

2002-2008 ENGINE

Cooling & Turbocharger System - Repair Instructions - Cooper S

COOLANT CHECKING COOL

17 00... FOLLOW INSTRUCTIONS FOR WORKING ON COOLING SYSTEM

WARNING: Scalding hazard! Work on the cooling system may only be carried out on the engine after it has cooled down.

IMPORTANT: When working on oil, coolant or fuel lines, make sure no oil, coolant or fuel drips onto the alternator.
Cover alternator with suitable material.
Otherwise there may be alternator malfunctions.

IMPORTANT: Only open the cooling system when the coolant is no longer hot.
Air may enter the cooling system if it is opened while the coolant is still hot.
This may cause the engine to overheat and result in permanent damage.

Recycling:

Catch and dispose of drained coolant.

Comply with the waste disposal regulations applicable in the relevant countries.

17 00 000 FITTING GUARD FOR INTERCOOLER

Special tools required:

- 11 8 480

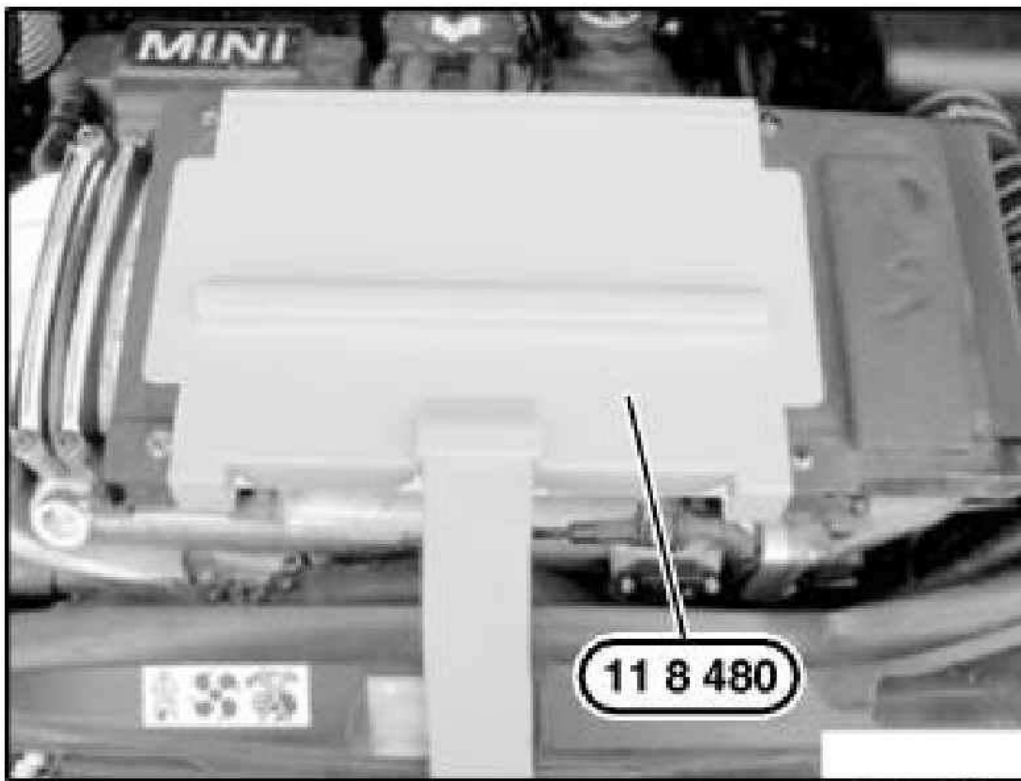
NOTE: Before beginning repair work in the engine compartment, fit guard 11 8 480 for intercooler.

IMPORTANT: The guard for the intercooler must be removed when the engine is running.
Driving with the intercooler guard fitted may result in engine damage.

Fit special tool 11 8 480.

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Fig. 1: Installing Special Tool

Courtesy of BMW OF NORTH AMERICA, INC.

The yellow ribbed belt must hang down over the front bumper to remind all personnel that the intercooler guard is fitted (e.g. when the engine hood/bonnet is closed).

17 00 005 DRAINING AND ADDING COOLANT (COOPER S)

WARNING: Work on the cooling system may only be carried out on the engine after it has cooled down.

Recycling:

Catch and dispose of drained coolant.

Comply with the waste disposal regulations applicable in the relevant countries.

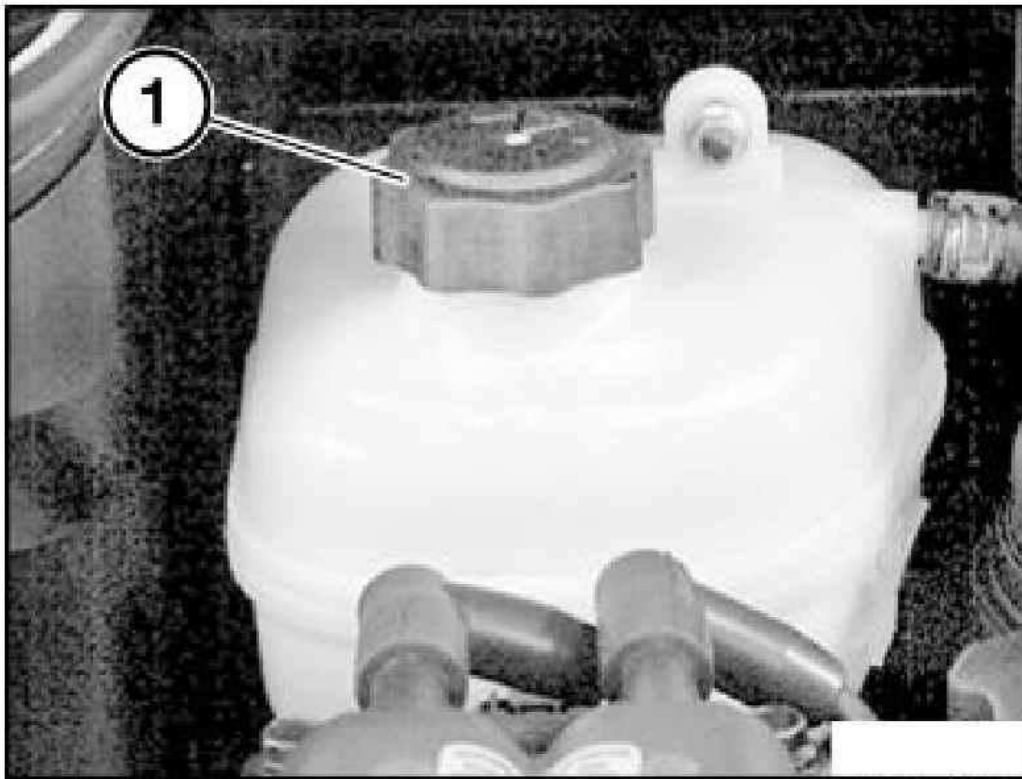
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NOTE: Follow instructions for working on cooling system. Refer to 17 00... Follow instructions for working on cooling system.
After adding coolant, vent cooling system and check for leaks. Refer to 17 00 039 Bleeding cooling system and checking for water leaks.

Draining coolant:

Screw off pressure relief cap (1) on expansion tank.

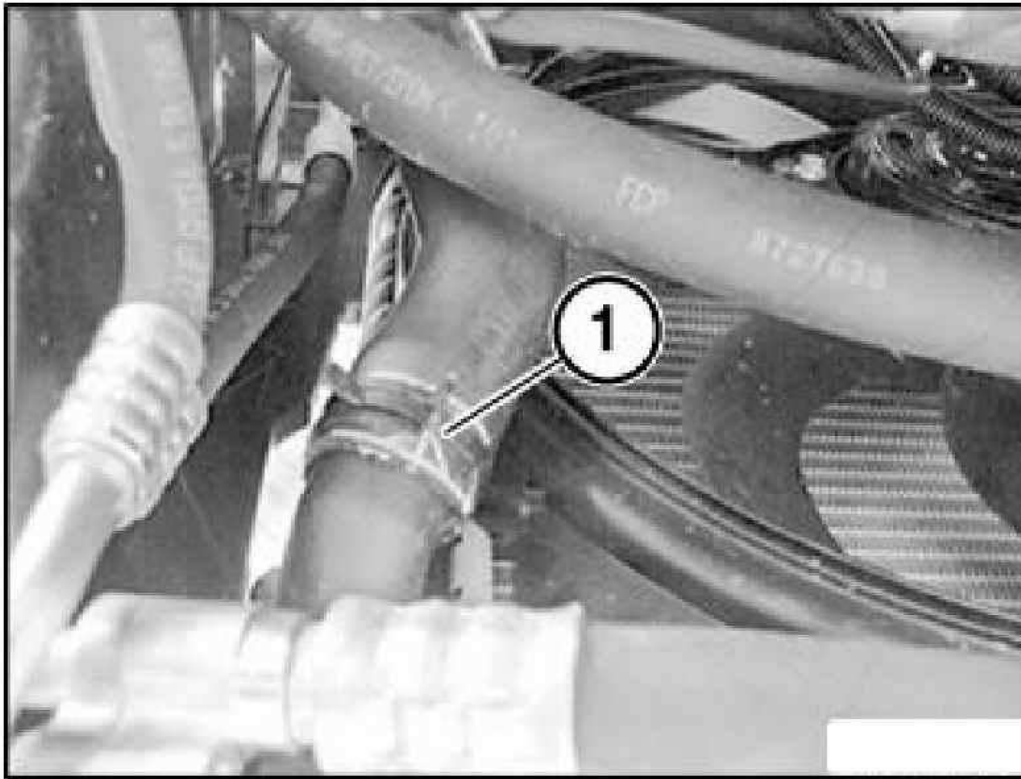


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Fig. 2: Removing Pressure Relief Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Remove underbody protection. Refer to 51 47 490 REMOVING AND INSTALLING/REPLACING FRONT UNDERBODY PROTECTION (ENGINE) .

Disconnect lower hose connection on radiator (1).



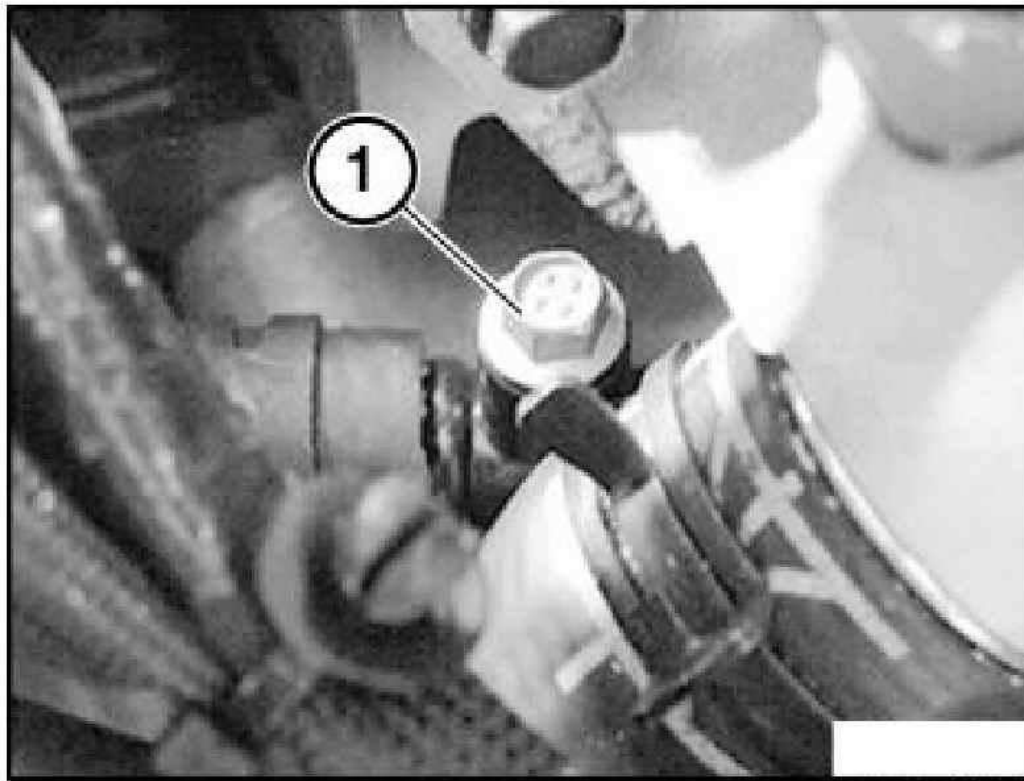
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Fig. 3: Disconnecting Coolant Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Drain, catch and dispose of coolant.

Reattach coolant hose (1).

Release vent screw (1) in heating distributor pipe.



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Fig. 4: Releasing Heating Distributor Pipe Vent Screw
Courtesy of BMW OF NORTH AMERICA, INC.

