RADIATOR - OPERATING FLUIDS

1.0 REQUIREMENTS MADE OF ENGINE COOLANT

Pure water is unsuitable as a coolant not just because of the lack of protection against freezing. Good functioning of the cooling system is only guaranteed once a suitable anti-freezing and anti-corrosive agent, or antifreeze for short, has been added.

The cooling system of BMW vehicles must only be filled with the anti-freezing and anti-corrosive agents approved for this purpose. The filling and maintenance instructions to be found in the Repair Instructions and operating instructions must be observed.

Antifreeze agents must meet the following requirements:

- They must guarantee operability of the cooling system in winter (anti-freezing protection by lowering the freezing point) and in summer (prevent boiling and boiling over of the coolant).
- They must protect metal components that come into contact with the coolant (grey cast iron, steel, aluminium alloy, brass, copper and solder) against corrosion and cavitation.
- They must be neutral with respect to rubber and plastic parts in the coolant circuit.
- They must guarantee the consistency of the above-mentioned quality criteria.

To create these coolant properties, the anti-freezing and anti-corrosive agents must be mixed to the correct ratio with water.

Prescribed mixture for coolant:

50 % antifreeze for anti-freezing protection down to -38 Â°C

The original coolant mixture poured into the cooling system at the factory has this antifreeze-to-water ratio.

If the proportion of antifreeze is less than 40 % to -29 Â°C (i.e. the water content is higher than 60 %), not only the degree of protection against freezing, but also protection against corrosion is reduced. When the water content is too high, this can lead to premature overheating in very hot weather or hot climates and as a consequence lead to coolant being ejected out of the system and damage to the engine through overheating.

This means that it is essential that an anti-freezing and anti-corrosive agent is added even in the tropics.

Too high a concentration, more than 55 % down to -47Â°C, leads to deterioration of the cooling properties (heat transfer) and protection against freezing-up is modified in the opposite direction, i.e. it also deteriorates.

The amounts of antifreeze required for providing protection against freezing-up are stated as percentage figures on the containers.

Minimum requirements concerning water quality:

- Appearance: colourless, clear
- Sediment, without suspended matter
- pH value: 6.5-8.0
- Total hardness, max.: 20Â° dH (German hardness grade) or in new measuring unit:
- Total hardness, max.: 3.6 mmol Ca 2+/ltr.
- Chloride content: max. 100 mg/ltr.
- Sulphate content: max. 100 mg/ltr.

cardiagn.com

Potable tap water usually fulfils these requirements. Local water utilities can provide information about the quality of the water they supply. If necessary, the water must be treated (e.g. softened) or distilled water must be used.

The quality of regenerated sea water (as found in the Gulf states) is inadequate!

Status 12/2006

2.0 CHANGE INTERVAL, CHANGE AND CHECK OF COOLANT, DISPOSAL, CLEANING THE COOLING SYSTEM

Change interval, change and check of coolant

Regular testing of the coolant composition as part of inspections I and II. Due to decreasing corrosion protective effect the change interval of 4 years (3 years for M-power vehicles) has to be maintained. The antifreeze concentration of the coolant should be checked before the start of the cold season. Checking the composition is also necessary after adding coolant. When adjusting and checking the concentration, a areometer spindle is required (antifreeze tester). Mixing the approved substances with each other is allowed.

The technical advancement has made it possible, that no coolant change is required for the vehicles specified below.

- E65 from 09/2003
- E85 from market introduction
- Condition Based Service-vehicles from 09/2003
- Service interval indicator-vehicles with petrol engines from 03/2003
- Service interval indicator vehicles with diesel engine from 09/2003
- M-vehicles from 09/2003
- All vehicles with market introduction after 09/2003

Disposal

For the disposal of the coolant, the safety data sheets of the manufacturers for antifreeze and corrosion inhibitors or the legal regulations of the individual countries must be observed.

Status 04/2014

3.0 APPROVED ANTIFREEZE AND CORROSION INHIBITORS

	A special antifreeze and corrosion inhibitor is mandatory for the MINI Diesel engine W16.
IMPORTANT:	For approved antifreeze and corrosion inhibitors for the W16 engine see Appendix 3.2.
	For approved antifreeze and corrosion inhibitors for W11, W12, W17, N12, N14 engine see Appendix 3.1.

With the protection of the environment in mind, BMW has been filling all of its vehicles with nitrite- and amino-free antifreeze and corrosion inhibitors since mid-1986 as standard practice.

The use of antifreeze and corrosion inhibitors that contain nitrites and amines is no longer permissible.

Trade name	BMW part number	Container size
BMW Antifreeze	83 51 2 355 290	1.5-litre can
BMW Antifreeze	83 51 2 355 291	60-litre barrel
BMW Antifreeze	83 51 2 355 293	205-litre barrel

cardiagn.com

Trade name	Manufacturer/Supplier
Alpine C48 Longlife Antifreeze	Mitan Mineralol GmbH
Antifreeze concentrate AWM G11	Tosol-Sintez
Aral Antifreeze Extra	Aral AG
AVIA Antifreeze APN	AVIA Mineralol AG
BMW Antifreeze	BMW AG
Castrol Radiocool NF	Castrol International
Fuchs MAINTAIN FRICOFIN	Fuchs Europe Schmierstoffe GmbH
GlysantinÂ® G48Â®-24 Engine Coolant	THEBE UNICO
GlysantinÂ® G48Â®	BASF series introduction
Lukoil Antifreeze HD G11	Lukoil
Lukoil Coolant Plus	Lukoil Lubricants Austria GmbH
OMV Coolant Plus	OMV AG
Zerex G48Â® Antifreeze	Valvoline

Status 11/2015

3.1 APPROVED ANTIFREEZE AND CORROSION INHIBITORS FOR MINI EXCEPT W16 DIESEL

3.2 APPROVED ANTIFREEZE AND CORROSION INHIBITORS FOR MINI W16 DIESEL

3.3 APPROVED ANTIFREEZE AND CORROSION INHIBITORS FOR BMW I

4.0 COOLANT ADDITIVES

BMW does not approve the use of coolant additives that e.g. provide additional protection against corrosion or are aimed at sealing hairline cracks.

Due to the poorer transfer of heat from the cylinder head to the coolant, this can lead to heat accumulation and hot spots, which in turn can lead to cylinder head gaskets burning through and cracking of the cylinder head.

We cannot provide warranty for any consequences and effects the use of such additives may have.

1.0 GENERAL INFORMATION ON LONG-TERM ANTIFREEZE AND CORROSION INHIBITORS

The cooling system of BMW cars must only be filled with reputable brand name ethylene glycol long-term antifreeze having corrosion inhibitors that are compatible with aluminum radiators.

Coolants must fulfill four basic requirements.

- Guarantee sufficient cooling.
- Protect various metals (gray cast iron, steel, aluminum alloys, brass, copper and solder) against corrosion.
- Prevent excessive silicate gel precipitation, which may cause clogging of the cooling system.
- Guarantee operation of cooling system in winter (prevent freezing of coolant) and in summer by boosting the boiling point.

The quality or grade of a long-term antifreeze and corrosion inhibitor is very important to be able to protect metal (gray cast iron, steel, aluminum alloys, brass, copper and solder) in the cooling system against corrosion. It guarantees full operation of the cooling system in winter and also increases the boiling point at high outside temperatures and under heavy loads.

INITIAL FILLING IN FACTORY

The factory fills the cooling system for protection against freezing, for the U. S. and Canada, down to -34Â°F (-37Â°C). This means an antifreeze ratio of 50% antifreeze and 50% water. In severely cold areas, the

cardiagn.com

antifreeze can be increased to 60% which provides freezing protection down to -62Â°F (-52Â°C). Do not exceed a 60% ratio of antifreeze.

The specified antifreeze ratio is important, since an insufficient amount would impair antifreezing and corrosion inhibiting protection. An excessive amount would not improve freezing protection, but instead reduce freezing protection.

CHANGE INTERVALS

Regular checking of coolant concentration is part of Inspection I or II. Refer to applicable Model Year Service Maintenance Checklist for change intervals.

LONG-TERM COOLANT

The BMW engine coolant has a long-term rating, except when the cooling system requires repairs. This coolant does not require a service interval if no repairs are made to the vehicles cooling system. Drained coolant is not to be re-used. Top up with new coolant.

REMARKS AND LIMITATIONS

Only tap water of drinking quality with the following properties may be used as coolant.

Appearance - colorless, clear

Residue - without suspended matter

pH value - 6.5 - 8.0

Total hardness - max. 357 PPM Calcium Carbonate

Chloride content - max. 100 mg/l

Sulfate content - max. 100 mg/l

The antifreeze concentration in a cooling system should be checked before the beginning of winter. When determining the mixture concentration it is important to make sure that there is sufficient protection against freezing.

A hydrometer (radiator antifreeze tester) is required for correct determination of antifreeze concentration. The composition of long-term antifreezes and corrosion inhibitors differs between manufacturers.

BMW Anti-Freeze/Coolant contains no nitrites or phosphates and has been formulated to prevent excessive silicate dropout. Order the 1 gallon container under BMW Part No. 82 14 1 467 704.

NOTE: **Do not mix BMW Anti-Freeze/Coolant with different antifreezes which contain nitrites and/or phosphates and a high silicate formulation.**

2.0 COOLANT ADDITIVES

No aftermarket coolant additives, including but not limited to those which provide additional corrosion inhibition or seal off minor leaks are approved by BMW.

Use of non-approved coolant additives may cause reduced heat transfer from the cylinder head to the coolant and the formation of hot spots. This can cause the burning through of cylinder head gaskets and/or cracking of the cylinder head.

BMW NA cannot accept the liability for the resulting effects and consequential damage caused by the use of coolant additives.

cardiagn.com

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

cardiagn.com

CHECKING COOLING SYSTEM

17 00 039 BLEED COOLING SYSTEM AND CHECK FOR WATERTIGHTNESS (N52T, N55)

WARNING: **Risk of scalding!**
Open sealing cap only after engine has cooled down.

IMPORTANT: Electric coolant pump!

IMPORTANT: Lifetime coolant filling:
Never reuse used coolant!
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be drained and refilled.
In the case of other removal work involving the draining of part quantities of coolant, replace these quantities which have been drained with new coolant.

Only when refilling!

Use only recommended coolant. See **RADIATOR -- OPERATING FLUIDS** .

Observe mixture ratio. See **RADIATOR -- OPERATING FLUIDS** .

Perform filling operation slowly.

Adjust coolant level to maximum.

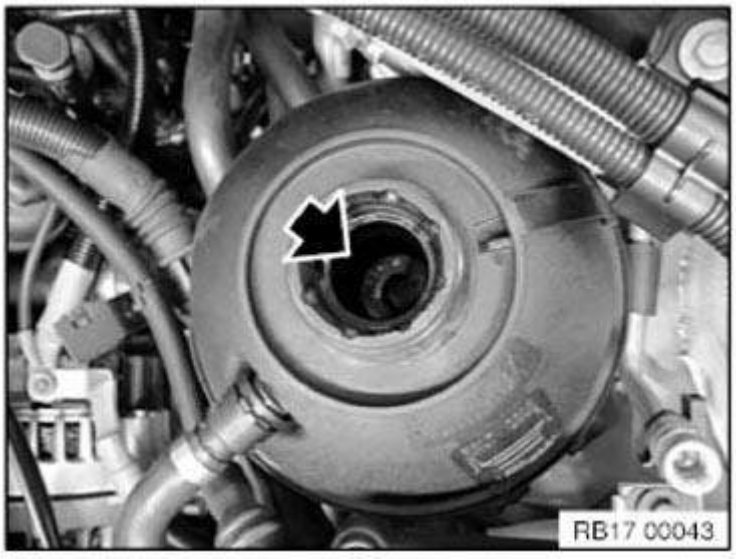


Fig. 1: Locating Expansion Tank Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Close coolant expansion tank.

Installation note:

Close the sealing cap (1) until the arrows line up.

cardiagn.com

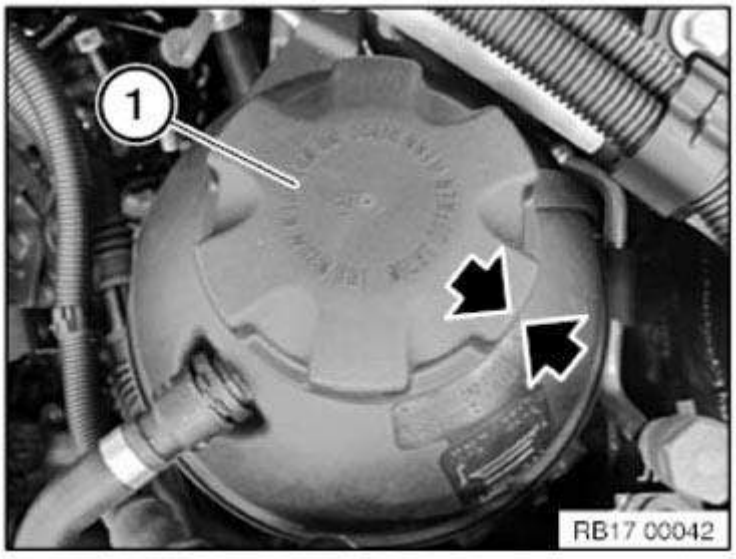


Fig. 2: Locating Coolant Expansion Tank Sealing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The following bleeding procedure is necessary when a part is replaced in the cooling system or when the cooling system is refilled.

Adding coolant:

NOTE: Fill coolant expansion tank up to lower edge of filler neck with recommended coolant. See RADIATOR -- OPERATING FLUIDS .

Observe mixture ratio. See **RADIATOR -- OPERATING FLUIDS** .

Observe **FILLING CAPACITIES** .

Close cap on expansion tank.

Installation note:

Have a cleaning cloth ready to catch escaping coolant.

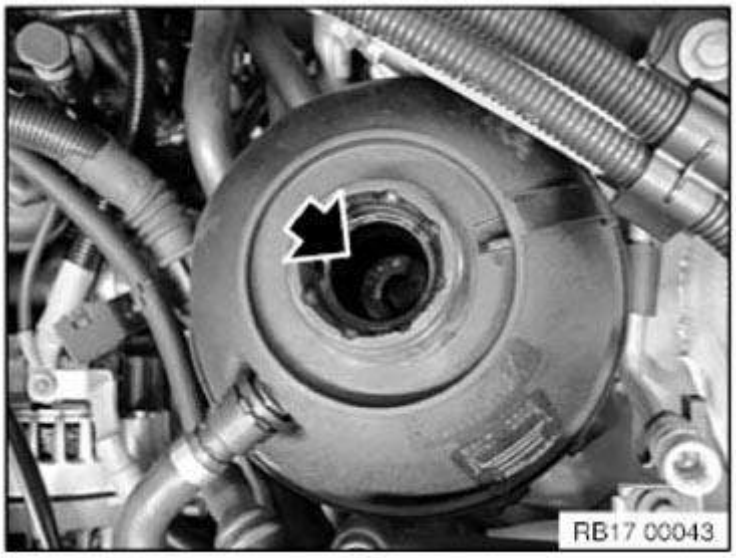


Fig. 3: Locating Expansion Tank Cap
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Bleed cooling system!

NOTE: **Do not open the coolant expansion tank cap during the bleeding procedure. Switch on the low-beam headlights to perform the bleeding procedure. If the low-beam headlights are not switched on, the ignition (Terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.**

1. Connect battery charger.
2. Switch the ignition on.
3. Switch on low-beam headlight.
4. Set heating to maximum temperature. Take back blower to smallest stage.
5. Driving experience switch must not be set to ECO PRO!
6. Press accelerator pedal for 10 seconds to floor. **Engine** must **not** be started.
7. The bleeding procedure was started by pressing the accelerator pedal and takes approx. 12 min. (the electrical coolant pump was activated and switches off automatically after approx. 12 min).
8. Then adjust fluid level in the coolant expansion tank to maximum.
9. Check the coolant system for **LEAKS**.
10. If the ventilation has to be performed again, deactivate DME completely (remove ignition key for approx. 3 minutes). Then repeat from point 3.

Close coolant expansion tank.

Installation note:

Close the sealing cap (1) until the arrows line up.

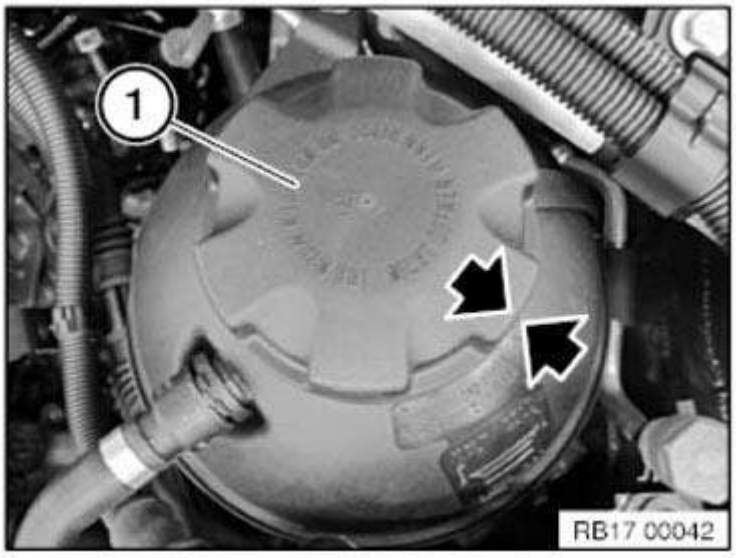


Fig. 4: Locating Coolant Expansion Tank Sealing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

17 00 009 CHECKING COOLING SYSTEM FOR WATERTIGHTNESS

Special tools required:

- **00 2 030**
- **17 0 100**

WARNING: **Risk of scalding!**

cardiagn.com

Only perform this repair work after engine has cooled down.

Protective measures/rules of conduct:

- Wear safety goggles
- Wear protective gloves
- Observe national/country-specific regulations

IMPORTANT: Risk of skidding due to coolant on the floor.
Danger of injury!

Catch and dispose of drained coolant in drip tray (1) and if necessary special tool **00 2 030** (universal hydraulic lifting equipment).

Recycling:

Observe country-specific waste disposal regulations.

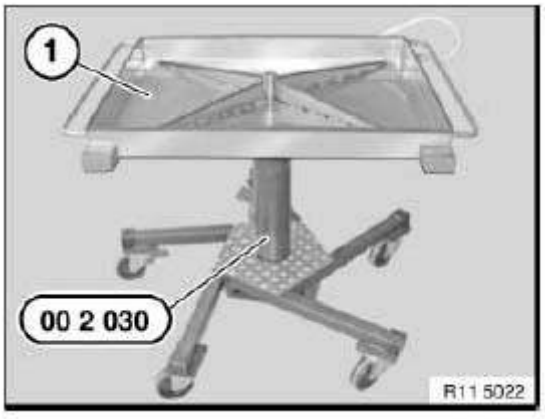


Fig. 5: Identifying Special Tool (00 2 030)
Courtesy of BMW OF NORTH AMERICA, INC.

Checking pressure drop in cooling system:

Open the sealing cap on the coolant expansion tank. Mount special tools 17 0 101 and 17 0 113 from set of special tools **17 0 100** .

Build up excess pressure . See **RADIATOR WITH MOUNTING, BMW (F25, F26, N20, N55, N52T)** or **RADIATOR WITH MOUNTING (N47T)** and wait approx. 2 minutes.

Cooling system is impervious to watertightness if pressure drop is max. 0.1 bar.

cardiagn.com

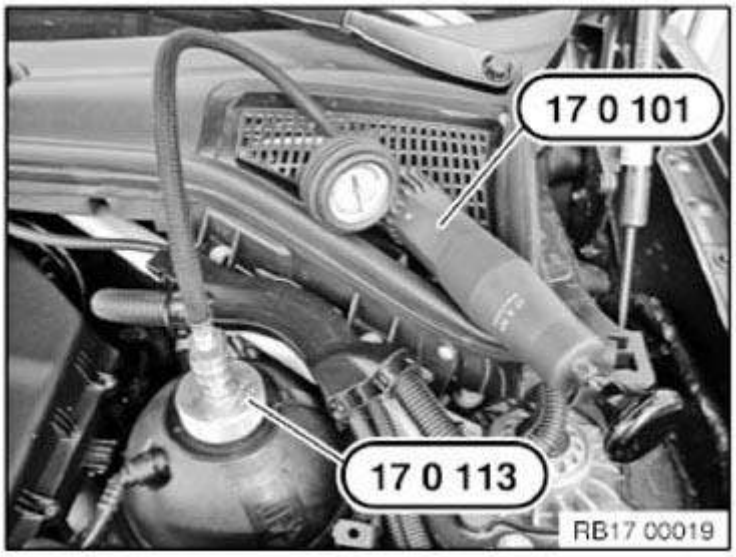


Fig. 6: Checking Pressure Drop In Cooling System
Courtesy of BMW OF NORTH AMERICA, INC.

Checking pressure relief valve in sealing cap:

NOTE: **While the driving at high ambient temperatures, the design may cause the pressure relief valve in the sealing cap to open slightly and air together with dissolved coolant to escape. This coolant vapor condenses on the surface of the expansion tank and leaves traces of coolant after the vehicle has cooled down. These coolant traces do not indicate whether the cap is defective or not. When the vehicle has been parked up for an extended period of time, the residual escaping coolant can cause the pressure relief valve in the sealing cap to stick; therefore check the sealing cap again 2 to 3 times.**
Replace the sealing cap only after you have checked three times and there is an incorrect opening pressure.

Checking pressure relief valve in sealing cap:

Screw sealing cap (1) onto special tool 17 0 114 from the special tool set **17 0 100** .

Use special tool (hand pump) 17 0 101 from the special tool set **17 0 100** to build up pressure; observe pressure gauge to ascertain when opening pressure is achieved.

Compare **opening pressure of pressure relief valve** . See **RADIATOR WITH MOUNTING, BMW (F25, F26, N20, N55, N52T)** or **RADIATOR WITH MOUNTING (N47T)** .

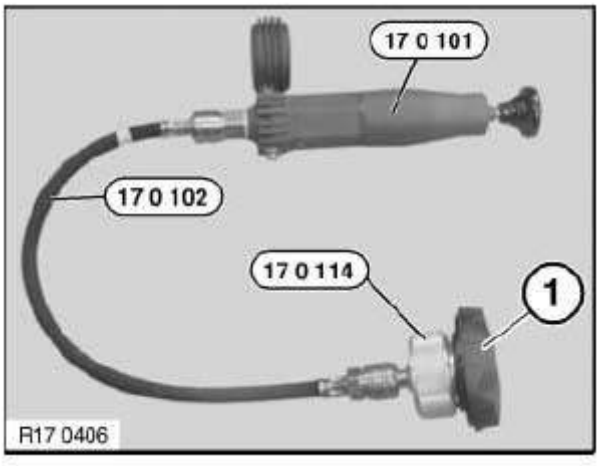


Fig. 7: Checking Pressure Relief Valve In Sealing Cap

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

17 00 008 DRAINING AND TOPPING UP COOLANT (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)

Special tools required:

- 00 2 030

WARNING: **Risk of scalding!**
Only carry out repair work on the cooling system when the engine has cooled down.

IMPORTANT: Lifetime coolant filling:
Never reuse used coolant!
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be drained and refilled.
In the case of other removal work involving the draining of part quantities of coolant, replace these quantities which have been drained with new coolant.

Installation note:

Use only recommended coolant. See **RADIATOR -- OPERATING FLUIDS** .

Observe mixture ratio. See **RADIATOR -- OPERATING FLUIDS** .

Protective measures/rules of conduct:

- Wear safety goggles
- Wear protective gloves
- Observe national/country-specific regulations

IMPORTANT: For dirt contamination of the cooling system (e.g. by engine oil), the cooling system must be rinsed with water until all dirt contamination is removed!

IMPORTANT: Risk of skidding due to coolant on the floor.
Danger of injury!

Catch and dispose of drained coolant in drip tray (1) and if necessary special tool 00 2 030 (universal hydraulic lifting equipment).

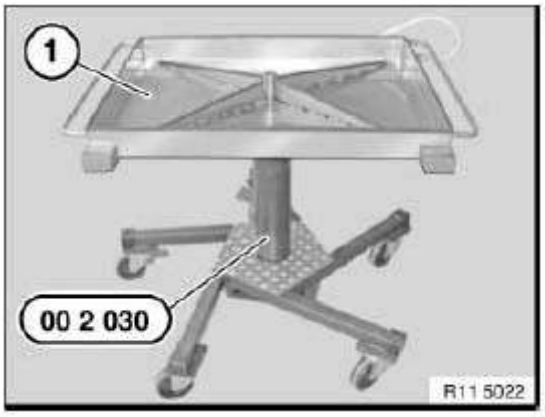


Fig. 8: Identifying Special Tool (00 2 030)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Recycling:

Observe country-specific waste disposal regulations.

Necessary preliminary tasks:

- Remove front **UNDERBODY PROTECTION** .

Draining coolant:

Open sealing cap on coolant expansion tank.

Release and detach coolant hoses (1) at radiator.

Drain, catch and dispose of coolant.

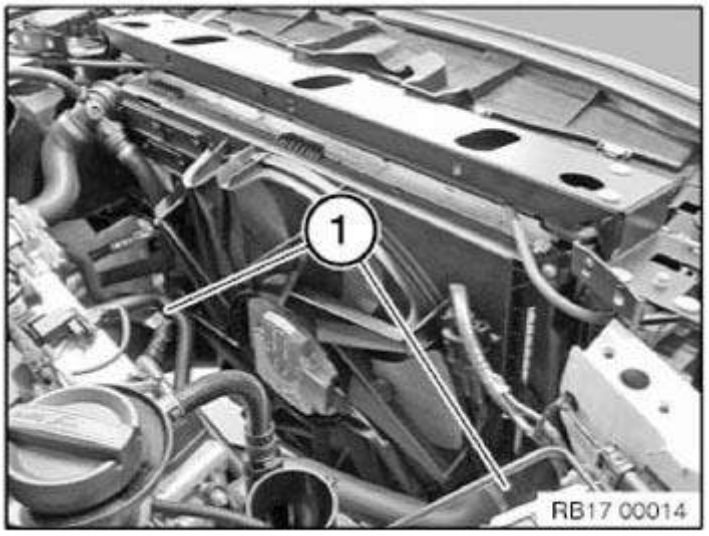


Fig. 9: Identifying Coolant Hoses
Courtesy of BMW OF NORTH AMERICA, INC.

Adding coolant:

Use only recommended coolant. See **RADIATOR -- OPERATING FLUIDS** .

Observe mixture ratio. See **RADIATOR -- OPERATING FLUIDS** .

Observe **capacities** . See **COOLANT, COOLING SYSTEM TEST, BMW (F25, N47 D20 O 1)** , **COOLANT, COOLING SYSTEM TEST, BMW (F25, F26, N55)** or **COOLANT, COOLING SYSTEM TEST, BMW (F25, F26, N20)** .

Fill and vent **COOLING SYSTEM**.

Observe bleeding instructions without fail.

Assemble engine.

CHECK COOLING SYSTEM FOR LEAKS.

17 00... INSTRUCTIONS FOR REPAIR WORK ON COOLING SYSTEM

WARNING: **Risk of scalding. Only carry out repair work on the cooling system after the engine has cooled down.**

IMPORTANT: Wear protective gloves and safety goggles.

cardiagn.com

Lifetime coolant filling:
Never reuse used coolant.
When replacing and removing components which rely on the corrosion protection effect of the
IMPORTANT: coolant, it is essential to change the coolant. The cooling system must therefore be drained and refilled.
In the case of other removal work involving the draining of part quantities of coolant, replace these quantities which have been drained with new coolant.

Open cooling system only when it has cooled down.
IMPORTANT: Opening the cooling system while hot can result in air entering the system.
This can cause overheating with permanent damage to the engine.

You must protect the alternator against dirt contamination before carrying out any repair work
IMPORTANT: on the cooling circuit.
Cover alternator with suitable materials.
Failure to comply with this procedure may result in an alternator malfunction.

Do not fill coolant expansion tank over maximum level, as overfilling will cause the coolant to
IMPORTANT: overflow. This may give rise to traces of coolant on the expansion tank or in the engine compartment and wrongly suggest possible leaks.

Recycling

Catch and dispose of drained coolant.

Observe country-specific waste disposal regulations.

NOTE: **To disconnect coolant hoses, use commercially available disconnect tools such as HAZET brand tools (see chart).**

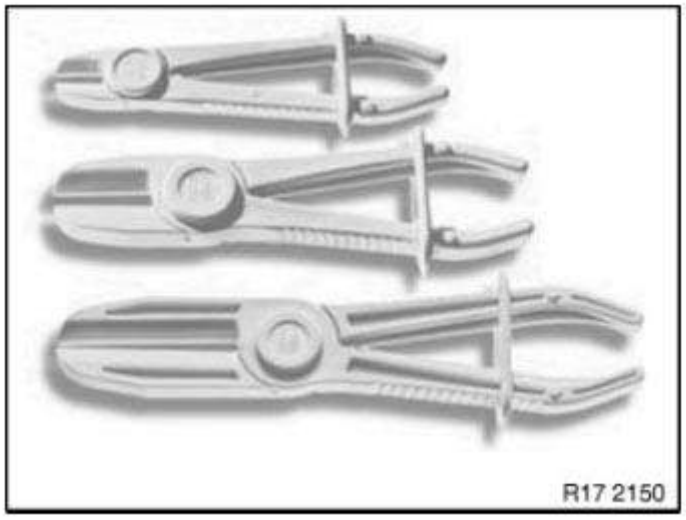


Fig. 10: Identifying Coolant Hose Tools
Courtesy of BMW OF NORTH AMERICA, INC.

HAZET number:	Designation
4590-1	Disconnect-pliers, length (mm): 150
4590-2	Disconnect-pliers, length (mm): 180
4590-3	Disconnect-pliers, length (mm): 253
4590/2	Disconnect-plier set
4590/3	Disconnect-plier set

cardiagn.com

Set of special tools 17 2 050 for removing and installing the spring bracket clamps for coolant hoses.

- (1) Release tool.
- (2) Pliers (bent version).
- (3) Pliers (straight version).

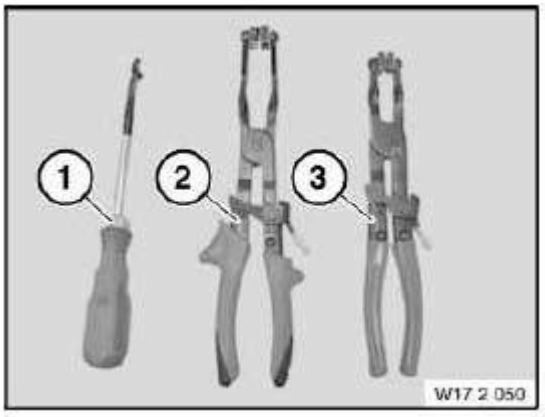


Fig. 11: Identifying Special Tools (17 2 050)
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen spring strap (1) with the pliers (2).

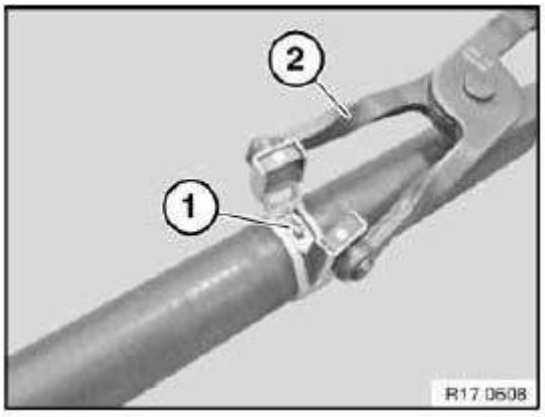


Fig. 12: Loosening Spring Strap Using Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock spring strap (1) with the release tool (2).

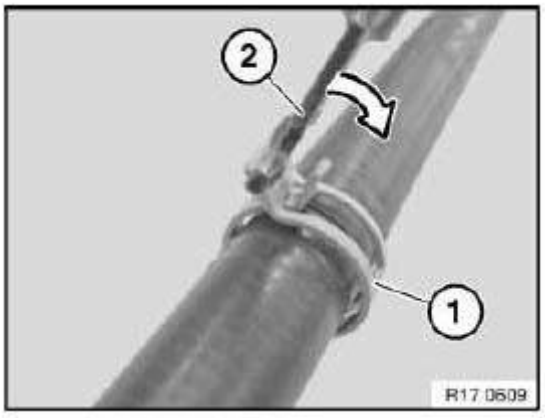


Fig. 13: Removing Spring Strap Using Release Tool
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

NOTE: **Tightening torque for hose clamps**

WAF 5	1.0 - 1.5 Nm
WAF 6	2.5 - 3.5 Nm

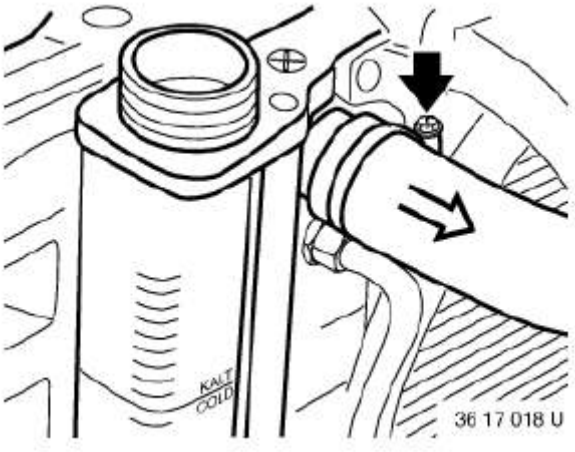


Fig. 14: Removing Hose Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Instructions for dismantling/assembly of coolant hose quick-release couplings

Dismantling of quick-release coupling

Pull out lock (1) and (2). Pull off hose.

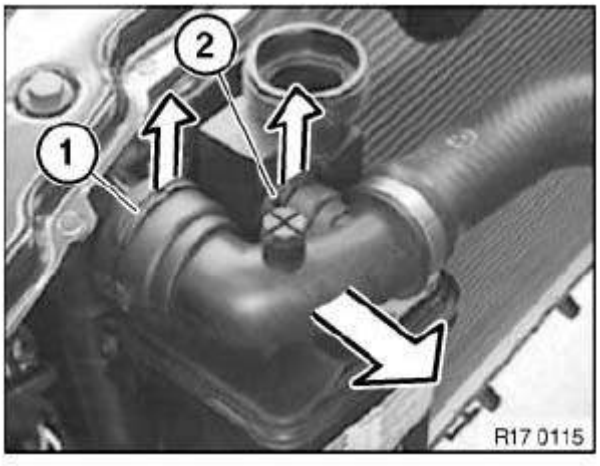


Fig. 15: Identifying Lock & Pulling Off Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check O-rings (1).

Do not coat O-rings (1) with lubricant.

cardiagn.com

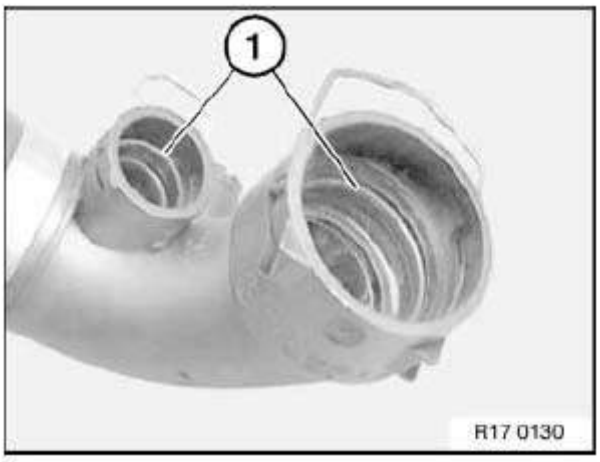


Fig. 16: Identifying O-Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Assembly of quick-release coupling

Press in lock (1) before installing quick-release coupling.

Push on hose.

Quick-release couplings must clearly snap audibly into place.

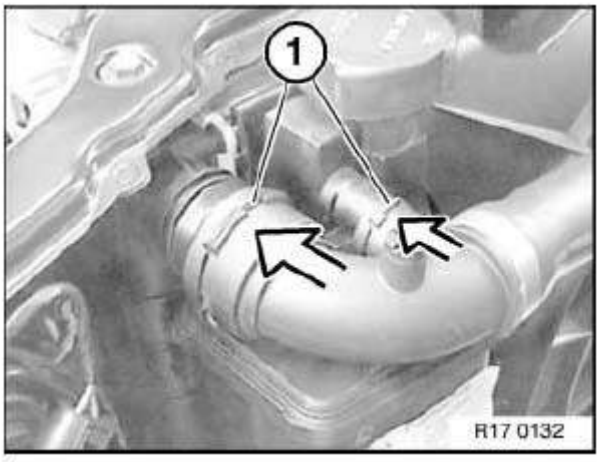


Fig. 17: Installing Quick-Release Couplings
Courtesy of BMW OF NORTH AMERICA, INC.

00 SAFETY INFORMATION FOR WORKING ON VEHICLES WITH AUTOMATIC ENGINE START-STOP FUNCTION (MSA)

See 00 SAFETY INFORMATION FOR WORKING ON VEHICLES WITH AUTOMATIC ENGINE START-STOP FUNCTION (MSA) .

17 00 039 VENTING AND FILLING COOLING SYSTEM WITH VACUUM FILLING UNIT

Special tools required:

- 00 2 030
- 17 0 100

Type	Engine	Adapter Y from 17 0 100
E60/E61/E63/E64	All	17 0 113

cardiagn.com

E65/E66	M54/N52/N62/N62T/N73	17 0 105
E65/E66	M57S/M57T/M67/M67T	17 0 113
E70/E71/E72	All	17 0 113
E81/E82/E84/E87/E88/E89	All	17 0 113
E83	M54/N46/N52K	17 0 105
E83	M47S/M57S/M57T/M57Y/N47	17 0 113
E85/E86	All	17 0 105
E90/E91/E92/E93	All	17 0 113
R50/R52	W10	17 0 107 and 17 0 102
R50	W17	17 0 109
R52/R53	W11	17 0 109
R55/R56/R57/R58/R60/R61	All	17 0 109
F25/F26	All	17 0 113
F20/F21/F22/F23/F30/F31/F32/F33/F34/F35/F36	All	17 0 113
F80/F82/F83	S55	17 0 113
F15	All	17 0 113
F55, F56	All	17 0 109
F45, F46	All	17 0 109
F16	All	17 0 113

IMPORTANT: Lifetime coolant filling:
Never reuse used coolant!
When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be drained and refilled.
In the case of other removal work involving the draining of part quantities of coolant, replace these quantities which have been drained with new coolant.

IMPORTANT: You must protect the alternator against contamination by coolant when carrying out repair work on the cooling circuit.
Cover alternator with suitable materials.
Failure to comply with this procedure may result in an alternator malfunction.

Note on ordering:

- Workshop equipment
- Workshop equipment catalogue
- Filling unit number 81 39 2 152 473
- Drip pan number 81 49 2 152 347
- Adapter: **17 0 100**

IMPORTANT: Risk of slipping due to coolant on the floor.
Danger of injury!

Catch and dispose of emerging coolant in drip tray (1) and if necessary special tool **00 2 030** (universal hydraulic lifting equipment).

cardiagn.com

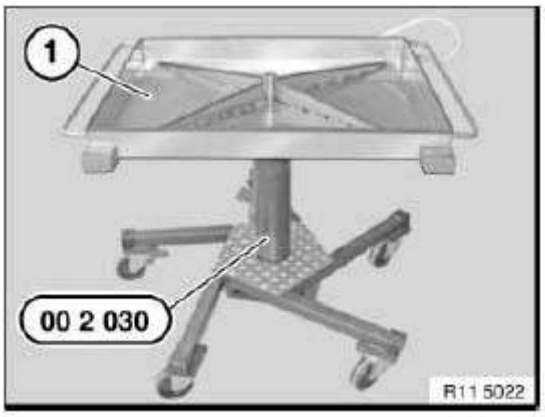


Fig. 18: Identifying Special Tool (00 2 030)
Courtesy of BMW OF NORTH AMERICA, INC.

Recycling:

Observe country-specific waste disposal regulations.

IMPORTANT: Check all the coolant hoses before filling the cooling system with the vacuum filling unit. If necessary, replace damaged and porous coolant hoses.

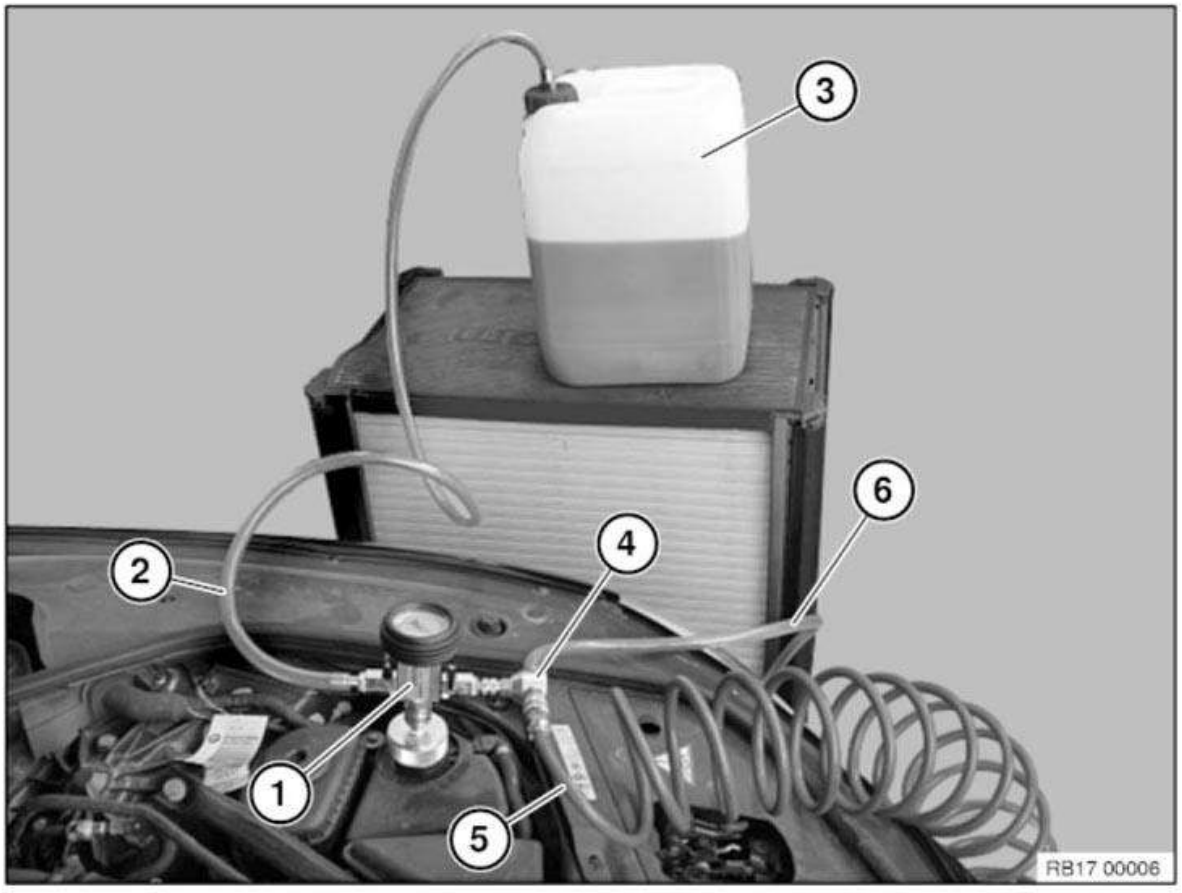


Fig. 19: Identifying Filler Hose, Coolant Container And Venturi Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

- 1) Filling unit with vacuum meter and shutoff valves
- 2) Filler hose
- 3) Coolant container
- 4) Venturi nozzle

cardiagn.com

- 5) Compressed air connection (max. 6 bar)
- 6) Outgoing-air hose (lead outgoing-air hose into a collecting container)

Preconditions

- Cooling system expansion tank must be empty.
- There must be sufficiently premixed coolant in the filling unit container, 1 - 2 liters more than the vehicle filling capacity.
  - Use only recommended coolant. See **RADIATOR -- OPERATING FLUIDS** .
  - Observe mixture ratio. See **RADIATOR -- OPERATING FLUIDS** .
  - Observe capacities.
- Position the filling unit container at the same height as the coolant expansion tank.
- Compressed-air connection with 6 bar pressure present.
- Set vehicle heater to maximum temperature.

Select adapter (Y) according to table and connect to coolant expansion tank.

Connect filler unit to adapter connection (X).

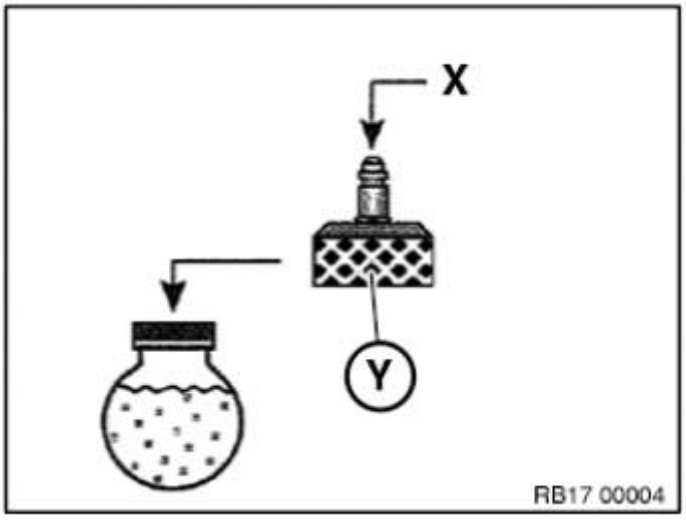


Fig. 20: Identifying Filler Unit Adapter Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Shutoff valves (A) and (B) of the filling unit (1) must be closed.

(X) Expansion tank connection

cardiagn.com

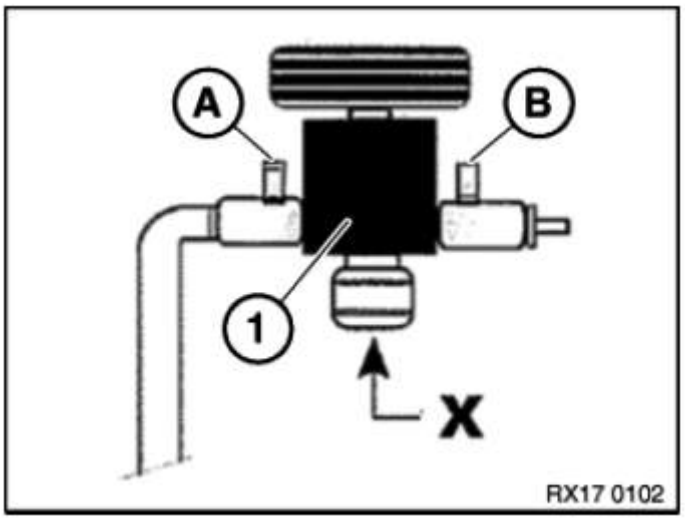


Fig. 21: Identifying Shutoff Valves And Expansion Tank Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Connect venturi nozzle (1) to filling unit (2).

(X) Expansion tank connection

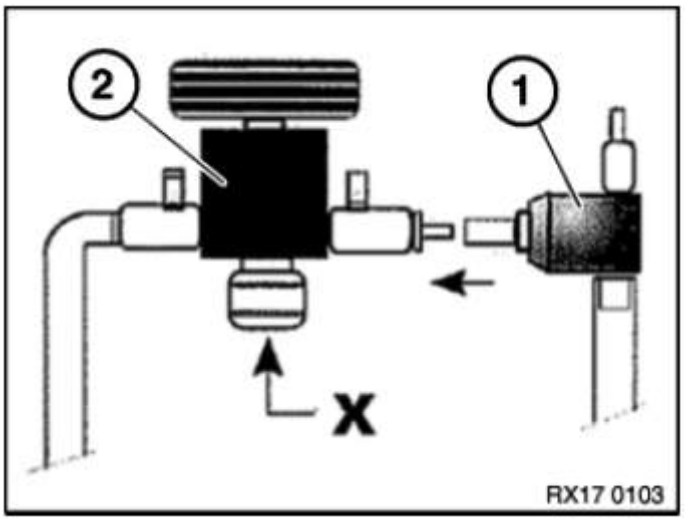


Fig. 22: Identifying Venturi Nozzle And Filling Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Connect compressed air (1).

(X) Expansion tank connection

cardiagn.com

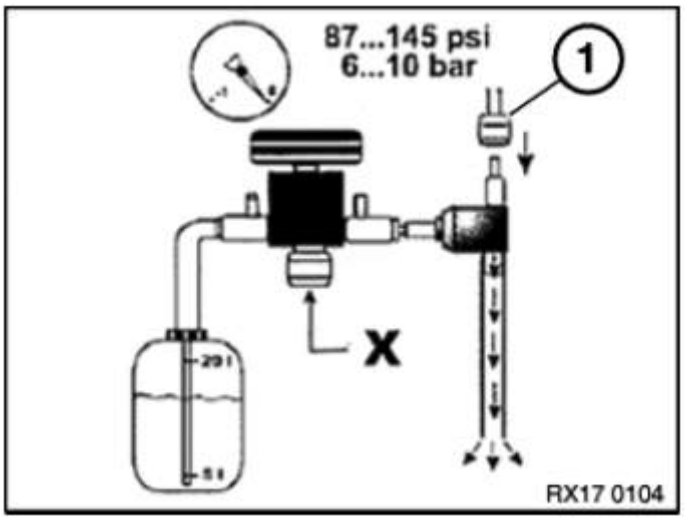


Fig. 23: Connecting Compressed Air
Courtesy of BMW OF NORTH AMERICA, INC.

Open shutoff valve (B).

The venturi nozzle produces a flow noise.

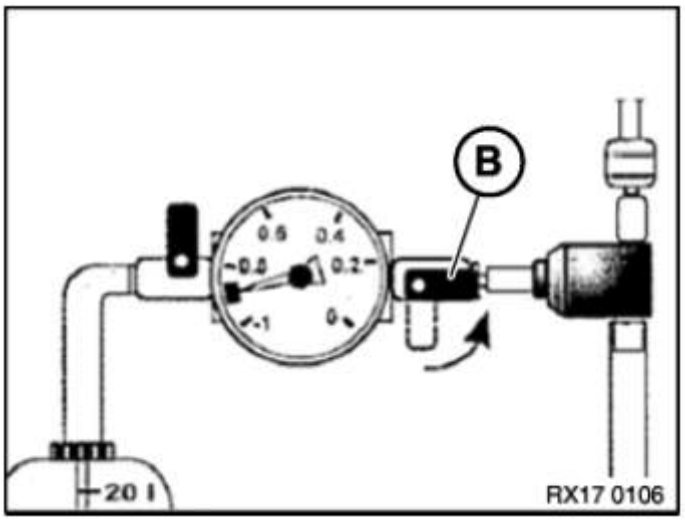


Fig. 24: Opening Shutoff Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Then open shutoff valve (A) until the filling hose (1) is free of bubbles.

Close shutoff valve (A) again. The filling hose (1) is vented in this way.

cardiagn.com

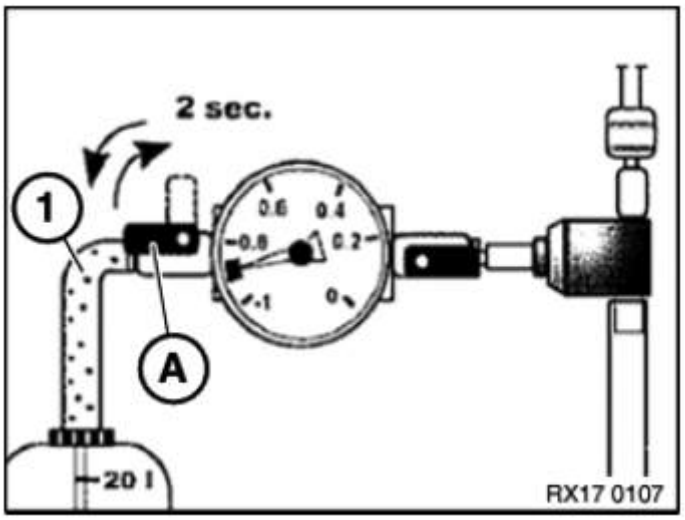


Fig. 25: Closing Shutoff Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Shutoff valve (B) will remain open.

Generate vacuum in coolant system for approx. 2 minutes. The end vacuum is reached at a vacuum of -0.7 to -0.95 bar.

Green scale on the vacuum meter.

NOTE: The coolant hoses contract during vacuum build-up.

Then close shutoff valve (B) again.

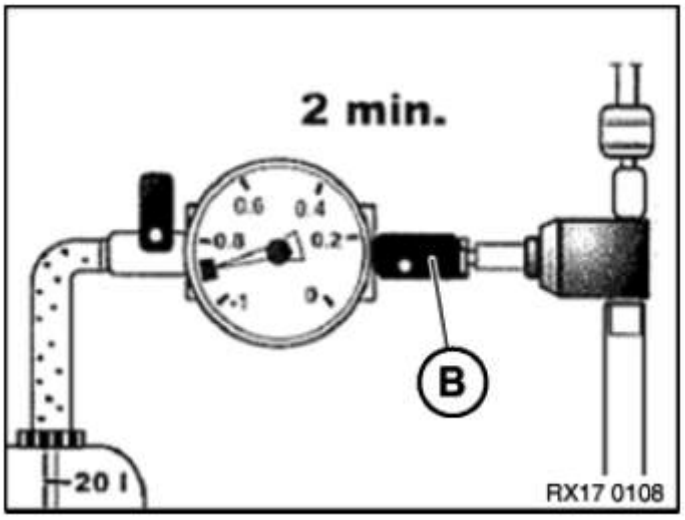


Fig. 26: Checking Coolant System Vacuum
Courtesy of BMW OF NORTH AMERICA, INC.

Both shutoff valves (A) and (B) must be closed. Then seal Venturi nozzle (1).

cardiagn.com

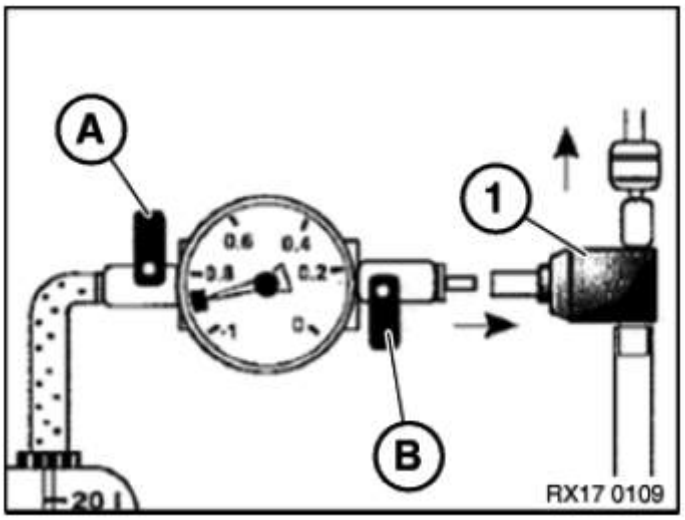


Fig. 27: Closing Shutoff Valves
Courtesy of BMW OF NORTH AMERICA, INC.

The cooling system must hold the vacuum for 30 s. If the needle in the vacuum meter falls, this indicates a leak in the cooling system.

If the vacuum remains constant, proceed with filling.

In event of leaks, check cooling system for leaks.

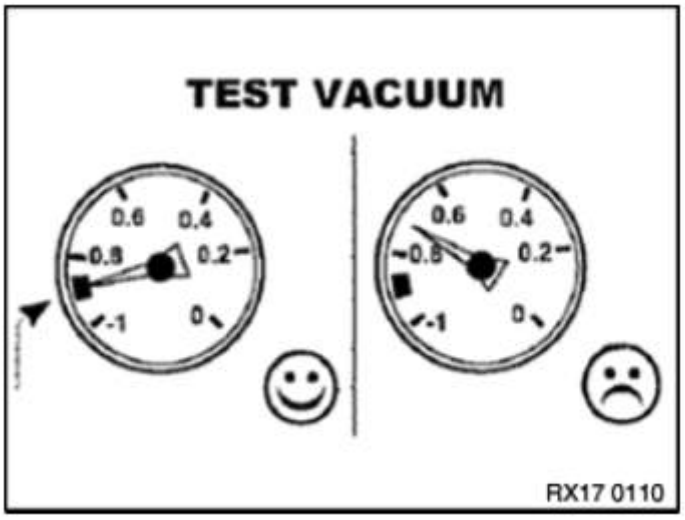


Fig. 28: Checking Cooling System For Leaks
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: There must be sufficiently premixed coolant in the filling unit container: 1-2 liters more than the vehicle filling capacity.
Position the filling unit container at the same height as the coolant expansion tank.

Shut-off valve (B) remains closed during the filling process.

cardiagn.com

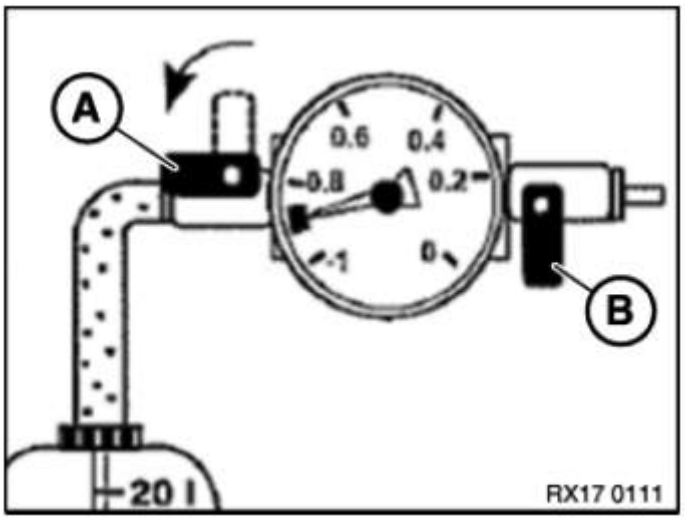


Fig. 29: Positioning Filling Unit Container
Courtesy of BMW OF NORTH AMERICA, INC.

To fill the cooling system, open shutoff valve (A) to filling unit container.

Coolant is now added.

The filling procedure is finished when the needle in the vacuum meter is at 0 bar or no longer falls.

If necessary, reduce remaining vacuum.

Open shutoff valve (B) to do so.

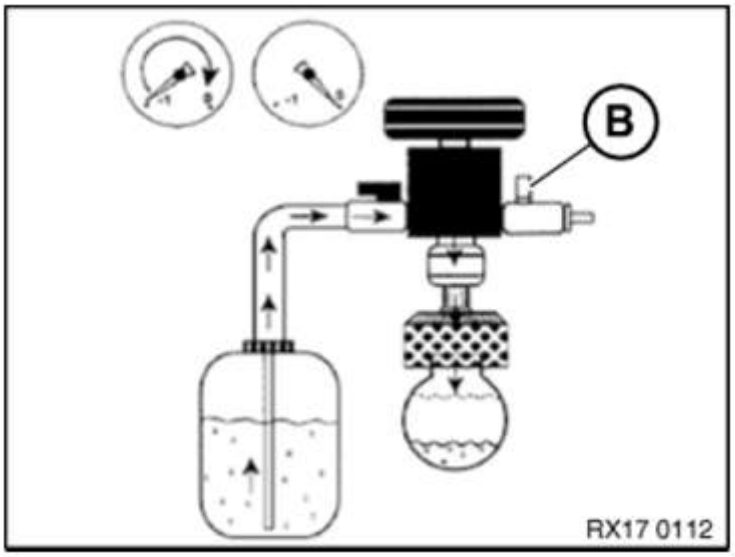


Fig. 30: Opening Shutoff Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Remove filling unit with adapter from expansion tank.

Adjust coolant level to maximum.

Close coolant expansion tank.

cardiagn.com

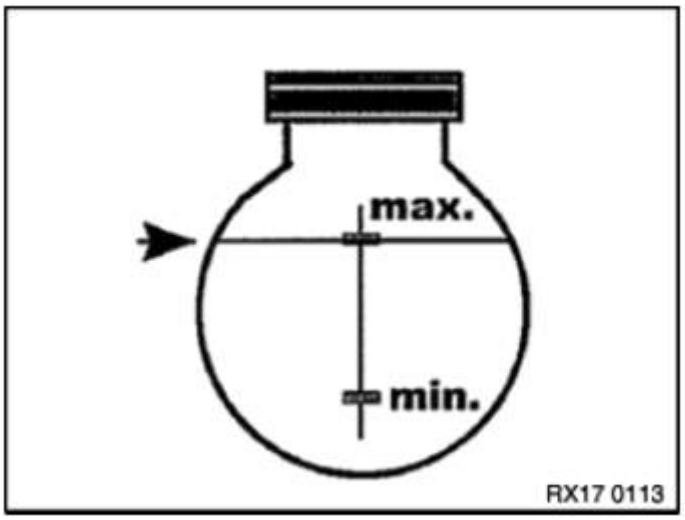


Fig. 31: Identifying Coolant Level
Courtesy of BMW OF NORTH AMERICA, INC.

After the cooling system has been filled with the vacuum filling unit, another bleeding procedure must be performed for the following vehicles:

- E84 N20
- **F25, F26 N52T, N55**
- **F25, F26 N20**
- E70, E71 N63, S63
- E70, E71 N57 D30 S 1
- E72 N63
- F20, F21, F30, F31 F35, N13
- F20, F21, F22, F23, F30, F31, F32, F33, F34, F35 F36 N20, N26
- F20, F21, F22, F23, F30, F31, F32, F33, F34, F35 F36 N55
- F30 N55 Hybrid car
- F15 N55
- F15 N63 B44 O1
- F15 N57 D30 S 1
- F55, F56 B38, B48, B46
- F80, F82, F83, S55
- F45, F46, B38, B48
- F25, F26, B47
- F45, F46, B47, B37
- F55, F56, B37, B47
- F16 N63 B44 O1
- F16 N55
- F16 N57 D30 S 1
- F22, F23, B47
- F21, F20, B37

After the cooling system has been filled with the vacuum filling unit, another bleeding procedure must be performed for vehicles with an electric coolant pump:

NOTE: **Do not open the coolant expansion tank sealing cap during the bleeding**

cardiagn.com

procedure.
Switch on the low-beam headlights to perform the bleeding procedure. If the low-beam headlights are not switched on, the ignition (Terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.

1. Connect battery charger.
2. Switch the ignition on.
3. Switch on low-beam headlight.
4. Set heating to maximum temperature. Take back blower to smallest stage.
5. FES (driving experience switch) must not be in ECO PRO!
6. Press accelerator pedal for 10 seconds to floor. **Engine** must **not** be started.
7. The venting procedure is started when the accelerator pedal is pressed and takes approx. 12 minutes. (Electric coolant pump was activated and shuts down automatically after approx. 12 min).
8. Then adjust filling level in coolant expansion tank to maximum.
9. Check cooling system for leaks.
10. If the ventilation has to be performed again, deactivate DME completely (remove ignition key for approx. 3 minutes). Then repeat from point 3.

Check function of cooling system.

Check cooling system for tightness.

17 00 039 VENTING COOLING SYSTEM AND CHECKING FOR WATERTIGHTNESS (N20)

WARNING: **Risk of scalding!**
Open sealing cap only after engine has cooled down.

Electric coolant pump!

IMPORTANT: **FOLLOW NOTES FOR CARRYING OUT REPAIR WORK ON THE COOLING SYSTEM**.

Lifetime coolant filling:
Never reuse used coolant!

IMPORTANT: When replacing and removing components which rely on the corrosion protection effect of the coolant, it is essential to change the coolant. The cooling system must therefore be drained and refilled.
In the case of other removal work involving the draining of part quantities of coolant, replace these quantities which have been drained with new coolant.

Only when refilling!

Use only recommended coolant. See **RADIATOR -- OPERATING FLUIDS** .

Observe mixture ratio. See **RADIATOR -- OPERATING FLUIDS** .

Perform filling operation slowly.

Adjust coolant level to maximum.

cardiagn.com

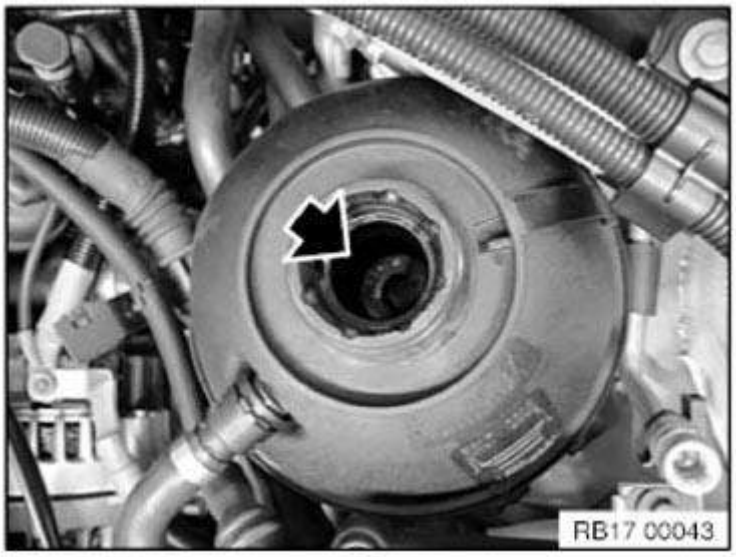


Fig. 32: Locating Expansion Tank Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Close coolant expansion tank.

Installation note:

Close the sealing cap (1) until the arrows line up.

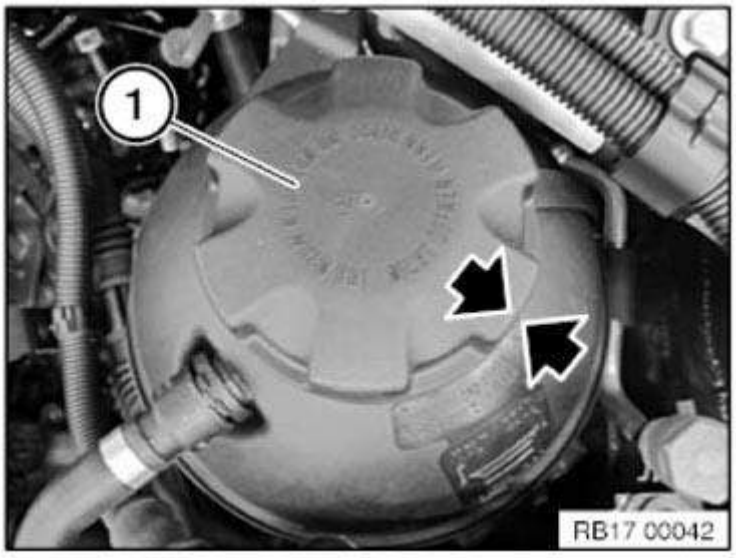


Fig. 33: Locating Coolant Expansion Tank Sealing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The following bleeding procedure is necessary e.g. when a part is replaced in the cooling system or when the cooling system is refilled.

Adding coolant:

Fill cooling system with **VACUUM FILLING DEVICE**.

Overview of bleeder screws in vehicles without high speed package.

1. Bleeder screw on radiator return hose.

cardiagn.com

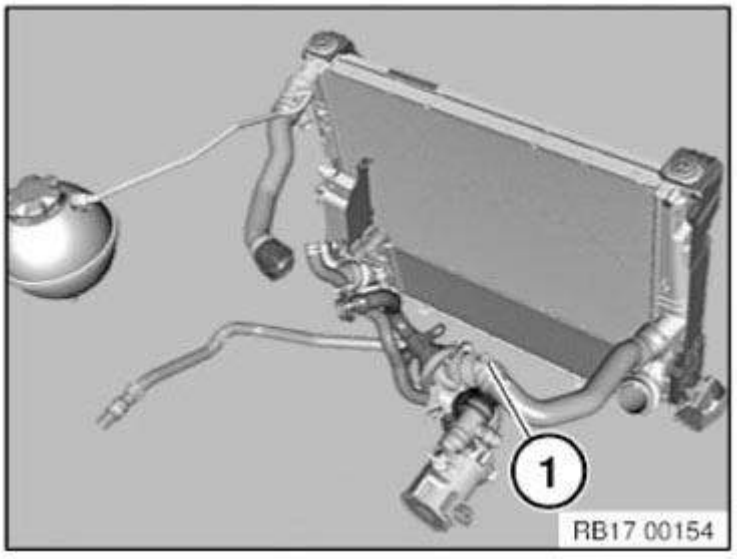


Fig. 34: Identifying Radiator Return Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Venting cooling system:

1. Fill cooling system using the vacuum filling device, after completing the filling procedure, remove the vacuum filling device.
2. Overfill expansion tank (to below the tank ventilation line).
3. Open the bleeder screw on radiator return hose (1) until coolant emerges without bubbles and then close it again.
4. Close bleeder screw on expansion tank
5. Massage coolant hoses (supply and return radiator).
6. Connect battery charger.
7. Switch on ignition and low-beam headlight. Switch on the low-beam headlights to perform the bleeding procedure. If the low-beam headlights are not switched on, the ignition (Terminal 15) will switch off automatically after a certain period of time and interrupt the bleeding procedure.
8. FES (driving experience switch) must not be in ECO PRO!
9. Set heater to maximum temperature and turn blower down to lowest speed.
10. Press accelerator pedal for 10 seconds to floor. **Engine** must **not** be started.
11. The bleeding procedure is started when the accelerator pedal is pressed and takes approx. 12 minutes. (Electric coolant pump was activated and shuts down automatically after approx. 12 min).
12. Then adjust fluid level in coolant expansion tank to maximum level.
13. **CHECK COOLING SYSTEM FOR WATERTIGHTNESS**.
14. Close coolant expansion tank.
15. After the bleeding procedure, let the engine run until it is warm and the electric fan starts running.
16. If venting has to be carried out again (e.g. if cooling system is leaking), allow DME to fall completely (leave ignition key removed for approx. 3 min), then repeat from Point 3.

Installation note:

Close the sealing cap (1) until the arrows line up.

cardiagn.com

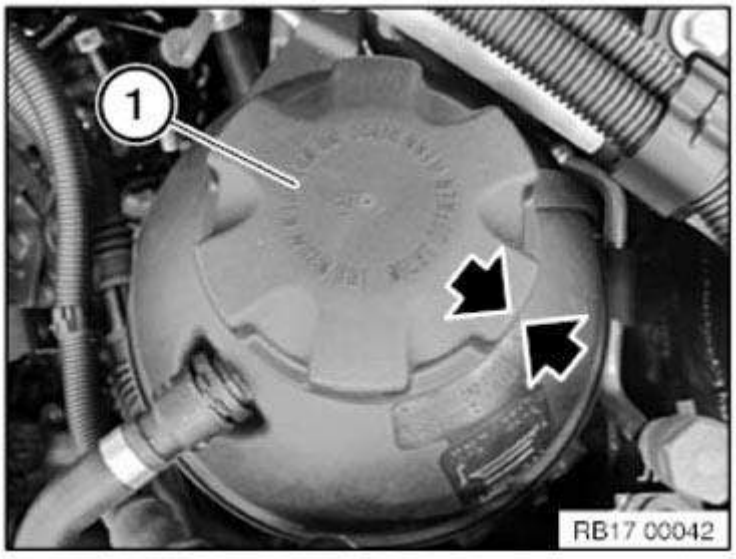


Fig. 35: Locating Coolant Expansion Tank Sealing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

RADIATOR, EXPANSION TANK, PIPES

64 53... INSTRUCTIONS FOR REPLACEMENT OF AIR CONDITIONING CAPACITORS AND RADIATOR/COOLERS

See 64 53... INSTRUCTIONS FOR REPLACEMENT OF AIR CONDITIONING CAPACITORS AND RADIATOR/COOLERS .

ENGINE RADIATOR WITH ATTACHMENT

64 53... INSTRUCTIONS FOR REPLACEMENT OF AIR CONDITIONING CAPACITORS AND RADIATOR/COOLERS

See 64 53... INSTRUCTIONS FOR REPLACEMENT OF AIR CONDITIONING CAPACITORS AND RADIATOR/COOLERS .

17 11 150 REMOVE, FIT/REPLACE ADDITIONAL OIL COOLER (N55)

Necessary preliminary tasks:

- REMOVE the right front section of the wheel arch cover.

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

IMPORTANT: Wear safety goggles and protective gloves.

Recycling:

Engine oil escapes when engine oil pipes are released. Collect any escaping engine oil using a suitable vessel and dispose of it.

Observe country-specific waste disposal regulations.

Release screw (1).

Tightening torque: 17 22 7AZ .

cardiagn.com

Remove engine oil pipe from engine oil cooler flange.

Replace sealing rings.

Release screws (3).

Tightening torque: **17 22 8AZ** .

Catch and dispose of emerging oil.

Remove engine oil cooler (2).

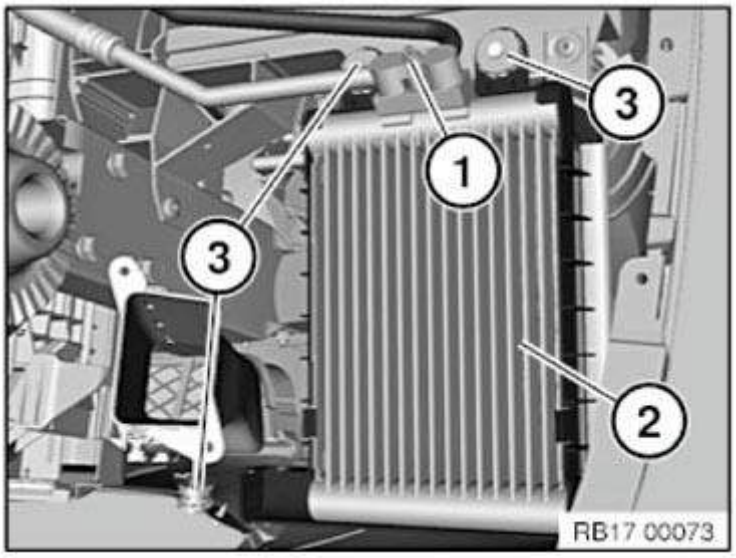


Fig. 36: Identifying Engine Oil Cooler & Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **After having completed repair work, check engine oil level, if necessary top up.**

17 11 000 REMOVING AND INSTALLING RADIATOR (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)

WARNING: **Risk of scalding!**
Only carry out repair work on the cooling system when the engine has cooled down.

IMPORTANT: Wear safety goggles and protective gloves.

Necessary preliminary tasks:

- Remove **fan cowl** . See **17 11 035 REMOVING AND INSTALLING/REPLACING FAN COWL WITH ELECTRIC FAN (N47 D20 O1, B47)** or **17 11 035 REMOVING AND INSTALLING/REPLACING FAN COWL WITH ELECTRIC FAN (N20, N55, N52T)**.
- Drain **COOLANT**.
- Release and detach coolant hoses from radiator

Bolts (1) on radiator on left and right.

Tightening torque: **17 10 4AZ** .

Feed out radiator towards rear and remove by pulling upwards.

cardiagn.com

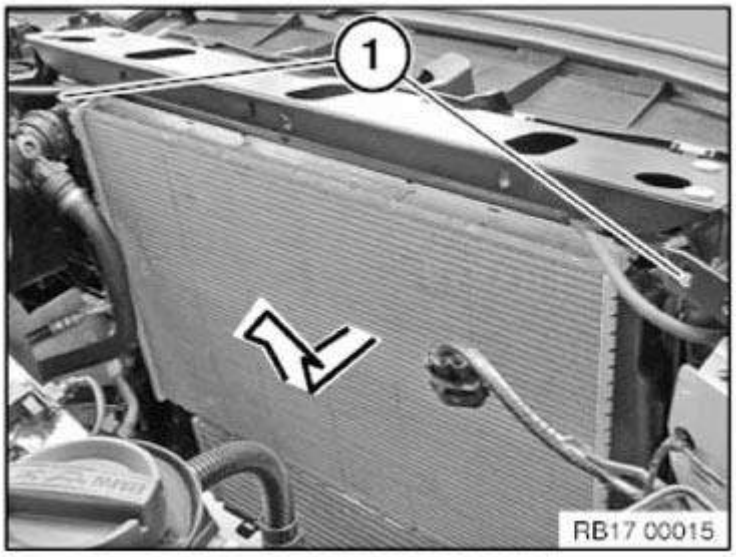


Fig. 37: Removing Radiator
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check **COOLING SYSTEM** for leaks.

17 11 100 REMOVING AND INSTALLING/REPLACING COOLANT EXPANSION TANK (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)

Necessary preliminary tasks:

- **FOLLOW** instructions for repair work on the cooling system.
- Disconnect coolant hoses from expansion tank for coolant.

If fitted:

Release screw (1).

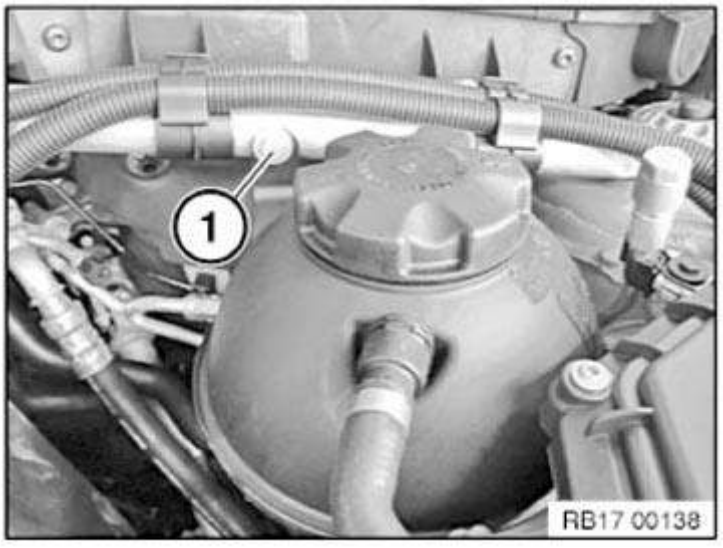


Fig. 38: Identifying Coolant Expansion Tank Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and detach coolant hose (2).

Pull expansion tank (1) upward out of retaining bracket.

cardiagn.com

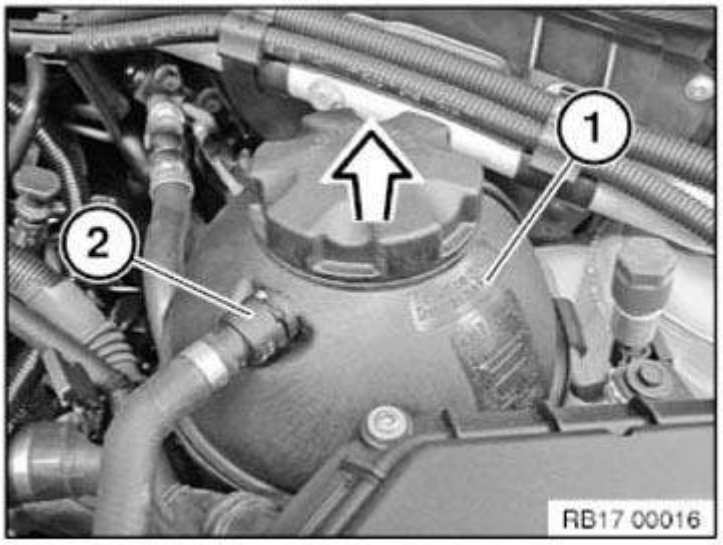


Fig. 39: Detaching Coolant Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Release and detach coolant hose (1) under expansion tank.

Unlock connector (2) on coolant level switch and disconnect.

Remove expansion tank.

Installation note:

Make sure guide pin (3) is fitted correctly in rubber grommet (4).

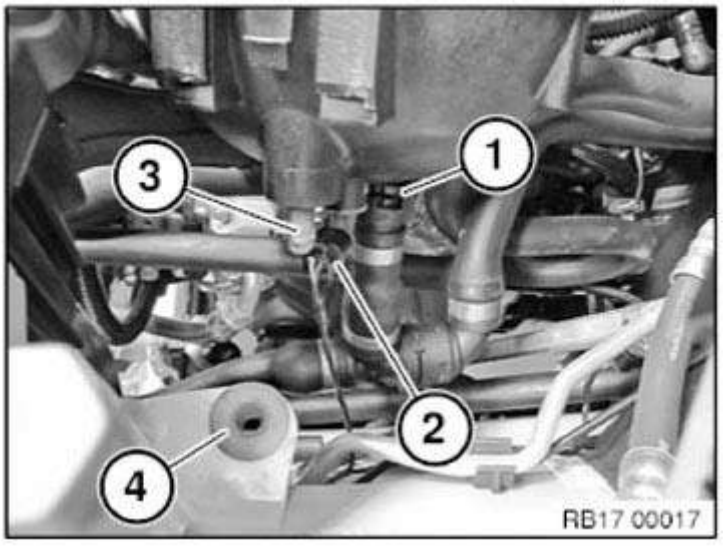


Fig. 40: Identifying Coolant Hose, Connector And Guide Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Top up **COOLANT**.

17 11 035 REMOVING AND INSTALLING/REPLACING FAN COWL WITH ELECTRIC FAN (N20, N55, N52T)

Necessary preliminary work:

cardiagn.com

- Switch off ignition.

Release screws (1).

Tightening torque: **17 10 1AZ** .

Unfasten screws (2).

Tightening torque: **17 10 2AZ** .

Remove cross connection (3).

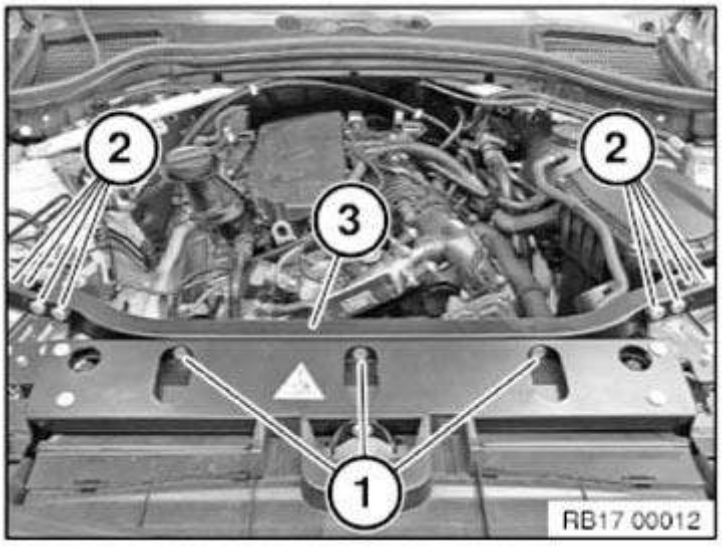


Fig. 41: Identifying Fan Cowl With Electric Fan Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Only for vehicles with automatic transmission:

Release screw (1).

Tightening torque: **17 10 6AZ** .

Release transmission oil cooler (2) from the fan cowl.

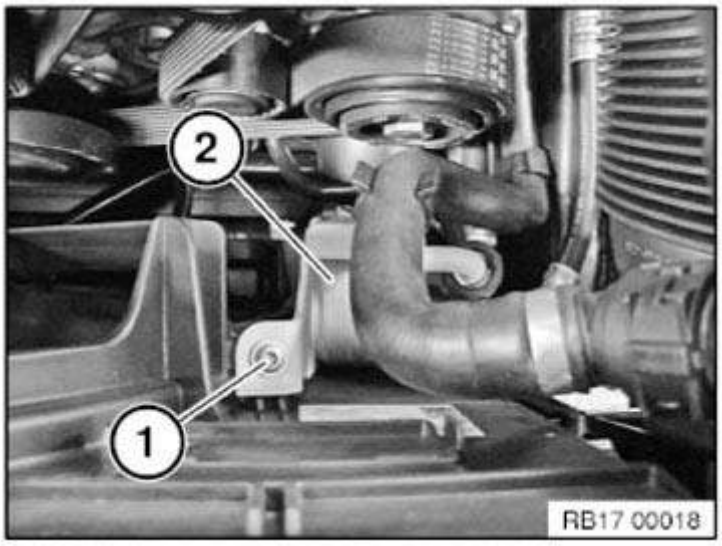


Fig. 42: Identifying Transmission Oil Cooler Screw
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release screw (1).

Tightening torque: **17 10 3AZ** .

Unlock and disconnect connectors (2) on fan cowl on right.

Pressing retainer (3) on fan cowl, left.

Detach coolant lines from fan cowl.

Remove fan cowl (4) towards top.

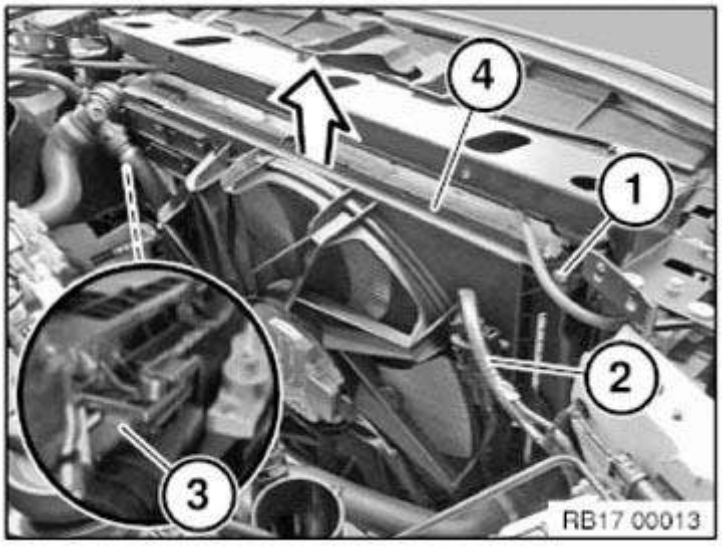


Fig. 43: Removing Fan Cowl
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Insert retaining tab (1) at bottom on module carrier.

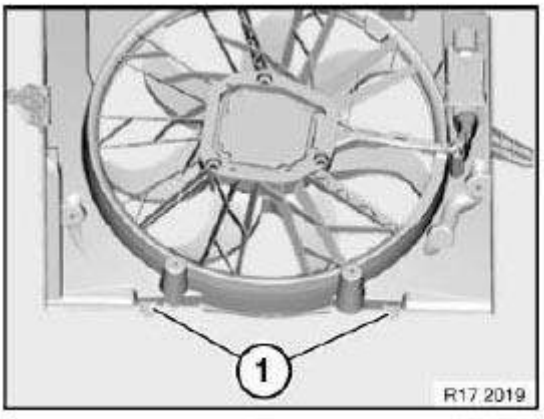


Fig. 44: Identifying Fan Retaining Tab
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Reassemble the vehicle.
Clear diagnostic fault entries from fault memory.

17 11 035 REMOVING AND INSTALLING/REPLACING FAN COWL WITH ELECTRIC FAN (N47 D20 O1, B47)

cardiagn.com

Necessary preliminary work:

- Switch off ignition.

Release screws (1).

Tightening torque: **17 10 1AZ** .

Unfasten screws (2).

Tightening torque: **17 10 2AZ** .

Remove cross connection (3).

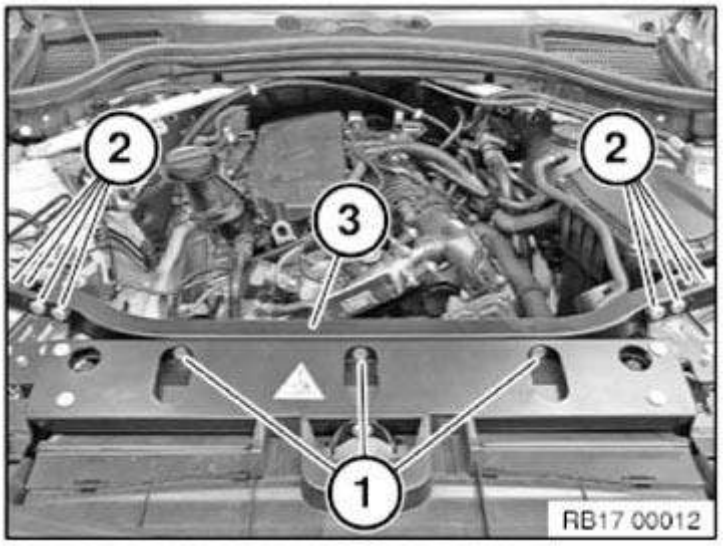


Fig. 45: Identifying Screws & Cross Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Version 1:

Release screw (1).

Tightening torque: **17 10 3AZ** .

Unlock and disconnect connectors (2) on fan cowl on right.

Pressing retainer (3) on fan cowl, left.

Detach coolant lines from fan cowl.

Remove fan cowl (4) towards top.

cardiagn.com

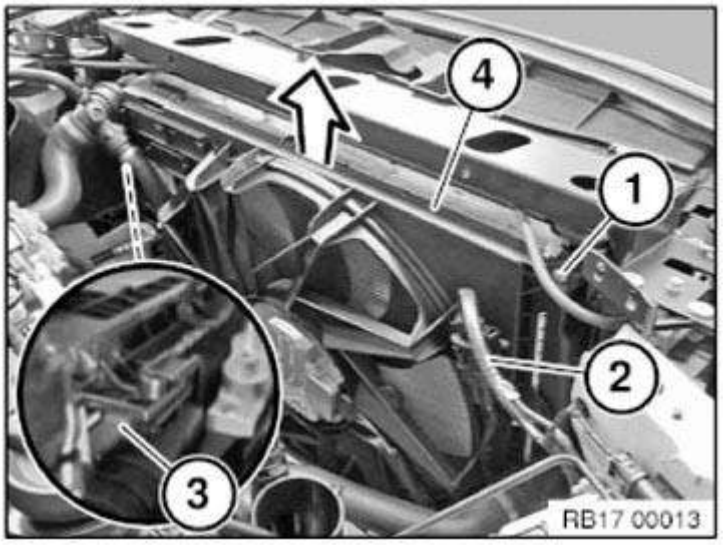


Fig. 46: Removing Fan Cowl
Courtesy of BMW OF NORTH AMERICA, INC.

Version 2:

Release left and right screws (1).

Tightening torque: **17 10 3AZ** .

Unlock and disconnect connectors (2) on fan cowl on right.

Pressing retainer (3) on fan cowl, left.

Detach coolant lines from fan cowl.

Remove fan cowl (4) towards top.

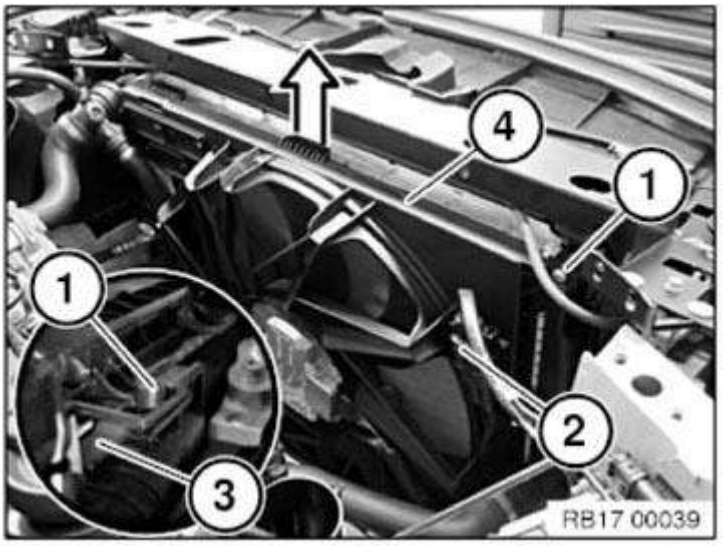


Fig. 47: Removing Fan Cowl
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Insert retaining tab (1) at bottom on module carrier.

cardiagn.com

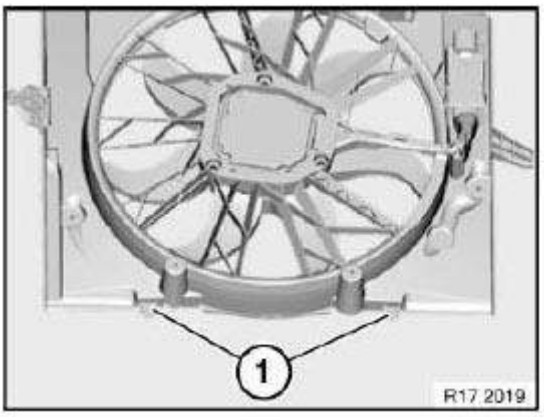


Fig. 48: Identifying Fan Retaining Tab
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Reassemble the vehicle.
Clear diagnostic fault entries from fault memory.

17 11 040 REMOVING AND INSTALLING/REPLACING THERMOSTAT CARTRIDGE (N47 D20 O 1, N57 D30 O 1)

IMPORTANT: Risk of scalding!
Only perform this repair work after engine has cooled down.

Recycling

Catch and dispose of drained coolant in a suitable container.

Observe country-specific waste disposal regulations.

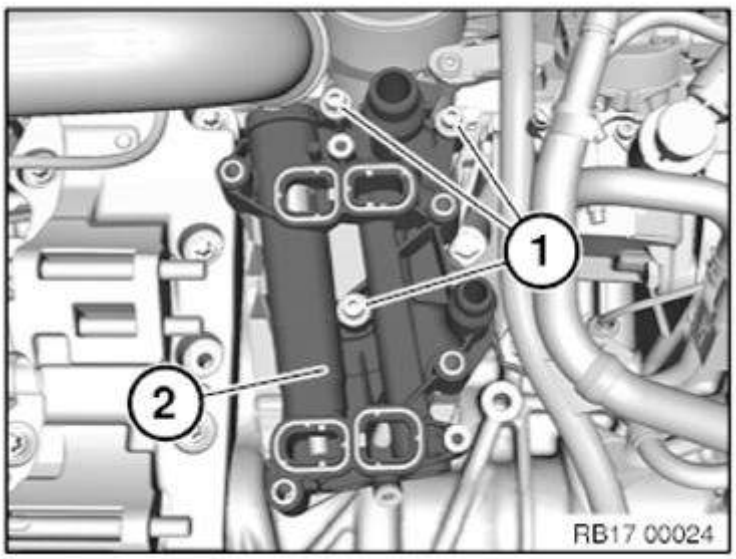
Necessary preliminary tasks:

- Remove **GEARBOX OIL COOLER**.

Release screws (1).

Tightening torque: **17 22 5AZ** .

Remove thermostat housing with thermostat (2).



cardiagn.com

Fig. 49: Identifying Thermostat Housing & Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace the seals (1) on the oil filter housing.

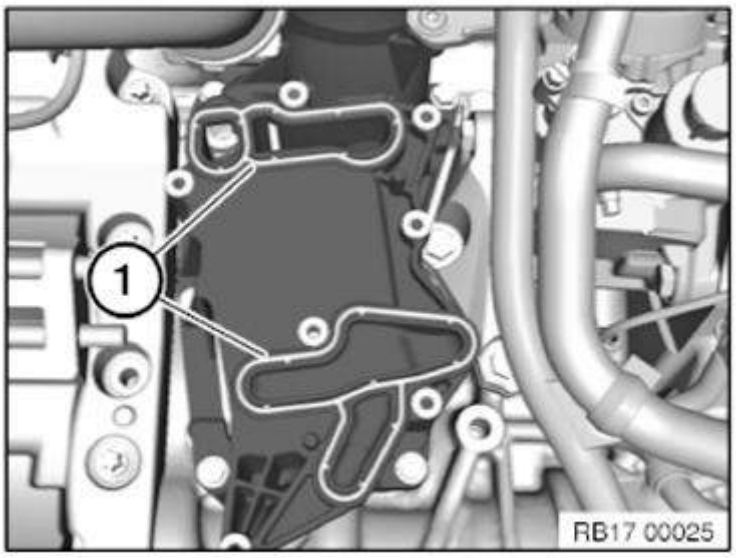


Fig. 50: Identifying Oil Filter Housing Seals
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

OIL COOLER

64 53... INSTRUCTIONS FOR REPLACEMENT OF AIR CONDITIONING CAPACITORS AND RADIATOR/COOLERS

See 64 53... INSTRUCTIONS FOR REPLACEMENT OF AIR CONDITIONING CAPACITORS AND RADIATOR/COOLERS .

17 11 150 REMOVE, FIT/REPLACE ADDITIONAL OIL COOLER (N55)

See 17 11 150 REMOVE, FIT/REPLACE ADDITIONAL OIL COOLER (N55).

17 21 500 RINSE TRANSMISSION OIL COOLER WITH LINES (AUTOMATIC TRANSMISSION) (GA8HP45Z, GA8HP50Z, GA8HP70Z, GA8HP75Z, GA8HP90Z)

Special tools required:

- 17 2 018
- 17 2 019

NOTE: **Carry out the operations listed when:**
Install a new or exchange transmission.

Procedure:

Automatic transmission removed.

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

cardiagn.com

Use quick-release coupling to connecting line **17 2 019** from oil dispenser unit.

Use quick-release coupling to drain line **17 2 018** .

Hold and direct open end of drain line into a suitable collecting vessel.

Using oil dispenser unit, flush approx. 1 liter of transmission fluid (refer to **AUTOMATIC TRANSMISSION -- OPERATING FLUIDS**) through oil lines and transmission oil cooler.

Reposition quick-release couplings.

Flush oil lines/transmission oil cooler in opposite direction with approx. 1 liter of transmission fluid (refer to **AUTOMATIC TRANSMISSION -- OPERATING FLUIDS**).

Disconnect quick-release couplings.

Remove adapter.

Recycling:

Never use flushing oil.

Dispose of flushing oil according to country-specific waste disposal regulations.

Press hydraulic lines (1) into adapters (2).

Slide clamping bracket (3) into guides and secure with screw (4).

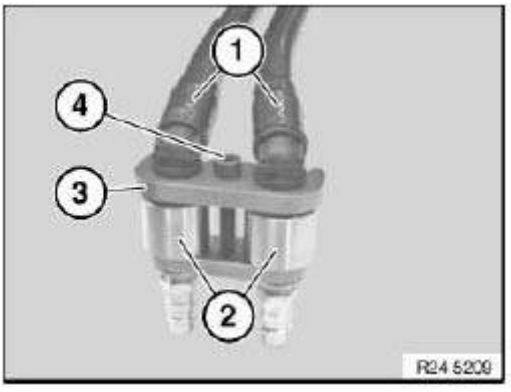
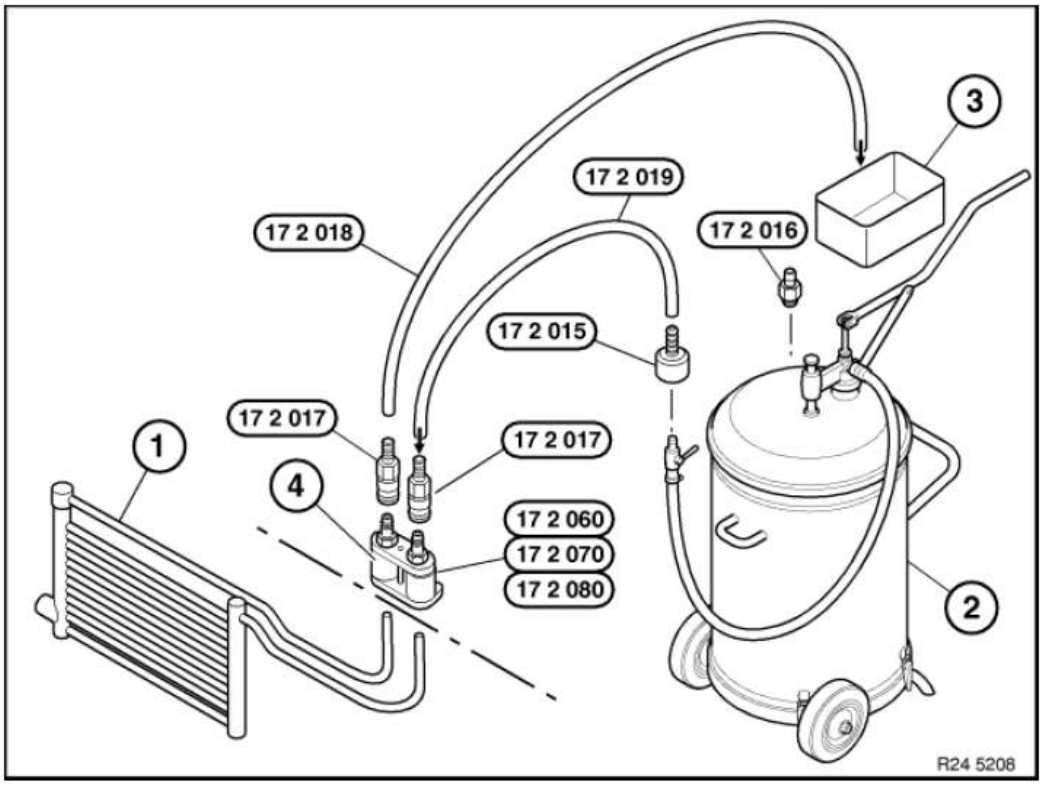


Fig. 51: Identifying Hydraulic Lines, Adapters And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Arrangement of flushing device for transmission GA8HP45Z, GA8HP50, GA8HP70Z, GA8HP75Z, GA8HP90Z

cardiagn.com



1) Transmission oil cooler with lines

2) Oil dispenser unit

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

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

17 2 017 Quick-release coupling (2 pieces)

17 2 019 Hose to oil dispenser unit (2)

3) Oil drip tray

17 2 018 Hose to oil drip tray (3)

4) Adapter with clamping bracket

17 2 080 Adapter with clamping bracket GA8HP45Z /GA8HP70Z /GA8HP90Z

Fig. 52: Identifying Flushing Device For Transmission (GA8HP45Z, GA8HP50, GA8HP70Z, GA8HP75Z, GA8HP90Z)
Courtesy of BMW OF NORTH AMERICA, INC.

OIL COOLER LINES

17 22... INSTALL/REMOVE/REPLACE GEARBOX OIL LINES FOR THE AUTOMATIC TRANSMISSION (N55)

IMPORTANT: Risk of scalding!
Only perform this repair work after engine has cooled down.

cardiagn.com

Necessary preliminary tasks:

- Remove intake port. See **13..... REMOVING INTAKE PORT (N55)** .
- Remove front **UNDERBODY PROTECTION** .
- Remove **LEFT UNDERBODY PANELLING**

Recycling

Transmission oil emerges when fluid lines are detached from transmission oil cooler.

Catch and dispose of escaping transmission oil in a suitable container.

Observe country-specific waste disposal regulations.

Unlock transmission fluid lines (1) and detach from gearbox oil cooler.

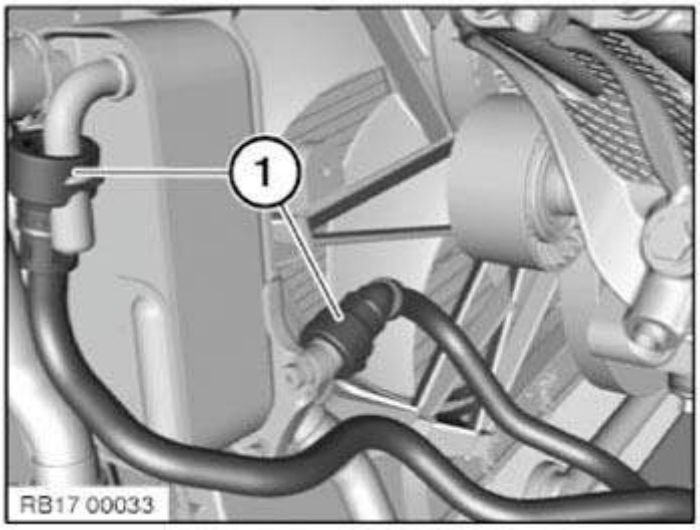


Fig. 53: Identifying Transmission Fluid Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Undo the gearbox oil lines (2) from the holders.

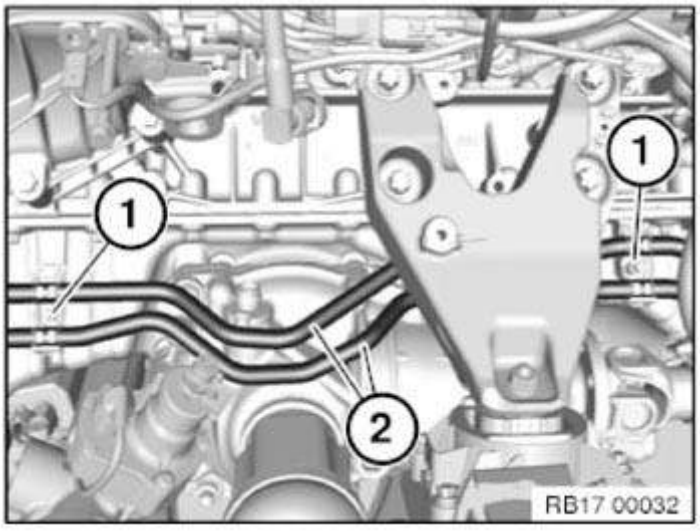


Fig. 54: Identifying Gearbox Oil Lines & Screws
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release screw (1).

Pull off and remove gearbox oil lines from the gearbox.

Replace gaskets.

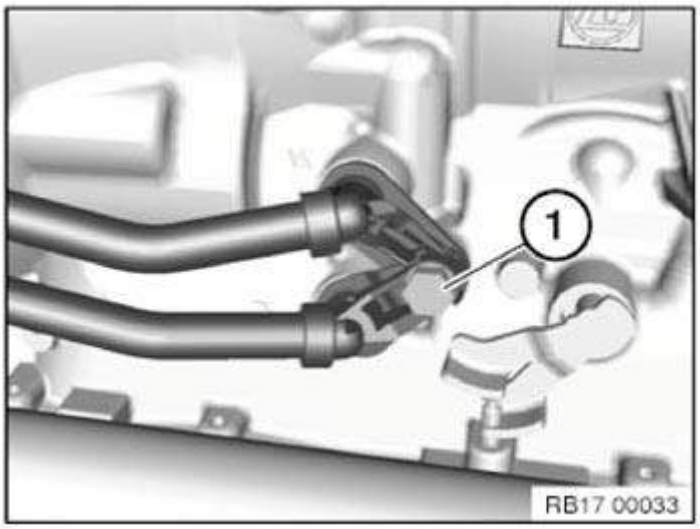


Fig. 55: Identifying Gearbox Oil Lines Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Check the software version if a plastic gearbox oil line has been fitted or must be replaced!

To prevent thermal damage of the components, it is only permitted to fit plastic gearbox oil lines in conjunction with integration level **F025-11-03-500** or higher (PU measure 1.04.2011).

Check integration level version and upgrade, if applicable.

NOTE: **Assemble engine.**
Check OIL LEVEL in automatic transmission. If necessary, top up automatic transmission oil.

17 22 010 REMOVING AND INSTALLING/REPLACING TRANSMISSION OIL COOLER FOR AUTOMATIC TRANSMISSION (N47 D20 O 1, N57 D30 O 1)

IMPORTANT: Risk of scalding!
Only perform this repair work after engine has cooled down.

Necessary preliminary tasks:

- Remove **INTAKE SILENCER HOUSING** .
- Drain **COOLANT**.
- Remove **COOLANT EXPANSION TANK**.

Recycling

Catch and dispose of drained coolant in a suitable container.

Transmission oil emerges when fluid lines are detached from transmission oil cooler.

Catch and dispose of escaping transmission oil in a suitable container.

Observe country-specific waste disposal regulations.

cardiagn.com

Unlock and detach coolant hose (1).

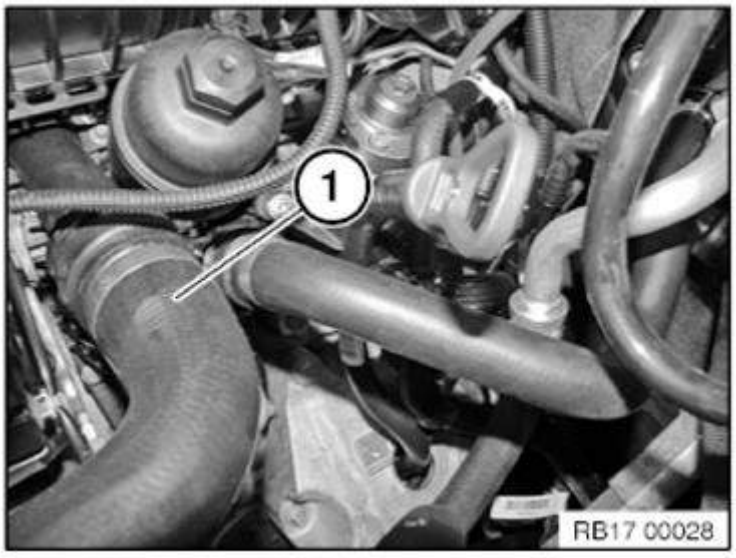


Fig. 56: Identifying Coolant Hose
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The transmission oil cooler is located in the oil filter housing.

Release screw (1).

Pull transmission oil lines off of transmission oil cooler and close with suitable plugs.

Unlock and detach coolant hose (2).

Installation note:

Replace sealing rings.

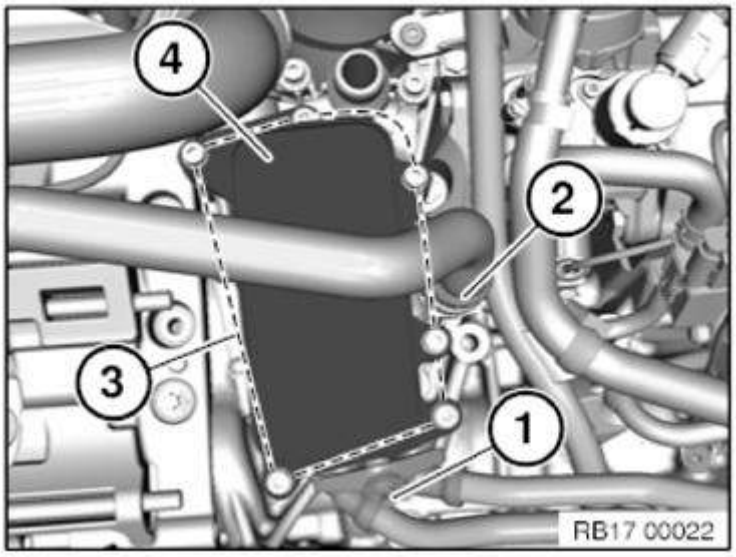


Fig. 57: Identifying Coolant Hose & Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts along line (3).

Remove transmission oil cooler (4).

cardiagn.com

Installation note:

Replace gaskets (1) on thermostat housing.

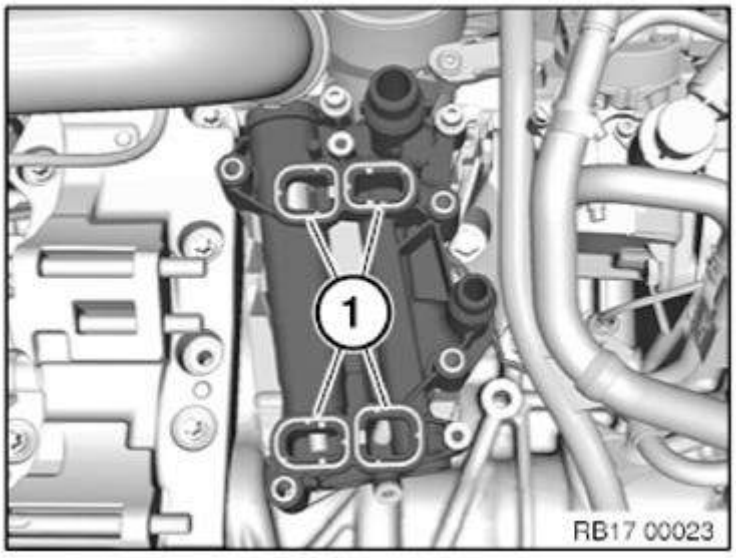


Fig. 58: Identifying Transmission Oil Cooler And Gaskets
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Assemble engine.**
Check OIL LEVEL in automatic transmission. If necessary, top up automatic transmission oil.

17 22 010 REMOVING AND INSTALLING/REPLACING TRANSMISSION OIL COOLER FOR AUTOMATIC TRANSMISSION (N52T)

IMPORTANT: Risk of scalding!
Only perform this repair work after engine has cooled down.

Necessary preliminary work:

- Drain **COOLANT**.

Recycling

Catch and dispose of drained coolant in a suitable collecting vessel.

Transmission oil emerges when fluid lines are detached from transmission oil cooler.

Catch and dispose of escaping transmission oil in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Release and disconnect coolant hoses (1).

Unlock transmission oil lines (2) and detach.

Release screw (3).

Tightening torque: **17 10 6AZ** .

Detach transmission oil cooler (4) from fan cowl and remove.

cardiagn.com

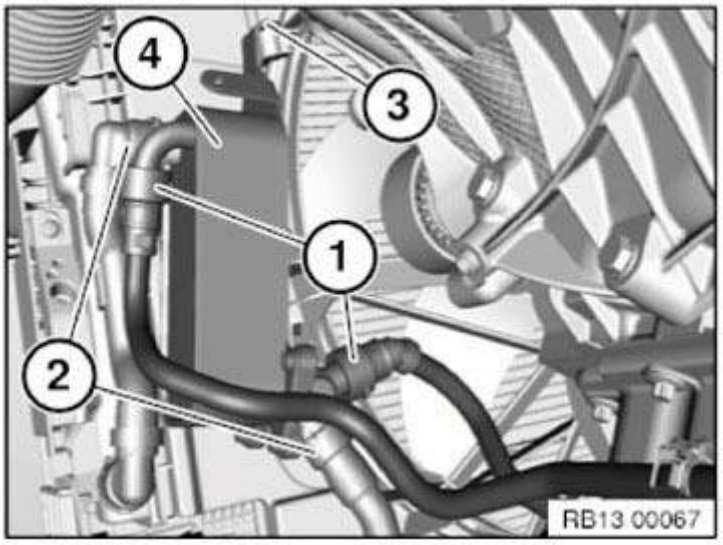


Fig. 59: Identifying Transmission Oil Lines, Coolant Hoses And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Assemble engine.**
Check OIL LEVEL in automatic transmission. If necessary, top up automatic transmission oil.

17 22 010 REMOVING AND INSTALLING/REPLACING TRANSMISSION OIL COOLER FOR AUTOMATIC TRANSMISSION (N55)

IMPORTANT: Risk of scalding!
Only perform this repair work after engine has cooled down.

Necessary preliminary work:

- Drain COOLANT.
- Remove intake port. See 13..... REMOVING INTAKE PORT (N55) .

Recycling

Catch and dispose of drained coolant in a suitable container.

Transmission oil emerges when engine oil lines are detached from transmission oil cooler.

Catch and dispose of escaping transmission oil in a suitable container.

Observe country-specific waste disposal regulations.

Release and disconnect coolant hoses (1).

Unlock transmission oil lines (2) and detach.

Release screw (3).

Tightening torque: 17 10 6AZ .

Detach transmission oil cooler (4) from fan cowl and remove.

cardiagn.com

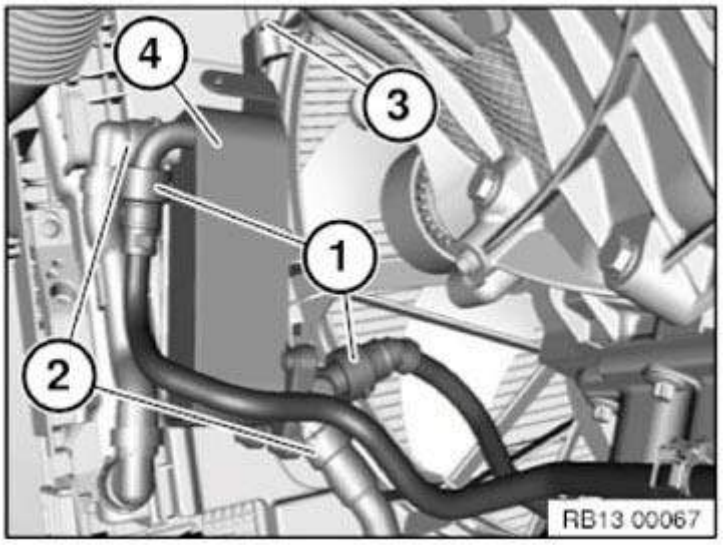


Fig. 60: Identifying Transmission Oil Lines And Coolant Hoses
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Assemble engine.**
Check OIL LEVEL in automatic transmission. If necessary, top up automatic transmission fluid.

17 21 500 RINSE TRANSMISSION OIL COOLER WITH LINES (AUTOMATIC TRANSMISSION) (GA8HP45Z, GA8HP50Z, GA8HP70Z, GA8HP75Z, GA8HP90Z)

See 17 21 500 RINSE TRANSMISSION OIL COOLER WITH LINES (AUTOMATIC TRANSMISSION) (GA8HP45Z, GA8HP50Z, GA8HP70Z, GA8HP75Z, GA8HP90Z).

CHARGE AIR COOLER WITH MOUNT

64 53... INSTRUCTIONS FOR REPLACEMENT OF AIR CONDITIONING CAPACITORS AND RADIATOR/COOLERS

See 64 53... INSTRUCTIONS FOR REPLACEMENT OF AIR CONDITIONING CAPACITORS AND RADIATOR/COOLERS .

17 51 000 REMOVING AND INSTALLING/REPLACING CHARGE AIR COOLER (N20, N55, N47 D20 O 1, N57 D30 O/T 1, B47)

Necessary preliminary tasks:

- Remove front UNDERBODY PROTECTION .

IMPORTANT: Coat sealing rings of snap fasteners with lubricant.
Pressure pipes cannot be fitted without lubricant.

Release lock (1) with a suitable tool.

Disconnect pressure pipe (2) on left from charge air cooler.

cardiagn.com

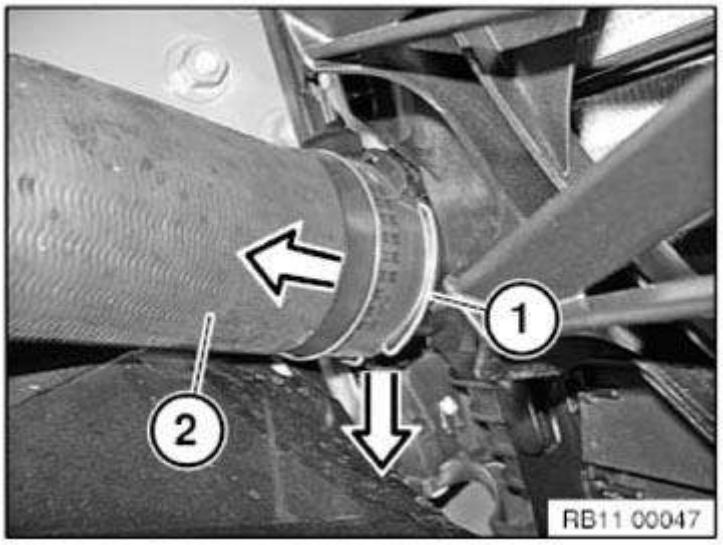


Fig. 61: Disconnecting Pressure Pipe From Charge Air Cooler
Courtesy of BMW OF NORTH AMERICA, INC.

Release lock (1) in direction of arrow.

Detach pressure pipe (2) on right from charge air cooler in direction of arrow.

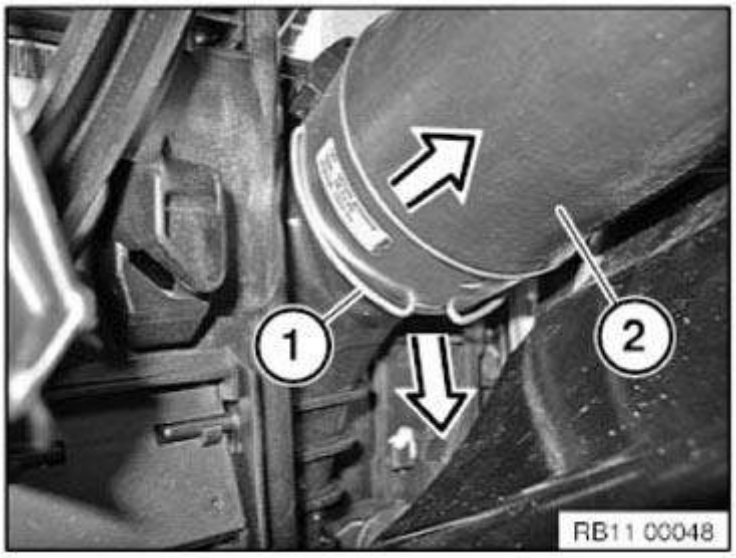


Fig. 62: Detaching Pressure Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Remove expanding rivets (1).

Pull back cover (2) and remove.

Release screws (3).

Tightening torque: **17 10 5AZ** .

Feed out charge air cooler (4) towards bottom and remove.

cardiagn.com

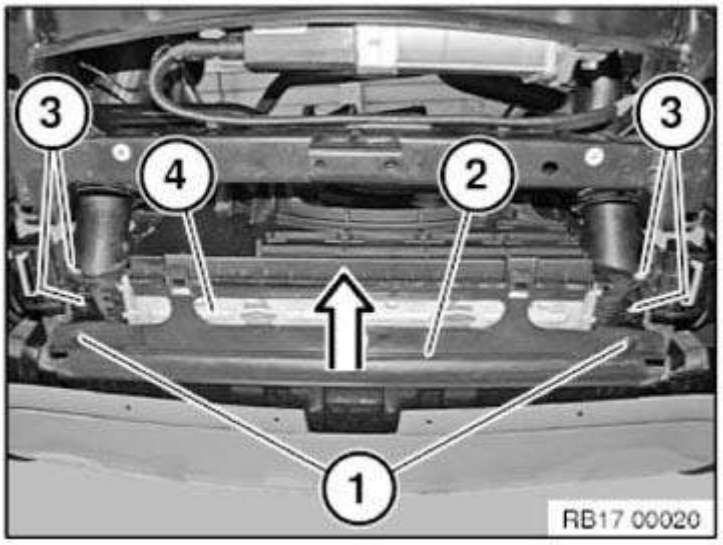


Fig. 63: Removing Charge Air Cooler
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Charge air hoses must audibly snap into place.

Coat sealing rings of charge air hoses with lubricant.

Pressure pipes cannot be fitted without lubricant.

Check charge air system for leaks.

Assemble engine.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702201

cardiagn.com

COOLING SYSTEM

0491391 ADAPTER

0491391 170009 Adapter AM

NOTE: (Adapter for radiator expansion tank) Series: E36/model: M3 US engine: W10

Storage Location

B83

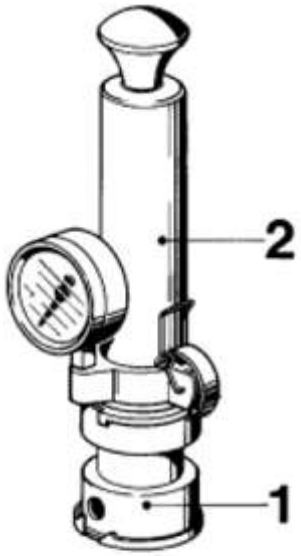


Fig. 1: Identifying Adapter (0491391)
Courtesy of BMW OF NORTH AMERICA, INC.

0494643 ADAPTER

0494643 170114 Adapter Minimum set: Mechanical tools AM

NOTE: For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)

cardiagn.com



Fig. 2: Identifying Adapter (0494643)
Courtesy of BMW OF NORTH AMERICA, INC.

0493108 ADAPTER

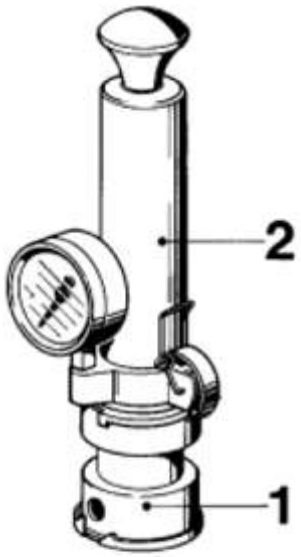
0493108 170007 Adapter AM

Replaced by: 83300494417

NOTE: **(Adapter) For testing the expansion tank cover/Series: E31, E32, E34, E36, E38, E39 Replaced by 17 0 100 (0 494 417)**

Storage Location

C17



W17 0 000

Fig. 3: Identifying Adapter (0493108)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0494426 ADAPTER

0494426 170109 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator connection R53/W11, R50/W17 adapter corresponds to 17 0 051**



Fig. 4: Identifying Adapter (0494426)
Courtesy of BMW OF NORTH AMERICA, INC.

0495889 ADAPTER

0495889 170115 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap Model series: N12, N14**

SI number

01 26 06 (321)



Fig. 5: Identifying Adapter (0495889)
Courtesy of BMW OF NORTH AMERICA, INC.

0496485 ADAPTER

0496485 172070 Adapter Minimum set: Mechanical tools AM

NOTE: **For flushing fluid cooler and lines of automatic transmission. Check lines:**

cardiagn.com

Diameter 15 mm

Storage Location

A25

SI number

01 14 08 (464)

Consisting of:

1. **0496490** Adapter
2. **0496491** Clip

NOTE: **(Clamping bracket)**

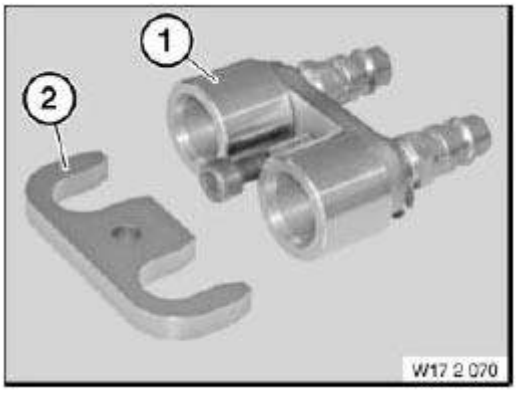


Fig. 6: Identifying Adapter (0496485)
Courtesy of BMW OF NORTH AMERICA, INC.

0494642 ADAPTER

0494642 170113 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)**



Fig. 7: Identifying Adapter (0494642)
Courtesy of BMW OF NORTH AMERICA, INC.

0491404 ADAPTER

cardiagn.com

0491404 172011 Adapter Minimum set: Mechanical tools AM

NOTE: **For connecting the oil cooler lines to the oil dispenser unit - Transmission: A5S 310Z, A5S 560Z, A5S 325Z Deletion, only available via tool set**

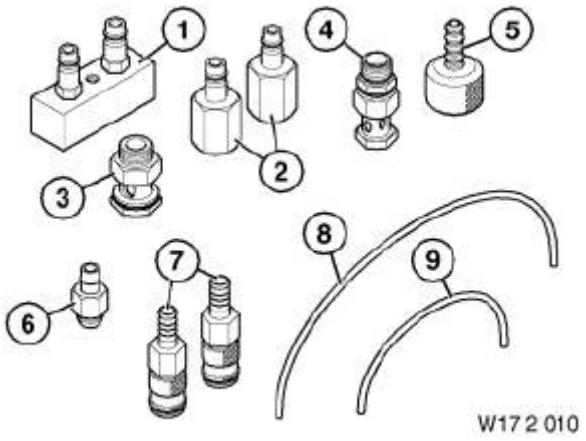


Fig. 8: Identifying Adapter (0491404)
Courtesy of BMW OF NORTH AMERICA, INC.

0496484 ADAPTER

0496484 172060 Adapter Minimum set: Mechanical tools AM

NOTE: **For flushing fluid cooler and lines of automatic transmission. Check lines: Diameter 12 mm**

Storage Location

A25

SI number

01 14 08 (464)

Consisting of:

1. 0496487 Adapter

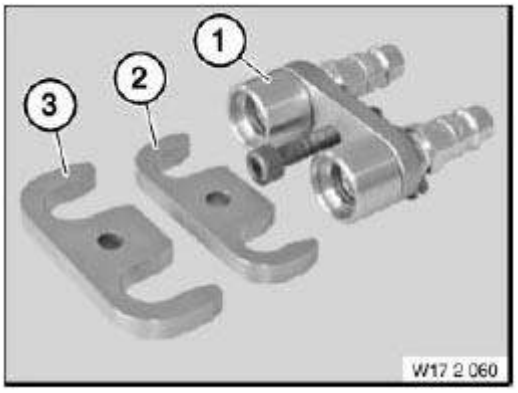


Fig. 9: Identifying Adapter (0496484)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0496488 Clip

NOTE: **(Clamping bracket) Clamping bracket for aluminum line. Discontinued,**

cardiagn.com

can only be ordered using complete tool

3. **0496489** Clip

NOTE: **(Clamping bracket) Clamping bracket for steel line with pressed-on aluminum bush (connection). Discontinued, can only be ordered using complete tool**

0494430 ADAPTER

0494430 170131 Adapter AM

NOTE: **Connection from pump 17 0 101 and hose 17 0 102 to adapter from 17 0 000, Liquidation of existing inventory and then available only as a complete tool set 17 0 130 = 83 30 0 494 429 - as of 29.11.2011**

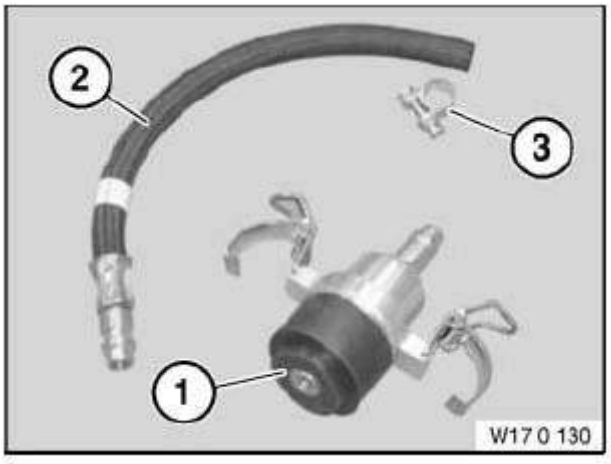


Fig. 10: Identifying Adapter (0494430)
Courtesy of BMW OF NORTH AMERICA, INC.

0494423 ADAPTER

0494423 170106 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap (sawtooth thread)**

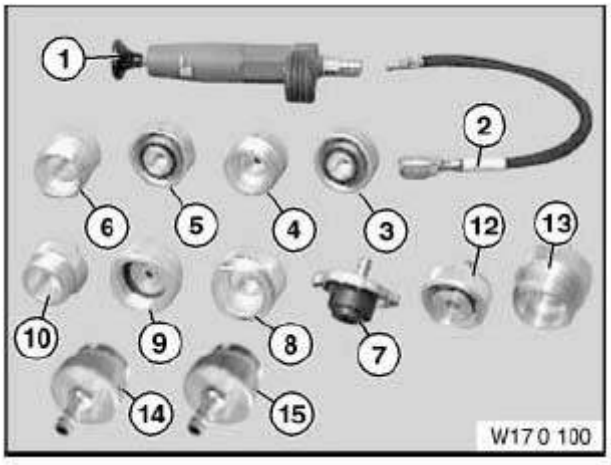


Fig. 11: Identifying Adapter (0494423)
Courtesy of BMW OF NORTH AMERICA, INC.

0494425 ADAPTER

cardiagn.com

0494425 170108 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap R50/W10**

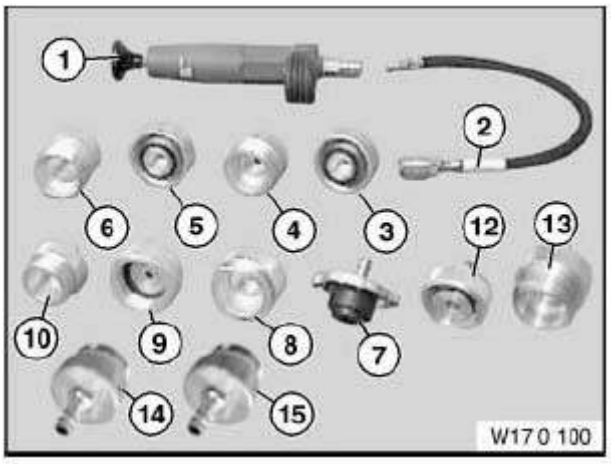


Fig. 12: Identifying Adapter (0494425)
Courtesy of BMW OF NORTH AMERICA, INC.

0491390 ADAPTER

0491390 170006 Adapter AM

Replaced by: 83300493108

NOTE: **(Adapter) For screw-on radiator caps (sawtooth thread)/Replaces 06/97 with 17 0 007/Reason: Expansion tank cover design change**

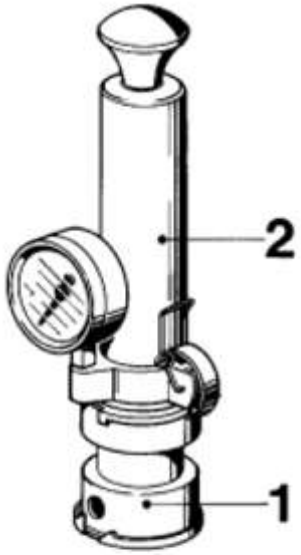


Fig. 13: Identifying Adapter (0491390)
Courtesy of BMW OF NORTH AMERICA, INC.

0491403 ADAPTER

cardiagn.com

0491403 172010 Adapter Minimum set: Mechanical tools AM

NOTE: (Adapter kit) For rinsing the oil cooler in automatic transmissions.

SI number

01 12 96 (103)

Consisting of:

1 = 0493621 Plate

NOTE: (Mounting plate) For adapter 17 2 011 - Transmission: A5S 325Z Deletion, only available via tool set

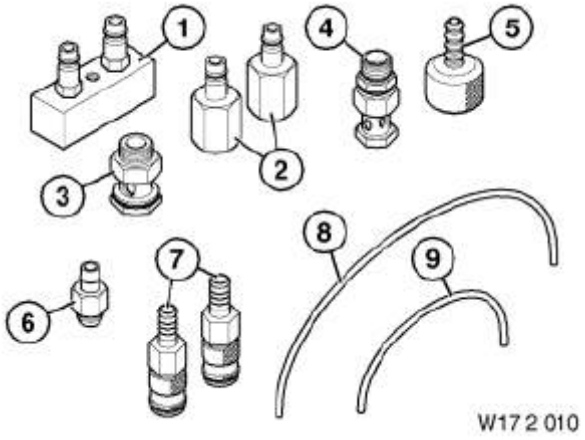


Fig. 14: Identifying Adapter (0491403)
Courtesy of BMW OF NORTH AMERICA, INC.

1 = 0491404 Adapter

NOTE: For connecting the oil cooler lines to the oil dispenser unit - Transmission: A5S 310Z, A5S 560Z, A5S 325Z Deletion, only available via tool set

2 = 0491405 Adapter

NOTE: (Adapter (2 pieces)) For connecting the oil cooler lines to the oil dispenser unit - Transmission: A4S 310R Deletion, only available via tool set

3 = 0491406 Screw

NOTE: (Banjo bolt (2 pieces)) Thread M18x1.5 with nut and gasket for connecting the oil cooler lines to the oil dispenser unit - \Transmission: A5S 440Z Deletion, only available via tool set

4 = 0491407 Screw

NOTE: (Banjo bolt (2 pieces)) Thread M16x1.5 with nut, gasket and thread piece for connecting the oil cooler lines to the oil dispenser unit - transmission: A5S 300J Deletion, only available via tool set

5 = 0491408 Connector

NOTE: For Tecalemit oil dispenser unit Deletion, only available via tool set

cardiagn.com

6 = 0491409 Connector

NOTE: **For Horn oil dispenser unit Deletion, only available via tool set**

7 = 0491410 Adapter

NOTE: **(Clutch) Scope: 2 pieces Only available as part of complete set**

8 = 0491411 Hose

NOTE: **(Hose, long)**

9 = 0491412 Hose

NOTE: **(Hose, short)**

0494427 ADAPTER

0494427 170111 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap R53/W11, R50/W17 adapter corresponds to 17 0 052**

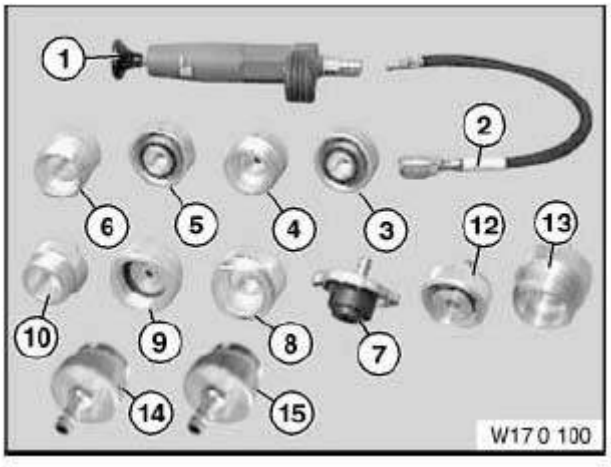


Fig. 15: Identifying Adapter (0494427)
Courtesy of BMW OF NORTH AMERICA, INC.

0496490 ADAPTER

0496490 172071 Adapter Minimum set: Mechanical tools AM

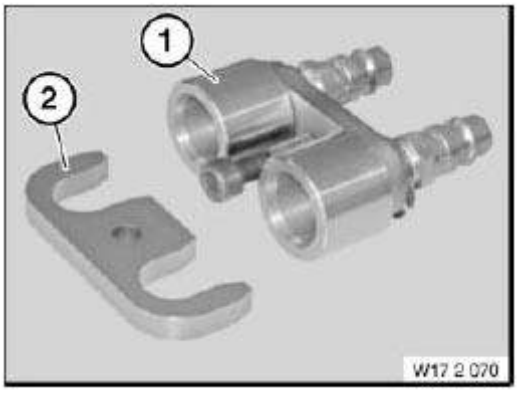


Fig. 16: Identifying Adapter (0496490)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0491389 ADAPTER

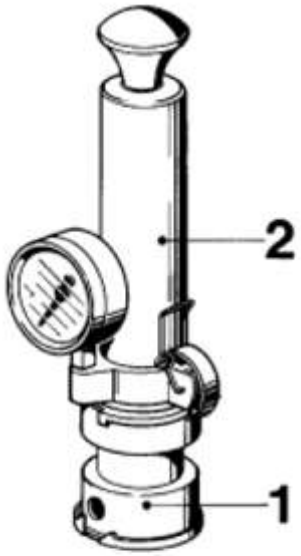
0491389 170005 Adapter AM

Replaced by: 83300494417

NOTE: **(Adapter) For screw-on radiator caps (sawtooth thread)/Series: E31, E32, E34, E36, E38, E39 Replaced by 17 0 100 (0 494 417)**

Storage Location

C17



W17 0 000

Fig. 17: Identifying Adapter (0491389)
Courtesy of BMW OF NORTH AMERICA, INC.

0494420 ADAPTER

0494420 170103 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap (normal thread)**

cardiagn.com



Fig. 18: Identifying Adapter (0494420)
Courtesy of BMW OF NORTH AMERICA, INC.

0494421 ADAPTER

0494421 170104 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap (normal thread)**

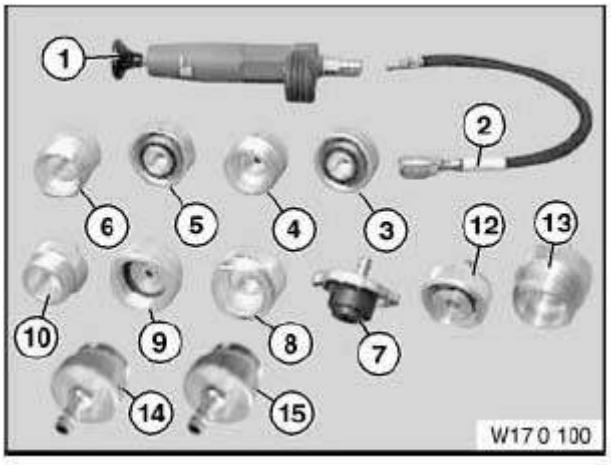


Fig. 19: Identifying Adapter (0494421)
Courtesy of BMW OF NORTH AMERICA, INC.

0494429 ADAPTER

0494429 170130 Adapter AM

NOTE: **(Adapter kit) For connecting the adapters from 17 0 000 with pump 17 0 101 and hose 17 0 102.**

SI number

01 07 02 (884)

Consisting of:

1. 0494430 Adapter

NOTE: **Connection from pump 17 0 101 and hose 17 0 102 to adapter from 17 0**

cardiagn.com

000, Liquidation of existing inventory and then available only as a complete tool set 17 0 130 = 83 30 0 494 429 - as of 29.11.2011

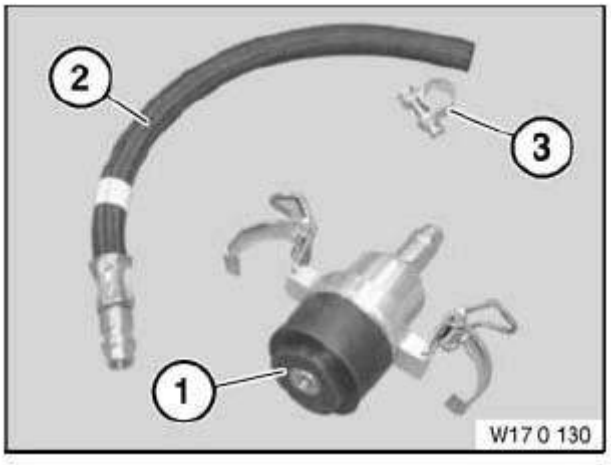


Fig. 20: Identifying Adapter (0494429)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0494431 Hose

NOTE: **(Hose with coupling) Connection of pump 17 0 101 to adapter 17 0 007 Liquidation of existing inventory and then available only via complete tool set 17 0 130 = 83 30 0 494 429 - status 29.11.2011**

3. 0494761 Clamp

NOTE: **(Hose clamp) for hose 17 0 132 Liquidation of existing inventory and then available only via complete tool set 17 0 130 = 83 30 0 494 429 - status 29.11.2011**

0491385 ADAPTER

0491385 170001 Adapter AM

NOTE: **(Adapter) For checking the pressure relief valve in the radiator cap/Series: all, except E28**

Storage Location

C17

cardiagn.com

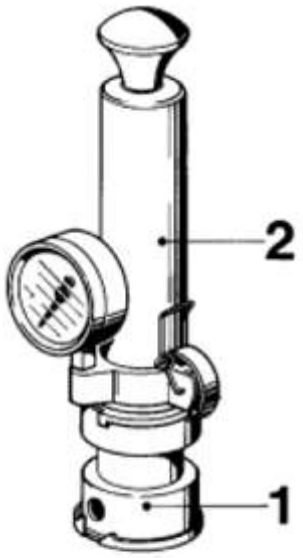


Fig. 21: Identifying Adapter (0491385)
Courtesy of BMW OF NORTH AMERICA, INC.

0491388 ADAPTER

0491388 170004 Adapter AM

NOTE: **(Adapter) For screw-on radiator caps (standard thread)/Series: E28, E30, E32/Engine: M51 Free only for motorcycle!!!**

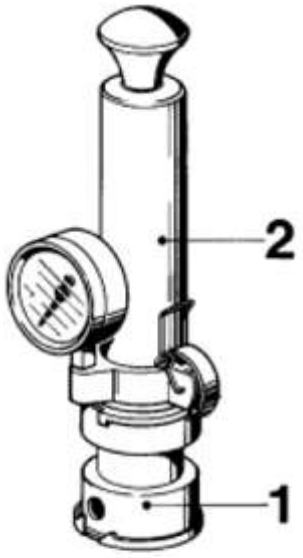


Fig. 22: Identifying Adapter (0491388)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0491387 ADAPTER

0491387 170003 Adapter AM

NOTE: (Adapter) For screw-on radiator caps (standard thread)/Series: E28, E30, E31, E32 engine: all, except M51 Free only for motorcycle!!!

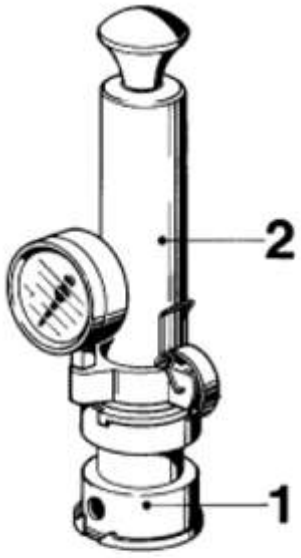


Fig. 23: Identifying Adapter (0491387)
Courtesy of BMW OF NORTH AMERICA, INC.

0496492 ADAPTER

0496492 172081 Adapter Minimum set: Mechanical tools AM

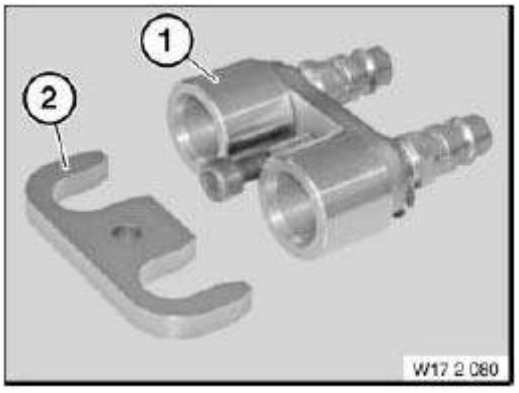


Fig. 24: Identifying Adapter (0496492)
Courtesy of BMW OF NORTH AMERICA, INC.

0491405 ADAPTER

0491405 172012 Adapter Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **(Adapter (2 pieces)) For connecting the oil cooler lines to the oil dispenser unit - Transmission: A4S 310R Deletion, only available via tool set**

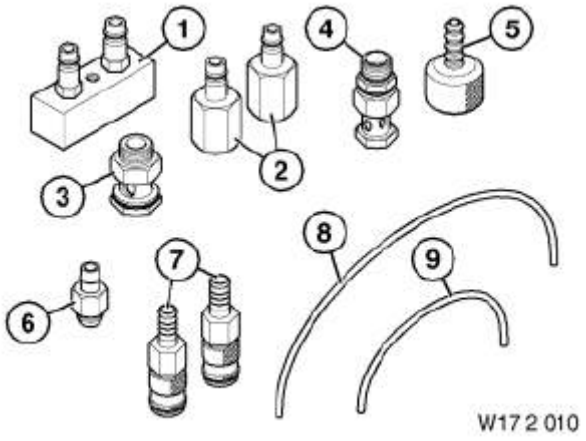


Fig. 25: Identifying Adapter (0491405)
Courtesy of BMW OF NORTH AMERICA, INC.

0496487 ADAPTER

0496487 172061 Adapter Minimum set: Mechanical tools AM

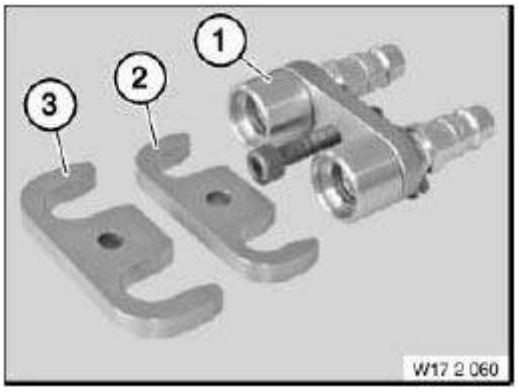


Fig. 26: Identifying Adapter (0496487)
Courtesy of BMW OF NORTH AMERICA, INC.

0494424 ADAPTER

0494424 170107 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap R50/W10**

cardiagn.com



Fig. 27: Identifying Adapter (0494424)
Courtesy of BMW OF NORTH AMERICA, INC.

0494422 ADAPTER

0494422 170105 Adapter Minimum set: Mechanical tools AM

NOTE: **For radiator cap (sawtooth thread)**



Fig. 28: Identifying Adapter (0494422)
Courtesy of BMW OF NORTH AMERICA, INC.

0496486 ADAPTER

0496486 172080 Adapter Minimum set: Mechanical tools AM

NOTE: **For flushing fluid cooler and lines of automatic transmission. Check lines: Plastic tubes**

Storage Location

A25

SI number

01 14 08 (464)

cardiagn.com

Consisting of:

1. 0496492 Adapter
2. 0496493 Clip

NOTE: **(Clamping bracket)**

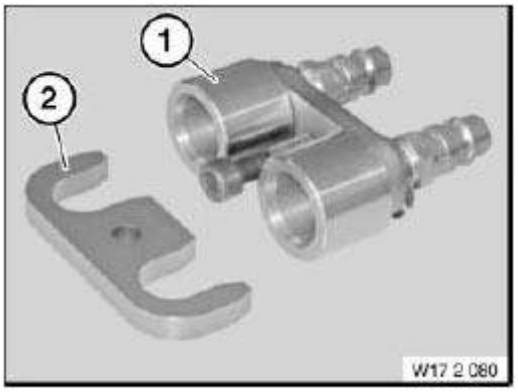


Fig. 29: Identifying Adapter (0496486)
Courtesy of BMW OF NORTH AMERICA, INC.

0491410 ADAPTER

0491410 172017 Adapter Minimum set: Mechanical tools AM

NOTE: **(Clutch) Scope: 2 pieces Only available as part of complete set**

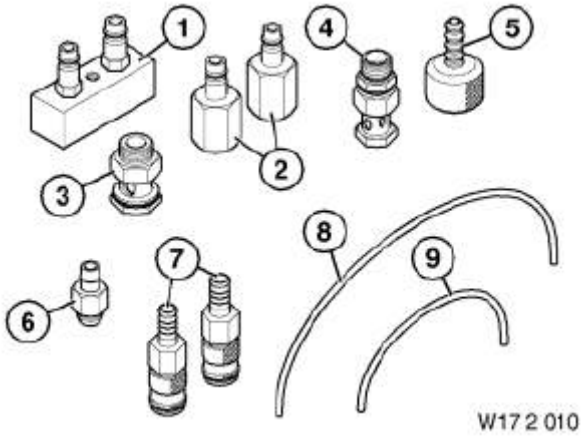


Fig. 30: Identifying Adapter (0491410)
Courtesy of BMW OF NORTH AMERICA, INC.

0494428 CASE

0494428 170112 Case Minimum set: Mechanical tools AM

cardiagn.com

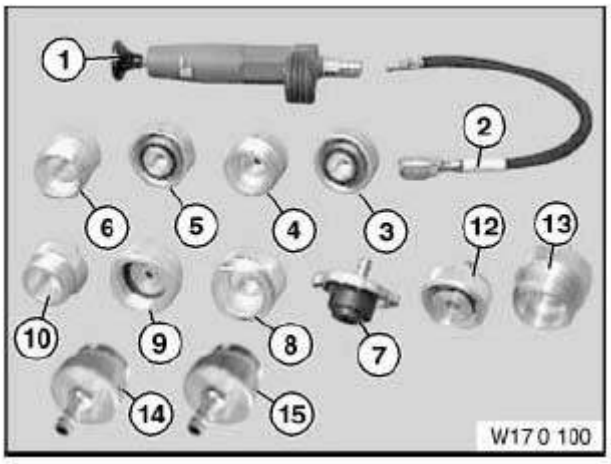


Fig. 31: Identifying Case (0494428)
Courtesy of BMW OF NORTH AMERICA, INC.

0494761 CLAMP

0494761 170133 Clamp AM

NOTE: (Hose clamp) for hose 17 0 132 Liquidation of existing inventory and then available only via complete tool set 17 0 130 = 83 30 0 494 429 - status 29.11.2011

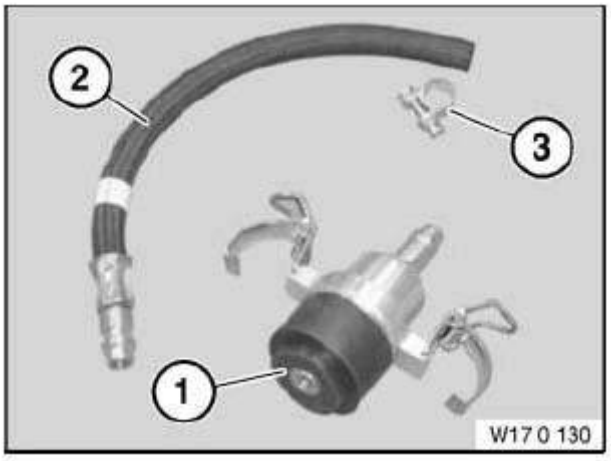


Fig. 32: Identifying Clamp (0494761)
Courtesy of BMW OF NORTH AMERICA, INC.

0496489 CLIP

0496489 172063 Clip Minimum set: Mechanical tools AM

NOTE: (Clamping bracket) Clamping bracket for steel line with pressed-on aluminum bush (connection). Discontinued, can only be ordered using complete tool

cardiagn.com

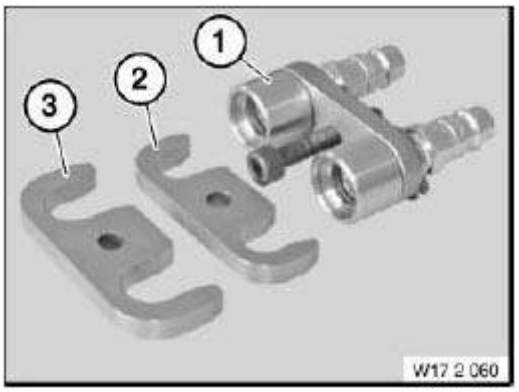


Fig. 33: Identifying Clip (0496489)
Courtesy of BMW OF NORTH AMERICA, INC.

0496491 CLIP

0496491 172072 Clip Minimum set: Mechanical tools AM

NOTE: (Clamping bracket)

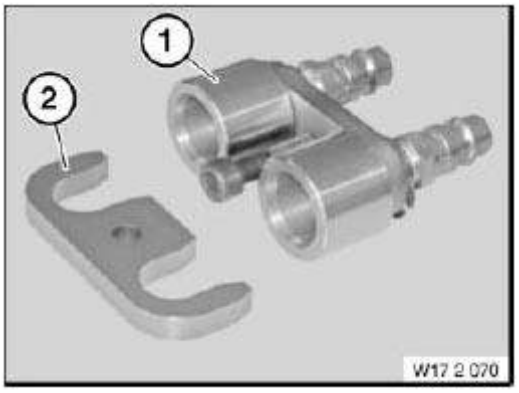


Fig. 34: Identifying Clip (0496491)
Courtesy of BMW OF NORTH AMERICA, INC.

0496493 CLIP

0496493 172082 Clip Minimum set: Mechanical tools AM

NOTE: (Clamping bracket)

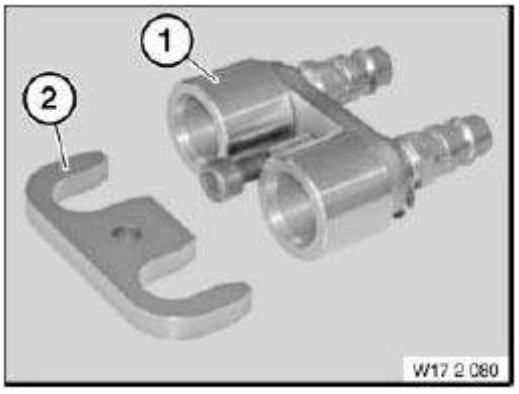


Fig. 35: Identifying Clip (0496493)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496488 CLIP

0496488 172062 Clip Minimum set: Mechanical tools AM

NOTE: **(Clamping bracket) Clamping bracket for aluminum line. Discontinued, can only be ordered using complete tool**

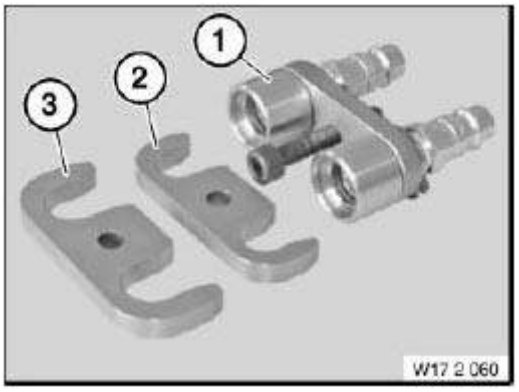


Fig. 36: Identifying Clip (0496488)
Courtesy of BMW OF NORTH AMERICA, INC.

0491409 CONNECTOR

0491409 172016 Connector Minimum set: Mechanical tools AM

NOTE: **For Horn oil dispenser unit Deletion, only available via tool set**

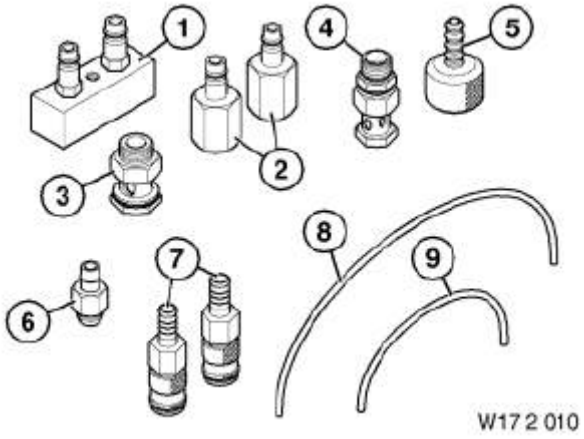


Fig. 37: Identifying Connector (0491409)
Courtesy of BMW OF NORTH AMERICA, INC.

0491408 CONNECTOR

0491408 172015 Connector Minimum set: Mechanical tools AM

NOTE: **For Tecalemit oil dispenser unit Deletion, only available via tool set**

cardiagn.com

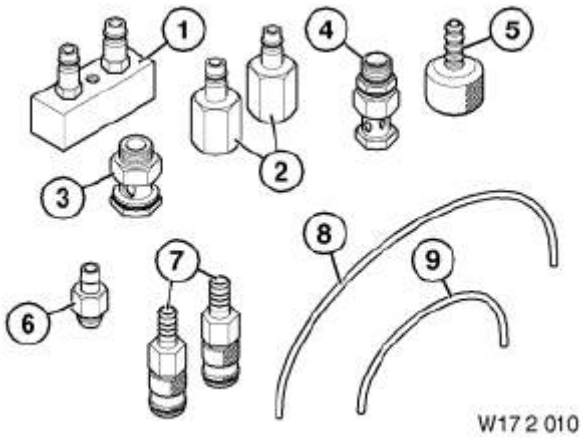


Fig. 38: Identifying Connector (0491408)
Courtesy of BMW OF NORTH AMERICA, INC.

2152473 FILLING DEVICE

2152473 Filling device AM

In conjunction with: **ADAPTER FOR CONNECTION TO ENGINE COOLING SYSTEM 17 0 100 = 0494417**

NOTE: **Vacuum filling device for filling the engine cooling system.**

SI number

08 15 08 (481)



Fig. 39: Identifying Filling Device (2152473)
Courtesy of BMW OF NORTH AMERICA, INC.

0491412 HOSE

0491412 172019 Hose Minimum set: Mechanical tools AM

NOTE: **(Hose, short)**

cardiagn.com

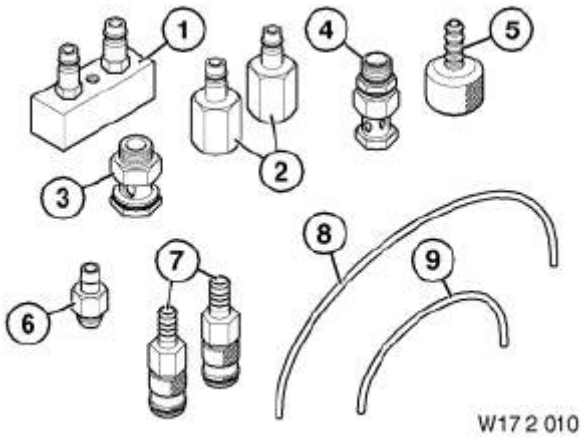


Fig. 40: Identifying Hose (0491412)
Courtesy of BMW OF NORTH AMERICA, INC.

0494419 HOSE

0494419 170102 Hose Minimum set: Mechanical tools AM

NOTE: **(hose with quick-release coupling)**



Fig. 41: Identifying Hose (0494419)
Courtesy of BMW OF NORTH AMERICA, INC.

0494431 HOSE

0494431 170132 Hose AM

NOTE: **(Hose with coupling) Connection of pump 17 0 101 to adapter 17 0 007 Liquidation of existing inventory and then available only via complete tool set 17 0 130 = 83 30 0 494 429 - status 29.11.2011**

cardiagn.com

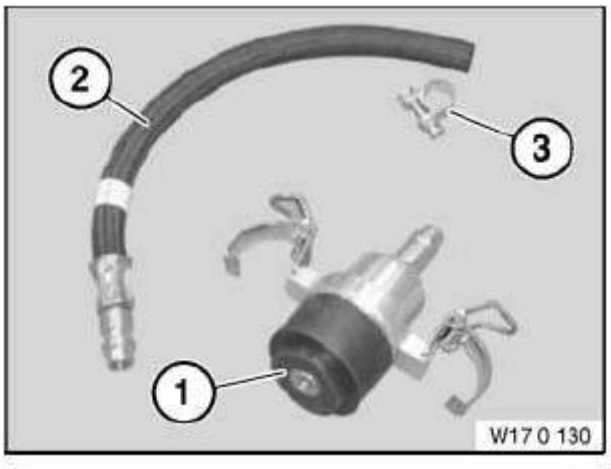


Fig. 42: Identifying Hose (0494431)
Courtesy of BMW OF NORTH AMERICA, INC.

0491411 HOSE

0491411 172018 Hose Minimum set: Mechanical tools AM

NOTE: **(Hose, long)**

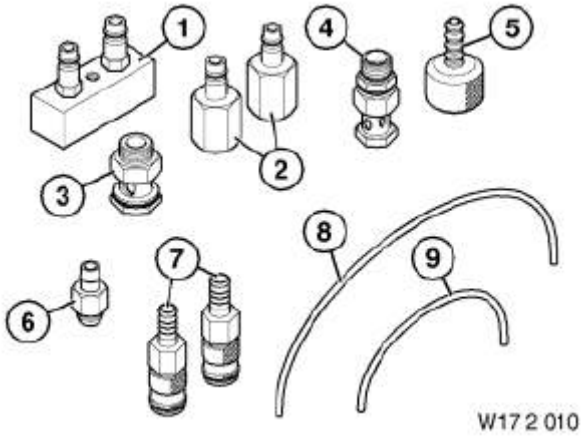


Fig. 43: Identifying Hose (0491411)
Courtesy of BMW OF NORTH AMERICA, INC.

0494017 HOSE

0494017 170008 Hose AM

NOTE: **(Pressure hose)**

Storage Location

A43

cardiagn.com

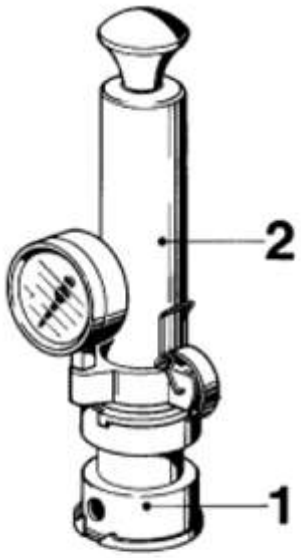


Fig. 44: Identifying Hose (0494017)
Courtesy of BMW OF NORTH AMERICA, INC.

0491402 MEASURING DEVICE

0491402 170020 Measuring device Mechanical tool

NOTE: (Conversion kit) for tester 17 0 002, extension of pressure range from 1.6 bar to 2.5 bar, see 17 0 010

0493621 PLATE

0493621 172021 Plate Minimum set: Mechanical tools AM

NOTE: (Mounting plate) For adapter 17 2 011 - Transmission: A5S 325Z Deletion, only available via tool set

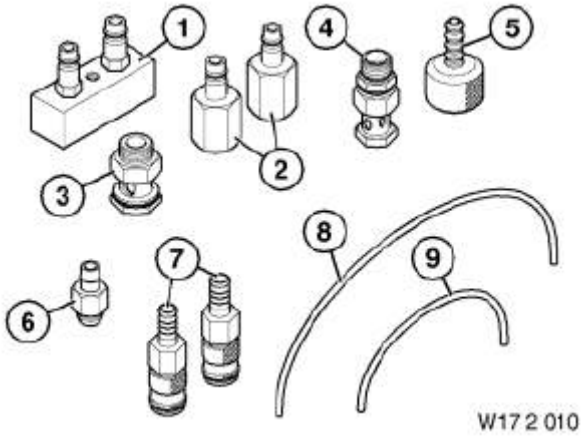


Fig. 45: Identifying Plate (0493621)
Courtesy of BMW OF NORTH AMERICA, INC.

0495797 PLIERS

cardiagn.com

0495797 172053 Pliers AM

NOTE: **(Pliers (straight version) Remaining inventories will be sold off and then no longer available as individual parts, but as part of complete tool set 17 2 050 = 0495794 only.**

Storage Location

B85

SI number

01 26 06 (321)

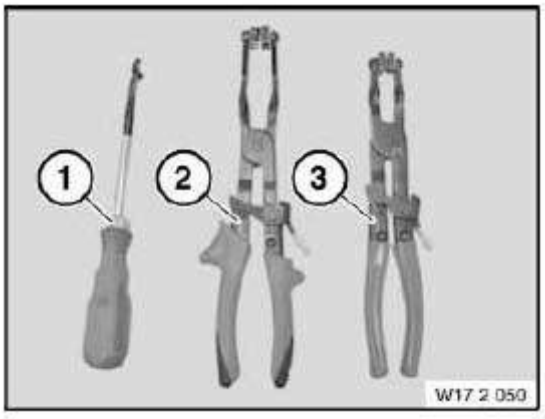


Fig. 46: Identifying Pliers (0495797)
Courtesy of BMW OF NORTH AMERICA, INC.

