

2002-2005 ENGINE

Fuel System - Repair Instructions - Cooper S

FUEL PICK-UP CLEANING

16 00 005 DRAINING AND FILLING FUEL TANK

IMPORTANT:

- **Observe country-specific safety regulations.**
- **Make sure the work bay is adequately ventilated.**
- **Connect an exhaust extractor system to exhaust tailpipe.**
- **Do not allow the electric fuel pump to run dry!**
- **Carefully withdraw extraction hose so as not to damage non-return flap.**
- **The electric fuel pump must not operate without fuel!**
- **On conclusion of repair work and before starting the engine for the first time, the fuel tank must be filled via the fuel filler pipe with at least 5 liters of fuel.**

Drawing off fuel:

Start engine and allow to run. The electric fuel pump runs.

The pump delivers fuel via the suction jet pump and the tank expansion line from the left to the right side of the fuel tank.

Fuel can be drawn off from the left and right tank halves through the fuel filler pipe down to a small residual amount. This residual amount is drawn off after removal of the sensors for the fuel gauge (right/left).

Feed suction hose of extractor unit into filler pipe. In so doing, turn hose slightly if necessary.

Insertion length:

90 cm

Draw off fuel with extractor unit as far as possible.

Observe the fuel gauge in the instrument cluster while extracting fuel.

Drawing off residual fuel quantity:

**IMPORTANT: Make sure vehicle interior is adequately ventilated.
Catch dripping fuel in a suitable container.**

Remove (right) fuel gauge sensor. Refer to **16 14 017 Removing and installing/replacing fuel filter with fuel**

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S

level sensor .

Remove (left) fuel gauge sensor. Refer to **16 14 015 Removing and installing/replacing fuel pump with fuel level sensor** .

Draw off residual fuel quantity through installation openings.

Fuel filling:

Feed suction hose of extractor unit approx. 40 cm into fuel filler pipe.

Fill fuel from suction extractor unit.

Extracting fuel after a defect in the suction jet pump:

Completely empty left half of fuel tank via fuel filler pipe.

Remove (right) fuel gauge sensor. Refer to **16 14 017 Removing and installing/replacing fuel filter with fuel level sensor** .

Insert extractor hose through installation opening of sensor into the fuel tank. The fuel (also residual quantities) can now be drawn off.

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

Special tools required:

- 13 3 010
- 16 1 070
- 16 1 171
- 16 1 174

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

Necessary preliminary tasks:

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

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

- Content of fuel tank:
 1. Maximum 90 %

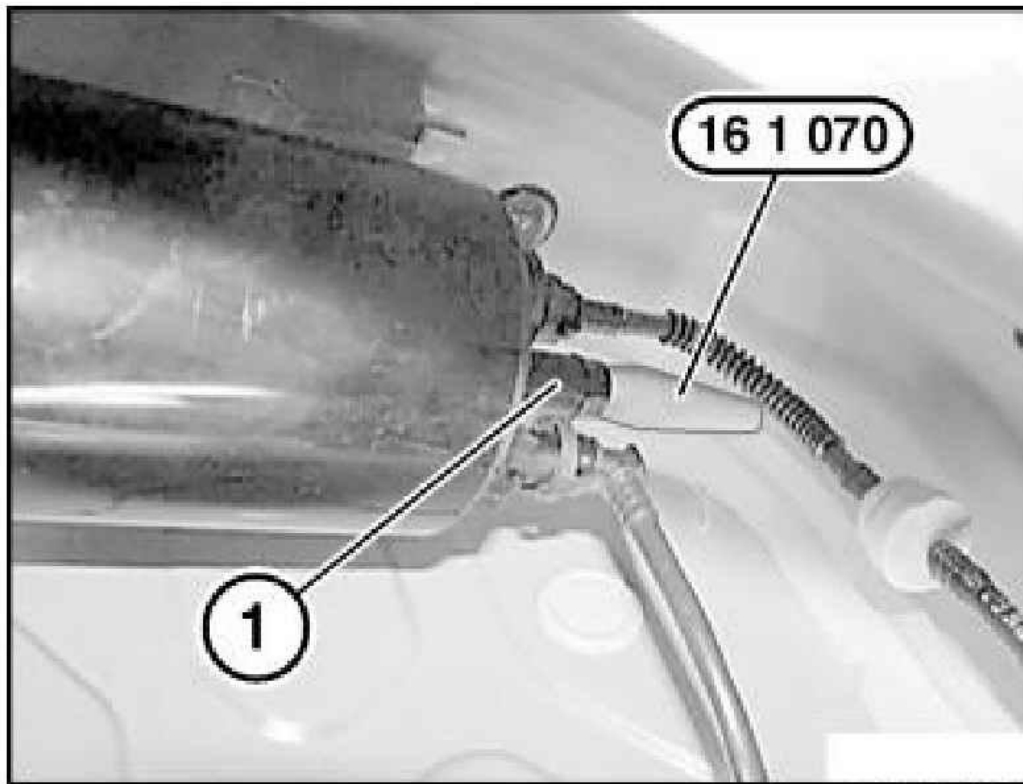
2. Minimum 13 % (reserve telltale must not light up).

- 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.

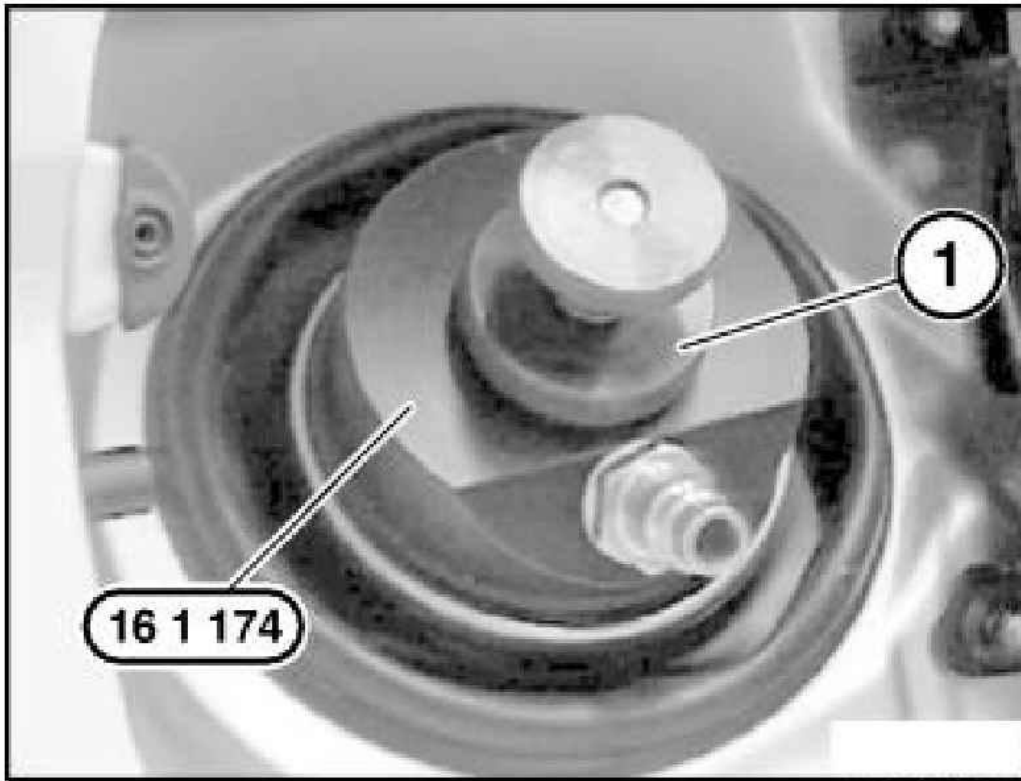
Using special tool 16 1 070, seal opening (1) on carbon canister.



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Fig. 1: Opening Seal With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Remove fuel filler cap and connect special tool 16 1 174 to fuel filler neck.



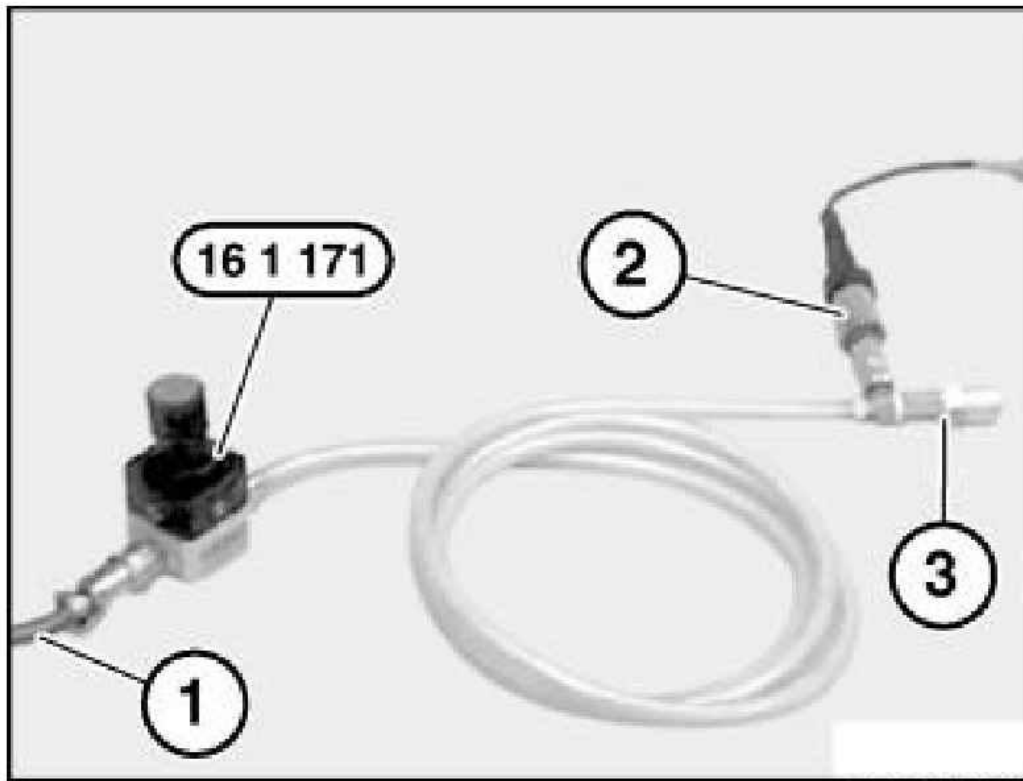
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Fig. 2: Attaching Special Tool 16 1 174
Courtesy of BMW OF NORTH AMERICA, INC.

Clamp special tool 16 1 174 on fuel filler neck with adjusting wheel (1).

IMPORTANT: Set pressure regulator on special tool 16 1 171 fully in " -" direction.

Connect special tool 16 1 171 using compressed air line (1) to garage compressed air system (8...10 bar).



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Fig. 3: View Of Special Tool

Courtesy of BMW OF NORTH AMERICA, INC.

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

IMPORTANT: Do not connect fast-release coupling (3) of special tool 16 1 171.

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

Using pressure regulator on special tool 16 1 171, increase pressure by 0.050 bar.

Connect special tool 16 1 174 to fast -release coupling of special tool 16 1 171.

Using pressure regulator on special tool 16 1 171, reset gauge pressure in fuel tank to 0.050 bar.

IMPORTANT: Do not under any circumstances increase pressure by more than 0.05 bar as this would result in damage to the fuel tank and venting system.

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S

Using special tool 13 3 010, disconnect delivery line from special tool 16 1 171 to fuel 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. Refer to <u>16 00 510 Conducting leak test on fuel tank and tank ventilation system</u> .