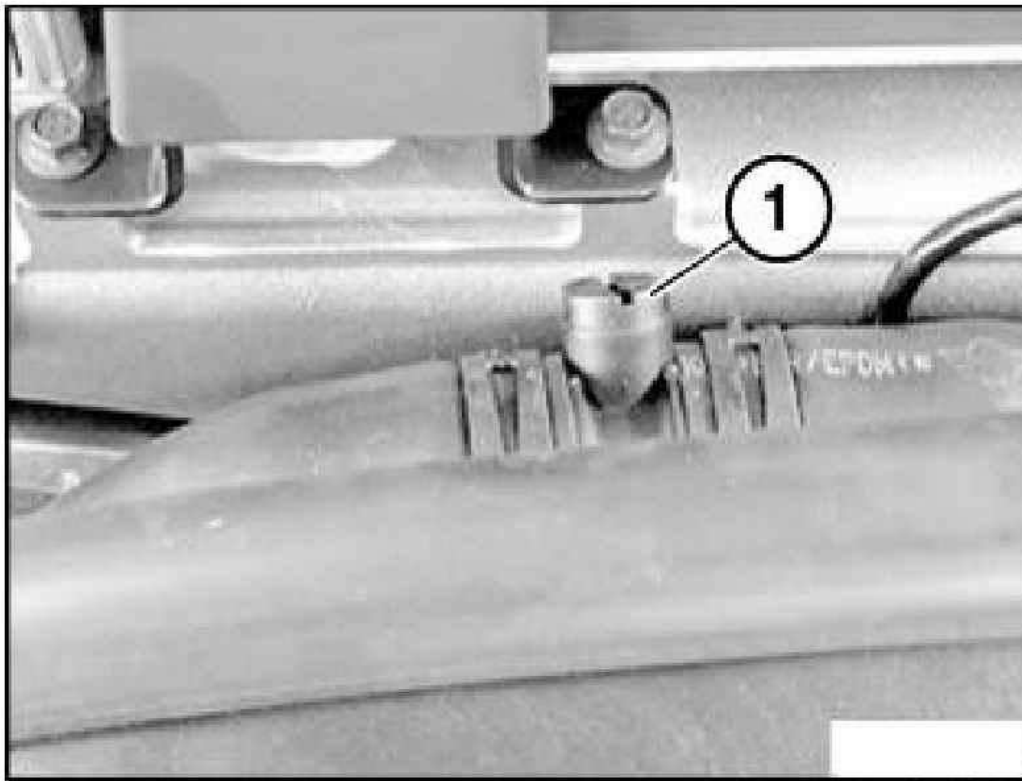
Tightening torque 17 00 1AZ. Refer to **COOLING SYSTEM - TIGHTENING TORQUES** .

Release vent screw (1) in upper radiator hose.

The cooling system is vented during filling.

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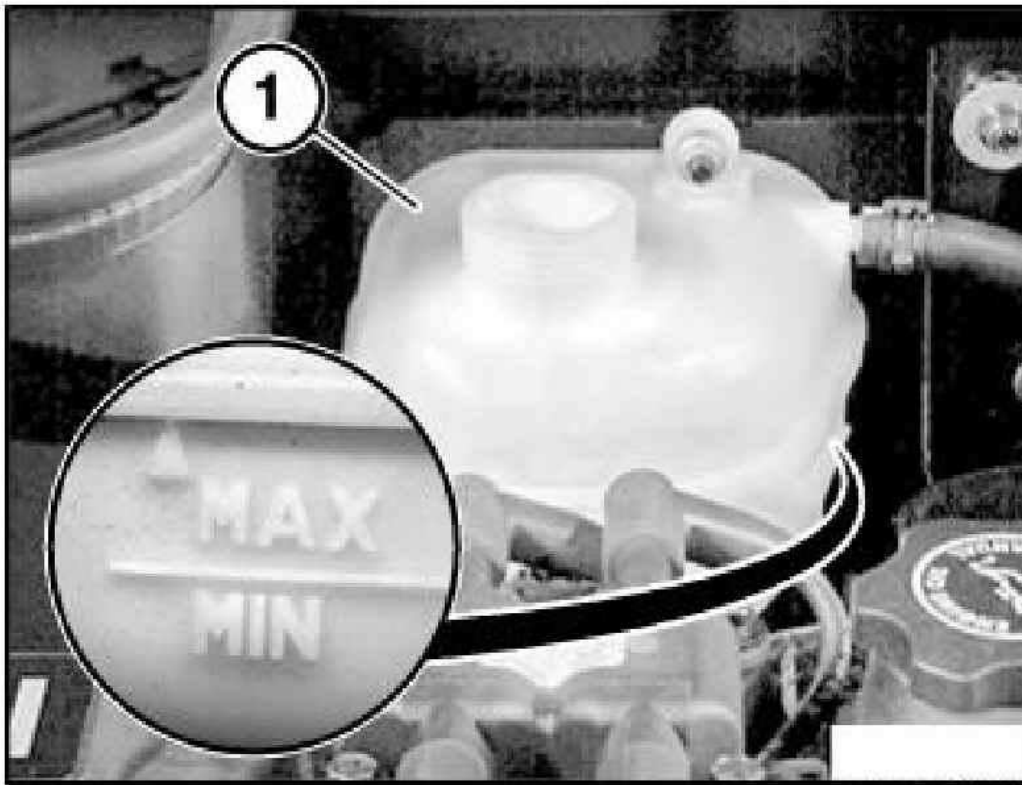


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Fig. 5: Releasing Upper Radiator Hose Vent Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Adding coolant:

Pour coolant into expansion tank (1).



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Fig. 6: Filling Expansion Tank

Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down vent screws as soon as coolant emerges.

Tightening torque 17 00 2AZ. Refer to **COOLING SYSTEM - TIGHTENING TORQUES** .

Fill expansion tank up to maximum level.

Start engine and run at idle speed. Fill expansion tank if liquid level drops.

Continue running engine until liquid level stops dropping.

Switch off engine.

Fill expansion tank up to maximum level.

NOTE: Before filling, turn on ignition and set heating control to maximum temperature.

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**Set fan to low setting.
Add coolant slowly.**

Use only approved coolant, refer to BMW operating fluids in Main Group 17.

17 00 009 CHECKING COOLING SYSTEM FOR LEAKS (W11)

Special tools required:

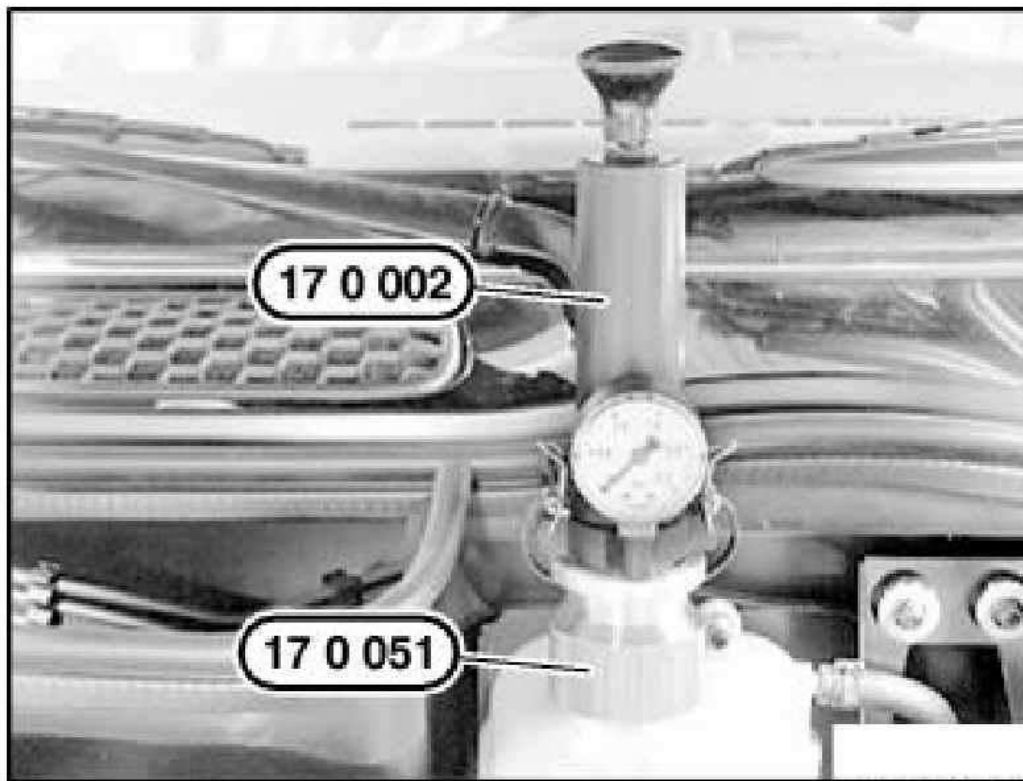
- 17 0 002
- 17 0 008
- 17 0 051
- 17 0 052

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

Checking pressure drop in cooling system:

Remove cap from expansion tank.

Connect special tool 17 0 051 to expansion tank. Connect special tool 17 0 002.



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Fig. 7: Connecting Special Tool To Expansion Tank
Courtesy of BMW OF NORTH AMERICA, INC.

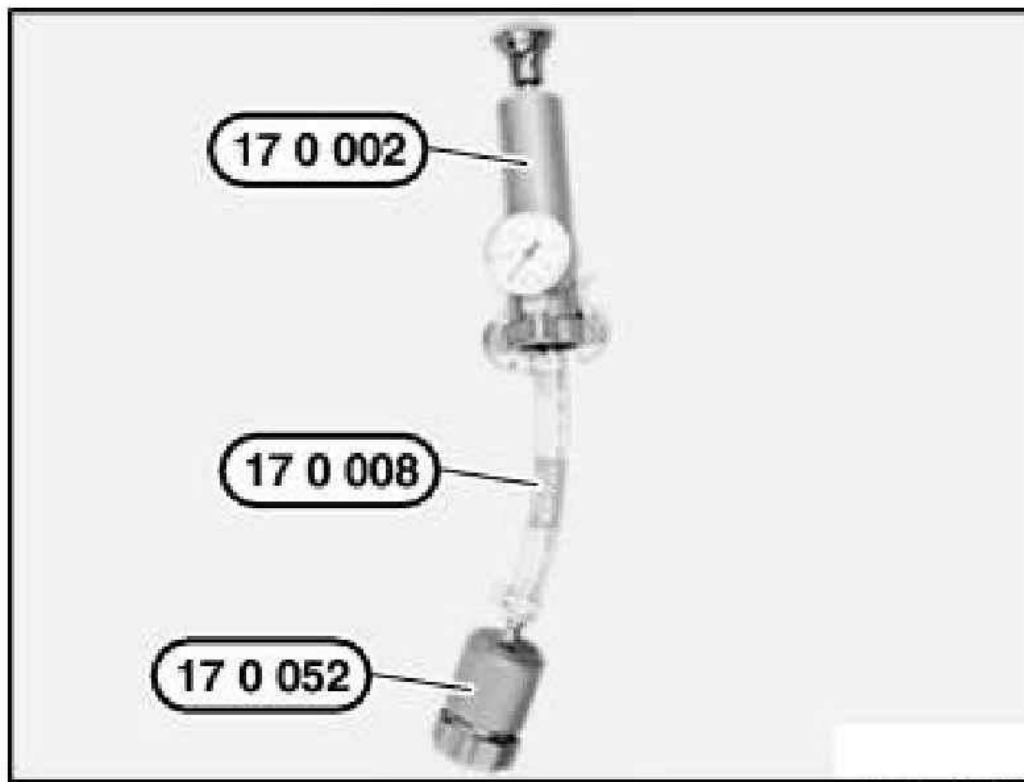
Pressurize cooling system to 1.5 bar and wait approx. 2 minutes.

Cooling system is tight if pressure drop does not exceed 0.1 bar.

Checking pressure relief valve in cap:

Remove rubber seal from special tool 17 0 002.

Connect special tools 17 0 052, 17 0 008 and 17 0 002 to cap.



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Fig. 8: Connecting Special Tools To Pressurize Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Pressurize cap.

Opening gauge pressure must be 0.89 - 1.20 bar.

17 00 010 CHECKING FOR LEAKS BETWEEN COOLING SYSTEM AND COMBUSTION CHAMBER

CAUTION: Checking for leaks while the engine is running creates the risk of engine overheating.
Observe coolant temperature.

R50:

Remove pressure cap from fill tower.

