop at least 2 hours before the test so that the fuel temperature is approximately that of the workshop temperature (ideal fuel temperature approx. 10...20°C).
- Never refuel the vehicle directly prior to the leak test due to the strong emission of gas by the fresh fuel.

Remove rear right wheel arch trim.

Fold strainer in insect strainer to one side.

Using special tool **16 1 070 PLUG (CARBON CANISTER)**, seal opening for insect strainer on carbon canister.

Remove fuel filler cap and connect special tool **16 1 170 TESTER WITH TEST ADAPTER** to fuel filler neck.

Clamp special tool. See **16 1 170 TESTER WITH TEST ADAPTER** on fuel filler neck with adjusting wheel (1).

IMPORTANT: Set pressure regulator on special tool 16 1 171. See **16 1 170 TESTER WITH TEST ADAPTER** fully in "-" direction.

Connect special tool. See **16 1 170 TESTER WITH TEST ADAPTER** using compressed air line (1) to garage compressed air system (8...10 bar).

Connect pressure sensor (2) from Diagnosis and Information System with a measuring range of 0...3.5 bar.

TESTER WITH TEST ADAPTER yet.

Select "Measurement" function on Diagnosis and Information System (DIS).

Set measuring range according to pressure sensor to 0...3.5 bar.

Using pressure regulator on special tool 16 1 171 **16 1 170 TESTER WITH TEST ADAPTER** , increase pressure by 0.050 bar.

Connect special tool 16 1 174 **16 1 170 TESTER WITH TEST ADAPTER** to fast-release coupling of special tool 16 1 171 **16 1 170 TESTER WITH TEST ADAPTER** .

Using pressure regulator on special tool 16 1 171 **16 1 170 TESTER WITH TEST ADAPTER** , reset gauge pressure in fuel tank to 0.050 bar.

IMPORTANT: Do not under any circumstances increase pressure by more than 0.100 bar as this would result in damage to the fuel tank and venting system.

Using special tool 13 3 010 **13 3 010 HOSE CLIP** , disconnect supply line from special tool 16 1 171 **16 1 170 TESTER WITH TEST ADAPTER** to tank filler neck.

Allow a rest period of approx. 20 secs.

Read off and note down starting pressure value. Wait approx. 60 secs.

Read off final pressure value and compare with starting pressure value.

Measurement evaluation:**Measurement Evaluation**

Pressure drop between 0.008 and 0.010 bar.	Measure again.
Pressure drop in 60 secs. greater than 0.010 bar.	System leaking beyond permitted levels. Carry out leak test <u>16 00 510 Conducting Leak Test On Fuel Tank And Tank Ventilation System.</u>

16 00 102 CHECKING FUEL TANK AND TANK VENTING SYSTEM FOR LEAKS WITH TANK LEAKAGE DIAGNOSIS MODULE (DM-TL)

NOTE: An OBD fault is indicated by the "Check Engine" indicator lamp in the instrument cluster lighting up. This may indicate a leak in the tank venting system. Information on this is provided by the fault memory of the DME control unit.

- Read out fault memory of DME control unit and carry out a diagnosis in accordance with faults stored.
- A leak test with the DM-TL module is then carried out if:

- The components of the DM-TL module are O.K.
- A fault is stored in the DME fault memory (tank leak detected).

Adhere to following conditions in order to carry out a correct leak test:

- Content of fuel tank < 90 %
- Reserve indicator lamp "off"
- Leave car in workshop for at least 2 hours so that fuel temperature comes into line with workshop temperature (ideal fuel temperature approx. 10...20 °C).
- Do not under any circumstances fill up car with fresh fuel (strong exhalation of fresh fuel).
- Check that fuel tank cap is correctly seated.

WARNING: Check that fuel tank cap is correctly seated.

Clear DME fault memory.

In the Diagnosis and Information System (DIS), go to the "Function and component selection" page.

Work through tank leakage diagnosis module. Leakage test is carried out.

If fault is recorded again in DME fault memory (tank leak detected), carry out leak test. See **16 00 510 Conducting Leak Test On Fuel Tank And Tank Ventilation System**.

16 00 510 CONDUCTING LEAK TEST ON FUEL TANK AND TANK VENTILATION SYSTEM

NOTE: The following procedure is only applicable to vehicles with the tank leak diagnosis module (DM-TL).

Select "Tank leak diagnosis module (DM-TL)" on Diagnosis and Information System (DIS).

- The leak diagnosis pump pressurizes the fuel tank and tank venting system for 30 secs.
- If pressure is required for more than 30 secs., reactivate the "Activate" button after 30 secs. in each case.

For vehicles without tank leak diagnosis module:

Pressures fuel tank and tank venting system. See **16 00 100 Checking Fuel Tank And Tank Ventilation System For Leaks**.

When leak-testing with a leak detector: follow manufacturer's operating instructions.

IMPORTANT: On vehicles with tank leak diagnosis modules (DM-TL), do not work with external pressurization as the tank venting system will leak under this

condition. Or use a suitable extractor system.

On account of emerging fuel vapors, carry out all operations in well ventilated rooms.

Observe country-specific accident prevention and occupational safety regulations.

The leak test can be carried out with a leak detector. Possible causes may be:

- Fuel tank cap leaking (check fuel cap pressure relief valve. See **16 11 130 Checking Filler Cap Pressure Relief Valve**)
- Tank venting lines leaking (fuel tank carbon canister - tank venting valve)
- Tank venting valve leaking (engine compartment)
- Fuel level sensor flange on tank leaking

11 FUEL TANK WITH MOUNTING

16 11 ... REPLACING LEFT OR RIGHT CLAMPING BAND FOR FUEL TANK

Necessary preliminary tasks:

- Remove underbody panelling. See **51 47 ... REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT UNDERBODY PANELLING** on left and right

IMPORTANT: Secure fuel tank against slipping and falling out.

Heavily support the fuel tank.

Release screws (1) and remove clamping band.

Installation:

Tightening torque. See **16 11 FUEL TANK AND MOUNTING PARTS** .

16 11 030 REMOVING AND INSTALLING/REPLACING FUEL TANK

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

IMPORTANT: Ensure adequate ventilation in the place of work! Avoid skin contact (wear gloves)!

After installation of fuel tank/prior to first engine start-up:

- Check ground connection at fuel filler neck to body for continuity. If necessary, clean contact surface between body and fuel filler pipe screw connection.
- Fill fuel tank with at least 5 liters of fuel.
- Check transfer function of suction jet pump. See **16 12 ... Checking repumping function of suction - jet pump with BMW Diagnosis System.**

Necessary preliminary tasks:

- Draw off fuel from fuel tank. See **16 00 005 Draining and Filling Fuel Tank**
- Remove propeller shaft. See **26 11 000 REMOVING AND INSTALLING PROPELLER SHAFT (INSERTED) COMPLETELY**
- Remove underbody panelling on left and right. See **51 47 ... REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT UNDERBODY PANELLING**
- Remove rear right wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER**

Release nuts (1) and remove holder (2).

Release hose clamp (1) and detach fuel filler hose in direction of arrow.

Installation:

Tightening torque 16 12 1AZ. See **16 12 FUEL DELIVERY** .

Unlock quick-release fastener (1) and detach vent line.

Detach vent line from holders (2).

Unlock fuel feed line at quick-release fastener (1) and disconnect.

IMPORTANT: Catch escaping fuel in a suitable container.

IMPORTANT: Secure fuel tank against slipping and falling out.

Heavily support the fuel tank.

Release screws (1) on clamping bands on left and right.

Installation:

Tightening torque 16 11 2AZ. See **16 11 FUEL TANK AND MOUNTING PARTS** .

Slacken nut (2).

Installation:

Tightening torque 16 11 2AZ. See **16 11 FUEL TANK AND MOUNTING PARTS** .

IMPORTANT: Do not lead refuelling vent line through opening in body when lowering.

Lower fuel tank a little so that sensor units can be reached.

Disconnect plug connection (1).

Unlock and detach quick-connect couplings (2).

Disconnect plug connection (1).

Unlock and detach quick-connect couplings (2).

Lower fuel tank.

The following components must be modified when the fuel tank is replaced:

- Right sensor unit (1). See **16 12 000 Removing and Installing or Replacing Fuel Gauge Sensor (Petrol/Gasoline, Right)**
- Left sensor unit (2). See **16 12 001 Removing and Installing or Replacing Fuel Gauge Sensor (Petrol/Gasoline, Left)**
- Fuel feed line (3)
- If necessary, lines for independent heating

16 11 060 REMOVING AND INSTALLING OR REPLACING FUEL FILLER PIPE

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

IMPORTANT: Ensure adequate ventilation in the place of work! Avoid skin contact (wear gloves)!

Before starting the engine for the first time:

- Fill fuel tank with at least 5 liters of fuel.
- Check ground connection at fuel filler neck to body for continuity. If necessary, clean contact surface between body and fuel filler pipe screw connection.

Necessary preliminary tasks:

- Draw off fuel from fuel tank. See **16 00 005 Draining and Filling Fuel Tank**
- Remove rear right wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER**
- Remove underbody panelling on right. See **51 47 ... REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT UNDERBODY PANELLING**

Unhook retaining strap (1) from tank flap.

Open cap and set to one side.

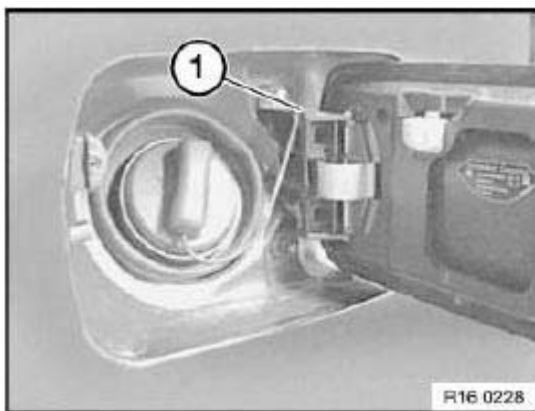


Fig. 3: Identifying Retaining Strap

Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten hose clip (1).