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

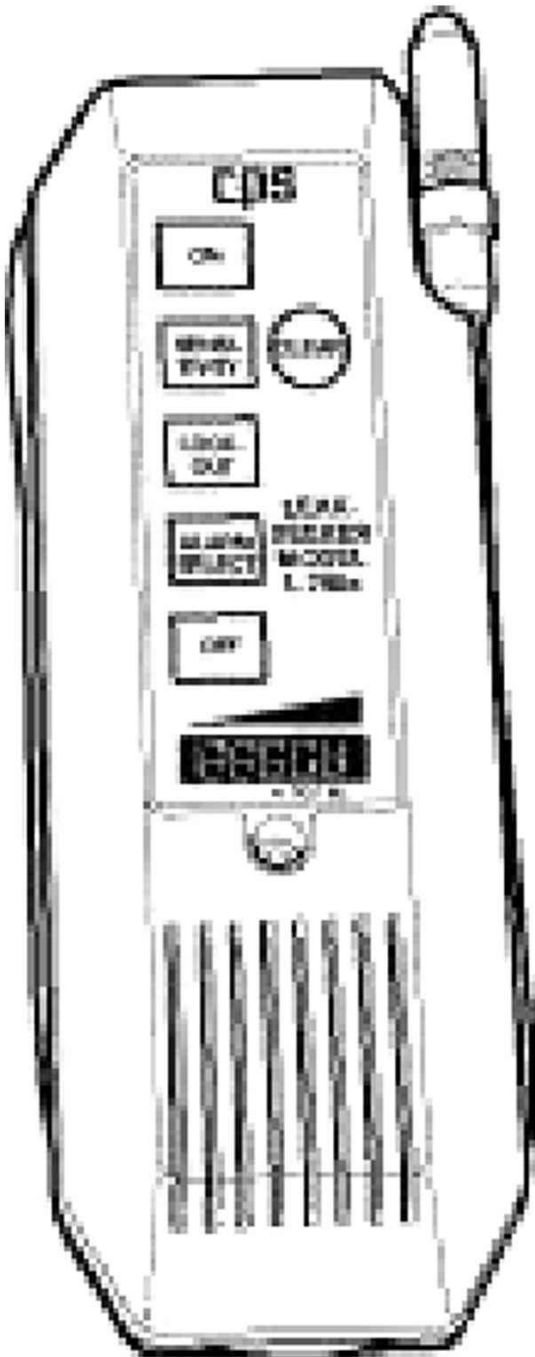
NOTE: For vehicles without DMTL
Pressurize fuel tank and tank venting system. Refer to **16 00 100 Checking fuel tank and tank ventilation system for leaks** .
During the leak test with a leak detector, be sure to follow the operating instructions of the equipment manufacturer.

IMPORTANT: Escaping fuel vapors; only work in well -ventilated rooms or use suitable exhaust extraction unit.
Observe country-specific accident prevention and occupational safety regulations.

The leak test can be carried out with a leak detector.

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2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



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Fig. 4: Identifying Leak Detector
Courtesy of BMW OF NORTH AMERICA, INC.

Possible causes may be:

- Fuel filler cap leaking
- Tank venting lines leaking (fuel tank; carbon canister; tank venting valve)
- Tank ventilation valve leaky (engine compartment)
- Tank sensor on fuel tank leaky

FUEL TANK WITH MOUNTING

16 11 030 REMOVING AND INSTALLING FUEL TANK

Special tools required:

- 34 6 330

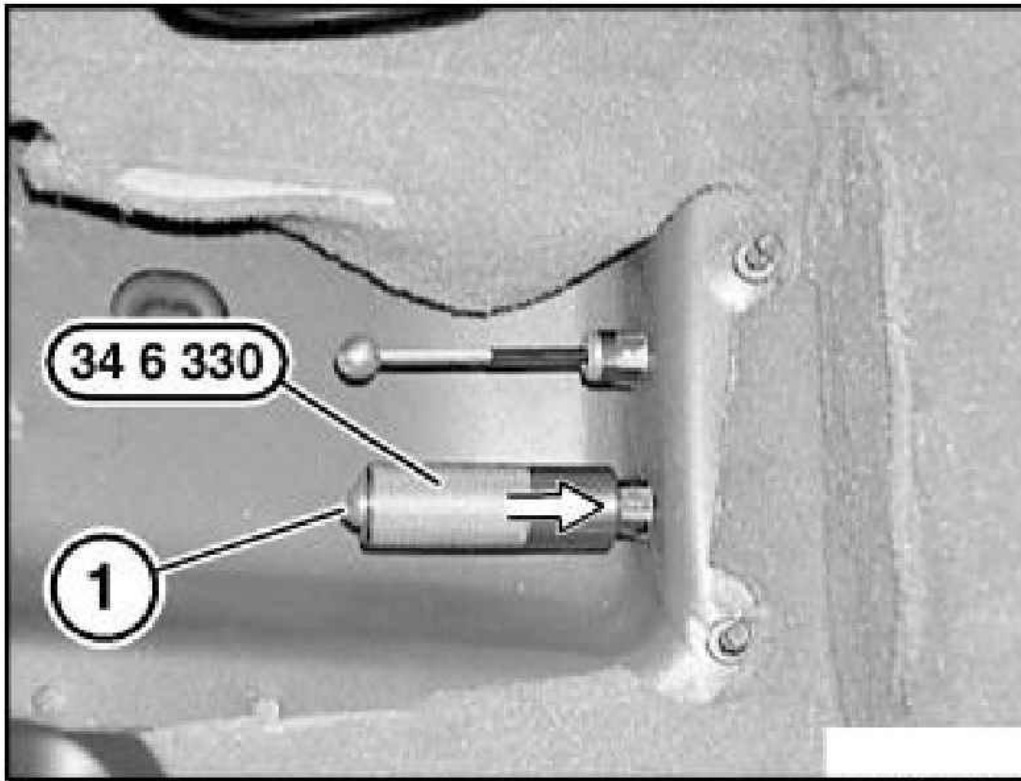
IMPORTANT: After installation of fuel tank/prior to first engine start -up:

- **Check electrical resistance between metal filler bowl and wheel hub.**
- **Measured value: approx. 0.65 ohm.**
- **Fill fuel tank with at least 5 liters of fuel.**

Necessary preliminary tasks:

- Draw off fuel from fuel tank. Refer to **16 00 005 Draining and filling fuel tank** .
- Remove final muffler. Refer to **18 12 030 REMOVING AND INSTALLING/REPLACING REAR MUFFLER (COOPER S)** .
- Remove exhaust heat shield
- Detach rear half of battery main lead.
- Remove rear storage compartment. Refer to **51 16 216 REMOVING AND INSTALLING REAR CENTRE CONSOLE** .
- Remove bracket for rear storage compartment. Refer to **51 16 218 REMOVING AND INSTALLING / REPLACING REAR COMPARTMENT HOLDER** .
- Disconnect parking brake Bowden cables on rear brake caliper. Refer to **34 41 120 REMOVING AND INSTALLING/REPLACING BOTH HANDBRAKE BOWDEN CABLES** .
- Remove rear seat. Refer to **52 26 005 Removing and installing or replacing rear seat** .
- Remove trim panels.
- Remove rear left wheel arch trim, refer to **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH LINER**
- Disconnect fuel level sensor and wiring harness.

Attach special tool 34 6 330 to parking brake Bowden cable (1).



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Fig. 5: Attaching Special Tool 34 6 330
Courtesy of BMW OF NORTH AMERICA, INC.

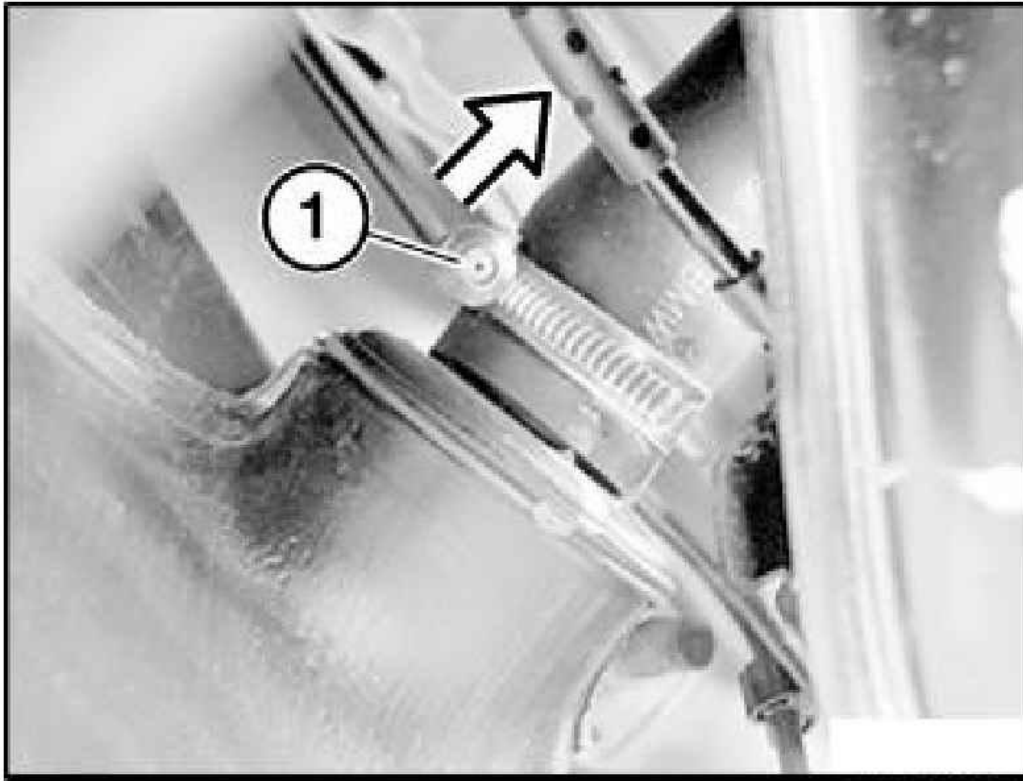
Slide special tool 34 6 330 in direction of arrow onto barbs of parking brake Bowden cable (1) until barbs are free.

Push parking brake Bowden cable towards rear.

Installation:

Adjust handbrake. Refer to **34 10 014 ADJUSTING HANDBRAKE** .

Release hose clamp (1) and remove filler hose from fuel tank.



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Fig. 6: Removing Filler Hose

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

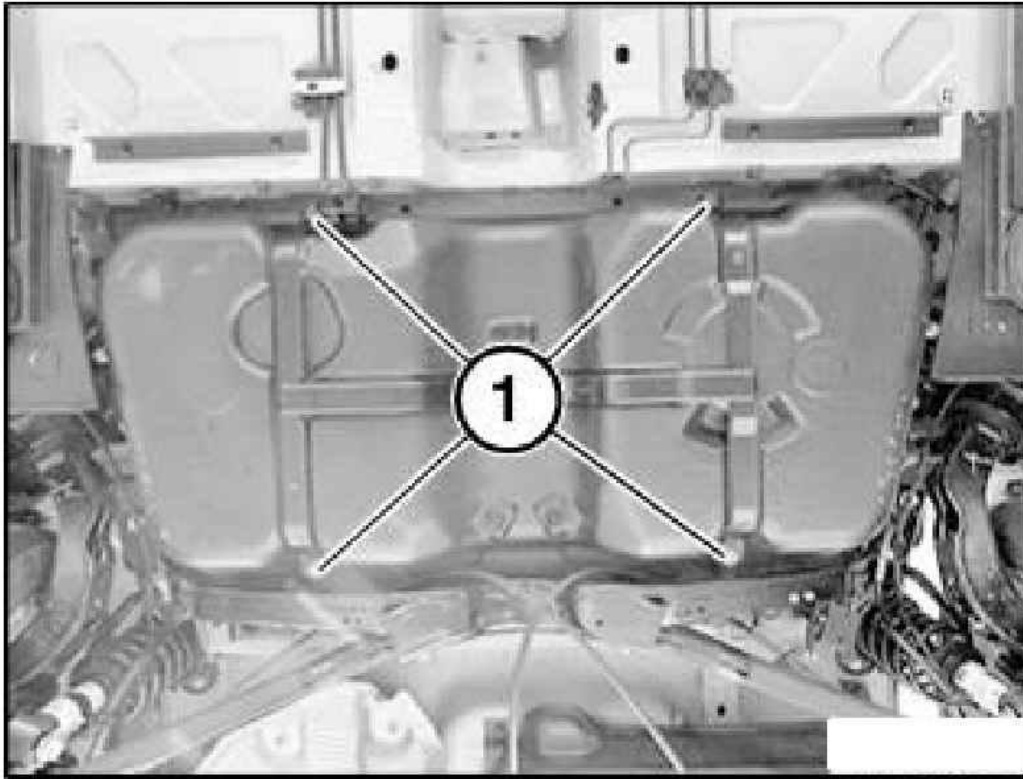
Tightening torque 16 11 4AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES** .

Remove vent hose from fuel filler pipe.

Support fuel tank over a large area with a suitable jack.