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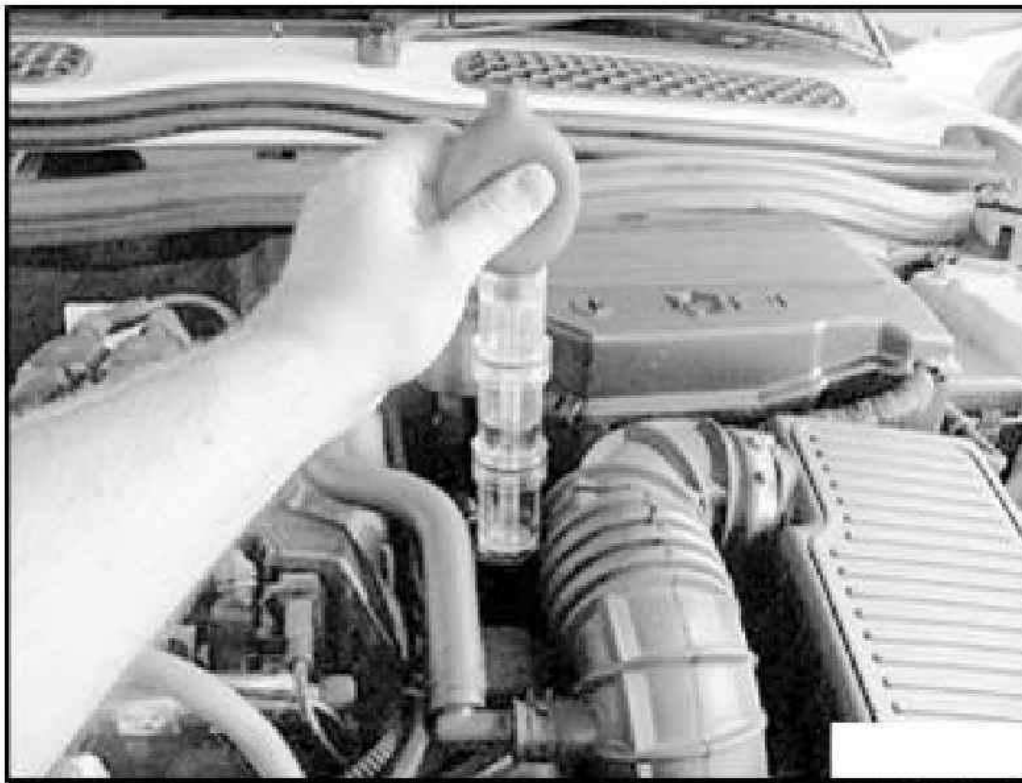
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Check for leaks with CO2 leak tester.

R53:

Remove pressure cap from expansion tank.

Check for leaks with CO2 leak tester.



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Fig. 9: Checking For Leaks

Courtesy of BMW OF NORTH AMERICA, INC.

Follow equipment manufacturer's operating instructions.

17 00 039 BLEEDING COOLING SYSTEM AND CHECKING FOR WATER LEAKS

WARNING: Danger of scalding - only remove cover when engine has cooled down.

Checking coolant level

Allow engine to cool down before checking coolant level.

Coolant temperature must not be more than 30 °C.

If ambient temperature exceeds 30°C, wait until engine has cooled down to ambient temperature.

Use only recommended coolant, refer to BMW Operating Fluids .

Check coolant level and top up if necessary.

- Add coolant, refer to **17 00 005 Draining and adding coolant (COOPER S)**
- Checking cooling system for water leaks, refer to **17 00 009 Checking cooling system for leaks (W11)**

ENGINE RADIATOR WITH ATTACHMENT**17 11 000 REMOVING AND INSTALLING RADIATOR**

WARNING: Danger of scalding!

Only carry out work on the cooling system after the engine has cooled down!

Necessary preliminary tasks:

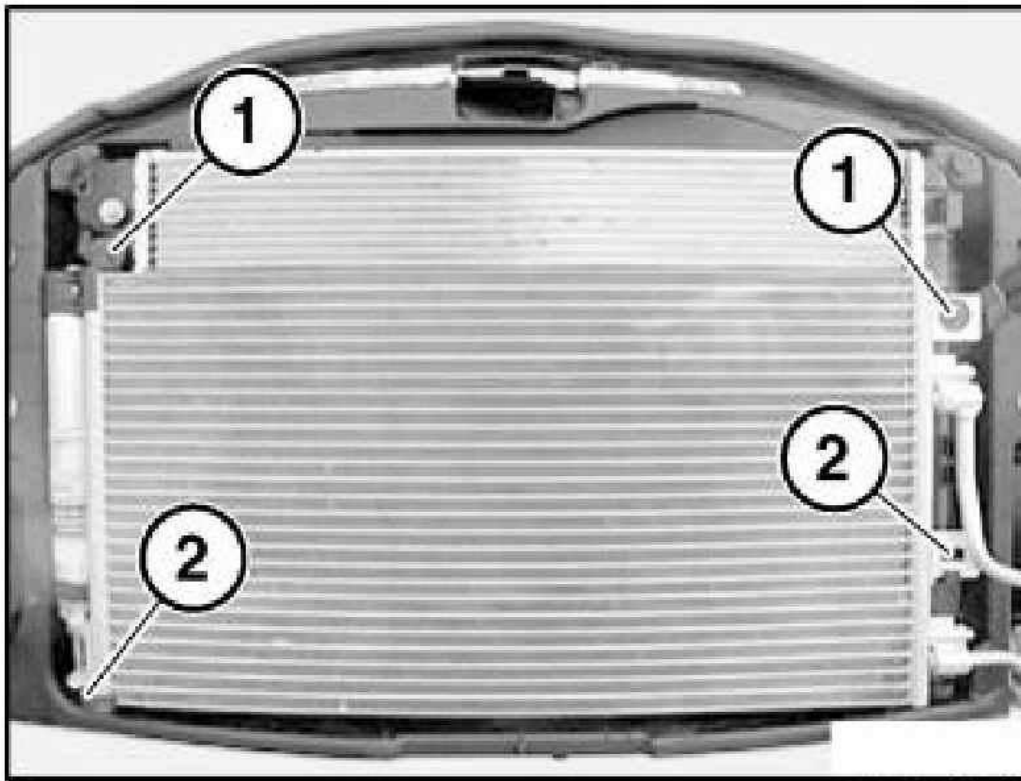
- Switch off ignition
- Drain coolant, refer to **17 00 005 Draining and adding coolant (COOPER S)**
- Remove front carrier, refer to **51 11 050 REMOVING AND INSTALLING/REPLACING CARRIER FOR FRONT BUMPER TRIM**
- Remove oil cooler, if fitted (ECVT only)
- Remove upper radiator hose

IMPORTANT: Make sure without fail that coolant hoses are correctly routed, risk of damage by sharp edges or abrasion.

Remove retaining screws (1) of condenser and lift condenser out of fixture/retaining lug (2).

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Fig. 10: Removing Condenser

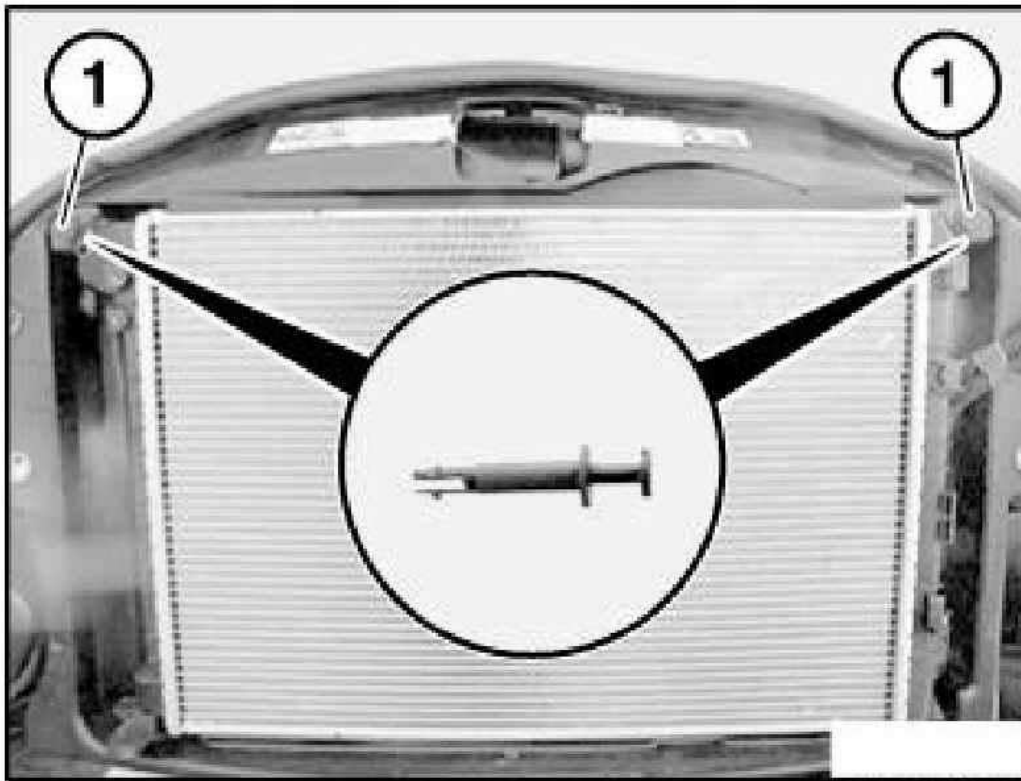
Courtesy of BMW OF NORTH AMERICA, INC.

Work carefully so as not to damage connected lines.

Remove upper radiator hose.

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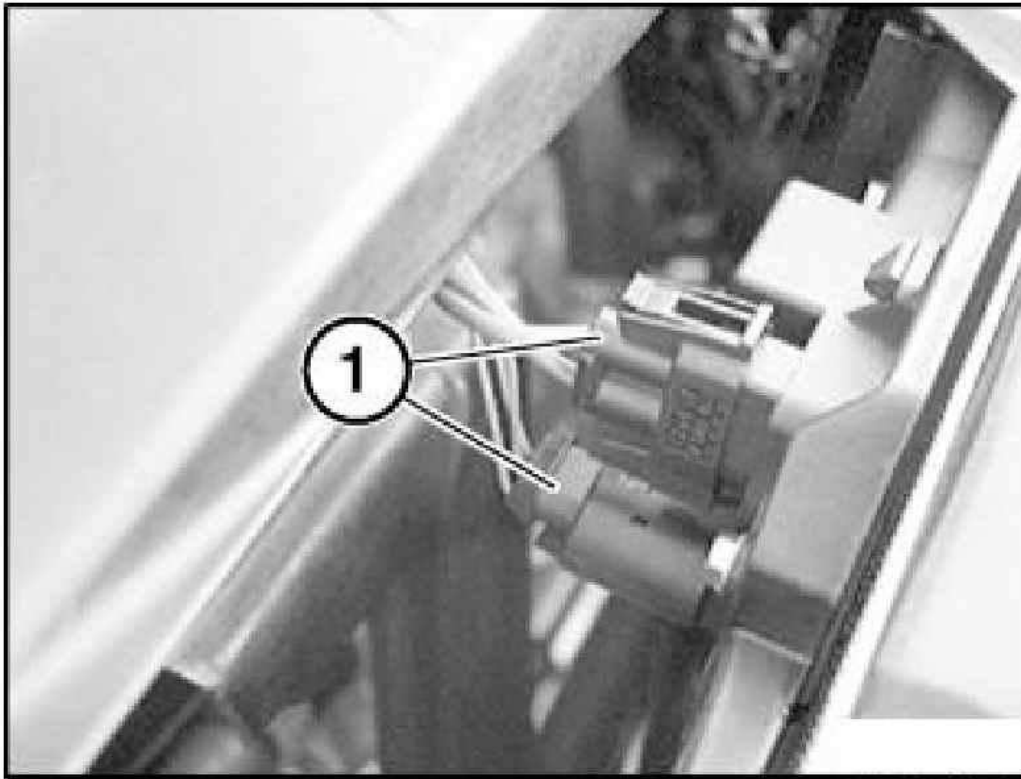


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Fig. 11: Removing Radiator Retaining Pins
Courtesy of BMW OF NORTH AMERICA, INC.

Remove retaining pins (1) of radiator.

Tilt upper radiator forwards.



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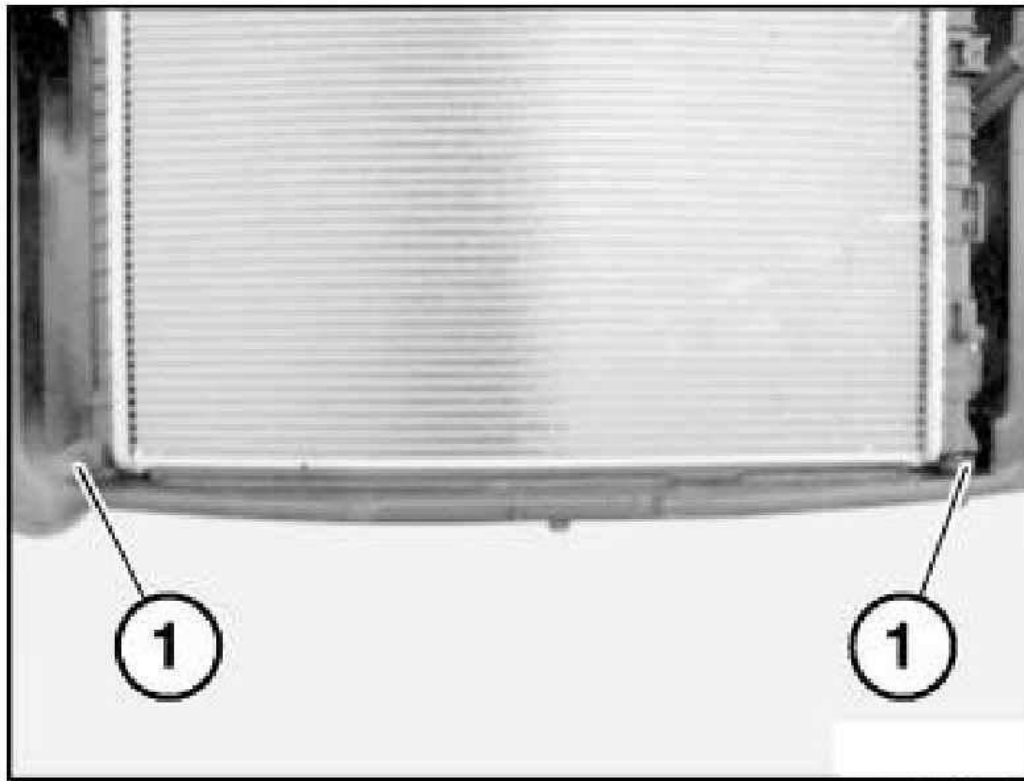
Fig. 12: Disconnecting Wiring Harness From Fan Relay Block
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect wiring harness from fan relay block (1).