Installation:

Replace hose clip.

Tightening torque 16 12 1AZ. See **16 12 FUEL DELIVERY** .

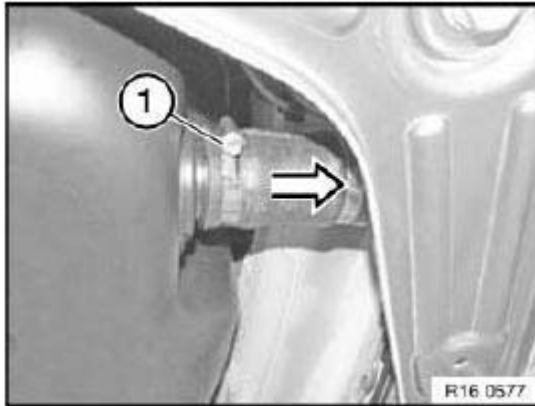


Fig. 4: Identifying Hose Clip

Courtesy of BMW OF NORTH AMERICA, INC.

Unlock quick-release fasteners (1) and disconnect vent hoses.

Release nuts (2) and (3).

Installation:

Check plastic nut (3), replace if necessary.

Tightening torque 16 12 2AZ. See **16 12 FUEL DELIVERY**.

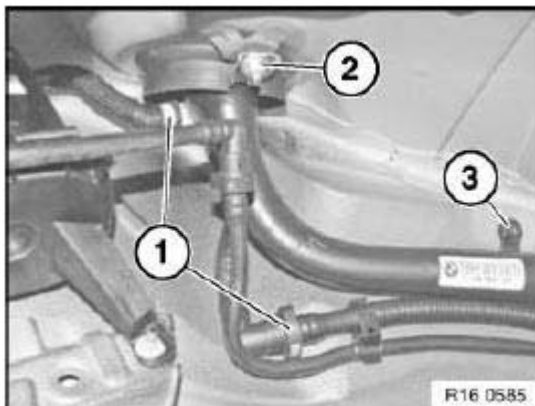


Fig. 5: Identifying Quick-Release Fasteners And Nut

Courtesy of BMW OF NORTH AMERICA, INC.

Unclip line holder (1).

Release nut (2) and remove fuel filler pipe.

Installation:

Check plastic nut (2), replace if necessary.

Tightening torque 16 12 2AZ. See **16 12 FUEL DELIVERY** .

16 11 071 REPLACING RUBBER SLEEVE BETWEEN FUEL FILLER PIPE AND FUEL TANK

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

IMPORTANT: Ensure adequate ventilation in the place of work! Avoid skin contact (wear gloves)!

Before starting the engine for the first time:

- Fill fuel tank with at least 5 liters of fuel.

Necessary preliminary tasks:

- Draw off fuel from fuel tank. See **16 00 005 Draining and Filling Fuel Tank**
- Remove underbody panelling on right. See **51 47 ... REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT UNDERBODY PANELLING**
- Remove rear right wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER**

Unclip line holder (1).

Slacken nut (2).

Installation:

Check plastic nut (2), replace if necessary.

Tightening torque 16 12 2AZ. See **16 12 FUEL DELIVERY** .

Loosen hose clamps (1).

Detach rubber sleeve first from fuel filler pipe and then from fuel tank.

Installation:

Tightening torque 16 11 3AZ. See **16 11 FUEL TANK AND MOUNTING PARTS** .

16 11 130 CHECKING FILLER CAP PRESSURE RELIEF VALVE**Special tools required:**

- 13 3 010 **13 3 010 HOSE CLIP**
- 16 1 171 **16 1 170 TESTER WITH TEST ADAPTER**
- 16 1 172 **16 1 170 TESTER WITH TEST ADAPTER**
- 16 1 173 **16 1 170 TESTER WITH TEST ADAPTER**

Set pressure regulator on special tool 16 1 171. See **16 1 170 TESTER WITH TEST ADAPTER** fully in "-" direction.

Connect special tool 16 1 171. See **16 1 170 TESTER WITH TEST ADAPTER** via compressed air line (1) to workshop/garage compressed air system (8 ... 10 bar).

Connect pressure sensor (2) of Diagnosis and Information System with a measuring range of 0...3.5 bar.

Select special tool 16 1 172 or 16 1 173. See **16 1 170 TESTER WITH TEST ADAPTER** matching vehicle's filler cap and attach to quick release coupling of special tool 16 1 171. See **16 1 170 TESTER WITH TEST ADAPTER** .

Install filler cap on selected special tool (3).

NOTE: **Only the absolute pressure is indicated in the display of the Diagnosis and Information System (DIS). The current ambient air pressure is already displayed without additional pressurization.**

Check testing equipment for leaks!

Select "Measurement" function on Diagnosis and Information System (DIS).

Set measuring range according to pressure sensor to 0-3.5 bar.

Increase pressure by 0.2 bar with pressure regulator on special tool 16 1 171. See **16 1 170 TESTER WITH TEST ADAPTER** .

Using special tool 13 3 010. See **13 3 010 HOSE CLIP** , disconnect delivery line from special tool 16 1 171. See **16 1 170 TESTER WITH TEST ADAPTER** to tank filler neck.

Wait 60 secs.

Read off final pressure value and compare with starting pressure value.

Measurement evaluation:**Measurement Evaluation:**

Pressure drop > 0.012 bar	Testing equipment leaking. Check connection points for leaks.
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Check filler cap pressure relief!

Follow same test procedure as for "Checking testing equipment for leaks".

Increase pressure by 0.3 bar with pressure regulator on special tool 16 1 171. See **16 1 170 TESTER WITH TEST ADAPTER**.

Measurement evaluation:**Measurement Evaluation**

Pressure drop > 0.012 bar	Filler cap pressure relief valve faulty. Replace filler cap.
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12 FUEL TRANSFER, SENSOR**16 12 ... CHECKING REPUMPING FUNCTION OF SUCTION - JET PUMP WITH BMW DIAGNOSIS SYSTEM**

IMPORTANT: Ensure adequate ventilation in the place of work!

Ensure absolute cleanliness when working on the open fuel tank.

Contaminants in the fuel tank can impair driving operation or may even result in vehicle breakdown!

Catch escaping fuel in a suitable container.

Necessary preliminary tasks:

- Fill level must be < or = 28 l
 - If necessary, draw off fuel from fuel tank **16 00 005 Draining and Filling Fuel Tank**
- Pour two to three liters of fuel into the left tank chamber via the flange opening
- Connect diagnosis system
 - Path:
 - Brief test KOMBI Instrument cluster
 - Diagnosis control unit functions
 - Diagnosis requests
 - Tank sensor 1, tank sensor 2

NOTE: Tank sensor 1 = right tank sensor
Tank sensor 2 = left tank sensor

Compare display for left and right tank chambers.

Repumping function OK

If fill level of tank sensor 2 (left chamber) is falling (approx. one liter per minute).

Repumping function not OK

If fill level of tank sensor 2 (left chamber) is stable or rising.

16 12 000 REMOVING AND INSTALLING OR REPLACING FUEL GAUGE SENSOR (PETROL/GASOLINE, RIGHT)

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

IMPORTANT: Ensure adequate ventilation in the place of work!

Ensure absolute cleanliness when working on the open fuel tank.

Contaminants in the fuel tank can impair driving operation or may even result in vehicle breakdown!

Before starting the engine for the first time:

- Fill fuel tank with at least 5 liters of fuel

Check transfer function of suction jet pump. See **16 12 ... Checking Repumping Function Of Suction - Jet Pump with BMW Diagnosis System.**

Necessary preliminary tasks:

- Draw off fuel from fuel tank. See **16 00 005 Draining and Filling Fuel Tank**
- Remove rear seat bench **30 3RD SEAT ROW**, **52 26 005 REMOVING AND INSTALLING / REPLACING REAR SEAT**

For vehicles with 2 seat rows only:

Disconnect plug connection (1).

Remove cover (2).

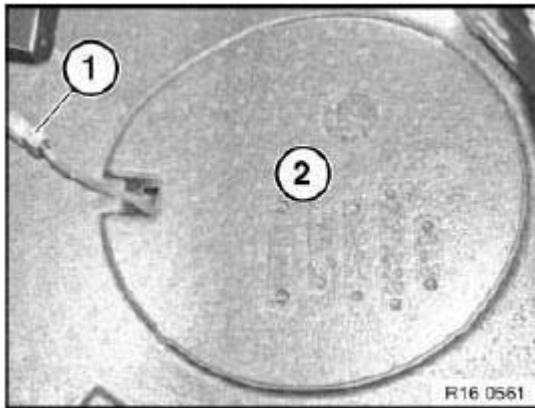


Fig. 6: Identifying Plug Connection And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove cover for service opening (2) from right side of fuel tank.

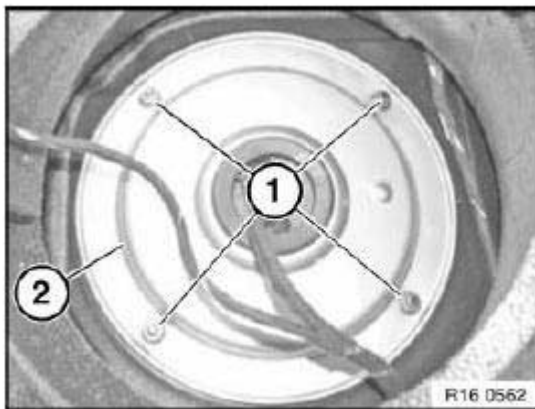


Fig. 7: Identifying Nuts And Cover For Service Opening
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock quick-release fastener (2) and detach vent line.

If necessary, unlock quick-release fastener (3) for fuel feed line of independent heating and detach.