0495794 PLIERS

0495794 172050 Pliers AM

NOTE: **(Set of pliers) For assembling and disassembling the spring band clamps (Coolant hoses)**

Storage Location

B85

SI number

01 26 06 (321)

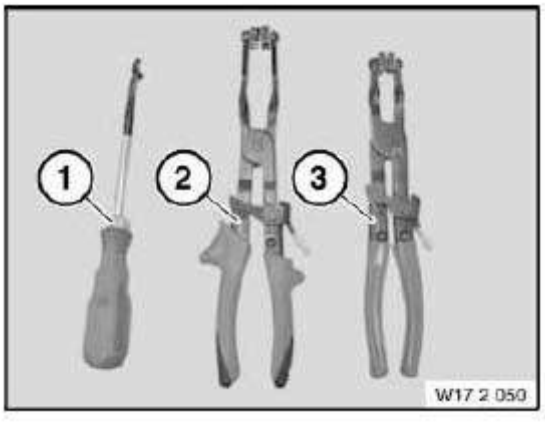


Fig. 47: Identifying Pliers (0495794)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0495795 Release tool

   NOTE: **Remaining inventories will be sold off and then no longer available individually, but as part of complete tool set 17 2 050 = 0495794 only.**

2. 0495796 Pliers

   NOTE: **(Pliers (curved version) Remaining inventories will be sold off and then no longer available as individual parts, but as part of complete tool set 17 2 050 = 0495794 only.**

3. 0495797 Pliers

   NOTE: **(Pliers (straight version) Remaining inventories will be sold off and then no longer available as individual parts, but as part of complete tool set 17 2 050 = 0495794 only.**

0495796 PLIERS

0495796 172052 Pliers AM

NOTE: **(Pliers (curved version) Remaining inventories will be sold off and then no longer available as individual parts, but as part of complete tool set 17 2 050 = 0495794 only.**

Storage Location

B85

SI number

01 26 06 (321)

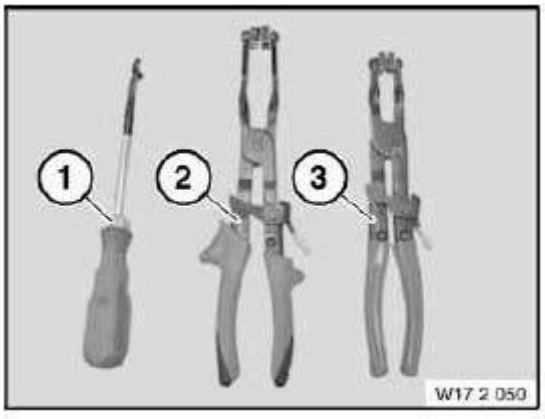


Fig. 48: Identifying Pliers (0495796)
Courtesy of BMW OF NORTH AMERICA, INC.

0494418 PUMP

0494418 170101 Pump Minimum set: Mechanical tools AM

cardiagn.com



Fig. 49: Identifying Pump (0494418)
Courtesy of BMW OF NORTH AMERICA, INC.

0495795 RELEASE TOOL

0495795 172051 Release tool AM

NOTE: **Remaining inventories will be sold off and then no longer available individually, but as part of complete tool set 17 2 050 = 0495794 only.**

Storage Location

B85

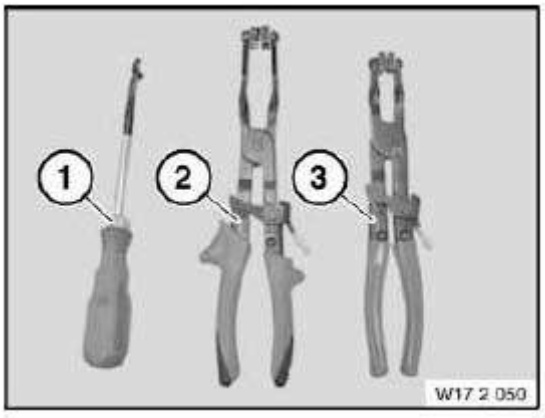


Fig. 50: Identifying Release Tool (0495795)
Courtesy of BMW OF NORTH AMERICA, INC.

0491406 SCREW

0491406 172013 Screw Minimum set: Mechanical tools AM

NOTE: **(Banjo bolt (2 pieces)) Thread M18x1.5 with nut and gasket for connecting the oil cooler lines to the oil dispenser unit - \Transmission: A5S 440Z Deletion, only available via tool set**

cardiagn.com

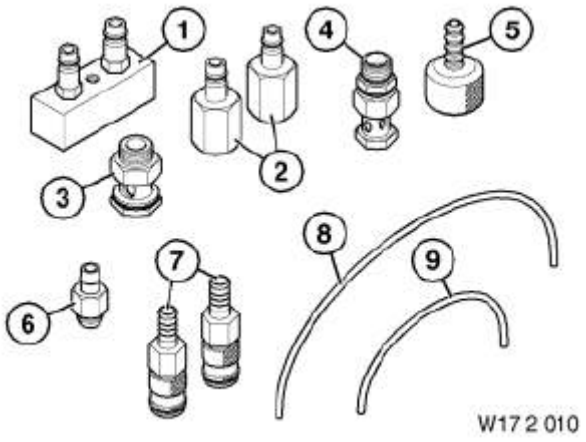


Fig. 51: Identifying Screw (0491406)
Courtesy of BMW OF NORTH AMERICA, INC.

0491407 SCREW

0491407 172014 Screw Minimum set: Mechanical tools AM

NOTE: **(Banjo bolt (2 pieces)) Thread M16x1.5 with nut, gasket and thread piece for connecting the oil cooler lines to the oil dispenser unit - transmission: A5S 300J Deletion, only available via tool set**

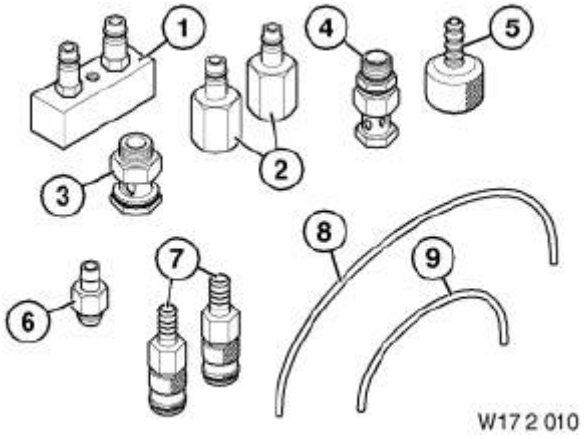


Fig. 52: Identifying Screw (0491407)
Courtesy of BMW OF NORTH AMERICA, INC.

0494417 TESTER

0494417 170100 Tester Minimum set: Mechanical tools AM

NOTE: **For checking engine cooling system on watertightness. For checking radiator cap.**

SI number

01 07 02 (884)

Consisting of:

1. 0494418 Pump
2. 0494419 Hose

NOTE: **(hose with quick-release coupling)**

cardiagn.com

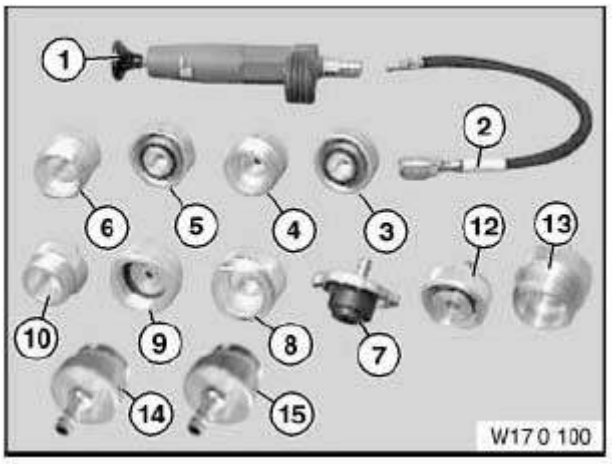


Fig. 53: Identifying Tester (0494417)
Courtesy of BMW OF NORTH AMERICA, INC.

3. 0494420 Adapter

   NOTE: For radiator cap (normal thread)

4. 0494421 Adapter

   NOTE: For radiator cap (normal thread)

5. 0494422 Adapter

   NOTE: For radiator cap (sawtooth thread)

6. 0494423 Adapter

   NOTE: For radiator cap (sawtooth thread)

7. 0494424 Adapter

   NOTE: For radiator cap R50/W10

8. 0494425 Adapter

   NOTE: For radiator cap R50/W10

9. 0494426 Adapter

   NOTE: For radiator connection R53/W11, R50/W17 adapter corresponds to 17 0 051

10. 0494427 Adapter

    NOTE: For radiator cap R53/W11, R50/W17 adapter corresponds to 17 0 052

11. 0494428 Case
12. 0494642 Adapter

    NOTE: For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)

13. 0494643 Adapter

cardiagn.com

NOTE: **For radiator cap Model series: E60, E61, E63, E64 SI no.: 1 08 03 (988)**

14. 0495889 Adapter

NOTE: **For radiator cap Model series: N12, N14**

0491384 TESTER

0491384 170000 Tester AM

Replaced by: 83300494417

NOTE: **For checking cooling system for tightness and function of pressure relief valve in radiator cap. Replaced by 17 0 100 (0 494 417)**

Storage Location

A43

C17

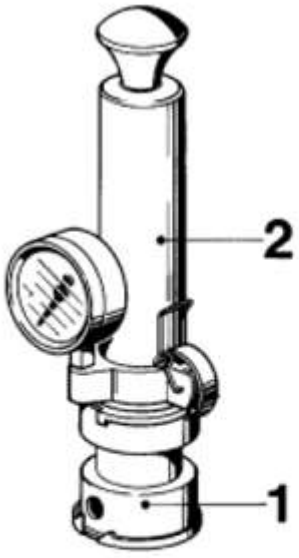
Consisting of:

8 = 0494017 Hose

NOTE: **(Pressure hose)**

1 = 0491385 Adapter

NOTE: **(Adapter) For checking the pressure relief valve in the radiator cap/Series: all, except E28**



W17 0 000

Fig. 54: Identifying Tester (0491384)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

2 = **0491386** Tester

NOTE: **(Tester without adapter) Pressure range 0...2.5 bar/Series: all, except E28 Free only for motorcycle!!!**

3 = **0491387** Adapter

NOTE: **(Adapter) For screw-on radiator caps (standard thread)/Series: E28, E30, E31, E32 engine: all, except M51 Free only for motorcycle!!!**

4 = **0491388** Adapter

NOTE: **(Adapter) For screw-on radiator caps (standard thread)/Series: E28, E30, E32/Engine: M51 Free only for motorcycle!!!**

5 = **0491389** Adapter

NOTE: **(Adapter) For screw-on radiator caps (sawtooth thread)/Series: E31, E32, E34, E36, E38, E39 Replaced by 17 0 100 (0 494 417)**

6 = **0491390** Adapter

NOTE: **(Adapter) For screw-on radiator caps (sawtooth thread)/Replaces 06/97 with 17 0 007/Reason: Expansion tank cover design change**

9 = **0491391** Adapter

NOTE: **(Adapter for radiator expansion tank) Series: E36/model: M3 US engine: W10**

7 = **0493108** Adapter

NOTE: **(Adapter) For testing the expansion tank cover/Series: E31, E32, E34, E36, E38, E39 Replaced by 17 0 100 (0 494 417)**

0491386 TESTER

0491386 170002 Tester AM

NOTE: **(Tester without adapter) Pressure range 0...2.5 bar/Series: all, except E28 Free only for motorcycle!!!**

Storage Location

C17

cardiagn.com

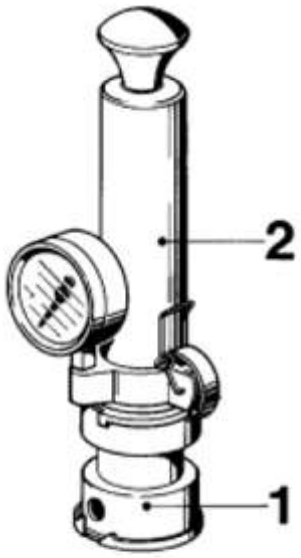


Fig. 55: Identifying Tester (0491386)
Courtesy of BMW OF NORTH AMERICA, INC.

2184117 TOOL SET

2184117 Tool set Mechanical tool

NOTE: **For disconnecting the coolant or fuel hoses.**

SI number

08 03 10 (651)

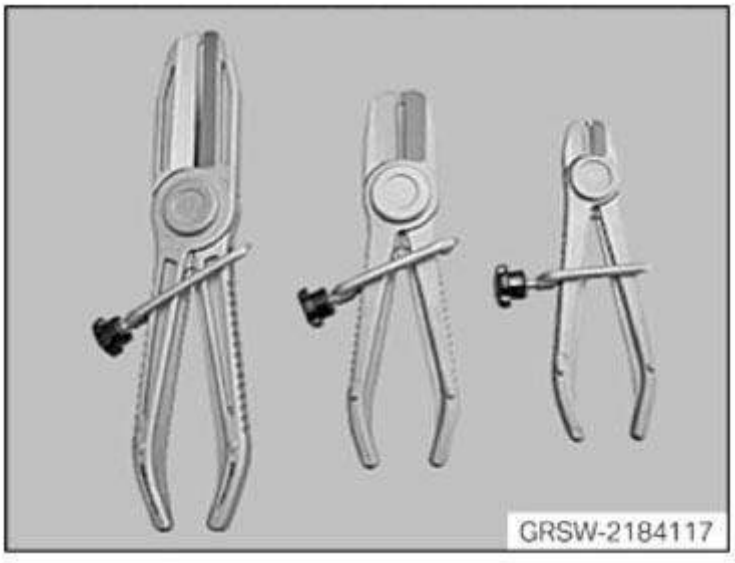


Fig. 56: Identifying Tool Set (2184117)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

cardiagn.com

COOLANT, COOLING SYSTEM TEST (F25, F26, N20)

17 00 COOLANT, COOLING SYSTEM TEST F25/F26/N20

NOTE: **Prescribed mixture for coolant: 50% antifreeze for anti-freezing protection down to -38 Â°C. The original coolant mixture poured into the cooling system at the factory has this antifreeze-to-water ratio.**

COOLANT, COOLING SYSTEM TEST SPECIFICATION

Model series	F25	F25	F26	F26
Model designation	xDrive 20i, sDrive 20i	xDrive 20i	xDrive 20i	xDrive 20i
Coolant quantity on vehicles with manual gearbox	7, 5 l	Â	Â	Â
Coolant quantity on vehicles with automatic transmission	7, 5 l	7, 5 l	7, 5 l	7, 5 l
Top-up quantity of coolant in the event of repair with disconnected coolant hoses.	2.0 l	2, 0 l	2, 0 l	2, 0 l
Test pressure for cooling system excess pressure	1, 5 bar	1, 5 bar	1, 5 bar	1, 5 bar

COOLANT, COOLING SYSTEM TEST (F25/N52)

17 00 COOLANT, COOLING SYSTEM TEST F25/N52

NOTE: **Prescribed mixture for coolant: 50% antifreeze for anti-freezing protection down to -38 Â°C. The original coolant mixture poured into the cooling system at the factory has this antifreeze-to-water ratio.**

COOLANT, COOLING SYSTEM TEST SPECIFICATION

Model series	F25
Model designation	xDrive 28i, N52 Engine (2010-2011)
Top-up quantity of coolant in the event of repair with disconnected coolant hoses. Observe the mixture ratio and filling level!	2.0 liters
Testing pressure for cooling system	1.5 bar

COOLANT, COOLING SYSTEM TEST (F25, F26, N55)

17 00 COOLANT, COOLING SYSTEM TEST F25/F26/N55

NOTE: **Prescribed mixture for coolant: 50% antifreeze for anti-freezing protection down to -38 Â°C. The original coolant mixture poured into the cooling system at the factory has this antifreeze-to-water ratio.**

cardiagn.com

COOLANT, COOLING SYSTEM TEST SPECIFICATION

Model series	F25, F26
Model designation	xDrive 35i
Coolant quantity on vehicles with manual gearbox	Â
Coolant quantity on vehicles with automatic transmission	9, 6 l
Top-up quantity of coolant in the event of repair with disconnected coolant hoses. Observe the mixture ratio and filling level!	2, 0 l
Testing pressure for cooling system	1, 5 bar

COOLANT, COOLING SYSTEM TEST (F25, N47 D20 O 1)

17 00 COOLANT, COOLING SYSTEM TEST F25/N47 D20 O 1

NOTE: **Prescribed mixture for coolant: 50% antifreeze for anti-freezing protection down to -38 Â°C. The original coolant mixture poured into the cooling system at the factory has this antifreeze-to-water ratio.**

COOLANT, COOLING SYSTEM TEST SPECIFICATION

Model series	F25	F25
Model designation	sDrive 18d	xDrive 20d
Coolant quantity on vehicles with manual gearbox	8.7 l	8.7 l
Coolant quantity on vehicles with automatic transmission	9 l	9 l
Top-up quantity of coolant in the event of repair with disconnected coolant hoses.	2, 0 l	2, 0 l
Test pressure for cooling system (excess pressure)	1, 5 bar	1, 5 bar

RADIATOR WITH MOUNTING (N47T)

17 11 RADIATOR WITH MOUNTING F25/N47 D20 O1

RADIATOR WITH MOUNTING SPECIFICATION

Cap for cooling system	Â	Â
Pressure relief valve opens when the pressure exceeds the ambient pressure.	bar	$1.4^{+0.1}_{-0.2}$
Electric changeover valve must open at latest when the pressure is lower than the ambient pressure	bar	0.1
Test radiator pressure (excess pressure)	bar	1.5

RADIATOR WITH MOUNTING (F25, F26, N20, N55, N52T)

17 11 RADIATOR WITH MOUNTING F25/F26/N20/N55/N52T

RADIATOR WITH MOUNTING SPECIFICATION

Cap for cooling system	Â	Â

cardiagn.com

Pressure relief valve opens when the pressure exceeds the ambient pressure.	bar	$1,4^{+0,1}_{-0,2}$
Electric changeover valve must open at latest when the pressure is lower than the ambient pressure	bar	0.1
Test radiator pressure (excess pressure)	bar	1, 5

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702143

cardiagn.com

ENGINE OIL COOLER LINES AND TRANSMISSION OIL COOLER LINES (N20)

17 22 ENGINE OIL COOLER LINES AND TRANSMISSION OIL COOLER LINES

TIGHTENING TORQUE SPECIFICATION - ENGINE OIL COOLER LINES AND TRANSMISSION OIL COOLER LINES

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Transmission oil cooler line to transmission	N20/N26	M8	Â	19 Nm
2AZ	Bracket, gearbox fluid lines to oil sump	N20/N26	M6	Â	10 Nm
3AZ	Bracket for gearbox cooler line and engine oil pipe	N20/N26	M6	Â	10 Nm
4AZ	Holder for transmission oil cooler to engine mounting bracket	N20/N26	M6	Â	8 Nm

RADIATOR, EXPANSION TANK (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)

17 10 RADIATOR, EXPANSION TANK (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)

TIGHTENING TORQUE SPECIFICATION - RADIATOR, EXPANSION TANK

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Cross connection, front, to cross connection, rear	N20/N55/N52T/N47 D20 O 1/N57 D30 O 1/N57 D30 T 1/B47	M6	Â	11 Nm
2AZ	Cross connection to carrier support	N20/N55/N52T/N47 D20 O 1/N57 D30 O 1/N57 D30 T 1/B47	M8	Â	20 Nm
3AZ	Fan cowl on radiator	N20/N55/N52T/N47 D20 O 1/N57 D30 O 1/N57 D30 T 1/B47	Â	Â	4 Nm
4AZ	Radiator on module carrier	N20/N55/N52T/N47 D20 O 1/N57 D30 O 1/N57 D30 T 1/B47	Â	Â	4 Nm
5AZ	Intercooler to module carrier	N20/N55/N47 D20 O 1/N57 D30 O 1/N57 D30 T 1/B47	Â	Â	4 Nm

cardiagn.com

6AZ	Transmission oil heat exchanger to fan cowl	N20/N55/N52T/B47	Â	Â	4 Nm

TRANSMISSION OIL COOLER LINES (N47, N55, N52)

17 22 TRANSMISSION OIL COOLER LINES

TIGHTENING TORQUE SPECIFICATION - TRANSMISSION OIL COOLER LINES

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Assembly, transmission oil cooler line to oil sump	N55/B47	M6	Â	10 Nm
2AZ	Transmission oil line to transmission oil cooler	N55/N52T/B47	M6x35	Â	8 Nm
3AZ	Transmission oil cooler line to transmission	N55/N47 D20 O1/N52T/N57 D30 O1/N57 D30 T1/B47	M8	Â	19 Nm
4AZ	Gearbox oil cooler to thermostat housing	N47 D20 O1/N57 D30 O1/N57 D30 T1/B47	M6	Â	8 Nm
5AZ	Thermostat housing to oil filter housing	N47 D20 O1/N57 D30 O1/N57 D30 T1/B47	M6	Â	8 Nm
6AZ	Gearbox oil cooler line to transmission oil sump	N52T/B47	M6	Â	8 Nm
7AZ	Engine oil pipes to engine oil cooler	N55/B47	M6	Â	12 Nm
8AZ	Engine oil cooler to holder	N55/B47	M6	Â	8 Nm

cardiagn.com

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702163

ENGINE, GENERAL

11 00 039 CHECKING COMPRESSION OF ALL CYLINDERS (N20, N26)

Special tools required:

- 11 0 222
- 11 8 732
- 11 8 731
- 0 490 615
- 0 496 107
- 13 6 052
- 11 4 310

IMPORTANT: High tension - mortal danger!
Interrupt power supply to ignition coils.
Read and comply with notes on compression pressure check.

Necessary preliminary tasks:

- Remove SPARK PLUGS

Unscrew tip (1) from special tool 11 0 222 .

IMPORTANT: Then check the Schrader valve that is now visible for secure seating.
Prepare special tool 11 0 222 in conjunction with 11 8 732 and 11 8 731 .

Order number: 0 490 615/0 496 107.

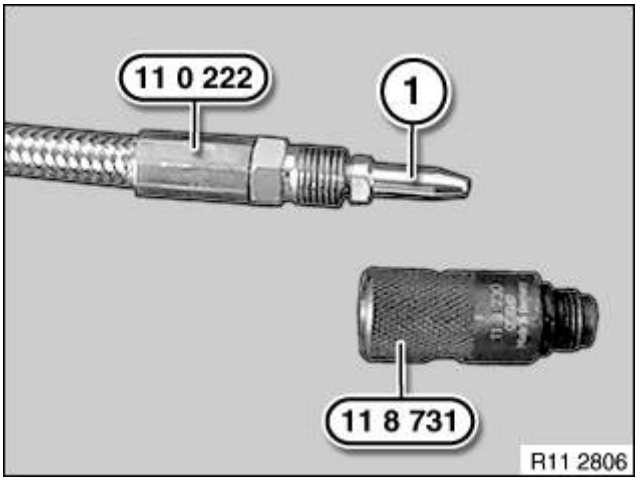


Fig. 1: Identifying Tip And Special Tool (11 0 222)
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare special tool 11 0 222 in conjunction with 11 8 732 and 11 8 731 .

cardiagn.com

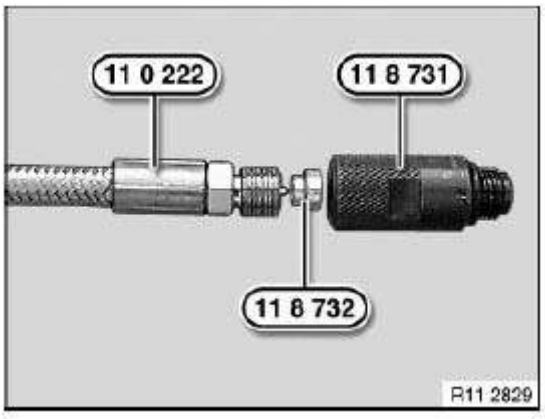


Fig. 2: Identifying Special Tools (11 0 222), (11 8 732) And (11 8 731)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 0 222** into special tool **11 8 731** to 10 Nm.

IMPORTANT: Oil screw thread on special tool **11 8 731** .

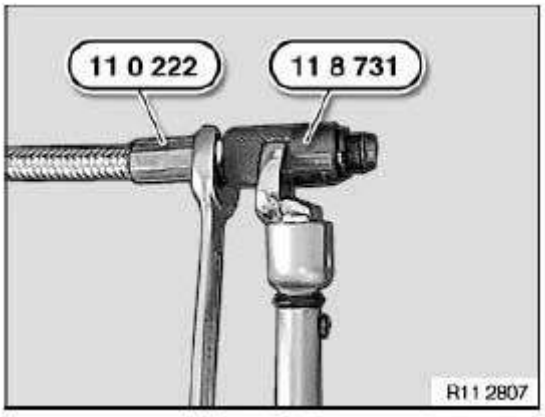
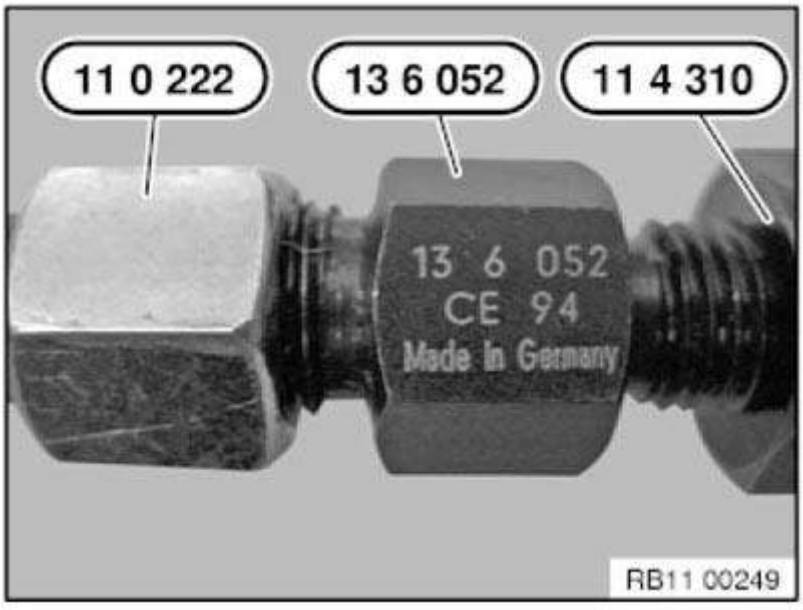


Fig. 3: Inserting Special Tool (11 0 222) Into Special Tool (11 8 731)
Courtesy of BMW OF NORTH AMERICA, INC.

Connect special tool **11 0 222** to **13 6 052** and **11 4 310** .

Tightening torque: 10 Nm.



cardiagn.com

Fig. 4: Connecting Special Tool (11 0 222) To (13 6 052) & (11 4 310)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in pressure sensor 81 38 0 431 592 manually with special tool **11 4 310** .

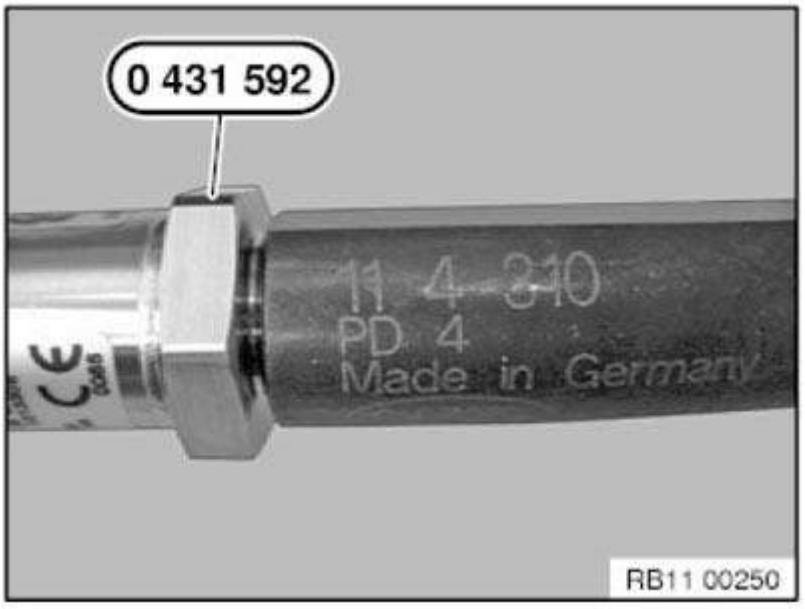


Fig. 5: Identifying Special Tool (11 4 310)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw prepared special tools (1) into cylinders according to diagnosis information.

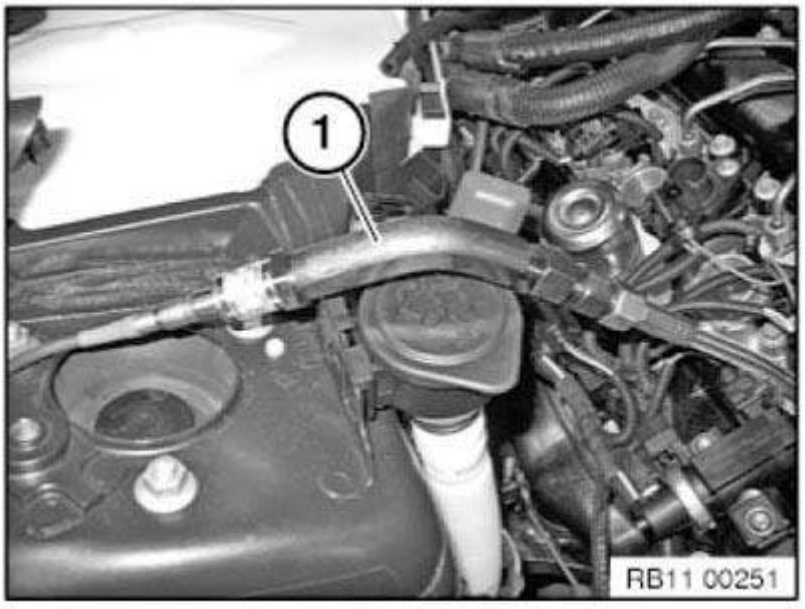


Fig. 6: Identifying Special Tools
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect ignition coils and injector wiring harness from DME control unit (2).

cardiagn.com

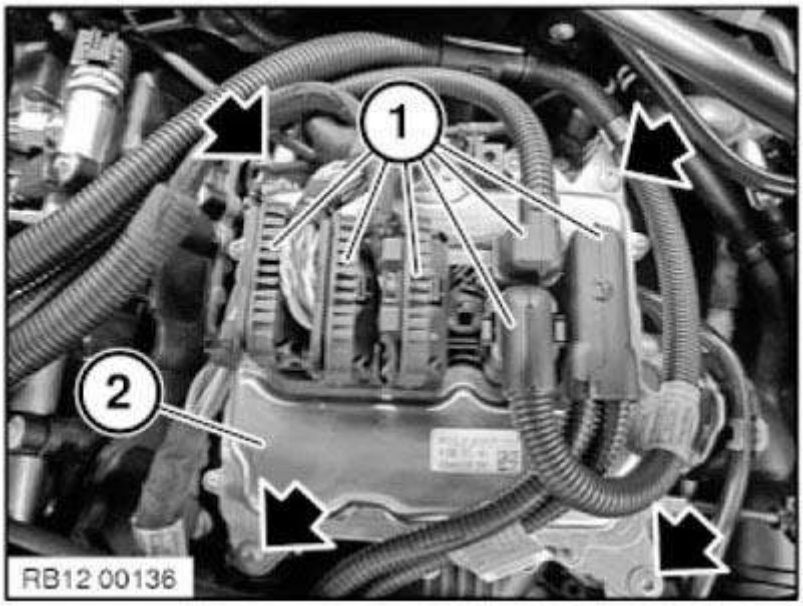


Fig. 7: Disconnecting Ignition Coils And Injector Wiring Harness From DME Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Compression check, electronic.

Connect ISID and IMIB (Integrated Measurement Interface Box) (1).

Follow diagnosis instruction.

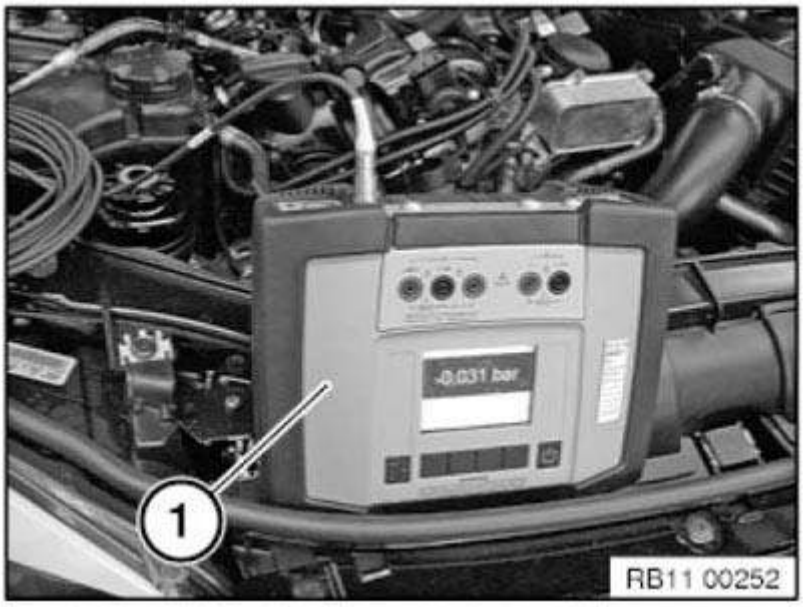


Fig. 8: Identifying ISID And IMIB Box
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fault memory.

11 00 039 CHECKING COMPRESSION OF ALL CYLINDERS (N47 D20 O1)

Special tools required:

- **11 0 235**

cardiagn.com

- 11 8 880

Necessary preliminary work:

- Remove all GLOW ELEMENTS .

WARNING: **On vehicles with manual gearbox:**
There must be no drive position engaged during the starting operation.

IMPORTANT: To prevent the injectors from injecting, it is necessary to disconnect the injection system plug connections.

Screw in special tools 11 8 880 and 11 0 235 .

NOTE: **The compression check on all cylinders must have a constant battery voltage. If necessary, connect an auxiliary battery or charger.**
The number of engine revolutions for the compression check must be identical for each cylinder. (The measuring result could be falsified.)
Technical DATA .

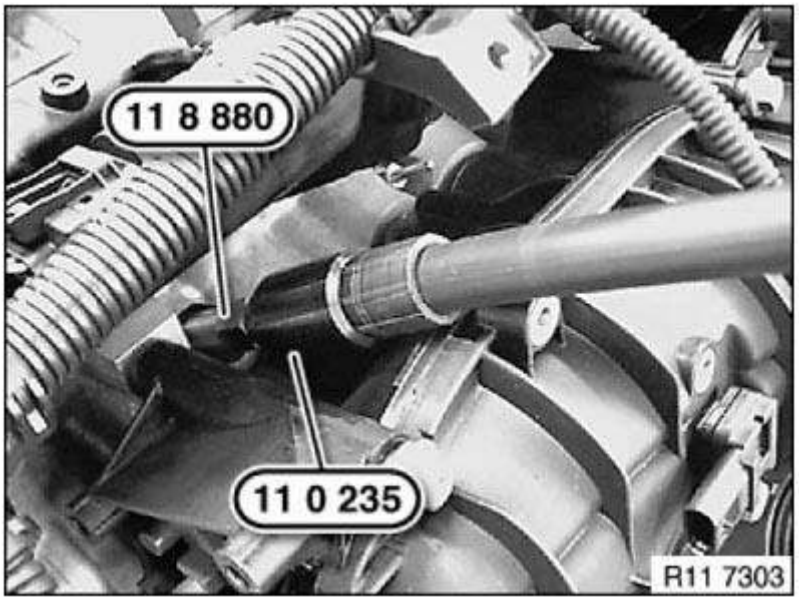


Fig. 9: Identifying Special Tools (11 8 880) & (11 0 235)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Delete fault memory in the Digital Diesel Electronics.

Check function of Digital Diesel Electronics.

11 00 039 CHECKING COMPRESSION OF ALL CYLINDERS (N55)

Special tools required:

- 11 0 222
- 11 0 224
- 11 8 731
- 11 8 732

High tension - mortal danger!

cardiagn.com

IMPORTANT: Interrupt voltage supply to ignition coils.
Read and comply with notes on compression pressure check.

Necessary preliminary tasks:

- Remove **SPARK PLUGS** .

Unscrew tip (1) from special tool **11 0 222** .

IMPORTANT: Then check the Schrader valve that is now visible for secure seating.

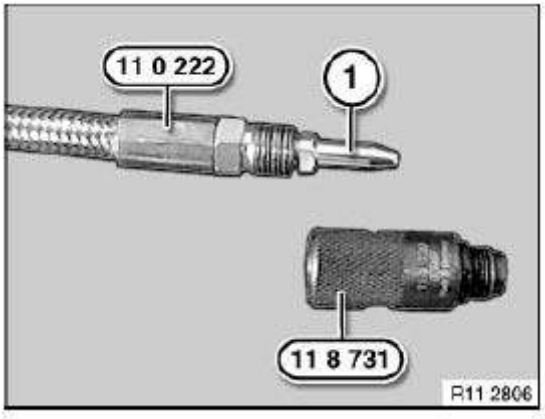


Fig. 10: Identifying Special Tool (11 0 222) And (11 8 731)
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare special tool **11 0 222** in conjunction with **11 8 732** and **11 8 731** .

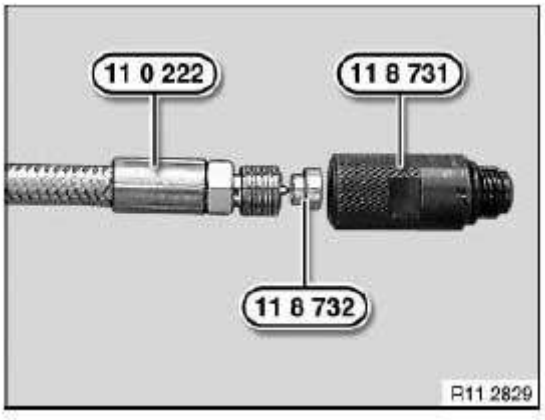


Fig. 11: Identifying Special Tools (11 0 222), (11 8 732) And (11 8 731)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 0 222** into special tool **11 8 731** to 10 Nm.

IMPORTANT: Oil thread on special tool **11 8 731** .

cardiagn.com

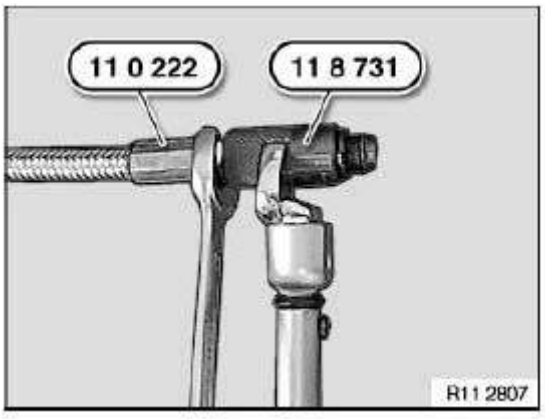


Fig. 12: Identifying Oil Screw Using Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 0 222** by hand into spark plug thread and connect special tool **11 0 224** .

Depress accelerator pedal and actuate starter until compression pressure stops rising.

- **NOMINAL VALUES** , compression pressure

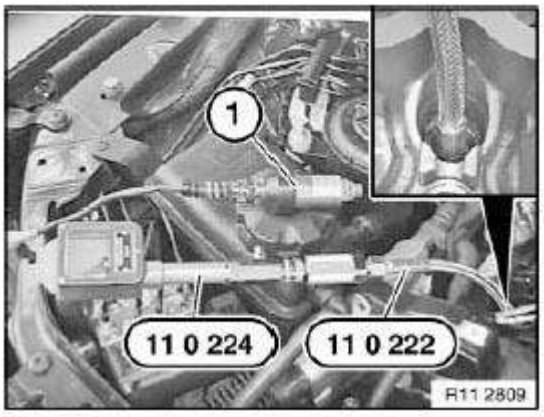


Fig. 13: Identifying Special Tools (11 0 222) And (11 0 224)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Delete fault memory.

00 DANGER OF POISONING IF OIL IS INGESTED/ABSORBED THROUGH THE SKIN

See **DANGER OF POISONING IF OIL IS INGESTED/ABSORBED THROUGH THE SKIN** .

11 00 000 DIFFERENCES AMONG ENGINE BLOCK VERSIONS (N47)

Engine generation = N47

Distinguishing features:

Longitudinal and transverse installation = **D** /C

Displacement = **2.0l** /1.6l

Power stage = T/**O** /U/K

T = Top power stage.

cardiagn.com

O = Upper power stage.

U = Lower power stage.

K = Smallest power stage.

Expansion stage = **1 (TU)** (first technical update)

Expansion stage = **2 (TU)** (second technical update)

Â	Power in kilowatts (KW)	Displacement in liters	Installation variants	Counterbalance shafts (AGW)	Transmission versions
N47 D20 T	160 KW	2 l	Longitudinal installation	with AGW	Manual gearbox/automatic
N47 D20 O1	135 KW	2 l	Longitudinal installation	with AGW	Manual gearbox/automatic
N47 D20 U1	105 KW	2 l	Longitudinal installation	with and without AGW	Manual gearbox/automatic
N47 D20 K1	85 KW	2 l	Longitudinal installation	with and without AGW	Manual gearbox/automatic
N47 D16 U1	82 KW	1.6 l	Longitudinal installation	without AGW	Manual gearbox/automatic
N47 C20 U1	105 KW	2 l	Transverse installation	without AGW	Manual gearbox/automatic
N47 C20 K1	85 KW	2 l	Transverse installation	without AGW	Manual gearbox/automatic
N47 C16 U1	82 KW	1.6 l	Transverse installation	without AGW	Manual gearbox/automatic
N47 C16 K1	66 KW	1.6 l	Transverse installation	without AGW	Manual gearbox

ENGINE IDENTIFICATION

Engine number at the marked surface.

Replacement drives are already assigned a number containing the identification and engine number at the factory.

The old drive number must be imprinted for replacement crankcases.

Magnesium crank cases feature a label, the engine number does not need to be embossed.

M47/M47TU/M47T2

cardiagn.com

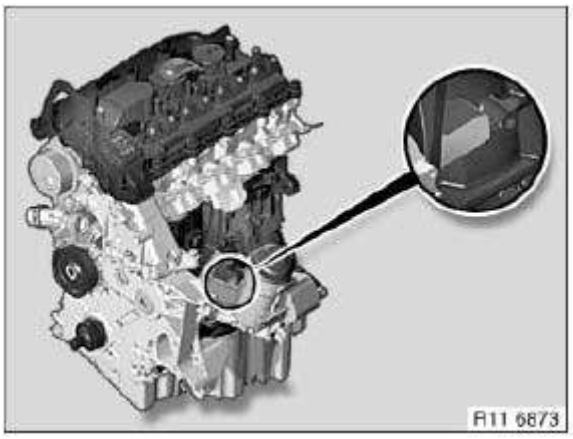


Fig. 14: Engine Identification (M47/M47TU/M47T2)
Courtesy of BMW OF NORTH AMERICA, INC.

M57/M57TU/M57T2

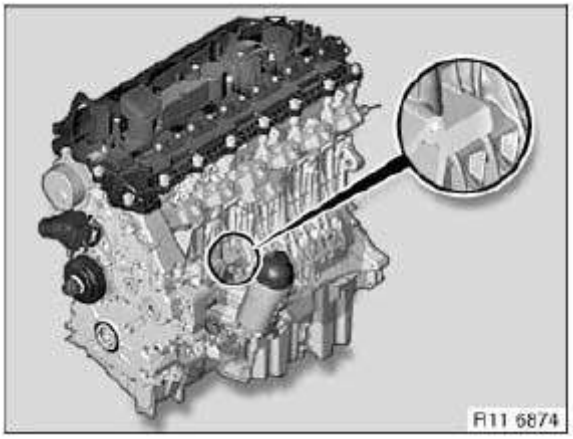


Fig. 15: Engine Identification (M57/M57TU/M57T2)
Courtesy of BMW OF NORTH AMERICA, INC.

M67/M67TU

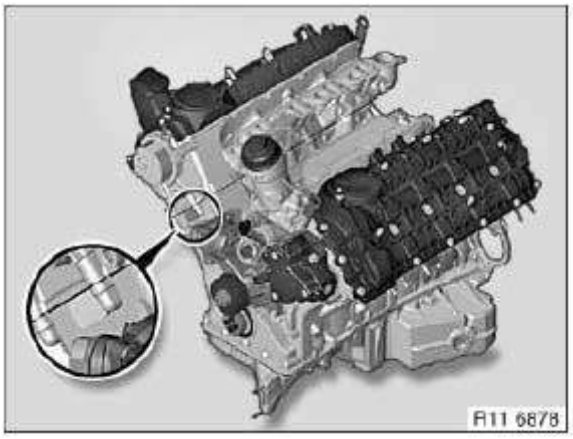


Fig. 16: Engine Identification (M67/M67TU)
Courtesy of BMW OF NORTH AMERICA, INC.

N47/N47S/N47C/N47T/N57/N57S/N57T

cardiagn.com

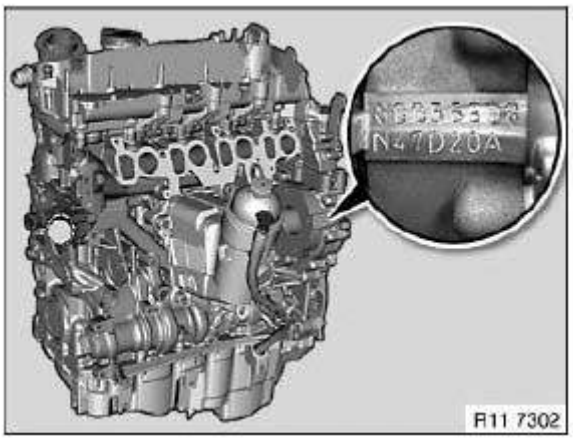


Fig. 17: Engine Identification (N47/N47S/N47C/N47T/N57/N57S/N57T)
Courtesy of BMW OF NORTH AMERICA, INC.

M52/M52TU

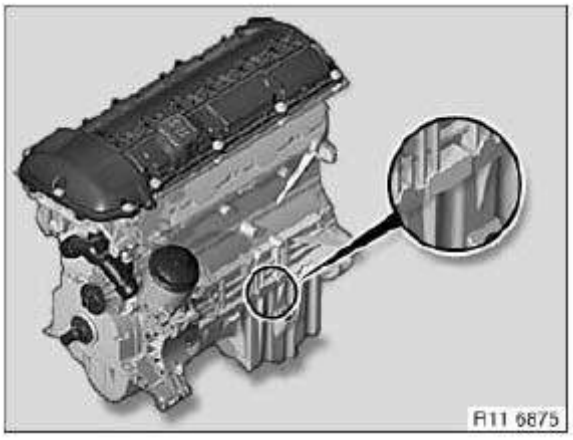


Fig. 18: Engine Identification (M52/M52TU)
Courtesy of BMW OF NORTH AMERICA, INC.

M54

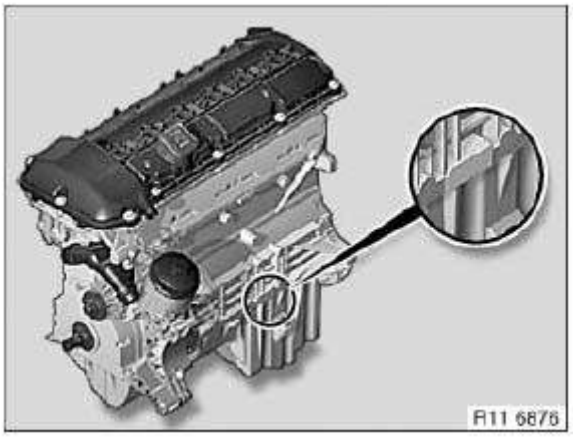


Fig. 19: Engine Identification (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

M56

cardiagn.com

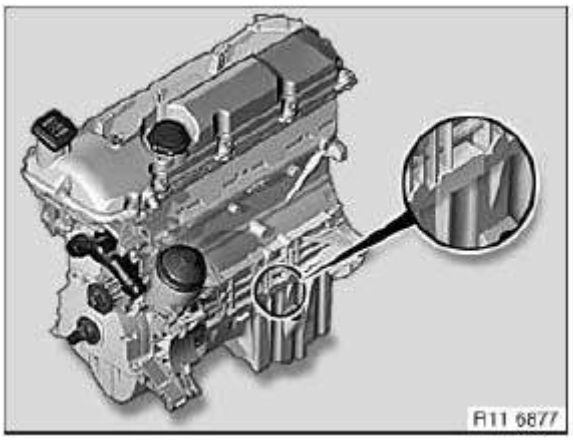


Fig. 20: Engine Identification (M56)
Courtesy of BMW OF NORTH AMERICA, INC.

N20/N26

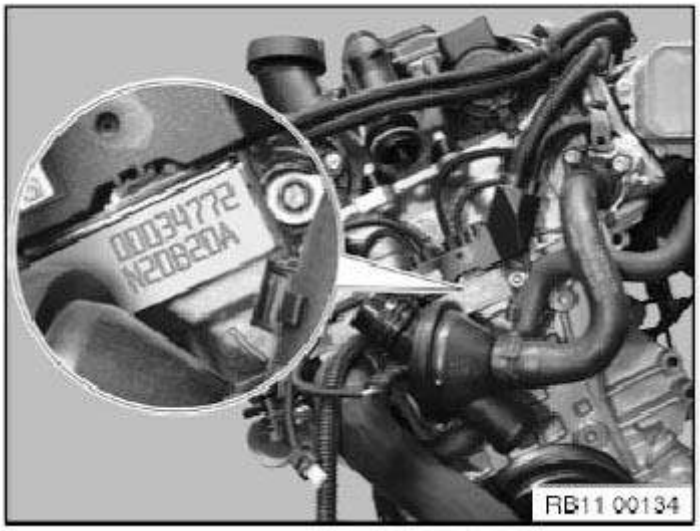


Fig. 21: Engine Identification (N20/N26)
Courtesy of BMW OF NORTH AMERICA, INC.

N40/N45/N45T/N43

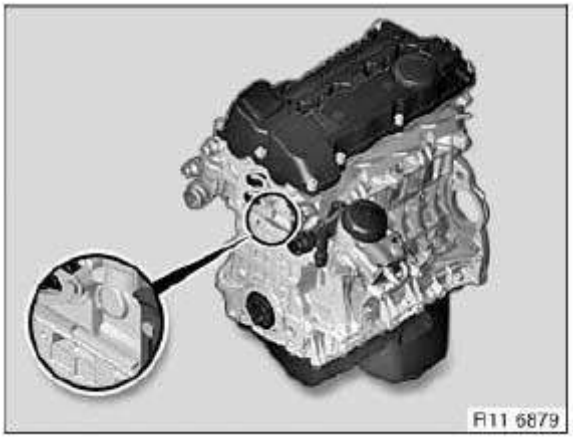


Fig. 22: Engine Identification (N40/N45/N45T/N43)
Courtesy of BMW OF NORTH AMERICA, INC.

N42/N46/N46T

cardiagn.com

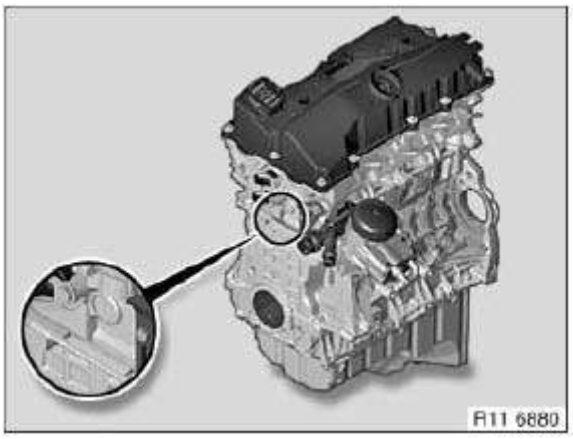


Fig. 23: Engine Identification (N42/N46/N46T)
Courtesy of BMW OF NORTH AMERICA, INC.

N51/N52/N52K/N52T/N53/N54/N55

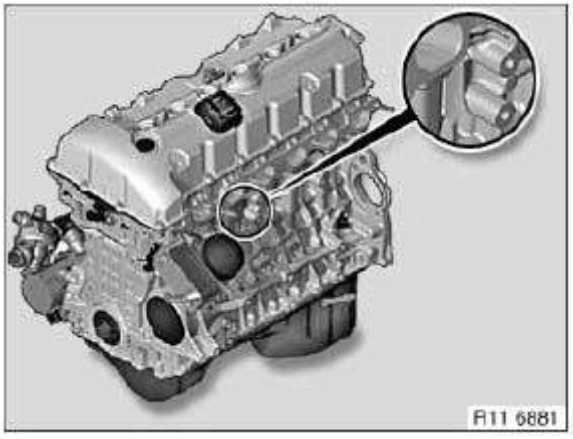


Fig. 24: Engine Identification (N51/N52/N52K/N52T/N53/N54/N55)
Courtesy of BMW OF NORTH AMERICA, INC.

N62/N62TU

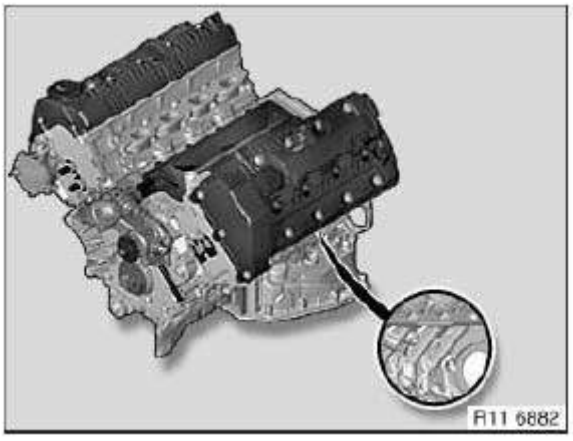


Fig. 25: Engine Identification (N62/N62TU)
Courtesy of BMW OF NORTH AMERICA, INC.

Position (1) engine number.

Position (2) engine code letters.

cardiagn.com

N63, N63TU.

S63

N74

S63T0 to engine number 2001 0052 on right side cyl. 1-4.

S63T0 from engine number 2001 0053 on left side cyl.l 5-8.

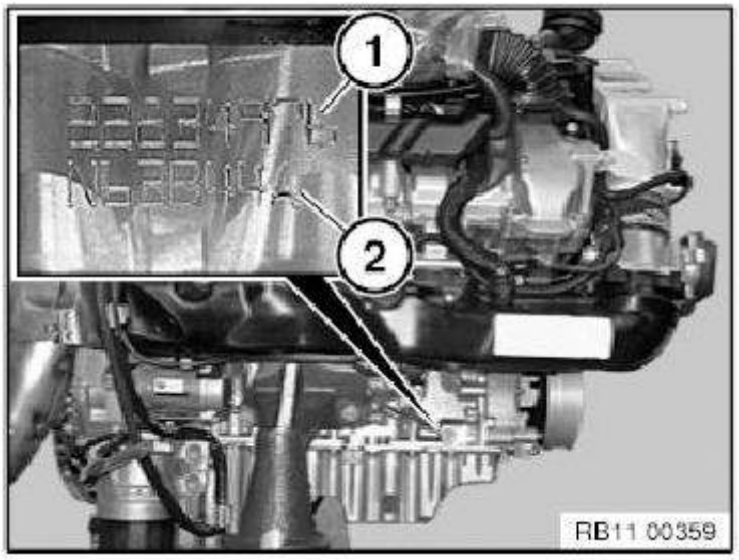


Fig. 26: Identifying Engine Code Letters And Numbers
Courtesy of BMW OF NORTH AMERICA, INC.

E72 Vehicles must be imprinted on the left side cyl. 5-8.

N73

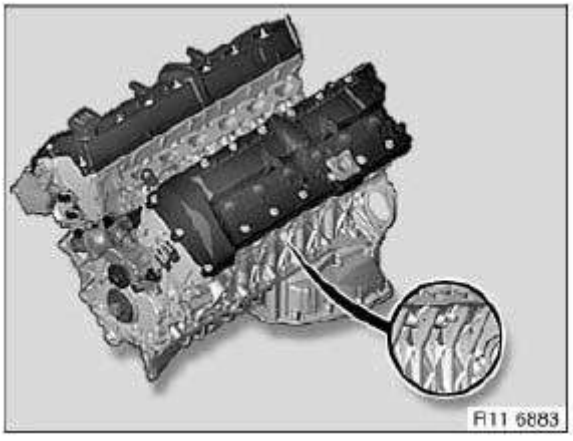


Fig. 27: Engine Identification (N73)
Courtesy of BMW OF NORTH AMERICA, INC.

S54

cardiagn.com

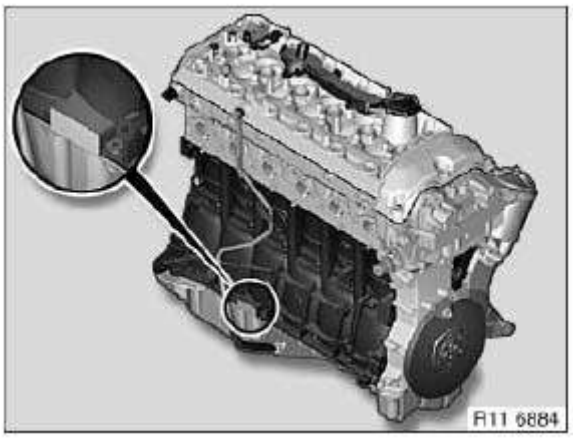


Fig. 28: Engine Identification (S54)
Courtesy of BMW OF NORTH AMERICA, INC.

S85/S65

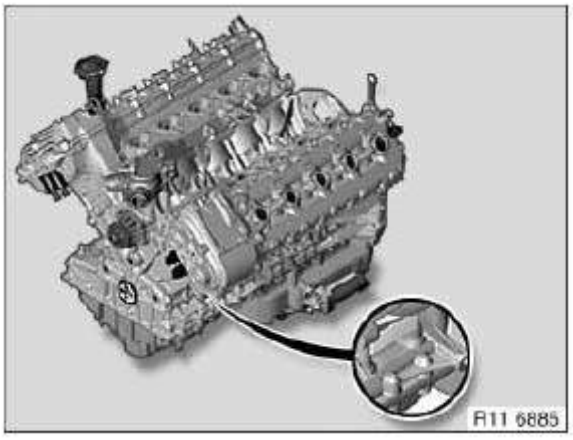


Fig. 29: Engine Identification (S85/S65)
Courtesy of BMW OF NORTH AMERICA, INC.

S55

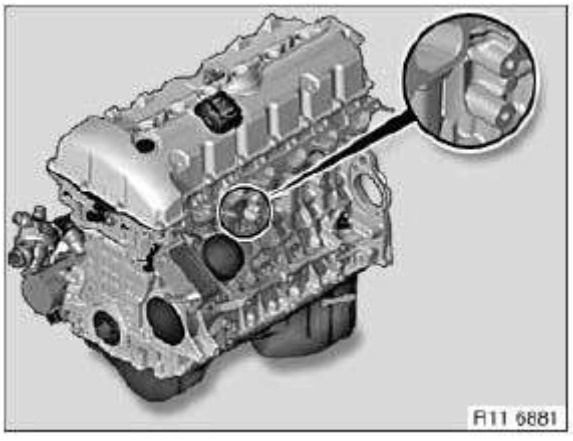


Fig. 30: Engine Identification (S55)
Courtesy of BMW OF NORTH AMERICA, INC.

W10/W11

cardiagn.com

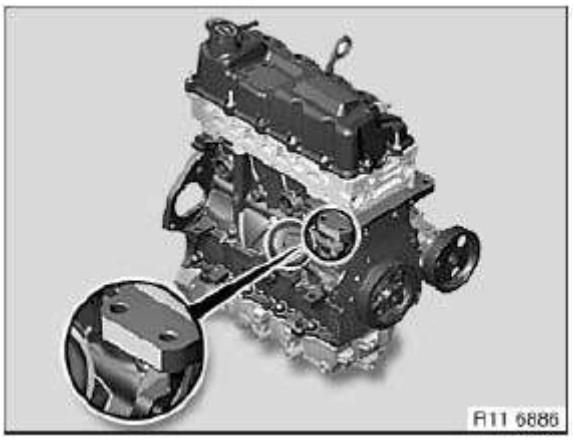


Fig. 31: Engine Identification (W10/W11)
Courtesy of BMW OF NORTH AMERICA, INC.

W16



Fig. 32: Engine Identification (W16)
Courtesy of BMW OF NORTH AMERICA, INC.

W17

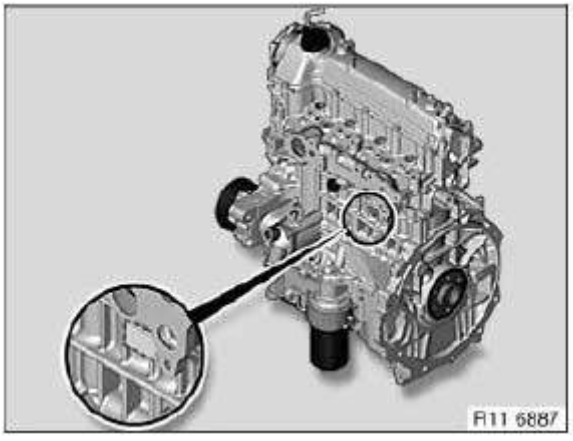


Fig. 33: Engine Identification (W17)
Courtesy of BMW OF NORTH AMERICA, INC.

W20

cardiagn.com

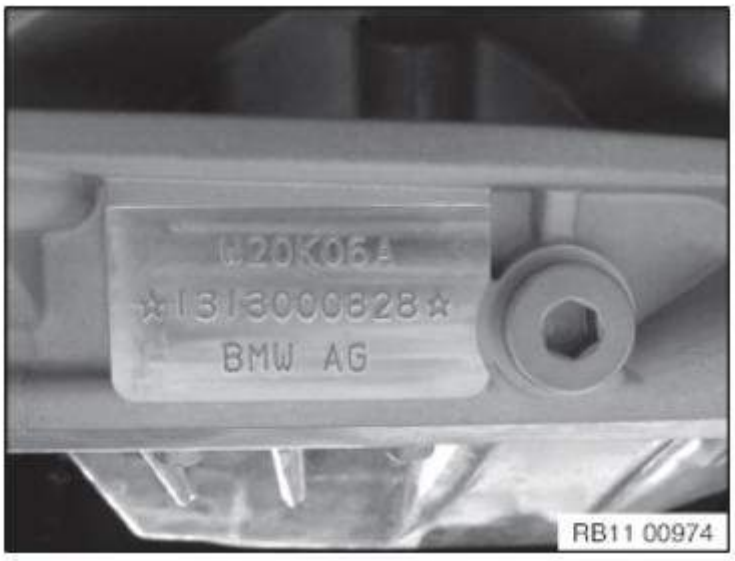


Fig. 34: Engine Identification (W20)
Courtesy of BMW OF NORTH AMERICA, INC.

N12/N13/N14/N16/N18



Fig. 35: Engine Identification (N12/N13/N14/N16/N18)
Courtesy of BMW OF NORTH AMERICA, INC.

B37/B38/B47/B48/B57/B58

cardiagn.com

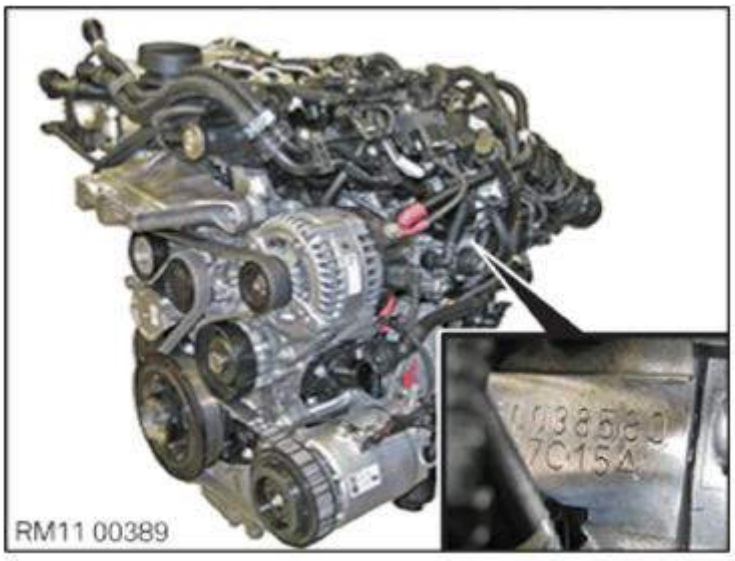


Fig. 36: Engine Identification (B37/B38/B47/B48/B57/B58)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 00 300 ENGINE OIL CONSUMPTION MEASUREMENT

IMPORTANT: This procedure for measuring oil consumption may not be used for the S 85 due to the oil pan design.

Many complaints about oil consumption are caused by the oil level being measured using the wrong method.

The oil consumption should be measured after a distance of 7, 500 km at the earliest, as the process of running in the engine will not have been essentially completed and the engine oil consumption stabilized until this distance has been covered.

Engine oil consumption that may occur in an engine can only be determined by the customer on the basis of the refilled engine oil quantity. As soon as the engine oil level falls below the MAX mark on the dipstick, many customers top up the engine oil without paying attention to a number of basic rules, such as the vehicle must be standing on level ground, a certain period of time must be left to allow the oil to flow back to the sump. In such cases, the available container sizes (e. g. 1-liter can) make it easy to top up above the MAX mark. Too much added engine oil is damaging to the engine and is consumed more quickly due to the splash effect.

It is therefore recommended to allow the engine oil level to the MIN mark and only then to add the required engine oil quantity. The distance between the marks is equivalent to approx. 1.0 to 1.5 liters.

The procedure for checking the oil level is given in the Owner's Handbook for the vehicle concerned.

The service delegates will only deal with claims made under warranty if exact measurements by weighing are available (see below).

Measuring oil consumption by weighing:

To assess a warranty or goodwill claim, only the following oil consumption measurement method by weighing can be accepted (this must have been carried out by a BMW contractual partner):

NOTE: **The engine must not leak any oil.**
Engine oil may only be drained off when the engine is at its normal operating temperature. The engine oil temperature must be at least 95 Â°C and read off on the diagnosis system.

cardiagn.com

Preparation:

1. Eliminate any leaks and traces of oil before measuring the engine oil consumption.
2. Allow the engine to run at idling speed for 5 minutes, during which the engine oil temperature must not drop below 90 Â°C.
3. Unscrew the main flow oil filter cover (the engine oil will flow back into the oil sump from the oil filter housing).

   Tightening specifications: O-ring slightly oiled, 1. initial tightening 30 Nm, 2. release oil filter cover 180Â°, 3. final torque 40 Nm.

4. Unscrew the oil drain plug.

   Tightening specifications: Replace sealing ring, tighten 40 Nm.

5. Allow the engine oil to drain off for 15 minutes.

   If necessary, remove the fan/fan cowl.

6. Turn the engine once through 360 degrees by the vibration damper.
7. Allow the engine oil to drain off for 15 minutes.
8. Retighten the primary flow oil filter.
9. Pour in the specified engine oil quantity for the engine type in question (with filter change).
10. Drive the vehicle for a distance of at least 1, 000 km/500 miles. Increasing the mileage will produce significantly better measuring results.

    Measurement procedure:

11. Check the engine for leaks; if the engine is not tight, the examination will not be meaningful.
12. Prepare the measuring container to be able to capture the oil quantity.
13. Allow the engine to run at idling speed for 5 minutes, during which the engine oil temperature must not drop below 90 Â°C.
14. Unscrew the main flow oil filter cover (the engine oil will flow back into the oil sump from the oil filter housing).

    Tightening specifications: O-ring slightly oiled, 1. initial tightening 30 Nm, 2. release oil filter cover 180Â°, 3. final torque 40 Nm.

15. Unscrew the oil drain plug.

    Tightening specifications: Replace sealing ring, tighten 40 Nm.

16. Allow the engine oil to drain off for 15 minutes.

    If necessary, remove the fan/fan cowl.

17. Turn the engine once through 360 degrees by the vibration damper.
18. Allow the engine oil to drain off for 15 minutes.
19. Weight the **amount of drained engine oil** . (Engine oil has a density of about 0.86 g/cm^3 at room temperature.)

cardiagn.com

$$\text{Engine oil consumption} = \frac{\text{Amount of oil added (cm}^3\text{) - amount of oil drained off (g): 0.86 g/cm}^3}{\text{mileage reading when draining - mileage reading when adding engine oil}}$$

Example:

Volume of oil added at mileage reading 44,800: 4.000 cm³

Weight of oil added at mileage reading 45,900: 2.700 g

$$\text{Engine oil consumption} = \frac{\text{4.000 cm3 - 2.700 g : 0.86 g/cm}^3}{\text{45,900 km - 44,800 km}} = 0.78\ \text{cm}^3\text{/km}$$

0.78 cm³/km = 0.78 l/1,000 km

Fig. 37: Engine Oil Consumption Calculation
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Vehicle data: _____

BMW (type): _____

Chassis number: _____

Added oil quantity (in ccm): _____ ccm at kilometre reading:_____

less drained off oil quantity (in g) : 0.86 (g/ccm) _____ ccm at kilometre reading:_____

=> oil consumption: _____ ccm => mileage: _____ km

Oil consumption [l/1000 km] =

_____ *[ccm] oil consumption* _____ [km] mileage

Oil consumption after balancing out: _____ l/1000 km

Oil grade: _____

Oil grade: _____

Viscosity: _____

Cause of damage: _____

_____ _____

Dealer address Signature

Fig. 38: Test Certificate For Engine Oil Consumption
Courtesy of BMW OF NORTH AMERICA, INC.

11 00... HANDLING COMPONENTS AFTER FLOOD DAMAGE

Flood damage can occur if the permissible fording depth of a vehicle is exceeded. Ingress of water can cause damage to the engine (water shock) or components.

Because dirt particles generally enter into the component with the water (e.g. starter motor, wiring harness), the components need to be thoroughly inspected.

Residual moisture in the components leads to corrosion (increased contact resistance in the component), which can lead to a component failure at a later time.

cardiagn.com

If water ingress into the electrical components cannot be ruled out, it is recommended to replace the component to ensure correct functioning through the vehicle lifetime.

11 00 091 INSTALLING REPLACEMENT ENGINE (N47T)

Special tools required:

- 11 5 320
- 11 8 740
- 11 8 741
- 11 9 260

IMPORTANT: Do not remove transportation retainer (adapter) of high pressure pump without special tool. **Risk of damage** to timing chain drive.

Necessary preliminary work:

- Remove engine. See **11 00 050 REMOVE AND INSTALL ENGINE (N47 D20 01 F25)**.
- Mount engine on assembly stand. See **11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N47 D20 O1)**.
- Convert all assemblies.

IMPORTANT: Do not remove transportation retainer without special tool 11 8 740 .

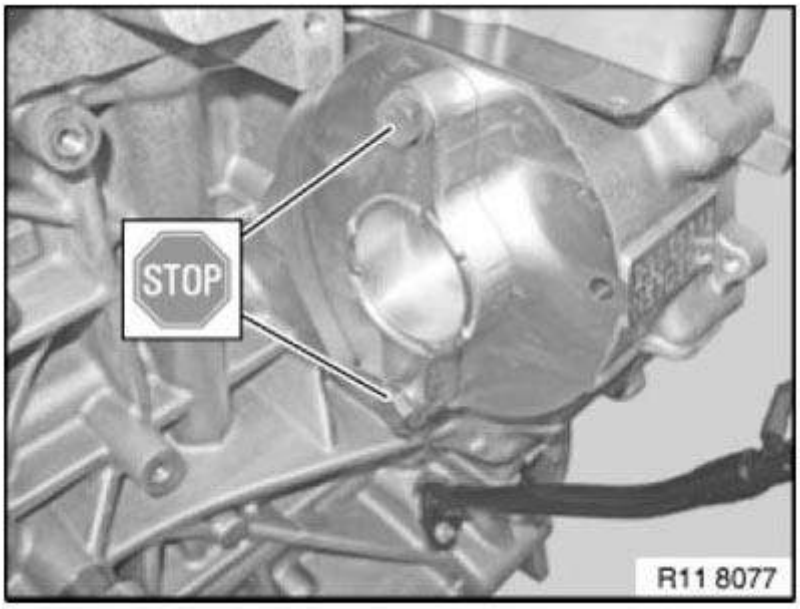


Fig. 39: Identifying Transportation Retainer
Courtesy of BMW OF NORTH AMERICA, INC.

Install flywheel.

Screw in bolts (1 to 8).

Installation note:

Replace screws.

NOTE: **Picture shows automatic flywheel.**

cardiagn.com

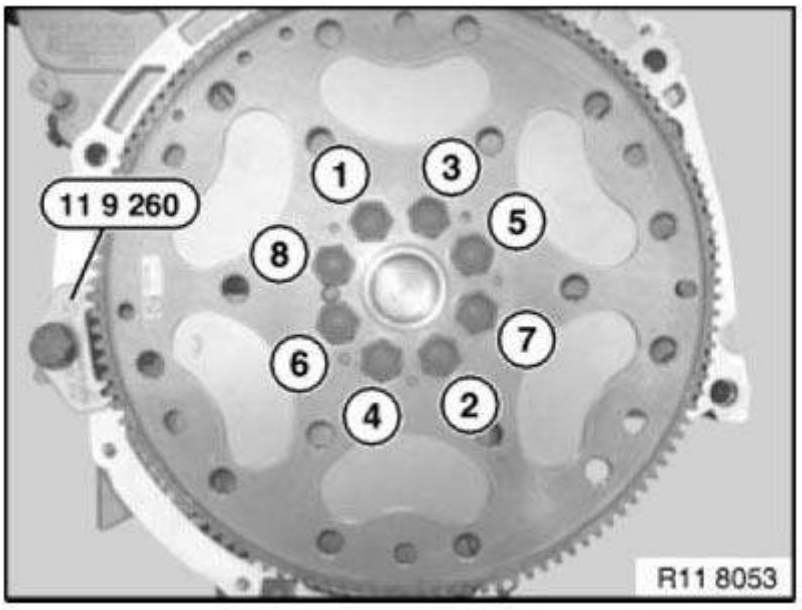


Fig. 40: Installing Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.

Secure engine in TDC setting with special tool **11 5 320** .

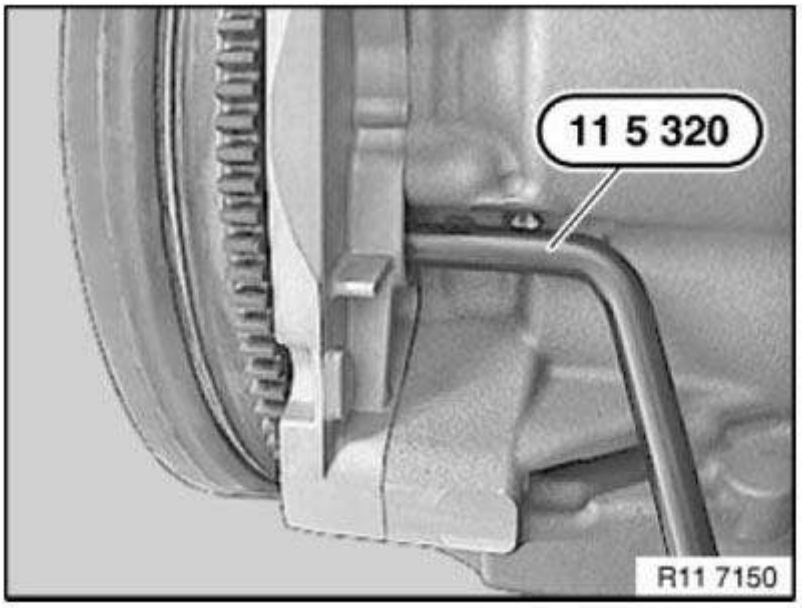


Fig. 41: Identifying Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool **11 9 260** .

Tighten bolts in sequence (1 to 8).

Tightening torque: **11 22 1AZ** .

cardiagn.com

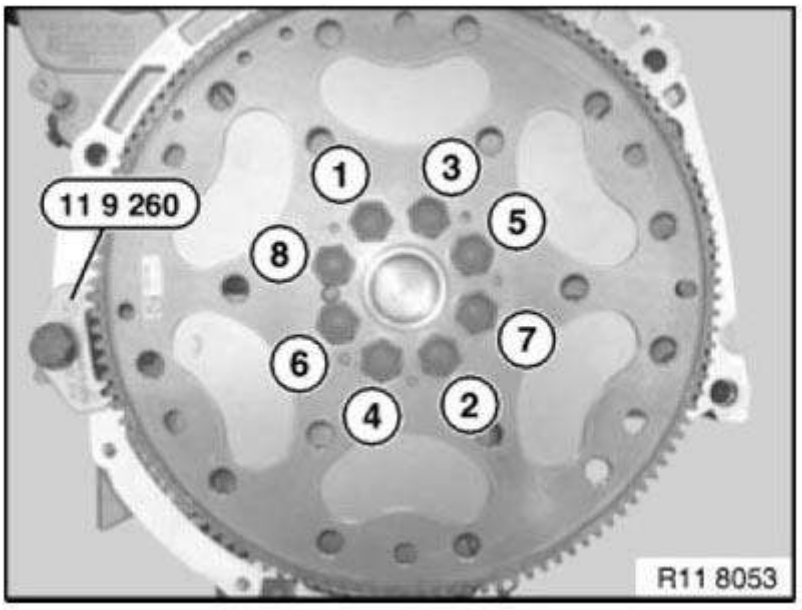


Fig. 42: Flywheel Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in special tool **11 8 740**

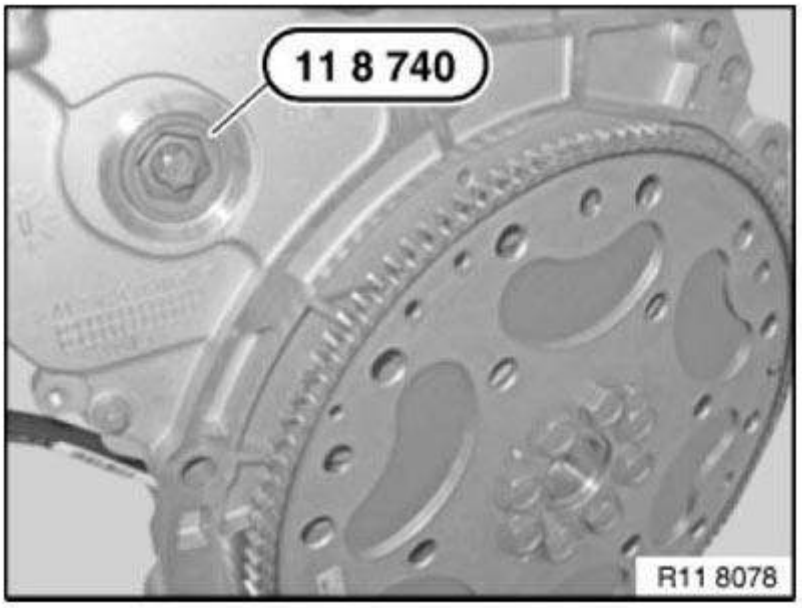


Fig. 43: Identifying Special Tool (11 8 740)
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew screws (1).

cardiagn.com

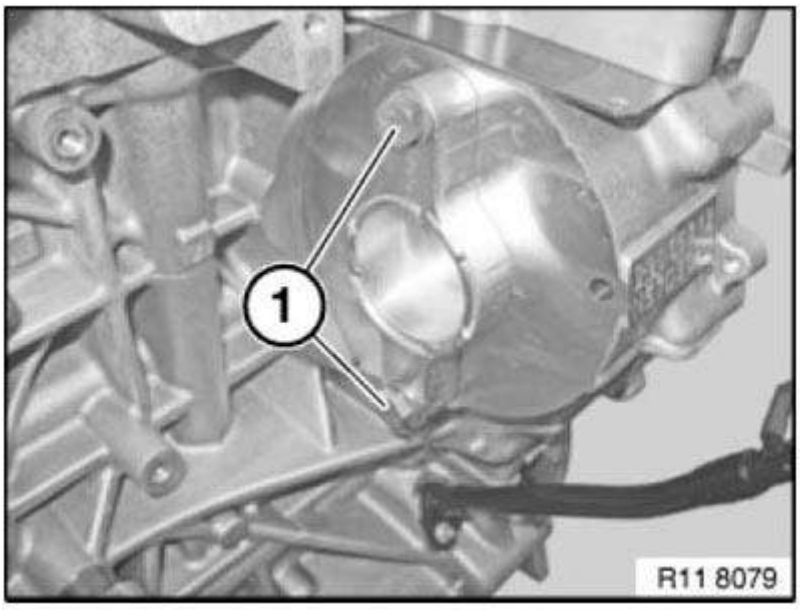


Fig. 44: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Special tool 11 8 741 remains in timing case housing.
Central bolt (1) remains in camshaft sprocket.

Remove central bolt (1).

NOTE: Central bolt (1) is supported on special tool 11 8 740 until transportation retainer is pressed out towards rear.

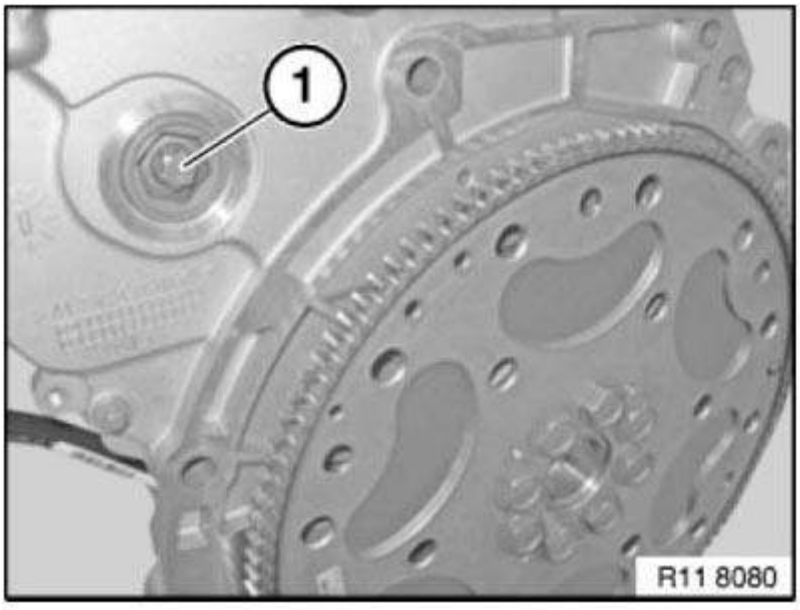


Fig. 45: Identifying Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Remove transportation retainer (1).

Install high pressure pump.

Transportation retainer (1) must be sent back to BMW (obligatory return).

cardiagn.com

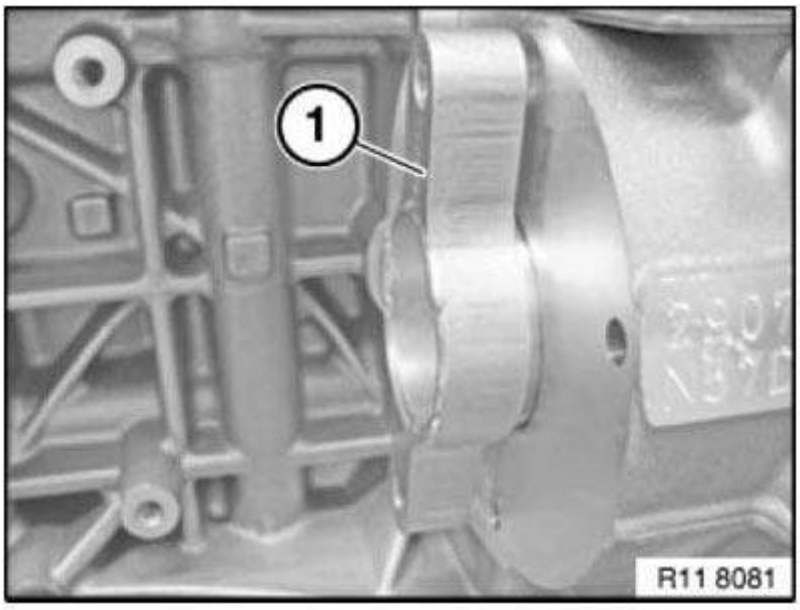


Fig. 46: Identifying Transportation Retainer
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 00 1AZ** .

Remove vacuum line (2) in direction of arrow.

Installation note:

Replace O-ring on vacuum line.

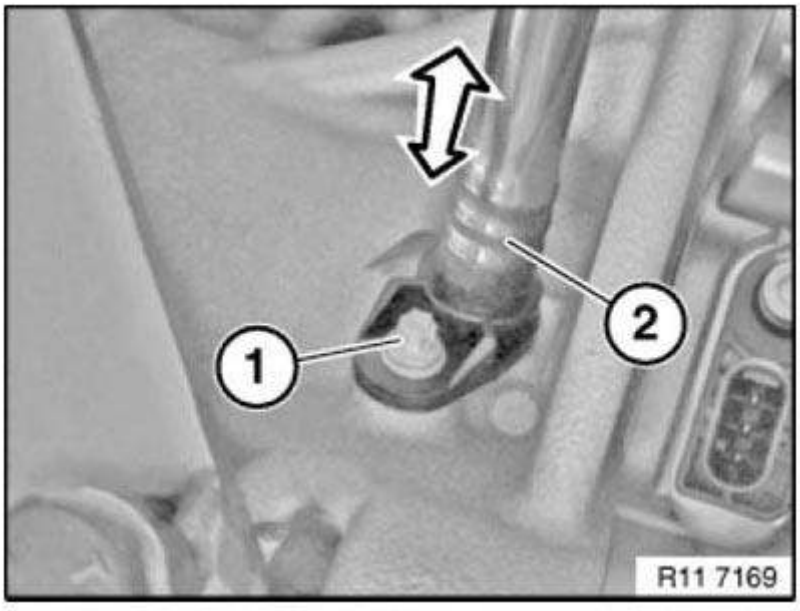


Fig. 47: Removing Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N47 D20 O1)

Special tools required:

cardiagn.com

- 00 2 300
- 00 2 320
- 11 8 770

IMPORTANT: Pay attention to manufacturer's information

Necessary preliminary work:

- Remove engine. See **11 00 050 REMOVE AND INSTALL ENGINE (N47 D20 01 F25)**.
- Remove engine support arm on left and right. See **22 11 110 REPLACING LEFT ENGINE SUPPORT ARM (N47)** and **22 11 100 REPLACING RIGHT ENGINE SUPPORT ARM (N47)** .

Prepare special tool **00 2 300** together with the special tool **00 2 320** .

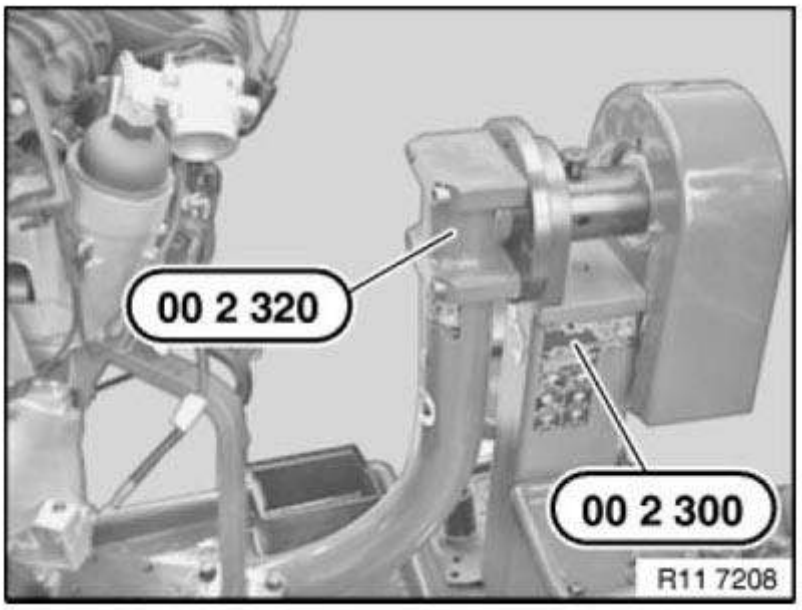


Fig. 48: Removing Engine Support Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 8 770** on left to support on engine support arm with screws (1).

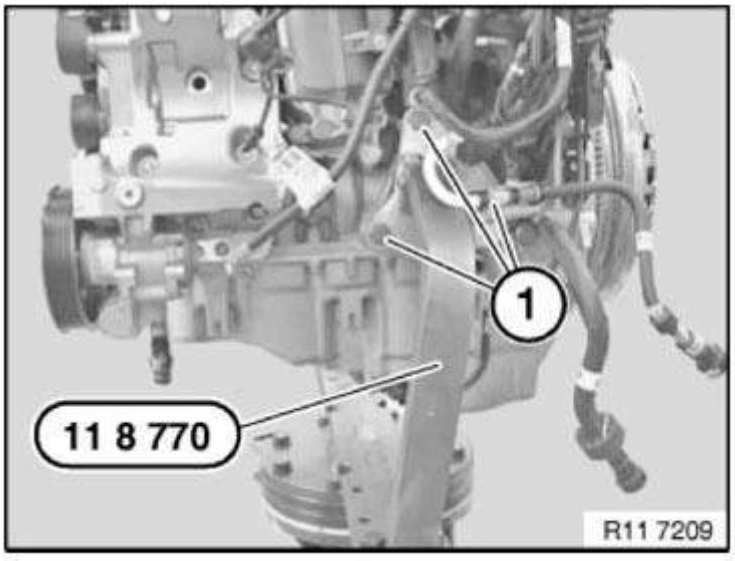


Fig. 49: Securing Special Tool 11 8 770 On Left To Support On Engine Support Arm With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Secure special tool **11 8 770** on right to support on engine support arm with screws (1).

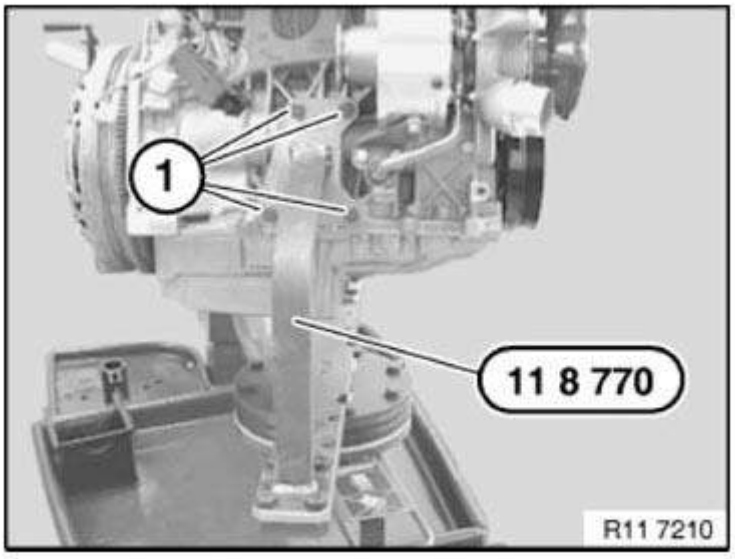


Fig. 50: Securing Special Tool 11 8 770 On Right To Support On Engine Support Arm With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N52T)

Special tools required:

- **11 8 540**
- **00 2 300**

Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
IMPORTANT: For reliable identification:
Aluminum screws/bolts are **not magnetic.**
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

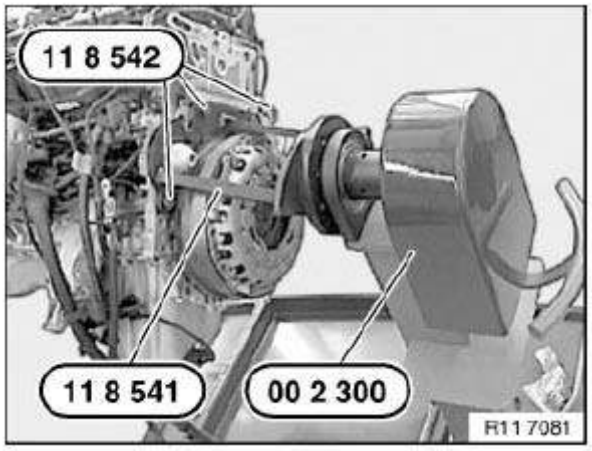
NOTE: **Special tools 11 8 542 and 11 8 541 are included in set of special tools 11 8 540 .**

Necessary preliminary tasks:

- Remove **ENGINE**

Use special tool 11 8 541 to attach engine to special tool **00 2 300** .

Use special tool 11 8 542 to attach engine or engine block to 11 8 541.



cardiagn.com

Fig. 51: Mounting Engine Or Engine Block With Special Tool (11 8 542) To (11 8 541)
Courtesy of BMW OF NORTH AMERICA, INC.

11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N55)

Special tools required:

- 00 2 300
- 11 8 541
- 11 8 542

IMPORTANT: Aluminum screws/bolts must be replaced each time they are **released.**
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic.**
Jointing torque and angle of rotation must be observed without fail **(risk of damage).**

Necessary preliminary tasks:

- Remove ENGINE

Use special tool 11 8 541 to mount engine on special tool 00 2 300 .

Mount engine or engine block with special tool 11 8 542 on 11 8 541 .

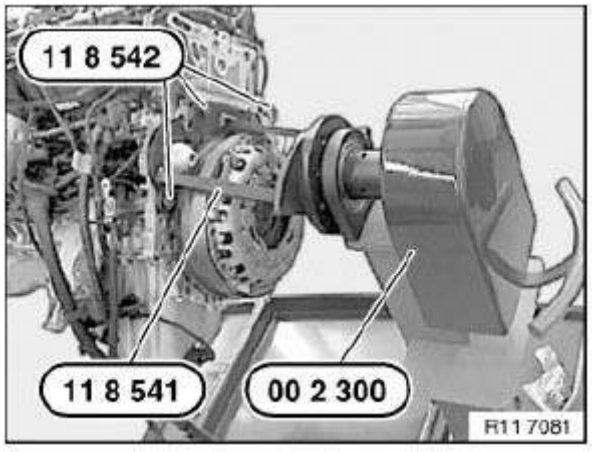


Fig. 52: Mounting Engine Or Engine Block With Special Tool (11 8 542) To (11 8 541)
Courtesy of BMW OF NORTH AMERICA, INC.

11 00 MOUNTING THE ENGINE ON THE ASSEMBLY STAND (N20/N26)

Special tools required:

- 00 2 300
- 11 8 541
- 11 8 542
- 83 30 0 495 187
- 83 30 2 212 832

IMPORTANT: Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Remove engine. See 11 00 050 REMOVING AND INSTALLING ENGINE (N20).

cardiagn.com

Attach engine or engine block to the fixture (2) using bolts (1).

Use special tool (2) to attach the engine to special tool **00 2 300** .

Order number, assembly block: 83 30 0 495 187

Order number, fixture: 83 30 2 212 832

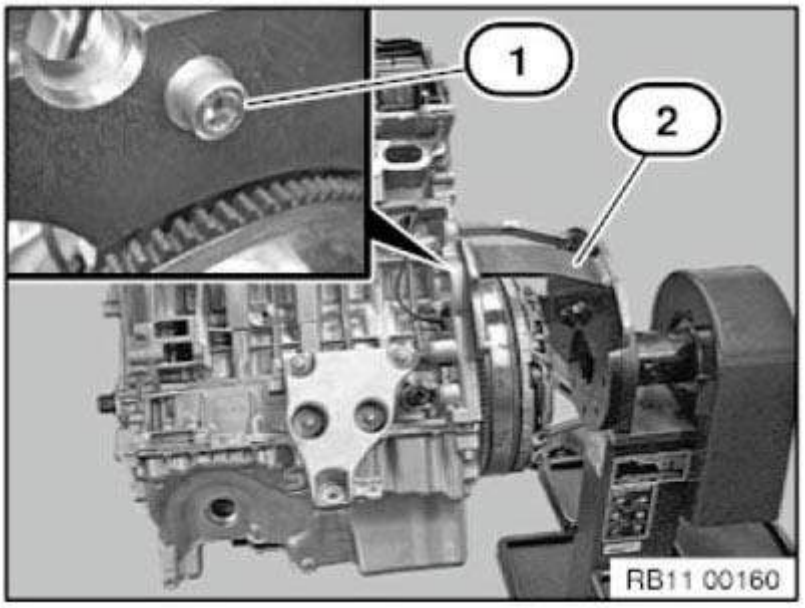


Fig. 53: Attaching Engine Block To Fixture
Courtesy of BMW OF NORTH AMERICA, INC.

11 00... OIL CONSUMPTION MEASUREMENT

Procedure for oil consumption measurement, see following documents:

- Oil consumption measurement. See **11 00 300 ENGINE OIL CONSUMPTION MEASUREMENT**.
- Record on oil consumption measurement. See **11 00 300 ENGINE OIL CONSUMPTION MEASUREMENT**.
- Engine oil and oil filter renewal. See **11 00... ENGINE OIL CHANGE (N47 D20 1)**, **11 00... SERVICE - ENGINE OIL (N52T)**, **11 00... SERVICE - ENGINE OIL (N55)** or **11 00... ENGINE OIL SERVICE (N20, N26)**.

11 00... OVERVIEW OF CONSUMABLES (ELECTRONIC PARTS CATALOGUE)

1.0 Sealing compound for **injection** .

Â	Repair instructions (engine)	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
1.1	N40, N42, N45, N46, N43, N45N, N46N	Loctite 171000 primer	83 19 7 515 683	For hardening Loctite 128357 sealing compound
1.2	N40, N42, N45, N46, N43, N45N, N46N, N55	Loctite 128357 liquid gasket	83 19 7 536 051	Sealing between crankcase upper and lower halves
1.3	N51, N52, N53, N54, N52N, N55	Loctite 171000 primer	83 19 7 515 683	For hardening Loctite 193140 sealing compound
1.4	N51, N52, N53,	Loctite 193140	83 19 0 439 030	Sealing between

cardiagn.com

	N54, N52N, N55, S55	liquid gasket		crankcase upper and lower halves
1.5	S65, S85	Loctite 171000 primer	83 19 7 515 683	For hardening Loctite 193140 sealing compound
1.6	S65, S85	Loctite 193140 liquid gasket	83 19 0 439 030	Sealing between crankcase upper and lower halves
1.7	W20	Dow Corning liquid gasket	07 58 0 397 777	Sealing between crankcase upper and lower halves Sealing of oil sump

2.0 Sealing compound for **application** .

Â	**Designation in repair instructions**	**Designation, Electronic Parts Catalogue**	**Part number, Electronic Parts Catalogue**	**Application examples**
2.1	M41, M47, M47TU, M47T2, M50, M51, M52, M52TU, M54, M57, M57TU, M57T2, M60, M62 N12, N14, N16, N18 N20, N26 N40, N42, N45, N45N, N46, N46N, N43, N47, N47top, N47C N47D1 N51, N52, N52N, N53, N54, N55, N57, N57T, N62, N62TU, N63, N73, N73H, N74 S14, S38, S50, S52, S54, S62, S65, S85	Drei Bond 1209 liquid gasket	07 58 9 062 376	For sealing junction points on crankcase
2.2	N12, N13, N14, N16, N18, N20, N26 W10, W11, W16,	Loctite 5970 liquid gasket	83 19 0 404 517	Sealing between crankcase upper and lower sections.
2.2	N47top, N47D1, N47C1 N57D1 N57S1, B37, B38, B47, B48,	Loctite 5970 liquid gasket	83 19 0 404 517	Timing case cover sealing, oil sump, coolant pump, component carrier.
2.3	N12, N14, N16, N18 W16	Loctite 648 liquid gasket	07 58 9 067 732	Sealing between cover sleeve and crankcase
2.4	N12, N13, N14, N16, N18 W16	Loctite 121078 liquid gasket	83 19 2 223 765	Sealing between cover sleeve and crankcase

3.0 **Cleaning agent.**

cardiagn.com

Â	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
3.1	N12, N13, N14, N18, N20, N26, N45, N46, N45T, N46T, N43, N51, N52, N52Kp, N52TU, N53, N55, N63, N63S, N63 Hybrid, N63O1, N63O2 N73, N74 B37, B38 B47, B48,	Cold cleaner (chlorine free)	83 19 0 026 956	Cleaning assemblies, washing engine
3.2	M47, M47T1 M47T2, M57 M57T1, M57T2 N47 K/U/O/T 0/1 N47C	Universal cleaner	83 19 0 413 478	Clean intake pipe.

4.0 Lubricant for **application** .

Â	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
4.1	N12, N13, N18, N20, N26, N42, N46, N46TU, N51, N52, N52KP, N52TU, N55, N62, N62TU, N63O0, N63O1, N63O2, N73 S55, S63T0 B37, B38, B47, B48,	Lubricating grease Longtime PD1	83 19 2 160 340	For greasing the splined shaft on actuator drive/gearing of intermediate shaft.
4.2	M47, M47TU, M47T2, M57, M57TU, M57T2,	High temperature paste	83 19 2 152 323	For greasing the thread on the exhaust turbocharger.
4.3	N12, N13, N14, N16, N18 N20, N26, N40, N42, N45, N45TU N46, N46TU, N43. N51, N52, N52Kp, N52TU, N53, N54, N55. N62, N62TU, N63O0, N63O1, N63O2 N73, N73H, N74. S63T1, S65, S85.	High temperature paste (NEVER-SEEZ compound)	83 19 2 158 851	For greasing the threads on the oxygen sensors.
4.4	N47, N47O1 N47C1, N47T N47D1	Copper paste	81 22 9 400 794	For greasing the double hex head bolt on the exhaust

cardiagn.com

	N57 N57D1 N63O0, N63O1, N63O2 S63, S63T0			turbocharger. For greasing the central bolt on the VANOS gear.
4.5	M47, M47TU, M47T2 M57, M57TU, M57T2 N47, N47O1 N47C1, N47T N47D1 N57 N57D1	High-temperature grease (UrethynE2).	83 23 0 441 070	For greasing the injectors or injector shafts. Magnet and Piezo injector.
4.6	N47T0, N47T1 N57T0, N57T1, N57S1	Assembly paste, ATE grease	83 19 9 407 854	For lubricating the O-rings of the pressure pipes Multistage turbocharging assembly.
4.7	W20	Assembly paste, grease	No longer greased.	For greasing the torsion splined shaft.
4.8	N63O1, N63O2	Assembly paste, grease	83 23 9 407 778	For greasing the central bolt on the crankshaft.

5.0 Lubricants to loosen locked **screw connections.**

Â	**Designation in repair instructions**	**Designation, Electronic Parts Catalogue**	**Part number, Electronic Parts Catalogue**	**Application examples**
5.1	M47, M47TU, M47TU2, M57, M57TU, M57TU2. N47, N47C, N47D1, N57, N57D1, N57S1 W16, W17,	Brunox lubricating grease	83 23 0 445 529	For releasing the glow elements
5.2	E89 F10, F11.	Brunox lubricating grease	83 23 0 445 529	For releasing and fixing the screw connection of the rubber mounts

6.0 Spray to **search for leaks and establish contact**

Â	**Designation in repair instructions**	**Designation, Electronic Parts Catalogue**	**Part number, Electronic Parts Catalogue**	**Application examples**
6.1	Petrol: N13, N20, N26, N54, N55 B38, B48 Diesel fuel: M47, M47TU, M47TU2, M57, M57TU, M57TU2. N47, N47C, N47D1, N57, N57D1,	Lecksuch Spray	83 19 9 407 861	Check charge air path for tightness. Example: leakage on charge air hose or charge air cooler.

cardiagn.com

	B37, B47			
6.2	S55	Contact spray	81 22 9 400 208	Cleaning and protecting electrical plug connections.

11 00 050 REMOVE AND INSTALL ENGINE (N47 D20 01 F25)

Special tools required:

- **11 0 020**

Necessary preliminary tasks:

- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .
- Disconnect **BATTERY EARTH LEAD** .
- Move **ENGINE COMPARTMENT LID** into service position.
- Remove both **TRAILING LINKS** .
- Remove acoustic cover at rear. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .
- Remove **RADIATOR** .
- Disconnect all coolant hoses including heater hose from engine.
- Remove **EXPANSION TANK** .
- Remove left **PRESSURE PIPE**.
- Remove right **PRESSURE PIPE**.
- **RELEASE A/C COMPRESSOR AND PLACE TO ONE SIDE** .
- Release **ENGINE WIRING HARNESS** from electronics box.
- Remove **DIESEL PARTICULATE FILTER** .
- Remove **TRANSMISSION** .
- **All-wheel drive vehicles only:**

Remove both **OUTPUT SHAFTS** .

Recycling:

Catch and dispose of escaping fuel with auxiliary materials.

Observe country-specific waste disposal regulations.

Remove rear acoustic cover:

Release positive battery cable (1) from clamp.

Release expanding rivets (2).

Remove rear acoustic cover (3).

cardiagn.com

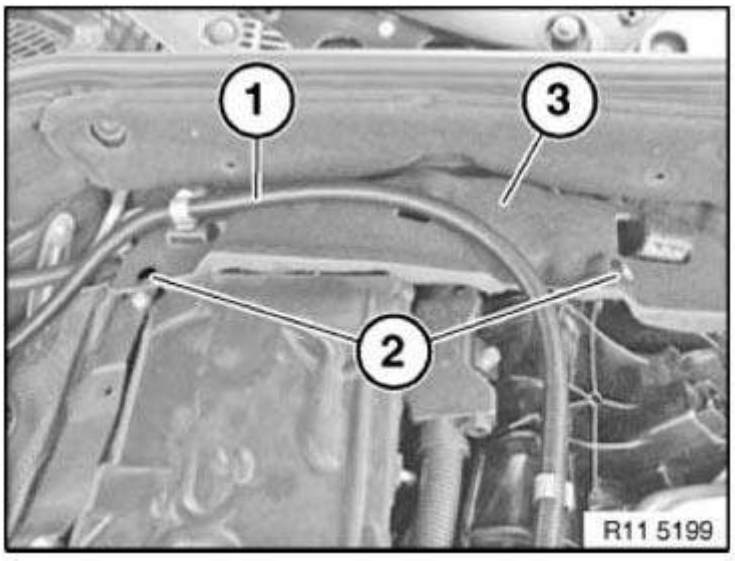


Fig. 54: Identifying Positive Battery Cable And Rear Acoustic Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Detach snap fastener (1).

Installation note:

Make sure that snap fastener (1) is correctly engaged.

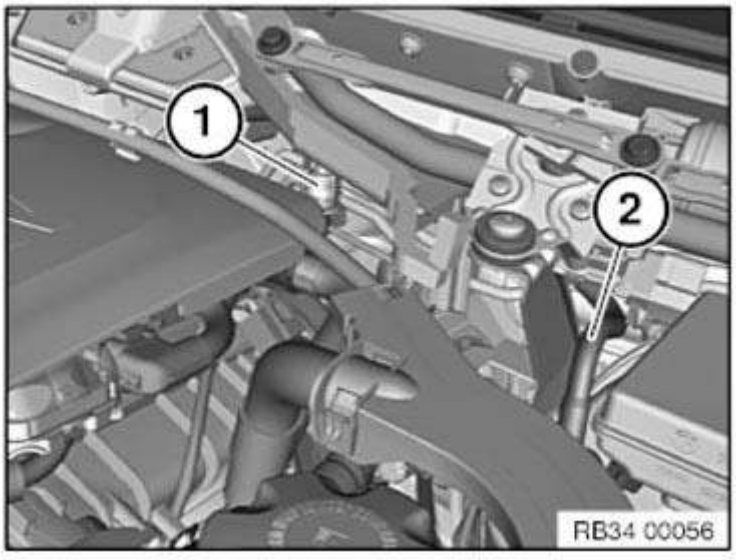


Fig. 55: Identifying Snap Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock fuel feed and return lines (1) and disconnect.

Detach vacuum hose (2) for engine mount.

cardiagn.com

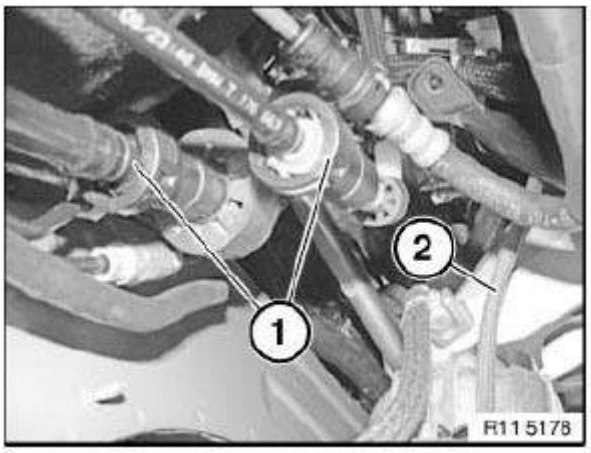


Fig. 56: Identifying Fuel Feed And Return Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Secure engine wiring harness (1) on engine against falling out.

Fit special tool **11 0 020** on engine.

IMPORTANT: Pay attention to chain of special tool **11 0 020** . **Risk of damage.**
Only raise engine at the lifting lugs (2) provided for this purpose.

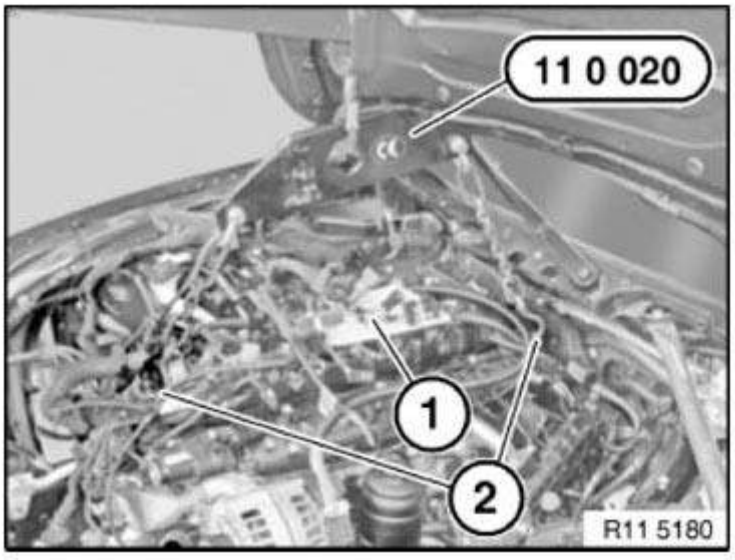


Fig. 57: Identifying Engine Wiring Harness And Lugs
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Picture shows F01.

Release nut (1) on left and right engine mounts.

Installation note:

Replace nuts.

Release ground strap on left engine support arm.

cardiagn.com

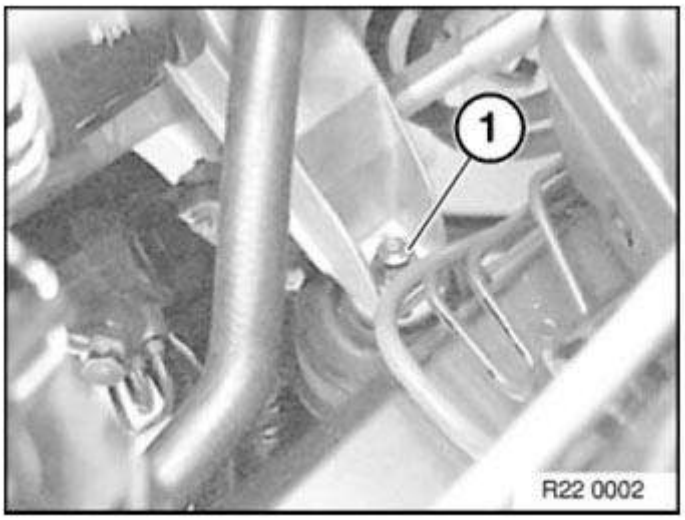


Fig. 58: Identifying Nut On Left And Right Engine Mounts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check **COOLING SYSTEM** for leaks.

11 00 050 REMOVE AND INSTALL ENGINE (N52T)

Special tools required:

- **11 0 000**
- 11 7 310
- **13 5 280**

IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released** . Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic.** Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Clamp off negative **BATTERY CABLE** .
- **MOVE** engine compartment lid into service position.
- Remove **EXHAUST SYSTEM** .
- Remove **TRANSMISSION** .
- Remove front **OUTPUT SHAFTS** .
- Remove **TRAILING LINKS** .
- Remove **INTAKE SILENCER HOUSING** .
- Remove **EXPANSION TANK** .
- Remove **FAN COWL** with electric fan.
- Remove **THERMOSTAT**.
- Draw off **A/C SYSTEM** .
- Remove **RADIATOR** .

cardiagn.com

- Detach all coolant hoses from engine.
- **REMOVE** intake plenum.
- Detach vacuum line.
- Unfasten engine wiring harness and lay to one side.

To remove or refit the engine, the towing hook 72 15 8 108 670 is required.

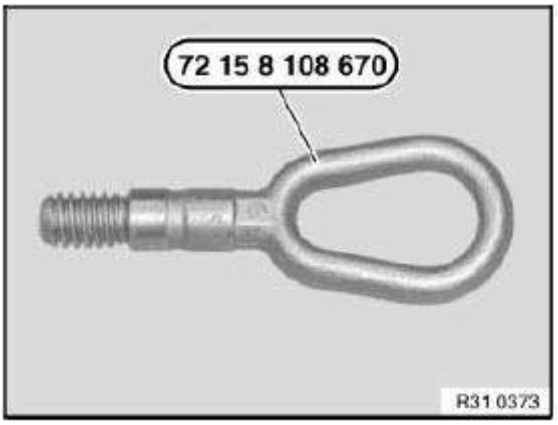


Fig. 59: Identifying Towing Hook (72 15 8 108 670)
Courtesy of BMW OF NORTH AMERICA, INC.

Fold back cover (1).

Release nut underneath. Remove positive battery cable from positive battery connection point.

Tightening torque: **12 42 3AZ** .

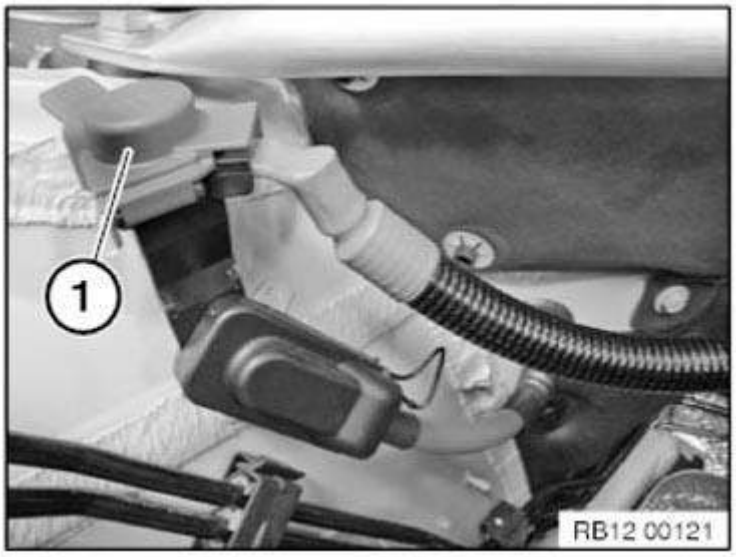


Fig. 60: Identifying Back Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Support engine with special tool 11 7 310 on steering box.

cardiagn.com

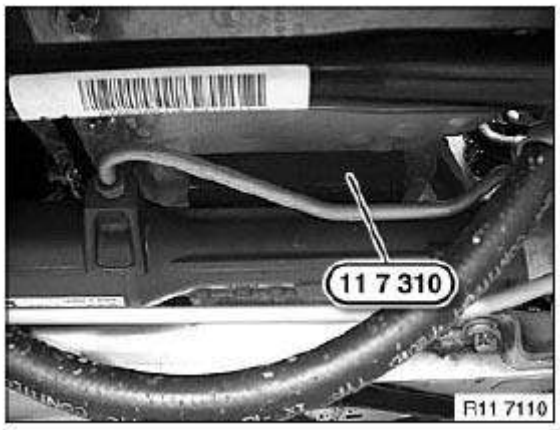


Fig. 61: Identifying Special Tool (11 7 310) On Steering Box
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and detach fuel and tank ventilation lines (1).

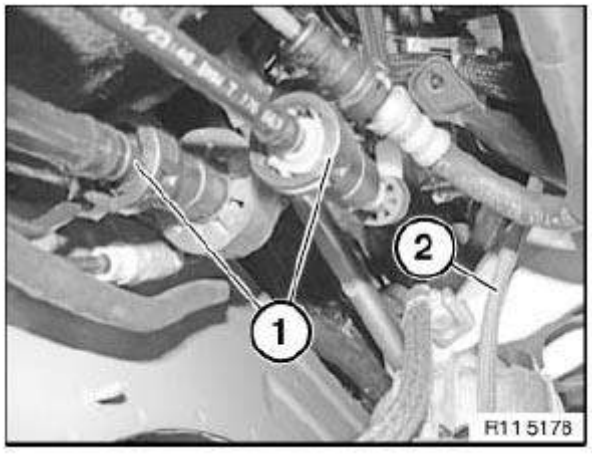


Fig. 62: Identifying Fuel And Tank Ventilation Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Seal fuel lines with special tool **13 5 280** .

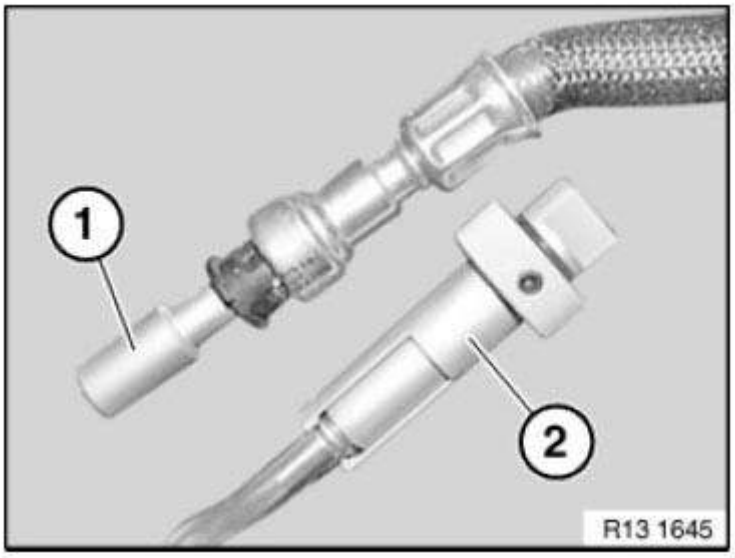


Fig. 63: Identifying Seal Fuel Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (2, 3).

cardiagn.com

Disconnect pressure and intake pipes from air conditioning compressor.

Installation note:

Replace all sealing rings and moisten with refrigerant oil.

Tightening torque: **64 53 7AZ** .

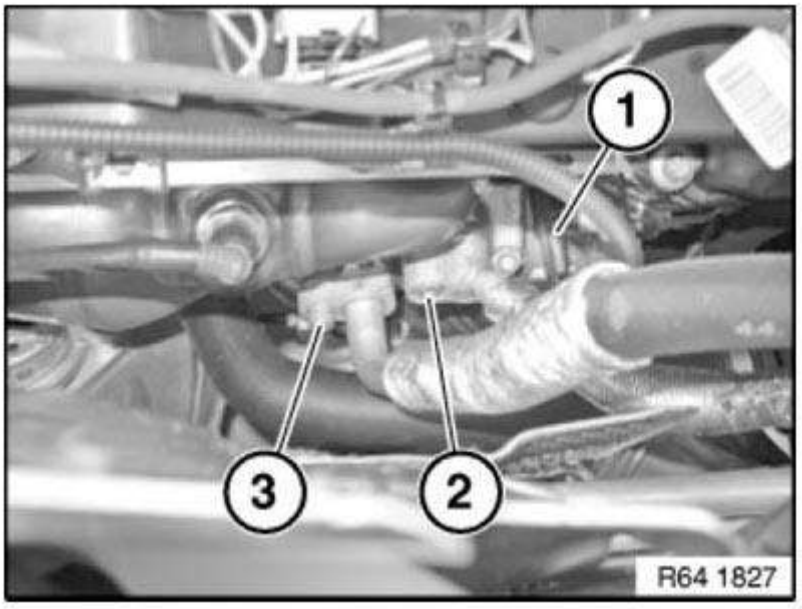


Fig. 64: Identifying Intake Pipe Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew left and right engine mounts.

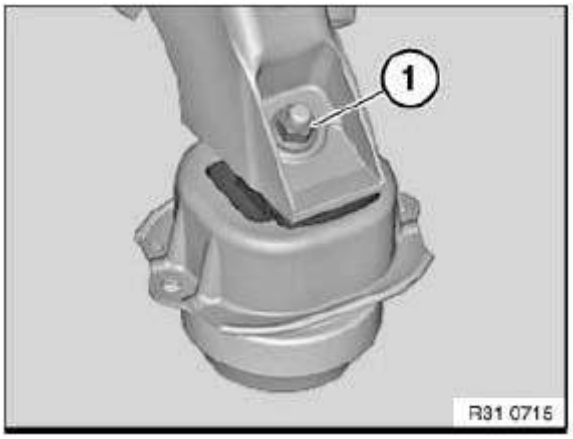


Fig. 65: Identifying Engine Mount Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Screw towing eye (1) into cylinder head.

Tightening torque: **11 12 11AZ** .

Attach special tool **11 0 000** to engine crane.

Suspend special tool **11 0 000** from the designated mounting eyelets (2) only.

Lift engine out with engine crane.

cardiagn.com

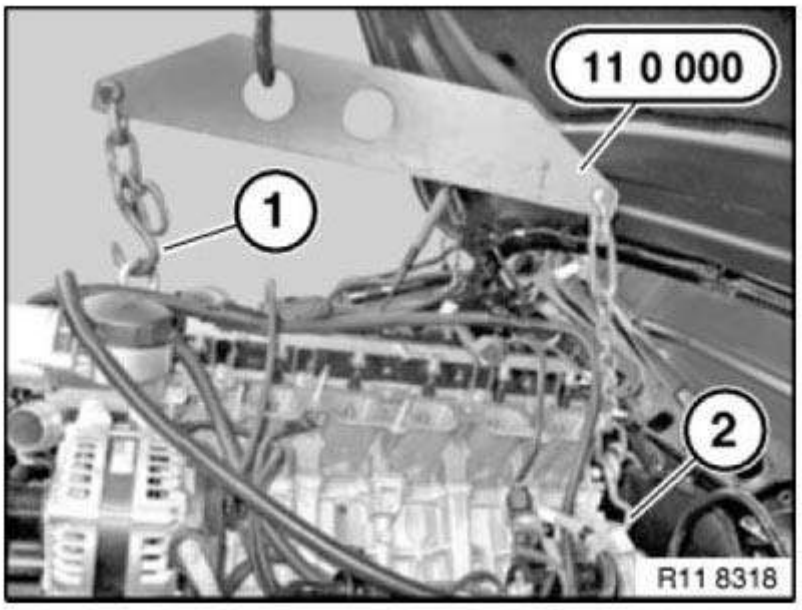


Fig. 66: Attaching Special Tool (11 0 000) To Engine Crane
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME.

11 00 050 REMOVING AND INSTALLING ENGINE (N20)

Special tools required:

- **11 0 000**
- 72 15 8 108 670
- **13 5 160**
- **00 9 030**

Necessary preliminary tasks:

- Disconnect **NEGATIVE BATTERY LEAD** .
- **MOVE** engine compartment lid into service position.
- **REMOVE** both trailing links.
- Remove **TRANSMISSION** .
- Remove **EXHAUST SYSTEM** .
- Remove both front **DRIVE SHAFTS** (all-wheel drive vehicles only).
- Drain **ENGINE OIL**.
- Remove **ACOUSTIC COVER**
- Remove **INTAKE SILENCER HOUSING** .
- **REMOVE** bottom clean air pipe.
- **REMOVE LEFT CHARGE AIR DUCT**.
- Remove **RIGHT CHARGE-AIR DUCT**.
- Detach all coolant hoses from engine.
- Remove **COOLANT THERMOSTAT**.
- Evacuate **HEATING AND AIR CONDITIONING SYSTEM** .

For removing and installing the engine, the towing hook 72 15 8 108 670 is required.

cardiagn.com

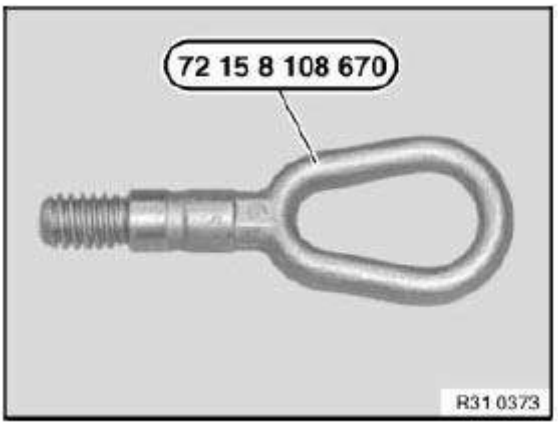


Fig. 67: Identifying Towing Hook (72 15 8 108 670)
Courtesy of BMW OF NORTH AMERICA, INC.

Fold back cover (1).

Release nut underneath. Remove positive battery cable from positive battery connection point.

Tightening torque: **12 42 3AZ** .

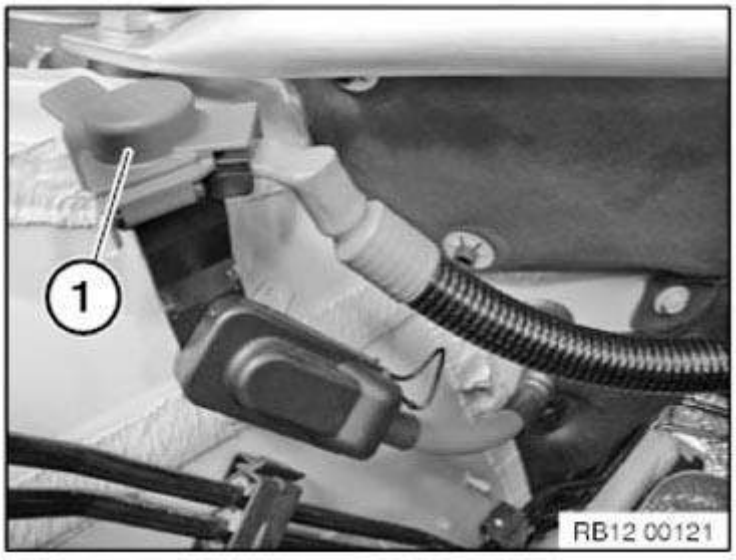


Fig. 68: Identifying Back Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release vacuum line (1) to vacuum pump.

cardiagn.com

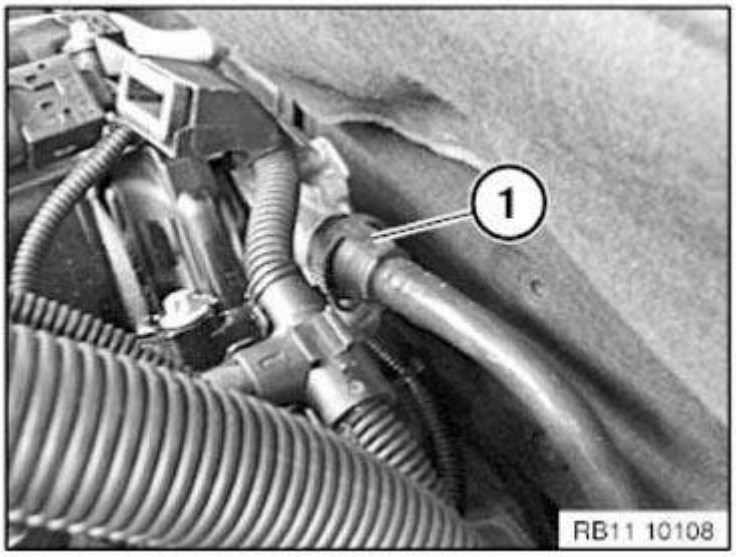


Fig. 69: Identifying Vacuum Line To Vacuum Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Detach the fuel line at the snap fastener (1).

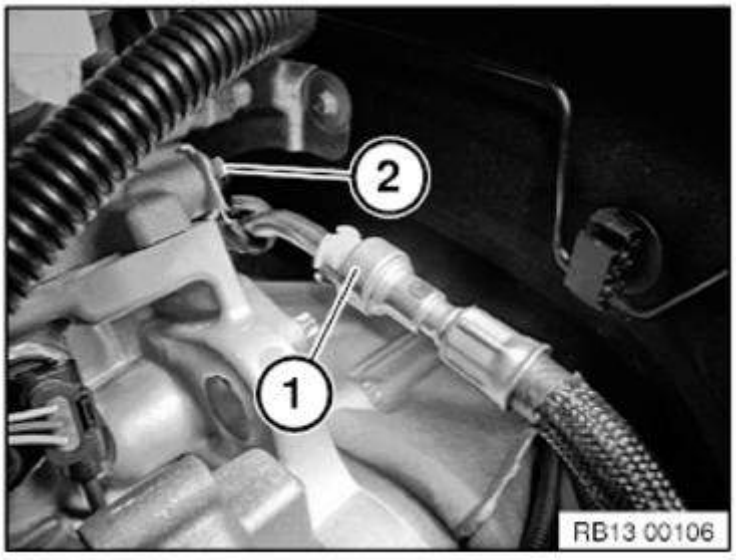


Fig. 70: Identifying Fuel Line And Snap Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Seal fuel lines with seals (1) and (2) from set of special tools **13 5 160** .

cardiagn.com

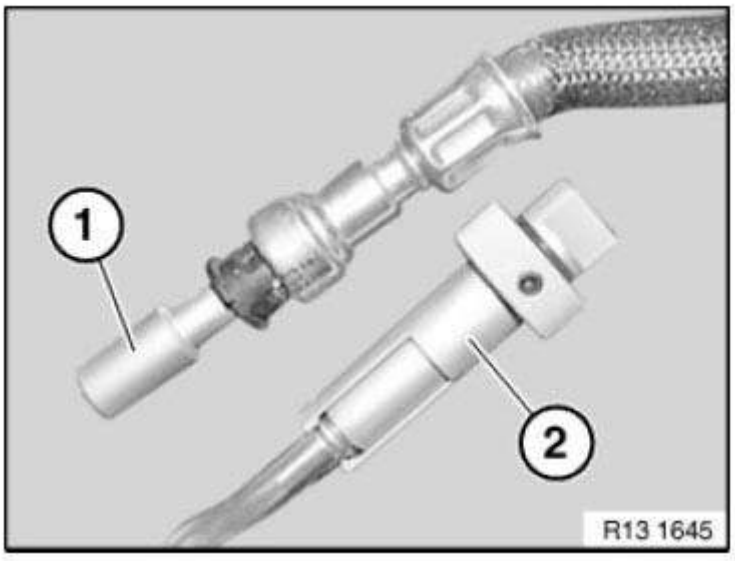


Fig. 71: Identifying Fuel Lines With Seals
Courtesy of BMW OF NORTH AMERICA, INC.

Release and disconnect plug connection (2) at A/C compressor.

Release screws (1).

Tightening torque: **64 52 1AZ** .

Remove refrigerant lines (3).

Installation note:

Replace sealing rings.

Use special tool **00 9 030** to install sealing rings without damaging them.

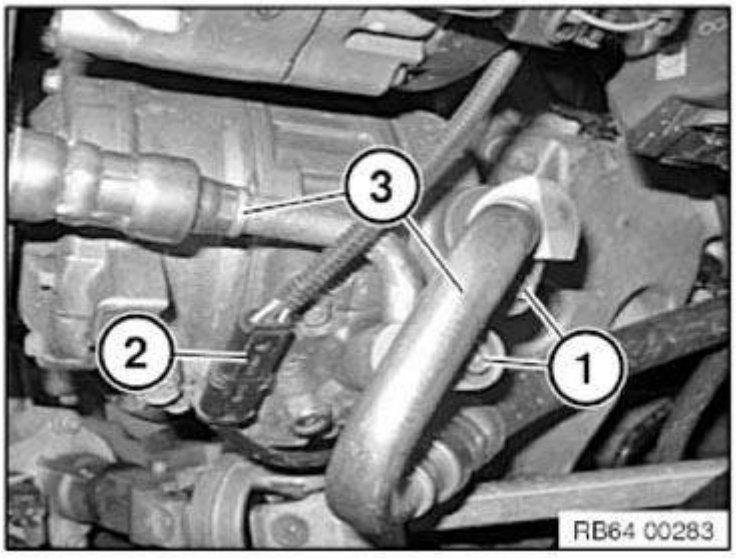


Fig. 72: Identifying A/C Compressor And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock all connectors (1) from control unit and disconnect.

Place engine wiring harness to one side.

Installation note:

cardiagn.com

Make sure grommets are correctly fitted (watertightness).

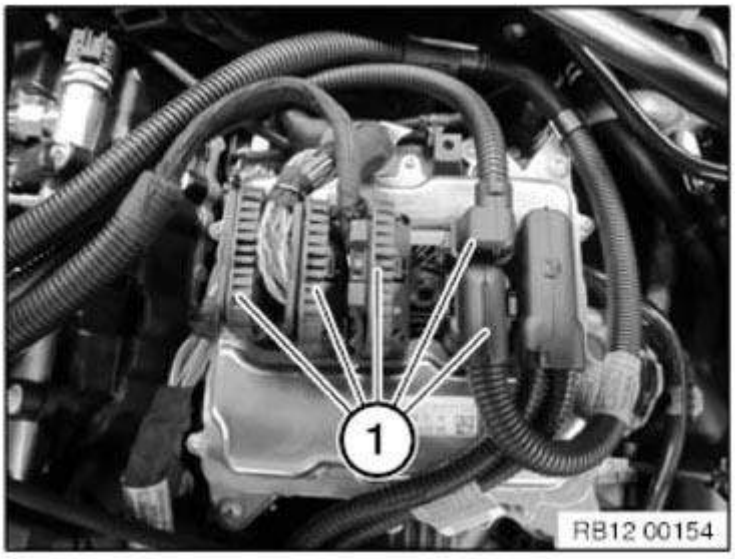


Fig. 73: Identifying Control Unit Connectors
Courtesy of BMW OF NORTH AMERICA, INC.

Detach all connectors from Power

Distribution Module (1). Release wiring harness from bulkhead.

Disconnect plug connection (2).

Release screws (3) and lay wiring harness to one side.

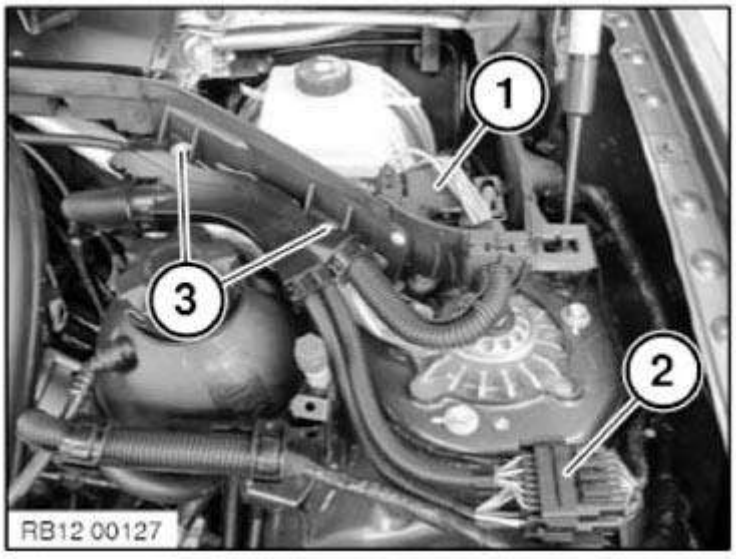


Fig. 74: Identifying Power Distribution Module And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) on engine mount on left and right.

Tightening torque: **22 11 2AZ** .

cardiagn.com

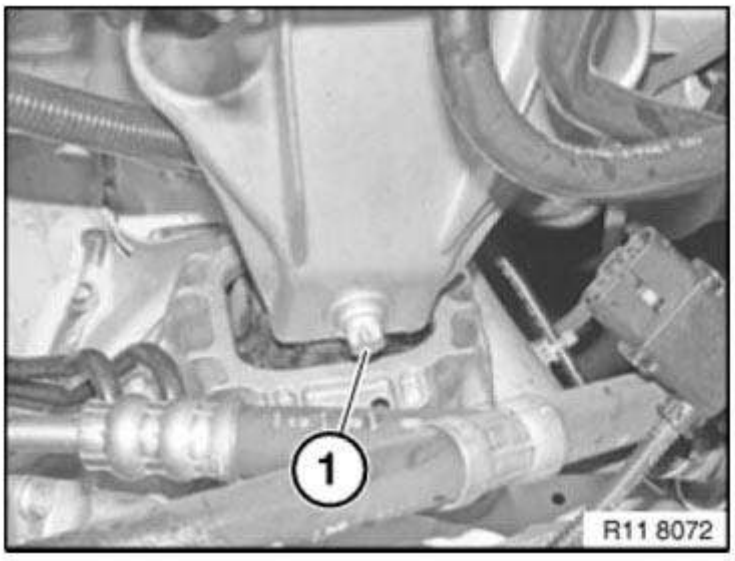


Fig. 75: Identifying Screws On Engine Mount
Courtesy of BMW OF NORTH AMERICA, INC.

Schematic diagram:

Screw towing eye (1) into cylinder head.

Tightening torque: **11 12 5AZ** .

Attach special tool **11 0 000** to engine crane.

Suspend special tool **11 0 000** only from designated mounting eyelets (2).

The installation eye is in close proximity to starter motor.

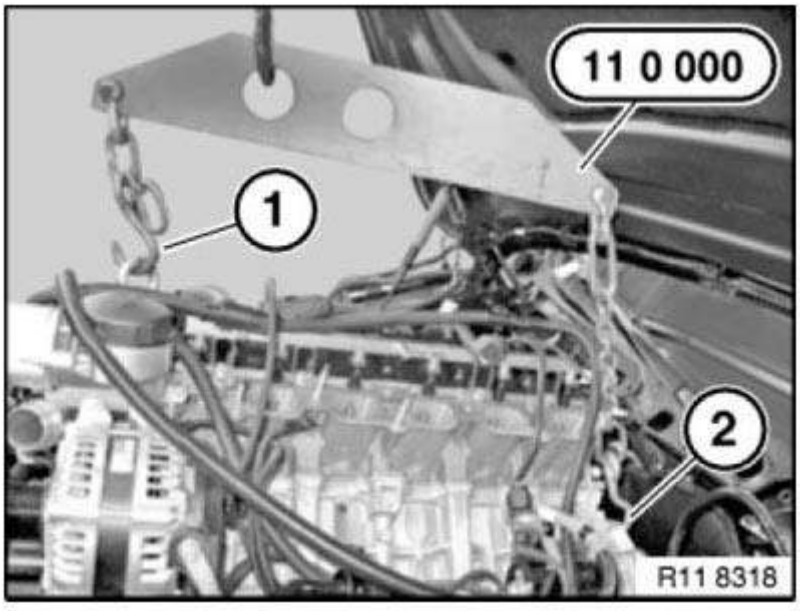


Fig. 76: Attaching Special Tool (11 0 000) To Engine Crane
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Note restrictions on steering shaft and bulkhead.

Lift engine out with engine crane.

Assemble engine.

cardiagn.com

Check function of DME.

11 00 050 REMOVING AND INSTALLING ENGINE (N55)

Special tools required:

- 11 0 000
- 11 7 310
- 11 8 680
- 13 5 281
- 13 5 282
- 00 9 030

Necessary preliminary work:

- Disconnect NEGATIVE BATTERY LEAD .
- Disconnect POSITIVE TERMINAL at positive battery connection point in engine compartment.
- MOVE engine compartment lid into service position.
- Remove INTAKE PLENUM.
- Remove CLEAN AIR PIPE .
- REMOVE LEFT CHARGE AIR DUCT.
- Remove right CHARGE-AIR DUCT.
- Remove both tension struts. See TENSION STRUT .
- Remove rear ignition coil cover. See 12..... REMOVING AND INSTALLING/REPLACING REAR IGNITION COIL COVER (N55) .
- Evacuate A/C SYSTEM
- Remove the CATALYTIC CONVERTER .
- Remove TRANSMISSION .
- Remove front OUTPUT SHAFTS
- Remove RADIATOR .
- Detach all coolant hoses from engine.
- Detach vacuum line from brake booster.
- Unfasten ENGINE WIRING HARNESS and lay to one side.

To remove or install the engine, the towing hook 72 15 8 108 670 is required.

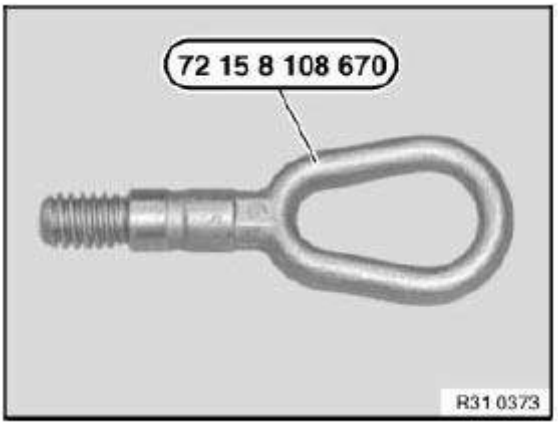


Fig. 77: Identifying Towing Hook (72 15 8 108 670)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Example illustration.

Release screws (2) and remove refrigerant lines (3).

Tightening torque: **64 52 1AZ** .

Installation note:

Replace sealing rings.

Use special tool **00 9 030** to mount sealing rings without damaging them.

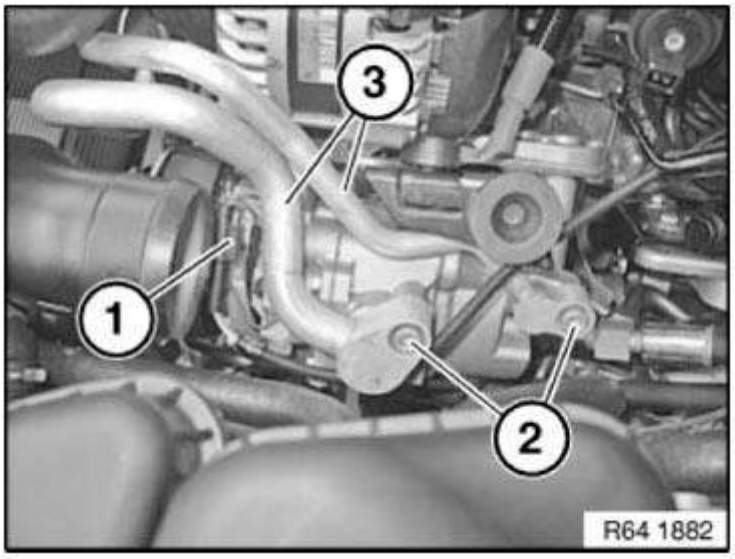


Fig. 78: Identifying Refrigerant Lines And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release fuel feed and return lines (1) under vehicle and disconnect.

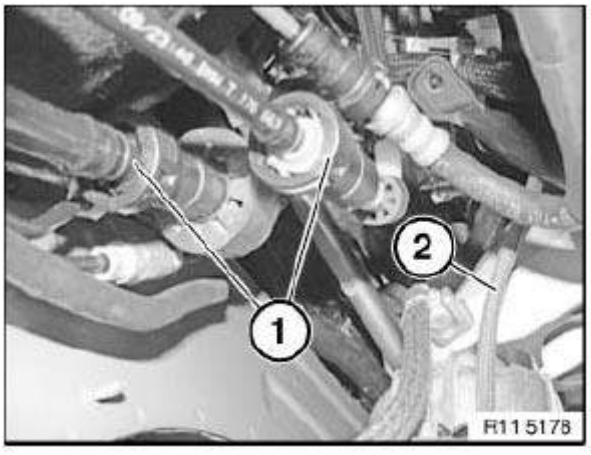


Fig. 79: Identifying Fuel Feed And Return Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Close off fuel line (3) with special tool **13 5 281** .

Close off fuel line (2) with special tool **13 5 282** .

cardiagn.com

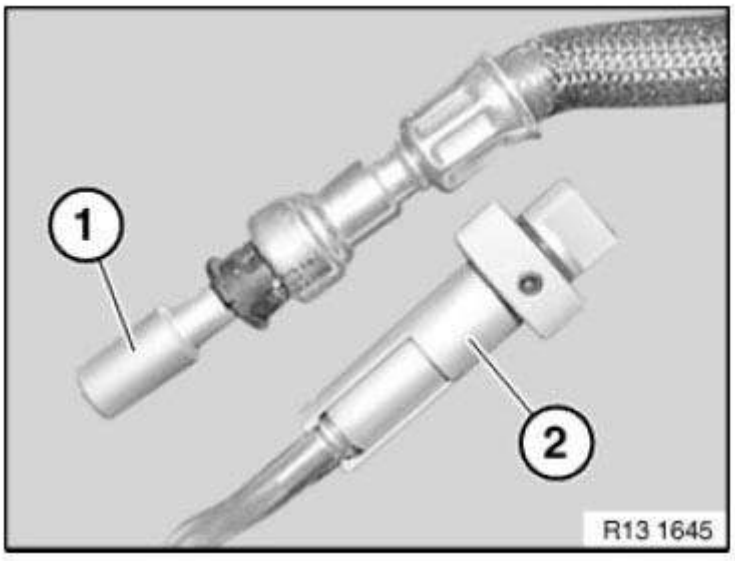


Fig. 80: Identifying Fuel Feed And Return Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Attach special tool 11 8 680 to rear lifting eye (gearbox side).

Push ball lock pin (1) in direction of arrow and hold down until special tool 11 8 680X is positioned in lifting eye.

Pull ball lock pin (1) outward in direction of arrow until both balls (2) are pushed outward.

Installation note:

For checking correct mounting of special tool 11 8 680.

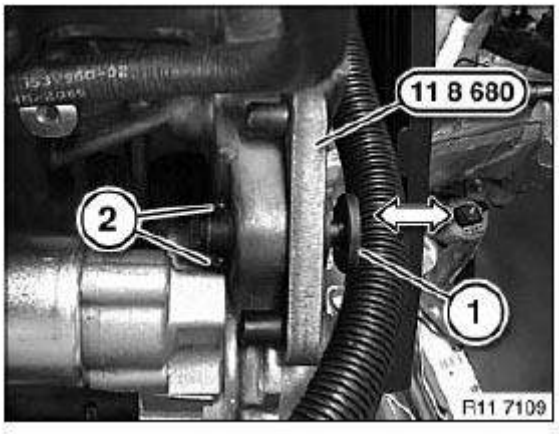


Fig. 81: Pushing Ball Lock Pin
Courtesy of BMW OF NORTH AMERICA, INC.

There must be a 6.5 mm gap between ball lock pin (1) and ball lock pin housing.

The gap measurement can be checked using a 6.5 mm drill.

Attach special tool **11 0 000** to engine crane.

Suspend special tool **11 0 000** from the designated mounting eyelets of special tool 11 8 680 only (see arrow).

cardiagn.com

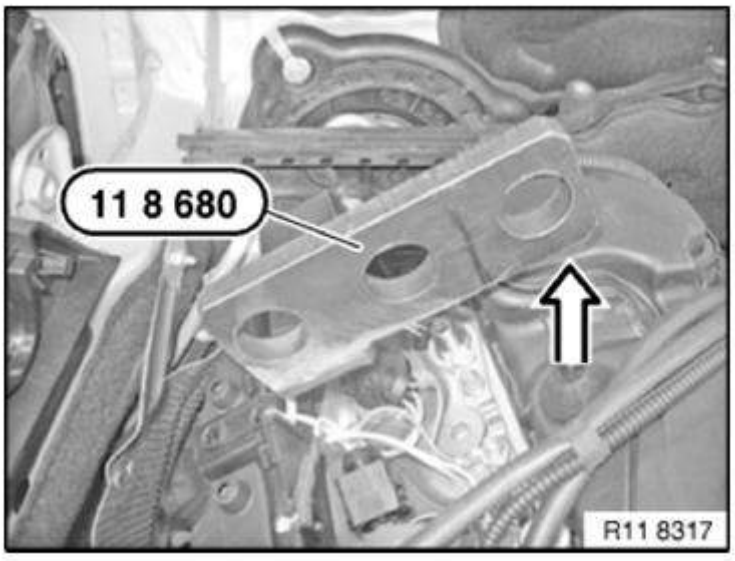


Fig. 82: Suspending Special Tool (11 0 000) From The Designated Mounting Eyelets Of Special Tool (11 8 680)
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) on engine mount on left and right.

Installation note:

Replace self-locking nuts.

Tightening torque: **22 11 2AZ** .

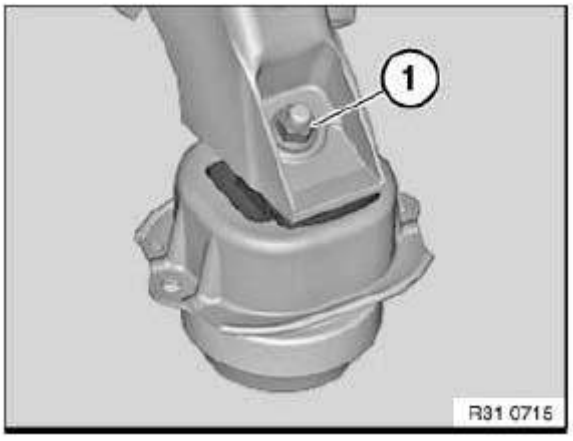


Fig. 83: Identifying Engine Mount Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Screw towing eye into cylinder head.

Tightening torque: **11 12 5AZ** .

Suspend special tool **11 0 000** from the designated mounting eyelets (1) only.

Lift engine out with engine crane.

cardiagn.com

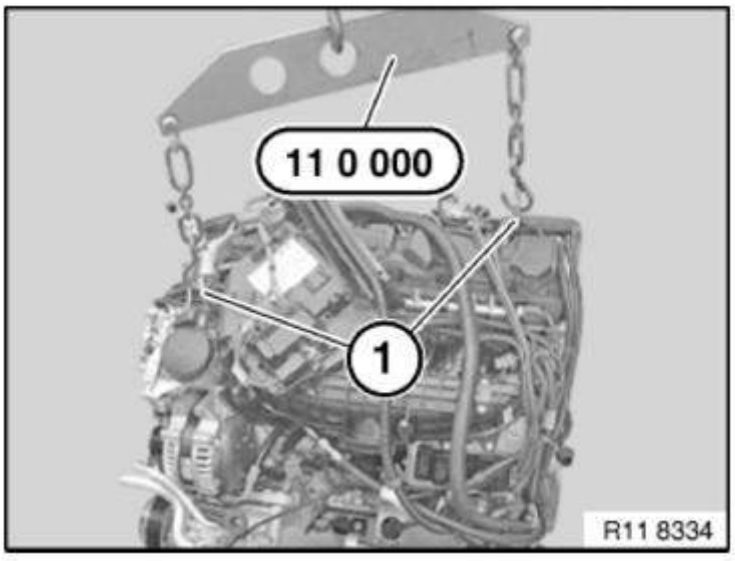


Fig. 84: Identifying Special Tool (11 0 000) From Designated Mounting Eyelets
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME.

11 12 090 REMOVING AND INSTALLING/RENEWING ACOUSTIC COVER (N20)

See **11 12 090 REMOVING AND INSTALLING/RENEWING ACOUSTIC COVER (N20)**.

11 00 REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N52T)

Release screws (1).

Tightening torque: **11 12 6AZ** .

Remove ignition coil cover (2) towards top.

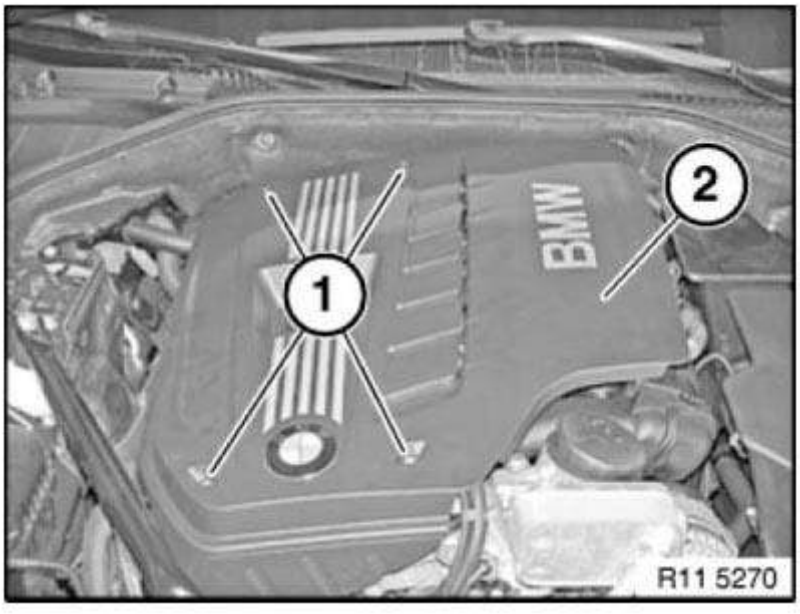


Fig. 85: Identifying Ignition Coil Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

00 RISK OF INJURY IF OIL COMES INTO CONTACT WITH EYES AND SKIN

cardiagn.com

See 00 RISK OF INJURY IF OIL COMES INTO CONTACT WITH EYES AND SKIN .

00 SAFETY INFORMATION FOR WORKING ON VEHICLES WITH AUTOMATIC ENGINE START-STOP FUNCTION (MSA)

See 00 SAFETY INFORMATION FOR WORKING ON VEHICLES WITH AUTOMATIC ENGINE START-STOP FUNCTION (MSA) .

00 SAFETY INSTRUCTIONS FOR HANDLING OIL

See 00 SAFETY INSTRUCTIONS FOR HANDLING OIL .

11 00 670 SECURING ENGINE IN INSTALLATION POSITION F25, F26 (N47T, N55, N52T, N57T, B47)

Special tools required:

- 00 6 001
- 00 6 031
- 00 6 051
- 00 6 052
- 00 6 053

WARNING: **Danger of injury!**
Observe following instructions relating to special tool:

1. **Prior to each use, check the special tools for defects, modifications and operational reliability.**
2. **Damaged/modified special tools must not be used!**
3. **No changes or modifications may be made to the special tools!**
4. **Keep special tools dry, clean and free of grease.**

NOTE:

- **Numbering system for special tools has been re-encoded. See 11... EQUIPMENT RECODING SPECIAL TOOL NUMBER OF THE TRANSVERSE MEMBER FOR FIXING THE ENGINE IN THE INSTALLATION LOCATION.**

Illustration: N63 engine

IMPORTANT: Special tool 00 6 001 must not be fitted when cross-member (1) is installed!

cardiagn.com

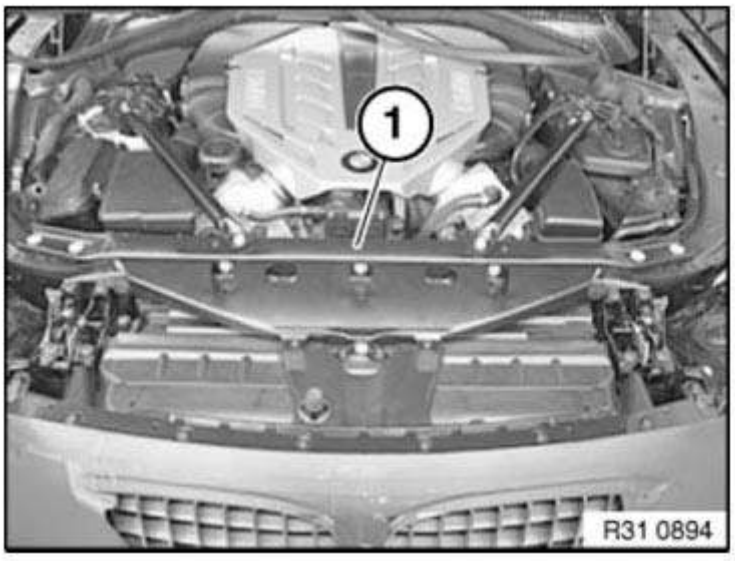


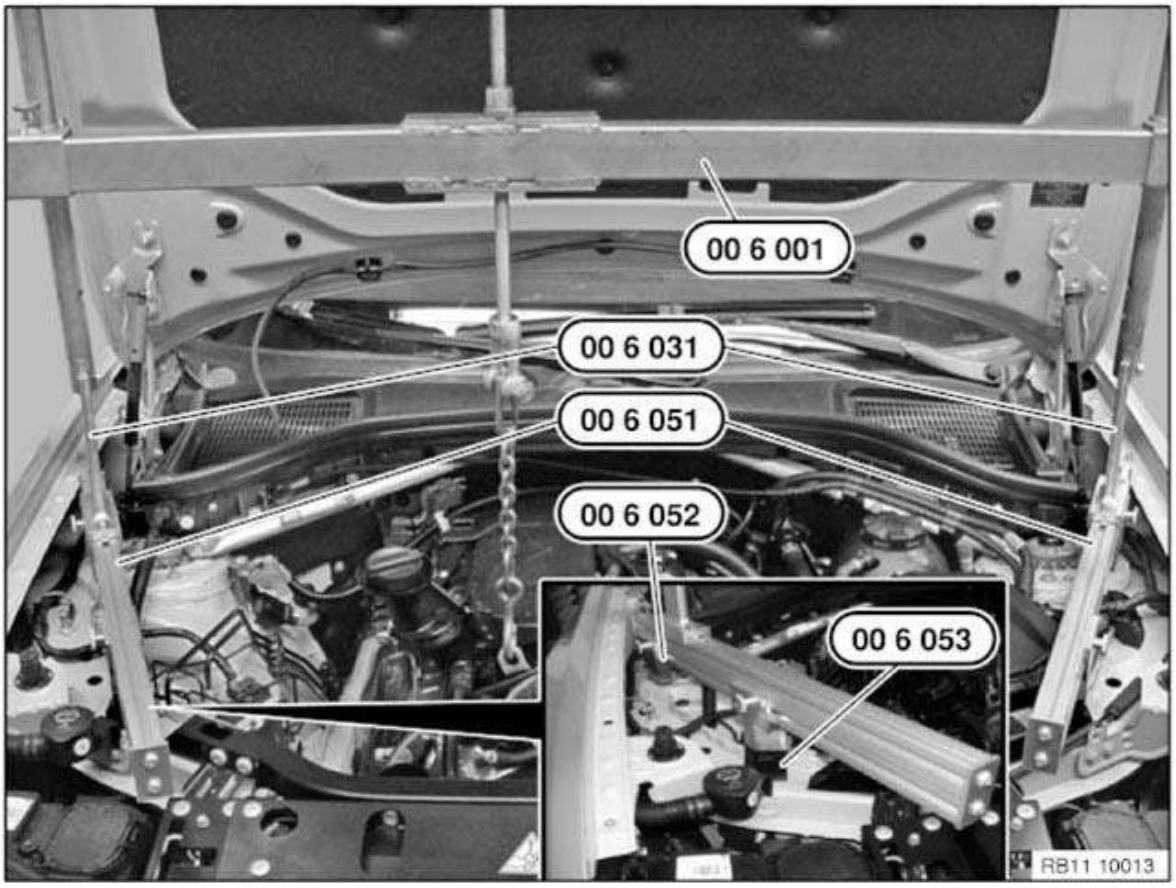
Fig. 86: Identifying Cross-Member
Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary tasks:

- Secure the engine compartment lid in the **SERVICE POSITION** .
- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .
- Remove intake silencer housing (N57T, N47T). See **13 71 000 REMOVING/REPLACING INTAKE SILENCER HOUSING (N47 D20 O1)** .

Assembly cross-member 00 6 001 with special tools 00 6 031, 00 6 051, 00 6 052, 00 6 053.

Fit cross-member 00 6 001 with a 2nd person helping.



cardiagn.com

Fig. 87: Fitting Cross-Member (00 6 001) Using Special Tools
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Use for N55 towing hook (72 15 8 108 670).**

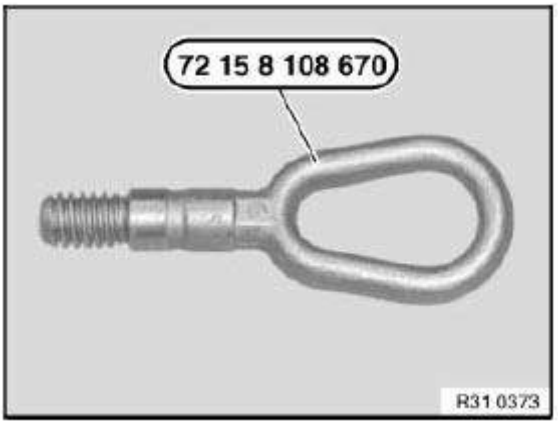


Fig. 88: Identifying Towing Hook (72 15 8 108 670)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **N55 only**

Screw towing hook (1) into engine block.

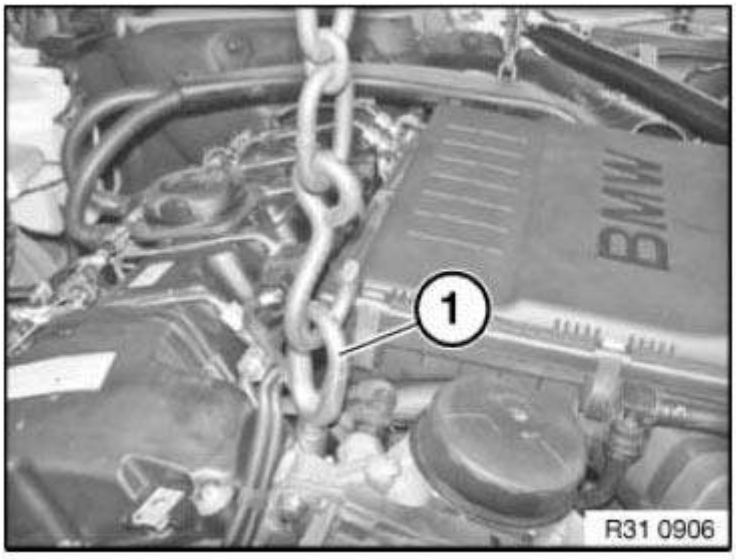


Fig. 89: Identifying Towing Hook
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before lifting the engine, check the lifting lugs for damage (cracks) and to ensure they are seated securely.

NOTE: **Use suspension eye (1) on engine block.**

cardiagn.com

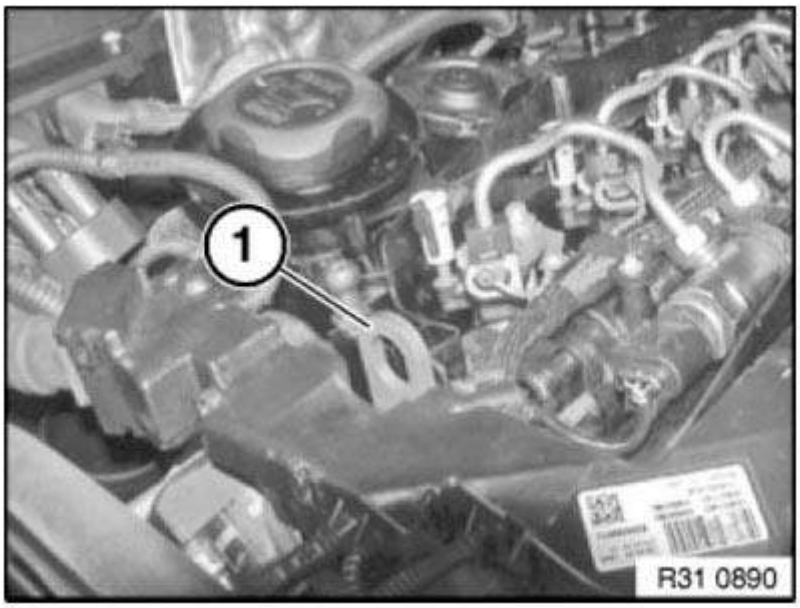


Fig. 90: Identifying Suspension Eye On Engine Block
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Avoid a change of engine position in the transverse or longitudinal direction. Always make sure there is sufficient clearance between the engine (or its add-on parts) and the body.

WARNING: **Danger of injury!**
Tighten down all screws and nuts on cross-member 00 6 000.