Lift radiator out of lower fixtures (1).

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Fig. 13: Removing Radiator From Lower Fixtures

Courtesy of BMW OF NORTH AMERICA, INC.

17 11 001 REPLACING RADIATOR

For procedure.

17 11 031 REMOVING AND INSTALLING/REPLACING FAN COWL

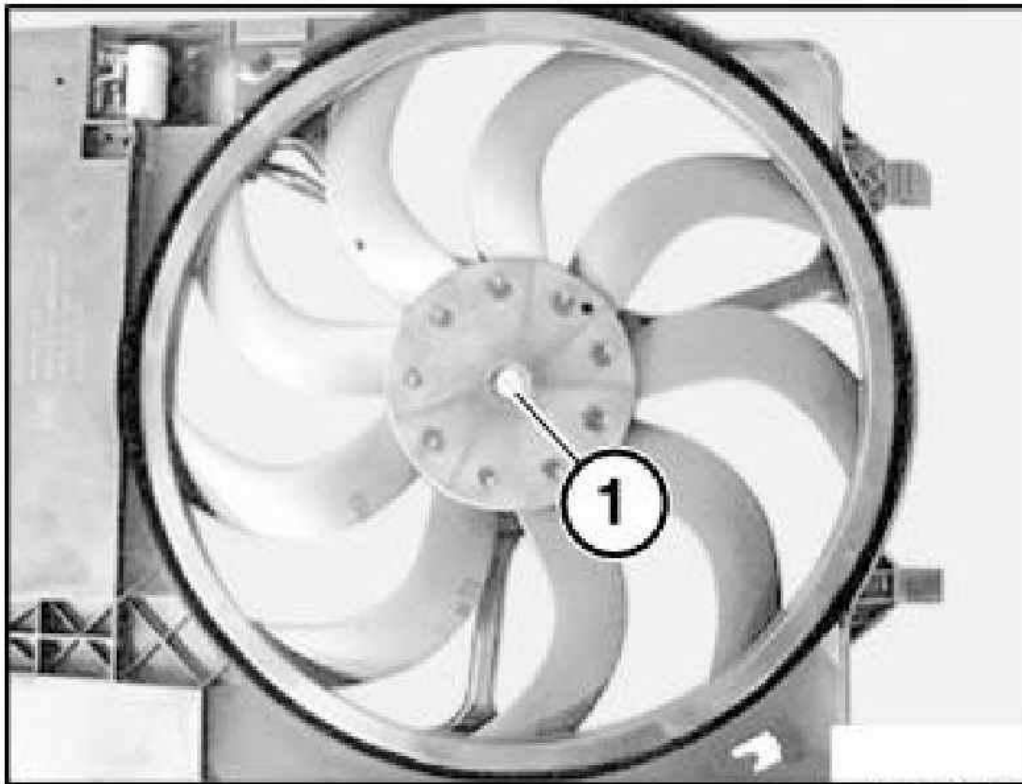
Necessary preliminary tasks:

- Remove fan cowl with electric fan, refer to **17 11 035 Removing and installing/replacing fan cowl with electric fan (W10, W11)**

IMPORTANT: Make sure without fail that coolant hoses are correctly routed, risk of damage by sharp edges or abrasion.

NOTE: Nut (1) for fan blade has a left-hand thread.

Unscrew nut (1).



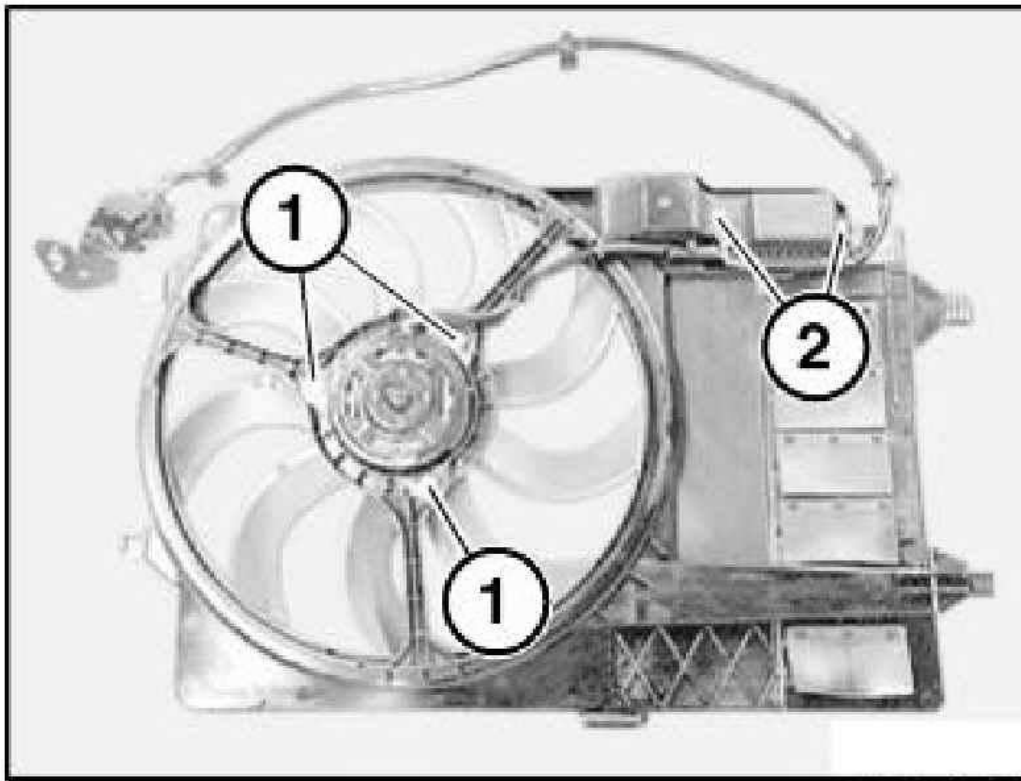
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Fig. 14: Removing Fan Blade Nut

Courtesy of BMW OF NORTH AMERICA, INC.

Tightening torque 17 11 1AZ. Refer to **COOLING SYSTEM - TIGHTENING TORQUES** .

Undo screws (1) for fan motor and screws (2) for series resistor block.



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Fig. 15: Removing Components

Courtesy of BMW OF NORTH AMERICA, INC.

Remove fan motor, series resistor block and fan shroud.

Installation:

Fit wiring loom correctly.

If fitted, do not remove metal tabs (balance weight) on fan wheel (imbalance).

Tightening torque 17 11 2AZ. Refer to **COOLING SYSTEM - TIGHTENING TORQUES** .

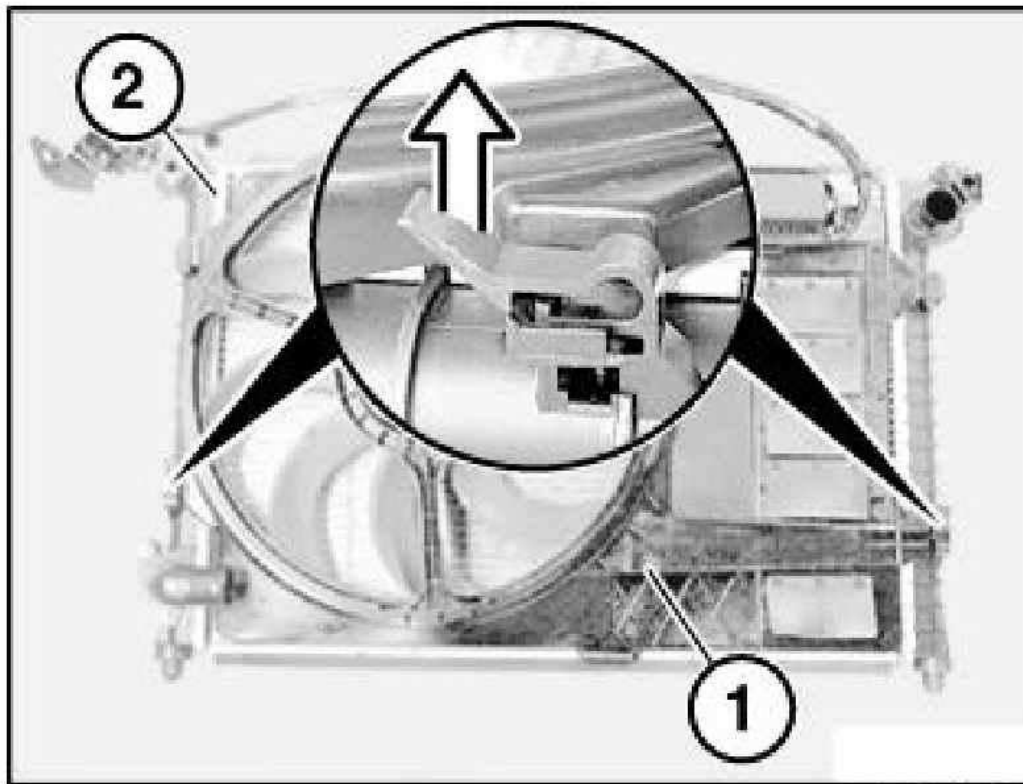
17 11 035 REMOVING AND INSTALLING/REPLACING FAN COWL WITH ELECTRIC FAN (W10, W11)

Necessary preliminary tasks:

- Remove radiator, refer to **17 11 000 Removing and installing radiator**

IMPORTANT: Make sure without fail that coolant hoses are correctly routed, risk of damage by sharp edges or abrasion.

Unclip fan housing (1) on radiator (2) and move upward.



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Fig. 16: Removing Fan Cowl

Courtesy of BMW OF NORTH AMERICA, INC.

Remove fan cowl with electric fan.

OIL COOLER

17 21 500 FLUSHING OIL COOLER WITH LINES (AUTOMATIC TRANSMISSION)

Special tools required:

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- 17 2 018
- 17 2 019

NOTE: **Carry out the work steps listed when:
Fitting a new or replacement transmission
Flushing can only be carried out with the automatic transmission removed.**

Procedure:

Automatic transmission removed.

Connect appropriate adapters (see description below) to oil lines exiting from automatic transmission.

Connect the connecting line 17 2 019 from the oil collection unit with the quick-release coupling.

Connect drain line 17 2 018 using quick-release coupling.

Feed open end of drain line into a suitable collection container.

Using oil collection unit, flush approx. 1 liter of transmission fluid (refer to) through oil lines and oil cooler.

Reposition quick -release couplings.

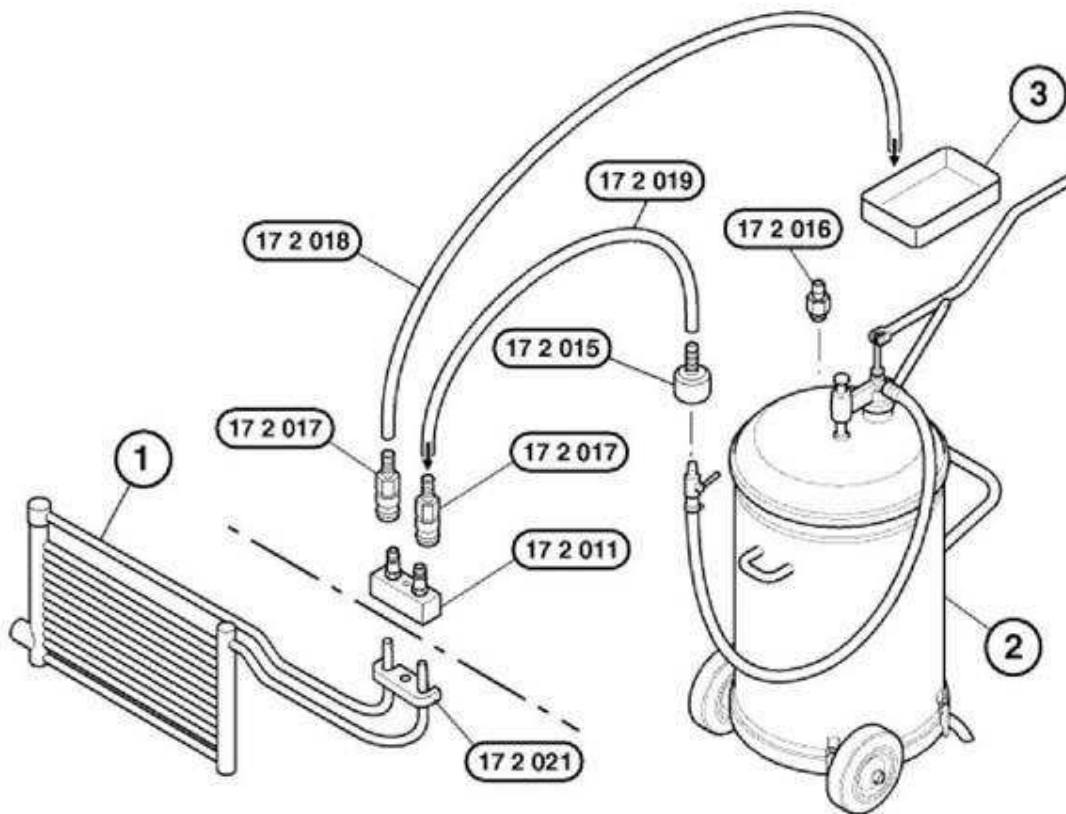
Flush oil lines/oil cooler in opposite direction with approx. 1 liter of transmission fluid (refer to BMW Service Operating Fluids).