If necessary, disconnect plug connection (4) for independent heating fuel pump.

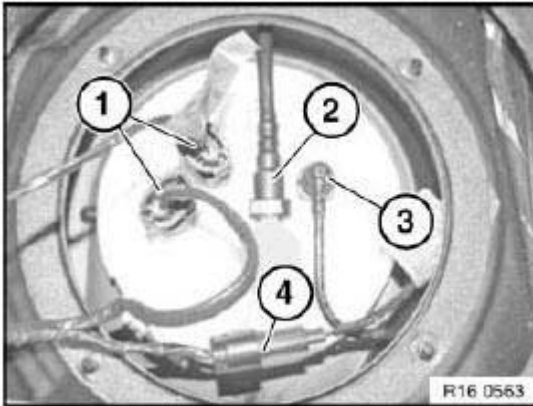


Fig. 8: Identifying Plug Connection And Quick-Release Fastener
 Courtesy of BMW OF NORTH AMERICA, INC.

Release completely remainder of torque break off head (1) with a screwdriver.

Remove hose clamp from clamping ring (2).

NOTE: A flexible extension can be used to release the hose clamp,

Press clamping ring (2) part at open end in direction of arrow and remove.

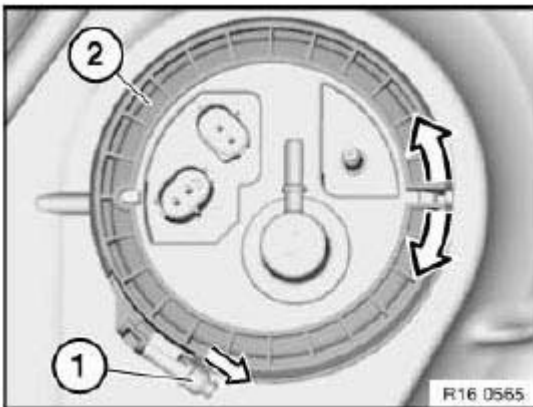


Fig. 9: Identifying Break off Head And Clamping Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure that service cover is installed in correct position.

Indentation (2) on clamping ring must line up with raised section (1) of tank.

Pin on service cover (3) must line up with indentation on clamping ring.

Hose clip with torque break off head (4) must always be replaced.

Tighten hose clip until torque break off head (4) breaks off.

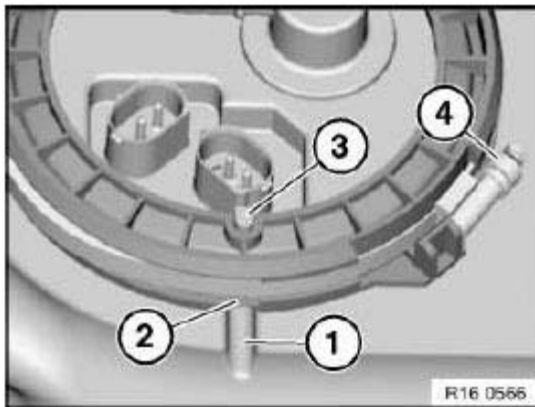


Fig. 10: Identifying Indentation, Service Cover And Break off Head
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Seal (1) must always be replaced.

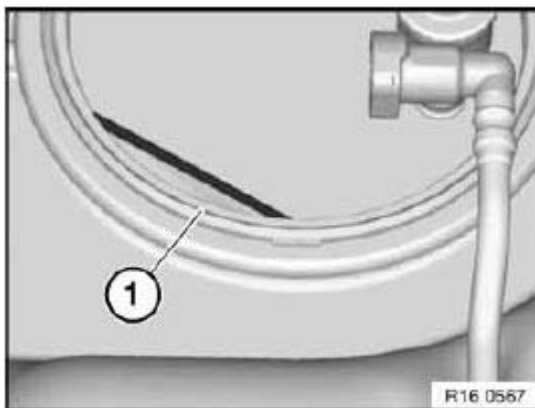


Fig. 11: Identifying Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect grounding cable (1) towards top.

IMPORTANT: Grounding cable (1) must be replaced if it has been detached once!

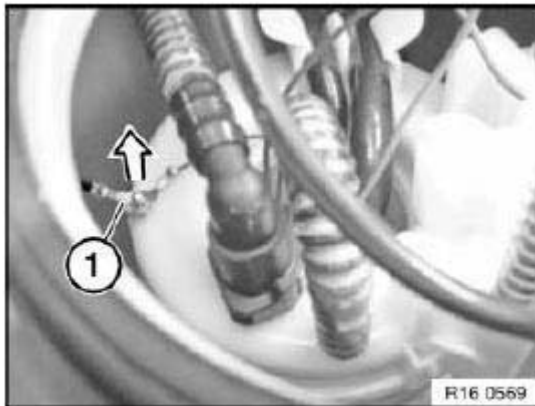


Fig. 12: Identifying Grounding Cable

Courtesy of BMW OF NORTH AMERICA, INC.

Carefully raise service cover.

Unclip plastic tube (1).

Unlock and disconnect quick-connect coupling (2).

Remove fuel pump.

**IMPORTANT: Catch escaping fuel in suitable container.
No fuel is permitted to get into the interior!**

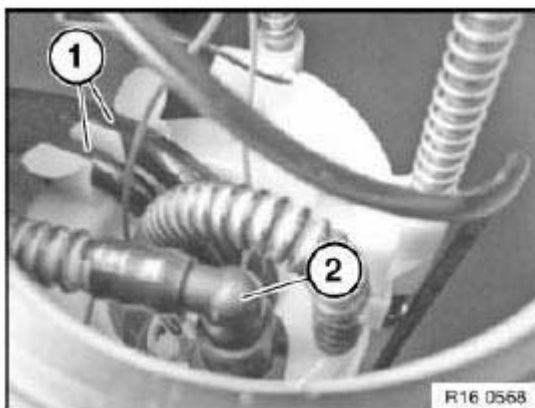


Fig. 13: Identifying Plastic Tube And Quick-Connect Coupling

Courtesy of BMW OF NORTH AMERICA, INC.

With fuel pump removed, disconnect plug connection (1) in tank and replace grounding cable (2).

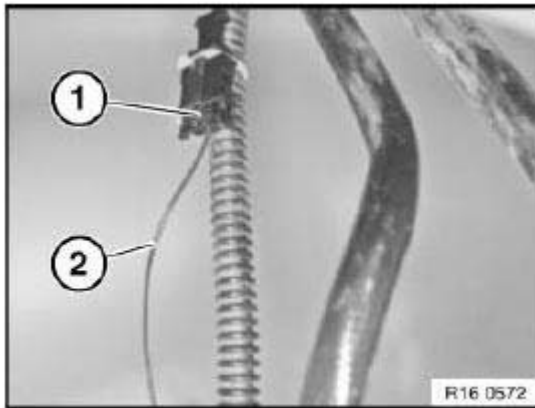


Fig. 14: Identifying Plug Connection And Grounding Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip fuel level sensor (1) in direction of arrow from housing and then slide out of guides (2) in direction of arrow.

Installation:

Fuel level sensor (1) must be felt and heard to snap into place.

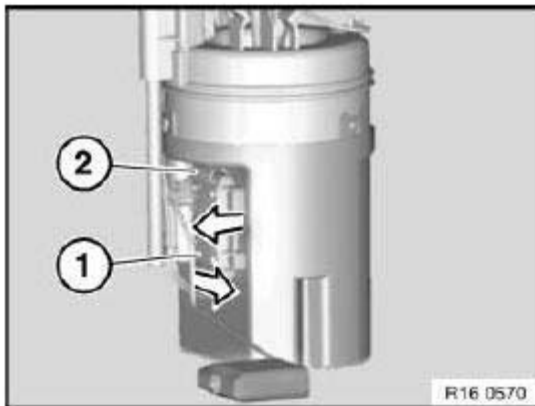


Fig. 15: Identifying Fuel Level Sensor And Guides
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) and disengage cable (2) from guides.

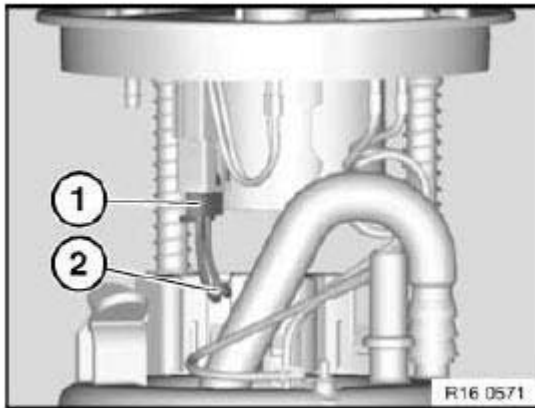


Fig. 16: Identifying Plug Connection And Disengage Cable
 Courtesy of BMW OF NORTH AMERICA, INC.

16 12 001 REMOVING AND INSTALLING OR REPLACING FUEL GAUGE SENSOR (PETROL/GASOLINE, LEFT)

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

IMPORTANT: Ensure adequate ventilation in the place of work!
Ensure absolute cleanliness when working on the open fuel tank.
Contaminants in the fuel tank can impair driving operation or may even result in vehicle breakdown!

Before starting the engine for the first time:

- Fill fuel tank with at least 5 liters of fuel

Necessary preliminary tasks:

- Draw off fuel from fuel tank. See **16 00 005 Draining and Filling Fuel Tank**
- Remove rear seat bench. See **30 3RD SEAT ROW ,52 26 005 REMOVING AND INSTALLING / REPLACING REAR SEAT**
- Remove right sensor unit. See **16 12 000 Removing and Installing or Replacing Fuel Gauge Sensor (Petrol/Gasoline, Right)**

For vehicles with 2 seat rows only:

Remove cover (2).