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2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



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Fig. 7: Locating Screws

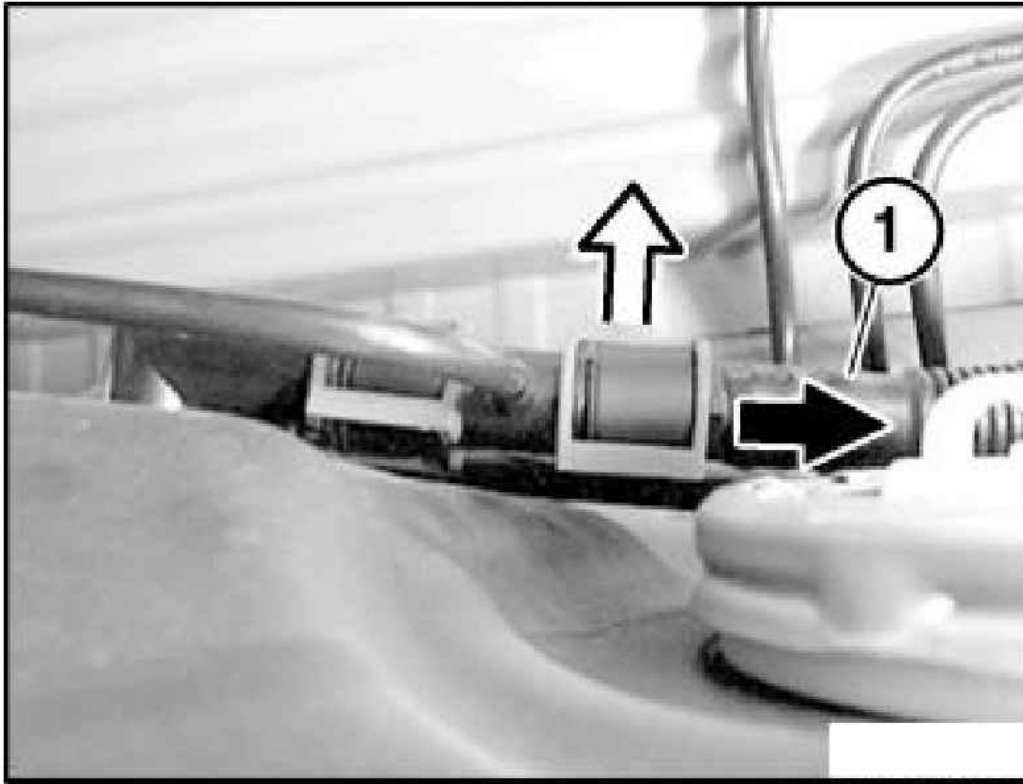
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws (1).

Installation:

Tightening torque 16 11 3AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES** .

Lower fuel tank and disconnect right vent line (1) from fuel tank.



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Fig. 8: Disconnecting Right Vent Line
Courtesy of BMW OF NORTH AMERICA, INC.

Pull vent line through body.

Remove fuel tank.

Installation:

Make sure lines and wiring harness are not trapped or crushed during installation.

16 11 060 REMOVING AND INSTALLING/REPLACING FUEL FILLER PIPE

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

- Check electrical resistance between metal filler bowl and wheel hub.
- Measured value: approx. 0.65 ace;O.

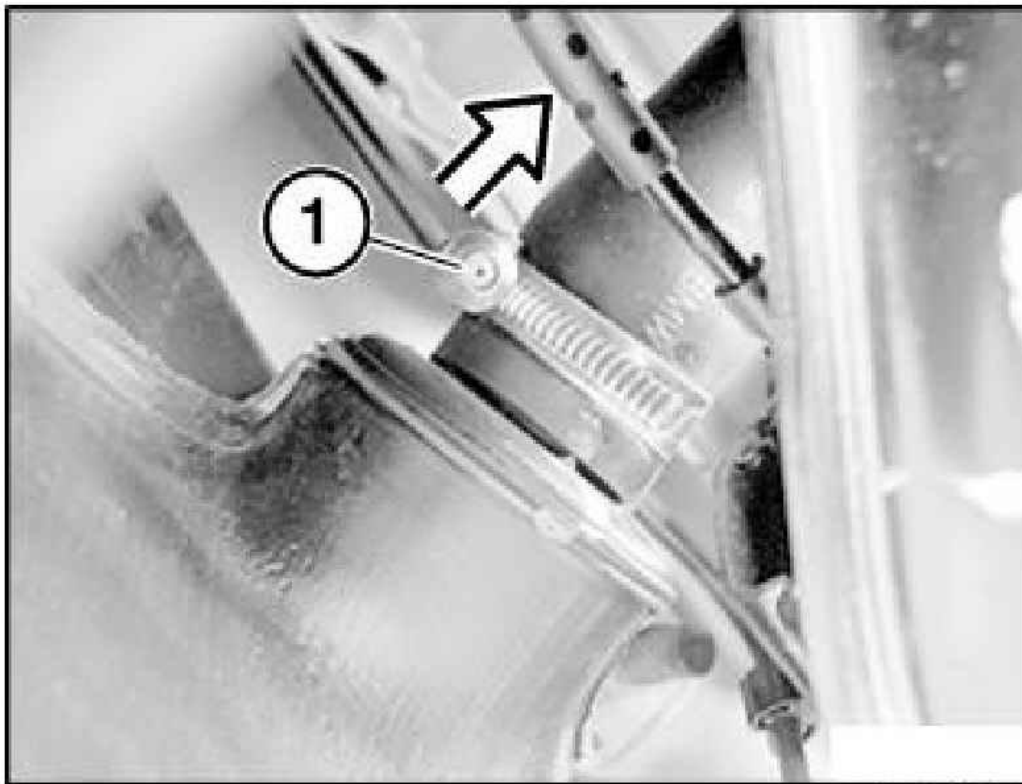
- Fuel tank must be filled with at least 5 liters of fuel.

Necessary preliminary tasks:

- Remove rear left wheel arch trim, refer to **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH LINER**
- Unscrew fuel filler cap from fuel filler pipe

NOTE: Fuel tank must be no more than half full; if necessary, draw off fuel from fuel tank.

Unfasten hose clip (1).



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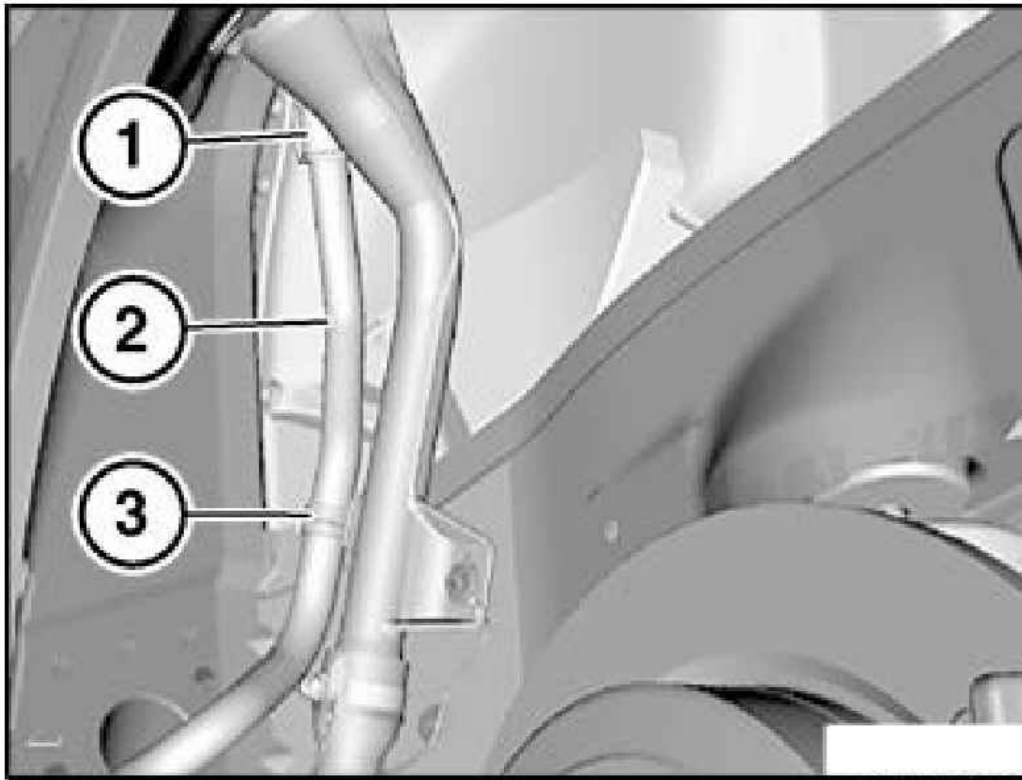
Fig. 9: Detaching Fuel Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Detach fuel hose from fuel tank.

Installation:

Tightening torque 16 11 4AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES** .

Detach quick-release fastener (1).

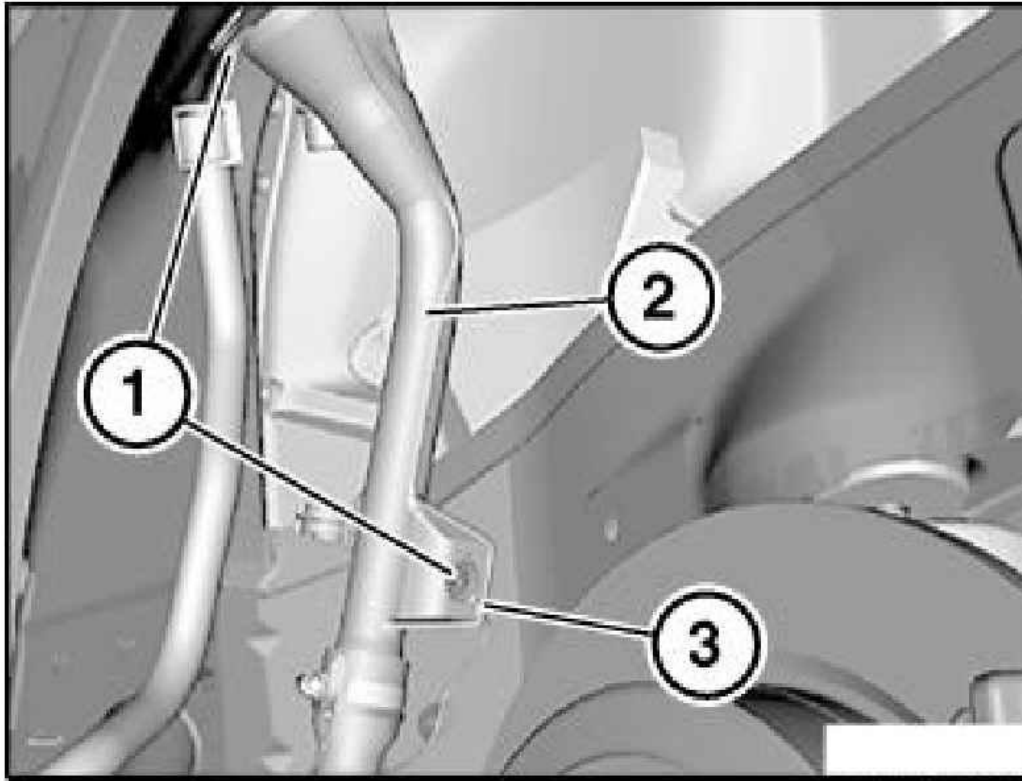


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Fig. 10: Disengaging Fuel Filler Pipe From Mounting
Courtesy of BMW OF NORTH AMERICA, INC.

Disengage fuel filler pipe (2) from mounting (3).

Unscrew nuts (1).



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Fig. 11: Removing Fuel Filler Pipe

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Replace nuts.

Tightening torque, 16 11 1AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES**.

Remove fuel filler pipe (2).

Installation:

Make sure grounding cable (3) is correctly fitted.