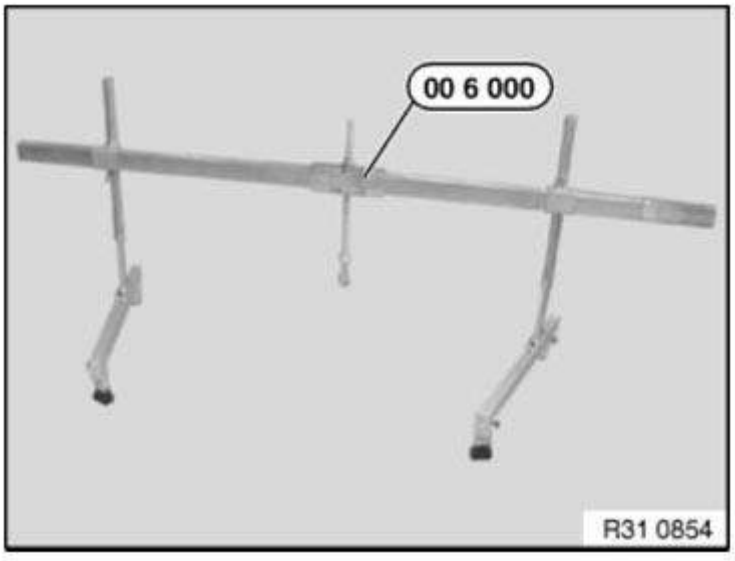


Fig. 91: Identifying Cross-Member (00 6 000)
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1) on engine mount.

Raise engine approx. 10 mm with cross member.

cardiagn.com

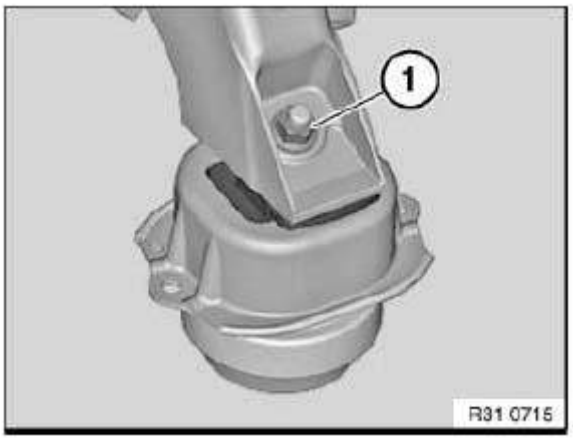


Fig. 92: Identifying Engine Mount Nut
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Right engine mount N57 engines.**

Release bolts (1) on right engine mount.

Raise engine approx. 10 mm with cross member.

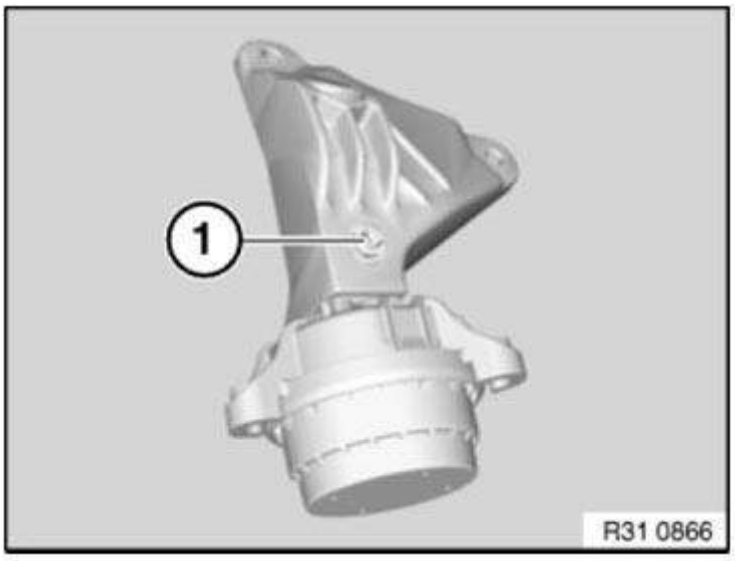


Fig. 93: Identifying Bolt On Engine Mount
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Observe installation note!
To ensure play between engine mount and engine support arm, lower the engine completely before tightening the screw connection (engine mount/engine support arm).
Tightening torque: 22 11 2AZ .

11 00... ENGINE OIL CHANGE (N47 D20 1)

WARNING: **Risk of scalding!**
Carry out work on the vehicle only when wearing oil- and heat-resistant protective gloves incl. forearm protection, face guard and protective apron.

IMPORTANT: Carry out engine oil service only when the engine is at operating temperature.
Observe the exact engine oil filling capacity.
Overfilling the engine with engine oil will result in **engine damage** .

cardiagn.com

IMPORTANT: Risk of damage!
When working on the engine oil, coolant or fuel circuit, it is essential always to protect the alternator against dirt contamination.
Cover alternator with suitable materials.

Recycling:

Catch and dispose of drained engine oil in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Necessary preliminary work:

- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .

Release oil filter cover (1) with a suitable tool.

NOTE: Engine oil flows out of the oil filter housing and back into the oil sump.

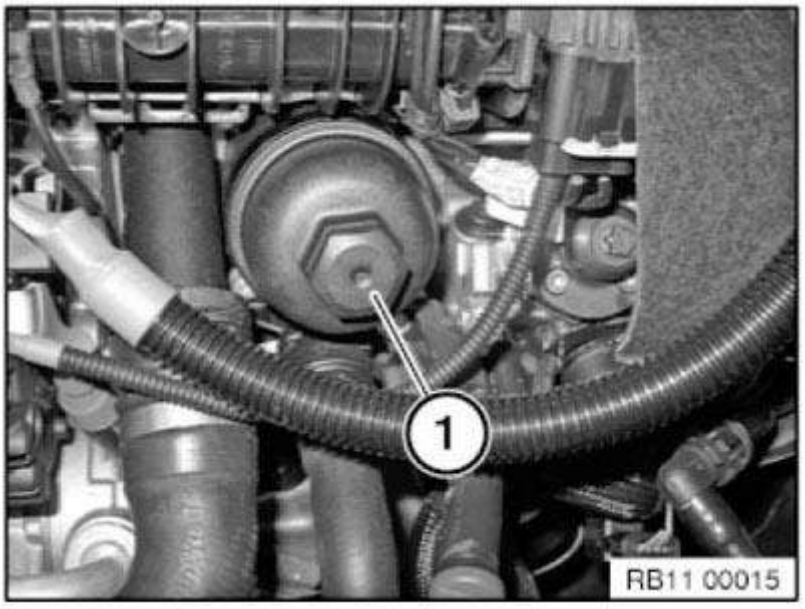


Fig. 94: Identifying Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

E90, E91, E92, E93

Turn plastic screw (1).

Release service opening (2).

cardiagn.com

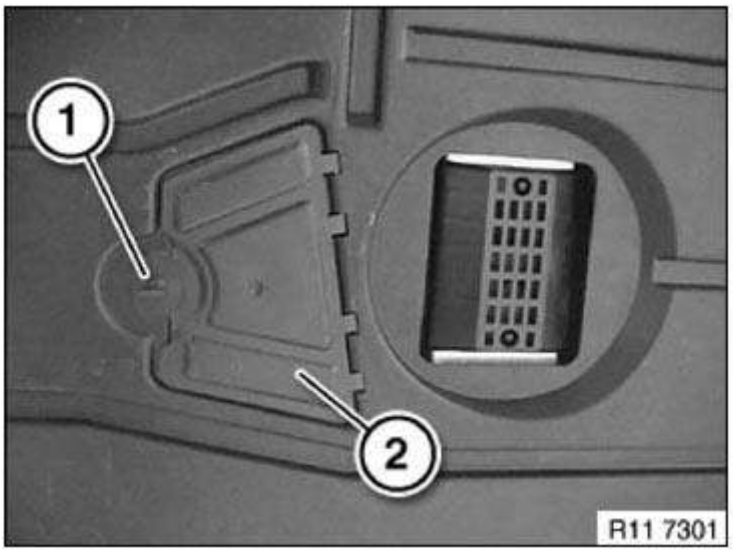


Fig. 95: Identifying Plastic Screw
Courtesy of BMW OF NORTH AMERICA, INC.

F10, F11

Release screw (1).

Open and close service opening (2) in direction of arrow.

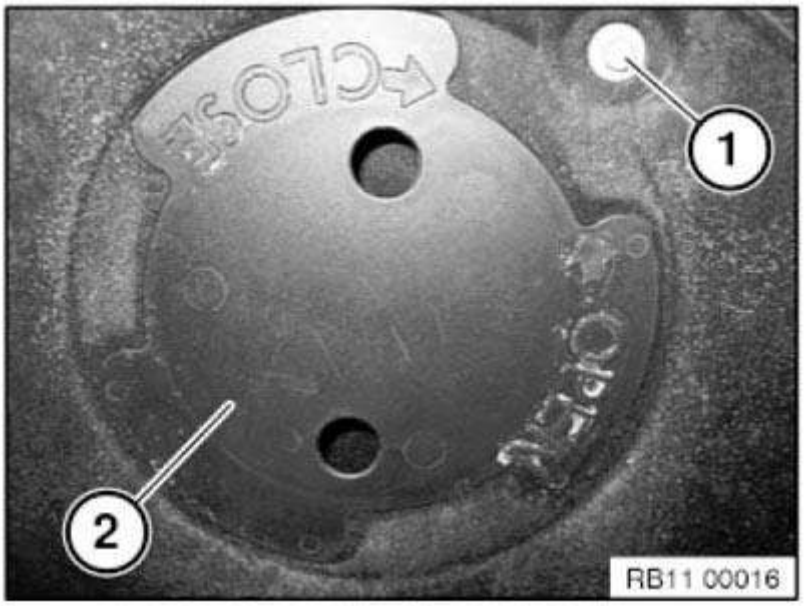


Fig. 96: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of shorting at starter motor!

Open oil drain plug (1) of oil sump and drain engine oil.

Tightening torque: **11 13 1AZ** .

Installation note:

Replace sealing ring.

cardiagn.com

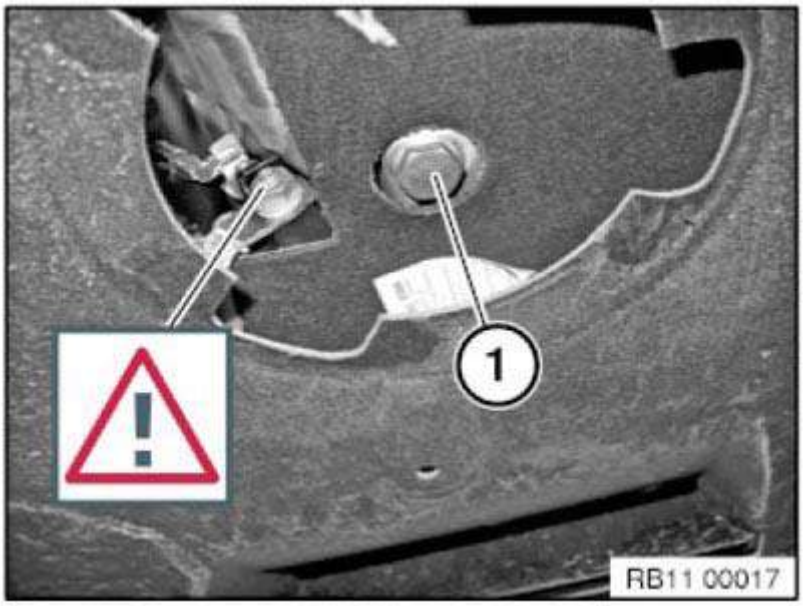


Fig. 97: Identifying Oil Drain Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Pull out oil filter element (2) in direction of arrow.

Installation note:

Replace oil filter element (2) and sealing ring (1).

NOTE: Moisten sealing ring (1) on oil filter cover and sealing ring (3) on oil filter element guide with engine oil.

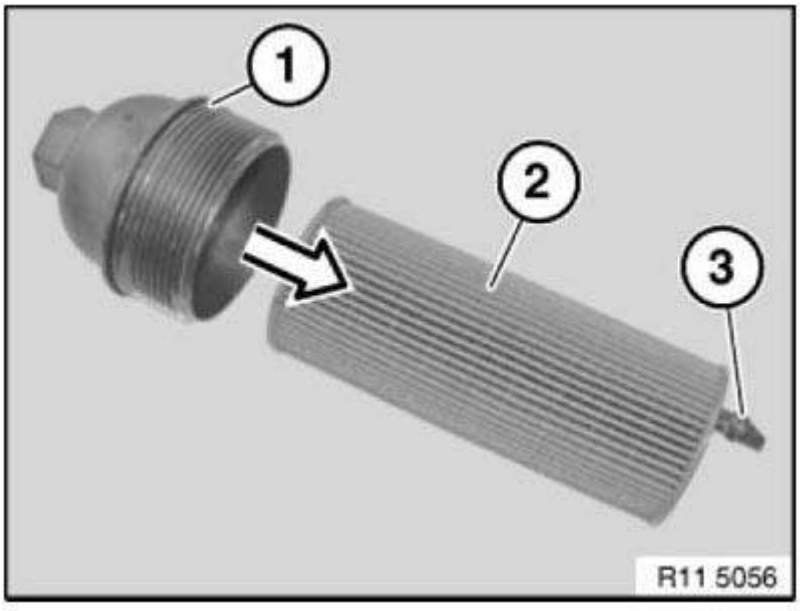


Fig. 98: Pulling Out Oil Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Observe the guide bore (1) for oil filter element in oil filter housing (2).

cardiagn.com

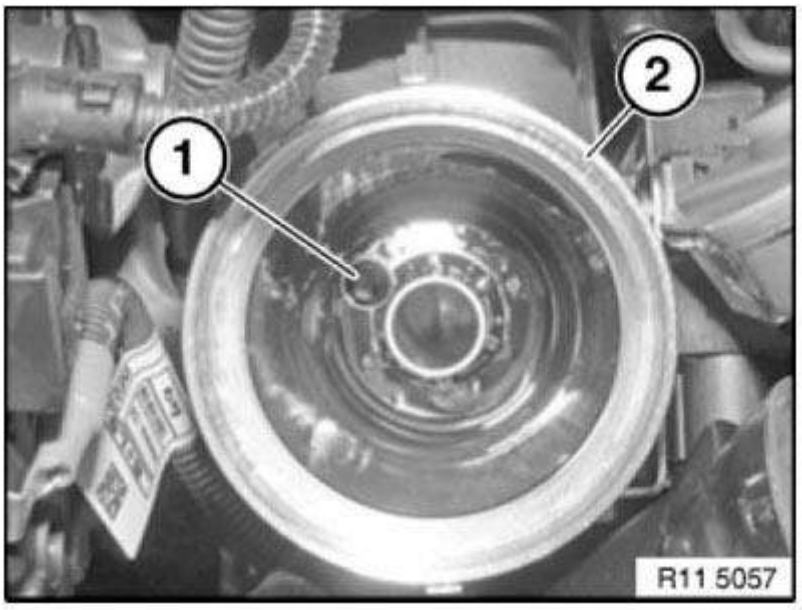


Fig. 99: Identifying Guide Bore And Oil Filter Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Secure oil filter cover (1) with a suitable tool.

Tightening torque: **11 42 1AZ** .

NOTE: **Pour in ENGINE OIL .**

Start engine and run at idle until oil pressure indicator light goes out.

Switch off engine

Check oil filter cover (1) and screw plug on oil sump for tightness.

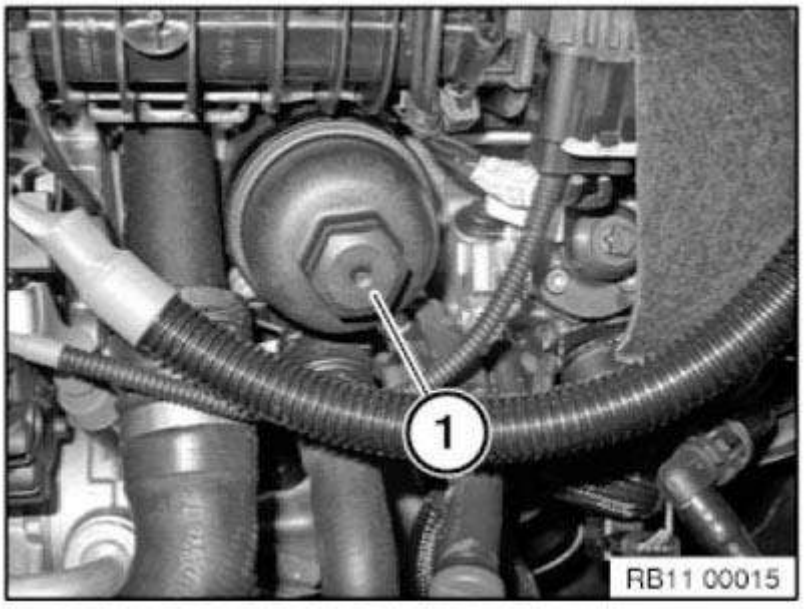


Fig. 100: Identifying Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Checking oil level:

cardiagn.com

- Park vehicle on a horizontal surface
- Using the oil dipstick, check the engine oil level after five minutes on the engine at operating temperature
- Top up engine oil if necessary

11 00... SERVICE - ENGINE OIL (N52T)

Special tools required:

- 11 9 240

WARNING: **Risk of scalding!**
Carry out work on the vehicle only when wearing oil- and heat-resistant protective gloves incl. forearm protection, face guard and protective apron.

IMPORTANT: Carry out the engine oil service only when the engine is at operating temperature.
Observe the exact engine oil filling capacity.
Overfilling the engine with engine oil will result in **engine damage** .
Checking and drip-off times (at least 10 minutes) must be observed.

IMPORTANT: Risk of damage!
Protect belt drive against dirt.
Cover with suitable materials.

Recycling:

Catch and dispose of drained engine oil in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Release oil filter cover with special tool 11 9 240 .

Tightening torque: 11 42 1AZ .

NOTE: **Engine oil flows out of the oil filter housing and back into the oil sump.**

Illustration shows N52K.

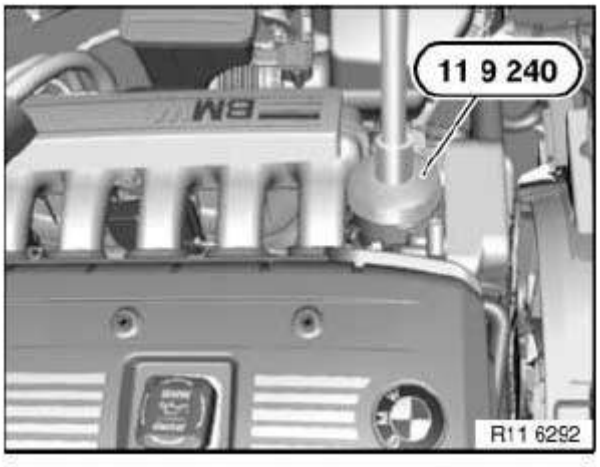


Fig. 101: Releasing Oil Filter Cover With Special Tool (11 9 240)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Presentation: without underbody protection.**

Unclip service opening on underbody protection.

cardiagn.com

Remove screw plug (1) from oil sump and drain engine oil.

Tightening torque: **11 13 1AZ** .

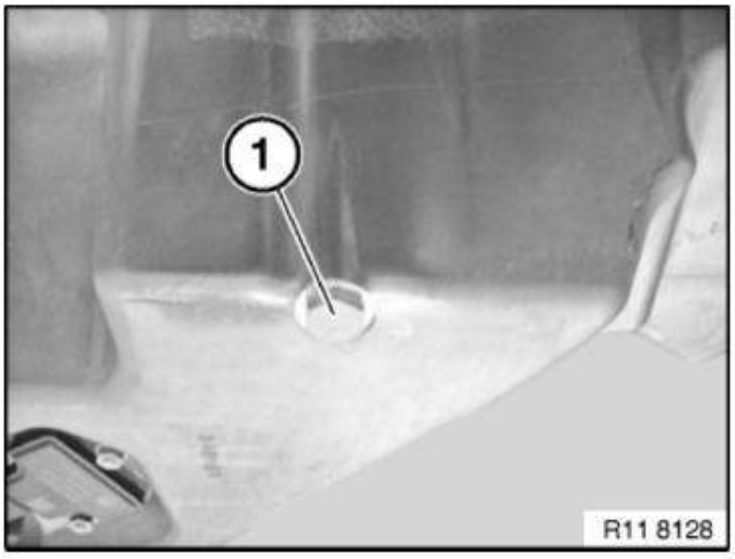


Fig. 102: Identifying Screw Plug From Oil Sump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace sealing ring.

Remove and insert oil filter element (1) in direction of arrow.

Installation note:

Replace oil filter element (1) and sealing ring (2).

Replace gasket (3) and renew if necessary.

NOTE: Coat sealing rings (2, 3) with engine oil.

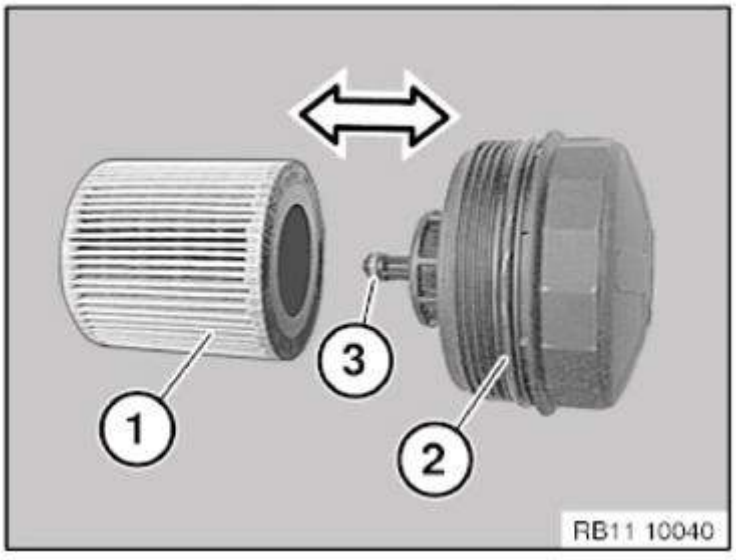


Fig. 103: Inserting Oil Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Secure oil filter cover with special tool 11 9 240 .

Tightening torque: 11 42 1AZ .

NOTE: **Pour in engine oil . See 1140 OIL SUPPLY (N52T) .**

Start engine and run at idle until oil pressure indicator light goes out.

Switch off engine

Check oil filter cover and screw plug on oil sump for leaks.

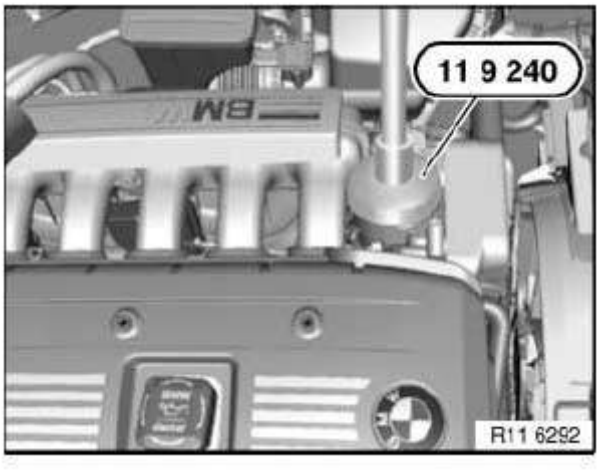


Fig. 104: Securing Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Illustration shows N52K.

Checking engine oil level:

- Park vehicle on a horizontal surface
- Allow engine to run at operating temperature for three minutes with increased engine speed (approx. 1100 rpm)
- Read off engine oil level in instrument panel or on Control Display
- Top up engine oil if necessary

11 00... SERVICE - ENGINE OIL (N55)

Special tools required:

- 11 9 240

WARNING: **Risk of scalding!**
Carry out work on the vehicle only when wearing oil- and heat-resistant protective gloves incl. forearm protection, face guard and protective apron.

IMPORTANT: Carry out the engine oil service only when the engine is at operating temperature.
Observe the exact engine oil filling capacity.
Overfilling the engine with engine oil will result in **engine damage** .
Checking and drip-off times (at least 10 minutes) must be observed.

Risk of damage!

cardiagn.com

IMPORTANT: Protect belt drive against dirt.
Cover with suitable materials.

Recycling:

Catch and dispose of drained engine oil in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Release oil filter cover with special tool **11 9 240** .

Tightening torque: **11 42 1AZ** .

NOTE: **Engine oil flows out of the oil filter housing and back into the oil sump.**

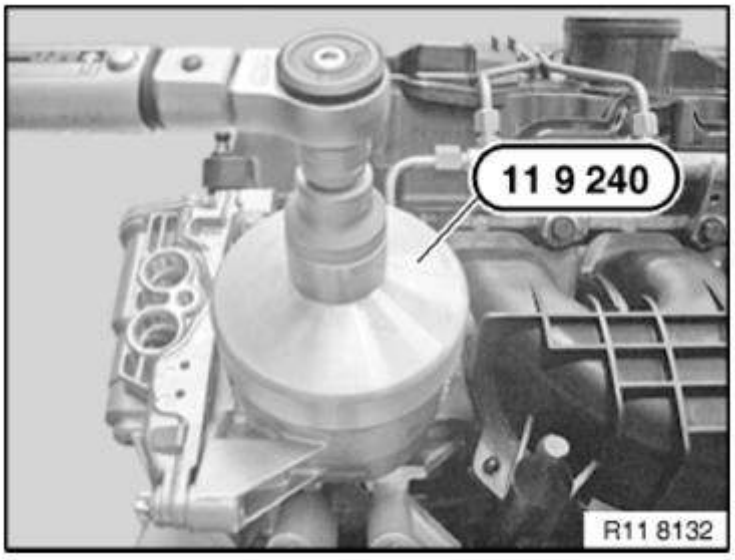


Fig. 105: Releasing Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Rear wheel drive:

Open oil drain plug (1) on oil sump.

Drain engine oil.

Installation note:

Replace sealing ring.

Tightening torque: **11 13 1AZ** .

cardiagn.com

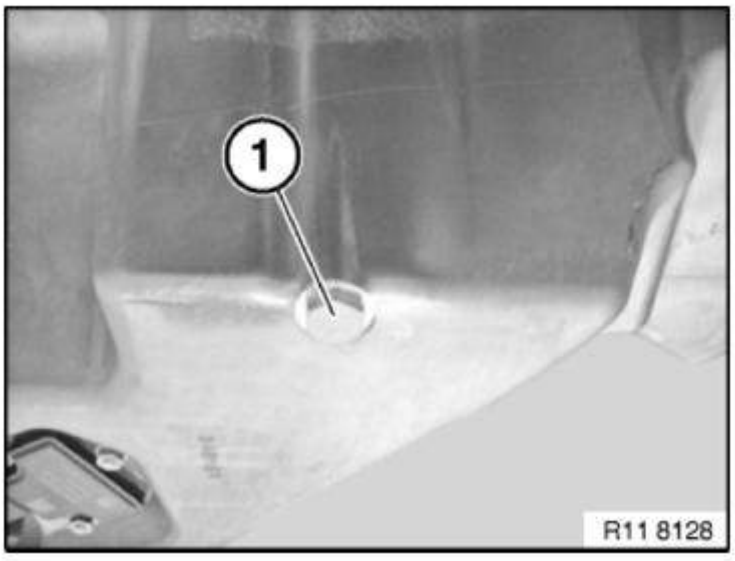


Fig. 106: Identifying Oil Drain Plug On Oil Sump
Courtesy of BMW OF NORTH AMERICA, INC.

Four-wheel drive:

Open oil drain plug (1) of oil sump and drain engine oil.

Installation note:

Replace sealing ring.

Tightening torque: **11 13 1AZ** .

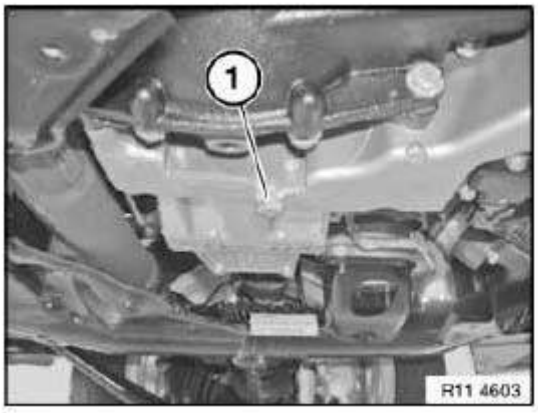


Fig. 107: Identifying Oil Drain Plug Of Oil Sump
Courtesy of BMW OF NORTH AMERICA, INC.

Remove and insert oil filter element (1) in direction of arrow.

Installation note:

Replace oil filter element (1) and sealing ring (2).

Replace gasket (3) and renew if necessary.

NOTE: Coat sealing rings (2, 3) with engine oil.

cardiagn.com

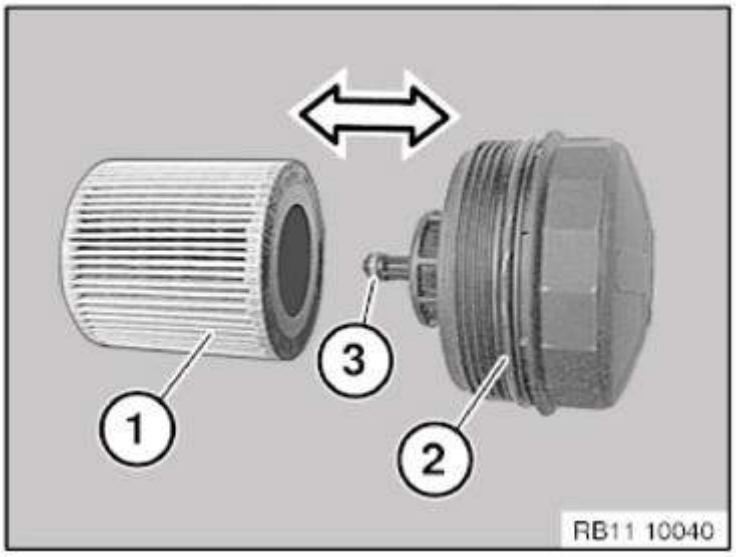


Fig. 108: Inserting Oil Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

Secure oil filter cover with special tool **11 9 240** .

Tightening torque: **11 42 1AZ** .

NOTE: **Pour in ENGINE OIL .**

Start engine and run at idle until oil pressure indicator light goes out.

Switch off engine

Check oil filter cover and screw plug on oil sump for leaks.

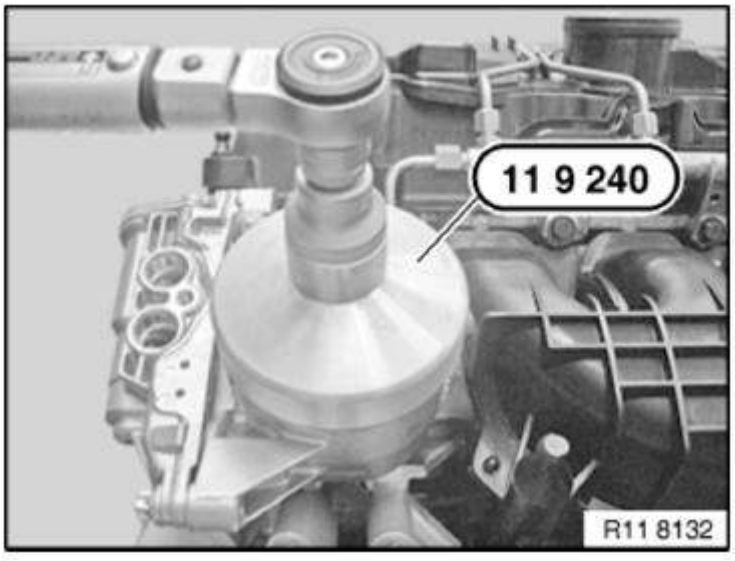


Fig. 109: Securing Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Checking engine oil level:

- Park vehicle on a horizontal surface
- Allow engine to run at operating temperature for three minutes with increased engine speed (approx.

cardiagn.com

1100 rpm)

- Read off engine oil level in instrument panel or on Control Display
- Top up engine oil if necessary

11 00... ENGINE OIL SERVICE (N20, N26)

Special tools required:

- 11 9 240
- 83 30 0 493 936

WARNING: **Risk of scalding!**
Carry out work on the vehicle only when wearing oil- and heat-resistant protective gloves incl. forearm protection, face guard and protective apron.

IMPORTANT: Carry out the engine oil service only when the engine is at operating temperature.
Observe the exact engine oil filling capacity.
Overfilling the engine with engine oil will result in **engine damage** .
Checking and drip-off times (at least 10 minutes) must be observed.

IMPORTANT: Risk of damage!
Protect belt drive against dirt.
Cover with suitable materials.

Recycling:

Catch and dispose of drained engine oil in a suitable collecting vessel.

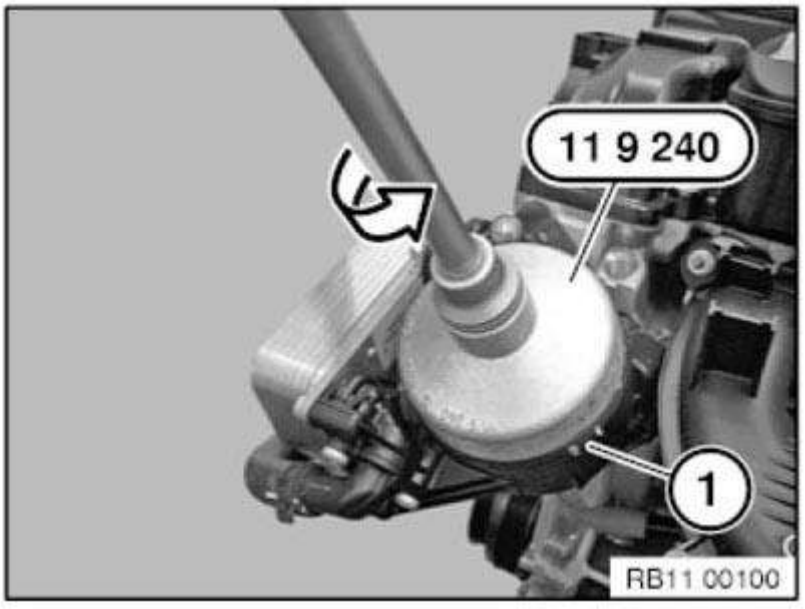
Observe country-specific waste disposal regulations.

Release oil filter cover with special tool 11 9 240 .

Tightening torque: 11 42 1AZ .

NOTE: **Engine oil flows out of the oil filter housing and back into the oil sump.**

Order number: 83 30 0 493 936



cardiagn.com

Fig. 110: Releasing Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Rear-wheel drive (plastic oil sump):

Open oil drain plug (1) on oil sump.

Drain engine oil.

Installation note:

Replace oil drain plug.

Tightening torque: **11 13 2AZ** .

If prescribed torque has been reached and oil drain plug (1) still does not latch, oil drain plug (1) must be positioned such that a latch mechanism is aligned (see arrow).

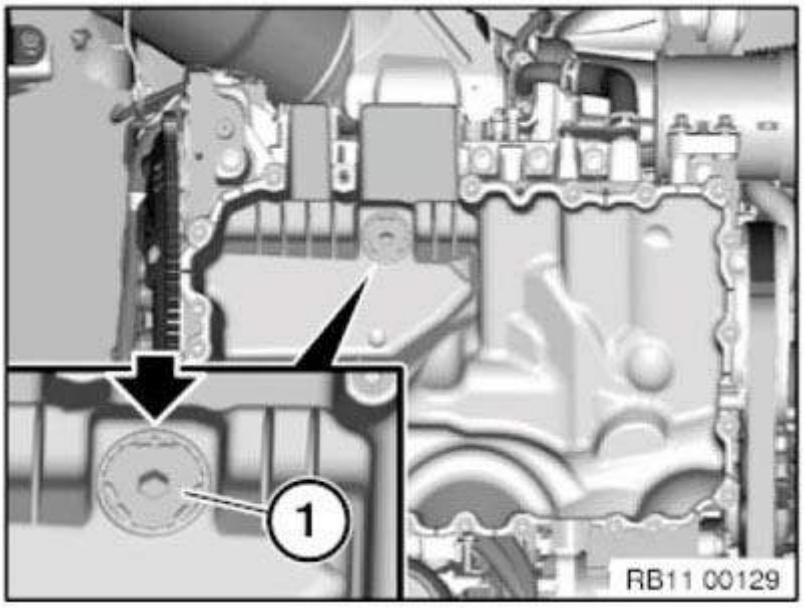


Fig. 111: Locating Oil Drain Plug
Courtesy of BMW OF NORTH AMERICA, INC.

If applicable, oil drain plug (1) may need to be rotated back again (released).

Four-wheel drive (aluminum oil sump):

Open oil drain plug (1) of oil sump and drain engine oil.

Installation note:

Replace sealing ring.

Tightening torque: **11 13 1AZ** .

cardiagn.com

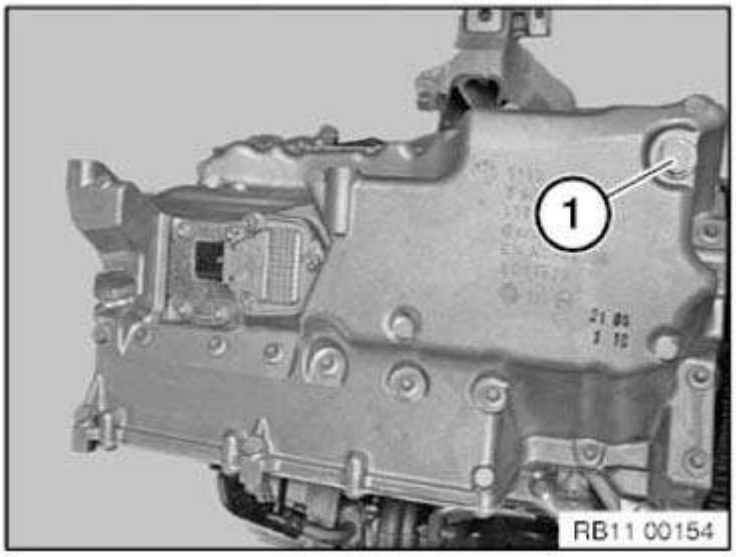


Fig. 112: Identifying Oil Drain Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Remove and insert oil filter element (1) in direction of arrow.

Installation note:

Replace oil filter element (2) and sealing rings (1).

NOTE: Moisten sealing rings (1) with engine oil.

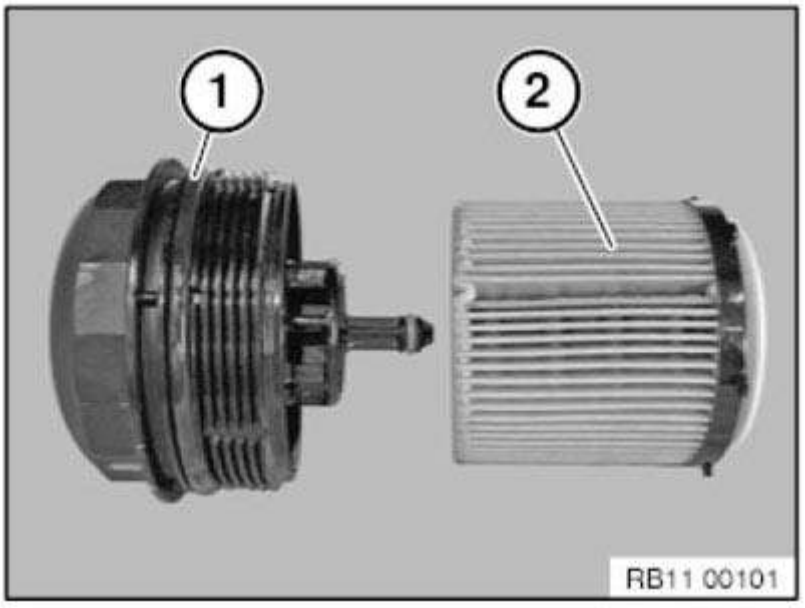


Fig. 113: Identifying Oil Filter Element And Sealing Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Secure oil filter cover with special tool **11 9 240** .

Tightening torque: **11 42 1AZ** .

NOTE: Pour in engine oil . See OIL SUPPLY (N20, N26, B20) .

Start engine and run at idle speed.

cardiagn.com

Monitor control messages in instrument cluster or Check-Control messages.

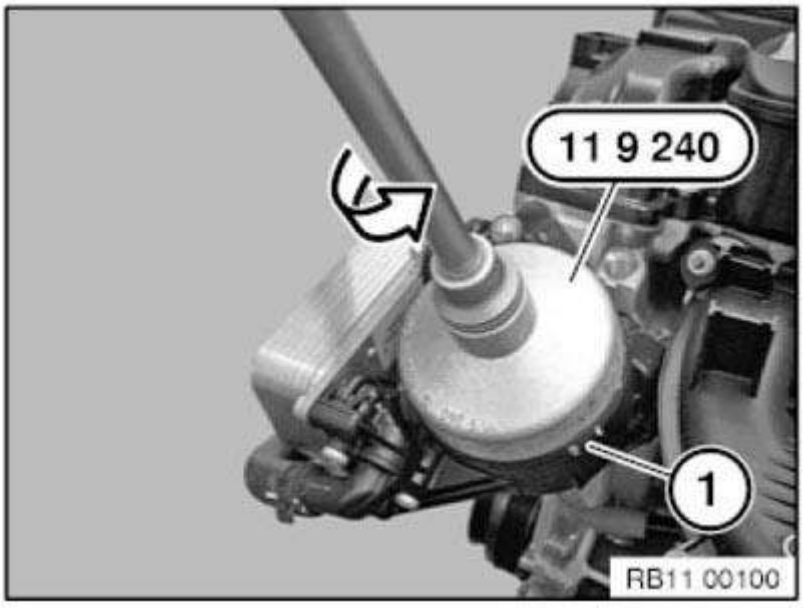


Fig. 114: Securing Oil Filter Cover With Special Tool (11 9 240)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Check-Control message (red oil can) is only displayed if oil pressure drops below minimum permissible oil pressure for longer than approx. 8 seconds.

Switch off engine

Check oil filter cover and screw plug on oil sump for leaks.

Assemble engine.

Checking oil level:

- Park vehicle on a horizontal surface
- Allow engine to run at operating temperature for three minutes with increased engine speed (approx. 1100 rpm)
- Read off oil level in instrument cluster or on control display
- Top up engine oil if necessary

11... EQUIPMENT RECODING SPECIAL TOOL NUMBER OF THE TRANSVERSE MEMBER FOR FIXING THE ENGINE IN THE INSTALLATION LOCATION

Equipment recoding from 00 0 200 to 00 6 0 000

Designation	Special tool new	Special tool previous
Cross-member, previous	-	00 0 200
Cross-member, new	00 6 000	-
Mounting bridge	00 6 001	00 0 201
Spindle with hook	00 6 002	00 0 202
Extension	00 6 003	00 0 203
Adapter support	00 6 004	00 0 204
Extension	00 6 005	00 0 205
Chain with hook	00 6 006	00 0 209
Set of supports	00 6 010	00 0 206

cardiagn.com

Set of supports	00 6 020	00 0 207
Set of supports	00 6 030	00 0 208
Connector	00 6 031	-
Profile strip (2 x)	00 6 032	-
Supports (4 x)	00 6 033	-
Set of supports	00 6 040	-
Profile strip	00 6 041	00 0 451
Supports (2 x)	00 6 042	00 0 452
Supports, short (2 x)	00 6 043	-
Set of supports	00 6 050	-
Profile strip (2 x)	00 6 051	-
Supports, short (2 x)	00 6 052	-
Supports, long (2 x)	00 6 053	-
Support, long	00 6 060	-
Supports (2 x)	00 6 070	-

ENGINE BLOCK

11 11 579 CHECKING CRANKCASE FOR WATERTIGHTNESS (N47 D20 O1)

Special tools required:

- 11 6 281
- 11 6 282
- 11 8 821
- 11 8 822
- 11 8 823
- 11 8 824
- 11 8 825
- 11 8 891

Necessary preliminary work:

- Remove ENGINE.
- Mount engine on assembly stand. See 11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N47 D20 O1).
- Remove COOLANT PUMP.
- Remove OIL FILTER HOUSING.
- Remove CYLINDER HEAD.
- Remove all PISTONS.
- Remove CRANKSHAFT.

IMPORTANT: Pressure test crankcase to maximum **3** bar.
Heat crankcase to 60 Â°C.
Check for bubble formation in a water bath.

Mount all special tools 11 8 825 on crankcase.

cardiagn.com

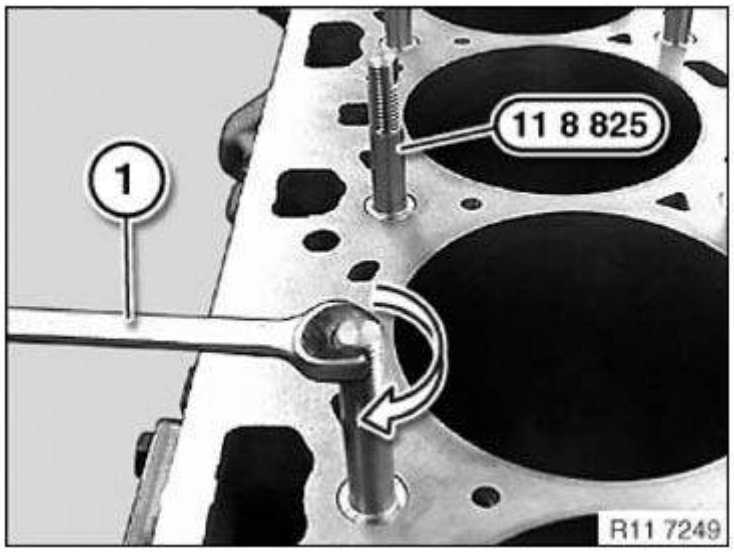


Fig. 115: Mounting Special Tools (11 8 825) On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool **11 8 891** on crankcase.

Secure special tool in sequence (1 to 10).

Tightening torque: Nut (1 to 10) **8 Nm.**

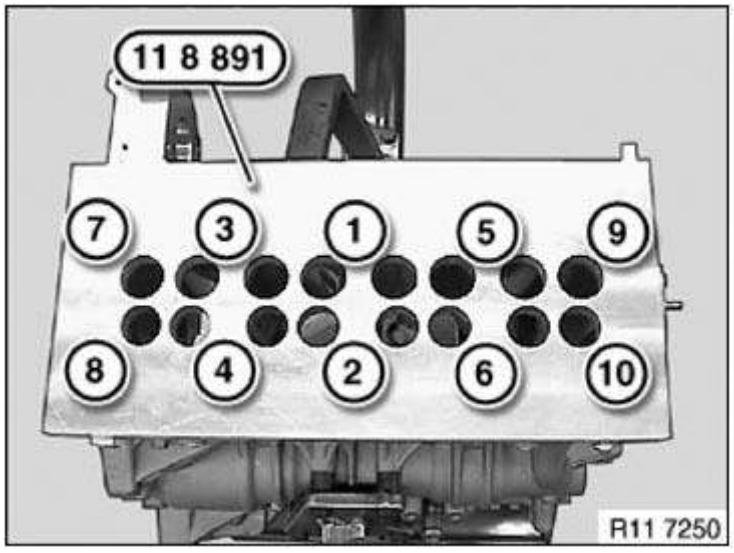


Fig. 116: Special Tool Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 8 821** with screw (1).

Secure special tool **11 8 822** with bolts (3).

Secure special tool **11 8 823** with bolts (2).

IMPORTANT: Maximum screw length M6x20 **risk of damage!** on crankcase.

Use bolts to fasten special tool **11 6 282** .

Tightening torque: screws M6x20 with **8 Nm.**

cardiagn.com

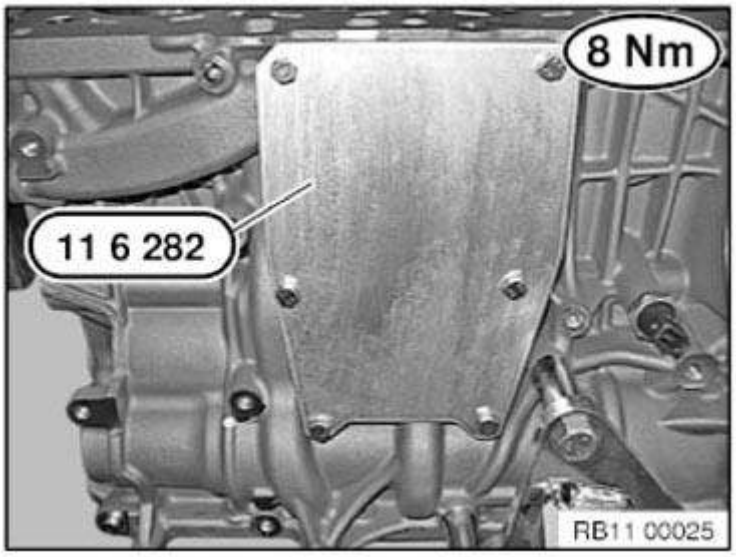


Fig. 117: Identifying Special Tool (11 6 282) And Bolts With Torque Specifications
Courtesy of BMW OF NORTH AMERICA, INC.

Screw down special **11 6 281** tool on to sealing surface of coolant pump.

Tightening torque: screws with **8 Nm.**

IMPORTANT: Maximum screw length M6x20 **risk of damage!** on crankcase.

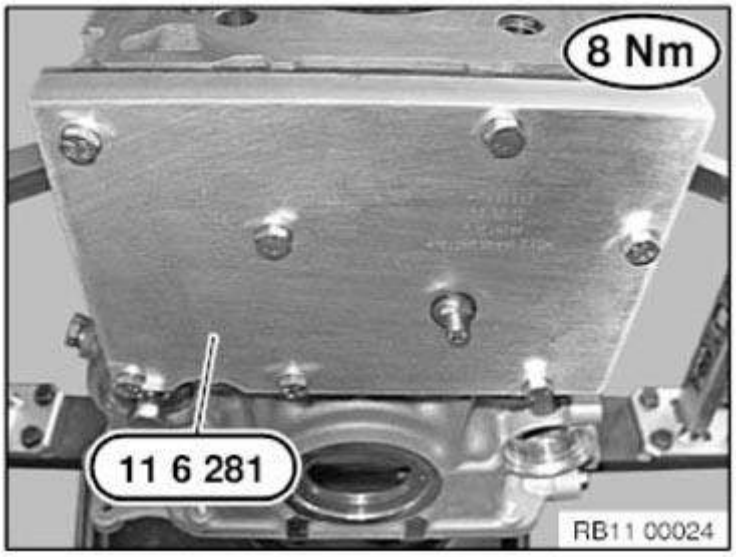


Fig. 118: Identifying Special Tool (11 6 281) With Torque Specifications
Courtesy of BMW OF NORTH AMERICA, INC.

Release valve cap on compressed air connection.

Pressure test crankcase to maximum **3** bar.
IMPORTANT: Heat crankcase to 60 Â°C.
Check for bubble formation in a water bath.

cardiagn.com

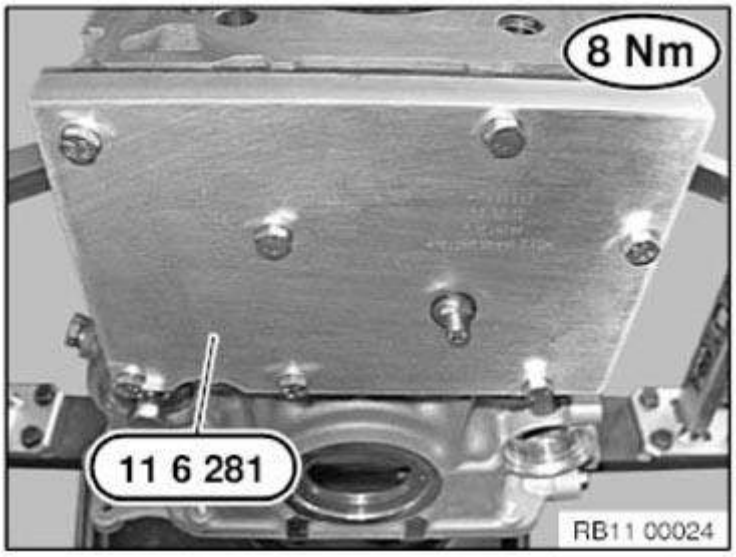


Fig. 119: Identifying Special Tool (11 6 281) With Torque Specifications
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

CYLINDER HEAD WITH COVER

11 12 729 CHECKING CYLINDER HEAD FOR WATER LEAKS (N47 D20 O1)

Special tools required:

- 11 8 890
- 11 8 891
- 11 8 892
- 11 8 893
- 11 6 231
- 11 6 232

IMPORTANT: Pressure-test cylinder head to max. **3** bar.
Heat cylinder head to 60 Â°.
Check for bubble formation in a water bath.

Necessary preliminary work:

- Remove **CYLINDER HEAD**.
- Disassemble **CYLINDER HEAD**.

Extend special tool **11 8 891** with special tool **11 8 893** .

cardiagn.com

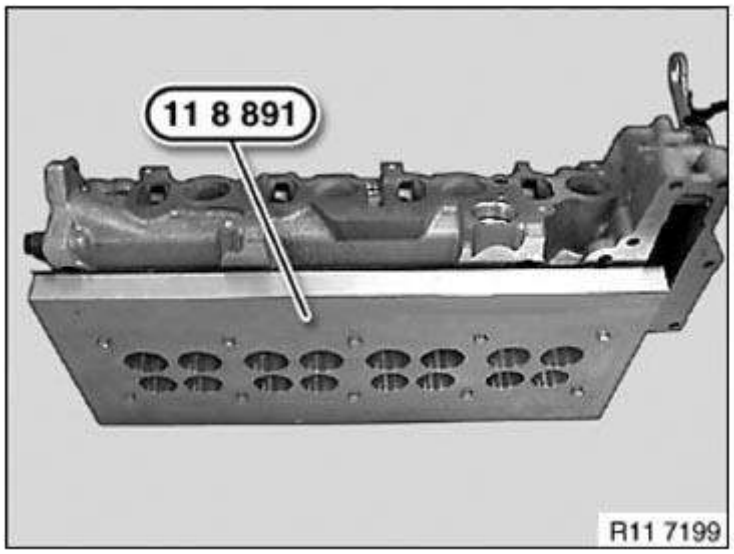


Fig. 120: Identifying Special Tool (11 8 891) And Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Mounting special tool 11 8 890**

Use bolts to fasten **11 8 891** special tool **11 8 893** .

Tightening torque: **25 Nm** .

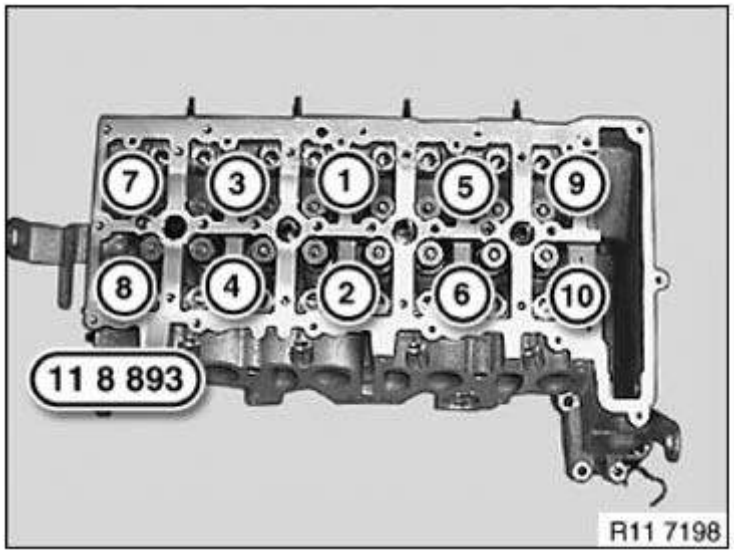


Fig. 121: Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Fasten special tool **11 6 232** with screw (1).

cardiagn.com

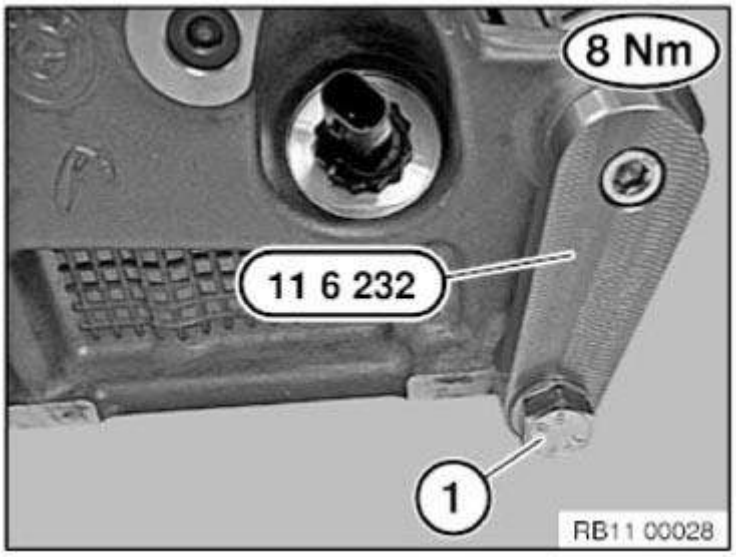


Fig. 122: Identifying Special Tool (11 6 232) & Screw With Torque Specifications
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 6 231** with screw.

NOTE: **Compressed air at valve (1) must not exceed 3 bar .**
Heat cylinder head to 60 Â°.
Check for bubble formation in a water bath.

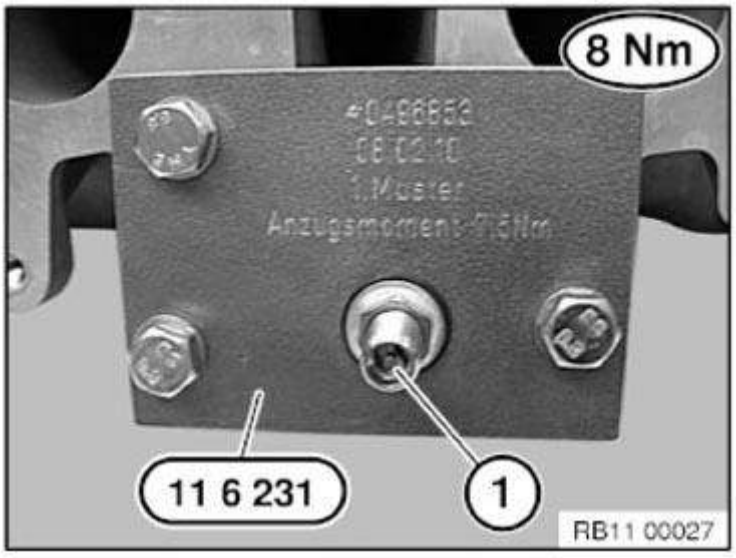


Fig. 123: Identifying Special Tool (11 6 231) & Screw With Torque Specifications
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 729 CHECKING CYLINDER HEAD FOR WATER LEAKS (N52T)

Special tools required:

- **11 4 341**
- **11 4 342**
- **11 4 344**
- **11 4 345**

cardiagn.com

IMPORTANT: Pressure-test cylinder head to max. **3** bar.
Heat cylinder head to 60 Â°.
Check for bubble formation in a water bath.

Necessary preliminary work:

- Remove **CYLINDER HEAD**.
- Disassemble **CYLINDER HEAD**

NOTE: Check special tool 11 4 341 is correctly attached to cylinder.

Secure special tool **11 4 341** using bolts **11 4 345** tightened to 25 Nm.

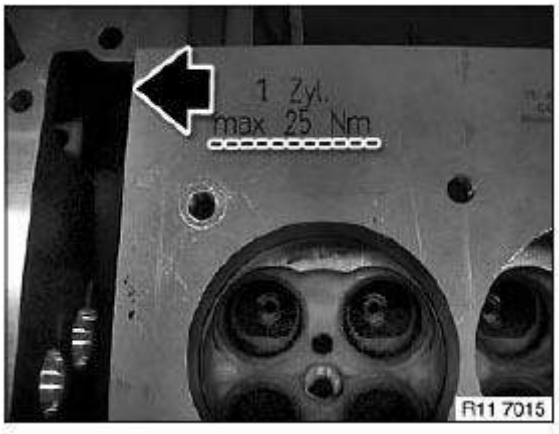


Fig. 124: Checking Cylinder Head For Water Leaks
Courtesy of BMW OF NORTH AMERICA, INC.

Extend special tool **11 4 341** with special tool **11 4 345** .

Installation:

Cylinder no. 1 is marked.

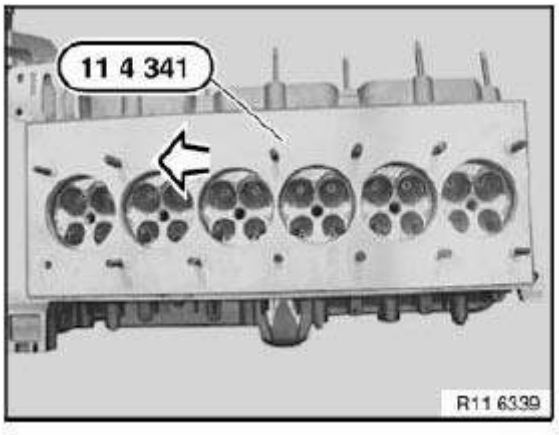


Fig. 125: Identifying Special Tool (11 4 341)
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool **11 4 342** with screws (1). Screw in knurled screw in direction of arrow.

Sealing flange must rest flat.

cardiagn.com

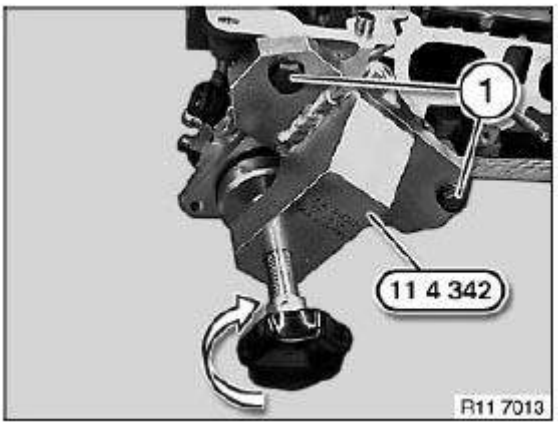


Fig. 126: Identifying Special Tool (11 4 342) & Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 344** with bolts (1).

NOTE: **Compressed air at valve max. 3 bar .**
Heat cylinder head to 60 Â°.
Check for bubble formation in a water bath.

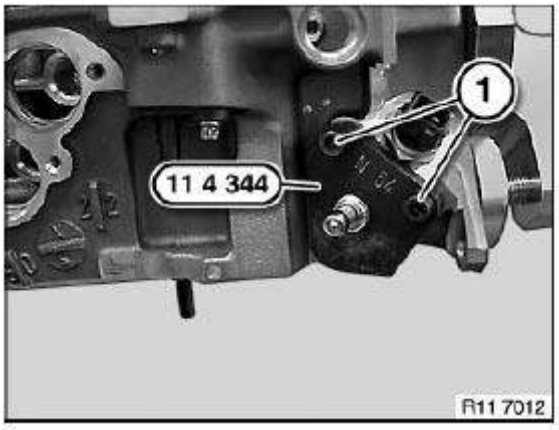


Fig. 127: Identifying Special Tool (11 4 344) With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 729 CHECKING CYLINDER HEAD FOR WATER LEAKS (N55)

Special tools required:

- **11 4 342**
- **11 4 344**
- **11 7 190**

Pressure-test cylinder head to max. **3** bar.
IMPORTANT: Heat cylinder head to 60 Â°.
Check for bubble formation in a water bath.

Necessary preliminary tasks:

- Remove **CYLINDER HEAD**.
- Disassemble **cylinder head** . See **11 34 552 REMOVING AND INSTALLING/REPLACING ALL**

cardiagn.com

VALVES (N55), 11 31 028 REMOVING AND INSTALLING/REPLACING EXHAUST CAMSHAFT (N55) or 11 31 025 REMOVING AND INSTALLING/REPLACING INTAKE CAMSHAFT (N55).

Fit special tool 11 7 190 .

Installation note:

Secure special tool to 15 Newton meters.

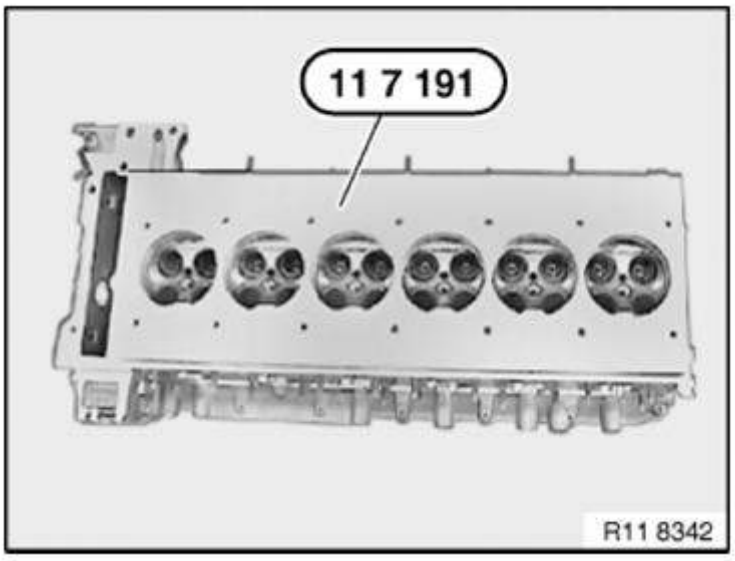


Fig. 128: Identifying Special Tool (11 7 191)
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool 11 4 342 with screws (1).

Screw in knurled screw in direction of arrow.

Sealing flange must rest flat.

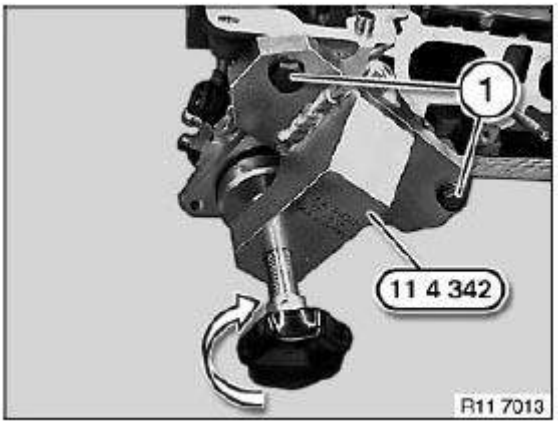


Fig. 129: Identifying Special Tool (11 4 342) & Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool 11 4 344 with bolts (1).

NOTE: **Compressed air at valve max. 3 bar.**
Heat cylinder head to 60 Â°.
Check for bubble formation in a water bath.

cardiagn.com

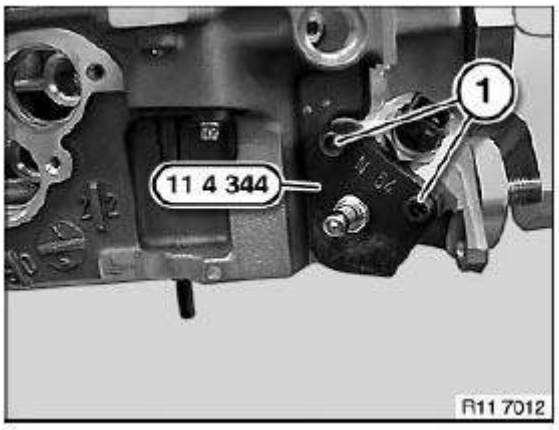


Fig. 130: Identifying Special Tool (11 4 344) With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 729 CHECKING CYLINDER HEAD FOR WATERTIGHTNESS (N20, N26)

Special tools required:

- 11 4 340
- 2 212 824
- 83 30 2 212 824

Pressure-test cylinder head to max. **3** bar.
IMPORTANT: Heat cylinder head to 60 Â°.
Check for bubble formation in a water bath.

NOTE: **The special tools 11 4 342 and 11 4 344 are included in the set of special tools 11 4 340 .**

Necessary preliminary tasks:

- Remove CYLINDER HEAD.
- Disassemble **cylinder head** . See 11 31 028 REMOVING AND INSTALLING/REPLACING EXHAUST CAMSHAFT (N20/N26), 11 34 552 REMOVING AND INSTALLING/REPLACING ALL VALVES (N20, N26) or 11 31 025 REMOVING AND INSTALLING/REPLACING INTAKE CAMSHAFT (N20/N26)

Fit special tool 11 4 342 with screws (1).

Screw in knurled screw in direction of arrow.

Sealing flange must rest flat.

cardiagn.com

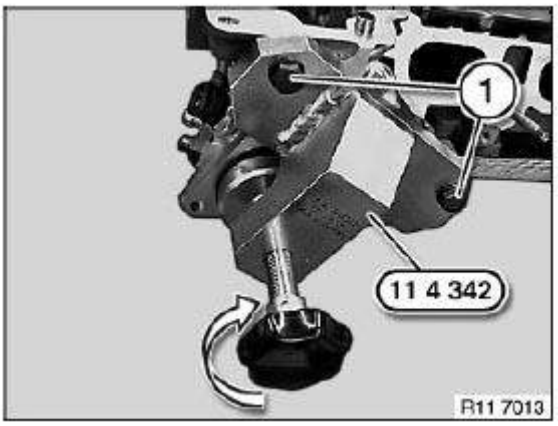


Fig. 131: Identifying Special Tool (11 4 342) & Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool **2 212 824** .

Installation note:

Secure special tool with maximum 20 Nm.

Order number: 83 30 2 212 824

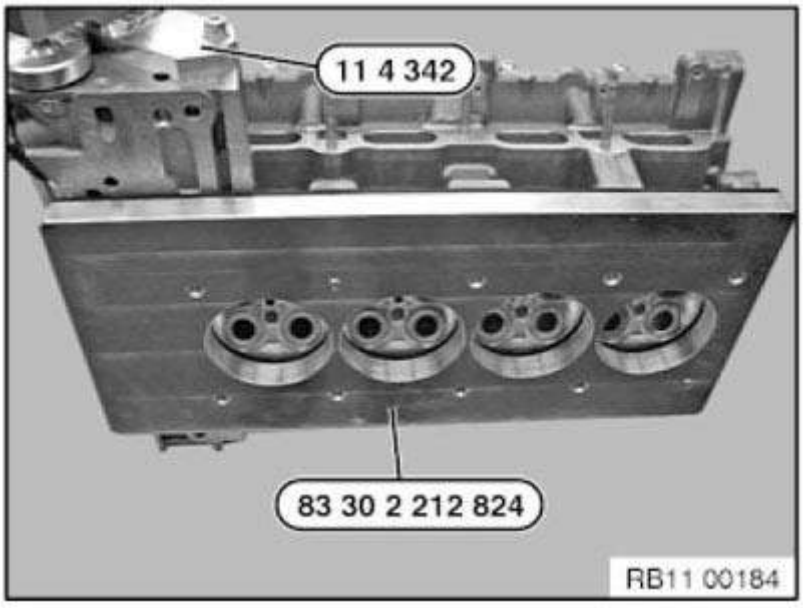


Fig. 132: Fitting Special Tool (2 212 824)
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 344** with screws (1).

NOTE: **Compressed air at valve max. 3 bar .**
Heat cylinder head to 60 Â°.
Check for bubble formation in a water bath.

cardiagn.com

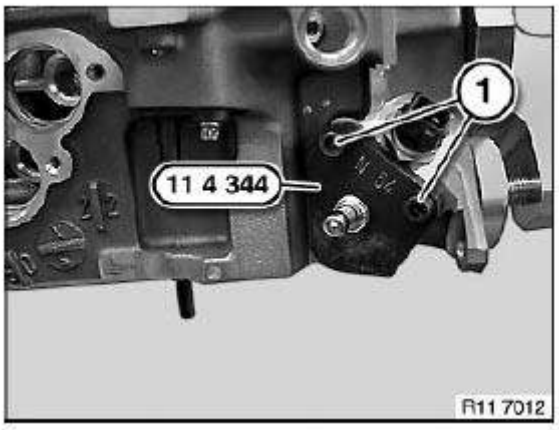


Fig. 133: Identifying Special Tool (11 4 344) With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 800 CLEANING CYLINDER HEAT INTAKE CHANNELS AND INTAKE PLENUM (N47, N57)

Special tools required:

- 11 6 480
- 11 5 320
- 2 356 969
- 2 356 966
- 2 356 967
- 00 9 120

Necessary preliminary tasks:

- Disconnect NEGATIVE BATTERY LEAD
- Remove intake plenum. See 11 61 550 REMOVING AND INSTALLING/REPLACING AIR INTAKE PLENUM (N47 D20 O1).
- Remove electric fan if necessary. See 17 11 035 REMOVING AND INSTALLING/REPLACING FAN COWL WITH ELECTRIC FAN (N47 D20 O1, B47) .
- Remove underbody protection. See 51 47 490 REMOVING AND INSTALLING/REPLACING FRONT UNDERBODY PROTECTION or 51 47 491 REMOVING AND INSTALLING/REPLACING REAR UNDERBODY PROTECTION .
- Remove stiffening plate if necessary

Cleaning intake plenum:

Wear safety goggles and protective gloves.

IMPORTANT: **Never** place electrical components in cleaning bath!

Dismantle intake plenum (remove exhaust-gas recirculation valve, throttle valve, swirl-flap controller, preheating control unit and charging pressure sensor if necessary).

Prepare cleaning bath with 1 part BMW UNIVERSAL CLEANER (see Section 3.2) and 2 parts water.

Place intake plenum in cleaning bath. Leave to soak at least 1 hr.

Crank engine to cylinder no. 1 TDC setting:

cardiagn.com

Crank engine with special tool 11 6 480 to TDC firing position of cylinder no. 1.

IMPORTANT: Do not crank engine in reverse direction.

NOTE: **Figure N47D.**

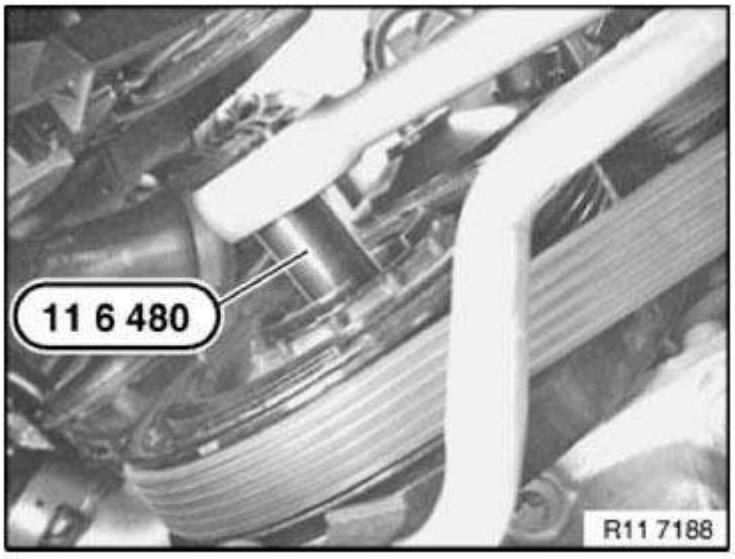


Fig. 134: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap of gear case cover.

Crank engine at central bolt with special tool 11 6 480

Use special tool 11 5 320 to block the crankshaft in the TDC firing position Cylinder 1.

IMPORTANT: Do not turn the engine back.
Special tool 11 6 480 must be removed before starting engine.

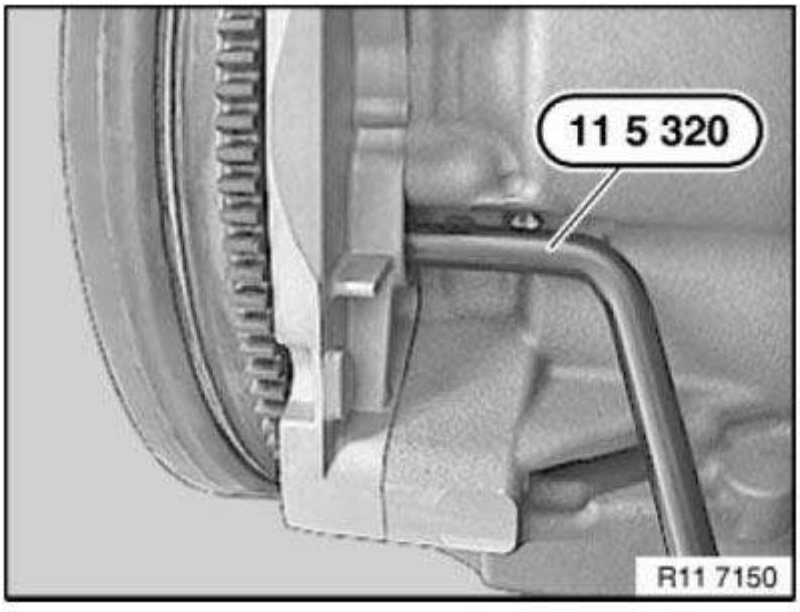


Fig. 135: Identifying Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

The cam on the intake camshaft (E) points obliquely upwards at cylinder No. 1.

cardiagn.com

The cam on the exhaust camshaft (A) points obliquely outward to the left at cylinder No. 1.

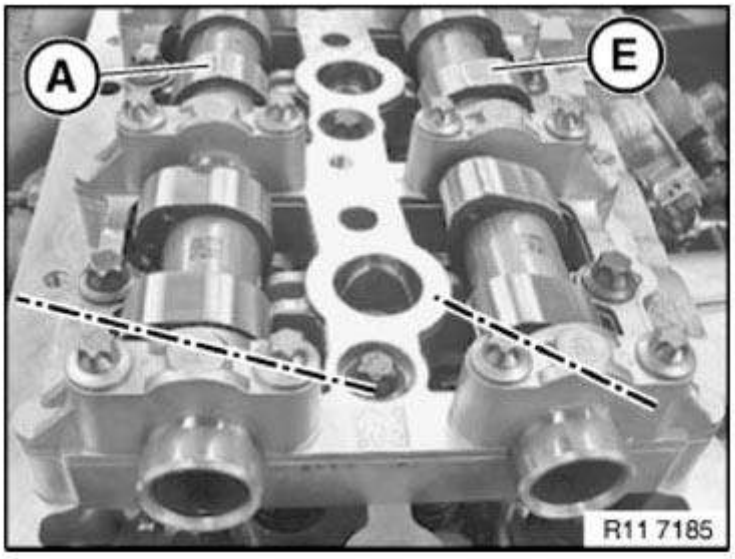


Fig. 136: Identifying Cam On Intake And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Visual inspection via oil filler cap (1) if necessary. Remove oil filler neck if necessary.**

Cam (2) on exhaust camshaft points obliquely outward to the left at cylinder No. 1.

Figure N47.

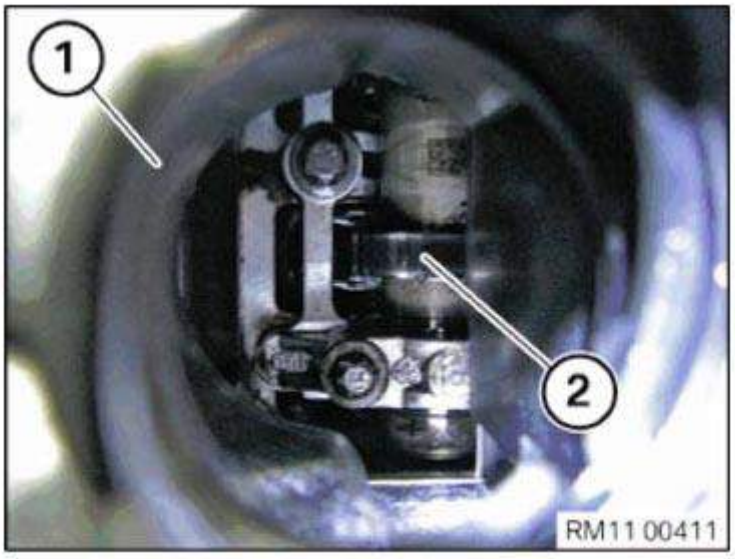


Fig. 137: Identifying Oil Filler Cap And Cam
Courtesy of BMW OF NORTH AMERICA, INC.

Cleaning intake ports:

IMPORTANT:	Risk of engine damage! When cleaning the intake ports, it must be ensured that the intake valves of the corresponding cylinder are closed. Start with the 1st cylinder when cleaning the intake ports.

The following are required:

cardiagn.com

- Blasting tool 81 29 2 208 034
- Walnut shell granulate
- Vacuum cleaner

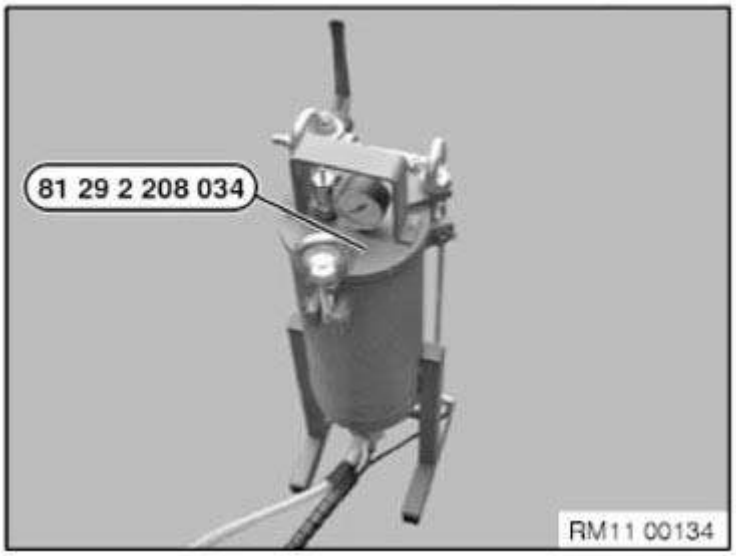


Fig. 138: Identifying Blasting Tool (81 29 2 208 034)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Front area of sensors is marked with two notches. These can additionally be highlighted in color.
During the blasting process, only pull the wands out of the vacuum adapter until the mark becomes visible.

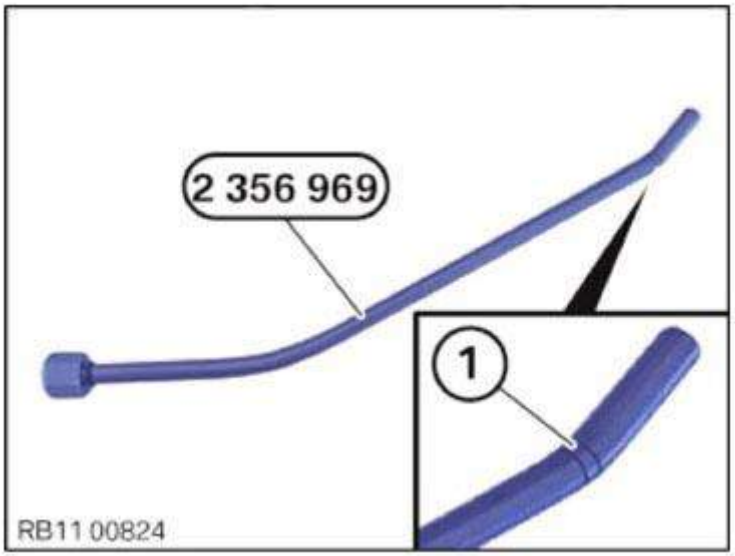


Fig. 139: Identifying Blasting Wand For Swirl Ports (2 356 969)
Courtesy of BMW OF NORTH AMERICA, INC.

Blasting wand for swirl ports:

- **2 356 969**

Vacuum adapter for tangential swirl port:

- 2 356 966

cardiagn.com

Vacuum adapter for swirl port:

- 2 356 967



Fig. 140: Identifying Vacuum Adapters (2 356 966) & (2 356 967)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Use 2 liters of granulate per cleaning operation; this corresponds to a blasting duration of approx. 20 seconds.

Open blasting tool (1) and pour in 2 liters of granulate (2).

Close the device again.

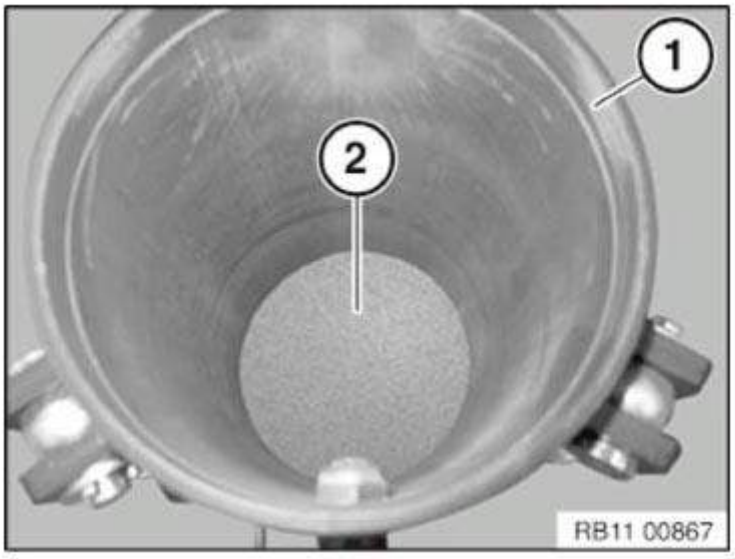


Fig. 141: Identifying Blasting Tool And Granulate
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Operating pressure 6 - 8 bar.

Close main valve (1) on blasting tool (2).

Connect compressed air (3).

cardiagn.com

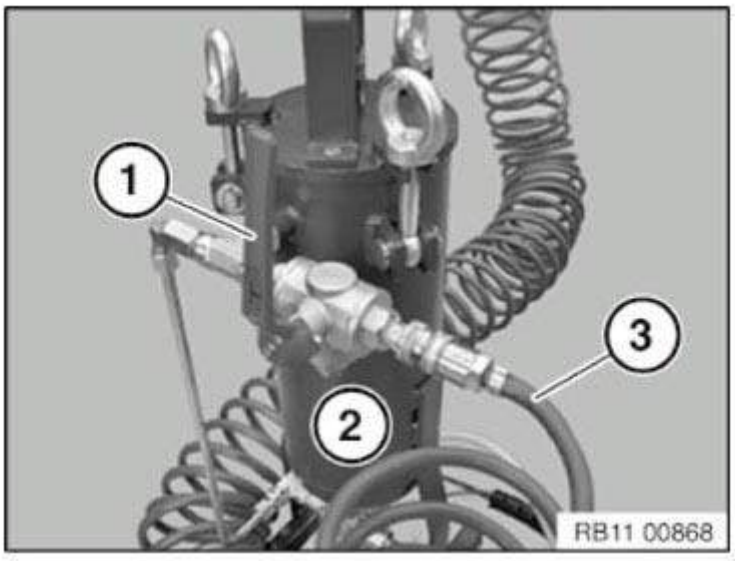


Fig. 142: Connecting Compressed Air
Courtesy of BMW OF NORTH AMERICA, INC.

Cleaning the swirl port of 1st cylinder:

Prior to the blasting process, clean the front area of both intake ports (1) of first cylinder with a suitable tool (e.g. plastic scraper, brushes 83 19 2 298 237).

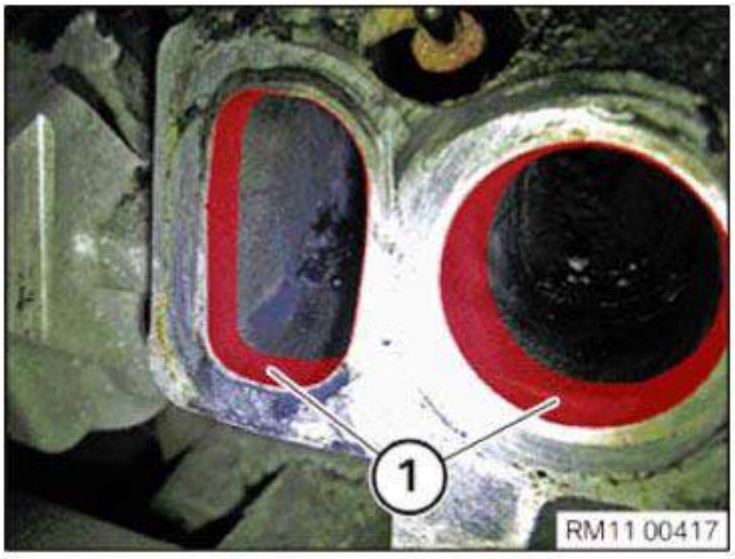


Fig. 143: Identifying Intake Ports
Courtesy of BMW OF NORTH AMERICA, INC.

Screw together blasting wand **2 356 969** (1) and actuator (2).

Open blasting tool and pour in 2 l granulate.

Close the device again.

NOTE: Actuator (3) has two stages!

In stage one, only compressed air flows through the blasting wand.

In stage two (operation is fully pressed), granulate is added (blasting process).

cardiagn.com

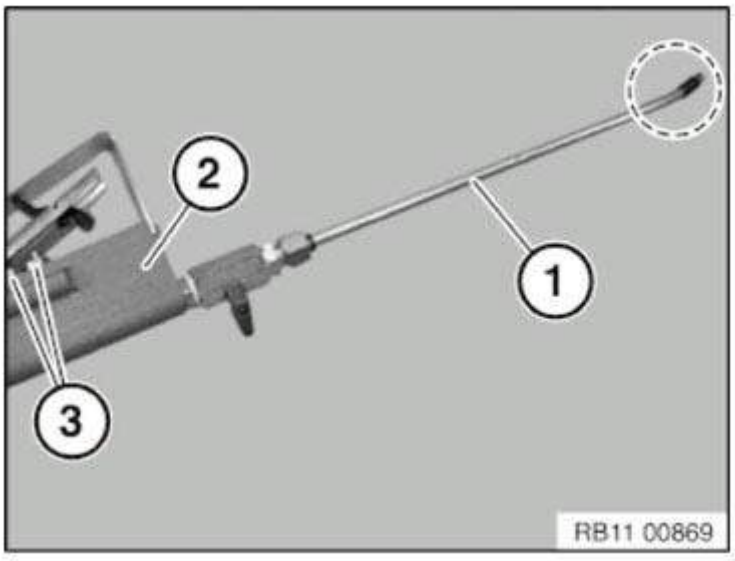


Fig. 144: Identifying Blasting Wand & Actuator
Courtesy of BMW OF NORTH AMERICA, INC.

Connect vacuum adapter 2 356 967 to vacuum cleaner. Hold vacuum adapter 2 356 967 against swirl port at no. 1 cylinder.

Open the main valve on the blasting tool and switch the vacuum cleaner on.



Fig. 145: Holding Vacuum Adapter (2 356 967) Against Swirl Port
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Danger of injury!
Risk of damage!
Second person required to assist.
Blasting wand may only be pulled out until the mark becomes visible.

Wear safety goggles.

Insert blasting wand **2 356 969** into adapter 2 356 967.

Open the actuator valve (1).

cardiagn.com

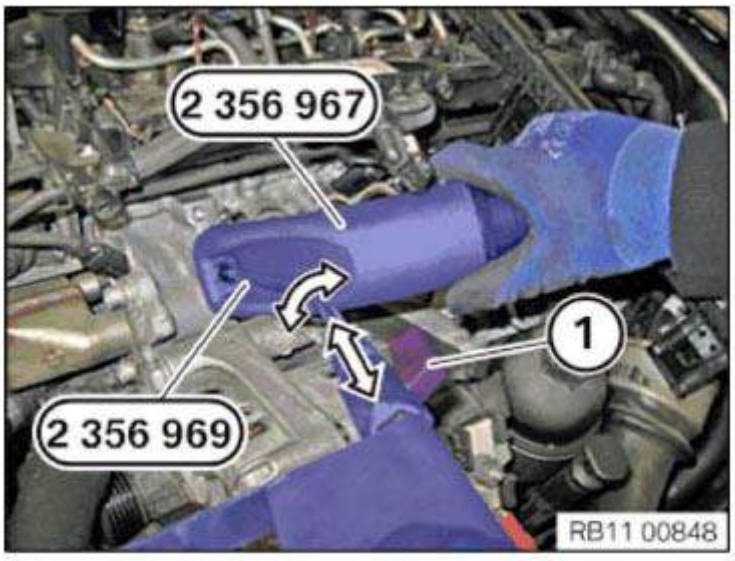


Fig. 146: Opening Actuator Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Slide locking lever (1) to the front in direction of arrow.

Operate compressed-air valve (2) at stage one; compressed air can now flow in.

Fully operate valve (3) at stage two; walnut shell granulate is now injected.

Clean intake port, rotating the blasting wand and moving it vertically up and down.

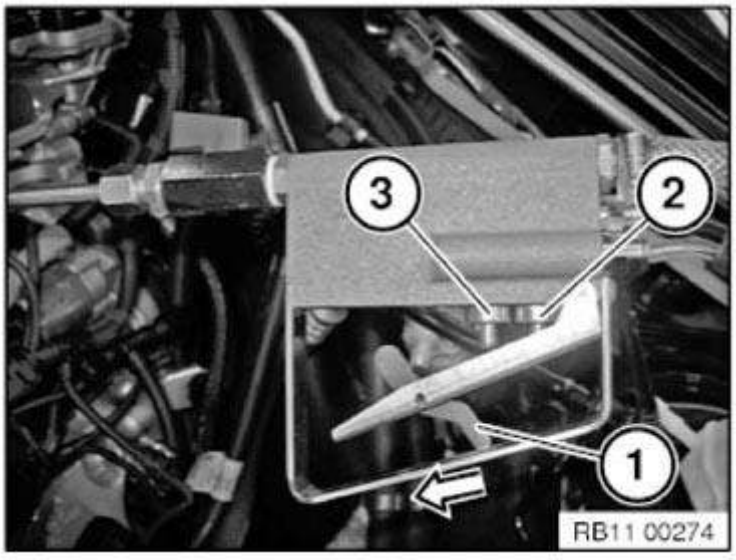


Fig. 147: Sliding Lock Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Blasting wand may only be pulled out until the mark becomes visible.

When you notice that the container is becoming empty, continue operation for at least 10 seconds at stage one in order to swirl up and draw off the remaining granulate.

Close operation valve. Close main valve, check pressure drop at the pressure gauge.

Evaluate result if necessary.

If necessary, repeat procedure.

cardiagn.com

Cleaning the tangential swirl port of 1st cylinder:

Open blasting tool and pour in 2 l granulate.

Close the device again.

Connect vacuum adapter 2 356 966 to vacuum cleaner. Hold vacuum adapter 2 356 966 on swirl port of first cylinder.

Open the main valve on the blasting tool and switch the vacuum cleaner on.



Fig. 148: Holding Vacuum Adapter (2 356 966) On Swirl Port
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:
Danger of injury!
Risk of damage!
Second person required to assist.
Blasting wand may only be pulled out until the mark becomes visible.

Wear safety goggles.

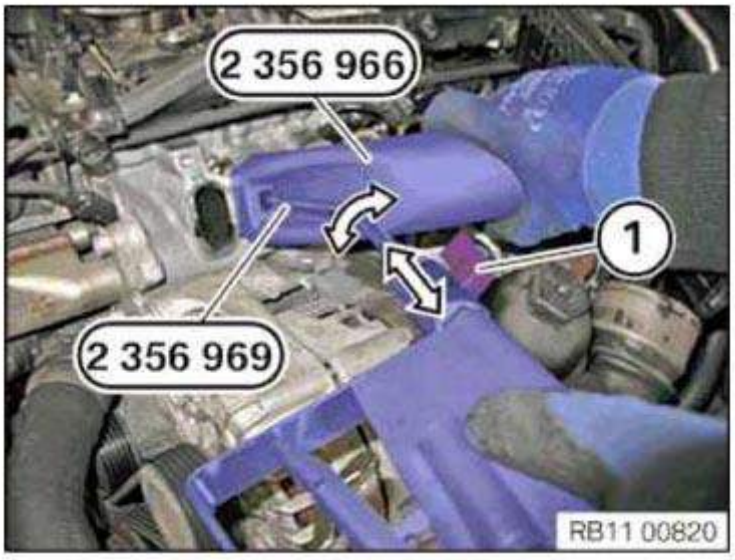


Fig. 149: Opening Actuator Valve
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Insert blasting wand **2 356 969** into adapter 2 356 966.

Open the actuator valve (1).

Slide locking lever (1) to the front in direction of arrow.

Operate compressed-air valve (2) at stage one; compressed air can now flow in.

Fully operate valve (3) at stage two; walnut shell granulate is now injected.

Clean intake port, rotating the blasting wand and moving it vertically up and down.

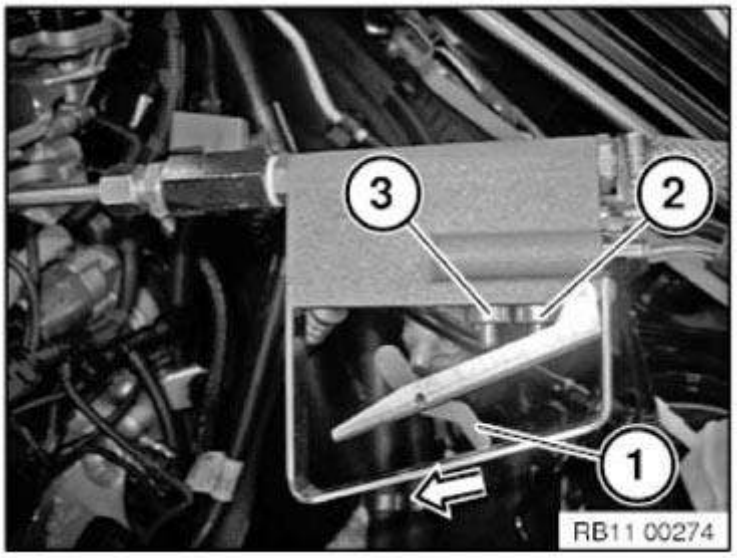


Fig. 150: Sliding Lock Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Blasting wand may only be pulled out until the mark becomes visible.

When you notice that the container is becoming empty, continue operation for at least 10 seconds at stage one in order to swirl up and draw off the remaining granulate.

Close operation valve. Close main valve, check pressure drop at the pressure gauge.

Evaluate result if necessary.

If necessary, repeat procedure.

Cleaning the other cylinders:

IMPORTANT: Do not crank engine in reverse direction.

Remove special tool for securing the crankshaft.

Proceed in the standard firing order while using the same procedure to clean the swirl ports at the remaining cylinders.

cardiagn.com

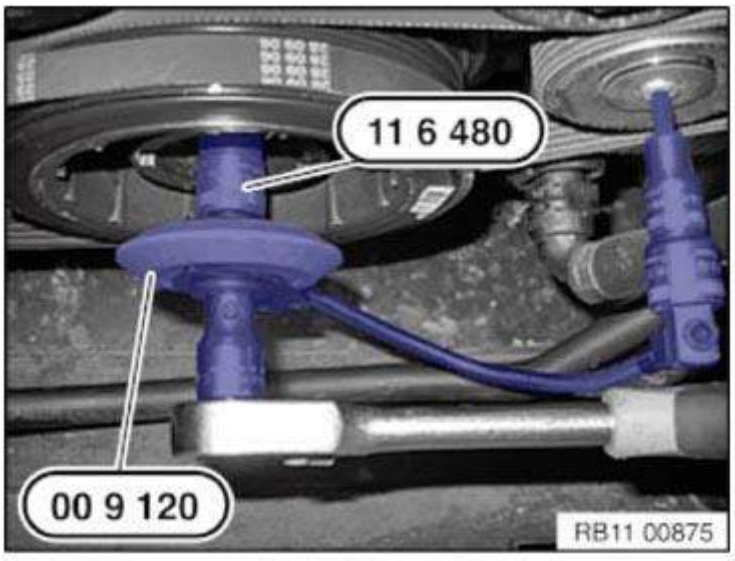


Fig. 151: Identifying Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Firing order:

- **1 3 4 2** (4-cylinder engine)
- **1 5 3 6 2 4** (6-cylinder engine)

During this process, crank engine at central bolt with **00 9 120** and **11 6 480** by **180Â°** (4-cylinder engine) or **120Â°** (6-cylinder engine).

NOTE: Figure M47.

Cleaning intake plenum:

Wear safety goggles and protective gloves.

Remove the intake plenum from the cleaning bath.

Clean plenum openings and swirl flaps with brush set (1) part number: 83 19 2 298 237.

Clean throttle valve, exhaust-gas recirculation valve, mixing tube and add-on parts with brush set if necessary.

Parts: Replace all gaskets.



cardiagn.com

Fig. 152: Cleaning Intake Plenum
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **Do not** clean electrical components with a component washing machine or high pressure cleaner.

Then clean the plenum with a parts washer or a high-pressure cleaner.

Observe country-specific waste disposal regulations.

Crank motor at central bolt at least twice.

Assemble engine.

Clear diagnostic fault entries from fault memory.

11 12 719 MILLING CYLINDER HEAD LOWER FACE (N20, N26)

Necessary preliminary tasks:

- Remove **CYLINDER HEAD**
- Remove **EXHAUST CAMSHAFT**.
- Remove **INTERMEDIATE LEVER** on intake side

Check evenness of cylinder head sealing faces with a standard straightedge (1).

NOTE: Max. deviation from flatness (longitudinal) 0.10 mm

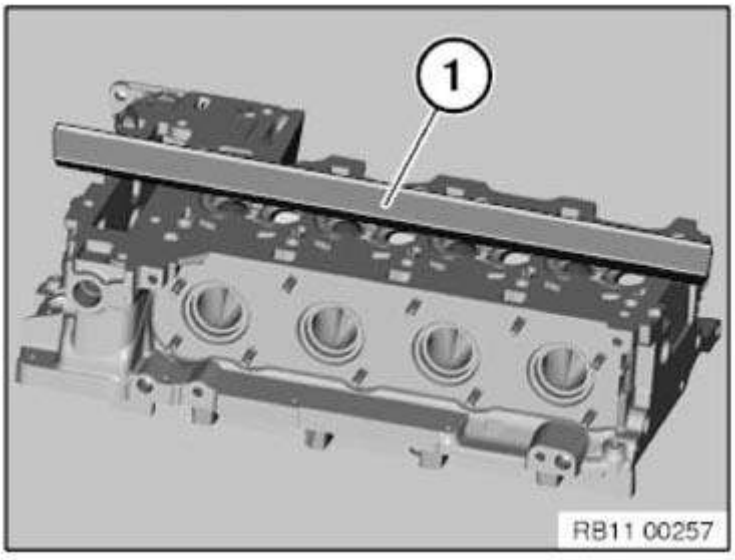


Fig. 153: Checking Evenness Of Cylinder Head Sealing Faces (Longitudinal)
Courtesy of BMW OF NORTH AMERICA, INC.

Check evenness of cylinder head sealing faces with a standard straightedge (1).

NOTE: Max. deviation from flatness (transverse) 0.05 mm

cardiagn.com

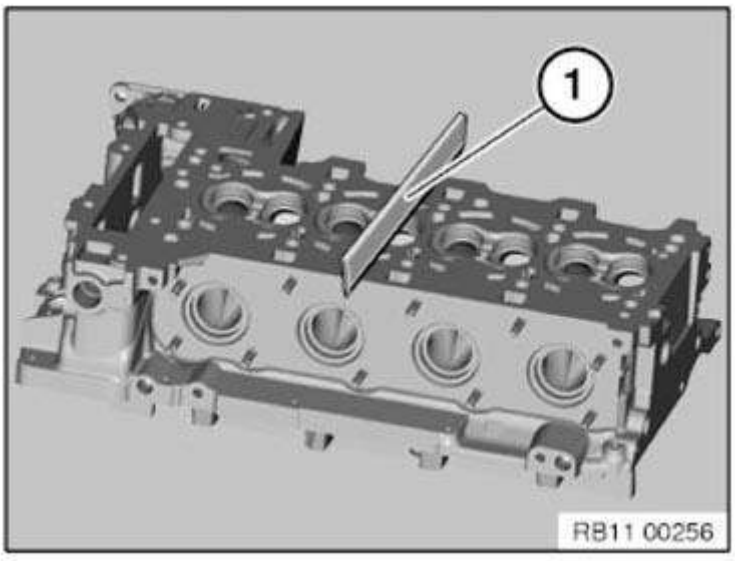


Fig. 154: Checking Evenness Of Cylinder Head Sealing Faces (Transverse)
Courtesy of BMW OF NORTH AMERICA, INC.

Check cylinder head for **WATERTIGHTNESS**.

Assemble engine.

11 12 040 REMOVING AND INSTALLING ALL IGNITION COILS AND INJECTOR WELLS (N20, N26)

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove all **INJECTORS** .

Release screws (1).

Tightening torque: **11 12 6AZ** .

Remove injector slot (2).

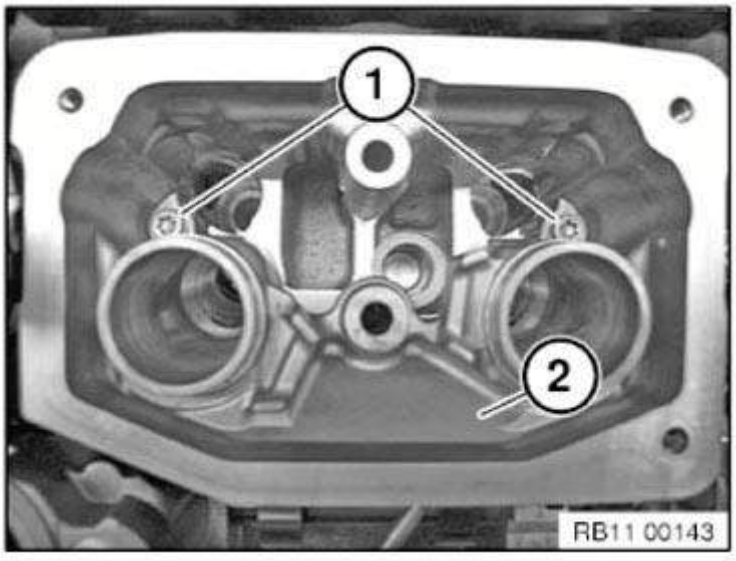


Fig. 155: Identifying Screws And Injector Slot
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Check fitting bushes (1) for damage.

Installation note:

Replace gasket (2).

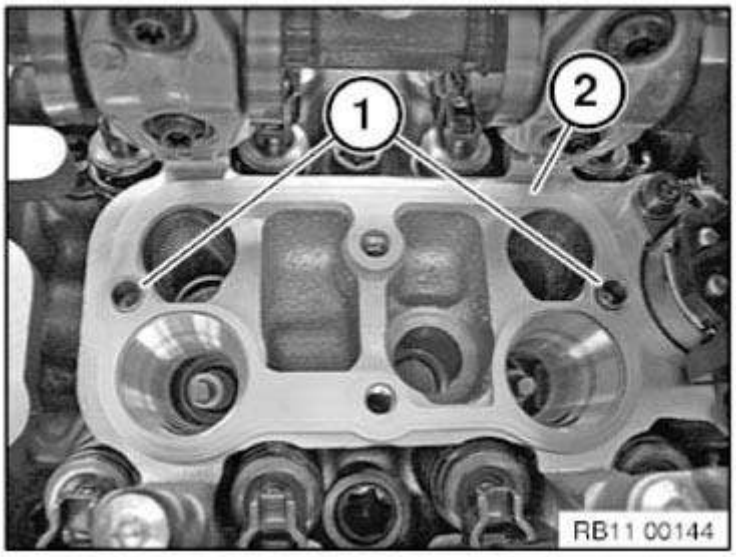


Fig. 156: Identifying Bushes And Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 040 REMOVING AND INSTALLING ALL IGNITION COILS AND INJECTOR WELLS (N55)

Necessary preliminary work:

- Remove **CYLINDER HEAD COVER**.
- Remove all **INJECTORS** .

Release screws (1).

Tightening torque: **11 12 8AZ** .

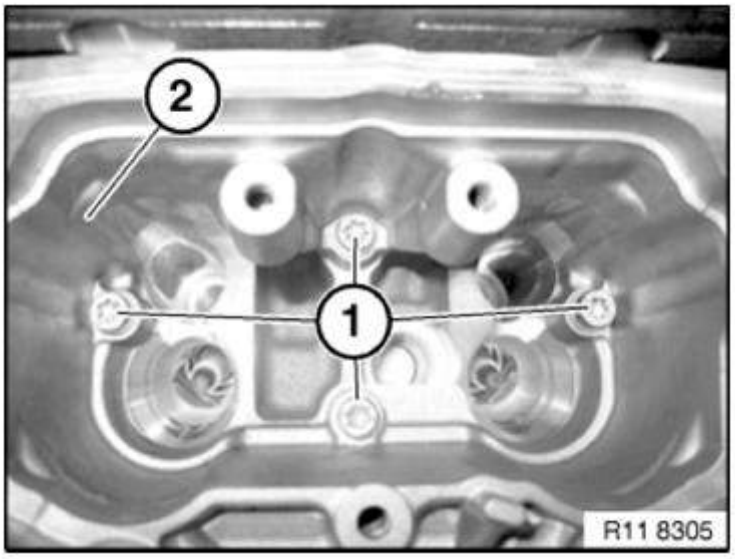


Fig. 157: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Check fitting bushes (1) for damage.

Installation note:

Replace gasket (2).

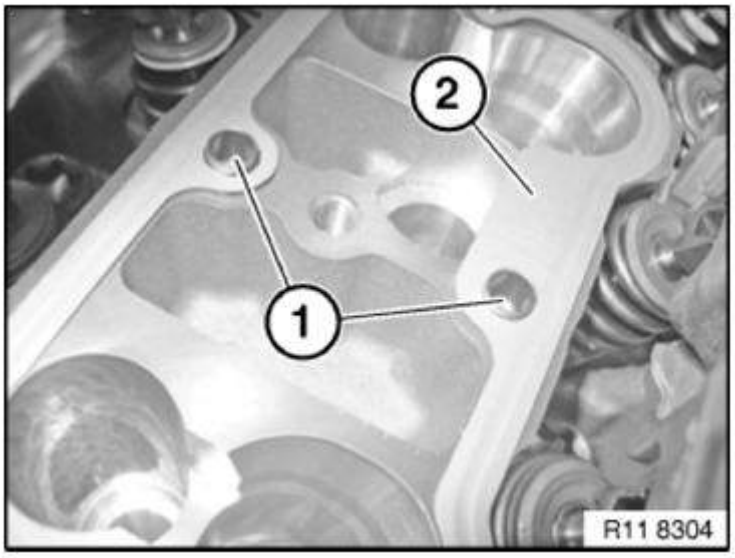


Fig. 158: Identifying Gasket And Bushes
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 100 REMOVING AND INSTALLING CYLINDER HEAD (N20, 26)

Special tools required:

- 11 0 320
- 11 4 420
- 11 4 430
- 11 4 471
- 11 4 472
- 11 8 580
- 11 7 170
- 2 318 428

Fit new cylinder head bolts.
Do not wash off bolt coating.
IMPORTANT: **Lightly** oil washer on the contact surfaces (both sides).
There must be no coolant, water or engine oil in the blind holes.
Risk of cracking and corrosion!

Necessary preliminary tasks:

- Remove **EXHAUST SYSTEM** .
- Remove the **CATALYTIC CONVERTER** .
- Remove **EXHAUST TURBOCHARGER** with integrated exhaust manifold.
- Drain **COOLANT** .
- Drain **ENGINE OIL**.
- Remove intake **PLENUM**.

cardiagn.com

- Detach coolant hoses from cylinder head.
- Remove **CYLINDER HEAD COVER**.
- Remove **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.
- Remove **INJECTOR SHAFTS**.

IMPORTANT: Secure eccentric shaft (1) with open-end spanner (3) (risk of return stroke).

Slowly adjust eccentric shaft (1) to minimum lift via servomotor using 4-mm hexagon socket wrench (2) and open-end spanner (3).

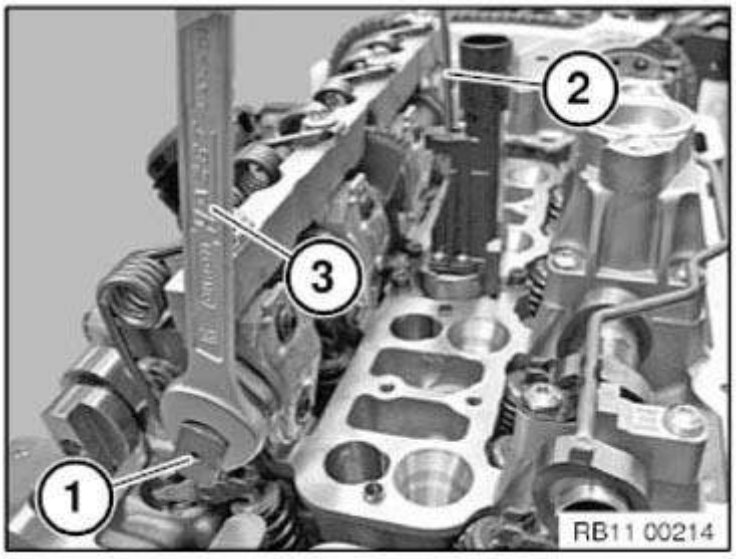


Fig. 159: Securing Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Position eccentric shaft in the middle between maximum stroke and minimum stroke.

Secure eccentric shaft (1) with special tool **11 7 170** .

The open-end spanner can now be removed.

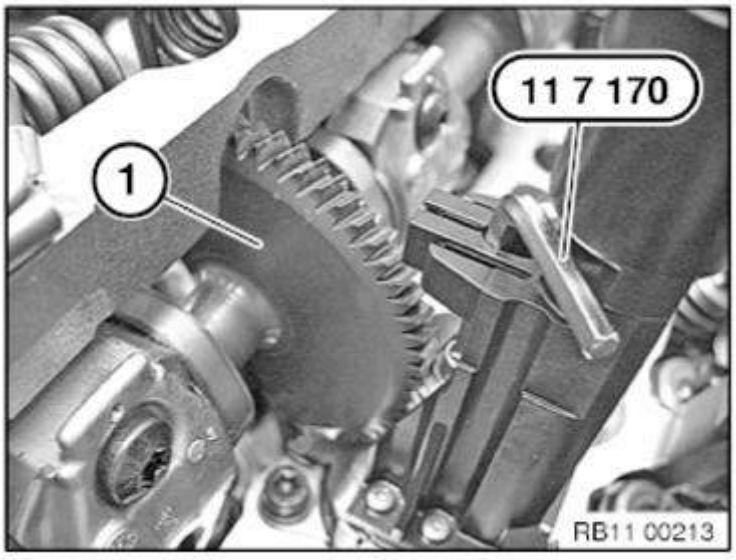


Fig. 160: Securing Eccentric Shaft With Special Tool (11 7 170)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove maximum stroke limit position (2).

cardiagn.com

Tightening torque: **11 37 5AZ** .

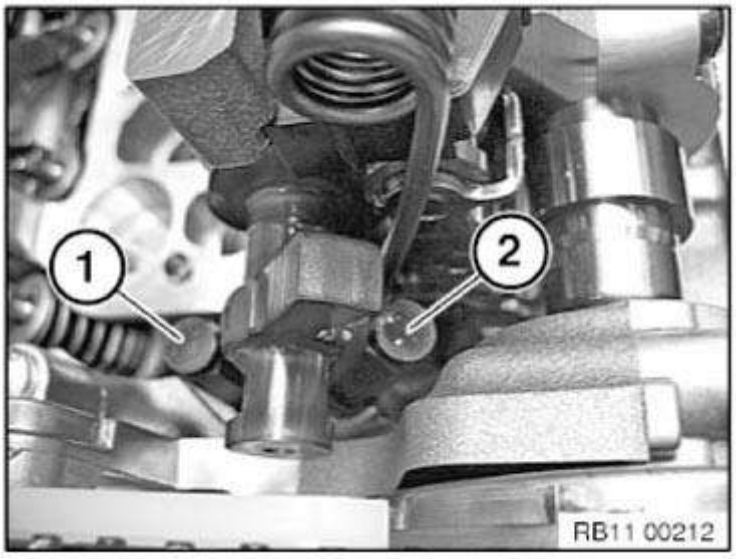


Fig. 161: Identifying Stroke Limit Position
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten engine wiring harness (1) at cylinder head cover.

Unscrew cable channel (2) from the cylinder head cover.

Unclip the cable channel (3) from the cylinder head cover.

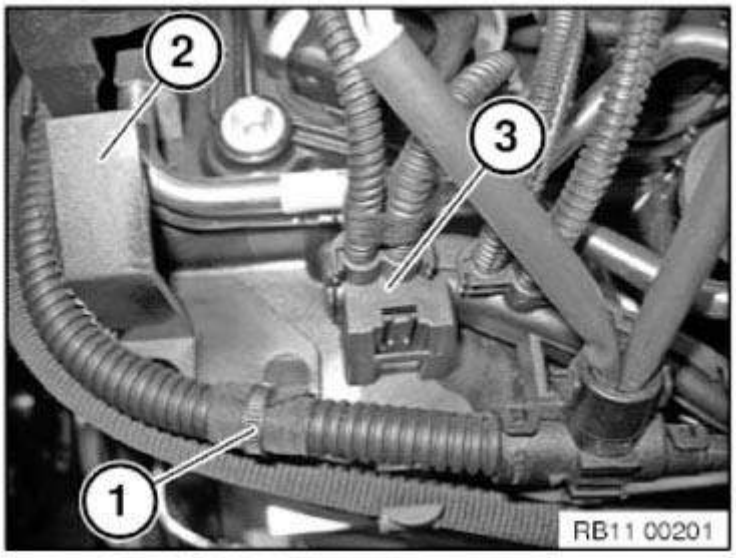


Fig. 162: Identifying Engine Wiring Harness And Cable Channel
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip engine wiring harness (1).

Release screw (2).

Remove bracket (3).

cardiagn.com

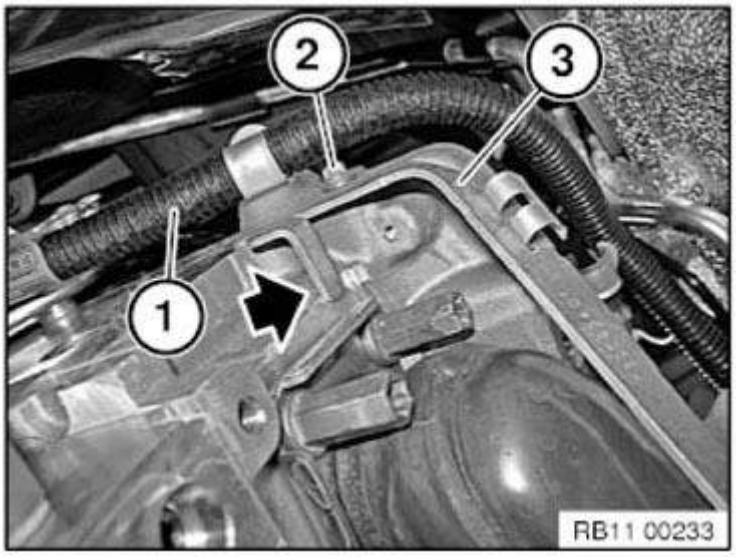


Fig. 163: Identifying Engine Wiring, Screw, And Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1) from timing chain module on cylinder head.

Tightening torque: **11 31 4AZ** .

Remove upper chain module upwards.

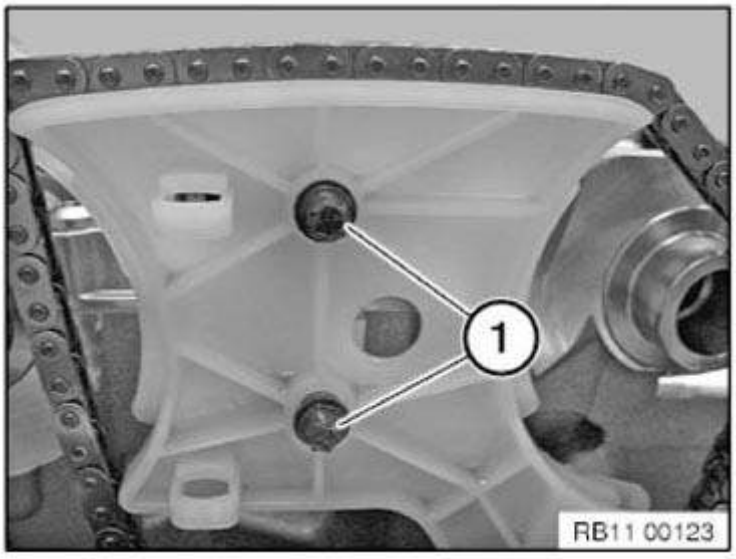


Fig. 164: Identifying Bolts From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Remove **VIBRATION DAMPER**.

Open screw plug (2).

Tightening torque: **11 11 7AZ** .

cardiagn.com

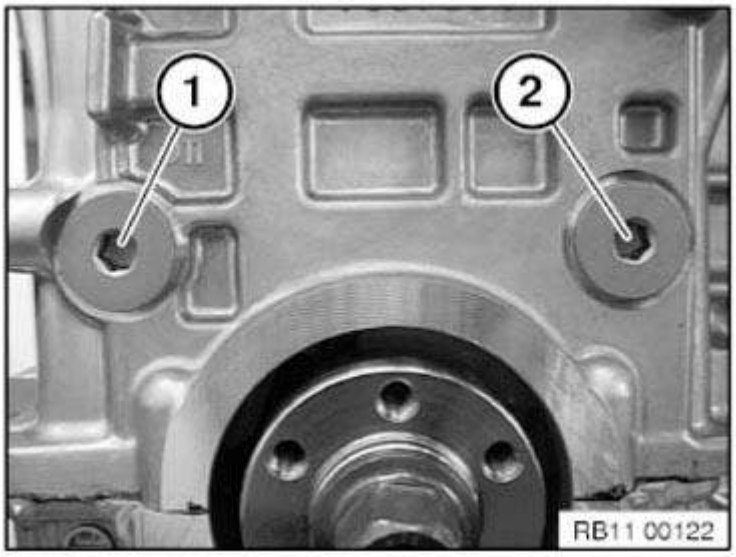


Fig. 165: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release right bearing journal (1) from chain module for timing chain on crankcase.

Tightening torque: **11 31 5AZ** .

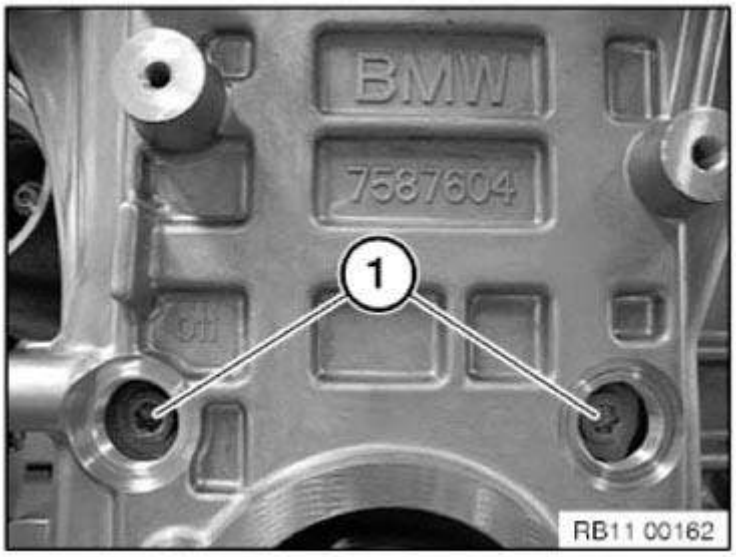


Fig. 166: Identifying Right Bearing Journal
Courtesy of BMW OF NORTH AMERICA, INC.

Press chain module slightly to one side.

Release screws (1).

Tightening torque: **11 12 3AZ** .

cardiagn.com

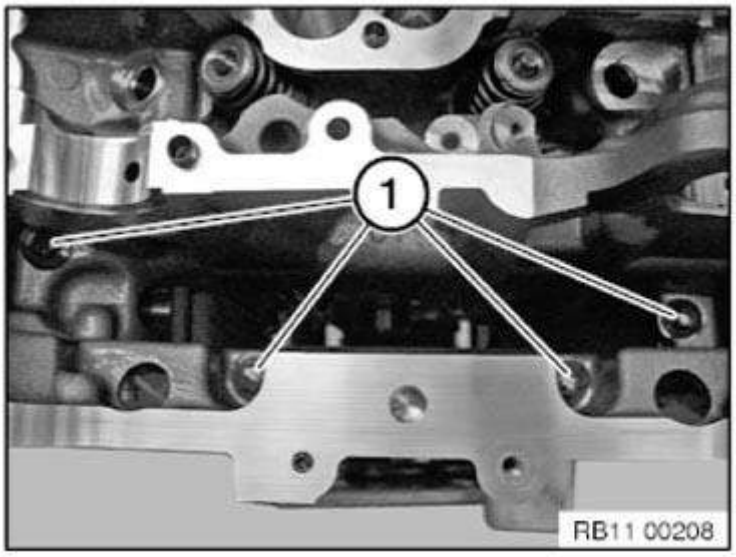


Fig. 167: Identifying Screws Of Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 12 3AZ** .

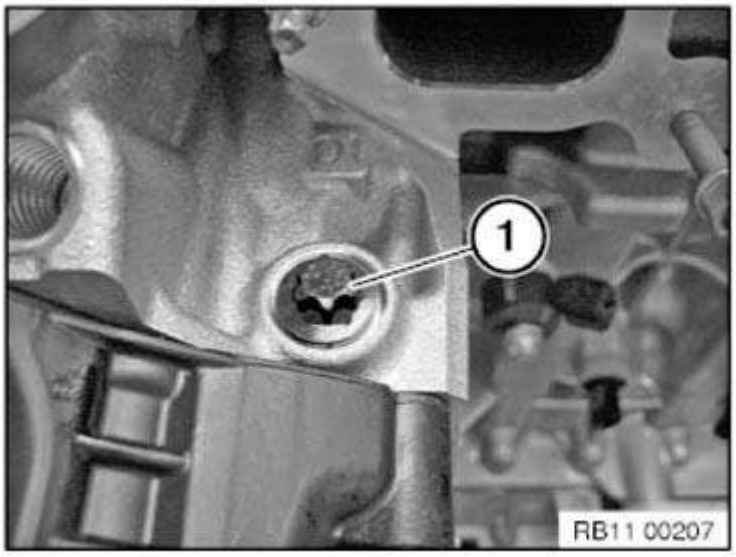


Fig. 168: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Various special tools are required for the cylinder head screw connection.

Screw M11 with special tool **11 8 580**

Screw M9 with special tool **11 4 420** (old)

Screw M9 with special tool **2 318 428** (new)

cardiagn.com

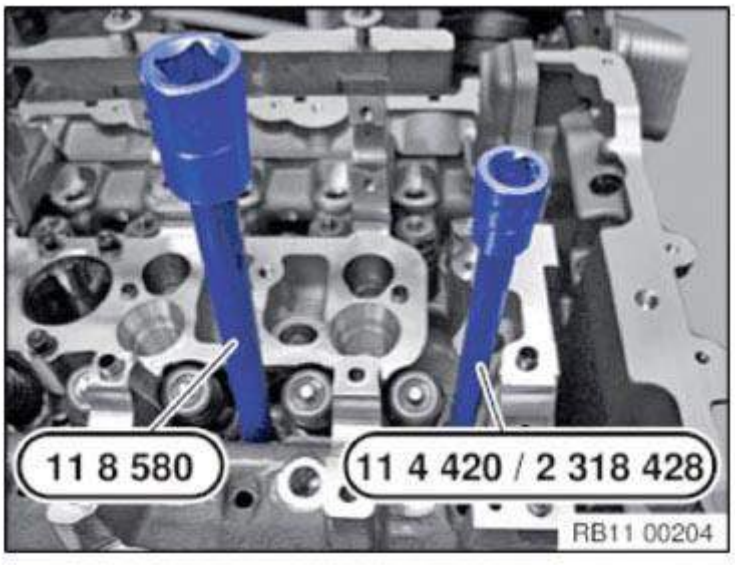


Fig. 169: Identifying Special Tool (11 8 580)
Courtesy of BMW OF NORTH AMERICA, INC.

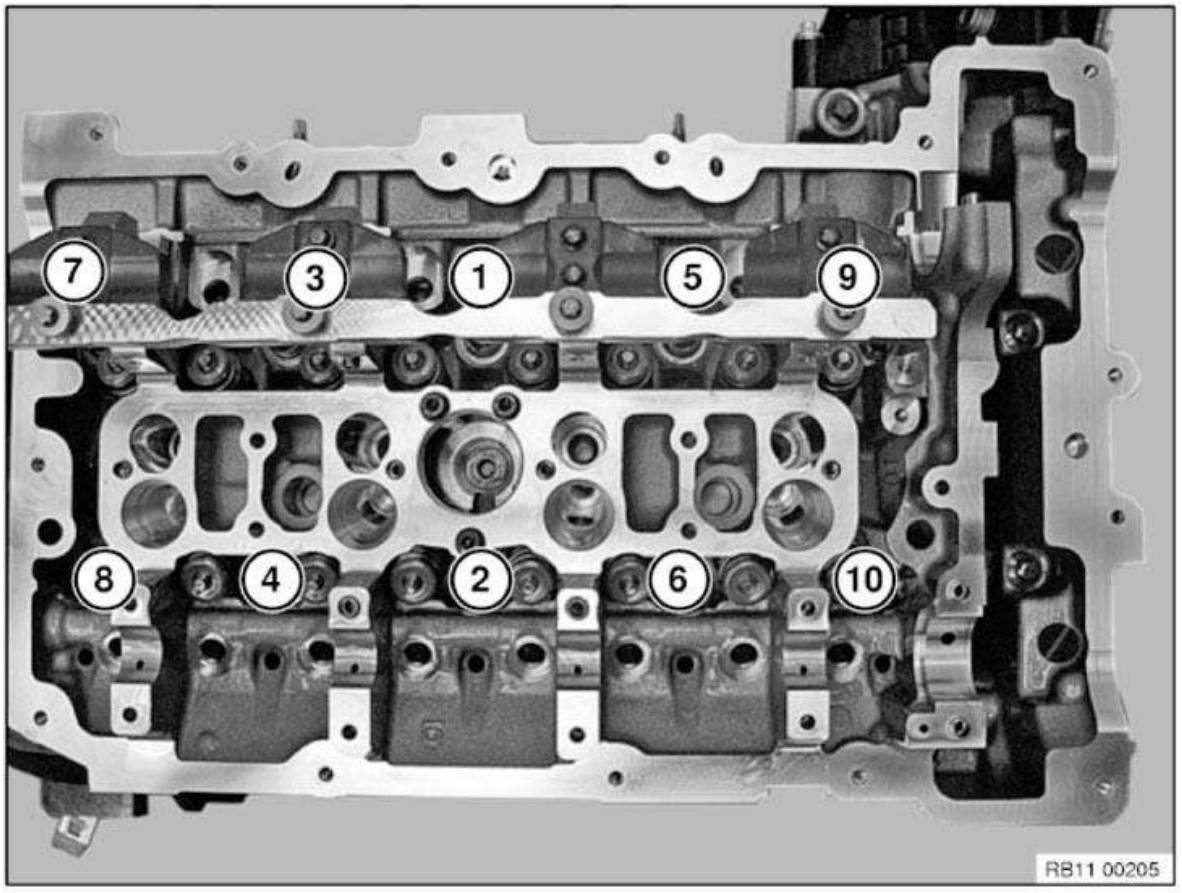


Fig. 170: Cylinder Head Bolts Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Release cylinder head bolts in sequence 10 to 7 with special tool **11 4 420** .

Release cylinder head bolts in sequence 6 to 1 with special tool **11 8 580** .

NOTE: **Graphics show intermediate lever, intake and exhaust camshaft.**

IMPORTANT: Removing and install cylinder head with a second person helping.

cardiagn.com

Weight of cylinder head with add-on parts is approx. 40 kg.

Do not rest cylinder head on sealing surface. **Risk of damage to valves!**

Remove coarse residues on sealing surfaces with special tool **11 4 471** from cylinder head and crankcase.

IMPORTANT: Do not use any metal-cutting tools.

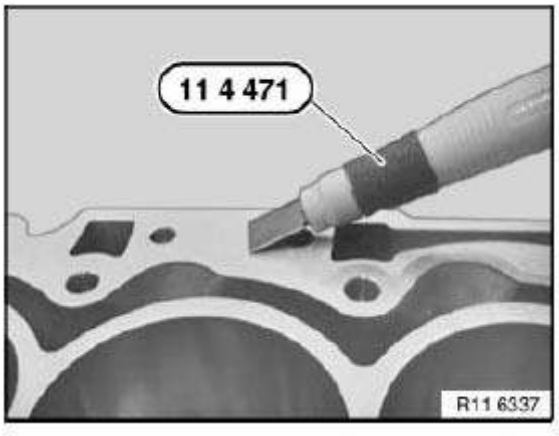


Fig. 171: Identifying Special Tool (11 4 471)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove fine residues on sealing surfaces with special tool **11 4 472** from cylinder head and crankcase.

IMPORTANT: Do not use any metal-cutting tools.
There must be no coolant, water or engine oil in the pocket holes.
Risk of cracking and corrosion!

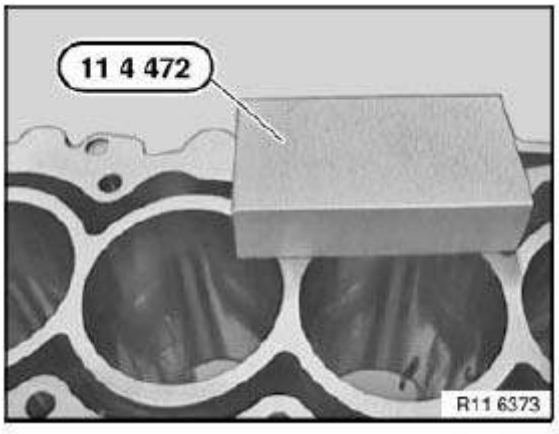


Fig. 172: Identifying Special Tool (11 4 472)
Courtesy of BMW OF NORTH AMERICA, INC.

Clean all blind holes.

Replace **CYLINDER HEAD GASKET**.

cardiagn.com

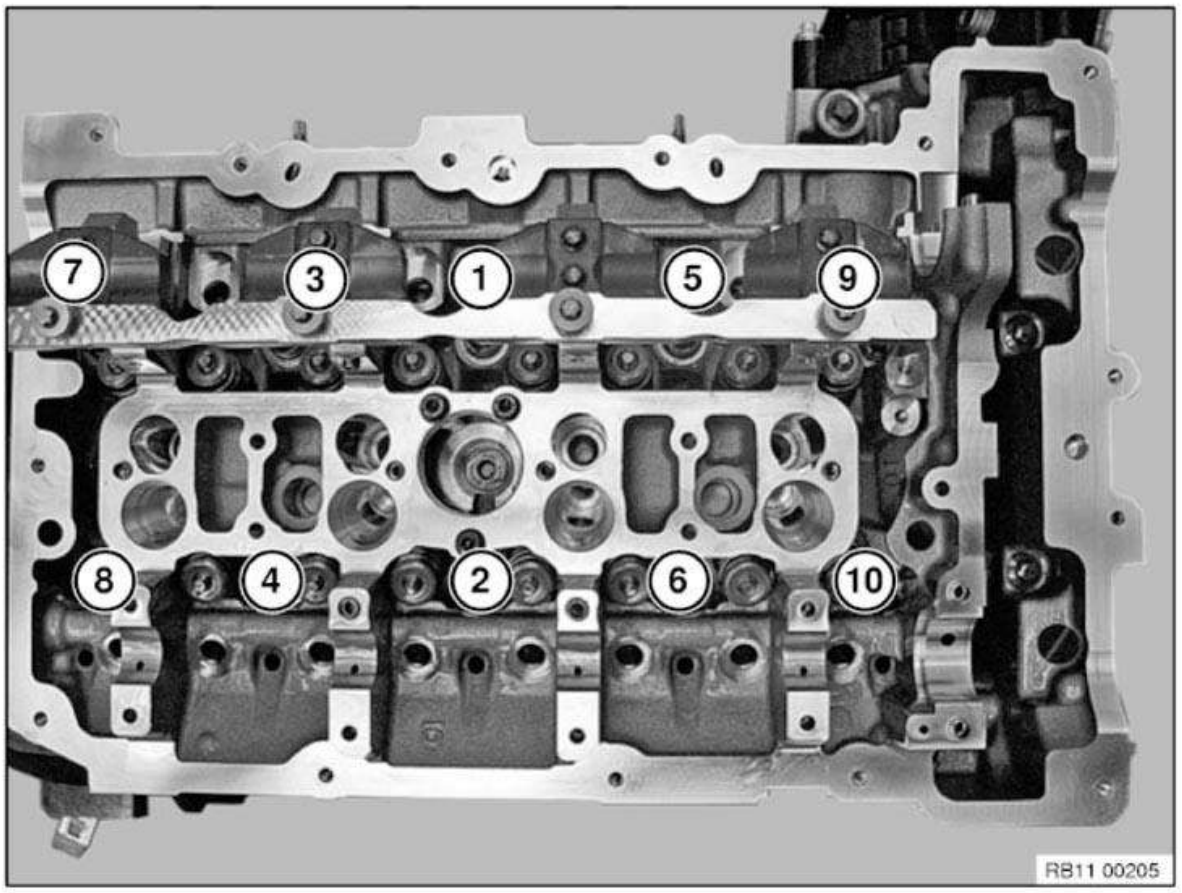


Fig. 173: Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Fit new cylinder head bolts.

Insert cylinder head bolts (1 to 6) with special tool **11 8 580** .

Tightening torque: **11 12 1AZ** .

Insert cylinder head bolts (7 to 10) with special tool **11 4 420** .

Tightening torque: **11 12 2AZ** .

Insert bolts (1).

Tightening torque: **11 12 3AZ** .

cardiagn.com

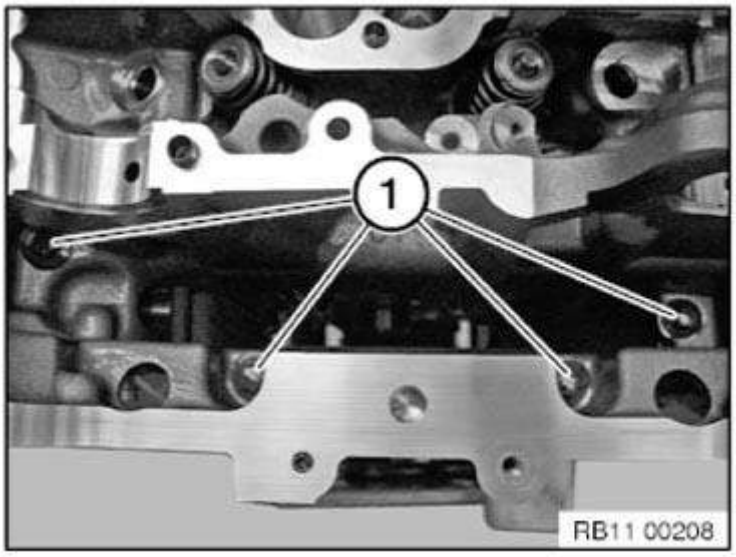


Fig. 174: Identifying Screws Of Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

Insert screw (1).

Tightening torque: **11 12 3AZ** .

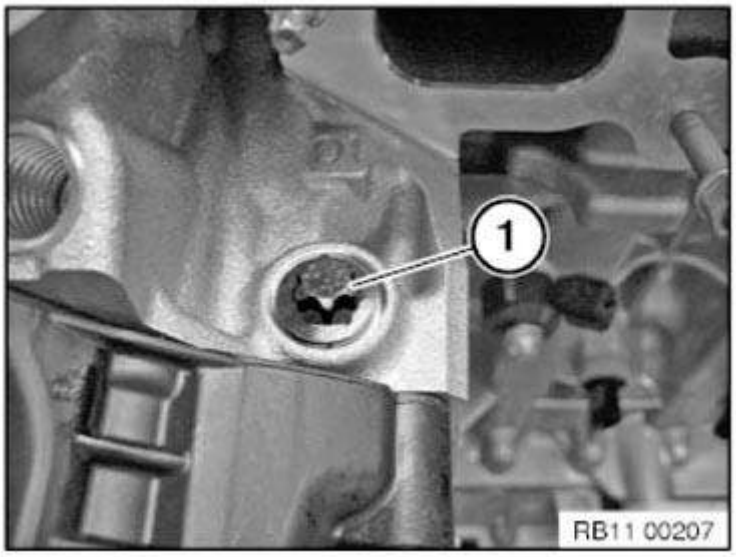


Fig. 175: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 100 REMOVING AND INSTALLING CYLINDER HEAD (N47 D20 O1)

Special tools required:

- **00 2 530**
- **00 9 120**
- **11 5 320**
- **11 6 050**
- **11 6 480**
- **11 4 471**

cardiagn.com

- 11 4 472
- 2 364 711
- 11 8 760

IMPORTANT: There must be no coolant, water and engine oil in any of the threaded holes in the engine block.
Fit new cylinder head bolts.
Do not wash off bolt coating.
Jointing torque and angle of rotation must be observed without fail **(risk of damage!)** .

Necessary preliminary tasks:

- Disconnect ground cable from battery. See **61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD** .
- Remove **CYLINDER HEAD COVER**.
- Check **TIMING**.
- **REMOVE** intake plenum.
- Undo **EXHAUST TURBOCHARGER** from exhaust manifold.
- Drain and dispose of **COOLANT** .
- **REMOVE EXHAUST-GAS RECIRCULATION COOLER**
- **DISCONNECT COOLANT HOSES**.

Release coolant drain plug on engine block (if fitted).

Tightening torque: **11 11 2AZ** .

Installation note:

Replace sealing ring.

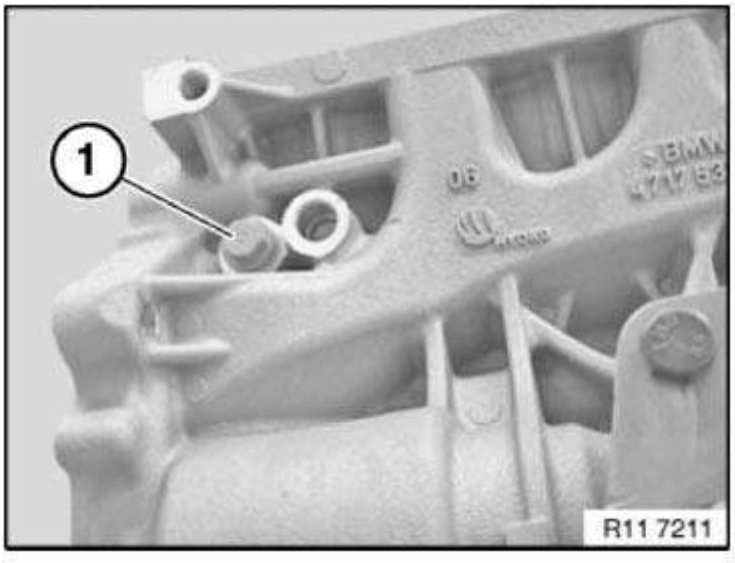


Fig. 176: Identifying Coolant Drain Plug On Engine Block
Courtesy of BMW OF NORTH AMERICA, INC.

Turn engine with special tool **11 6 480** in direction of rotation until the piston at the first cylinder is in the "top dead center" top position.

Secure flywheel with special tool **11 5 320** in the TDC firing position of cylinder 1.

Remove **CHAIN TENSIONER**.

cardiagn.com

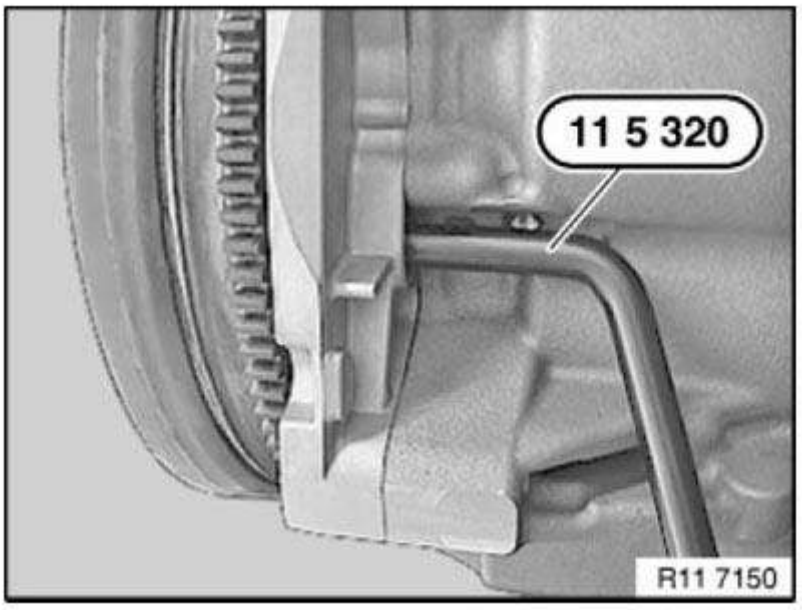


Fig. 177: Securing Flywheel Using Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

Release camshaft bolts (1).

Tightening torque: **11 31 1AZ** .

Remove sprocket.

IMPORTANT: Protect timing chain to prevent it from falling.
Risk of damage to oil spray nozzle.

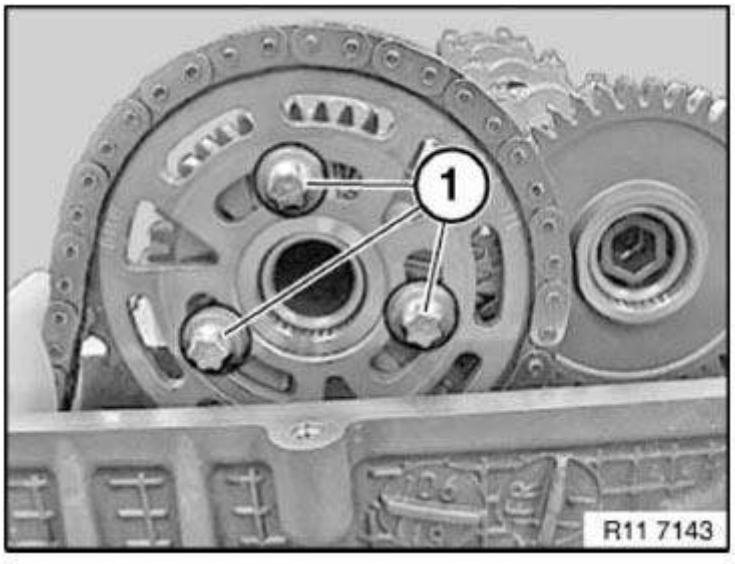


Fig. 178: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1) from outside to inside.

Remove camshaft carrier with camshafts.

cardiagn.com

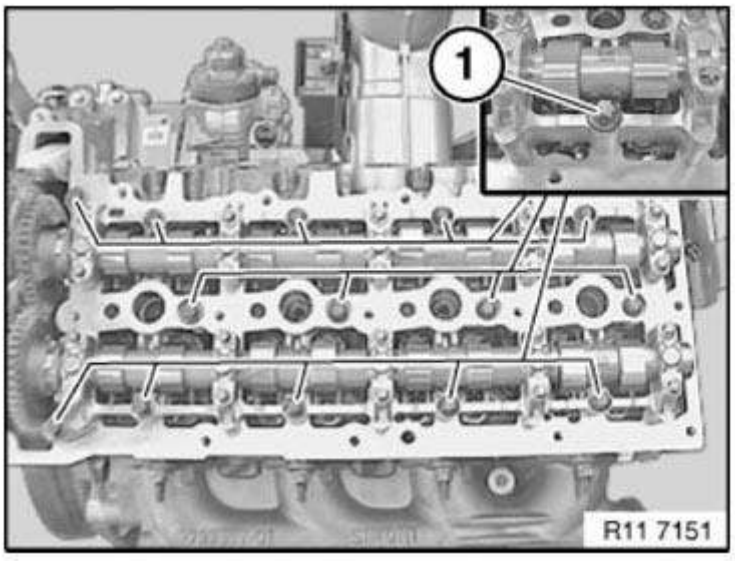


Fig. 179: Identifying Camshaft Carrier Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

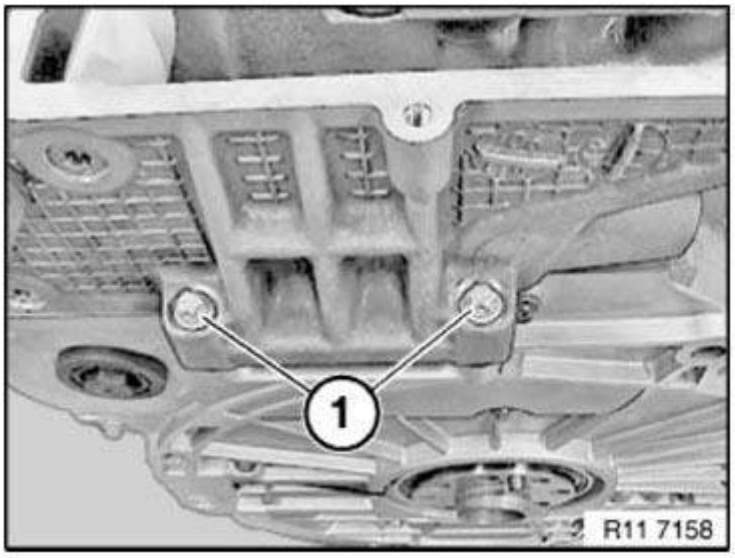


Fig. 180: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

cardiagn.com

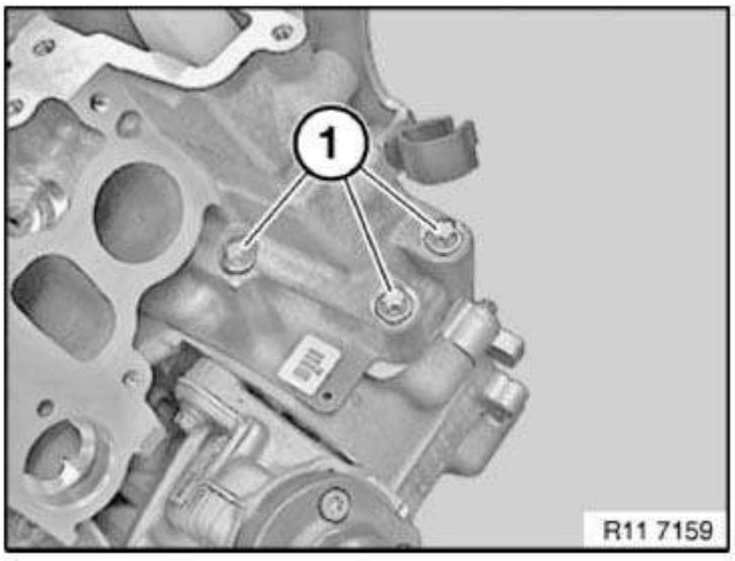


Fig. 181: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release cylinder head bolts in sequence 10 to 1.

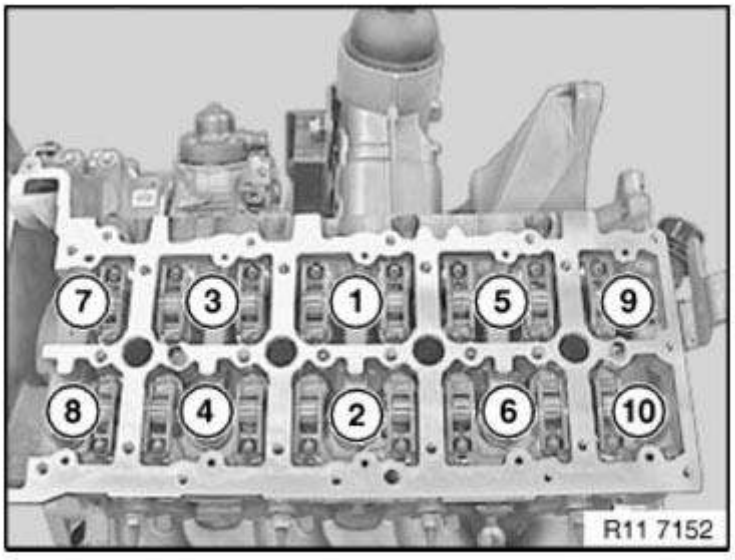


Fig. 182: Identifying Cylinder Head Bolts Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Before cleaning the sealing surfaces using the special tools **11 4 471** and **11 4 472** the risers for the oil ducts must be sealed.

Seal oil duct at front using special tool **(B)** from tool set **2 364 711** .

IMPORTANT: Do not use any metal-cutting tools.

cardiagn.com



Fig. 183: Identifying Front Seal Oil Duct And Special Tool (2 364 711)
Courtesy of BMW OF NORTH AMERICA, INC.

Seal oil ducts at rear using special tool **(B)** from tool set **2 364 711** .

IMPORTANT: Do not use any metal-cutting tools.

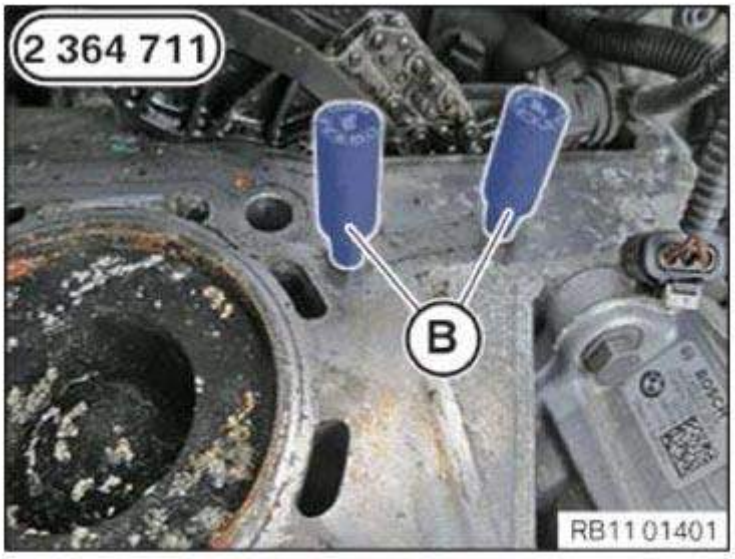


Fig. 184: Identifying Rear Seal Oil Ducts And Special Tool (2 364 711)
Courtesy of BMW OF NORTH AMERICA, INC.

Seal oil duct at center using special tool **(C)** from tool set **2 364 711** .

IMPORTANT: Do not use any metal-cutting tools.

cardiagn.com

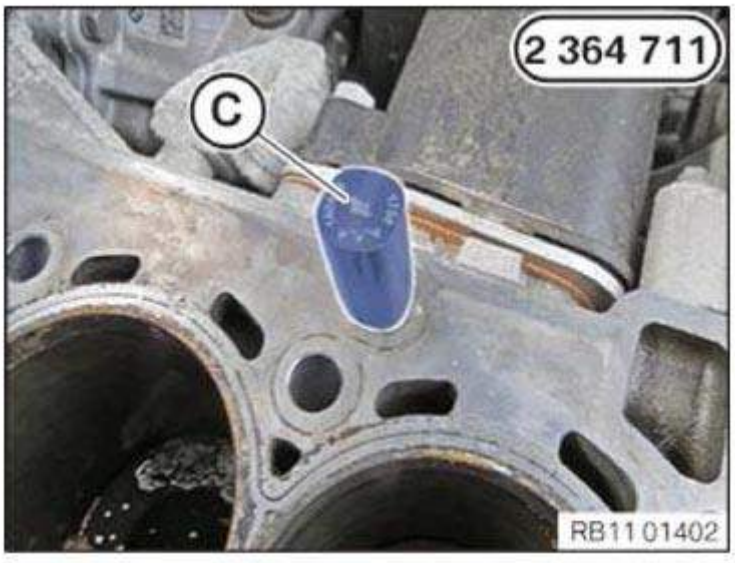


Fig. 185: Identifying Center Seal Oil Duct And Special Tool (2 364 711)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove coarse residues on sealing surfaces with special tool **11 4 471** from cylinder head and crankcase.

IMPORTANT: Do not use any metal-cutting tools.

Graphic N52.

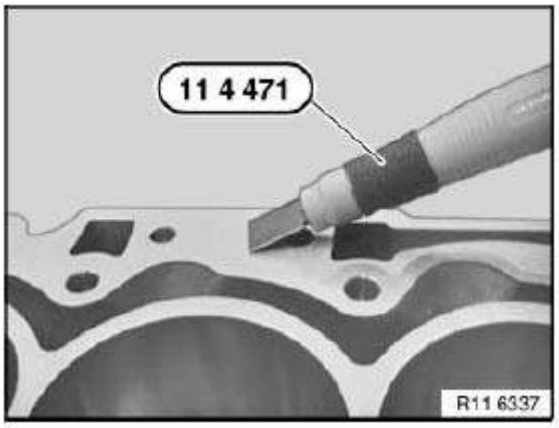


Fig. 186: Identifying Special Tool (11 4 471)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove fine residues on sealing surfaces with special tool **11 4 472** from cylinder head and crankcase.

Do not use any metal-cutting tools (e.g. abrasive cloth).
IMPORTANT: There must be no coolant, water or engine oil in the pocket holes.
Risk of cracking and corrosion!

cardiagn.com

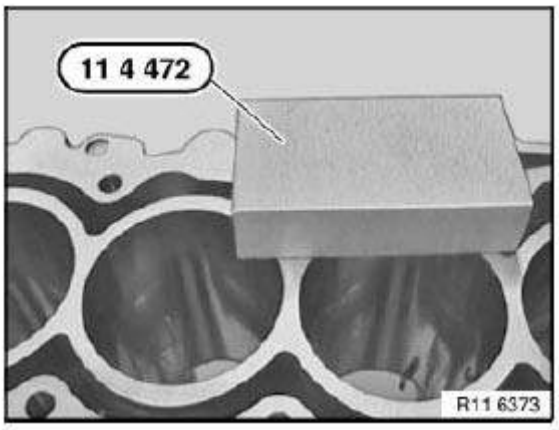


Fig. 187: Identifying Special Tool (11 4 472)
Courtesy of BMW OF NORTH AMERICA, INC.

Clean all blind holes.

Graphic N52.

IMPORTANT: All glow elements protrude at the sealing surface and may be damaged when put down. Remove cylinder head and set down in such a way that glow elements are not damaged.

If necessary, remove glow elements with special tool **11 6 050** .

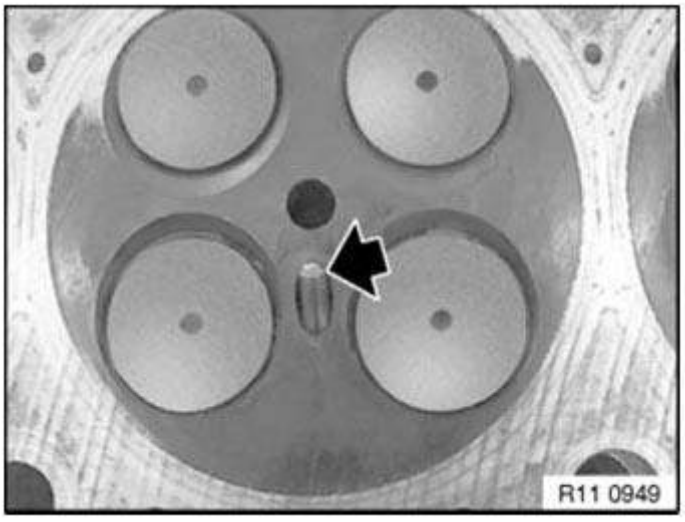


Fig. 188: Locating Glow Elements
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Without repair work on the engine block which alters the piston protrusion, use a new cylinder head gasket with the same gasket thickness (number of holes).

cardiagn.com

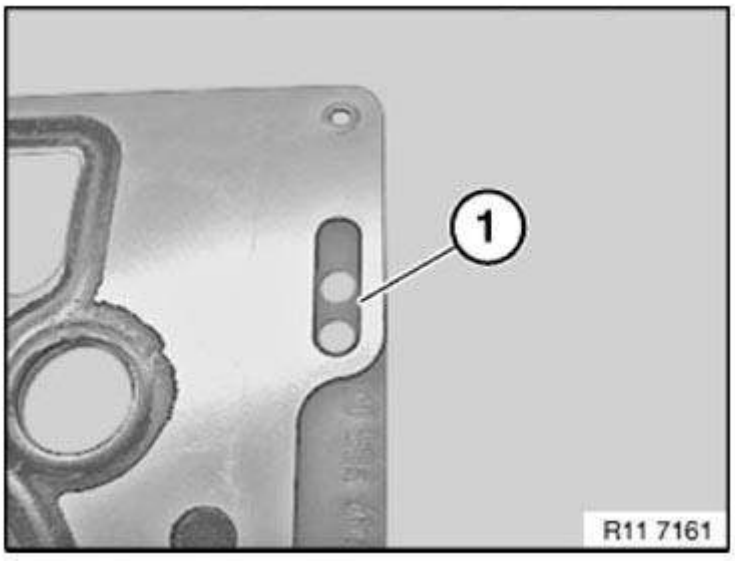


Fig. 189: Identifying Thickness Marking
Courtesy of BMW OF NORTH AMERICA, INC.

If repair work is carried out on the crank drive or piston, the gasket thickness must be redetermined.

Measuring the piston protrusion:

Fit dial gauge with measuring fixture special tool **00 2 530** on cleaned cylinder sealing surface and set under preload to zero.

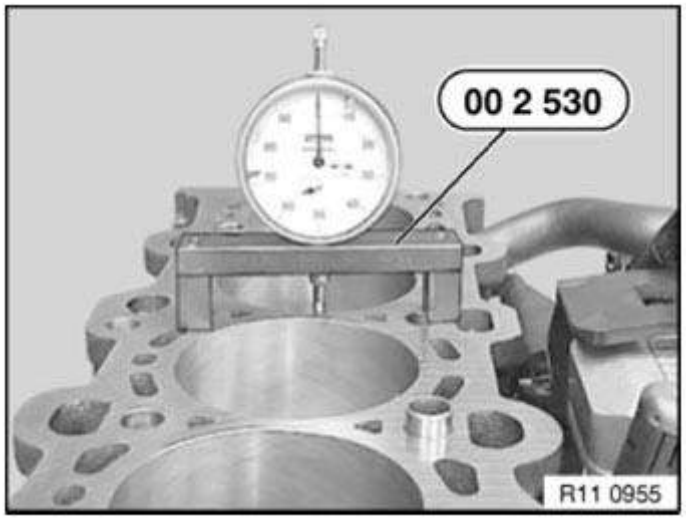


Fig. 190: Measuring Piston Protrusion
Courtesy of BMW OF NORTH AMERICA, INC.

Clean piston at measuring points (1 and 2).

Fit dial gauge at measuring point (1) on cleaned piston and determine highest point by rotating crankshaft.

Measure and note down piston protrusion at measuring points (1 and 2) on all 4 pistons.

Installation note:

DETERMINE THICKNESS OF CYLINDER HEAD GASKET.

cardiagn.com

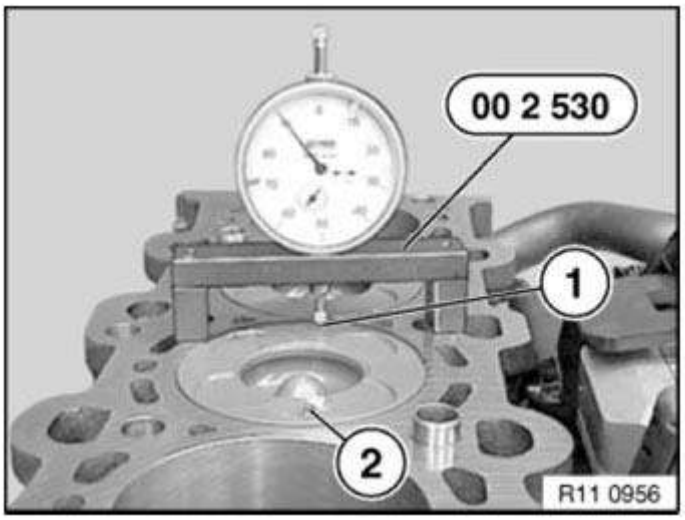


Fig. 191: Measuring Piston Protrusion Points On Pistons
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **00 2 530** with dial gauge (1) on cylinder head.

Set dial gauge (1) to zero.

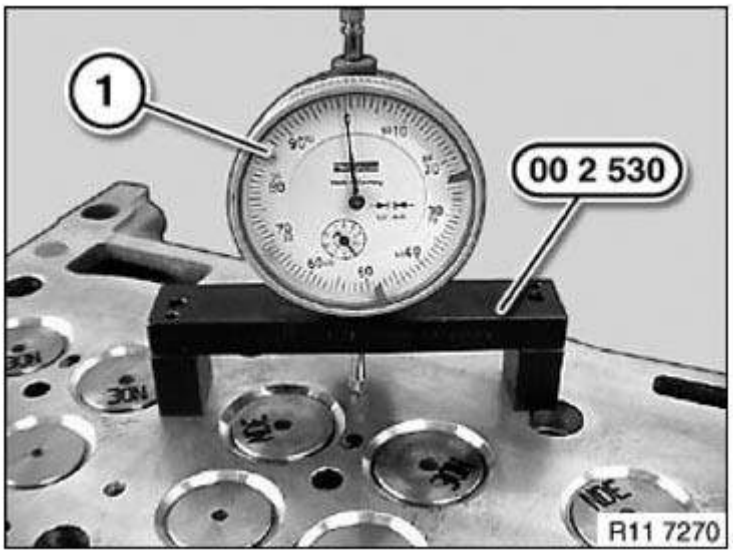


Fig. 192: Positioning Special Tool (00 2 530) With Dial Gauge On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **00 2 530** with dial gauge (1) on valve.