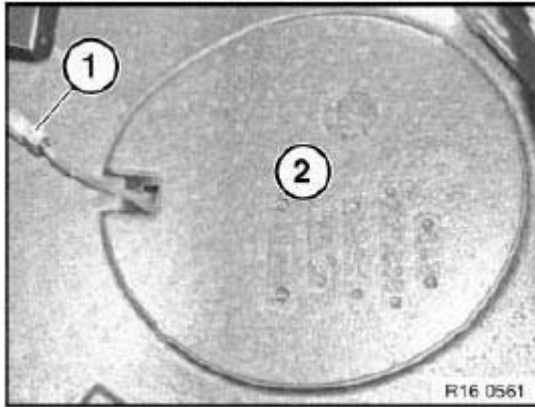


Fig. 17: Identifying Plug Connection And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove cover for service opening (2) from left side of fuel tank.

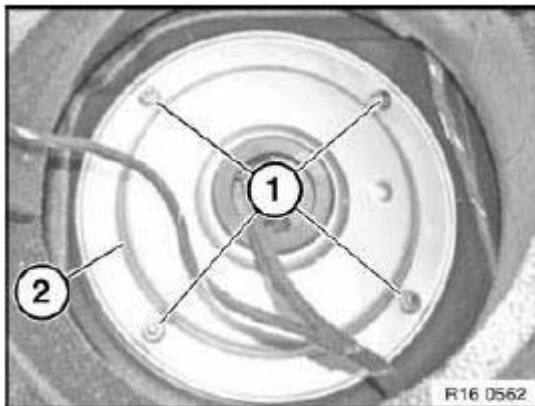


Fig. 18: Identifying Nuts And Cover For Service Opening
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock quick-release fastener (2) and detach fuel feed line.

Unlock quick-release fastener (3) for vent line and detach.

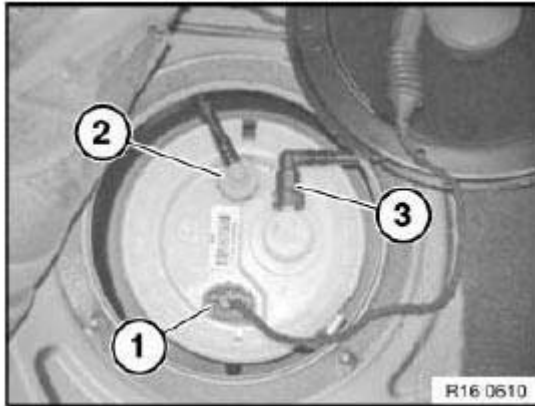


Fig. 19: Identifying Plug Connection And Quick-Release Fastener
 Courtesy of BMW OF NORTH AMERICA, INC.

Release completely remainder of torque break off head (1) with a screwdriver.

Remove hose clamp from clamping ring (2).

NOTE: A flexible extension can be used to release the hose clamp,

Press clamping ring (2) part at open end in direction of arrow and remove.

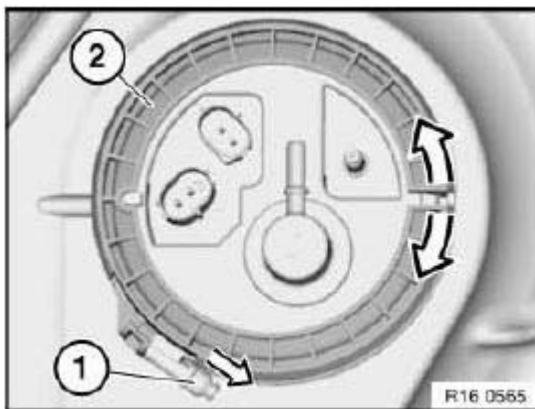


Fig. 20: Identifying Break off Head And Clamping Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure that service cover is installed in correct position.

Indentation (2) on clamping ring must line up with raised section (1) of tank.

Pin on service cover (3) must line up with indentation on clamping ring.

Hose clip with torque break off head (4) must always be replaced.

Tighten hose clip until torque break off head (4) breaks off.

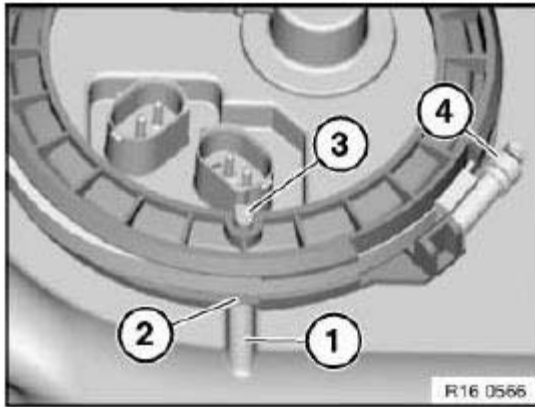


Fig. 21: Identifying Indentation, Service Cover And Break off Head
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Seal (1) must always be replaced.



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

Attach an auxiliary lead (1) to hose pack (2) through service opening.

The auxiliary lead is pulled through with the hose pack towards the left and facilitates subsequent reinstallation.

Installation:

Make sure when pulling through the hose pack that the main ventilation system in the tank tunnel is not damaged.

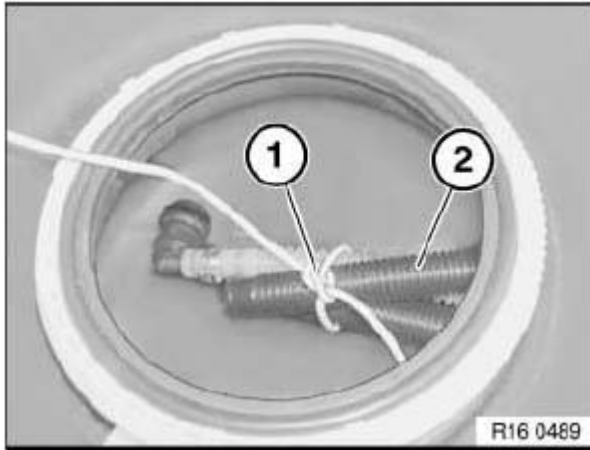


Fig. 23: Identifying Lead And Hose Pack
Courtesy of BMW OF NORTH AMERICA, INC.

Remove sensor unit (1) from fuel tank.

Feed sensor unit (1) with hose pack (2) out of fuel tank.

Installation:

When replacing the sensor unit, modify the end of the auxiliary lead to the new hose pack and carefully pull in through the tank.

NOTE: Illustration shows the tank removed.

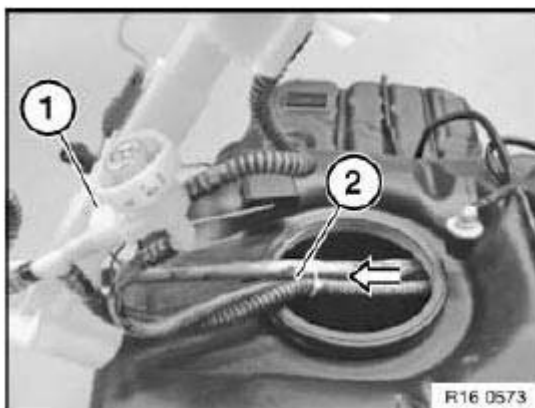


Fig. 24: Identifying Sensor Unit And Hose Pack
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip fuel level sensor (1) in direction of arrow from housing and then slide out of guides in direction of arrow.

Installation:

Fuel level sensor (1) must be felt and heard to snap into place.

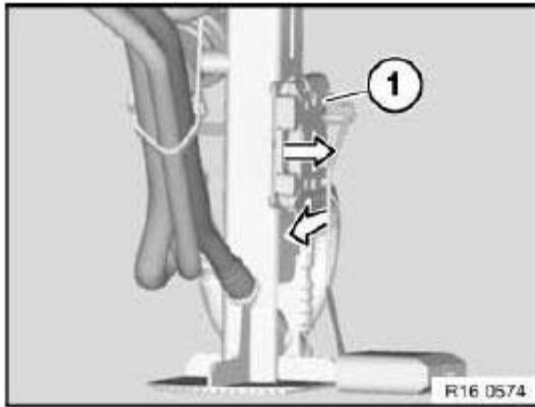


Fig. 25: Identifying Fuel Level Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) and disengage cable (2) from guides.

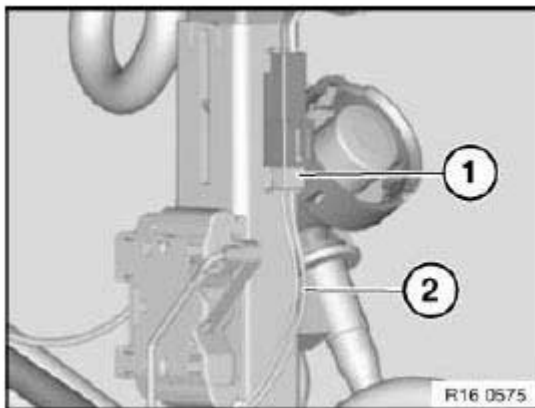


Fig. 26: Identifying Plug Connection And Disengage Cable
Courtesy of BMW OF NORTH AMERICA, INC.

16 12 010 REMOVING AND INSTALLING/REPLACING CARBON CANISTER

Necessary preliminary tasks:

- Remove rear right wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER**

Unlock quick-release fasteners (1) and disconnect vent lines.

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Release screws (2) and remove carbon canister (3).

Installation:

Tightening torque 16 13 1AZ. See **16 13 TANK VENTILATION** .

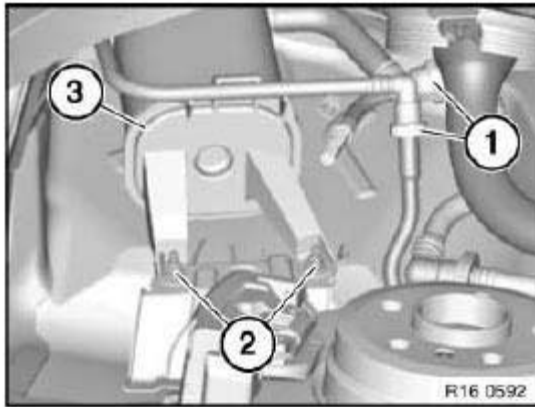


Fig. 27: Identifying Quick-Release Fasteners, Screws And Carbon Canister
Courtesy of BMW OF NORTH AMERICA, INC.