Following seals must be correctly fitted:

- Vent hose to fuel filler pipe

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S

- Fuel filler pipe to body cutout

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

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

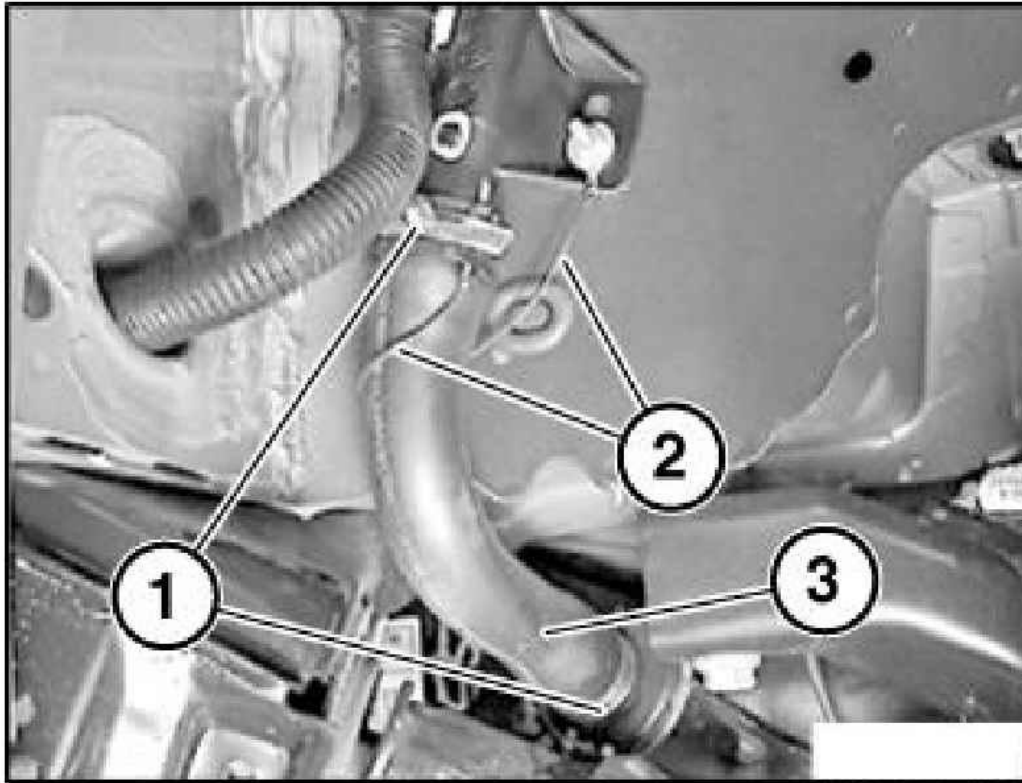
- Check electrical resistance between metal filler bowl and wheel hub.
- Measured value: approx. 0.65 ace;O.
- Fuel tank must be filled with at least 5 liters of fuel.

Necessary preliminary tasks:

- Remove rear left wheel arch trim, refer to **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH LINER**
- Unscrew fuel filler cap from fuel filler pipe

NOTE: Fuel tank must be no more than half full; if necessary, draw off fuel from fuel tank. Refer to **16 00 005 Draining and filling fuel tank** .

Unfasten hose clips (1).



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Fig. 12: Removing Hose Clip

Courtesy of BMW OF NORTH AMERICA, INC.

First detach rubber sleeve (3) from fuel filler pipe.

Detach rubber sleeve (3) from fuel tank.

Installation:

Tightening torque 16 11 4AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES** .

Make sure grounding cable (2) is correctly fitted.

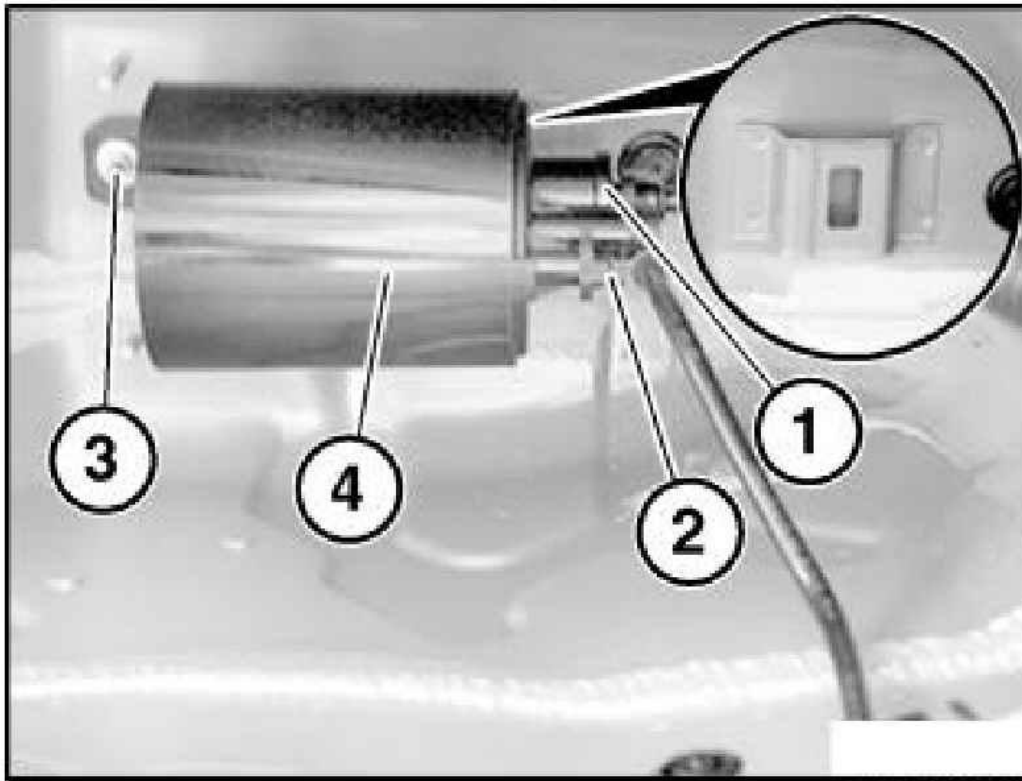
FUEL TRANSFER, SENSOR FOR GAUGE

16 12 010 REMOVING AND INSTALLING/REPLACING CARBON CANISTER

Necessary preliminary tasks:

- Remove rear right wheel arch trim, refer to **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH LINER**

Detach quick-release fasteners (1 and 2).



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Fig. 13: Removing Carbon Canister
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect wires.

Unscrew bolt (3).

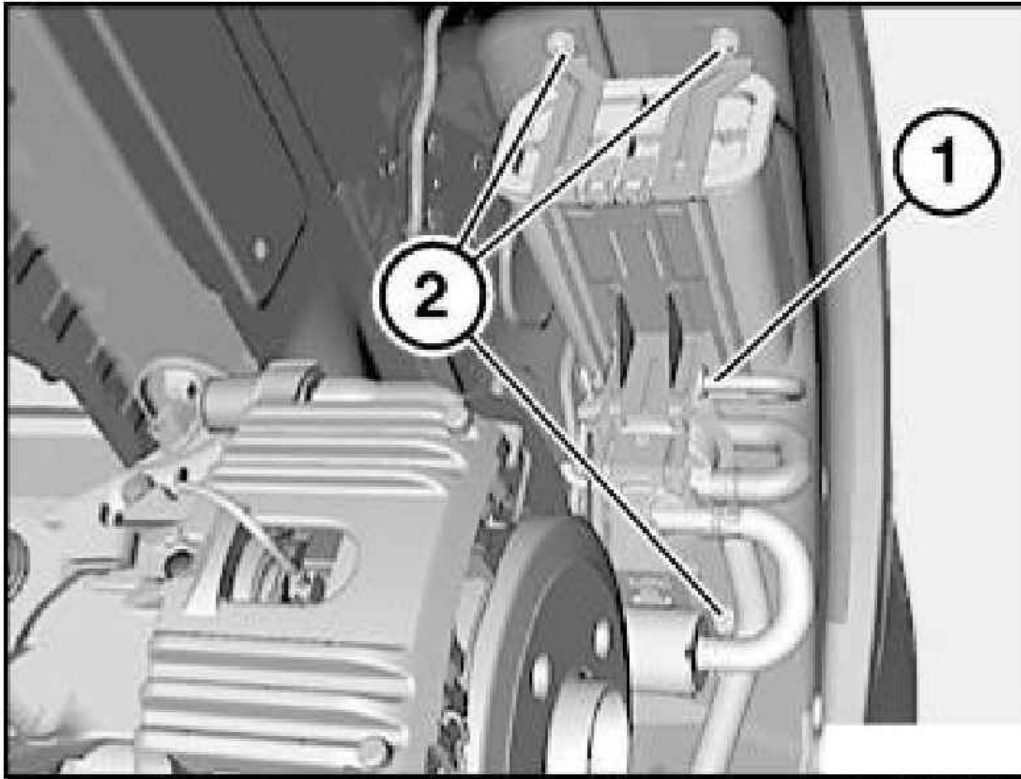
Withdraw carbon canister (4) from mounting and remove.

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

Necessary preliminary tasks:

- Remove rear right wheel arch trim, refer to **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH LINER**

Remove hose (1).



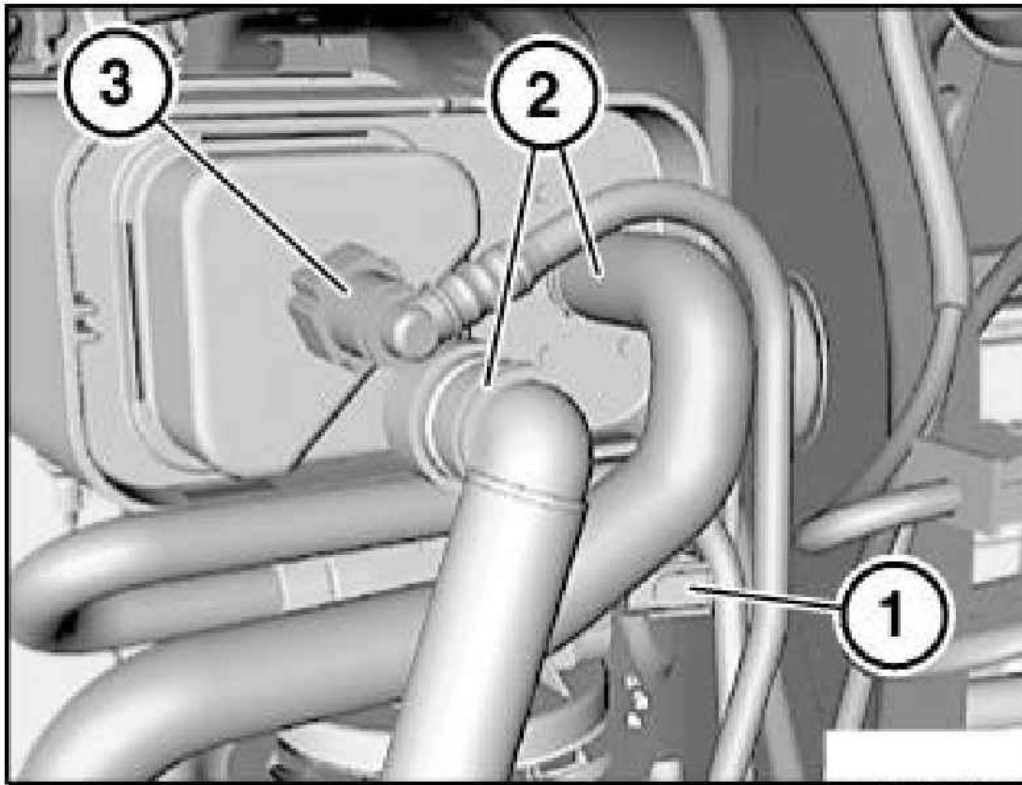
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Fig. 14: Lowering Carbon Canister
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (2) and lower carbon canister with holder slightly.

IMPORTANT: Lower carefully so as not to damage hoses connected to carbon canister.

Disconnect plug connection (1).