Determine **VALVE UNDER PROTRUSION** .

cardiagn.com

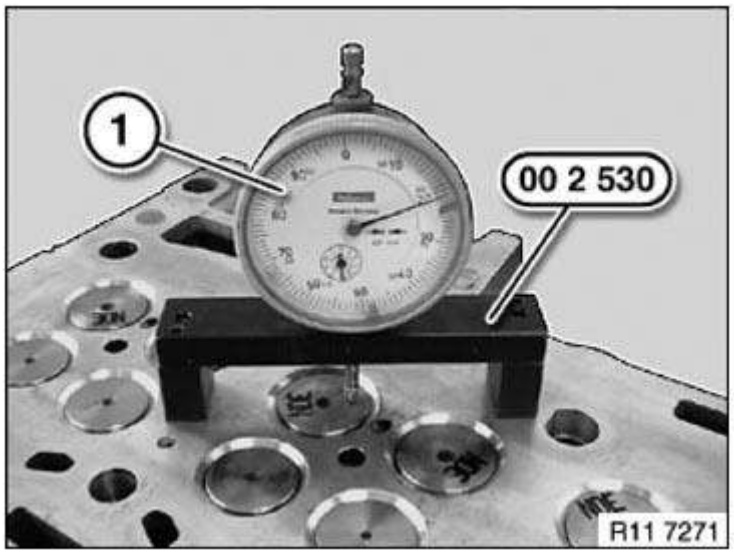


Fig. 193: Positioning Special Tool (00 2 530) With Dial Gauge On Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Check fitting sleeves (1) for damage and correct installation position.

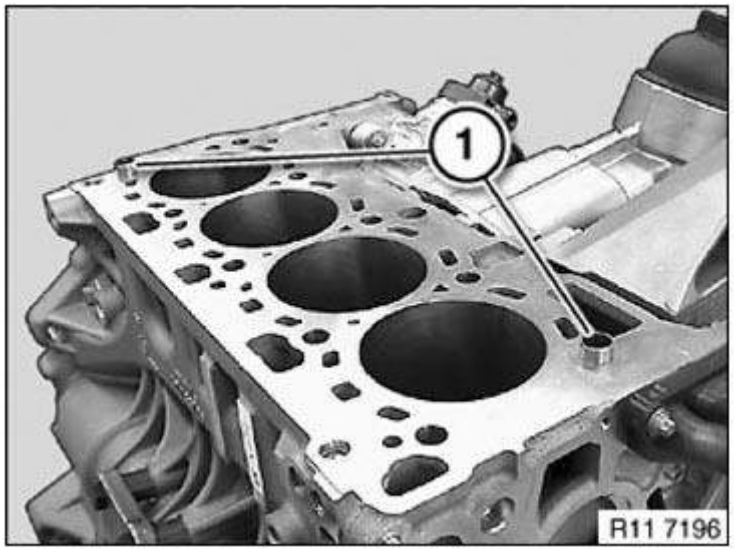


Fig. 194: Identifying Fitting Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:
There must be no coolant, water and engine oil in any of the threaded holes in the engine block.
Fit new cylinder head bolts.
Do not wash off bolt coating.
Jointing torque and angle of rotation must be observed without fail **(risk of damage!)** .

Fit new cylinder head gasket with previously determined gasket thickness (number of holes).

Fit cylinder head and secure with new bolts, tightening in the sequence 1 to 10.

Tightening torque: **11 12 1AZ** .

cardiagn.com

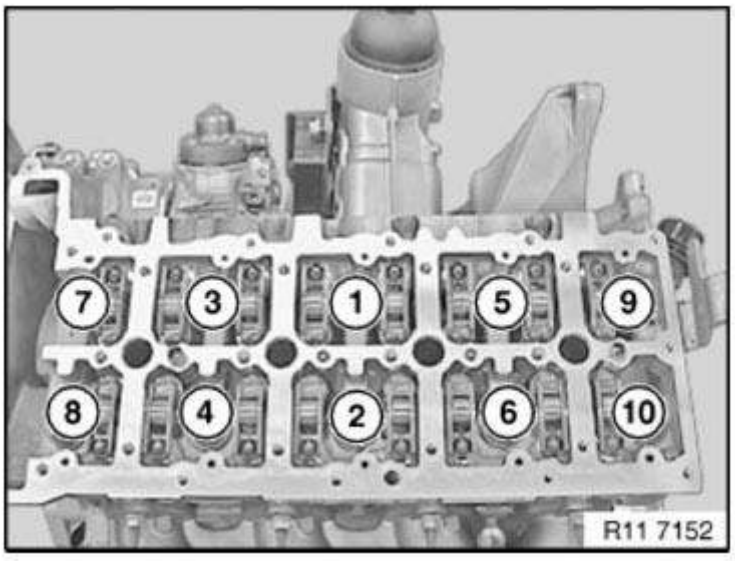


Fig. 195: Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Secure cylinder head bolts (1) with special tool **00 9 120** .

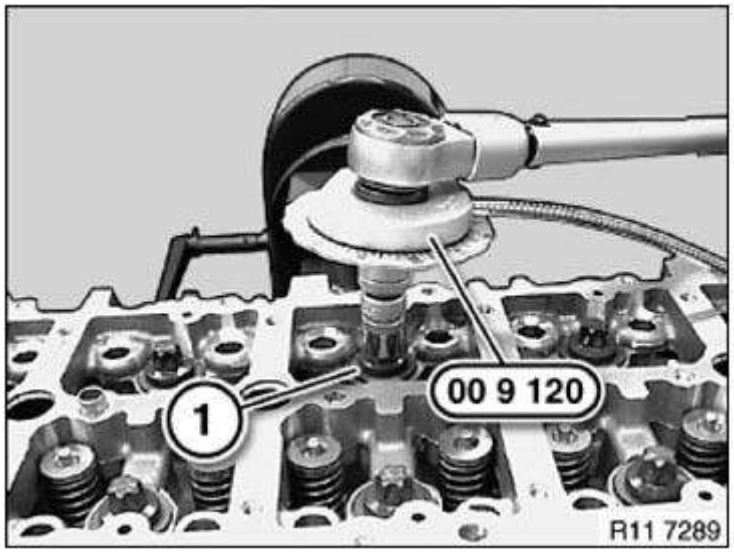


Fig. 196: Securing Cylinder Head Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Install and tighten down screws (1).

cardiagn.com

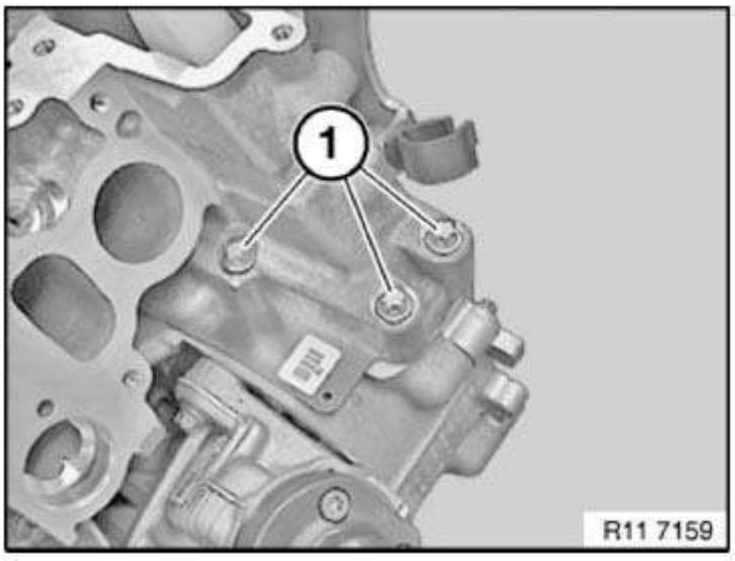


Fig. 197: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Install and tighten down screws (1).

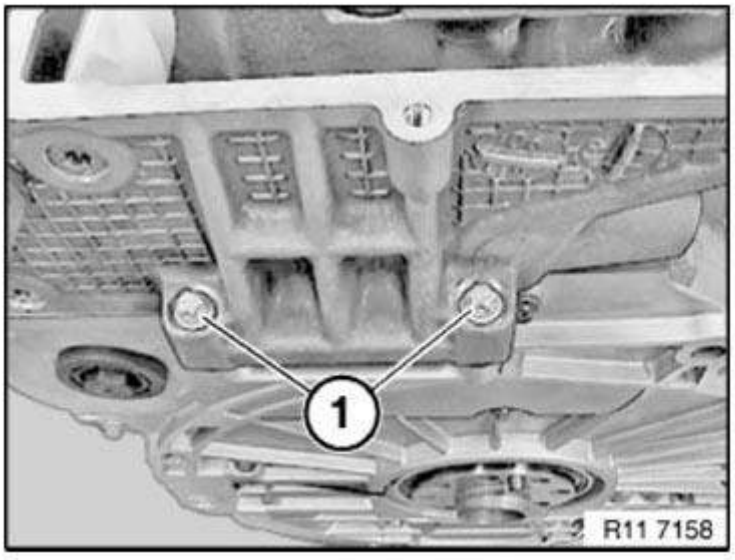


Fig. 198: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Make sure that the hydraulic valve clearance compensating element (1) is installed in the correct position.

cardiagn.com

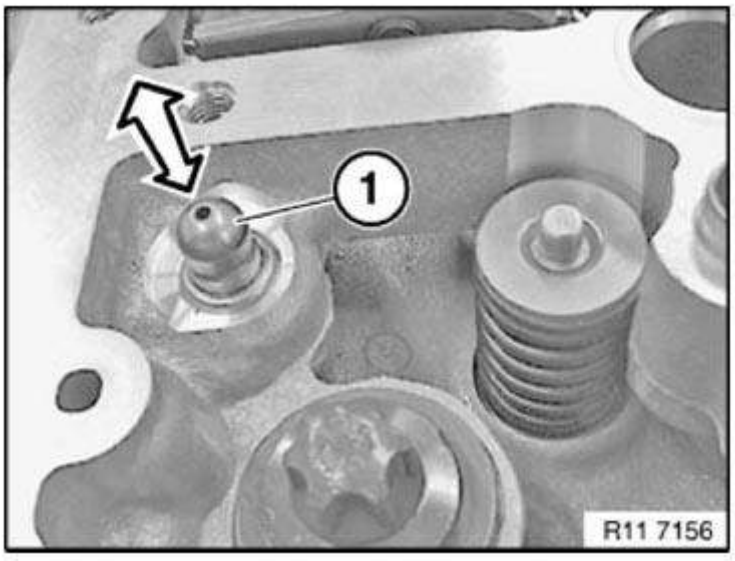


Fig. 199: Installing Hydraulic Valve Clearance Compensating Element
Courtesy of BMW OF NORTH AMERICA, INC.

Make sure roller cam followers (1) are in correct installation position.

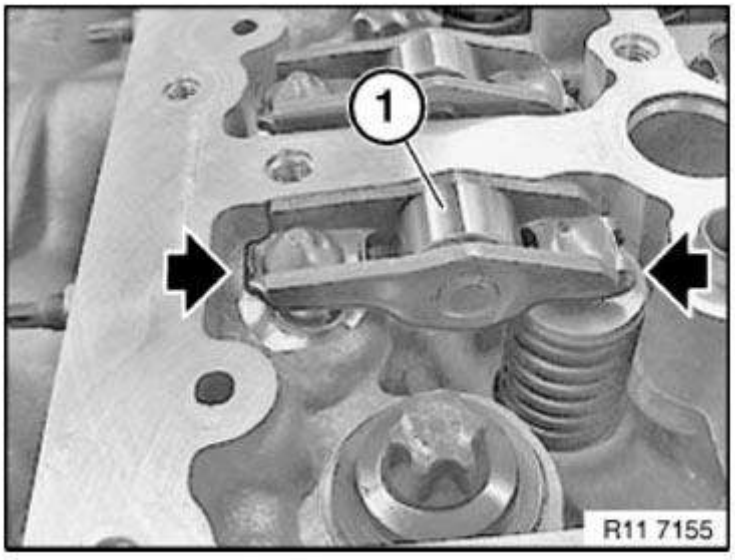


Fig. 200: Locating Roller Cam Followers
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The camshaft sprockets (A and E) must be adjusted to the marking before the camshaft carrier is mounted on the cylinder head.
Risk of damage! to engine valves.

cardiagn.com

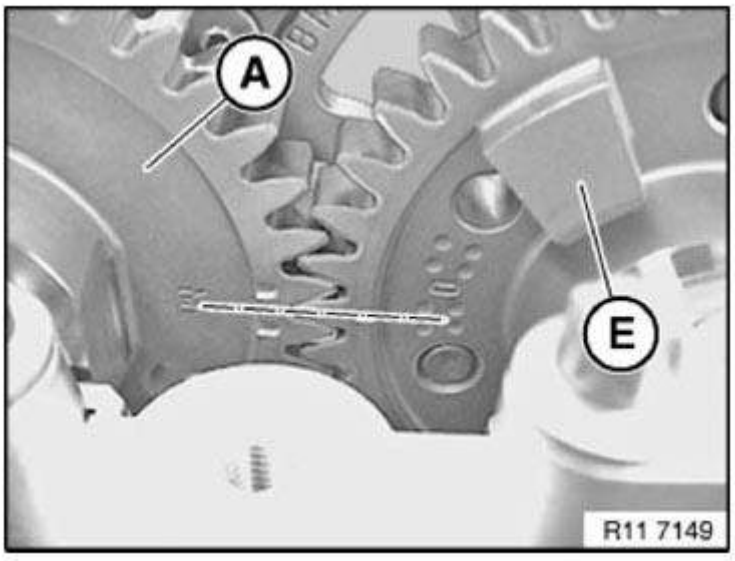


Fig. 201: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Place camshaft carrier on cylinder head.

Tightening torque: **11 31 3AZ** .

Tighten bolts in sequence (1 to 14).

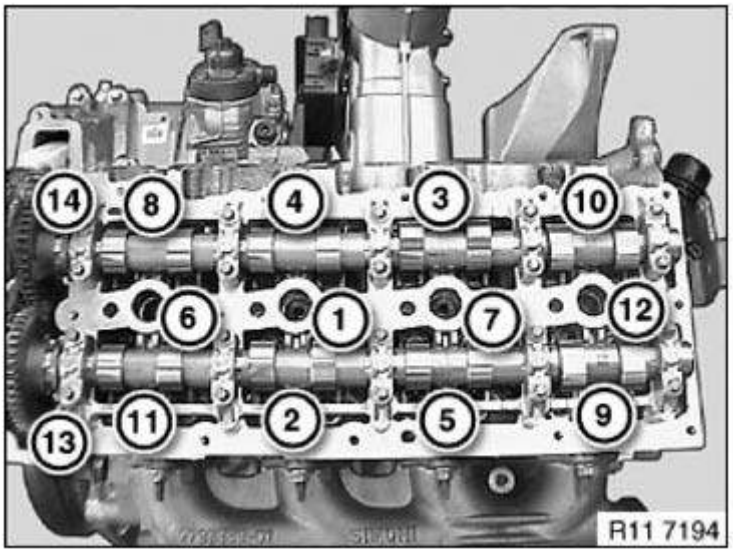


Fig. 202: Identifying Camshaft Carrier On Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool **11 8 760** on exhaust camshaft.

NOTE: **Special tool 11 8 760 must lie flush on cylinder head.**

cardiagn.com

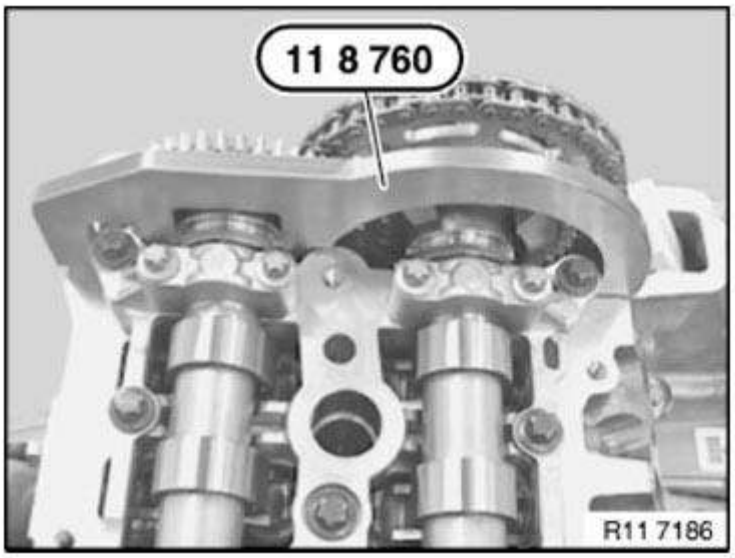


Fig. 203: Identifying Special Tool (11 8 760)
Courtesy of BMW OF NORTH AMERICA, INC.

Install chain sprocket with timing chain.

Insert camshaft bolts (1).

Tighten camshaft bolts (1) to 10 Nm.

Release camshaft bolts (1) by 90Â°.

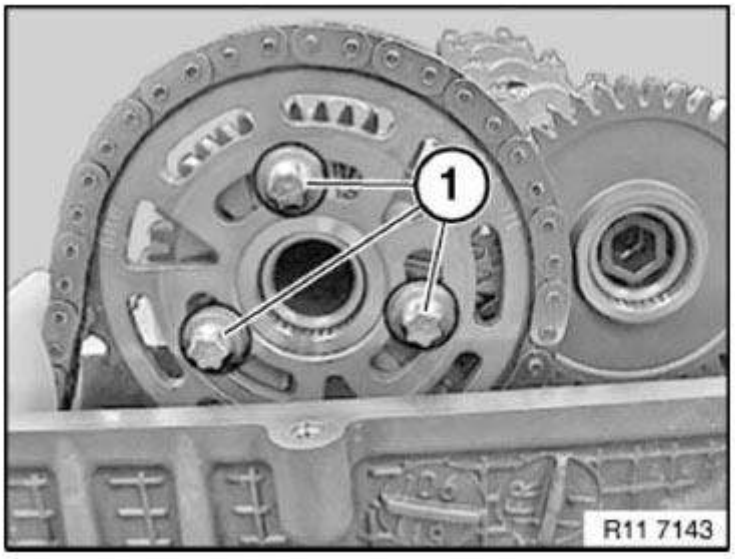


Fig. 204: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Install **CHAIN TENSIONER** (1).

cardiagn.com

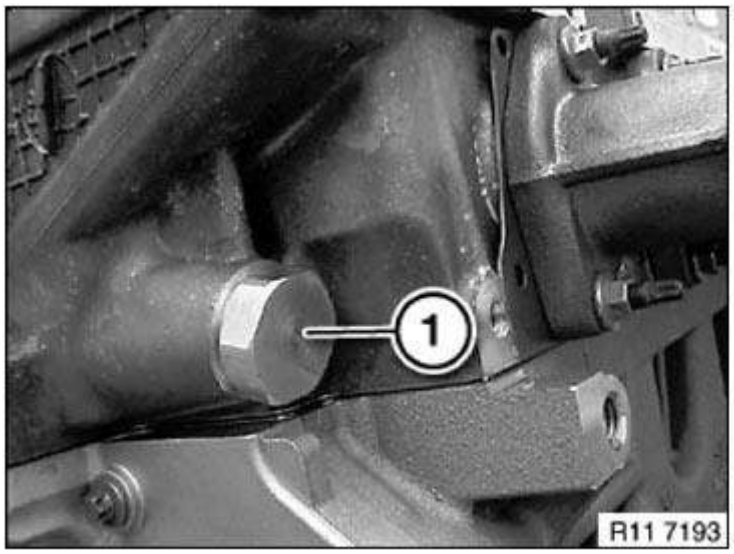


Fig. 205: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten camshaft bolts (1).

Tightening torque: **11 31 1AZ** .

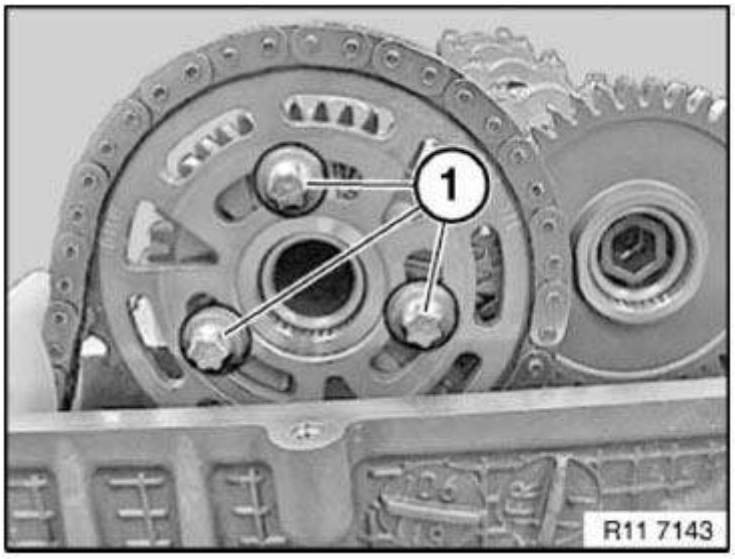


Fig. 206: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Cooling system . See **17 00 039 VENTING AND FILLING COOLING SYSTEM WITH VACUUM FILLING UNIT** or **17 00 008 DRAINING AND TOPPING UP COOLANT (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)** must be topped up, vented and checked for watertightness.

11 12 100 REMOVING AND INSTALLING CYLINDER HEAD (N52T)

Special tools required:

- **11 0 320**
- **11 4 420**
- **11 4 430**
- **11 4 471**

cardiagn.com

- 11 4 472
- 11 8 580

IMPORTANT:
Aluminum-magnesium materials.
No steel screws/bolts may be used due to the threat of electrochemical corrosion.
A magnesium crankcase requires aluminum screws/bolts exclusively.
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage).**

Necessary preliminary tasks:

- Remove **EXHAUST SYSTEM** .
- Drain **COOLANT** .
- Drain off **ENGINE OIL**.
- Remove both **exhaust manifolds** . See **18 40 050 REMOVING AND INSTALLING/REPLACING FRONT EXHAUST MANIFOLD (N52T)** or **18 40 060 REMOVING AND INSTALLING/REPLACING REAR EXHAUST MANIFOLD (N52T)**
- Remove **INTAKE PLENUM**.
- Detach coolant hoses from cylinder head.
- Remove **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.
- Remove both **SOLENOID VALVES**.

IMPORTANT:
Fit new cylinder head bolts.
Do not wash off bolt coating.
There must be no fluids or contaminants in any of the threaded holes for the cylinder head bolt connections.
Risk of cracking and corrosion!
Apply a **light** coat of oil to washer contact areas and threads of new cylinder head bolts.

Release screws (1).

Unclip timing chain module (2) at separation point (3) and remove towards top.

Set down timing chain.

IMPORTANT:
If the timing chain is stowed in the gear case, the crankshaft must no longer be rotated.
This would cause the timing chain on the crankshaft sprocket to jam or jump.

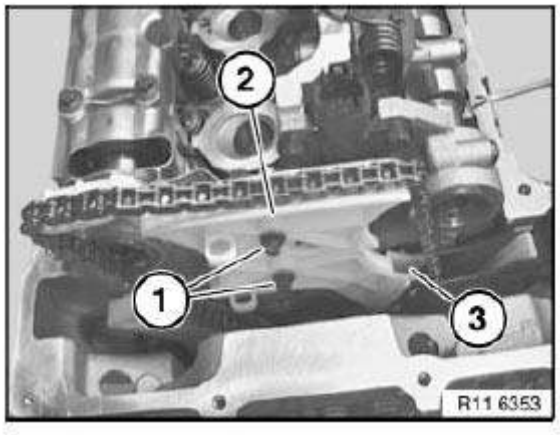


Fig. 207: Identifying Timing Chain Module And Screws

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The timing chain is lifted out with a hook only during assembly.

Release bolts (2) for eccentric shaft sensor (1).

Remove eccentric shaft sensor (1) towards front.

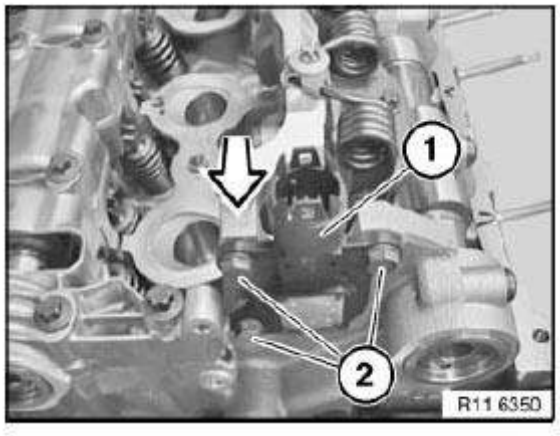


Fig. 208: Removing Eccentric Shaft Sensor & Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Screw (1) is not magnetic and must be secured against falling down.

Release screw (1).

Remove magnet wheel (2) towards front.

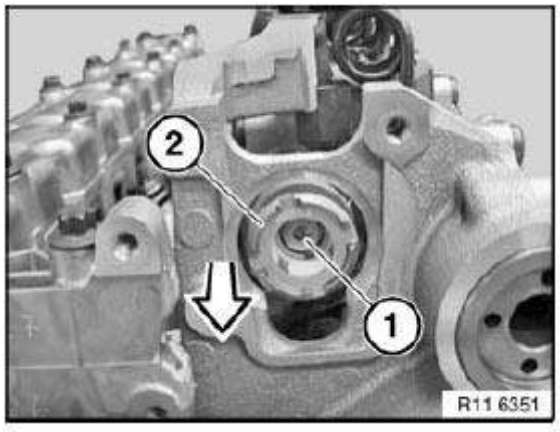


Fig. 209: Removing Magnet Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Magnet wheel (1) is highly magnetic and must be protected against metal chips.

After removing, place magnet wheel (1) in a plastic bag (2) with a seal.

cardiagn.com

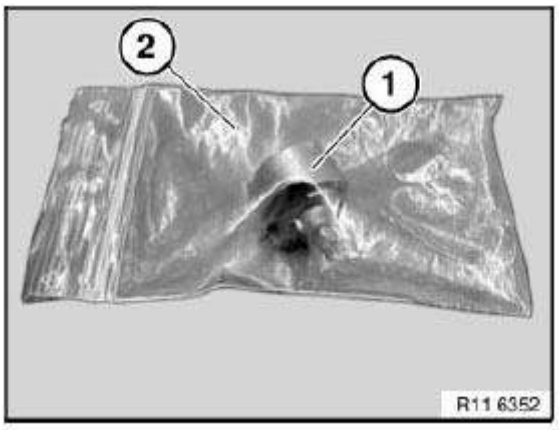


Fig. 210: Identifying Magnet Wheel And Plastic Bag
Courtesy of BMW OF NORTH AMERICA, INC.

Preload eccentric shaft (1) upwards in direction of arrow.

Remove stop screw between 1st and 2nd cylinders.

Tightening torque: **11 37 5AZ** .

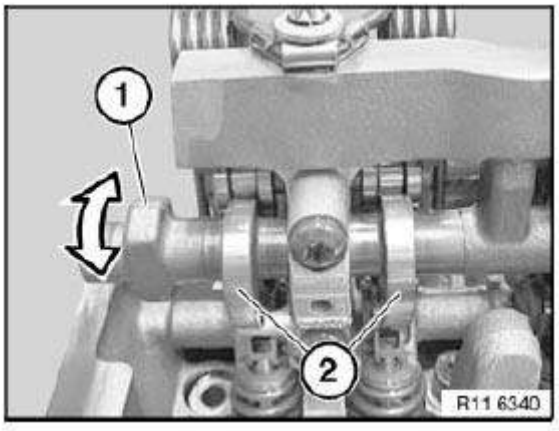
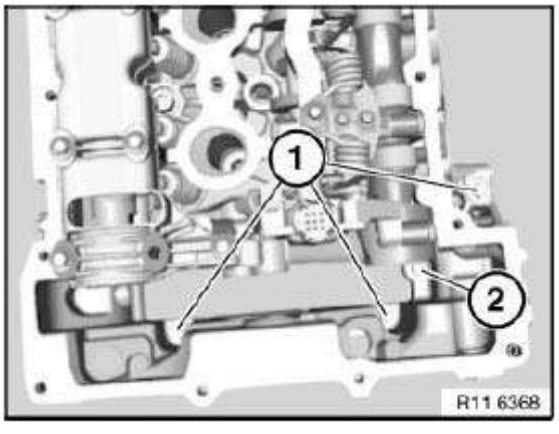


Fig. 211: Preloading Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Bolt (2) can only be released when the timing chain module is pressed forward slightly.**

IMPORTANT: Secure bolt (2) with a gripper against falling down.



cardiagn.com

Fig. 212: Identifying Timing Chain Module Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (2).

Tightening torque: **11 12 3AZ** .

Release screws (1).

Tightening torque: **11 12 4AZ** .

Installation note:

Replace aluminum screws.

IMPORTANT: Observe different bolt heads.

Release cylinder head bolts (1) M10 with special tool **11 8 580** .

Release cylinder head bolts (2) M9 with special tool **11 4 420** .

NOTE: Graphic shows intake and exhaust camshafts removed.

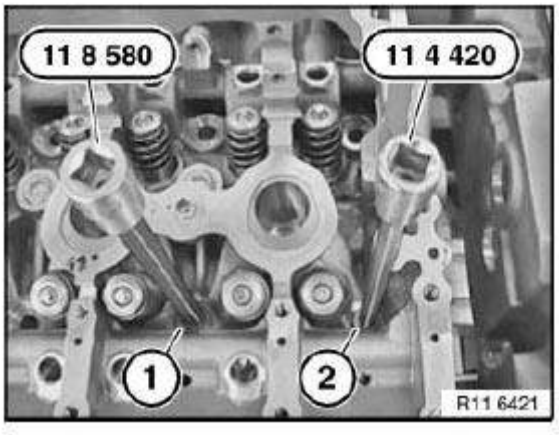


Fig. 213: Removing Cylinder Head Bolts Using Special Tools
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Observe different M9 screw lengths (1 and 3).

Release cylinder head bolts (1 and 3) M9 with special tool **11 4 420**

Tightening torque: **11 12 2AZ** .

Release cylinder head bolts (2) M10 with special tool **11 8 580** from outside inwards.

cardiagn.com

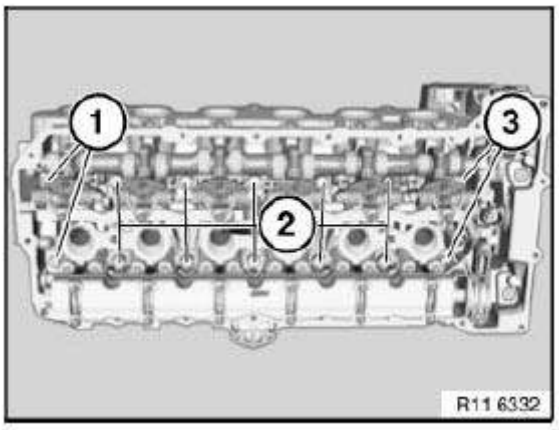


Fig. 214: Identifying Cylinder Head Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Tightening torque: **11 12 1AZ** .

IMPORTANT: All cylinder head bolts (1, 2 and 3) must be replaced.
Jointing torque and angle of rotation must be observed without fail.
Risk of damage!

Secure special tool **11 0 320** with existing cylinder head cover bolts (1).

Tightening torque: **11 12 5AZ** .

IMPORTANT: Removing and install cylinder head with a second person helping.
Weight of cylinder head with add-on parts is approx. 40 kg.
Do not rest cylinder head on sealing surface. **Risk of damage to valves!**

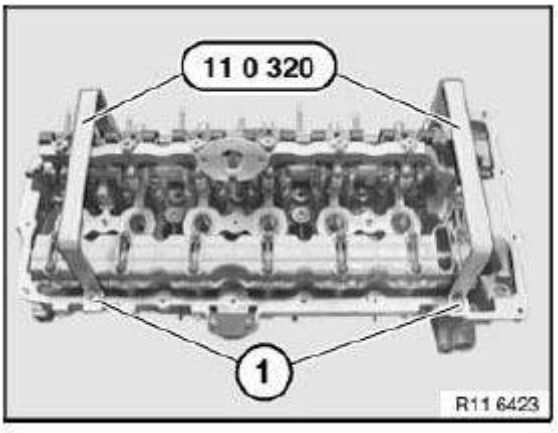


Fig. 215: Identifying Special Tool (11 0 320)
Courtesy of BMW OF NORTH AMERICA, INC.

Insert **11 4 430** special tool into bore holes.

cardiagn.com

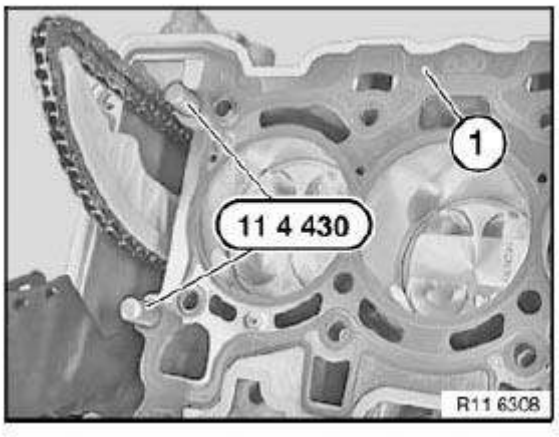


Fig. 216: Inserting Special Tool (11 4 430) Into Bore Holes
Courtesy of BMW OF NORTH AMERICA, INC.

Remove coarse residues on sealing surfaces with special tool **11 4 471** from cylinder head and crankcase.

IMPORTANT: Do not use any metal-cutting tools.

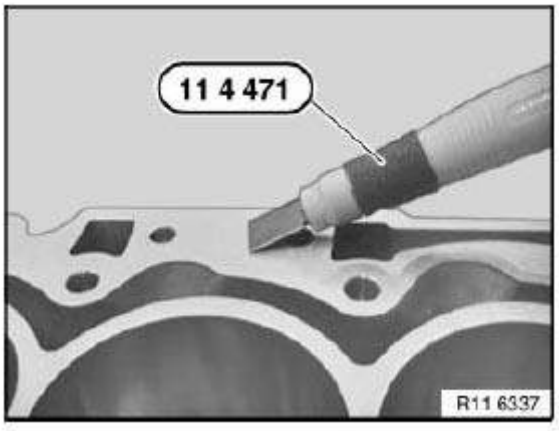


Fig. 217: Identifying Special Tool (11 4 471)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove fine residues on sealing surfaces with special tool **11 4 472** from cylinder head and crankcase.

IMPORTANT: Do not use any metal-cutting tools.

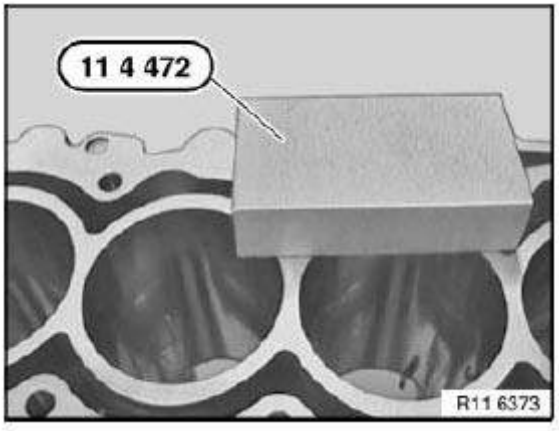


Fig. 218: Identifying Special Tool (11 4 472)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

There must be no fluids or contaminants in any of the threaded holes (1) for the cylinder head bolt connections.

Risk of cracking and corrosion!

Clean all threaded holes.

Replace **CYLINDER HEAD GASKET**.

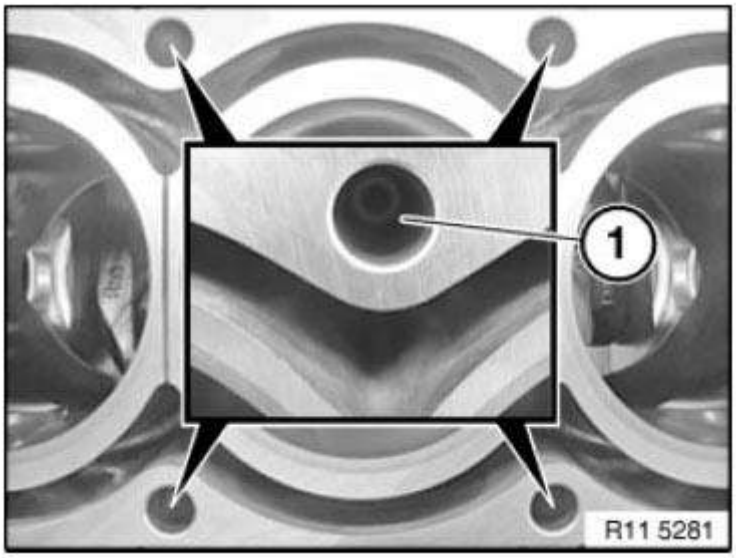


Fig. 219: Identifying Threaded Holes For Cylinder Head Bolt Connections
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Observe sequence for tightening cylinder head bolts without fail.

Fit new cylinder head bolts.

Insert cylinder head bolts (1 to 10) with special tool **11 8 580** .

Tightening torque: **11 12 1AZ** .

Insert cylinder head bolts (11 to 14) with special tool **11 4 420** .

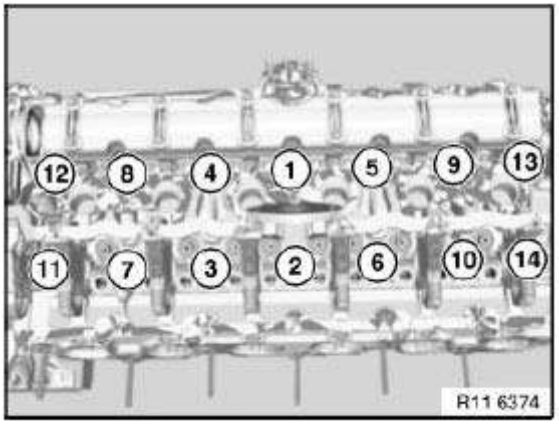


Fig. 220: Identifying Cylinder Head Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Tightening torque: **11 12 2AZ** .

NOTE: **Graphic shows intake and exhaust camshafts removed.**

cardiagn.com

Observe sequence for tightening cylinder head bolts without fail.

IMPORTANT: The 2nd angle of rotation relates only to cylinder head bolts 1 to 10.

Installation note:

- **Jointing torque:**

  All cylinder head bolts 1 to 14 to 30 Nm

- **1st angle of rotation:**

  All cylinder head bolts 1 to 14 to 90Â°

- **2nd angle of rotation:**

  Only cylinder head bolts 1 to 10 to 90Â°

- **3rd angle of rotation:**

  All cylinder head bolts 1 to 14 to 45Â°

Insert bolts (1).

Tightening torque: **11 12 4AZ** .

IMPORTANT: Secure bolt (2) with a gripper against falling down.

Insert bolt (2).

Tightening torque: **11 12 3AZ** .

Installation note:

Replace aluminum screws.

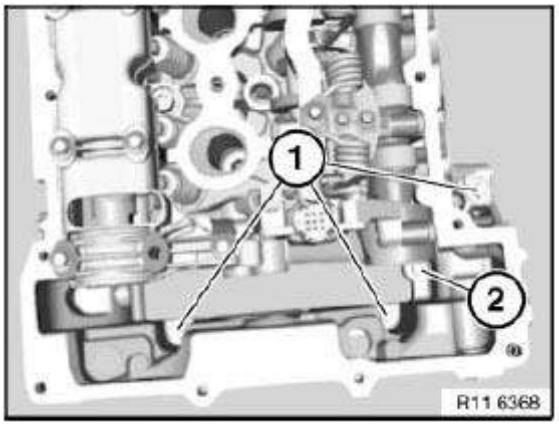


Fig. 221: Identifying Timing Chain Module Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 100 REMOVING AND INSTALLING CYLINDER HEAD (N55)

Special tools required:

- **11 0 320**

cardiagn.com

- 11 4 420
- 11 4 430
- 11 4 471
- 11 4 472
- 11 8 580

Fit new cylinder head bolts.
Do not wash off bolt coating.
IMPORTANT: **Lightly** oil washer on the contact surfaces (both sides).
There must be no coolant, water or engine oil in the blind holes.
Risk of cracking and corrosion!

Necessary preliminary tasks:

- Remove **EXHAUST SYSTEM** .
- Drain **COOLANT** .
- Drain **ENGINE OIL**.
- Remove **ENGINE**.
- Mount engine on **ASSEMBLY STAND**.
- Remove intake **PLENUM**.
- Remove **EXHAUST TURBOCHARGER** with integrated exhaust manifold.
- Detach coolant hoses from cylinder head.
- Remove **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

IMPORTANT: If the timing chain is stowed in the gear case, the crankshaft must no longer be rotated.

Release screws (1).

Unclip timing chain module (2) at separation point (3) and remove towards top.

Set down timing chain.

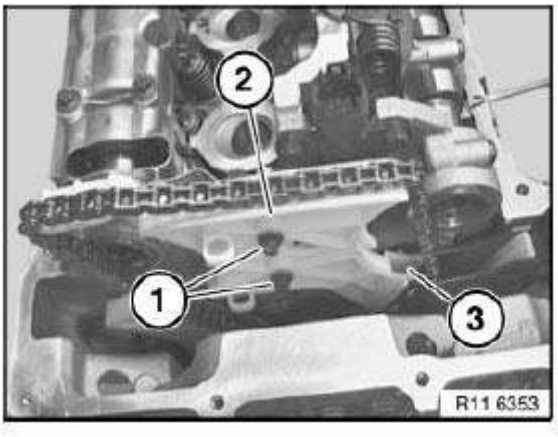


Fig. 222: Identifying Timing Chain Module And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Graphic shows N52.**

NOTE: **Bolt (2) can only be released when the timing chain module is pressed forward slightly.**

Release screws (1).

cardiagn.com

Tightening torque: 11 12 3AZ .

Release screw (2).

Tightening torque: 11 12 3AZ .

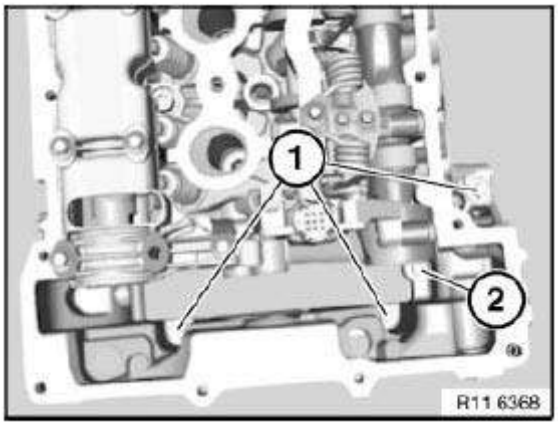


Fig. 223: Identifying Timing Chain Module Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

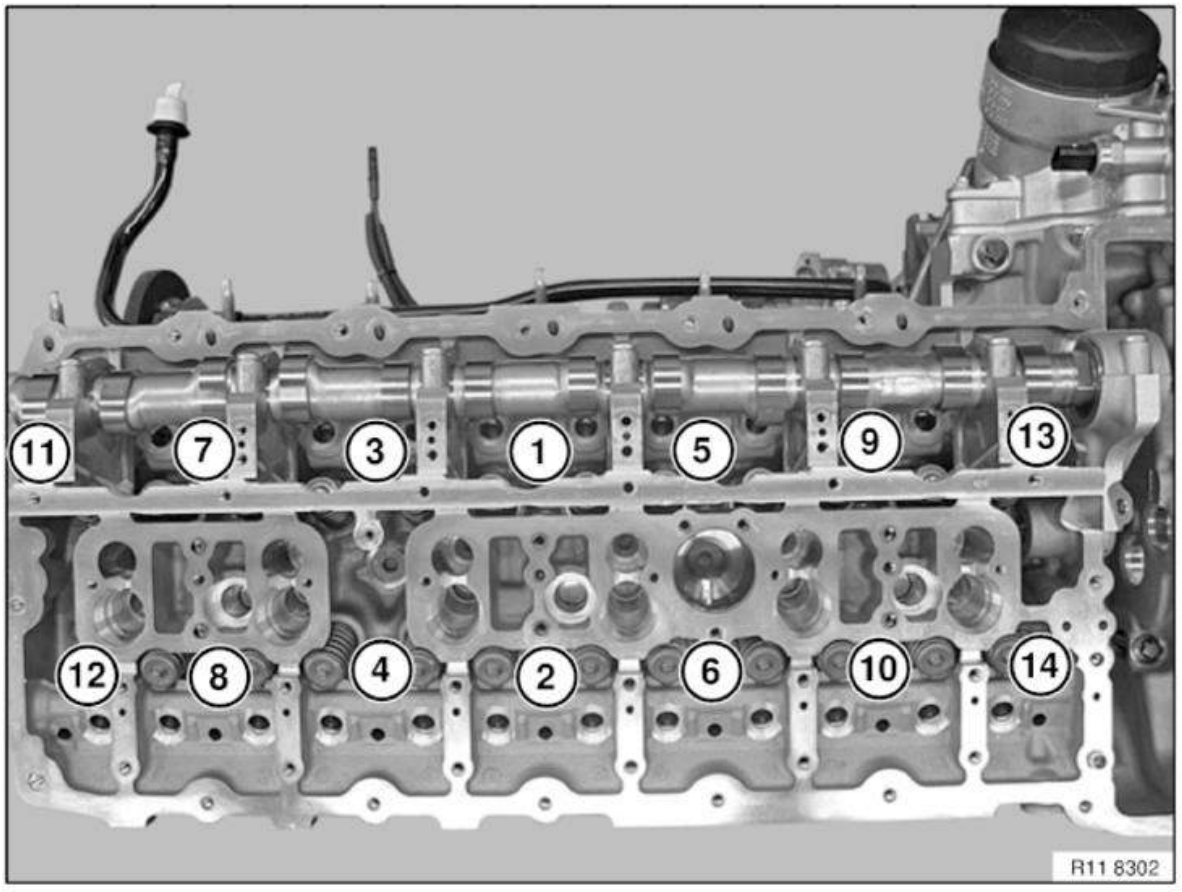


Fig. 224: Cylinder Head Bolts Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Release cylinder head bolts in sequence 14 to 11 with special tool 11 4 420 .

Release cylinder head bolts in sequence 10 to 1 with special tool 11 8 580 .

NOTE: Picture shows intermediate lever and exhaust camshaft removed.

Secure special tool 11 0 320 with bolts (1).

cardiagn.com

Tightening torque: **11 12 4AZ** .

IMPORTANT: Removing and install cylinder head with a second person helping.
Weight of cylinder head with add-on parts is approx. 40 kg.
Do not rest cylinder head on sealing surface. **Risk of damage to valves!**

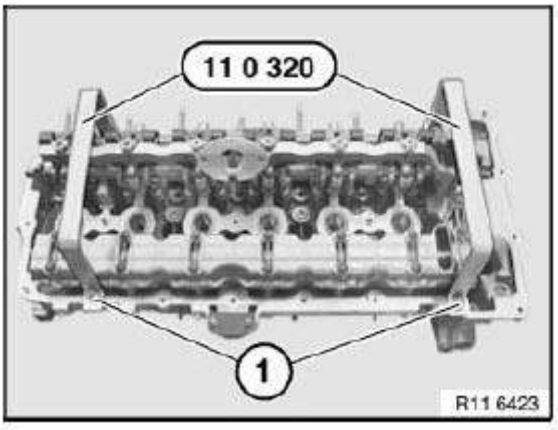


Fig. 225: Identifying Special Tool (11 0 320)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Graphic shows N52.

Insert **11 4 430** special tool into bore holes.

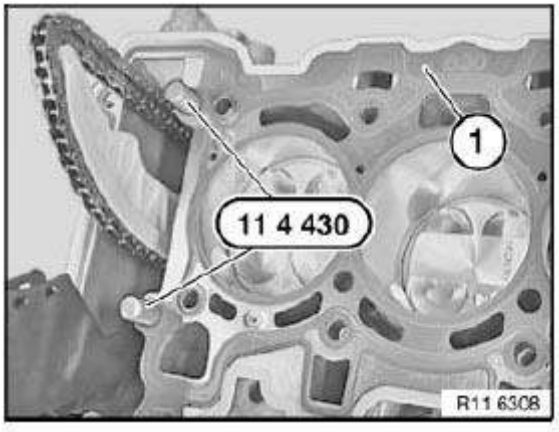


Fig. 226: Inserting Special Tool (11 4 430) Into Bore Holes
Courtesy of BMW OF NORTH AMERICA, INC.

Remove coarse residues on sealing surfaces with special tool **11 4 471** from cylinder head and crankcase.

IMPORTANT: Do not use any metal-cutting tools.

cardiagn.com

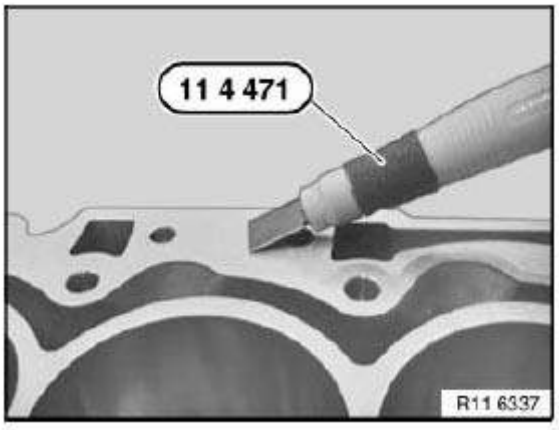


Fig. 227: Identifying Special Tool (11 4 471)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove fine residues on sealing surfaces with special tool **11 4 472** from cylinder head and crankcase.

Do not use any metal-cutting tools.
IMPORTANT: There must be no coolant, water or engine oil in the pocket holes.
Risk of cracking and corrosion!

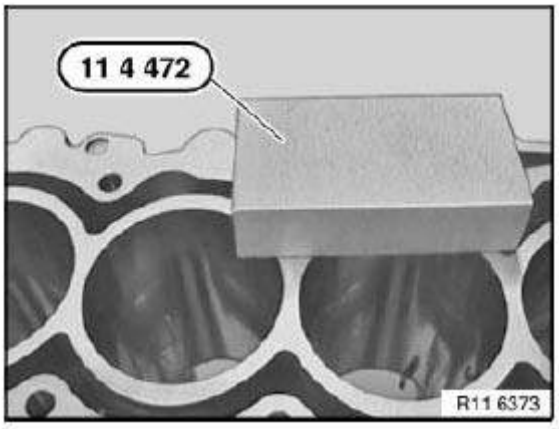


Fig. 228: Identifying Special Tool (11 4 472)
Courtesy of BMW OF NORTH AMERICA, INC.

Clean all blind holes.

Replace **CYLINDER HEAD GASKET**.

cardiagn.com

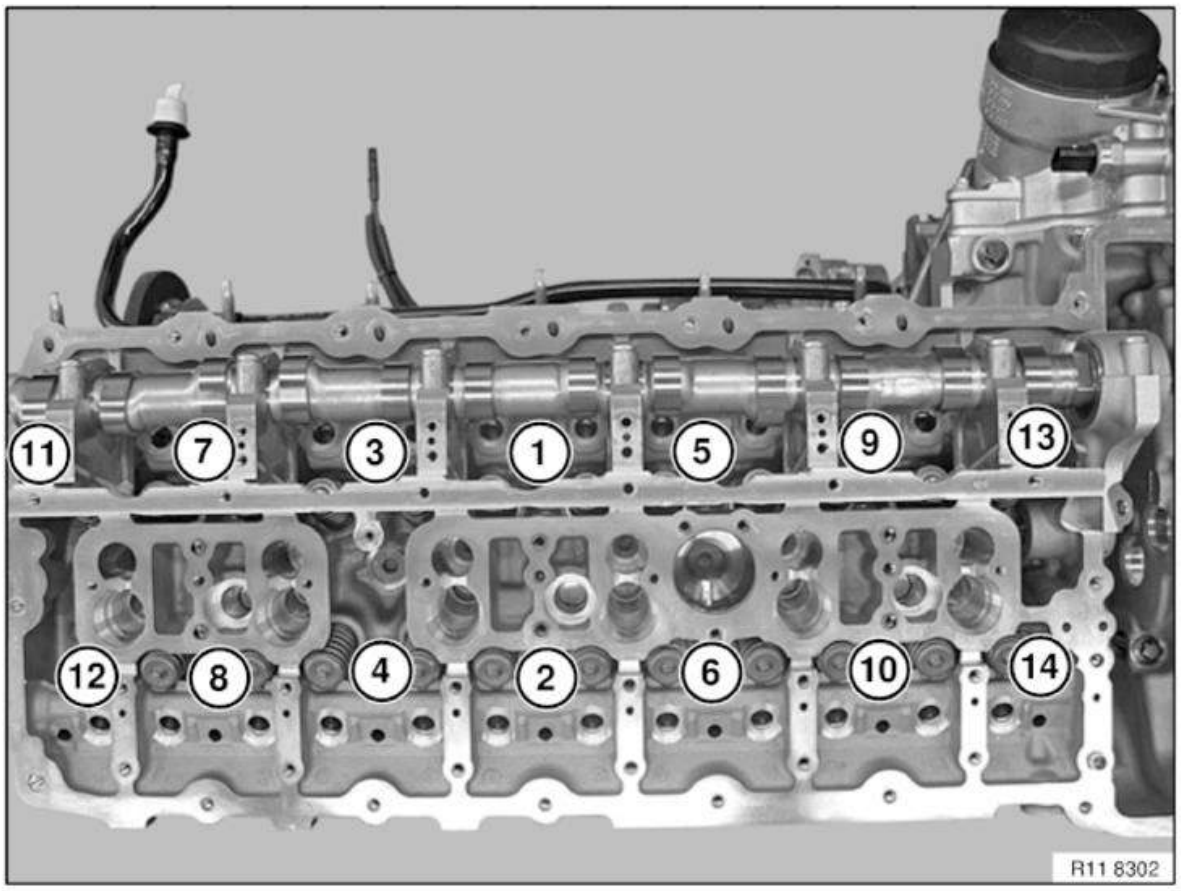


Fig. 229: Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Fit new cylinder head bolts.

Insert cylinder head bolts (1 to 10) with special tool **11 8 580** .

Tightening torque: **11 12 1AZ** .

Insert cylinder head bolts (11 to 14) with special tool **11 4 420** .

Tightening torque: **11 12 2AZ** .

NOTE: Picture shows intermediate lever and exhaust camshaft removed.

Insert bolts (1).

Tightening torque: **11 12 3AZ** .

Insert bolt (2).

Tightening torque: **11 12 3AZ** .

cardiagn.com

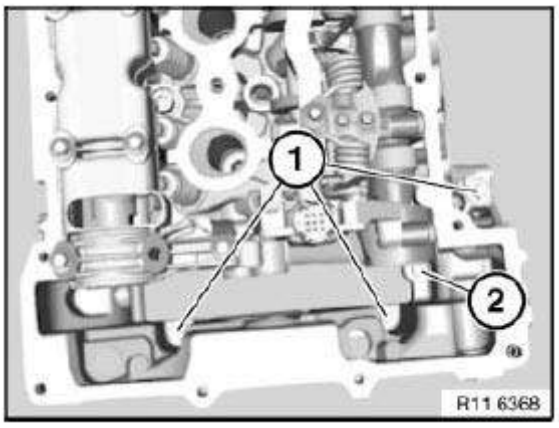


Fig. 230: Identifying Timing Chain Module Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 090 REMOVING AND INSTALLING/RENEWING ACOUSTIC COVER (N20)

Unlock and pull off vacuum connections (1) and (2) from vacuum accumulator.

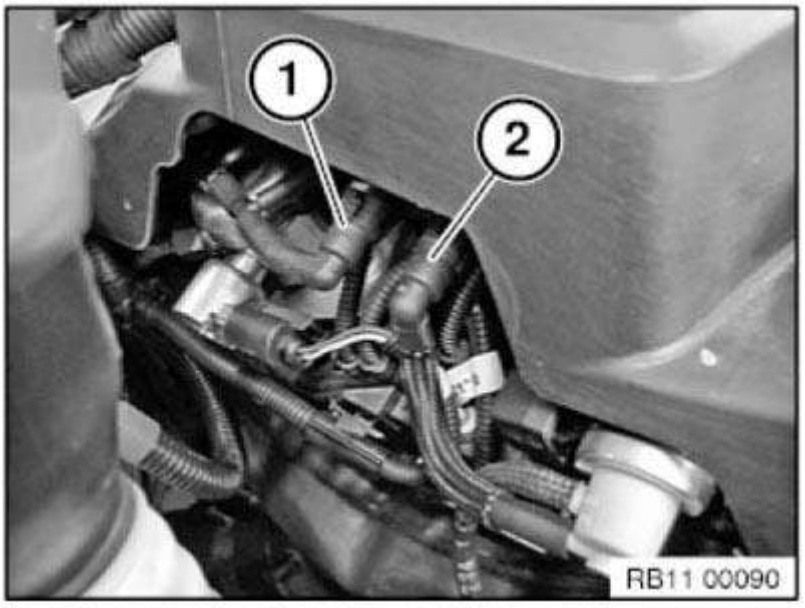


Fig. 231: Identifying Vacuum Connections And Accumulator
Courtesy of BMW OF NORTH AMERICA, INC.

If the hose clips (1) are not installed, they must be retrofitted.

Part Number 66 13 1 379 229

cardiagn.com

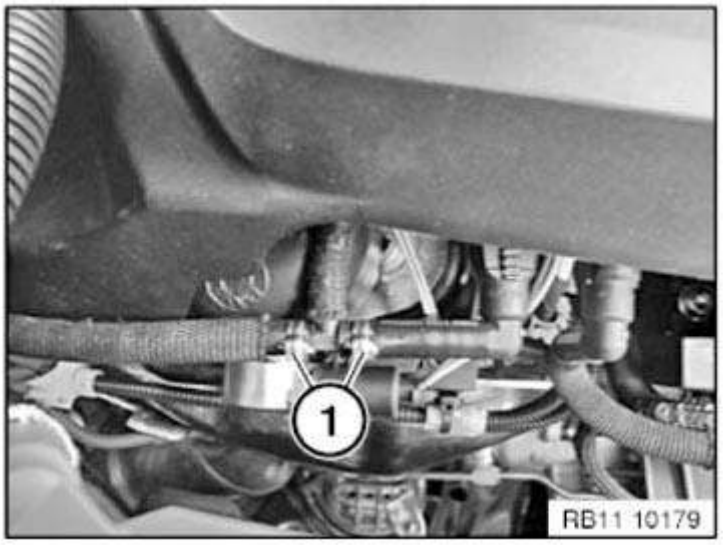


Fig. 232: Identifying Hose Clips
Courtesy of BMW OF NORTH AMERICA, INC.

Remove acoustic cover (1) in following steps:

- Lift up in the front area.
- Pull out from rear rubber guide in direction of travel.



Fig. 233: Identifying Acoustic Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Insert acoustic cover into existing rubber mounts.

cardiagn.com

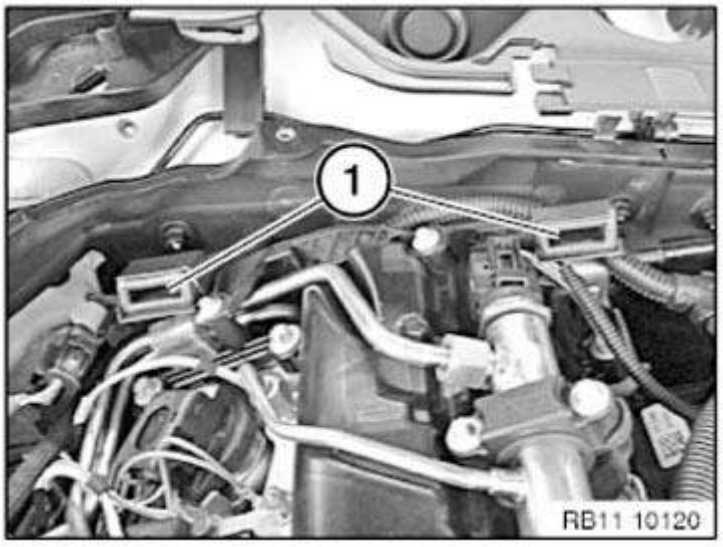


Fig. 234: Identifying Acoustic Cover And Rubber Mounts
Courtesy of BMW OF NORTH AMERICA, INC.

11 12 251 REMOVING AND INSTALLING/REPLACING GASKET FOR ECCENTRIC SHAFT SENSOR (N52T)

Special tools required:

- 11 6 420

Necessary preliminary tasks:

- Remove IGNITION COIL COVER.

Removal:

Unlock and disconnect the connector (1).



Fig. 235: Identifying Eccentric Shaft Sensor Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Lift gasket (1) using a suitable tool.

cardiagn.com

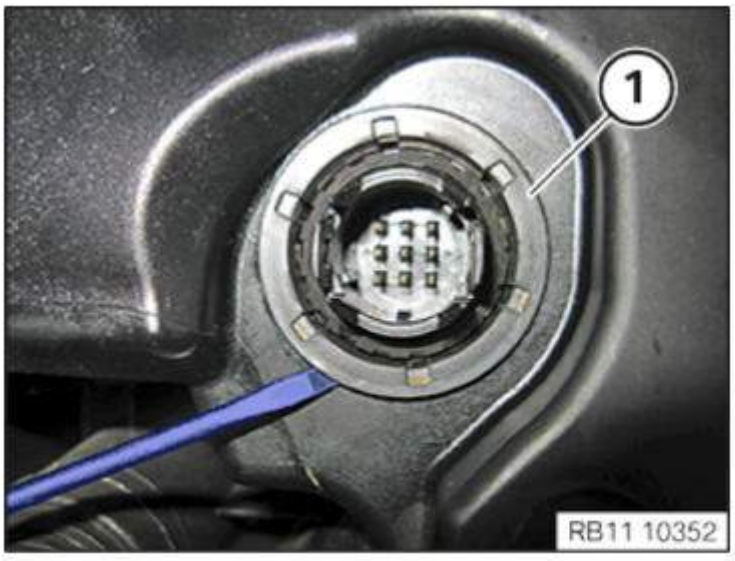


Fig. 236: Lifting Gasket Using Suitable Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Lift out gasket (1) using a plastic tool.

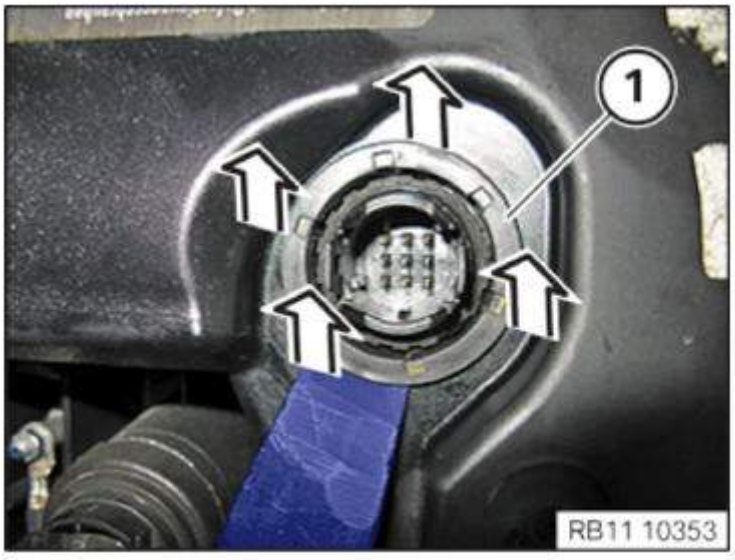


Fig. 237: Lifting Gasket Using Plastic Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Remove eccentric shaft sensor gasket (1).

cardiagn.com

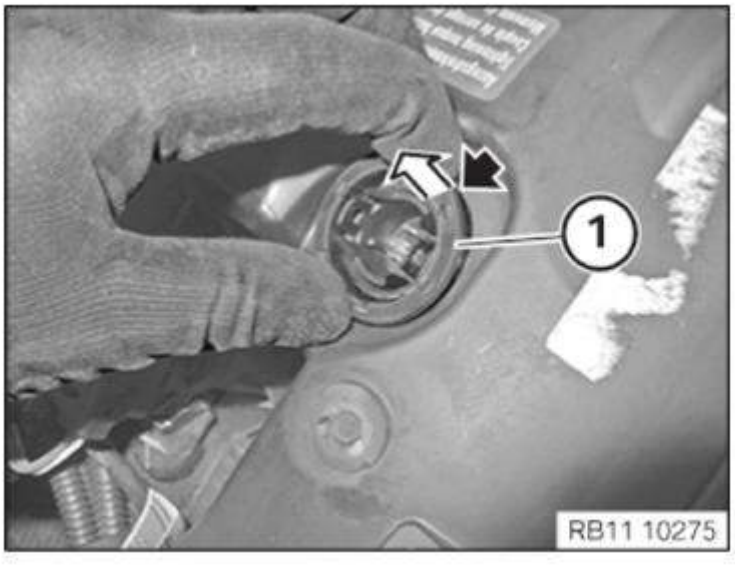


Fig. 238: Removing Eccentric Shaft Sensor Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Insert gasket.

Installation note:

Coat sealing surfaces lightly with engine oil.



Fig. 239: Inserting Gasket Of Sealing Surfaces
Courtesy of BMW OF NORTH AMERICA, INC.

Press in gasket (1) with special tool **11 6 420** .

cardiagn.com



Fig. 240: Pressing Gasket Using Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Connect the plug (1).



Fig. 241: Identifying Eccentric Shaft Sensor Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Required follow-up work:

- Install **IGNITION COIL COVER**.

11 12 000 REMOVING AND INSTALLING/SEALING CYLINDER HEAD COVER (N20)

Necessary preliminary tasks:

- Remove **COWL PANEL COVER** .
- Undo **ENGINE WIRING HARNESS** in the area of the cylinder head cover.
- Remove engine **VENTILATION LINE**.
- Remove **BOTH ACTUATORS**.
- Remove and install **RAIL** .
- Remove **HIGH PRESSURE PUMP** .
- Remove **PRESSURE LINE BETWEEN RAIL AND HIGH PRESSURE PUMP** .

cardiagn.com

- **REMOVE** feed line.
- Remove **VACUUM PUMP**.

Release screw (1).

Lever out cable clip (2).

Remove cover (3).

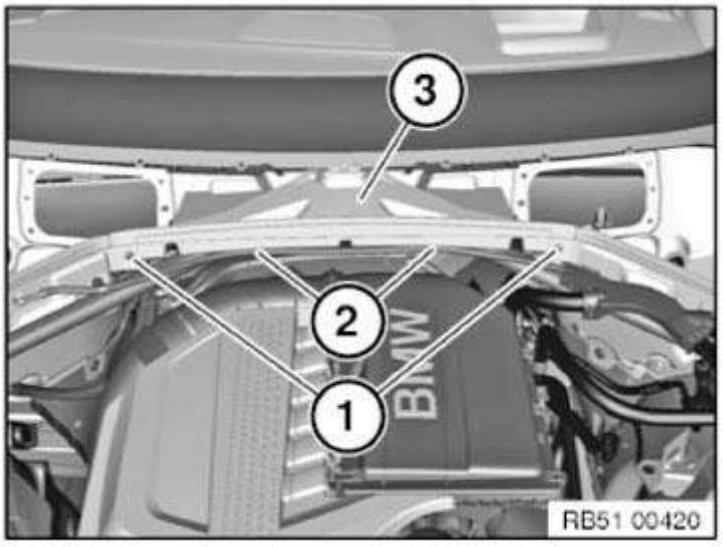


Fig. 242: Identifying Cable Clip, Cover And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip oxygen sensor connector (1) from holder and disconnect plug connection.

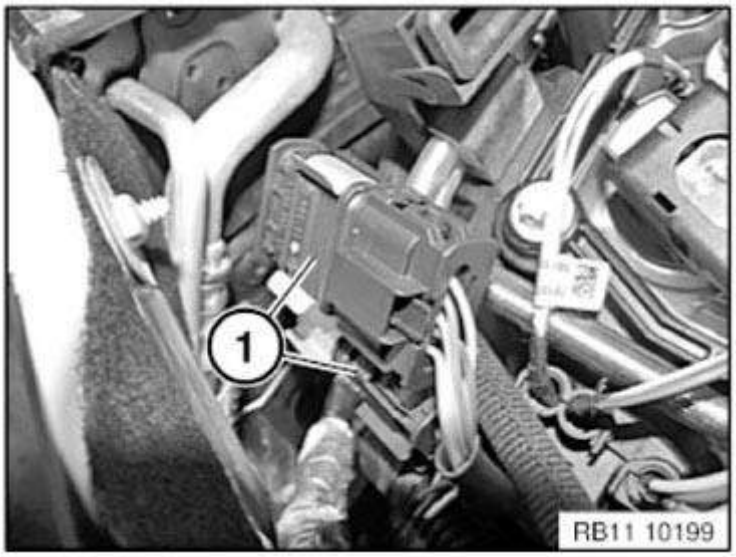


Fig. 243: Identifying Oxygen Sensor Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove flange (2).

cardiagn.com

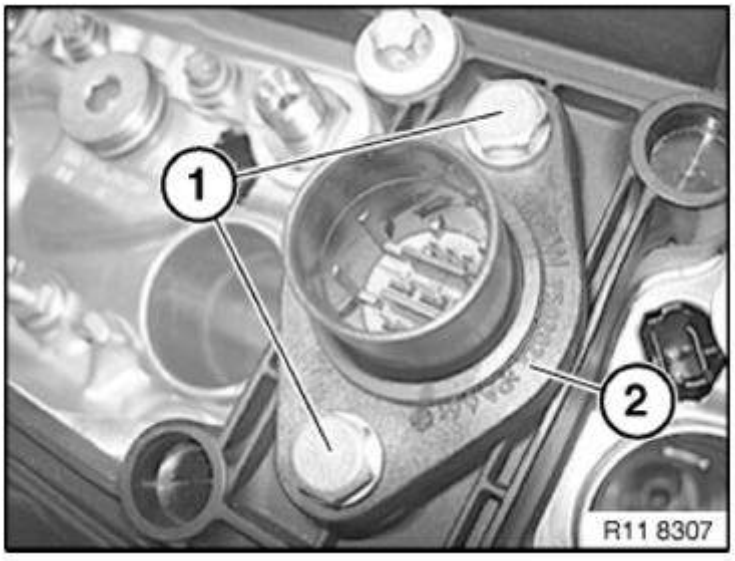


Fig. 244: Identifying Flange And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) from the electro-pneumatic pressure converter (3).

Remove vacuum line (OUT).

Undo screws (2) and put electro-pneumatic pressure converter to one side.

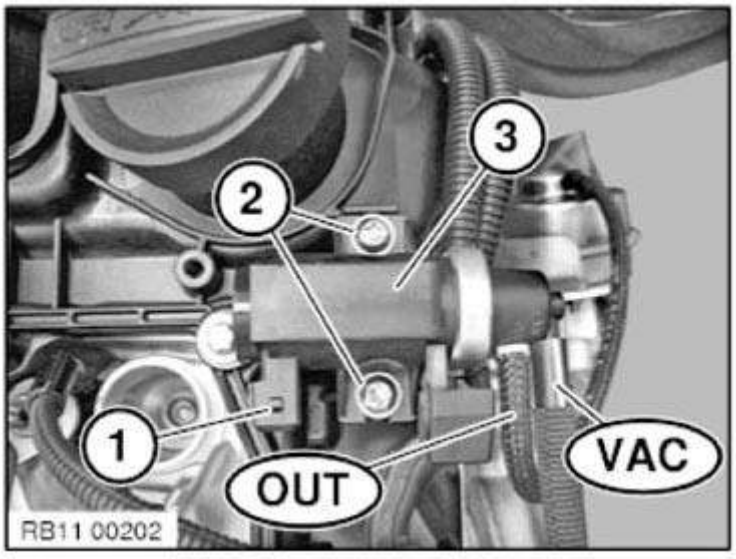


Fig. 245: Identifying Plug Connection, Electro-Pneumatic Pressure Converter And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten engine wiring harness (1) at cylinder head cover.

Unscrew cable channel (2) from the cylinder head cover.

Unclip the cable channel (3) from the cylinder head cover.

cardiagn.com

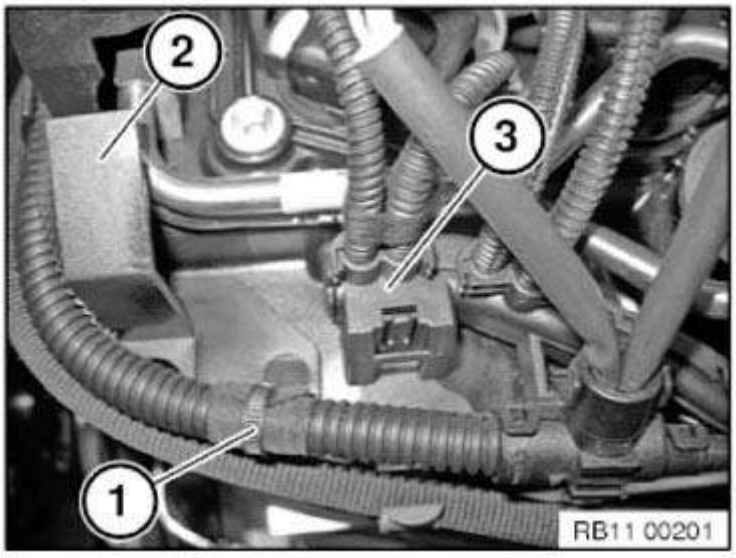


Fig. 246: Identifying Engine Wiring Harness And Cable Channel
Courtesy of BMW OF NORTH AMERICA, INC.

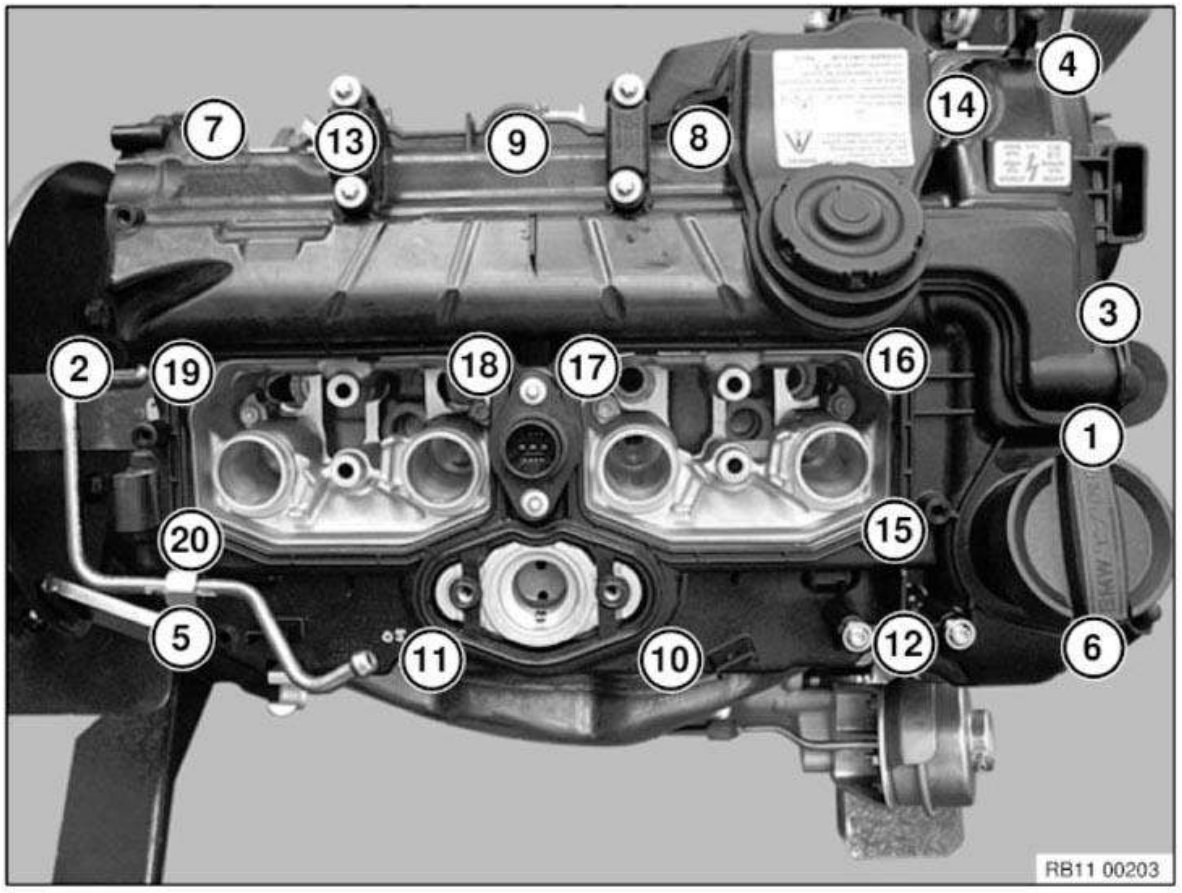


Fig. 247: Cylinder Head Cover Screws Loosening/Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws of cylinder head cover from outside inwards in 1/2 turns.

Remove cylinder head cover.

Replace all gaskets.

Clean sealing surfaces at the contact surfaces of the cylinder head and the spark plug channels.

Installation note:

cardiagn.com

Pay attention when placing cylinder head cover on centering pin (1)

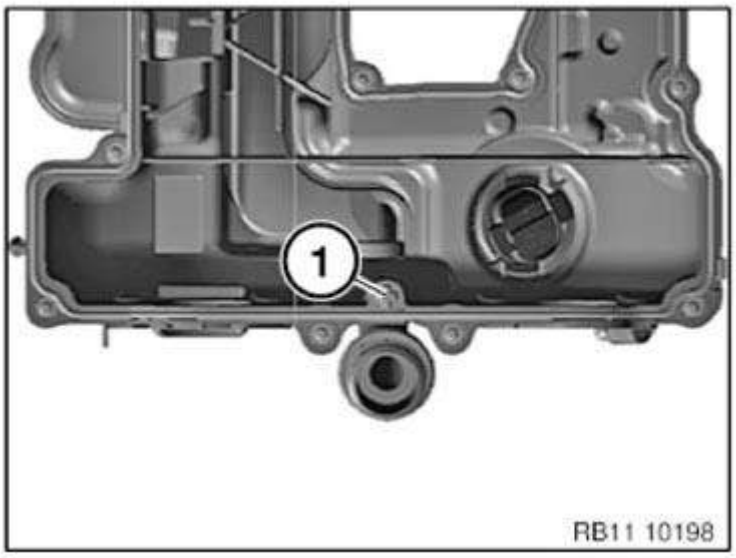


Fig. 248: Identifying Cylinder Head Cover On Centering Pin
Courtesy of BMW OF NORTH AMERICA, INC.

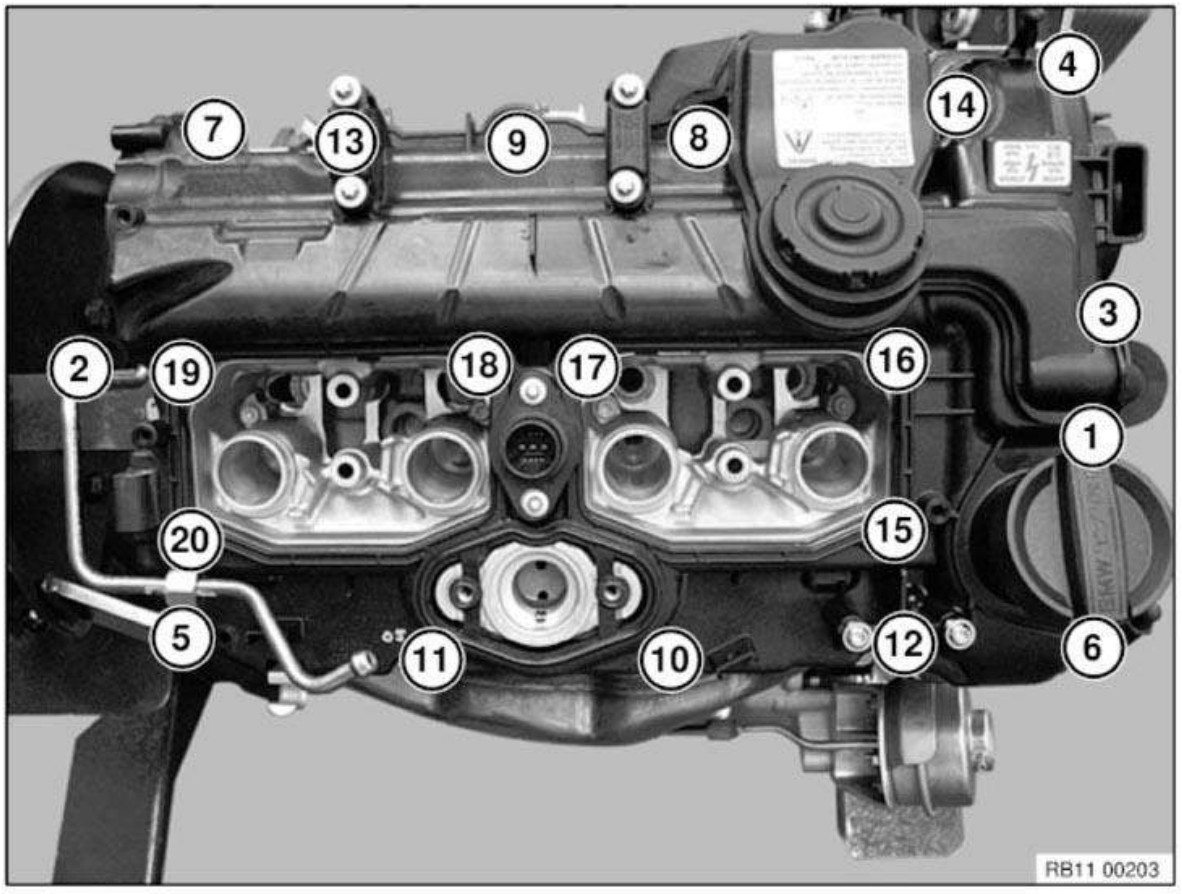


Fig. 249: Cylinder Head Cover Screws Loosening/Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Fit cylinder head cover.

Insert screws of the cylinder head cover by 1/2 turn.

Tighten the cylinder head cover screws in sequence_(20 to 1).

Tightening torque: **11 12 4AZ** .

cardiagn.com

NOTE: **Assemble engine.**
Check engine for leak tightness.

11 12 000 REMOVING AND INSTALLING/SEALING CYLINDER HEAD COVER (N47 D20 O1)

IMPORTANT: When carrying out repair work on the oil, coolant or fuel circuit, the alternator must be protected against dirt contamination.
Cover alternator with suitable materials.

Necessary preliminary tasks:

- Remove **INTAKE SILENCER HOUSING** only F10, F11, F07, F25.
- Remove acoustic cover at front (only F10, F11, F07) and rear.
- Remove bottom section of microfilter (only E9x).
- Remove tension struts, only E9x.
- Remove intake **PLENUM**.
- Remove all **INJECTORS** .
- Remove **PRESSURE ACCUMULATOR** .
- Release engine wiring harness in area of cylinder head cover. See **ENGINE WIRING HARNESS** .

Release screw (1).

Tightening torque: **11 12 5AZ** .

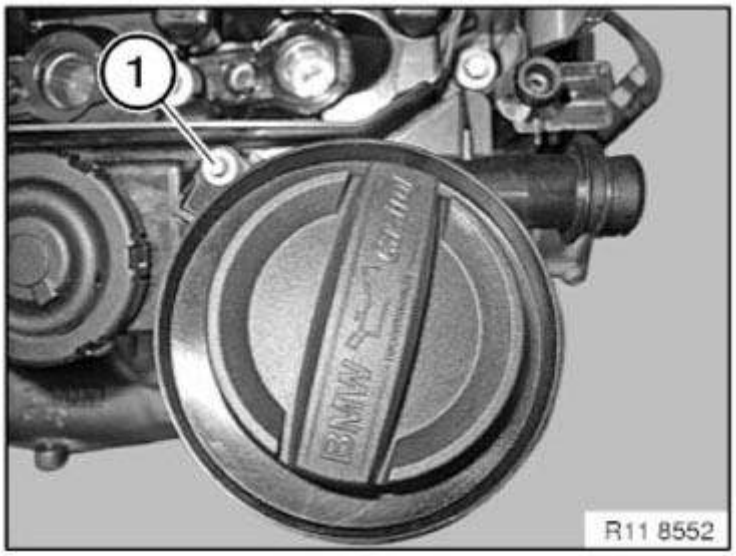


Fig. 250: Identifying Cylinder Head Cover And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Turn complete oil filler neck (1) clockwise by approx. 25Â°.

Remove oil filler neck (1) towards top.

Installation note:

Check O-ring for damage.

cardiagn.com

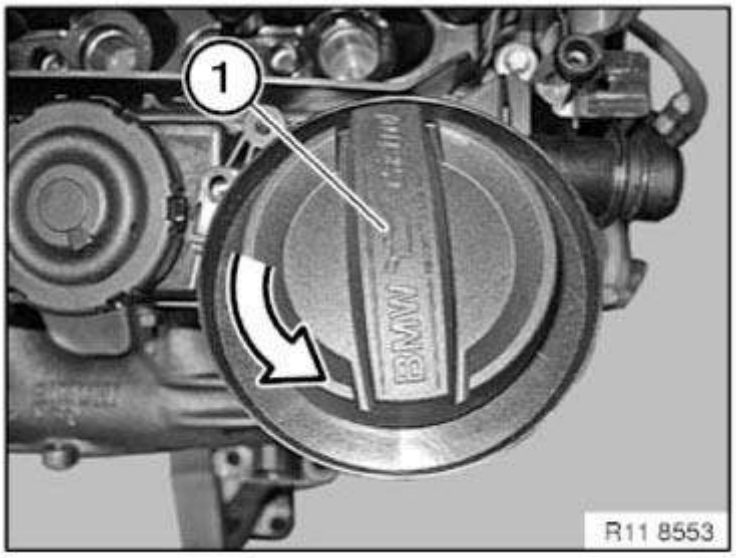


Fig. 251: Turning Oil Filler Neck
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Unclip cable clip (2) and lay to one side.

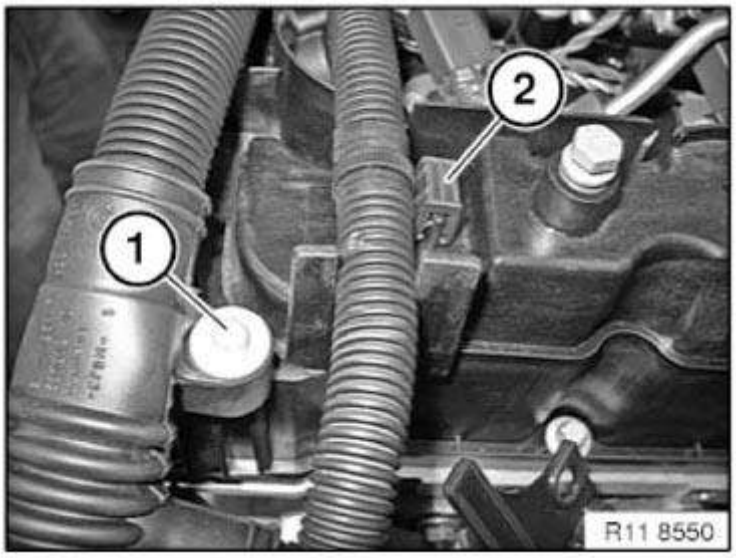


Fig. 252: Identifying Cable Clip And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1 and 2).

Tightening torque: **11 12 2AZ** .

cardiagn.com

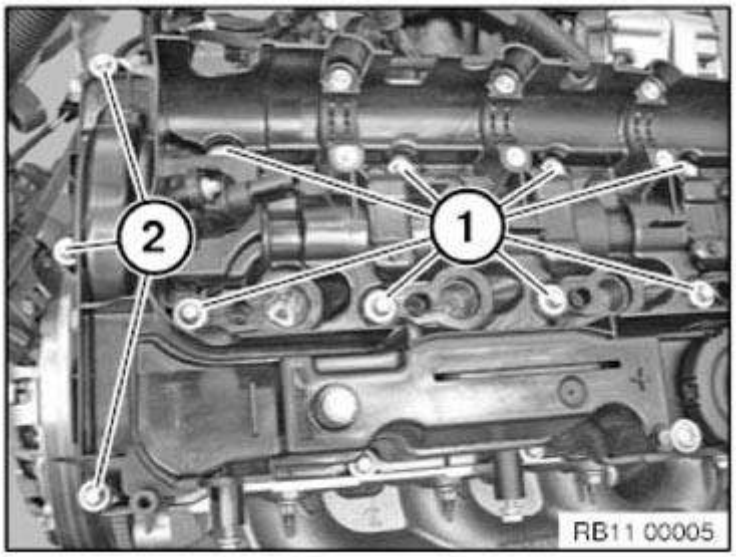


Fig. 253: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 12 2AZ** .

Remove cylinder head cover by lifting it out.

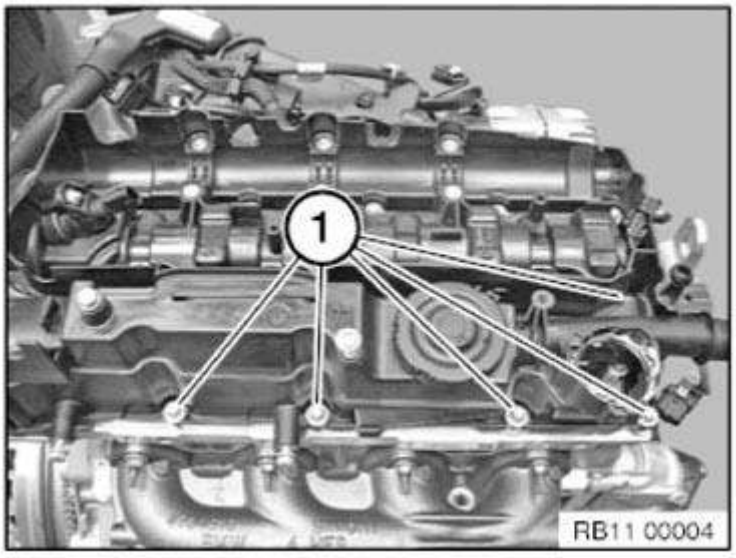


Fig. 254: Identifying Cylinder Head Cover Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace profile seals (1 and 2).

cardiagn.com

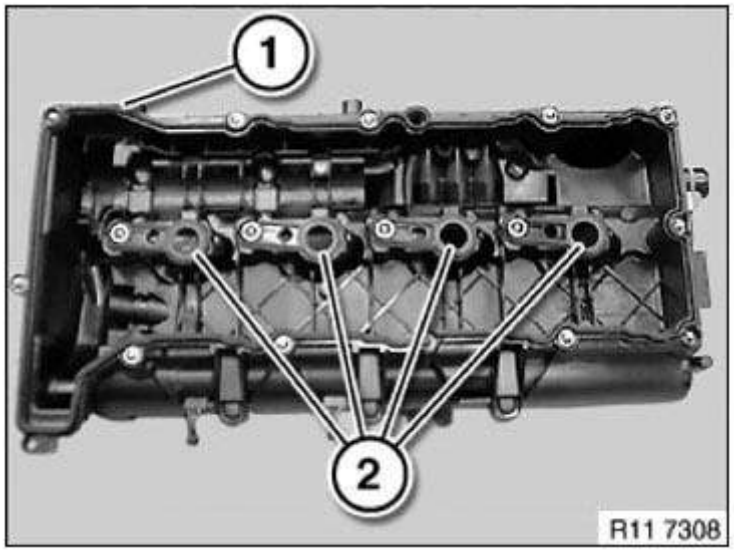


Fig. 255: Identifying Profile Seals
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check engine for leak tightness.

11 12 000 REMOVING AND INSTALLING/SEALING CYLINDER HEAD COVER (N52T)

IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released.** Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic.** Jointing torque and angle of rotation must be observed without fail **(risk of damage).**

Necessary preliminary tasks:

- Remove **IGNITION COILS** .
- Release ignition wiring harness in cylinder head cover area.
- Remove right **TENSION STRUT** .
- Remove **BULKHEAD** , center.

Unlock and detach vent hose (1).

If necessary, pull off metal bracket (2) in direction of arrow.

Release screws (3) on electric servomotor.

Tightening torque: **11 37 3AZ** .

NOTE:	**A further screw, which cannot be seen in the Fig. 256, must be released under the electric servomotor (4).**

cardiagn.com

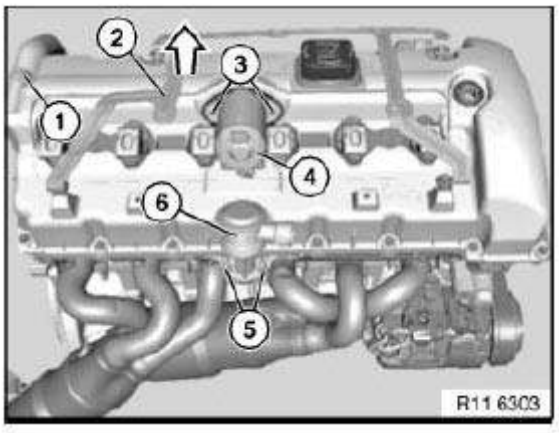


Fig. 256: Identifying Vent Hose, Bracket, Screw, Nuts And Electric Servomotor
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw on electric servomotor.

Tightening torque: **11 37 3AZ** .

Remove servomotor (4) in direction of arrow.

IMPORTANT: Observe different screw lengths.
Installation location of screws (1 and 2) is specified by the different bush shapes.

Release screws in area (1).

Tightening torque: **11 12 5AZ** .

Installation note:

Replace aluminum screws.

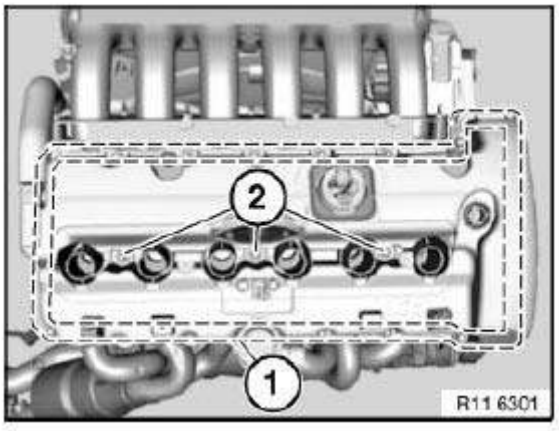


Fig. 257: Identifying Threaded Bolt And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release threaded bolt (2).

Tightening torque: **11 12 5AZ** .

Installation note:

Replace aluminum screws.

Installation note:

cardiagn.com

Slotted sleeves (2) for guiding ignition coils in cylinder head cover (1) must be replaced.

Remove slotted sleeves (2).

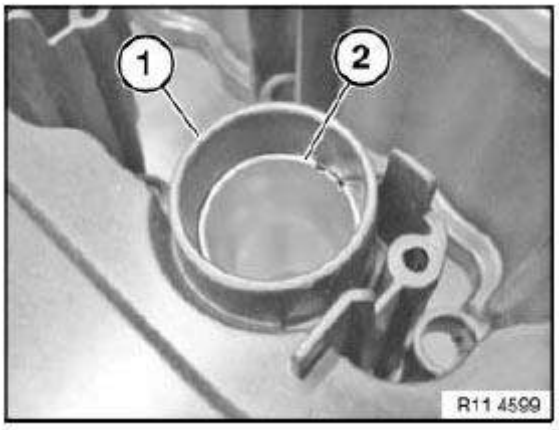


Fig. 258: Identifying Slotted Sleeves For Ignition Coils In Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean all sealing surfaces (1 and 2).

IMPORTANT: Do not use any metal-cutting tools.

Installation note:

Replace gaskets (1 and 2).

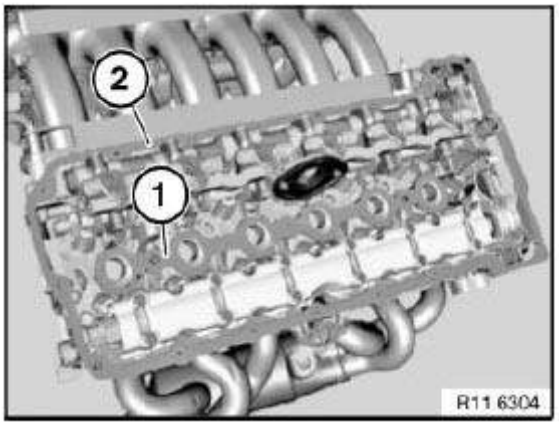


Fig. 259: Identifying Sealing Surfaces
Courtesy of BMW OF NORTH AMERICA, INC.

Replace **ECCENTRIC SHAFT SENSOR SEALING RING** (1) if necessary.

Installation note:

This operation cannot be performed with the cylinder head cover installed.

cardiagn.com

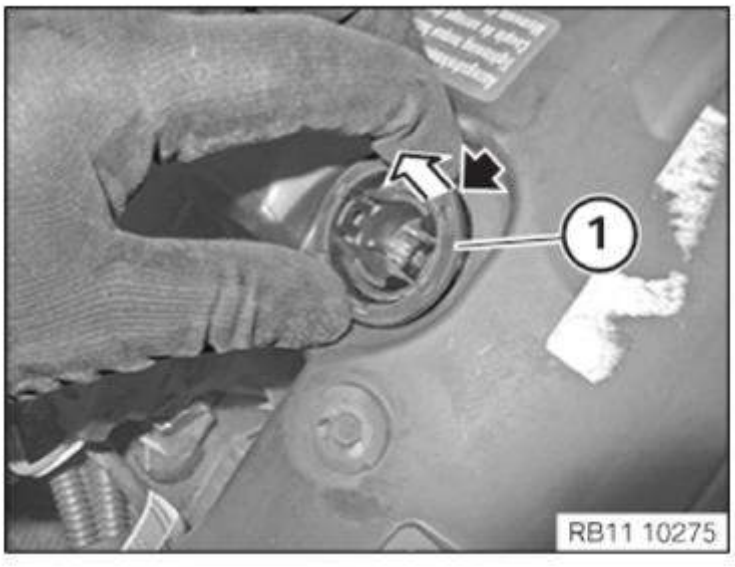


Fig. 260: Removing Eccentric Shaft Sensor Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 000 REMOVING AND INSTALLING/SEALING CYLINDER HEAD COVER (N55)

Necessary preliminary tasks:

- **RELEASE ENGINE WIRE HARNESS** in the area of the cylinder head cover.
- Disconnect **PRESSURE LINES** .
- Remove **CLEAN AIR PIPE** .

Release screws (1).

Remove flange (2).

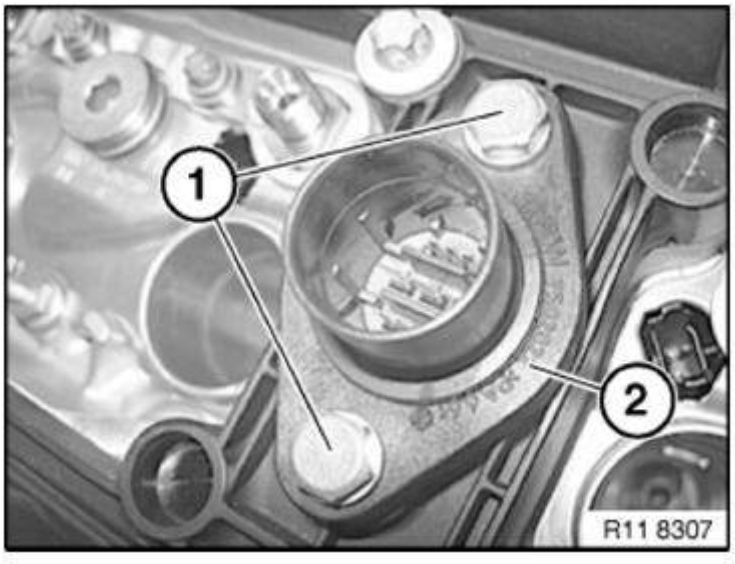


Fig. 261: Identifying Flange And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Press and hold down the unlocking device on the vacuum line (1) on the vacuum reservoir (cylinder head cover) in the direction of the arrow.

Detach vacuum line (1) in upward direction.

cardiagn.com

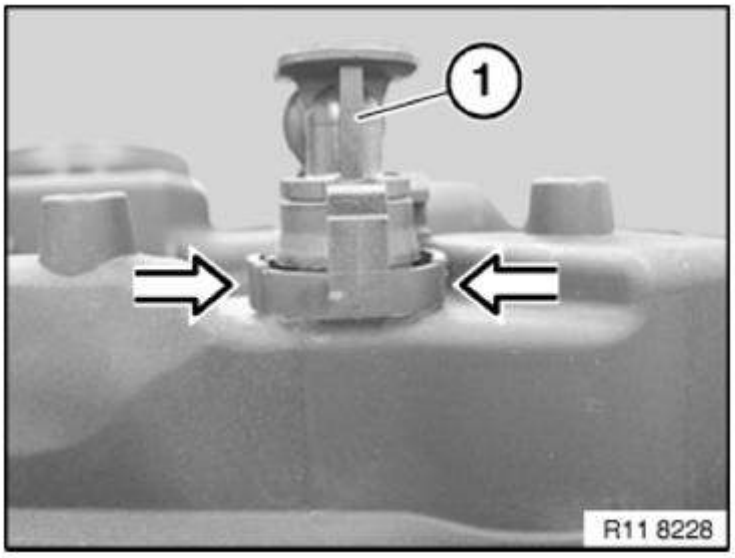


Fig. 262: Detaching Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not loosen the engine vent line (4) on the cylinder head cover.

To dismantle the engine vent line, loosen the screws on the air intake system (3).

NOTE: **When changing a faulty engine vent line, the clutch on the coupling on the cylinder head cover may be broken open.**

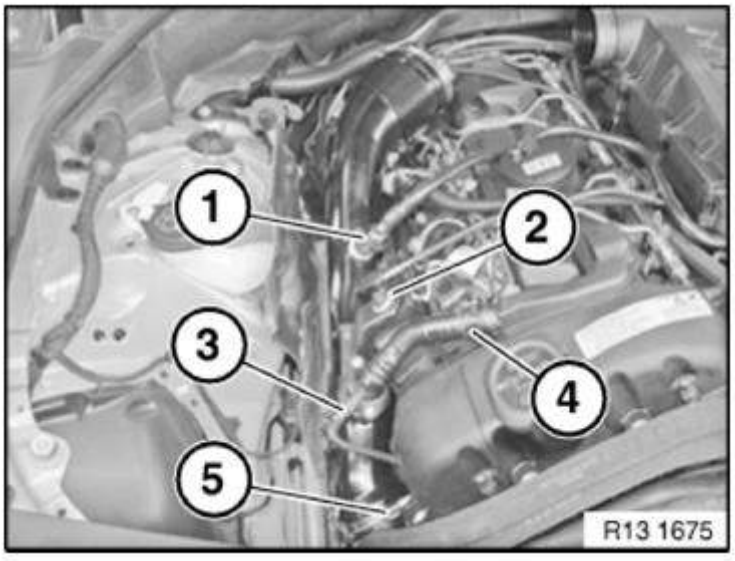


Fig. 263: Identifying Engine Vent Line, Air Intake System And Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

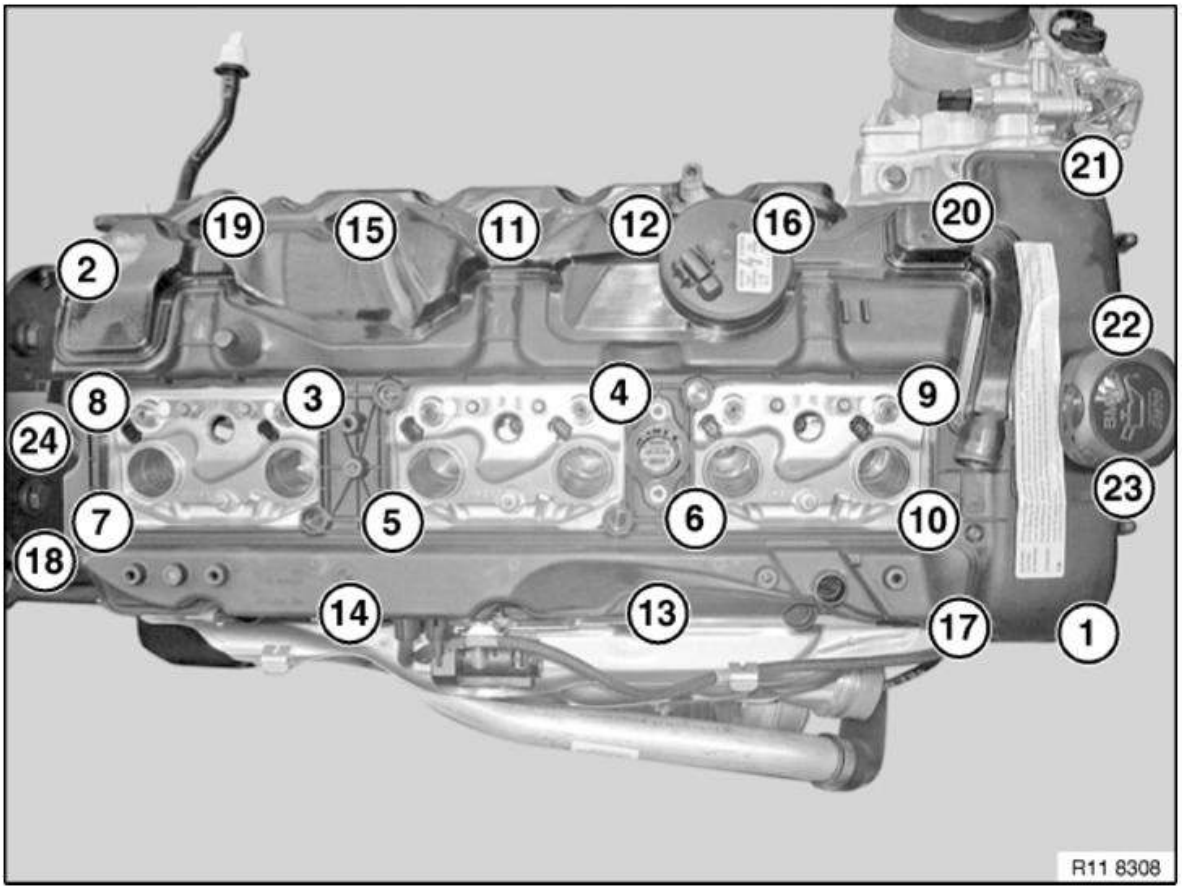


Fig. 264: Identifying Screws Of Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws of cylinder head cover from outside inwards in 1/2 turns.

Remove cylinder head cover.

Replace all gaskets.

cardiagn.com

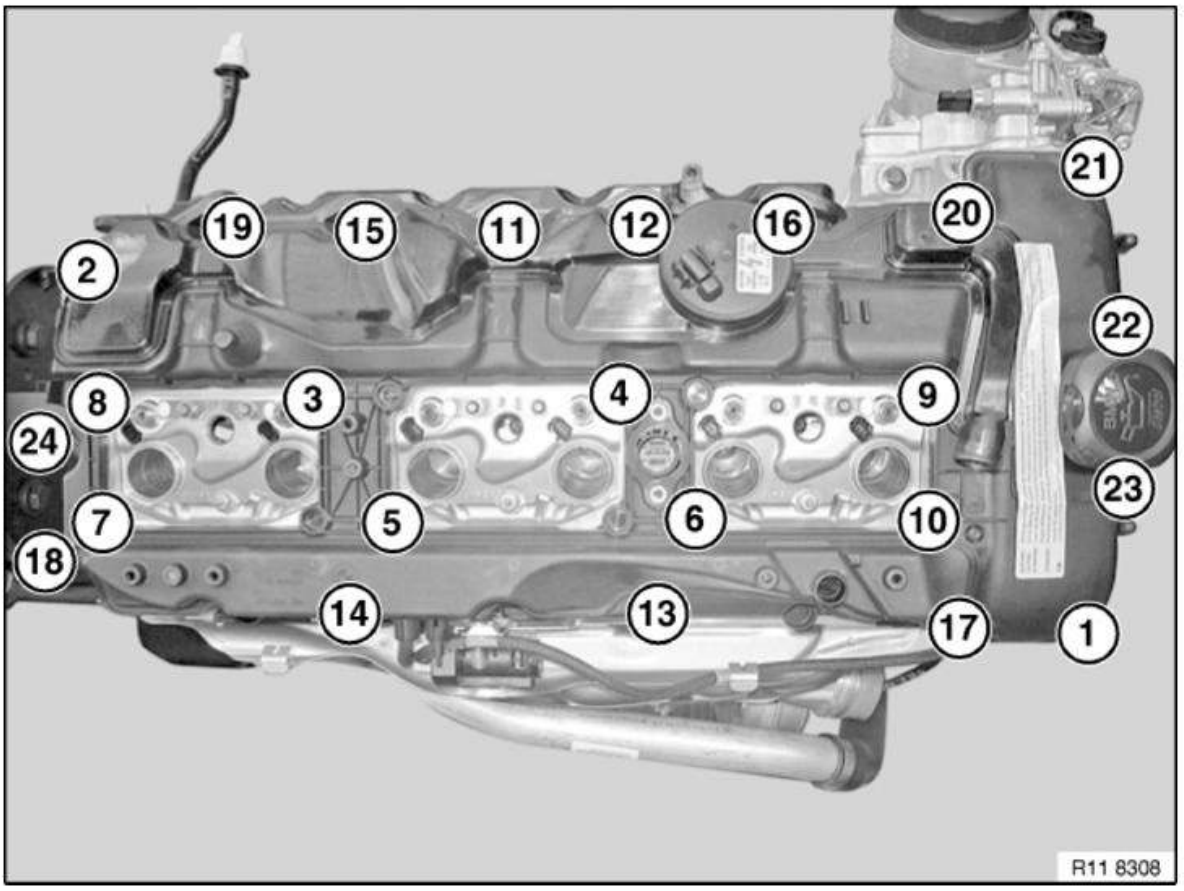


Fig. 265: Identifying Screws Of Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Fit cylinder head cover.

Insert screws of the cylinder head cover by 1/2 turn.

Tighten fit screws (1) using 8.5 Nm.

Tighten positional screw (2) using 8.5 Nm.

Tighten remaining screws of cylinder head cover in sequence 3 to 23.

Tightening torque: **11 12 4AZ** .

11 12 101 REPLACING CYLINDER HEAD GASKET (N20, N26)

Special tools required:

- **11 4 470**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD**.
- Check cylinder head for **DEVIATION FROM FLATNESS**.
- Check cylinder head for **WATERTIGHTNESS**.

Remove remnants of oil and dirt from blind holes (1).

IMPORTANT: Work on sealing surface on engine block and on cylinder head with special tool **11 4 470** only. Do not use any metal-cutting tools. Graphic N55.

cardiagn.com

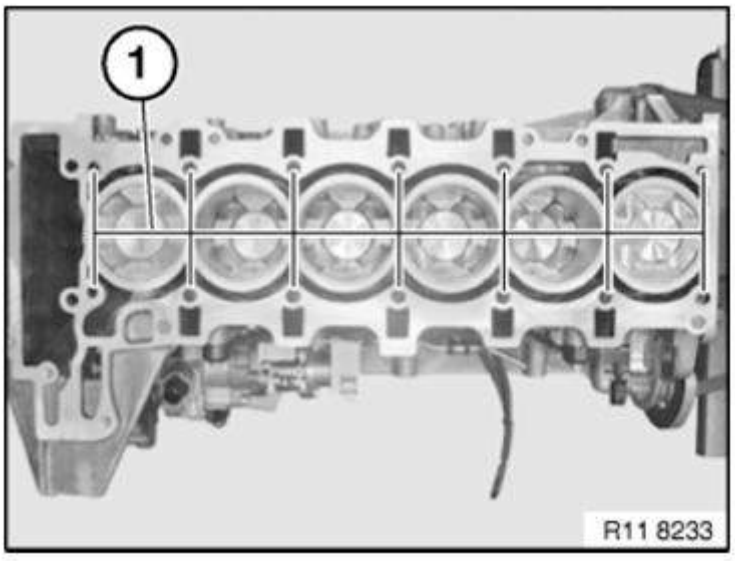


Fig. 266: Identifying Remnants Of Oil And Dirt From Blind Holes
Courtesy of BMW OF NORTH AMERICA, INC.

Check adapter sleeves (1) for damage and firm seating.

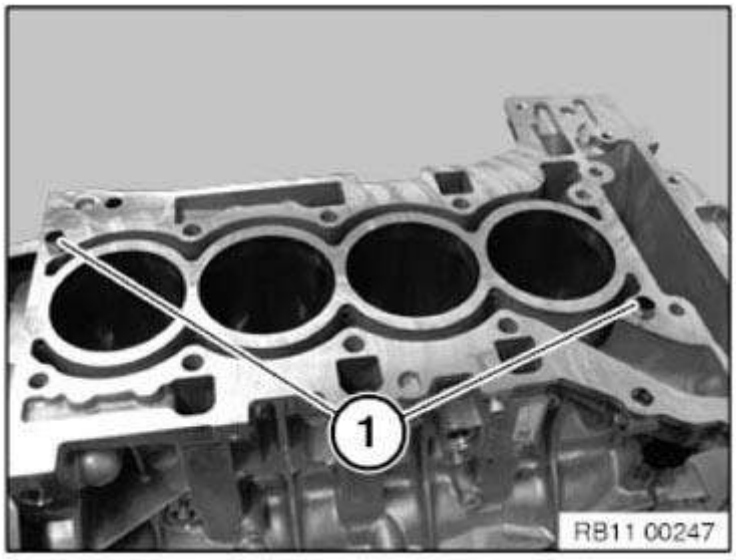


Fig. 267: Identifying Adapter Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

The cylinder head gasket (1) can only be checked using the part number.

Installation note:

If an oversized gasket is needed, the right part number must be determined as specified by Parts Product Management.

cardiagn.com

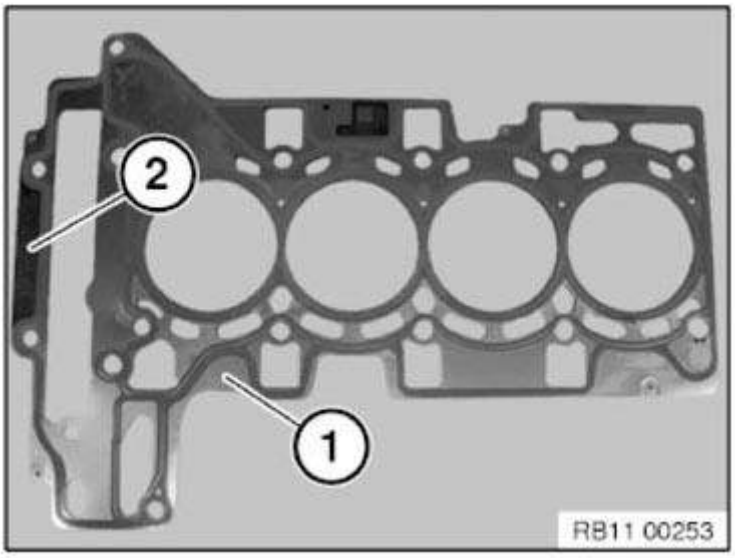


Fig. 268: Identifying Cylinder Head Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 501 REPLACING CYLINDER HEAD GASKET (N47 D20 O1)

Necessary preliminary work:

- Remove **CYLINDER HEAD**.

The cylinder head gasket is designed as a beaded metal gasket.

Pay attention to gasket thickness (1).

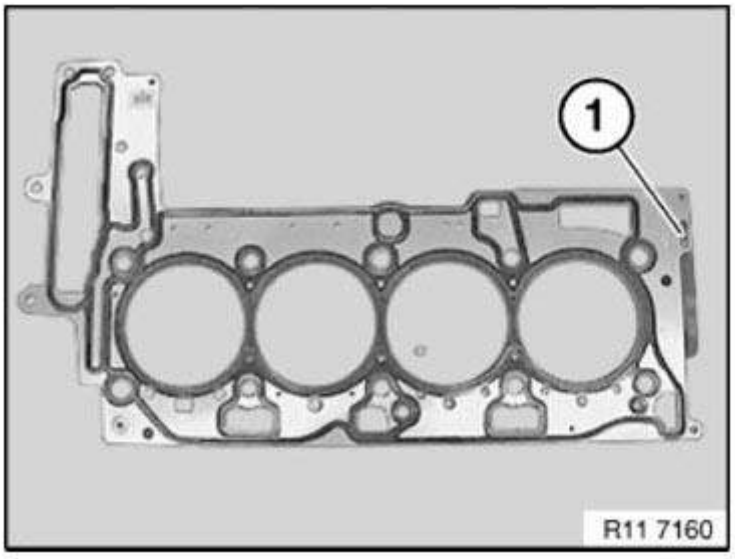


Fig. 269: Identifying Cylinder Head Gasket Thickness
Courtesy of BMW OF NORTH AMERICA, INC.

Highest piston protrusion at measuring points (1 and 2) of all 4 pistons determines thickness of cylinder head gasket.

Piston protrusion up to 0.92 mm

- Install 1 hole cylinder head gasket.

cardiagn.com

Piston protrusion >0.92... 1.03 mm

- Install 2 hole cylinder head gasket.

Piston protrusion greater than >1.03... 1.18 mm

- Install 3 hole cylinder head gasket.

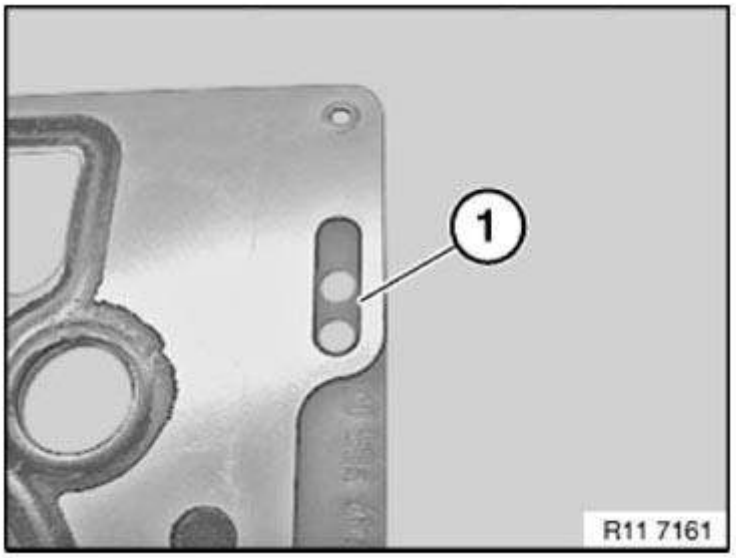


Fig. 270: Identifying Thickness Marking
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 101 REPLACING CYLINDER HEAD GASKET (N52T)

Special tools required:

- 11 4 430
- 11 4 470

IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released.** Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic.** Jointing torque and angle of rotation must be observed without fail **(risk of damage).**

Necessary preliminary work:

- Remove CYLINDER HEAD.

Insert 11 4 430 special tool into bore holes.

Remove cylinder head gasket.

IMPORTANT:	Check marking (1) on cylinder head gasket (B25 or B30). • B = petrol/gasoline engine • 30= displacement (3 liters)

cardiagn.com

Do not mix them up as this will cause **engine damage** .

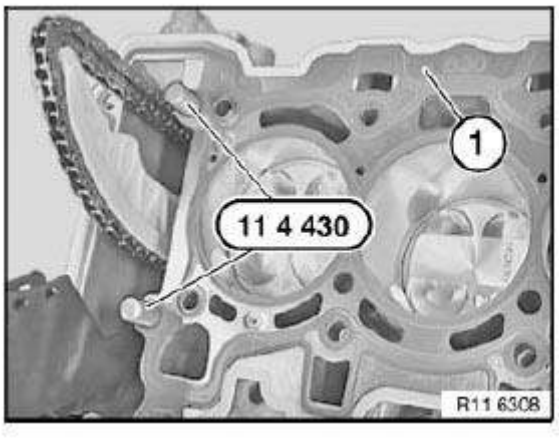


Fig. 271: Inserting Special Tool (11 4 430) Into Bore Holes
Courtesy of BMW OF NORTH AMERICA, INC.

There must be no fluids or contaminants in any of the threaded holes (1) for the cylinder head bolt connections.

IMPORTANT: Work on sealing surface on engine block and on cylinder head with special tool **11 4 470** only. Do not use any metal-cutting tools.

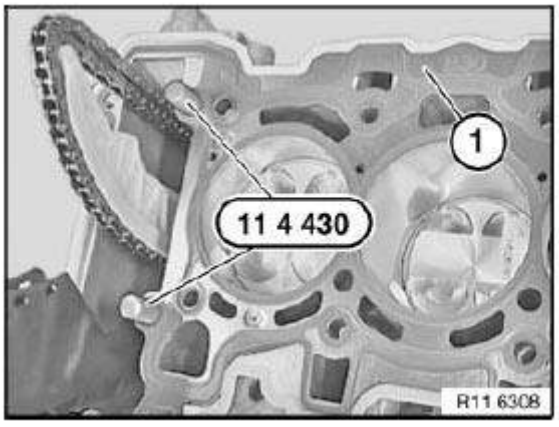


Fig. 272: Identifying Threaded Holes For Cylinder Head Bolt Connections
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Rubber coating (2) on cylinder head gasket (3) must not under any circumstances be damaged (electrochemical corrosion).

Cylinder head gasket (3) is a sheet-metal gasket.

cardiagn.com

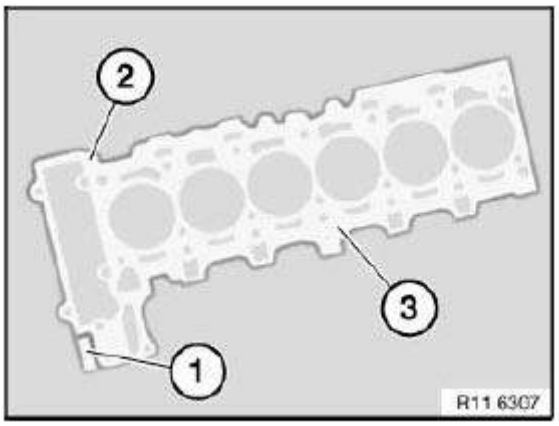


Fig. 273: Identifying Cylinder Head Gasket And Rubber Coating
Courtesy of BMW OF NORTH AMERICA, INC.

Check adapter sleeves (1) for damage and firm seating.

Place cylinder head gasket (2) in direction of arrow on engine block.

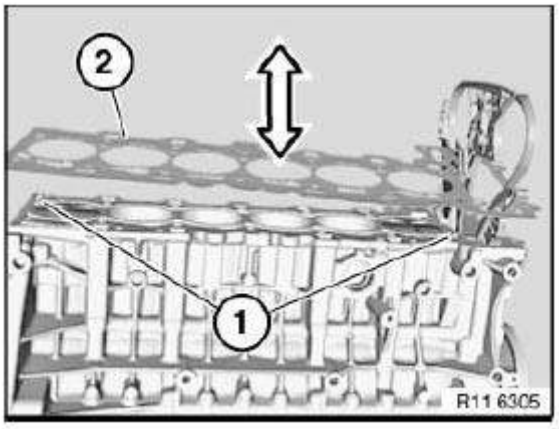


Fig. 274: Identifying Cylinder Head Gasket And Adapter Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check cylinder head for DEVIATION FROM FLATNESS.**
Check cylinder head for WATER LEAKS.

Assemble engine.

11 12 101 REPLACING CYLINDER HEAD GASKET (N55)

Special tools required:

- 11 4 430
- 11 4 470

IMPORTANT: Aluminum screws/bolts must be replaced each time they are **released.**
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic.**
Jointing torque and angle of rotation must be observed without fail **(risk of damage).**

Necessary preliminary tasks:

- Remove CYLINDER HEAD.

cardiagn.com

- Check cylinder head for **DEVIATION FROM FLATNESS**.
- Check cylinder head for **WATERTIGHTNESS**.

Remove the cylinder head gasket.

Insert special tool **11 4 430** into feed pipe of oil pump.

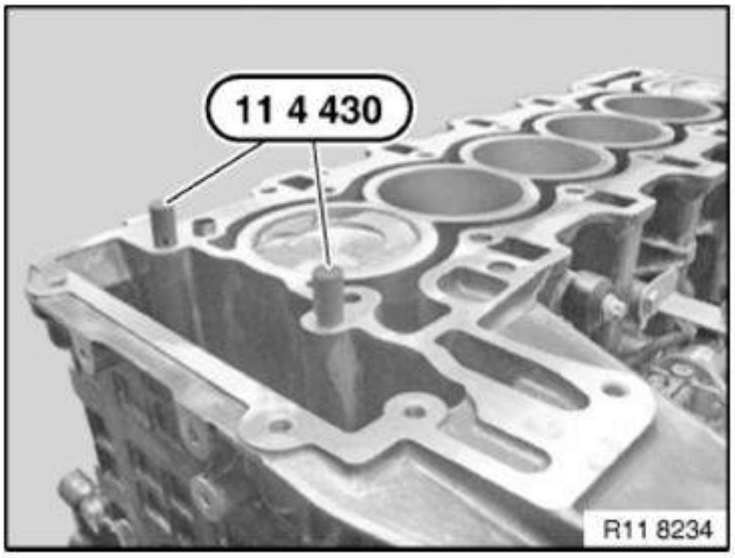


Fig. 275: Inserting Special Tool (11 4 430) Into Feed Pipe Of Oil Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Remove remnants of oil and dirt from blind holes (1).

IMPORTANT: Work on sealing surface on engine block and on cylinder head with special tool **11 4 470** only. Do not use any metal-cutting tools.

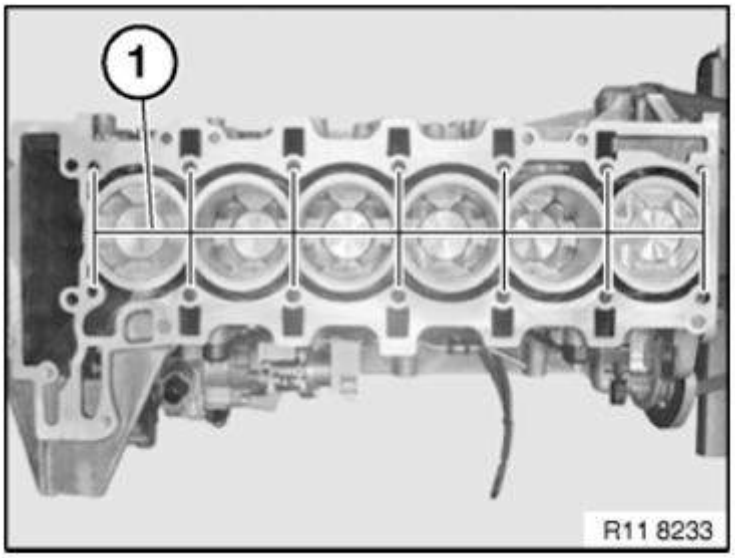


Fig. 276: Identifying Remnants Of Oil And Dirt From Blind Holes
Courtesy of BMW OF NORTH AMERICA, INC.

Check adapter sleeves (1) for damage and firm seating.

cardiagn.com

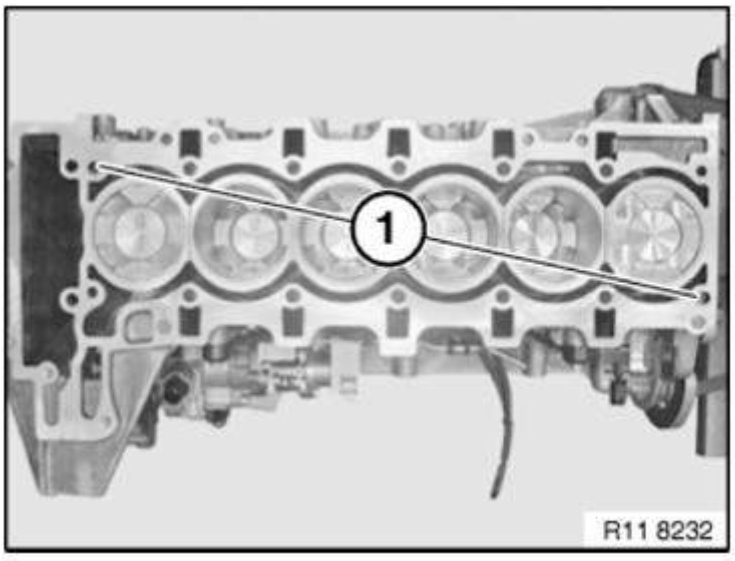


Fig. 277: Identifying Adapter Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

The cylinder head gasket on the N55 is a beaded metal gasket.

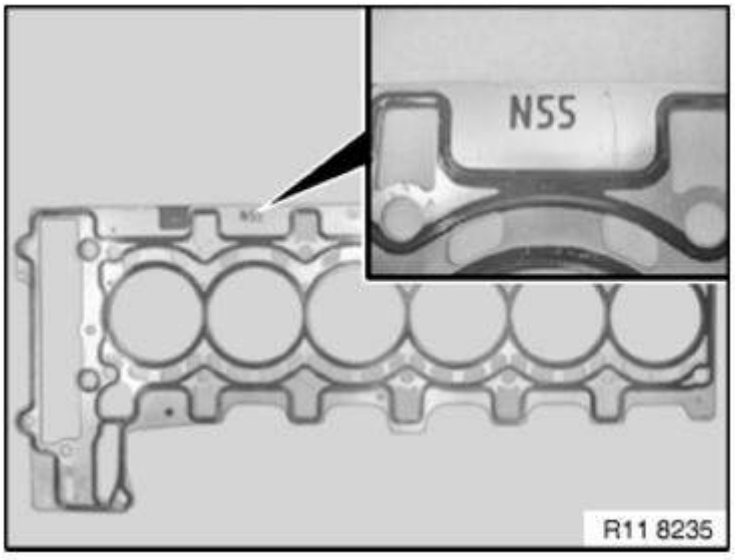


Fig. 278: Identifying Cylinder Head Gasket (N55)
Courtesy of BMW OF NORTH AMERICA, INC.

Place cylinder head gasket (2) in direction of arrow on engine block.

Fix new cylinder head gasket with fitting sleeves (1).

cardiagn.com

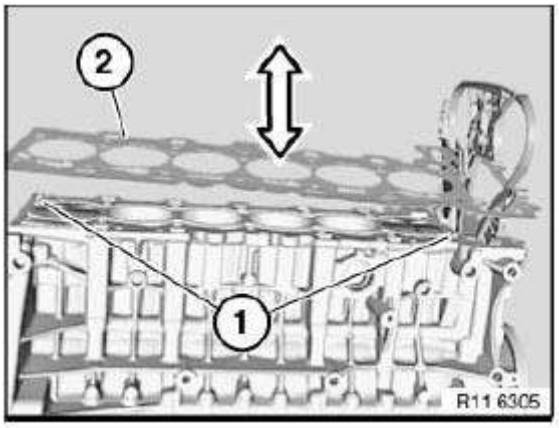


Fig. 279: Identifying Cylinder Head Gasket And Adapter Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 12 719 RESURFACING CYLINDER HEAD LOWER FACE (N52T)

Necessary preliminary work:

- Remove **CYLINDER HEAD**
- Remove **EXHAUST CAMSHAFT**.
- Remove **INTERMEDIATE LEVER** on intake side

Check evenness of cylinder head lower faces with a standard straightedge (1).

NOTE: **Max. deviation from level (longitudinal) 0.10 mm**

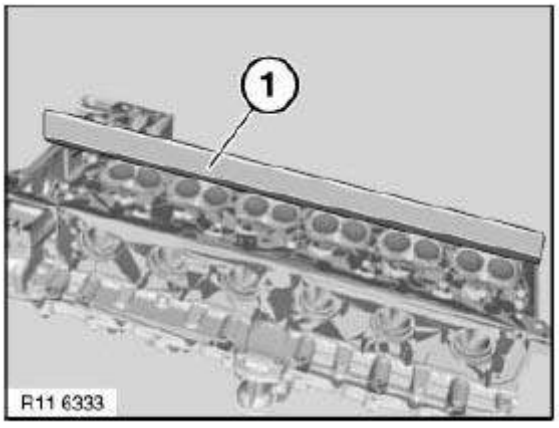


Fig. 280: Checking Evenness Of Cylinder Head Lower Faces (Longitudinal)
Courtesy of BMW OF NORTH AMERICA, INC.

Check evenness of cylinder head lower faces with a standard straightedge (1).

NOTE: **Max. deviation from level (transverse) 0.05 mm**

cardiagn.com

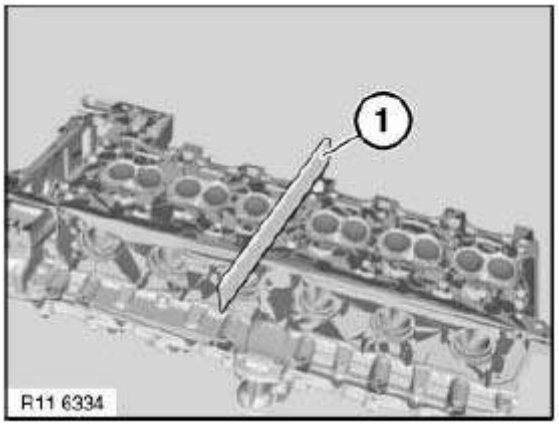


Fig. 281: Checking Evenness Of Cylinder Head Lower Faces (Transverse)
Courtesy of BMW OF NORTH AMERICA, INC.

Check cylinder head for **WATER LEAKS**.

Assemble engine.

11 12 719 RESURFACING CYLINDER HEAD LOWER FACE (N55)

Necessary preliminary tasks:

- Remove **CYLINDER HEAD**.
- Remove **EXHAUST CAMSHAFT**.
- Remove **INTERMEDIATE LEVER** on inlet side.

Check evenness of cylinder head sealing faces with a standard straightedge (1).

NOTE: Max. deviation from flatness (longitudinal) 0.10 mm

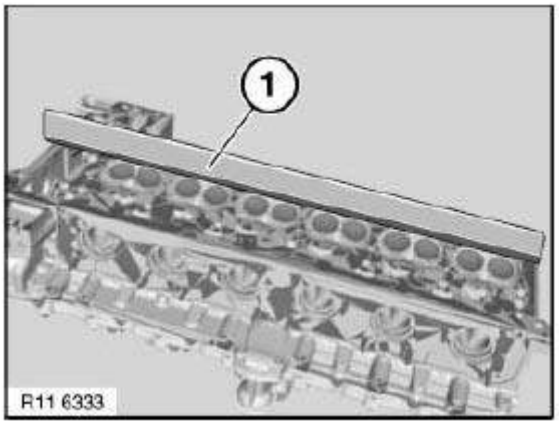


Fig. 282: Checking Evenness Of Cylinder Head Lower Faces (Longitudinal)
Courtesy of BMW OF NORTH AMERICA, INC.

Check evenness of cylinder head sealing faces with a standard straightedge (1).

NOTE: Max. deviation from flatness (transverse) 0.05 mm

cardiagn.com

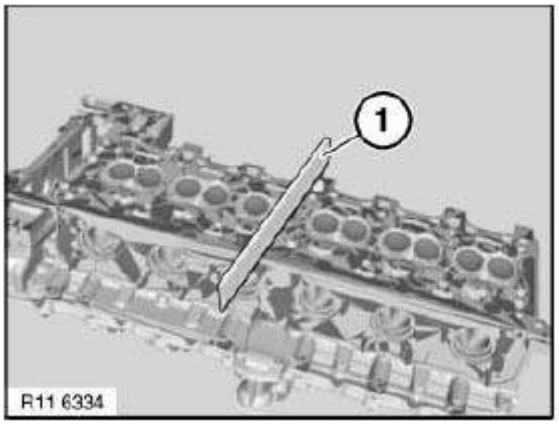


Fig. 283: Checking Evenness Of Cylinder Head Lower Faces (Transverse)
Courtesy of BMW OF NORTH AMERICA, INC.

Check cylinder head for **WATERTIGHTNESS**.

Assemble engine.

OIL SUMP

11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N20) (AS OF 07.2013)

Necessary preliminary tasks:

- Drain and add **ENGINE OIL**.
- Lower **FRONT AXLE** .

Disconnect plug connection (1) on oil level sensor.

Release bolts (2) on transmission.

Tightening torque: **24 00 1AZ** .

Release bolts along line (3).

Tightening torque: **11 13 4AZ** .

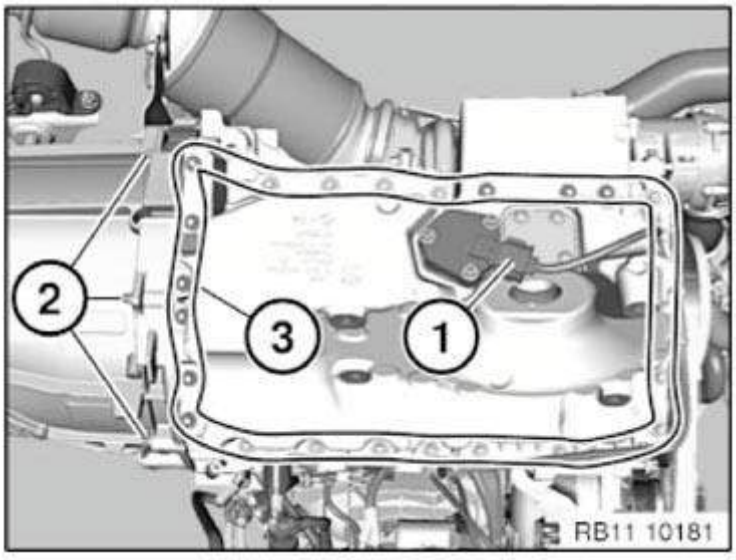


Fig. 284: Identifying Plug Connection On Oil Level Sensor

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Remove oil sump in downward direction.

Assemble engine.

11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N20) (UP TO 06.2013)

Necessary preliminary tasks:

- Drain and add **ENGINE OIL**.
- Lower **FRONT AXLE** .
- **REMOVE FRONT AXLE DIFFERENTIAL** .
- Remove **BEARING SUPPORT** .

Disconnect plug connection (1) on oil level sensor.

Release bolts (2) on transmission.

Tightening torque: **24 00 1AZ** .

Release bolts along line (3).

Tightening torque: **11 13 4AZ** .

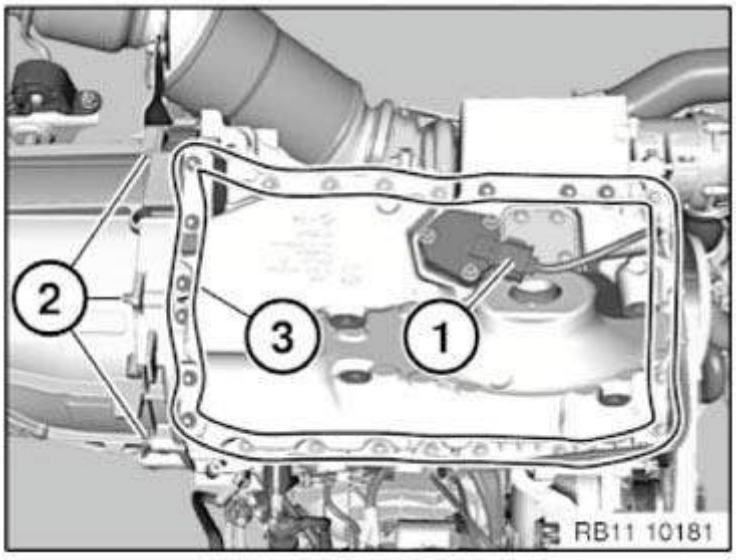


Fig. 285: Identifying Plug Connection On Oil Level Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Remove oil sump in downward direction.

Assemble engine.

11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N47 D20 O1) F25

Special tools required:

- **00 0 200**
- **00 0 201**
- **00 0 202**

cardiagn.com

- 00 0 204
- 00 0 208
- 11 0 000
- 11 8 780
- (11 4 472)
- (11 4 471)

Necessary preliminary tasks:

- Remove front UNDERBODY PROTECTION .
- Drain ENGINE OIL.
- REMOVE FRONT AXLE DIFFERENTIAL .
- Remove BEARING SUPPORT .

IMPORTANT: Engines with surface sealant:
Application time of sealing bead max. 12 minutes.

Release dipstick (1) on oil filter housing and pull upwards out of oil sump.

Installation note:

Replace gasket.

Unplug connector (2) from oil level switch and unclip cable in area of oil sump.

Modify oil level sensor if replacing oil sump.

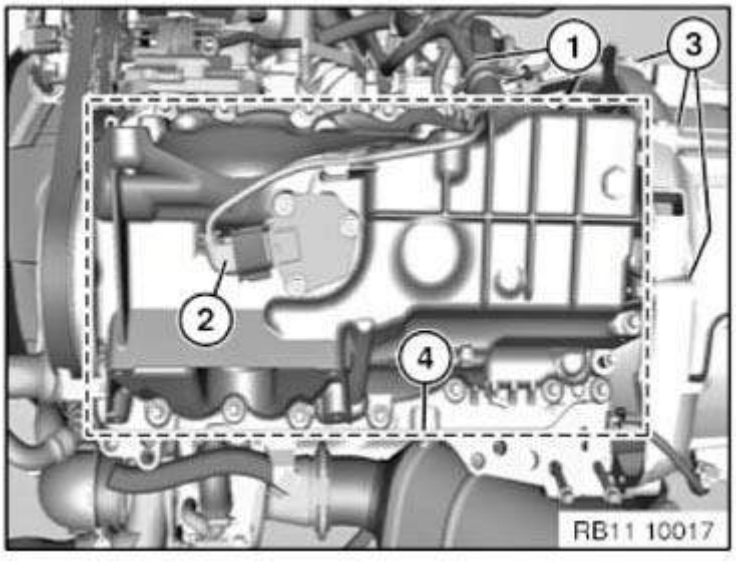


Fig. 286: Identifying Dipstick On Oil Filter Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (3) on transmission.

Release sump bolts along dashed line (4).

Tightening torque: 11 13 2AZ .

Detach oil sump downward.

Installation note:

cardiagn.com

Tighten down all screws diagonally and evenly.

Only on vehicles with gasket

Remove gasket (1).

Remove gasket debris from sealing face and clean sealing face.

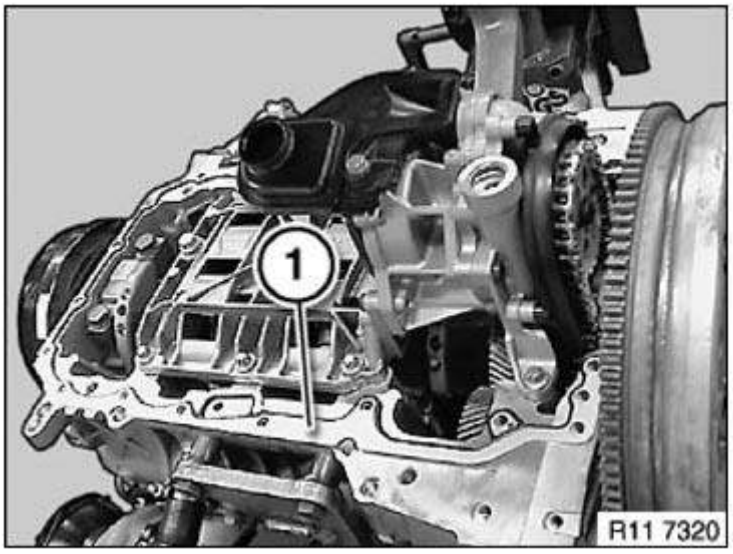


Fig. 287: Identifying Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Use **LIQUID SEALANT 2.1** Drei Bond.

Apply Drei Bond liquid sealant lightly and evenly in the area of the arrows on the differential cover to the engine block.

IMPORTANT: Oil sump gasket must not be lubricated.

Install oil sump with a new gasket.

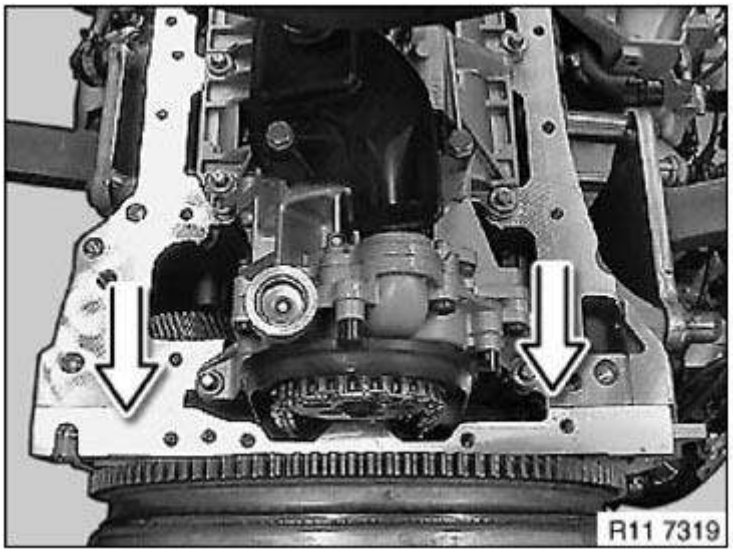


Fig. 288: Installing Oil Sump
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Installation note:

Special tool **11 8 780** is only necessary if the engine or the transmission is removed.

Position special tool **11 8 780** with transmission bolts (1) so that engine oil sump is exactly flush with engine block.

Attaching the oil sump.

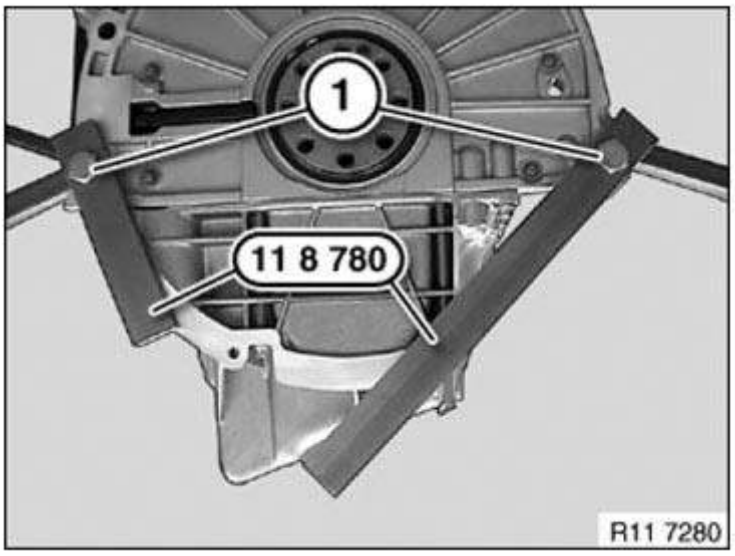


Fig. 289: Positioning Special Tool (11 8 780) With Transmission Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Engines with liquid seal:

IMPORTANT: The oil sump can only be loosened in the areas (1) where an aperture is present in the oil sump.

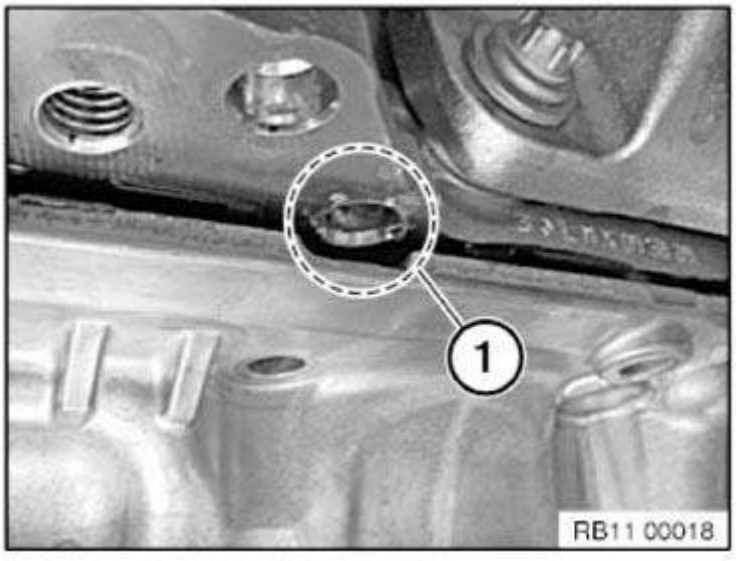


Fig. 290: Identifying Oil Sump Seal Areas
Courtesy of BMW OF NORTH AMERICA, INC.

Use a suitable crow bar (1) at the appropriate point to release the oil sump in direction of arrow.

cardiagn.com

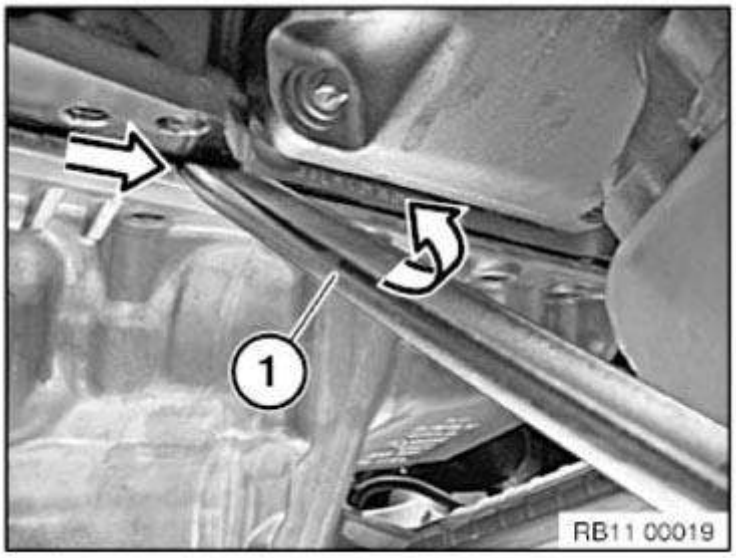


Fig. 291: Releasing Oil Sump
Courtesy of BMW OF NORTH AMERICA, INC.

Clean sealing surface (1) with special tool (11 4 472).

Installation note:

Sealing surfaces must be free of oil, grease and cleaning agents.

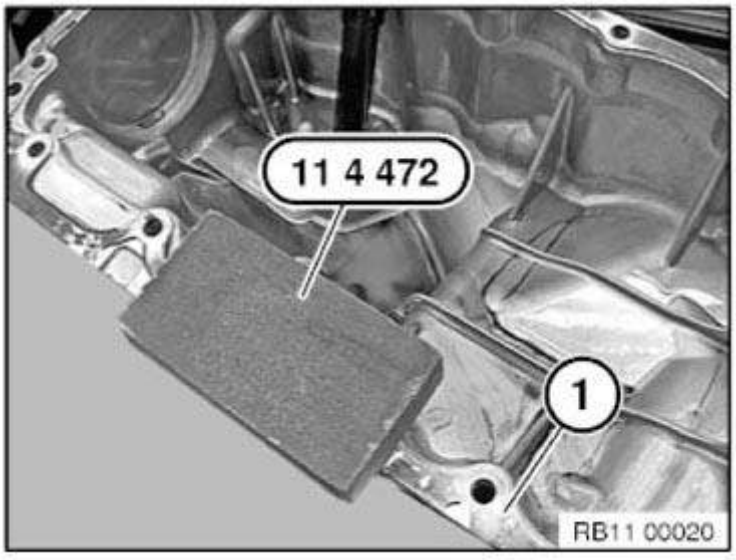


Fig. 292: Cleaning Sealing Surface Using Special Tool (11 4 472)
Courtesy of BMW OF NORTH AMERICA, INC.

Clean sealing surface (1) with special tool (11 4 471).

Installation note:

Sealing surfaces must be free of oil, grease and cleaning agents.

cardiagn.com

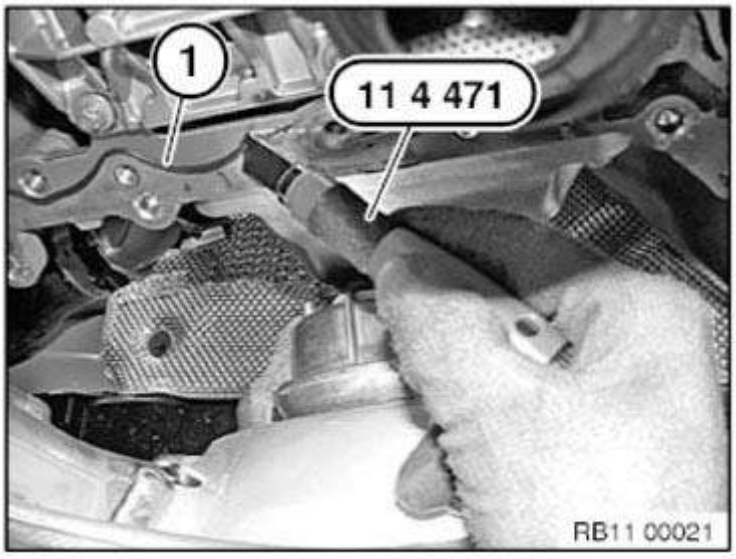


Fig. 293: Cleaning Sealing Surface Using Special Tool (11 4 471)
Courtesy of BMW OF NORTH AMERICA, INC.

Apply sealing compound:

APPLY THE SEALING COMPOUND IN AREA (1).

Make sure that the sealing bead runs along the inner edge.

The oil return channel must be completely surrounded (see arrow).

Installation note:

The oil sump must be installed approximately 10 minutes after application of the sealing compound.

Sealant height approximately 2 to 2.5 mm.

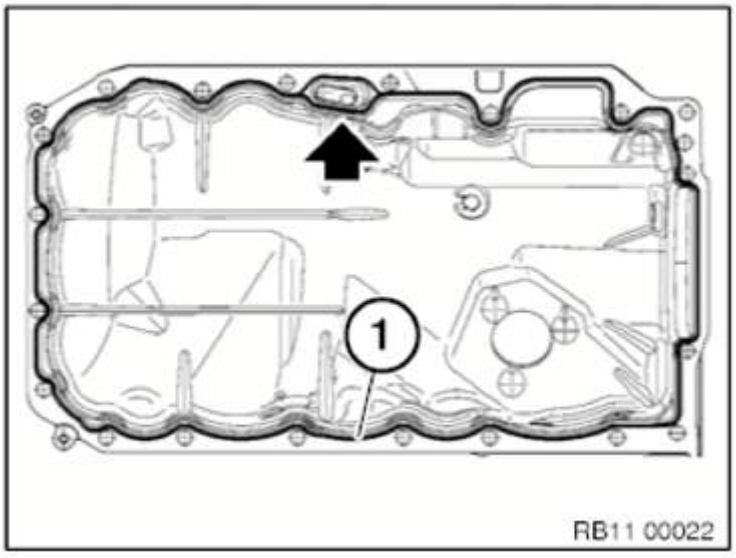


Fig. 294: Locating Sealing Compound Applying Area
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Special tool **11 8 780** is only necessary if the engine or the transmission is removed.

Position special tool **11 8 780** with transmission bolts (1) so that engine oil sump is exactly flush with engine

cardiagn.com

block.

Attaching the oil sump.

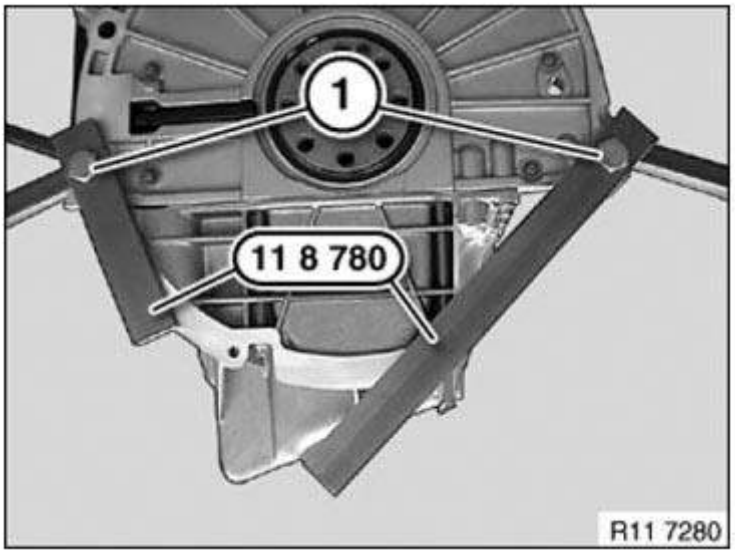


Fig. 295: Positioning Special Tool (11 8 780) With Transmission Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N52T)

IMPORTANT:	When performing repair work on the engine oil, coolant or fuel circuit, you must protect the alternator against dirt contamination. **Risk of damage!** Cover alternator with suitable materials. Failure to comply with this procedure may result in an alternator malfunction.
IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released.** Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic.** Jointing torque and angle of rotation must be observed without fail **(risk of damage).**

Necessary preliminary tasks:

- Drain and add **ENGINE OIL**.
- Remove **FRONT AXLE DIFFERENTIAL** .
- Remove **BEARING SUPPORT** .

Release bolts along line (1).

Tightening torque: **11 13 2AZ** .

Installation note:

Replace aluminum screws.

Detach transmission oil lines from oil sump.

cardiagn.com

Tightening torque: **11 13 10AZ** .

Release screws (3), gearbox to oil sump.

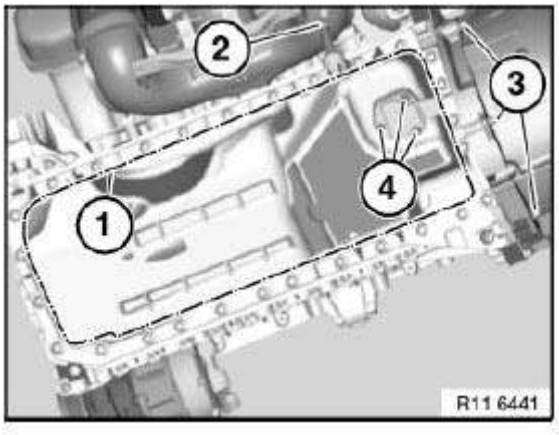


Fig. 296: Identifying Screw And Nuts Of Oil Level Sensor And Sump
Courtesy of BMW OF NORTH AMERICA, INC.

Tightening torque: **11 13 8AZ** .

If necessary, release nuts (4). Remove oil level sensor.

Tightening torque: **11 13 9AZ** .

Installation note:

Replace sealing ring.

IMPORTANT: There must be no adhesive residues in the lower crankcase section retaining threads.
Clean retaining threads and sealing surfaces.

Installation note:

Replace all gaskets.

Assemble engine.

11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N55)

IMPORTANT: Aluminum screws/bolts are permitted with and without color coding (blue).
Aluminum screws/bolts must be replaced each time they are **released.**
For reliable identification:
Aluminum screws/bolts are **not magnetic.**
Jointing torque and angle of rotation must be observed without fail **(risk of damage).**

Necessary preliminary tasks:

- Drain and add **ENGINE OIL**.
- Remove **FRONT AXLE DIFFERENTIAL** .
- Remove **BEARING SUPPORT** .

NOTE: **The lines must be detached from the oil sump on vehicles with automatic transmission; if necessary, detach oil pump and place to one side.**

Release bolts (3) on transmission.

cardiagn.com

Tightening torque: **11 13 6AZ** .

Detach return hose (2).

IMPORTANT: Different screw lengths for securing the oil sump are fitted in vehicles with all-wheel drive or with or without automatic transmission.
Observe different tightening torques.

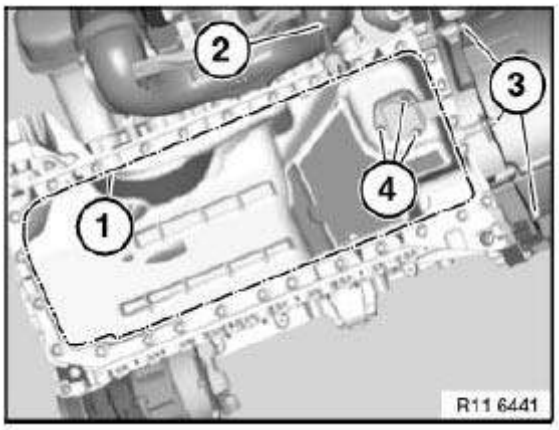


Fig. 297: Identifying Return Hose And Bolts Along Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts along line (1).

For vehicles with four-wheel drive or automatic transmission:

Tightening torque: **11 13 2 AND 3AZ** .

Additionally for vehicles with four-wheel drive:

Tightening torque: **11 13 4AZ** .

Installation note:

Replace aluminum screws.

If necessary, release nuts (4). Remove oil level sensor.

Tightening torque: **11 13 7AZ** .

Installation note:

Replace sealing ring.

IMPORTANT: There must be no adhesive residues in the lower crankcase section retaining threads.
Clean retaining threads and sealing surfaces.

Installation note:

Replace all gaskets.

Assemble engine.

HOUSING COVER

11 14 110 REMOVING AND INSTALLING, SEALING/REPLACING TIMING CASE COVER AT

cardiagn.com

REAR (N47 D20 O1)

Special tools required:

- 00 9 120
- 11 4 470
- 11 8 815

IMPORTANT: Engines with surface sealant:
Application time of sealing bead max. 12 minutes.

Necessary preliminary work:

- Remove ENGINE.
- Remove FLYWHEEL.
- Remove CYLINDER HEAD.
- Removing OIL SUMP.

Release screws (1).

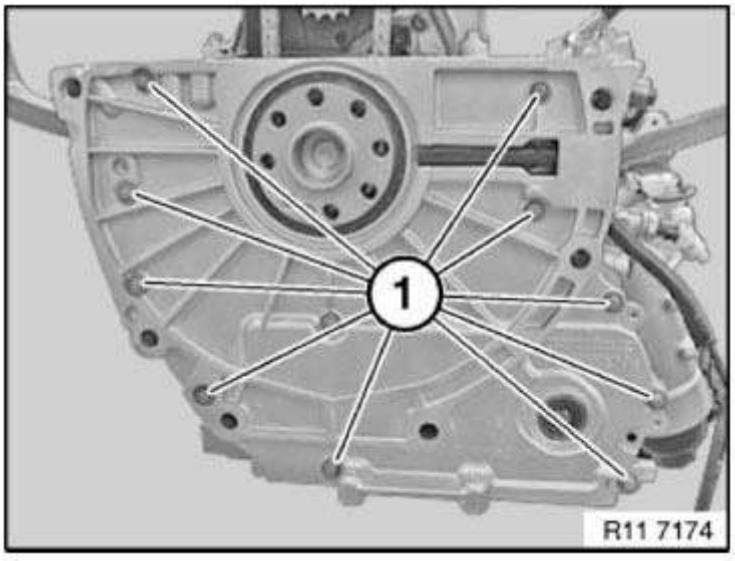


Fig. 298: Identifying Timing Case Cover Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen gear case cover with a screwdriver (1) in direction of arrow.

cardiagn.com

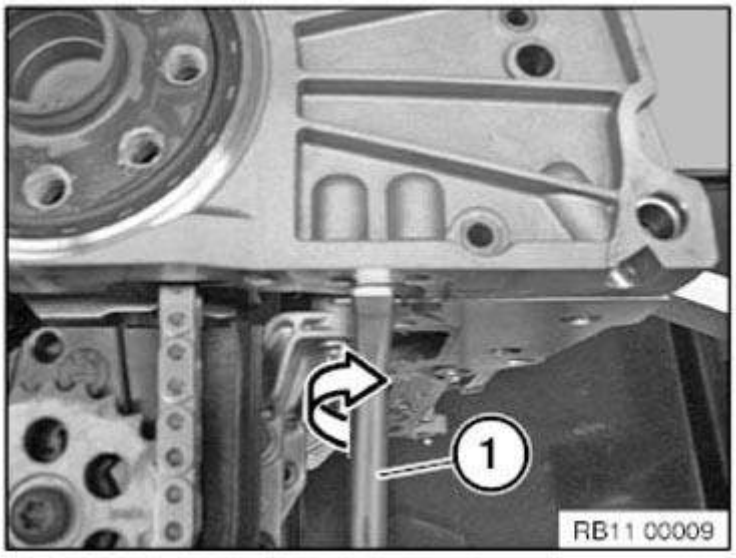


Fig. 299: Loosening Gear Case Cover With Screwdriver
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen gear case cover with a screwdriver (1) in direction of arrow.

Remove gear case cover.

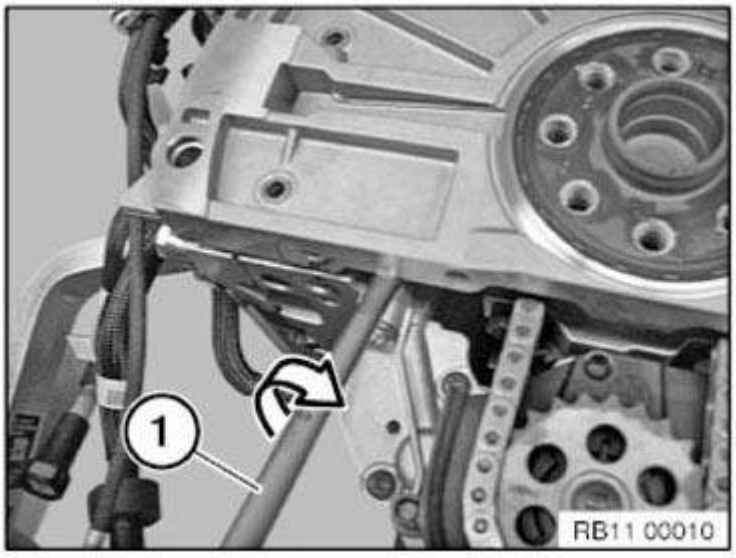


Fig. 300: Loosening Gear Case Cover With Screwdriver
Courtesy of BMW OF NORTH AMERICA, INC.