16 12 010 REMOVING AND INSTALLING/REPLACING CARBON CANISTER (US VERSION WITH DMTL)

Necessary preliminary tasks:

- Remove rear right wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER**

Disconnect plug connection (1).

Unlock and detach quick-connect couplings (2).

Unclip cable holders (3) from carbon canister.

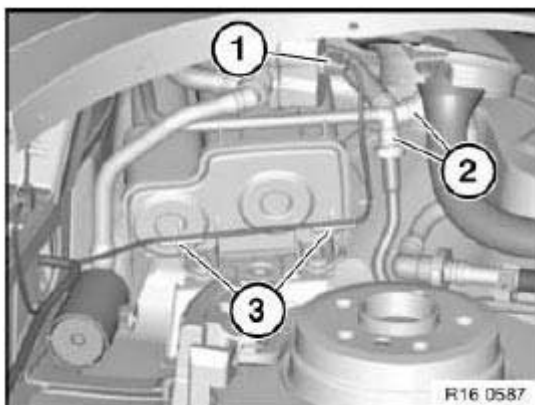


Fig. 28: Identifying Plug Connection, Quick-Connect Couplings And Cable Holders

Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove carbon canister (2) towards bottom.

Installation:

Tightening torque 16 13 1AZ. See **13 FUEL VENTILATION** .

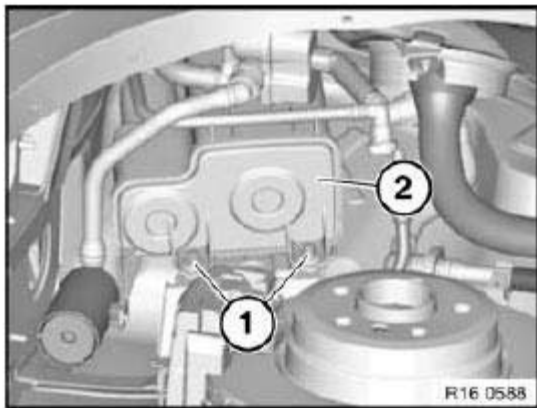


Fig. 29: Identifying Nuts And Carbon Canister
Courtesy of BMW OF NORTH AMERICA, INC.

The following components must be modified when the carbon canister is replaced:

- Dust filter (1). See **16 14 060 Removing and Installing/Replacing Dust Filter for Tank Leak Diagnosis Module (DMTL)**
- Tank leakage diagnosis module (2). See **16 13 015 Removing and Installing/Replacing Tank Leak Diagnosis Module (Petrol/Gasoline Cars with US DMTL Version)**
- Hose (3) between carbon canister and tank leakage diagnosis module

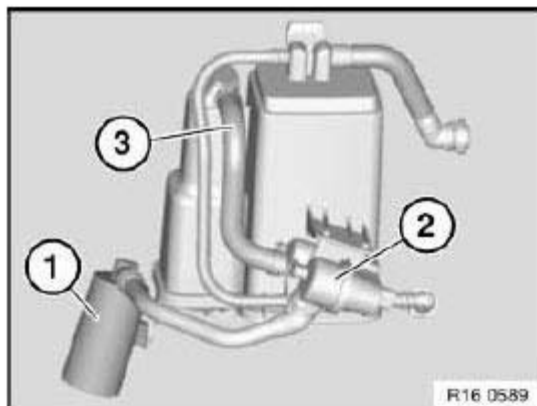


Fig. 30: Identifying Dust Filter, Diagnosis Module And Hose
Courtesy of BMW OF NORTH AMERICA, INC.

13 FUEL VENTILATION

16 13 015 REMOVING AND INSTALLING/REPLACING TANK LEAK DIAGNOSIS MODULE (PETROL/GASOLINE CARS WITH US DMTL VERSION)

Necessary preliminary tasks:

- Remove carbon canister. See **16 12 010 Removing and Installing/Replacing Carbon Canister (US Version with DMTL)**

Unlock and disconnect quick-connect coupling (1).

Unfasten hose clip (2) and remove hose.

Installation:

If necessary, replace hose clamp.

Release screws (3) and remove tank leakage diagnosis module.

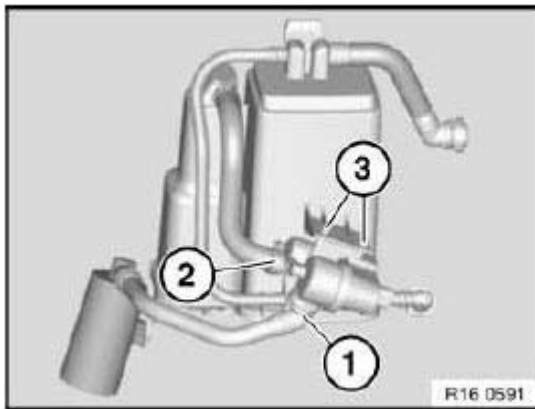


Fig. 31: Identifying Quick-Connect Coupling, Hose Clip And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

14 FUEL PUMP

16 12 000 REMOVING AND INSTALLING OR REPLACING FUEL GAUGE SENSOR (PETROL/GASOLINE, RIGHT)

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

IMPORTANT: Ensure adequate ventilation in the place of work!

Ensure absolute cleanliness when working on the open fuel tank.

Contaminants in the fuel tank can impair driving operation or may even result in vehicle breakdown!

Before starting the engine for the first time:

- Fill fuel tank with at least 5 liters of fuel

Check transfer function of suction jet pump. See **16 12 ... Checking Repumping Function Of Suction - Jet Pump with BMW Diagnosis System.**

Necessary preliminary tasks:

- Draw off fuel from fuel tank. See **16 00 005 Draining and Filling Fuel Tank**
- Remove rear seat bench. See **30 3RD SEAT ROW** and **52 26 005 REMOVING AND INSTALLING / REPLACING REAR SEAT**

For vehicles with 2 seat rows only:

Disconnect plug connection (1).

Remove cover (2).

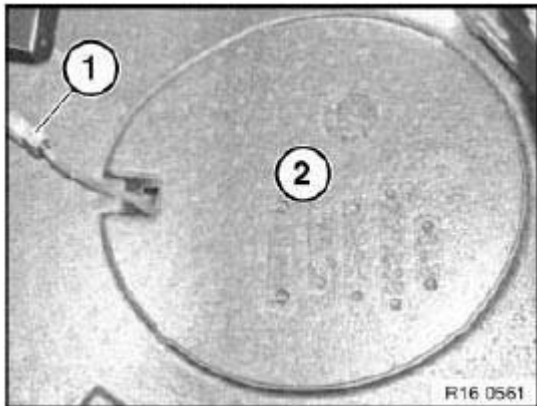


Fig. 32: Identifying Plug Connection And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove cover for service opening (2) from right side of fuel tank.

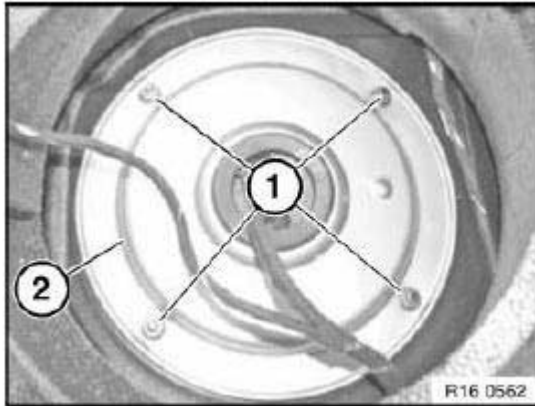


Fig. 33: Identifying Nuts And Cover For Service Opening
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock quick-release fastener (2) and detach vent line.

If necessary, unlock quick-release fastener (3) for fuel feed line of independent heating and detach.

If necessary, disconnect plug connection (4) for independent heating fuel pump.

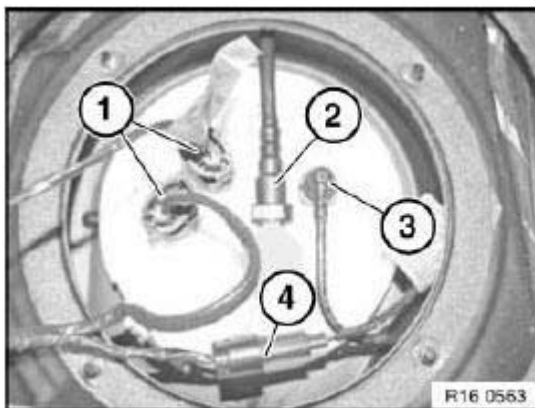


Fig. 34: Identifying Plug Connection And Quick-Release Fastener
 Courtesy of BMW OF NORTH AMERICA, INC.

Release completely remainder of torque break off head (1) with a screwdriver.

Remove hose clamp from clamping ring (2).

NOTE: A flexible extension can be used to release the hose clamp,

Press clamping ring (2) part at open end in direction of arrow and remove.

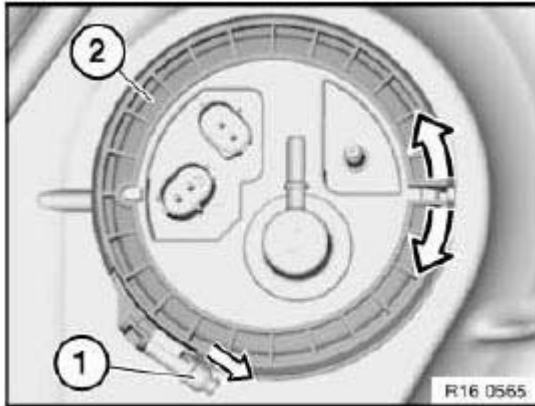


Fig. 35: Identifying Break off Head And Clamping Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure that service cover is installed in correct position.