Disconnect quick -release couplings, remove adapters.

NOTE: **Dispose of flushing oil properly; do not under any circumstances reuse it.**

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- 1) Transmission-oil cooler with lines
- 2) Oil collection unit
- 3) Oil drip tray

17 2 011 Adapter for connecting transmission-side oil cooler lines (1)

17 2 015 Connection for oil collection unit (2), manufacturer: Deutsche Tecalemit or

17 2 016 Connection for oil collection unit (2), manufacturer: Horn

17 2 017 Quick-release coupling (2 pieces)

17 2 018 Hose to oil drip tray (3)

17 2 019 Hose to oil collection unit (2)

17 2 021 Mounting plate for adapter 17 2 011 for transmissions A5S 325Z, GA6HP26Z

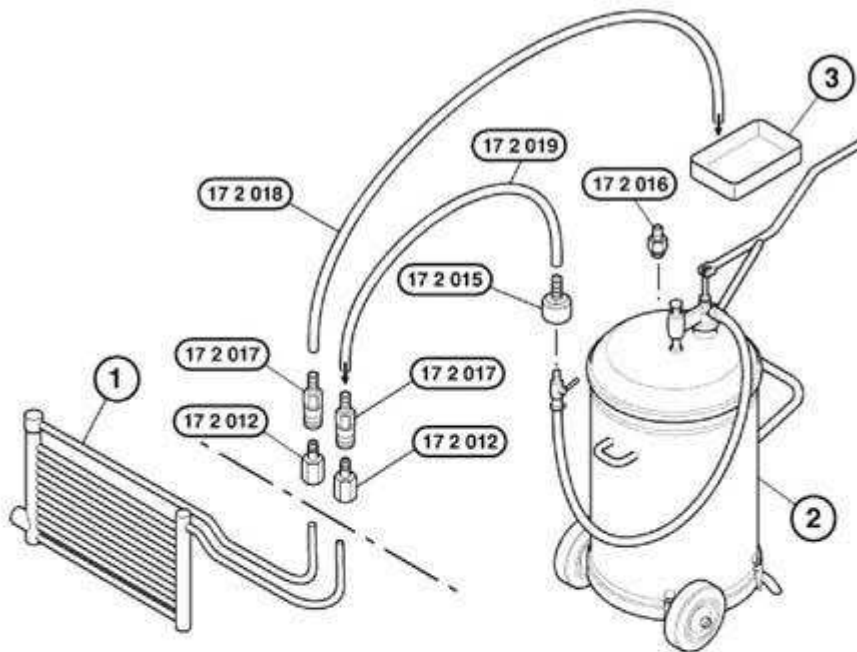
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Fig. 17: Arrangement Of Flushing Device For Transmissions A5S 310Z, A5S 560Z, A5S 360R/390R, A4S 200R, A5S 325Z, GA6HP26Z

Courtesy of BMW OF NORTH AMERICA, INC.

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- 1) Transmission-oil cooler with lines
- 2) Oil collection unit
- 3) Oil drip tray

17 2 012 Adapters (2 x) for connecting transmission-side oil cooler lines (1)

17 2 015 Connection for oil collection unit (2), manufacturer: Deutsche Tecalemit or

17 2 016 Connection for oil collection unit (2), manufacturer: Horn

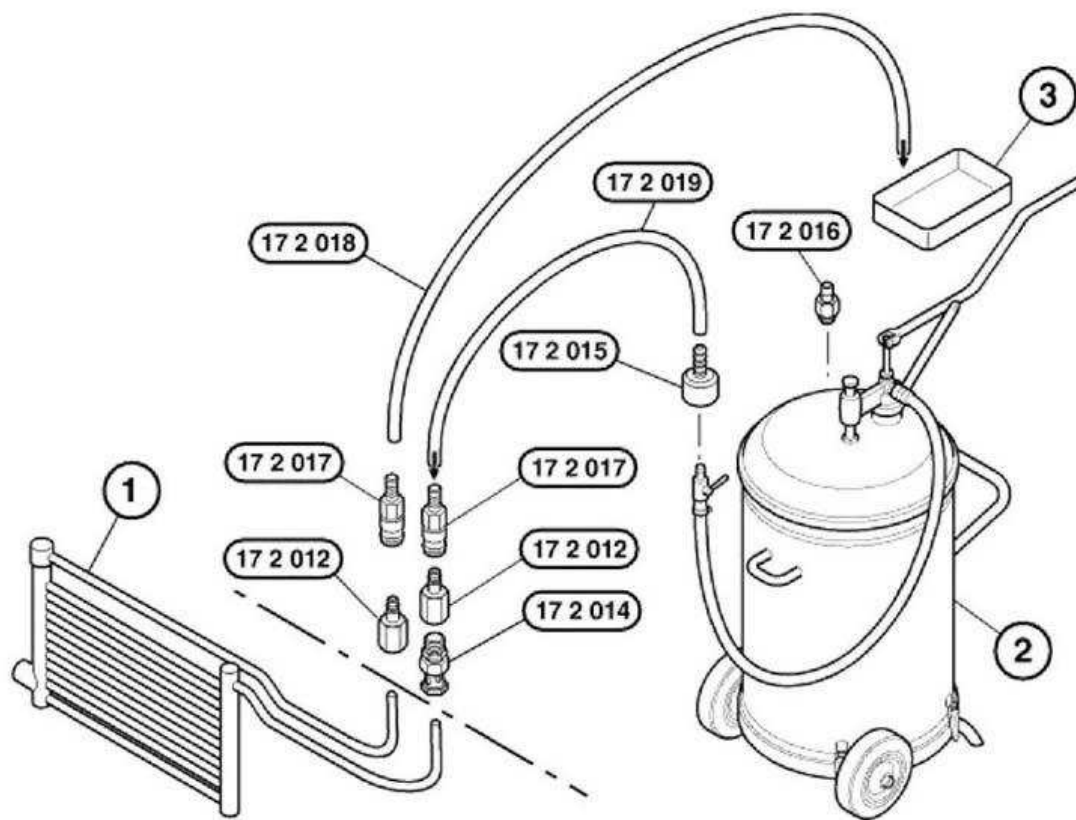
17 2 017 Quick-release coupling (2 pieces)

17 2 018 Hose to oil drip tray (3)

17 2 019 Hose to oil collection unit (2)

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Fig. 18: Arrangement Of Flushing Device For Transmission A4S 310R)
Courtesy of BMW OF NORTH AMERICA, INC.



- 1) Transmission-oil cooler with lines
- 2) Oil collection unit
- 3) Oil drip tray

17 2 012 Adapters (2 x) for connecting transmission-side oil cooler lines (1)

17 2 014 Banjo bolt for connecting transmission-side oil cooler lines (1)

17 2 015 Connection for oil collection unit (2), manufacturer: Deutsche Tecalemit or

17 2 016 Connection for oil collection unit (2), manufacturer: Horn

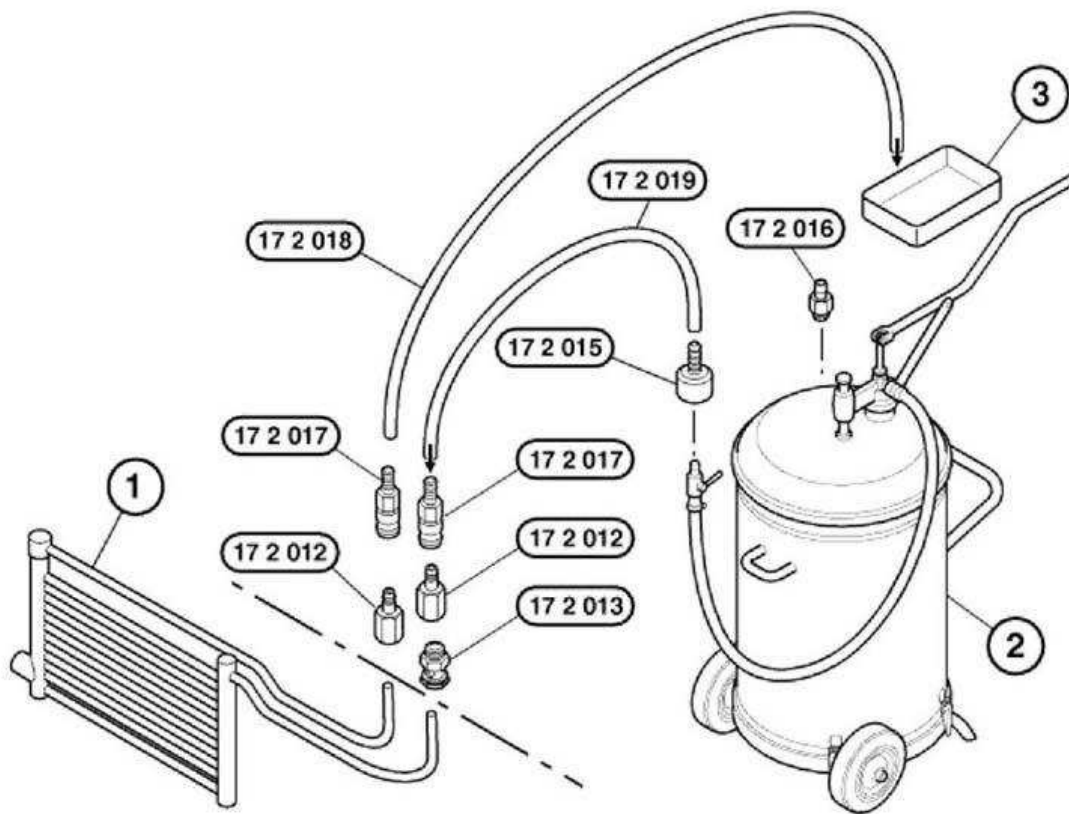
17 2 017 Quick-release coupling (2 pieces)

17 2 018 Hose to oil drip tray (3)

17 2 019 Hose to oil collection unit (2)

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Fig. 19: Arrangement Of Flushing Device For Transmission A4S 300J
Courtesy of BMW OF NORTH AMERICA, INC.



- 1) Transmission-oil cooler with lines
- 2) Oil collection unit
- 3) Oil drip tray

17 2 012 Adapters (2 x) for connecting transmission-side oil cooler lines (1)

17 2 014 Banjo bolt for connecting transmission-side oil cooler lines (1)

17 2 015 Connection for oil collection unit (2), manufacturer: Deutsche Tecaletmit or

17 2 016 Connection for oil collection unit (2), manufacturer: Horn

17 2 017 Quick-release coupling (2 pieces)

17 2 018 Hose to oil drip tray (3)

17 2 019 Hose to oil collection unit (2)

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Fig. 20: Arrangement Of Flushing Device For Transmission A5S 440Z
Courtesy of BMW OF NORTH AMERICA, INC.