Remove gasket remnants from crankcase and gear case cover with special tool **11 4 470** .

Apply sealing bead (1) at marked points.

Installation note:

Application time of sealing bead (1) max. 12 minutes.

Position sealing bead (1) at marked point (see arrow) on outside on gear case cover.

Thickness of **SEALING BEAD**: **1.5 to 2.0 mm.**

cardiagn.com

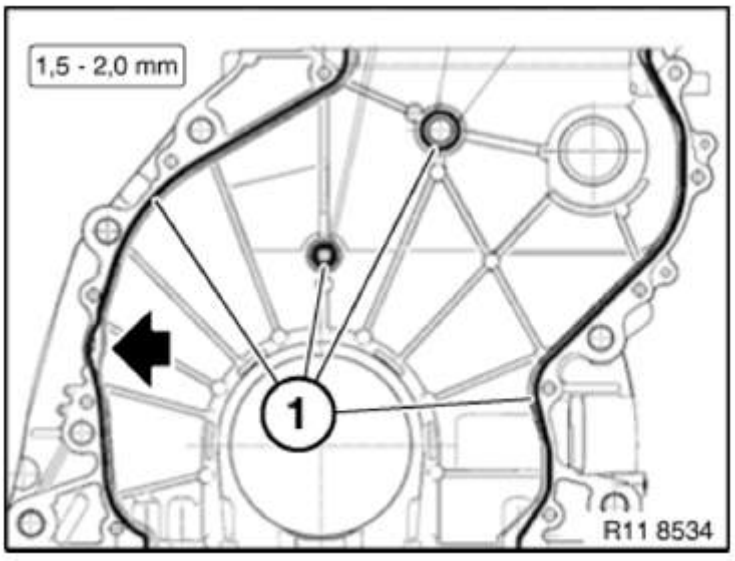


Fig. 301: Locating Sealing Bead Marked Point On Gear Case Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Insert bolts (1).

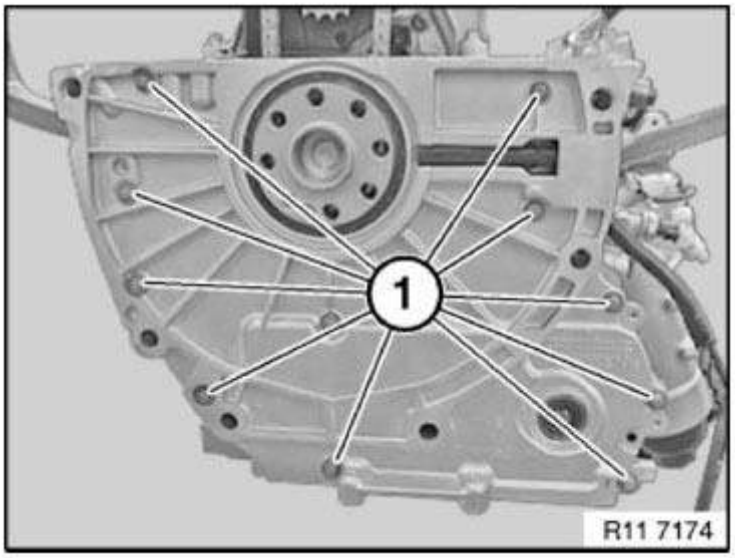


Fig. 302: Identifying Timing Case Cover Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **00 9 120** with bolts (1).

Tightening torque: **11 14 2AZ** .

cardiagn.com

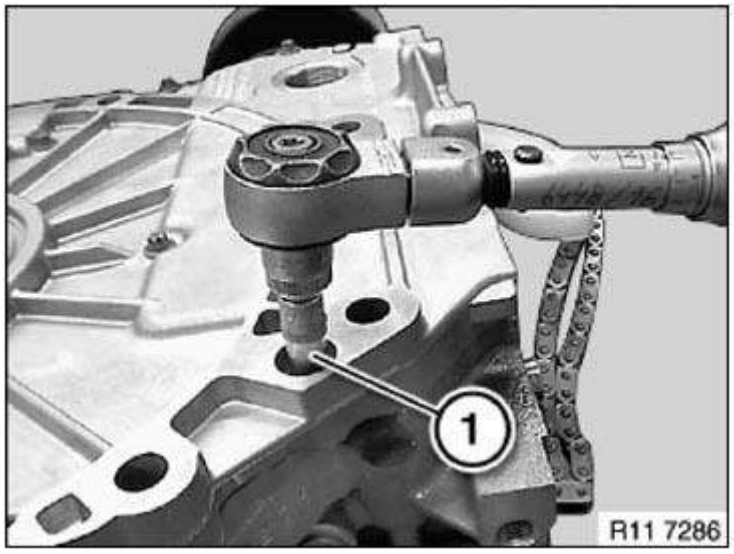


Fig. 303: Securing Special Tool (00 9 120) With Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

REPLACE RADIAL SHAFT SEAL AT FRONT.

ASSEMBLE ENGINE.

Procedure for replacing gear case cover.

Release screws (1).

Release bolt holding high pressure pump.

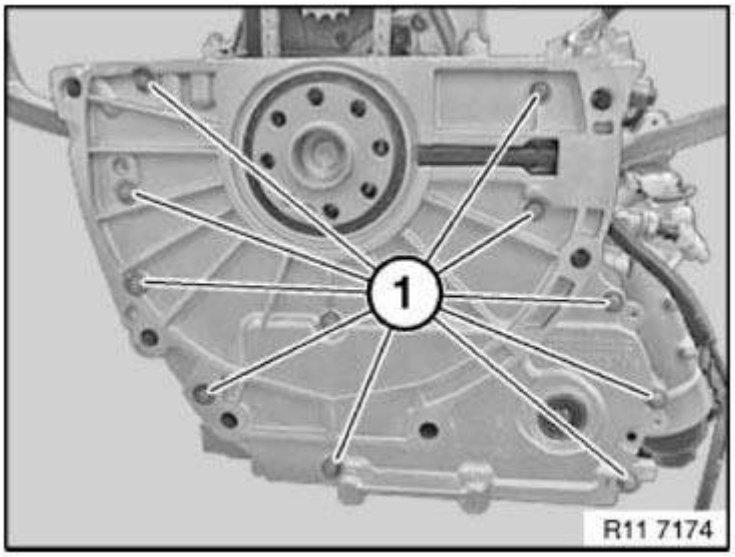


Fig. 304: Identifying Timing Case Cover Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove gasket remnants from the crankcase with special tool **11 4 470** .

Apply sealing bead (1) at marked points.

Installation note:

Application time of sealing bead (1) max. 12 minutes.

Position sealing bead (1) at marked point (see arrow) on inside on gear case cover.

cardiagn.com

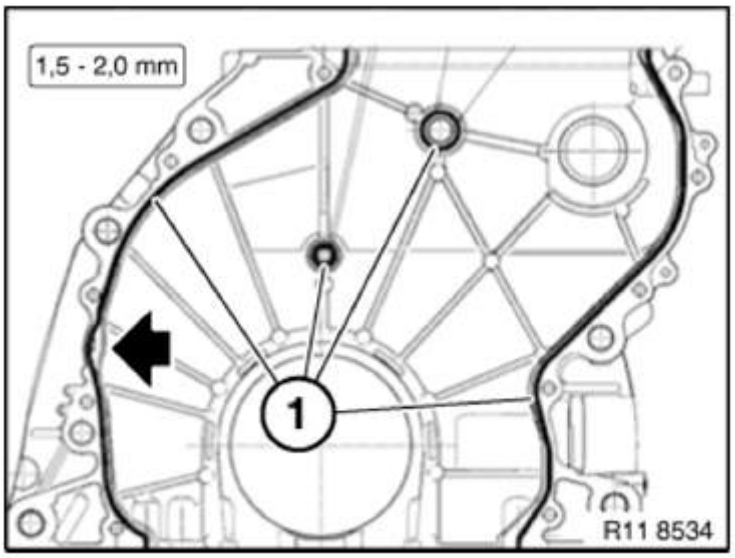


Fig. 305: Locating Sealing Bead Marked Point On Gear Case Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Thickness of **SEALING BEAD**: **1.5 to 2.0 mm.**

Preassemble special tool **11 8 815** on crankshaft.

Install accelerator pedal module ring (1) with gear case cover dry and without lubricant.

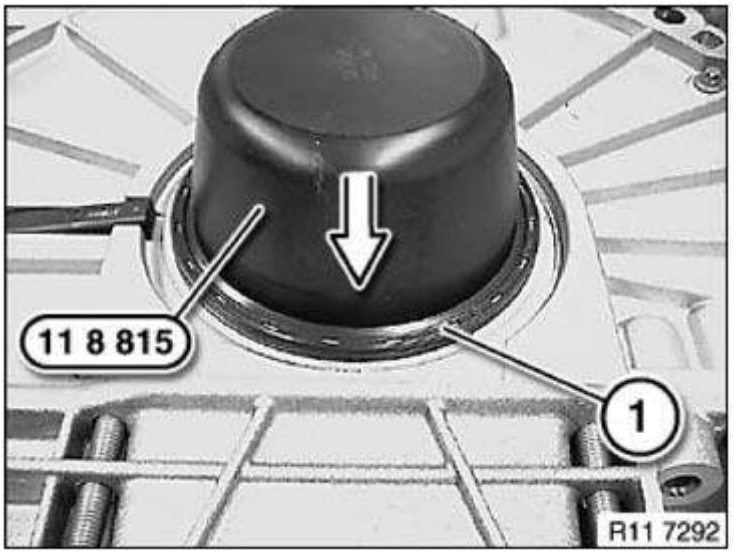


Fig. 306: Installing Accelerator Pedal Module Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Insert bolts (1).

cardiagn.com

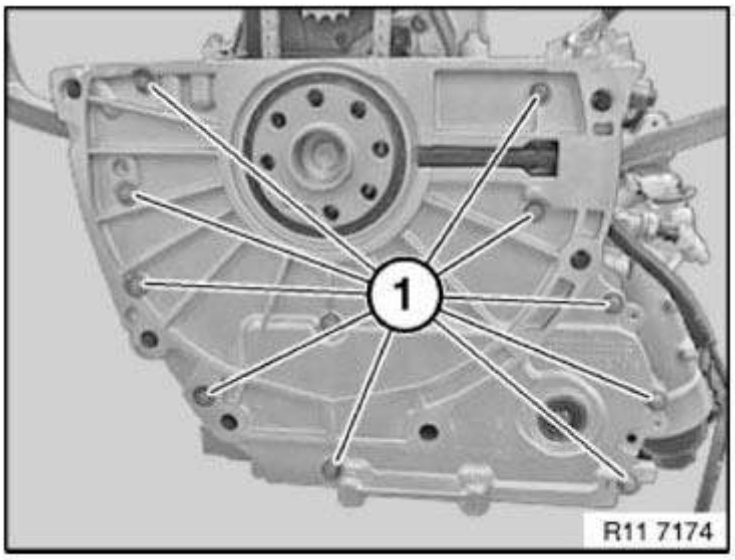


Fig. 307: Identifying Timing Case Cover Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **00 9 120** with bolts (1).

Tightening torque: **11 14 2AZ** .

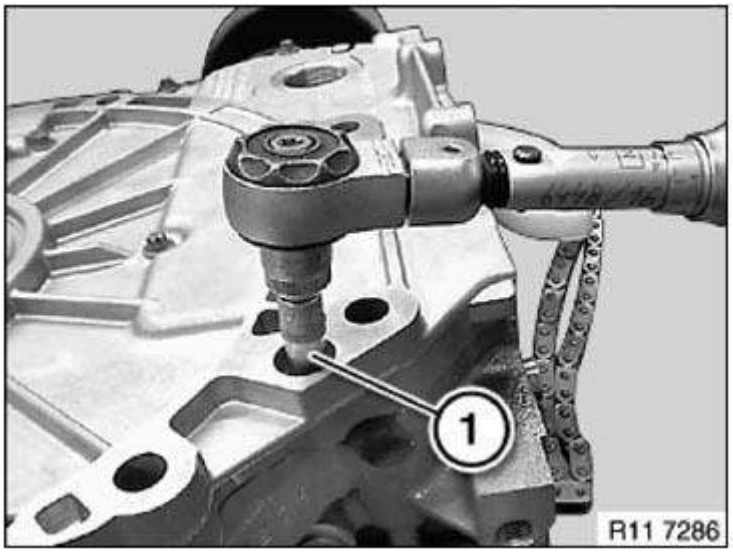


Fig. 308: Securing Special Tool (00 9 120) With Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 14 015 REMOVING AND INSTALLING/REPLACING SEALING CAP FOR OIL PUMP CHAIN TENSIONER (N55)

Special tools required:

- **11 8 530**
- **11 8 531**
- **11 8 532**
- **11 8 533**
- **11 8 534**
- **11 8 535**

cardiagn.com

- 11 8 537
- 2 318 118
- 2 318 119

Necessary preliminary work:

- Remove **FAN COWL** .
- Remove **DRIVE BELT** for alternator.
- Remove both drive belt tensioning devices (hybrid car).
- Remove vibration damper. See **11 23 010 REMOVING AND INSTALLING/REPLACING VIBRATION DAMPER (N55)**.

Drive out sealing cap (1) with a suitable punch (2) in direction of arrow.

NOTE: The sealing cap is driven out diagonally during this operation.

Fig. 309: Removing Sealing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Removing sealing cap:

Prepare special tool **11 8 530** .

Remove special tool **11 8 533** from special tool **11 8 532** and **11 8 534** .

Special tool 11 8 536 is not required.

Fig. 310: Identifying Special Tool (11 8 530)
Courtesy of BMW OF NORTH AMERICA, INC.

Special tool **2 318 118** is magnetic.

Secure special tool **2 318 118** on special tool **11 8 531** (refer to **Fig. 311**).

Fig. 311: Identifying Special Tool (2 318 118)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw back screw (2) on special tool **2 318 119** .

Install special tool **2 318 119** with screw (1) on special tool **11 8 531** .

Fig. 312: Identifying Special Tool (11 8 531)
Courtesy of BMW OF NORTH AMERICA, INC.

Position sealing cap (1) on crankcase (2).

Fig. 313: Positioning Sealing Cap On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Installing sealing cap:

Screw in screw (1) on special tool **2 318 119** up to limit position.

Tightening torque: 20 Nm.

cardiagn.com

Fig. 314: Installing Sealing Cap Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 14 005 REPLACING FRONT CRANKSHAFT SEAL (N20, N26)

Special tools required:

- 11 0 371
- 11 0 372
- 83 30 0 496 275
- 2 212 822
- 11 9 231
- 11 9 233

Necessary preliminary tasks:

- Remove VIBRATION DAMPER

IMPORTANT: Do not release central bolt.
If the central bolt is released, the sprockets of the timing chain and the oil pump will no longer be non-positively connected to the crankshaft. Intake and exhaust camshafts can turn in relation to crankshaft.
Risk of damage!

Fig. 315: Identifying Crankshaft Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool 11 0 371 to 50 Nm into radial shaft seal.

Screw in spindle 11 0 372 .

Release crankshaft seal from housing.

Repeat the operation several times if necessary.

Order number: 83 30 0 496 275

Fig. 316: Releasing Crankshaft Seal From Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully saw open crankshaft seal (1) at cutting line (2).

Remove crankshaft seal (1) from special tool 11 0 371 .

Fig. 317: Removing Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The following text describes installation and sealing between the engine block and crankshaft seal.
The engine block will not be leak proof at the outside of the crankshaft seal if you fail to comply with the individual work steps and the work sequence.

cardiagn.com

Connect supporting sleeve (1) to special tool **2 212 822** .

Position radial shaft seal (2) carefully in direction of arrow on special tool **2 212 822** .

Fig. 318: Connecting Supporting Sleeve To Special Tool 2 212 822
Courtesy of BMW OF NORTH AMERICA, INC.

Slide the radial shaft seal (1) all the way home.

Remove supporting sleeve (2).

Fig. 319: Removing Supporting Sleeve
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **2 212 822** to the crankshaft with 2 screws.

Fig. 320: Securing Special Tool 2 212 822 To Crankshaft With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Align radial shaft seal (1) in parallel with the special tool **11 9 231** for housing separation.

Fig. 321: Aligning Radial Shaft Seal With Special Tool 11 9 231 For Housing Separation
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in radial shaft seal with special tool **11 9 231** in conjunction with special tool **11 9 233** until flush.

Fig. 322: Drawing Radial Shaft Seal With Special Tool 11 9 231
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 14 005 REPLACING FRONT CRANKSHAFT SEAL (N47 D20 O1)

Special tools required:

- **11 8 801**
- **11 8 802**
- **11 8 803**
- **11 8 804**

Necessary preliminary work:

- Removing **VIBRATION DAMPER**:
- Lever out FPM ring using suitable tool.

IMPORTANT: Accelerator pedal module rings must be installed in a dry condition. Do not use engine oil or lubricant.

Fasten special tool **11 8 801** with **11 8 802** on the crankshaft.

Fig. 323: Identifying Special Tool 11 8 801 With 11 8 802 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Position accelerator pedal module ring on the special tool **11 8 801** .

Fig. 324: Positioning Accelerator Pedal Module Ring On Special Tool 11 8 801
Courtesy of BMW OF NORTH AMERICA, INC.

Pull on accelerator pedal module-ring with special tool **11 8 803** and **11 8 804** .

Screw in special tool **11 8 803** until it is flush with the crankcase.

Fig. 325: Pulling On Accelerator Pedal Module Ring With Special Tool 11 8 803 And 11 8 804
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

IMPORTANT: Do not start engine without drive belt **(risk of damage!).**
Check engine for leak tightness.

11 14 005 REPLACING FRONT CRANKSHAFT SEAL (N52T)

Special tools required:

- **11 0 371**
- **11 0 372**
- **11 4 370**
- **11 9 221**
- **11 9 222**
- **11 9 224**
- **11 9 231**
- **11 9 233**
- **11 9 234**
- **11 9 235**

Necessary preliminary work:

- Remove **VIBRATION DAMPER**

IMPORTANT: Do not release central bolt.
If the central bolt is released, the camshaft sprockets of the timing chain and the oil pump will no longer be non-positively connected to the crankshaft. Intake and exhaust camshafts can turn in relation to crankshaft.
Risk of damage!

Fig. 326: Identifying Crankshaft Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Turn back special tool **11 9 222** .

Push special tool **11 9 221** onto crankshaft.

IMPORTANT: When screws are tightened down (special tool **11 9 224**) crankshaft seal is pressed inwards approx. 1 mm and thus slackened for subsequent removal.

cardiagn.com

Fig. 327: Pushing Special Tool 11 9 221 Onto Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Insert screws (special tool **11 9 224**) and tighten down to approx. 20 Nm.

Screw special tool **11 0 371** to 80 Nm into crankshaft seal.

Screw in spindle **11 0 372** .

Release crankshaft seal from housing.

Repeat the operation several times if necessary.

Fig. 328: Releasing Crankshaft Seal From Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully saw open crankshaft seal (1) at cutting line (2).

Remove crankshaft seal (1) from special tool **11 0 371** .

Fig. 329: Removing Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The following text describes installation and sealing between the engine block and crankshaft seal.
The engine block will not be leakproof at the outside of the crankshaft seal if you fail to comply with the individual work steps and the work sequence.

Installation note:

Clean sealing surface (1) and degrease thoroughly in area of housing partition.

Apply a light coat of oil to running surface (2) of crankshaft seal.

Graphic N42.

Fig. 330: Identifying Sealing Surface And Running Surface
Courtesy of BMW OF NORTH AMERICA, INC.

Push radial shaft seal (1) carefully in direction of arrow on special tool **11 9 235** .

Fig. 331: Pushing Radial Shaft Seal On Special Tool 11 9 235
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Special tool **11 9 235** can only be attached with 2 opposite bolts.
Determine hole pattern on special tool.

Screw special tool **11 9 235** with special tool **11 9 234** on crankshaft.

Fig. 332: Screwing Special Tool 11 9 235 With 11 9 234 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Align groove (2) of radial shaft seal (1) centered to the housing partition (3).

IMPORTANT: After installation, the grooves must be filled with sealing compound.

cardiagn.com

Fig. 333: Aligning Groove Of Radial Shaft Seal Centered To Housing Partition
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in radial shaft seal with special tool **11 9 231** in conjunction with special tool **11 9 233** until flush.

Fig. 334: Drawing Radial Shaft Seal With Special Tool 11 9 231
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Use **PRIMER 1.3 AND LIQUID SEAL 1.4**.

Prepare liquid sealing compound (1) in special tool **11 4 370** .

Remove screw caps (1) from injector (2).

Screw on metering needle.

Insert piston for pressing out.

Fig. 335: Identifying Liquid Sealing Compound, Bottle, Screw Caps From Injector
Courtesy of BMW OF NORTH AMERICA, INC.

Injector (2) contains the sealing compound Loctite, manufacturer's number 128357.

Bottle (3) contains the primer Loctite, manufacturer's number 171000.

Before filling with sealing compound:

Moisten brush with Loctite primer, manufacturer's number 171000. Insert brush as far as possible into grooves (1) on crankshaft seal in order to coat housing partition on engine block.

Graphic N42.

Fig. 336: Inserting Brush Into Grooves On Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Using injector (2), fill both grooves (3) flush with Loctite sealing compound, manufacturer's number 128357.

Graphic N42.

Fig. 337: Filling Both Grooves Flush With Loctite Sealing Compound
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Loctite primer, manufacturer's number 171000, binds the Loctite sealing compound, manufacturer's number 128357, and prevents leakage.

Coat surface of sealing compound in both grooves (1) with Loctite primer, manufacturer's number 171000.

Graphic N42.

Fig. 338: Coating Surface Of Sealing Compound In Both Grooves
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Assemble engine.

11 14 005 REPLACING FRONT CRANKSHAFT SEAL (N55) AS OF 02.2014

Special tools required:

- 11 0 371
- 11 0 372
- 11 4 370
- 11 9 221
- 11 9 222
- 11 9 224
- 11 9 231
- 11 9 233
- 11 9 234
- 11 9 235
- 2 303 795

Necessary preliminary tasks:

- Remove VIBRATION ABSORBER.

IMPORTANT: Do not release central bolt.
If the central bolt is released, the sprockets of the timing chain and the oil pump will no longer be non- positively connected to the crankshaft. Intake and exhaust camshafts can turn in relation to crankshaft.
Risk of damage!

Fig. 339: Identifying Crankshaft Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool 11 0 371 to 80 Nm into crankshaft seal.

Screw in spindle 11 0 372 .

Release crankshaft seal from housing.

Repeat the operation several times if necessary.

Fig. 340: Releasing Crankshaft Seal From Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully saw open crankshaft seal (1) at cutting line (2).

Remove crankshaft seal (1) from special tool 11 0 371 .

Fig. 341: Removing Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The following text describes installation and sealing between the engine block and crankshaft seal.
The engine block will not be leak proof at the outside of the crankshaft seal if you fail to comply with the individual work steps and the work sequence.

cardiagn.com

Push radial shaft seal (1)

11 9 235 carefully in direction of arrow on the special tool.

Fig. 342: Pushing Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Remove support ring (1).

Fig. 343: Identifying Support Ring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Special tool 11 9 235 can only be fastened with 2 opposite bolts. Determine hole pattern on special tool.

Fasten special tool 11 9 235 onto crankshaft by 2 screws (1).

Fig. 344: Identifying Special Tool (11 9 235)
Courtesy of BMW OF NORTH AMERICA, INC.

Position radial shaft seal (1) on crankcase in direction of arrow using special tool 11 9 235 .

Fig. 345: Positioning Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Insert radial shaft seal flush into crankcase with special tool 11 9 231 and 2 303 795 .

Fig. 346: Inserting Radial Shaft Seal Flush Into Crankcase Using Special Tool (11 9 231 And 2 303 795)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 14 005 REPLACING FRONT CRANKSHAFT SEAL (N55) UP TO 02.2014

Special tools required:

- 11 0 371
- 11 0 372
- 11 4 370
- 11 9 221
- 11 9 222
- 11 9 224
- 11 9 231
- 11 9 233
- 11 9 234
- 11 9 235

Necessary preliminary tasks:

- Remove VIBRATION DAMPER

  Do not release central bolt.

cardiagn.com

IMPORTANT: If the central bolt is released, the sprockets of the timing chain and the oil pump will no longer be non-positively connected to the crankshaft. Intake and exhaust camshafts can turn in relation to crankshaft.
Risk of damage!

Fig. 347: Identifying Crankshaft Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 0 371** with 80 Newton meters into the crankshaft seal.

Screw in spindle **11 0 372** .

Release crankshaft seal from housing.

Repeat the operation several times if necessary.

Fig. 348: Releasing Crankshaft Seal From Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully saw open crankshaft seal (1) at cutting line (2).

Remove crankshaft seal (1) from special tool **11 0 371** .

Fig. 349: Removing Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The following text describes installation and sealing between the engine block and crankshaft seal.
The engine block will not be leak proof at the outside of the crankshaft seal if you fail to comply with the individual work steps and the work sequence.

Installation note:

Clean sealing surface (1) and degrease thoroughly in area of housing partition.

Apply a light coat of oil to running surface (2) of crankshaft seal.

Graphic N42.

Fig. 350: Identifying Sealing Surface And Running Surface
Courtesy of BMW OF NORTH AMERICA, INC.

Push radial shaft seal (1) **11 9 235** carefully in direction of arrow on the special tool.

Fig. 351: Pushing Radial Shaft Seal On Special Tool 11 9 235
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **11 9 235** Special tool can only be fastened with 2 opposite bolts.
Determine hole pattern on special tool.

Screw special tool **11 9 235** with special tool **11 9 234** on crankshaft.

Fig. 352: Screwing Special Tool 11 9 235 With 11 9 234 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Align groove (2) of radial shaft seal (1) centered to the housing partition (3).

IMPORTANT: After installation, the grooves must be filled with sealing compound.

Fig. 353: Aligning Groove Of Radial Shaft Seal Centered To Housing Partition
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in radial shaft seal with special tool **11 9 231** in conjunction with special tool **11 9 233** until flush.

Fig. 354: Drawing Radial Shaft Seal With Special Tool 11 9 231
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Use **PRIMER 1.3 AND LIQUID SEAL 1.4**.

Prepare liquid sealing compound (1) in special tool **11 4 370** .

Remove sealing caps (1) from injector (2).

Screw on metering needle.

Insert piston for pressing out.

Syringe (2) contains the sealing compound Loctite, manufacturer's number 128357.

Bottle (3) contains the primer Loctite, manufacturer's number 171000.

Fig. 355: Identifying Liquid Sealing Compound, Bottle, Screw Caps From Injector
Courtesy of BMW OF NORTH AMERICA, INC.

Before filling with sealing compound:

Moisten brush with Loctite primer, manufacturer's number 171000. Insert brush as far as possible into grooves (1) on crankshaft seal in order to coat housing partition on engine block.

Graphic N42.

Fig. 356: Inserting Brush Into Grooves On Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Using syringe (2), fill both grooves (3) flush with Loctite sealing compound, manufacturer's number 128357.

Graphic N42.

Fig. 357: Filling Both Grooves Flush With Loctite Sealing Compound
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Loctite primer, manufacturer's number 171000, binds the Loctite sealing compound, manufacturer's number 128357, and prevents leakage.**
Coat surface of sealing compound in both grooves (1) with Loctite primer, manufacturer's number 171000.
Graphic N42.

cardiagn.com

Fig. 358: Coating Surface Of Sealing Compound In Both Grooves
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 14 151 REPLACING CRANKSHAFT SEAL ON TRANSMISSION SIDE (N20, N26)

Special tools required:

- **11 8 220**
- **11 9 181**
- **11 9 183**
- **11 9 184**
- 23 0 490 (puller)
- **11 9 182**
- **2 212 827**

Necessary preliminary tasks:

- Remove **FLYWHEEL**.

IMPORTANT: Magnet wheel (1) is magnetic.
Keep magnet wheel (1) in a plastic bag away from swarf.

Remove magnet wheel (1) from crankshaft.

Installation note:

Check the fitting sleeve for damage.

Note the installation position of the magnet wheel.

Fig. 359: Identifying Magnet Wheel On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw on pulse sensor (1).

Slide **PULSE SENSOR** (2) upwards.

Fig. 360: Identifying Pulse Sensor With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Drill size maximum 2, 5 mm.
Remove swarf immediately.

Drill a hole with a drill (1) in the radial shaft seal (see arrow).

Fig. 361: Drilling Hole On Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Remove swarf from the radial shaft seal (1).

Fig. 362: Identifying Swarf From Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

IMPORTANT: Risk of damage at the crankcase and on the running surface of the crankshaft. Immediately carefully remove residual swarf.

Screw in special tool 23 0 490 (puller) in direction of arrow.

Drive out radial shaft seal with impact weight in direction of arrow.

Fig. 363: Driving Out Radial Shaft Seal With Impact Weight
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare radial shaft seal (1) on special tool **11 8 220** .

Fig. 364: Identifying Radial Shaft Seal On Special Tool 11 8 220
Courtesy of BMW OF NORTH AMERICA, INC.

Position the radial shaft seal (1) with special tool **11 8 220** on the crankshaft.

Fig. 365: Positioning Radial Shaft Seal With Special Tool 11 8 220 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Brush radial shaft seal (1) over the special tool **11 8 220** .

Move radial shaft seal (1) parallel up against the crankcase.

Fig. 366: Moving Radial Shaft Seal Parallel Up Against Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Fasten special tool **11 9 182** with special tool **11 9 184** on the crankshaft.

Fig. 367: Identifying Special Tool 11 9 182 With 11 9 184 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Prepare special tool **11 9 181** for installation.

Connect special tool **2 212 827** onto special tool **11 9 181** .

Fig. 368: Connecting Special Tool 2 212 827 Onto Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Pull on radial shaft seal with special tools **11 9 181** and **2 212 827** in combination with special tool **11 9 183** .

Fig. 369: Pulling On Radial Shaft Seal With Special Tools 11 9 181
Courtesy of BMW OF NORTH AMERICA, INC.

Screw on radial shaft seal with special tool **11 9 183** to limit position.

Fig. 370: Screwing On Radial Shaft Seal With Special Tool 11 9 183 To Limit Position
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

cardiagn.com

Assemble engine.

11 14 151 REPLACING RADIAL CRANKSHAFT SEAL ON TRANSMISSION SIDE (N52T) FROM 01.01.09

Special tools required:

- 11 8 220
- 11 9 181
- 11 9 182
- 11 9 183
- 11 9 184
- 11 9 185
- 23 0 490 (puller)

Necessary preliminary work:

- Remove **flywheel** . See 11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N52T).

IMPORTANT: Magnet wheel (1) is magnetic.
Keep magnet wheel (1) in a plastic bag away from swarf.

Remove magnet wheel (1) from crankshaft.

Fig. 371: Identifying Magnet Wheel On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw on pulse sensor (1).

Slide **PULSE SENSOR** (2) upwards.

Fig. 372: Identifying Pulse Sensor With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Drill size maximum 2.5 millimeters.
Remove swarf immediately.

Drill a hole with a drill (1) in the radial shaft seal (see arrow).

Fig. 373: Drilling Hole On Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Immediately carefully remove swarf on the radial shaft seal (1).

Fig. 374: Identifying Swarf On Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in special tool 23 0 490 (puller) in direction of arrow.

Drive out radial shaft seal with impact weight in direction of arrow.

IMPORTANT: Immediately carefully remove residual swarf.

cardiagn.com

Fig. 375: Driving Out Radial Shaft Seal With Impact Weight
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare radial shaft seal (1) on special tool **11 8 220** .

Fig. 376: Identifying Radial Shaft Seal On Special Tool 11 8 220
Courtesy of BMW OF NORTH AMERICA, INC.

Position the radial shaft seal (1) with special tool **11 8 220** on the crankshaft.

Fig. 377: Positioning Radial Shaft Seal With Special Tool 11 8 220 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Brush radial shaft seal (1) over the special tool **11 8 220** .

Move radial shaft seal (1) parallel up against the crankcase.

Fig. 378: Moving Radial Shaft Seal Parallel Up Against Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Fasten special tool **11 9 182** with special tool **11 9 184** on the crankshaft.

Fig. 379: Fastening Special Tool 11 9 182 With 11 9 184 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Prepare special tool **11 9 181** for installation.

Connect special tool **11 9 185** onto special tool **11 9 181** .

Fig. 380: Connecting Special Tool 11 9 185 Onto Special Tool 11 9 181
Courtesy of BMW OF NORTH AMERICA, INC.

Pull on radial shaft seal with special tools **11 9 181** and **11 9 185** in combination with special tool **11 9 183** .

Fig. 381: Pulling On Radial Shaft Seal With Special Tools 11 9 181 And 11 9 185
Courtesy of BMW OF NORTH AMERICA, INC.

Screw on radial shaft seal with special tool **11 9 183** to limit position.

Fig. 382: Screwing On Radial Shaft Seal With Special Tool 11 9 183 To Limit Position
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

11 14 151 REPLACING RADIAL CRANKSHAFT SEAL ON TRANSMISSION SIDE (N55)

Special tools required:

- **11 8 220**

cardiagn.com

- 23 0 490 (puller)
- **11 9 180**
- **11 9 183**

Necessary preliminary work:

- Remove **FLYWHEEL**

IMPORTANT: Magnet wheel (1) is magnetic.
Keep magnet wheel (1) in a plastic bag away from swarf.

Remove magnet wheel (1) from crankshaft.

Fig. 383: Identifying Magnet Wheel On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw on pulse sensor (1).

Slide **PULSE SENSOR** (2) upwards.

Fig. 384: Identifying Pulse Sensor With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Drill size maximum 2.5 millimeters.
Remove swarf immediately.

Drill a hole with a drill (1) in the radial shaft seal (see arrow).

Fig. 385: Drilling Hole On Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Immediately carefully remove swarf on the radial shaft seal (1).

Fig. 386: Identifying Swarf From Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in special tool 23 0 490 (puller) in direction of arrow.

Drive out radial shaft seal with impact weight in direction of arrow.

IMPORTANT: Immediately carefully remove residual swarf.

Fig. 387: Driving Out Radial Shaft Seal With Impact Weight
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare radial shaft seal (1) on special tool **11 8 220** .

Fig. 388: Identifying Radial Shaft Seal On Special Tool 11 8 220
Courtesy of BMW OF NORTH AMERICA, INC.

Position the radial shaft seal (1) with special tool **11 8 220** on the crankshaft.

cardiagn.com

Fig. 389: Positioning Radial Shaft Seal With Special Tool 11 8 220 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Brush radial shaft seal (1) over the special tool **11 8 220** .

Move radial shaft seal (1) parallel up against the crankcase.

Fig. 390: Moving Radial Shaft Seal Parallel Up Against Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool 11 9 182 to crankshaft with special tool 11 9 184 from set of special tools **11 9 180** .

Fig. 391: Fastening Special Tool 11 9 182 With 11 9 184 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Prepare special tool 11 9 181 from set of special tools **11 9 180** for installation.

Connect special tool 11 9 185 to special tool 11 9 181 from set of special tools **11 9 180** .

Fig. 392: Connecting Special Tool 11 9 185 Onto Special Tool 11 9 181
Courtesy of BMW OF NORTH AMERICA, INC.

Pull in radial shaft seal with special tool 11 9 181 and 11 9 185 in conjunction with special tool 11 9 183 from set of special tools **11 9 180** .

Fig. 393: Pulling On Radial Shaft Seal With Special Tools 11 9 181 And 11 9 185
Courtesy of BMW OF NORTH AMERICA, INC.

Screw on radial shaft seal with special tool **11 9 183** to limit position.

Fig. 394: Screwing On Radial Shaft Seal With Special Tool 11 9 183 To Limit Position
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

11 14 151 REPLACING RADIAL CRANKSHAFT SEAL ON TRANSMISSION SIDE (N52T) BY 31.12.08

Special tools required:

- **11 8 220**
- **11 9 181**
- **11 9 182**
- **11 9 183**
- **11 9 184**
- **11 9 185**
- 23 0 490 (puller)

Necessary preliminary tasks:

cardiagn.com

- Remove **GEARBOX**
- Remove **FLYWHEEL**

IMPORTANT: Drill size maximum 2, 5 mm.
Remove swarf immediately.

Drill a hole with a drill (1) in the radial shaft seal (see arrow).

Fig. 395: Drilling Hole On Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Immediately carefully remove swarf on the radial shaft seal (1).

Fig. 396: Identifying Swarf On Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in special tool 23 0 490 (puller) in direction of arrow.

Drive out radial shaft seal with impact weight in direction of arrow.

IMPORTANT: Immediately carefully remove residual swarf.

Fig. 397: Driving Out Radial Shaft Seal With Impact Weight
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare radial shaft seal (1) on special tool **11 8 220** .

Fig. 398: Identifying Radial Shaft Seal On Special Tool 11 8 220
Courtesy of BMW OF NORTH AMERICA, INC.

Position the radial shaft seal (1) with special tool **11 8 220** on the crankshaft.

Fig. 399: Positioning Radial Shaft Seal With Special Tool 11 8 220 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Brush radial shaft seal (1) over the special tool **11 8 220** .

Move radial shaft seal (1) parallel up against the crankcase.

Fig. 400: Moving Radial Shaft Seal Parallel Up Against Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Fasten special tool **11 9 182** with special tool **11 9 184** on the crankshaft.

Fig. 401: Identifying Special Tool 11 9 182 With 11 9 184 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Prepare special tool **11 9 181** for installation.

Connect special tool **11 9 185** onto special tool **11 9 181** .

cardiagn.com

Fig. 402: Connecting Special Tool 11 9 185 Onto Special Tool 11 9 181
Courtesy of BMW OF NORTH AMERICA, INC.

Pull on radial shaft seal with special tool **11 9 181** and **11 9 185** in combination with special tool **11 9 183** .

Fig. 403: Pulling On Radial Shaft Seal With Special Tools 11 9 181 And 11 9 185
Courtesy of BMW OF NORTH AMERICA, INC.

Screw on radial shaft seal with special tool **11 9 183** to limit position.

Fig. 404: Screwing On Radial Shaft Seal With Special Tool 11 9 183 To Limit Position
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

11 14 151 REPLACING REAR CRANKSHAFT SEAL (N47 D20 O1)

Special tools required:

- **11 8 810**
- **11 8 811**
- **11 8 812**
- **11 8 813**
- **11 8 815**
- **11 8 814**

Necessary preliminary tasks:

- **DRAIN ENGINE OIL**.
- **REMOVE FLYWHEEL**.
- Remove radial shaft seal with a suitable tool.

IMPORTANT: The radial shaft seal must be installed dry.
Do not use engine oil or lubricant.

Position special tool **11 8 815** on crankshaft.

Fig. 405: Positioning Special Tool 11 8 815 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Use special tool **11 8 815** to fit the radial shaft seal (1) in the direction of the arrow just up to gear case cover and position.

Remove special tool **11 8 815** .

cardiagn.com

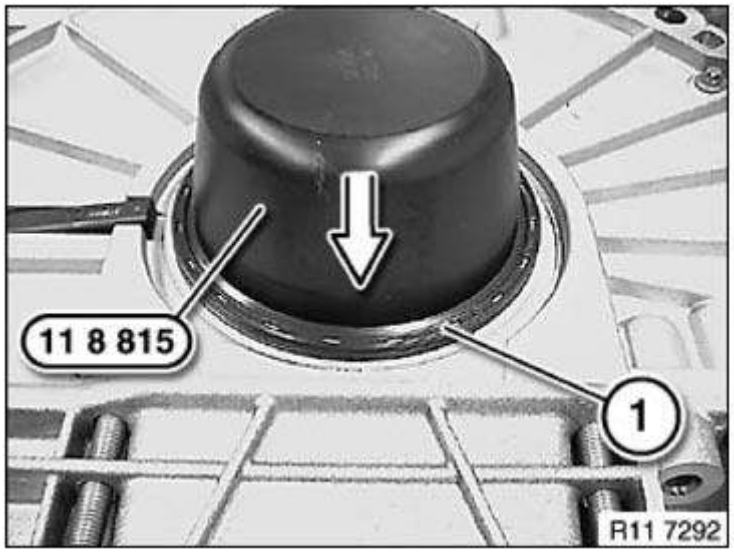


Fig. 406: Fitting Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Fasten special tool **11 8 811** with special tool **11 8 812** on the crankshaft.

Position radial shaft seal (1).

Fig. 407: Positioning Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Slide on special tool **11 8 813** .

Screw down special tool **11 8 814** .

Fig. 408: Screwing Down Special Tool 11 8 814
Courtesy of BMW OF NORTH AMERICA, INC.

Press in radial shaft seal with special tool **11 8 813** .

Screw in special tool **11 8 813** up to gear case cover.

Fig. 409: Pressing Radial Shaft Seal With Special Tool 11 8 813
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools **11 8 810** .

Assemble engine.

Check engine for leak tightness.

11 14 010 REPLACING SEALING CAP FOR VACUUM PUMP (N55)

Special tools required:

- **11 8 530**
- **11 8 531**
- **11 8 532**
- **11 8 533**
- **11 8 534**

cardiagn.com

- 11 8 535
- 11 8 537

Necessary preliminary tasks:

- Remove **FAN COWL** .
- Remove drive belt **TENSIONING DEVICES**.

Removing sealing cap:

Prepare special tool 11 8 530 .

Remove special tool 11 8 533 from special tool 11 8 532 .

Install special tool 11 8 534 .

Special tool 11 8 536 is not required.

Fig. 410: Identifying Special Tool (11 8 530)
Courtesy of BMW OF NORTH AMERICA, INC.

Attach special tool 11 8 531 to long special tool 11 8 535 .

Short special tool 11 8 535 (short); a 6 mm thick M10 washer must be placed underneath between crankcase and special tool 11 8 531 .

NOTE: For purposes of clarity, graphics show alternator and power steering pump removed.

Fig. 411: Attaching Special Tool 11 8 531 To Long Special Tool 11 8 535
Courtesy of BMW OF NORTH AMERICA, INC.

Special tool 11 8 537 must be positioned manually on sealing cap.

Screw in special tool 11 8 534 .

NOTE: The sealing cap is pressed out diagonally during this work step

Fig. 412: Screwing Special Tool 11 8 534
Courtesy of BMW OF NORTH AMERICA, INC.

Installing sealing cap:

Prepare special tool 11 8 530 .

Remove special tool 11 8 534 from special tool.

Install special tools 11 8 533 and 11 8 532 .

Fig. 413: Identifying Special Tool (11 8 530)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in new sealing cap (1) with special tools 11 8 532 and 11 8 533 until flush with crankcase upper part.

cardiagn.com

Fig. 414: Screwing Sealing Cap With Special Tools 11 8 532
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 14 010 REPLACING SEALING COVER FOR VACUUM PUMP (N52T)

Special tools required:

- 11 8 531
- 11 8 532
- 11 8 533
- 11 8 534
- 11 8 535
- 11 8 537
- 11 9 266

Necessary preliminary work:

- Remove FAN COWL
- Remove alternator DRIVE BELT
- Remove both drive belt TENSIONERS

NOTE: For purposes of clarity, graphics show alternator and power steering pump removed.

Secure special tools 11 8 535 , 11 8 531 , 11 8 537 and special tool 11 9 266 .

Fig. 415: Removing Alternator And Power Steering Pump Using Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 8 537 by hand on sealing cap.

Screw in special tool 11 8 534 .

NOTE: The sealing cap is pressed out diagonally during this operation

Fig. 416: Screwing Special Tool 11 8 534
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in new sealing cap (1) with special tools 11 8 532 and 11 8 533 until flush with crankcase upper part.

Fig. 417: Screwing Sealing Cap With Special Tools 11 8 532
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

CRANKCASE VENTILATION

11 15 001 REMOVING AND INSTALLING/REPLACING THE ENGINE VENTILATION LINE WITH AND WITHOUT HEATING ELEMENT (N20)

Release connector (1) and remove.

cardiagn.com

Unlock clamps. Detach engine tank ventilation line (2) from cylinder head cover and from clean air pipe.

Feed out and remove engine tank ventilation line.

Check gaskets; replace damaged gaskets.

Fig. 418: Identifying Engine Tank Ventilation Line From Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 15 005 REMOVING TANK VENTILATION LINE (N20, N26)

Necessary preliminary tasks:

- Remove **EXHAUST TURBOCHARGER**.

Release screw (1).

Tightening torque: **11 42 6AZ**

Remove oil return line (2).

Installation note:

Replace O-ring.

Remove vent line (3).

Fig. 419: Identifying Oil Return Line, Vent Line And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release retaining clip (3).

Remove vent line (2).

Installation note:

Make sure vent line (2) is in correct installation position.

Fig. 420: Removing Vent Line
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

CRANKSHAFT WITH BEARING

11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N20, N26)

See **11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N20, N26)**.

11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N52T)

See **11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N52T)**.

11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N55)

See **11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N55)**.

cardiagn.com

11 21 531 REPLACING ALL CRANKSHAFT MAIN BEARING (N55)

Special tools required:

- 00 2 590
- 11 4 470
- 11 8 510

Necessary preliminary tasks:

- Remove CRANKSHAFT.

Checking position of oil spray nozzles:

Check position of oil spray nozzle according to position on special tool 11 8 510 .

Insert special tool 11 8 510 into main bearing screw connection and secure from turning with screw (1).

Fig. 421: Checking Position Of Oil Spray Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, adjust oil spray nozzles and secure.

Tighten banjo bolt (1).

Tightening torque: 11 11 5AZ .

Fig. 422: Identifying Banjo Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Bearing shell (1) with lubricating groove must be fitted in upper section of crankcase.

Bearing shell (2) without lubricating groove must be installed in lower section of crankcase.

IMPORTANT: Allocation of bearing positions:
Bearing position 1 is at the front on the timing chain drive in the direction of travel.

Fig. 423: Identifying Bearing Shell With And Without Lubricating Groove
Courtesy of BMW OF NORTH AMERICA, INC.

Main bearing classification (1) in crankcase.

Installation note:

When all the letters and number code have been determined, the bearing shell color must be allocated, see table.

Fig. 424: Identifying Main Bearing Classification In Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Main bearing classification:

Code letters A/B or C) are used for the crankcase upper section.

For bearing seat assignment from 1 to 7, the first bearing position is indicated by a star (1) on timing drive.

cardiagn.com

Fig. 425: Identifying Main Bearing Classification Code Letters
Courtesy of BMW OF NORTH AMERICA, INC.

Main bearing classification:

ID codes 1/2 or 3) are used for crankcase lower section.

For bearing seat assignment (1) from 1 to 7, the first bearing position is located on timing drive.

NOTE: **Code letters (2) are required exclusively for classifying CONNECTING ROD BEARING.**

Observe bearing classification. See **CRANKSHAFT AND BEARINGS (N55)** .

Fig. 426: Identifying Main Bearing Classification ID Codes
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The letter/number combination produces a bearing shell pairing.

Identification by different colors.

IMPORTANT: First bearing position is on the timing drive.
Engine damage will result if an insufficiently small radial clearance is determined.
If a large radial clearance is determined, this can lead to noises in crankshaft drive.

Code letters on crankcase:

Code letter A = bearing shell (1) color Yellow with lubricating groove.

Code letter B = bearing shell (1) color Green with lubricating groove.

Code letter C = bearing shell (1) color Red with lubricating groove.

Code numbers on crankshaft:

Code number 1 = bearing shell (2) Yellow without lubricating groove.

Code number 2 = bearing shell (2) Green without lubricating groove.

Code number 3 = bearing shell (2) Red without lubricating groove.

Fig. 427: Identifying Bearing Shell With And Without Lubricating Groove
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The color set **Yellow and Red** must not be fitted; the bearing colors Green/Green must be selected for this color set.

Installation note:

Possible color combinations for mounting the crankshaft in the crankcase.

Installation example:

For bearing 1 with code letter **B** on **crankcase** and code letter **1** on **crankshaft** , the bearing shell (1) with the color **Green** is required for the **crankcase upper section** and bearing shell (2) with the color **Yellow** for the

cardiagn.com

crankcase lower section (bedplate).

Fig. 428: Identifying Bearing Shell With And Without Lubricating Groove
Courtesy of BMW OF NORTH AMERICA, INC.

Bearing 2: **B** and **2** colors Green and Green.

Bearing 3: **A** and **2** colors Yellow and Green.

Bearing 4: **B** and **2** colors Green and Green.

Bearing 5: **A** and **1** colors Yellow and Yellow.

Bearing 6: **B** and **3** colors Green and Red.

Bearing 7: **B** and **1** colors Green and Yellow.

IMPORTANT: The color set **Yellow and Red** must not be fitted; the bearing colors Green/Green must be selected for this color set.

(A 1) Crankcase/**Yellow**	**(B 1)** Crankcase/**Green**	**(C 1)** Crankcase/**Green**
(A 1) Crankcase lower section/**Yellow**	**(B 1)** Crankcase lower section/**Yellow**	**(C 1)** Crankcase lower section/**Green**
(A 2) Crankcase/**Yellow**	**(B 2)** Crankcase/**Green**	**(C 2)** Crankcase/**Red**
(A 2) Crankcase lower section/**Green**	**(B 2)** Crankcase lower section/**Green**	**(C 2)** Crankcase lower section/**Green**
(A 3) Crankcase/**Green**	**(B 3)** Crankcase/**Green**	**(C 3)** Crankcase/**Red**
(A 3) Crankcase lower sections/**Green**	**(B 3)** Crankcase lower section/**Red**	**(C 3)** Crankcase lower section/**Red**

NOTE: **Guide bearing shell (1) at bearing seat 4 is a thrust bearing. Observe bearing classification . See CRANKSHAFT AND BEARINGS (N55) .**

Fig. 429: Identifying Bearing Shell On Bearing Seat
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not use any metal-cutting tools.
Only use special tool **11 4 470** to clean sealing surfaces.

Installation note:

Clean all sealing surfaces.

Install bearing shells (2) and guide bearing shell (3).

Fig. 430: Identifying Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

If a radial clearance needs to be redetermined, use special tool **00 2 590** to do this.

Installation note:

All measuring points must be clean and free from oil and grease. If necessary, clean all measuring points.

cardiagn.com

The old bearing screws can be used to determine the radial clearance.

Set up **CRANKCASE LOWER SECTION** with bearing shells.

Remove crankcase lower section.

Read off **radial clearance** . See **CRANKSHAFT AND BEARINGS (N55)** at width of flattened Plastigage and measuring scale.

Installation note:

Remove Plastigage.

Apply a light coat of oil to bearing shells and crankshaft.

Fig. 431: Measuring Radial Clearance Using Flattened Plastigage And Scale
Courtesy of BMW OF NORTH AMERICA, INC.

Fit **CRANKCASE LOWER SECTION**.

Assemble engine.

11 21 531 REPLACING ALL CRANKSHAFT MAIN BEARING SHELLS (N20, N26)

Special tools required:

- **00 2 590**
- **11 4 470**
- **2 212 829**

Necessary preliminary tasks:

- Remove **CRANKSHAFT**.

Checking position of oil spray nozzles:

Check position of oil spray nozzle according to position on special tool **2 212 829** .

Insert special tool **2 212 829** into main bearing screw connection and secure from turning with screw (1).

Secure oil spray nozzle with screw (2).

Tightening torque: **11 11 3AZ** .

Fig. 432: Checking Position Of Oil Spray Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Bearing shell (1) with lubricating groove must be fitted in upper section of crankcase.

Bearing shell (2) without lubricating groove must be installed in lower section of crankcase.

IMPORTANT: Allocation of bearing positions:
Bearing position 1 is at the front on the timing chain drive in the direction of travel.

Fig. 433: Identifying Bearing Shell With And Without Lubricating Groove

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Main bearing classification:

Code letters A/B or C) are used for the crankcase upper section.

Code letter (K) stands for clutch side.

Same procedure, with missing code letter (K).

The bearing seat assignment is from 5 to 1, the first bearing position is at the control drive.

Fig. 434: Identifying Main Bearing Classification Code Letters
Courtesy of BMW OF NORTH AMERICA, INC.

Main bearing classification:

ID codes 1/2 or 3) are used for crankcase lower section.

For bearing seat assignment (1) from 1 to 5, the first bearing position is located on timing drive.

NOTE: **Code letters (2) are required exclusively for classifying CONNECTING ROD BEARING.**

Observe bearing classification. See **CRANKSHAFT AND BEARINGS (N20, N26, B20)** .

Fig. 435: Identifying Main Bearing Classification ID Codes
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The letter/number combination produces a bearing shell pairing.

Identification by different colors.

First bearing position is on the timing drive.
IMPORTANT: Engine damage will result if an insufficiently small radial clearance is determined.
If a large radial clearance is determined, this can lead to noises in crankshaft drive.

Code letters on crankcase:

Code letter A = bearing shell (1) color Yellow with lubricating groove.

Code letter B = Bearing shell (1) in blue with lubricating groove.

Code letter C = bearing shell (1) color Red with lubricating groove.

Code numbers on crankshaft:

Code number 1 = bearing shell (2) Yellow without lubricating groove.

ID code 2 = Bearing shell (2) in blue without lubricating groove.

Code number 3 = bearing shell (2) Red without lubricating groove.

IMPORTANT: The color set **yellow and red** must not be installed, bearing colors blue/blue must be selected for this color set.

cardiagn.com

Fig. 436: Identifying Bearing Shell With And Without Lubricating Groove
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Possible color combinations for mounting the crankshaft in the crankcase.

Installation example:

For bearing 1 with the code letter **C** at the **crankcase** and the ID code **2** on the **crankshaft** , the bearing shell (1) in **red** is required for the **top part of the crankcase** and a bearing shell (2) in **blue** is required for the **crankcase lower section** (bedplate).

Fig. 437: Identifying Bearing Shell With And Without Lubricating Groove
Courtesy of BMW OF NORTH AMERICA, INC.

Bearing 2: **A** and **2** in yellow and blue.

Bearing 3: **C** and **2** in red and blue.

Bearing 4: **A** and **1** colors Yellow and Yellow.

Bearing 5: **C** and **1** in blue and blue.

IMPORTANT: The color set **yellow and red** must not be installed, bearing colors blue/blue must be selected for this color set.

(A 1) Crankcase/**Yellow**	**(B 1)** Crankcase/**Blue**	**(C 1)** Crankcase/**Blue**
(A 1) Crankcase lower section/**Yellow**	**(B 1)** Crankcase lower section/**Yellow**	**(C 1)** Crankcase lower section/**Blue**
(A 2) Crankcase/**Yellow**	**(B 2)** Crankcase/**Blue**	**(C 2)** Crankcase/**Red**
(A 2) Crankcase lower section/**Blue**	**(B 2)** Crankcase lower section/**Blue**	**(C 2)** Crankcase lower section/**Blue**
(A 3) Crankcase/**Blue**	**(B 3)** Crankcase/**Blue**	**(C 3)** Crankcase/**Red**
(A 3) Crankcase lower section/**Blue**	**(B 3)** Crankcase lower section/**Red**	**(C 3)** Crankcase lower section/**Red**

NOTE: **Guide bearing shell (1) at bearing seat 3 is a thrust bearing.**

Fig. 438: Identifying Guide Bearing Shell At Bearing Seat 3
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not use any metal-cutting tools.
Only use special tool **11 4 470** to clean sealing surfaces.

Installation note:

Clean all sealing surfaces.

Install bearing shells (2) and guide bearing shell (3).

Fig. 439: Identifying Bearing Shells And Guide Bearing Shell
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

cardiagn.com

If a radial clearance needs to be redetermined, use special tool **00 2 590** to do this.

Installation note:

All measuring points must be clean and free from oil and grease. If necessary, clean all measuring points.

The old bearing screws can be used to determine the radial clearance.

Set up **CRANKCASE LOWER SECTION** with bearing shells.

Remove crankcase lower section.

Read off radial clearance at width of flattened Plastigage and measuring scale. See **CRANKSHAFT AND BEARINGS (N20, N26, B20)** .

Installation note:

Remove Plastigage.

Apply a light coat of oil to bearing shells and crankshaft.

Fig. 440: Measuring Radial Clearance Using Flattened Plastigage And Scale
Courtesy of BMW OF NORTH AMERICA, INC.

Fit **CRANKCASE LOWER SECTION**.

Assemble engine.

11 21 531 REPLACING ALL CRANKSHAFT MAIN BEARING SHELLS (N47 D20 O1)

Special tools required:

- **00 2 590**

Replace main bearing bolts.
There must be no oil in the blind holes **(risk of cracking)** .
Do **not** wash off bolt coating.
IMPORTANT: Incorrect installation of the bearing cap leads to damage to the crankcase.
Check **grinding stage of crankshaft** . See **CRANKSHAFT AND BEARINGS (N47)** .
The code letter **K** on the crankcase and on the crankshaft stands for "Kupplungsseite" (German = clutch end).

Installation note:

The assignment of the bearing shells in the crankcase (classification) may no longer apply after the crankshaft has been replaced.

Install **yellow** bearing shells in crankcase (see BMW Parts installation instructions).

Bearing classification from 1 to 3 possible.

1. Bearing color - yellow
2. Bearing color - green
3. Bearing color - white

Necessary preliminary tasks:

- Remove **CRANKSHAFT**.

cardiagn.com

Bearing classification in bearing cap:

The number combination from left to right is from 1 to 5.

Example: Possible combination of bearing colors.

1. 1 = yellow
2. 2 = green
3. 2 = green
4. 2 = green
5. 3 = white

See **Fig. 441**.

Fig. 441: Identifying Bearing Classification In Bearing Cap (Combination Number)
Courtesy of BMW OF NORTH AMERICA, INC.

Bearing classification in crankcase:

The code letter **K** on the crankcase stands for "Kupplungsseite" (German = clutch end).

The number combination from left to right is from bearing seat 5 to 1.

Example: Possible combination of bearing colors.

1. 2 = green
2. 1 = yellow
3. 2 = green
4. 1 = yellow
5. 2 = green

The classifications 1 (yellow) and 3 (white) and 3 (white) and 1 (yellow) are not allowed.

The classification 2 (green) and 2 (green) should be selected.

See **Fig. 442**.

Fig. 442: Identifying Combination Of Bearing Colors
Courtesy of BMW OF NORTH AMERICA, INC.

(1/1) Bearing cap/yellow	**(2/1)** Bearing cap/yellow	**(3/1)** Bearing cap/green
(1/1) Crankcase/yellow	**(2/1)** Crankcase/green	**(3/1)** Crankcase/green
(1/2) Bearing cap/green	**(2/2)** Bearing cap/green	**(3/2)** Bearing cap/green
(1/2) Crankcase/yellow	**(2/2)** Crankcase/green	**(3/2)** Crankcase/white
(1/3) Bearing cap/green	**(2/3)** Bearing cap/white	**(3/3)** Bearing cap/white
(1/3) Crankcase/green	**(2/3)** Crankcase/green	**(3/3)** Crankcase/white

Place main bearing shell (1) with lubricating groove in crankcase (see arrows).

Observe combination of bearing colors according to the table.

Fig. 443: Placing Main Bearing Shell With Lubricating Groove In Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Installation note:

Thrust bearing (1) on the crankshaft is installed at bearing position 3.

Observe combination of bearing colors according to the table.

Fig. 444: Identifying Thrust Bearing On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Place main bearing shell (1) with no lubricating groove in the bearing cap (see arrows).

Installation note:

Pay attention to guide lug on main bearing shell (1).

Observe combination of bearing colors according to the table.

Fig. 445: Placing Main Bearing Shell With Lubricating Groove In Bearing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

The bearing shells are marked with yellow, green or white color.

1. Bearing shell
2. Guide bearing

Observe **grinding stage of main bearing journals** . See **CRANKSHAFT AND BEARINGS (N47)** .

Fig. 446: Locating Bearing Shells Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **00 2 590** on main bearing to be measured and bolt to main bearing cap.

Tightening torque: **11 11 1AZ** .

Remove main bearing cap and read off radial clearance at width of flattened plastic thread (Plastigage) with assistance of measuring scale.

If necessary, to correct bearing clearance, fit new bearing shells with a different color coding.

Fig. 447: Measuring Radial Clearance Using Flattened Plastigage And Scale
Courtesy of BMW OF NORTH AMERICA, INC.

check side clearance. See **CRANKSHAFT AND BEARINGS (N47)** .

If necessary, check guide bearing shells, crankshaft and engine block.

Fig. 448: Checking Guide Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 21 531 REPLACING ALL CRANKSHAFT MAIN BEARING SHELLS (N52T)

Special tools required:

- **00 2 590**

cardiagn.com

- 11 4 251
- 11 4 252
- 11 4 470

IMPORTANT: Aluminum-magnesium materials.
No steel screws/bolts may be used due to the threat of electrochemical corrosion.
A magnesium crankcase requires aluminum screws/bolts exclusively.
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

- Remove CRANKSHAFT

Checking position of oil spray nozzles:

Insert special tool 11 4 251 in the screw connection of the main bearing.

NOTE: Special tool 11 4 252 must be preinstalled at the seventh main bearing.

Check position of oil spray nozzle (2) according to position (1) on special tool 11 4 251 .

If necessary, adjust and secure oil spray nozzle (2).

Tightening torque: 11 11 5AZ .

Fig. 449: Checking Position Of Oil Spray Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

Remove bearing shells (2) and guide bearing shell (3).

NOTE: Guide bearing shell (3) is a thrust bearing.
Observe bearing classification. See CRANKSHAFT AND BEARINGS (N52T) .

Fig. 450: Identifying Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Bearing shell (1) with lubricant groove must be fitted in crankcase.

Bearing shell (2) without lubricant groove must be fitted in bedplate.

IMPORTANT: Allocation of bearing points:
Bearing point 1 is at the front on the timing chain drive in the direction of travel.

Fig. 451: Identifying Bearing Shell With And Without Lubricating Groove
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: All crankshaft crank pins are classified.
The identification (2) is located on the first crankshaft web.

cardiagn.com

Optional classifications (2) per connecting rod

On the connecting rod and connecting rod bearing cap:

r. connecting rod = yellow

Connecting rod bearing cap = red

b. Connecting rod = violet

Connecting rod bearing cap= blue

Observe bearing classification. See **CRANKSHAFT AND BEARINGS (N52T)** .

Fig. 452: Identifying Main Bearing Classification ID Codes
Courtesy of BMW OF NORTH AMERICA, INC.

Example:

Possible classification: b r r r r r

Cylinder 1: Classification b

Violet (connecting rod)/\Blue (connecting rod bearing cap)

Cylinder 2: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 3: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 4: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 5: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 6: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Main bearing classification (1) in crankcase, code letters A/B or C, see table.

Installation note:

When all the letters and number code have been determined, the bearing shell color must be allocated, see table.

Fig. 453: Identifying Main Bearing Classification In Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The letter/number combination produces a bearing shell pairing.

Identification by different colors.

cardiagn.com

First bearing point is on the timing drive.
IMPORTANT: The color combination **Yellow and Red** must not be fitted.
Engine damage will result if excessively small bearing play is determined.

Code letters on crankcase:

Code letter A = bearing shell (1) color Yellow.

Code letter B = bearing shell (1) color Green.

Code letter C = bearing shell (1) color Red.

Code numbers on crankshaft:

Code number 1 = bearing shell (2) Yellow.

Code number 2 = bearing shell (2) Green.

Code number 3 = bearing shell (2) Red.

Fig. 454: Identifying Bearing Shell With And Without Lubricating Groove
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The color combination **Yellow and Red** must not be fitted; the bearing colors Green/Green must be selected for this color combination, see table.

Installation example:

For bearing 1 with code letter **A** on the **crankcase** and code number **1** on the **crankshaft** bearing shell (1) with the color **Yellow** is required for the **crankcase** and bearing shell (2) with the color **Yellow** for the **crankcase lower half** (bedplate).

Lager 2: **A** and **2** colors Yellow and Green.

Lager 3: **B** and **2** colors Green and Green.

Lager 4: **C** and **2** colors Red and Green.

Lager 5: **B** and **1** colors Green and Yellow.

Lager 6: **C** and **3** colors Red and Red.

Fig. 455: Identifying Bearing Shell With And Without Lubricating Groove
Courtesy of BMW OF NORTH AMERICA, INC.

Lager 7: **C** and **1** colors Green and Green.

The color combination **Yellow and Red** must not be fitted.

Installation note:

Possible color combinations for mounting the crankshaft in the crankcase.

(A 1) Crankcase/**Yellow**	**(B 1)** Crankcase/**Green**	**(C 1)** Crankcase/**Green**
(A 1) Crankcase lower half/**Yellow**	**(B 1)** Crankcase lower half/**Yellow**	**(C 1)** Crankcase lower half/**Green**
(A 2) Crankcase/**Yellow**	**(B 2)** Crankcase/**Green**	**(C 2)** Crankcase/**Red**

cardiagn.com

(A 2) Crankcase lower half/**Green**	**(B 2)** Crankcase lower half/**Green**	**(C 2)** Crankcase lower half/**Green**
(A 3) Crankcase/**Green**	**(B 3)** Crankcase/**Green**	**(C 3)** Crankcase/**Red**
(A 3) Crankcase lower half/**Green**	**(B 3)** Crankcase lower half/**Red**	**(C 3)** Crankcase lower half/**Red**

Install bearing shells (2) and guide bearing shell (3).

Installation note:

Clean all sealing surfaces.

IMPORTANT: Do not use any metal-cutting tools.

Clean sealing faces with special tool **11 4 470** .

Determine bearing play with special tool **00 2 590** .

Installation note:

Fig. 456: Identifying Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

All measuring points must be clean and free from oil and grease. If necessary, clean all measuring points.

Use the existing screws to determine the bearing play.

Set up **BEDPLATE** with bearing shells.

Remove bedplate.

Read off bearing play at width of flattened plastic thread and measurement scale.

Installation note:

Remove plastic thread.

Apply a light coat of oil to bearing shells and crankshaft.

Fig. 457: Measuring Radial Clearance Using Flattened Plastigage And Scale
Courtesy of BMW OF NORTH AMERICA, INC.

Install **BEDPLATE**.

Assemble engine.

11 21 500 REPLACING CRANKSHAFT (N20, N26)

Special tools required:

- **11 4 470**
- **00 9 120**
- **11 6 252**
- **11 4 440**
- **11 6 251**
- **00 2 010**

Necessary preliminary tasks:

cardiagn.com

- Remove **ENGINE**.
- Mount engine on **ASSEMBLY STAND**.
- Remove **VIBRATION ABSORBER**.
- Remove **OIL SUMP**.
- Remove **OIL PUMP**.
- Remove timing **CHAIN MODULE**.
- Remove **CHAIN MODULE** for oil pump.
- Remove **CYLINDER HEAD**.
- Remove **flywheel** . See **11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N20, N26)** or **11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N20)**.
- Remove all **PISTONS**.

Release all screws (1).

Fig. 458: Identifying Crankshaft Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Undo screws (10 bis 1) from the outside to the inside.

Fig. 459: Loosening/Tightening Sequence Of Crankcase Lower Section Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove the crankcase lower section (1) in the direction of the arrow towards the top.

Fig. 460: Removing Crankcase Lower Section
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Remove crankshaft with aid of a second person.
Weight of crankshaft approx. 21 kg.

Remove crankshaft (1) upward in direction of arrow.

Remove and replace (if applicable) **BEARING SHELLS** and guide bearing shells.

Fig. 461: Identifying Bearing Shells And Guide Bearing Shell
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: If the screw (1) is undone, the oil spray nozzle (2) must be readjusted.

Fig. 462: Identifying Oil Spray Nozzle Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Setting the oil nozzle to the crankcase.

Place feeler gauge (2) between oil nozzle (1) and crankcase.

Fig. 463: Placing Feeler Gauge Between Oil Nozzle And Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Adjust feeler gauge to 0.40 mm.

Bring oil nozzle into contact with the feeler gauge by pressing lightly.

Tighten bolt (1).

Tightening torque: **11 11 3AZ** .

Fig. 464: Tightening Oil Nozzle Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Clean all sealing surfaces (1) with special tool **11 4 470** .

Insert all **CRANKSHAFT MAIN BEARINGS**.

Installation note:

Remove residue of seals from the crankcase (2).

Check fitting bushes (1) for damage and replace if applicable.

Oil all bearing points adequately with engine oil.

Fig. 465: Locating Crankcase Seals Residue
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Insert crankshaft with aid of a second person.
Weight of crankshaft approx. 21 kg.

Insert crankshaft (1).

Fig. 466: Inserting Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check durability of sealing compound, do not use sealing compound that has expired.

Maximum processing time of the **SEALING COMPOUND 2.2** 10 minutes.

Apply sealing compound in the stated areas with a width of 2.0 to 2.6 mm.

Fig. 467: Identifying Sealing Compound Applying Areas
Courtesy of BMW OF NORTH AMERICA, INC.

Fit crankcase lower section (watch fitting bushes).

Fig. 468: Fitting Crankcase Lower Section
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 469: Loosening/Tightening Sequence Of Crankcase Lower Section Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Please observe the tightening sequence of the screws (1 to 10).

cardiagn.com

Join screws (1).

Fig. 470: Tightening Crankshaft Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Mark all screws (1) with a crosswise colored mark.

Fig. 471: Identifying Crankshaft Screws Colored Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Retighten all screws using special tools **00 9 120** .

Tightening torque: **11 11 1AZ** .

Installation note:

After tightening all screws, the colored mark must be aligned in the same way.

Fig. 472: Tightening Engine Block Screw Using Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

All screws (1) from the inside to the outside.

Tightening torque: **11 11 2AZ** .

Fig. 473: Tightening Engine Block Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool **11 6 252** with magnetic foot on special tool **11 4 440** .

Clamp special tool **11 6 251** on special tool **11 6 252** .

Position special tool **11 6 251** with button on the flat side of the crankshaft.

Press crankshaft (1) in direction of arrow up to stop.

Set dial gauge with knurled screw (2) on zero.

Fig. 474: Pressing Crankshaft Up To Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Press crankshaft (1) in direction of arrow from right to left up to stop.

Determine crankshaft axial clearance. See **CRANKSHAFT AND BEARINGS (N20, N26, B20)** .

Fig. 475: Pressing Crankshaft From Right To Left Up To Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Turn crankshaft (1) via the central bolt with special tool **00 2 010** to determine the coefficient of friction, see **CRANKSHAFT AND BEARINGS (N20, N26, B20)** .

Graphic N55.

Fig. 476: Turning Crankshaft Central Bolt Using Special Tool (00 2 010)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Replace front **CRANKSHAFT SEAL**.

Replace **CRANKSHAFT SEAL** (transmission side).

Assemble engine.

11 21 500 REPLACING CRANKSHAFT (N47 D20 O1)

Special tools required:

- **00 2 300**
- **00 9 120**
- **11 6 250**
- **11 8 750**
- **11 8 791**
- **11 8 792**
- **11 8 793**
- **11 8 870**
- **64 1 020**
- **2 318 115**

Replace main and connecting rod bolts.
There must be no oil in the blind holes **(risk of cracking)** .
Do **not** wash off bolt coating.
IMPORTANT: Incorrect assembly of the bearing caps will result in damage to the crankcase.
It is necessary to remove the counterbalance shafts (AGW) in order to remove the crankshaft.
To properly adjust the counterbalance shafts, a new, coated intermediate gear must **always** be fitted.

Necessary preliminary tasks:

- Remove **ENGINE**.
- Mount engine on assembly stand. See **11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N47 D20 O1)**.
- Remove **COOLANT PUMP**.
- Remove **OIL PUMP**.
- Remove **END COVER** at rear.
- Remove both **TIMING CHAINS**.
- **REMOVE ALL PISTONS**.

Check crankshaft side clearance.

Fit special tool **11 6 250** .

Side Clearance. See **CRANKSHAFT AND BEARINGS (N47)** .

If the permitted side clearance is exceeded:

- Check crankshaft and guide bearing shells.
- Replace worn component.

Fig. 477: Checking Crankshaft Side Clearance

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Remove sealing caps (1) with a suitable tool (2).

Installation note:

Replace sealing cap with O-ring.

Fig. 478: Removing Sealing Caps With Suitable Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Turn crankshaft until special tool **11 8 750** engages in left counterbalance shaft (1) (see arrow).

NOTE: Graphic without crankshaft

Fig. 479: Turning Crankshaft Using Special Tool 11 8 750
Courtesy of BMW OF NORTH AMERICA, INC.

Turn crankshaft until special tool **11 8 750** engages in right counterbalance shaft (1).

See arrow.

NOTE: Graphic without crankshaft.

Fig. 480: Turning Crankshaft Using Special Tool 11 8 750
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 8 750** to crankcase using screw (1) for coolant pump.

Position special tool **2 318 115** on special tool **11 8 750** and secure with screw (2).

Fig. 481: Positioning Special Tool 2 318 115 On Special Tool 11 8 750 And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque: **11 27 2AZ** .

Undo screws (2 and 3)

Tightening torque: **11 27 1AZ**

Fig. 482: Identifying Slacken Nut And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove nut from intermediate gearwheel (1).

Remove intermediate gearwheel (1).

NOTE: The gear is pressed onto the counterbalance shaft with a taper and can only be released with special tool 11 8 870 .

Once the gear has been released from the counterbalance shaft, special tool **11 8 870** can be unscrewed again by hand.

cardiagn.com

Fig. 483: Identifying Intermediate Gearwheel
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 8 870** into counterbalance shaft gear, thereby releasing counterbalance shafts from the gears.

IMPORTANT: **Risk of damage!** on crankcase.
Use special tool **00 2 300** to move engine to vertical position.

Remove counterbalance shaft (1) in upward direction of arrow from crankcase (2).

NOTE: Shown with crankshaft removed for clearer illustration.

Fig. 484: Removing Counterbalance Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Danger of mixing up needle bearings.
Needle bearings have different diameters.

Release needle bearing (1) in direction of arrow.

Remove released needle bearing (1) from counterbalance shaft (2) in direction of arrow.

Check counterbalance shaft (2) for wear at the bearing position and replace if necessary.

Fig. 485: Checking Counterbalance Shaft For Wear
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Bearing caps (1) 1...5 are marked on the exhaust side.
Bearing cap 3 is installed as a thrust bearing.

NOTE: Graphic at bearing seat number 5.

Fig. 486: Identifying Bearing Caps Are Marked On Exhaust Side
Courtesy of BMW OF NORTH AMERICA, INC.

Release main bearing screw connection of main bearing cap (1).

Remove main bearing cap 1...5.

IMPORTANT: With the assistance of a second person, remove crankshaft and carefully place to one side.
Pay attention to oil hole in bearing shell.
Pay attention to installation position of **CRANKSHAFT MAIN BEARING SHELLS**.

Fig. 487: Identifying Main Bearing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Oil bearing shell.

Install crankshaft.

Fit bearing caps 1 to 5 so that the ID codes always point to the exhaust side.

Both locating grooves of bearing shells in crankcase and on bearing cap must be mounted on one side.

cardiagn.com

IMPORTANT: Do not fit bearing cap in incorrect position.
Risk of damage to molding on crankcase.

Fig. 488: Identifying Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Align bearing cap exactly.

Fit main bearing bolts.

Tighten main bearing bolts in sequence (1 to 10) (observe tightening specifications).

Tightening torque: **11 11 1AZ** .

Fig. 489: Main Bearing Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The crankshaft must be fixed in the BDC position of cylinder No. 1 in order to adjust the counterbalance shafts.

Position special tool **11 8 791** on crankcase and secure with special tool **11 8 793** .

Fig. 490: Positioning Special Tool 11 8 791 On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Secure crankshaft with knurled screw **11 8 792** on special tool **11 8 791** .

Use special tool **00 2 300** to move engine to vertical position.

Fig. 491: Securing Crankshaft With Knurled Screw 11 8 792 On Special Tool 11 8 791
Courtesy of BMW OF NORTH AMERICA, INC.

Schematic representation of the differential bevel and intermediate gears.

IMPORTANT: To adjust the counterbalance shafts, it is essential to fit a new coated intermediate gearwheel (2).

All marks on the drive gears (1 and 3) and intermediate gearwheel (2) must point vertically to the oil sump sealing surface (upwards).

Fig. 492: Identifying Marks On Drive Gears And Intermediate Gearwheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

To facilitate installation of counterbalance shafts, rotate engine with special tool **00 2 300** to a convenient working position.

Fit gear (1) for right counterbalance shaft in direction of arrow.

Marks on drive gear counterbalance shaft (1) must point vertically to oil sump sealing surface (upwards).

NOTE: **For better graphic without crankshaft.**

cardiagn.com

Fig. 493: Fitting Right Counterbalance Shaft Gear
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **Risk of mixing up** gears.
Pay attention to inclination of tooth flanks.

Fit gear (1) for left counterbalance shaft in direction of arrow.

Marking on drive gear (1) must point vertically to oil pan sealing surface (upwards).

NOTE: **For better graphic without crankshaft.**

IMPORTANT: **Risk of mixing up** gears.
Pay attention to inclination of tooth flanks.

Fig. 494: Fitting Left Counterbalance Shaft Gear
Courtesy of BMW OF NORTH AMERICA, INC.

Insert counterbalance shafts (1) in direction of arrow in crankcase (2).

NOTE: **For better graphic without crankshaft.**

Fig. 495: Inserting Counterbalance Shafts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not drop counterbalance shafts into the bearing positions.

Insert special tool **64 1 020** or a suitable tool through the gear into the counterbalance shaft.

Carefully insert counterbalance shaft (1) into gear in direction of arrow.

Fig. 496: Inserting Counterbalance Shaft Into Gear
Courtesy of BMW OF NORTH AMERICA, INC.

Position counterbalance shaft (1) in direction of arrow in gear (2).

NOTE: **For better graphic without crankshaft.**

Fig. 497: Positioning Counterbalance Shaft In Gear
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not drop counterbalance shafts into the bearing positions.

Insert special tool **64 1 020** or a suitable tool through the gear into the counterbalance shaft.

Carefully insert counterbalance shaft (1) into gear in direction of arrow.

Fig. 498: Inserting Counterbalance Shaft Into Gear
Courtesy of BMW OF NORTH AMERICA, INC.

Position counterbalance shaft (1) in direction of arrow in gear (2).

NOTE: **For better graphic without crankshaft.**

cardiagn.com

Fig. 499: Positioning Counterbalance Shaft In Gear
Courtesy of BMW OF NORTH AMERICA, INC.

Screw both bolts (1) into the counterbalance shafts on the left and right.

Do not tighten both bolts otherwise the counterbalance shafts may jam and it will no longer be possible to position them in the next operation.

Fig. 500: Screwing Both Bolts Into Counterbalance Shafts
Courtesy of BMW OF NORTH AMERICA, INC.

Position both counterbalance shafts.

The balance weights of the counterbalance shafts must point to the oil sump. For this purpose, the engine must be moved into the normal position with special tool **00 2 300** .

Both counterbalance shafts together with the balance weights must now face downwards towards the oil sump.

Secure special tool **11 8 750** to the crankcase using the screws (1) for the coolant pump.

Special tool **11 8 750** can only be attached to the coolant pump on the crankcase using a bolt (1).

NOTE: **Graphic N47.**

Fig. 501: Identifying Special Tool (11 8 750) & (11 8 790)
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 8 750** to crankcase using screw (1) for coolant pump.

Position special tool **2 318 115** on special tool **11 8 750** and secure with screw (2).

Fig. 502: Positioning Special Tool (2 318 115) On Special Tool (11 8 750)
Courtesy of BMW OF NORTH AMERICA, INC.

Schematic representation of the differential bevel and intermediate gears.

All marks on the drive gears (1 and 3) and intermediate gearwheel (2) must point vertically to the oil sump sealing surface (upwards).

Fig. 503: Identifying Marks On Drive Gears And Intermediate Gearwheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The gear must be loose on the right-hand counterbalance shaft otherwise it will not be possible to install the intermediate gearwheel.

Install new intermediate gearwheel with coating.

Install intermediate gearwheel.

Secure bolt for counterbalance shafts (2 and 3) using special tool **00 9 120** .

Tightening torque: **11 27 1AZ** .

cardiagn.com

Fig. 504: Securing Bolt For Counterbalance Shafts Using Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before the intermediate gear (2) is secured, the intermediate gear (2) must be pressed hand-tight onto the **gearing** of the crankshaft (4) and counterbalance shaft (3) until zero-lash is achieved in both gears.

Fig. 505: Identifying Marks On Drive Gears And Intermediate Gearwheel
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten nut (1).

Tightening torque: **11 27 2AZ** .

Fig. 506: Identifying Nut And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Check side clearance. See **CRANKSHAFT AND BEARINGS (N47)** .

Fig. 507: Checking Crankshaft Side Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 21 500 REPLACING CRANKSHAFT (N47 D20 O1) AS FROM 6/2013

Special tools required:

- **00 2 300**
- **00 9 120**
- **11 6 250**
- **11 8 750**
- **11 8 791**
- **11 8 792**
- **11 8 793**
- **11 8 870**
- **64 1 020**
- **2 288 054**

IMPORTANT: Replace main and connecting rod bolts.
There must be no oil in the blind holes **(risk of cracking)** .
Do **not** wash off bolt coating.
Incorrect assembly of the bearing caps will result in damage to the crankcase.
It is necessary to remove the counterbalance shafts (AGW) in order to remove the crankshaft.
To properly adjust the counterbalance shafts, a new, coated intermediate gear must **always** be fitted.

Necessary preliminary tasks:

- Remove **ENGINE**.
- Mount engine on assembly stand. See **11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N47 D20 O1)**.
- Remove **COOLANT PUMP**.

cardiagn.com

- Remove **OIL PUMP**.
- Remove **END COVER** at rear.
- Remove both **TIMING CHAINS**.
- **REMOVE ALL PISTONS**.

Check crankshaft side clearance.

Fit special tool **11 6 250** .

Side clearance. See **CRANKSHAFT AND BEARINGS (N47)**

If the permitted side clearance is exceeded:

- Check crankshaft and guide bearing shells.
- Replace worn component.

Fig. 508: Checking Crankshaft Side Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Remove sealing caps (1) with a suitable tool (2).

Installation note:

Replace sealing cap with O-ring.

Fig. 509: Removing Sealing Caps With Suitable Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Turn crankshaft (1) to top dead center until the counterbalance shafts (2 and 3) are facing down with the locating bore (see arrow).

Fig. 510: Identifying Crankshaft & Counterbalance Shafts
Courtesy of BMW OF NORTH AMERICA, INC.

Turn crankshaft until special tool **2 288 054** engages in the counterbalance shaft.

See arrows.

Fig. 511: Turning Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **2 288 054** to the crankshaft with screws (1).

Fig. 512: Securing Special Tool 2 288 054 To Crankshaft With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque: **11 27 2AZ** .

Undo screws (2 and 3)

Tightening torque: **11 27 1AZ**

cardiagn.com

Fig. 513: Identifying Slacken Nut And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove nut from intermediate gearwheel (1).

Remove intermediate gearwheel (1).

NOTE: The gear is pressed onto the counterbalance shaft with a taper and can only be released with special tool 11 8 870 .

Once the gear has been released from the counterbalance shaft, special tool **11 8 870** can be unscrewed again by hand.

Fig. 514: Identifying Intermediate Gearwheel
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 8 870** into counterbalance shaft gear, thereby releasing counterbalance shafts from the gears.

IMPORTANT: Risk of damage! on crankcase.
Use special tool **00 2 300** to move engine to vertical position.

Remove counterbalance shaft (1) in upward direction of arrow from crankcase (2).

NOTE: Shown with crankshaft removed for clearer illustration.

Fig. 515: Removing Counterbalance Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Danger of mixing up needle bearings.
Needle bearings have different diameters.

Release needle bearing (1) in direction of arrow.

Remove released needle bearing (1) from counterbalance shaft (2) in direction of arrow.

Fig. 516: Releasing Needle Bearing
Courtesy of BMW OF NORTH AMERICA, INC.

Check counterbalance shaft (2) for wear at the bearing position and replace if necessary.

NOTE: Bearing caps (1) 1...5 are marked on the exhaust side.
Bearing cap 3 is installed as a thrust bearing.

NOTE: Graphic at bearing seat number 5.

Fig. 517: Identifying Bearing Cap Marks On Exhaust Side
Courtesy of BMW OF NORTH AMERICA, INC.

Release main bearing screw connection of main bearing cap (1).

Remove main bearing cap 1...5.

With the assistance of a second person, remove crankshaft and carefully place to one side.

cardiagn.com

IMPORTANT: Pay attention to oil hole in bearing shell.
Pay attention to installation position of **CRANKSHAFT MAIN BEARING SHELLS**.

Fig. 518: Identifying Main Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Oil bearing shell.

Install crankshaft.

Fit bearing caps 1 to 5 so that the ID codes always point to the exhaust side.

Both locating grooves of bearing shells in crankcase and on bearing cap must be mounted on one side.

Fig. 519: Identifying Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not fit bearing cap in incorrect position.
Risk of damage to molding on crankcase.

Align bearing cap exactly.

Fit main bearing bolts.

Tighten main bearing bolts in sequence (1 to 10) (observe tightening specifications).

Tightening torque: **11 11 1AZ** .

Fig. 520: Main Bearing Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Schematic representation of the differential bevel and intermediate gears.

IMPORTANT: To adjust the counterbalance shafts, it is essential to fit a new coated intermediate gearwheel (2).

All marks on the drive gears (1 and 3) and intermediate gearwheel (2) must point vertically to the oil sump sealing surface (upwards).

Fig. 521: Identifying Marks On Drive Gears And Intermediate Gearwheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

To facilitate installation of counterbalance shafts, rotate engine with special tool **00 2 300** to a convenient working position.

Fit gear (1) for right counterbalance shaft in direction of arrow.

Marks on drive gear counterbalance shaft (1) must point vertically to oil sump sealing surface (upwards).

NOTE: For better graphic without crankshaft.

Fig. 522: Fitting Right Counterbalance Shaft Gear

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **Risk of mixing up** gears.
Pay attention to inclination of tooth flanks.

Fit gear (1) for left counterbalance shaft in direction of arrow.

Marking on drive gear (1) must point vertically to oil pan sealing surface (upwards).

NOTE: For better graphic without crankshaft.

IMPORTANT: **Risk of mixing up** gears.
Pay attention to inclination of tooth flanks.

Fig. 523: Fitting Left Counterbalance Shaft Gear
Courtesy of BMW OF NORTH AMERICA, INC.

Insert counterbalance shafts (1) in direction of arrow in crankcase (2).

NOTE: For better graphic without crankshaft.

Fig. 524: Inserting Counterbalance Shafts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not drop counterbalance shafts into the bearing positions.

Insert special tool **64 1 020** or a suitable tool through the gear into the counterbalance shaft.

Carefully insert counterbalance shaft (1) into gear in direction of arrow.

Fig. 525: Inserting Counterbalance Shaft Into Gear
Courtesy of BMW OF NORTH AMERICA, INC.

Position counterbalance shaft (1) in direction of arrow in gear (2).

NOTE: For better graphic without crankshaft.

Fig. 526: Positioning Counterbalance Shaft Of Gear
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not drop counterbalance shafts into the bearing positions.

Insert special tool **64 1 020** or a suitable tool through the gear into the counterbalance shaft.

Carefully insert counterbalance shaft (1) into gear in direction of arrow.

Fig. 527: Inserting Counterbalance Shaft Into Gear
Courtesy of BMW OF NORTH AMERICA, INC.

Position counterbalance shaft (1) in direction of arrow in gear (2).

NOTE: For better graphic without crankshaft.

cardiagn.com

Fig. 528: Positioning Counterbalance Shaft Of Gear
Courtesy of BMW OF NORTH AMERICA, INC.

Screw both bolts (1) into the counterbalance shafts on the left and right.

Do not tighten both bolts otherwise the counterbalance shafts may jam and it will no longer be possible to position them in the next operation.

The balance weights of the counterbalance shafts must point to the oil sump. For this purpose, the engine must be moved into the normal position with special tool **00 2 300** .

Fig. 529: Identifying Screw Both Bolts Into Counterbalance Shafts
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare special tool **2 288 054** .

Fig. 530: Identifying Special Tool (2 288 054)
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust crankshaft (1) in first cylinder top dead center.

Turn counterbalance shafts (2 and 3) to installation position (see arrows).

Both counterbalance shafts together with the balance weights must now face downwards towards the oil sump.

Fig. 531: Locating Counterbalance Shafts
Courtesy of BMW OF NORTH AMERICA, INC.

Position both counterbalance shafts.

Position special tool **2 288 054** so that there is no gap.

Fig. 532: Positioning Special Tool So There Is No Gap
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **2 288 054** into the crankshaft with 20 Nm with screws (1).

The crankshaft and counterbalance shafts are now positioned.

Fig. 533: Securing Special Tool (2 288 054) Into Crankshaft With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Schematic representation of the differential bevel and intermediate gears.

All marks on the drive gears (1 and 3) and intermediate gearwheel (2) must point vertically to the oil sump sealing surface (upwards).

Fig. 534: Identifying Marks On Drive Gears And Intermediate Gearwheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The gear must be loose on the right-hand counterbalance shaft otherwise it will not be possible to install the intermediate gearwheel.

cardiagn.com

Install new intermediate gearwheel with coating.

Install intermediate gearwheel.

Secure bolt for counterbalance shafts (2 and 3) using special tool **00 9 120** .

Tightening torque: **11 27 1AZ** .

Fig. 535: Securing Bolt For Counterbalance Shafts Using Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before the intermediate gear (2) is secured, the intermediate gear (2) must be pressed hand-tight onto the **gearing** of the crankshaft (4) and counterbalance shaft (3) until zero-lash is achieved in both gears.

Fig. 536: Identifying Marks On Drive Gears And Intermediate Gearwheel
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten nut (1).

Tightening torque: **11 27 2AZ** .

Fig. 537: Identifying Nut And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Check Side clearance. See **CRANKSHAFT AND BEARINGS (N47)** .

Fig. 538: Checking Crankshaft Side Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 21 500 REPLACING CRANKSHAFT (N52T)

Special tools required:

- **00 2 010**
- **00 9 120**
- **11 4 370**
- **11 4 440**
- **11 4 470**
- **11 6 251**
- **11 6 252**
- **11 9 360**

IMPORTANT: Aluminum screws/bolts are permitted with and without color coding (blue).
Aluminum screws/bolts must be replaced each time they are **released** .
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

cardiagn.com

- Remove **ENGINE**
- Mount engine on **ASSEMBLY STAND**
- Remove **VIBRATION ABSORBER**
- Remove **OIL SUMP**
- Remove **OIL PUMP**
- Remove timing **CHAIN MODULE**
- Remove oil pump/vacuum pump **CHAIN MODULE**
- Remove **CYLINDER HEAD**.
- Remove **FLYWHEEL**
- Removing all **PISTONS**

Release screws (1).

Tightening torque: **11 13 11AZ** .

Installation note:

Replace aluminum screws.

Remove oil deflector (2).

Fig. 539: Identifying Oil Deflector Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screws (1).

Release aluminum screws (2).

Installation note:

Replace aluminum screws.

Fig. 540: Identifying Engine Block Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screws (1).

Installation note:

Replace aluminum screws.

NOTE: **Graphic shows N52.**

Fig. 541: Identifying Engine Block Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Unfasten screws (2).

Installation note:

Replace aluminum screws.

cardiagn.com

Release steel screws (14 to 1) from outside inwards.

Remove crankcase lower section upwards.

Fig. 542: Crankcase Steel Screws Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Remove crankshaft with aid of a second person.
Weight of crankshaft approx. 25 kg.

Remove crankshaft (1) upward in direction of arrow.

Remove **BEARING SHELLS** (2) and guide bearing shell (3), replace if necessary.

Fig. 543: Identifying Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Clean all sealing surfaces (1) with special tool **11 4 470** .

Fig. 544: Identifying Crankcase Sealing Surfaces
Courtesy of BMW OF NORTH AMERICA, INC.

Check fitting bushes for damage and secure seating; replace if necessary.

Install all **BEARING SHELLS**.

Installation note:

Oil all bearing points adequately with engine oil.

Fig. 545: Identifying Fitting Bushes
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Insert crankshaft with aid of a second person.
Weight of crankshaft approx. 25 kg.

Insert crankshaft (1).

Fit crankcase lower section (watch fitting bushes).

Fig. 546: Identifying Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 547: Crankcase Steel Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Follow tightening/torque sequence for the steel bolts (1 to 14).

JOIN steel bolts (1).

Fig. 548: Tightening Crankshaft Steel Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Mark across all steel bolts (1) with a colored mark.

Fig. 549: Identifying Crankshaft Steel Bolts With Colored Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten all steel bolts with a special tool **00 9 120** .

Tightening torque: **11 11 1AZ** .

Installation note:

All steel bolts must be positioned the same with respect to the colored mark after being fastened (see **Fig. 547**).

Fig. 550: Tightening Steel Bolts Using Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Aluminum bolts (1) and (2) can have a blue colored mark.

Aluminum screws/bolts are **not magnetic** .

Fig. 551: Identifying Engine Block Aluminum Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: In the case of aluminum screws, jointing torque and angle of rotation must be observed without fail.

JOIN all aluminum bolts (1) from inside toward the outside.

Tightening torque: **11 11 2AZ** .

Fig. 552: Tightening Aluminum Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Mark across all aluminum bolts (1) with a colored mark.

Fig. 553: Identifying Engine Block Aluminum Bolts With Colored Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten all aluminum bolts (1) only with special tool **00 9 120** .

Tightening torque: **11 11 3AZ** .

Tightening torque: **11 11 4AZ** .

Installation note:

All aluminum bolts must be equally positioned with respect to the colored mark after being fastened.

Fig. 554: Tightening Aluminum Bolts With Special Tool 00 9 120
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool **11 6 252** with magnetic foot on special tool **11 4 440** .

cardiagn.com

Clamp special tool **11 6 251** on special tool **11 6 252** .

Position special tool **11 6 251** with button on the flat side of the crankshaft.

Press crankshaft (1) in direction of arrow up to stop.

Set dial gauge with knurled screw (2) on zero.

Fig. 555: Pressing Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Press crankshaft (1) in direction of arrow from right to left up to stop.

Determine crankshaft axial clearance. See **CRANKSHAFT AND BEARINGS (N52T)** .

Fig. 556: Pressing Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Turn crankshaft (1) via the central bolt with special tool **00 2 010** to determine the coefficient of friction. See **CRANKSHAFT AND BEARINGS (N52T)** .

Fig. 557: Turning Crankshaft Central Bolt Using Special Tool (00 2 010)
Courtesy of BMW OF NORTH AMERICA, INC.

Drive both injector nozzles (1) on left and right on crankcase into the bore hole (see arrow) with special tool **11 9 360** .

Installation note:

Replace injector nozzles (1).

Fig. 558: Replacing Injector Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

Drive in both injector nozzles (1) on left and right with special tool **11 9 360** into crankcase.

Fig. 559: Installing Injector Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

Drive injector nozzle (1) all the way in.

Fig. 560: Identifying Injector Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Use **PRIMER 1.3 AND LIQUID SEALING COMPOUND 1.4**.

Prepare liquid sealing compound (2) in special tool **11 4 370** .

Screw on nozzle (1) for injecting sealing compound.

Fig. 561: Identifying Nozzle, Syringe And Injecting Sealing Compound
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Slowly and evenly insert liquid sealing compound (1) via the injector nozzle with special tool **11 4 370** in direction of arrow.

Graphic N42.

Fig. 562: Inserting Liquid Sealing Compound Using Special Tool (11 4 370)
Courtesy of BMW OF NORTH AMERICA, INC.

Replace **CRANKSHAFT SEAL** at front.

Replace **CRANKSHAFT RADIAL SEAL** (transmission side).

Assemble engine.

11 21 500 REPLACING CRANKSHAFT (N55)

Special tools required:

- **00 2 010**
- **00 9 120**
- **11 4 370**
- **11 4 440**
- **11 4 470**
- **11 6 251**
- **11 6 252**
- **11 9 360**

Aluminum screws/bolts are permitted with and without color coding (blue).
Aluminum screws/bolts must be replaced each time they are **released** .
IMPORTANT: For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Remove **ENGINE**
- Mount engine on **ASSEMBLY STAND**
- Remove **VIBRATION DAMPER**
- Remove **OIL SUMP**
- Remove **OIL PUMP**
- Remove timing **CHAIN MODULE**
- Remove oil pump/vacuum pump **CHAIN MODULE**
- Remove **CYLINDER HEAD**.
- Remove **FLYWHEEL**
- Removing all **PISTONS**

Release screws (1).

Tightening torque: **11 13 5AZ** .

Installation note:

Replace aluminum screws.

cardiagn.com

Remove oil deflector with integrated intake snorkel.

Fig. 563: Removing Oil Deflector With Integrated Intake Snorkel
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screws (1).

Release aluminum screws (2).

Installation note:

Replace aluminum screws.

Fig. 564: Identifying Engine Block Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screws (1).

Installation note:

Replace aluminum screws.

NOTE: Graphic shows N52.

Fig. 565: Identifying Engine Block Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Unfasten screws (2).

Installation note:

Replace aluminum screws.

Release steel screws (14 to 1) from outside inwards.

Remove crankcase lower section upwards.

Fig. 566: Crankcase Steel Screws Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Remove crankshaft with aid of a second person.
Weight of crankshaft approx. 25 kilograms.

Remove crankshaft (1) upward in direction of arrow.

Remove **BEARING SHELLS** (2) and guide bearing shell (3), replace if necessary.

Fig. 567: Identifying Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Clean all sealing surfaces (1) with special tool **11 4 470** .

cardiagn.com

Fig. 568: Identifying Crankcase Sealing Surfaces
Courtesy of BMW OF NORTH AMERICA, INC.

Check fitting sleeves for damage and secure seating; replace if necessary.

Install all **BEARING SHELLS**.

Installation note:

Oil all bearing points adequately with engine oil.

Fig. 569: Identifying Fitting Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Insert crankshaft with aid of a second person.
Weight of crankshaft approx. 25 kilograms.

Insert crankshaft (1).

Fit crankcase lower section (watch fitting bushes).

Fig. 570: Identifying Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 571: Crankcase Steel Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Follow tightening/torque sequence for the steel bolts (1 to 14).

JOIN steel bolts (1).

Fig. 572: Tightening Crankshaft Steel Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Mark across all steel bolts (1) with a colored mark.

Fig. 573: Identifying Crankshaft Steel Bolts With Colored Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten all steel bolts with a special tool **00 9 120** .

Tightening torque: **11 11 1AZ** .

Installation note:

All steel bolts must be positioned the same with respect to the colored mark after being fastened (see **Fig. 547**).

Fig. 574: Tightening Engine Block Steel Bolts Using Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Aluminum bolts (1) and (2) can have a blue colored mark.

cardiagn.com

Aluminum screws/bolts are **not magnetic** .

Fig. 575: Identifying Engine Block Aluminum Bolts With Colored Mark
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: In the case of aluminum screws, jointing torque and angle of rotation must be observed without fail.

JOIN all aluminum bolts (1) from inside toward the outside.

Tightening torque: **11 11 2AZ** .

Fig. 576: Tightening Engine Block Aluminum Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Mark across all aluminum bolts (1) with a colored mark.

Fig. 577: Identifying Engine Block Aluminum Bolts With Colored Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten all aluminum bolts (1) only with special tool **00 9 120** .

Tightening torque: **11 11 3AZ** .

Tightening torque: **11 11 4AZ** .

Installation note:

All aluminum bolts must be equally positioned with respect to the colored mark after being fastened.

Fig. 578: Tightening Aluminum Bolts With Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool **11 6 252** with magnetic foot on special tool **11 4 440** .

Clamp special tool **11 6 251** on special tool **11 6 252** .

Position special tool **11 6 251** with button on the flat side of the crankshaft.

Press crankshaft (1) in direction of arrow up to stop.

Set dial gauge with knurled screw (2) on zero.

Fig. 579: Pressing Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Press crankshaft (1) in direction of arrow from right to left up to stop.

Determine Crankshaft Axial Clearance. See **CRANKSHAFT AND BEARINGS (N55)** .

Fig. 580: Determining Crankshaft Axial Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Turn crankshaft (1) via the central bolt with special tool **00 2 010** to determine the coefficient of friction. See

cardiagn.com

CRANKSHAFT AND BEARINGS (N55) .

Fig. 581: Turning Crankshaft Central Bolt Using Special Tool (00 2 010)
Courtesy of BMW OF NORTH AMERICA, INC.

Drive both injector nozzles (1) on left and right on crankcase into the bore hole (see arrow) with special tool 11 9 360 .

Installation note:

Replace injector nozzles (1).

Fig. 582: Replacing Injector Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

Drive in both injector nozzles (1) on left and right with special tool 11 9 360 into crankcase.

Fig. 583: Installing Injector Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

Drive injector nozzle (1) all the way in.

Fig. 584: Identifying Injector Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Use PRIMER 1.3 AND LIQUID SEALING COMPOUND 1.4.

Prepare liquid sealing compound (2) in special tool 11 4 370 .

Screw on nozzle (1) for injecting sealing compound.

Fig. 585: Identifying Nozzle, Syringe And Injecting Sealing Compound
Courtesy of BMW OF NORTH AMERICA, INC.

Slowly and evenly insert liquid sealing compound (1) via the injector nozzle with special tool 11 4 370 in direction of arrow.

Graphic N42.

Fig. 586: Inserting Liquid Sealing Compound Using Special Tool (11 4 370)
Courtesy of BMW OF NORTH AMERICA, INC.

Replace front CRANKSHAFT SEAL.

Replace CRANKSHAFT SEAL (transmission side).

Assemble engine.

11 21 505 SEALING CRANKCASE LOWER SECTION (N20, N26)

Special tools required:

- 11 0 300

cardiagn.com

- 11 9 260
- 11 4 180
- 11 4 470
- 00 9 120
- 2 212 822
- 11 9 231
- 11 9 233
- 11 8 220
- 11 9 182
- 11 9 184
- 11 9 181
- 2 212 827
- 11 9 183

IMPORTANT: Changed procedure.
It is not necessary to remove the cylinder head and the crankshaft.

Necessary preliminary tasks:

- Remove **ENGINE**.
- Mount **ENGINE** on assembly stand.
- Remove clutch (if fitted).
- Remove left and right **engine support arm** . See **22 11 110 REPLACING LEFT ENGINE SUPPORT ARM (N20)** or **22 11 100 REPLACING RIGHT ENGINE SUPPORT ARM (N20)** .
- Remove **OIL SUMP**.
- Remove **VIBRATION DAMPER**.
- Remove **COUNTERBALANCE SHAFT**.

Release hose clamp (1) and detach coolant hose.

Tightening torque:**11 51 3AZ**

Unfasten plug connection (2) and disconnect.

Release screws (3) and remove coolant pump.

Tightening torque: **11 51 2AZ**

Fig. 587: Identifying Coolant Hose, Clamp, Plug Connection And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 42 6AZ** .

Remove oil return line (2).

Installation note:

Replace O-ring.

Remove vent line (3).

cardiagn.com

Fig. 588: Identifying Oil Return Line, Vent Line And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The dowel hole for the TDC setting is on the exhaust side below the exhaust manifold.

Rotate engine at central bolt and secure flywheel in position with special tool **11 0 300** .

Fig. 589: Securing Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.

Secure flywheel with special tool (1) **11 9 260** .

NOTE: Ensure that special tool 11 9 260 is fully engaged in the flywheel gearing.

Fig. 590: Securing Flywheel Using Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Automatic transmission:

Release flywheel bolts (1).

Release special tool (2).

Remove flywheel (3).

Fig. 591: Removing Flywheel Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Manual gearbox:

IMPORTANT: Position crankshaft at TDC.

Remove dual-mass flywheel.

Secure flywheel with special tool **11 9 260** .

Release flywheel bolts with special tool **11 4 180** .

Fig. 592: Securing Flywheel Using Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Magnet wheel (1) is magnetic.
Keep magnet wheel (1) in a plastic bag away from swarf.

Remove magnet wheel (1) from crankshaft.

Installation note:

Check the fitting sleeve for damage.

Note the installation position of the magnet wheel.

Fig. 593: Identifying Magnet Wheel On Crankshaft

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Release all crankcase bolts (1) along line (2).

Release screw on pulse sensor (1).

Fig. 594: Identifying Pulse Sensor With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 595: Identifying Crankcase Bolts Line
Courtesy of BMW OF NORTH AMERICA, INC.

Slide **PULSE SENSOR** (2) upwards.

Fig. 596: Crankcase Bolts Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Release crankcase bolts M10 in sequence 10 to 1.

Release crankcase lower section (1) from crankcase upper section (2) with suitable tool (3)

Remove crankcase lower section (1) upwards.

IMPORTANT: Do not rotate crankshaft without crankcase lower section (1) **(risk of damage)** .

Fig. 597: Removing Crankcase Lower Section From Crankcase Upper Section
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Timing chain is preloaded.
Do not raise crankshaft.

Carefully remove radial shaft seal (1).

Catch escaping engine oil with a cloth (2).

Fig. 598: Removing Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully remove radial shaft seal (1) towards front.

Catch escaping engine oil with a cloth (2).

Fig. 599: Removing Radial Shaft Seal Towards Front
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Protect crankcase against sealant residues with a cloth (1).
Remove sealing compound residues (1) with special tool **11 4 470** .

Fig. 600: Protecting Crankcase Against Sealant Residues Using Cloth
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

cardiagn.com

Check durability of sealing compound, do not use sealing compound that has expired.

Maximum processing time of the **SEALING COMPOUND 2.2** 10 minutes.

Apply sealing compound in the stated areas with a width of 2.0 to 2.6 mm.

Fig. 601: Identifying Sealing Compound Applying Areas
Courtesy of BMW OF NORTH AMERICA, INC.

Fit crankcase lower section (watch fitting bushes).

Fig. 602: Fitting Crankcase Lower Section
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 603: Crankcase Screws Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in all M10 crankcase screws in the sequence 1 to 10 and tighten with **JOINTING TORQUE** .

Identify all M10 crankcase bolts with a colored marking (1) for checking.

Fig. 604: Identifying Crankcase Bolt Marks
Courtesy of BMW OF NORTH AMERICA, INC.

Retighten all screws using special tool **00 9 120** , observing the specified sequence.

Tightening torque: **11 11 1AZ** .

Installation note:

After tightening all screws, the colored mark must be aligned in the same way.

Fig. 605: Tightening Engine Block Screws Using Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 606: Identifying Crankcase Bolts Line
Courtesy of BMW OF NORTH AMERICA, INC.

Insert all crankcase screws (1) and tighten from the inside to the outside.

Tightening torque: **11 11 2AZ** .

IMPORTANT: The following text describes the installation and sealing between the engine block and crankshaft seal at the front.
The engine block will not be leak proof at the outside of the crankshaft seal if you fail to comply with the individual work steps and the work sequence.

Connect supporting sleeve (1) to special tool **2 212 822** .

Position radial shaft seal (2) carefully in direction of arrow on special tool **2 212 822** .

Fig. 607: Positioning Radial Shaft Seal On Special Tool (2 212 822)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Slide the radial shaft seal (1) all the way home.

Remove supporting sleeve (2).

Fig. 608: Identifying Radial Shaft Seal And Supporting Sleeve
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **2 212 822** to the crankshaft with 2 screws.

Fig. 609: Securing Special Tool (2 212 822) To Crankshaft With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Align radial shaft seal (1) in parallel with the special tool **11 9 231** for housing separation.

Fig. 610: Aligning Radial Shaft Seal In Parallel With Special Tool (11 9 231)
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in radial shaft seal with special tool **11 9 231** in conjunction with special tool **11 9 233** until flush.

Fig. 611: Installing Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Installing crankshaft seal on transmission side:

Prepare radial shaft seal (1) on special tool **11 8 220** .

Fig. 612: Identifying Radial Shaft Seal On Special Tool (11 8 220)
Courtesy of BMW OF NORTH AMERICA, INC.

Position radial shaft seal (1) with special tool **11 8 220** on crankshaft.

Fig. 613: Positioning Radial Shaft Seal With Special Tool (11 8 220) On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Brush radial shaft seal (1) over special tool **11 8 220** .

Move radial shaft seal (1) parallel up against the crankcase.

Fig. 614: Moving Radial Shaft Seal Parallel Up Against Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Fasten special tool **11 9 182** with special tool **11 9 184** on the crankshaft.

Fig. 615: Installing Special Tool (11 9 182) With (11 9 184) On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Prepare special tool **11 9 181** for installation.

Connect special tool **2 212 827** onto special tool **11 9 181** .

cardiagn.com

Fig. 616: Connecting Special Tool (2 212 827) Onto Special Tool (11 9 181)
Courtesy of BMW OF NORTH AMERICA, INC.

Pull on radial shaft seal with special tools **11 9 181** and **2 212 827** in combination with special tool **11 9 183** .

Fig. 617: Pulling Radial Shaft Seal With Special Tools (11 9 181)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw on radial shaft seal with special tool **11 9 183** to limit position.

Fig. 618: Screwing Radial Shaft Seal With Special Tool (11 9 183) To Limit Position
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 21 505 SEALING CRANKCASE LOWER SECTION (N55)

Special tools required:

- **00 9 120**
- **11 0 300**
- **11 4 180**
- **11 4 370**
- **11 4 470**
- **11 8 181**
- **11 8 220**
- **11 8 640**
- **11 9 181**
- **11 9 182**
- **11 9 183**
- **11 9 184**
- **11 9 185**
- **11 9 231**
- **11 9 233**
- **11 9 234**
- **11 9 235**
- **11 9 260**
- **11 9 360**

IMPORTANT:
Aluminum-magnesium materials.
No steel screws/bolts may be used due to the threat of electrochemical corrosion.
A magnesium crankcase requires aluminum screws/bolts exclusively.
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Risk of damage!
Jointing torque and angle of rotation must be observed without fail.

IMPORTANT:
Changed procedure.
It is not necessary to remove the cylinder head and the crankshaft.

cardiagn.com

Necessary preliminary tasks:

- Remove **ENGINE**.
- **MOUNT ENGINE ON ASSEMBLY STAND**.
- Remove **engine support arm** . See **22 11 110 REPLACING LEFT ENGINE SUPPORT ARM (N55)** or **22 11 100 REPLACING RIGHT ENGINE SUPPORT ARM (N55)** on left and right.
- Remove **OIL SUMP**.

Release screws (1).

Pull out oil pump intake pipe (2).

Tightening torque: **11 13**

Fig. 619: Removing Oil Pump Intake Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 13 5AZ** .

Installation note:

Replace aluminum screws.

Remove oil deflector (2).

Fig. 620: Identifying Oil Deflector And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Secure oil pump drive gear with 6.0 mm dia. steel pin (3) to oil pump.

IMPORTANT: Release central bolt (2) only together with 6.0 mm dia. steel pin (3).
Do not remove sprocket.

Release central bolt (2).

Tightening torque: **11 41 5AZ** .

Fig. 621: Identifying Central Bolt And Steel Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws (2).

Tightening torque: **11 41 3AZ** .

Installation note:

Replace aluminum screws.

Fig. 622: Identifying Crankcase Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove screw plug (1) from crankcase at front.

cardiagn.com

NOTE: **Replace gasket.**

Fig. 623: Identifying Crankcase Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) for oil pump triangular drive with special tool **11 8 640** .

NOTE: **It is not necessary to remove the triangular drive.**

Fig. 624: Identifying Oil Pump Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Version 1:

IMPORTANT:
Observe different screw lengths.
Release screws (1).
Tightening torque: **11 41 2AZ** .
Tightening torque: **11 41 2AZ** .

Installation note:

Replace aluminum screws.

Fig. 625: Identifying Engine Block Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Version 2:

IMPORTANT:
Observe different screw lengths.
Release oil pump screws (1).
Tightening torque: **11 41 2AZ** .

Installation note:

Replace aluminum screws.

Fig. 626: Identifying Oil Pump Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Detach sprocket (1) in direction of arrow.

NOTE: **The chain tensioner pushes the timing chain (3) of the triangular drive upward.**

Do **not** remove camshaft sprocket.

Remove oil pump (2) in direction of arrow.

Fig. 627: Identifying Oil Pump, Timing Chain And Sprocket Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check spacer bushes (1) for secure seating and damage; replace if necessary.

cardiagn.com

Align mounting flats (3) on oil pump (2) to camshaft sprocket.

Install oil pump (2).

Fig. 628: Identifying Spacer Bushings, Mounting Flats & Oil Pump
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The dowel hole for the TDC setting is located on the intake side underneath the starter motor.

Rotate engine at central bolt and secure flywheel in position with special tool **11 0 300** .

Fig. 629: Securing Flywheel Using Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

Secure flywheel with special tool (1) 11 9 260 and special tool (2) 11 9 266.

Tightening torque

NOTE: Make sure that the special tool (1) completely engages in the flywheel teeth (see arrow)

Fig. 630: Securing Flywheel Using Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Automatic transmission:

Release flywheel bolts (1).

Release special tool (2).

Remove flywheel (3).

Fig. 631: Removing Flywheel Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Manual transmission:

IMPORTANT: Position crankshaft at TDC.

Remove dual-mass flywheel.

Secure flywheel with special tool **11 9 260** .

Remove **VIBRATION DAMPER**.

Release flywheel bolts with special tool **11 4 180** /

Fig. 632: Securing Flywheel Using Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 633: Identifying Crankcase Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release all crankcase bolts (1) along line (2).

Fig. 634: Crankcase Bolts Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Release crankcase bolts M10 in sequence 14 to 1.

Release crankcase lower section (1) from crankcase upper section (2) with suitable tool (3)

Remove crankcase lower section (1) upwards.

IMPORTANT: Do not rotate crankshaft without crankcase lower section (1) **(risk of damage)** .

Fig. 635: Removing Crankcase Lower Section From Crankcase Upper Section
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Timing chain is preloaded.
Do not raise crankshaft.

Carefully remove radial shaft seal (1).

Catch escaping engine oil with a cloth (2).

Fig. 636: Removing Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully remove radial shaft seal (1) towards front.

Catch escaping engine oil with a cloth (2).

Fig. 637: Removing Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Protect crankcase against sealant residues with a cloth (1).

Fig. 638: Protecting Crankcase Against Sealant Residues Using Cloth
Courtesy of BMW OF NORTH AMERICA, INC.

Remove sealing compound residues (1) with special tool **11 4 470** .

Remove injector nozzles (2) for liquid sealing compound on left and right.

Installation note:

Replace injector nozzles (2).

Clean all threads with compressed air.

Fig. 639: Identifying Injector Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

Position crankcase lower section (1) on crankcase upper section.

Screw in all M10 crankcase bolts.

cardiagn.com

Joint all M10 crankcase bolts (1) **20 NM** from inside outwards.

Fig. 640: Tightening M10 Crankcase Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Identify all M10 crankcase bolts with a colored marking (1) for checking.

Fig. 641: Identifying Crankcase Bolts Marks
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 642: Crankcase Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Secure crankcase bolts M10 in sequence 1 to 14 with special tool **00 9 120** .

Tightening torque: **11 11 1AZ** .

Fig. 643: Identifying Crankcase Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Insert all crankcase bolts (1).

IMPORTANT: Observe different lengths and sizes of the bolts.

Tightening torque: **11 11 2, 3 AND 4AZ** .

Tighten screw (1) for oil pump triangular drive with special tool **11 8 640** .

NOTE: Replace screw.

Tightening torque: **11 41 4 AZ** .

Fig. 644: Identifying Oil Pump Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten screw plug on front of crankcase.

Tightening torque: **11 11 9**

Installation note:

Replace sealing ring.

Fig. 645: Identifying Crankcase Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare radial shaft seal (1) on special tool **11 8 220** .

Fig. 646: Identifying Radial Shaft Seal On Special Tool 11 8 220
Courtesy of BMW OF NORTH AMERICA, INC.

Position radial shaft seal (1) with special tool **11 8 220** on crankshaft.

cardiagn.com

Fig. 647: Positioning Radial Shaft Seal With Special Tool 11 8 220 On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Brush radial shaft seal (1) over special tool **11 8 220** .

Move radial shaft seal (1) parallel up against the crankcase.

Fig. 648: Moving Radial Shaft Seal Parallel Up Against Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 9 182** with screws (special tool **11 9 184**) to crankshaft.

Fig. 649: Installing Special Tool (11 9 182)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Prepare special tool **11 9 181** for installation. Connect special tool **11 9 185** onto special tool **11 8 181** .

Fig. 650: Connecting Special Tool (11 9 185) Onto Special Tool (11 9 181)
Courtesy of BMW OF NORTH AMERICA, INC.

Pull on radial shaft seal with special tool **11 9 181** and **11 9 185** in combination with special tool **11 9 183** .

Fig. 651: Pulling Radial Shaft Seal With Special Tools (11 9 181) And (11 9 185)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw on radial shaft seal with special tool **11 9 183** to limit position.

Fig. 652: Screwing Radial Shaft Seal With Special Tool (11 9 183) To Limit Position
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean sealing surface (1) and degrease thoroughly in area of housing partition.

Apply a light coat of oil to running surface (2) of radial shaft seal.

NOTE: Graphic N42.

Fig. 653: Identifying Sealing Surface And Running Surface
Courtesy of BMW OF NORTH AMERICA, INC.

Push radial shaft seal (1) **11 9 235** carefully in direction of arrow on the special tool.

Fig. 654: Pushing Radial Shaft Seal On Special Tool 11 9 235
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **11 9 235** Special tool can only be fastened with 2 opposite bolts. Determine hole pattern on special tool.

Screw special tool **11 9 235** with special tool **11 9 234** on crankshaft.

cardiagn.com

Fig. 655: Screwing Special Tool (11 9 235) With (11 9 234) On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Align groove (2) of radial shaft seal (1) centered to the housing partition (3).

IMPORTANT: After installation, the grooves must be filled with sealing compound.

Fig. 656: Aligning Groove Of Radial Shaft Seal Centered To Housing Partition
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in radial shaft seal with special tool **11 9 231** in conjunction with special tool **11 9 233** until flush.

Fig. 657: Drawing Radial Shaft Seal With Special Tool (11 9 231)
Courtesy of BMW OF NORTH AMERICA, INC.

Drive both injector nozzles (1) on left and right with special tool **11 9 360** into crankcase up to stop.

Fig. 658: Installing Injector Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

After fitting both sealing rings, check both sealing ducts for clearance.

Blow compressed air (1) at max. 6 bar into injector nozzle (2).

Compressed air must emerge at both sealing rings on left and right from the outlet bores.

IMPORTANT: If the compressed air does not flow out of all ducts. the crankcase must again be taken apart and cleaned.

Fig. 659: Blowing Compressed Air Into Injector Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Use **PRIMER 1.3 AND LIQUID SEAL 1.4**.

As an alternative, **PRIMER 1.3 AND LIQUID SEAL 1.2** can also be used.

Prepare liquid sealing compound (1) in special tool **11 4 370** .

Injector nozzles for injecting sealing compound are not required.

Take note of the expiry date!

Fig. 660: Identifying Nozzle, Syringe And Injecting Sealing Compound
Courtesy of BMW OF NORTH AMERICA, INC.

Slowly insert liquid sealing compound (1) with special tool **11 4 370** in direction of arrow.

Liquid sealing compound must emerge at radial shaft seals at front and rear.

Fig. 661: Inserting Liquid Sealing Compound Using Special Tool (11 4 370)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Stop (seal off) escaping liquid sealing compound with primer 1.3.

Fig. 662: Applying Liquid Sealing Compound
Courtesy of BMW OF NORTH AMERICA, INC.

Stop (seal off) escaping liquid sealing compound with primer 1.3.

Fig. 663: Inserting Brush Into Grooves On Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 21 505 UNSEALING CRANKSHAFT HOUSING BOTTOM PART (N52T)

Special tools required:

- 00 9 120
- 11 0 300
- 11 4 180
- 11 4 370
- 11 4 470
- 11 8 181
- 11 8 220
- 11 8 640
- 11 9 181
- 11 9 182
- 11 9 183
- 11 9 184
- 11 9 185
- 11 9 231
- 11 9 233
- 11 9 234
- 11 9 235
- 11 9 260
- 11 9 360

IMPORTANT:
Aluminum-magnesium materials.
No steel screws/bolts may be used due to the threat of electrochemical corrosion.
A magnesium crankcase requires aluminum screws/bolts exclusively.
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Risk of damage!
Jointing torque and angle of rotation must be observed without fail.

IMPORTANT:
Changed procedure.
It is not necessary to remove the cylinder head and the crankshaft.

Necessary preliminary work:

cardiagn.com

- Remove **ENGINE**.
- **MOUNT ENGINE ON ASSEMBLY STAND**.
- Remove clutch (if fitted).
- Remove **engine support arm** . See **22 11 110 REPLACING LEFT ENGINE SUPPORT ARM (N52)** or **22 11 100 REPLACING RIGHT ENGINE SUPPORT ARM (N52)** .
- Remove **OIL SUMP**.

Release screws (1).

Pull out oil pump intake pipe (2).

Tightening torque: **11 13**

Fig. 664: Removing Oil Pump Intake Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 13 11AZ** .

Installation note:

Replace aluminum screws.

Remove oil deflector (2).

Fig. 665: Identifying Oil Deflector Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Secure oil pump sprocket with 6.0 mm dia. steel pin (3) to oil pump.

IMPORTANT: Release central bolt (2) only together with 6.0 mm dia. steel pin (3). Do not remove sprocket.

Release central bolt (2).

Tightening torque: **11 41 6AZ** .

Fig. 666: Identifying Central Bolt And Steel Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws (2).

Tightening torque: **11 41 5AZ** .

Installation note:

Replace aluminum screws.

Fig. 667: Identifying Crankcase Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove screw plug (1) from crankcase at front.

NOTE: **Replace gasket.**

cardiagn.com

Fig. 668: Identifying Crankcase Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) for oil pump triangular drive with special tool **11 8 640** .

NOTE: It is not necessary to remove the triangular drive.

Fig. 669: Identifying Oil Pump Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Version 1:

IMPORTANT: Observe different screw lengths.
Release screws (1).
Tightening torque: **11 41 2AZ** .
Tightening torque: **11 41 3AZ** .

Installation note:

Replace aluminum screws.

Fig. 670: Identifying Oil Pump Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Version 2:

IMPORTANT: Observe different screw lengths.
Release oil pump screws (1).
Tightening torque: **11 41 2AZ** .

Installation note:

Replace aluminum screws.

Fig. 671: Releasing Oil Pump Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Detach sprocket (1) in direction of arrow.

NOTE: The chain tensioner pushes the timing chain (3) of the triangular drive upward.

Do **not** remove camshaft sprocket.

Remove oil pump (2) in direction of arrow.

Fig. 672: Identifying Oil Pump, Timing Chain And Sprocket Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check spacer bushes (1) for secure seating and damage; replace if necessary.

Align mounting flats (3) on oil pump (2) to camshaft sprocket.

cardiagn.com

Install oil pump (2).

Fig. 673: Identifying Spacer Bushings And Oil Pump
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The dowel hole for the TDC position is located on the intake side underneath the starter motor.

Rotate engine at central bolt and secure flywheel in position with special tool **11 0 300** .

Fig. 674: Securing Flywheel Using Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

Secure flywheel with special tool (1) 11 9 260 and special tool (2) 11 9 266.

Tightening torque

NOTE: Make sure that the special tool (1) completely engages in the flywheel teeth (see arrow)

Fig. 675: Securing Flywheel Using Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Automatic transmission:

Release flywheel bolts (1).

Release special tool (2).

Remove flywheel (3).

Fig. 676: Removing Flywheel Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Manual gearbox:

IMPORTANT: Position crankshaft at TDC.

Remove dual-mass flywheel.

Secure flywheel with special tool **11 9 260** .

Remove **VIBRATION DAMPER**.

Release flywheel bolts with special tool **11 4 180** .

Fig. 677: Releasing Flywheel Bolt Using Special Tool (11 4 180)
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 678: Identifying Crankcase Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release all crankcase bolts (1) along line (2).

cardiagn.com

Fig. 679: Crankcase Bolts Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Release crankcase bolts M10 in sequence 14 to 1.

Release crankcase lower section (1) from crankcase upper section (2) with suitable tool (3)

Remove crankcase lower section (1) upwards.

IMPORTANT: Do not rotate crankshaft without crankcase lower section (1) **(risk of damage)** .

Fig. 680: Removing Crankcase Lower Section From Crankcase Upper Section
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Timing chain is preloaded.
Do not raise crankshaft.

Carefully remove radial shaft seal (1).

Catch escaping engine oil with a cloth (2).

Fig. 681: Removing Radial Shaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully remove radial shaft seal (1) towards front.

Catch escaping engine oil with a cloth (2).

Fig. 682: Removing Radial Shaft Seal Towards Front
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Protect crankcase against sealant residues with a cloth (1).

Fig. 683: Protecting Crankcase Against Sealant Residues Using Cloth
Courtesy of BMW OF NORTH AMERICA, INC.

Remove sealing compound residues (1) with special tool **11 4 470** .

Remove injector nozzles (2) for liquid sealing compound on left and right.

Installation note:

Replace injector nozzles (2).

Clean all threads with compressed air.

Fig. 684: Identifying Injector Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

Position crankcase lower section (1) on crankcase upper section.

Screw in all M10 crankcase bolts.

Joint all M10 crankcase bolts (1) **20 NM** from inside outwards.

cardiagn.com

Fig. 685: Positioning Crankcase Lower Section On Crankcase Upper Section
Courtesy of BMW OF NORTH AMERICA, INC.

Identify all M10 crankcase bolts with a colored marking (1) for checking.

Fig. 686: Identifying Crankcase Bolts Marks
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 687: Crankcase Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Secure crankcase bolts M10 in sequence 1 to 14 with special tool **00 9 120** .

Tightening torque: **11 11 1AZ** .

Fig. 688: Identifying Crankcase Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Insert all crankcase bolts (1).

IMPORTANT: Observe different lengths and sizes of the bolts.

Tightening torque: **11 11 2, 3 AND 4AZ** .

Tighten screw (1) for oil pump triangular drive with special tool **11 8 640** .

NOTE: Replace screw.

Tightening torque: **11 41 4 AZ** .

Fig. 689: Identifying Oil Pump Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten screw plug on front of crankcase.

Tightening torque: **11 11 7AZ** .

Installation note:

Replace sealing ring.

Fig. 690: Identifying Crankcase Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare radial shaft seal (1) on special tool **11 8 220** .

Fig. 691: Identifying Radial Shaft Seal On Special Tool (11 8 220)
Courtesy of BMW OF NORTH AMERICA, INC.

Position radial shaft seal (1) with special tool **11 8 220** on the crankshaft.

Fig. 692: Positioning Radial Shaft Seal With Special Tool (11 8 220) On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Brush radial shaft seal (1) over the special tool **11 8 220** .

Move radial shaft seal (1) parallel up against the crankcase.

Fig. 693: Moving Radial Shaft Seal Parallel Up Against Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 9 182** with screws (special tool **11 9 184**) to crankshaft.

Fig. 694: Installing Special Tool (11 9 182)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Prepare special tool **11 9 181** for installation. Connect special tool **11 9 185** onto special tool **11 8 181** .

Fig. 695: Connecting Special Tool (11 9 185) Onto Special Tool (11 9 181)
Courtesy of BMW OF NORTH AMERICA, INC.

Pull on radial shaft seal with special tool **11 9 181** and **11 9 185** in combination with special tool **11 9 183** .

Fig. 696: Pulling Radial Shaft Seal With Special Tools (11 9 181) And (11 9 185)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw on radial shaft seal with special tool **11 9 183** to limit position.

Fig. 697: Screwing Radial Shaft Seal With Special Tool 11 9 183 To Limit Position
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean sealing surface (1) and degrease thoroughly in area of housing partition.

Apply a light coat of oil to running surface (2) of radial seal.

NOTE: **Graphic N42.**

Fig. 698: Identifying Sealing Surface And Running Surface
Courtesy of BMW OF NORTH AMERICA, INC.

Push radial shaft seal (1) **11 9 235** carefully in direction of arrow on the special tool.

Fig. 699: Pushing Radial Shaft Seal On Special Tool (11 9 235)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **11 9 235** Special tool can only be fastened with 2 opposite bolts. Determine hole pattern on special tool.

Screw special tool **11 9 235** with special tool **11 9 234** on crankshaft.

Fig. 700: Screwing Special Tool (11 9 235) With (11 9 234) On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Align groove (2) of radial shaft seal (1) Centered to the housing partition (3.

IMPORTANT: After installation, the grooves must be filled with sealing compound.

Fig. 701: Aligning Groove Of Radial Shaft Seal Centered To Housing Partition
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in radial shaft seal with special tool **11 9 231** in conjunction with special tool **11 9 233** until flush.

Fig. 702: Drawing Radial Shaft Seal With Special Tool (11 9 231)
Courtesy of BMW OF NORTH AMERICA, INC.

Drive both injector nozzles (1) on left and right with special tool **11 9 360** into crankcase up to stop.

Fig. 703: Installing Injector Nozzles
Courtesy of BMW OF NORTH AMERICA, INC.

After fitting both sealing rings, check both sealing ducts for clearance.

Blow compressed air (1) at max. 6 bar into injector nozzle (2).

Compressed air must emerge at both sealing rings on left and right from the outlet bores.

IMPORTANT: If the compressed air does not flow out of all ducts. the crankcase must again be taken apart and cleaned.

Fig. 704: Identifying Injector Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Use **PRIMER 1.3 AND LIQUID SEAL 1.4**.

Prepare liquid sealing compound (1) in special tool **11 4 370** .

Injector nozzles for injecting sealing compound are not required.

Fig. 705: Identifying Nozzle, Syringe And Injecting Sealing Compound
Courtesy of BMW OF NORTH AMERICA, INC.

Slowly insert liquid sealing compound (1) with special tool **11 4 370** in direction of arrow.

Liquid sealing compound must emerge at radial shaft seals at front and rear.

Fig. 706: Inserting Liquid Sealing Compound Using Special Tool (11 4 370)
Courtesy of BMW OF NORTH AMERICA, INC.

Stop (seal off) escaping liquid sealing compound with primer 1.3.

Fig. 707: Applying Liquid Sealing Compound
Courtesy of BMW OF NORTH AMERICA, INC.

Stop (seal off) escaping liquid sealing compound with primer 1.3.

cardiagn.com

Fig. 708: Inserting Brush Into Grooves On Crankshaft Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

FLYWHEEL

11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N55)

Special tools required:

- 11 4 180
- 11 9 260
- 11 9 265

IMPORTANT:
Aluminum screws/bolts must be replaced each time they are **released.**
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic.**
Jointing torque and angle of rotation must be observed without fail **(risk of damage).**

Necessary preliminary tasks:

- Remove **transmission** . See 24 00 033 REMOVING AND INSTALLING AUTOMATIC TRANSMISSION (GA8HP45Z) N55 .

Automatic transmission:

Secure flywheel (1) with special tool 11 9 260 .

Unfasten flywheel bolts.

Tightening torque: 11 22 1AZ .

Installation note:

Flywheel (1) is secured with an dowel pin.

Fig. 709: Securing Flywheel With Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Manual gearbox:

Fasten dual-mass flywheel with special tool 11 9 260 and 11 9 265 .

Release flywheel bolts with special tool 11 4 180 /

Tightening torque: 11 22 2AZ .

Installation note:

Fit new flywheel bolts.

Clean all threads for flywheel bolts in crankshaft.

Fig. 710: Releasing Flywheel Bolts With Special Tool (11 4 180)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Pay attention to dowel pin.

Fig. 711: Removing Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Ensure installed position of magnet wheel is correct.

Fig. 712: Identifying Magnet Wheel On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N20, N26)

Special tools required:

- 11 9 260
- 11 4 180

Necessary preliminary tasks:

- Remove TRANSMISSION .

Automatic transmission:

Secure flywheel (1) with special tool 11 9 260 .

Unfasten flywheel studs.

Tightening torque: 11 22 1AZ .

Installation note:

Flywheel (1) is secured with an dowel pin.

Clean all threads for flywheel bolts in crankshaft.

Fit new flywheel bolts.

Fig. 713: Securing Flywheel With Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Manual transmission:

Fasten dual-mass flywheel with special tool 11 9 260 .

Release flywheel bolts with special tool 11 4 180 /

Tightening torque: 11 22 2AZ .

Installation note:

cardiagn.com

Flywheel is secured with a dowel pin.

Fit new flywheel bolts.

Clean all threads for flywheel bolts in crankshaft.

Fig. 714: Securing Flywheel With Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove flywheel.

Fig. 715: Removing Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Pay attention to dowel pin.

Ensure installed position of magnet wheel is correct.

Fig. 716: Identifying Magnet Wheel On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 22 000 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N47 D20 O1)

Special tools required:

- 11 4 180
- 11 9 260
- 11 9 263
- 11 9 264
- 11 9 265

Necessary preliminary tasks:

- Disconnect negative battery terminal. See 61 20 900 DISCONNECTING AND CONNECTING BATTERY NEGATIVE LEAD .
- Remove and install front and rear assembly underbody protection. See 51 47 490 REMOVING AND INSTALLING/REPLACING FRONT UNDERBODY PROTECTION or 51 47 491 REMOVING AND INSTALLING/REPLACING REAR UNDERBODY PROTECTION .
- Remove clutch.
- Remove and install TRANSMISSION .

Manual gearbox.

Secure flywheel with special tool 11 9 260 /11 9 265 .

Attach special tool 11 9 260 to the crankcase with a gearing screw (1).

Release flywheel studs with special tool 11 4 180 .

Tightening torque: 11 22 2AZ .

cardiagn.com

Fig. 717: Releasing Flywheel Studs Using Special Tool (11 4 180)
Courtesy of BMW OF NORTH AMERICA, INC.

Automatic transmission.

Secure flywheel (1) with special tool 11 9 260 /11 9 263 /11 9 264 .

Unfasten flywheel studs.

Tightening torque: 11 22 1AZ .

Fig. 718: Securing Flywheel Using Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 22 500 REMOVING AND INSTALLING/REPLACING FLYWHEEL (N52T)

Special tools required:

- 11 9 260

IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released** . Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic** . Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

- Remove TRANSMISSION

For vehicles with optional extra SA205 (automatic transmission):

Secure flywheel (1) with existing transmission bolt (2) and special tool 11 9 260 .

Installation note:

Replace aluminum screws.

Unfasten flywheel bolts.

Tightening torque: 11 22 1AZ .

Installation note:

Flywheel (1) is secured with an dowel pin.

Fit new flywheel bolts.

Clean all threads for flywheel bolts in crankshaft.

Fig. 719: Securing Flywheel With Transmission Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Assemble engine.

11 22 513 REPLACING ROLLER BEARING FOR DUAL-MASS FLYWHEEL (N20 N26)

Special tools required:

- 21 2 051
- 21 2 052

NOTE: **FLYWHEEL removed!**

Using hydraulic press (1) and special tool 21 2 051, press roller bearing out of dual-mass flywheel downwards on engine side.

IMPORTANT: Risk of damage:
Roller bearing must not be driven out.

Fig. 720: Pressing Flywheel Roller Bearing
Courtesy of BMW OF NORTH AMERICA, INC.

Push roller bearing (2) onto special tool 21 2 052.

Using hydraulic press (1), press roller bearing into dual-mass flywheel to limit position on clutch side.

IMPORTANT: Risk of damage:
Observe press-in instruction:

- Roller bearing must not be driven in.
- Roller bearing mounting force/travel monitored:

  Min. 2000 N 1 mm before end of pressing in.

  Max. 15, 000 N during entire press-in procedure.

Fig. 721: Pressing Roller Bearing Into Dual-Mass Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Assemble engine.**

11 22 513 REPLACING ROLLER BEARING FOR DUAL-MASS FLYWHEEL (N47 D20 O1)

Special tools required:

- 21 2 051
- 21 2 052

NOTE: **FLYWHEEL removed!**

Using hydraulic press (1) and special tool 21 2 051, press roller bearing out of dual-mass flywheel downwards on engine side.

IMPORTANT: Risk of damage:
Roller bearing must not be driven out.

cardiagn.com

Fig. 722: Pressing Flywheel Roller Bearing
Courtesy of BMW OF NORTH AMERICA, INC.

Push roller bearing (2) onto special tool 21 2 052.

Using hydraulic press (1), press roller bearing into dual-mass flywheel as far as it will go on clutch side.

IMPORTANT:

Risk of damage:
Observe press-in instruction:

- Roller bearing must not be driven in.
- Roller bearing mounting force/travel monitored:

  Min. 2000 N 1 mm before end of pressing in.

  Max. 15, 000 N during entire press-in procedure.

Fig. 723: Pressing Roller Bearing Into Dual-Mass Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.

11 22 513 REPLACING ROLLER BEARING FOR DUAL-MASS FLYWHEEL (N55)

Special tools required:

- 21 2 051
- 21 2 052

NOTE: Flywheel removed!

Using hydraulic press (1) and special tool 21 2 051, press roller bearing out of dual-mass flywheel downwards on engine side.

IMPORTANT: Risk of damage:
Roller bearing must not be driven out.

Fig. 724: Pressing Flywheel Roller Bearing
Courtesy of BMW OF NORTH AMERICA, INC.

Push roller bearing (2) onto special tool 21 2 052.

Using hydraulic press (1), press roller bearing into dual-mass flywheel to limit position on clutch side.

IMPORTANT:

Risk of damage:
Observe press-in instruction:

- Roller bearing must not be driven in.
- Roller bearing mounting force/travel monitored:

  Min. 2000 N 1 mm before end of pressing in.

  Max. 15, 000 N during entire press-in procedure.

Fig. 725: Pressing Roller Bearing Into Dual-Mass Flywheel

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

VIBRATION DAMPER

11 23 010 REMOVING AND INSTALLING/REPLACING VIBRATION DAMPER (N20, N26)

Special tools required:

- 11 9 260
- 11 8 180
- 22 2 742

Necessary preliminary tasks:

- Remove DRIVE BELT.
- REMOVE UNDERBODY PROTECTION AT FRONT AND REAR .

NOTE: Engine removed:

Block crankshaft with special tool 11 9 260 .

Fig. 726: Identifying Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Engine installed with manual transmission:

Block crankshaft with special tool 11 8 180 .

Fig. 727: Identifying Special Tool (11 8 180)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Engine installed with automatic transmission:

Block crankshaft with special tool 22 2 742.

Feed in special tool, slide screw forward and tighten.

Fig. 728: Identifying Special Tool (22 2 742)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove vibration damper.

Tightening torque: 11 23 1AZ .

Fig. 729: Identifying Vibration Damper Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 23 010 REMOVING AND INSTALLING/REPLACING VIBRATION DAMPER (N47 D20 O1)

Special tools required:

cardiagn.com

- 11 6 480
- 11 7 221
- 11 7 222
- 11 7 223

Necessary preliminary work:

- Remove acoustic cover. See 13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1) .
- Remove acoustic cover at front for belt drive, only F10, F11.
- Remove DRIVE BELT FOR ALTERNATOR.

Using a suitable tool, remove the protective cap (1) from deflecting element (2).

Release screw (3).

Tightening torque: 11 00 4AZ .

Remove deflecting element (2).

Fig. 730: Identifying Protective Cap, Deflecting Element And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble special tool 11 7 221 with special tool 11 7 222 and 11 7 223

Fig. 731: Identifying Special Tool (11 7 221), (11 7 222) And (11 7 223)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool 11 7 221 with special tool 11 7 223 into receptacle of the guide pulley.

NOTE: Use special tool 11 7 221 to turn the vibration damper in the direction of travel until the special tool 11 6 480 audibly clicks into place on the vibration damper.

Secure special tool 11 7 221 vibration damper (1).

Fig. 732: Turning Vibration Damper Using Special Tool (11 7 221)
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen bolts (1) on the vibration absorber (2).

Installation note:

Replace RADIAL SHAFT SEAL at front.

Fig. 733: Identifying Bolts On Vibration Absorber
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Position vibration damper as illustrated when refitting.

Fig. 734: Locating Vibration Damper
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

cardiagn.com

Secure the special tool **11 7 221** again in the area of the vibration damper to tighten the screws.

Tighten screws crosswise.

Fig. 735: Identifying Vibration Damper And Special Tool (11 7 221)
Courtesy of BMW OF NORTH AMERICA, INC.

Undo bolts (1) on vibration damper (2).

Remove special tool **11 7 221** in the area of the vibration damper (1).

Remove vibration damper.

Tightening torque: **11 23 1AZ** .

Fig. 736: Identifying Vibration Damper Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

IMPORTANT: Do not run engine without ribbed drive belt.
Risk of damage! to vibration absorber.

11 23 010 REMOVING AND INSTALLING/REPLACING VIBRATION DAMPER (N52T)

Necessary preliminary work:

- Remove **FAN COWL**
- Remove **DRIVE BELT**

Release screws (1).

Tightening torque: **11 23 1AZ** .

Remove vibration damper (2).

Fig. 737: Identifying Vibration Damper Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 23 010 REMOVING AND INSTALLING/REPLACING VIBRATION DAMPER (N55)

Special tools required:

- **11 8 180**
- **11 8 660**
- **11 9 260**

Necessary preliminary tasks:

- Remove **UNDERBODY PROTECTION**
- Remove **DRIVE BELT**.

NOTE: **Gearbox removed:**

cardiagn.com

Block crankshaft with special tool **11 9 260** .

NOTE: **Picture of flywheel removal.**

Fig. 738: Removing Flywheel With Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Gearbox installed with manual gearbox:**

Block crankshaft with special tool **11 8 180** .

Fig. 739: Identifying Special Tool (11 8 180)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Gearbox installed with automatic transmission:**

Block crankshaft with special tool **11 8 660** .

Fig. 740: Identifying Special Tool (11 8 660)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not release central bolt.
If the central bolt is accidentally loosened, the timing must be readjusted.

Fig. 741: Identifying Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1 to 8).

Remove vibration damper (1).

Screws on vibration damper

Tightening torque: **11 23 1AZ** .

Fig. 742: Vibration Damper Screws Loosening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

CONNECTING ROD WITH BEARING

11 24 571 REPLACE ALL CONNECTING ROD BEARINGS (N47 D20 O1)

Special tools required:

- **00 2 590**
- **00 9 120**
- **11 2 110**

Necessary preliminary work:

- Removing all **PISTONS**

cardiagn.com

IMPORTANT: The connecting rod bearing shells for the connecting rod and the connecting rod bearing cap are **different** .
Replace connecting rod bolts.

Insert one blue and one red bearing shell for each connecting rod (irrespective of the color coding on the connecting rod shaft).

IMPORTANT: Note **GRINDING STAGES ON CRANKSHAFT** .

Fig. 743: Identifying Connecting Rod Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Install piston.

Check connecting-rod bearing play.

Piston in BDC position.

Fit special tool **00 2 590** (Plastigage type PG 1) to oil-free crankshaft.

Fit bearing caps so that matching numbers match up.

Fig. 744: Installing Piston With Connecting Rod
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not turn the connecting rods or crankshaft.

Use the old connecting rod bolts to check connecting-rod bearing play.

00 9 120 Tighten down connecting rod bolts with special tool or special tool. **11 2 110**

Tightening torque: **11 24 1AZ** .

Fig. 745: Tightening Connecting Rod Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Remove bearing caps.

Read off bearing clearance at width of crushed plastic thread (Plastigage) with aid of measuring scale.

Connecting rod bearing play . See **CONNECTING RODS AND BEARINGS (N47)** or **CRANKSHAFT AND BEARINGS (N47)** .

Remove Plastigage.

Fig. 746: Checking Connecting-Rod Bearing Play
Courtesy of BMW OF NORTH AMERICA, INC.

Overview:

Color code/shaft diameter/bearing strength

Rt = red

Bl = blue

cardiagn.com

1. Crankshaft journal
2. Bearing clearance
3. Bearing shells: red or blue
4. connecting rod

Fig. 747: Identifying Crankshaft Journal, Bearing Clearance, Connecting Rod And Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 24 571 REPLACING ALL CONNECTING ROD BEARING SHELLS (N20, N26)

Special tools required:

- **00 2 590**
- **00 9 120**
- 83 30 0490 190
- 83 30 0 490 504

Modified procedure:
IMPORTANT: All crank pins are connected with the crankshaft.
The Blue/Red connecting rod bearing shell colors are **no longer** fitted in combination.

Necessary preliminary tasks:

- Removing **OIL SUMP**.

All crankshaft crank pins are classified.
IMPORTANT: The identification (2) is located on the first crank web.
The first code letter (2) from the left is the first cylinder towards the control chain side

Optional classifications (2) per connecting rod

On the connecting rod and connecting rod bearing cap:

r. Connecting rod = Yellow.

Connecting rod bearing cap = Red.

b. Connecting rod = Violet.

Connecting rod bearing cap = Blue

Fig. 748: Identifying Main Bearing Classification ID Codes
Courtesy of BMW OF NORTH AMERICA, INC.

Example:

Possible classification: b r r r

Cylinder 1: Classification b

Violet (connecting rod)/\Blue (connecting rod bearing cap)

Cylinder 2: Classification r

cardiagn.com

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 3: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 4: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Release connecting rod bolts (1).

Remove connecting rod bearing cap (2).

Fig. 749: Identifying Connecting Rod Bearing Cap And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **Risk of damage** to cylinder wall and to crankshaft.

Gently release connecting rod from crankshaft.

Remove connecting rod bearing shells (1 and 2).

Use new connecting rod bearing shells according to code letter.

Installation note:

Pay attention to guide lugs during installation.

IMPORTANT: All crankshaft crank pins are classified.

Fig. 750: Identifying Connecting Rod Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

If the connecting-rod bearing must be checked:

Piston in BDC position.

To determine the connecting rod bearing play, make sure that the bearing positions are clean and free from oil and grease.

Fit special tool **00 2 590** (Plastigage type PG 1) to oil-free crankshaft.

Fit connecting rod bearing cap so that pairing letters match up.

Order number: 83 30 0490 190

Fig. 751: Identifying Bearing Cap Pairing Letters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not distort connecting rods or crankshaft.

It is possible to use the old connecting rod bolts if the connecting-rod bearing play requires checking.

Tighten down connecting rod bolts with special tool **00 9 120** .

Tightening torque: **11 24 1AZ** .

cardiagn.com

Order number: 83 30 0 490 504

Fig. 752: Tightening Connecting Rod Bolts Using Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew connecting rod bearing cap. Read off connecting rod bearing play at width of flattened Plastigage on measurement scale.

CONNECTING ROD BEARING PLAY .

- Remove Plastigage
- Coat crankshaft and connecting rod bearing shells with oil
- Install new connecting rod bolts and tighten down with special tool **00 9 120** .

Tightening torque: **11 24 1AZ** .

Fig. 753: Checking Connecting-Rod Bearing Play
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 24 571 REPLACING ALL CONNECTING ROD BEARING SHELLS (N52T)

Special tools required:

- **00 2 590**
- **00 9 120**

IMPORTANT:	All crank pins are connected with the crankshaft. Modified procedure: The colors of the connecting rod bearing shells are the same at the top and bottom. The Blue/Red connecting rod bearing shell colors are **no longer** fitted in combination.

Necessary preliminary work:

- Remove **OIL SUMP**

IMPORTANT:	All crankshaft crank pins are classified. The identification is located on the first crank web.

Possible classifications per connecting rod and connecting rod bearing cap:

r: Connecting rod/bearing cap = Red.

b: Connecting rod/bearing cap = Blue.

Only one color may be fitted per connecting rod and connecting rod bearing cap.

Classification (2) on crank web for crank pins (1 to 6).

Example:

Possible classification: b r r r r r

Zyl 1: Classification **b** = blue/blue.

Zyl 2: Classification **r** = red/red.

cardiagn.com

Zyl 3: Classification **r** = red/red.

Zyl 4: Classification **r** = red/red.

Zyl 5: Classification **r** = red/red.

Zyl 6: Classification **r** = red/red.

Fig. 754: Identifying Main Bearing Classification ID Codes
Courtesy of BMW OF NORTH AMERICA, INC.

Release connecting rod bolts (1).

Remove connecting rod bearing cap (2).

Fig. 755: Identifying Connecting Rod Bearing Cap And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **Risk of damage** to cylinder wall and to crankshaft.

Gently release connecting rod from crankshaft.

Remove connecting rod bearing shells (1 and 2).

Install new connecting rod bearing shells.

Installation note:

Pay attention to guide lugs during installation.

IMPORTANT: All crankshaft crank pins are classified.

Fig. 756: Identifying Connecting Rod Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

In each case insert only one color of connecting rod bearing shell (1 and 2) for each connecting rod.

Check connecting-rod bearing play.

Piston in BDC position.

To determine the connecting-rod bearing play, make sure that the bearing positions are clean and free from oil and grease.

Fit special tool **00 2 590** (Plastigage type PG 1) to oil-free crankshaft.

Fit connecting rod bearing cap so that pairing letters match up.

Fig. 757: Identifying Connecting Rod Bearing Cap Pairing Letters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not distort connecting rods or crankshaft.

Use the old connecting rod bolts to check connecting-rod bearing play.

Tighten down connecting rod bolts with special tool **00 9 120** .

cardiagn.com

Tightening torque: **11 24 1AZ** .

Fig. 758: Identifying Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew connecting rod bearing cap. Read off connecting-rod bearing play at width of flattened Plastigage on measuring scale.

Connecting-rod bearing play . See **CONNECTING RODS AND BEARINGS (N52T)** .

- Remove Plastigage
- Coat crankshaft and connecting rod bearing shells with oil
- Install new connecting rod bolts and tighten down with special tool **00 9 120** .

Tightening torque: **11 24 1AZ** .

Fig. 759: Checking Connecting-Rod Bearing Play
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 24 571 REPLACING ALL CONNECTING ROD BEARING SHELLS (N55)

Special tools required:

- **00 2 590**
- **00 9 120**

IMPORTANT:	Modified procedure: All crank pins are connected with the crankshaft. The Blue/Red connecting rod bearing shell colors are **no longer** fitted in combination.

Necessary preliminary tasks:

- Removing **OIL SUMP**.

IMPORTANT:	All crankshaft crank pins are classified. The identification (2) is located on the first crank web.

Optional classifications (2) per connecting rod

On the connecting rod and connecting rod bearing cap:

r. Connecting rod = Yellow.

Connecting rod bearing cap = Red.

b. Connecting rod = Violet.

Connecting rod bearing cap = Blue

Fig. 760: Identifying Crankcase Lower Section Codes
Courtesy of BMW OF NORTH AMERICA, INC.

Example:

cardiagn.com

Possible classification: b r r r r r

Cylinder 1: Classification b

Violet (connecting rod)/\Blue (connecting rod bearing cap)

Cylinder 2: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 3: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 4: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 5: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Cylinder 6: Classification r

Yellow (connecting rod)/Red (connecting rod bearing cap)

Release connecting rod bolts (1).

Remove connecting rod bearing cap (2).

Fig. 761: Identifying Connecting Rod Bearing Cap And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **Risk of damage** to cylinder wall and to crankshaft.

Gently release connecting rod from crankshaft.

Remove connecting rod bearing shells (1 and 2).

Use new connecting rod bearing shells according to code letter.

Installation note:

Pay attention to guide lugs during installation.

IMPORTANT: All crankshaft crank pins are classified.

In each case insert only one color of connecting rod bearing shell (1 and 2) for each connecting rod.

Fig. 762: Identifying Connecting Rod Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Check connecting-rod bearing play.

Piston in BDC position.

To determine the connecting rod bearing play, make sure that the bearing positions are clean and free from oil and grease.

cardiagn.com

Fit special tool 00 2 590 (Plastigage type PG 1) to oil-free crankshaft.

Fit connecting rod bearing cap so that pairing letters match up.

Fig. 763: Identifying Bearing Cap Pairing Letters
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not distort connecting rods or crankshaft.

Use the old connecting rod bolts to check connecting-rod bearing play.

Tighten down connecting rod bolts with special tool 00 9 120 .

Tightening torque: 11 24 1AZ .

Fig. 764: Tightening Connecting Rod Bolts Using Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew connecting rod bearing cap. Read off connecting rod bearing play at width of flattened Plastigage on measurement scale.

CONNECTING ROD BEARING PLAY .

- Remove Plastigage
- Coat crankshaft and connecting rod bearing shells with oil
- Install new connecting rod bolts and tighten down with special tool 00 9 120 .

Tightening torque: 11 24 1AZ .

Fig. 765: Checking Connecting-Rod Bearing Play
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

PISTON WITH RINGS AND PIN

11 25 530 REMOVING AND INSTALLING OR REPLACING ALL PISTONS (N47 D20 O1)

Special tools required:

- 00 2 530
- 11 8 140
- 11 8 831
- 11 8 860
- 11 5 464

WARNING: **Safety goggles must be worn when working on the gudgeon pin circlip.**

Necessary preliminary work

- Remove ENGINE.
- Remove CYLINDER HEAD.
- Removing OIL SUMP.
- Remove OIL PUMP WITH VACUUM PUMP.

cardiagn.com

IMPORTANT: If pistons, connecting rods and bearing shells are reused, they must be reinstalled in the same places.
Individual connecting rod replacement is not permitted; they are classified by weight class.
Connecting rods and connecting rod bearing caps are denoted with the same pairing letters.
Mixing up the components will result in engine damage.
Piston and gudgeon pins are paired and must not be fitted individually or confused.

Installation note:

Different piston diameter at small eye.

In the bottom power stage a choice of installations is possible, renew piston in the same way as for used part:

Piston (1) MAHLE PISTON (MAHLE) small and lower power stage. See **CONNECTING RODS AND BEARINGS (N47)** .

Piston (2) FEDERAL-MOGUL l (FMN) lower top and top power stage. See **PISTONS WITH RINGS AND PINS (N47)** .

IMPORTANT: Do not release screw (1).
Oil spray nozzles (2) must not be maladjusted or bent.
A bent oil spray nozzle cannot be adjusted and must be replaced.

Fig. 766: Identifying Oil Spray Nozzles And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Position crankshaft vertically.
Proceed with care at the cylinder wall and oil spray nozzles **Risk of damage!**

Fig. 767: Identifying Connecting Rod Bearing Cap And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Undo the connecting rod bolt (1).

Remove connecting rod bearing caps (2) and set down in neat order.

Fig. 768: Identifying Connecting Rod Bearing Caps And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 8 860** in at large connecting rod eye.

Remove piston and connecting rod.

Installation note:

Pay attention to the protective edge for the cylinder wall.

Fig. 769: Identifying Special Tool (11 8 860)
Courtesy of BMW OF NORTH AMERICA, INC.

Position piston (1) with connecting rod on special tool **11 8 831** .

Fig. 770: Positioning Piston With Connecting Rod On Special Tool (11 8 831)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

WARNING: **Safety goggles must be worn for the next operation.**

WARNING: **Safety goggles must be worn.**

Lever out piston circlip (1) with special tool 11 5 464 in direction of arrow.

IMPORTANT: Piston and gudgeon pin are matched to each other.
They must not be mixed up.

Fig. 771: Removing Piston Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, replace **CONNECTING ROD BEARING**.

Installation note:

It must be possible to press gudgeon pin (1) through the bush (small connecting rod eye) and must not display any significant play.

Fig. 772: Pressing Gudgeon Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Before installation, measure piston installation clearance. Measure piston diameter with micrometer at measuring point A from lower edge of piston and offset at 90Â° to the axis of the gudgeon pin.

Distance A, see **PISTONS WITH RINGS AND PINS (N47)** .

Fig. 773: Measuring Piston Diameter Using Micrometer
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust micrometer to cylinder bore of engine block. Set internal measuring device on micrometer to zero. Measure bottom, center and top of cylinder bore in direction of travel and direction of rotation.

Diameter of the cylinder bore,

TECHNICAL DATA .

Piston installation clearance,

TECHNICAL DATA .

Permitted total wear clearance,

TECHNICAL DATA .

Fig. 774: Adjusting Micrometer To Cylinder Bore Of Engine Block
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Safety goggles must be worn.**

Fit gudgeon pin retaining ring (1) in connecting rod at the piston.

Fig. 775: Identifying Gudgeon Pin Retaining Ring
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

IMPORTANT: Piston and gudgeon pin are matched to each other.
They must not be mixed up.

Install circlip so that opening is opposite recess.

Fig. 776: Installing Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

Align contact points of **PISTON RINGS** (offset at approx. 120Â°, but do not arrange over gudgeon pin boss).

Lightly coat pistons and piston rings with oil.

Prepare piston with piston ring on special tool **11 8 140** .

Screw special tool **11 8 860** on at large connecting rod eye.

Fig. 777: Identifying Special Tool (11 8 140)
Courtesy of BMW OF NORTH AMERICA, INC.

Insert piston (1) with connecting rod in cylinder.

IMPORTANT: Risk of piston ring breakage.
Risk of damage to oil spray nozzle.
Only press pistons in with finger force - do **not** knock in!

Install piston so that arrow points forward in direction of travel.

Bolt piston (1) with connecting rod to crankshaft.

Fig. 778: Identifying Piston And Special Tool (11 8 140)
Courtesy of BMW OF NORTH AMERICA, INC.

The gasket thickness must be recalculated when repair work is carried out on the crankshaft drive or pistons.

Measuring the **piston protrusion** :

Fit dial gauge with measuring fixture special tool **00 2 530** on cleaned engine block sealing surface and set to zero under preload.

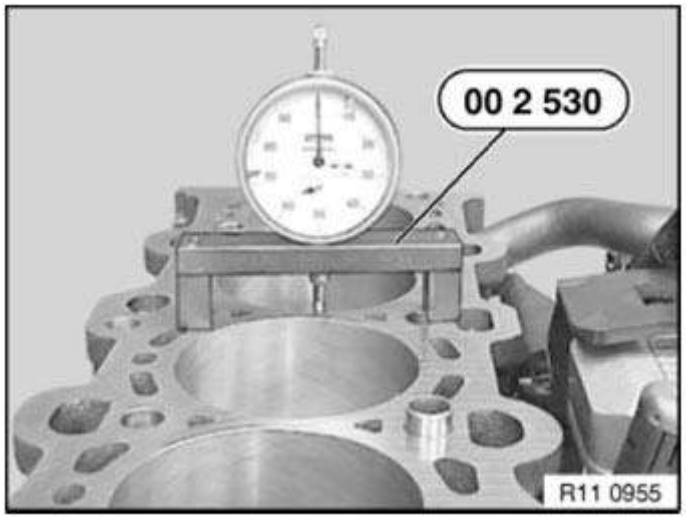


Fig. 779: Measuring Piston Protrusion

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Position piston at TDC.

Clean piston at measuring points (1 and 2).

Fit dial gauge at measuring point (1) on piston and determine highest point by rotating crankshaft.

Measure and note down piston protrusion at measuring points (1 and 2) on all pistons.

Determine **THICKNESS OF CYLINDER HEAD GASKET**.

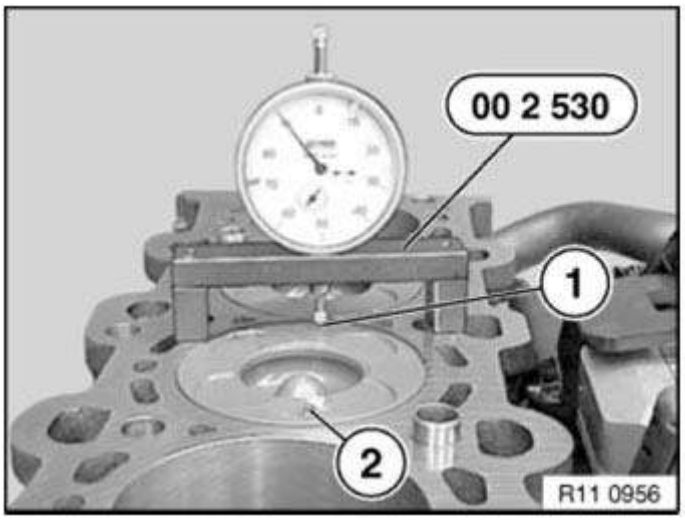


Fig. 780: Measuring Piston Protrusion At Points On Pistons
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check engine function and check for leak tightness.

11 25 530 REMOVING AND INSTALLING/REPLACING ALL PISTONS (N20, N26)

Special tools required:

- 11 8 590
- 11 4 492
- 11 5 341
- 11 5 342
- 11 8 562
- 11 8 564
- 11 8 141
- 00 9 120

WARNING: **Safety goggles must be worn when working on the piston pin circlip.**

IMPORTANT:
If pistons, connecting rods and bearing shells are reused, they must be reinstalled in the same places.
Piston and gudgeon pins are paired and must not be fitted individually.
Individual connecting rod replacement is not permitted; they are classified by weight class.
Connecting rods and connecting rod bearing caps are marked with the same pairing letters; mixing them up will result in engine damage.

cardiagn.com

Necessary preliminary tasks:

- Remove **ENGINE**.
- Mount engine on **ASSEMBLY STAND**.
- Remove **INTAKE PLENUM**.
- Remove **CYLINDER HEAD**.
- Remove **OIL SUMP**.
- Remove **OIL PUMP**.

NOTE: **In event of heavy oil carbon residue:**

Carefully remove oil carbon residue from cylinder wall.

NOTE: **Graphic N46.**

Fig. 781: Locating Carbon Residue On Cylinder Wall
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do **not** release screw (1).
OIL SPRAY NOZZLE (2) must not be maladjusted or bent.
If necessary, readjust **(risk of damage)** .

Fig. 782: Identifying Oil Spray Nozzle Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release connecting rod bolts (1).

Tightening torque: **11 24 1AZ** .

Remove connecting rod bearing cap (2).

IMPORTANT: Connecting rods and connecting rod bearing caps are marked with the same pairing letters; mixing them up will result in engine damage.

Fig. 783: Identifying Connecting Rod Bearing Cap And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 8 590** into big end of connecting rod.

Press out connecting rod and piston to cylinder head side.

IMPORTANT: **Risk of damage** to oil spray nozzle.

Fig. 784: Installing Special Tool (11 8 590) Into Connecting Rod End
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Safety goggles must be worn for the next operation.**

WARNING: **Safety goggles must be worn.**

To lever out piston circlip (1), support with special tool **11 4 492** on piston (2).

Lever out piston circlip (1) with special tool **11 4 492** in direction of arrow.

cardiagn.com

Fig. 785: Removing Piston Circlip Using Special Tool (11 4 492)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Connecting rods are divided into weight classes and are only available as a set. Old and new connecting rods must not be installed in mixed combinations.

Installation note:

The gudgeon pin must be able to be pressed through the bush by hand with little force and must not display any significant play.

Fig. 786: Pressing Connecting Rod Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Measure the Piston Installation Clearance. See **PISTONS WITH RINGS AND PINS (N20, N26, B20)** .

Measure piston diameter with micrometer at measuring point A from lower edge of piston and offset at 90Â° to the axis of the gudgeon pin.

Piston diameter at measuring point A.

Fig. 787: Measuring Piston Diameter Using Micrometer
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust micrometer to cylinder bore of engine block. Set internal measuring device on micrometer to zero. Measure bottom, center and top of cylinder bore in direction of travel and direction of rotation.

Diameter of cylinder bore.

Piston installation clearance.

Permissible **total wear clearance** . See **ENGINE BLOCK, CYLINDER CRANKCASE (N20, N26, B20)** or **PISTONS WITH RINGS AND PINS (N20, N26, B20)** .

Installation note:

If necessary, replace piston.

Fig. 788: Adjusting Micrometer To Cylinder Bore Of Engine Block
Courtesy of BMW OF NORTH AMERICA, INC.

Clamp special tool **11 5 341** in a vice.

NOTE: Piston and gudgeon pin are optimized to each other.

Screw in suitable special tool **11 5 342** with dia. 10.7 in special tool **11 5 341** .

Fig. 789: Installing Special Tool (11 5 341) In Vice
Courtesy of BMW OF NORTH AMERICA, INC.

Secure piston (1) with connecting rod to special tool **11 5 341** .

Fig. 790: Securing Piston With Connecting Rod With Special Tool

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Safety goggles must be worn.
Lift out circlip and press out piston pin.

Fig. 791: Removing Piston Pin Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: Safety goggles must be worn.

IMPORTANT: The opening of the piston pin circlip must be installed on the piston in the **6 o'clock position.**
Risk of damage!

Insert piston circlip (2) into groove of special tool **11 8 562** .

Bring piston circlip (2) into working position (1).

Fig. 792: Inserting Piston Circlip Into Special Tool Groove
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: Safety goggles must be worn.

Slide on special tool **11 8 564** up to piston pin circlip (1)

Special tools **11 8 562** and **11 8 564** are prepared.

Fig. 793: Identifying Special Tool (11 8 564) And Piston Pin Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: Safety goggles must be worn.

Opening on special tool **11 8 562** must point to piston crown; only then can special tool **11 8 564** be fitted correctly.

If the special tools **11 8 562** and **11 8 564** are not positioned correctly, the piston pin circlip must be driven in using a plastic hammer in direction of arrow.

NOTE: See Fig. 794.

Graphic with special tool 11 4 491

Fig. 794: Installing Piston Pin Circlip Using Plastic Hammer
Courtesy of BMW OF NORTH AMERICA, INC.

Install all **PISTON RINGS**.

Install all **BEARING SHELLS**.

Coat piston and piston rings with oil.

Pre-install piston (2) in special tool **11 8 141** .

Screw on special tool **11 8 590** in connecting rod (2).

Installation note:

cardiagn.com

Make sure protective lugs (1) on special tool **11 8 590** are positioned correctly and check for damage.

Fig. 795: Identifying Special Tool (11 8 590)
Courtesy of BMW OF NORTH AMERICA, INC.

Insert piston with connecting rod in cylinder.