Indentation (2) on clamping ring must line up with raised section (1) of tank.

Pin on service cover (3) must line up with indentation on clamping ring.

Hose clip with torque break off head (4) must always be replaced.

Tighten hose clip until torque break off head (4) breaks off.

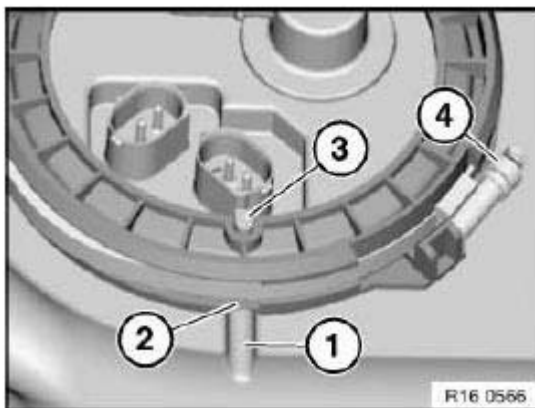


Fig. 36: Identifying Indentation, Service Cover And Break off Head
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Seal (1) must always be replaced.

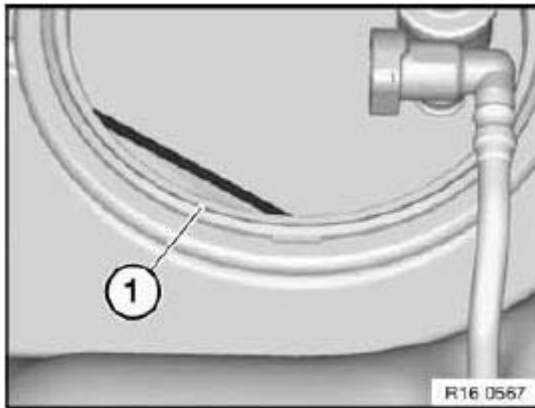


Fig. 37: Identifying Seal

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect grounding cable (1) towards top.

IMPORTANT: Grounding cable (1) must be replaced if it has been detached once!

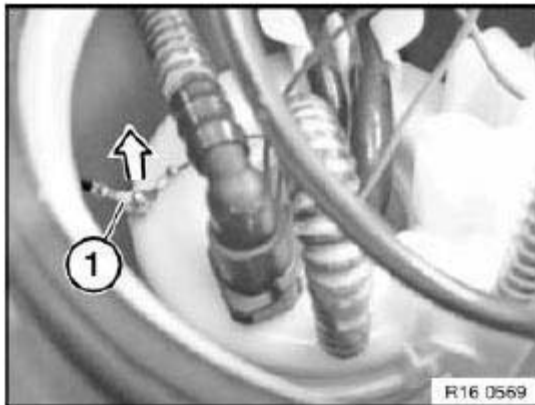


Fig. 38: Identifying Grounding Cable

Courtesy of BMW OF NORTH AMERICA, INC.

Carefully raise service cover.

Unclip plastic tube (1).

Unlock and disconnect quick-connect coupling (2).

Remove fuel pump.

**IMPORTANT: Catch escaping fuel in suitable container.
No fuel is permitted to get into the interior!**

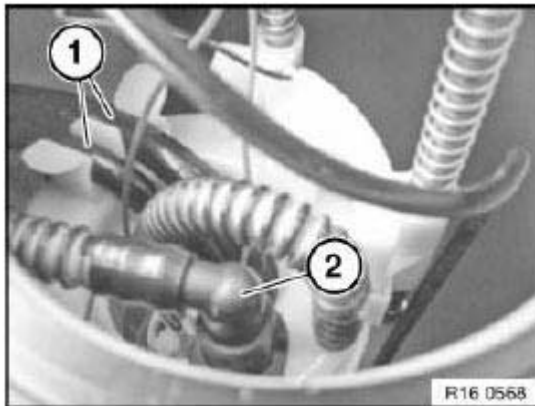


Fig. 39: Identifying Plastic Tube And Quick-Connect Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

With fuel pump removed, disconnect plug connection (1) in tank and replace grounding cable (2).

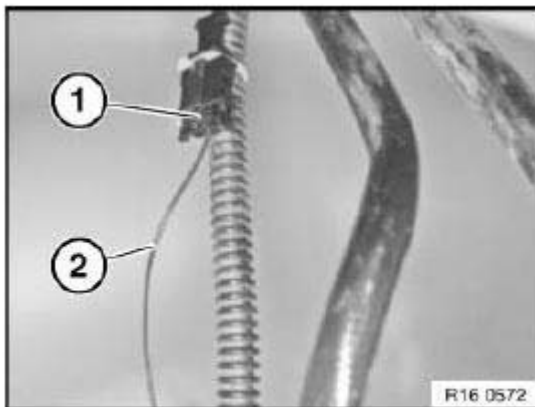


Fig. 40: Identifying Plug Connection And Grounding Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip fuel level sensor (1) in direction of arrow from housing and then slide out of guides (2) in direction of arrow.

Installation:

Fuel level sensor (1) must be felt and heard to snap into place.

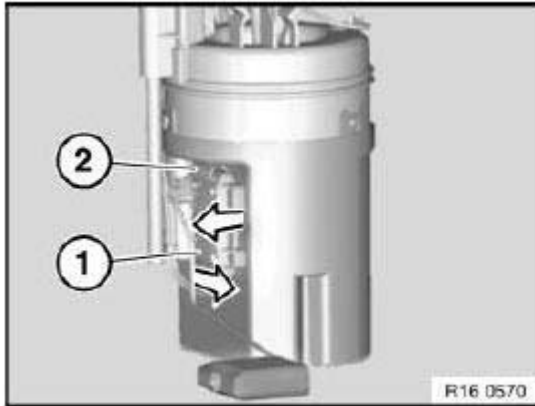


Fig. 41: Identifying Fuel Level Sensor And Guides
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) and disengage cable (2) from guides.

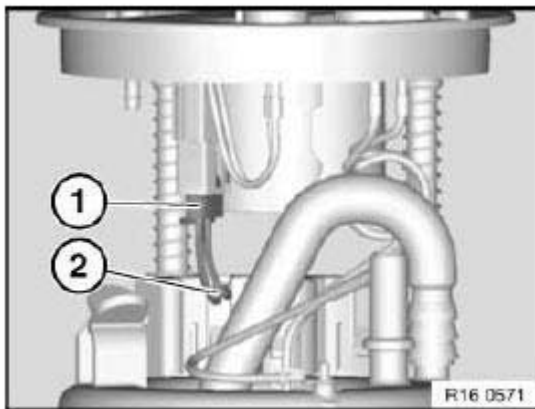


Fig. 42: Identifying Plug Connection And Disengage Cable
Courtesy of BMW OF NORTH AMERICA, INC.

16 12 001 REMOVING AND INSTALLING OR REPLACING FUEL GAUGE SENSOR (PETROL/GASOLINE, LEFT)

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

IMPORTANT: Ensure adequate ventilation in the place of work!
Ensure absolute cleanliness when working on the open fuel tank.
Contaminants in the fuel tank can impair driving operation or may even result

in vehicle breakdown!

Before starting the engine for the first time:

- Fill fuel tank with at least 5 liters of fuel

Check transfer function of suction jet pump. See **16 12 ... Checking Repumping Function Of Suction - Jet Pump with BMW Diagnosis System**.

Necessary preliminary tasks:

- Draw off fuel from fuel tank. See **16 00 005 Draining and Filling Fuel Tank**
- Remove rear seat bench. See **30 3RD SEAT ROW** or **52 26 005 REMOVING AND INSTALLING / REPLACING REAR SEAT**
- Remove right sensor unit **16 12 000 Removing and Installing or Replacing Fuel Gauge Sensor (Petrol/Gasoline, Right)**

For vehicles with 2 seat rows only:

Disconnect plug connection (1).

Remove cover (2).

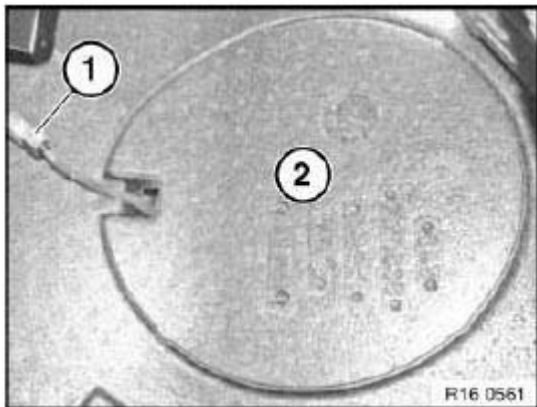


Fig. 43: Identifying Plug Connection And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove cover for service opening (2) from left side of fuel tank.

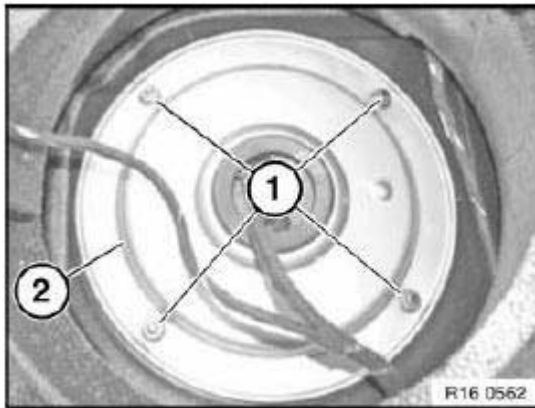


Fig. 44: Identifying Nuts And Cover For Service Opening
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock quick-release fastener (2) and detach fuel feed line.

Unlock quick-release fastener (3) for vent line and detach.