OIL COOLER WITH LINES

17 21 500 FLUSHING OIL COOLER WITH LINES (AUTOMATIC TRANSMISSION)

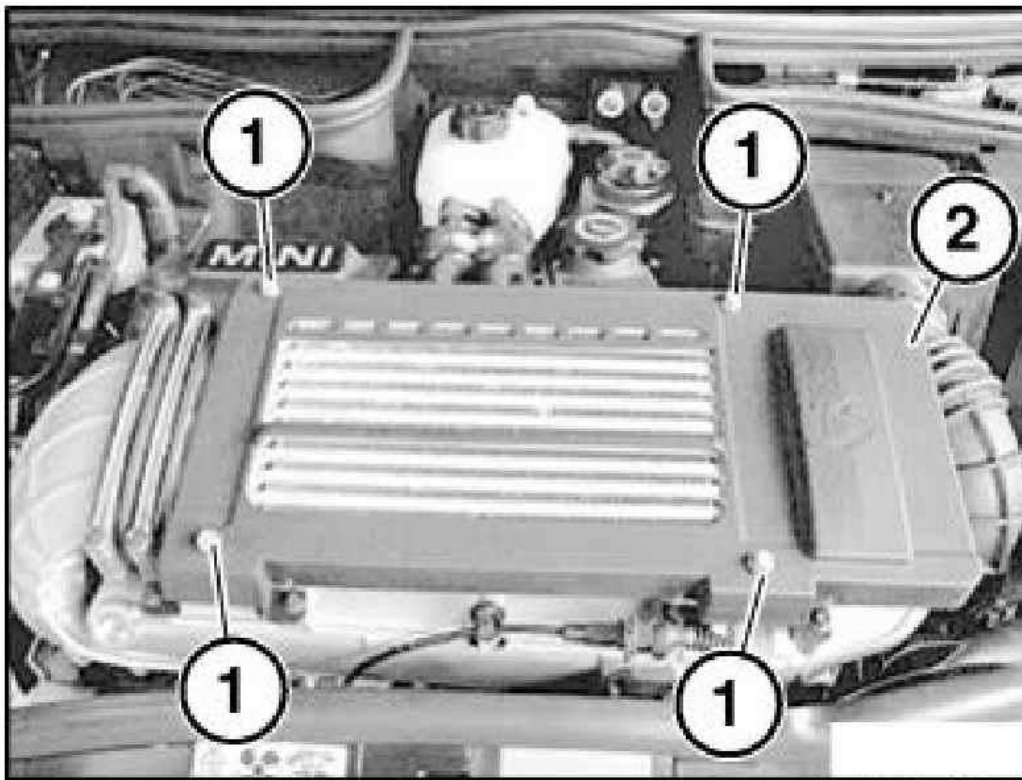
For procedure, refer to 17 21 500 Flushing oil cooler with lines (automatic transmission).

CHARGE AIR COOLER WITH MOUNT

17 51 000 REMOVING AND INSTALLING/REPLACING INTERCOOLER

IMPORTANT: Intercooler sealing rings may only be installed in clean and dry condition.
Do not lubricate seals.

Unscrew mounting bolts (1) from intercooler cover.



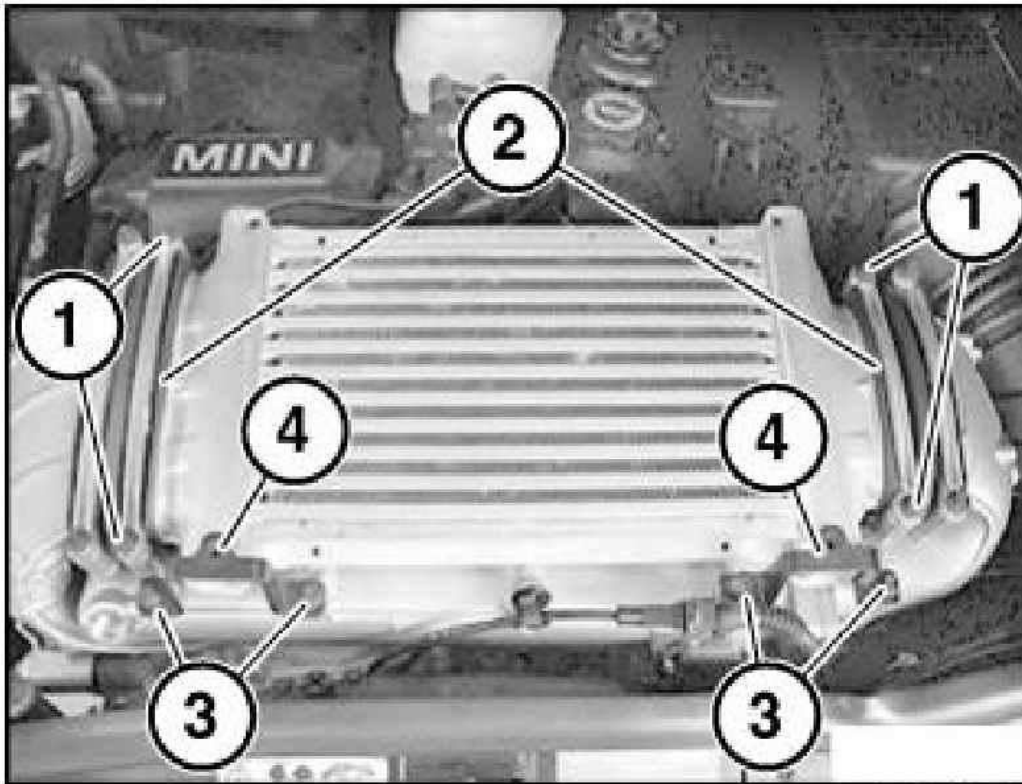
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Fig. 21: Removing Intercooler Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Remove intercooler cover (2).

Tightening torque 17 51 1AZ. Refer to COOLING SYSTEM - TIGHTENING TORQUES .

Remove screws (1) from brackets for sealing rings and remove upper brackets (2).



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Fig. 22: Removing Brackets

Courtesy of BMW OF NORTH AMERICA, INC.

Remove screws (3) from brackets for intercooler and remove brackets (4).

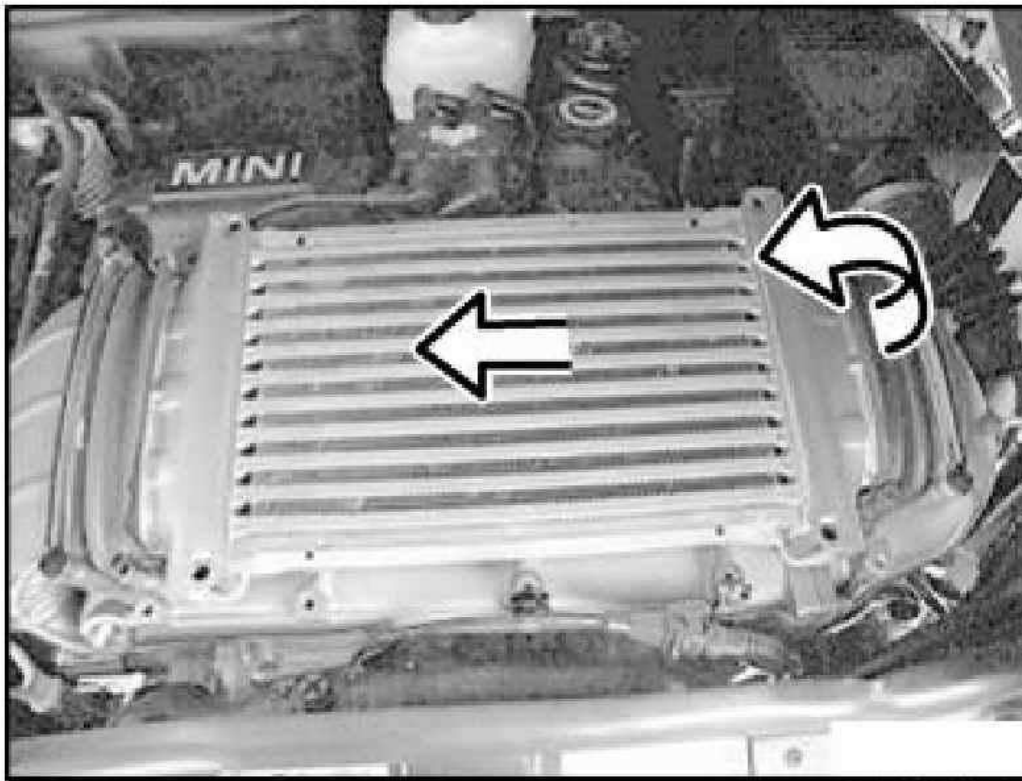
Tightening torque 17 51 2AZ. Refer to COOLING SYSTEM - TIGHTENING TORQUES .

Tightening torque 17 51 3AZ. Refer to COOLING SYSTEM - TIGHTENING TORQUES .

Remove intercooler from right side.

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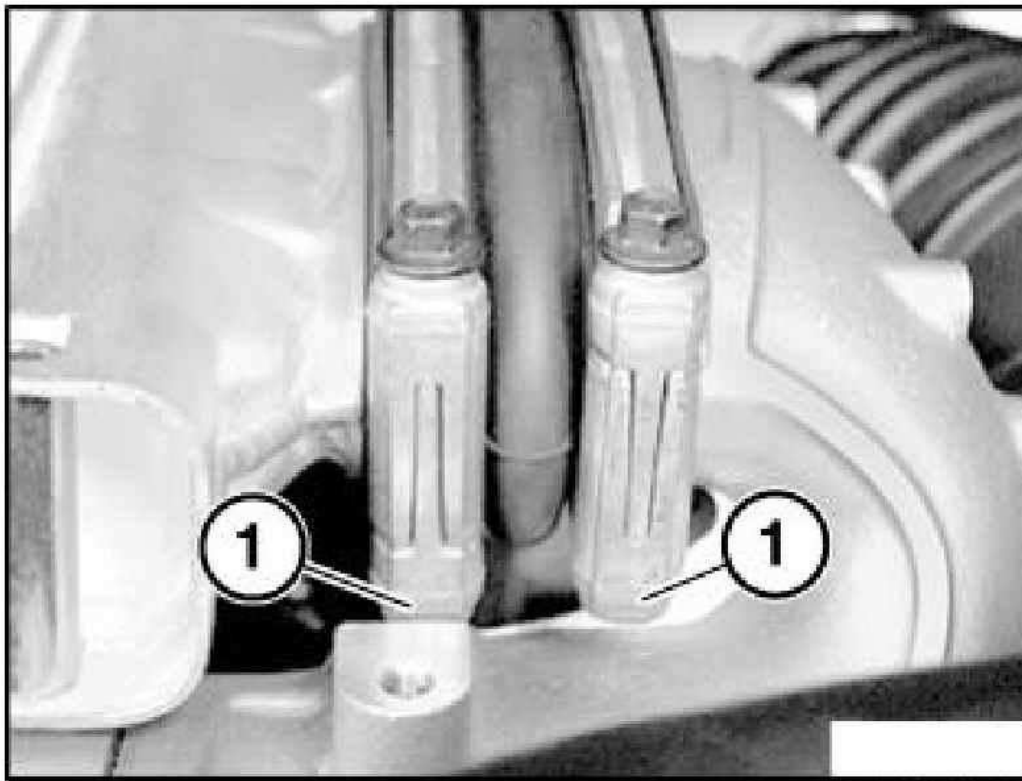
Fig. 23: Removing Intercooler From Right Side
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Inspect sealing rings for cracks and damage and replace if necessary.

Installation:

Make sure intercooler sealing rings are correctly seated.

Secure sealing ring holders (1) fitted with threads to underside.



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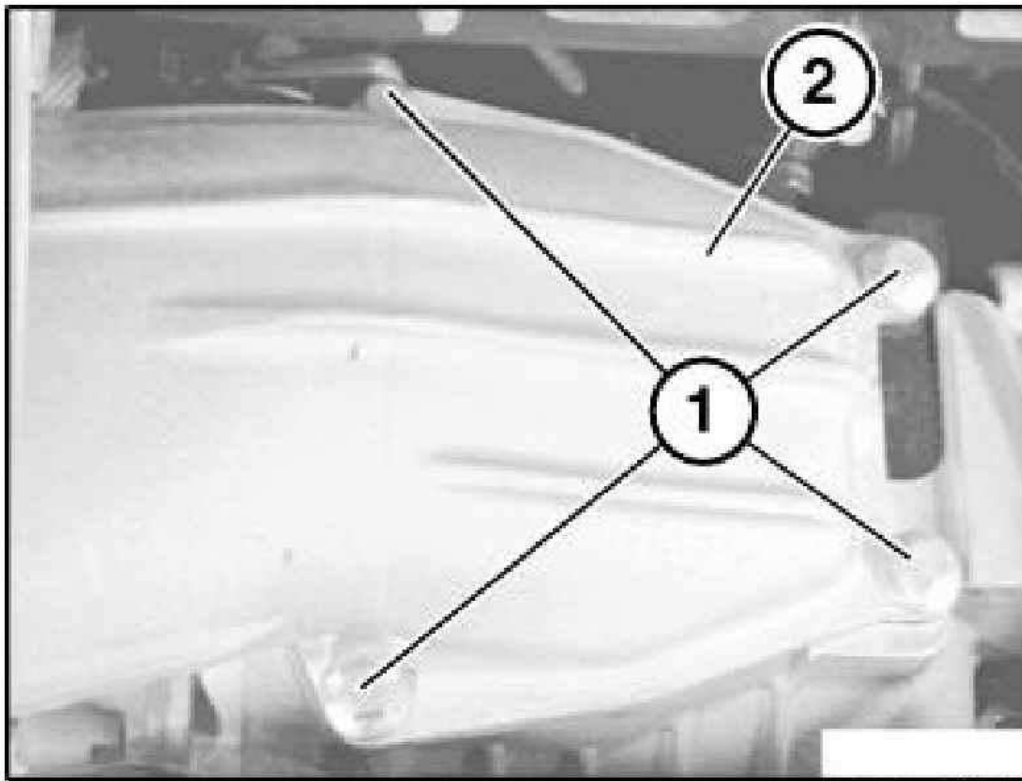
Fig. 24: Securing Sealing Ring Holders
Courtesy of BMW OF NORTH AMERICA, INC.