IMPORTANT: Risk of damage to oil spray nozzle.
Risk of breakage of piston rings.
Only press pistons into place with finger force - do not knock in!

Insert piston so that arrow on piston crown points to camshaft drive.

Press in piston (1) with special tool **11 8 141** .

Fig. 796: Pressing Piston Using Special Tool (11 8 141)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Connecting rod and connecting rod bearing cap are marked with pairing letters (1) and must not be mixed up.

Swapping or incorrectly fitting the connecting rod bearing cap on the big end will result in **engine damage** .

Fig. 797: Identifying Connecting Rod And Bearing Cap Marked Pairing Letters
Courtesy of BMW OF NORTH AMERICA, INC.

Apply a light coat of oil to crankshaft journals.

Attach connecting rod to crankshaft journal.

Screw off special tool **11 8 590** in anti-clockwise direction.

NOTE: Graphic N54.

Fig. 798: Installing Special Tool (11 8 590) Into Connecting Rod End
Courtesy of BMW OF NORTH AMERICA, INC.

Fit bearing caps (2) so that pairing letters match up.

Install new connecting rod bolts (1).

Join connecting rod bolts (1).

Tightening torque: **11 24 1AZ** .

Fig. 799: Identifying Connecting Rod Bearing Caps And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Secure connecting rod bolts (1) with special tool **00 9 120** .

Tightening torque: **11 24 1AZ** .

Fig. 800: Tightening Connecting Rod Bolts Using Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Assemble engine.

11 25 530 REMOVING AND INSTALLING/REPLACING ALL PISTONS (N52T)

Special tools required:

- 00 9 120
- 11 4 491
- 11 4 492
- 11 4 493
- 11 4 494
- 11 6 241
- 11 6 261
- 11 8 330

WARNING: **Danger of injury!**
Carry out work on piston pin circlip wearing protective goggles only.

IMPORTANT: If piston, connecting rod, big end bearing cap and connecting rod bearing shell are to be reused, they must be installed in the same position.
Individual replacement of a connecting rod is not permitted. Connecting rods are classified by weight categories and are only available as a set for all cylinders.
Connecting rod and big end bearing cap are marked with identical pairing letters and must not be mixed up.
Danger of engine damage!
Piston and gudgeon pins are paired and must not be fitted individually.

Necessary preliminary work:

- Remove ENGINE.
- Mount engine on ASSEMBLY STAND.
- Remove intake PLENUM.
- Remove CYLINDER HEAD.
- Remove OIL SUMP.
- Remove OIL PUMP.

NOTE: **Carefully remove heavy oil carbon residues from the cylinder wall (arrow).**

IMPORTANT: Do not use any metal-cutting tools.

Fig. 801: Locating Carbon Residue On Cylinder Wall
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Oil spray nozzle (2) must not be maladjusted or bent.
Risk of damage!

Do **not** release screw (1) of oil spray nozzle (2).

If necessary, readjust OIL SPRAY NOZZLE (2).

Fig. 802: Identifying Oil Spray Nozzle And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release connecting rod bolts (1).

Tightening torque: **11 24 1AZ** .

Installation note:

Replace screws.

Remove connecting rod bearing cap (2) in direction of arrow.

IMPORTANT: Connecting rod and big end bearing cap (2) are marked with identical pairing letters and must not be mixed up.
Danger of engine damage!

Fig. 803: Removing Connecting Rod Bearing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Attach special tool **11 8 330** to connecting rod.

Press out connecting rod and piston with special tool **11 8 330** towards cylinder head side.

NOTE: Special tool 11 8 330 also serves to prevent connecting rod and piston from falling down.

IMPORTANT: Do not touch the oil spray nozzle when removing the components.
Risk of damage!

Fig. 804: Attaching Special Tool (11 8 330) To Connecting Rod
Courtesy of BMW OF NORTH AMERICA, INC.

Preliminary work:

Clamp special tool **11 4 491** in vice.

Secure piston (1) with connecting rod to special tool **11 4 491** .

Fig. 805: Securing Piston With Connecting Rod
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: Danger of injury!
Carry out work on piston pin circlip wearing protective goggles only.

WARNING: Safety goggles must be worn.

Lever out circlip for gudgeon pin with special tool **11 4 492** in direction of arrow.

Fig. 806: Removing Gudgeon Pin Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, replace connecting rods.

IMPORTANT: Individual replacement of a connecting rod is not permitted. Connecting rods are classified by weight categories and are only available as a set for all cylinders.
Existing and new connecting rods must not be installed in mixed combinations.

cardiagn.com

Installation note:

It must be possible for the piston pin to be pressed with minimal force by hand through the small end bushing. There must be no noticeable play.

Fig. 807: Pressing Connecting Rod Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Measure piston installation clearance:

Measure piston diameter with micrometer at measuring point "A" from lower edge of piston and offset by 90Â° to piston pin axis.

Piston diameter . See **PISTONS WITH RINGS AND PINS (N52T)** at measuring point "A".

Fig. 808: Measuring Piston Diameter Using Micrometer
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust micrometer to cylinder bore of crankcase. Set internal measuring device on micrometer to "zero". Measure bottom, center and top of cylinder bore in direction of travel and direction of rotation.

Diameter of cylinder bore. See **ENGINE BLOCK, CYLINDER CRANKCASE (N52T)** .

Piston installation clearance. See **ENGINE IN GENERAL (N52T)** .

Total permissible wear tolerance. See **PISTONS WITH RINGS AND PINS (N52T)** .

If necessary, replace piston.

Fig. 809: Adjusting Micrometer To Cylinder Bore Of Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Safety goggles must be worn.**

Insert gudgeon pin circlip (2) into groove (1) of special tool **11 4 493** .

Move piston pin circlip (2) into installation position.

Fig. 810: Inserting Gudgeon Pin Circlip Into Special Tool (11 4 493) Groove
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Safety goggles must be worn.**

Guide lug and aperture on special tool **11 4 493** must point to piston crown. Only then can special tool **11 4 494** be correctly fitted.

When special tools **11 4 493** and **11 4 494** are correctly positioned, the circlip for gudgeon pin must be driven in with a plastic hammer in the direction of the arrow.

Fig. 811: Positioning Special Tool (11 4 493)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **For vehicles with B30 engine.**

Install all **PISTON RINGS**.

cardiagn.com

Install all **CONNECTING ROD BEARING SHELLS**.

Coat piston (2) and piston rings with oil.

Pre-install piston (2) in special tool **11 6 261** .

Attach special tool **11 8 330** to connecting rod (1).

Installation note:

11 8 330 Check protective lugs on special tool for correct position and damage.

Fig. 812: Installing Piston In Special Tool (11 6 261)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: For vehicles with B25 engine.

Install all **PISTON RINGS**.

Install all **CONNECTING ROD BEARING SHELLS**.

Coat piston (2) and piston rings with oil.

Pre-install piston (2) in special tool **11 6 241** .

Attach special tool **11 8 330** to connecting rod (1).

Installation note:

11 8 330 Check protective lugs on special tool for correct position and damage.

Fig. 813: Installing Piston In Special Tool (11 6 241)
Courtesy of BMW OF NORTH AMERICA, INC.

Insert piston (1) with connecting rod in cylinder.

IMPORTANT: Do not touch the oil spray nozzle when installing the components.
Risk of damage!
Risk of breakage of piston rings.

Press in piston (1) at marked points (see arrows) with finger pressure only, do not drive in.

Insert piston (1) so that arrow (2) on piston crown points to camshaft drive.

Press in piston (1) with special tool **11 6 261** /**11 6 241** .

Fig. 814: Pressing Piston
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Connecting rod and big end bearing cap are marked with identical pairing letters (1) and must not be mixed up.
Mixing them up or incorrectly fitting the big end bearing cap on the connecting rod will result in **engine damage** .

Fig. 815: Identifying Connecting Rod And Bearing Cap Marked Pairing Letters
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Apply a light coat of oil to connecting rod bearing journal.

Join connecting rod and connecting rod bearing journal.

Detach special tool **11 8 330** .

Fig. 816: Detaching Special Tool (11 8 330) To Connecting Rod
Courtesy of BMW OF NORTH AMERICA, INC.

Fit big end bearing caps (2) so that pairing letters match up.

Installation note:

Replace screws.

Install new connecting rod bolts (1).

IMPORTANT: Jointing torque and angle of rotation must be observed without fail.
Risk of damage!

Tightening torque: **11 24 1AZ** .

Fig. 817: Identifying Connecting Rod Bearing Cap And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, tighten connecting rod bolts to angle of rotation with special tool **00 9 120** .

Tightening torque: **11 24 1AZ** .

Fig. 818: Identifying Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 25 530 REMOVING AND INSTALLING/REPLACING ALL PISTONS (N55)

Special tools required:

- **00 9 120**
- **11 4 491**
- **11 4 492**
- **11 8 141**
- **11 8 562**
- **11 8 564**
- **11 8 590**

WARNING: **Safety goggles must be worn when working on the gudgeon pin circlip.**

IMPORTANT: If pistons, connecting rods and connecting rod bearing shells are reused, they must be reinstalled in the same places.
Piston and gudgeon pins are paired and must not be fitted individually.
Individual connecting rod replacement is not permitted; they are classified by weight class.
Connecting rods and connecting rod bearing caps are marked with the same pairing letters; mixing them up will result in engine damage.

cardiagn.com

Necessary preliminary work:

- Remove **ENGINE**.
- Mount engine on **ASSEMBLY STAND**.
- Remove **INTAKE PLENUM**.
- Remove **CYLINDER HEAD**.
- Remove **OIL SUMP**.
- Remove **oil pump** . See **11 41 000 REMOVING AND INSTALLING/REPLACING OIL PUMP (N55) UP TO MARCH 2012** or **11 41 000 REMOVING AND INSTALLING/REPLACING OIL PUMP (N55) FROM MARCH 2012**.

NOTE: **In event of heavy oil carbon residue:**

Carefully remove oil carbon residue from cylinder wall.

NOTE: **Graphic shows N46.**

Fig. 819: Locating Carbon Residue On Cylinder Wall
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do **not** release screw (1).
OIL SPRAY NOZZLE (2) must not be maladjusted or bent.
If necessary, readjust **(risk of damage)** .

Fig. 820: Identifying Oil Spray Nozzle And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release connecting rod bolts (1).

Tightening torque: **11 24 1AZ** .

Remove connecting rod bearing cap (2).

IMPORTANT: Connecting rods and connecting rod bearing caps are marked with the same pairing letters; mixing them up will result in engine damage.

Fig. 821: Identifying Connecting Rod Bearing Cap And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 8 590** into big end of connecting rod.

Press out connecting rod and piston to cylinder head side.

IMPORTANT: **Risk of damage** to oil spray nozzle.

Fig. 822: Installing Special Tool (11 8 590) Into Connecting Rod End
Courtesy of BMW OF NORTH AMERICA, INC.

Preliminary work:

Secure special tool **11 4 491** in vice.

Secure piston (1) with connecting rod to special tool **11 4 491** .

cardiagn.com

NOTE: **Graphic shows N52.**

Fig. 823: Securing Piston With Connecting Rod To Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Safety goggles must be worn for the next operation.**

WARNING: **Safety goggles must be worn.**

To lever out piston circlip (1), support with special tool **11 4 492** on piston (2).

Lever out piston circlip (1) with special tool **11 4 492** in direction of arrow.

Fig. 824: Removing Piston Circlip Using Special Tool (11 4 492)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Connecting rods are divided into weight classes and are only available as a set.
Old and new connecting rods must not be installed in mixed combinations.

Installation note:

The gudgeon pin must be able to be pressed through the bush by hand with little force and must not display any significant play.

Fig. 825: Pressing Connecting Rod Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Measuring piston installation clearance. See **PISTONS WITH RINGS AND PINS (N55)** .

Measure piston diameter with micrometer at measuring point A from lower edge of piston and offset at 90Â° to the axis of the gudgeon pin.

Piston diameter at measuring point A.

Fig. 826: Measuring Piston Diameter Using Micrometer
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust micrometer to cylinder bore of engine block. Set internal measuring device on micrometer to zero. Measure bottom, center and top of cylinder bore in direction of travel and direction of rotation.

Diameter of cylinder bore.

Piston installation clearance.

Permissible **total wear clearance** . See **ENGINE BLOCK, CYLINDER CRANKCASE (N55, B30)** or **PISTONS WITH RINGS AND PINS (N55)** .

Installation note:

If necessary, replace piston.

Fig. 827: Adjusting Micrometer To Cylinder Bore Of Engine Block
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

WARNING: **Safety goggles must be worn.**

IMPORTANT: The opening of the piston pin circlip must be installed on the piston in the **6 o'clock position. Risk of damage!**

Insert piston circlip (2) into groove of special tool **11 8 562** .

Bring piston circlip (2) into working position (1).

Fig. 828: Inserting Piston Circlip Into Special Tool Groove
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Safety goggles must be worn.**

Slide on special tool **11 8 564** up to piston pin circlip (1)

Special tools **11 8 562** and **11 8 564** are prepared.

Fig. 829: Identifying Special Tool (11 8 564) And Piston Pin Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Safety goggles must be worn.**

The aperture on special tool **11 8 562** must point to piston crown; only then can special tool **11 8 564** be fitted correctly.

If the special tools **11 8 562** and **11 8 564** are not positioned correctly, the piston pin circlip must be driven in using a plastic hammer in direction of arrow.

NOTE: **See Fig. 830.**

Fig. 830: Installing Piston Pin Circlip Using Plastic Hammer
Courtesy of BMW OF NORTH AMERICA, INC.

Piston pin circlip is correctly installed when opening (1) points downwards.

Fig. 831: Identifying Piston Pin Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

Install all **PISTON RINGS**.

Install all **BEARING SHELLS**.

Coat piston and piston rings with oil.

Pre-install piston (2) in special tool **11 8 141** .

Screw on special tool **11 8 590** in connecting rod (2).

Installation note:

Make sure protective lugs (1) on special tool **11 8 590** are positioned correctly and check for damage.

Fig. 832: Installing Piston Into Special Tool

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Insert piston with connecting rod in cylinder.

IMPORTANT: Risk of damage to oil spray nozzle.
Risk of breakage of piston rings.
Press in piston in direction of arrow with finger pressure only, do not drive in.

Insert piston so that arrow on piston crown points to camshaft drive.

Press in piston (1) with special tool **11 8 141** .

Fig. 833: Pressing Piston Using Special Tool (11 8 141)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Connecting rod and connecting rod bearing cap are marked with pairing letters (1) and must not be mixed up.
Swapping or incorrectly fitting the connecting rod bearing cap on the big end will result in **engine damage** .

Fig. 834: Identifying Connecting Rod And Bearing Cap Marked Pairing Letters
Courtesy of BMW OF NORTH AMERICA, INC.

Apply a light coat of oil to crankshaft journal.

Assemble connecting rod and crankshaft journal.

Screw off special tool **11 8 590** in anti-clockwise direction.

NOTE: Illustration shows N54.

Fig. 835: Removing Special Tool (11 8 590) From Connecting Rod End
Courtesy of BMW OF NORTH AMERICA, INC.

Fit bearing caps (2) so that pairing letters match up.

Install new connecting rod bolts (1).

Join connecting rod bolts (1).

Tightening torque: **11 24 1AZ** .

Fig. 836: Identifying Connecting Rod Bearing Caps And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Secure connecting rod bolts (1) with special tool **00 9 120** .

Tightening torque: **11 24 1AZ** .

Fig. 837: Tightening Connecting Rod Bolts Using Special Tool (00 9 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 25 671 REPLACING PISTON RINGS ON ALL PISTONS (N20, N26)

cardiagn.com

Necessary preliminary tasks:

- Remove all **PISTONS**.

Measuring side clearance of piston rings in piston ring groove.

TECHNICAL DATA .

NOTE: It is not possible to measure the axial clearance of the M-flex rings.

Fig. 838: Measuring Piston Rings Side Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Remove plain rectangular compression ring and stepped ring upwards with piston ring pliers.

The M-flex ring comprises two steel band rings and a bearing spring.

NOTE: The M-flex ring cannot be removed with piston ring pliers.

Put aside all piston rings in correct sequence and installation position.

It might not be possible to find the identification on used piston rings.

Fig. 839: Removing Plain Rectangular Compression Ring And Stepped Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

New pistons may only be installed together with new piston rings.

Insert removed piston ring into cylinder bore hole.

With aid of piston (piston crown), position piston ring in its measuring position.

Determine **END CLEARANCE** with a feeler gauge.

Fig. 840: Checking Piston Ring End Clearance Using Feeler Gauge
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Schematic diagram of piston rings.

Installation note:

1. Plain rectangular compression ring "top"
2. Piston ring "top"
3. Steel band with M-flex ring

Fig. 841: Identifying Piston Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Piston rings with "TOP" identification (1) must point to piston crown.

cardiagn.com

Fig. 842: Piston Rings With TOP Identification
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The M-flex ring comprises two steel band rings (1) and a bearing spring (2).

Installation note:

Insert bearing spring (2) into piston ring groove and then fit steel band rings (1) so that contact points are offset by approx. 120Â°.

Fig. 843: Identifying Support Spring And Steel Band Rings
Courtesy of BMW OF NORTH AMERICA, INC.

The contact points (1) of the piston rings must be arranged offset by approx. 120Â°. However, the contact points (1) must not be arranged over the gudgeon pin boss.

NOTE: Graphic of N52.

Fig. 844: Identifying Piston Contact Points
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 25 671 REPLACING PISTON RINGS ON ALL PISTONS (N47 D20 O1)

Necessary preliminary work:

- Remove **PISTONS**.

Remove all piston rings (2) with piston ring pliers (1).

NOTE: It might not be possible to find the identification on used piston rings. Put aside piston rings in correct sequence and installation position.

Fig. 845: Removing Piston Rings Using Piston Ring Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Piston rings with "TOP" identification must point to piston crown.

1. Plain rectangular compression ring
2. Piston ring
3. Bevelled roof ring with spiral expander

Arrange piston ring contact points with offset of approx. 120Â° to one another, but not over gudgeon pin boss.

Fig. 846: Identifying Piston Ring Installation Position
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Marking (TOP) must point towards piston crown.

The oil scraper ring has no identification marking and can be installed in any position.

cardiagn.com

Fig. 847: Identifying Piston Ring Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust piston rings to 120 degree position.

Fig. 848: Identifying Piston Ring Positions
Courtesy of BMW OF NORTH AMERICA, INC.

Measure axial play.

Refer to **TECHNICAL DATA** .

Fig. 849: Measuring Piston Rings Side Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Measure end clearance.

Refer to Technical Data . See **PISTONS WITH RINGS AND PINS (N47)** .

Fig. 850: Checking Piston Ring End Clearance Using Feeler Gauge
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 25 671 REPLACING PISTON RINGS ON ALL PISTONS (N52T)

Necessary preliminary work:

- Removing all **PISTONS**

Measuring axial clearance of piston rings in piston ring groove. See **PISTONS WITH RINGS AND PINS (N52T)** .

NOTE: **It is not possible to measure the axial clearance of the U-flex rings.**

Fig. 851: Measuring Piston Rings Side Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Remove plain rectangular compression ring and stepped ring upwards with piston ring pliers.

The U-flex ring comprises two steel band rings and a bearing spring.

NOTE: **The U-flex ring cannot be removed with piston ring pliers.**

Put aside all piston rings in correct sequence and installation position.

It might not be possible to find the identification on used piston rings.

Fig. 852: Removing Plain Rectangular Compression Ring And Stepped Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

New pistons may only be installed together with new piston rings.

cardiagn.com

Determine end clearance with a feeler gauge. See **PISTONS WITH RINGS AND PINS (N52T)** .

Fig. 853: Checking Piston Ring End Clearance Using Feeler Gauge
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Schematic diagram of piston rings.

Installation note:

Piston rings with "TOP" identification must point to piston crown.

1. Plain rectangular compression ring
2. Stepped ring "TOP"
3. U-flex ring

Fig. 854: Identifying Piston Rings
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The U-flex ring comprises two steel band rings (1) and a bearing spring (2).

Installation note:

Insert bearing spring (2) into piston ring groove and then fit steel band rings (1) so that contact points are offset by approx. 120Â°.

Fig. 855: Identifying Steel Band Rings And Support Spring
Courtesy of BMW OF NORTH AMERICA, INC.

The contact points (1) of the piston rings must be arranged offset by approx. 120Â°. However, the contact points (1) must not be arranged over the gudgeon pin boss.

NOTE: Picture shows N52.

Fig. 856: Identifying Piston Contact Points
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 25 671 REPLACING PISTON RINGS ON ALL PISTONS (N55)

Necessary preliminary tasks:

- Remove all **PISTONS**.

Measuring side clearance of piston rings in piston ring groove.

TECHNICAL DATA .

NOTE: It is not possible to measure the axial clearance of the M-flex rings.

Fig. 857: Measuring Piston Rings Side Clearance
Courtesy of BMW OF NORTH AMERICA, INC.

Remove plain rectangular compression ring and stepped ring upwards with piston ring pliers.

cardiagn.com

The M-flex ring comprises two steel band rings and a bearing spring.

NOTE: The M-flex ring cannot be removed with piston ring pliers.

Put aside all piston rings in correct sequence and installation position.

It might not be possible to find the identification on used piston rings.

Fig. 858: Removing Plain Rectangular Compression Ring And Stepped Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

New pistons may only be installed together with new piston rings.

Insert removed piston ring into cylinder bore hole.

With aid of piston (piston crown), position piston ring in its measuring position.

Determine **END CLEARANCE** with a feeler gauge.

Fig. 859: Checking Piston Ring End Clearance Using Feeler Gauge
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Schematic diagram of piston rings.

Installation note:

1. Plain rectangular compression ring "top"
2. Piston ring "top"
3. Steel band with M-flex ring

Fig. 860: Identifying Piston Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Piston rings with "TOP" identification (1) must point to piston crown.

Fig. 861: Piston Rings With TOP Identification
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The M-flex ring comprises two steel band rings (1) and a bearing spring (2).

Installation note:

Insert bearing spring (2) into piston ring groove and then fit steel band rings (1) so that contact points are offset by approx. 120Â°.

Fig. 862: Identifying Steel Band Rings And Bearing Spring
Courtesy of BMW OF NORTH AMERICA, INC.

The contact points (1) of the piston rings must be arranged offset by approx. 120Â°. However, the contact points (1) must not be arranged over the gudgeon pin boss.

cardiagn.com

NOTE: **Graphic of N52.**

Fig. 863: Identifying Piston Contact Points
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

BALANCING SHAFTS

11 27 110 REMOVING AND REFITTING/REPLACING BALANCER SHAFTS (N20)

Special tools required:

- 2 219 548
- 2 212 825
- 2 318 117
- 11 4 120
- 11 4 420
- 11 8 580

IMPORTANT: The counterbalance shaft must be adjusted to the motor.

Necessary preliminary tasks:

- Removing **oil sump** . See 11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N20).

Installation note:

Wet special tool 2 219 548 with oil to simplify dismantling and installation.

Secure crankshaft with special tool 2 219 548 via the dowel hole.

Fig. 864: Identifying Special Tool (2 219 548)
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen sealing cap using a screwdriver.

Fig. 865: Loosening Sealing Cap Using Screwdriver
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Position counterbalance shaft with special tool 2 212 825 .

Secure special tool 2 212 825 on oil pump housing with screw (1).

If special tool 2 212 825 cannot be positioned, the TIMING must be readjusted.

Fig. 866: Locating Special Tool (2 212 825), Oil Pump Housing And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Sprocket must be blocked with special tool 2 318 117 in order to release central bolt (2).
Attach special tool 2 318 117 to crankcase with screws (3).

cardiagn.com

Press back chain tensioner and fix with special tool **11 4 420** .

Installation note:

There are various central bolts of the oil pump/camshaft sprocket.

1. Loosen torx socket with T50 using special tool **11 4 420** .
2. Torx socket with T60 can be released using special tool **11 8 580** .

Fig. 867: Attaching Special Tool (2 318 117) To Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Release oil pump central bolt (2).

Tightening torque: **11 41 5AZ** .

Unfasten screws (2).

Release screws (1).

Tightening torque: **11 41 3AZ** .

Remove gear and chain module (2).

Fig. 868: Identifying Screws, Gear And Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Observe different screw lengths.

Release screws (1).

Tightening torque: **11 41 6AZ/2AZ** .

Release screws, remove oil pump with counterbalance shaft.

Tightening torque: **11 41 2AZ** .

Installation note:

Check spacer bushes for secure seating and damage; replace if necessary.

Fig. 869: Identifying Oil Pump, Counterbalance Shaft And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

V-RIBBED BELT WITH TENSIONER/DEFLECTION ELEMENT

11 28 025 REMOVING AND INSTALLING/REPLACING DEFLECTION PULLEY (N47 D20 O1)

Necessary preliminary tasks:

- Remove **ALTERNATOR DRIVE BELT**.

Unclip protective cap (1) with a suitable tool.

cardiagn.com

Fig. 870: Identifying Protective Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 00 4AZ** .

Remove deflection pulley (2).

Fig. 871: Identifying Deflection Pulley And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 115 REMOVING AND INSTALLING/REPLACING HYDRAULIC VALVE (N55)

See **11 41 115 REMOVING AND INSTALLING/REPLACING HYDRAULIC VALVE (N55)**.

11 28 050 REPLACING DRIVE BELT FOR AIR CONDITIONING COMPRESSOR (N20)

Special tools required:

- **11 0 390**

Necessary preliminary tasks:

- Remove the **CLEAN AIR PIPE** to the exhaust turbocharger.

NOTE: **Mark the direction of travel of the drive belt if it is to be reused.**

Turn belt tensioner (1) on the hexagon head (2) in direction of arrow until bore hole on the belt tensioner is flush with the dowel hole.

Keep the belt tensioner (1) tensioned and position with a lock pin or special tool **11 0 390** , if applicable.

Remove drive belt (3).

Fig. 872: Turning Belt Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Installation note:

Check drive belt for correct installation position and, if reusing, observe direction of travel. **Risk of damage** .

11 28 010 REMOVING AND INSTALLING/REPLACING ALTERNATOR DRIVE BELT (N47 D20 O1)

Special tools required:

- **11 3 340**

Necessary preliminary tasks:

- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .

Check drive belt for coolant and oil residues, replace if necessary.

cardiagn.com

IMPORTANT: The drive belt must be replaced if it is contaminated with hydraulic fluid.

IMPORTANT: Belt tensioner (1) is preloaded.

Fig. 873: Identifying Belt Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Increase preload on tensioning pulley (1) with tool (2) until special tool can be positioned on tensioning pulley **11 3 340** (1).

Preload belt tensioner (1).

Both bore holes, see arrow, must be flush.

Fig. 874: Increasing Preload On Tensioning Pulley
Courtesy of BMW OF NORTH AMERICA, INC.

Remove drive belt.

Fig. 875: Identifying Drive Belt
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 28 010 REPLACING DRIVE BELT FOR ALTERNATOR (N20, N26)

Special tools required:

- **11 0 390**

Necessary preliminary tasks:

- Remove the **CLEAN AIR PIPE** to the exhaust turbocharger.

NOTE: Mark the direction of travel of the drive belt if it is to be reused.

Turn belt tensioner (1) on the hexagon head (2) in direction of arrow until bore hole on the belt tensioner is flush with the dowel hole.

Keep the belt tensioner (1) tensioned and position with a lock pin or special tool **11 0 390** , if applicable.

Remove drive belt (3).

Fig. 876: Turning Belt Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Installation note:

Check drive belt for correct installation position and, if reusing, observe direction of travel. **Risk of damage** .

11 28 010 REPLACING DRIVE BELT FOR ALTERNATOR (N52T)

Special tools required:

cardiagn.com

- 11 3 340

IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released** . Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic** . Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

- Remove FAN COWL with electric fan

Drive belt route

NOTE: Mark the direction of travel of the drive belt if it is to be reused.

Turn belt tensioner (3) in direction of arrow until bore (4) is flush on housing.

Secure belt tensioner (3) in place with special tool 11 3 340 .

Load is removed from tensioning pulley (2).

Remove drive belt (1) towards top.

Fig. 877: Turning Belt Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Installation note:

Check drive belt for correct installation position and, if reusing, observe direction of travel. **Risk of damage** .

11 28 010 REPLACING DRIVE BELT FOR ALTERNATOR (N55)

Special tools required:

- 11 0 390

Necessary preliminary tasks:

- Remove FAN COWL with electric fan.

Routing of drive belt without Dynamic Drive

NOTE: Mark the direction of travel of the drive belt if it is to be reused.

Turn belt tensioner (2) in direction of arrow until belt tensioner bore hole is flush on crankcase.

Hold belt tensioner (2) under tension.

Secure special tool 11 0 390 .

Remove drive belt (3).

cardiagn.com

Fig. 878: Turning Belt Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Routing of drive belt with Dynamic Drive

NOTE: Mark the direction of travel of the drive belt if it is to be reused.

Turn belt tensioner (2) in direction of arrow until belt tensioner bore hole is flush on crankcase.

Hold belt tensioner (2) under tension.

Secure special tool **11 0 390** .

Remove drive belt (3).

Fig. 879: Turning Belt Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Installation note:

Check drive belt for correct installation position and, if reusing, observe direction of travel. **Risk of damage** .

11 28 020 REMOVING AND INSTALLING/REPLACING BELT TENSIONER FOR THE ALTERNATOR (N47 D20 O1)

Special tools required:

- **11 3 340**

Necessary preliminary tasks:

- Remove **ALTERNATOR DRIVE BELT**.

Release screws (1).

Remove belt tensioner (2) with roller and deflecting element.

Fig. 880: Identifying Special Tool (11 3 340)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

If a tensioning device is no longer needed, the special tool **11 3 340** must be removed using a vice.

11 28 020 REPLACING TENSIONING DEVICE FOR ALTERNATOR DRIVE BELT (N20, N26)

Special tools required:

- **11 0 390**

Necessary preliminary tasks:

- Remove **DRIVE BELT**.

Remove special tool **11 0 390** from the belt tensioner (1), if applicable a lock pin (2).

cardiagn.com

Loosen screws (3) on the belt tensioner.

Tightening torque: **11 28 1AZ** .

Fig. 881: Identifying Belt Tensioner, Lock Pin, And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 28 020 REPLACING TENSIONING DEVICE FOR ALTERNATOR DRIVE BELT (N52T)

Special tools required:

- **11 3 340**

IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released** . Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic** . Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

- Remove **DRIVE BELT**

Remove special tool **11 3 340** .

Release screw (3) on belt tensioner (4).

Tightening torque: **11 28 1AZ** .

Installation note:

Replace aluminum screws.

Remove belt tensioner (4).

Fig. 882: Removing Belt Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 28 020 REPLACING TENSIONING DEVICE FOR ALTERNATOR DRIVE BELT (N55)

Special tools required:

- **11 0 390**

Necessary preliminary tasks:

- Remove **DRIVE BELT**

Remove special tool **11 0 390** .

Release screw (1) on belt tensioner.

cardiagn.com

Tightening torque: **11 28 1AZ** .

Fig. 883: Removing Belt Tensioner Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

CAMSHAFT

11 31 505 ADJUSTING CAMSHAFT TIMING (N47 D20 O1)

Special tools required:

- **11 4 480**
- **11 5 320**
- **11 6 480**
- **11 8 760**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.

Crank engine at central bolt with special tool **11 6 480**

IMPORTANT: Do not turn the engine **against the direction of travel** .

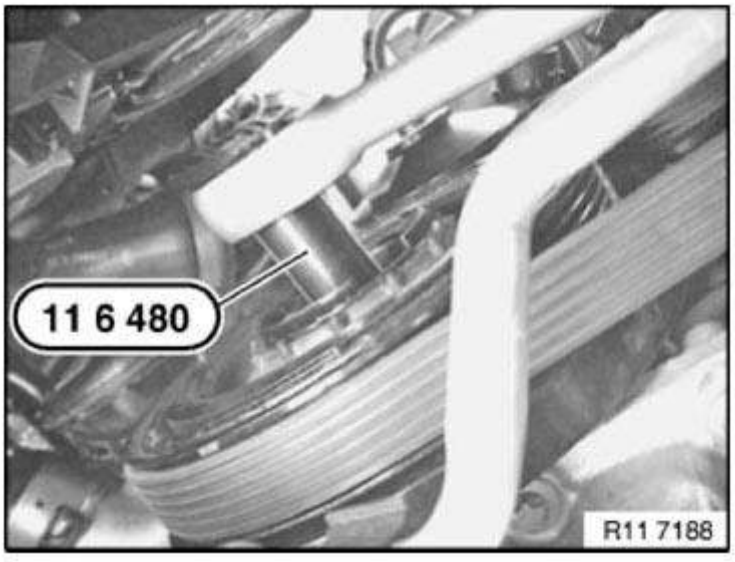


Fig. 884: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap of gear case cover.

Block crankshaft with cylinder no. 1 in TDC firing position with special tool **11 5 320** .

cardiagn.com

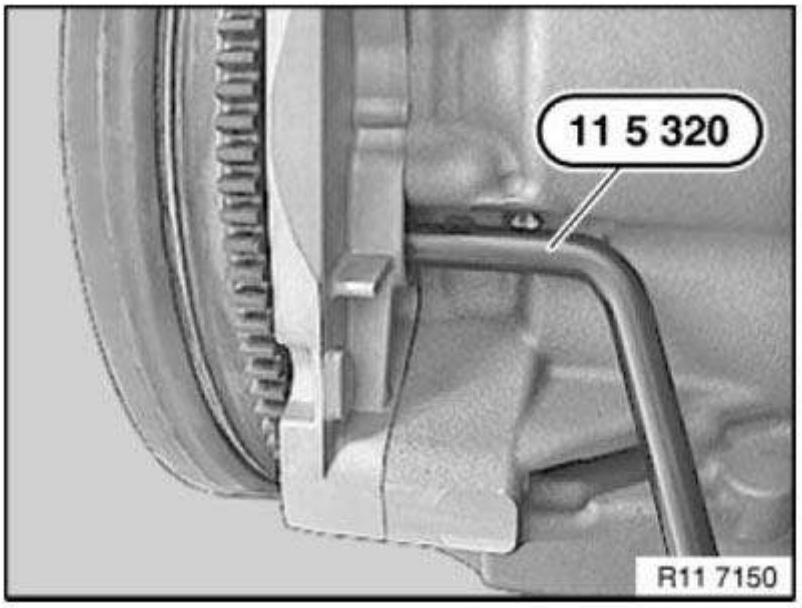


Fig. 885: Identifying Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

It must be possible to read the part number on the exhaust and intake camshafts (E and A) from above.

NOTE: **See Fig. 886.**

Fig. 886: Installing Exhaust And Intake Camshafts
Courtesy of BMW OF NORTH AMERICA, INC.

The cam on the intake camshaft (E) points obliquely upwards at cylinder No. 1.

The cam on the exhaust camshaft (A) points obliquely outward to the left at cylinder No. 1.

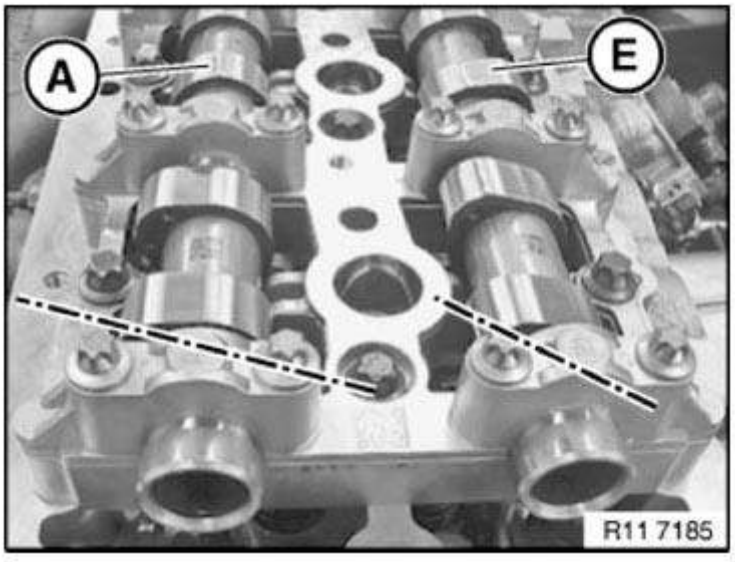


Fig. 887: Identifying Cam On Intake And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

The marking on exhaust sprocket wheel (A) must be aligned with the marking on intake sprocket wheel (E).

NOTE: **See Fig. 888.**

The exhaust camshaft must be removed if the marks do not agree (are not aligned).

cardiagn.com

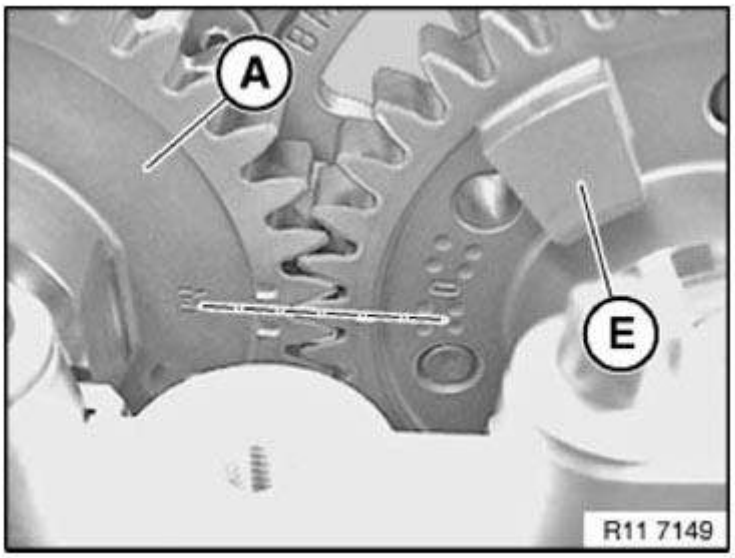


Fig. 888: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Release all bolts of bearing caps A1 to A5 working from the outside inwards.

Tightening torque: **11 31 2AZ** .

Remove exhaust camshaft in upward direction.

Place all components on special tool **11 4 480** in a tidy and orderly fashion.

Fig. 889: Identifying Bearing Caps Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release chain tensioner (1).

Tightening torque: **11 12 2AZ** .

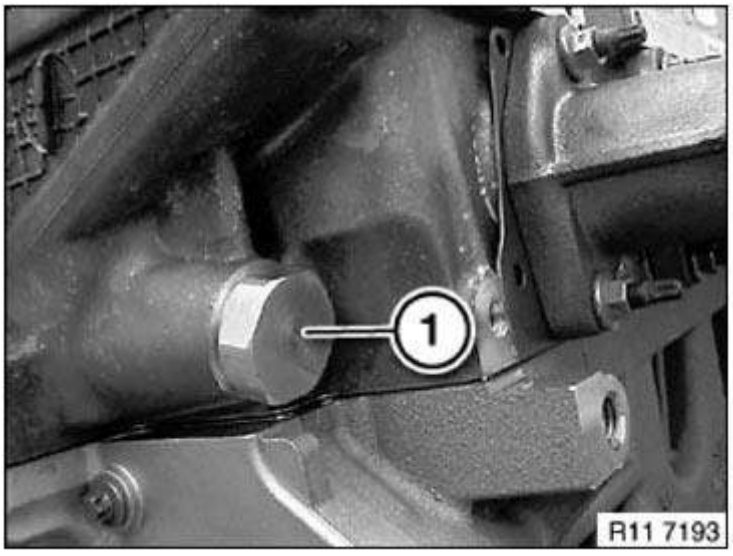


Fig. 890: Identifying Chain Tensioner Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Remove camshaft bolts (1) and detach camshaft sprocket.

cardiagn.com

Tightening torque: 11 31 1AZ .

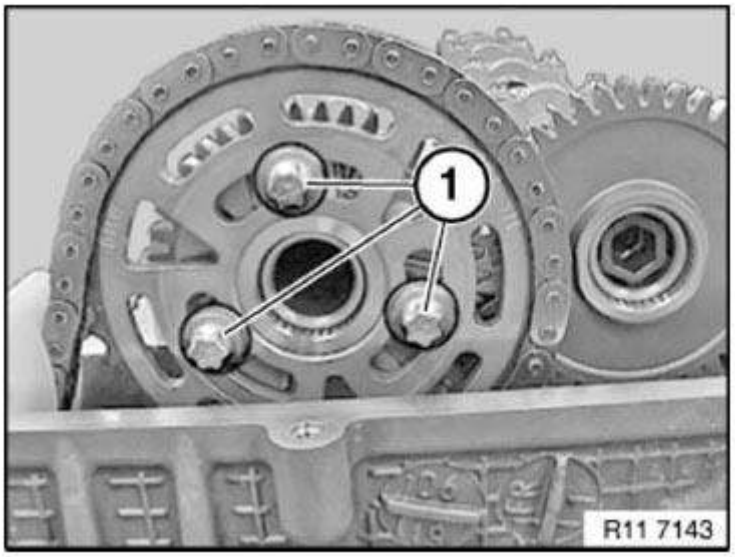


Fig. 891: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Position intake camshaft (E).

Installation note:

Note installation position of roller cam follower.

Fit exhaust camshaft (A) in such a way that both marks are aligned.

NOTE: **See Fig. 892.**

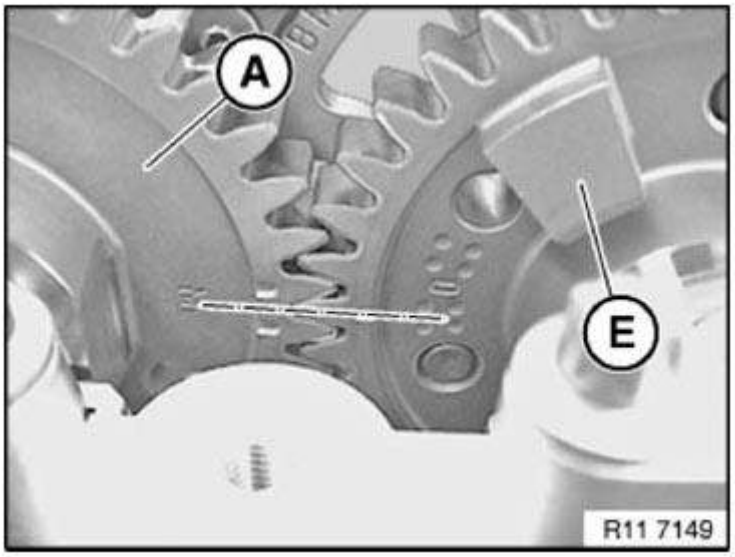


Fig. 892: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten all bearing caps A1 to A5 working from the inside outwards.

Tightening torque: 11 31 2AZ .

Fig. 893: Identifying Bearing Caps Bolts

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Place the camshaft sprocket with timing chain on the intake camshaft such that bolts (1) are located in the center of the slots.

Insert bolts (1).

Tighten bolts (1) to 10 Nm.

Release bolts (1) again by a 90Â° turn.

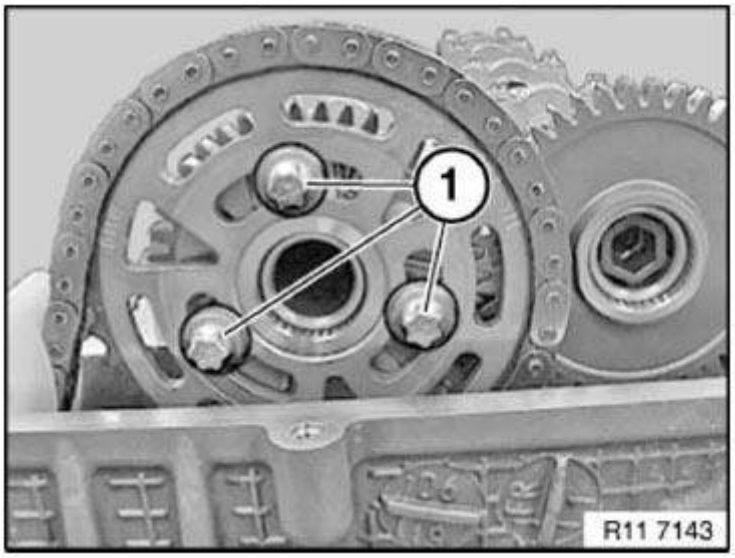


Fig. 894: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Install chain tensioner (1).

Tightening torque: **11 12 3AZ** .

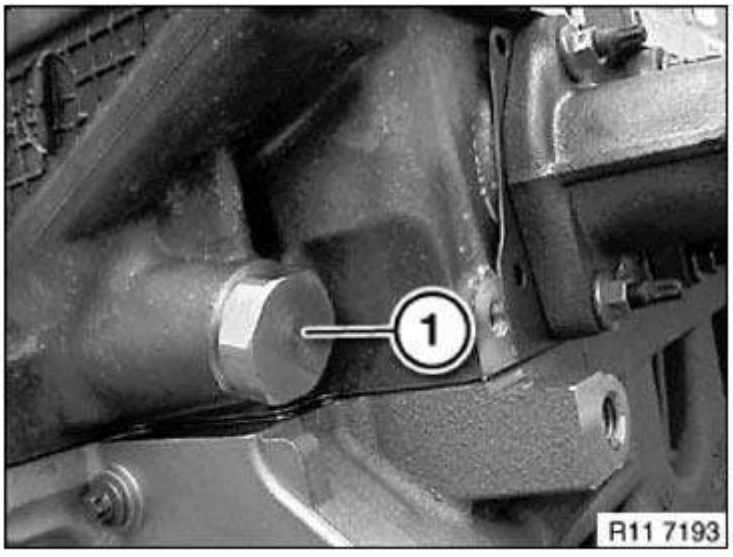


Fig. 895: Identifying Chain Tensioner Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool **11 8 760** on exhaust camshaft.

NOTE: Special tool 11 8 760 must lie flush on cylinder head.

cardiagn.com

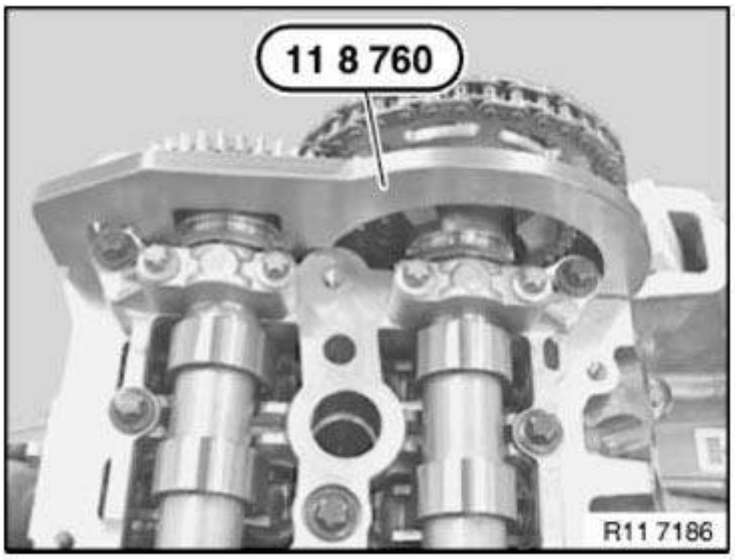


Fig. 896: Identifying Special Tool (11 8 760)
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down screws (1).

Tightening torque: **11 31 1AZ** .

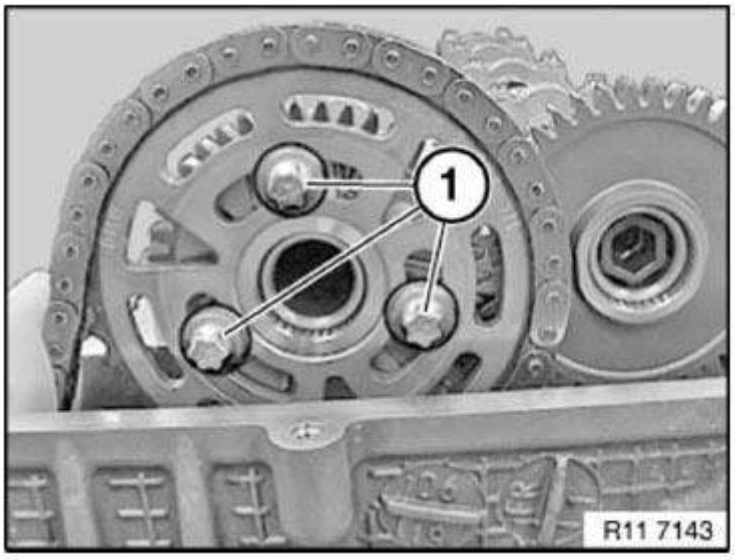


Fig. 897: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Crank engine twice in direction of rotation with special tool **11 6 480** up to TDC firing position of cylinder no. 1.

Check **CAMSHAFT ADJUSTMENT**.

IMPORTANT: Do not **turn the engine back** .

cardiagn.com

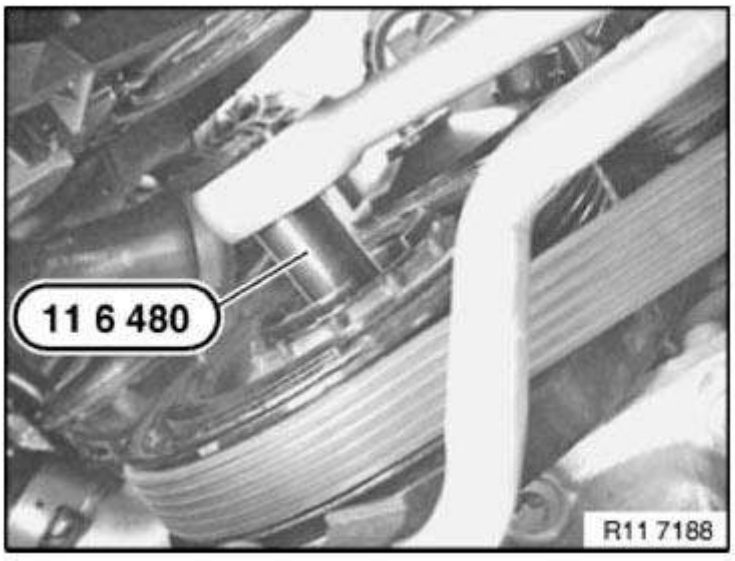


Fig. 898: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Turn over engine twice.

Check timing.

IMPORTANT: Special tool **11 5 320** must be removed before starting engine.

11 31 505 ADJUSTING TIMING OF CAMSHAFT(S) (N20, N26)

Special tools required:

- **2 212 831**
- **11 9 340**
- **00 9 460**

Necessary preliminary work:

- Remove **CYLINDER HEAD COVER**.
- Check **TIMING**.

With 1st cylinder in TDC firing position, cams of intake camshaft point upwards at an angle.

Position tracing gauge (2) on mounting flats of intake camshaft.

Order number: **2 212 831**

Fig. 899: Positioning Tracing Gauge On Mounting Flats Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

With 1st cylinder in TDC firing position, cams of exhaust camshaft point upwards at an angle.

Fig. 900: Positioning Tracing Gauge On Mounting Flats Of Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

The designation E and A on the intake and exhaust camshaft (1) as well as the part numbers can be read from

cardiagn.com

above.

Fig. 901: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

Secure mounting bridge (1) on cylinder head.

Secure tracing gauges (2 and 3) to mounting bridge (1).

Fig. 902: Securing Mounting Bridge On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The screw connection (5) is imperative for undoing and securing the central bolt.

Secure tracing gauge (2) with screw (5).

Fig. 903: Securing Tracing Gauge With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The screw connection (7) is imperative for undoing and securing the central bolt.

Screw (6) must be removed for securing the screw (7).

Secure tracing gauge with screw (7).

Fig. 904: Securing Tracing Gauge With Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Only use special tool to undo central bolts (2 and 3) of VANOS units.
If it is not possible to fit special tool, mounting flats of relevant camshaft must be counter-held **(risk of damage!)** .

Undo central bolts (2 and 3).

Fig. 905: Removing Central Bolts Of VANOS Units
Courtesy of BMW OF NORTH AMERICA, INC.

Remove vacuum unit (1) and lay to one side.

Release **CHAIN TENSIONER** (2).

Tightening torque: **11 31 7AZ** .

IMPORTANT: Have a cleaning cloth ready. A small quantity of engine oil will emerge after the screw connection has been released.
Make sure no engine oil runs onto belt drive.

Installation note:

Replace sealing ring.

Fig. 906: Identifying Vacuum Unit And Chain Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Rotate camshaft sensor wheel until retaining pin (1 and 2) match up with setting gauge.

Secure camshaft sensor wheel.

Fig. 907: Securing Camshaft Sensor Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Pretension timing chain with special tool **11 9 340** and **00 9 460** **0, 6 Nm**

Fig. 908: Identifying Special Tool (11 9 340) And (00 9 250)
Courtesy of BMW OF NORTH AMERICA, INC.

Only use special tool to secure central bolt (1) of intake adjuster.

Tightening torque: **11 36 1AZ** .

Fig. 909: Securing Central Bolt Of Intake Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Only use special tool to secure central bolt (1) of exhaust camshaft adjuster.

Tightening torque: **11 36 1AZ** .

Fig. 910: Securing Central Bolt Of Exhaust Camshaft Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Crank engine on the central bolt twice in the direction of engine rotation and check the **TIMING**.

Assemble engine.

11 31 505 ADJUSTING TIMING OF CAMSHAFT(S) (N52T)

Special tools required:

- **00 9 120**
- **00 9 250**
- **11 0 300**
- **11 4 280**
- **11 4 281**
- **11 4 282**
- **11 4 283**
- **11 4 290**
- **11 9 340**

Necessary preliminary work:

- Remove **CYLINDER HEAD COVER**

Remove fastener (1) in direction of arrow.

Installation note:

cardiagn.com

Install fastener (1) with bore hole facing outwards.

Fig. 911: Removing Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Rotate crankshaft at central bolt into TDC position.

Slide special tool **11 0 300** in direction of arrow into dowel hole and secure crankshaft.

IMPORTANT: On vehicles with automatic transmission, there is a large bore hole for the TDC position shortly before the dowel bore. This bore hole can be confused with the dowel bore.

If the flywheel is secured in the correct dowel hole with special tool **11 0 300** , the engine can no longer be moved at the central bolt.

Fig. 912: Securing Flywheel Using Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

With 1st cylinder in firing TDC position, cams of intake camshaft (1) at 1st cylinder point upwards at an angle.

Fig. 913: Identifying Cams Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

The part numbers or read-code (2) on the intake and exhaust camshafts (1) point upward.

Fig. 914: Identifying Intake And Exhaust Camshafts Part Numbers
Courtesy of BMW OF NORTH AMERICA, INC.

With 1st cylinder in firing TDC position, cams of exhaust camshaft (3) at 6th cylinder point downwards at an angle.

Cam follower (1) is not actuated.

NOTE: When the engine is installed, the position of the exhaust camshaft (3) for the timing can only be checked with a mirror.

Fig. 915: Identifying Cams Of Exhaust Camshaft And Cam Follower
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 283** with bolts (1) to cylinder head.

NOTE: Fit special tool 11 4 282 underneath on side of intake camshaft.

Mount special tool **11 4 281** on intake and exhaust camshafts.

Fig. 916: Fitting Special Tool (11 4 282) Underneath On Side Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Release central bolts (1).

Release central bolts (1) with special tool **11 4 280** only.

Release chain tensioner (2) (have a cleaning cloth ready).

cardiagn.com

NOTE: **Picture in CAD and does not show special tools.**

Fig. 917: Identifying Chain Tensioner And Central Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Turn sensor gears (2) in direction of arrow until locating pins (1) on special tool **11 4 290** match up.

Slide on special tool **11 4 290** in direction of arrow.

Fig. 918: Identifying Sensor Gears And Pins
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 290** with bolts (1). **11 9 340** Screw special tool into cylinder head.

Pretension timing chain with special tool **00 9 250** to **0.6 Nm** .

Secure both central bolts of intake and exhaust camshaft adjusters with special tool **00 9 120** to intake and exhaust camshafts.

Tightening torque: **11 36 1AZ** .

Fig. 919: Securing Central Bolts Of Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 505 ADJUSTING TIMING OF CAMSHAFT(S) (N55)

Special tools required:

- **00 9 120**
- **00 9 250**
- **11 4 280**
- **11 4 281**
- **11 4 282**
- **11 4 285**
- **11 4 290**
- **11 9 340**

IMPORTANT: For the positioning of the special tool **11 4 281** on the mounting flats of the intake camshaft, a collision with the cylinder throttle return spring 1 can occur.
Rework special tool **11 4 281** on the basis of the following **DESCRIPTION**.

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Check **TIMING**.

With 1st cylinder in TDC firing position, cams of intake camshaft (1) at 1st cylinder point upwards at an angle.

Fig. 920: Identifying Cams Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

With 1st cylinder in TDC firing position, cams of the exhaust camshaft (1) point upwards at an angle.

Fig. 921: Identifying Cams Of Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Part numbers (2) on intake and exhaust camshafts (1) point upwards.

Fig. 922: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 285** with bolts (1) to cylinder head.

NOTE: Fit special tool 11 4 282 underneath on side of intake camshaft.

Mount reworked special tool **11 4 281** on the intake camshaft.

Mount special tool **11 4 281** on the exhaust camshaft.

Fig. 923: Fitting Special Tool (11 4 282) Underneath On Side Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Only use special tool **11 4 280** to loosen central bolts (1 and 2) of VANOS unit.

Release central bolts (1 and 2).

Fig. 924: Identifying Central Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release **CHAIN TENSIONER** (1).

Tightening torque: **11 31 7AZ** .

IMPORTANT: Have a cleaning cloth ready. A small quantity of engine oil will emerge after the screw connection has been released.
Make sure no engine oil runs onto belt drive.

Installation note:

Replace sealing ring.

Fig. 925: Identifying Chain Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Turn increment wheel (2) in direction of arrow until retaining pins (1) on special tool **11 4 290** match up.

11 4 290 Slide on special tool in direction of arrow.

Fig. 926: Identifying Increment Wheel, Retaining Pins And Special Tool (11 4 290)
Courtesy of BMW OF NORTH AMERICA, INC.

Use bolts to fasten special tool **11 4 290** .

Installation note:

cardiagn.com

Replace both central bolts.

Screw in both central bolts.

Release both central bolts 90Â°.

11 9 340 Screw special tool into cylinder head.

Fig. 927: Releasing Central Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Pretension timing chain with special tool **11 9 340** and **00 9 250** **0, 6 Nm**

Fig. 928: Identifying Special Tool (11 9 340) And (00 9 250)
Courtesy of BMW OF NORTH AMERICA, INC.

Use special tool **00 9 120** to tighten central bolts of intake adjuster.

Tightening torque: **11 36 1AZ** .

Fig. 929: Tightening Central Bolts Of Intake Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Use special tool **00 9 120** to tighten central bolts of exhaust camshaft adjuster.

Tightening torque: **11 36 1AZ** .

Fig. 930: Tightening Central Bolts Of Exhaust Camshaft Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Crank engine on the central bolt twice in the direction of engine rotation and check the **TIMING**.

Assemble engine.

11 31 005 CHECKING CAMSHAFT TIMING (N20, N26)

Special tools required:

- **2 219 548**
- **2 212 831**
- **2 212 830**

Necessary preliminary tasks:

- Remove top **CLEAN AIR PIPE** .
- Remove **SPARK PLUGS** .
- Remove **CYLINDER HEAD COVER**.
- **Remove underbody protection at front and rear** . See **51 47 490 REMOVING AND INSTALLING/REPLACING FRONT UNDERBODY PROTECTION** or **51 47 491 REMOVING AND INSTALLING/REPLACING REAR UNDERBODY PROTECTION** .

Remove seal plug (1).

cardiagn.com

Rotate crankshaft at central bolt into TDC position.

Slide in special tool 2 219 548 into dowel hole and secure crankshaft.

IMPORTANT: If the flywheel is secured in the correct dowel hole with special tool 2 219 548 , the engine can no longer be moved at the central bolt.

Fig. 931: Identifying Seal Plug And Special Tool (2 219 548)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove seal plug (1) in direction of arrow using a screwdriver.

Fig. 932: Removing Seal Plug
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Special tool 2 219 548 can only be fixed to the flywheel (1) in the position specified (see arrow).

Fig. 933: Identifying Flywheel Position
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Coat special tool 2 219 548 with oil for simplifying disassembly and installation.

Secure crankshaft with special tool 2 219 548 via the dowel hole.

Fig. 934: Identifying Special Tool (2 219 548)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Special tool: 2 212 831

Use special tool (1) to attach special tool (4) to the cylinder head.

Fig. 935: Attaching Special Tool (2 212 831) To Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Attach special tool (1) to cylinder head using a screw (2).

Fig. 936: Attaching Special Tool To Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool (3) without recess at mounting flats of the exhaust camshaft.

The cams of the exhaust camshaft point diagonally upwards when in TDC firing position at cylinder 1.

Fig. 937: Positioning Special Tool On Mounting Flats Of Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Position the special tool (2) with recess at the mounting flats of the intake camshaft.

With 1st cylinder in TDC firing position, cams of intake camshaft (1) point upward at an angle.

cardiagn.com

Fig. 938: Positioning Special Tool On Mounting Flats Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Fit gauge for the camshaft sensor wheel (1) to the cylinder head.

Check setting of the camshaft sensor wheels.

Special tool **2 212 830**

Fig. 939: Identifying Camshaft Sensor Wheel Gauge To Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Position the camshaft sensor wheel of the exhaust camshaft in the direction of the arrow using the pin (1).

Position the camshaft sensor wheel of the intake camshaft in the direction of the arrow using the pin (2).

Installation note:

If the camshaft sensor wheels have been readjusted, the **CENTRAL BOLTS** must be loosened.

Fig. 940: Securing Camshaft Sensor Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If special tool 2 219 548 cannot be removed due to stiff movement, then it can be removed by turning and pulling with the aid of half-round long-nose pliers (angled) (1).**

Fig. 941: Identifying Special Tool (2 219 548)
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, adjust **VALVE TIMING**.

Assemble engine.

11 31 005 CHECKING CAMSHAFT TIMING (N47 D20 O1)

Special tools required:

- **11 5 320**
- **11 6 480**
- **11 8 760**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.

Crank engine with special tool **11 6 480** to TDC firing position of cylinder no. 1.

IMPORTANT: Do not turn the engine **against the direction of travel** .

cardiagn.com

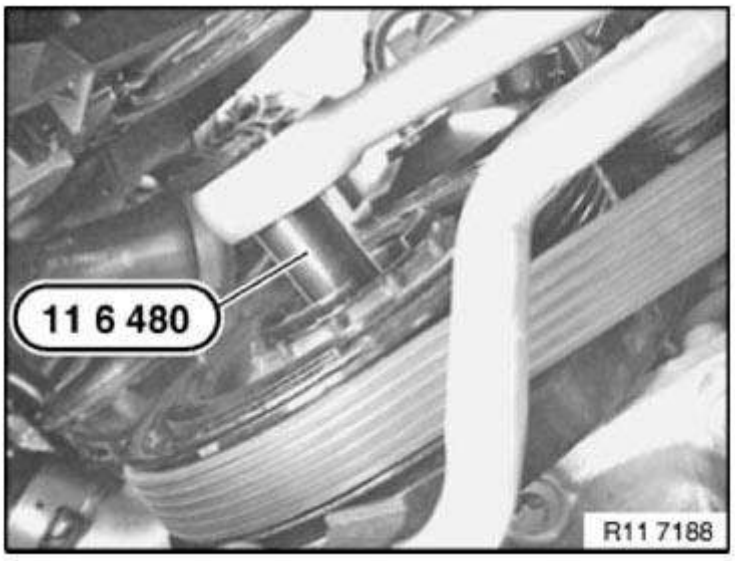


Fig. 942: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap of gear case cover.

Crank engine at central bolt with special tool **11 6 480**

Use special tool **11 5 320** to block the crankshaft in the TDC firing position Cylinder 1

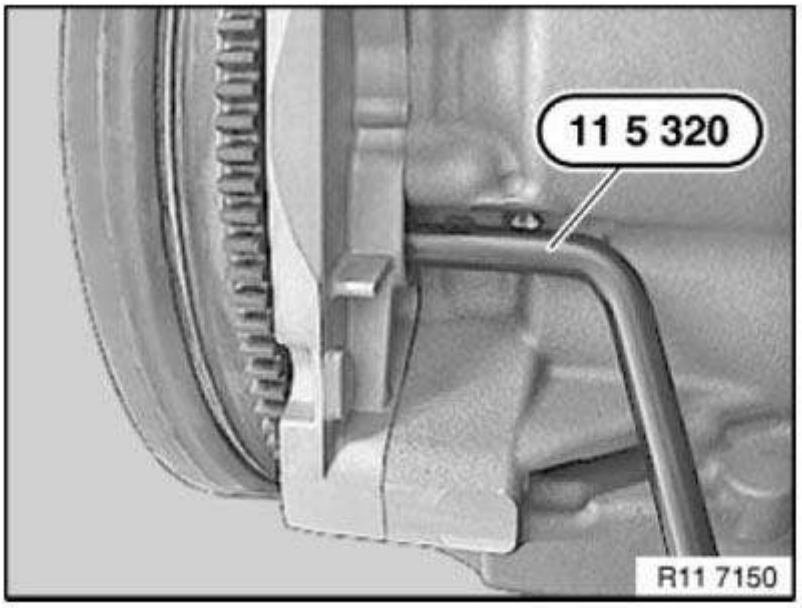


Fig. 943: Identifying Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

The cam on the intake camshaft (E) points obliquely upwards at cylinder No. 1.

The cam on the exhaust camshaft (A) points obliquely outward to the left at cylinder No. 1.

cardiagn.com

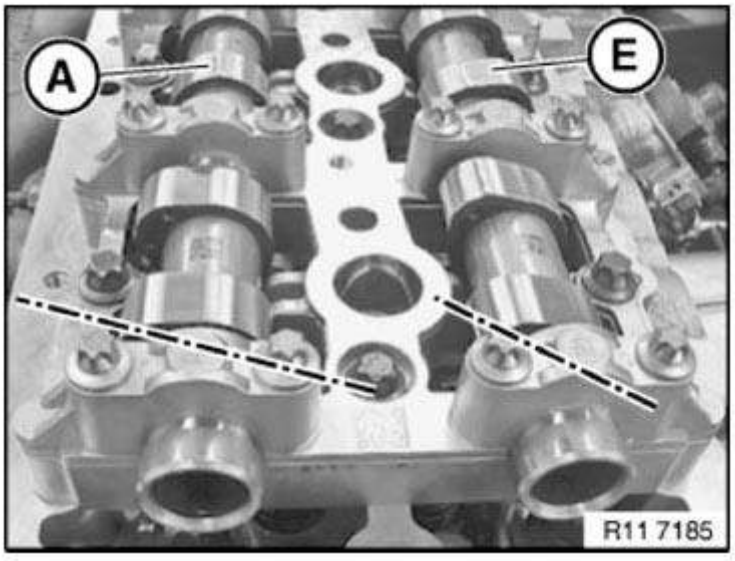


Fig. 944: Identifying Cam On Intake And Exhaust Camshaft Position
Courtesy of BMW OF NORTH AMERICA, INC.

The marking on exhaust sprocket wheel (A) must be aligned with the marking on intake sprocket wheel (E).

NOTE: **See Fig. 945.**

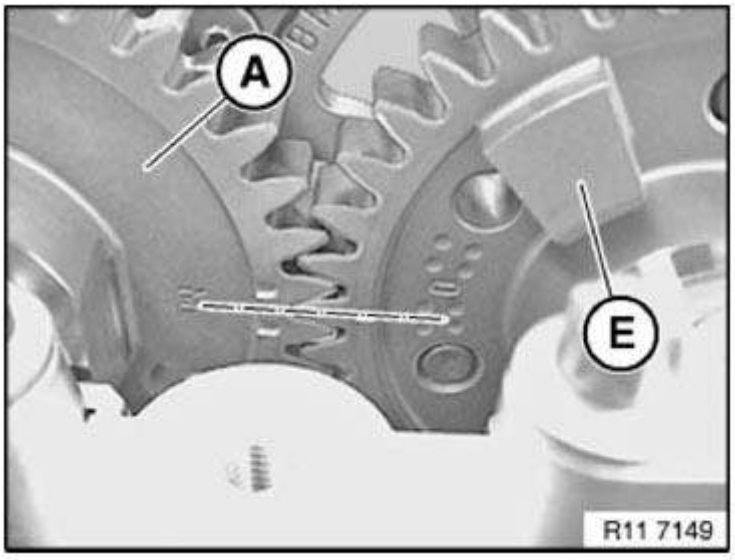


Fig. 945: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool **11 8 760** on exhaust camshaft.

NOTE: **Special tool 11 8 760 must lie flush on cylinder head.**

If necessary, adjust **CAMSHAFT TIMING**.

cardiagn.com

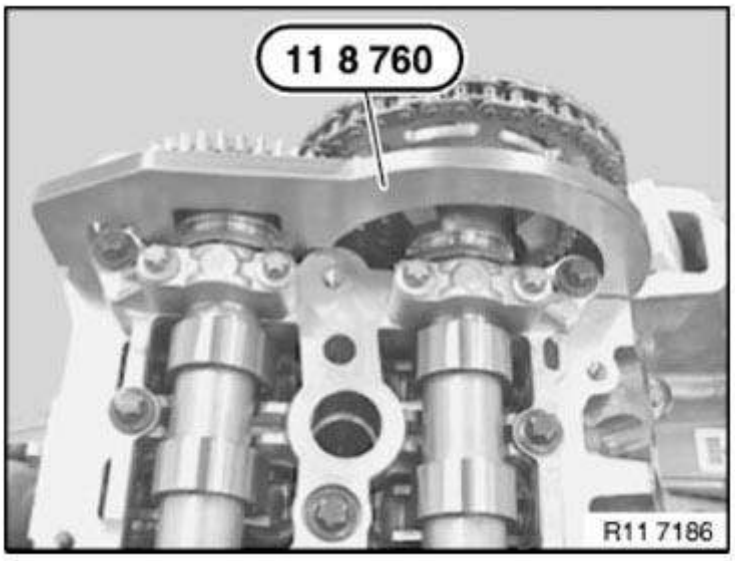


Fig. 946: Identifying Special Tool (11 8 760)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

IMPORTANT: **11 5 320** Remove special tool before starting engine.

11 31 005 CHECKING CAMSHAFT TIMING (N55)

Special tools required:

- **11 0 300**
- **11 4 281**
- **11 4 282**
- **11 4 285**

IMPORTANT: When the engine is shut down, the intake and exhaust camshaft adjusters are normally locked in their initial setting. In order to avoid incorrect timing adjustment, it is essential to check the locking of the camshaft adjuster and if necessary perform locking by rotating the camshafts.

IMPORTANT: For the positioning of the special tool **11 4 281** on the mounting flats of the intake camshaft, a collision with the cylinder throttle return spring 1 can occur.
Special tool **11 4 281** reconditions at following description.

Check for freedom of movement of throttle return spring at intermediate lever cylinder 1.

Recondition special tool **11 4 281** .

Rework chamfer on special tool **11 4 281** as shown in the range of 50 millimeters long and 8.5 millimeters wide.

Fig. 947: Checking Throttle Return Spring Using Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Recondition chamfer on special tool **11 4 281** to 8.5 millimeters (see **Fig. 948**).

Fig. 948: Identifying Special Tool (11 4 281)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove **UNDERBODY PROTECTION**
- Remove **FAN COWL** . **(Not E70, E71, F25)**
- Remove **REINFORCEMENT PLATE** **(all-wheel drive vehicles only)**

Remove fastener (1) in direction of arrow.

Installation note:

Install fastener (1) with bore facing outwards.

Fig. 949: Removing Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Rotate crankshaft at central bolt into TDC setting.

Slide special tool **11 0 300** in direction of arrow into dowel hole and secure crankshaft.

IMPORTANT: If the flywheel is secured in the correct dowel hole with special tool **11 0 300** , the engine can no longer be moved at the central bolt.

Fig. 950: Securing Flywheel Using Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Vehicles with automatic transmission can only be secured to the specified position on flywheel (1) (see arrow).

Fig. 951: Identifying Flywheel Position
Courtesy of BMW OF NORTH AMERICA, INC.

With 1st cylinder in TDC firing position, cams of intake camshaft (1) point upward at an angle.

Fig. 952: Identifying Cams Of Intake Camshaft Position
Courtesy of BMW OF NORTH AMERICA, INC.

With 1st cylinder in TDC firing position, cams of the exhaust camshaft (1) point upwards at an angle.

Fig. 953: Identifying Cams Of Exhaust Camshaft Position
Courtesy of BMW OF NORTH AMERICA, INC.

The timings are correct when the part numbers or read code (1) and the intake and exhaust camshafts point upwards.

Fig. 954: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 285** with bolts (1) to cylinder head.

NOTE: Fit special tool 11 4 282 underneath on side of intake camshaft.

Mount reworked special tool **11 4 281** on the intake camshaft.

cardiagn.com

Mount special tool **11 4 281** on the exhaust camshaft.

Fig. 955: Fitting Special Tool (11 4 282) Underneath On Side Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, adjust **VALVE TIMING**.

Assemble engine.

11 31 005 CHECKING TIMING OF CAMSHAFT(S) (N52T)

Special tools required:

- **11 0 300**
- **11 4 281**
- **11 4 282**
- **11 4 283**

IMPORTANT: When the engine is shut down, the intake and exhaust camshaft adjusters are normally locked in their initial setting. In order to avoid incorrect timing adjustment, it is essential to check the locking of the camshaft adjuster and if necessary perform locking by rotating the camshafts.

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**
- Remove **UNDERBODY PROTECTION** .

Remove fastener (1) in direction of arrow.

Installation note:

Install fastener (1) with bore facing outwards.

Fig. 956: Removing Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Rotate crankshaft at central bolt into TDC setting.

Slide special tool **11 0 300** in direction of arrow into dowel hole and secure crankshaft.

IMPORTANT: On vehicles with optional extra SA205 (automatic transmission), there is a large bore hole for the TDC setting shortly before the dowel hole. This bore hole can be confused with the dowel hole.

Fig. 957: Securing Flywheel Using Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

If the flywheel is secured in the correct dowel hole with special tool **11 0 300** , the engine can no longer be moved at the central bolt.

With 1st cylinder in TDC firing position, cams of intake camshaft (1) at 1st cylinder point upwards at an angle.

Fig. 958: Identifying Cams Of Intake Camshaft Position
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

The timings are correct when the part numbers or read code (1) and the intake and exhaust camshafts point upwards.

Fig. 959: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

With 1st cylinder in TDC firing position, cams of exhaust camshaft (3) at 6th cylinder point downwards at an angle.

Rocker arm (1) is not actuated.

NOTE: When the engine is installed, the position of the exhaust camshaft (3) for the timing can only be checked with a mirror.

Fig. 960: Identifying Cams Of Exhaust Camshaft And Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 283** with bolts (1) to cylinder head.

NOTE: Fit special tool 11 4 282 underneath on side of intake camshaft.

Mount special tool **11 4 281** on intake and exhaust camshafts.

Fig. 961: Fitting Special Tool (11 4 282) Underneath On Side Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, adjust **VALVE TIMING**.

Assemble engine.

11 31 548 CHECKING TIMING CHAIN FOR ELONGATION AND REPLACING BOTH TIMING CHAINS (N47D/D/C K/U/O/T 0/1)

Special tools required:

- **11 5 320**
- **11 6 480**
- **11 8 760**
- **11 4 320**
- **11 8 740**
- **11 3 340**

Necessary preliminary tasks:

- **CHECK TOP TIMING CHAIN**.
- Remove **CYLINDER HEAD COVER**.

The marking on exhaust sprocket wheel (A) must be aligned with the marking on intake sprocket wheel (E).

NOTE: See Fig. 962.

cardiagn.com

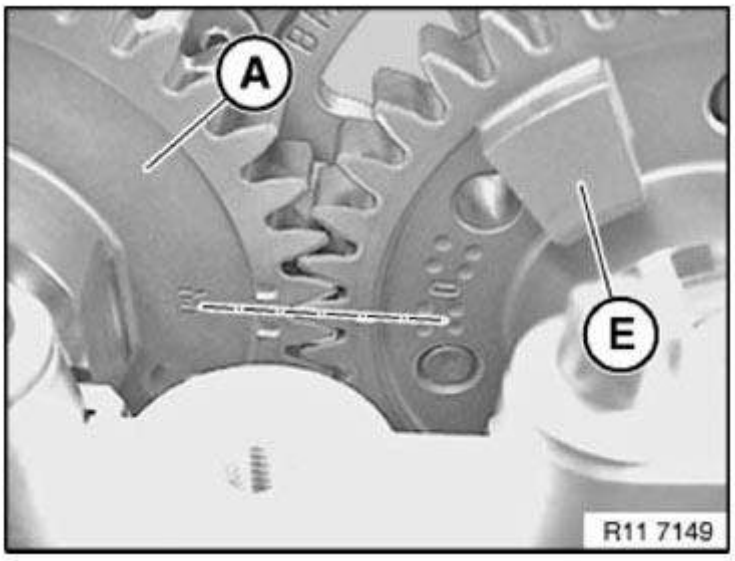


Fig. 962: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

It is not permitted to turn the engine back, measured values are distorted.

Special tool **11 5 320** must be exactly in the alignment position.

Remove protective cap of gear case cover.

Turn engine with special tool **11 6 480** .

Use special tool **11 5 320** to block the crankshaft in the TDC firing position Cylinder 1

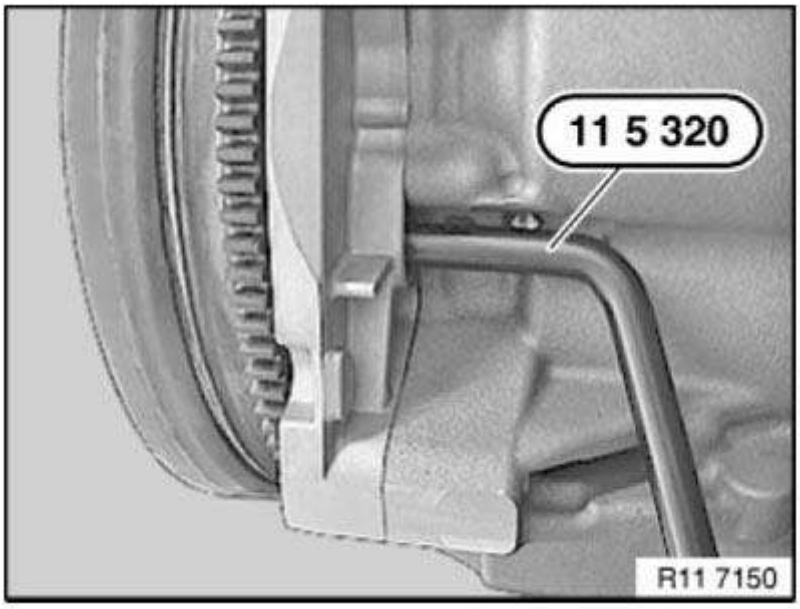


Fig. 963: Identifying Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool **11 8 760** on exhaust camshaft.

cardiagn.com

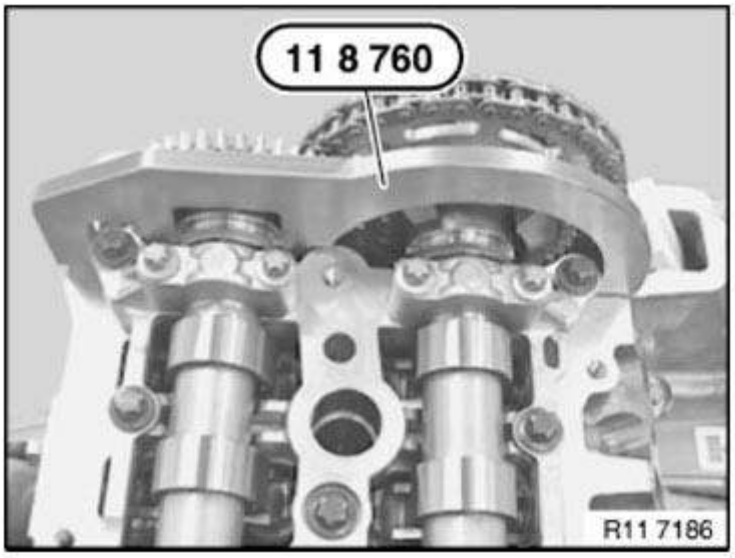


Fig. 964: Identifying Special Tool (11 8 760)
Courtesy of BMW OF NORTH AMERICA, INC.

Determine gap dimension.

Slide feeler gauge (1) between cylinder head and special tool **11 8 760** without jamming (see arrow).

Fig. 965: Sliding Feeler Gauge Between Cylinder Head And Special Tool (11 8 760)
Courtesy of BMW OF NORTH AMERICA, INC.

Follow diagnosis instruction.

Necessary preliminary tasks:

- Remove **ENGINE**.
- Mount engine on assembly stand. See **11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N47 D20 O1)**.
- Remove **CYLINDER HEAD**.
- Remove **OIL SUMP**.
- Remove **GEAR CASE COVER**.
- Remove **OIL/VACUUM PUMP**.

Remove timing chain for the cylinder head.

Remove tensioning rail (1) from cylinder head.

NOTE: Bearing journal (2) does not have to be removed.

Fig. 966: Identifying Tensioning Rail And Bearing Pin
Courtesy of BMW OF NORTH AMERICA, INC.

The crankshaft must be blocked in order to release central bolt (1) of the high pressure pump.

Position special tool **11 4 320** with screw (2) at the crankcase.

Release central bolt (1) of high pressure pump.

IMPORTANT: Release central bolt only, do not remove.

cardiagn.com

Fig. 967: Positioning Special Tool (11 4 320) With Screw On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 8 740** into sprocket of high pressure pump.

Undo the central bolt (1) of the high pressure pump until the central bolt can rest on the special tool **11 8 740** .

Keep turning the central bolt (1) until the sprocket has come loose from the high pressure pump shaft.

Fig. 968: Screwing Special Tool (11 8 740) Into Sprocket Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Press chain tensioner in with tensioning rail (1) by hand in the direction of the arrow until the special tool **11 3 340** can be positioned.

Remove chain tensioner.

Fig. 969: Pressing Chain Tensioner In with Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Undo both bearing journals (1).

Remove guide rail (2).

Release bearing journal (4).

Remove tensioning rail (3).

Fig. 970: Identifying Guide Rail, Bearing Journal And Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Remove special tool **11 4 320** .

Fig. 971: Identifying Special Tool (11 4 320)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove impeller (1) with timing chain (2) from high pressure pump and crankshaft.

Remove timing chain (2).

Fig. 972: Identifying Timing Chain & Impeller
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The check the **11Â° after top dead center.**

Pistons (2) on cylinders 1 and 4 must be **approx. 1 mm** below the contact surface.

Using a caliper gauge (1), measure the short length on cylinder 1.

Fig. 973: Measuring Short Length On Cylinder 1 Using Caliper Gauge

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Pay attention to the spline groove on the high pressure pump (1) (see arrow).

Fig. 974: Identifying Spline Groove On High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The marking on crankcase and groove on the high pressure pump must be in line (graphic N57).

Fig. 975: Identifying Crankcase Mark On High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Spline and marking (0) on pinion are on a single plane.

Fig. 976: Identifying Groove Mark On Pinion
Courtesy of BMW OF NORTH AMERICA, INC.

Position impeller (1) with timing chain (2) on high pressure pump.

Marking (0) and cast lug must be in line.

Fig. 977: Identifying Timing Chain And Impeller Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Insert central bolt (1) of high pressure pump.

Fig. 978: Identifying Central Bolt Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Clean all the threads of the bearing journals (if necessary with screw tap).

Position guide rail (2).

Screw in both bearing journals (1).

Tightening torque: **11 11 3AZ** .

Position tensioning rail (3).

Screw in bearing journals (4).

Tightening torque: **11 11 3AZ** .

Fig. 979: Identifying Guide Rail, Bearing Journal And Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in the central bolt (1) of the high pressure pump.

Position crankshaft on crankcase with special tool **11 4 320** .

cardiagn.com

Secure special tool **11 4 320** with screw (2) on the crankcase.

Secure central bolt (1) of high pressure pump.

Fig. 980: Positioning Special Tool (11 4 320) With Screw On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Remove timing chain for the cylinder head.

Install tensioning rail (1) of cylinder head.

NOTE: Bearing journal (2) does not have to be removed.

Fig. 981: Identifying Tensioning Rail And Bearing Pin
Courtesy of BMW OF NORTH AMERICA, INC.

11 31 540 CHECKING TIMING CHAIN FOR ELONGATION AND REPLACING CHAIN TENSIONER (N47 D/C K/U/O/T 0/1)

Special tools required:

- **2 353 281**
- **11 6 480**

IMPORTANT: Measurement of timing chain is only possible during manual cranking (dynamic).
An engine start is **not** permissible.
Cranking the engine only with an installed special tool (chain tensioner) is permissible.

IMPORTANT: Do not crank engine against direction of rotation, apply mark to vibration absorber.

Necessary preliminary tasks:

- **REMOVE CHAIN TENSIONER**, remove sealing ring.
- Start diagnosis test module in:

  Activities

  Information search

  Function structure

  drive

  Diesel fuel electronics

  Engine mechanics

  Timing chain

IMPORTANT: Cranking the engine only with an installed special tool (chain tensioner) is permissible.

Install special tool **2 353 281** **without** sealing ring.

Install special tool **2 353 281** **without** shim.

Tightening torque: **11 12 3AZ** .

cardiagn.com

Fig. 982: Identifying Special Tool (2 353 281)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not crank engine against direction of rotation, apply mark to vibration absorber.

Crank engine with special tool **11 6 480** .

Measurement of timing chain.

Crank engine at constant speed in direction of rotation **4 times.**

Determine minimum dimension on special tool **2 353 281** with the aid of a second person.

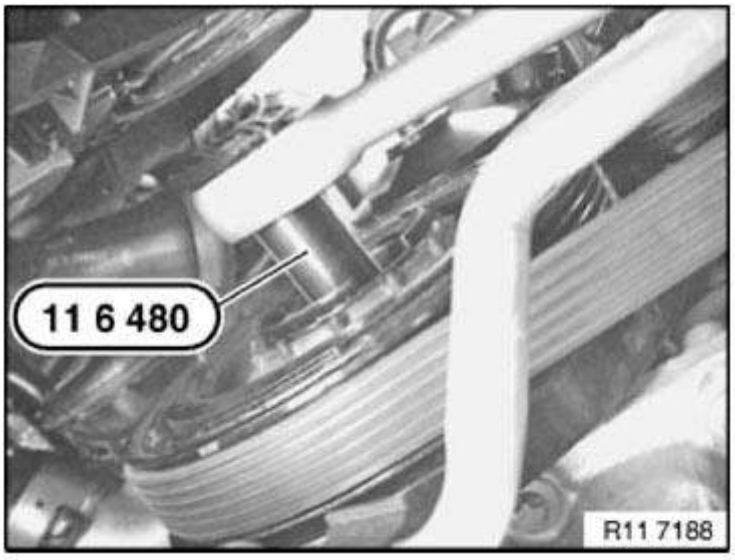


Fig. 983: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Determine protrusion or short length of the measuring pin on special tool **2 353 281** (see **Fig. 984**).

Graphic: **A**

Minimum protrusion greater than 4 mm (indentation visible).

Fig. 984: Measuring Short Length Of Pin On Special Tool (2 353 281)
Courtesy of BMW OF NORTH AMERICA, INC.

Graphic: **B**

Minimum protrusion 4 mm (indentation not visible).

Fig. 985: Measuring Short Length Of Pin On Special Tool (2 353 281)
Courtesy of BMW OF NORTH AMERICA, INC.

Graphic: **C**

Minimum protrusion 2 mm.

Fig. 986: Measuring Short Length Of Pin On Special Tool (2 353 281)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Graphic: **D**

Measuring pin flush with reference surface (see arrow).

Fig. 987: Measuring Pin Flush With Reference Surface Of Special Tool (2 353 281)
Courtesy of BMW OF NORTH AMERICA, INC.

Graphic: **E**

Short length to reference surface (see arrow).

Fig. 988: Identifying Special Tool (2 353 281)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Follow diagnosis instruction.

11 31 544 CHECKING TIMING CHAIN FOR ELONGATION AND REPLACING TOP TIMING CHAIN (N47 D/C K/U/O/T 0/1)

Special tools required:

- 2 354 985
- 11 5 320
- 11 6 480
- 11 8 760
- 2 353 281

Installation note:

To remove and install the timing chain, special tool **2 354 985** is required.

All the tools shown are available in tool set **2 354 985** .

Necessary preliminary tasks:

- CHECK TOP TIMING CHAIN
- REMOVE CYLINDER HEAD COVER.

The marking on exhaust sprocket wheel (A) must be aligned with the marking on intake sprocket wheel (E).

NOTE: **See Fig. 989.**

cardiagn.com

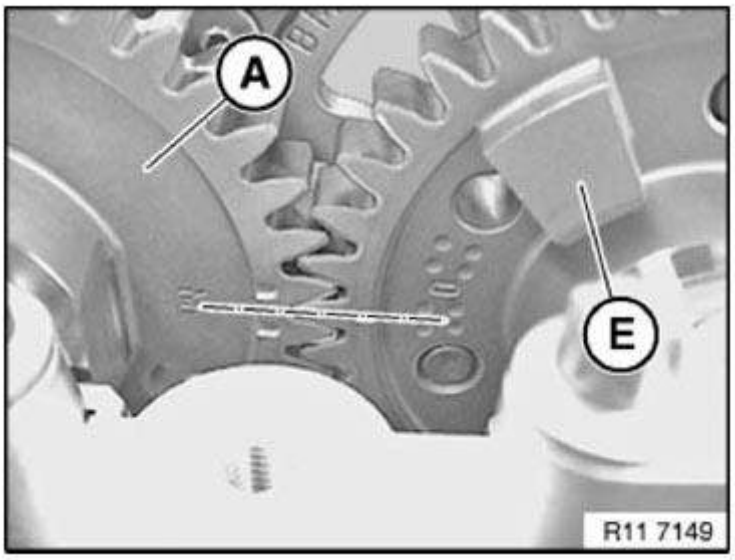


Fig. 989: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

It is not permitted to turn the engine back, measured values are distorted.

Special tool **11 5 320** must be exactly in the alignment position.

Remove protective cap of gear case cover.

Turn engine with special tool **11 6 480** .

Use special tool **11 5 320** to block the crankshaft in the TDC firing position

Cylinder 1

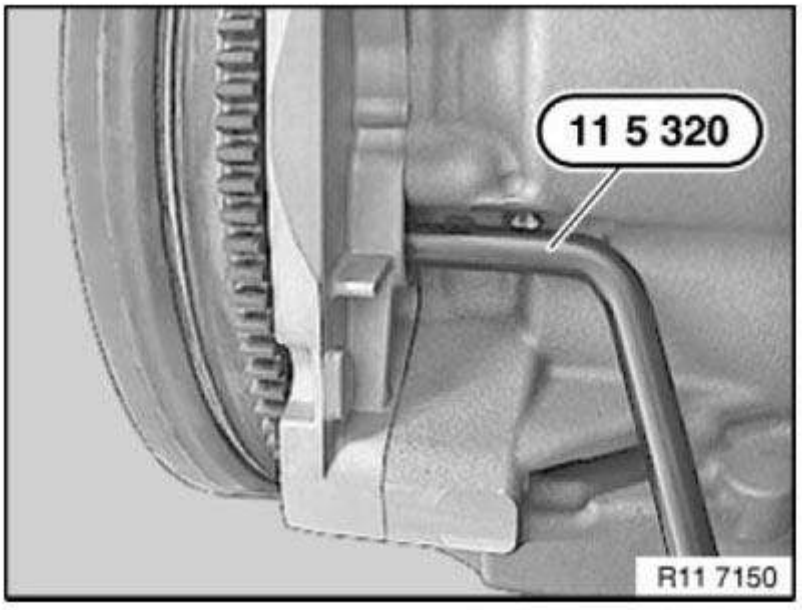


Fig. 990: Identifying Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool **11 8 760** on exhaust camshaft.

cardiagn.com

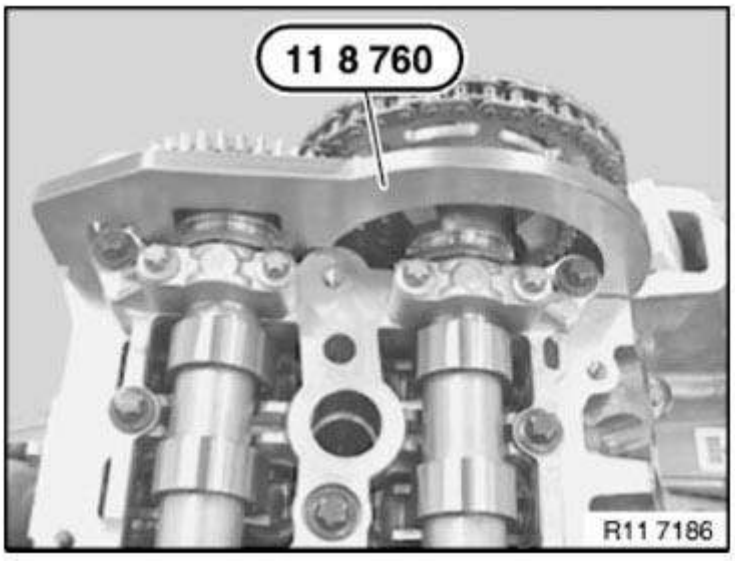


Fig. 991: Identifying Special Tool (11 8 760)
Courtesy of BMW OF NORTH AMERICA, INC.

Determine gap dimension.

Slide feeler gauge (1) between cylinder head and special tool **11 8 760** without jamming (see arrow).

Fig. 992: Sliding Feeler Gauge Between Cylinder Head And Special Tool (11 8 760)
Courtesy of BMW OF NORTH AMERICA, INC.

Follow diagnosis instruction.

IMPORTANT: Loose chain sections can fall into the engine!

IMPORTANT: Screws (1) can fall into the chain drive **risk of damage!**

Secure special tool 2 354 958 to cylinder head with screws (1).

Tightening torque: **11 00 2AZ** .

Fig. 993: Identifying Special Tool (2 354 958) To Cylinder Head With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove special tool **2 353 281** .

Fig. 994: Identifying Special Tool 2 353 281
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Install chain tensioner with part number 8 576 201 (AF 24).

Replace sealing ring.

Tightening torque: **11 12 3AZ** .

Fig. 995: Identifying Chain Tensioner Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Cover cylinder head (1) at chain drive with a suitable cleaning cloth.

Mark right rivet (2) at cover tab (3) (see arrow).

Fig. 996: Identifying Mark Right Rivet And Cover Tab
Courtesy of BMW OF NORTH AMERICA, INC.

Opening the timing chain:

Turn back pressing-off bolt (1) on special tool 2 354 984.

Fig. 997: Identifying Special Tool (2 354 984)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Bore hole (centering aid)

Turn back pressing-off bolt on special tool 2 354 984 up to short length (see arrow).

Fig. 998: Pressing Bolt On Special Tool (2 354 984)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Loose rivet can fall in the engine compartment.
Seal bore hole on special tool 2 354 983 with suitable auxiliary materials.

Position special tool 2 354 983 on timing chain (rivet) (center).

Pretension spindle 2 354 984 up to bolt/limit position of timing chain by hand.

Press off rivet with pressing-off bolt (1), screw in special tool up to limit position.

Fig. 999: Positioning Special Tool (2 354 983) On Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Remove rivet (1) from special tool 2 354 983 with a magnet (2).

Remove special tool 2 354 983.

Fig. 1000: Removing Rivet From Special Tool (2 354 983) With Magnet
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Coat ends of chain lock (1) with grease.

Tightening the timing chain:

Attach chain lock (1) in the open timing chain.

Check camshaft sprocket for wear.

Fig. 1001: Attaching Chain Lock In Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

IMPORTANT: Observe direction of installation!
Oil holes (3) must be visible from the outside.

Attach timing chain (2) in the chain lock (1).

Both timing chains must be aligned with each other.

Outer tab on lock (1) must be aligned with the outer tabs of the timing chains (see **Fig. 1002**).

Fig. 1002: Attaching Timing Chain In Chain Lock
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Turn engine in direction of engine rotation until the run-through timing chain can be removed.

Keep timing chains (1) under tension.

Do not crank engine too far under any circumstances.

Fig. 1003: Turning Timing Chains
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Loose components can fall into the chain drive **risk of damage!**

Remove timing chain (3) with chain lock (2).

Fig. 1004: Removing Timing Chain With Chain Lock
Courtesy of BMW OF NORTH AMERICA, INC.

Pressing in the timing chain:

IMPORTANT: Loose components can fall into the chain drive **risk of damage!**

Press in both end of timing chain (1) on camshaft sprocket.

Insert chain lock (2) from the rear through both ends of new timing chain (1).

Fig. 1005: Pressing Both End Of Timing Chain On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rounded sides (2) of cover tab (1) must point towards timing chain.

Fig. 1006: Identifying Rounded Sides Of Cover Tab Pointing Toward Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare special tool 2 354 976 with cover tab (1) using the rounded side (see **Fig. 1007**).

Fasten cover tab (1) on magnets of special tool 2 354 976.

Fig. 1007: Identifying Special Tool (2 354 976) With Cover Tab
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

IMPORTANT: Loose components.

Prepare special tool 2 354 976 with cover tab on special tool 2 354 962.

Fig. 1008: Identifying Cover Tab On Special Tool (2 354 962)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Maximum 20 Nm
Do not increase torque, risk of damage on chain lock.

Manually join cover tab on chain lock to spindle on special tool 2 354 962.

Make sure chain locks and special tool 2 354 976 are positioned exactly **risk of damage!**

Press on cover tabs with 20 Nm.

Graphic shows removed chain drive.

Fig. 1009: Identifying Chain Locks And Special Tool (2 354 976)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not exceed maximum **20 Nm** torque on chain lock not **risk of damage!**
For safety purposes, the chain lock must be pressed in again.

Fig. 1010: Identifying Special Tool (2 354 962)
Courtesy of BMW OF NORTH AMERICA, INC.

Remount special tool 2 354 976 on special tool 2 354 962 (see **Fig. 1011**).

Press in both rivets individually on chain lock with special tool 2 354 962 to maximum **20 Nm.**

Check both rivets (see **Fig. 1011**).

Fig. 1011: Pressing Both Rivets On Chain Lock
Courtesy of BMW OF NORTH AMERICA, INC.

Follow diagnosis instruction.

11 31... CHECKING/REWORKING INTAKE CAMSHAFT (N20, N26)

Necessary preliminary tasks:

Remove **VACUUM PUMP**

IMPORTANT: Work may only be carried out on the appropriate intake camshaft variant.
Determined **INTAKE CAMSHAFT VARIANT**.

Repair kit components:

- **A** Test sleeve with test pin
- **B** Pretensioning sleeve with spring sheet tube (1)
- **C** Press-in stamp

Fig. 1012: Identifying Repair Kit Components

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Checking position of end cover in intake camshaft:

NOTE: For clarification, the following operations show the intake camshaft removed.

Insert test sleeve (A) in drive flange for vacuum pump of intake camshaft (1) and move into position.

Slide in test pin (2) in direction of arrow up to stop.

Determine position of test pin (2).

Fig. 1013: Inserting Test Sleeve In Drive Flange For Vacuum Pump Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Clear protrusion of test pin (1) in relation to test sleeve (A):

(End cover already moved. Installation depth not sufficient.)

Remove test sleeve with test pin.

Replace intake camshaft.

IMPORTANT: Replace **INTAKE CAMSHAFT** in acc. with altered procedure.

Fig. 1014: Identifying Test Pin Clear Protrusion
Courtesy of BMW OF NORTH AMERICA, INC.

Slight protrusion of test pin (1) in relation to test sleeve (A):

(End cover already moved. Installation depth not sufficient.)

Remove test sleeve with test pin.

Replace intake camshaft.

IMPORTANT: Replace **INTAKE CAMSHAFT** in acc. with altered procedure.

Fig. 1015: Identifying Slight Protrusion Test Pin
Courtesy of BMW OF NORTH AMERICA, INC.

No protrusion or slight negative protrusion of test pin (1) in relation to test sleeve (A):

(End cover not moved. Installation depth sufficient.)

Remove test sleeve with test pin.

Retrofit spring sheet tube.

Fig. 1016: Identifying No Protrusion Of Test Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Retrofitting spring sheet tube:

IMPORTANT: The bore holes in the spring sheet tube (1) must be in the forward push-in direction.

cardiagn.com

Insert pretensioning sleeve (B) with spring sheet tube (1) as shown in intake camshaft (2) and bring into position.

Fig. 1017: Inserting Pretensioning Sleeve With Spring Sheet Tube
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Bring press-in stamp (C) into position.

Press spring sheet tube (1) in direction of arrow with press-in stamp (C) into pretensioning sleeve (B) until spring sheet tube is virtually flush.

Fig. 1018: Pressing Spring Sheet Tube
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: In the next step the spring sheet tube (1) must engage in intake camshaft (2). This prevents the end cover (3) from moving.

Fig. 1019: Engaging Spring Sheet Tube
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Pretensioning sleeve (B) and press-in stamp (C) **must** be moved into position so that spring sheet tube locks in intake camshaft.

Turn press-in stamp over. Insert tip of press-in stamp into spring sheet tube (1).

Press spring sheet tube (1) in direction of arrow fully into camshaft until press-in stamp (C) and pretensioning sleeve (B) are in contact.

Fig. 1020: Pressing Spring Sheet Tube
Courtesy of BMW OF NORTH AMERICA, INC.

Remove pretensioning sleeve (B) and press-in stamp (C) together.

Required follow-up work:

Install **VACUUM PUMP**

11 31... DETERMINING INTAKE CAMSHAFT VARIANT (N20, N26)

Necessary preliminary tasks:

- Remove **VACUUM PUMP**

NOTE: **Variant A: X = approx. 8 mm**
Variant B: Y = approx. 4 mm

Fig. 1021: Identifying Intake Camshaft Variant
Courtesy of BMW OF NORTH AMERICA, INC.

Identify intake camshaft variant by means of mirror (1) on vacuum pump drive flange.

IMPORTANT: **If variant A** is fitted, proceed with **CHECKING INTAKE CAMSHAFT**.
If variant B is fitted, no further action is required. Install **VACUUM PUMP**.

cardiagn.com

Fig. 1022: Locating Intake Camshaft Variant By Means Of Mirror On Vacuum Pump Drive Flange
Courtesy of BMW OF NORTH AMERICA, INC.

11 31 090 INSTALLING AND REMOVING/REPLACING CHAIN TENSIONER PISTON (N20, N26)

Release screws (1).

Tightening torque: **11 65 4AZ** .

Fig. 1023: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Raise vacuum unit (1) slightly.

Release chain tensioner (2).

Tightening torque: **11 31 7AZ** .

IMPORTANT: Have a cleaning cloth ready. A small quantity of engine oil will escape after the screw connection has been released.
Make sure no engine oil runs onto belt drive.

Fig. 1024: Identifying Vacuum Unit And Chain Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace sealing ring.

If the chain tensioner is reused, its oil chamber must be drained.

Place chain tensioner on a level support and slowly compress.

Repeat process twice.

Fig. 1025: Installing Chain Tensioner On Level Support
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 090 INSTALLING AND REMOVING/REPLACING CHAIN TENSIONER PISTON (N47 D20 O1)

Release chain tensioner (1).

Tightening torque: **11 12 3AZ** .

IMPORTANT: Have a cleaning cloth ready. A small quantity of engine oil will emerge after the screw connection has been released.
Make sure no oil runs into the clutch housing.

cardiagn.com

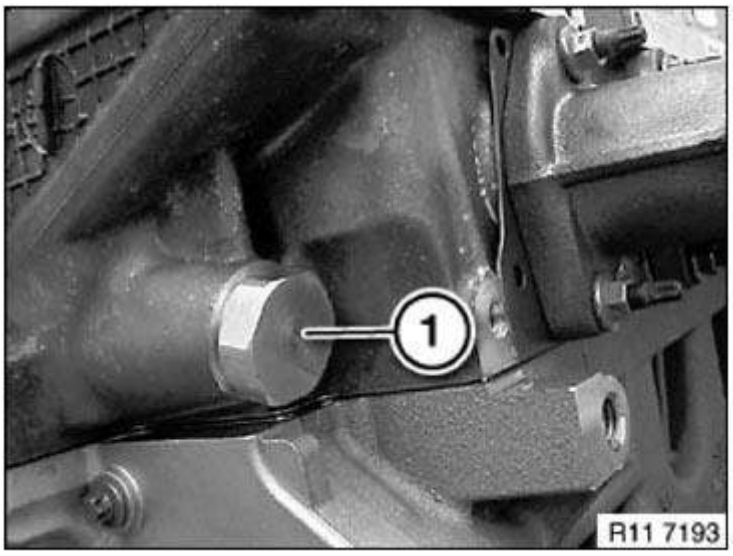


Fig. 1026: Identifying Chain Tensioner Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace sealing ring.

If the chain tensioner is reused, its oil chamber must be drained. Place chain tensioner on a level support and slowly compress.

Repeat process twice.

Fig. 1027: Installing Chain Tensioner On Level Support
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Install new chain tensioner (1) with AF 24 mm.

Fig. 1028: Identifying Chain Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 090 INSTALLING AND REMOVING/REPLACING CHAIN TENSIONER PISTON (N52T)

Release chain tensioner (1).

Tightening torque: **11 31 4AZ** .

IMPORTANT: Have a cleaning cloth ready. A small quantity of engine oil will emerge after the screw connection has been released.
Make sure no engine oil runs onto belt drive.

Fig. 1029: Identifying Chain Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

cardiagn.com

No sealing ring is fitted during series assembly.

A sealing ring must be fitted by service personnel when the chain tensioner is fitted.

If the chain tensioner is reused, its oil chamber must be drained. Place chain tensioner on a level working surface and slowly compress.

Repeat procedure twice.

Fig. 1030: Draining Oil Chamber Of Chain Tensioner On Level Support
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 090 INSTALLING AND REMOVING/REPLACING CHAIN TENSIONER PISTON (N55)

Necessary preliminary tasks:

- Remove **AIR DUCT**

Release chain tensioner (1).

Tightening torque: **11 31 7AZ** .

IMPORTANT: Have a cleaning cloth ready. A small quantity of engine oil will emerge after the screw connection has been released.
Make sure no engine oil runs onto belt drive.

Fig. 1031: Draining Oil Chamber Of Chain Tensioner On Level Support
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace sealing ring.

If the chain tensioner is used again, the oil must be drained out of the chain tensioner.

Place chain tensioner on a level support and slowly compress.

Repeat process twice.

Fig. 1032: Identifying Chain Tensioner On Level Support
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 14 110 REMOVING AND INSTALLING, SEALING/REPLACING TIMING CASE COVER AT REAR (N47 D20 O1)

See **11 14 110 REMOVING AND INSTALLING, SEALING/REPLACING TIMING CASE COVER AT REAR (N47 D20 O1)**.

11 31 025 REMOVING AND INSTALLING/REPLACING INTAKE CAMSHAFT (N20/N26)

Special tools required:

- **11 4 481**

cardiagn.com

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**
- Adjust **VALVE TIMING**
- Remove **INTAKE ADJUSTER**
- Remove **INTERMEDIATE LEVER**
- Remove **DME CONTROL UNIT** .

NOTE: **All bearing caps are identified with numbers from 1 to 4.**

The front bearing cap is a thrust bearing and does not have an identification.

Release screws on all bearing caps (1 to 10).

Set down all bearing caps in a tidy and orderly fashion on special tool **11 4 481** .

Order number: 83 30 0 495 106

Fig. 1033: Identifying Screws On Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Marks of intake and exhaust camshafts are different.
Mixing up the intake and exhaust camshaft will result in **engine damage.**
A Exhaust camshaft.
E Intake camshaft

Fig. 1034: Identifying Exhaust And Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Insert intake camshaft so that data code (1) on mounting flats points upwards.

Fig. 1035: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

Position intake camshaft so that cams point downward at an angle and to the left.

Fig. 1036: Identifying Cams Of Intake Camshaft Position
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **All bearing caps are identified with numbers from 1 to 4.**

The front bearing cap is a thrust bearing and does not have an identification.

Insert screws on all bearing caps from (10) to (1).

Tightening torque: **11 31 3AZ** .

Fig. 1037: Bearing Caps Screws Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 025 REMOVING AND INSTALLING/REPLACING INTAKE CAMSHAFT (N52T)

cardiagn.com

Special tools required:

- 11 4 281
- 11 4 481

IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released** . Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic** . Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Remove CYLINDER HEAD COVER
- Check TIMING
- Remove INTAKE ADJUSTER
- Remove INTERMEDIATE LEVER

NOTE: All bearing caps (2) are identified with numbers from 1 to 6.

Bearing cap (1) is a thrust bearing.

Release bearing cap (1).

Release screws on bearing caps (2) 1 to 6.

Tightening torque: 11 31 9AZ .

Set all bearing caps down in special tool 11 4 481 in a neat and orderly fashion.

Fig. 1038: Releasing Screws Of Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Remove intake camshaft (2) towards top.

Installation note:

Clean all bearing positions and lubricate with oil.

Check plain rectangular compression rings (1) for damage and replace if necessary.

Fig. 1039: Removing Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Metal plain rectangular compression ring:

IMPORTANT: Plain rectangular compression rings (1) can easily break.

Only replace plain rectangular compression rings (1) when they are broken.

The plain rectangular compression rings have catches at the joint.

Press plain rectangular compression rings (1) apart upwards and downwards and removed towards front.

cardiagn.com

Fig. 1040: Pressing Plain Rectangular Compression Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Make sure plain rectangular compression rings (1) can move freely.

Installation note:

When intake camshafts are inserted, no joint must point to a separating joint.

Plastic plain rectangular compression ring:

Installation note:

The plastic plain rectangular compression ring is maintenance free and does not have to be replaced.

Insert plastic plain rectangular compression ring (1) into groove of intake camshaft (2) (see arrow).

Lightly oil plastic plain rectangular compression ring (1) and rotate in direction of arrow until plastic plain rectangular compression ring (1) is positioned on the intake camshaft.

Fig. 1041: Inserting Plastic Rectangular Compression Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Check plastic plain rectangular compression ring (1 and 2) for freedom of movement.

Fig. 1042: Identifying Plastic Plain Rectangular Compression Ring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:	Marks of intake and exhaust camshafts are different. Mixing up the intake and exhaust camshaft will result in **engine damage** . A Exhaust camshaft. E Intake camshaft

Fig. 1043: Identifying Exhaust And Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Insert intake camshaft (1) so that part number on mounting flats points upwards.

Position intake camshaft (1) so that cams point upwards at an angle.

Attach special tool **11 4 281** to mounting flats.

Fig. 1044: Identifying Cams Of Intake Camshaft Position
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 025 REMOVING AND INSTALLING/REPLACING INTAKE CAMSHAFT (N55)

Special tools required:

- **11 4 481**

Necessary preliminary tasks:

cardiagn.com

- Remove **CYLINDER HEAD COVER**.
- Remove **INTAKE ADJUSTER**.
- Remove **INTERMEDIATE LEVER**.
- Adjust **VALVE TIMING**.

NOTE: All bearing caps are identified with numbers from 1 to 6.

The front bearing cap is a thrust bearing and does not have an identification.

Release screws on thrust bearing cover.

Release screws on all bearing caps 1 to 6.

Set all bearing caps down in special tool **11 4 481** in a neat and orderly fashion.

Fig. 1045: Identifying Screws On Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Remove intake camshaft (2) towards top.

Installation note:

Clean all bearing positions and lubricate with oil.

Check plain rectangular compression rings (1) for damage.

Fig. 1046: Removing Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Metal plain rectangular compression ring:

IMPORTANT: Plain rectangular compression rings (1) can easily break.

Only replace plain rectangular compression rings (1) when they are broken.

The plain rectangular compression rings have catches at the joint.

Fig. 1047: Identifying Plain Rectangular Compression Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Press plain rectangular compression rings (1) apart upwards and downwards and removed towards front.

Make sure plain rectangular compression rings (1) can move freely.

Installation note:

When intake camshafts are inserted, no joint must point to a separating joint.

Plastic plain rectangular compression ring:

Installation note:

The plastic plain rectangular compression ring is maintenance free and does not have to be replaced.

Insert plastic plain rectangular compression ring (1) into groove of intake camshaft (2) (see arrow).

cardiagn.com

Fig. 1048: Inserting Plastic Plain Rectangular Compression Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Lightly oil plastic plain rectangular compression ring (1) and rotate in direction of arrow until plastic plain rectangular compression ring (1) is positioned on the intake camshaft.

Check plastic plain rectangular compression ring (1 and 2) for freedom of movement.

Fig. 1049: Identifying Plastic Plain Rectangular Compression Ring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Marks of intake and exhaust camshafts are different.
Mixing up the intake and exhaust camshaft will result in **engine damage.**
A Exhaust camshaft.
E Intake camshaft

Fig. 1050: Identifying Exhaust And Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Install intake camshaft so that the latch mechanism of the plain rectangular compression rings (1) does not point to a contact point of the bearing cap

Center latch mechanism of the plain rectangular compression rings with the bearing cap.

NOTE: Image of the exhaust camshaft.

Fig. 1051: Locating Plain Rectangular Compression Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Insert intake camshaft so that data code (1) on mounting flats points upwards.

Fig. 1052: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

Position intake camshaft (1) so that cams point upwards at an angle and to the left.

Fig. 1053: Positioning Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: All bearing caps are identified with numbers from 1 to 6.

The front bearing cap is a thrust bearing and does not have an identification.

Insert screws on all bearing caps 1 to 6.

Insert screws on thrust bearing cover.

Tightening torque: **11 31 3AZ** .

Fig. 1054: Identifying Intake Camshaft Bearing Cap Numbers
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

cardiagn.com

11 31 025 REPLACING INTAKE CAMSHAFT (N47 D20 O1)

Special tools required:

- 11 5 320
- 11 6 480
- 11 8 760

Necessary preliminary work:

- REMOVE CYLINDER HEAD COVER.

Crank engine with special tool 11 6 480 to TDC firing position of cylinder no. 1.

IMPORTANT: Do not turn the engine against the direction of travel.

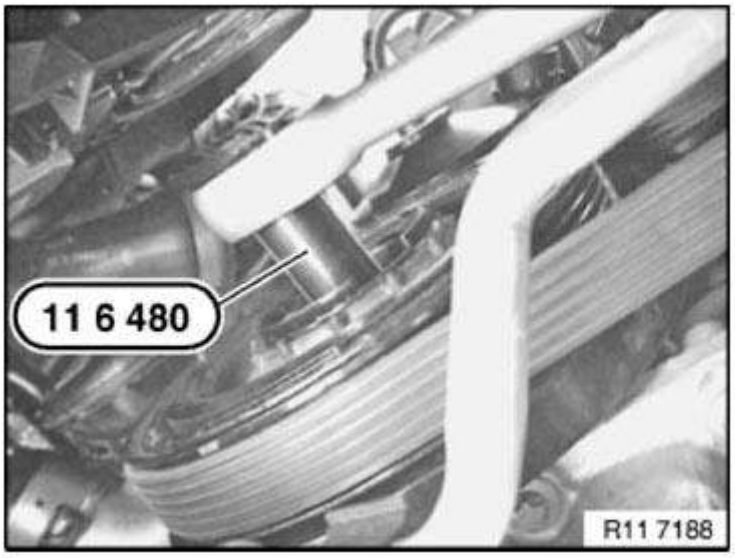
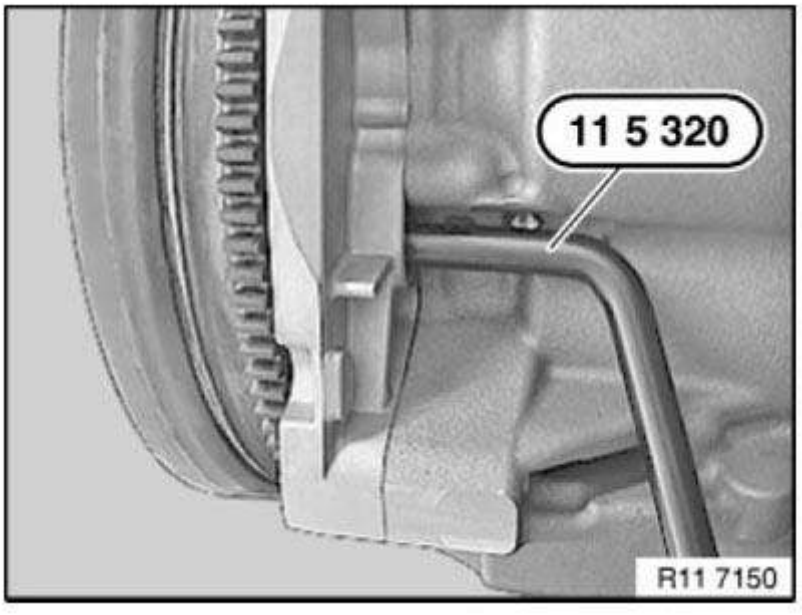


Fig. 1055: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap of gear case cover.

Block crankshaft with cylinder no. 1 in TDC firing position with special tool 11 5 320 .



cardiagn.com

Fig. 1056: Identifying Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

Release chain tensioner (1).

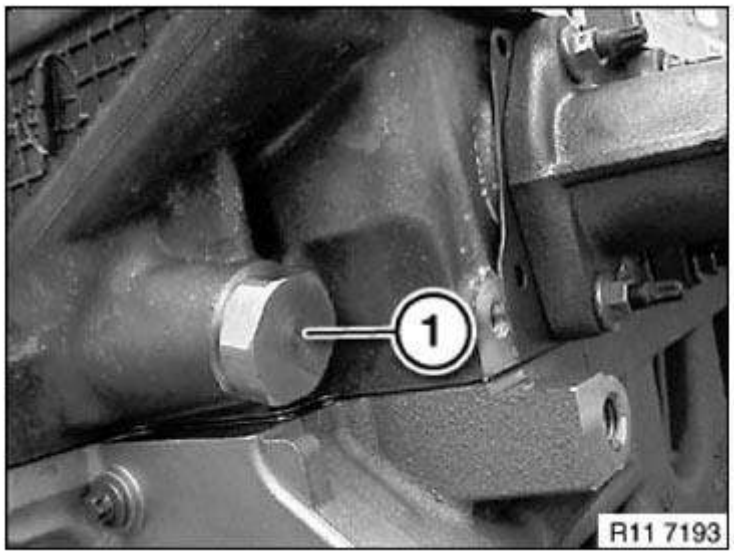


Fig. 1057: Identifying Chain Tensioner Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove camshaft sprocket from the intake camshaft and feed out of timing chain.

Store timing chain in cylinder head.

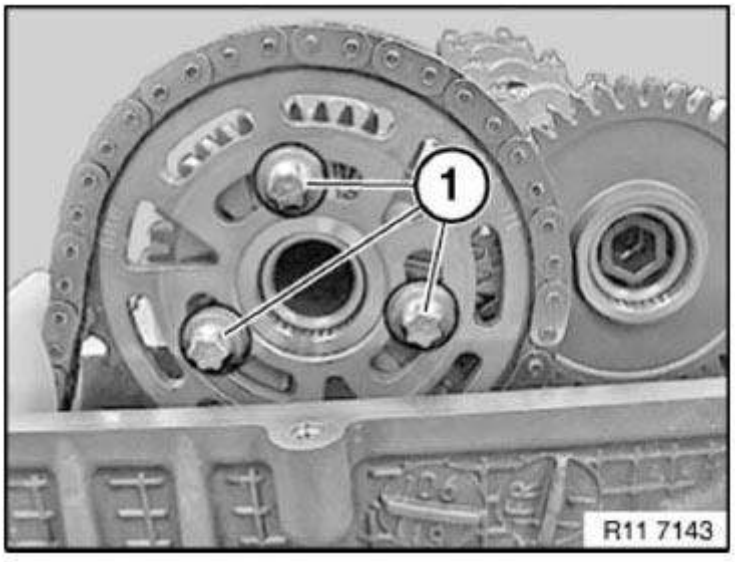


Fig. 1058: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Remove intake camshaft.

NOTE: It is necessary to adjust the engine timing in order to remove the intake camshaft.

Release bearing caps E1 to E5 by 1/2 a turn at a time, working from the outside inwards.

cardiagn.com

Pull intake camshaft upwards to remove.

Fig. 1059: Identifying Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Preparation for installation:

Oil all bearing positions (1).

Fig. 1060: Lubricating All Bearing Positions
Courtesy of BMW OF NORTH AMERICA, INC.

Check installation position of the roller cam followers **(risk of damage!)** .

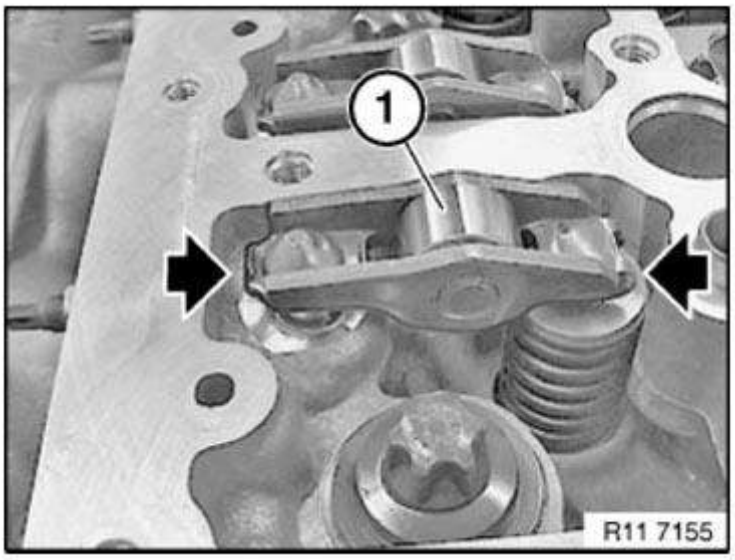


Fig. 1061: Identifying Roller Cam Followers
Courtesy of BMW OF NORTH AMERICA, INC.

Install intake camshaft.

Install intake camshaft (1) marked with (E).

Fig. 1062: Identifying Intake Camshaft Mark
Courtesy of BMW OF NORTH AMERICA, INC.

The marks on both camshafts (A and E) must agree when installing intake camshaft (E) (see **Fig. 1063**).

cardiagn.com

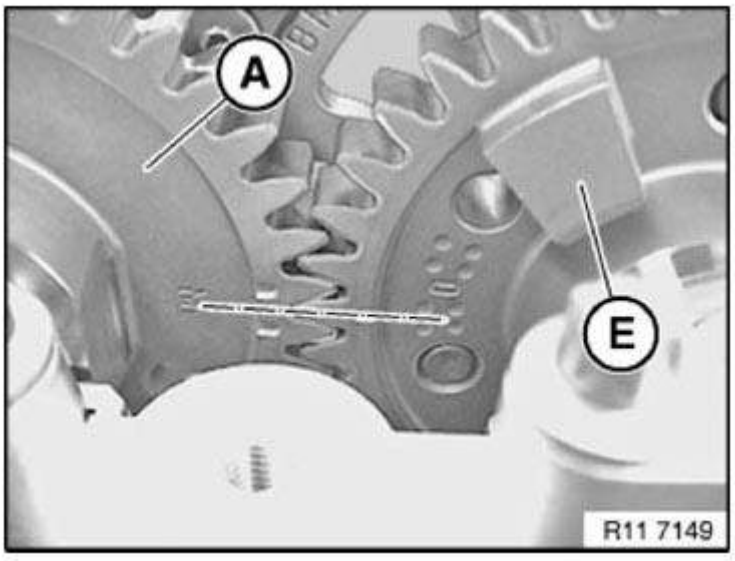


Fig. 1063: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten bearing caps E1 to E5 by 1/2 a turn at a time on the camshaft carrier, working from the inside outwards.

Tightening torque: **11 31 2AZ** .

Fig. 1064: Identifying Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Place the camshaft sprocket with timing chain on the intake camshaft such that bolts (1) are located in the center of the slots.

Insert bolts (1).

Tighten bolts (1) to 10 Nm.

Release bolts (1) again by a 90Â° turn.

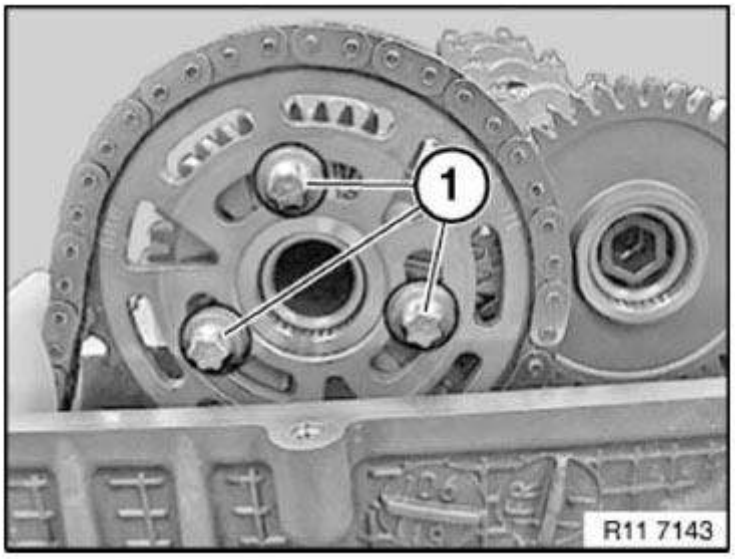


Fig. 1065: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Install **CHAIN TENSIONER** (1).

cardiagn.com

Tightening torque: 11 12 3AZ .

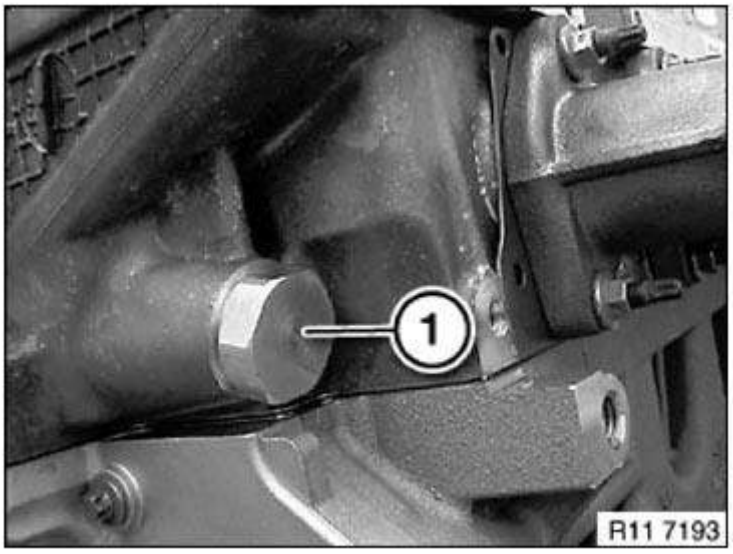


Fig. 1066: Identifying Chain Tensioner Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Place special tool 11 8 760 on exhaust camshaft.

NOTE: Special tool 11 8 760 must lie flush on cylinder head.

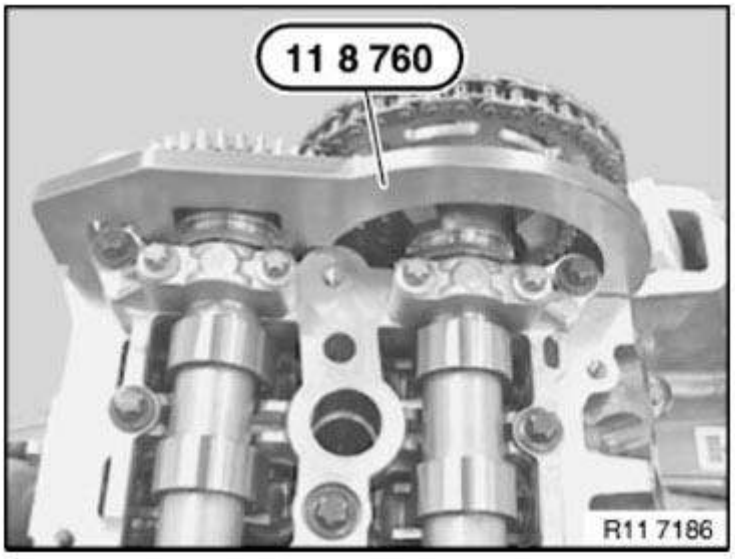


Fig. 1067: Identifying Special Tool (11 8 760)
Courtesy of BMW OF NORTH AMERICA, INC.

Marks on both camshafts (A and E) must agree (be aligned) (see Fig. 1068).

cardiagn.com

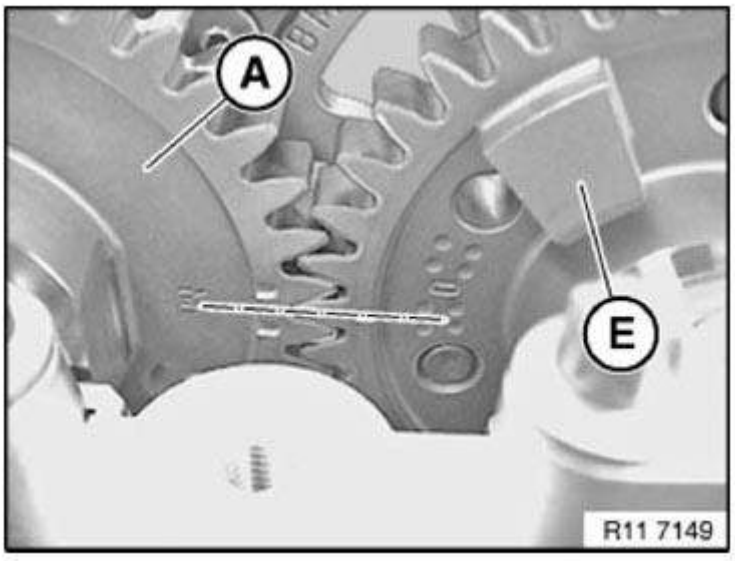


Fig. 1068: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten camshaft bolts (1).

Tightening torque: **11 31 1AZ** .

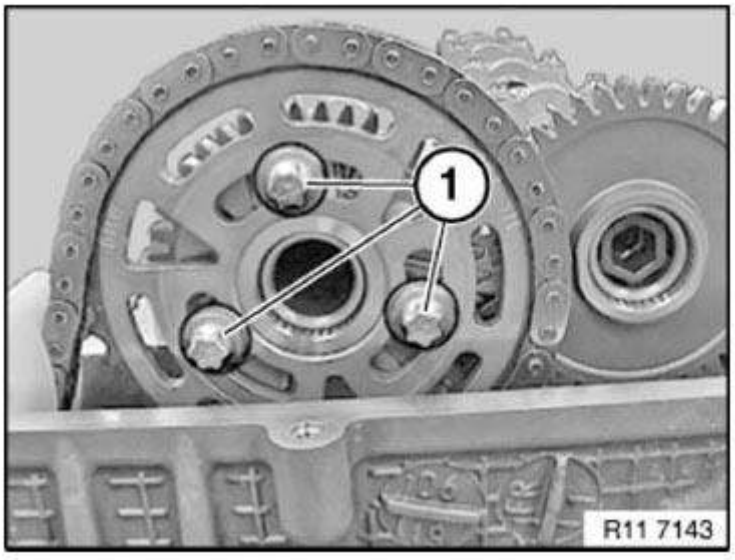


Fig. 1069: Identifying Camshaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Crank engine twice in direction of rotation with special tool **11 6 480** up to TDC firing position of cylinder no. 1.

Check **CAMSHAFT ADJUSTMENT**.

IMPORTANT: **Do not crank the engine back** !

cardiagn.com

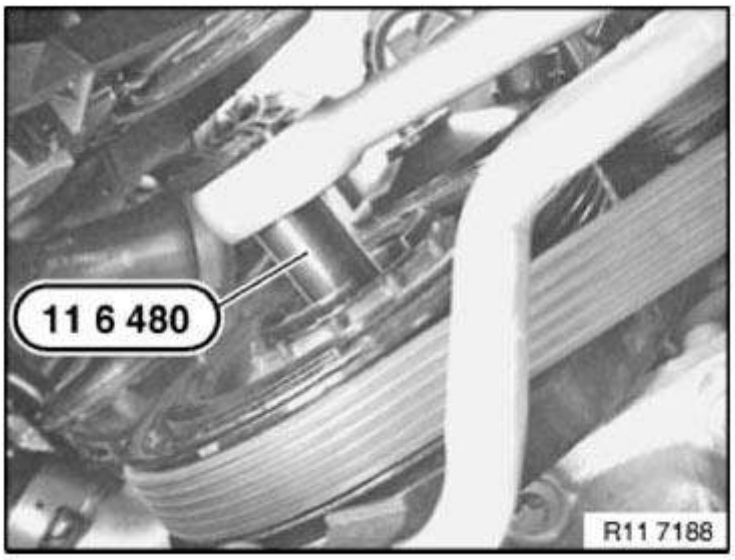


Fig. 1070: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 052 REPLACING BOTH TIMING CHAINS (N47 D20 O1)

Special tools required:

- 11 3 340
- 11 4 180
- 11 4 320
- 11 5 320
- 11 8 740
- 11 8 780
- 11 9 260
- 11 4 120
- 2 285 671

Necessary preliminary tasks:

- Remove **ENGINE**.
- Mount engine on assembly stand. See **11 00 MOUNTING ENGINE ON ASSEMBLY STAND (N47 D20 O1)**.
- Remove **CYLINDER HEAD**.
- Removing **OIL SUMP**.
- Remove **GEAR CASE**.
- Remove **OIL/VACUUM PUMP**.

Remove timing chain for the cylinder head.

Remove tensioning rail (1) from cylinder head.

NOTE: Bearing journal (2) does not have to be removed.

Fig. 1071: Identifying Tensioning Rail And Bearing Pin
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

The crankshaft must be blocked in order to release central bolt (1) of the high pressure pump.

Position special tool **11 4 320** with screw (2) at the crankcase.

Release central bolt (1) of high pressure pump.

IMPORTANT: Release central bolt only, do not remove.

Fig. 1072: Positioning Special Tool (11 4 320) With Screw On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Screw special tool **11 8 740** into sprocket of high pressure pump.

Undo the central bolt (1) of the high pressure pump until the central bolt can rest on the special tool **11 8 740** .

Keep turning the central bolt (1) until the sprocket has come loose from the high pressure pump shaft.

Fig. 1073: Identifying High Pressure Pump Central Bolt On Special Tool (11 8 740)
Courtesy of BMW OF NORTH AMERICA, INC.

Press chain tensioner in with tensioning rail (1) by hand in the direction of the arrow until the special tool **11 4 120** can be positioned.

Remove chain tensioner.

Fig. 1074: Pressing Chain Tensioner In Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Undo both bearing journals (1).

Remove guide rail (2).

Release bearing journal (4).

Remove tensioning rail (3).

Fig. 1075: Identifying Guide Rail, Bearing Journal And Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Remove special tool **11 4 320** .

Fig. 1076: Identifying Special Tool (11 4 320)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove impeller (1) with timing chain (2) from high pressure pump and crankshaft.

Remove timing chain (2).

Fig. 1077: Identifying Timing Chain & Impeller
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: High pressure pump and crankshaft must be positioned **to each other** .

cardiagn.com

Fit timing chain (1).

Position crankshaft with special tool **2 285 671** (crankshaft is in the 11Â° top dead center).

Fix special tool **2 285 671** via the fitting bush on the crankcase.

Fig. 1078: Fitting Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

To check the **11Â° after top dead center.**

Pistons on cylinders 1 and 4 must be **approx. 0.5 to 1 mm** below the contact surface.

Fig. 1079: Measuring Short Length On Cylinder 1 Using Caliper Gauge
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Pay attention to the spline groove on the high pressure pump (1) (see arrow).

Fig. 1080: Identifying Spline Groove On High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The marking on crankcase and groove on the high pressure pump must be in line (graphic N57).

Fig. 1081: Identifying Crankcase Mark On High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Spline and marking (0) on pinion are on a single plane.

Fig. 1082: Identifying Groove Mark On Pinion
Courtesy of BMW OF NORTH AMERICA, INC.

Position impeller (1) with timing chain (2) on high pressure pump.

Marking (0) and cast lug must be in line.

Fig. 1083: Identifying Timing Chain And Impeller Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Insert central bolt (1) of high pressure pump.

Fig. 1084: Identifying Central Bolt Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Clean all the threads of the bearing journals (if necessary with screw tap).

Position slide rail (1).

cardiagn.com

Screw in bearing journals (2).

Tightening torque: **11 11 3AZ** .

Fig. 1085: Identifying Slide Rail And Bearing Journals Screw
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Clean all the threads of the bearing journals (if necessary with screw tap).

Position guide rail (1).

Screw in bearing journals (2).

Tightening torque: **11 11 3AZ** .

Position tensioning rail (3).

Screw in bearing journals (4).

Fig. 1086: Identifying Guide Rail, Bearing Journal And Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

The crankshaft must be blocked in order to secure the central bolt of the high pressure pump.

Remove special tool **11 3 340** on the chain tensioner.

Position special tool **2 285 671** on the crankcase.

Secure central bolt of high pressure pump.

Tightening torque: **13 52 2AZ** .

Fig. 1087: Securing Central Bolt Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Position tensioning rail (1) with timing chain for cylinder head.

Fig. 1088: Identifying Tensioning Rail And Bearing Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Position timing chain with secondary sprocket wheel for oil pump.

Installation note:

Pay attention to mounting flats on oil pump shaft (1) (see arrow).

Fit special tool **11 4 320** .

Fig. 1089: Mounting Flats On Oil Pump Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Left-hand threads.

Insert screw (1).

cardiagn.com

Tightening torque: **11 41 3AZ** .

Fig. 1090: Identifying Camshaft Sprocket And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check fitting sleeves for damage.

Apply **SEALING COMPOUND 2.2** along the housing (1) with a thickness of approx. 1.5 to 2 mm.

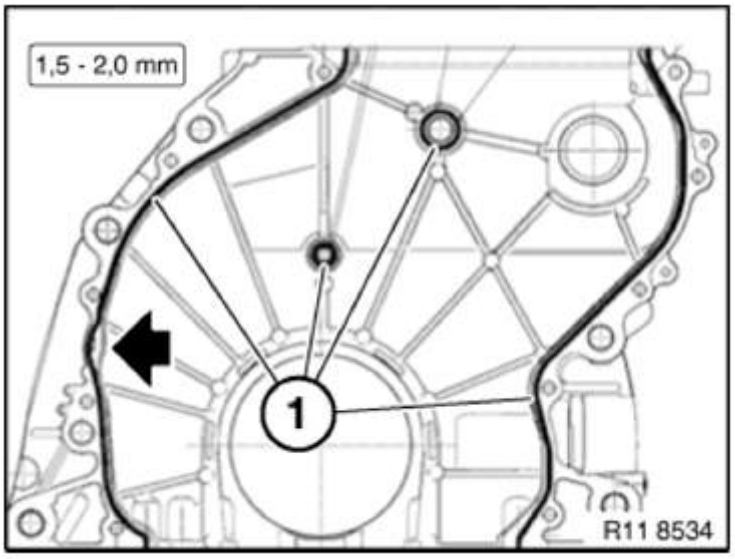


Fig. 1091: Identifying Sealing Compound Housing Applying Area
Courtesy of BMW OF NORTH AMERICA, INC.

Mount **GEAR CASE COVER**.

Mount **OIL SUMP** with special tool **11 8 780** .

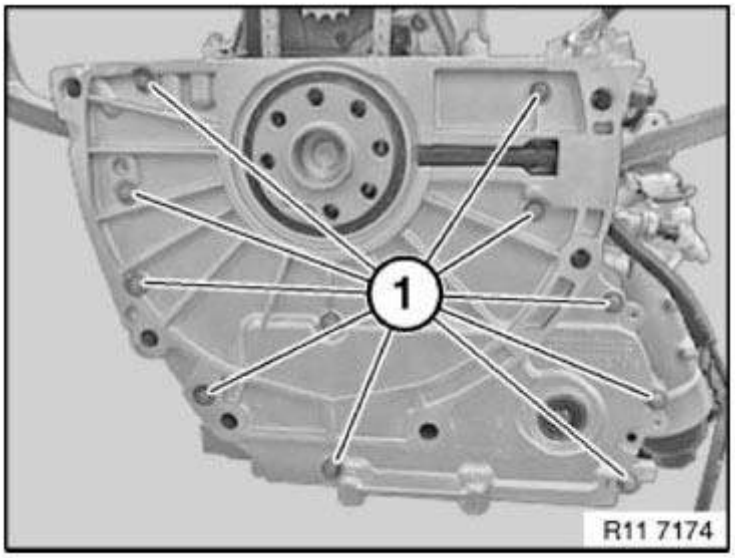


Fig. 1092: Identifying Screws Of Oil Sump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Flywheel must be installed to determined TDC.

cardiagn.com

Position flywheel.

Secure **FLYWHEEL** with special tool **11 9 260** .

Secure flywheel studs with special tool **11 4 180** .

Fig. 1093: Securing Flywheel Studs With Special Tool (11 4 180)
Courtesy of BMW OF NORTH AMERICA, INC.

Turn flywheel (1) back.

Block crankshaft with special tool **11 5 320** in TDC firing position for cylinder 1.

Fig. 1094: Turning Flywheel
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 028 REMOVING AND INSTALLING/REPLACING EXHAUST CAMSHAFT (N52T)

Special tools required:

- **11 4 460**
- **11 9 000**
- **11 4 350**
- **00 9 120**

IMPORTANT: It is absolutely essential to follow an exact procedure for removing and installing the exhaust camshaft.
Risk of damage!
Top and bottom bearing strips must be pre-tensioned with a total of six special tools 11 4 461.

NOTE: **Special tools (11 4 461), (11 4 462) and (11 4 463) are included in set of special tools 11 4 460 .**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**
- Check **TIMING**
- Remove **EXHAUST CAMSHAFT ADJUSTER**

The screw connection of the bearing strips must be released from the outside inwards.

Lift out upper and lower bearing strips (1) with exhaust camshaft.

Remove upper bearing strip (1).

Remove exhaust camshaft from lower bearing strip.

Fig. 1095: Removing Upper Bearing Strip
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Marks of intake and exhaust camshafts are different.
Mixing up the intake and exhaust camshaft will result in **engine damage.**
A Exhaust camshaft.

cardiagn.com

E Intake camshaft

Fig. 1096: Identifying Exhaust And Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Metal plain rectangular compression ring:

IMPORTANT: Plain rectangular compression rings (1) can easily break.

Only replace plain rectangular compression rings (1) when they are broken.

The plain rectangular compression rings have catches at the joint.

Press plain rectangular compression rings (1) apart upwards and downwards and removed towards front.

Make sure plain rectangular compression rings (1) can move freely.

Installation note:

When exhaust camshafts are inserted, no joint must point to a separating joint.

Fig. 1097: Pressing Plain Rectangular Compression Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Plastic plain rectangular compression ring:

Installation note:

The plastic plain rectangular compression ring is maintenance free and does not have to be replaced.

Insert plastic rectangular compression ring (1) into groove of exhaust camshaft (2) (see arrow).

Lightly oil plastic rectangular compression ring (1) and rotate in direction of arrow until compression ring (1) is positioned on the exhaust camshaft.

Fig. 1098: Inserting Plastic Rectangular Compression Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Check plastic plain rectangular compression ring (1 and 2) for freedom of movement.

Fig. 1099: Identifying Plastic Plain Rectangular Compression Ring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Removal on engine:
Set engine to ignition TDC at cylinder No. 1.
Removed cylinder head:
When using special tool **11 9 000** , it will be necessary to remove the aluminum strip.

Installation bearing strip:

Preassemble special tool 11 4 462 on 2nd cylinder.

Insert special tool 11 4 463 in screw connection of cylinder head cover.

IMPORTANT: Special tool 11 4 463 is a special screw.

cardiagn.com

Press down rocker arms (3) on 2nd cylinder with spindle nut (2) of special tool 11 4 462.

Fig. 1100: Pressing Down Rocker Arms
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Before mounting the exhaust camshaft, make sure that the rocker arm (1) is well fitted and pay attention to the hydraulic valve clearance adjustment element and the valve.

Refer to Removing and installing/replacing all **ROCKER ARMS**.

Fig. 1101: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Position lower bearing strip (1) with exhaust camshaft (2) on rocker arms.

Align exhaust camshaft (2).

Cylinder nos. 2 and 4 are at valve overlap.

Cams (3) on cylinder no. 1 point upwards at an angle.

Part number (4) on mounting flats of exhaust camshaft (2) points upwards.

Fig. 1102: Identifying Lower Bearing Strip And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: There must be no adhesive residues in the cylinder head threaded holes.
Clean threaded holes.

Fit upper bearing strip (1).

Insert bolts dry.

Tension down upper bearing strip (1) with exhaust camshaft at bearing positions 3 and 5 through a 1/2 bolt turn.

Join exhaust camshaft to upper and lower bearing strips (1) with torque wrench (2) from inside outwards to **8 Nm.**

Fig. 1103: Tensioning Down Upper Bearing Strip
Courtesy of BMW OF NORTH AMERICA, INC.

Release all screws of upper bearing strip (1) from outside inwards by 90Â°.

Installation note:

Upper and lower bearing strips must be aligned to each other at ground surfaces (1 and 2).

Make sure that thrust piece and shanks of special tools 11 4 461 rest on the milled surfaces.

Fig. 1104: Identifying Ground Surfaces Of Upper And Lower Bearing Strips
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Schematic diagram of special tool 11 4 461 at top bearing strip (2) and bottom**

cardiagn.com

bearing strip (1).

Pretension all special tools 11 4 461 only with special tool **11 4 350** .

IMPORTANT: Tighten screw (3) on synchronizing key to 2 Nm. **Risk of damage!**

Fig. 1105: Tightening Screw On Synchronizing Key
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 4 461 over screw connection of bearing strips.

Make sure that the shanks rest exactly on the ground surfaces of the upper bearing strip (2) and lower bearing strip (1).

Fig. 1106: Positioning Special Tool (11 4 461) Over Screw Connection Of Bearing Strips
Courtesy of BMW OF NORTH AMERICA, INC.

Position screw of special tool 11 4 461 on ground surfaces of top bearing strip (1) and bottom bearing strip (2).

IMPORTANT: Tighten screws on synchronizing key to 2 Nm. **Risk of damage!**

Fig. 1107: Positioning Screw Of Special Tool (11 4 461) On Ground Surfaces
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **Set special tool 11 4 350 to 2 Nm.**
Pretension all special tools 11 4 461 only with special tool **11 4 350** .

Fig. 1108: Identifying Special Tool (11 4 350)
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tools 11 4 461 with screw (1) to inside of cylinder head.

On 2nd cylinder, fit special tool 11 4 461 with screw facing outwards.

Position special tools 11 4 461 so that screw connections (2) of bearing strip are easily accessible.

Fig. 1109: Positioning Special Tools (11 4 461) To Screw Connections
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten upper and lower bearing strips with special tool **00 9 120** .

Tightening torque: **11 12 8AZ** .

IMPORTANT: Only remove special tool 11 4 461 when exhaust camshaft screw connection is **completed** .

Fig. 1110: Tightening Upper And Lower Bearing Strips
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 028 REMOVING AND INSTALLING/REPLACING EXHAUST CAMSHAFT (N55)

Special tools required:

cardiagn.com

- 00 9 120
- 11 4 350
- 11 4 461
- 11 7 100
- 11 8 550
- 11 8 552
- 11 8 553
- 11 9 000

IMPORTANT: It is absolutely essential to follow an exact procedure for removing and installing the exhaust camshaft.
Risk of damage!
The upper and lower bearing strips must be preloaded with a total of six special tools 11 8 550 .

Necessary preliminary work:

- Remove CYLINDER HEAD COVER.
- Remove ALL IGNITION COILS AND INJECTOR SHAFTS.
- Remove EXHAUST CAMSHAFT ADJUSTER
- Adjust VALVE TIMING.

Remove fitting bushes (1).

Installation note:

Check fitting bushes (1) for damage and replace if necessary.

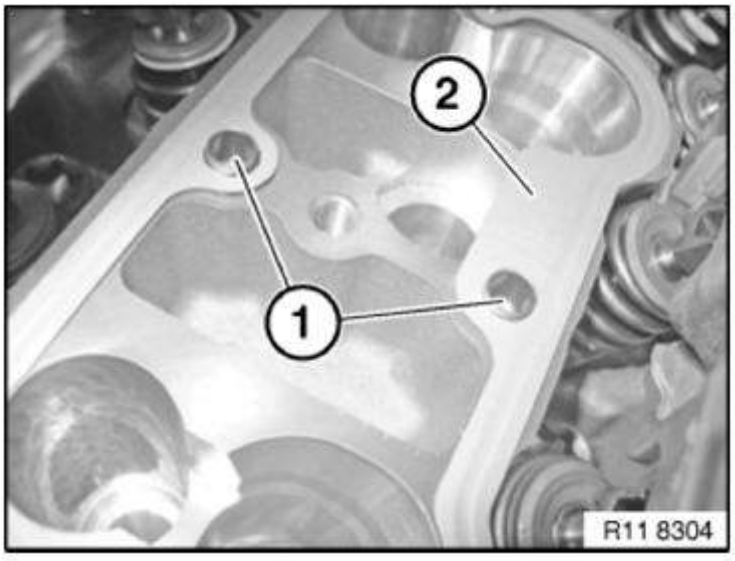


Fig. 1111: Identifying Gasket And Bushes
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 7 100 on cylinder 2.

Hand-tighten special tool 11 7 100 with special tool 11 8 552 .

Fig. 1112: Positioning Special Tool (11 7 100) On Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Graphic without bearing strip.**

cardiagn.com

Screw in roller cam follower at 2nd cylinder using spindle nut of special tool **11 7 100** to end stop.

Fig. 1113: Identifying Roller Cam Follower
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw connection on bearing strip in sequence from 15 to 1.

Remove upper bearing strip (1).

NOTE: **The upper and lower bearing strips (1) can also be lifted out completely with exhaust camshaft.**

Fig. 1114: Releasing Screw Connection On Bearing Strip
Courtesy of BMW OF NORTH AMERICA, INC.

Remove exhaust camshaft (1) from bearing strip in direction of arrow.

Set down exhaust camshaft (1) on special tool.

Fig. 1115: Removing Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Marks of intake and exhaust camshafts are different.
Mixing up the intake and exhaust camshaft will result in **engine damage.**
A = Exhaust camshaft.
E = Intake camshaft

Fig. 1116: Identifying Exhaust And Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Metal plain rectangular compression ring:

IMPORTANT: Plain rectangular compression rings (1) can easily break.

Only replace plain rectangular compression rings (1) when they are broken.

The plain rectangular compression rings have catches at the joint.

Fig. 1117: Pressing Plain Rectangular Compression Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Press plain rectangular compression rings (1) apart upwards and downwards and removed towards front.

Make sure plain rectangular compression rings (1) can move freely.

Installation note:

When exhaust camshafts are inserted, no joint must point to a separating joint.

Plastic plain rectangular compression ring:

Installation note:

The plastic plain rectangular compression ring is maintenance free and does not have to be replaced.

cardiagn.com

Insert plastic rectangular compression ring (1) into groove of exhaust camshaft (2) (see arrow).

Lightly oil plastic rectangular compression ring (1) and rotate in direction of arrow until compression ring (1) is positioned on the exhaust camshaft.

Fig. 1118: Inserting Plastic Rectangular Compression Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Check plastic plain rectangular compression ring (1 and 2) for freedom of movement.

Fig. 1119: Identifying Plastic Plain Rectangular Compression Ring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Removal on engine:
Set engine to ignition TDC at cylinder No. 1.
Removed cylinder head:
When using special tool **11 9 000** , it will be necessary to remove the aluminum strip.

Installation note:

Before mounting the exhaust camshaft, ensure the correct fit of the rocker arm (1) on the hydraulic valve clearance compensating element and the valve.

See "**REMOVING AND INSTALLING/REPLACING ALL ROLLER CAM FOLLOWERS**".

Fig. 1120: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Mounting bearing strip:

Pre-install special tool **11 7 100** on cylinder no. 2.

IMPORTANT: Special tool **11 8 552** is a special screw.

Press down rocker arms (3) on cylinder no. 2 with spindle nut (2) of special tool **11 7 100** .

Fig. 1121: Pressing Down Roller Cam Follower
Courtesy of BMW OF NORTH AMERICA, INC.

Position lower bearing strip (1) with exhaust camshaft (2) on rocker arms.

Align exhaust camshaft (2).

Cylinder nos. 2 and 4 are at valve overlap.

Cams (3) on cylinder no. 1 point upwards at an angle.

Part number (4) on mounting flats of exhaust camshaft (2) points upwards.

Fig. 1122: Identifying Lower Bearing Strip, Cams And Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Insert exhaust camshaft so that none of the latching mechanisms for the plain rectangular compression rings (1) point to a bearing cap joint.

cardiagn.com

Center latch mechanism of the plain rectangular compression rings with the bearing cap.

Fig. 1123: Identifying Plain Rectangular Compression Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Insert exhaust camshaft so that the data code (1) on the mounting flats faces up.

NOTE: **Graphic of intake camshaft.**

Fig. 1124: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

The cam (1) at cylinder 6 points downward at an angle.

Fig. 1125: Identifying Cam Cylinder Angle
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: There must be no oil residues in the cylinder head threaded holes.
Clean threaded holes.

Fit upper bearing strip (1).

Insert bolts dry.

Join exhaust camshaft to lower and upper bearing strips (1) with torque wrench (2) to **8 Nm** in sequential order from 1 to 15.

Release all screws of upper bearing strip (1) from outside inwards by 90Â°.

Fig. 1126: Upper Bearing Strip Screws Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Upper and lower bearing strips must be aligned to each other at ground surfaces (1 and 2).

Make sure that the synchronizing key and the shanks of special tools 11 4 461 rest on the milled surfaces.

Fig. 1127: Identifying Ground Surfaces Of Upper And Lower Bearing Strips
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Schematic diagram of special tool 11 8 553 at upper bearing strip (1) and lower bearing strip (2).**
Preload all special tools 11 8 553 with special tool 11 4 350 only.

IMPORTANT: Tighten screw (3) on synchronizing key to 2 Nm. **Risk of damage!**

Fig. 1128: Tightening Screw On Synchronizing Key
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 8 553 over screw connection of bearing strips.

Make sure that the shanks rest exactly on the ground surfaces of the upper bearing strip (2) and lower bearing

cardiagn.com

strip (1).

Fig. 1129: Positioning Special Tool (11 8 553) Over Screw Connection Of Bearing Strips
Courtesy of BMW OF NORTH AMERICA, INC.

Initially tighten screw of special tool **11 8 553** to ground surfaces of upper bearing strip (1) and lower bearing strip (2).

IMPORTANT: Tighten screws on synchronizing key to 2 Nm. **Risk of damage!**

Fig. 1130: Tightening Screw Of Special Tool (11 8 553) To Ground Surfaces Of Bearing Strip
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: **Set special tool 11 8 553 to 2 Nm.**
Preload all special tools **11 8 553** with special tool **11 4 350** only.

Fig. 1131: Identifying Special Tool (11 4 350)
Courtesy of BMW OF NORTH AMERICA, INC.

Mount special tools **11 8 553** to inside of cylinder head with pressure bolt.

Mount special tool **11 8 553** on cylinder no. 2 with pressure bolt facing outward.

Position special tools **11 8 553** so that screw connections (2) of bearing strip are easily accessible.

Fig. 1132: Positioning Special Tools (11 8 553) To Screw Connections Of Bearing Strip
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten top and bottom bearing strip with special tool **00 9 120** .

Tightening torque: **11 31 1AZ** .

IMPORTANT: Remove special tool **11 8 553** only when exhaust camshaft screw connection is **completed** .

Fig. 1133: Tightening Bearing Strip Using Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 028 REMOVING AND INSTALLING/REPLACING EXHAUST CAMSHAFT (N20/N26)

Special tools required:

- **11 9 000**
- 83 30 0494 362

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Adjust **valve timing** . See **11 31 505 ADJUSTING TIMING OF CAMSHAFT(S) (N20, N26)**.
- Remove **EXHAUST CAMSHAFT ADJUSTER**

Release screws (1).

cardiagn.com

Tightening torque: **11 31 4AZ** .

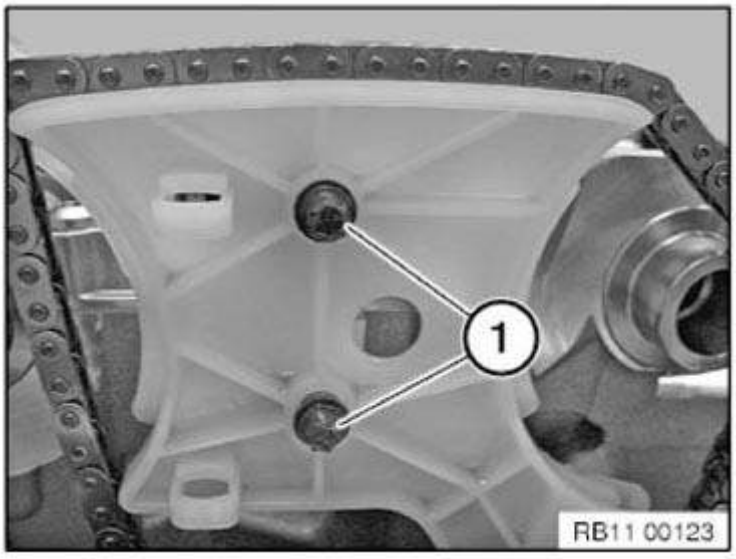


Fig. 1134: Identifying Bolts From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Release banjo bolt (1).

Tightening torque: **11 31 9AZ** .

Installation note:

Replace sealing rings.

Unclip engine oil pipe (2) from the brackets (see arrows).

Fig. 1135: Locating Brackets Of Engine Oil Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 31 1AZ** .

Remove bearing cap (2).

Fig. 1136: Identifying Bearing Cap And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove roller tappet (1).

Unfasten screws (2).

Tightening torque: **11 31 1AZ** .

Remove high-pressure pump bracket (3).

Fig. 1137: Identifying Roller Tappet And High-Pressure Pump Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1 and 2) by half a rotation.

cardiagn.com

Tightening torque: **11 31 1AZ** .

Fig. 1138: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:	Marks of intake and exhaust camshafts are different. Mixing up the intake and exhaust camshaft will result in **engine damage.** A = Exhaust camshaft. E = Intake camshaft

Fig. 1139: Identifying Exhaust And Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:	Removal on engine: Set engine to ignition TDC at cylinder No. 1. Removed cylinder head: When using special tool **11 9 000** , it will be necessary to remove the aluminum strip. Order number: 83 30 0494 362

Installation note:

Prior to installation of exhaust camshaft, ensure proper installation position of rocker arm (1).

Fig. 1140: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Insert exhaust camshaft so that the data code (1) on the mounting flats faces up.

NOTE: **Graphic of intake camshaft N43**

Fig. 1141: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

The cam (1) at cylinder 4 points downward at an angle.

Fig. 1142: Identifying Cam Of Cylinder
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 028 REPLACING EXHAUST CAMSHAFT (N47 D20 O1)

Special tools required:

- **11 6 480**

Necessary preliminary work:

- **REMOVE CYLINDER HEAD COVER**.

Crank engine with special tool **11 6 480** to TDC firing position of cylinder no. 1.

IMPORTANT: Do not turn the engine **against the direction of travel** .

cardiagn.com

Fig. 1143: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Check position of exhaust and intake camshafts (see **Fig. 1144**).

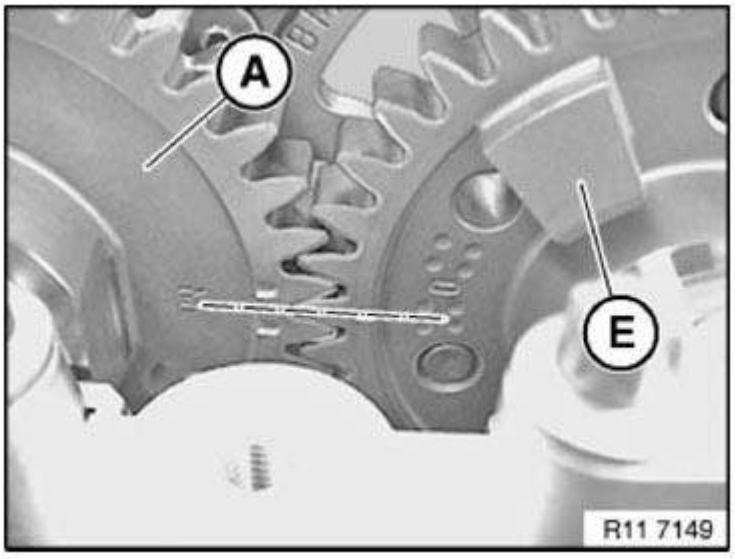


Fig. 1144: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Remove exhaust camshaft.

NOTE: It is not necessary to adjust the engine timing in order to remove the exhaust camshaft.

Release bearing caps A1 to A5 by 1/2 a turn at a time, working from the outside inwards.

Feed exhaust camshaft upwards to remove.

Fig. 1145: Identifying Bearing Caps Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Preparation for installation:

Oil all bearing positions (1).

Fig. 1146: Lubricating All Bearing Positions
Courtesy of BMW OF NORTH AMERICA, INC.

Check installation position of the roller cam followers **(risk of damage!)** .

cardiagn.com

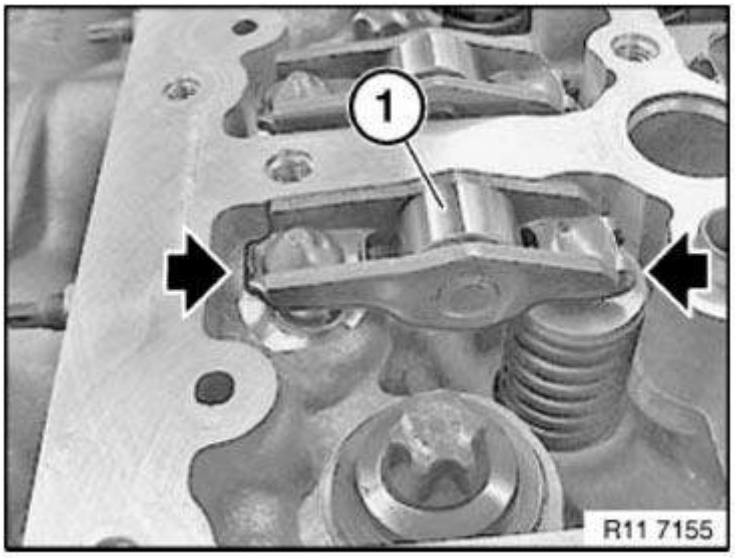


Fig. 1147: Identifying Roller Cam Followers
Courtesy of BMW OF NORTH AMERICA, INC.

Installing exhaust camshaft.

Insert exhaust camshaft (1) marked with (A).

Fig. 1148: Identifying Exhaust Camshaft Marking
Courtesy of BMW OF NORTH AMERICA, INC.

The marks on both camshafts (A and E) must agree when installing exhaust camshaft (A) (see **Fig. 1149**).

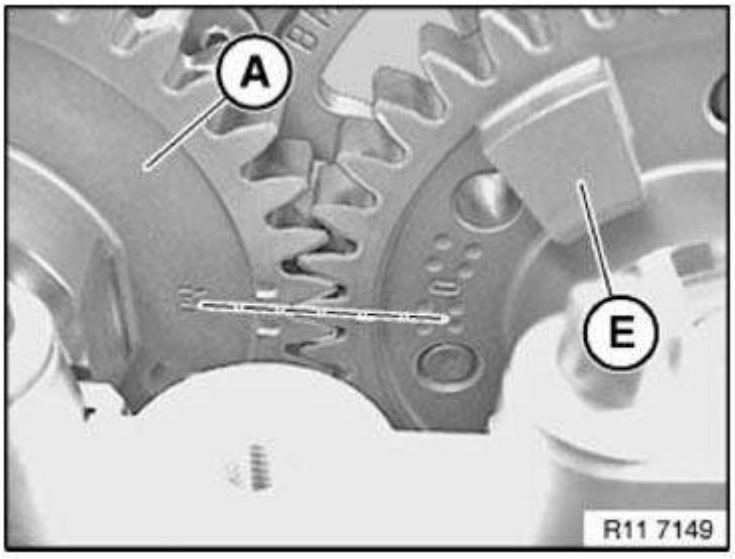


Fig. 1149: Identifying Camshaft Sprocket Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten bearing caps A1 to A5 by 1/2 a turn at a time on the camshaft carrier, working from the inside outwards.

Tightening torque: **11 31 2AZ** .

Fig. 1150: Identifying Bearing Cap Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Using special tool **11 6 480** , crank engine twice in direction of engine rotation until cylinder no. 1 is back in TDC firing position.

Check **CAMSHAFT ADJUSTMENT**.

Fig. 1151: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 31 051 REPLACING TIMING CHAIN (N20, N26)

Special tools required:

- **11 4 120**
- **11 9 260**
- **11 0 300**
- **11 8 180**
- **11 8 660**
- 83 30 2 212 831
- **2 212 825**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove all **SPARK PLUGS** .
- Remove **VIBRATION DAMPER**.
- Remove **CRANKSHAFT SEAL** at front
- Check **TIMING**.
- Removing **OIL SUMP**.

Push back the chain tensioner with the tensioning rail (1).