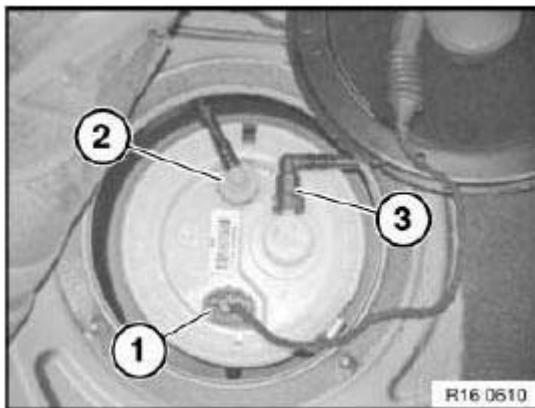


Fig. 45: Identifying Plug Connection And Quick-Release Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Release completely remainder of torque break off head (1) with a screwdriver.

Remove hose clamp from clamping ring (2).

NOTE: A flexible extension can be used to release the hose clamp,

Press clamping ring (2) part at open end in direction of arrow and remove.

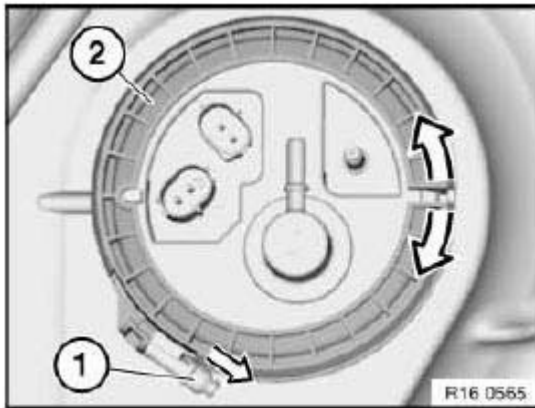


Fig. 46: Identifying Break off Head And Clamping Ring
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure that service cover is installed in correct position.

Indentation (2) on clamping ring must line up with raised section (1) of tank.

Pin on service cover (3) must line up with indentation on clamping ring.

Hose clip with torque break off head (4) must always be replaced.

Tighten hose clip until torque break off head (4) breaks off.

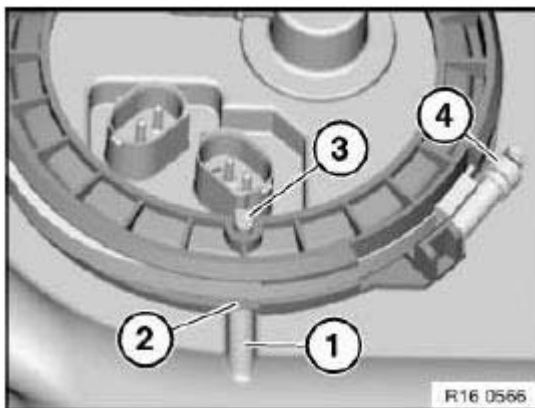


Fig. 47: Identifying Indentation, Service Cover And Break Off Head
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Seal (1) must always be replaced.

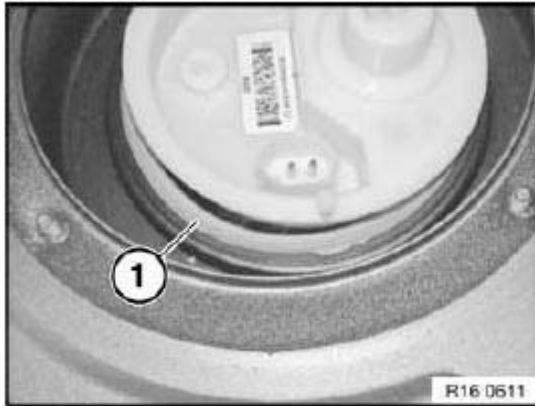


Fig. 48: Identifying Seal

Courtesy of BMW OF NORTH AMERICA, INC.

Attach an auxiliary lead (1) to hose pack (2) through service opening.

The auxiliary lead is pulled through with the hose pack towards the left and facilitates subsequent reinstallation.

Installation:

Make sure when pulling through the hose pack that the tank ventilation system in the tank tunnel is not damaged.

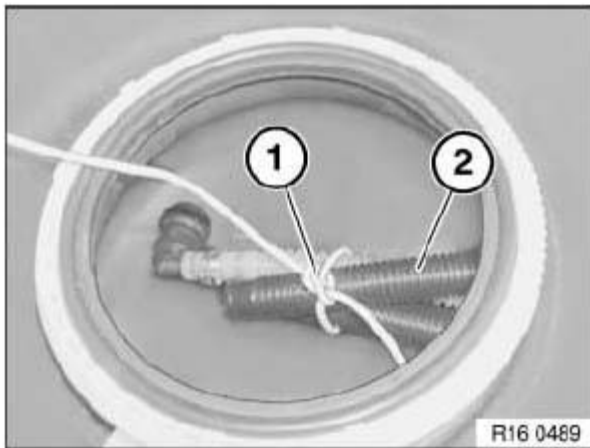


Fig. 49: Identifying Lead And Hose Pack

Courtesy of BMW OF NORTH AMERICA, INC.

Remove sensor unit (1) from fuel tank.

Feed sensor unit (1) with hose pack (2) out of fuel tank.

Installation:

When replacing the sensor unit, modify the end of the auxiliary lead to the new hose pack and carefully pull in through the tank.

NOTE: Illustration shows the tank removed.

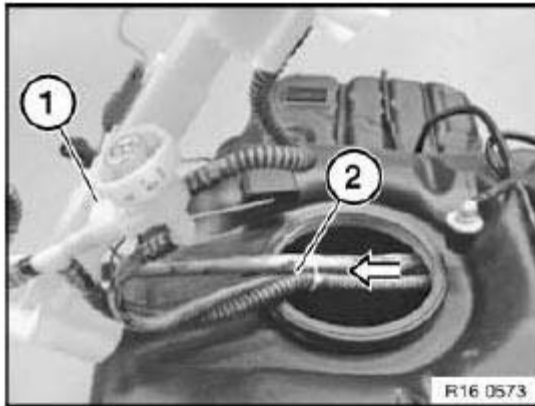


Fig. 50: Identifying Sensor Unit And Hose Pack
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip fuel level sensor (1) in direction of arrow from housing and then slide out of guides in direction of arrow.

Installation:

Fuel level sensor (1) must be felt and heard to snap into place.

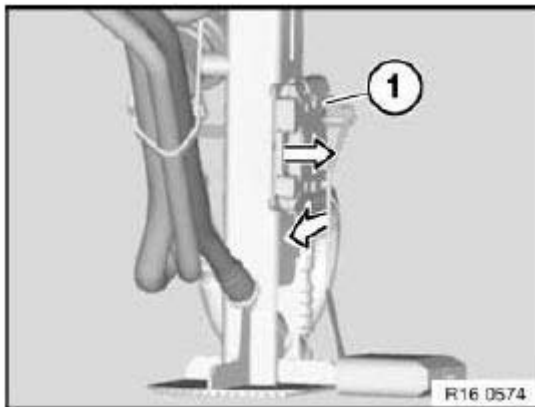


Fig. 51: Identifying Fuel Level Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) and disengage cable (2) from guides.

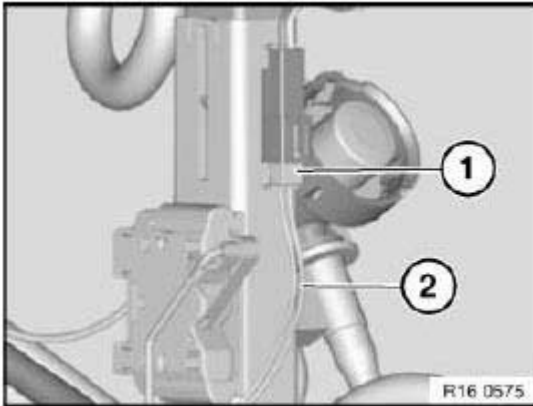


Fig. 52: Identifying Plug Connection And Disengage Cable
 Courtesy of BMW OF NORTH AMERICA, INC.

16 14 010 REMOVING AND INSTALLING/REPLACING FUEL PUMP (PETROL/GASOLINE VEHICLES)

Special tools required:

- 00 9 252

Recycling

Fuel escapes when fuel lines are detached. Have a suitable collecting container ready.

Catch and dispose of escaping fuel.

Observe country-specific waste-disposal regulations.

IMPORTANT: Ensure adequate ventilation in the place of work!
Ensure absolute cleanliness when working on the open fuel tank.
Contaminants in the fuel tank can impair driving operation or may even result in vehicle breakdown!

Before starting the engine for the first time:

- Fill fuel tank with at least 5 liters of fuel

Check transfer function of suction jet pump. See **16 12 ... Checking Repumping Function Of Suction - Jet Pump with BMW Diagnosis System.**

Necessary preliminary tasks:

- Draw off fuel from fuel tank. See **16 00 005 Draining and Filling Fuel Tank**
- Remove rear seat bench. See **30 3RD SEAT ROW** or **52 26 005 REMOVING AND INSTALLING /**

REPLACING REAR SEAT

For vehicles with 2 seat rows only:

Disconnect plug connection (1).

Remove cover (2).

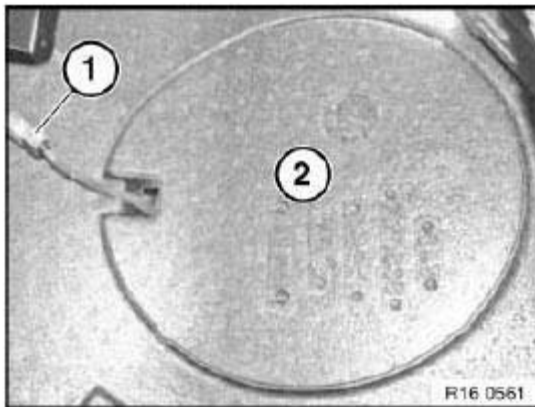


Fig. 53: Identifying Plug Connection And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove cover for service opening (2) from right side of fuel tank.