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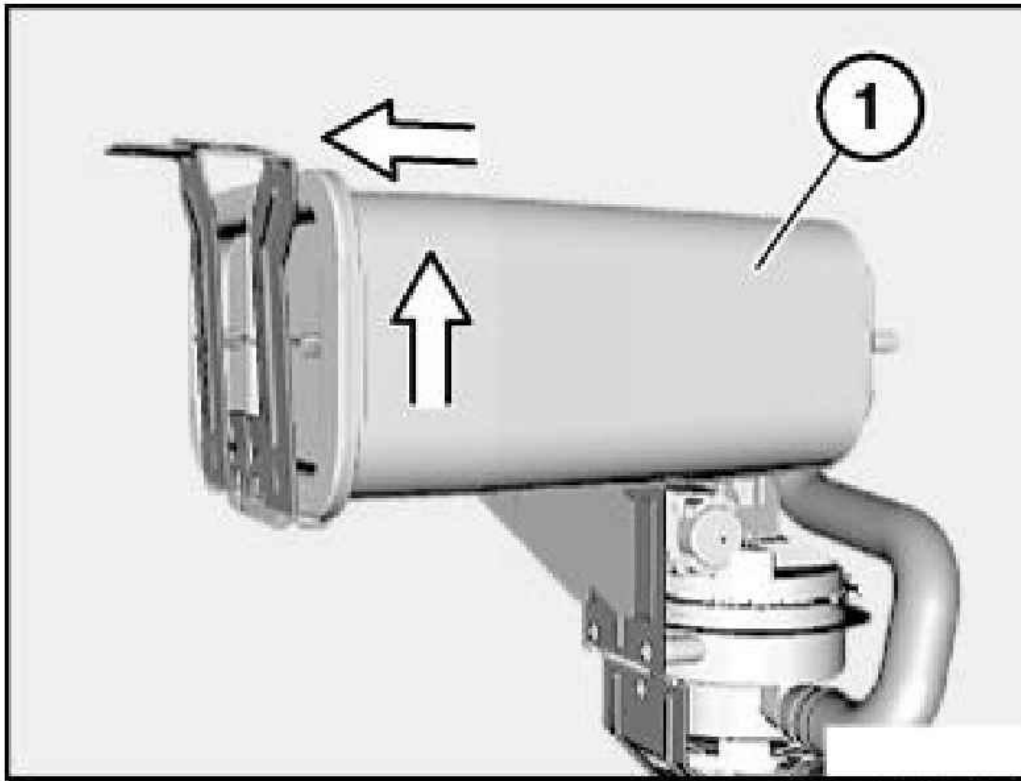
Fig. 15: Removing Carbon Canister
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect hoses (2).

Squeeze quick-release fastener (3) together and detach line.

Remove carbon canister with holder.

Remove carbon canister (1) in direction of arrow from holder.



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Fig. 16: Removing Carbon Canister From Holder
Courtesy of BMW OF NORTH AMERICA, INC.

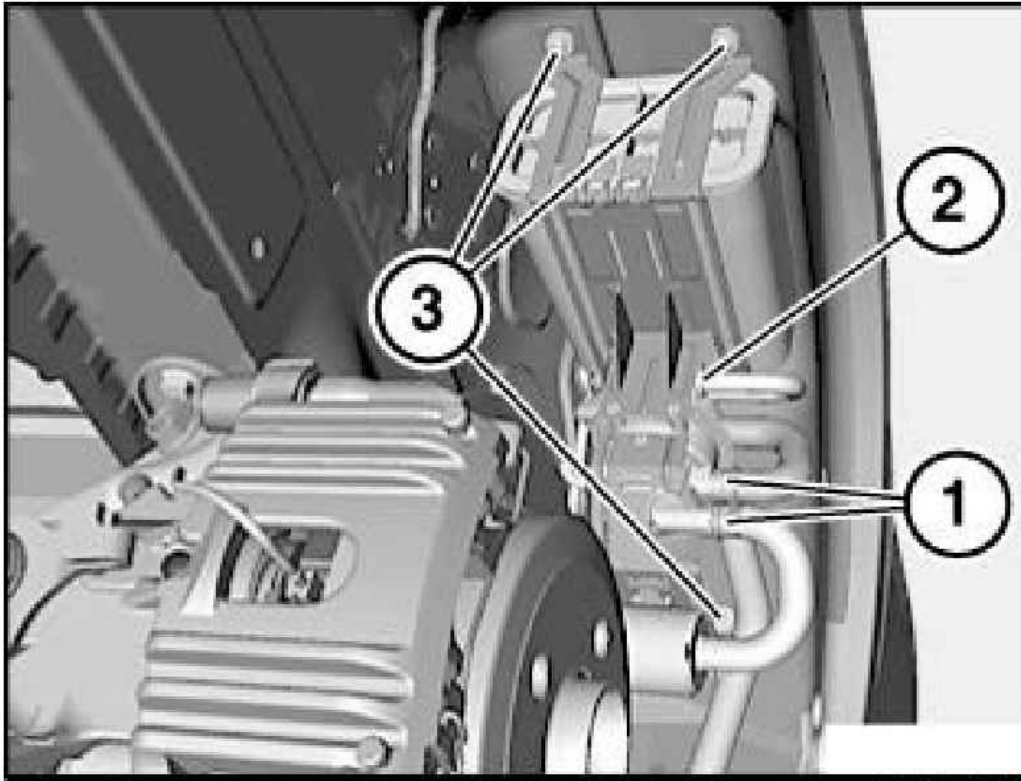
FUEL VENTILATION

16 13 015 REMOVING AND INSTALLING/REPLACING TANK LEAKAGE DIAGNOSIS MODULE (DMTL)

Necessary preliminary tasks:

- Remove rear right wheel arch trim, refer to **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH LINER**

Disconnect plug connection.



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Fig. 17: Removing Clamps

Courtesy of BMW OF NORTH AMERICA, INC.

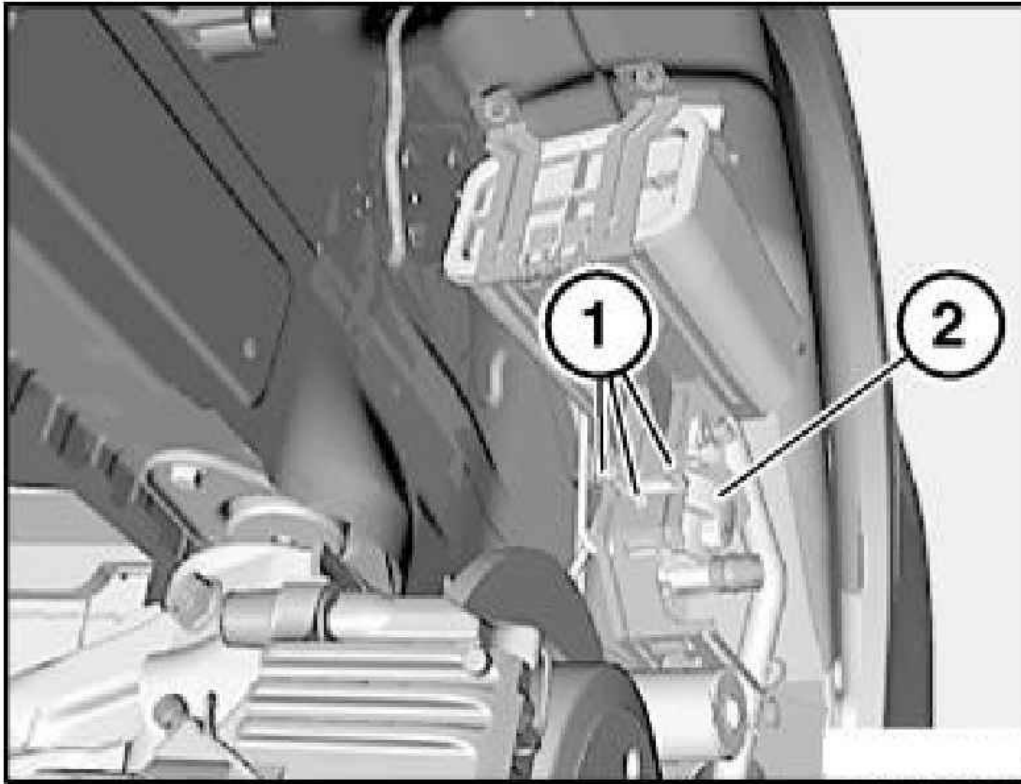
Release clamps (1) and detach hoses.

Remove hose (2).

Release nuts (3) and lower DMTL with holder slightly.

IMPORTANT: Lower carefully so as not to damage hoses connected to carbon canister.

Release screws (1) and swing out leak diagnosis pump.



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Fig. 18: Removing Leak Diagnosis Pump

Courtesy of BMW OF NORTH AMERICA, INC.

FUEL PUMP

16 14 015 REMOVING AND INSTALLING/REPLACING FUEL PUMP WITH FUEL LEVEL SENSOR

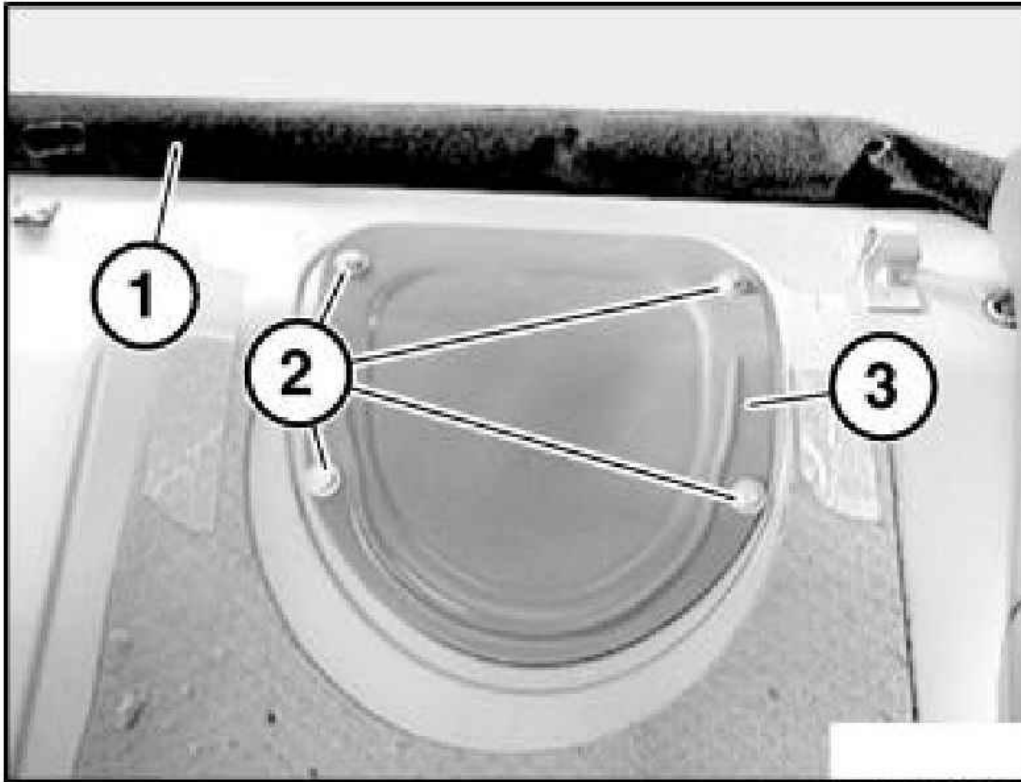
Special tools required:

- 16 1 020

Necessary preliminary tasks:

- Draw off fuel from fuel tank, refer to **16 00 005 Draining and filling fuel tank**
- Remove rear seat. Refer to 52 26 005 Removing and installing or replacing rear seat .

Push trim panel (1) forward.



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Fig. 19: Removing Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (2).

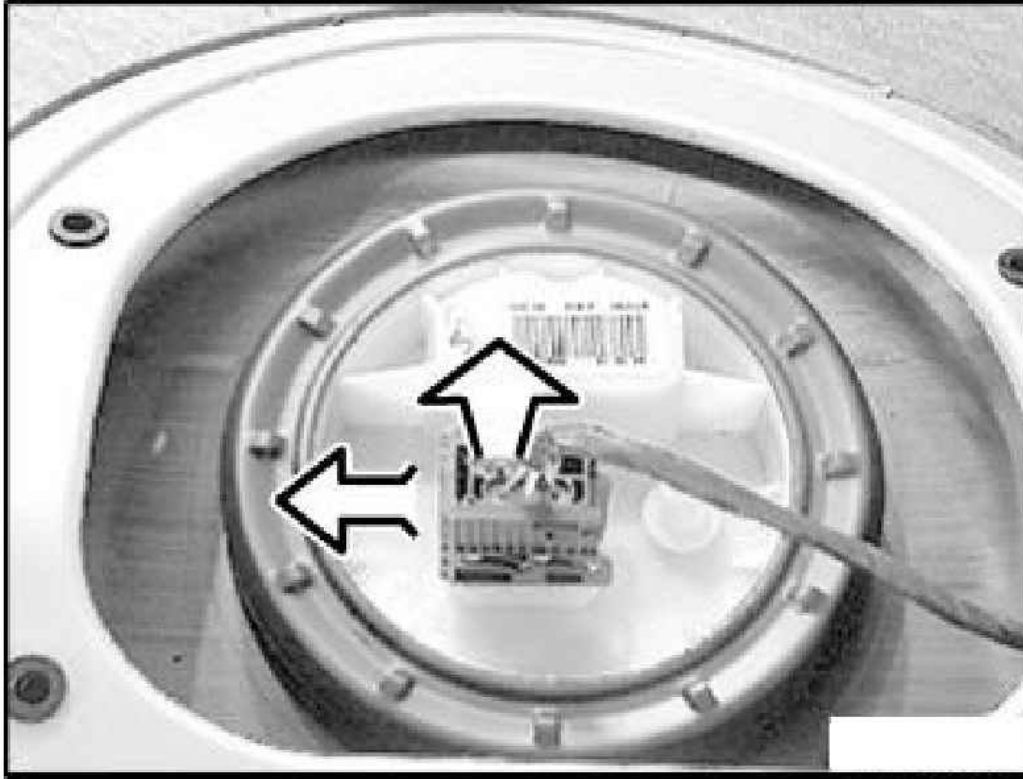
Tightening torque, 16 11 2AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES** .