Secure chain tensioner using special tool **11 4 120** .

Fig. 1152: Securing Chain Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Engine removed:

Block crankshaft at flywheel with special tool **11 9 260** .

IMPORTANT: To release central bolt (1), remove special tool **11 0 300** .

Fig. 1153: Securing Flywheel With Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Vehicles with manual gearbox:

Attach special tool **11 8 180** to manual gearbox with existing transmission bolts (1).

Block crankshaft in direction of arrow with special tool.

cardiagn.com

Fig. 1154: Attaching Special Tool (11 8 180) To Manual Transmission
Courtesy of BMW OF NORTH AMERICA, INC.

Vehicles with automatic transmission:

Block crankshaft with special tool **11 8 660** .

Feed in special tool, slide screw forward and tighten.

Fig. 1155: Identifying Special Tool (2 222 742)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Breakaway torque of central bolt > 600 Nm.
A 3/4 inch tool is needed to release the central bolt.

Release central bolt (1).

Tightening torque: **11 21 1AZ** .

Fig. 1156: Releasing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Remove special tool (1) to release the central bolts on the intake and exhaust camshaft adjusters.

Remove **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

Order number: 83 30 2 212 831

Fig. 1157: Releasing Central Bolts On Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Remove **CHAIN TENSIONER**.

Screw in vibration absorber screws (1).

Pull out hub (2) on crankshaft forward in direction of arrow.

Fig. 1158: Pulling Hub On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Open screw plug (1).

Tightening torque: **11 31 8AZ** .

Fig. 1159: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release bearing journal (1) from timing chain module on cylinder head.

Tightening torque: **11 31 6AZ** .

Fig. 1160: Identifying Bearing Journal From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release screw plugs (1 and 2).

Tightening torque: 11 11 7AZ .

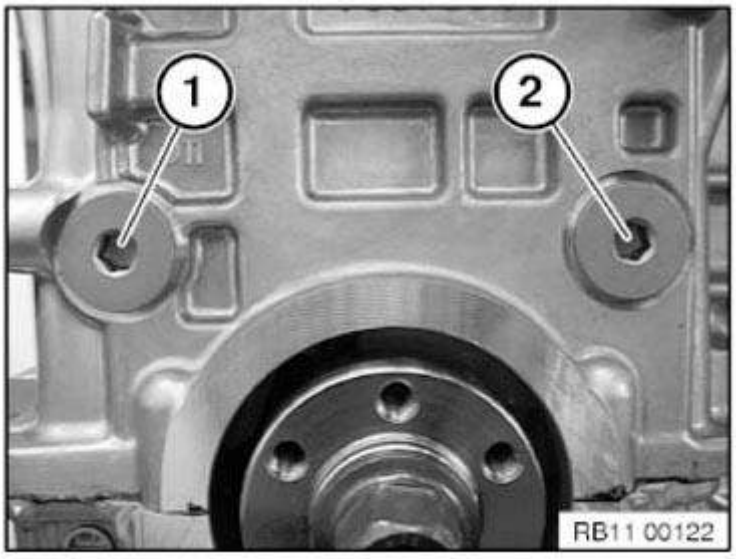


Fig. 1161: Identifying Screw Plugs
Courtesy of BMW OF NORTH AMERICA, INC.

Release bearing journal (1) on left and right of timing chain module for timing chain on crankcase.

Tightening torque: 11 31 5AZ .

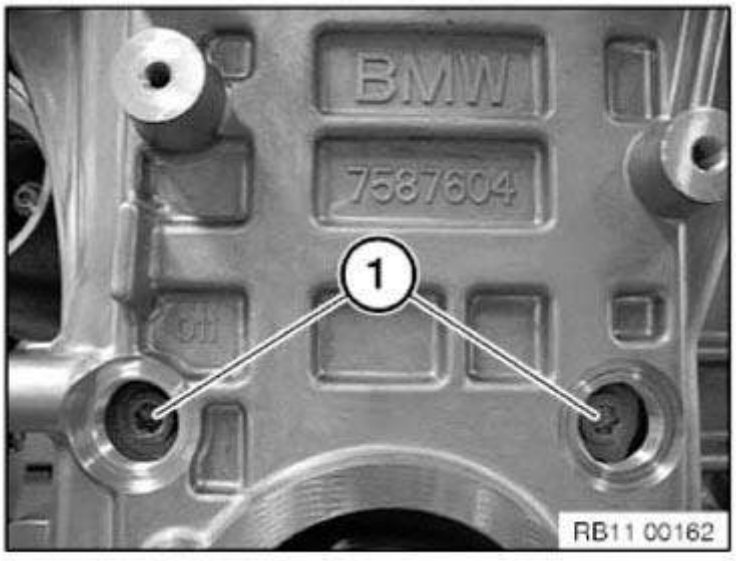


Fig. 1162: Identifying Bearing Journal From Chain Module For Timing Chain On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1) from timing chain module on cylinder head.

Tightening torque: 11 31 4AZ .

Remove chain module with timing chain and camshaft sprocket upwards.

cardiagn.com

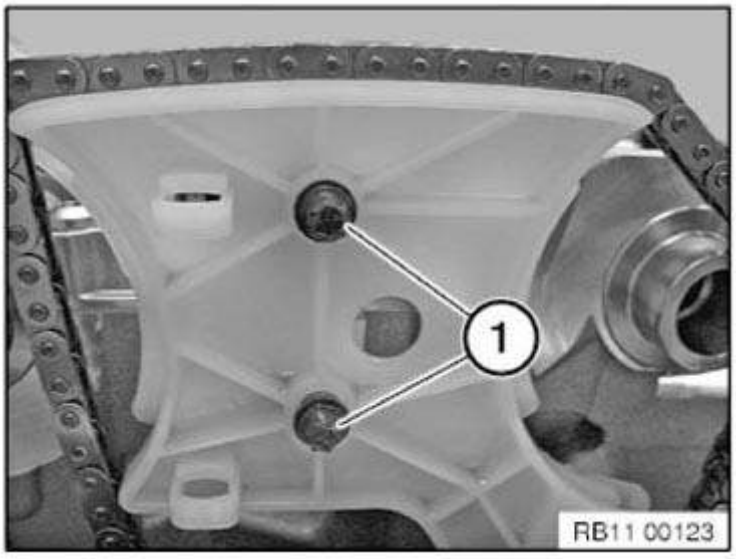


Fig. 1163: Identifying Bolts From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Remove timing chain module (1) upward.

Fig. 1164: Removing Timing Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Note direction of installation of camshaft sprocket (2). Collar (see arrow) on camshaft sprocket (2) points to **engine** . Incorrect assembly will result in **engine damage** .

Fig. 1165: Identifying Collar On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Pull timing chain upwards until camshaft sprocket engages chain guide (1).

Install timing chain and camshaft sprocket in this position.

Installation note:

Permanently hold timing chain under tension. Timing chain may jam on chain guide (1).

Fig. 1166: Identifying Timing Chain And Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen sealing cap using a screwdriver.

Fig. 1167: Loosening Sealing Cap Using Screwdriver
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Turn engine at central bolt until special tool **2 212 825** can be positioned in counterbalance shaft.

Secure special tool **2 212 825** to oil pump housing with screw (1).

cardiagn.com

Fig. 1168: Identifying Special Tool (2 212 825), Oil Pump Housing And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Fit hub and central bolt (1).

Fig. 1169: Identifying Hub And Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Remove special tool **11 4 120** .

Fig. 1170: Removing Special Tool (11 4 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Insert central bolt (1) with hub for crankshaft.

Tighten down central bolt (1).

Tightening torque: **11 21 1AZ** .

Install **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

Fig. 1171: Inserting Central Bolt With Hub For Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Crank engine twice.

Check **TIMING**.

Replace front **CRANKSHAFT SEAL**.

Assemble engine.

11 31 051 REPLACING TIMING CHAIN (N52T)

Special tools required:

- **00 9 140**
- **11 0 300**
- **11 4 280**
- **11 4 281**
- **11 4 282**
- **11 4 283**
- **11 4 360**
- **11 4 362**
- **11 5 200**
- **11 9 280**

Necessary preliminary work:

- Remove **CYLINDER HEAD COVER**
- Remove all **SPARK PLUGS** .
- Remove **CHAIN TENSIONER**.

cardiagn.com

- Remove **CRANKSHAFT SEAL** at front
- Remove drive belt **TENSIONER**
- Remove **VIBRATION DAMPER**

Remove fastener (1) in direction of arrow.

Installation note:

Install fastener (1) with bore hole facing outwards.

Fig. 1172: Removing Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Rotate crankshaft at central bolt into TDC position.

Slide special tool **11 0 300** in direction of arrow into dowel hole and secure crankshaft.

IMPORTANT: On vehicles with automatic transmission, there is a large bore hole for the TDC position shortly before the dowel bore. This bore hole can be confused with the dowel bore.

Fig. 1173: Securing Flywheel Using Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

If the flywheel is secured in the correct dowel hole with special tool **11 0 300** , the engine can no longer be moved at the central bolt.

IMPORTANT: Do not remove special tool **11 0 300** to release central bolt (1).
Employ a **second** person for gripping when releasing central bolt (1).

Screw special tool **11 9 280** onto hub of vibration damper.

Release central screw (1).

Tightening torque: **11 21 1AZ** .

Remove hub towards front.

Fig. 1174: Removing Central Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Open plug (1).

Tightening torque: **11 31 5AZ** .

Fig. 1175: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Open plug (1).

Tightening torque: **11 11 7AZ** .

Installation note:

Replace aluminum screws.

cardiagn.com

Fig. 1176: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release bearing pin (1) from timing chain module on cylinder head.

Tightening torque: **11 31 5AZ** .

Fig. 1177: Releasing Bearing Pin From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Release bearing pin (1) from timing chain module on crankcase.

Tightening torque: **11 31 4AZ** .

Fig. 1178: Releasing Bearing Pin From Timing Chain Module On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Install special tool **11 4 280** to release the central bolts on the intake and exhaust camshaft adjusters.

Secure special tool **11 4 283** with bolts (1) to cylinder head.

NOTE: Fit special tool 11 4 282 underneath on side of intake camshaft.

Fig. 1179: Fitting Special Tool (11 4 282) Underneath On Side Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Mount special tool **11 4 281** on intake and exhaust camshafts.

Do not remove special tool **11 4 280** .

Remove **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

Release bolts (1) from timing chain module on cylinder head.

Tightening torque: **11 31 3AZ** .

Remove chain module with timing chain and camshaft sprocket upwards in direction of arrow.

Fig. 1180: Releasing Bolts From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Note installation direction of sprocket (2).
Collar (see arrow) on sprocket (2) points to **engine** .
Incorrect assembly will result in **engine damage** .

Fig. 1181: Identifying Collar On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Pull timing chain (1) upwards until camshaft sprocket (2) engages chain guide (3).

Install timing chain (1) and camshaft sprocket (2) in this position.

Installation note:

cardiagn.com

Always hold timing chain (1) under tension. Timing chain (1) may jam on chain guide (3).

Fig. 1182: Installing Timing Chain And Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Install hub with central bolt.

Tighten down screws (1) with special tool **11 5 200** to hub.

Fig. 1183: Tightening Screws Of Hub
Courtesy of BMW OF NORTH AMERICA, INC.

Remove **TENSIONER** for drive belt.

Screw in special tool **11 4 362** from special tool set **11 4 360** .

Mount special tool **11 9 280** on **11 5 200** .

Support special tool **11 9 280** on special tool **11 4 360** .

Special tool **11 0 300** secures crankshaft.

Tighten central bolt to jointing torque.

Tightening torque: **11 21 1AZ** .

Mark central bolt and hub with paint.

Fig. 1184: Tightening Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Mark special tools with colored line (1).

See **Fig. 1185**.

IMPORTANT: Do not **remove the special tool while tightening the central bolt to torsion angle. Risk of damage!**

If necessary, tighten central bolt to angle of rotation with special tool 00 9 140 .

Tightening torque: 11 21 1AZ .

Fig. 1185: Identifying Colored Line
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten central bolt with a second person helping.

Tightening torque: **11 21 1AZ** .

Install **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

Install **CHAIN TENSIONER**.

Fig. 1186: Tightening Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Crank engine twice.

Check **TIMING**.

If necessary, adjust **VALVE TIMING**.

Assemble engine.

11 31 051 REPLACING TIMING CHAIN (N55) FROM MARCH 2012

Special tools required:

- **11 0 300**
- **11 4 280**
- **11 8 180**
- **11 8 660**
- **11 9 260**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove all **SPARK PLUGS** .
- Remove **CRANKSHAFT SEAL** at front.
- Remove **TENSIONING DEVICE** for drive belt.
- Remove **VIBRATION DAMPER**.
- Check **TIMING**.
- Remove **SEALING COVER** for vacuum pump.
- Remove **SEALING CAP** of chain tensioner for oil pump.

Engine removed:

Block crankshaft with special tool **11 9 260** .

IMPORTANT: To release central bolt (1), remove special tool **11 0 300** .

Fig. 1187: Releasing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: When central bolt of crankshaft is released, there is no longer a secure connection to timing drive.

Mark position of crankshaft using a colored mark (1).

This will make future insertion of special tool **11 0 300** easier.

Fig. 1188: Identifying Crankshaft Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Vehicles with automatic transmission:

Block crankshaft with special tool **11 8 660** .

Fig. 1189: Identifying Special Tool (11 8 660)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Vehicles with manual gearbox:

Attach special tool **11 8 180** to manual transmission with existing transmission bolts (1).

Block crankshaft in direction of arrow with special tool.

Fig. 1190: Attaching Special Tool (11 8 180) To Manual Transmission
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before releasing the central bolt, the hydraulic chain tensioner must be drained.

Carefully press tensioning rail (1) with a suitable screwdriver (2) in direction of arrow.

As the oil pressure in the chain tensioner can only be drained pulsating, the tensioning rail (1) must be pressed several times.

Fig. 1191: Pressing Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Press the tensioning rail (1) and hold down.

Fix chain tensioner piston in position with a suitable lock pin (2).

Fig. 1192: Adjusting Chain Tensioner Piston Position
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Breakaway torque of the central bolt > 600 Newton meters
A 3/4-inch tool (large powered square) is required to release central bolt.

Release central bolt (1) with 3/4-inch tool (2).

Tightening torque: **11 21 1AZ** .

Fig. 1193: Removing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Remove **CHAIN TENSIONER**.

Screw in vibration absorber screws (1).

Move hub (2) on crankshaft forward in direction of arrow to remove.

Fig. 1194: Moving Hub On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Open screw plug (1).

Tightening torque: **11 31 8AZ** .

Fig. 1195: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Open screw plug (1).

Tightening torque: **11 11 7AZ** .

Installation note:

Replace aluminum screws.

Fig. 1196: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release bearing journal (1) from timing chain module on cylinder head.

Tightening torque: **11 31 6AZ** .

Fig. 1197: Releasing Bearing Journal From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Install special tool **11 4 280** to release the central bolts on the intake and exhaust camshaft adjusters.

Remove **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

Fig. 1198: Releasing Central Bolts On Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Release bearing journal (1) from timing chain module on crankcase.

Tightening torque: **11 31 5AZ** .

Fig. 1199: Releasing Bearing Journal From Timing Chain Module On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1) from timing chain module on cylinder head.

Tightening torque: **11 31 4AZ** .

Remove chain module with timing chain and camshaft sprocket upwards in direction of arrow.

NOTE: **Graphic N52.**

Fig. 1200: Releasing Bolts From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Note direction of installation of camshaft sprocket (2).
Collar (see arrow) on camshaft sprocket (2) points to **engine** .
Incorrect assembly will result in **engine damage** .

Fig. 1201: Locating Collar On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Pull timing chain (1) upwards until camshaft sprocket (2) engages chain guide (3).

Install timing chain (1) and sprocket (2) in this position.

cardiagn.com

Installation note:

Always hold timing chain (1) under tension. Timing chain (1) may jam on chain guide (3).

Fig. 1202: Installing Timing Chain And Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Insert central bolt (1) with hub for crankshaft.

Tighten down central bolt (1).

Tightening torque: **11 21 1AZ** .

Install **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

Install **CHAIN TENSIONER**.

Fig. 1203: Inserting Central Bolt With Hub For Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Crank engine twice.

Check **TIMING**.

If necessary, adjust **VALVE TIMING**.

Replace front **CRANKSHAFT SEAL**.

Assemble engine.

11 31 051 REPLACING TIMING CHAIN (N55) UP TO MARCH 2012

Special tools required:

- **11 0 300**
- **11 4 280**
- **11 8 180**
- **11 8 660**
- **11 9 260**
- **11 4 120**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove all **SPARK PLUGS** .
- Remove **CRANKSHAFT SEAL** at front.
- Remove **TENSIONING DEVICE** for drive belt.
- Remove **VIBRATION DAMPER**.
- Check **TIMING**.
- Remove **SEALING CAP** for vacuum pump.

Engine removed:

Block crankshaft with special tool **11 9 260** .

cardiagn.com

IMPORTANT: To release central bolt (1), remove special tool **11 0 300** .

Fig. 1204: Releasing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: When central bolt of crankshaft is released, there is no longer a secure connection to timing drive.

Mark position of crankshaft using a colored mark (1).

This will make future insertion of special tool **11 0 300** easier.

Fig. 1205: Identifying Crankshaft Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Vehicles with automatic transmission:

Block crankshaft with special tool **11 8 660** .

Fig. 1206: Identifying Special Tool (11 8 660)
Courtesy of BMW OF NORTH AMERICA, INC.

Vehicles with manual gearbox:

Attach special tool **11 8 180** to manual transmission with existing transmission bolts (1).

Block crankshaft in direction of arrow with special tool.

Fig. 1207: Attaching Special Tool (11 8 180) To Manual Transmission
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before releasing the central bolt, the chain tensioner must be relieved of tension.

Press timing chain with chain tensioner (1) in direction of arrow.

Disconnect timing chain with special tool **11 4 120** .

Fig. 1208: Disconnecting Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Breakaway torque of the central bolt > 600 Newton meters
A 3/4-inch tool (large powered square) is required to release central bolt.

Release central bolt (1) with 3/4-inch tool (2).

Tightening torque: **11 21 1AZ** .

Fig. 1209: Removing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Remove **CHAIN TENSIONER**.

Screw in vibration absorber screws (1).

cardiagn.com

Move hub (2) on crankshaft forward in direction of arrow to remove.

Fig. 1210: Moving Hub On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Open screw plug (1).

Tightening torque: **11 31 8AZ** .

Fig. 1211: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Open screw plug (1).

Tightening torque: **11 11 7AZ** .

Installation note:

Replace aluminum screws.

Fig. 1212: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release bearing journal (1) from timing chain module on cylinder head.

Tightening torque: **11 31 6AZ** .

Fig. 1213: Releasing Bearing Journal From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Install special tool **11 4 280** to release the central bolts on the intake and exhaust camshaft adjusters.

Remove **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

Fig. 1214: Releasing Central Bolts On Intake And Exhaust Camshaft Adjusters
Courtesy of BMW OF NORTH AMERICA, INC.

Release bearing journal (1) from timing chain module on crankcase.

Tightening torque: **11 31 5AZ** .

Fig. 1215: Releasing Bearing Journal From Timing Chain Module On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts (1) from timing chain module on cylinder head.

Tightening torque: **11 31 4AZ** .

Remove chain module with timing chain and camshaft sprocket upwards in direction of arrow.

NOTE: **Graphic N52.**

cardiagn.com

Fig. 1216: Releasing Bolts From Timing Chain Module On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Note direction of installation of camshaft sprocket (2).
IMPORTANT: Collar (see arrow) on camshaft sprocket (2) points to **engine** .
Incorrect assembly will result in **engine damage** .

Fig. 1217: Locating Collar On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Pull timing chain (1) upwards until camshaft sprocket (2) engages chain guide (3).

Install timing chain (1) and sprocket (2) in this position.

Installation note:

Always hold timing chain (1) under tension. Timing chain (1) may jam on chain guide (3).

Fig. 1218: Installing Timing Chain And Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Insert central bolt (1) with hub for crankshaft.

Tighten down central bolt (1).

Tightening torque: **11 21 1AZ** .

Install **INTAKE AND EXHAUST CAMSHAFT ADJUSTERS**.

Install **CHAIN TENSIONER**.

Fig. 1219: Inserting Central Bolt With Hub For Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Crank engine twice.

Check **TIMING**.

If necessary, adjust **VALVE TIMING**.

Replace front **CRANKSHAFT SEAL**.

Assemble engine.

11 31... SERVICE SOLUTION - REPLACING INTAKE CAMSHAFT (N20, N26)

Special tools required:

- **11 7 110**
- **11 4 481**

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**

Necessary preliminary tasks:

cardiagn.com

- Remove **DME CONTROL UNIT** .
- Remove **CYLINDER HEAD COVER**.
- Check **TIMING**.
- Remove **INTAKE ADJUSTER**.

Removal:

NOTE: **Injector shafts shown removed for purposes of clarity.**

IMPORTANT: Secure eccentric shaft (1) with open-end spanner (3) (risk of return stroke).

Slowly adjust eccentric shaft (1) to minimum lift via servomotor using 4-mm hexagon socket wrench (2) and open-end spanner (3).

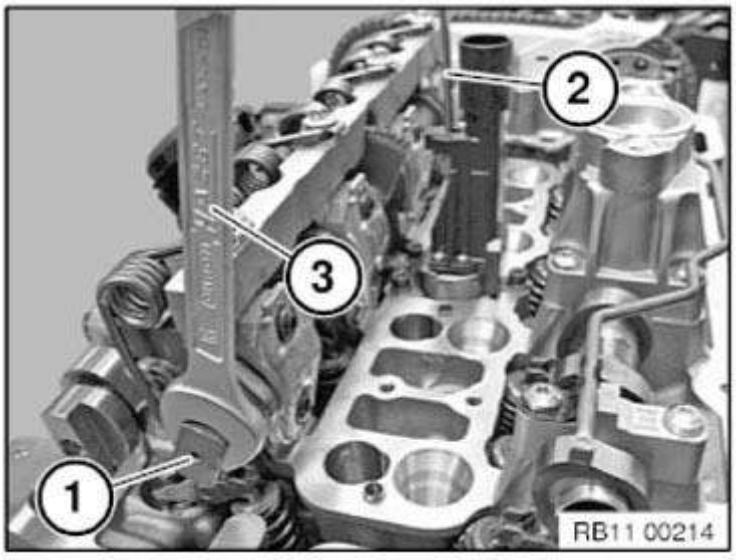


Fig. 1220: Securing Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolt (1) on the oil spray nozzle.

Tightening torque: **11 37 4AZ** .

Unclip oil spray nozzle (2) from the bracket on the actuator drive (3) in direction of arrow.

Fig. 1221: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 7 110** on return spring (1) (see arrows).

Fig. 1222: Positioning Special Tool (11 7 110) On Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**

Place special tool **11 7 110** flat on cylinder head.

Turn knurled screw (1) in direction of arrow until both clamping levers secure return spring in gate.

cardiagn.com

Fig. 1223: Turning Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Return spring is correctly preloaded when both clamping levers are parallel to guide block.

Fig. 1224: Sliding Clamping Levers
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!

Left and right return springs (1) must be positioned in lateral guide of special tool **11 7 110** .

Fig. 1225: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

Preload return spring with lever (1) on special tool **11 7 110** in direction of arrow.

Fig. 1226: Preloading Return Spring With Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Lock special tool **11 7 110** with catch on lever (1).

IMPORTANT: Screw connection on throttle return spring can only be released with secured special tool **11 7 110** .

Fig. 1227: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Fig. 1228: Releasing Screw
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**
Lever (1) is preloaded.

IMPORTANT: Improper handling. **Risk of damage!**

Secure lever (1).

Press back latching hook (2).

Return spring tension can now be released.

Fig. 1229: Pressing Back Latching Hook
Courtesy of BMW OF NORTH AMERICA, INC.

Release knurled screw (1) on special tool **11 7 110** in direction of arrow.

Fig. 1230: Releasing Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release special tool **11 7 110** in direction of arrow from return spring (1).

Fig. 1231: Removing Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Return springs (1) remain on the engine.

Fig. 1232: Identifying Return Springs
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: All bearing caps are identified with numbers from 1 to 4.

The front bearing cap is a thrust bearing and does not have an identification.

Release screws on all bearing caps (1 to 10).

Set down all bearing caps in a tidy and orderly fashion on special tool **11 4 481** .

Fig. 1233: Identifying Screws On Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do **not** remove intermediate levers (2). Mixing up the intermediate levers (2) will cause the engine to suffer idle-speed fluctuations.

Remove intake camshaft.

Fig. 1234: Identifying Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

IMPORTANT: Marks of intake and exhaust camshafts are different.
Mixing up the intake and exhaust camshaft will result in **engine damage** .
A Exhaust camshaft.
E Intake camshaft

Fig. 1235: Identifying Exhaust And Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Insert intake camshaft so that data code (1) on mounting flats points upwards.

Fig. 1236: Identifying Camshaft Data Code
Courtesy of BMW OF NORTH AMERICA, INC.

Position intake camshaft so that cams point downward at an angle and to the left.

Fig. 1237: Locating Cams Point Of Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: All bearing caps are identified with numbers from 1 to 4.

The front bearing cap is a thrust bearing and does not have an identification.

cardiagn.com

Insert screws on all bearing caps from (10) to (1).

Tightening torque: **11 31 3AZ** .

Fig. 1238: Identifying Screws On Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 7 110** on return spring.

Fig. 1239: Positioning Special Tool On Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Clamp throttle return spring with knurled screw (1) in direction of arrow.

Fig. 1240: Removing Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Return spring (1) is positioned correctly when latching hooks surround return spring (1).

Fig. 1241: Positioning Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**
Check return spring on intermediate lever to ensure correct installation position.

Press special tool **11 7 110** to stop in direction of arrow.

Fig. 1242: Checking Return Spring On Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Install return spring (2) on gate.

IMPORTANT: Insert return spring (2) in intermediate lever (1) (see arrow).
Check that rocker arm (3) is in correct installation position.

Fig. 1243: Identifying Throttle Return Spring, Intermediate Lever And Roller Cam Follower
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Check that intermediate lever (1) is installed in correct position on eccentric shaft (2).

Fig. 1244: Identifying Intermediate Lever And Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Observe thread on cylinder head. **Risk of damage!**

Tighten bolt (1).

Tightening torque: **11 37 2AZ** .

cardiagn.com

Fig. 1245: Identifying Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**
Lever (1) is preloaded.

IMPORTANT: Improper handling. **Risk of damage!**

Secure lever (1).

Press back latching hook (2).

Return spring tension can now be released.

Fig. 1246: Pressing Back Latching Hook
Courtesy of BMW OF NORTH AMERICA, INC.

Check installation position of intermediate lever and return spring again, remove special tool **11 7 110** .

Retract oil spray nozzle (2) on actuator drive (3).

Engage bolt (1) and release back to 90Â°.

For exact positioning of the oil spray nozzle (2) audibly clip it in at the top.

Tightening torque: **11 37 4AZ** .

Fig. 1247: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Required follow-up work:

Install **INTAKE ADJUSTER**.

Adjust **VALVE TIMING**.

Fit **CYLINDER HEAD COVER**.

Install **DME CONTROL UNIT** .

ROCKER ARM WITH BEARING MOUNT

11 33 050 REMOVING AND INSTALLING OR REPLACING ALL ROCKER ARMS (N20, N26)

Special tools required:

- **11 4 481**
- **11 4 482**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove **INTERMEDIATE LEVER**.
- Remove **EXHAUST CAMSHAFT**.

Roller cam followers (1) on intake side are divided into bearing classes.

cardiagn.com

IMPORTANT: The tolerance classes are marked according to the graphic in numbers from 1 to 5.
Already used roller cam followers (1) may only be reused in the same position.

Fig. 1248: Identifying Roller Cam Followers
Courtesy of BMW OF NORTH AMERICA, INC.

Detach roller cam followers (1) from hydraulic valve clearance compensating element and remove.

Place all roller cam followers (1) in neat order on special tool **11 4 481** .

Installation note:

Prior to installation of intermediate levers, ensure proper installation position of roller cam followers (1).

Classification of roller cam follower intake.

Standard: Number 3. standard.

Number 2. slow idle.

Number 4. fast idle.

In case of repair: rough idling speed.

Repair: 1

Number 1. lower engine speed in idle.

Number 5. higher engine speed in idle.

Fig. 1249: Identifying Intake Roller Cam Follower Number (3)
Courtesy of BMW OF NORTH AMERICA, INC.

Detach roller cam follower (1) on exhaust side from hydraulic valve clearance compensating element and remove.

Place all roller cam followers (1) in neat order on special tool **11 4 482** .

Installation note:

Prior to installation of exhaust camshaft, ensure proper installation position of roller cam followers (1).

Fig. 1250: Identifying Roller Cam Followers
Courtesy of BMW OF NORTH AMERICA, INC.

Remove hydraulic valve clearance compensating element (1) on intake side in direction of arrow.

Installation note:

If hydraulic valve clearance compensating elements (1) are reused, they must be placed together with rocker arms in neat order in special tool **11 4 481** .

Fig. 1251: Removing Compensating Element
Courtesy of BMW OF NORTH AMERICA, INC.

Remove hydraulic valve clearance compensating element (1) on exhaust side in direction of arrow.

cardiagn.com

Installation note:

If hydraulic valve clearance compensating elements (1) are reused, they must be placed together with rocker arms in neat order in special tool **11 4 482** .

Fig. 1252: Removing Compensating Element On Exhaust Side
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME; if necessary, readjust uniform mixture distribution.

11 33 062 REMOVING AND INSTALLING/REPLACING ALL HYDRAULIC VALVE CLEARANCE COMPENSATING ELEMENTS (N47 D20 O1)

Special tools required:

- **11 4 480**
- **11 5 320**
- **11 6 480**

Necessary preliminary work:

- Remove **CYLINDER HEAD COVER**.

Use special tool **11 6 480** to turn engine to TDC firing position of cylinder 1.

IMPORTANT: Do not turn the engine against the direction of travel.

Fig. 1253: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap of gear case cover.

Block crankshaft with cylinder no. 1 in TDC firing position with special tool **11 5 320** .

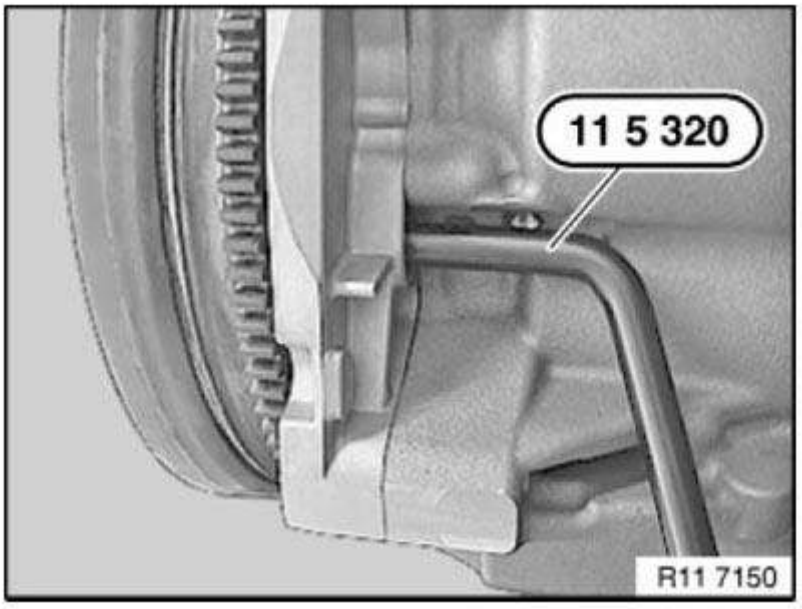


Fig. 1254: Identifying Special Tool (11 5 320)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release **CHAIN TENSIONER** (1).

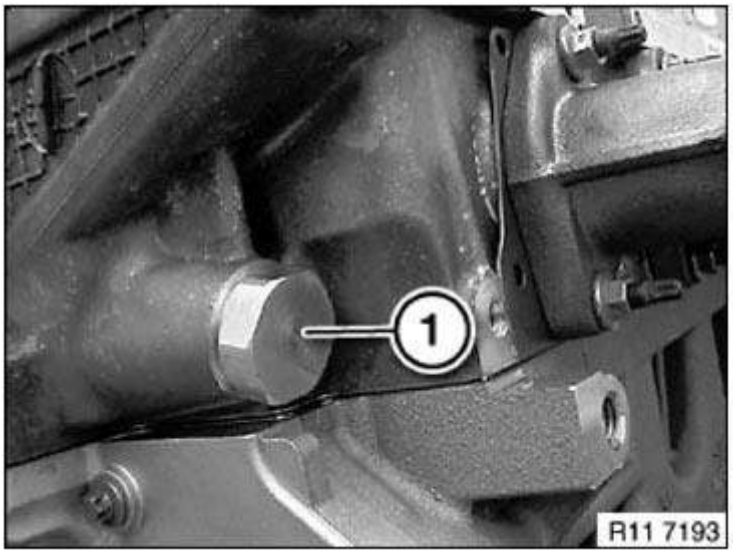


Fig. 1255: Identifying Chain Tensioner Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) on camshaft sprocket.

Remove camshaft sprocket from intake camshaft.

Pull camshaft sprocket out of timing chain and place it neatly on the special tool **11 4 480** .

Place timing chain at the cylinder head.

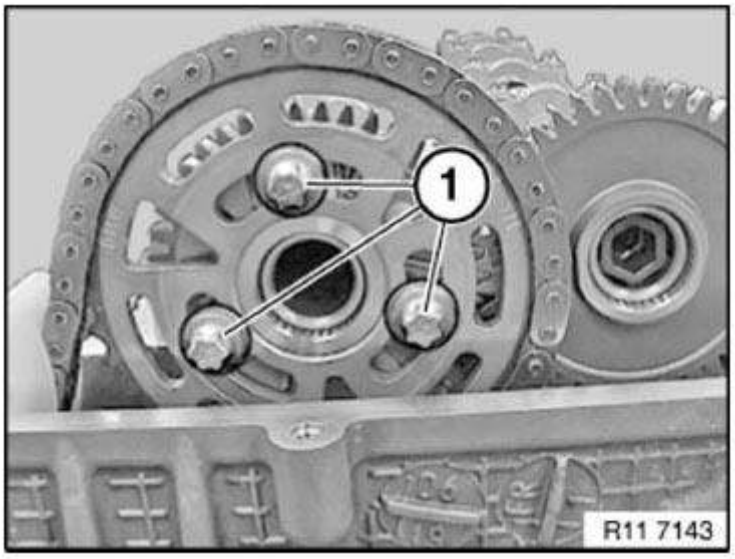


Fig. 1256: Identifying Screws On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Both camshafts can be removed with the camshaft carrier.

Release all bolts (1) from outside inwards.

Take off camshaft carrier by lifting it upwards.

cardiagn.com

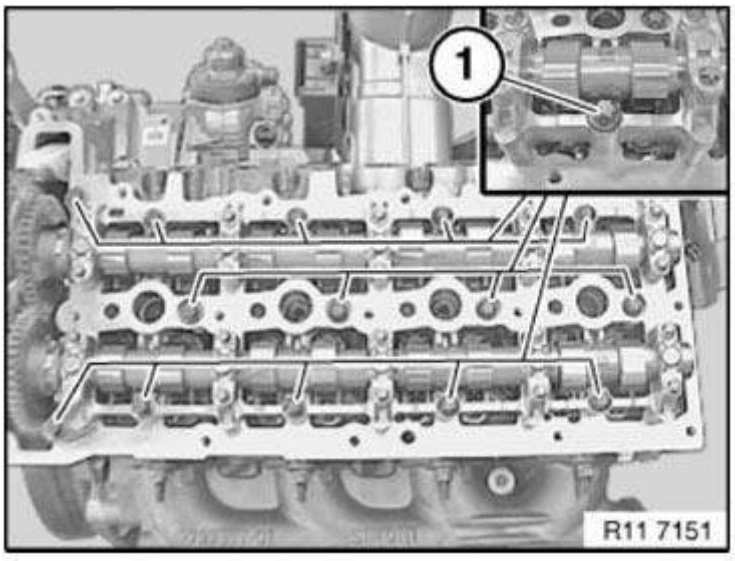


Fig. 1257: Identifying Camshaft Carrier Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Set down all rocker arms (1) on special tool **11 4 480** in neat order.

Installation note:

Already used rocker arms may be reused only in the same position.

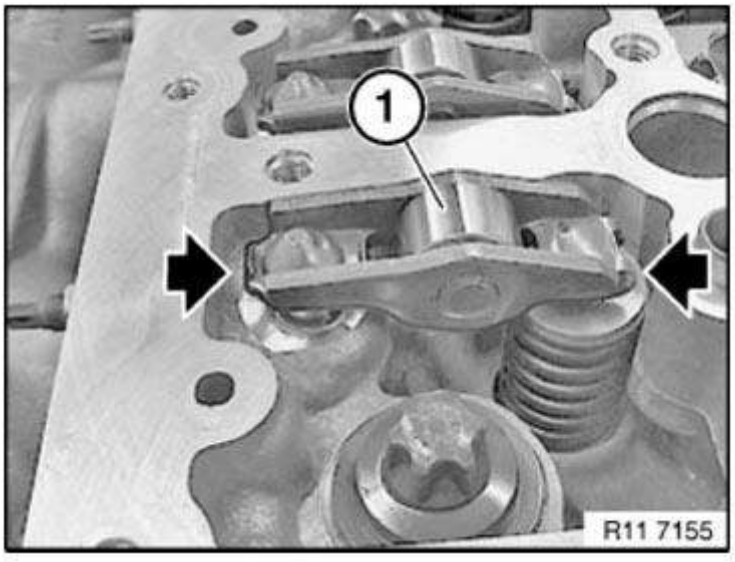


Fig. 1258: Identifying Roller Arm Followers
Courtesy of BMW OF NORTH AMERICA, INC.

Remove valve clearance compensating element (1) in direction of arrow.

Installation note:

If reusing valve clearance compensating elements (1), store them in an orderly fashion on special tool **11 4 480** .

Reuse valve clearance compensating elements in the same positions.

cardiagn.com

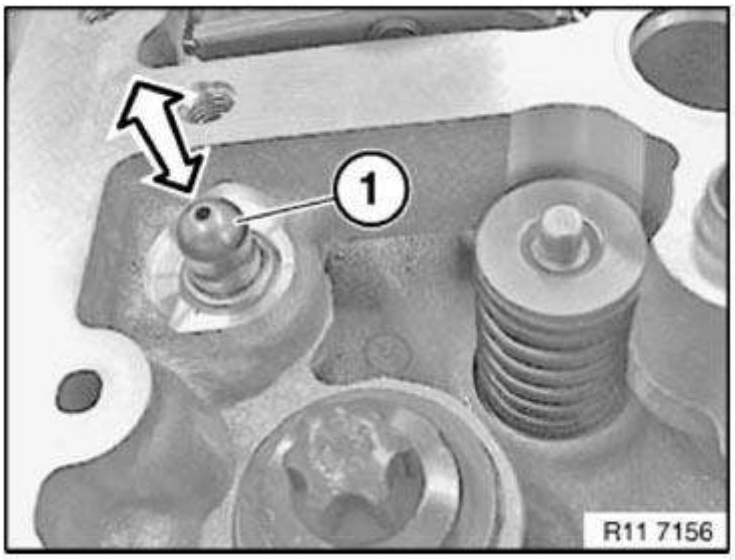


Fig. 1259: Identifying Compensating Element
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Make sure roller cam followers are in correct installation positions.

Place camshaft carrier on cylinder head.

Tighten bolts in sequence (1 to 14).

Tightening torque: **11 31 3AZ** .

NOTE: **Picture shows N47.**

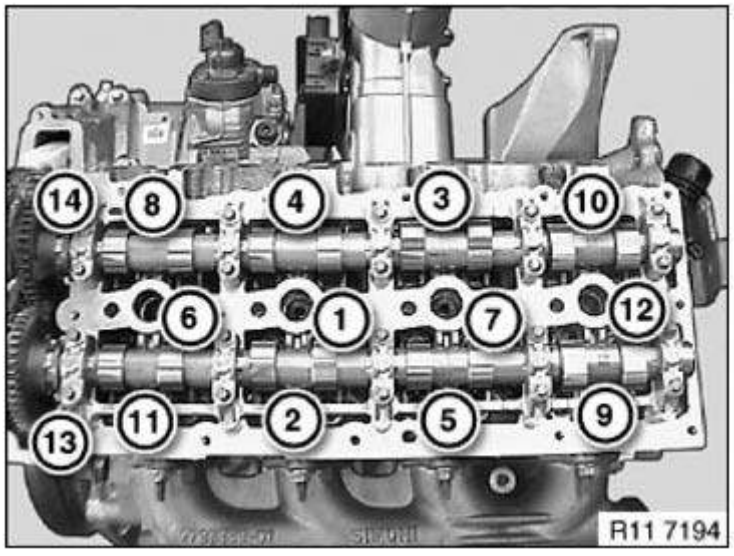


Fig. 1260: Camshaft Carrier On Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust **VALVE TIMING**.

Assemble engine.

11 33 062 REMOVING AND INSTALLING/REPLACING ALL ROCKER ARMS (N47 D20 O1)

cardiagn.com

Special tools required:

- 11 4 480
- 11 5 320
- 11 6 480

Necessary preliminary work:

- Remove CYLINDER HEAD COVER.

Crank engine with special tool 11 6 480 to TDC firing position of cylinder no. 1.

IMPORTANT: Do not turn the engine against the direction of travel.

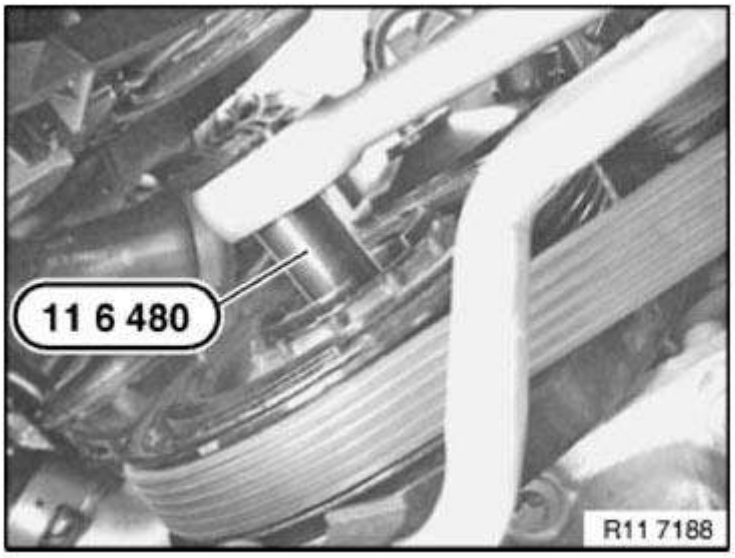


Fig. 1261: Identifying Special Tool (11 6 480)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap of gear case cover.

Block crankshaft with cylinder no. 1 in TDC firing position with special tool 11 5 320 .

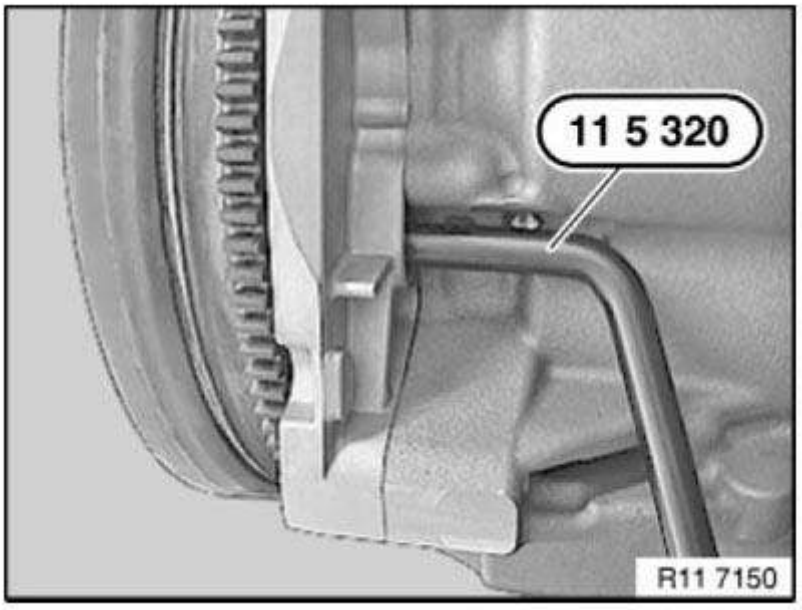


Fig. 1262: Identifying Special Tool (11 5 320)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Release **CHAIN TENSIONER (1)**.

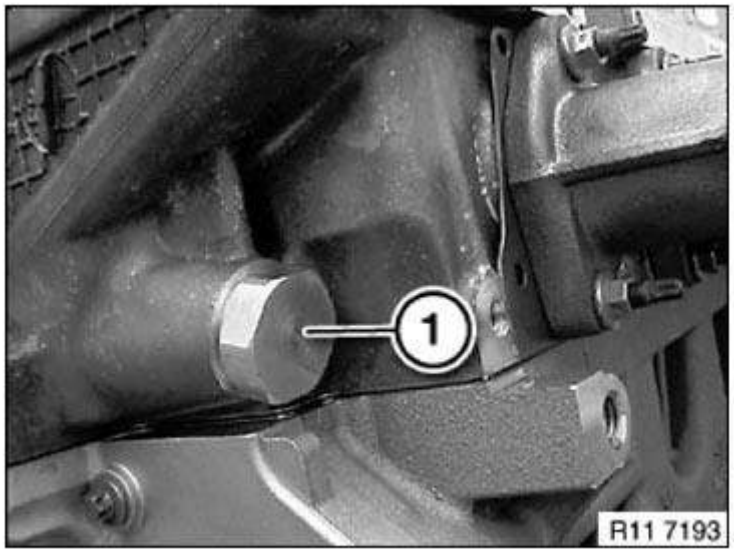


Fig. 1263: Identifying Chain Tensioner Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove camshaft sprocket from the intake camshaft and feed out of timing chain.

Place timing chain at the cylinder head.

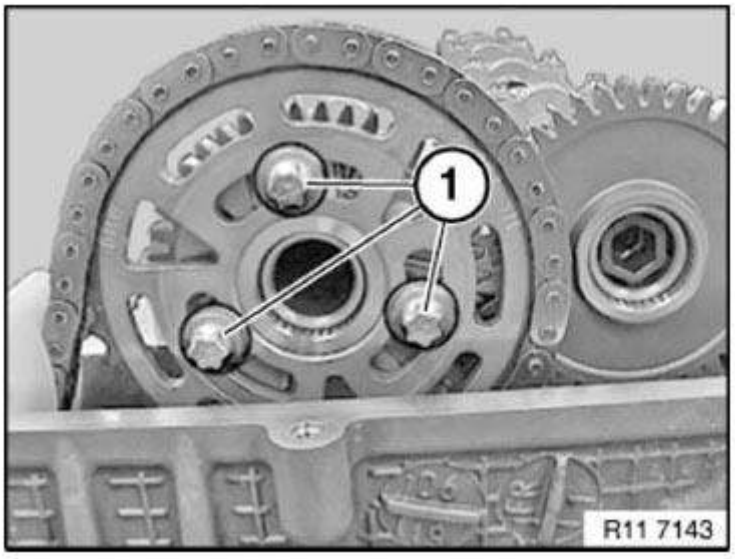


Fig. 1264: Identifying Screws On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Both camshafts can be removed with the camshaft carrier.

Release all bolts (1) from outside inwards.

cardiagn.com

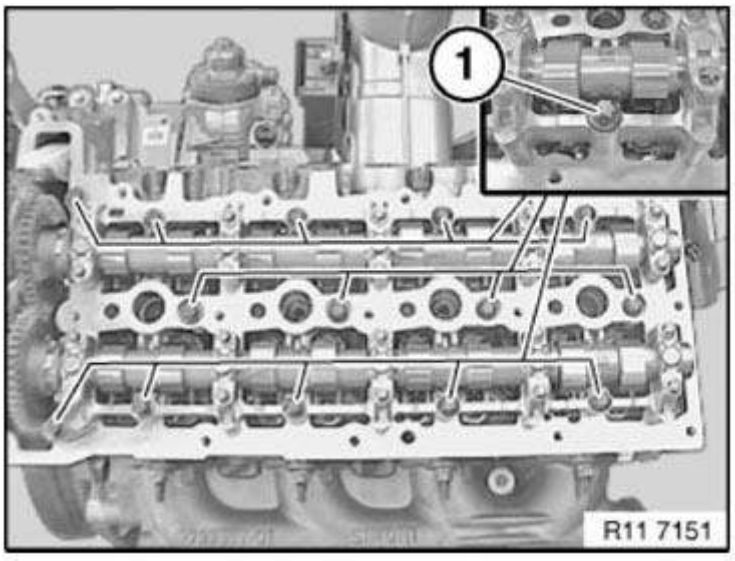


Fig. 1265: Identifying Camshaft Carrier Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Set down all rocker arms (1) on special tool **11 4 480** in neat order.

Installation note:

Already used rocker arms (1) may only be reused in the same position.

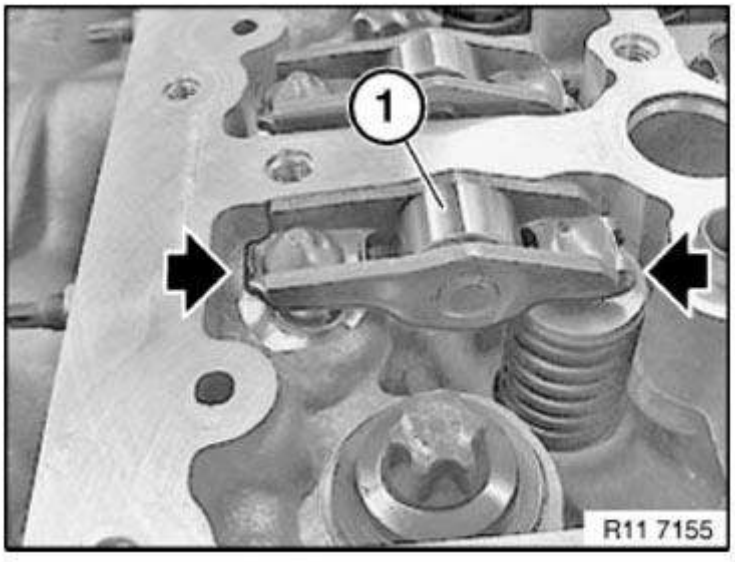


Fig. 1266: Locating Rocker Arms
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Make sure roller cam followers are in correct installation positions.

Place camshaft carrier on cylinder head.

Tighten bolts in sequence (1 to 14).

Tightening torque: **11 31 3AZ** .

cardiagn.com

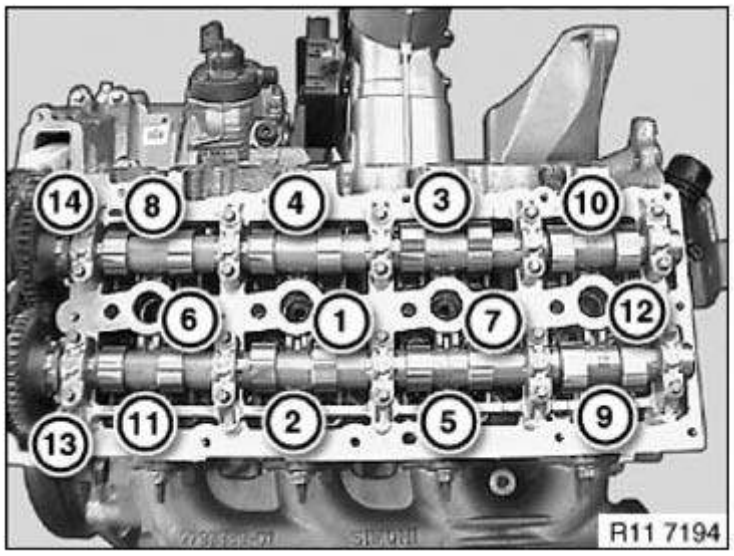


Fig. 1267: Camshaft Carrier On Cylinder Head Bolts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust **VALVE TIMING**.

Assemble engine.

11 33 050 REMOVING AND INSTALLING/REPLACING ALL ROCKER ARMS (N52T)

Special tools required:

- **11 4 480**

Necessary preliminary work:

- Remove **CYLINDER HEAD COVER**.
- Remove **INTERMEDIATE LEVER**.
- Remove **EXHAUST CAMSHAFT**.

IMPORTANT: Rocker arms (1) are divided into bearing categories.
The tolerance classes are marked according to the graphic in numbers from 1 to 5.
Already used rocker arms (1) may only be reused in the same position.

Fig. 1268: Identifying Rocker Arm
Courtesy of BMW OF NORTH AMERICA, INC.

Detach rocker arms (1) from HVCA element and remove.

Set down all rocker arms (1) in neat order in special tool **11 4 480** .

Installation note:

Before installing exhaust camshaft or intermediate levers, make sure rocker arms (1) are correctly seated.

Remove HVC element (1) in direction of arrow.

Installation note:

If hydraulic valve clearance compensating elements (1) are reused, they must be placed together with rocker arms in neat order in special tool **11 4 480** .

cardiagn.com

Fig. 1269: Removing HVC Element
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME; if necessary, readjust uniform mixture distribution.

11 33 050 REMOVING AND INSTALLING/REPLACING ALL ROCKER ARMS (N55)

Special tools required:

- 11 4 481
- 11 4 482

Necessary preliminary tasks:

- Remove CYLINDER HEAD COVER.
- Remove INTERMEDIATE LEVER.
- Remove EXHAUST CAMSHAFT.

IMPORTANT: Roller cam followers (1) on intake side are divided into bearing classes. The tolerance classes are marked according to the graphic in numbers from 1 to 5. Already used roller cam followers (1) may only be reused in the same position.

Fig. 1270: Identifying Roller Cam Followers
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen and remove roller cam followers (1) from hydraulic valve clearance compensating element.

Place all roller cam followers (1) in neat order on special tool 11 4 481 .

Installation note:

Prior to installation of intermediate levers, ensure proper installation position of roller cam followers (1).

Classification of roller cam follower intake.

Standard: Number 3. standard.

Number 2. slow idle.

Number 4. fast idle.

In case of repair: rough idling speed.

Repair: 1

Number 1. slow speed in idle.

Number 5. high speed in idle.

Fig. 1271: Identifying Intake Roller Cam Follower Number (3)
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen and remove roller cam followers (1) on exhaust side from hydraulic valve clearance compensating element.

cardiagn.com

Place all roller cam followers (1) in neat order on special tool **11 4 482** .

Installation note:

Prior to installation of exhaust camshaft, ensure proper installation position of roller cam followers (1).

Fig. 1272: Identifying Roller Cam Followers
Courtesy of BMW OF NORTH AMERICA, INC.

Remove hydraulic valve clearance compensating element (1) on intake side in direction of arrow.

Installation note:

If hydraulic valve clearance compensating elements (1) are reused, they must be placed together with rocker arms in neat order in special tool **11 4 481** .

Fig. 1273: Removing Compensating Element
Courtesy of BMW OF NORTH AMERICA, INC.

Remove hydraulic valve clearance compensating element (1) on exhaust side in direction of arrow.

Installation note:

If hydraulic valve clearance compensating elements (1) are reused, they must be placed together with rocker arms in neat order in special tool **11 4 482** .

Fig. 1274: Removing Compensating Element On Exhaust Side
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME; if necessary, readjust uniform mixture distribution.

VALVES WITH SPRINGS

11 34 552 REMOVING AND INSTALLING/REPLACING ALL VALVES (N20, N26)

Special tools required:

- **11 4 481**
- **11 4 482**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD**.
- Remove **INTERMEDIATE LEVER**.
- Remove **ECCENTRIC SHAFT**.
- Remove **INTAKE CAMSHAFT**.
- Remove **EXHAUST CAMSHAFT**.
- Remove **ROCKER ARM**.
- Remove **VALVE SPRINGS**.
- Remove **VALVE STEM SEALS**.

Arrangement:

cardiagn.com

1. Intake valve 5 mm dia.
2. Valve stem seal with lower spring cup
3. Valve spring
4. Upper spring cup
5. Valve keys

If the valves are to be reused, they must be placed in neat order in special tool **11 4 481** .

Fig. 1275: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

Arrangement:

1. Discharge valve 6 mm dia.
2. Valve stem seal with lower spring cup
3. Valve spring
4. Upper spring cup
5. Valve keys

If the valves are to be reused, they must be placed in neat order in special tool **11 4 482** .

Fig. 1276: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME; if necessary, readjust uniform mixture distribution.

11 34 552 REMOVING AND INSTALLING/REPLACING ALL VALVES (N52T)

Special tools required:

- **11 4 480**

Necessary preliminary work:

- Remove **CYLINDER HEAD**.
- Remove **INTERMEDIATE LEVER**
- Remove **ECCENTRIC SHAFT**
- Remove **INTAKE CAMSHAFT**
- Remove **EXHAUST CAMSHAFT**.
- Remove **ROCKER ARM**
- Remove **VALVE SPRINGS**
- Remove **VALVE STEM SEALS**

Arrangement:

1. Valve
2. Valve stem seal with lower spring cup
3. Valve spring
4. Upper spring cup
5. Valve keys

cardiagn.com

If the valves are to be reused, they must be placed in neat order in special tool **11 4 480** .

Fig. 1277: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME; if necessary, readjust uniform mixture distribution.

11 34 552 REMOVING AND INSTALLING/REPLACING ALL VALVES (N55)

Special tools required:

- **11 4 481**
- **11 4 482**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD**.
- Remove **INTERMEDIATE LEVER**.
- Remove **ECCENTRIC SHAFT**.
- Remove **INTAKE CAMSHAFT**.
- Remove **EXHAUST CAMSHAFT**.
- Remove **ROCKER ARM**.
- Remove **VALVE SPRINGS**.
- Remove **VALVE STEM SEALS**.

Arrangement:

1. Intake valve 5 mm dia.
2. Valve stem seal with lower spring cup
3. Valve spring
4. Upper spring cup
5. Valve keys

If the valves are to be reused, they must be placed in neat order in special tool **11 4 481** .

Fig. 1278: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

Arrangement:

1. Discharge valve 6 mm dia.
2. Valve stem seal with lower spring cup
3. Valve spring
4. Upper spring cup
5. Valve keys

If the valves are to be reused, they must be placed in neat order in special tool **11 4 482** .

Fig. 1279: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Assemble engine.

Check function of Digital Engine Electronics; if necessary, readjust uniform mixture distribution.

11 34 715 REPLACING ALL VALVE SPRINGS (N20, N26)

Special tools required:

- 11 4 481
- 11 4 482
- 11 8 840
- 11 9 000
- 11 9 007

Necessary preliminary tasks:

- Remove CYLINDER HEAD.
- Remove EXHAUST CAMSHAFT.
- Remove INTERMEDIATE LEVER.
- Remove INTAKE CAMSHAFT.
- Remove ROCKER ARM.

Place cylinder head on special tool 11 9 000 .

Align special tool 11 9 007 on particular combustion chamber.

Fig. 1280: Aligning Special Tool (11 9 007) On Combustion Chamber
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool 11 9 007 on cylinder head.

Push locks (1) and (2) toward inside and pre-load via eccentric shaft.

Fig. 1281: Pushing Locks Of Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Press down **valve springs** with special tool 11 8 840 .

Fig. 1282: Pressing Valve Springs
Courtesy of BMW OF NORTH AMERICA, INC.

Remove valve key (1) with a magnet.

Remove valve spring with spring cups.

If individual components are to be reused, they must be placed in neat order in special tool 11 4 481 .

Fig. 1283: Removing Valve Key
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Incorrect assembly possible.
Incorrect installation will result in valve spring breakage.
Risk of mixing up the valve springs for the inlet and exhaust valves.

cardiagn.com

Valve springs are marked in color (1).

Colors for intake valves:

- Green/blue
- Yellow/Blue

Fig. 1284: Identifying Valve Spring Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Colors for discharge valves:

- Green/white
- Yellow/white

Install the valve spring so that the larger diameter (X) points to the lower spring cup.

Arrangement:

1. Valve
2. Valve stem seal with lower spring cup
3. Valve spring
4. Upper spring cup
5. Valve keys

Fig. 1285: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME; if necessary, readjust uniform mixture distribution.

11 34 715 REPLACING ALL VALVE SPRINGS (N47 D20 O1)

Special tools required:

- 11 4 480
- 11 8 840
- 11 9 000
- 11 9 001
- 11 9 005
- 11 9 006
- 11 9 008
- 11 9 009
- 11 9 011

Necessary preliminary work:

- Remove CYLINDER HEAD.
- Place cylinder head on special tool 11 9 001 .

Position special tool 11 9 008 with straight surface on the cylinder head (see Fig. 1286).

cardiagn.com

NOTE: **Procedure for all 4-, -6- and 8-cylinder diesel engines.**

Fig. 1286: Positioning Special Tool (11 9 008) With Straight Surface On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Insert special tool **11 9 006** and lock with special tool **11 9 005** in direction of arrow.

Fig. 1287: Inserting Special Tool (11 9 006) And Lock With Special Tool (11 9 005)
Courtesy of BMW OF NORTH AMERICA, INC.

Lock special tool **11 9 005** in direction of arrow.

Rotate cylinder head, using special tool **11 9 000** , 180Â° into installation position.

Fig. 1288: Rotating Cylinder Head Using Special Tool (11 9 000)
Courtesy of BMW OF NORTH AMERICA, INC.

Align special tool **11 9 009** in direction of valve axis. Select corresponding groove with special tool **11 8 840** .

Press down valve spring on upper spring cup with special tool **11 9 009** .

Hook in with special tool **11 9 011** .

Fig. 1289: Pressing Down Valve Spring On Upper Spring Cup With Special Tool (11 9 009)
Courtesy of BMW OF NORTH AMERICA, INC.

Use a magnet to remove valve keys (1) from valve (2).

Remove valve spring and spring cup.

Place down valve springs and valve keys on special tool **11 4 480** in an orderly manner.

Fig. 1290: Removing Valve Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Check color code of valve spring (1).

The color (2) on the valve spring is important for allocation purposes.

Possible color sets:

- Yellow - orange
- Green - orange
- Blue - orange

The installation position of the valve spring can be freely selected.

Fig. 1291: Identifying Valve Spring Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Installation sequence:

1. Valve
2. Valve stem seal

cardiagn.com

3. Valve spring
4. Top spring cup
5. Valve keys

Fig. 1292: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, replace **VALVE STEM SEALS**.

Assemble engine.

11 34 715 REPLACING ALL VALVE SPRINGS (N52T)

Special tools required:

- **11 0 346**
- **11 4 480**
- **11 9 000**
- **11 9 017**

Necessary preliminary work:

- Remove **CYLINDER HEAD**.
- Remove **EXHAUST CAMSHAFT**.
- Remove **INTERMEDIATE LEVER**
- Remove **INTAKE CAMSHAFT**
- Remove **ROCKER ARM**

Place cylinder head on special tool **11 9 000** .

Press down **inlet valves** with special tool **11 9 017** .

Press down **outlet valves** with special tool **11 0 346** .

Fig. 1293: Pressing Inlet Valves
Courtesy of BMW OF NORTH AMERICA, INC.

Remove valve keys with a magnet.

Remove valve spring with spring cups.

If the individual components are to be reused, they must be placed in neat order in special tool **11 4 480** .

Fig. 1294: Removing Valve Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Incorrect installation possible.
IMPORTANT: Incorrect installation will result in valve spring breakage.
Risk of mixing up the valve springs for the inlet and exhaust valves.

The valve spring is color-coded (1) at the lower end.

Install the valve spring so that the larger diameter points to the lower spring cup.

cardiagn.com

Fig. 1295: Identifying Valve Spring Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Arrangement:

1. Valve
2. Valve stem seal with lower spring cup
3. Valve spring
4. Upper spring cup
5. Valve keys

Fig. 1296: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME; if necessary, readjust uniform mixture distribution.

11 34 715 REPLACING ALL VALVE SPRINGS (N55)

Special tools required:

- **11 4 481**
- **11 4 482**
- 11 8 841
- 11 8 842
- **11 9 000**
- **11 9 007**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD**.
- Remove **EXHAUST CAMSHAFT**.
- Remove **INTERMEDIATE LEVER**.
- Remove **INTAKE CAMSHAFT**.
- Remove **ROCKER ARM**.

Place cylinder head on special tool **11 9 000** .

Align special tool **11 9 007** on particular combustion chamber.

Fig. 1297: Aligning Special Tool (11 9 007) On Combustion Chamber
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 9 007** on cylinder head.

Push locks (1 and 2) toward inside and preload via eccentric shaft.

Fig. 1298: Positioning Special Tool (11 9 007) On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Press down **intake valve** with special tool 11 8 841.

cardiagn.com

Fig. 1299: Pressing Valve Springs
Courtesy of BMW OF NORTH AMERICA, INC.

Remove valve key (1) with a magnet.

Remove valve spring with spring cups.

If individual components are to be reused, they must be placed in neat order in special tool **11 4 481** .

Fig. 1300: Removing Valve Key
Courtesy of BMW OF NORTH AMERICA, INC.

Press down **discharge valve** with special tool 11 8 842.

Fig. 1301: Pressing Discharge Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Remove valve key (1) with a magnet.

Remove valve spring with spring cups.

If individual components are to be reused, they must be placed in neat order in special tool **11 4 482** .

Fig. 1302: Removing Valve Key
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Incorrect assembly possible.
Incorrect installation will result in valve spring breakage.
Risk of mixing up the valve springs for the inlet and exhaust valves.

Valve springs are marked in color (1).

Colors for intake valves:

- Green/blue
- Yellow/Blue

Fig. 1303: Identifying Valve Spring Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Colors for discharge valves:

- Green/white
- Yellow/white

Install the valve spring so that the larger diameter points to the lower spring cup.

Arrangement:

1. Valve
2. Valve stem seal with lower spring cup
3. Valve spring
4. Upper spring cup
5. Valve keys

cardiagn.com

Fig. 1304: Identifying Valve Components
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of Digital Engine Electronics; if necessary, readjust uniform mixture distribution.

11 34 560 REPLACING ALL VALVE STEM SEALS (N20, N26)

Special tools required:

- 11 1 480
- 11 6 380

Necessary preliminary tasks:

- Remove CYLINDER HEAD.
- Remove INTERMEDIATE LEVER
- Remove ECCENTRIC SHAFT
- Remove INTAKE CAMSHAFT
- Remove EXHAUST CAMSHAFT.
- Remove ROCKER ARMS
- REMOVE all valve springs

Press special tool 11 1 480 forcefully onto valve stem seals.

Detach valve stem seal from valve stem by turning and simultaneously pulling special tool 11 1 480 .

Installation note:

Insert all VALVES.

Order number: 83 30 0 490 796

Fig. 1305: Detaching Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **For use on the N20 engine, special tool 11 6 380 must be remachined according to the graphic with a 10 mm dia. drill bit to a depth of B = approx. 23 mm. This modification has already been taken into account for reordering. Order number: 83 30 0 493 249**

Fig. 1306: Identifying Special Tool (11 6 380)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Different diameters at valve stem.
All valve stem seals are color-coded.

For 5 mm dia. valves, the valve stem seal is marked red or brown.

For 6 mm dia. valves, the valve stem seal is marked green.

Fig. 1307: Identifying Valve Stem Seal Mark
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Installation note:

Fit the **mounting sleeves** (plastic sleeves) contained in the delivery specification on the valve stem end.

Lubricate assembly sleeve.

Press on valve stem seal by hand with special tool **11 6 380** as far as it will go.

NOTE: Order number: 83 30 0 493 249

Fig. 1308: Pressing Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 34 560 REPLACING ALL VALVE STEM SEALS (N47 D20 O1)

Special tools required:

- **11 1 480**
- **11 6 380**

Necessary preliminary work:

- Remove **CYLINDER HEAD**.
- Remove all **VALVE SPRINGS**.

Tap open valve stem seal (1) with special tool **11 1 480** or with a size 13 or 14 hexagon bit.

Remove valve stem seal (1) with a twisting and pulling action.

Fig. 1309: Identifying Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The contact surface (1) must be clean.

Fig. 1310: Identifying Valve Stem Seal And Contact Surface
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Before installing the valve stem seals, the protective grommet must be fitted on the valve stem **Risk of damage!** to the sealing lip!

Press on valve stem seal (1) to stop using special tool **11 6 380** in direction of arrow.

Fig. 1311: Pressing Valve Stem Seal Using Special Tool (11 6 380)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 34 560 REPLACING ALL VALVE STEM SEALS (N52T)

cardiagn.com

Special tools required:

- 11 1 480
- 11 6 380

Necessary preliminary work:

- Remove CYLINDER HEAD.
- Remove INTERMEDIATE LEVER
- Remove ECCENTRIC SHAFT
- Remove INTAKE CAMSHAFT
- Remove EXHAUST CAMSHAFT.
- Remove ROCKER ARMS

Firmly press special tool 11 1 480 onto old valve stem seals.

Detach valve stem seal from valve stem by turning and simultaneously pulling special tool 11 1 480 .

Installation note:

Insert all VALVES.

Fig. 1312: Detaching Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: For use on the N55 engine, special tool 11 6 380 must be remachined according to the picture with a 10 mm dia. drill bit to a depth of B = approx. 23 mm. This modification has already been taken into account for reordering.

Fig. 1313: Identifying Special Tool (11 6 380)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Different diameters at valve stem.
All valve stem seals are color-coded.

For 5 mm dia. valves, the valve stem seal is marked red or brown.

For 6 mm dia. valves, the valve stem seal is marked green.

Fig. 1314: Identifying Valve Stem Seal Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Fit the **mounting sleeves** (plastic sleeves) contained in the delivery specification on the valve stem end.

Lubricate assembly sleeve.

Press on valve stem seal by hand with special tool 11 6 380 as far as it will go.

NOTE: Graphic N42.

Fig. 1315: Pressing Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Assemble engine.

11 34 560 REPLACING ALL VALVE STEM SEALS (N55)

Special tools required:

- 11 1 480
- 11 6 380

Necessary preliminary tasks:

- Remove CYLINDER HEAD.
- Remove INTERMEDIATE LEVER.
- Remove ECCENTRIC SHAFT.
- Remove INTAKE CAMSHAFT.
- Remove EXHAUST CAMSHAFT.
- Remove ROCKER ARM.

Press special tool 11 1 480 forcefully onto valve stem seals.

Detach valve stem seal from valve stem by turning and simultaneously pulling special tool 11 1 480 .

Installation note:

Insert all VALVES.

Fig. 1316: Detaching Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: For use on the N55 engine, special tool 11 6 380 must be remachined according to the graphic with a 10 mm dia. drill bit to a depth of B = approx. 23 mm. This modification has already been taken into account for reordering.

Fig. 1317: Identifying Special Tool (11 6 380)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Different diameters at valve stem.
All valve stem seals are color-coded.

For 5 mm dia. valves, the valve stem seal is marked red or brown.

For 6 mm dia. valves, the valve stem seal is marked green.

Fig. 1318: Identifying Valve Stem Seal Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Fit the **mounting sleeves** (plastic sleeves) contained in the delivery specification on the valve stem end.

Lubricate assembly sleeve.

Press on valve stem seal by hand with special tool 11 6 380 as far as it will go.

NOTE: Graphic N42.

cardiagn.com

Fig. 1319: Pressing Valve Stem Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

VARIABLE CAMSHAFT TIMING

11 36 046 REMOVING AND INSTALLING OR REPLACING INTAKE AND EXHAUST CAMSHAFT ADJUSTERS (N52T)

Special tools required:

- 11 4 280
- 11 4 281
- 11 4 282
- 11 4 283

Necessary preliminary work:

- Remove CYLINDER HEAD COVER
- Check TIMING

IMPORTANT: Install special tool 11 4 280 to secure the central bolts on the intake and exhaust camshaft adjusters and camshafts.

Fit special tool 11 4 283 with screws (1).

Fit special tool 11 4 281 on special tool 11 4 283 .

Fig. 1320: Installing Special Tools To Secure The Central Bolts On The Intake And Exhaust Camshaft Adjusters And Camshafts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Fit special tool 11 4 282 underneath on side of intake camshaft.

Release chain tensioner (2).

Tightening torque: 11 31 6AZ .

Release central bolts on inlet and exhaust adjustment units (1).

Tightening torque: 11 36 1AZ .

Installation:

Replace central bolts.

NOTE: Picture in CAD and does not show special tools.

Fig. 1321: Identifying Chain Tensioner And Central Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Remove exhaust camshaft adjuster (1) from exhaust camshaft.

Remove inlet adjuster (2) from intake camshaft.

cardiagn.com

Installation:

To facilitate removal and installation of the inlet and exhaust camshaft adjusters, turn the camshaft sensor wheels downwards at the opening.

Fig. 1322: Removing Exhaust Camshaft Adjuster & Inlet Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of mixing up the intake and exhaust camshaft adjusters.
Danger of engine damage!

Intake and exhaust adjustment units are different.

VANOS is marked with AUS/EX for the exhaust camshaft.

VANOS is marked with EIN/IN for the intake camshaft.

Camshaft sensor wheels can be fitted alternatively.

Fig. 1323: Identifying Exhaust Camshaft Markings
Courtesy of BMW OF NORTH AMERICA, INC.

Position inlet and exhaust adjustment units on camshafts.

Installation position of intake and exhaust adjustment units can be freely selected.

Insert central bolts (1).

Tightening torque: **11 36 1AZ** .

Installation:

Replace central bolts.

Fig. 1324: Identifying Chain Tensioner And Central Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Install special tool **11 4 280** to secure the central bolts on the intake and exhaust camshaft adjusters and camshafts.

NOTE: **Picture in CAD and does not show special tools.**

IMPORTANT: Incorrect installation possible!

Press tensioning rail (1) by hand against guide rail and make sure timing chain is guided in tensioning rail (1).

NOTE: **Schematic representation of removed timing chain module.**

Adjust **VALVE TIMING**.

Fit **CHAIN TENSIONER**.

Fig. 1325: Identifying Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Assemble engine.

11 36 046 REMOVING AND INSTALLING OR REPLACING INTAKE AND EXHAUST CAMSHAFT ADJUSTERS (N55)

Special tools required:

- 00 9 120
- 00 9 250
- 11 4 280
- 11 4 290
- 11 9 340

Necessary preliminary tasks:

- Remove CYLINDER HEAD COVER.
- Check TIMING.

IMPORTANT: Only use special tool 11 4 280 to loosen central bolts (1 and 2) of VANOS unit.
Modify special tool 11 4 280 for N55 engine.

Release central bolts (1 and 2).

Fig. 1326: Identifying Central Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release chain tensioner (1).

Tightening torque: 11 31 7AZ .

IMPORTANT: Have a cleaning cloth ready. A small quantity of engine oil will emerge after the screw connection has been released.
Make sure no engine oil runs onto belt drive.

Fig. 1327: Identifying Chain Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace sealing ring.

Slightly lift timing chain (1) and remove exhaust camshaft adjuster (2) from exhaust camshaft.

Slightly tilt exhaust camshaft adjuster (2) and remove upward.

Fig. 1328: Removing Exhaust Camshaft Adjuster From Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Slightly lift timing chain (1) and remove intake adjuster (2) from intake camshaft.

Slightly tilt intake adjuster (2) and remove upward.

Fig. 1329: Removing Intake Adjuster From Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

IMPORTANT: Risk of mixing up the intake and exhaust camshaft adjusters.
Danger of engine damage!

Intake and exhaust camshaft adjusters are different.

The variable camshaft timing control is marked with AUS/EX for the exhaust camshaft.

The variable camshaft timing control is marked with EIN/IN for the intake camshaft.

The increment wheels can be fitted alternatively.

Fig. 1330: Identifying Marking On Exhaust And Inlet Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace central bolts.

Place intake adjuster onto intake camshaft.

Place exhaust camshaft adjuster onto exhaust camshaft.

Installation position of intake and exhaust camshaft adjusters can be freely selected.

Fig. 1331: Identifying Central Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Insert central bolts (1) until stop.

Release central bolts (1) again by a 90Â° turn.

IMPORTANT: Incorrect assembly possible!

Press tensioning rail (1) by hand against guide rail and make sure timing chain is guided in tensioning rail (1).

NOTE: Schematic representation of removed timing chain module.

Fig. 1332: Identifying Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Turn increment wheel (2) in direction of arrow until retaining pins (1) on special tool **11 4 290** match up.

11 4 290 Slide on special tool in direction of arrow.

Fig. 1333: Turning Increment Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Special tool **11 4 280** must be mounted for fastening central bolts

Use bolts to fasten special tool **11 4 290** .

11 9 340 Screw special tool into cylinder head.

Fig. 1334: Fastening Central Bolts Using Special Tools (11 4 280), (11 4 290) & (11 9 340)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Pretension timing chain with special tool **11 9 340** & **00 9 250** **0, 6 Nm**

Fig. 1335: Identifying Special Tool (11 9 340) And (00 9 250)
Courtesy of BMW OF NORTH AMERICA, INC.

Use special tool **00 9 120** to tighten central bolts of intake adjuster.

Tightening torque: **11 36 1AZ** .

Fig. 1336: Tightening Central Bolts Of Intake Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Use special tool **00 9 120** to tighten central bolts of exhaust camshaft adjuster.

Tightening torque: **11 36 1AZ** .

Fig. 1337: Tightening Central Bolts Of Exhaust Camshaft Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Rev engine on the central bolt twice in the direction of engine rotation and verify **TIMING**.

Assemble engine.

11 36 046 REMOVING AND INSTALLING/REPLACING INTAKE AND EXHAUST CAMSHAFT ADJUSTERS (N20, N26)

Special tools required:

- 83 30 2 212 831
- **11 4 480**
- 83 30 0 495 105
- 83 30 2 212 830
- **11 9 340**
- **00 9 250**
- **00 9 460**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Check **TIMING**.
- Remove **both pulse sensors for camshafts** . See **12 14 523 REPLACING PULSE SENSOR ON INTAKE CAMSHAFT (N20)** or **12 14 524 REPLACING PULSE SENSOR ON EXHAUST CAMSHAFT (N20)** .

IMPORTANT: To release the central bolt, screw connection (7) on the exhaust camshaft is necessary.

Fig. 1338: Releasing Central Bolt With Screw Connection On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: To release the central bolt, screw connection (5) on the intake camshaft is necessary.

cardiagn.com

Fig. 1339: Releasing Central Bolt With Screw Connection On Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Use only special tool (1) to release central bolt of the VANOS unit.
Order number: 83 30 2 212 831

Fig. 1340: Releasing Central Bolt Of VANOS Unit Using Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Release central bolt (1) of the exhaust camshaft adjuster.

Fig. 1341: Identifying Central Bolt Of Exhaust Camshaft Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Release central bolt (1) of the intake adjuster.

Fig. 1342: Identifying Central Bolt Of Intake Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 65 4AZ** .

Fig. 1343: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release chain tensioner (2).

Tightening torque: **11 31 7AZ** .

IMPORTANT: Have a cleaning cloth ready. A small quantity of engine oil will escape after the screw connection has been released.
Make sure no engine oil runs onto belt drive.

Installation note:

Replace sealing ring.

Fig. 1344: Identifying Vacuum Unit And Chain Tensioner
Courtesy of BMW OF NORTH AMERICA, INC.

Remove VANOS solenoid valve (1) of the exhaust side.

Remove pulse sensor wheel (2) of the exhaust side and set down on special tool **11 4 480** in neat order.

Order number: 83 30 0 495 105

Fig. 1345: Identifying Exhaust Side VANOS Solenoid Valve And Pulse Sensor Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Slightly lift timing chain (2) and remove exhaust camshaft adjuster (1) from exhaust camshaft.

Slightly tilt exhaust camshaft adjuster (1) and remove upward.

cardiagn.com

Fig. 1346: Removing Exhaust Camshaft Adjuster From Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Remove VANOS solenoid valve (1) of the intake side.

Remove pulse sensor wheel (2) of the intake side and set down on special tool **11 4 480** in neat order.

Fig. 1347: Identifying Intake Side VANOS Solenoid Valve And Pulse Sensor Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Slightly lift timing chain (2) and remove intake adjuster (1) from intake camshaft.

Slightly tilt intake adjuster (1) and remove upward.

Fig. 1348: Removing Intake Adjuster From Intake Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of mixing up the intake and exhaust camshaft adjusters.
Danger of engine damage!

Intake and exhaust camshaft adjusters are different.

VANOS is marked with EX for the exhaust camshaft.

VANOS is marked with IN for the intake camshaft.

Fig. 1349: Identifying Intake/Exhaust Camshaft Identification Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The camshaft sensor wheel can be optionally installed.

Turn camshaft sensor wheel until the retaining pins (1 and 2) match up on the special tool.

Move retaining pins (1 and 2) in direction of arrow.

Order number: 83 30 2 212 830

Fig. 1350: Securing Camshaft Sensor Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool (1) with bolts.

Move central bolts (2 and 3) to the adjuster units to the system.

Order number: 83 30 2 212 830

Fig. 1351: Securing Special Tool With Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

11 9 340 Screw special tool into cylinder head.

Timing chain with special tool **11 9 340** and or **00 9 250** to **0.6 Nm** pretension.

cardiagn.com

Fig. 1352: Identifying Special Tool (11 9 340) And (00 9 250)
Courtesy of BMW OF NORTH AMERICA, INC.

Secure central bolt (1) of intake adjuster with special tool.

Tightening torque: **11 36 1AZ** .

Fig. 1353: Securing Central Bolt Of Intake Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Secure central bolt (1) of the exhaust camshaft adjuster with special tool.

Tightening torque: **11 36 1AZ** .

Fig. 1354: Securing Central Bolt Of Exhaust Camshaft Adjuster
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Install **CHAIN TENSIONER**.

Rev engine on the central bolt twice in the direction of engine rotation and verify **TIMING**.

Assemble engine.

11 36 655 REMOVING AND INSTALLING/REPLACING BOTH ACTUATORS (N20)

IMPORTANT:

It is essential to observe conditions of absolute cleanliness when removing and installing the intake and exhaust actuators.
Possible malfunction if there is dirt contamination in the valves:

- Irregular operation
- OBD fault entry
- Exhaust gas emission characteristics.
- Low engine performance

Necessary preliminary work:

- Remove **ACOUSTIC COVER**

Detach lines (1) from retaining tabs (2).

Fig. 1355: Detaching Lines From Retaining Tabs
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (5) on intake actuator (6).

Release screws (4).

Tightening torque: **11 36 2AZ** .

Remove intake actuator (1) to the front.

Disconnect plug connection (2) on exhaust actuator (3).

cardiagn.com

Release screws (1).

Tightening torque: **11 36 2AZ** .

Remove exhaust actuator (3) to the front.

Fig. 1356: Identifying Intake Actuator, Exhaust Actuator, Connectors And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME.

11 36 655 REMOVING AND INSTALLING/REPLACING BOTH SOLENOID VALVES (N52T)

It is essential to observe conditions of absolute cleanliness when removing and installing the intake and exhaust solenoid valves.
Possible malfunction if valves are contaminated:

IMPORTANT:

- Rough running
- OBD fault entry
- Exhaust emission characteristics
- Low engine power

Necessary preliminary work:

- **REMOVE ENGINE COVER**

Disconnect plug connection (1) on intake solenoid valve (2).

Release screw (3).

NOTE: Secure support and sealing ring against falling down.

Remove intake solenoid valve (2) with holder towards front.

Disconnect plug connection (6) on exhaust solenoid valve (5).

Release screw (4).

NOTE: Secure support and sealing ring against falling down.

Fig. 1357: Identifying Plug Connection On Intake Solenoid Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Remove exhaust solenoid valve (5) with holder towards front.

Tightening torque: **11 36 3AZ** .

IMPORTANT: Risk of mixing up plug connections (1 and 6).

Installation note:

Replace support and sealing rings.

cardiagn.com

Assemble engine.

Check function of DME.

11 36 655 REMOVING AND INSTALLING/REPLACING BOTH SOLENOID VALVES (N55)

IMPORTANT:

On removing and installing the VANOS solenoid valve (intake) and VANOS solenoid valve (exhaust), adhere to conditions of absolute cleanliness.
Possible malfunction if there is dirt contamination in the valves:

- Irregular operation
- OBD fault entry
- Exhaust gas emission characteristics.
- Low engine performance

Necessary preliminary tasks:

- Remove ignition coil cover. See **12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55)** .

Disconnect plug connection (1) on VANOS intake solenoid valve.

Disconnect plug connection (2) on VANOS exhaust solenoid valve.

Fig. 1358: Identifying Connectors For Intake/Exhaust Solenoid Valves
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (2).

Remove VANOS intake solenoid valve (1) with holder towards the front.

Release screw (3).

Move VANOS exhaust solenoid valve (4) with holder approx. 10 millimeters towards the front

Tightening torque: **11 36 3AZ** .

Fig. 1359: Identifying Intake/Exhaust Solenoid Valves And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Turn the VANOS exhaust solenoid valve (1) approx. 90Â° in direction of arrow until it can be removed from the front on engine wiring harness.

Fig. 1360: Turning Exhaust Solenoid Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Remove O-ring (2).

Remove support ring (1).

Installation note:

Replace support and O-rings.

cardiagn.com

Fig. 1361: Identifying Support Ring And O-Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of Digital Engine Electronics.

VARIABLE VALVE GEAR

11 37... FAULT PATTERNS, VALVE GEAR (N20/26/N55)

WARNING: **The preloading on the throttle return springs increases as the rotation on the worm gear increases. Danger of injury!**
The eccentric shaft may only be twisted on the mounting flats for protection. Risk of damage to the eccentric shaft gearing and to the servomotor worm drive.
The eccentric shaft must not spring back to the minimum stroke stop. Risk of damage!

Necessary preliminary tasks:

- Remove cylinder head cover. See **11 12 000 REMOVING AND INSTALLING/SEALING CYLINDER HEAD COVER (N20)** or **11 12 000 REMOVING AND INSTALLING/SEALING CYLINDER HEAD COVER (N55)**.
- Remove ignition coil and injector shafts. See **11 12 040 REMOVING AND INSTALLING ALL IGNITION COILS AND INJECTOR WELLS (N20, N26)** or **11 12 040 REMOVING AND INSTALLING ALL IGNITION COILS AND INJECTOR WELLS (N55)**.

WARNING: **Heed stop installation instructions.**

The eccentric shaft on the mounting flats (2) must only be turned with an open-end spanner (1) for support.

The eccentric shaft has **mounting flats on both sides;** if the engine is installed, the front mounting flat must be used.

Heed the following work instructions.

After the engine stops, the eccentric shaft is in the maximum stroke position.

If the actuator drive is defective, the eccentric shaft is located in an undetermined position.

Fig. 1362: Turning Eccentric Shaft Using Open-End Spanner
Courtesy of BMW OF NORTH AMERICA, INC.

Check throttle return spring (2) for breakage and correct installation position on intermediate lever (1).

Check roller cam follower (3) for correct installation position.

Fig. 1363: Identifying Throttle Return Spring, Intermediate Lever And Roller Cam Follower
Courtesy of BMW OF NORTH AMERICA, INC.

Check that intermediate lever (1) is correctly seated.

NOTE: **Graphic does not show sliding block.**

cardiagn.com

Fig. 1364: Identifying Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Check wear at stop (1) - minimum lift and maximum lift.

Check that stops are securely seated.

Tightening torque: **11 37 5AZ** .

Fig. 1365: Identifying Intermediate Lever Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Stiff movement in eccentric shaft bearing is excluded.

Stiff movement can occur in worm gear.

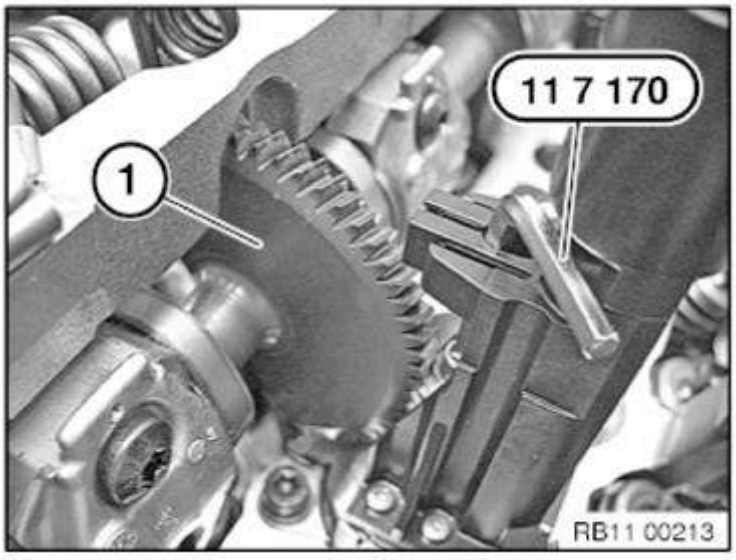


Fig. 1366: Securing Eccentric Shaft With Special Tool (11 7 170)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 37 005 REMOVING AND INSTALLING/REPLACING ECCENTRIC SHAFT (N20, N26)

Special tools required:

- **11 4 481**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove **SERVOMOTOR FOR ECCENTRIC SHAFT DRIVE**.
- Remove **INTERMEDIATE LEVER**.

NOTE: **All bearing caps of the eccentric shaft are identified with numbers from 1 to 4.**

Release screws on bearing cap 1 to 4.

Set all bearing caps down in special tool **11 4 481** in a neat and orderly fashion.

Remove eccentric shaft with gentle tilting and swivel motion.

cardiagn.com

Place eccentric shaft on special tool **11 4 481** .

Fig. 1367: Identifying Eccentric Shaft Bearing Caps
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Needle bearings (1) can break very easily.

Installation note:

Replace eccentric shaft.

Carefully pull needle bearing (1) apart at point of separation.

Slide on all needle bearings (1) of eccentric shaft.

Fig. 1368: Identifying Needle Bearings Of Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Install bearing shells (1) as pictured.

NOTE: If bearing shells need to be replaced due to a defect, always replace bearing shells (1) and needle bearings together.

Fig. 1369: Installing Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Any installation position may be selected for bearing shells (1) and (2).

If bearing shells (1) in cylinder head are inserted with tips pointing downward, the bearing shells (2) must be inserted in the opposite direction in the bearing cap (see example in picture).

Fig. 1370: Identifying Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The gearing and the guide bearing lateral to the eccentric shaft must be greased with **LONGTIME PD 1 (4.1)**.

All bearing caps of the eccentric shaft are identified with numbers from 1 to 4.

Coat all bearing positions with engine oil.

Insert eccentric shaft.

Place on all bearing caps according to arrangement.

Insert all screws.

Tightening torque: **11 31 2AZ** .

Fig. 1371: Identifying Eccentric Shaft Bearing Cap Numbers
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Check intermediate shaft for ease of movement.

Assemble engine.

11 37 005 REMOVING AND INSTALLING/REPLACING ECCENTRIC SHAFT (N52T)

Special tools required:

- 11 4 481

Necessary preliminary work:

- Remove CYLINDER HEAD COVER
- Remove INTERMEDIATE LEVER

If necessary, move eccentric shaft (1) on mounting flats to minimum lift (2).

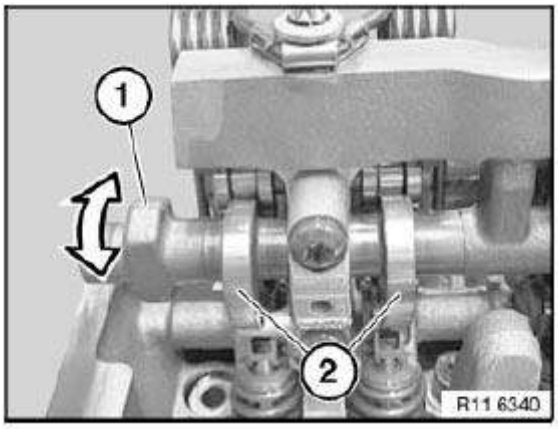


Fig. 1372: Moving Eccentric Shaft On Mounting Flats
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **All bearing caps (1 and 2) of eccentric shaft are marked with numbers from 1 to 6 (1 for 1st cylinder to 6 for 6th cylinder).**
Bearing cap 6 (1) is provided with a stop.

Release screws on bearing cap 6 (1).

Release screws on bearing caps 1 to 5 (2).

Set all bearing caps down in special tool 11 4 481 in a neat and orderly fashion.

Remove eccentric shaft with gentle tilting and swivel motion.

Fig. 1373: Removing Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Screw is not magnetic and must be secured against falling down.

Release screw.

Remove magnet wheel (1).

Fig. 1374: Identifying Magnet Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

IMPORTANT: Magnet wheel (1) is highly magnetic and must be protected against metal filings/borings.

After removing, place magnet wheel (1) in a plastic bag (2) with a seal.

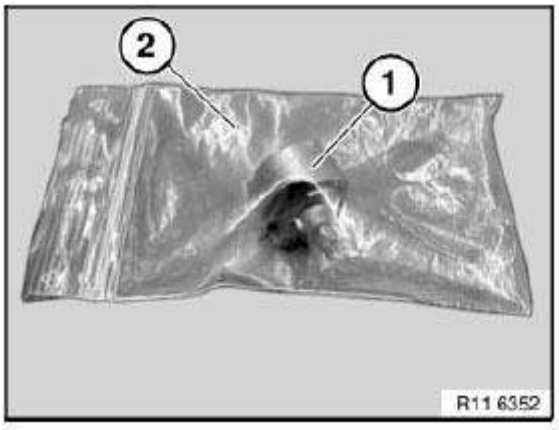


Fig. 1375: Identifying Magnet Wheel And Plastic Bag
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Needle bearing (1) can break very easily.

Carefully pull needle bearing (1) apart at point of separation.

Remove all needle bearings (1) from eccentric shaft.

Installation:

Spline teeth of eccentric shaft must be greased with **(2.4) LONGTIME PD 1**.

Fig. 1376: Removing Needle Bearings From Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Install bearing shells (1) as pictured.

NOTE: Always replace bearing shells (1) and needle bearings together.

Fig. 1377: Installing Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Install bearing shell (1) with tip facing down (see arrow) in cylinder head.

Install bearing shell (2) with tip facing up in bearing cap.

Fig. 1378: Installing Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: All bearing caps (1 and 2) of eccentric shaft are marked with numbers from 1 to 6 (1 for 1st cylinder to 6 for 6th cylinder).

Bearing cap 6 (1) is provided with a stop.

Insert eccentric shaft.

Adjust eccentric shaft on mounting flats to minimum stroke.

cardiagn.com

Fit all bearing caps (1 and 2).

Insert all screws.

Tightening torque: **11 12 7AZ** .

Installation:

Spline teeth of eccentric shaft must be greased with **(2.4) LONGTIME PD 1**.

Fig. 1379: Inserting Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 37 005 REMOVING AND INSTALLING/REPLACING ECCENTRIC SHAFT (N55)

Special tools required:

- **11 4 481**

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove **SERVOMOTOR FOR ECCENTRIC SHAFT DRIVE**.
- Remove **INTERMEDIATE LEVER**.

NOTE: **All bearing caps (1) of eccentric shaft are marked with numbers from 1 to 6 (1 for 1st cylinder to 6 for 6th cylinder).**

Release screws on bearing caps 1 to 6 (1).

Set all bearing caps down in special tool **11 4 481** in a neat and orderly fashion.

Remove eccentric shaft with gentle tilting and swivel motion.

Place eccentric shaft on special tool **11 4 481** .

Fig. 1380: Identifying Bearing Caps Of Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Needle bearings (1) can break very easily.

Installation note:

Replace eccentric shaft.

Carefully pull needle bearing (2) apart at point of separation.

Slide on all needle bearings (1) of eccentric shaft.

Fig. 1381: Identifying Needle Bearings Of Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Install bearing shells (1) as pictured.

cardiagn.com

NOTE:	**If bearing shells need to be replaced due to a defect, always replace bearing shells (1) and needle bearings together.**

Fig. 1382: Installing Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Any installation position may be selected for bearing shells (1 and 2).

If bearing shells (1) in cylinder head are inserted with tips pointing downward, the bearing shells (2) must be inserted in the opposite direction in the bearing cap (see example in picture).

Fig. 1383: Installing Bearing Shells
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

All bearing caps (1) of eccentric shaft are marked with numbers from 1 to 6 (1 for 1st cylinder to 6 for 6th cylinder).

Insert eccentric shaft.

Coat all bearing positions with engine oil.

Put on all bearing caps (1) according to cylinder assignment.

Insert all screws.

Tightening torque: **11 31 2AZ** .

Installation note:

Gearing of eccentric shaft must be greased with **LONGTIME PD 1 (2.4)**.

Fig. 1384: Identifying Bearing Caps Of Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Check intermediate shaft for ease of movement.

Assemble engine.

11 37 030 REMOVING AND INSTALLING/REPLACING ECCENTRIC SHAFT SENSOR (N52)

Necessary preliminary tasks:

- Remove cylinder head cover. See **11 12 000 REMOVING AND INSTALLING/SEALING CYLINDER HEAD COVER (N52T)**.

IMPORTANT:	All bolts are secured against falling out, release bolts (2) on cylinder head only but do **not** unscrew fully. Bolts (2) can fall out. **Risk of damage** to timing chain drive.

Release screws (2).

Lift out sensor (1).

cardiagn.com

NOTE: **Illustrations show timing chain removed.**

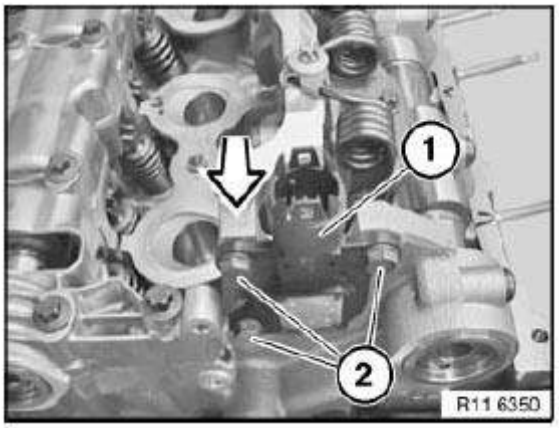


Fig. 1385: Identifying Screws & Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 37 010 REMOVING AND INSTALLING/REPLACING INTERMEDIATE LEVERS (N20, N26)

Special tools required:

- 11 4 450
- 11 4 481
- 11 7 110

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**

Necessary preliminary tasks:

- Remove **ALL IGNITION COILS AND INJECTOR SHAFTS**
- Remove stop screws for eccentric shaft

IMPORTANT: Secure eccentric shaft (1) with open-end spanner (3) (risk of return stroke).

Slowly adjust eccentric shaft (1) to minimum lift via servomotor using 4-mm hexagon socket wrench (2) and open-end spanner (3).

cardiagn.com

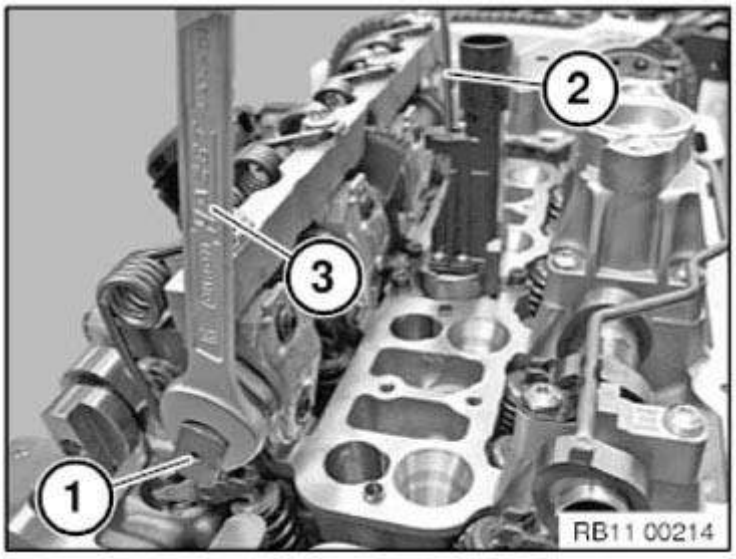


Fig. 1386: Securing Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolt (1) on the oil spray nozzle.

Tightening torque: **11 37 4AZ** .

Unclip oil spray nozzle (2) from the bracket on the actuator drive (3) in direction of arrow.

Fig. 1387: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Remove minimum stroke stop (1).

Tightening torque: **11 37 5AZ** .

Fig. 1388: Identifying Minimum Stroke Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 7 110** on return spring (1) (see arrows).

Fig. 1389: Positioning Special Tool (11 7 110) On Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**

Place special tool **11 7 110** flat on cylinder head.

Turn knurled screw (1) in direction of arrow until both clamping levers secure return spring in gate.

Fig. 1390: Turning Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Return spring is correctly preloaded when both clamping levers are parallel to guide block.

cardiagn.com

Fig. 1391: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!

Left and right return springs (1) must be positioned in lateral guide of special tool **11 7 110** .

Fig. 1392: Positioning Return Springs In Lateral Guide Of Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

Preload return spring with lever (1) on special tool **11 7 110** in direction of arrow.

Fig. 1393: Inserting Return Spring With Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Lock special tool **11 7 110** with catch on lever (1).

IMPORTANT: Screw connection on throttle return spring can only be released with secured special tool **11 7 110** .

Fig. 1394: Locking Special Tool (11 7 110) With Catch On Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Fig. 1395: Releasing Screw
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**
Lever (1) is preloaded.

IMPORTANT: Improper handling. **Risk of damage!**

Secure lever (1).

Press back latching hook (2).

Return spring tension can now be released.

Fig. 1396: Pressing Back Latching Hook
Courtesy of BMW OF NORTH AMERICA, INC.

Release knurled screw (1) on special tool **11 7 110** in direction of arrow.

Fig. 1397: Releasing Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release special tool **11 7 110** in direction of arrow from return spring (1).

Fig. 1398: Releasing Special Tool (11 7 110) From Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Press return spring (1) apart.

Remove return spring (1) upward.

Fig. 1399: Removing Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Uniform distribution must not be changed.
Place all components in a clean and orderly condition in special tool **11 4 481** .

In the case of an engine which has already been in use, all components must be re-installed in the same positions.

1. Eccentric shaft with bearing
2. Bearing caps of eccentric shaft (set out in order)
3. Intake camshaft
4. Bearing caps of intake camshaft (set out in order)

Fig. 1400: Identifying Engine Components
Courtesy of BMW OF NORTH AMERICA, INC.

5. Intake valves with valve springs
6. Valve heads and valve keys
7. Rocker arm with hydraulic valve clearance compensating element (set out in order).
8. Return springs.
9. Gates (set out in order)
10. Intermediate levers (set out in order)

Release screws (1) on gate (2).

Tightening torque: **11 37 1AZ** .

Place all gates (2) in neat order in special tool **11 4 481** .

Installation note:

Mixing up the gates (2) will cause the engine to suffer idle-speed fluctuations.

Fig. 1401: Identifying Screws On Gate
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

All contact surfaces (1) of gates must be clean and free from oil and grease. If necessary, clean contact surfaces (1).

Fig. 1402: Identifying Contact Surfaces Of Gates
Courtesy of BMW OF NORTH AMERICA, INC.

Lift out intermediate levers (1).

Place all intermediate levers (1) in neat order in special tool **11 4 481** .

Installation note:

cardiagn.com

Mixing up the intermediate levers (1) will cause the engine to suffer idle-speed fluctuations.

Installation note:

All contact surfaces must be clean and free of oil and grease. If necessary, clean contact surfaces.

Fig. 1403: Identifying Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

All intermediate levers are classified.

All intermediate levers must be reinstalled in the same positions in an engine which has already been in use.

Intermediate levers are classified from 1 to 5.

Fig. 1404: Identifying Intermediate Levers Codes
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before installing intermediate levers (1), make sure rocker arms are correctly positioned.
Risk of damage!

Fig. 1405: Identifying Roller Cam Followers
Courtesy of BMW OF NORTH AMERICA, INC.

Install intermediate levers (1).

Fig. 1406: Identifying Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Fit gate (2) cleanly into recess.

Tighten screws (1) hand-tight.

Check that intermediate levers are in correct installation position.

Release screws (1) by a 1/4 turn.

Fig. 1407: Identifying Screws And Gate Into Recess
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 450** on screw connection of eccentric shaft and set adjusting screw on special tool **11 4 450** , if necessary.

Turn eccentric lever on special tool **11 4 450** in direction of arrow.

Gate is now preloaded.

Fasten screws (1) of gates.

Tightening torque: **11 37 1AZ** .

Installation note:

At cylinder no. 3, the gate can be pre-installed with one screw (internal) only.

cardiagn.com

Fig. 1408: Securing Special Tool (11 4 450) On Screw Connection Of Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Oil spray nozzle is fitted only after return spring has been installed.

Graphic N55.

Press return spring (1) apart.

Install return spring (1).

Graphic N55.

Fig. 1409: Pressing Return Spring Apart
Courtesy of BMW OF NORTH AMERICA, INC.

Install return spring (2) on gate.

Installation note:

Insert return spring (2) in intermediate lever (1) (see arrow).

Check that rocker arm (3) is in correct installation position.

Fig. 1410: Identifying Throttle Return Spring, Intermediate Lever And Roller Cam Follower
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 7 110** on return spring.

Fig. 1411: Positioning Special Tool (11 7 110) On Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Clamp throttle return spring with knurled screw (1) in direction of arrow.

Fig. 1412: Clamping Throttle Return Spring With Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Return spring (1) is positioned correctly when latching hooks surround return spring (1).

Fig. 1413: Positioning Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**
Check return spring on intermediate lever to ensure correct installation position.

Press special tool **11 7 110** to stop in direction of arrow.

Fig. 1414: Checking Return Spring On Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Observe thread on cylinder head. **Risk of damage!**

cardiagn.com

Tighten bolt (1).

Tightening torque: **11 37 2AZ** .

Fig. 1415: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

Retract oil spray nozzle (2) on actuator drive (3).

Engage bolt (1) and release back to 90Â°.

For exact positioning of the oil spray nozzle (2) audibly clip it in at the top.

Tightening torque: **11 37 4AZ** .

Fig. 1416: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 37 010 REMOVING AND INSTALLING/REPLACING INTERMEDIATE LEVERS (N52T)

Special tools required:

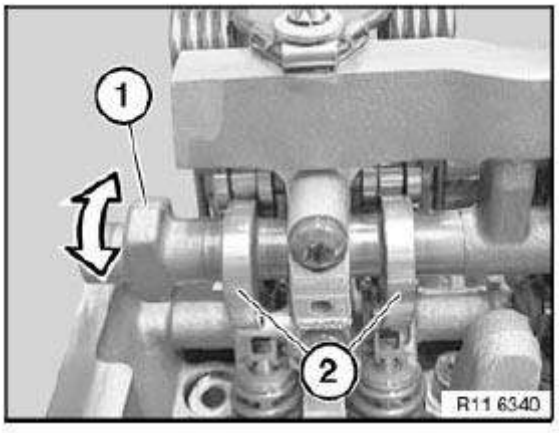
- **11 4 450**
- **11 4 481**
- **11 7 110**

IMPORTANT:	Aluminum-magnesium materials. **No** steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released** . Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic** . Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

- Remove **CYLINDER HEAD COVER**.

If necessary, move eccentric shaft (1) on mounting flats to minimum lift (2).



cardiagn.com

Fig. 1417: Moving Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Oil spray nozzle must be removed from 3rd cylinder (make a note of installation position of oil spray nozzle).**

Fig. 1418: Identifying Oil Spray Nozzle And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 7 110** on return spring (1) (see arrows).

Fig. 1419: Positioning Special Tool (11 7 110) On Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**

Place special tool **11 7 110** flat on cylinder head.

Turn knurled screw (1) in direction of arrow until both clamping levers secure return spring in guide block.

Fig. 1420: Turning Knurled Screw Using Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

Return spring is correctly preloaded when both clamping levers are parallel to guide block.

Fig. 1421: Identifying Preloaded Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!

Left and right return springs (1) must be positioned in lateral guide of special tool **11 7 110** .

Fig. 1422: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

Preload return spring with lever (1) on special tool **11 7 110** in direction of arrow.

Fig. 1423: Preloading Return Spring With Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Lock special tool **11 7 110** with latching hook on lever (1).

IMPORTANT: Screw fixing on return spring can only be released with special tool 11 7 110 secured.

Fig. 1424: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

cardiagn.com

Fig. 1425: Releasing Screw
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**
Lever (1) is preloaded.

IMPORTANT: Improper handling.
Risk of damage!

Secure lever (1)

Press back latching hook (2).

Return spring tension can now be released.

Fig. 1426: Pressing Back Latching Hook
Courtesy of BMW OF NORTH AMERICA, INC.

Release knurled screw (1) on special tool **11 7 110** in direction of arrow.

Fig. 1427: Releasing Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release special tool **11 7 110** in direction of arrow from return spring (1).

Fig. 1428: Releasing Special Tool (11 7 110) From Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Press torsion spring apart at positions (1).

Remove torsion spring towards top.

Fig. 1429: Removing Torsion Spring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Uniform distribution must **not** be changed.
Place all components in clean and orderly condition in special tool **11 4 481** .

All components must be reinstalled in the same positions in an engine which has already been in use.

Fig. 1430: Identifying Engine Components
Courtesy of BMW OF NORTH AMERICA, INC.

1. Eccentric shaft with bearing
2. Bearing caps of eccentric shaft (set out in order)
3. Intake camshaft
4. Bearing caps of intake camshaft (set out in order)
5. Intake valves with valve springs
6. Valve plates and valve keys
7. Rocker arms with HVCA elements (set out in order)
8. Torsion springs
9. Guide blocks (set out in order)

cardiagn.com

10. Intermediate levers (set out in order)

Release screws (1) on guide block (2).

Tightening torque: **11 37 1AZ** .

Place all guide blocks (2) in neat order in special tool **11 4 481** .

Installation:

Mixing up the guide blocks (2) will cause the engine to suffer idle-speed fluctuations.

This will result in maladjustment of **uniform distribution** .

Fig. 1431: Identifying Screws On Guide Block
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

All contact surfaces (1) of guide block must be clean and free from oil and grease. If necessary, clean contact surfaces (1).

Fig. 1432: Identifying Contact Surfaces Of Guide Block
Courtesy of BMW OF NORTH AMERICA, INC.

Lift out intermediate levers (2).

Place all intermediate levers (2) in neat order in special tool **11 4 481** .

Installation:

Mixing up the intermediate levers (2) will cause the engine to suffer idle-speed fluctuations.

Installation:

All contact surfaces (1) must be clean and free from oil and grease. If necessary, clean contact surfaces (1).

Fig. 1433: Identifying Contact Surfaces And Intermediate Levers
Courtesy of BMW OF NORTH AMERICA, INC.

All intermediate levers (1) are classified.

All intermediate levers (1) must be reinstalled in the same positions in an engine which has already been in use.

Fig. 1434: Identifying Intermediate Levers Codes
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before installing intermediate levers (2), make sure rocker arms are correctly positioned.
Risk of damage!

Install intermediate levers (2).

Fig. 1435: Identifying Contact Surfaces And Intermediate Levers
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Fit guide block (2) cleanly into opening.

Tighten screws (1) hand-tight.

Check that intermediate levers are in correct installation position.

Release screws (1) by a 1/4 turn.

Fig. 1436: Identifying Screws And Guide Block
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 450** to screw connection (1) of eccentric shaft.

Shift eccentric lever (3) on special tool **11 4 450** in direction of arrow.

Guide block is now preloaded.

Insert screws (2) of guide blocks.

Tightening torque: **11 37 1AZ** .

Installation:

At cylinder no. 3, the guide block can be pre-installed with one screw (internal) only.

Oil spray nozzle is fitted only after torsion spring has been installed.

Fig. 1437: Securing Special Tool (11 4 450) To Screw Connection Of Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Install torsion spring (2) on guide block.

Installation:

Insert torsion spring (2) in intermediate lever (1) (see arrow).

Check that rocker arm (3) is in correct installation position.

Fig. 1438: Identifying Throttle Return Spring, Intermediate Lever And Roller Cam Follower
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 7 110** on return spring.

Fig. 1439: Positioning Special Tool (11 7 110) On Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Clamp return spring with knurled screw (1) in direction of arrow.

Fig. 1440: Clamping Return Spring With Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Return spring (1) is positioned correctly when catches (see arrows) are surrounding return spring (1).

Fig. 1441: Positioning Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

WARNING: **Risk of injury in event of incorrect use.**

Improper handling.
IMPORTANT: **Risk of damage!**
Check return spring on intermediate lever to ensure correct installation position.

Press special tool **11 7 110** to stop in direction of arrow.

Fig. 1442: Checking Return Spring On Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Pay attention to thread on cylinder head.
Risk of damage!

Tighten bolt (1).

Tightening torque: **11 37 2AZ** .

Fig. 1443: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

At cylinder no. 3, adjust oil spray nozzle (2) so that oil spray points precisely towards spline teeth (3).

Insert screw (1) with oil spray nozzle (2) (external).

Tightening torque: **11 37 4AZ** .

Fig. 1444: Identifying Oil Spray Nozzle And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 37 010 REMOVING AND INSTALLING/REPLACING INTERMEDIATE LEVERS (N55)

Special tools required:

- **11 4 450**
- **11 4 481**
- **11 7 110**

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**

Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
IMPORTANT: For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove **ALL IGNITION COILS AND INJECTOR SHAFTS**.

cardiagn.com

- Remove console for windscreen wiper (only E7x).

Slowly adjust eccentric shaft in direction of arrow to minimum stroke via the servomotor with a 4-mm hexagon socket wrench (2) and an open-end spanner (1).

IMPORTANT: Secure eccentric shaft with open-end spanner (1) (risk of return stroke).

Fig. 1445: Adjusting Eccentric Shaft To Minimum Stroke
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolt (1) on the oil spray nozzle.

Tightening torque: **11 37 4AZ** .

Unclip oil spray nozzle (2) from the bracket on the actuator drive (3) in direction of arrow.

Fig. 1446: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 7 110** on return spring (1) (see arrows).

Fig. 1447: Positioning Special Tool (11 7 110) On Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**

Place special tool **11 7 110** flat on cylinder head.

Turn knurled screw (1) in direction of arrow until both clamping levers secure return spring in gate.

Fig. 1448: Turning Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Return spring is correctly preloaded when both clamping levers are parallel to guide block.

Fig. 1449: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage!

Left and right return springs (1) must be positioned in lateral guide of special tool **11 7 110** .

Fig. 1450: Positioning Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Preload return spring with lever (1) on special tool **11 7 110** in direction of arrow.

Fig. 1451: Inserting Return Spring With Lever
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Lock special tool 11 7 110 with latching hook on lever (1).

IMPORTANT: Screw connection on return spring can first be released with secured special tool 11 7 110 .

Fig. 1452: Identifying Special Tool (11 7 110)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Fig. 1453: Releasing Screw
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: Risk of injury in event of incorrect use.
Lever (1) is preloaded.

IMPORTANT: Improper handling. **Risk of damage!**

Secure lever (1).

Press back latching hook (2).

Return spring tension can now be released.

Fig. 1454: Pressing Back Latching Hook
Courtesy of BMW OF NORTH AMERICA, INC.

Release knurled screw (1) on special tool 11 7 110 in direction of arrow.

Fig. 1455: Releasing Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release special tool 11 7 110 in direction of arrow from return spring (1).

Fig. 1456: Releasing Special Tool (11 7 110) From Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Press return spring (1) apart.

Remove return spring (1) upward.

Fig. 1457: Removing Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Uniform distribution must **not** be changed.
Place all components in clean and orderly condition in special tool 11 4 481 .

All components must be reinstalled in the same positions in an engine which has already been in use.

Fig. 1458: Identifying Engine Components
Courtesy of BMW OF NORTH AMERICA, INC.

1. Eccentric shaft with bearing

cardiagn.com

2. Bearing caps of eccentric shaft (set out in order)
3. Intake camshaft
4. Bearing caps of intake camshaft (set out in order)
5. Intake valves with valve springs
6. Valve heads and valve keys
7. Rocker arms with hydraulic valve clearance compensating elements (in neat order).
8. Return springs.
9. Gates (set out in order)
10. Intermediate levers (set out in order)

Release screws (1) on gate (2).

Tightening torque: **11 37 1AZ** .

Place all gates (2) in neat order in special tool **11 4 481** .

Installation note:

Mixing up the gates (2) will cause the engine to suffer idle-speed fluctuations.

This will result in maladjustment of **uniform distribution** .

Fig. 1459: Identifying Screws On Gate
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

All contact surfaces (1) of gates must be clean and free from oil and grease. If necessary, clean contact surfaces (1).

Fig. 1460: Identifying Contact Surfaces Of Gates
Courtesy of BMW OF NORTH AMERICA, INC.

Lift out intermediate levers (1).

Place all intermediate levers (1) in neat order in special tool **11 4 481** .

Installation note:

Mixing up the intermediate levers (1) will cause the engine to suffer idle-speed fluctuations.

Installation note:

All contact surfaces must be clean and free of oil and grease. If necessary, clean contact surfaces.

Fig. 1461: Identifying Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

All intermediate levers are classified.

All intermediate levers must be reinstalled in the same positions in an engine which has already been in use.

Intermediate levers are classified from 1 to 5.

cardiagn.com

Fig. 1462: Identifying Intermediate Lever Codes
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before installing intermediate levers (1), make sure rocker arms are correctly positioned.
Risk of damage!

Fig. 1463: Identifying Intermediate Levers
Courtesy of BMW OF NORTH AMERICA, INC.

Install intermediate levers (1).

Fig. 1464: Installing Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Fit gate (2) cleanly into recess.

Tighten screws (1) hand-tight.

Check that intermediate levers are in correct installation position.

Release screws (1) by a 1/4 turn.

Fig. 1465: Identifying Gate And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool **11 4 450** on screw connection (1) of eccentric shaft and set adjusting screw on special tool **11 4 450** if necessary.

Turn eccentric lever on special tool **11 4 450** in direction of arrow.

Gate is now preloaded.

Insert screws (1) of gates.

Tightening torque: **11 37 1AZ** .

Installation note:

At cylinder no. 3, the gate can be pre-installed with one screw (internal) only.

Fig. 1466: Securing Special Tool (11 4 450) On Screw Connection Of Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Oil spray nozzle is fitted only after return spring has been installed.

Press return spring (1) apart.

Install return spring (1).

Fig. 1467: Pressing Return Spring Apart
Courtesy of BMW OF NORTH AMERICA, INC.

Install return spring (2) on gate.

Installation note:

cardiagn.com

Insert return spring (2) in intermediate lever (1) (see arrow).

Check that rocker arm (3) is in correct installation position.

Fig. 1468: Identifying Throttle Return Spring, Intermediate Lever And Roller Cam Follower
Courtesy of BMW OF NORTH AMERICA, INC.

Position special tool **11 7 110** on return spring.

Fig. 1469: Positioning Special Tool (11 7 110) On Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

Clamp return spring with knurled screw (1) in direction of arrow.

Fig. 1470: Clamping Return Spring With Knurled Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Return spring (1) is positioned correctly when latching hooks surround return spring (1).

Fig. 1471: Positioning Return Spring
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Risk of injury in event of incorrect use.**

IMPORTANT: Improper handling. **Risk of damage!**
Check return spring on intermediate lever to ensure correct installation position.

Press special tool **11 7 110** to stop in direction of arrow.

Fig. 1472: Checking Return Spring On Intermediate Lever
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Pay attention to thread on cylinder head. **Risk of damage!**

Tighten bolt (1).

Tightening torque: **11 37 2AZ** .

Fig. 1473: Tightening Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Retract oil spray nozzle (2) on actuator drive (3).

Engage bolt (1) and release back to 90Â°.

For exact positioning of the oil spray nozzle (2) audibly clip it in at the top.

Tightening torque: **11 37 4AZ** .

Fig. 1474: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

cardiagn.com

11 37 020 REMOVING AND INSTALLING/REPLACING SERVOMOTOR FOR ECCENTRIC SHAFT (N20, N26)

Special tools required:

- 11 7 170

WARNING: **The preloading on the throttle return springs increases as the rotation on the worm gear increases. Danger of injury!**
The eccentric shaft may only be twisted on the mounting flats for protection. Risk of damage to the eccentric shaft gearing and to the servomotor worm drive.
The eccentric shaft must not spring back to the minimum stroke stop. Risk of damage!

Necessary preliminary work:

- Remove CYLINDER HEAD COVER.
- Remove IGNITION COIL AND INJECTOR SHAFTS.

WARNING: **Heed stop installation instructions.**

The eccentric shaft on the mounting flats (1) must only be turned with an open-end spanner (2) for support.

The eccentric shaft has **mounting flats on both sides;** if the engine is installed, the front mounting flat must be used.

Heed the following work instructions.

After the engine stops, the eccentric shaft is in the maximum stroke position.

If the actuator drive is defective, the eccentric shaft is located in an undetermined position.

Fig. 1475: Turning Eccentric Shaft On Mounting Flats
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) at oil spray nozzle (2).

Tightening torque: 11 37 4AZ .

Unclip oil spray nozzle (2) from the bracket on the actuator drive (3) in direction of arrow.

Fig. 1476: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Turn 4-mm hexagon socket wrench (2) clockwise (maximum stroke).

Secure eccentric shaft (1) with open-end spanner (3) for support.

Fix eccentric shaft with an open-end spanner (3) (kickback danger)

cardiagn.com

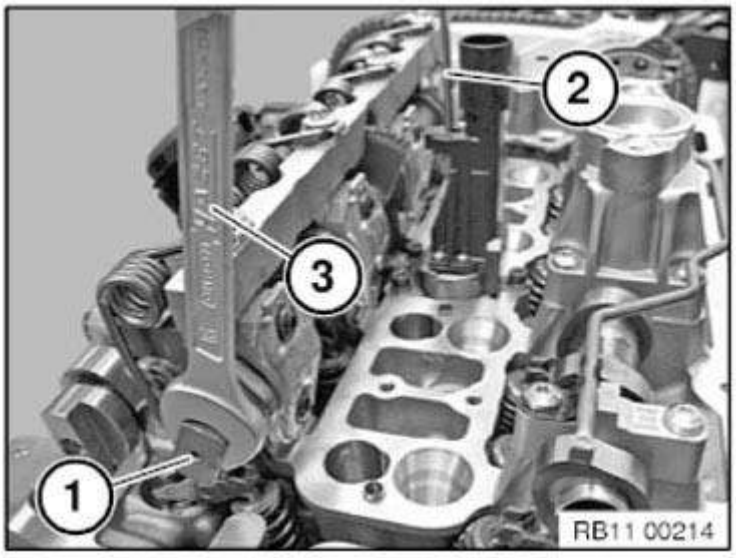


Fig. 1477: Securing Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Position eccentric shaft in the middle between maximum stroke and minimum stroke.

Secure eccentric shaft (1) with special tool **11 7 170** .

The open-end spanner can now be removed.

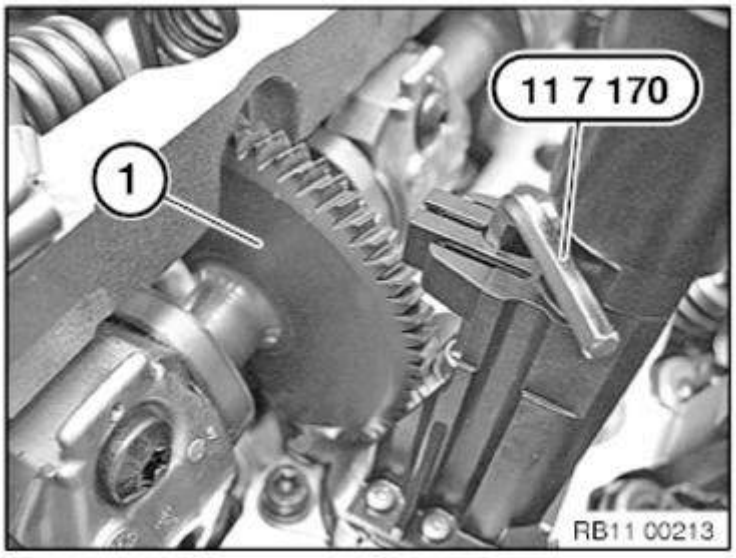


Fig. 1478: Securing Eccentric Shaft With Special Tool (11 7 170)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove minimum stroke stop (1).

Stop (2) of maximum stroke must remain in place for support of the intermediate shaft.

Tightening torque: **11 37 5AZ** .

cardiagn.com

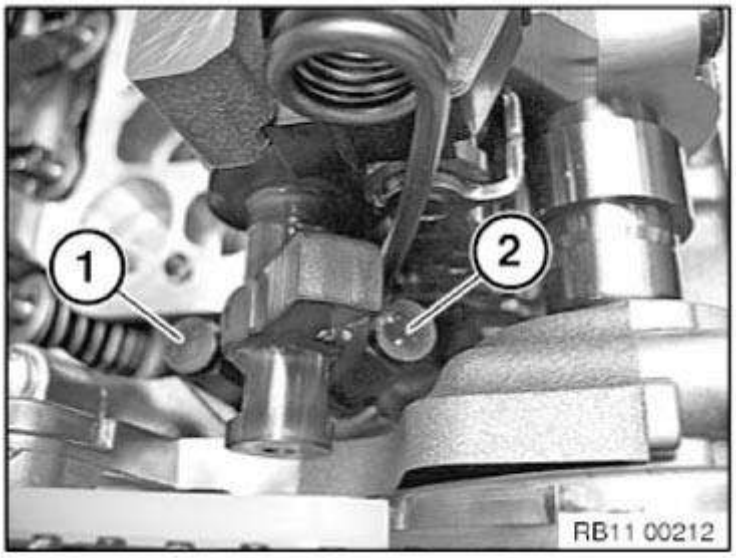


Fig. 1479: Removing Minimum Stroke Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Slowly adjust eccentric shaft to minimum stroke via servomotor using 4-mm hexagon socket wrench (2) and open-end spanner (3).

IMPORTANT: Secure eccentric shaft with an open-end spanner (1) **(kick-back danger)**

Release gearing of the eccentric shaft from worm drive.

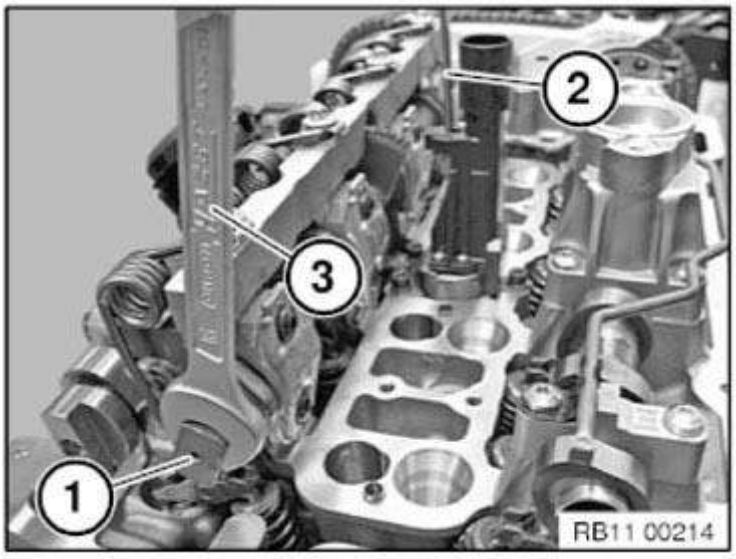


Fig. 1480: Adjusting Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Eccentric shaft (2) is no longer connected to the worm drive of the servomotor in this working position.

Turn eccentric shaft (2) approximately 90Â° further with an open-end spanner (1).

Secure eccentric shaft (2) against kickback with the assistance of a second person.

Graphic N55.

Fig. 1481: Turning Eccentric Shaft

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Position stop (1) of eccentric shaft at stop of maximum stroke.

Fig. 1482: Positioning Stop Of Eccentric Shaft At Stop Of Maximum Stroke
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in stop (1) for minimum stroke.

Tightening torque: **11 37 5AZ** .

Installation note:

The eccentric shaft is now secured and can no longer kick back.

Fig. 1483: Identifying Stop For Minimum Stroke
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Fig. 1484: Identifying Eccentric Shaft Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Turn servomotor (1) in direction of arrow and remove upwards.

Installation note:

Clean blind holes with compressed air.

The gearing of the worm gear and the eccentric shaft must be greased with **LONG-TIME PD 1 (4.1)**.

Fig. 1485: Turning Servomotor
Courtesy of BMW OF NORTH AMERICA, INC.

Insert bolts (1).

Tightening torque: **11 37 3AZ** .

Installation note:

Eccentric shaft and worm drive must now be joined.

Fig. 1486: Identifying Eccentric Shaft Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Release stop (1) of minimum stroke of eccentric shaft.

Tightening torque: **11 37 5AZ** .

IMPORTANT: Secure eccentric shaft with an open-end spanner (kickback danger)

Fig. 1487: Identifying Stop For Minimum Stroke
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

cardiagn.com

Carefully mate eccentric shaft gear in the worm shaft of the servomotor by turning the actuator drive.

Fix eccentric shaft with an open-end spanner (3) for support and secure (kickback danger).

Centrally clamp the eccentric shaft with a 4-mm hexagon socket wrench (2) at the servomotor.

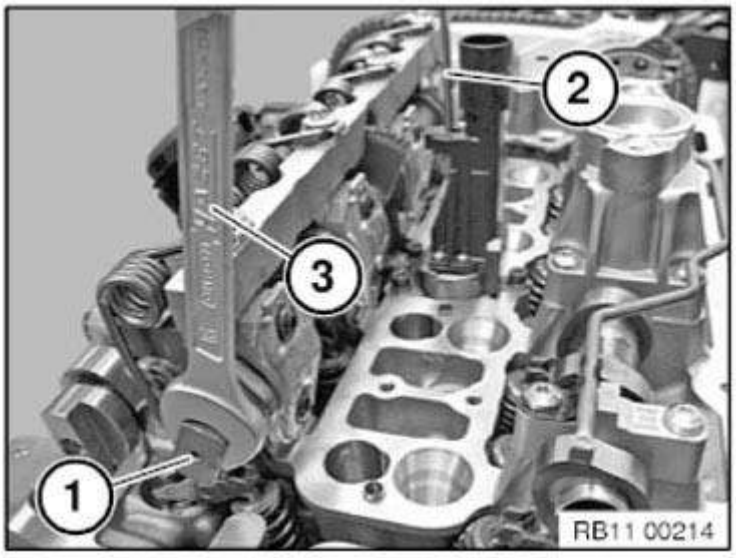


Fig. 1488: Securing Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Secure eccentric shaft (1) with special tool **11 7 170** .

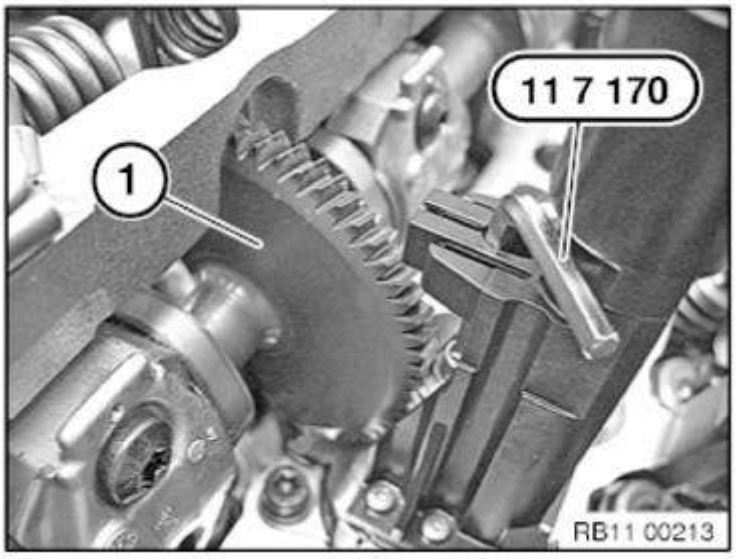


Fig. 1489: Securing Eccentric Shaft With Special Tool (11 7 170)
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in stop (1) for minimum stroke.

Tightening torque: **11 37 5AZ** .

cardiagn.com

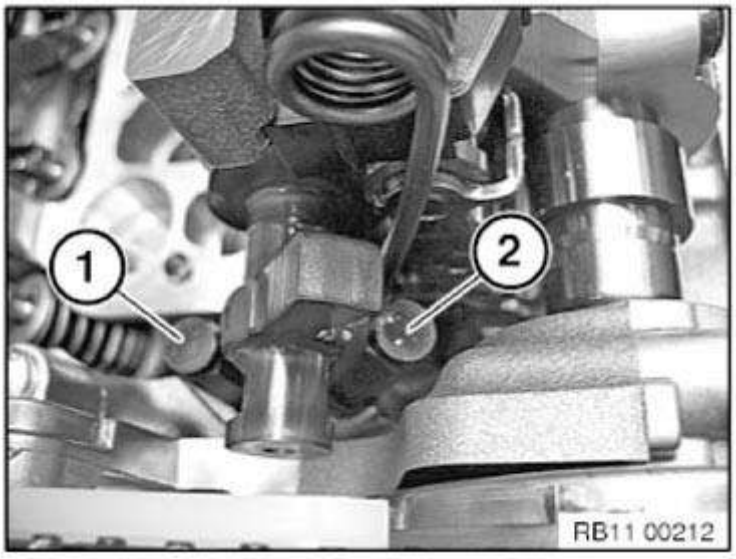


Fig. 1490: Identifying Minimum Stroke Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Slowly adjust eccentric shaft (1) to maximum stroke via servomotor using 4-mm hexagon socket wrench (2) and open-end spanner (3).

IMPORTANT: Merely secure eccentric shaft with an open-end spanner (1).

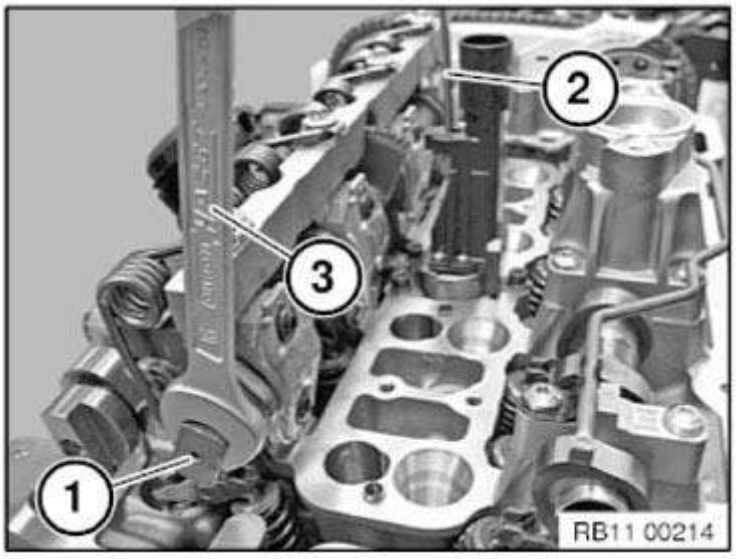


Fig. 1491: Securing Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Retract oil spray nozzle (2) on actuator drive (3).

Engage bolt (1) and release back to 90Â°.

For exact positioning of the oil spray nozzle (2) audibly clip it in at the top.

Secure oil spray nozzle (2) with screw (1).

Tightening torque: **11 37 4AZ** .

Fig. 1492: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Remove all special tools.

Assemble engine.

Check function of DME.

- Service function.
- Drive.
- Digital Motor Electronics
- Valvetronic run-in procedure.

11 37 020 REMOVING AND INSTALLING/REPLACING SERVOMOTOR FOR ECCENTRIC SHAFT (N52T)

Necessary preliminary tasks:

Remove **ACOUSTIC COVER**

Remove ignition coils (1) next to the servomotor (2).

Detach the ignition wiring harness (3) from the cylinder head cover and place it to one side.

Fig. 1493: Identifying Ignition Coils, Servomotor And Ignition Wiring Harness From Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock the plug connection (1) on the servomotor (2) and disconnect the plug.

Fig. 1494: Identifying Plug Connection On Servomotor
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The servomotor must be returned to its service position before the screws are removed. **Risk of damage** to intermediate shaft.

Using a hexagon socket wrench (2) and reversible ratchet, turn the screw (1) to the right as indicated by the arrow. This releases the tension on the intermediate shaft.

NOTE: Do not turn the screw beyond the pressure point.

Fig. 1495: Using A Hexagon Socket Wrench And Reversible Ratchet, Turn The Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release the screw (1) beneath the servomotor.

Tightening torque: **11 37 3AZ** .

Fig. 1496: Identifying Servomotor Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 37 3AZ** .

Fig. 1497: Identifying Servomotor Screws

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Turn the screw (1) to the left and remove the servomotor (2) by extracting it in the direction indicated by the arrow.

Fig. 1498: Removing Servomotor
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, detach the screws (1) and replace the seal (2).

Fig. 1499: Identifying Servomotor Seal With Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The gearing of the worm gear and the eccentric shaft must be greased with **LONG-TIME PD 1 (4.1)**.

Insert the servomotor (1) and turn the screw (2) to the right, continuing until the servomotor (1) is against the sealing flange (3).

Fig. 1500: Identifying Servomotor, Screw & Sealing Flange
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME.

11 37 020 REMOVING AND INSTALLING/REPLACING SERVOMOTOR FOR ECCENTRIC SHAFT (N55)

WARNING: **The preloading on the throttle return springs increases as the rotation on the worm gear increases. Danger of injury!**
The eccentric shaft may only be twisted on the mounting flats for protection. Risk of damage to the eccentric shaft gearing and to the servomotor worm drive.
The eccentric shaft must not spring back to the minimum stroke stop. Risk of damage!

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**.
- Remove **IGNITION COILS AND INJECTOR SHAFTS** of cylinders 1 to 4.

WARNING: **Heed stop installation instructions.**

The eccentric shaft on the mounting flats (2) must only be turned with an open-end spanner (1) for support.

Heed the following work instructions.

After the motor stops, the eccentric shaft is in the maximum stroke position.

If the actuator drive is defective, the eccentric shaft is located in an undetermined position.

Fig. 1501: Turning Eccentric Shaft Using Open-End Spanner
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release bolt (1) on the oil spray nozzle.

Tightening torque: **11 37 4AZ** .

Unclip oil spray nozzle (2) from the bracket on the actuator drive (3) in direction of arrow.

Fig. 1502: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

If the eccentric shaft is not on maximum stroke, the eccentric shaft must be adjusted to maximum stroke.

IMPORTANT: Fix eccentric shaft with an open-end spanner (kickback danger)
Adjust eccentric shaft only on the hexagon socket of the actuator drive (preload).

Remove minimum stroke stop (1).

Fig. 1503: Removing Minimum Stroke Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Turn 4-mm hexagon socket wrench (1) clockwise in direction of arrow (maximum stroke).

Secure eccentric shaft with an open-end spanner (2) for support in direction of arrow.

Fix eccentric shaft with an open-end spanner (2) (kickback danger)

Fig. 1504: Fixing Eccentric Shaft With Open-End Spanner
Courtesy of BMW OF NORTH AMERICA, INC.

Remove minimum stroke stop (1).

Tightening torque: **11 37 5AZ** .

Fig. 1505: Removing Minimum Stroke Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust eccentric shaft (1) to minimum stroke in direction of arrow via servomotor.

IMPORTANT: Secure eccentric shaft with an open-end spanner (kickback danger)

Fig. 1506: Adjusting Eccentric Shaft To Minimum Stroke
Courtesy of BMW OF NORTH AMERICA, INC.

Slowly adjust eccentric shaft in direction of arrow to minimum stroke via the servomotor with a 4-mm hexagon socket wrench (2) and an open-end spanner (1).

IMPORTANT: Secure eccentric shaft with an open-end spanner (1) (kickback danger)

Release gearing of the eccentric shaft from worm drive.

Fig. 1507: Adjusting Eccentric Shaft To Minimum Stroke
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Eccentric shaft (2) is no longer connected to the worm drive of the servomotor in this working position.

cardiagn.com

Turn eccentric shaft (2) approximately 90Â° further with an open-end spanner (1).

Secure eccentric shaft (2) against kickback with the assistance of a second person.

Fig. 1508: Turning Eccentric Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Eccentric shaft (1) is located in a relaxed position.
Secure eccentric shaft (1) against kickback with the assistance of a second person.

Unfasten screws (2).

Fig. 1509: Identifying Eccentric Shaft And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove servomotor (1) upward in direction of arrow.

Installation note:

Clean blind holes with compressed air.

Install servomotor (1) downward in direction of arrow.

Secure eccentric shaft against kickback with the assistance of a second person.

Installation note:

The gearing of the eccentric shaft and the worm gear must be greased with **LONG-TIME PD 1 (4.1)**.

Fig. 1510: Installing Servomotor
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Eccentric shaft and worm drive must now be joined.

Carefully mate eccentric shaft gear in the worm shaft of the servomotor by simultaneously pressing and turning on the actuator drive.

Insert bolts (2).

Tightening torque: **11 37 3AZ** .

Fig. 1511: Identifying Eccentric Shaft And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Preload eccentric shaft to maximum stroke with a 4-mm hexagon socket wrench (1) on the servomotor in direction of arrow.

Fix eccentric shaft with an open-end spanner (2) for support and secure (kickback danger).

Fig. 1512: Fixing Eccentric Shaft With Open-End Spanner
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Adjust eccentric shaft (1) back to maximum stroke in direction of arrow via servomotor.

IMPORTANT: Fix eccentric shaft with an open-end spanner and secure. (kickback danger)

Fig. 1513: Adjusting Eccentric Shaft To Maximum Stroke
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in stop (1) for minimum stroke.

Tightening torque: **11 37 5AZ** .

IMPORTANT: Fix eccentric shaft with an open-end spanner and secure. (kickback danger)

Fig. 1514: Identifying Minimum Stroke Stop
Courtesy of BMW OF NORTH AMERICA, INC.

Retract oil spray nozzle (2) on actuator drive (3).

Engage bolt (1) and release back to 90Â°.

For exact positioning of the oil spray nozzle (2) audibly clip it in at the top.

Secure oil spray nozzle (2) with screw (1).

Tightening torque: **11 37 4AZ** .

Fig. 1515: Removing Oil Spray Nozzle
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Assemble engine.

Check function of Digital Engine Electronics.

- Service function.
- Drive.
- Digital Motor Electronics
- Valvetronic run-in procedure.

OIL SUPPLY

11 40 000 CHECKING ENGINE OIL PRESSURE (N20, N26)

Special tools required:

- **11 9 240**
- 0 493 936
- **2 212 823**
- **11 4 310**
- **11 9 250**
- **11 6 410**

The regulated oil pump can only be checked and measured with the diagnosis system.

cardiagn.com

IMPORTANT:

Vehicles with a regulated oil pump have a **HYDRAULIC VALVE** fitted.
Diagnosis path:

- DME Digital Motor Electronics
- Complete vehicle
- Power train
- Engine electronics
- Engine oil
- Oil-pressure control

Necessary preliminary tasks:

- Connect BMW diagnosis system to vehicle.
- Observe diagnosis instructions.
- Protect drive belt against dirt
- Have a cleaning cloth ready to catch escaping oil

Release oil filter cover with special tool **11 9 240** .

Tightening torque: **11 42 1 AZ** .

Order number: 0 493 936

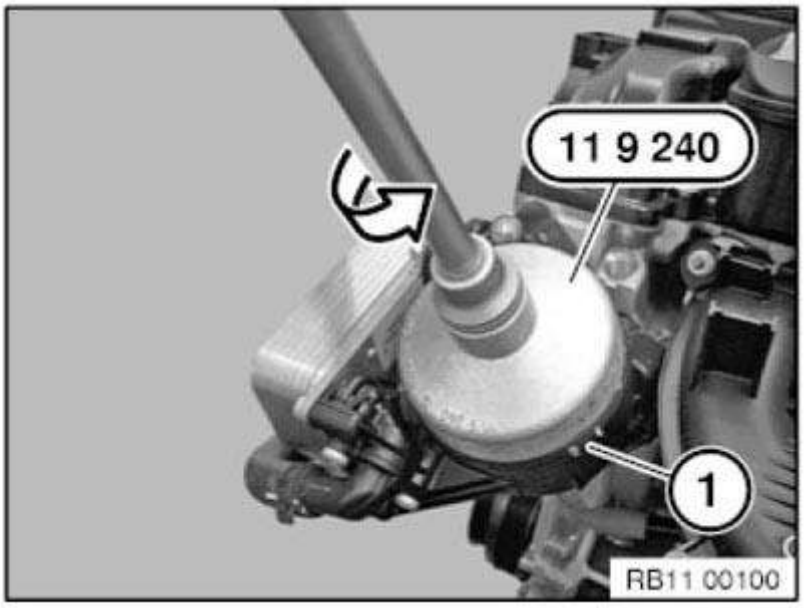


Fig. 1516: Releasing Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully pull off the filter element (2).

Installation note:

Check all O-rings for damage, replace if necessary.

cardiagn.com

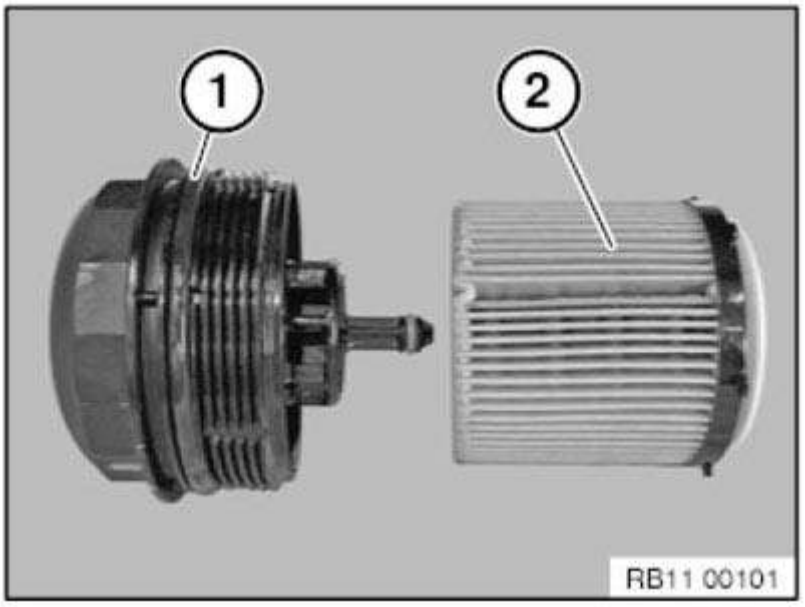


Fig. 1517: Identifying Oil Filter Element And Sealing Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Order number for special tool: **2 212 823** with **11 4 310** screw.

Screw the pressure sensor (1) hand tight.

Apply light coating of oil to sealing ring at pressure sensor (1) 100 bar.

Fig. 1518: Screwing Pressure Sensor Using Special Tool (2 212 823)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Engine oil pressure measurement is only possible with the diagnosis system.

Install the filter element (2) into the special tool (1).

Fig. 1519: Installing Filter Element Into Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Special tool to fit aluminum housing up to 11/2011

Secure special tool **11 9 250** at hexagon head in a vice.

Release insert (2) using a slotted screwdriver (1) in direction of arrow.

Fig. 1520: Securing Special Tool (11 9 250) At Hexagon Head In Vice
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw piece (1) on special tool **11 6 410** .

Fig. 1521: Releasing Screw Piece On Special Tool (11 6 410)
Courtesy of BMW OF NORTH AMERICA, INC.

Insert screw piece (1) hand-tight in direction of arrow on special tool **11 6 410** .

Fig. 1522: Inserting Screw Piece On Special Tool (11 6 410)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Install filter element (1) in special tool **11 9 250** .

Installation note:

Coat O-ring with engine oil.

Fig. 1523: Installing Filter Element In Special Tool (11 9 250)
Courtesy of BMW OF NORTH AMERICA, INC.

Measure the engine oil pressure with diagnosis system.

Order number for special tool: Screw **2 212 823** to oil filter housing.

Special tool **11 4 310** on special tool, order number: **2 212 823** .

Hand-tighten the 100 bar pressure sensor (1) on the special tool **11 4 310** .

Connect cable (2) of IMIB (Integrated Measurement Interface Box) to pressure sensor (1) 100 bar.

Fig. 1524: Identifying Special Tools, Pressure Sensor And IMIB Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Start the engine, comply with diagnosis instructions.

11 40 000 CHECKING ENGINE OIL PRESSURE (N55)

Special tools required:

- **11 6 410**
- **11 9 240**
- **11 9 250**
- **13 6 051**
- **2 212 823**
- **11 4 310**

IMPORTANT:

The regulated oil pump can only be checked and measured with the diagnosis system.
Vehicles with a regulated oil pump have a **HYDRAULIC VALVE** fitted.
Diagnosis path:

- DME Digital Motor Electronics
- Complete vehicle
- Power train
- Engine electronics
- Engine oil
- Oil-pressure control

Special tool **11 9 250** must be converted for N55

Necessary preliminary tasks:

- Connect BMW diagnosis system to vehicle.
- Observe diagnosis instructions.

cardiagn.com

- Protect drive belt against dirt
- Have a cleaning cloth ready to catch escaping oil

Secure special tool **11 9 250** at hexagon head in a vice.

Release insert (2) using a slotted screwdriver (1) in direction of arrow.

Fig. 1525: Securing Special Tool 11 9 250 At Hexagon Head In Vice
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw piece (1) on special tool **11 6 410** .

Fig. 1526: Releasing Screw Piece On Special Tool (11 6 410)
Courtesy of BMW OF NORTH AMERICA, INC.

Install special tool **11 6 410** in special tool **11 9 250** .

Insert central bolt with a slotted screwdriver (1) hand-tight.

Fig. 1527: Inserting Central Bolt With Slotted Screwdriver
Courtesy of BMW OF NORTH AMERICA, INC.

Insert screw piece (1) hand-tight in direction of arrow on special tool **11 6 410** .

Fig. 1528: Inserting Screw Piece On Special Tool (11 6 410)
Courtesy of BMW OF NORTH AMERICA, INC.

Release oil filter cover with special tool **11 9 240** .

Tightening torque: **11 42 1 AZ** .

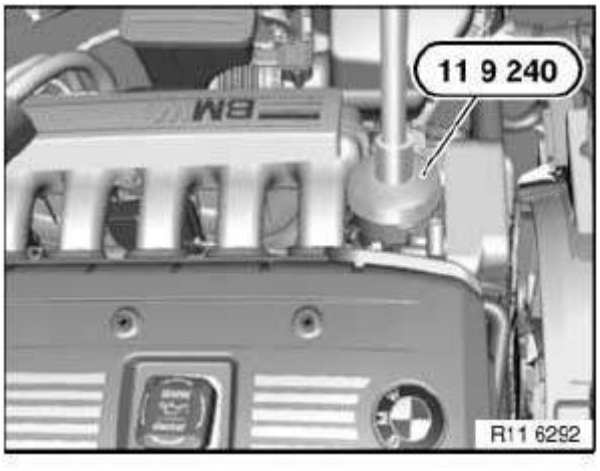


Fig. 1529: Releasing Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Carefully detach filter element.

Installation note:

Check all O-rings for damage, replace if necessary.

cardiagn.com

Fig. 1530: Checking O-Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Install filter element (1) in special tool **11 9 250** .

Installation note:

Coat O-ring with engine oil.

Fig. 1531: Installing Filter Element In Special Tool (11 9 250)
Courtesy of BMW OF NORTH AMERICA, INC.

Order number for special tool: Bolt **2 212 823** with **11 4 310** .

Screw the pressure sensor (1) hand tight.

Apply light coating of oil to sealing ring at pressure sensor (1) 100 bar.

Fig. 1532: Screwing Pressure Sensor Using Special Tool (2 212 823)
Courtesy of BMW OF NORTH AMERICA, INC.

Measure the engine oil pressure with diagnosis system.

Order number for special tool: Screw **2 212 823** to oil filter housing.

Special tool **11 4 310** on special tool, order number: **2 212 823** .

Screw in pressure sensor (1) 100 bar at special tool **11 4 310** (finger-tight).

Connect cable (2) of IMIB (Integrated Measurement Interface Box) to pressure sensor (1) 100 bar.

Graphic N20.

Fig. 1533: Identifying Special Tools, Pressure Sensor And IMIB Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Start engine and check engine oil pressure by means of diagnosis.

11 40 000 CHECKING OIL PRESSURE (N47 D20 O1)

Special tools required:

- **11 4 050**
- **13 3 061**
- **13 3 063**
- **13 6 051**
- **13 6 054**

Necessary preliminary work:

- Remove **OIL PRESSURE SWITCH** .

Install special tool **11 4 050** with sealing ring (1) in place of oil pressure switch.

Fig. 1534: Identifying Special Tool (11 4 050)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Check engine oil pressure with DIS Tester

Attach special tool **13 6 054** with sealing ring (1) and special tool **13 6 051** and connect to DIS Tester.

Check engine oil pressure with pressure gauge

Install special tool **13 3 063** and special tool **13 3 061** (pressure gauge).

Fig. 1535: Checking Engine Oil Pressure With Pressure Gauge
Courtesy of BMW OF NORTH AMERICA, INC.

Fit pressure gauge **13 3 061** .

Check engine oil pressure.

Start engine and run at idle speed.

Nominal value. See **OIL PUMP WITH STRAINER AND DRIVE (N47T)** .

Fig. 1536: Identifying Pressure Gauge (13 3 061)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove all special tools.

Reassemble vehicle and set in horizontal position.

Switch off engine, wait approx. 5 minutes and then check engine oil level.

Top up engine oil if necessary.

OIL PUMP WITH FILTER AND DRIVE

11 66 000 REMOVING AND INSTALLING OR REPLACING VACUUM/OIL PUMP (N47 D20 O1)

See **11 66 000 REMOVING AND INSTALLING OR REPLACING VACUUM/OIL PUMP (N47 D20 O1)**.

11 41 010 REMOVING AND INSTALLING OR REPLACING CHAIN MODULE FOR OIL PUMP/VACUUM PUMP (N52T)

Special tools required:

- **00 9 140**
- **11 0 290**
- **11 0 300**
- **11 4 120**
- **11 4 360**
- **11 4 362**
- **11 4 440**
- **11 5 200**
- **11 8 640**
- **11 9 280**

Aluminum-magnesium materials.

cardiagn.com

IMPORTANT: **No** steel screws/bolts may be used due to the threat of electrochemical corrosion.
A magnesium crankcase requires aluminum screws/bolts exclusively.
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Remove **CYLINDER HEAD COVER**
- Remove **OIL SUMP**
- Remove **DRIVE BELT**
- Remove drive belt **TENSIONER**
- Remove **VIBRATION DAMPER**
- Remove **SEALING CAP** for vacuum pump
- Check **TIMING**
- Remove **CHAIN TENSIONER**.

Procedure on installed engine:

Turn sprocket (3) with central bolt at crankshaft into position until special tool **11 0 290** can be secured.

Simultaneously secure special tool **11 0 290** to sprocket (3) and special tool **11 4 362** .

Release screw (2) for sprocket (3).

Tightening torque: **11 66 2AZ** .

Fig. 1537: Securing Special Tool (11 0 290) To Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Press timing chain with chain tensioner (1) in direction of arrow.

Disconnect timing chain with special tool **11 4 120** .

Feed out sprocket (3) at hexagon head (4) of vacuum pump.

Installation note:

If the chain module is replaced, a mounting bar (2) is already pre-installed.

Fig. 1538: Disconnecting Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **To release bolt (1), insert a 6 mm drill bit between sprocket and oil pump housing.**

Release screw (1) for sprocket.

Tightening torque: **11 41 6AZ** .

Release screws (2) for chain module.

Tightening torque: **11 41 5AZ** .

cardiagn.com

Installation note:

Replace aluminum screws.

Fig. 1539: Identifying Chain Module & Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: To release central bolt (1), remove special tool **11 0 300** .
Employ a **second** person for gripping when releasing central bolt (1).

Screw special tool **11 9 280** onto hub of vibration absorber.

Release central bolt (1).

Tightening torque: **11 21 1AZ** .

Installation note:

Replace central bolt (1).

Fig. 1540: Removing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Remove hub (2) towards front.

Installation note:

Replace **CRANKSHAFT SEAL** at front.

Open screw plug on bedplate.

Tightening torque: **11 11 8AZ** .

Graphic N42.

Fig. 1541: Removing Hub
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screw (1) with special tool **11 8 640** .

Tightening torque: **11 41 4AZ** .

Installation note:

Replace aluminum screws.

Fig. 1542: Identifying Aluminum Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Remove chain module (1) in direction of arrow.

Fig. 1543: Removing Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

Pay attention to direction of installation of the crankshaft sprocket (2).

cardiagn.com

IMPORTANT: Collar (see arrow) on sprocket (2) points to **engine** .
Incorrect assembly will result in **engine damage** .

Fig. 1544: Locating Collar On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Procedure on removed engine:

NOTE: Engine is mounted on special tool 11 4 440 .

Release screw (1) for vacuum pump sprocket.

Tightening torque: **11 66 2AZ** .

Release screw (2) for oil pump sprocket.

Tightening torque: **11 41 6AZ** .

Release central bolt (3).

Tightening torque: **11 21 1AZ** .

Fig. 1545: Removing Oil Pump Sprocket, Screws & Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace central bolt (3).

Remove hub (4) towards front.

Install hub with new central bolt.

Tighten down special tool **11 5 200** with screws (1) to hub.

Fig. 1546: Identifying Central Bolt, Hub & Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Remove **TENSIONER** for drive belt.

Screw in special tool **11 4 362** from special tool set **11 4 360** .

Mount special tool **11 9 280** on **11 5 200** .

Support special tool **11 9 280** on special tool **11 4 362** .

Tighten central bolt to jointing torque.

Tightening torque: **11 21 1AZ** .

Mark central bolt and hub with paint.

Special tool **11 0 300** secures crankshaft.

Fig. 1547: Tightening Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Mark special tools with colored mark (1).

See **Fig. 1548**.

IMPORTANT: Do not remove the special tool while tightening the central bolt to angle of rotation.

Risk of damage!

If necessary, tighten central bolt to angle of rotation with special tool **00 9 140** .

Tightening torque: **11 21 1AZ** .

Fig. 1548: Marking Special Tools With Colored Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Rotate crankshaft at central bolt into TDC setting.

Slide special tool **11 0 300** in direction of arrow into dowel hole and secure crankshaft.

IMPORTANT: On vehicles with automatic transmission, there is a large bore hole for the TDC position shortly before the dowel bore. This bore hole can be confused with the dowel hole.

If the flywheel is secured in the correct dowel hole with special tool **11 0 300** , the engine can no longer be moved at the central bolt.

Fig. 1549: Securing Flywheel Using Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace **CRANKSHAFT SEAL** at front.

Adjust **VALVE TIMING**

Assemble engine.

11 41 010 REMOVING AND INSTALLING/REPLACING CHAIN MODULE FOR OIL PUMP (N20, N26)

Special tools required:

- **2 219 548**
- 83 30 2 212 831
- **2 212 825**
- **11 4 120**
- **2 318 117**
- **11 9 260**
- **11 8 180**
- **11 8 660**
- **2 212 831**
- **00 9 140**

IMPORTANT: The counterbalance shaft must be adjusted to the motor.

Necessary preliminary tasks:

cardiagn.com

- **REMOVE CYLINDER HEAD COVER**.
- Remove all **SPARK PLUGS** .
- Removing **OIL SUMP**.
- **REMOVE** alternator drive belt.
- Remove **VIBRATION DAMPER**.
- Secure **CAMSHAFTS** with special tool.
- Remove **CHAIN TENSIONER PISTON**.

Installation note:

Wet special tool **2 219 548** with oil for simpler removal and installation.

Secure crankshaft with special tool **2 219 548** above the dowel hole.

Secure camshafts with special tool 83 30 2 212 831 (procedure: see check timings).

Fig. 1550: Identifying Special Tool (2 219 548)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Detach intake snorkel (2) in direction of arrow.

Fig. 1551: Detaching Intake Snorkel
Courtesy of BMW OF NORTH AMERICA, INC.

Remove sealing cap using a screwdriver.

Fig. 1552: Removing Sealing Cap Using Screwdriver
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Only open central bolt of oil pump with special tool.

Secure special tool **2 212 825** to oil pump with screw (1).

The counterbalance shaft is now secured.

Fig. 1553: Identifying Special Tool (2 212 825), Oil Pump Housing And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Push back chain tensioner with tensioning rail (1) and secure with special tool **11 4 120** .

NOTE: Sprocket must be blocked with special tool 2 318 117 in order to release central bolt (2).

Mount special tool **2 318 117** and secure with screws (3).

Release central bolt (2) for oil pump drive shaft.

Remove special tool **2 318 117** .

Installation note:

cardiagn.com

Fig. 1554: Releasing Central Bolt For Oil Pump Drive Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Replace central bolt (2).

Tightening torque: **11 41 5AZ** .

NOTE: Engine removed.

Block crankshaft with special tool **11 9 260** .

Fig. 1555: Identifying Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Engine installed with manual transmission:

Block crankshaft with special tool **11 8 180** .

Fig. 1556: Identifying Special Tool (11 8 180)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Engine installed with automatic transmission:

Block crankshaft with special tool **11 8 660** .

Feed in special tool, slide screw forward and tighten.

Fig. 1557: Identifying Special Tool (2 222 742)
Courtesy of BMW OF NORTH AMERICA, INC.

or

Block crankshaft with special tool **11 8 660** .

Fig. 1558: Identifying Special Tool (11 8 660)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not remove special tools **2 219 548** and **2 212 831** to release central bolt (1).

Release central bolt (1).

Breakaway torque greater than **500 Nm** .

Installation note:

Release central bolt (1) with 3/4 inch tool (2).

Fig. 1559: Releasing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in two screws (1) and pull off hub (2) in direction of arrow.

Fig. 1560: Pulling Hub On Crankshaft

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) and pull off chain module (2) off of oil pump drive shaft.

Tightening torque: **11 41 3AZ** .

Fig. 1561: Identifying Gear And Chain Module Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Observe mounting flats on camshaft sprocket (1).

Both grip discs (2) must be attached to drive gear for oil pump with welding spots.

Grip discs are not individually available.

If grip discs are damaged, the drive gear for oil pump with grip discs must be replaced.

Before installation: Press back chain tensioner with tensioning rail and secure with special tool **11 4 120** .

Fig. 1562: Identifying Camshaft Sprocket & Grip Disc
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Grip disc (1) is only fitted on vehicles with manual gearbox.

Installation note:

Grip disc (1) must be fitted (manual gearbox only)

If grip disc (1) is not mounted, central bolt can come loose (engine damage).

Fig. 1563: Identifying Grip Disc
Courtesy of BMW OF NORTH AMERICA, INC.

Position module (1) for oil pump drive.

Position module (2) for camshaft drive.

Insert hub (3) for vibration absorber with grip disc.

Fig. 1564: Positioning Module For Camshaft Drive And Oil Pump Drive
Courtesy of BMW OF NORTH AMERICA, INC.

Position chain module (2) for oil pump drive shaft on mounting flats.

Insert bolts (1).

Tightening torque: **11 41 3AZ** .

Fig. 1565: Identifying Gear And Chain Module Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Camshaft sprocket must be blocked with special tool 2 318 117 in order to tighten central bolt (2).

cardiagn.com

Mount special tool **2 318 117** and secure with screws (3).

Insert and tighten central bolt (2) for oil pump drive shaft.

Installation note:

Replace screw.

Tightening torque: **11 41 5AZ** .

Fig. 1566: Inserting Central Bolt For Oil Pump Drive Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Disassemble special tools **11 4 120** and. **2 318 117** .

Insert central bolt.

Secure central bolt with special tool **00 9 140** .

Tightening torque: **11 21 1AZ** .

Position magnetic foot (1) in suitable location.

Installation note:

Replace front **CRANKSHAFT SEAL**.

Fig. 1567: Securing Central Bolt With Special Tool (00 9 140)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 010 REMOVING AND INSTALLING/REPLACING CHAIN MODULE FOR OIL PUMP/VACUUM PUMP (N55) FROM MARCH 2012

Special tools required:

- **00 9 140**
- **11 0 290**
- **11 0 300**
- **11 4 120**
- **11 8 640**
- **11 8 650**
- **11 9 260**
- **2 303 793**
- **11 8 180**
- **11 8 660**
- **11 4 280**

IMPORTANT: Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

cardiagn.com

Necessary preliminary tasks:

- **REMOVE CYLINDER HEAD COVER**.
- Remove all **SPARK PLUGS** .
- Removing **OIL SUMP**.
- Remove **DRIVE BELT**.
- Remove **TENSIONING DEVICE** for drive belt.
- Remove **VIBRATION DAMPER**.
- Remove **SEALING COVER** for vacuum pump.
- Remove **SEALING CAP** of chain tensioner for oil pump.
- Remove **CHAIN TENSIONER**.

Screw in special tool **11 8 650** on belt tensioner screw connection on crankcase.

Turn sprocket with central bolt at crankshaft into position until special tool **11 0 290** can be secured.

Simultaneously secure special tool **11 0 290** to sprocket and special tool **11 8 650** .

Release screw (1) for sprocket.

Tightening torque: **11 66 2AZ** .

Fig. 1568: Screwing Special Tool (11 8 650) On Screw Connection Of Belt Tensioner On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before releasing the central bolt on the oil pump, the hydraulic chain tensioner must be drained.

Carefully press tensioning rail (1) with a suitable screwdriver (2) in direction of arrow.

As the oil pressure in the chain tensioner can only be drained pulsating, the tensioning rail (1) must be pressed several times.