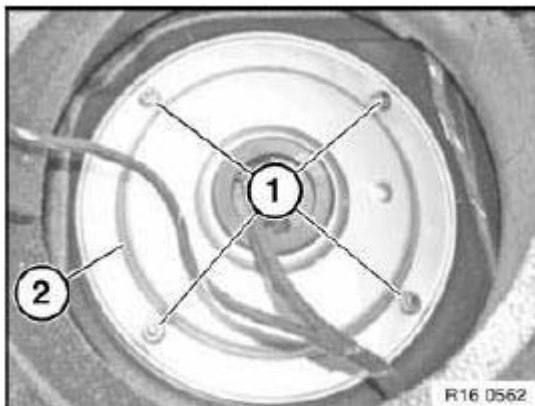


Fig. 54: Identifying Nuts And Cover For Service Opening
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock quick-release fastener (2) and detach vent line.

If necessary, unlock quick-release fastener (3) for independent heating and detach.

If necessary, disconnect plug connection (4) for independent heating fuel pump.

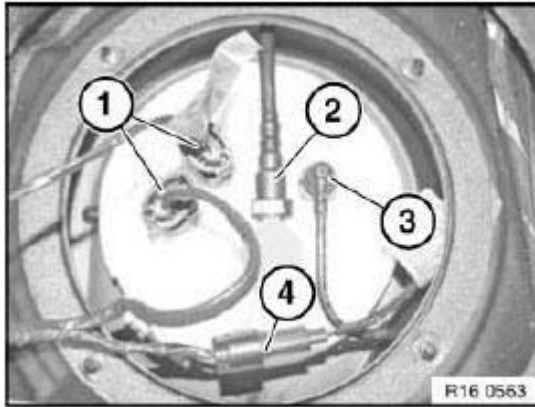


Fig. 55: Identifying Plug Connection And Quick-Release Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Lever out remainder of torque break off head (1) with a screwdriver in direction of arrow.

Release hose clip of clamping ring (2) completely.

NOTE: A flexible extension can be used to release the hose clamp, e.g. special tool 00 9 252 .

Press clamping ring (2) part at open end in direction of arrow and remove.

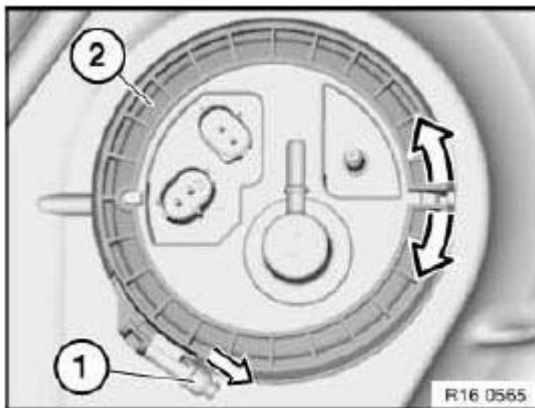


Fig. 56: Identifying Break off Head And Clamping Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure that service cover is installed in correct position.

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Indentation (2) on clamping ring must line up with raised section (1) of tank.

Pin on service cover (3) must line up with indentation on clamping ring.

Hose clip with torque break off head (4) must always be replaced.

Tighten hose clip until torque break off head (4) breaks off.

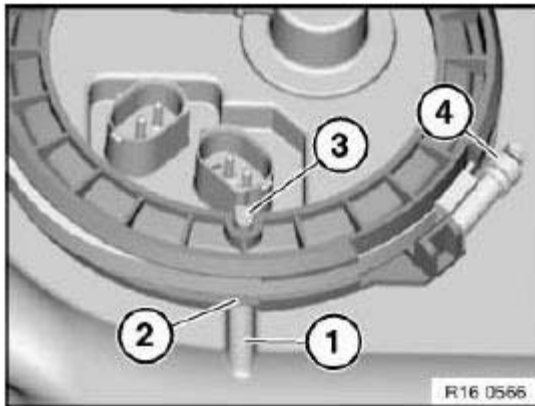


Fig. 57: Identifying Indentation, Service Cover And Break off Head
 Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Seal (1) must always be replaced.

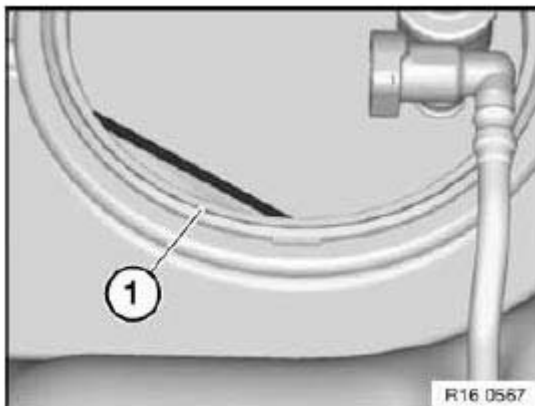


Fig. 58: Identifying Seal
 Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect grounding cable (1) towards top.

IMPORTANT: Grounding cable (1) must be replaced if it has been detached once!

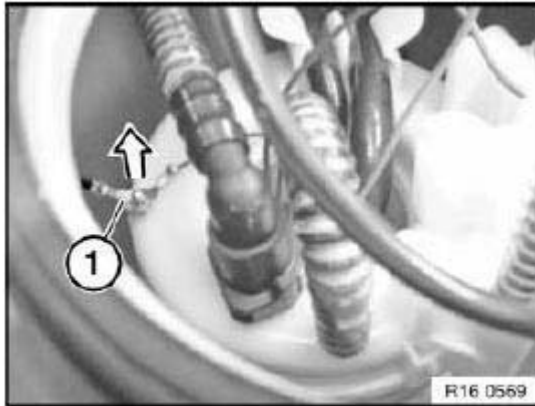


Fig. 59: Identifying Grounding Cable

Courtesy of BMW OF NORTH AMERICA, INC.

Carefully raise service cover.

Unclip plastic tube (1).

Unlock and disconnect quick-connect coupling (2).

Remove fuel pump.

**IMPORTANT: Catch escaping fuel in suitable container.
No fuel is permitted to get into the interior!**

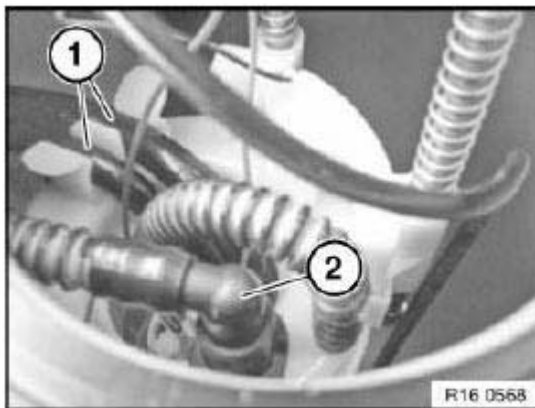


Fig. 60: Identifying Plastic Tube And Quick-Connect Coupling

Courtesy of BMW OF NORTH AMERICA, INC.

With fuel pump remove, disconnect plug connection (1) and replace grounding cable (2).

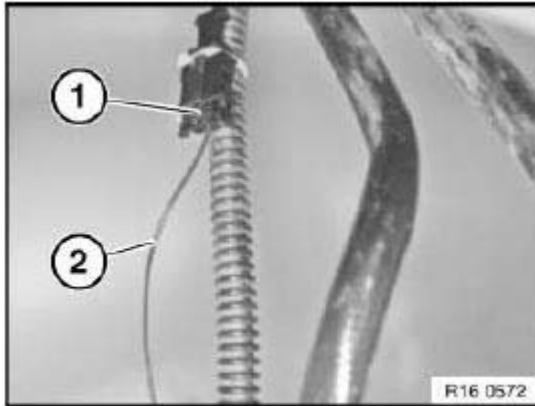


Fig. 61: Identifying Plug Connection And Grounding Cable
Courtesy of BMW OF NORTH AMERICA, INC.

16 14 060 REMOVING AND INSTALLING/REPLACING DUST FILTER FOR TANK LEAK DIAGNOSIS MODULE (DMTL)

Necessary preliminary tasks:

- Remove rear right wheel arch trim. See **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH COVER**

Unlock and disconnect quick-connect coupling (1).

Release screws (2) and remove dust filter (3).

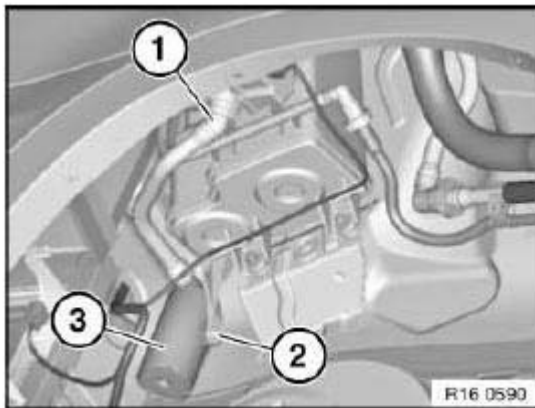


Fig. 62: Identifying Quick-Connect Coupling, Screws And Dust Filter
Courtesy of BMW OF NORTH AMERICA, INC.

16 14 500 REMOVING AND INSTALLING OR REPLACING CONTROL UNIT FOR ELECTRIC FUEL PUMP

protection). See 61 35... NOTES ON ESD PROTECTION (ELECTRO STATIC DISCHARGE) .

Necessary preliminary tasks:

- Raise luggage compartment floor trim

Release screws (1) and remove battery cover towards top.

Unlock plug connections (1) and disconnect.

Release nuts (2) and remove control unit.

(Internal nut must only be slackened).

Installation:

Tightening torque 16 14 1AZ. See **16 14 FUEL PUMP** .

Replacement:

- Carry out programming/coding. See **CODING & PROGRAMMING**