Remove cover (3).

Disconnect plug connection.

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2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



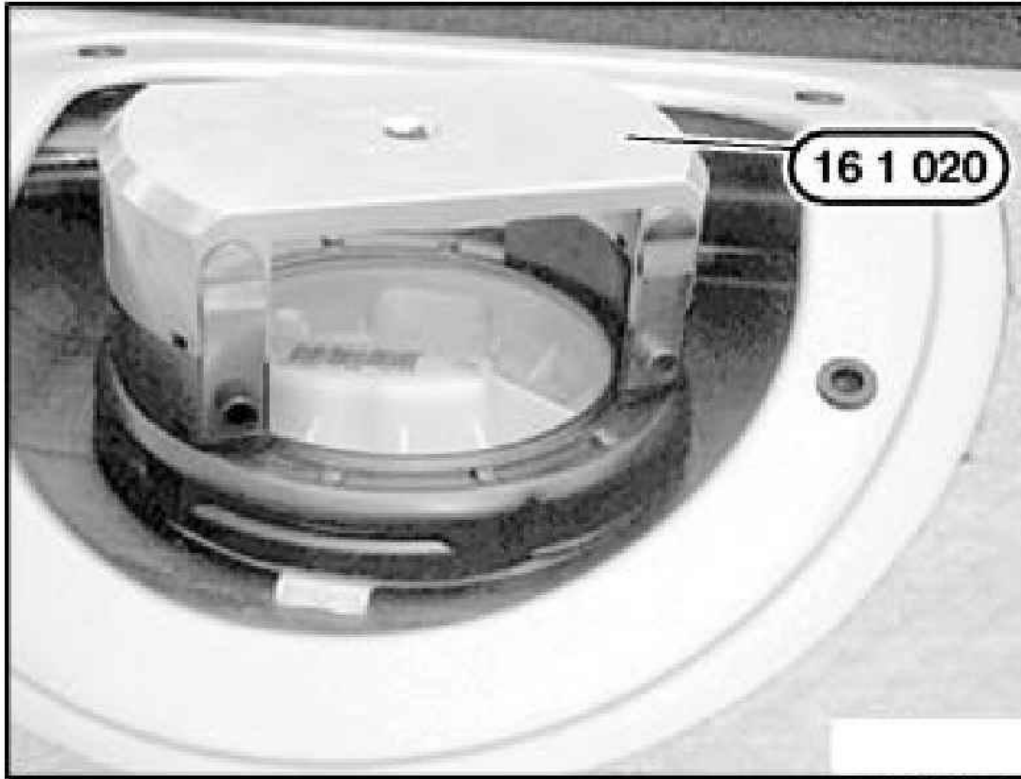
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Fig. 20: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw cap with special tool 16 1 020.

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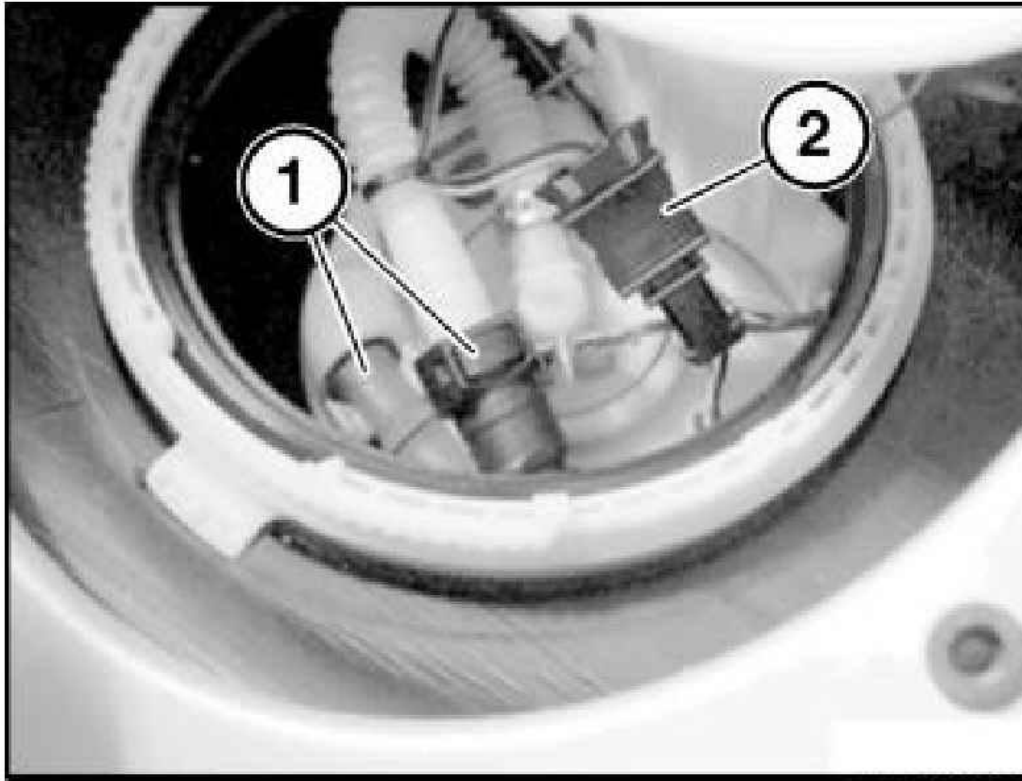
Fig. 21: Removing Screw Cap With Special Tool 16 1 020
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Replace rubber seal.

Tightening torque, 16 14 1AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES**.

Raise unit.



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Fig. 22: Removing Sensor Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Remove locking clip of line connection.

Detach lines (1) and plug (2) from sensor unit.

Carefully lift sensor unit out of tank.

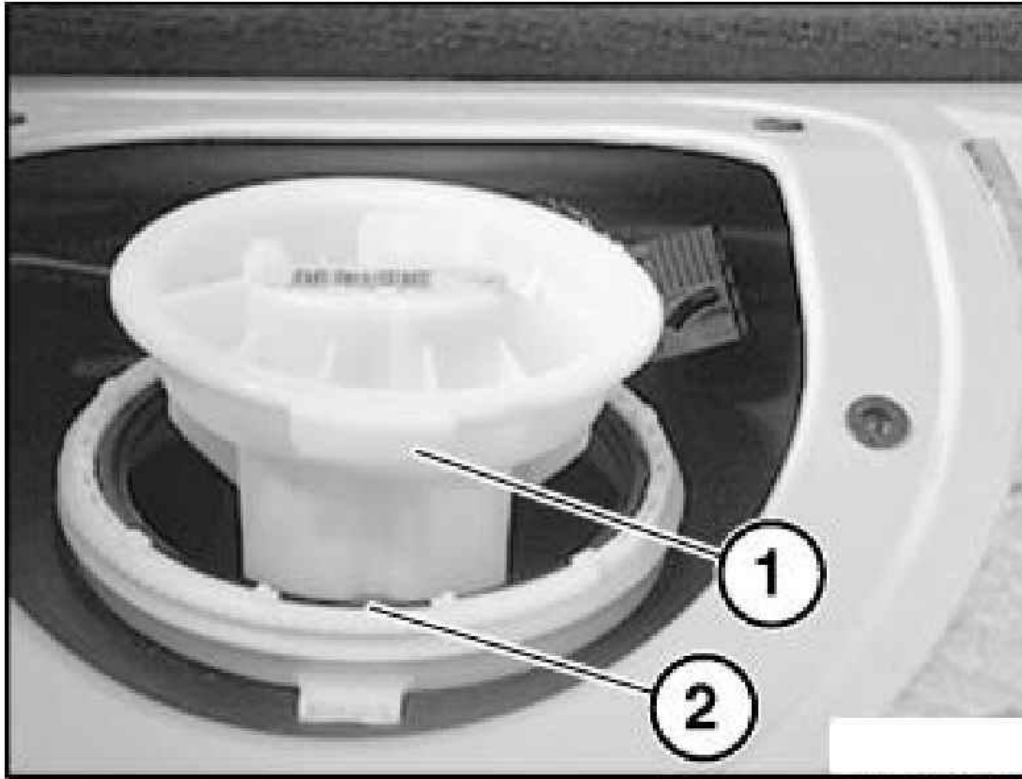
Catch dripping fuel in a suitable container.

Installation:

When installing fuel level sensor, make sure lug (1) engages in recess (2) on tank.

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



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Fig. 23: Installing Fuel Level Sensor

Courtesy of BMW OF NORTH AMERICA, INC.

16 14 017 REMOVING AND INSTALLING/REPLACING FUEL FILTER WITH FUEL LEVEL SENSOR

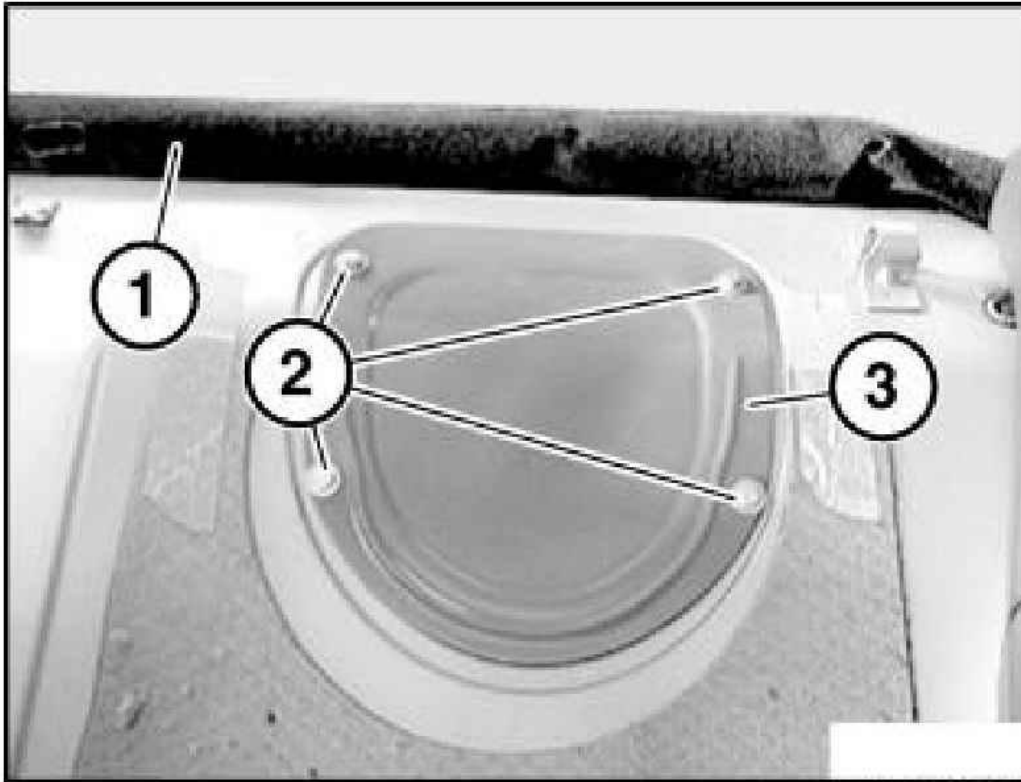
Special tools required:

- 16 1 020

Necessary preliminary tasks:

- Discharge fuel tank, refer to **16 00 005 Draining and filling fuel tank**
- Remove rear seat. Refer to 52 26 005 Removing and installing or replacing rear seat .
- Remove sensor unit (left), refer to **16 14 015 Removing and installing/replacing fuel pump with fuel level sensor**

Push trim panel (1) forward.



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Fig. 24: Removing Cover

Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws (2).