17 51 080 REMOVING AND INSTALLING/REPLACING TURBOCHARGER EXHAUST PIPE (RIGHT)

Remove left turbocharger exhaust pipe. Refer to **17 51 085 Removing and installing/replacing pipe between intercooler and intake manifold (left)**.

Remove intake manifold. Refer to **11 61 051 REMOVING AND INSTALLING INTAKE MANIFOLD (COOPER S)** .

Release bolts (1) and remove turbocharger exhaust pipe (2).

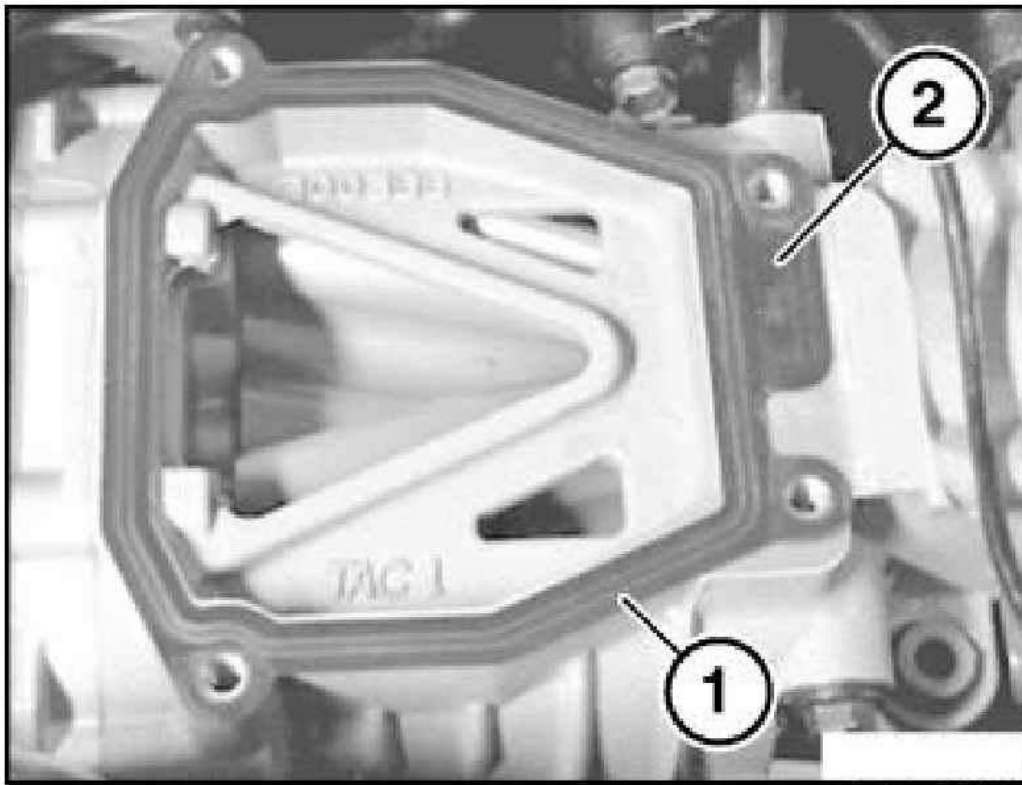


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Fig. 25: Removing Turbocharger Exhaust Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Tightening torque 17 51 4AZ. Refer to **COOLING SYSTEM - TIGHTENING TORQUES** .

Install new gasket (1) as shown so that TOP lettering (2) is can be read.



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Fig. 26: Installing Gasket

Courtesy of BMW OF NORTH AMERICA, INC.

17 51 085 REMOVING AND INSTALLING/REPLACING PIPE BETWEEN INTERCOOLER AND INTAKE MANIFOLD (LEFT)

Disconnect battery. Refer to **12 00 DISCONNECTING AND CONNECTING BATTERY** .

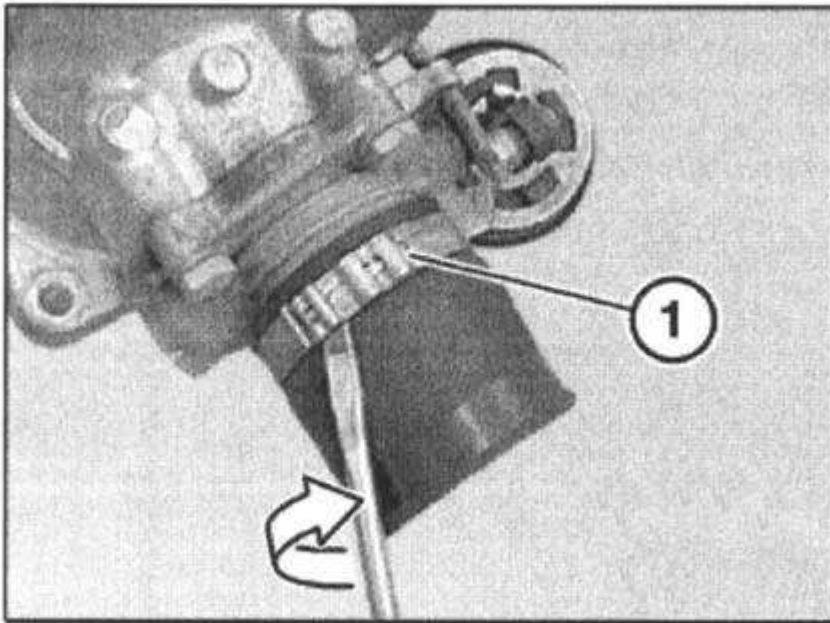
Remove throttle. Refer to **13 54 030 REMOVING AND INSTALLING/SEALING THROTTLE ASSEMBLY (COOPER S)** .

Remove intercooler. Refer to **17 51 000 Removing and installing/replacing intercooler**.

Lever out hose clamp (1) with screwdriver in direction of arrow.

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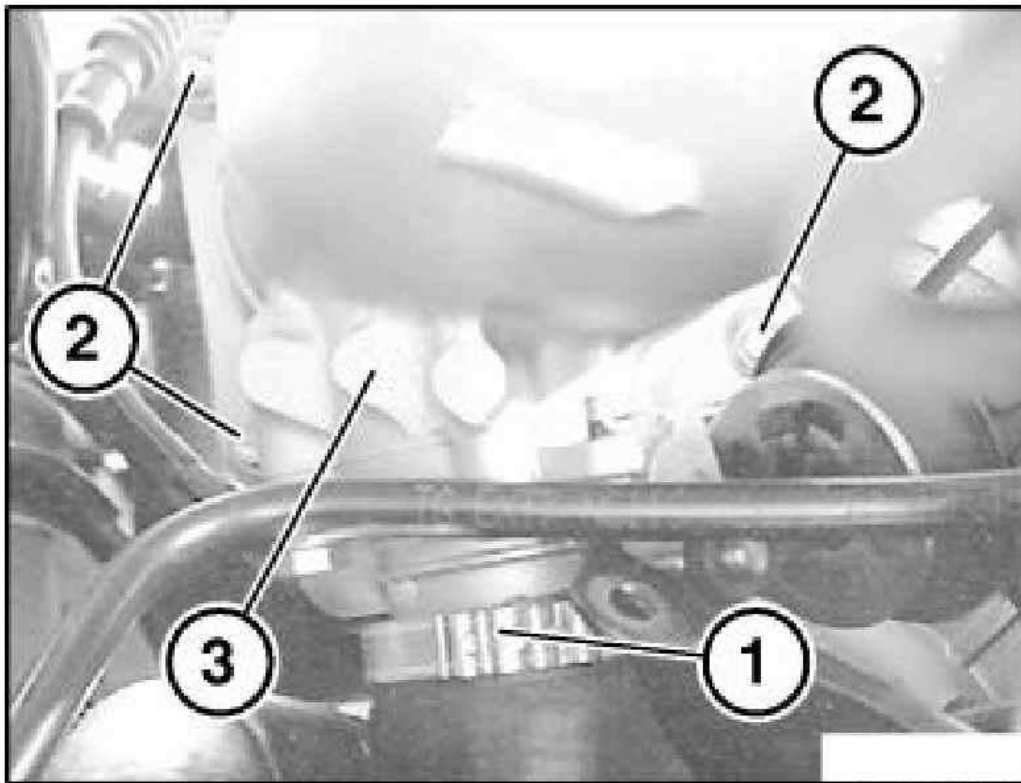
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Fig. 27: Levering Out Hose Clamp

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Illustration shows removed air duct.

Unscrew housing retaining nuts (2).



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Fig. 28: Removing Housing

Courtesy of BMW OF NORTH AMERICA, INC.

Remove housing (3).

Replace seal.

Tightening torque 17 51 5AZ. Refer to **COOLING SYSTEM - TIGHTENING TORQUES** .

Secure hose clamp (1) with special tool 13 1 511.

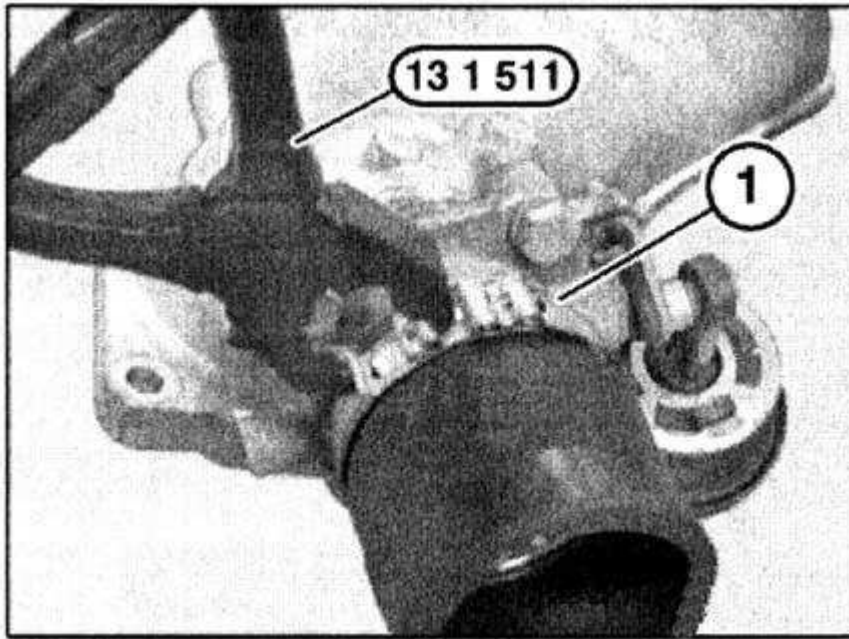


Fig. 29: Securing Hose Clamp

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Illustration shows removed air duct.

Assemble engine.

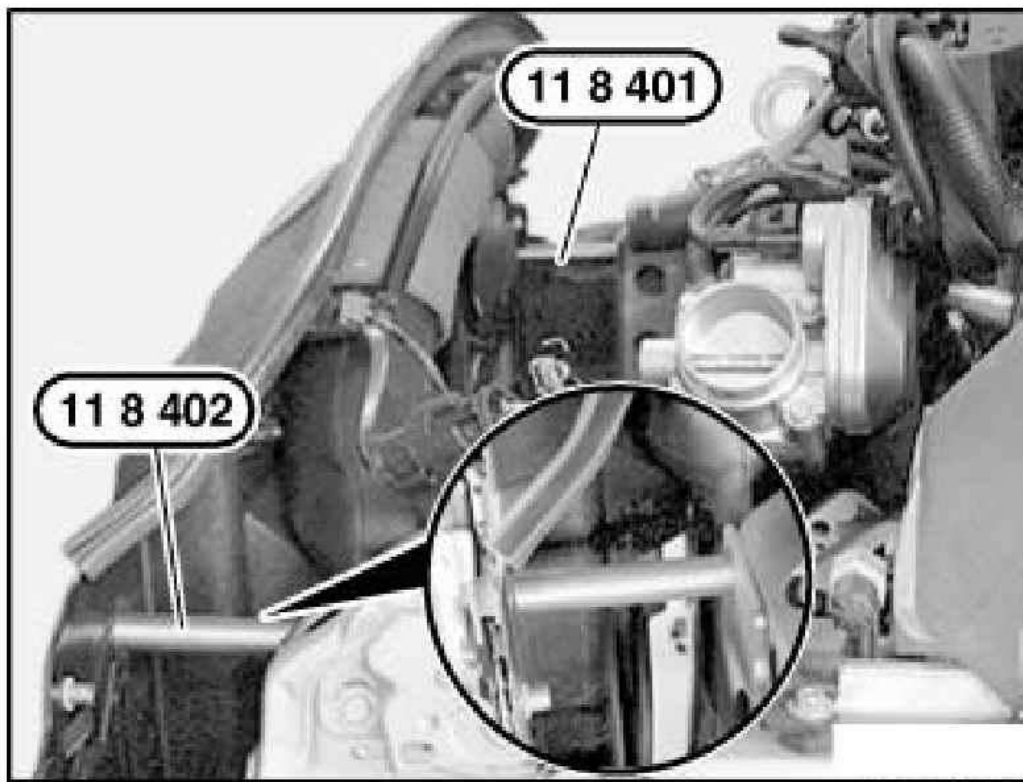
17 51 090 REMOVING AND INSTALLING OR REPLACING TURBOCHARGER INLET PIPE

Special tools required:

- 11 8 401
- 11 8 402

Remove impact tube. Refer to 31 11 020 Removing and installing/replacing bumper bracket .