Installation:

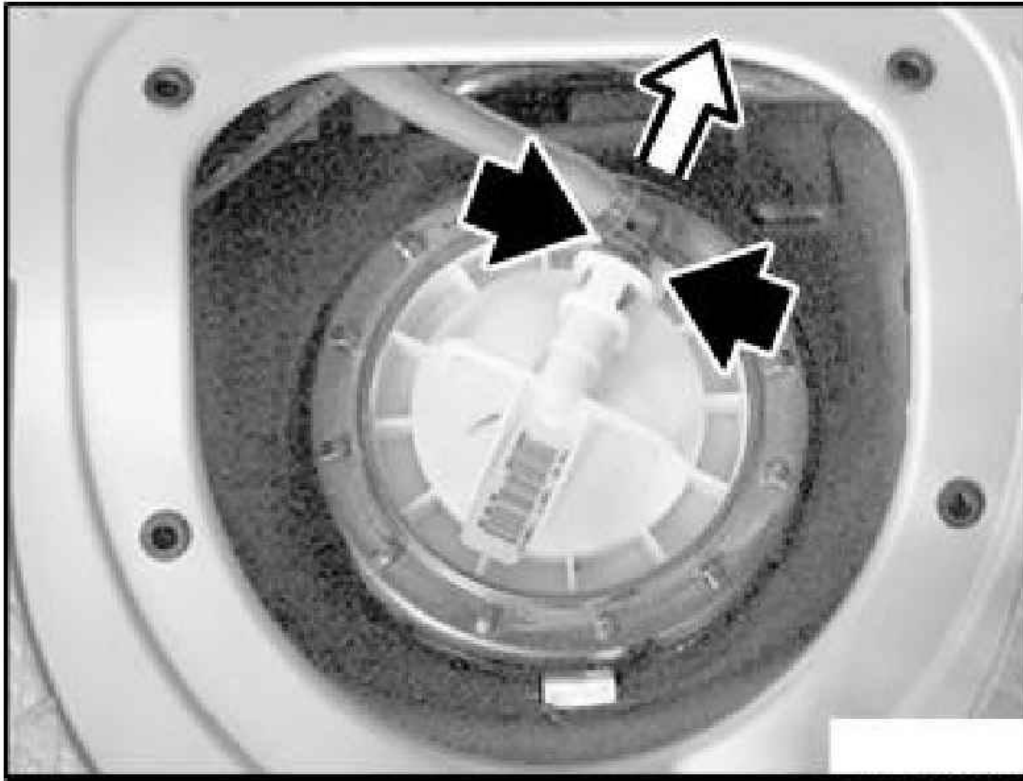
Tightening torque 16 11 2AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES** .

Remove the cover (3).

Unlock and withdraw fuel hose.

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



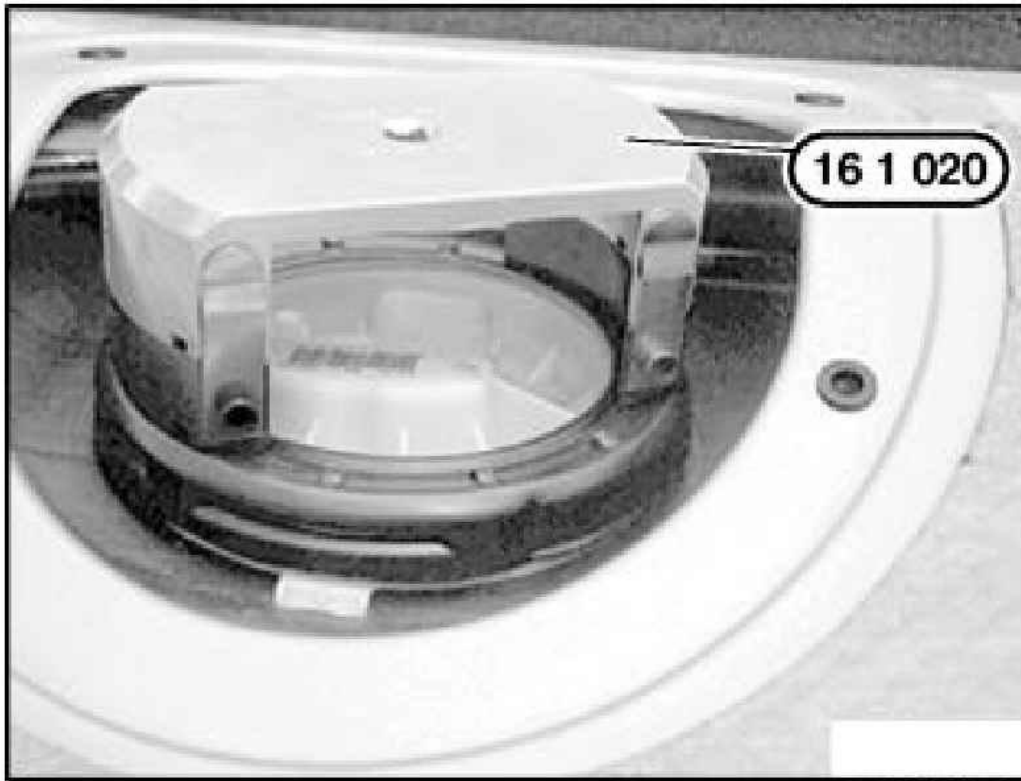
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Fig. 25: Withdrawing Fuel Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Release locking ring with special tool 16 1 020.

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



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Fig. 26: Releasing Locking Ring

Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

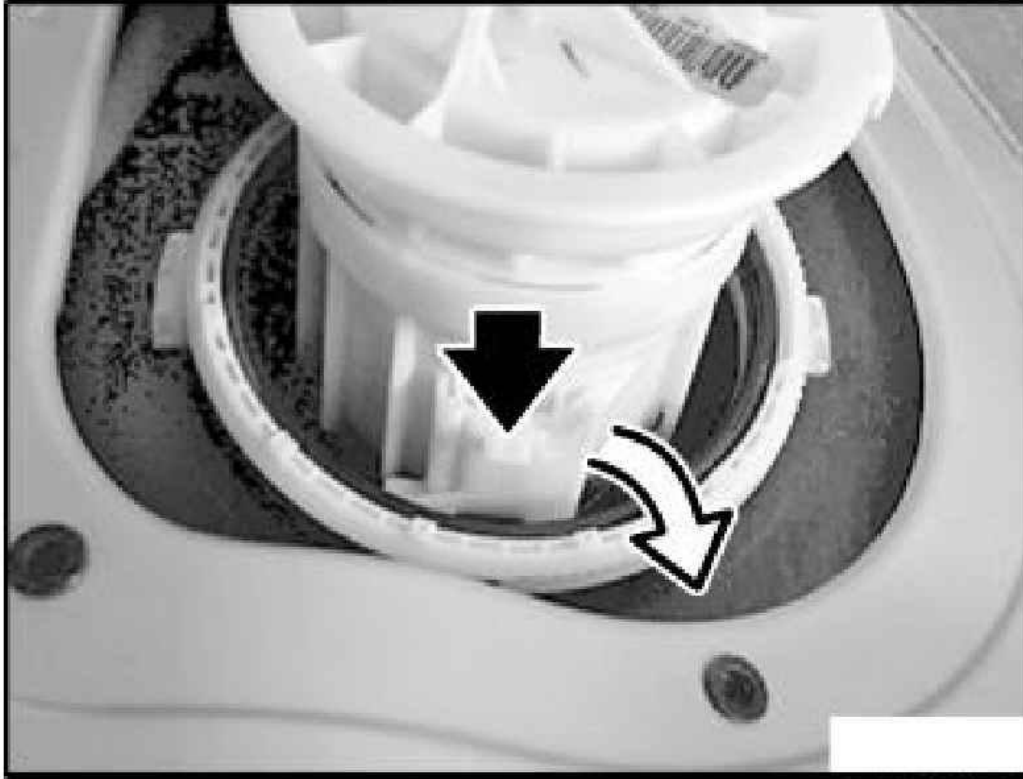
Replace rubber seal.

Tightening torque 16 14 1AZ. Refer to **FUEL SUPPLY SYSTEM - TIGHTENING TORQUES** .

Remove line holder from sensor unit. Lift sensor unit and lines out of fuel tank.

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



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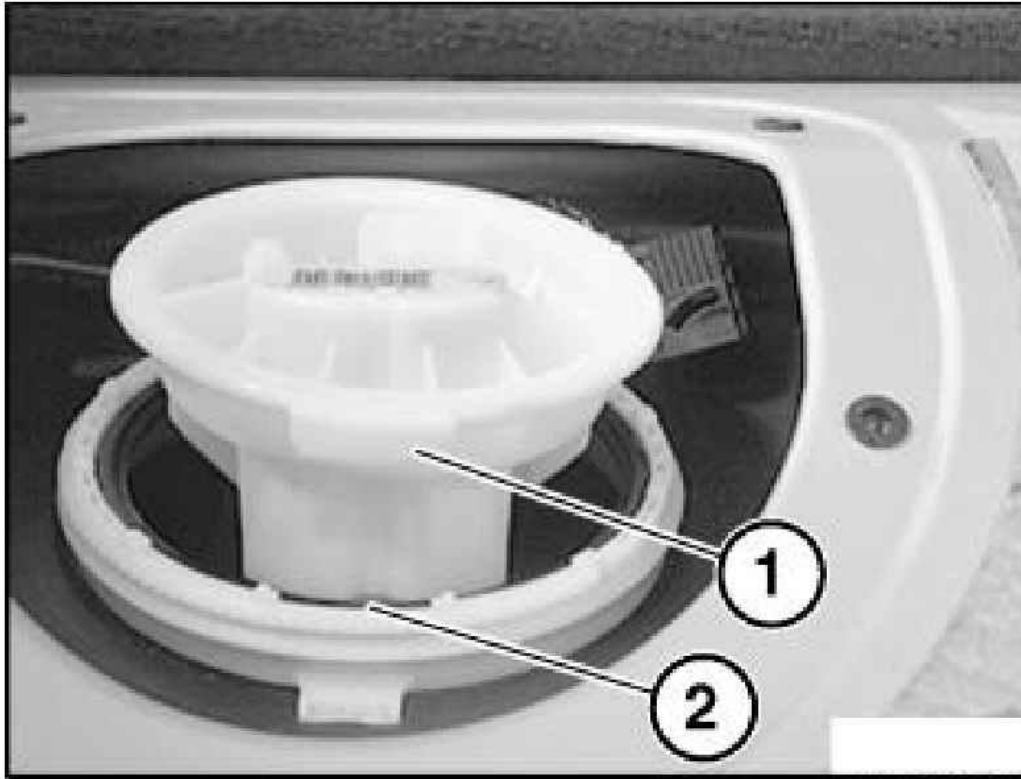
Fig. 27: Removing Line Holder From Sensor Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

When installing fuel filter, make sure lug (1) engages in recess (2) on tank.

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



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Fig. 28: Installing Fuel Filter

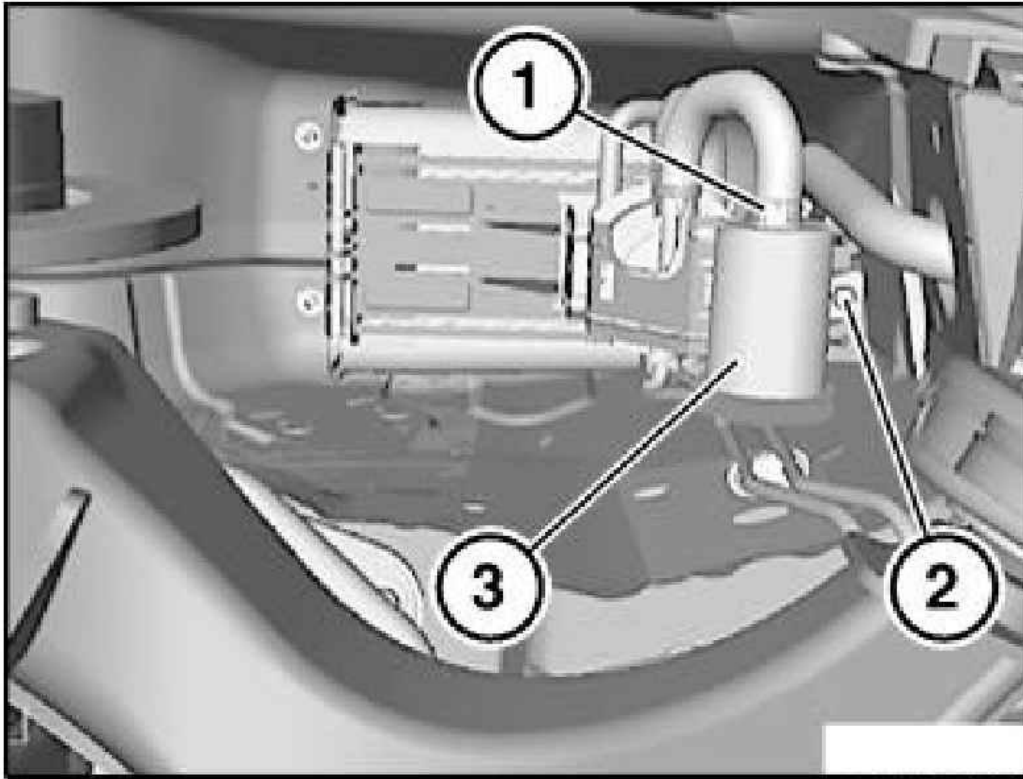
Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary tasks:

- Remove rear right wheel arch trim, refer to **51 71 041 REMOVING AND INSTALLING/REPLACING REAR LEFT OR RIGHT WHEEL ARCH LINER**

Release clamp (1) and detach hose.



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Fig. 29: Removing Dust Filter

Courtesy of BMW OF NORTH AMERICA, INC.

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

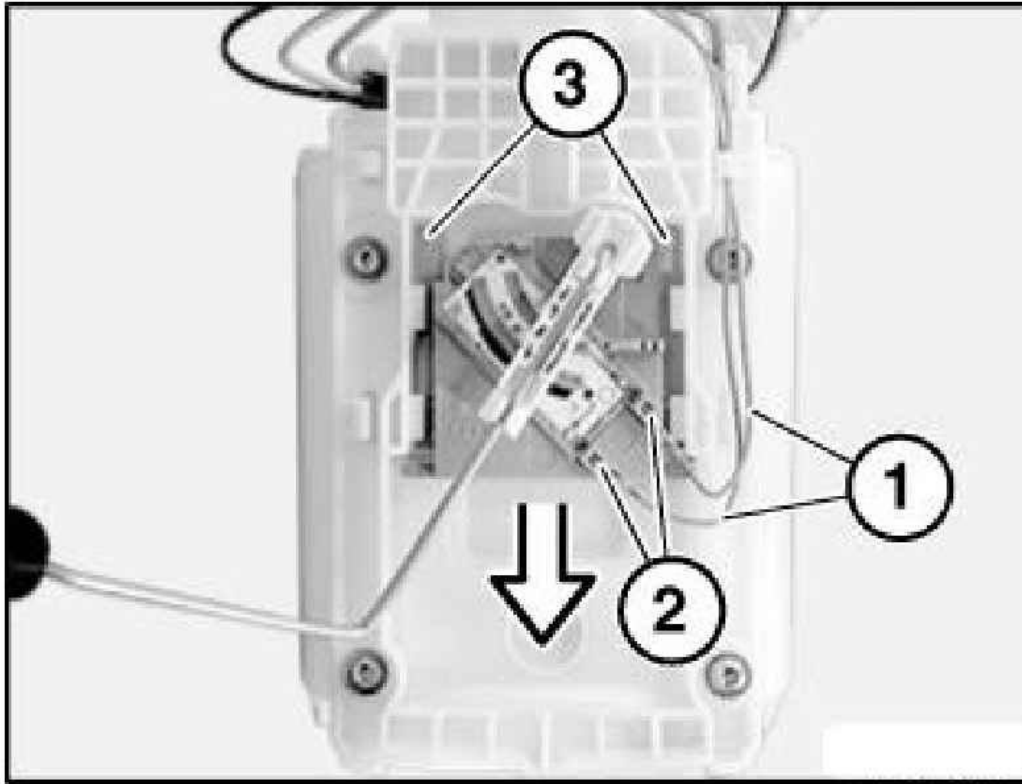
16 14 080 REPLACING FUEL LEVEL SENSOR (LEFT)

Necessary preliminary tasks:

- Remove fuel pump, refer to **16 14 015 Removing and installing/replacing fuel pump with fuel level sensor**

Detach lines (1) at retaining lugs (2).

Release fuel level sensor from hooks (3) and pull off downwards.



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Fig. 30: Removing Fuel Level Sensor

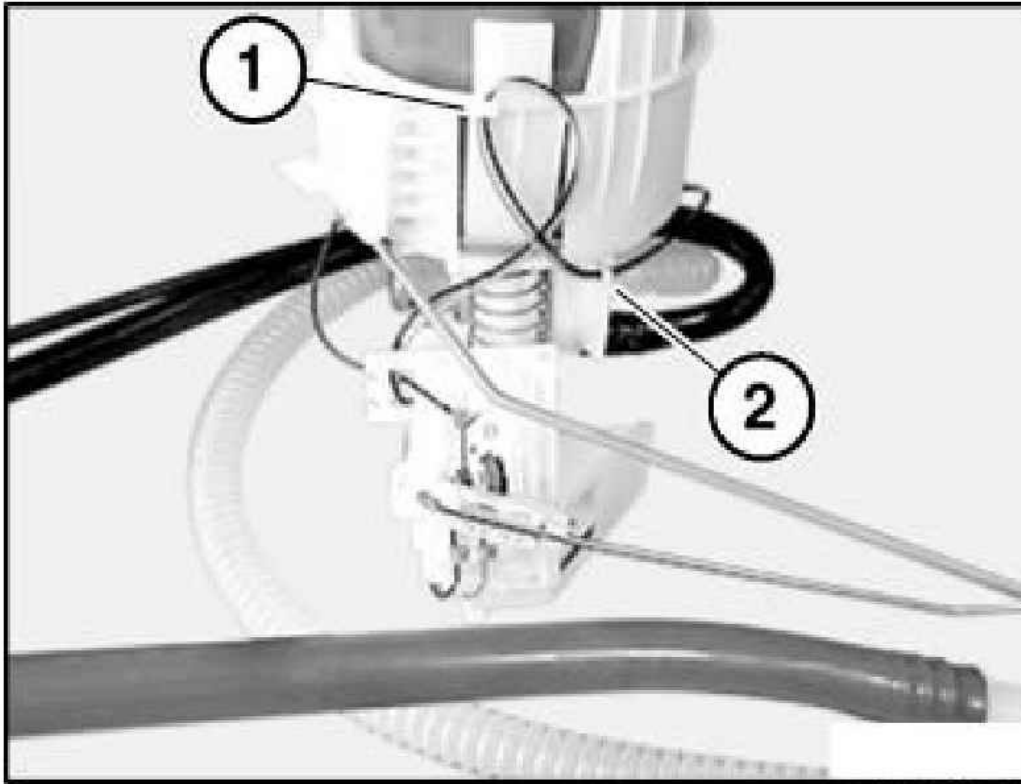
Courtesy of BMW OF NORTH AMERICA, INC.

16 14 084 REPLACING FUEL LEVEL SENSOR (RIGHT)

Necessary preliminary tasks:

- Remove fuel filter, refer to **16 14 017 Removing and installing/replacing fuel filter with fuel level sensor**

Release line from hooks (1) and (2).



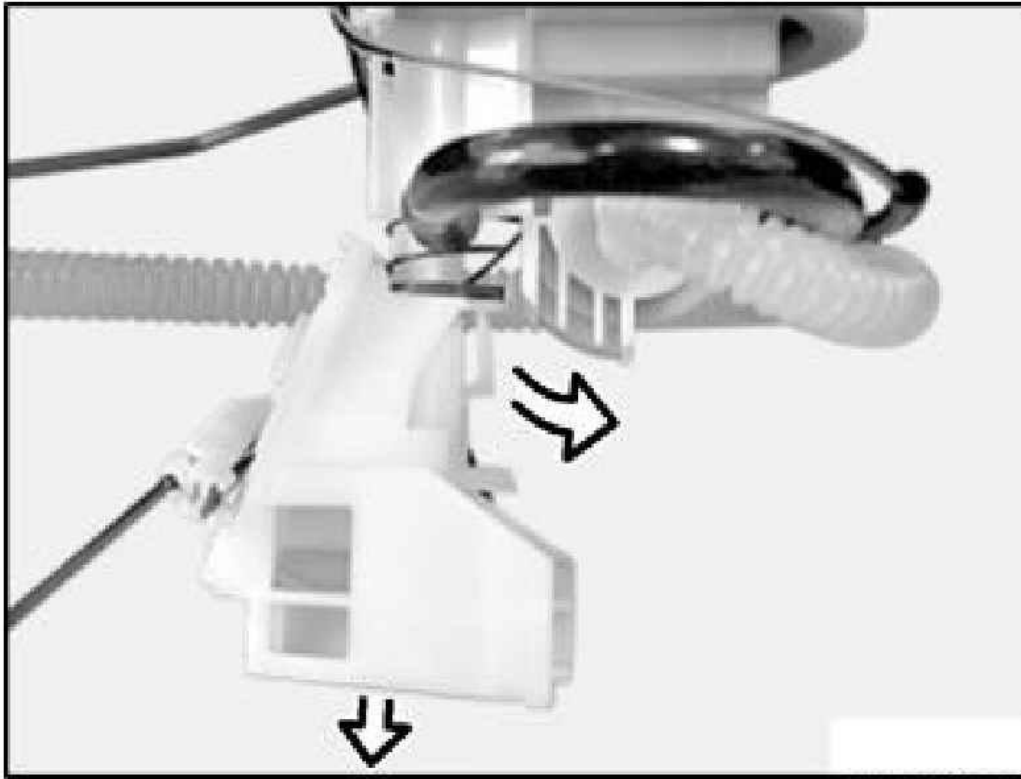
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Fig. 31: Releasing Line From Hooks
Courtesy of BMW OF NORTH AMERICA, INC.

Remove fuel level sensor. To do so, release retaining hook and pull off sensor downwards.

2006 MINI Cooper

2002-2005 ENGINE Fuel System - Repair Instructions - Cooper S



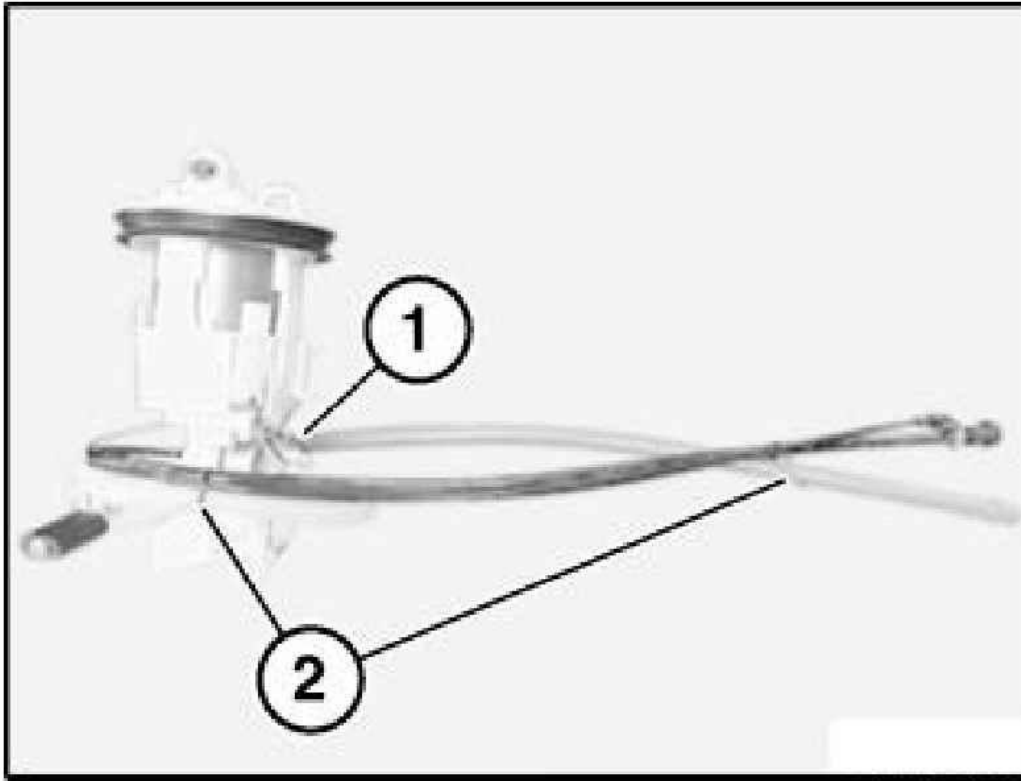
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Fig. 32: Removing Fuel Level Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Release line (1) from line clips (2).

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Fig. 33: Releasing Line From Line Clips
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Make sure the line is correctly routed and does not obstruct the float.