Lower front end module and attach special tools 11 8 401 and 11 8 402.



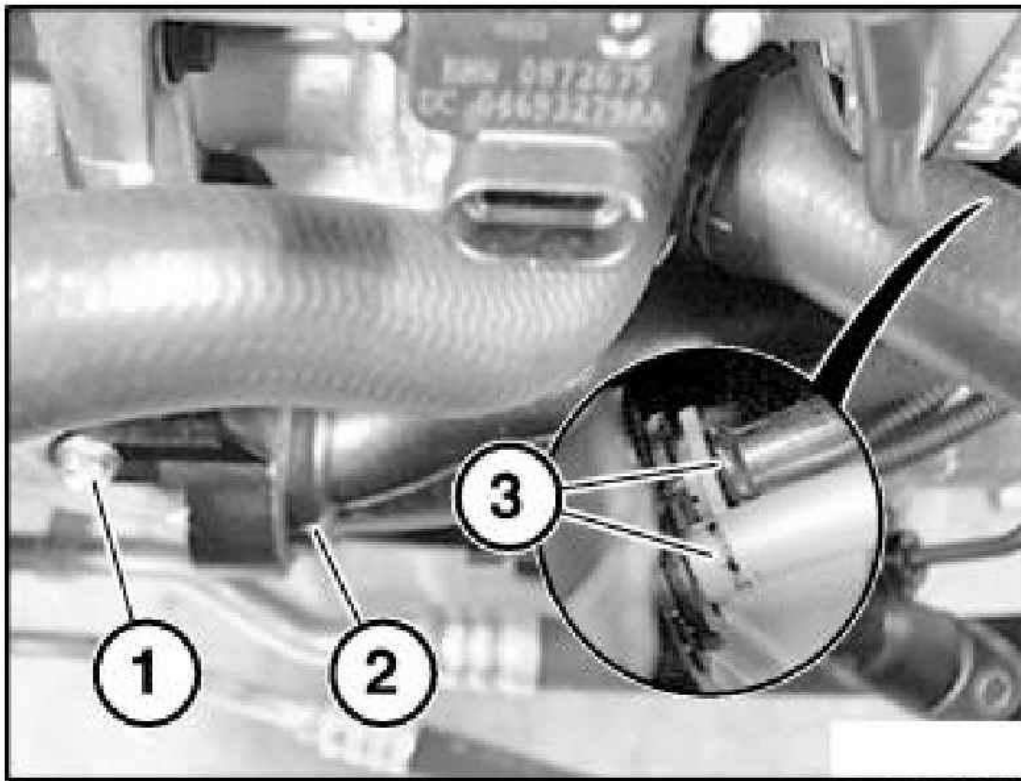
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Fig. 30: Attaching Special Tool

Courtesy of BMW OF NORTH AMERICA, INC.

Remove pipe from intercooler to intake manifold. Refer to **17 51 085 Removing and installing/replacing pipe between intercooler and intake manifold (left)**.

Remove retaining bolt (1) for turbocharger inlet.



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Fig. 31: detaching Turbocharger Inlet Pipe From Feed Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Detach turbocharger inlet pipe (2) from feed lines (3).

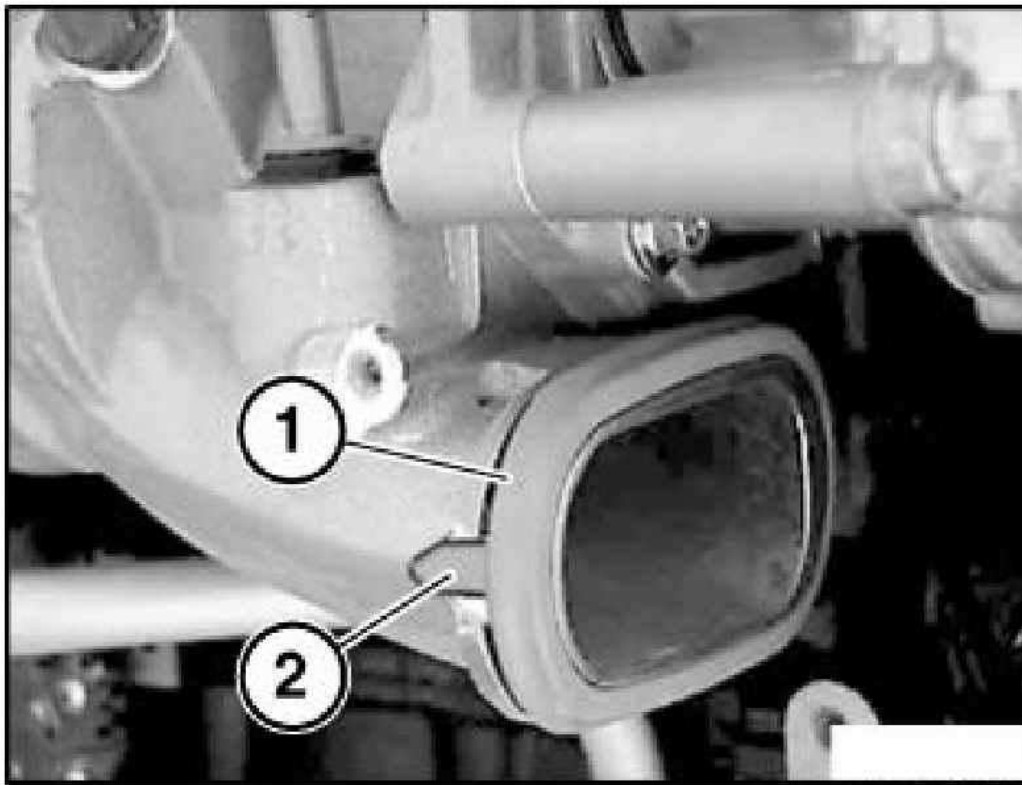
NOTE: Release pipes at quick -release couplings.

Tightening torque 11 65 1AZ. Refer to ENGINE - TIGHTENING TORQUES .

Check sealing ring (1) for damage.

NOTE: Guide lug (2).

Replace sealing ring if damaged.



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Fig. 32: Checking Sealing Ring

Courtesy of BMW OF NORTH AMERICA, INC.

17 51 100 REMOVING AND INSTALLING/REPLACING LEFT OR RIGHT SEALING RINGS ON INTERCOOLER

Remove intercooler. Refer to **17 51 000 Removing and installing/replacing intercooler.**

Unscrew retaining screws (1) of sealing ring brackets on left and right sides, remove brackets and sealing rings.

2008 MINI Cooper

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Fig. 33: Removing Brackets & Seals

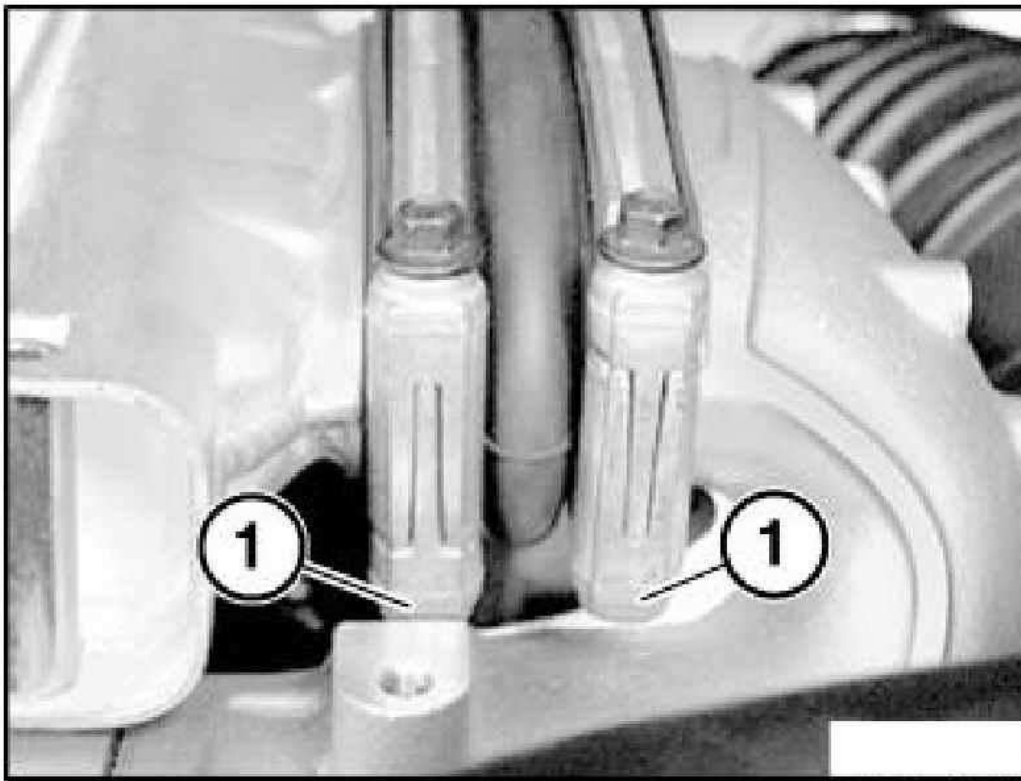
Courtesy of BMW OF NORTH AMERICA, INC.

Replace sealing rings.

Tightening torque 17 51 2AZ. Refer to **COOLING SYSTEM - TIGHTENING TORQUES** .

Installation:

Before installing sealing ring, first place sealing ring bracket on left side of intercooler on sealing ring.



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Fig. 34: Aligning Brackets And Threads
Courtesy of BMW OF NORTH AMERICA, INC.

Check that sealing rings and brackets are correctly positioned.

Pay attention to alignment of brackets and threads on underside.

17 51 104 REMOVING AND INSTALLING/REPLACING SEALING RINGS ON INTERCOOLER

Remove intercooler. Refer to **17 51 000 Removing and installing/replacing intercooler.**

Remove screws (1) from brackets for sealing rings, remove brackets and sealing rings.



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Fig. 35: Removing Brackets & Seals

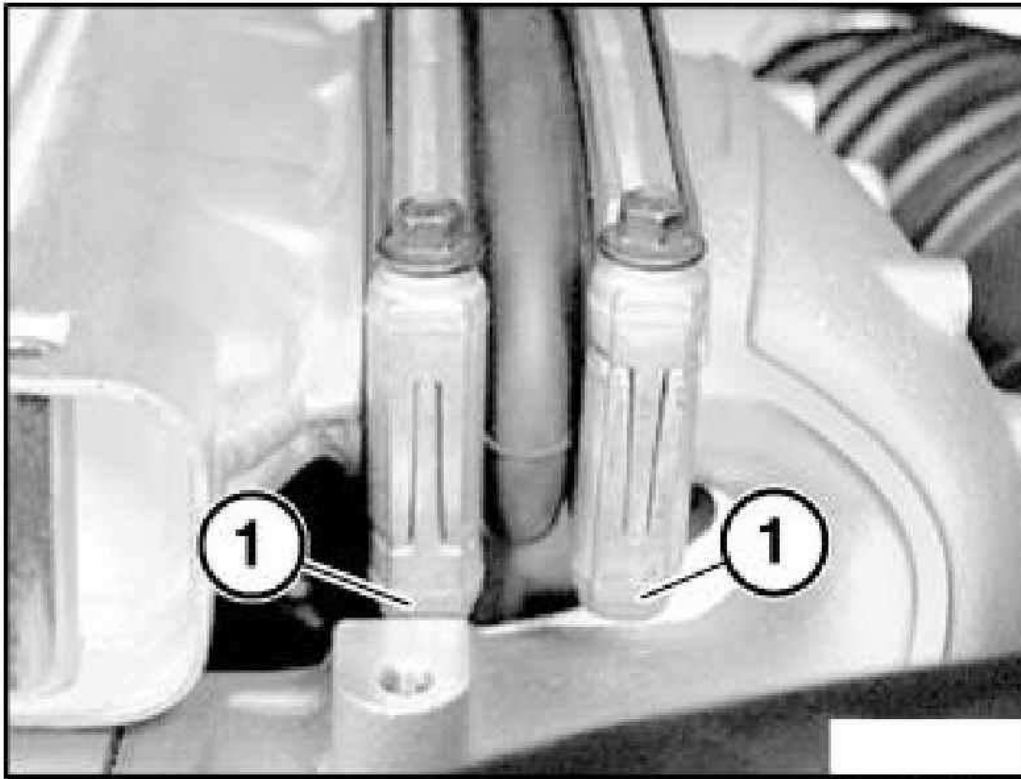
Courtesy of BMW OF NORTH AMERICA, INC.

Replace sealing rings.

Tightening torque 17 51 2AZ. Refer to **COOLING SYSTEM - TIGHTENING TORQUES** .

Installation:

Before installing sealing ring, first place sealing ring bracket on left side of intercooler on sealing ring.



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Fig. 36: Aligning Brackets And Threads
Courtesy of BMW OF NORTH AMERICA, INC.

Check that sealing rings and brackets are correctly positioned.

Pay attention to alignment of brackets and threads on underside (1).