Fig. 1569: Pressing Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Press the tensioning rail (1) and hold down.

Fix chain tensioner piston in position with a suitable lock pin (2).

Release screws (3).

Tightening torque: **11 41 7AZ** .

Fig. 1570: Fixing Chain Tensioner Piston In Position Using Suitable Lock Pin
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Sprocket must be blocked in order to release central bolt (1).

Secure special tool **2 303 793** to crankcase.

Release oil pump central bolt (1).

Tightening torque: **11 41 5AZ** .

cardiagn.com

Fig. 1571: Releasing Oil Pump Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Remove fastener (1) in direction of arrow.

Fig. 1572: Removing Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Position flywheel (1) with special tool **11 0 300** in TDC setting.

Fig. 1573: Positioning Flywheel With Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

Press timing chain with chain tensioner (1) in direction of arrow.

Disconnect timing chain with special tool **11 4 120** .

Feed out sprocket (3) at hexagon head (4) of vacuum pump.

Installation note:

If the chain module is replaced, a mounting bar (2) is already pre-installed.

Fig. 1574: Disconnecting Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screws (1).

Remove oil pump drive gear from the drive shaft.

Fig. 1575: Identifying Mounting Flats On Oil Pump Drive
Courtesy of BMW OF NORTH AMERICA, INC.

Open screw plug (1).

Tightening torque: **11 11 9AZ** .

Installation note:

Replace sealing ring.

Fig. 1576: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Lock flywheel (1) with special tool **11 9 260** .

Fig. 1577: Identifying Flywheel With Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Gearbox installed with manual gearbox:

Block crankshaft with special tool **11 8 180** .

cardiagn.com

Fig. 1578: Identifying Special Tool (11 8 180)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Gearbox installed with automatic transmission:

Block crankshaft with special tool **11 8 660** .

Fig. 1579: Identifying Special Tool (11 8 660)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not remove special tools **11 0 300** and **11 4 280** to release central bolt (1).

Release central bolt (1).

Installation note:

Release central bolt (1) with 3/4 tool (2).

Breakaway torque approx. 500 Nm.

Fig. 1580: Removing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in two screws (1) and remove hub (2) in direction of arrow.

Installation note:

Replace front **CRANKSHAFT SEAL**.

Fig. 1581: Removing Hub On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screw (1) with special tool **11 8 640** .

Fig. 1582: Identifying Aluminum Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Remove chain module (1) in direction of arrow.

Fig. 1583: Removing Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Both grip discs must be attached to drive gear for oil pump with welding spots.

Grip discs are not individually available.

If grip discs are damaged, the drive gear for oil pump with grip discs must be replaced.

Fig. 1584: Identifying Grip Discs
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

cardiagn.com

Grip disc (1) must be mounted.

If grip disc (1) is not mounted, central bolt can come loose (engine damage).

Fig. 1585: Identifying Grip Disc
Courtesy of BMW OF NORTH AMERICA, INC.

Note installation direction of sprocket (2).
IMPORTANT: Collar (see arrow) on sprocket (2) points to **engine** .
Incorrect assembly will result in **engine damage** .

Fig. 1586: Locating Collar On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Insert chain module.

Secure aluminum screw (1) with special tool **11 8 640** .

Tightening torque: **11 41 3AZ** .

Fig. 1587: Identifying Aluminum Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Insert aluminum screws (1) for chain module.

Tightening torque: **11 41 6AZ** .

Installation note:

Replace aluminum screws.

Pay attention to mounting flats on oil pump drive.

Fig. 1588: Insert Aluminum Screws For Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

Position module (1) for oil pump drive.

Position module (2) for camshaft drive.

Insert hub (3) for vibration absorber with grip disc.

Fig. 1589: Positioning Module For Camshaft Drive And Oil Pump Drive
Courtesy of BMW OF NORTH AMERICA, INC.

Insert central bolt (1).

Secure central bolt with special tool **00 9 140** .

Tightening torque: **11 21 1AZ** .

Installation note:

Replace front **CRANKSHAFT SEAL**.

cardiagn.com

Fig. 1590: Inserting Central Bolt With Hub For Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 010 REMOVING AND INSTALLING/REPLACING CHAIN MODULE FOR OIL PUMP/VACUUM PUMP (N55) UP TO MARCH 2012

Special tools required:

- 00 9 140
- 11 0 290
- 11 0 300
- 11 4 120
- 11 8 640
- 11 8 650
- 11 9 260
- 2 303 793
- 11 8 180
- 11 8 660
- 11 4 280

Aluminum screws/bolts must be replaced each time they are released.
Aluminum screws/bolts are permitted with and without color coding (blue).
IMPORTANT: For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail (**risk of damage**).

Necessary preliminary tasks:

- Remove CYLINDER HEAD COVER
- Remove all SPARK PLUGS .
- Remove OIL SUMP
- Remove DRIVE BELT
- Remove drive belt TENSIONING DEVICE
- Remove VIBRATION DAMPER
- Remove SEALING CAP for vacuum pump
- Remove CHAIN TENSIONER.

Fig. 1591: Screwing Special Tool (11 8 650) On Screw Connection Of Belt Tensioner On Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in special tool 11 8 650 on belt tensioner screw connection on crankcase.

Turn sprocket with central bolt at crankshaft into position until special tool 11 0 290 can be secured.

Simultaneously secure special tool 11 0 290 to sprocket and special tool 11 8 650 .

Release screw (1) for sprocket.

Tightening torque: 11 66 2AZ .

NOTE: Sprocket must be blocked in order to release central bolt (1).

cardiagn.com

Secure special tool **2 303 793** to crankcase.

Release oil pump central bolt (1).

Tightening torque: **11 41 5AZ** .

Fig. 1592: Identifying Oil Pump Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Remove fastener (1) in direction of arrow.

Fig. 1593: Removing Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Position flywheel (1) with special tool **11 0 300** in TDC setting.

Fig. 1594: Positioning Flywheel With Special Tool (11 0 300)
Courtesy of BMW OF NORTH AMERICA, INC.

Press timing chain with chain tensioner (1) in direction of arrow.

Disconnect timing chain with special tool **11 4 120** .

Feed out sprocket (3) at hexagon head (4) of vacuum pump.

Installation note:

If the chain module is replaced, a mounting bar (2) is already pre-installed.

Fig. 1595: Disconnecting Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screws (1).

Remove oil pump drive gear from the drive shaft.

Fig. 1596: Identifying Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Open screw plug (1).

Tightening torque: **11 11 9AZ** .

Installation note:

Replace sealing ring.

Fig. 1597: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Without transmission.

Lock flywheel (1) with special tool **11 9 260** .

cardiagn.com

Fig. 1598: Identifying Flywheel With Special Tool (11 9 260)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Gearbox installed with manual gearbox:

Block crankshaft with special tool **11 8 180** .

Fig. 1599: Identifying Special Tool (11 8 180)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Gearbox installed with automatic transmission:

Block crankshaft with special tool **11 8 660** .

Fig. 1600: Identifying Special Tool (11 8 660)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not remove special tools **11 0 300** and **11 4 280** to release central bolt (1).

Release central bolt (1).

Installation note :

Release central bolt (1) with 3/4 tool (2).

Breakaway torque approx. 500 Nm.

Fig. 1601: Removing Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in two screws (1) and remove hub (2) in direction of arrow.

Installation note :

Replace front **CRANKSHAFT SEAL**.

Fig. 1602: Removing Hub On Crankshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screw (1) with special tool **11 8 640** .

Fig. 1603: Removing Aluminum Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Remove chain module (1) in direction of arrow.

Installation note :

Both grip discs must be attached to drive gear for oil pump with welding spots.

Fig. 1604: Removing Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

Grip discs are not individually available.

cardiagn.com

If grip discs are damaged, the drive gear for oil pump with grip discs must be replaced.

Fig. 1605: Identifying Grip Discs
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note :

Grip disc (1) must be mounted.

If grip disc (1) is not mounted, central bolt can come loose (engine damage).

Fig. 1606: Identifying Grip Disc
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Note installation direction of sprocket (2).
Collar (see arrow) on sprocket (2) points to **engine** .
Incorrect assembly will result in **engine damage** .

Fig. 1607: Identifying Collar On Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Insert chain module.

Secure aluminum screw (1) with special tool **11 8 640** .

Tightening torque: **11 41 3AZ** .

Fig. 1608: Identifying Aluminum Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Insert aluminum screws (1) for chain module.

Tightening torque: **11 41 6AZ** .

Installation note :

Replace aluminum screws.

Pay attention to mounting flats on oil pump drive.

Fig. 1609: Inserting Aluminum Screws For Chain Module
Courtesy of BMW OF NORTH AMERICA, INC.

Position module (1) for oil pump drive.

Position module (2) for camshaft drive.

Insert hub (3) for vibration absorber with grip disc.

Fig. 1610: Positioning Module For Camshaft Drive And Oil Pump Drive
Courtesy of BMW OF NORTH AMERICA, INC.

Insert central bolt (1).

cardiagn.com

Secure central bolt with special tool **00 9 140** .

Tightening torque: **11 21 1AZ** .

Installation note :

Replace front **CRANKSHAFT SEAL**.

Fig. 1611: Securing Central Bolt With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 115 REMOVING AND INSTALLING/REPLACING HYDRAULIC VALVE (N20, N26)

Necessary preliminary tasks:

- **REMOVE LEFT CHARGE AIR DUCT**.

Installation location: Next to left engine support arm.

Detach connector from hydraulic valve (2).

Release screw (1).

Tightening torque: **11 41 4AZ** .

Remove hydraulic valve (2).

Fig. 1612: Identifying Hydraulic Valve And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Replace O-ring (1).

Fig. 1613: Identifying Hydraulic Valve O-Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of Digital Engine Electronics.

CHECK ENGINE OIL PRESSURE.

DIAGNOSIS PATH:

- DME Digital Motor Electronics
- Complete vehicle
- Power train
- Engine electronics
- Engine oil
- Oil-pressure control

11 41 115 REMOVING AND INSTALLING/REPLACING HYDRAULIC VALVE (N55)

Necessary preliminary tasks:

cardiagn.com

- **REMOVE** fan cowl with electric fan.
- Have a cleaning cloth ready to catch escaping oil

Detach connector (1) from hydraulic valve (2).

Fig. 1614: Identifying Hydraulic Valve And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) and remove hydraulic valve.

Tightening torque: **11 41 4AZ** .

Fig. 1615: Identifying Hydraulic Valve Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Replace O-ring (1).

Fig. 1616: Identifying Hydraulic Valve O-Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of Digital Engine Electronics.

Check **OIL PRESSURE**.

Diagnosis path:

- Digital Motor Electronics
- Complete vehicle
- Power train
- Engine electronics
- Engine oil
- Oil-pressure control

11 41 000 REMOVING AND INSTALLING OR REPLACING OIL/VACUUM PUMP (N47 D20 O1)

Special tools required:

- **00 9 120**
- **11 4 350**
- **11 4 470**

IMPORTANT: It is possible to remove and install the oil vacuum pump without removing the transmission.

Necessary preliminary tasks:

- Remove **OIL SUMP**.

Release screws (1).

Remove intake snorkel in direction of arrow.

Fig. 1617: Removing Intake Snorkel

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Installation note:

Clean and blow out the thread

Fig. 1618: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Fig. 1619: Releasing Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

NOTE: Illustration shows gear case cover removed.

Fig. 1620: Identifying Gear Case Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Oil vacuum pump must be fed out at chain drive (1).

When installed, the oil pump chain (1) must be fed out from the sprocket wheel of the oil pump drive gear; the sprocket wheel cannot be removed.

Fig. 1621: Identifying Oil Pump Chain
Courtesy of BMW OF NORTH AMERICA, INC.

Feed out oil vacuum pump (1) in direction of arrow and remove.

Installation in reverse sequence.

Installation note:

Clean all sealing surfaces with special tool **11 4 470** .

Fig. 1622: Removing Oil Vacuum Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Install all screws (1) and tighten down.

Tightening torque: **11 41 1AZ** .

Fig. 1623: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Install and tighten down screws (1).

Tightening torque: **11 41 1AZ** .

Fig. 1624: Identifying Gear Case Cover And Screws

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean and blow out the thread

Insert and secure screw (1).

Secure screw (1) with special tool **00 9 120** .

Tightening torque: **11 41 2AZ** .

Fig. 1625: Securing Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 000 REMOVING AND INSTALLING/REPLACING OIL PUMP (N52T)

Special tools required:

- **11 8 640**

Necessary preliminary work:

- Remove **OIL SUMP**

Release screws (1).

Tightening torque: **11 41 1AZ** .

Installation note:

Replace aluminum screws.

Remove intake pipe (2) in direction of arrow.

Installation note:

Replace sealing ring.

Fig. 1626: Removing Oil Pump Intake Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Secure oil pump sprocket with 6.0 mm dia.steel pin (3) to oil pump.

IMPORTANT: Release central bolt (2) only together with 6.0 mm dia. steel pin (3).

Do not remove sprocket.

Release central bolt (2).

Tightening torque: **11 41 6AZ** .

Fig. 1627: Identifying Central Bolt And Steel Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten screws (2).

cardiagn.com

Tightening torque: **11 41 5AZ** .

Installation note:

Replace aluminum screws.

Fig. 1628: Identifying Crankcase Screw And Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Remove screw plug (1) from crankcase at front.

NOTE: Replace gasket.

Fig. 1629: Identifying Crankcase Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) for oil pump triangular drive with special tool **11 8 640** .

NOTE: It is not necessary to remove the triangular drive.

Fig. 1630: Identifying Oil Pump Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release oil pump screws (1).

Tightening torque: **11 41 2AZ** .

IMPORTANT: Observe different screw lengths.

Installation note:

Replace aluminum screws.

Fig. 1631: Identifying Oil Pump Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Detach sprocket (1) in direction of arrow.

NOTE: Chain tensioner presses timing chain (3) upwards.

Do **not** remove sprocket (1).

Remove oil pump (2) in direction of arrow.

Fig. 1632: Identifying Oil Pump, Timing Chain And Sprocket Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check spacers (1) for secure seating and damage; replace if necessary.

Align mounting flats (3) on oil pump (2) to sprocket (4).

Install oil pump (2).

cardiagn.com

Fig. 1633: Aligning Mounting Flats On Oil Pump To Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 000 REMOVING AND INSTALLING/REPLACING OIL PUMP (N55) FROM MARCH 2012

Special tools required:

- **2 303 793**

IMPORTANT:
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Removing **OIL SUMP**.
- Remove **SEALING CAP** of vacuum pump.
- Remove **SEALING CAP** for oil pump chain tensioner.

Undo all the aluminum screws (1) along the line.

Installation note:

Replace aluminum screws.

Remove intake pipe with oil deflector.

Installation note:

Replace O-ring.

Fig. 1634: Removing Intake Pipe With Oil Deflector
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Before releasing the central bolt on the oil pump, the hydraulic chain tensioner must be drained.

Carefully press tensioning rail (1) with a suitable screwdriver (2) in direction of arrow.

As the oil pressure in the chain tensioner can only be drained pulsating, the tensioning rail (1) must be pressed several times.

Fig. 1635: Pressing Tensioning Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Press the tensioning rail (1) and hold down.

Fix chain tensioner piston in position with a suitable lock pin (2).

Tightening torque: **11 41 7AZ** .

Fig. 1636: Adjusting Chain Tensioner Piston Position

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Sprocket must be blocked in order to release central bolt (1).

Secure special tool **2 303 793** to crankcase.

Release oil pump central bolt (1).

Tightening torque: **11 41 5AZ** .

Fig. 1637: Releasing Oil Pump Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screws (1).

Tightening torque: **11 41 6AZ** .

Installation note:

Replace aluminum screws.

Watch mounting flats on oil pump sprocket.

Fig. 1638: Identifying Mounting Flats On Oil Pump Drive
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Observe different screw lengths.

Release aluminum screws (1).

Tightening torque: **11 41 2AZ** .

Installation note:

Replace aluminum screws.

Fig. 1639: Identifying Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Detach sprocket (1) in direction of arrow.

NOTE: Chain tensioner presses timing chain (3) upwards.

Do **not** remove sprocket (1).

Remove oil pump (2) in direction of arrow.

Fig. 1640: Identifying Oil Pump, Timing Chain And Sprocket Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check spacer bushes for secure seating and damage; replace if necessary.

Fig. 1641: Identifying Spacer Bushes

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Install oil pump (2).

Align mounting flats (3) on oil pump (2) to sprocket (4).

Fig. 1642: Aligning Mounting Flats On Oil Pump To Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Install intake pipe with oil deflector.

Installation note:

Replace O-ring.

Insert all the aluminum screws (1) along the line.

Installation note:

Replace aluminum screws.

Tightening torque: **11 41 1AZ** .

Fig. 1643: Identifying Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 000 REMOVING AND INSTALLING/REPLACING OIL PUMP (N55) UP TO MARCH 2012

Special tools required:

- **11 4 120**
- **2 303 793**

IMPORTANT:
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Removing **OIL SUMP**.
- Remove **SEALING CAP** of vacuum pump.

Undo all the aluminum screws (1) along the line.

Installation note:

Replace aluminum screws.

Remove intake pipe with oil deflector.

Installation note:

Replace O-ring.

cardiagn.com

Fig. 1644: Removing Intake Pipe With Oil Deflector
Courtesy of BMW OF NORTH AMERICA, INC.

Press timing chain with chain tensioner (1) in direction of arrow.

Disconnect timing chain with special tool **11 4 120** .

Feed out camshaft sprocket (3) at hexagon head (4) of vacuum pump.

Installation note:

If the chain module is replaced, a mounting bar (2) is already pre-installed.

Fig. 1645: Disconnecting Timing Chain
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Sprocket must be blocked in order to release central bolt (1).

Secure special tool **2 303 793** to crankcase.

Release oil pump central bolt (1).

Tightening torque: **11 41 5AZ** .

Fig. 1646: Releasing Oil Pump Central Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Release aluminum screws (1).

Tightening torque: **11 41 6AZ** .

Installation note:

Replace aluminum screws.

Watch mounting flats on oil pump sprocket.

Fig. 1647: Releasing Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Observe different screw lengths.

Release aluminum screws (1).

Tightening torque: **11 41 2AZ** .

Installation note:

Replace aluminum screws.

Fig. 1648: Identifying Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Detach sprocket (1) in direction of arrow.

NOTE: Chain tensioner presses timing chain (3) upwards.

cardiagn.com

Do **not** remove sprocket (1).

Remove oil pump (2) in direction of arrow.

Fig. 1649: Identifying Oil Pump, Timing Chain And Sprocket Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check spacer bushes for secure seating and damage; replace if necessary.

Fig. 1650: Identifying Spacer Bushes
Courtesy of BMW OF NORTH AMERICA, INC.

Install oil pump (2).

Align mounting flats (3) on oil pump (2) to sprocket (4).

Fig. 1651: Aligning Mounting Flats On Oil Pump To Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Install intake pipe with oil deflector.

Installation note:

Replace O-ring.

Insert all the aluminum screws (1) along the line.

Installation note:

Replace aluminum screws.

Tightening torque: **11 41 1AZ** .

Fig. 1652: Identifying Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 41 000 REMOVING AND INSTALLING/REPLACING THE OIL PUMP (N20)

Special tools required:

- **11 6 254**
- **11 6 252**
- **11 6 251**
- **11 4 480**
- 2 354 194

IMPORTANT: The counterbalance shaft must be adjusted to the motor. The tooth backlash of the counterbalance shaft and oil pump must be adjusted.

Necessary preliminary tasks:

cardiagn.com

- Remove oil sump. See **11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N20) (AS OF 07.2013)** or **11 13 000 REMOVING AND INSTALLING, SEALING OR REPLACING OIL SUMP (N20) (UP TO 06.2013)**.
- Functional description of oil pump. See **OIL SUPPLY** .

Release screw (1).

Detach intake snorkel (2) in direction of arrow.

Fig. 1653: Detaching Intake Snorkel
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1 to 6).

Remove oil pump from counterbalance shaft housing.

Fig. 1654: Loosening/Tightening Sequence Of Oil Pump Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Check the contact surface (2) of the oil pump (1) for damage and clean it.

Fig. 1655: Identifying Contact Surface Of Oil Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

In order to adjust the tooth backlash, the drive shaft (1) must be blocked.

Fig. 1656: Identifying Drive Shaft
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble screws (1 to 6).

Release all screws from (1 to 6) by 90Â°.

Fig. 1657: Loosening/Tightening Sequence Of Oil Pump Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool 11 6 254 to the crankcase with a screw.

Fig. 1658: Securing Special Tool (11 6 254) To Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

Secure special tool 11 6 252 with magnetic foot to special tool 11 6 254.

Fit dial gauge 11 6 251 to special tool 11 6 252.

Fig. 1659: Securing/Fitting Special Tools
Courtesy of BMW OF NORTH AMERICA, INC.

Press back chain tensioner with tensioning rail (1) and secure with special tool 11 6 251.

Fig. 1660: Pressing-Back Chain Tensioner With Tensioning Rail And Securing With Special Tool (11 6

cardiagn.com

251)
Courtesy of BMW OF NORTH AMERICA, INC.

Fix special tool 2 354 194 on the oil pump housing (see arrows).

Fig. 1661: Fixing Special Tool (2 354 194) On Oil Pump Housing (1 Of 2)
Courtesy of BMW OF NORTH AMERICA, INC.

Fix special tool 2 354 194 on the oil pump housing (see arrows).

Fig. 1662: Fixing Special Tool (2 354 194) On Oil Pump Housing (2 Of 2)
Courtesy of BMW OF NORTH AMERICA, INC.

The drive shaft of the oil pump must be blocked in order to adjust the tooth backlash.

IMPORTANT: Secure screw (1) on special tool 2 354 194 with a maximum of 3 Nm (**risk of damage!**).

Fig. 1663: Securing Screw On Special Tool (2 354 194)
Courtesy of BMW OF NORTH AMERICA, INC.

Twist camshaft sprocket (1) to the left to the limit position.

Set dial gauge 11 6 251 to zero.

Fig. 1664: Twisting Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Twist oil pump housing (2) in direction of arrow.

Fig. 1665: Identifying Oil Pump Housing And Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Twist camshaft sprocket (1) to the right to the limit position.

Adjust tooth backlash to between 0.06 mm and 0.1 mm.

Fig. 1666: Twisting Camshaft Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten bolt (1).

Check the adjustment value of the tooth backlash.

Tightening torque: **11 41 7AZ** .

Fig. 1667: Identifying Oil Pump Housing And Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten screws (1 to 6).

Tightening torque: **11 41 7AZ** .

Fig. 1668: Loosening/Tightening Sequence Of Oil Pump Screws

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 27 110 REMOVING AND REFITTING/REPLACING BALANCER SHAFTS (N20)

See 11 27 110 REMOVING AND REFITTING/REPLACING BALANCER SHAFTS (N20).

OIL FILTER AND LINES

11 42 198 REMOVING AND INSTALLING OIL FEED LINE FOR EXHAUST TURBOCHARGER (N20, N26)

- Remove EXHAUST TURBOCHARGER.

NOTE: **Oil feed line (2) can only be renewed after removal of the exhaust turbocharger.**

Release screw (1).

Tightening torque: 11 42 4AZ .

Use appropriate tool to loosen oil feed line (2) at connection.

Fig. 1669: Identifying Oil Feed Line And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all sealing rings (1).

Fig. 1670: Identifying Sealing Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 42 210 REMOVING AND INSTALLING OIL RETURN LINE FOR EXHAUST TURBOCHARGER (N20, N26)

- Remove ASSEMBLY UNDERBODY PROTECTION .

Unfasten screws (2).

Tightening torque: 11 42 5AZ .

Carefully press oil return line (3) to one side.

Installation note:

Replace gasket.

Fig. 1671: Identifying Oil Return Line And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: 11 42 6AZ .

cardiagn.com

Pull off oil return line (2).

Installation note:

Replace O-ring.

Fig. 1672: Identifying Oil Return Line, Vent Line And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check engine oil level, top up if necessary

11 42 020 REMOVING AND INSTALLING/REPLACING FULL-FLOW OIL FILTER (N20, N26)

Special tools required:

- 11 9 240
- Remove 17 2 053

WARNING: **Risk of scalding!**
Only perform this repair work on an engine that has cooled down.

Recycling:

Catch and dispose of drained coolant.

Observe country-specific waste disposal regulations

Necessary preliminary tasks:

- Remove INTAKE PLENUM.
- Protect drive belt and alternator against dirt with suitable auxiliary materials.

Release oil filter cover with special tool 11 9 240 .

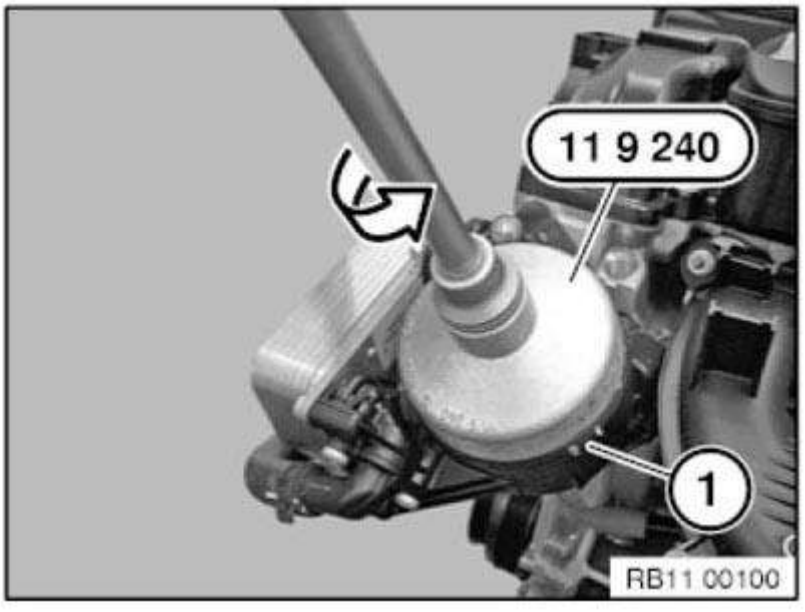


Fig. 1673: Releasing Oil Filter Cover
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Close off coolant hoses (1 and 2) with clamping tongs (3).

Fig. 1674: Identifying Coolant Hoses And Clamping Tongs
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Detach coolant hose (2).

Fig. 1675: Identifying Coolant Hose And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Fig. 1676: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Tightening torque: **11 42 2AZ** .

Release clamp (1) with special tool **17 2 053** .

Detach coolant hose (2).

Fig. 1677: Detaching Coolant Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip engine wiring harness (1).

Fig. 1678: Identifying Engine Wiring Harness
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 42 2AZ** .

Fig. 1679: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock retainer (1).

Detach coolant hose (2).

Fig. 1680: Identifying Coolant Hose And Retainer
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 42 2AZ** .

Remove oil filter housing (2).

Fig. 1681: Identifying Oil Filter Housing And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Installation note:

Replace all gaskets.

Assemble engine.

Installation note:

BLEEDING INSTRUCTION must be observed without fail.

11 42 020 REMOVING AND INSTALLING/REPLACING FULL-FLOW OIL FILTER (N47 D20 O1)

Necessary preliminary tasks:

- Drain **COOLANT** .
- Remove **INTAKE PLENUM**.
- Remove **TRANSMISSION OIL COOLER** (if fitted).
- Replace **ENGINE OIL**.

Release screw (1).

Tightening torque: **11 00 4AZ** .

Fig. 1682: Identifying Screw Of Oil Filter
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 00 4AZ** .

Lift out oil filter housing.

Fig. 1683: Identifying Screws Of Oil Filter Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 00 4AZ** .

Remove oil filter module.

Fig. 1684: Identifying Screws Of Oil Filter Module
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 42 2AZ** .

Installation note:

Replace sealing element (2).

Fig. 1685: Identifying Sealing Element And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove seals (1 and 2).

cardiagn.com

Remove non-return valve (3).

Fig. 1686: Identifying Non-Return Valve And Seals
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace non-return valve (1).

Replace profile seal (2).

Replace profile seal (3).

Fig. 1687: Identifying Non-Return Valve And Profile Seal
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 42 020 REMOVING AND INSTALLING/REPLACING FULL-FLOW OIL FILTER (N52T)

Special tools required:

- 11 8 640

WARNING: **Risk of scalding!**
Only perform this repair work on an engine that has cooled down.

Recycling:

Catch and dispose of drained coolant.

Observe country-specific waste disposal regulations.

Necessary preliminary tasks:

- Drain COOLANT
- Release the OIL FILTER COVER, drain oil.
- Remove INTAKE SILENCER HOUSING
- If necessary, remove intake duct.

NOTE: **Illustrations on N52 are shown with heat exchanger.**

Detach coolant hoses from oil filter housing.

NOTE: **Protect drive belt against dirt contamination.**

Fig. 1688: Identifying Screws Of Coolant Hoses
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Unfasten screws (2).

Tightening torque: 11 42 4AZ .

Release screw (1) with special tool 11 8 640 in connection with the joint.

cardiagn.com

Tightening torque: **11 42 2AZ** .

Installation note:

Tightening to torque permissible with maximum of 7Â° tilt extension.

Fig. 1689: Releasing Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Unplug oil pressure switch connector (1).

Unfasten screws (2).

Tightening torque: **11 42 2AZ** .

NOTE: **Protect drive belt against dirt contamination.**
Have cleaning cloth ready to catch residual oil.

Installation note:

Replace all gaskets.

If necessary, replace filter element.

Fig. 1690: Removing Oil Pressure Switch Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

NOTE: **Protect drive belt against dirt contamination.**

Installation note:

BLEEDING INSTRUCTIONS must be observed without fail.

11 42 020 REMOVING AND INSTALLING/REPLACING FULL-FLOW OIL FILTER (N55)

Special tools required:

- **11 9 240**

WARNING: **Risk of scalding!**
Only perform this repair work on an engine that has cooled down.

IMPORTANT: Risk of damage!
When working on the engine oil, coolant or fuel circuit, it is essential always to protect the alternator and belt drive against contamination.
Cover alternator with suitable materials.

Necessary preliminary tasks:

- Remove intake **PLENUM**.
- Drain **COOLANT** .
- Remove **OIL-TO-WATER HEAT EXCHANGER**.

Fig. 1691: Identifying Screws Of Thermostat Housing

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Loosen oil filter cover with special tool 11 9 240 .

Tightening torque: 11 42 1AZ .

NOTE: Engine oil flows out of the oil filter housing and back into the oil sump.

Installation note:

Replace sealing rings on oil filter cover.

Moisten sealing rings with engine oil.

Fig. 1692: Loosening Oil Filter Cover With Special Tool (11 9 240)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Release screw (2).

NOTE: Have cleaning cloth ready to catch residual oil.

Tightening torque: 11 42 2AZ .

Installation note:

Replace all gaskets.

If necessary, replace filter element.

Modify oil pressure switch when replacing.

Fig. 1693: Identifying Oil Filter Cover Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 42 035 REMOVING AND INSTALLING/REPLACING THE THERMOSTAT HOUSING (N55)

Special tools required:

- 11 9 240

Necessary preliminary tasks:

- Loosen oil lines on thermostat housing.

Loosen oil filter housing with special tool 11 9 240 /

NOTE: The remaining engine oil can flow back into the engine oil sump.

cardiagn.com

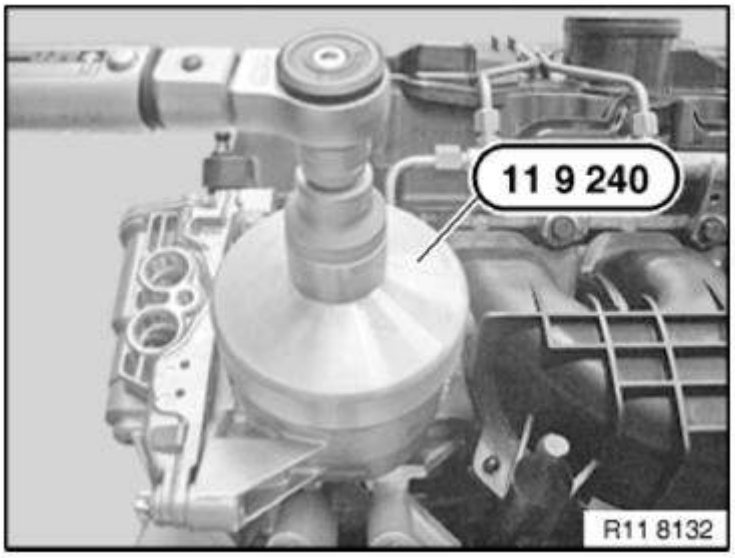


Fig. 1694: Loosening Oil Filter Housing With Special Tool (11 9 240)
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

NOTE: Catch escaping engine oil with suitable auxiliary materials.

Remove thermostat housing.

Fig. 1695: Identifying Screws Of Thermostat Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace gasket (1).

Fig. 1696: Identifying Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Checking engine oil level:

- Park vehicle on a horizontal surface.
- Allow engine at normal operating temperature to run for three minutes with increased revs (approx. 110rpm)
- Read off engine oil level in instrument panel or on Control Display
- Top up engine oil if necessary.

OIL FILLING, DIPSTICK

11 43 000 REMOVING AND INSTALLING/SEALING OIL DIPSTICK GUIDE TUBE (N47 D20 01)

Necessary preliminary work:

- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .
- Remove **UNDERBODY PROTECTION** .

Release screw (1) on oil filter housing.

cardiagn.com

Release engine wiring harness and vacuum line on guide tube for oil dipstick (2).

Release oil dipstick guide tube from oil sump.

Installation note:

Replace O-ring in engine oil sump.

Fig. 1697: Identifying Screw On Oil Filter Housing
Courtesy of BMW OF NORTH AMERICA, INC.

OIL COOLER

11 44 001 REMOVING AND INSTALLING OR REPLACING OIL-TO-WATER HEAT EXCHANGER (N47 D20 O1)

Necessary preliminary work:

- Remove **FULL-FLOW OIL FILTER**.

Release screws (1).

Remove plate together with heat exchanger (2).

Tightening torque: **11 42 2AZ** .

Fig. 1698: Removing Plate Together With Heat Exchanger
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 44 000 REMOVING AND INSTALLING/REPLACING OIL-TO-WATER HEAT EXCHANGER (N52T)

WARNING: **Risk of scalding!**
Only perform this repair work on an engine that has cooled down.

Recycling:

Catch and dispose of drained coolant.

Observe country-specific waste disposal regulations.

Necessary preliminary tasks:

- Drain **COOLANT**

Release coolant hose (1).

Tightening torque: **11 42 4AZ** .

Unfasten screws (2).

Tightening torque: **11 42 3AZ** .

Installation note:

Replace all gaskets.

cardiagn.com

Fig. 1699: Identifying Coolant Hose And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Installation note:

BLEEDING INSTRUCTION must be observed without fail.

Fill **COOLING SYSTEM** .

WATER PUMP WITH DRIVE

11 51 000 REMOVING AND INSTALLING/REPLACING COOLANT PUMP (N20)

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

IMPORTANT: If a coolant pump that has already been operated is reused, it must be filled with coolant after removal.
Mixture ratio, water: coolant = 1: 1
Protect plug connections against coolant and dirt contamination.

Recycling:

Catch and dispose of drained coolant in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Retaining elements on chassis and suspension and steering parts must be replaced.

Necessary preliminary tasks:

- Follow diagnosis instruction.
- Drain **COOLANT** .
- Notes **COOLING SYSTEM** .
- Remove **CLEAN AIR PIPE** .
- Remove **UNDERBODY PROTECTION** .

Release screws (1) and remove cover (2) (if installed).

Fig. 1700: Identifying Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) on the bottom of the coolant pump.

Tightening torque: **11 51 2AZ** .

Fig. 1701: Identifying Screws Of Coolant Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen hose clamps (1).

cardiagn.com

Installation note:

Note the installation position of the hose clamps.

Tightening torque: **11 51 3AZ** .

Fig. 1702: Identifying Hose Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Release coolant hoses (1) and (2).

Unlock plug (4) and remove.

Release screw (3).

Tightening torque: **11 51 2AZ** .

Remove coolant pump (5).

Fig. 1703: Identifying Coolant Pump, Coolant Hoses And Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Follow assembly instructions:

Installation note:

Hose clamps (1) must be installed in the center of the marked area.

Fig. 1704: Identifying Hose Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Attach coolant pump with screw (1).

Connector (2) must snap audibly into place.

Fig. 1705: Identifying Coolant Pump Screw And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

If the electric coolant pump is reused, it must be rotated one turn due to the breakaway torque at the impeller.

Assemble engine.

BLEEDING INSTRUCTIONS must be observed **without fail** .

Carry out wheel alignment check.

11 51 000 REMOVING AND INSTALLING/REPLACING COOLANT PUMP (N47 D20 O1)

Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Retaining elements on chassis and suspension and steering parts must be replaced.

cardiagn.com

Necessary preliminary tasks:

- Remove **DRIVE BELT** for alternator
- **REMOVE EXHAUST-GAS RECIRCULATION COOLER**
- **REMOVE COOLANT THERMOSTAT**

Release bolts (1) and remove coolant pump.

NOTE: **Picture shows N47.**

Fig. 1706: Identifying Bolts Of Coolant Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Seal coolant pump (1) with **LIQUID SEALING COMPOUND 2.2**.

Fig. 1707: Identifying Coolant Pump Sealing Area
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Vent cooling system and check for leak tightness.

11 51 000 REMOVING AND INSTALLING/REPLACING COOLANT PUMP (N52T)

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

Recycling:

Catch and dispose of drained coolant in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

IMPORTANT:
If a coolant pump that has already been operated is reused, it must be filled with coolant immediately after removal.
Mixture ratio, water: coolant = 1: 1
Protect plug connections against coolant and contamination.
Cover plug connections with suitable materials.

IMPORTANT:
Aluminum-magnesium materials .
No steel screws/bolts may be used due to the threat of electrochemical corrosion.
A magnesium crankcase requires aluminum screws/bolts exclusively.
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Retaining elements on chassis and suspension and steering parts must be replaced.

Necessary preliminary tasks:

cardiagn.com

- Remove **FAN COWL** .
- Drain **COOLANT** .
- Remove **COOLANT THERMOSTAT**.

Unlock and disconnect plug connections (1) on steering box.

NOTE: **Mark position of steering box and release screws (2).**

Do not remove steering box.

Tightening torque: **32 00 1AZ** .

Fig. 1708: Identifying Steering Box Plug Connections And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen hose clamps (1).

Detach coolant hoses.

Disconnect plug connection (4).

Release screws (5).

Tightening torque: **11 51 1AZ** .

Remove electric coolant pump in downward direction.

Installation note:

Replace aluminum screws.

Fig. 1709: Identifying Hose Clamps, Plug Connection And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

If the electric coolant pump is reused, it must be rotated one turn due to the breakaway torque at the impeller.

Assemble engine.

Top up **COOLANT** .

11 51 000 REMOVING AND INSTALLING/REPLACING COOLANT PUMP (N55)

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

IMPORTANT: If a coolant pump that has already been operated is reused, it must be filled with coolant after removal.
Mixture ratio, water: coolant = 1: 1
Protect plug connections against coolant and contamination.

Recycling:

Catch and dispose of drained coolant in a suitable container.

Observe country-specific waste disposal regulations.

cardiagn.com

Installation note:

1. All screws, nuts, bolts and hose clamps removed during the repair must be replaced.
2. Retaining elements on chassis and suspension and steering parts must be replaced.

Necessary preliminary tasks:

- Follow diagnosis instructions.
- Remove **ENGINE SPLASH GUARD** .
- Drain **COOLANT** .
- Remove **THERMOSTAT**.

Disconnect plug connection (1).

Release coolant hose (2).

Installation note:

Note installation hose clamps.

Tightening torque: **11 53 9AZ** .

Fig. 1710: Identifying Plug Connection And Coolant Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Release coolant hose (1).

Installation note:

Note installation hose clamps.

Tightening torque: **11 53 5AZ** .

Fig. 1711: Releasing Coolant Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Follow assembly instructions:

Installation note:

Hose clamps (1) must be installed in the center of the marked area (see **Fig. 1712**).

Fig. 1712: Identifying Hose Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 51 2AZ** .

Installation note:

Replace aluminum screws.

Fig. 1713: Identifying Aluminum Screws
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Unclip cable (1) from bracket.

Release screw (2).

Tightening torque: **11 51 2AZ** .

Fig. 1714: Unclip Cable From Bracket And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

If the electric coolant pump is reused, it must be rotated one turn due to the breakaway torque at the impellers.

Assemble engine.

BLEEDING INSTRUCTIONS must be observed **without fail.**

THERMOSTAT AND CONNECTIONS

11 53 086 REMOVING AND INSTALLING COOLANT RETURN LINE (N20, N26)

- Remove **EXHAUST TURBOCHARGER**.

Release screw (1).

Tightening torque: **11 53 7AZ** .

Installation note:

Replace O-ring.

Fig. 1715: Releasing Screw Of Coolant Return Line
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 53 082 REMOVING AND INSTALLING COOLING WATER FEED LINE (N20, N26)

- Remove **EXHAUST TURBOCHARGER**.

Release screw (1).

Tightening torque: **11 53 3AZ** .

Fig. 1716: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Remove the coolant line (1) in direction of arrow.

Installation note:

Replace O-ring.

Fig. 1717: Removing Coolant Line
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

cardiagn.com

11 53 795 REMOVING AND INSTALLING/REPLACING CHANGEOVER VALVE FOR LOW PRESSURE EGR COOLER (N47 SCR)

Necessary preliminary tasks:

- Remove intake silencer housing. See **13 71 000 REMOVING/REPLACING INTAKE SILENCER HOUSING (N47 D20 O1)** .
- Drain coolant. See **17 00 008 DRAINING AND TOPPING UP COOLANT (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)** .

Disconnect plug connection (1).

Undo screws (2 and 3)

Pull changeover valve forwards and release hose clamps (4).

Fig. 1718: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Top up **COOLING SYSTEM** , bleed and check for leaks.

11 53 000 REMOVING AND INSTALLING OR REPLACING COOLANT THERMOSTAT (N47 D20 O1)

Necessary preliminary tasks:

- Drain **COOLANT**
- Remove front acoustic cover (F10, F11, F07).

Disconnect coolant hoses on thermostat.

Release screws (1) on thermostat housing.

Remove thermostat housing (2).

Installation note:

Replace gasket.

Fig. 1719: Identifying Screws On Thermostat Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace gasket (1).

Fig. 1720: Replacing Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Fill . See **17 00 039 VENTING AND FILLING COOLING SYSTEM WITH VACUUM FILLING UNIT** or **17 00 008 DRAINING AND TOPPING UP COOLANT (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)** and bleed cooling system.

cardiagn.com

11 53 000 REMOVING AND INSTALLING/REPLACING COOLANT THERMOSTAT (N20, N26)

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

Recycling

Observe country-specific waste disposal regulations.

Catch and dispose of drained coolant in a suitable container.

IMPORTANT: Protect plug connections against coolant and contamination.
Cover plug connections with suitable materials.

Necessary preliminary tasks:

- Remove top **CLEAN AIR PIPE** .
- Remove **ENGINE VENTILATION LINE**.

Disconnect plug connection (1).

Disconnect coolant hoses (2-4) on thermostat with **CLAMPING TONGS** .

Disconnect coolant hoses (2-4) from thermostat.

Release screws (5) and remove thermostat.

Tightening torque: **11 53 1AZ** .

Fig. 1721: Identifying Coolant Hoses, Plug Connection And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Top up **COOLANT** .

VENT COOLING SYSTEM .

11 53 000 REMOVING AND INSTALLING/REPLACING COOLANT THERMOSTAT (N52T)

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

Recycling:

Catch and dispose of drained coolant in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Necessary preliminary work:

- Remove front **UNDERBODY PROTECTION** .
- Drain **COOLANT** .

Release hose clamp (1) and detach coolant hose.

Release hose clamp (2) and detach coolant hose.

cardiagn.com

Unlock and detach coolant hose (3).

Unlock and detach coolant hose (4).

Disconnect plug connection (5).

Release screws (6).

Tightening torque: **11 53 1AZ** .

Remove coolant thermostat (7).

NOTE: **Illustration shows coolant thermostat removed.**

Fig. 1722: Identifying Coolant Thermostat And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Fig. 1723: Identifying Snap Fastener On Coolant Hose And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

11 53 000 REMOVING AND INSTALLING/REPLACING COOLANT THERMOSTAT (N55)

WARNING: **Risk of scalding!**
Only perform these tasks on an engine that has cooled down.
Danger of injury!
Risk of skidding due to coolant on the floor.

Recycling:

Catch and dispose of drained coolant in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

Read and comply with **GENERAL NOTES** .
IMPORTANT: Protect plug connections against coolant and dirt contamination.
Cover plug connections with suitable materials.

Necessary preliminary tasks:

- Remove front **UNDERBODY PROTECTION** .
- **E70, E71** :

  Remove reinforcement plate.

- **E82, E84, E88, E90, E91, E92, E93, F25** :

  Remove **CHARGE AIR COOLER** .

- Remove **FAN COWL** .
- Place oil drip tray for coolant under engine compartment.

NOTE: **Illustration shows coolant thermostat removed.**

Disconnect coolant hoses (arrows) on the thermostat (1) with clamping tongs.

cardiagn.com

Fig. 1724: Locating Coolant Hoses On Thermostat
Courtesy of BMW OF NORTH AMERICA, INC.

Release hose clamp (1) and detach coolant hose.

Release hose clamp (2) and detach coolant hose.

Unlock and detach coolant hose (3).

Unlock and detach coolant hose (4).

Disconnect plug connection (5).

Release screws (6).

Tightening torque: **11 53 1AZ** .

Remove coolant thermostat (7).

Fig. 1725: Identifying Coolant Thermostat, Plug Connection, Hose Clamp And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Illustration shows coolant thermostat removed.

Assemble engine.

FILL THE COOLING SYSTEM .

Observe **CAPACITIES** .

Installation note:

Check coolant hoses for cracks and damage.

Renew coolant hoses as required.

Recommendation:

On vehicles older than five years, renew coolant hoses.

Check function of cooling system.

INTAKE MANIFOLD

11 61 730 BMW LEAKAGE TEST FOR AIR INTAKE SYSTEM (N20/N26)

Special tools required:

- 2 201 924
- **0 426 464**
- **2 285 501**
- **2 353 954**

IMPORTANT: Excess pressure and vacuum lines are identified by the size of the seals and color-coded Red and Blue and must not be mixed up with each other.
Build up pressure with Blue color.
Generate vacuum pressure with Red color.
Mixing up the functions will result in damage to the engine.

cardiagn.com

Necessary preliminary tasks:

- Prepare BMW diagnosis system.
- Start diagnosis program.
    1. Power train
    2. Engine electronics
    3. Air supply
    4. Charging pressure control or Perception or Lack of power

Diagnosis instruction **Check air intake system for leaks** .

Pressure measurement:

Prepare BMW diagnosis system on diagnosis unit.

1. Fit connector (81 29 2 158 850) on diagnosis auxiliary device (81 29 0 426 464).

   Connect pressure hose 2 201 924 on diagnosis auxiliary device (81 29 0 426 464).

2. Overpressure connection (Blue).
3. Connect 12 V cable (3), positive battery terminal and negative terminal.
4. Connect 12 V cable (4), positive battery terminal and negative terminal.

Fig. 1726: Fitting Connector (81 29 2 158 850) On Diagnosis Auxiliary Device
Courtesy of BMW OF NORTH AMERICA, INC.

Insert the blue overpressure lines on the diagnosis auxiliary device **0 426 464** on the connector (1).

Connect IMIB (3) with connector (2) of the auxiliary diagnosis device using pressure hose 2 201 924.

Graphic N63.

Fig. 1727: Inserting Blue Overpressure Lines On Diagnosis Auxiliary Device
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect clean air pipe at intake silencer housing.

Screw seal plug **2 285 501** (B11) air-tight onto clean air pipe.

Connect the auxiliary diagnosis device with the seal plug by means of the blue pressure line.

Fig. 1728: Disconnecting Air Pipe Of Intake Silencer Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Diagnosis instruction **Check turbocharging path with charge air cooler for leaks** .

Unlock snap fastener (1) on exhaust turbocharger.

Disconnect pressure hose at exhaust turbocharger.

NOTE: **Shown with engine/cooling package removed for better overview.**

Fig. 1729: Identifying Snap Fastener On Exhaust Turbocharger

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Close off pressure hose air-tight to the charge air cooler with the seal plug **2 285 501** (A11).

Fig. 1730: Closing Off Pressure Hose Air-Tight To The Charge Air Cooler
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock retaining clip (1) on the throttle valve pressure hose.

Unclip tank ventilation line (2) from bracket.

Unlock and disconnect plug connection (4) on charging pressure sensor.

Undo connecting coupling (5) of the tank ventilation line.

Fig. 1731: Unlocking Retaining Clip On Throttle Valve Pressure Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Required seal plug.

Part Number 13 90 7 515 387

Fig. 1732: Identifying Special Tool (7 515 387)
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock tank ventilation line at the pressure pipe and close off with seal plug 7 515 387.

Fig. 1733: Closing Pressure Pipe Using Seal Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Prepare pressure gauge from the tool set **2 285 501** with pressure hose.

Close off pressure pipe with seal plug **2 285 501** (C11).

Set pressure gauge to 1 bar with adjusting screw.

Close off sliding piece (1) on pressure gauge in direction of arrow.

Fig. 1734: Closing Off Sliding Piece On Pressure Gauge In Direction Of Arrow
Courtesy of BMW OF NORTH AMERICA, INC.

Diagnosis instruction **Leak detection with BMW smoke tester** .

Disconnect the overpressure line (2) on the diagnosis auxiliary device.

Connect pressure line (1) from the BMW smoke tester **2 353 954** with the overpressure line (2).

Fig. 1735: Connecting Pressure Line
Courtesy of BMW OF NORTH AMERICA, INC.

Put the BMW smoke tester **2 353 954** into operation according to the operating instructions.

Fig. 1736: Identifying BMW Smoke Tester (2 353 954)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Follow diagnosis instruction.

11 12 800 CLEANING CYLINDER HEAT INTAKE CHANNELS AND INTAKE PLENUM (N47, N57)

See **11 12 800 CLEANING CYLINDER HEAT INTAKE CHANNELS AND INTAKE PLENUM (N47, N57)**.

11 61 085 REMOVING AND INSTALLING/REPLACING ADJUSTER (N47 D20 O1)

IMPORTANT: The adaptation values must be reset before the adjuster is replaced.

Necessary preliminary work:

- Reset adaptation value with diagnosis system.
- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .

Disconnect plug connection (1).

Release screws (3).

Detach adjuster (2).

Installation note:

Observe installation position at linkage.

Fig. 1737: Identifying Plug Connection And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 61 086 REMOVING AND INSTALLING/REPLACING MIXING TUBE FOR INTAKE AIR (N47 D20 O1)

Necessary preliminary tasks:

- Reset adaptation value with diagnosis system.
- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .

Disconnect plug connection (1).

Fig. 1738: Identifying Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) on throttle body.

Tightening torque: **13 54 1AZ** .

Installation note:

Replace seals on throttle body and intake air mixing tube.

Fig. 1739: Identifying Screws On Throttle Body
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

cardiagn.com

Unfasten screws (2).

Disconnect plug connection of exhaust-gas temperature sensor.

Remove mixing tube towards front.

Fig. 1740: Identifying Exhaust-Gas Temperature Sensor And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace O-ring (1).

Replace gasket (2).

Fig. 1741: Identifying O-Ring And Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Pay attention to mounting lugs (1).

Remove mixing tube in direction of arrow.

Fig. 1742: Identifying Mounting Lugs
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 61 050 REMOVING AND INSTALLING INTAKE PLENUM (N20)

Necessary preliminary tasks:

- Disconnect **BATTERY EARTH LEAD** .
- Remove **ACOUSTIC COVER**.

Unlock and pull off all connectors (1) from the DME control unit (2).

Release all wiring harnesses attached to intake plenum.

Release screws and remove DME control unit.

Tightening torque: **12 14 1AZ** .

cardiagn.com

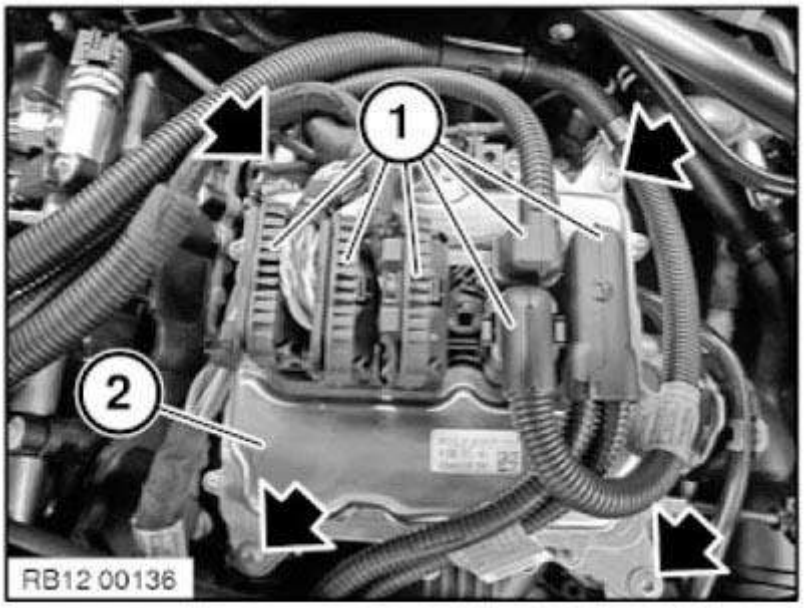


Fig. 1743: Identifying DME Control Unit & Connectors
Courtesy of BMW OF NORTH AMERICA, INC.

Press and hold lock (1) of tank ventilation line (2).

Pull off tank ventilation line (2).

Fig. 1744: Identifying Tank Ventilation Line
Courtesy of BMW OF NORTH AMERICA, INC.

Detach plug connection (1) at tank vent valve (2).

Release tank ventilation lines from tank vent valve and throttle body.

Detach tank vent valve (2) from mounting.

Fig. 1745: Identifying Tank Vent Valve And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) on throttle valve drive.

Fig. 1746: Identifying Plug Connection On Throttle Valve Drive
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock connector (1) and remove.

Fig. 1747: Identifying Throttle Valve Drive Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock snap fastener (2).

Pull off charge air duct from throttle body.

Fig. 1748: Identifying Charge Air Duct And Plug Connection

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Tightening torque: **11 61 1AZ** .

Release cable strap under intake plenum with a suitable tool.

Installation note:

Check all profile seals, replace if necessary.

Fig. 1749: Identifying Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all gaskets.

Assemble engine.

11 61 050 REMOVING AND INSTALLING INTAKE PLENUM (N52T)

Necessary preliminary tasks:

- Remove **IGNITION COIL COVER**.
- Remove left **TRAILING LINK** .
- Remove **EXPANSION TANK** .
- Remove **SUCTION FILTER HOUSING** .
- Remove **THROTTLE BODY** .
- Remove **ENGINE CONTROL UNIT** from intake plenum.
- Remove **PARTITION WALL** in center of units compartment.
- Unclip cable from holder on intake plenum.
- Detach oil reservoir for hydraulic steering and place to one side.

Open holder (2).

Disconnect plug connection (1) under of intake plenum.

Release engine ventilation from cylinder head cover.

Fig. 1750: Identifying Plug Connection, Holder And Engine Ventilation
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Disconnect plug connection (3).

Release screws (4).

Detach engine wiring harness (2) from intake plenum and lay to one side.

For purposes of clarity, graphic shows intake plenum removed (E92).

Fig. 1751: Identifying Plug Connection, Screws And Engine Wiring Harness

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) on oil pressure switch (2).

Fig. 1752: Identifying Plug Connection On Oil Pressure Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Release fuel injection pipe (2) and lay to one side.

NOTE: Do not detach fuel line.

Release screws (1).

Tightening torque: **11 61 1AZ** .

Unscrew nuts (3).

Tightening torque: **11 61 2AZ** .

Graphic (E92).

Fig. 1753: Identifying Fuel Rail, Screws And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Raise intake plenum approx. 10 cm.

Disconnect plug connections (1) at bottom.

Fig. 1754: Identifying Plug Connections
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all gaskets.

Top up **COOLANT** .

Assemble engine.

11 61 050 REMOVING AND INSTALLING INTAKE PLENUM (N55)

Necessary preliminary work:

- Disconnect **BATTERY EARTH LEAD** .
- Remove **INTAKE FILTER HOUSING** .
- Remove left **CHARGE AIR DUCT**.
- Remove ignition coil cover. See **12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55)** .

Disconnect all plug connections (1) on engine control unit.

Fig. 1755: Identifying Plug Connections
Courtesy of BMW OF NORTH AMERICA, INC.

Open retaining clip (1).

cardiagn.com

Release wiring harness section (2) from retaining clip (1).

Fig. 1756: Identifying Retaining Clip And Wiring Harness Section
Courtesy of BMW OF NORTH AMERICA, INC.

Release all wiring harness sections from holder (1).

Disconnect plug connection (2) at charging pressure sensor.

Fig. 1757: Identifying Plug Connection And Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release all wiring harness sections from holders (1 and 2).

Fig. 1758: Identifying Wiring Harness Sections From Holders
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) on tank vent valve.

Fig. 1759: Identifying Plug Connection On Tank Vent Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Press and hold down the unlocking device on the vacuum line (1) on the vacuum reservoir (cylinder head cover) in direction of arrow.

Detach vacuum line (1) in upward direction.

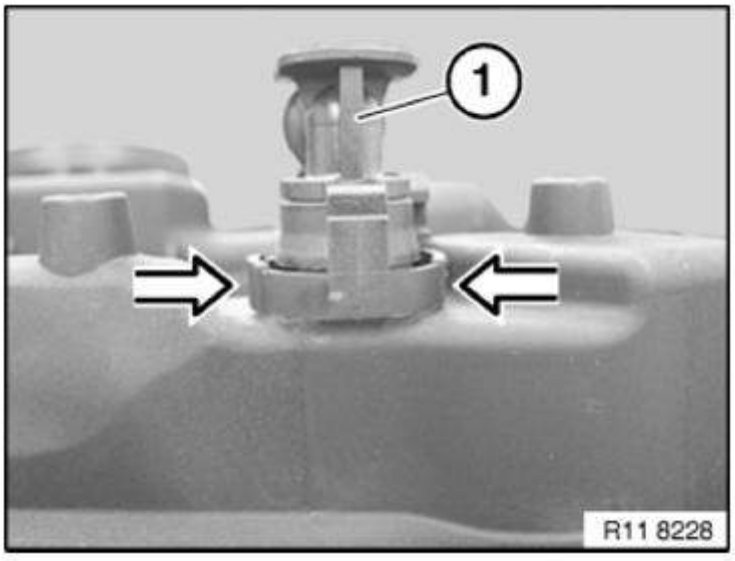


Fig. 1760: Detaching Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

Detach vacuum line (2) in upward direction.

Fig. 1761: Identifying Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) on throttle valve drive.

cardiagn.com

Fig. 1762: Identifying Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 61 2AZ** .

Unscrew nuts (2).

Tightening torque: **11 61 1AZ** .

Fig. 1763: Identifying Gaskets And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all gaskets.

Assemble engine.

11 61 350 REMOVING AND INSTALLING/RENEWING PRESSURE PIPE ON THROTTLE BODY (N47 D20 O1)

IMPORTANT: In the event of a leak at the pressure pipe, there is a **risk of damage** to the exhaust turbocharger.

Necessary preliminary work:

- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .

NOTE: Lock (1) must snap into place in bracket (see arrow).

Fig. 1764: Identifying Snap Lock
Courtesy of BMW OF NORTH AMERICA, INC.

Release lock (1) with a suitable tool.

Disconnect pressure pipe (2) from charge air cooler.

Fig. 1765: Disconnecting Pressure Pipe From Charge Air Cooler
Courtesy of BMW OF NORTH AMERICA, INC.

Release lock (1) in direction of arrow.

Release pressure pipe (2) in direction of arrow.

Fig. 1766: Releasing Pressure Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: In the event of a leak at the pressure pipe, there is a **risk of damage** to the exhaust turbocharger.

Check sealing lip (1) for damage.

Installation note:

cardiagn.com

If sealing lip (1) is damaged, the seal must be replaced.

Fig. 1767: Identifying Sealing Lip
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: In the event of a leak at the pressure pipe, there is a **risk of damage** to the exhaust turbocharger.

Check sealing ring for damage.

Installation note:

If the sealing ring is damaged, the seal must be replaced.

Fig. 1768: Identifying Sealing Ring For Damage
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check differentiated air intake system for tightness.

11 61 550 REMOVING AND INSTALLING/REPLACING AIR INTAKE PLENUM (N47 D20 O1)

Installation note:

If the air intake plenum is replaced, the stop values for the swirl flaps must be deleted and taught in again.

Follow diagnosis instruction.

Necessary preliminary tasks:

- Disconnect negative battery cable. See **NEGATIVE BATTERY LEAD** .
- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .
- Remove lower section of microfilter housing (only E9x, E84).
- Remove pressure pipe at throttle body.

Push the cable clamps (1) on both halves apart and pull them off the holder.

Fig. 1769: Identifying Cable Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1 and 2) from the preheating control unit.

Disconnect plug connection (3) from the electric changeover valve (4) of the engine mount.

Detach the electric changeover valve (4) in direction of arrow and lay to one side.

Fig. 1770: Identifying Plug Connection From Electric Changeover Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen all cable clamps (1 and 2) on the intake plenum.

Disconnect plug connection (3) at charge air pressure sensor.

Release nut (4) on alternator.

cardiagn.com

Tightening torque: **12 52 2AZ**

Lay positive battery cable (5) to one side.

Fig. 1771: Identifying Cable Clamps On Intake Plenum
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen screws (1) on the exhaust-gas recirculation cooler.

Fig. 1772: Identifying Screws On Exhaust-Gas Recirculation Cooler
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove the air intake system toward the top.

Fig. 1773: Identifying Intake System And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove the exhaust-gas recirculation pipe (1) in direction of arrow.

Fig. 1774: Locating Exhaust-Gas Recirculation Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace O-ring (1).

Replace beaded metal gasket (2).

Fig. 1775: Identifying Beaded Metal Gasket And O-Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Replace intake plenum.

Release screws (3).

Modify the swirl-flap actuator (2).

Fig. 1776: Identifying Swirl-Flap Actuator And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Slide the drive unit for swirl flaps (2) forward in direction of arrow.

Lift the connecting lever (1) with a screwdriver in direction of arrow until the guide lever (3) is disconnected from the connecting lever (1).

Fig. 1777: Identifying Swirl Flaps Drive Unit And Guide Lever
Courtesy of BMW OF NORTH AMERICA, INC.

Unclamp retaining clamps (1) from the seal holder.

Fig. 1778: Identifying Retaining Clamps

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Unclamp retaining clamps (1) from the seal holder.

Remove the seal holders (2) with swirl flaps.

Fig. 1779: Identifying Retaining Clamps And Seal Holders
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Open all swirl flaps to install the seal holder (1). This prevents jamming the seal holder (1).

Clean the sealing ring on the intake plenum (2).

Position the seal holder (1) with open swirl flaps on the intake plenum (2).

Fig. 1780: Identifying Sealing Ring On Intake Plenum
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Note fixing (2) on the seal holder (1).

Attach the seal holder (1) with the retaining clamps on the air intake system.

Fig. 1781: Identifying Retaining Clamps On Air Intake System
Courtesy of BMW OF NORTH AMERICA, INC.

Before the swirl flap drive can be installed, the connecting lever (1) must be positioned toward the intake plenum.

Prepare the connecting lever (2) for the guide (1) on the intake plenum.

Fig. 1782: Identifying Guide On Intake Plenum
Courtesy of BMW OF NORTH AMERICA, INC.

The adjustment lever (1) on the swirl flap drive is worked at the marked area.

Fig. 1783: Identifying Adjustment Lever
Courtesy of BMW OF NORTH AMERICA, INC.

The adjustment lever (1) on the swirl flap drive must be positioned with the connecting lever (2) of the swirl flaps toward the guide groove (3) on the intake plenum before the swirl flap drive can be attached.

Secure the actuator drive (1) with screws (3).

Fig. 1784: Identifying Adjustment Lever And Swirl Flaps Toward Guide Groove On Intake Plenum
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 1785: Identifying Actuator Drive And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

cardiagn.com

Position the air intake system on the cylinder head.

Tack the air intake system on in the following order (from 1 to 4).

Fig. 1786: Identifying Air Intake System On Cylinder Head
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

To ensure tightness of the air intake system, the tightening sequence must be complied with.

Tighten the air intake system in sequence (1 to 7).

Tightening torque: **11 61 1AZ** .

Fig. 1787: Identifying Air Intake System Screws Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check air intake system for leaks.

Check function of DDE.

11 53 795 REMOVING AND INSTALLING/REPLACING CHANGEOVER VALVE FOR LOW PRESSURE EGR COOLER (N47 SCR)

Necessary preliminary tasks:

- Remove intake silencer housing. See **13 71 000 REMOVING/REPLACING INTAKE SILENCER HOUSING (N47 D20 O1)** .
- Drain coolant. See **17 00 008 DRAINING AND TOPPING UP COOLANT (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)** .

Disconnect plug connection (1).

Undo screws (2 and 3)

Pull changeover valve forwards and release hose clamps (4).

Fig. 1788: Disconnecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Top up **COOLING SYSTEM** , bleed and check for leaks.

11 61 365 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N20)

Necessary preliminary tasks:

- Remove **INTAKE SILENCER HOUSING** .
- Remove **FRONT UNDERBODY PROTECTION** .

1. Unlocked
2. Locked

cardiagn.com

Installation note:

Ensure locking clamps are correctly fitted.

Lock must engage.

Fig. 1789: Identifying Charge Air Duct Locking Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip line (1).

Unfasten plug connection (2) and disconnect.

Unlock snap fastener (3) and pull charge-air duct from throttle body.

Unlock tank ventilation line (4) underneath and disconnect.

Fig. 1790: Identifying Tank Ventilation Line, Plug Connection And Snap Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock snap fastener (1) and remove the charge-air duct.

Fig. 1791: Identifying Charge-Air Duct And Snap Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Visually inspect the form sealing ring (1) for correct position and damage.

VDA couplings are correctly fitted when they snap into place with an audible click.

Fig. 1792: Identifying Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 61 368 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N55)

Necessary preliminary tasks:

- Remove **UNDERBODY PROTECTION** .
- Remove **INTAKE SILENCER HOUSING** .

1. Unlocked
2. Locked

Installation note:

Ensure locking clamps are correctly fitted.

Lock must engage.

Fig. 1793: Identifying Charge Air Duct Locking Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Unlock snap fasteners (1).

Unclip vacuum hose (2) and lay to one side.

Disconnect plug connection (3).

Pull charge air duct out of rubber grommet (4).

Remove charge air duct.

Installation note:

plug connection (3) must snap audibly into place!

Fig. 1794: Identifying Charge Air Duct Of Rubber Grommet And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 61 360 REMOVING AND INSTALLING/REPLACING PRESSURE PIPE, EXHAUST TURBOCHARGER TO CHARGE AIR COOLER (N47 D20 O1)

IMPORTANT: In the event of a leak at the pressure pipe, there is a **risk of damage** to the exhaust turbocharger.

Necessary preliminary work:

- Remove **INTAKE SILENCER HOUSING** .

NOTE: Snap lock (1) into place on lock (see arrow).

Fig. 1795: Snapping Lock Into Place
Courtesy of BMW OF NORTH AMERICA, INC.

Release lock (1) in direction of arrow.

Release pressure pipe (2) in direction of arrow.

Fig. 1796: Releasing Pressure Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Release lock (1).

Release pressure pipe (2) in direction of arrow.

Fig. 1797: Releasing Pressure Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Check sealing lip (1) for damage.

Installation note:

If sealing lip (1) is damaged, the gasket must be replaced.

IMPORTANT: In the event of a leak at the pressure pipe, there is a **risk of damage** to the exhaust turbocharger.

cardiagn.com

Fig. 1798: Identifying Sealing Lip
Courtesy of BMW OF NORTH AMERICA, INC.

Check sealing ring for damage.

Installation note:

If sealing lip (1) is damaged, the gasket must be replaced.

IMPORTANT: In the event of a leak at the pressure pipe, there is a **risk of damage** to the exhaust turbocharger.

Fig. 1799: Identifying Sealing Ring For Damage
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check differentiated air intake system for tightness.

11 61 362 REMOVING AND INSTALLING/REPLACING RIGHT CHARGE AIR LINE (N20, N26)

Necessary preliminary tasks:

- Remove **INTAKE SILENCER HOUSING** .

Unlock snap fastener (1) and (2) and remove the charge air guide.

NOTE: Shown with engine/cooling package removed for better overview.

Fig. 1800: Identifying Charge Air Guide And Snap Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Visually inspect the form sealing ring (1) for correct position and damage.

VDA couplings are correctly fitted when they snap into place with an audible click.

Fig. 1801: Identifying Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 61 362 REMOVING AND INSTALLING/REPLACING RIGHT CHARGE-AIR DUCT (N55)

Necessary preliminary work:

- Remove **UNDERBODY PROTECTION** .
- Remove **AIR DUCT** .

Unclip coolant hose (1) from holder.

Release retainers (2) and (3) of charge air duct (4).

Remove charge air duct (4).

cardiagn.com

Fig. 1802: Identifying Charge Air Duct And Retainers
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check DME control unit (turbocharger) for correct operation.

EXHAUST MANIFOLD

18 40 050 REMOVING AND INSTALLING/REPLACING FRONT EXHAUST MANIFOLD (N52T)

See **18 40 050 REMOVING AND INSTALLING/REPLACING FRONT EXHAUST MANIFOLD (N52T)** .

18 40 060 REMOVING AND INSTALLING/REPLACING REAR EXHAUST MANIFOLD (N52T)

See **18 40 060 REMOVING AND INSTALLING/REPLACING REAR EXHAUST MANIFOLD (N52T)** .

SUPERCHARGER WITH CONTROL

11 65 020 REMOVING AND INSTALLING/REPLACING EXHAUST TURBOCHARGER (N20)

WARNING: **The module consists of exhaust turbo charger and exhaust manifold.**

Necessary preliminary tasks:

- Remove the **CATALYTIC CONVERTER** .
- Remove **ACOUSTIC COVER**.
- Drain **COOLANT** .
- **REMOVE** bottom clean air pipe.
- Drain **ENGINE OIL**.
- Remove right **ENGINE SUPPORT ARM** .

Release screws (1) from heat shield.

Remove heat shield

Tightening torque: **11 65 5AZ** .

Fig. 1803: Identifying Heat Shield Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock snap fastener (1) and tie charge air duct to one side.

NOTE: **Shown with engine/cooling package removed for better overview.**

Fig. 1804: Identifying Snap Fastener On Tie Charge Air Duct
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect vacuum hose (1) from vacuum line.

Disconnect plug connection (2) on blow-off valve.

Fig. 1805: Identifying Plug Connection On Blow-Off Valve
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Unlock retaining clip (1) with a screwdriver in direction of arrow and hold.

Pull off retaining clip (1) with suitable pliers in direction of arrow.

Pull off wastegate linkage (2) from wastegate flap.

Fig. 1806: Pulling Wastegate Linkage From Wastegate Flap
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **11 65 4AZ** .

Remove vacuum unit.

Fig. 1807: Identifying Vacuum Unit Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unclamp engine wiring harness (1) from bracket.

Release screw (2) and remove holder (3).

Tightening torque: **11 00 2AZ** .

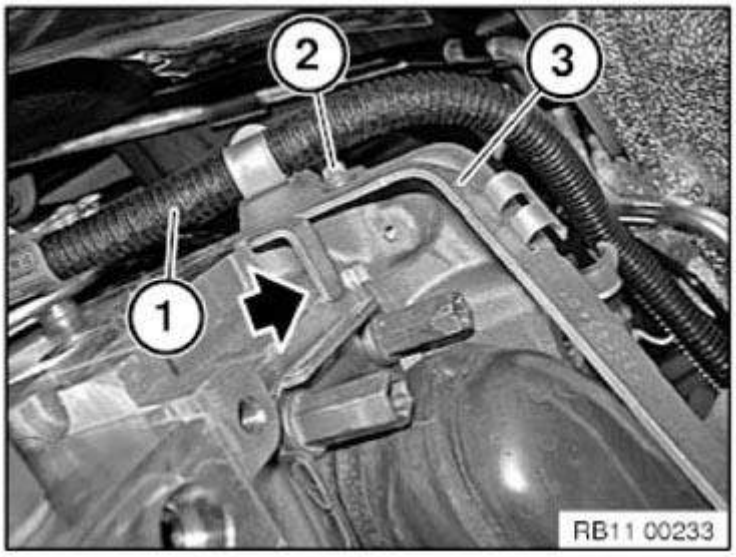


Fig. 1808: Identifying Engine Wiring, Screw, And Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

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

Fig. 1809: Identifying Holder And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Unfasten screws (2).

Release oil return pipe (3) and place to one side.

Tightening torque **11 42 6AZ** .

cardiagn.com

NOTE: **Replace gasket.**

Fig. 1810: Identifying Oil Return Line And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Fig. 1811: Identifying Oil Return Pipe Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 42 6AZ** .

Remove oil return line (2).

Installation note:

Replace O-ring.

Fig. 1812: Identifying Oil Return Line, Vent Line And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 53 10AZ** .

If necessary, use appropriate tool to loosen coolant return line (3) and coolant flow line (2) at connection point.

Installation note:

Replace sealing rings.

Fig. 1813: Identifying Coolant Return Line And Coolant Flow Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 42 4AZ** .

Release connection of oil feed line (2), if necessary with a suitable tool.

Installation note:

Replace sealing ring.

Fig. 1814: Identifying Oil Feed Line Connection And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 1815: Exhaust Gas Manifold Flange Nuts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Tape off engine support at front right with suitable auxiliary materials (risk of damage!).

Release nuts (1) to (10) and remove exhaust turbocharger towards bottom.

cardiagn.com

NOTE: **Oil supply line (2) can only be replaced after removal of the turbocharger.**

Release screw (1).

If necessary, use appropriate tool to loosen oil feeder lines at point of connection (2).

Fig. 1816: Identifying Oil Supply Line And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all sealing rings (1).

Renew sealing rings of coolant **RETURN** and **FEED LINES**.

Fig. 1817: Identifying Sealing Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all graphite seals (1).

Position turbocharger on cylinder head and hold in place with two bolts.

Fig. 1818: Identifying Graphite Seals
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 1819: Identifying Exhaust Gas Manifold Flange Nuts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:
The module consists of exhaust gas turbo loader and exhaust gas manifold and must be installed stress-free.
Torque and torque sequence must be observed without fail.
Tightening torque: **11 65 1AZ** .

1. Join flange nuts to a torque of **8 Nm** in sequence (1) to (10).
2. Tighten flange nuts to a torque of **13 Nm** in sequence (1) to (10).

Installation note:

If screw (1) cannot be secured, holder must be released.

Secure screws (1).

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

Fig. 1820: Identifying Oil Return Line And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Observe BMW Diagnostics System instruction.

Carry out BMW leak test for intake system.

cardiagn.com

11 65 020 REMOVING AND INSTALLING/REPLACING EXHAUST TURBOCHARGER (N55)

WARNING: **The module consists of exhaust turbo charger and exhaust manifold. The weight of the turbocharger is approx. 15 kg.**

Necessary preliminary work:

- Remove the **CATALYTIC CONVERTER** .
- Remove **CHARGE AIR DUCT**.
- Remove **COOLANT PUMP**.
- Remove **CLEAN AIR PIPE** .

Release screws (1).

Tightening torque **11 53 4AZ** .

Fig. 1821: Identifying Clean Air Pipe And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 53 10AZ** .

If necessary, use appropriate tool to loosen coolant return line (3) and coolant flow line (2) at connection point.

Installation note:

Replace sealing rings.

Fig. 1822: Identifying Coolant Return Line And Coolant Flow Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Loosen screws (3) but do not remove.

Fig. 1823: Identifying Turbocharger Module, Holder And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 42 6AZ** .

If necessary, use appropriate tool to loosen connection of oil return lines (2).

Installation note:

Replace sealing ring.

Fig. 1824: Identifying Oil Return Lines Connection And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque **11 42 7AZ** .

cardiagn.com

If necessary, use appropriate tool to loosen connection of oil return lines (2).

Possibility of oil escaping when oil return line is disconnected.

Installation note:

Replace sealing ring.

Fig. 1825: Identifying Oil Return Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 42 4AZ** .

If necessary, use appropriate tool to loosen coolant return lines (2) at connection point.

Installation note:

Replace sealing ring.

Fig. 1826: Identifying Coolant Return Lines Connection And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen plug connection (1) at blow-off valve.

Release screw (2).

Tightening torque **11 65 4AZ** .

If necessary, use appropriate tool to loosen oil feeder lines at point of connection (3).

Oil may escape when the oil return line is disconnected.

Installation note:

Replace sealing ring.

Fig. 1827: Identifying Blow-Off Valve Plug Connection And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect vacuum line (1) from vacuum unit.

Fig. 1828: Identifying Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect vacuum line (1) from cylinder head cover.

Fig. 1829: Disconnecting Vacuum Line From Cylinder Head Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Remove heat shield (1).

Tightening torque: **11 65 2AZ**

Loosen all flange nuts (2) along the line.

cardiagn.com

Remove module by maneuvering downwards on gearbox side.

NOTE: **Total weight of module is approximately 15 kg .**

Fig. 1830: Identifying Heat Shield And Flange Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Oil supply line (2) can only be replaced after removal of the turbocharger.**

Release screw (1).

If necessary, use appropriate tool to loosen oil feeder lines at point of connection (2).

Fig. 1831: Identifying Oil Supply Line And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all sealing rings (1).

Fig. 1832: Identifying Sealing Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace all graphite seals (1).

Position turbocharger on cylinder head and hold in place with two bolts.

Fig. 1833: Identifying Graphite Seals
Courtesy of BMW OF NORTH AMERICA, INC.

Insert bolt (1) but do not tighten at this point.

Fig. 1834: Identifying Turbocharger Module, Holder And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Fig. 1835: Exhaust Gas Manifold Flange Nuts Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT:
The module consists of exhaust turbocharger and exhaust manifold and must be installed stress-free.
Torque and tightening sequence must be observed without fail.
Tightening torque: **11 65 1AZ** .

1. Join all flange nuts in sequence 1 to 15 to **8 Nm.**
2. Tighten all flange nuts to a torque of **13 Nm** in sequence (1 to 15).

Installation note:

Flange nuts 1 to 5 are accessible from above.

cardiagn.com

Flange nuts 6 to 15 are accessible from below.

Secure screws (3).

Tightening torque: **11 65 9AZ** .

Tighten bolt (1).

Tightening torque **11 65 8AZ** .

Fig. 1836: Identifying Turbocharger Module, Holder And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Observe BMW Diagnosis System instruction.

Carry out BMW leakage test for intake system.

11 65 020 REMOVING AND INSTALLING OR REPLACING EXHAUST TURBOCHARGER (N47 D20 O1)

Special tools required:

- **11 6 050**

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

NOTE: **Troubleshooting on exhaust turbocharger.**

IMPORTANT: Before installing exhaust turbocharger, check the oil supply to the exhaust turbocharger and the oil return from the exhaust turbocharger for foreign bodies and oil sludging, clean if necessary.

Necessary preliminary tasks:

- Remove **INTAKE SILENCER HOUSING** .
- Remove acoustic covers on top and front. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .
- Loosen V-Band washer **DIESEL PARTICLE FILTER** (diesel particle filter does not have to be removed).
- Remove right **PRESSURE PIPE**.

Loosen screw on air intake hose (2).

Unlock clip (1) in direction of arrow.

Pull off air intake hose (2) in direction of arrow.

Fig. 1837: Pulling Air Intake Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Fig. 1838: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release screw (1).

Unfasten banjo bolt (2).

11 62 2AZ .

Place exhaust pipe (3) to one side.

Remove heat shield toward top.

Fig. 1839: Identifying Exhaust Pipe And Banjo Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Use steel sealing rings (1) only.
Risk of damage!

Installation note:

Replace steel sealing rings (1).

Fig. 1840: Identifying Steel Sealing Rings
Courtesy of BMW OF NORTH AMERICA, INC.

Release banjo bolt (1).

NOTE: Catch escaping engine oil in a suitable container.

Disconnect line (2).

Tightening torque **11 42 3AZ** .

Installation note:

Clean sealing surfaces.

Fig. 1841: Identifying Banjo Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten hose clamp (3).

Tightening torque: **11 00 7AZ** .

Remove return line (2) from the removed exhaust turbocharger.

Release screws (1).

Installation note:

Replace gasket.

Fig. 1842: Identifying Exhaust Turbocharger Return Line And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

cardiagn.com

Unfasten screws (2).

Remove bracket (3).

Fig. 1843: Identifying Bracket And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release bihexagonal bolts on exhaust turbocharger with special tool **11 6 050** .

Tightening torque: **11 65 1AZ** .

Installation note:

Replace gasket.

Fig. 1844: Releasing Bihexagonal Bolts On Exhaust Turbocharger With Special Tool (11 6 050)
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: To avoid damaging the threads and prevent exhaust turbocharger leaks, insert mounting bolts in 1/2 turns simultaneously.

NOTE: High-strength bolts are not magnetic and cannot be removed with a magnet.

Use gripper (2) to remove bihexagonal bolt (1).

Fig. 1845: Removing Bihexagonal Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

If the exhaust turbocharger is replaced, the engine oil pipe (2) must be modified.

Release banjo bolt (1).

Installation note:

Tightening torque **11 42 3AZ** .

Replace sealing rings.

Oil line (2) must run obliquely along the housing (see **Fig. 1846**).

Fig. 1846: Identifying Banjo Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

IMPORTANT: Grease the thread on the exhaust turbocharger with the **ASSEMBLY PASTE 4.2**.

To avoid damaging the threads and prevent exhaust turbocharger leakage, insert retaining screws in 1/2 turns simultaneously until they are flush.

Release all bolts again by a 90Â° turn.

Follow sequence of exhaust turbocharger screw connections:

1. Secure V-band.

cardiagn.com

2. exhaust turbocharger screw connection at the exhaust manifold **11 65 1AZ** .
3. Crankcase holder on the exhaust turbocharger **11 00 2AZ** .

11 65 310 REMOVING AND INSTALLING/REPLACING BLOW-OFF VALVE (N20)

WARNING: **The module consists of exhaust turbo charger and exhaust manifold.**

Necessary preliminary tasks:

- Remove front right wheel (all-wheel drive vehicle only)
- Remove **CLEAN AIR PIPE** .
- Drain **COOLANT** .
- Remove **EXPANSION TANK** .
- Remove pedestrian protection at bottom (without USA).
- Remove **CHARGE AIR COOLER** .
- Remove the **CATALYTIC CONVERTER** .
- Drain **ENGINE OIL**.
- Remove **EXHAUST TURBOCHARGER**.

Release screws (1).

Tightening torque: **11 65 6AZ**

Remove blow-off valve (2).

Fig. 1847: Identifying Blow-Off Valve And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean the threads and sealing surfaces (2).

Fig. 1848: Locating Threads And Sealing Surfaces
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Observe BMW Diagnostics System instruction.

Carry out BMW leak test for intake system.

11 65 300 ADJUSTING ELECTRICAL CONTROLLER DRIVE (WASTEGATE VALVE) (N55)

NOTE: **Basic setting of the wastegate linkage can only be checked or adjusted using the diagnosis.**

IMPORTANT: The adjusting nuts (1 and 2) may only countered by using two open-end spanners. Using just one open-end spanner risks damaging the electrical actuator drive.

Installation note:

Shorten adjustment travel (-).

Increase adjustment travel (+).

cardiagn.com

To ensure a reliable setting of the adjustment travel, both adjusting nuts must be marked with a colored mark.

Fig. 1849: Adjusting Electrical Controller Drive (Wastegate Valve)
Courtesy of BMW OF NORTH AMERICA, INC.

One full turn of the adjusting nut corresponds to an adjustment travel of **0.75 mm** .

Example 1:

Actual value measured by the diagnostic function: **+0.75 mm** .

Required correction: **+0.75 mm: 0.75 mm = +1.0 turns.**

Adjust the linkage setting correction by turning nut (1) through 1.0 turns in + direction before resetting nut (2) and countering with 6 Nm.

Example 2:

Actual value measured by the diagnostic function: **-1, 5 mm** .

Required correction: **-1.5 mm: 0.75 mm = - 2 turns.**

Adjust the linkage setting correction by turning nut (2) through 2 turns in - direction before resetting nut (1) and countering with 6 Nm.

Check basic setting again using diagnosis.

Assemble engine.

11 65 300 REMOVING AND INSTALLING/REPLACING ELECTRICAL ACTUATOR (WASTEGATE VALVE) (N20)

Necessary preliminary tasks:

- Remove intake silencer housing. See **13 71 000 REMOVING AND INSTALLING/REPLACING INTAKE SILENCER HOUSING (N20)** .

Release plug connection (1) from electrical wastegate actuator.

Installation note:

Ensure retaining clip is seated correctly.

Lock must engage.

Fig. 1850: Identifying Plug Connection From Electrical Wastegate Actuator
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Never pull off the adjustment plate (2) from the wastegate flap lever if the servomotor is still screwed on.
Risk of damage to drive linkage.

Release retaining clip (1).

Installation note:

Always renew retaining clip (1) after releasing.

cardiagn.com

Fig. 1851: Identifying Adjustment Plate And Retaining Clip
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (3).

Tightening torque: **11 65 4AZ** .

Remove the wastegate actuator.

Fig. 1852: Removing Wastegate Actuator Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Basic setting of the wastegate linkage can only be checked or adjusted using the diagnosis.

IMPORTANT: The adjusting nuts (1 and 2) may only countered by using two open-end spanners. Using just one open-end spanner risks damaging the electrical actuator drive.

Installation note:

Shorten adjustment travel (-).

Increase adjustment travel (+).

To ensure a reliable setting of the adjustment travel, both adjusting nuts must be marked with a colored mark.

One full turn of the adjusting nut corresponds to an adjustment travel of **0.75 mm** .

Example 1:

Actual value measured by the diagnostic function: **+0.75 mm** .

Required correction: **+0.75 mm: 0.75 mm = +1.0 turns.**

Fig. 1853: Adjusting Electrical Controller Drive (Wastegate Valve)
Courtesy of BMW OF NORTH AMERICA, INC.

Adjust the linkage setting correction by turning nut (1) through 1.0 turns in + direction before resetting nut (2) and countering with 6 Nm.

Example 2:

Actual value measured by the diagnostic function: **-1.5 mm** .

Required correction: **-1.5 mm: 0.75 mm = - 2 turns.**

Adjust the linkage setting correction by turning nut (2) through 2 turns in - direction before resetting nut (1) and countering with 6 Nm.

Check basic setting again using diagnosis.

Assemble engine.

11 61 365 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N20)

See **11 61 365 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N20)**.

cardiagn.com

11 61 368 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N55)

See 11 61 368 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N55).

11 61 362 REMOVING AND INSTALLING/REPLACING RIGHT CHARGE AIR LINE (N20, N26)

See 11 61 362 REMOVING AND INSTALLING/REPLACING RIGHT CHARGE AIR LINE (N20, N26).

VACUUM PUMP

11 66 521 CHECKING FUNCTION OF VACUUM SYSTEM (N20)

Special tools required:

- 2 201 924

IMPORTANT: Note the sequence of the diagnosis instructions in the **ISID** : Depending on the fault pattern, the order of operations in the repair instructions may be different from the order of operations in the **ISID** .

Carry out procedure to check the vacuum system.

Check suction effect of vacuum pump.

Detach vacuum line (1) from vacuum reservoir.

Detach vacuum line (2) from exhaust flap.

Fig. 1854: Identifying Vacuum Line From Exhaust Flap
Courtesy of BMW OF NORTH AMERICA, INC.

Check suction effect of vacuum pump.

Fit special tool 2 201 924.

Seal vacuum line from vacuum pump to vacuum reservoir with a suitable plug (1).

Follow diagnosis instruction.

Fig. 1855: Fitting Special Tool (2 201 924)
Courtesy of BMW OF NORTH AMERICA, INC.

Check vacuum reservoir.

Reconnect vacuum line from vacuum pump to the vacuum reservoir.

NOTE: When used with the IMIB the absolute pressure is displayed.

Follow diagnosis instruction.

Fig. 1856: Identifying IMIB Pressure Display
Courtesy of BMW OF NORTH AMERICA, INC.

Check vacuum reservoir.

Detach vacuum line (1) from vacuum reservoir.

cardiagn.com

Seal connection on vacuum reservoir with sealing cap (2).

Follow diagnosis instruction.

Fig. 1857: Identifying Vacuum Line And Sealing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Functional check of exhaust flaps.

Check function of exhaust flap (1) on both rear silencers (2).

Follow diagnosis instruction.

Fig. 1858: Identifying Exhaust Flap On Both Rear Silencers
Courtesy of BMW OF NORTH AMERICA, INC.

Check suction operation on the exhaust flap.

Disconnect vacuum line (1) to exhaust flap at left spring strut dome and reconnect with a T-piece.

Connect special tool 2 201 924 with T-piece.

NOTE: When used with the IMIB the absolute pressure is displayed.

Follow diagnosis instruction.

Fig. 1859: Connecting Special Tool (2 201 924) With T-Piece
Courtesy of BMW OF NORTH AMERICA, INC.

Leakage test of hoses to exhaust flaps.

Check leakage test of hoses to exhaust flaps.

Disconnect vacuum line (1) with pliers (2) as shown in the graphic.

Follow diagnosis instruction.

Fig. 1860: Disconnecting Vacuum Line With Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

Pressure converter connections

Disconnect vacuum hose at connection (VAC = vacuum reservoir).

Disconnect vacuum hose at connection (OUT= turbocharger vacuum unit).

Fig. 1861: Disconnecting Vacuum Hose Connection (OUT Turbocharger Vacuum Unit)
Courtesy of BMW OF NORTH AMERICA, INC.

Leakage test of hoses to wastegate valve.

Connect vacuum line (1) with vacuum line (2) from vacuum reservoir with a T-piece and special tool 2 201 924.

Follow diagnosis instruction.

cardiagn.com

Fig. 1862: Connecting Vacuum Line From Vacuum Reservoir With T-Piece
Courtesy of BMW OF NORTH AMERICA, INC.

Check function of wastegate capsule.

Check function of linkage.

Follow diagnosis instruction.

Fig. 1863: Checking Wastegate Capsule Function
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Remove all special tools.

Reassemble the vehicle.

11 66 521 CHECKING FUNCTION OF VACUUM SYSTEM (N55)

Special tools required:

- 81 38 2 201 924
- 2 201 924

IMPORTANT: Note the sequence of the diagnosis instructions in the **ISID** : Depending on the fault pattern, the order of operations in the repair instructions may be different from the order of operations in the **ISID** .

Carry out procedure to check the vacuum system.

Check the function of the vacuum pump:

Press and pull off the lock of the vacuum line (1) (see arrows).

NOTE: This empties the vacuum reservoir, this will always be accompanied by a sucking noise.

Fig. 1864: Pressing Vacuum Line Lock
Courtesy of BMW OF NORTH AMERICA, INC.

Check suction effect of vacuum pump.

Connect vacuum line (1) and IMIB with special tool (2) 81 38 2 201 924.

Start engine.

Run engine at idle speed.

Follow diagnosis instruction.

Fig. 1865: Identifying Vacuum Line And IMIB
Courtesy of BMW OF NORTH AMERICA, INC.

Check vacuum reservoir.

Reconnect vacuum line from vacuum pump to the vacuum reservoir.

cardiagn.com

NOTE: When the IMIB (1) is used the absolute pressure is displayed.

Follow diagnosis instruction.

Fig. 1866: Identifying IMIB Pressure Display
Courtesy of BMW OF NORTH AMERICA, INC.

Pull off connection (1) at the vacuum reservoir to the exhaust flap.

Pull off connection (2) at the vacuum reservoir to the EPDW (pressure converter).

Fig. 1867: Identifying Vacuum Reservoir To Exhaust Flap Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Check vacuum reservoir.

Seal connection on vacuum reservoir with sealing cap (1).

Connect vacuum reservoir and IMIB using special tool 81 38 2 201 924.

Follow diagnosis instruction.

Fig. 1868: Connecting Vacuum Reservoir And IMIB Using Special Tool (2 201 924)
Courtesy of BMW OF NORTH AMERICA, INC.

Functional check of exhaust flaps (if installed).

Checking function of exhaust flap (1).

Follow diagnosis instruction.

Illustration: E81.

Fig. 1869: Identifying Exhaust Flap
Courtesy of BMW OF NORTH AMERICA, INC.

Check suction operation on the exhaust flap.

Pull off the vacuum line to the EPDW at the vacuum reservoir and seal the connection at the vacuum reservoir with sealing cap (1).

Pull off the vacuum line (2) to the exhaust flap and connect to special tool 2 201 924 and vacuum reservoir using T-piece.

NOTE: When the IMIB is used the absolute pressure is displayed.

Fig. 1870: Connecting Special Tool (2 201 924) And Vacuum Reservoir Using T-Piece
Courtesy of BMW OF NORTH AMERICA, INC.

Follow diagnosis instruction.

Leakage test of vacuum line to exhaust flap.

Disconnect vacuum line (1) with pliers (2) as shown in the graphic.

cardiagn.com

Follow diagnosis instruction.

Fig. 1871: Disconnecting Vacuum Line With Pliers
Courtesy of BMW OF NORTH AMERICA, INC.

Check function of wastegate valve.

Initial setting of wastegate linkage (1).

Observe wastegate linkage (1); it must close following activation (arrowed).

Follow diagnosis instruction.

Fig. 1872: Checking Initial Setting Of Wastegate Linkage
Courtesy of BMW OF NORTH AMERICA, INC.

Pressure converter connections

Disconnect vacuum hose at connection (VAC = vacuum reservoir).

Disconnect vacuum hose at connection (OUT= turbocharger vacuum unit).

Fig. 1873: Disconnecting Vacuum Hose Connection (OUT Turbocharger Vacuum Unit)
Courtesy of BMW OF NORTH AMERICA, INC.

Leakage test of hoses to wastegate valve.

Pull vacuum line off pressure converter plug connection (OUT).

Pull vacuum line off pressure converter plug connection (VAC).

Connect both vacuum lines to special tool 2 201 924 with a T-piece (1).

Follow diagnosis instruction.

Fig. 1874: Connecting Both Vacuum Lines To Special Tool (2 201 924) With T-Piece
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Remove all special tools.**
Reassemble the vehicle.

11 66 000 REMOVING AND INSTALLING OR REPLACING VACUUM/OIL PUMP (N47 D20 O1)

Special tools required:

- 00 9 120
- 11 4 350

IMPORTANT: It is possible to remove and install the vacuum oil pump **without** removing the transmission.

Necessary preliminary tasks:

- Removing **OIL SUMP**.

Release screws (1).

cardiagn.com

Remove intake snorkel in direction of arrow.

Fig. 1875: Removing Intake Snorkel
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Fig. 1876: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Installation note:

Clean and blow out the thread

Fig. 1877: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

When installed, the oil pump chain must be fed out from the sprocket wheel of the oil pump drive gear; the sprocket wheel cannot be removed.

NOTE: Illustration shows gear case cover removed.

Fig. 1878: Identifying Gear Case Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Oil vacuum pump must be fed out at chain drive (1).

Fig. 1879: Identifying Chain Drive
Courtesy of BMW OF NORTH AMERICA, INC.

Feed out oil vacuum pump (1) in direction of arrow and remove.

Installation in reverse sequence.

Installation note:

Clean all sealing surfaces.

Fig. 1880: Removing Oil Vacuum Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace O-ring.

Install all screws (1) and tighten down.

Tightening torque: **11 41 1AZ** .

Fig. 1881: Identifying Screws

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Install and tighten down screws (1).

Fig. 1882: Identifying Gear Case Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean and blow out the thread

Insert and secure screw (1).

Secure screw (1) with special tool **00 9 120** .

Tightening torque: **11 41 2AZ** .

Fig. 1883: Identifying Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 66 000 REMOVING AND INSTALLING/REPLACING VACUUM PUMP (N20)

Necessary preliminary tasks:

- Press brake pedal several times in order to reduce vacuum pressure in brake booster.
- Remove **COWL PANEL COVER**
- Remove **ACOUSTIC COVER**

Release screw (1).

Lever out cable clip (2).

Remove cover (3).

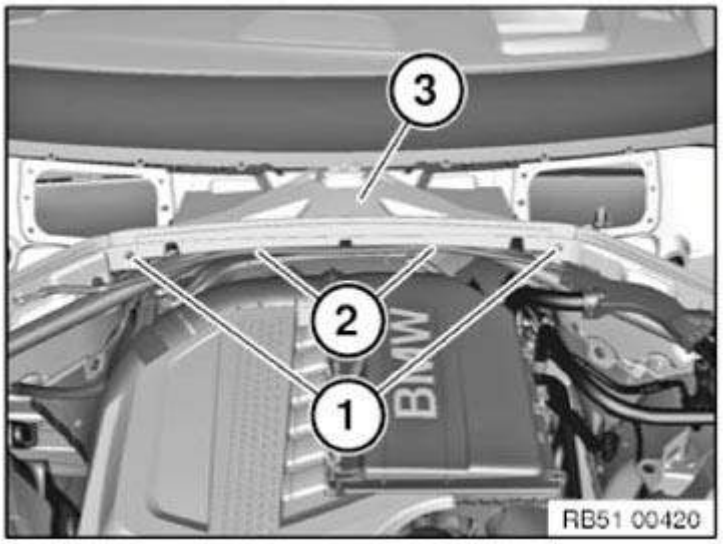


Fig. 1884: Identifying Cable Clip, Cover And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Graphic F30

cardiagn.com

Release vacuum line (1) from both plug connections and remove.

Fig. 1885: Identifying Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: For purposes of clarity, this work step is shown on the engine after it has been removed.
Release positive battery cable (1) from vacuum pump

Release screw and pull off vacuum line (2) of exhaust turbocharger control unit.

Release screws (3) and remove vacuum pump towards rear.

Fig. 1886: Identifying Positive Battery Cable, Screws & Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check sealing ring (1) for damage and replace if necessary.

Lightly oil sealing ring (1)

Align vacuum pump electric motor (3) to groove (2) on exhaust camshaft.

The vacuum pump can be installed more easily by simultaneously rotating and pressing.

Fig. 1887: Aligning Vacuum Pump Electric Motor To Groove On Exhaust Camshaft
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME.

11 66 000 REMOVING AND INSTALLING/REPLACING VACUUM PUMP (N52T)

Special tools required:

- 11 0 290
- 11 4 120
- 11 4 362

Necessary preliminary tasks:

- Remove DRIVE BELT.
- Remove BELT TENSIONER for drive belt.
- Remove SEALING CAP for vacuum pump.
- Remove intake PLENUM.

Rotate crankshaft at central bolt.

Rotate camshaft sprocket (3) until drilled holes and screws (1) match up.

Screw in special tool 11 4 362 .

Secure special tool 11 0 290 in sprocket (3) and on special tool 11 4 362 .

cardiagn.com

Release screw (2).

Tightening torque: **11 66 2AZ** .

Release screws (1) and secure against falling out.

Tightening torque: **11 66 1AZ** .

Fig. 1888: Securing Special Tool (11 0 290) To Sprocket
Courtesy of BMW OF NORTH AMERICA, INC.

Remove vacuum pump towards rear.

Installation note:

Replace gasket.

Press chain tensioner (1) with chain in direction of arrow.

Insert special tool **11 4 120** .

Remove sprocket (2) in direction of arrow.

Fig. 1889: Inserting Special Tool (11 4 120)
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

EXHAUST GAS RECIRCULATION

11 71 100 REMOVING AND INSTALLING/REPLACING EXHAUST-GAS RECIRCULATION COOLER (N47 D20 O1)

Necessary preliminary work:

- Remove acoustic cover at front. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .
- Drain coolant. See **17 00 008 DRAINING AND TOPPING UP COOLANT (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)** .

Release screws (1).

Installation note:

Replace gasket.

Tightening torque: **11 61 2AZ** .

Fig. 1890: Identifying Screws On Exhaust-Gas Recirculation Cooler
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Installation note:

Grease screws with **ASSEMBLY PASTE 4.2**.

Tightening torque: **11 71 1AZ** .

cardiagn.com

Fig. 1891: Identifying Exhaust-Gas Recirculation Valve And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Loosen the electric changeover valve (2) at the retaining clip (1) and pull off in direction of arrow.

Detach vacuum line (3) from electric changeover valve (2).

Release screw (4).

Tightening torque: **11 00 4AZ** .

Fig. 1892: Detaching Vacuum Line From Electric Changeover Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Release coolant lines (2 and 4) from exhaust-gas recirculation valve.

Fig. 1893: Identifying Exhaust-Gas Recirculation Valve, Coolant Lines, And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 00 4AZ** .

Fig. 1894: Identifying Exhaust-Gas Recirculation Cooler And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **11 00 4AZ** .

Installation note:

Replace pipe neck on EGR cooler.

Ensure that the pipe neck is mounted without tension.

Fig. 1895: Identifying Exhaust-Gas Recirculation Cooler And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Note screw sequence at the exhaust-gas guide module.

Screwed connections in sequence (1 to 5).

Fig. 1896: Exhaust-Gas Guide Module Screw Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

11 71 501 REMOVING AND INSTALLING/REPLACING EXHAUST-GAS RECIRCULATION VALVE (EGR) (N47 D20 O1)

Necessary preliminary tasks:

- Remove front acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .
- Remove **INTAKE SILENCER HOUSING** (E8x, F25 only).

cardiagn.com

- Remove **CLEAN AIR PIPE** (E8x, F25 only).

Unlock vent line (2) and pull off to achieve improved freedom of movement of the exhaust-gas recirculation valve mounting.

Fig. 1897: Identifying Vent Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) on exhaust-gas recirculation valve (3).

Release coolant lines (2 and 4).

Disconnect plug connection on exhaust-gas recirculation valve (3).

Installation note:

Install rear hose (2) before installing the exhaust-gas recirculation valve.

Replace O-ring.

Fig. 1898: Identifying Exhaust-Gas Recirculation Valve, Coolant Lines, And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DDE.

ELECTRONIC VALVE FOR EXHAUST GAS RECIRCULATION

11 74 555 REMOVING AND INSTALLING/REPLACING EXHAUST-GAS RECIRCULATION VALVE (N47 D20 O1)

Necessary preliminary work:

Remove front acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)** .

Loosen the electric changeover valve (2) at the retaining clip (1) and pull off in direction of arrow.

Detach vacuum lines from electric changeover valve (2).

Disconnect plug connection on electric changeover valve (2).

Fig. 1899: Identifying Vacuum Line, Electric Changeover Valve, Screw And Retaining Clip
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of Digital Diesel Electronics.

11 71 501 REMOVING AND INSTALLING/REPLACING EXHAUST-GAS RECIRCULATION VALVE (EGR) (N47 D20 O1)

See **11 71 501 REMOVING AND INSTALLING/REPLACING EXHAUST-GAS RECIRCULATION VALVE (EGR) (N47 D20 O1)**.

11 74 507 REPLACING THE PRESSURE CONVERTERS FOR EXHAUST TURBOCHARGER (N20)

cardiagn.com

Necessary preliminary tasks:

- Remove **ACOUSTIC COVER**.

Disconnect plug connection (1).

Remove vacuum line (OUT).

Unfasten screws (2).

Remove pressure converter (3).

Installation note:

If the pressure converter is renewed, the (VAC) line must be converted.

Fig. 1900: Identifying Pressure Converter And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check function of DME.

EMISSION CONTROL, OXYGEN SENSOR

11 78 513 REPLACING BOTH OXYGEN CONTROL SENSORS (N52T)

Special tools required:

- 11 7 020

WARNING: **Scalding hazard!**
Work should only be carried out on an exhaust system that has cooled down.

Installation:

The threads of new oxygen control sensors are already coated with Never Seez Compound.

If a oxygen control sensor is to be reused, apply a thin and even coating of Never Seez compound to the thread only.

The part of the oxygen control sensor which projects into the exhaust system branch (sensor ceramics) must not be cleaned and **not** coated with lubricant.

Oxygen control sensor, cylinder nos. 1 to 3:

NOTE: **The oxygen control sensor on the exhaust manifold of cylinder nos. 1 to 3 is accessible from above.**
Disconnect plug connection.
Unclip the cable from the holder.
Release oxygen control sensor on exhaust manifold of cylinder nos. 1 to 3 with special tool 11 7 020 .

Oxygen control sensor, cylinder nos. 4 to 6:

NOTE: **The oxygen control sensor on the exhaust manifold of cylinder nos. 4 to 6 is accessible from above.**

cardiagn.com

Disconnect plug connection.

Unclip the cable from the holder.

Release screws (1) on retaining plate.

Remove retaining plate (3).

Release oxygen control sensor (2) on exhaust manifold of cylinder nos. 4 to 6 with special tool **11 7 020** .

Fig. 1901: Identifying Oxygen Control Sensor On Exhaust Manifold
Courtesy of BMW OF NORTH AMERICA, INC.

All:

Installation:

Cable color of oxygen control sensor, cylinders nos. 1 to 3 = black.

Cable color of oxygen control sensor, cylinders nos. 4 to 6 = grey.

Tightening torque **11 78 1AZ** .

Assemble engine.

Check function of DME.

11 78 545 REPLACING BOTH OXYGEN MONITORING SENSORS (N52T)

Special tools required:

- **11 9 150**

WARNING: **Risk of burning!**
Work should only be carried out on an exhaust system that has cooled down.

Necessary preliminary work:

- Remove **UNDERBODY PROTECTION**

Installation note:

The threads of new lambda monitoring sensors are already coated with NEVER-SEEZ compound.

If a lambda monitoring sensor is to be reused, apply a thin and even coating of NEVER-SEEZ compound to the thread only.

The part of the lambda monitoring sensor which projects into the exhaust branch (sensor ceramics) must not be cleaned and **not** coated with lubricant.

Disconnect plug connection for oxygen monitoring sensor.

Release and tighten lambda monitoring sensor (1) on exhaust manifold of cylinder nos. 1 to 3 with special tool (2) **11 9 150** .

Tightening torque **11 78 1AZ** .

Installation note:

cardiagn.com

When special tool **11 9 150** is used, 47 Nm on torque wrench scale corresponds to an actual tightening torque of 50 Nm

Cable color of lambda monitoring sensor (1), cylinders nos. 1 to 3 = black.

Fig. 1902: Identifying Lambda Monitoring Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection for oxygen monitoring sensor.

Release lambda monitoring sensor (1) on exhaust manifold of cylinder nos. 4 to 6.

Tighten with special tool (2) **11 9 150** .

Tightening torque: **11 78 1AZ** .

Installation note:

When special tool **11 9 150** is used, 47 Nm on torque wrench scale corresponds to an actual tightening torque of 50 Nm

Cable color of lambda monitoring sensor (1), cylinders nos. 4 to 6 = grey.

Fig. 1903: Identifying Lambda Monitoring Sensor On Exhaust Manifold
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DME.

11 78 610 REPLACING MONITORING SENSOR (N55)

Special tools required:

- 11 7 030
- **11 9 150**

WARNING: **Risk of burning!**
Work should only be carried out on an exhaust system that has cooled down.

Necessary preliminary work:

- Remove rear ignition coil cover. See **12..... REMOVING AND INSTALLING/REPLACING REAR IGNITION COIL COVER (N55)** .
- Remove the **CATALYTIC CONVERTER** .

Installation note:

The threads of new monitoring sensors are already coated with NEVER-SEEZ compound.

If a monitoring sensor is to be reused, apply a thin and even coating of NEVER-SEEZ compound to the thread only.

The part of the monitoring sensor which projects into the exhaust branch (sensor ceramics) must not be cleaned and **not** coated with lubricant.

Disconnect plug connection of monitoring sensor (1).

cardiagn.com

Installation note:

Cable color of control sensor = black.

Cable color of monitoring sensor = grey.

Fig. 1904: Identifying Plug Connection Of Monitoring Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Remove monitoring sensor.

Tightening torque: **11 78 2AZ** .

Fig. 1905: Identifying Monitoring Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check function of DME.

11 78 510 REPLACING OXYGEN CONTROL SENSOR (N55)

Special tools required:

- 11 7 030
- **11 9 150**
- **11 4 260**

WARNING: **Risk of burning!**
Work should only be carried out on an exhaust system that has cooled down.

Installation note:

The threads of new oxygen control sensors are already coated with NEVER-SEEZ compound.

If an oxygen control sensor is to be reused, apply a thin and even coating of NEVER-SEEZ compound to the thread only.

The part of the lambda control sensor which projects into the exhaust branch (sensor ceramics) must not be cleaned and **not** coated with lubricant.

Necessary preliminary work:

- Remove rear ignition coil cover. See **12..... REMOVING AND INSTALLING/REPLACING REAR IGNITION COIL COVER (N55)** .
- Remove **REINFORCEMENT PLATE** .

Disconnect plug connection on oxygen control sensor (1).

Installation note:

Cable color of oxygen control sensor = black.

Cable color of oxygen monitoring sensor = grey.

Fig. 1906: Identifying Plug Connection On Oxygen Control Sensor

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Unclip cable (1) of control sensor out of holder.

Fig. 1907: Identifying Control Sensor Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Release oxygen sensor (1) from above with special tool **11 4 260** .

Tightening torque: **11 78 1AZ** .

Fig. 1908: Identifying Oxygen Sensor & Special Tool (11 4 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check function of DME.

11 78 510 REPLACING OXYGEN CONTROL SENSORS (N20, N26)

Special tools required:

- 11 7 030
- **11 4 260**

WARNING: **Risk of burning!**
Work should only be carried out on an exhaust system that has cooled down.

Installation note:

The threads of new oxygen control sensors are already coated with **NEVER SEEZ COMPOUND**.

If an oxygen control sensor is to be reused, apply a thin and even coating of NEVER-SEEZ compound to the thread only.

Sensor ceramics not cleaned and not coated with lubricant.

Necessary preliminary tasks:

- Remove **ACOUSTIC COVER**

Disconnect plug connection on oxygen control sensor (1).

Installation note:

Cable color of oxygen control sensor = black.

Cable color of oxygen monitoring sensor = grey.

Fig. 1909: Identifying Plug Connection On Oxygen Control Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: When using special tool **11 4 260** , it is essential to reduce the prescribed tightening torque by 3 Nm.

Release oxygen control sensor (2) with special tool **11 4 260** .

cardiagn.com

Tightening torque: **11 78 1AZ** .

Fig. 1910: Releasing Oxygen Control Sensor With Special Tool (11 4 260)
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check function of DME.

11 78 610 REPLACING OXYGEN MONITORING SENSORS (N20, N26)

Special tools required:

- 11 7 030

WARNING: **Risk of burning!**
Work should only be carried out on an exhaust system that has cooled down.

Necessary preliminary work:

- Remove **CATALYTIC CONVERTER** .

Installation note:

The threads of new oxygen monitoring sensors are already coated with **NEVER SEEZ COMPOUND**.

If a lambda monitoring sensor is to be reused, apply a thin and even coating of Never Seez Compound to the thread only.

Sensor ceramics must not be cleaned and **not** be coated with lubricant.

Disconnect plug connection on lambda monitoring sensor (1).

Installation note:

Cable color of oxygen control sensor = black.

Cable color of oxygen monitoring sensor = grey.

Fig. 1911: Identifying Plug Connection On Lambda Monitoring Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Release oxygen monitoring sensor with special tool 11 7 030.

Tightening torque: **11 78 2AZ** .

Fig. 1912: Releasing Oxygen Monitoring Sensor With Special Tool (11 7 030)
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check function of DME.

11 74 507 REPLACING THE PRESSURE CONVERTERS FOR EXHAUST TURBOCHARGER (N20)

See **11 74 507 REPLACING THE PRESSURE CONVERTERS FOR EXHAUST TURBOCHARGER (N20)**.

cardiagn.com

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

cardiagn.com

ENGINE

0491003 ADAPTER

0491003 114030 Adapter Mechanical tool

NOTE: For pressure gauge used for checking oil pressure

Storage Location

Y1

SI number

01 01 88 (812)

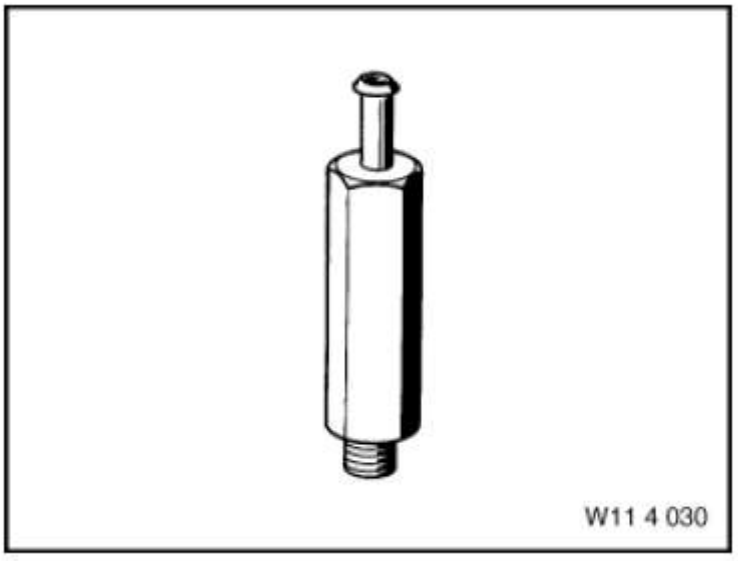


Fig. 1: Identifying Adapter (0491003)
Courtesy of BMW OF NORTH AMERICA, INC.

0495006 ADAPTER

0495006 114282 Adapter Minimum set: Mechanical tools AM

cardiagn.com

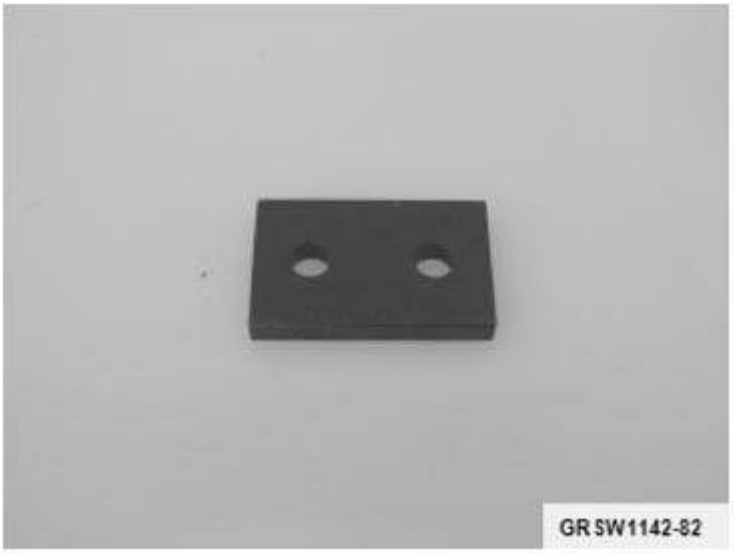


Fig. 2: Identifying Adapter (0495006)
Courtesy of BMW OF NORTH AMERICA, INC.

0494435 ADAPTER

0494435 118184 Adapter Minimum set: Mechanical tools AM

NOTE: **E65/M67**

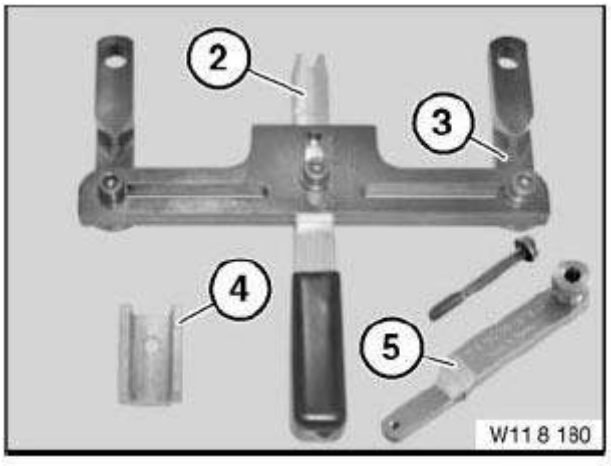


Fig. 3: Identifying Adapter (0494435)
Courtesy of BMW OF NORTH AMERICA, INC.

0495156 ADAPTER

0495156 115243 Adapter AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 5 240 (83 30 0 495 118) - as of 13.01.12**

SI number

01 02 05 (173)

cardiagn.com

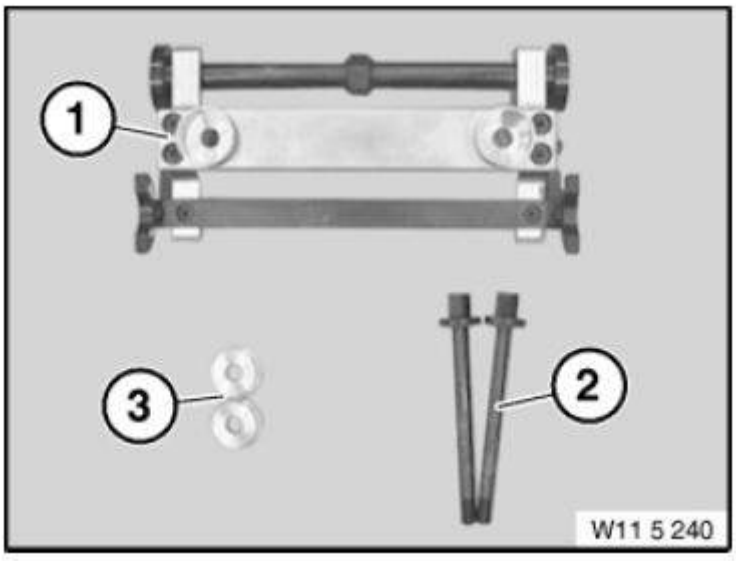


Fig. 4: Identifying Adapter (0495156)
Courtesy of BMW OF NORTH AMERICA, INC.

0495130 ADAPTER

0495130 115360 Adapter AM

NOTE: **For VANOS oil pressure measurement.**

Storage Location

A71

SI number

01 02 05 (173)

Consisting of:

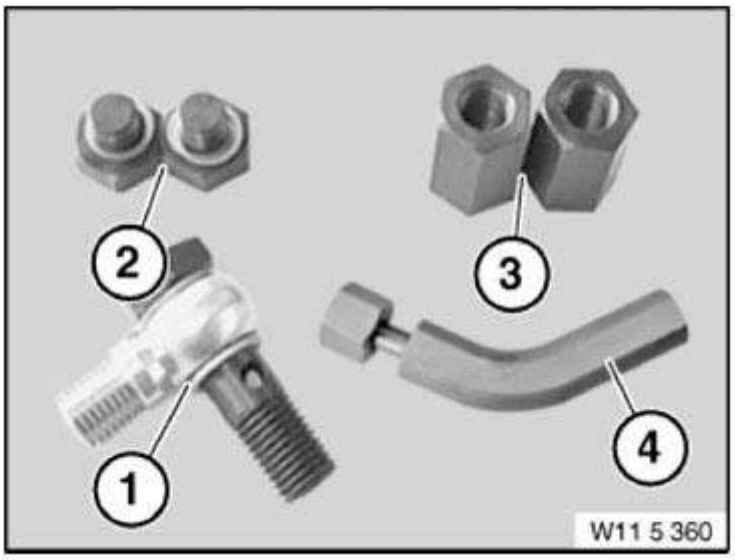


Fig. 5: Identifying Adapter (0495130)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0495178 Screw

NOTE: **(Banjo bolt with ring connector)**

cardiagn.com

2. 0495179 Screw

NOTE: **(Set of screw plugs (2 x))**

3. 0495262 Nut

NOTE: **(Set of lock nuts (2 x))**

4. 0495568 Adapter

NOTE: **For connecting pressure sensor**

0490662 ADAPTER

0490662 111019 Adapter AM

NOTE: **(Adapter) Replaced by 00 9 120 (0 490 504)**

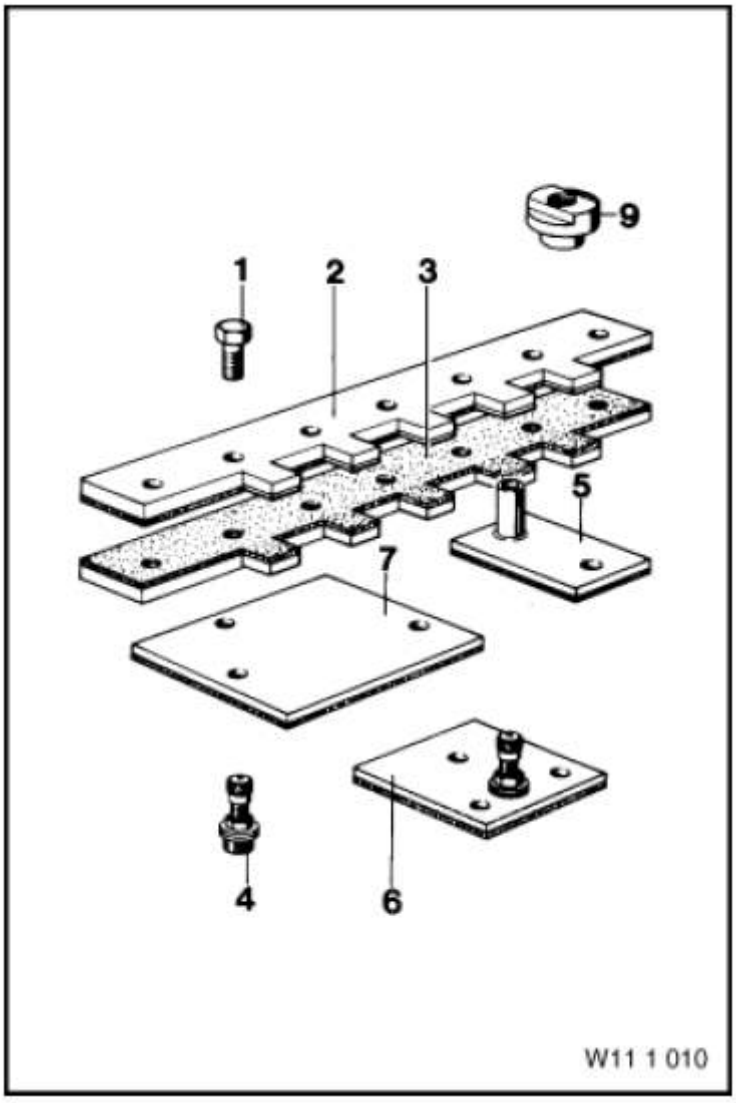


Fig. 6: Identifying Adapter (0490662)
Courtesy of BMW OF NORTH AMERICA, INC.

0494368 ADAPTER

0494368 119003 Adapter Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **(Sliding block)**

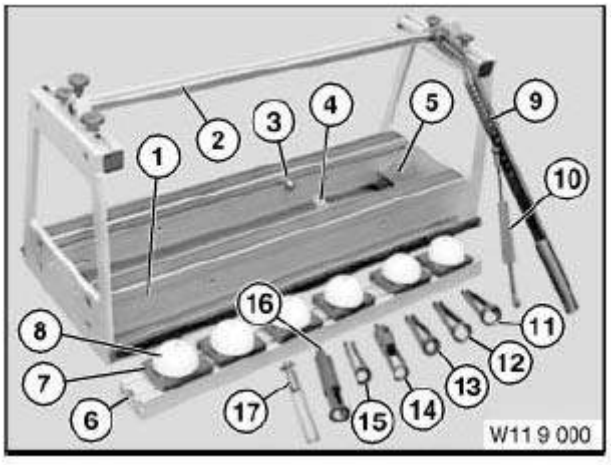


Fig. 7: Identifying Adapter (0494368)
Courtesy of BMW OF NORTH AMERICA, INC.

0491006 ADAPTER

0491006 114060 Adapter Mechanical tool

Replaced by: 83300491003

NOTE: **For pressure gauge for checking the oil pressure - Replaced by 11 4 030 (0 491 003)**

Storage Location

B9

2303795 ADAPTER

2303795 Adapter Minimum set: Mechanical tools AM

In conjunction with: **11 9 230 = 0493935**

NOTE: **For fitting the front RWD.**

Storage Location

A33

SI number

01 06 12 (800)

cardiagn.com



Fig. 8: Identifying Adapter (2303795)
Courtesy of BMW OF NORTH AMERICA, INC.

0496110 ADAPTER

0496110 118742 Adapter Minimum set: Mechanical tools AM

Replaced by: 83300496758

NOTE: **(Hexagon head adapter) Replaced by 11 8 0 32 (0 496 758)**

SI number

01 05 07 (353)

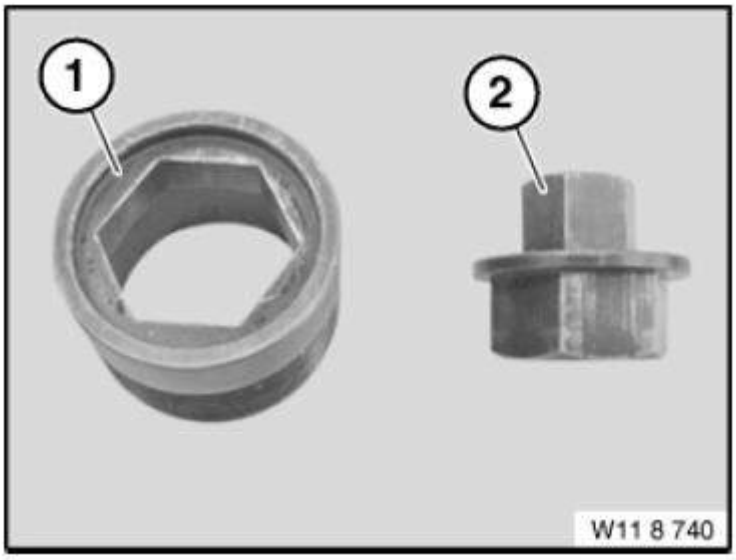


Fig. 9: Identifying Adapter (0496110)
Courtesy of BMW OF NORTH AMERICA, INC.

0491017 ADAPTER

0491017 114170 Adapter Mechanical tool

NOTE: **For pressure gauge 13 3 061 or BMW DIS for oil pressure testing - Model year: up to 08/95**

cardiagn.com

Storage Location

B3

SI number

01 12 93 (701)



Fig. 10: Identifying Adapter (0491017)
Courtesy of BMW OF NORTH AMERICA, INC.

0496305 ADAPTER

0496305 118731 Adapter Minimum set: Mechanical tools AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 8 73 (83 30 0 496 107) - as of 19.04.12**

SI number

01 04 07 (352)



Fig. 11: Identifying Adapter (0496305)
Courtesy of BMW OF NORTH AMERICA, INC.

0490668 ADAPTER

0490668 111025 Adapter AM

NOTE: **(Adapter) Engine: M20**

cardiagn.com

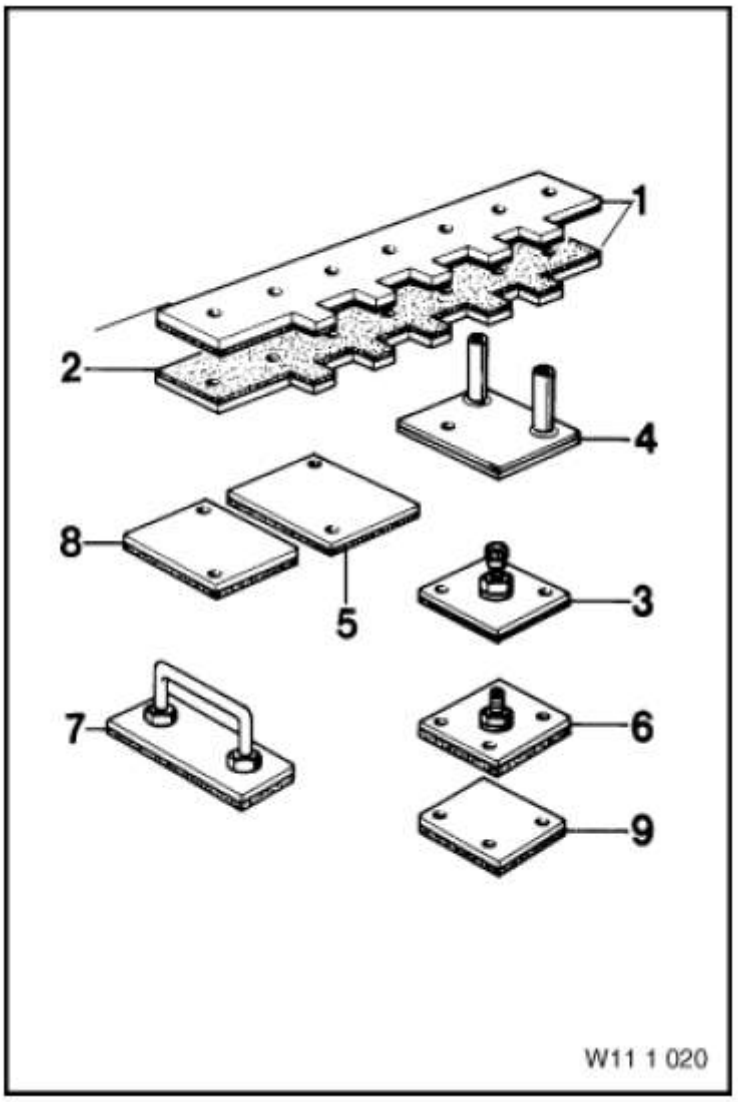


Fig. 12: Identifying Adapter (0490668)
Courtesy of BMW OF NORTH AMERICA, INC.

0490669 ADAPTER

0490669 111026 Adapter AM

NOTE: **(Adapter) Engine: M40**

cardiagn.com

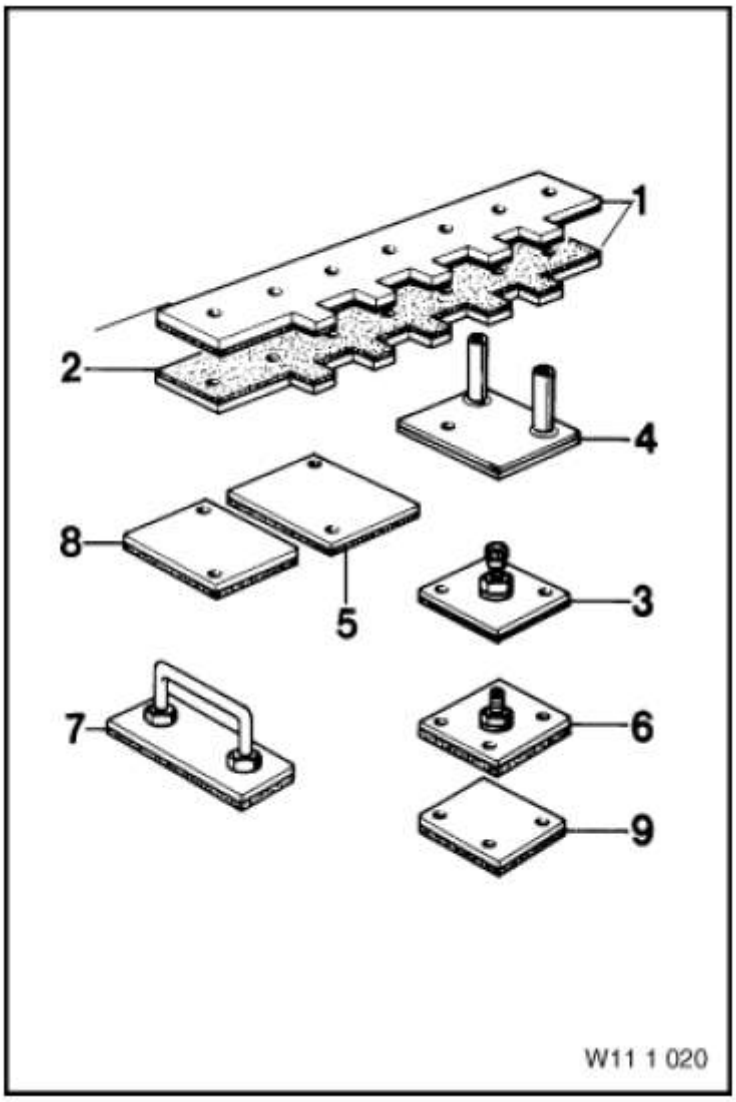


Fig. 13: Identifying Adapter (0490669)
Courtesy of BMW OF NORTH AMERICA, INC.

0490903 ADAPTER

0490903 113040 Adapter AM

NOTE: **(Adapter) for removing deflecting element with guide rail**

Storage Location

X3

Consisting of:

1. 0490904 Mandrel

   NOTE: **(Drift for deflecting element)**

2. 0490905 Adapter

   NOTE: **(Adapter for guide rail)**

cardiagn.com

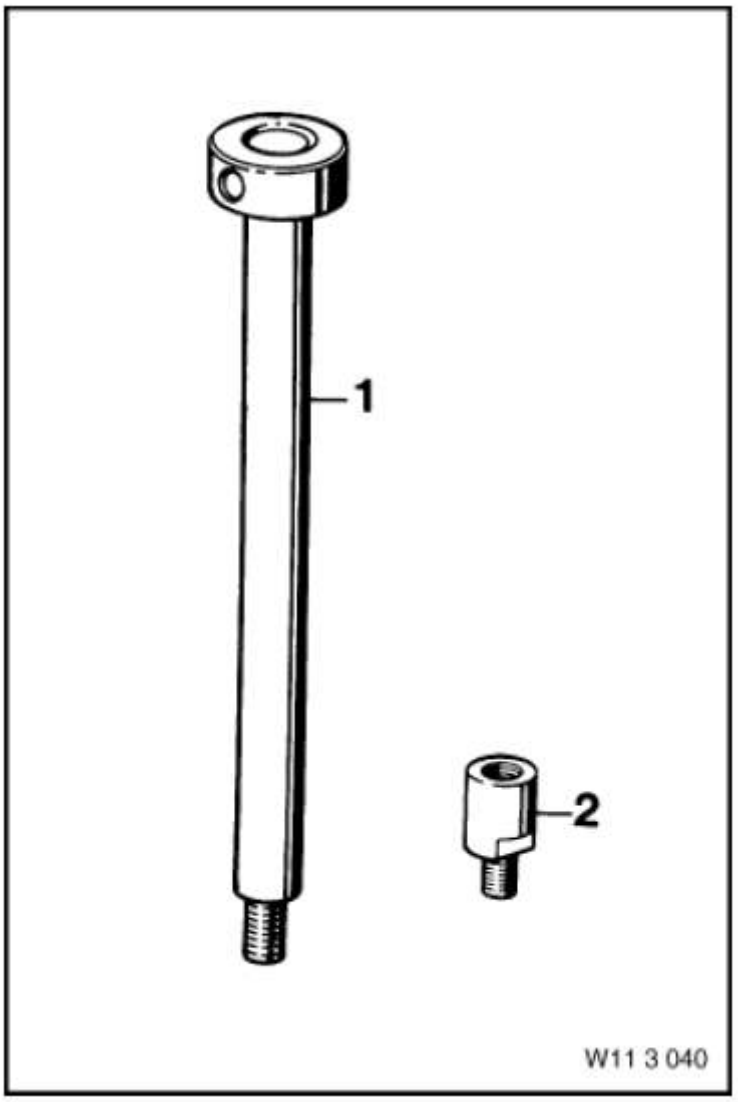


Fig. 14: Identifying Adapter (0490903)
Courtesy of BMW OF NORTH AMERICA, INC.

0496623 ADAPTER

0496623 114310 Adapter Minimum set: Mechanical tools AM

In conjunction with: **11 5 360 = 0495130**

NOTE: **For fuel pressure check. For variable camshaft timing control VANOS with Integrated Measurement Interface Box IMIB (100 bar sensor in delivery specification). In combination with 11 5 360.**

Storage Location

C26

SI number

01 27 09 (598)

cardiagn.com

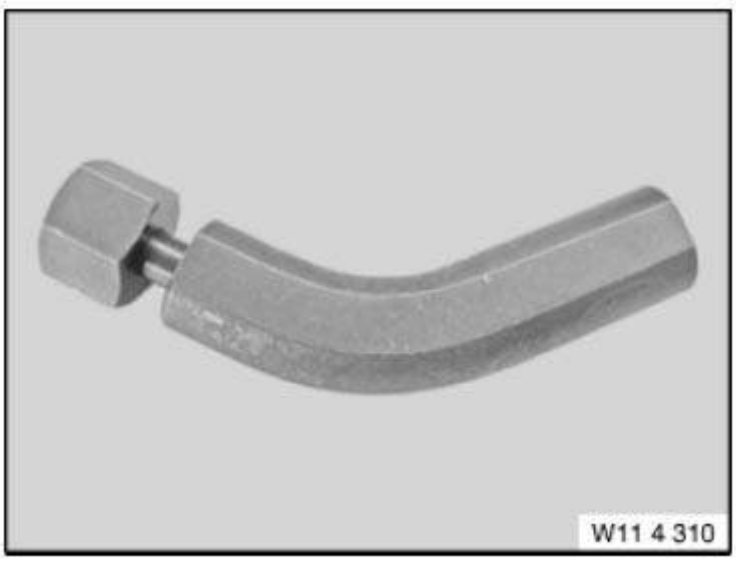


Fig. 15: Identifying Adapter (0496623)
Courtesy of BMW OF NORTH AMERICA, INC.

0496107 ADAPTER

0496107 118730 Adapter Minimum set: Mechanical tools AM

NOTE: **For compression testing.**

Storage Location

C23

SI number

01 04 07 (352)

Consisting of:

1. **0496305** Adapter

   NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 8 73 (83 30 0 496 107) - as of 19.04.12**

2. **0496306** Ring

   NOTE: **(Sealing ring) For secure connection of test probe 11 0 222 and adapter 11 8 730/731.**

cardiagn.com



Fig. 16: Identifying Adapter (0496107)
Courtesy of BMW OF NORTH AMERICA, INC.

2158850 ADAPTER

2158850 Adapter MP

In conjunction with: **DIAGNOSTIC AUXILIARY DEVICE 81290426464**

NOTE: **Adapter for connecting the diagnostic auxiliary device to the Integrated Measurement Interface Box.**

SI number

cardiagn.com

02 10 09 (613)



Fig. 17: Identifying Adapter (2158850)
Courtesy of BMW OF NORTH AMERICA, INC.

0490573 ADAPTER

0490573 110030 Adapter Minimum set: Mechanical tools Mechanical tool

NOTE: **(Adapter) For removing and installing the engine**

Storage Location

C1

SI number

01 10 90 (288)

cardiagn.com

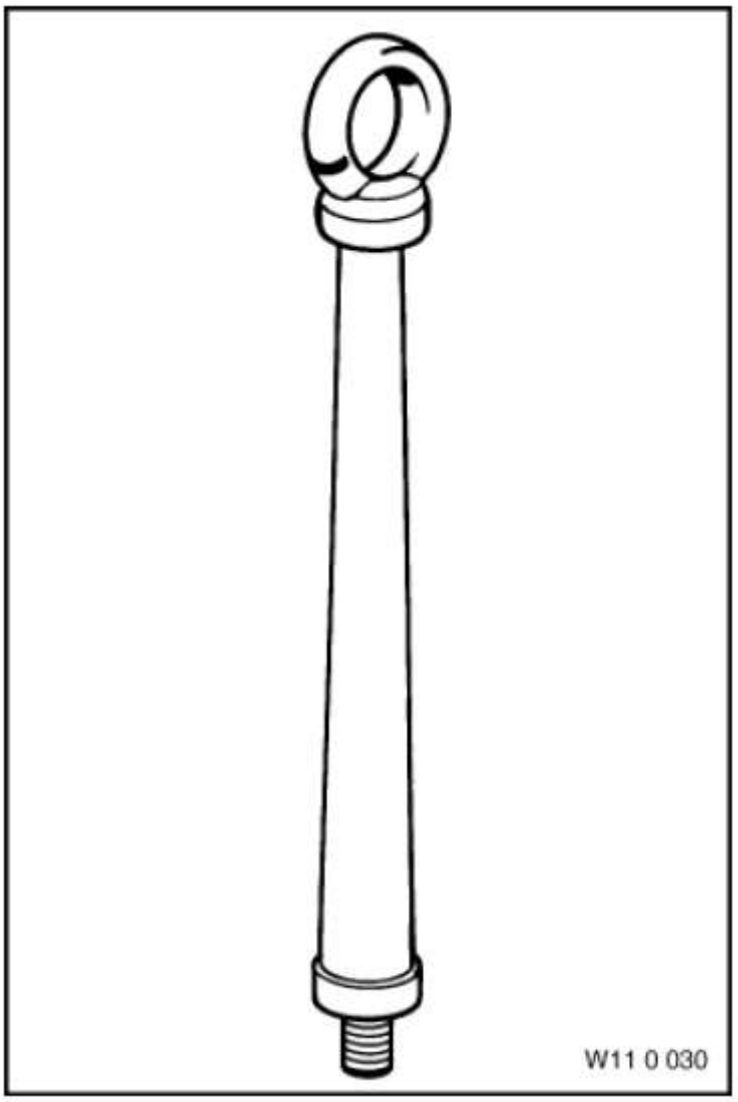


Fig. 18: Identifying Adapter (0490573)
Courtesy of BMW OF NORTH AMERICA, INC.

2212822 ADAPTER

2212822 Adapter Minimum set: Mechanical tools Mechanical tool

NOTE: **For installation of the front RWD.**

Storage Location

A29

SI number

01 05 11 (692)

cardiagn.com

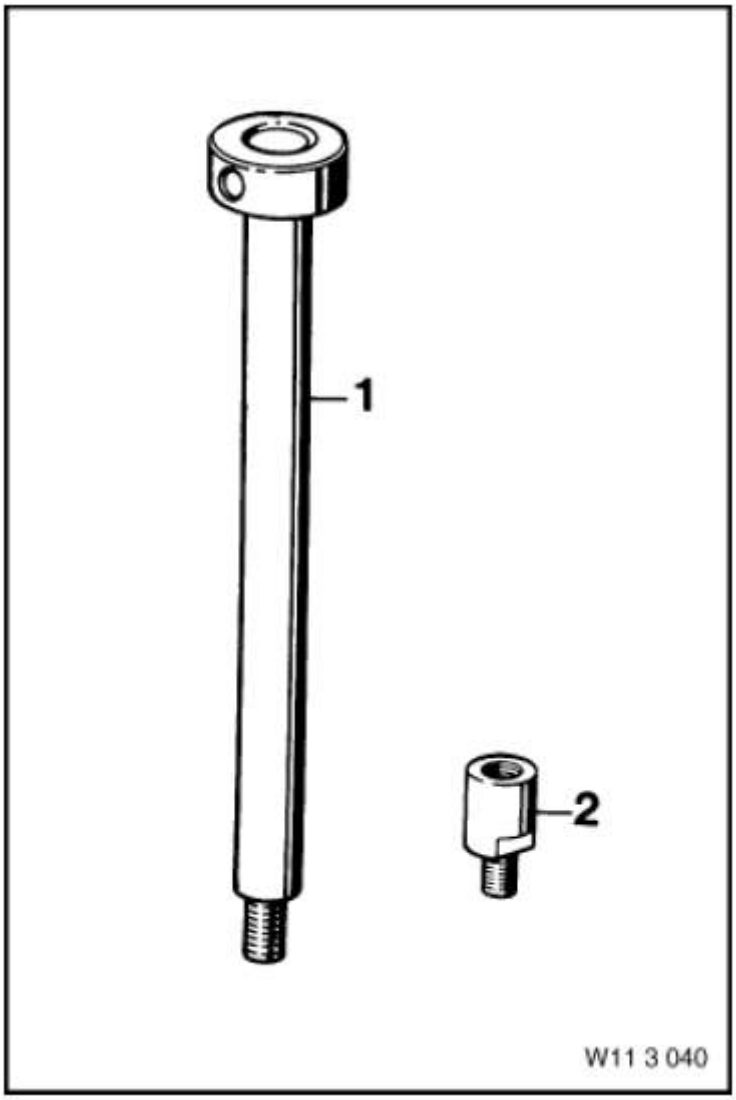


Fig. 19: Identifying Adapter (2212822)
Courtesy of BMW OF NORTH AMERICA, INC.

0490905 ADAPTER

0490905 113042 Adapter AM

NOTE: (Adapter for guide rail)



cardiagn.com

Fig. 20: Identifying Adapter (0490905)
Courtesy of BMW OF NORTH AMERICA, INC.

0493535 ADAPTER

0493535 114330 Adapter Mechanical tool

NOTE: **For pressure gauge used for checking oil pressure**

Storage Location

A4

SI number

01 12 99 (452)

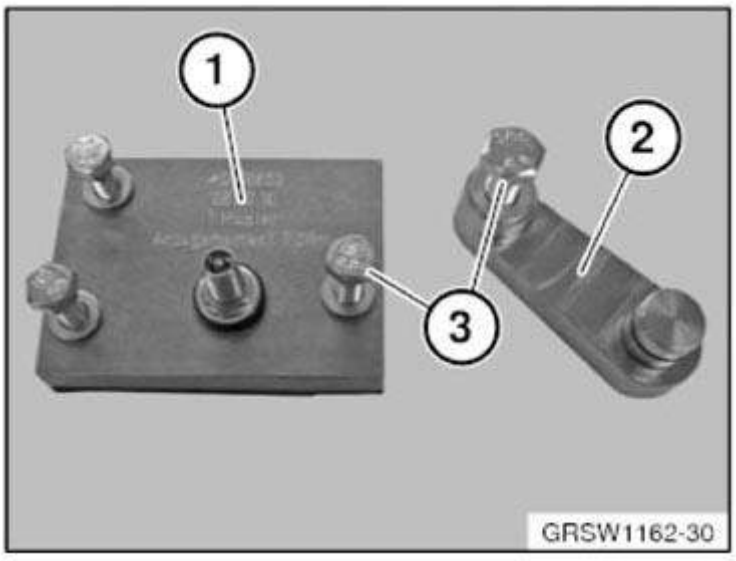


Fig. 21: Identifying Adapter (0493535)
Courtesy of BMW OF NORTH AMERICA, INC.

0496866 ADAPTER

0496866 116232 Adapter AM

NOTE: **Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**



cardiagn.com

Fig. 22: Identifying Adapter (0496866)
Courtesy of BMW OF NORTH AMERICA, INC.

0490834 ADAPTER

0490834 112118 Adapter AM

Replaced by: 83300490504

NOTE: **(Adapter) Replaced by 00 9 120 (0 490 504)**

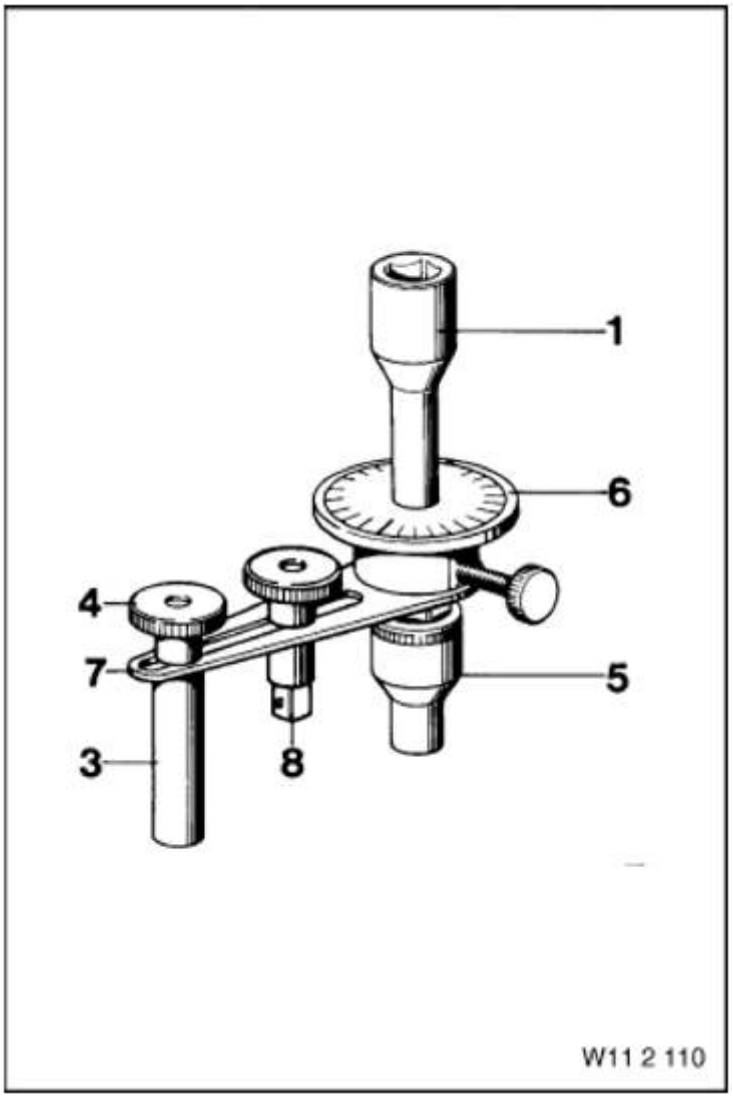


Fig. 23: Identifying Adapter (0490834)
Courtesy of BMW OF NORTH AMERICA, INC.

0493742 ADAPTER

0493742 114390 Adapter Mechanical tool

NOTE: **(Adapter screw) For oil pressure check**

Storage Location

A42

B42

SI number

cardiagn.com

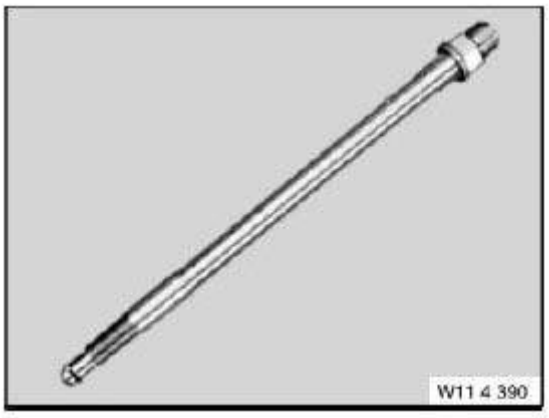


Fig. 24: Identifying Adapter (0493742)
Courtesy of BMW OF NORTH AMERICA, INC.

0494531 ADAPTER

0494531 118504 Adapter AM

NOTE: **Only available as part of complete tool set 11 8 500 (83 30 0 494 312).**

0495021 ADAPTER

0495021 114362 Adapter Minimum set: Mechanical tools AM

NOTE: **(Adapter with knurled screw)**

Storage Location

B51



Fig. 25: Identifying Adapter (0495021)
Courtesy of BMW OF NORTH AMERICA, INC.

0496758 ADAPTER

0496758 118032 Adapter Minimum set: Mechanical tools AM

NOTE: **Replaces special tool 11 8 742 from 08/2009, 09/2011 remaining inventories will**

cardiagn.com

be sold off - no longer available individually. Can only be ordered as part of the complete tool 83 30 0 496 725 (special tool number 11 8 030).

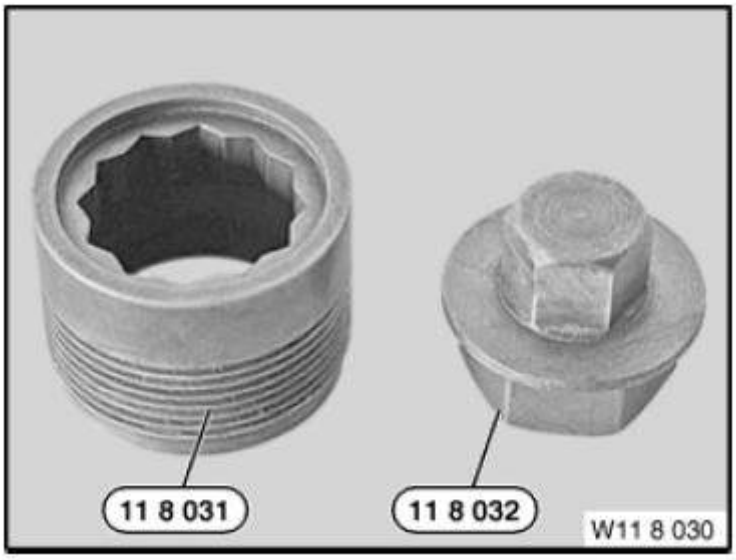


Fig. 26: Identifying Adapter (0496758)
Courtesy of BMW OF NORTH AMERICA, INC.

0491005 ADAPTER

0491005 114050 Adapter Minimum set: Mechanical tools Mechanical tool

NOTE: **(Adapter) For connecting pipe bend 13 6 054 to pressure gauge 13 3 061 or BMW diagnosis and information system for checking oil pressure**

Storage Location

A4

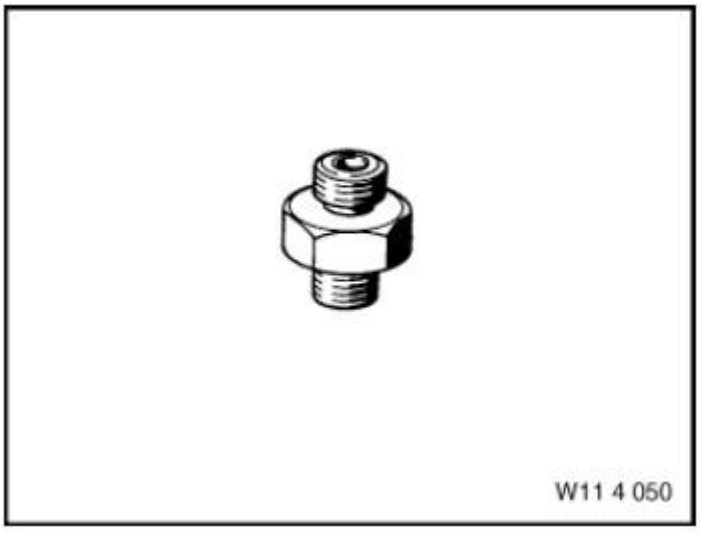


Fig. 27: Identifying Adapter (0491005)
Courtesy of BMW OF NORTH AMERICA, INC.

0491056 ADAPTER

0491056 115100 Adapter Mechanical tool

NOTE: **(Adapter with wrench socket) For cranking the engine at the crankshaft when**

cardiagn.com

adjusting the timing

Storage Location

B3

SI number

01 12 92 (606)

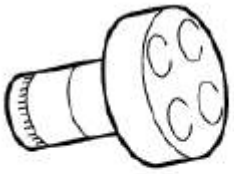


Fig. 28: Identifying Adapter (0491056)
Courtesy of BMW OF NORTH AMERICA, INC.

2318115 ADAPTER

2318115 Adapter AM

In conjunction with: **11 8 750 = 0496111**

NOTE: **For positioning counterbalance shaft.**

Storage Location

B33

SI number

01 09 12 (803)



Fig. 29: Identifying Adapter (2318115)
Courtesy of BMW OF NORTH AMERICA, INC.

0494716 ADAPTER

cardiagn.com

0494716 118185 Adapter Minimum set: Mechanical tools AM

NOTE: **(Adapter with adjusting sleeve) E46 M47TU**

Storage Location

B47

SI number

01 06 03 (982)

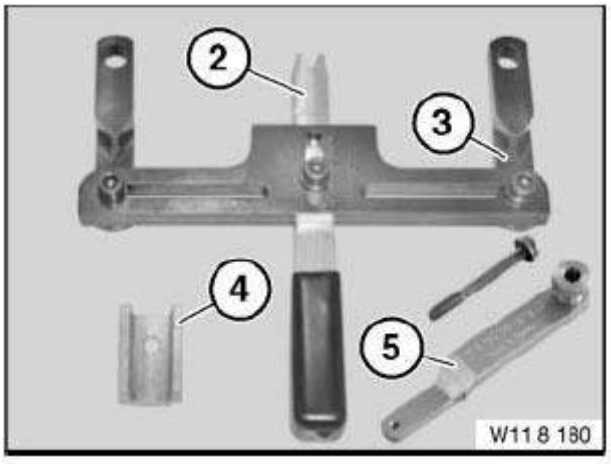


Fig. 30: Identifying Adapter (0494716)
Courtesy of BMW OF NORTH AMERICA, INC.

0490599 ADAPTER

0490599 110166 Adapter AM

Replaced by: 83300490613

NOTE: **(test adapter for petrol engine: M70 Discontinuation and replaced by 11 0 220 (0 490 613)**

cardiagn.com

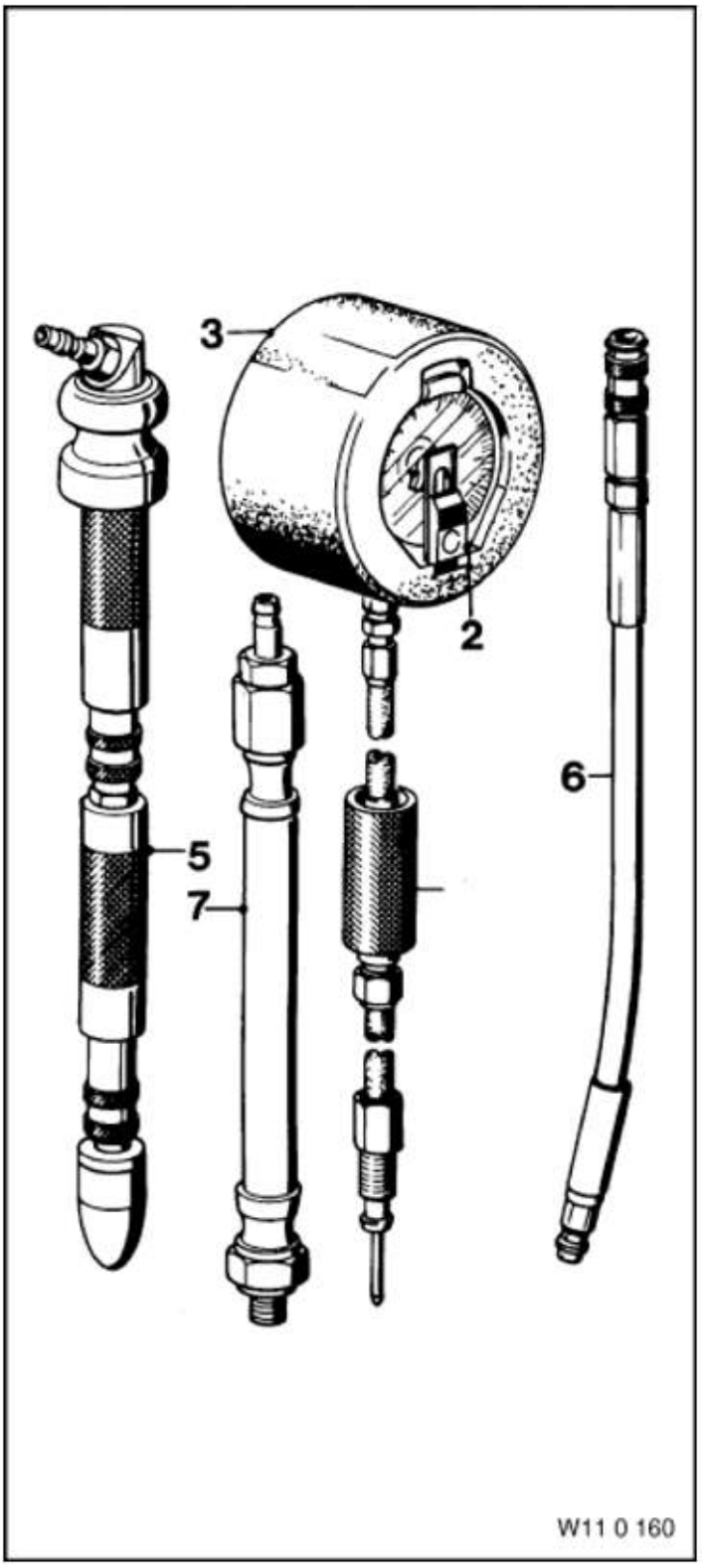


Fig. 31: Identifying Adapter (0490599)
Courtesy of BMW OF NORTH AMERICA, INC.

0495279 ADAPTER

0495279 110239 Adapter Minimum set: Mechanical tools AM

NOTE: **M67, M67TU engine**

SI number

01 06 05 (181)

cardiagn.com

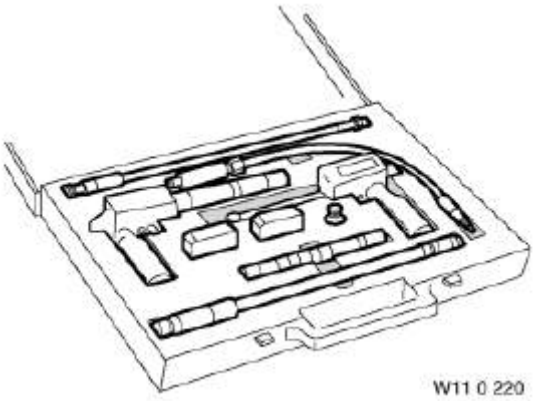


Fig. 32: Identifying Adapter (0495279)
Courtesy of BMW OF NORTH AMERICA, INC.

0490598 ADAPTER

0490598 110165 Adapter AM

Replaced by: 83300490613

NOTE: **(test adapter for petrol engine: all, except M70 Discontinuation and replaced by 11 0 220 (0 490 613)**

cardiagn.com

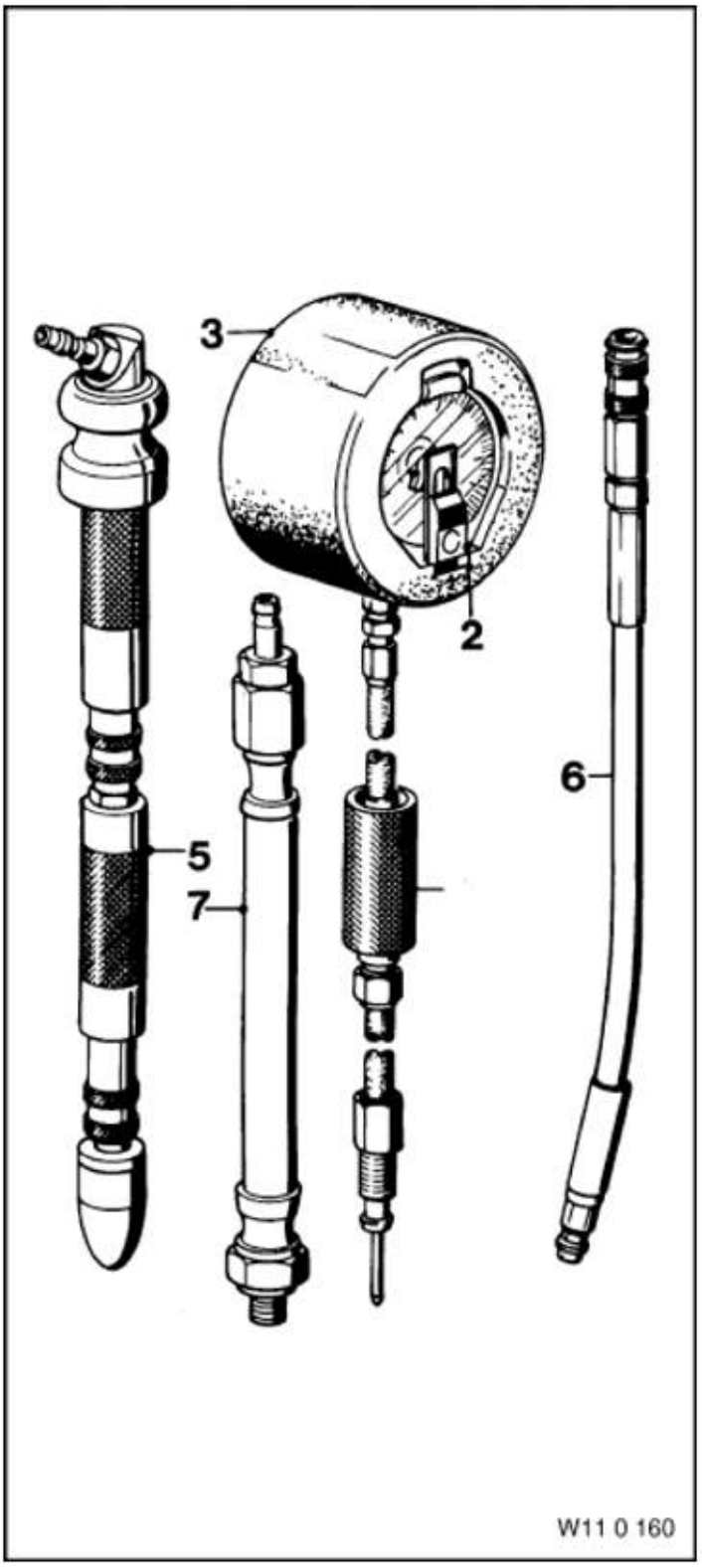


Fig. 33: Identifying Adapter (0490598)
Courtesy of BMW OF NORTH AMERICA, INC.

0496457 ADAPTER

0496457 116410 Adapter Minimum set: Mechanical tools Mechanical tool

NOTE: **For measuring oil pressure via oil filter housing.**

Storage Location

A26

cardiagn.com

SI number

01 07 08 (443)



Fig. 34: Identifying Adapter (0496457)
Courtesy of BMW OF NORTH AMERICA, INC.

0490666 ADAPTER

0490666 111023 Adapter AM

NOTE: **(Adapter) Engine: M20**

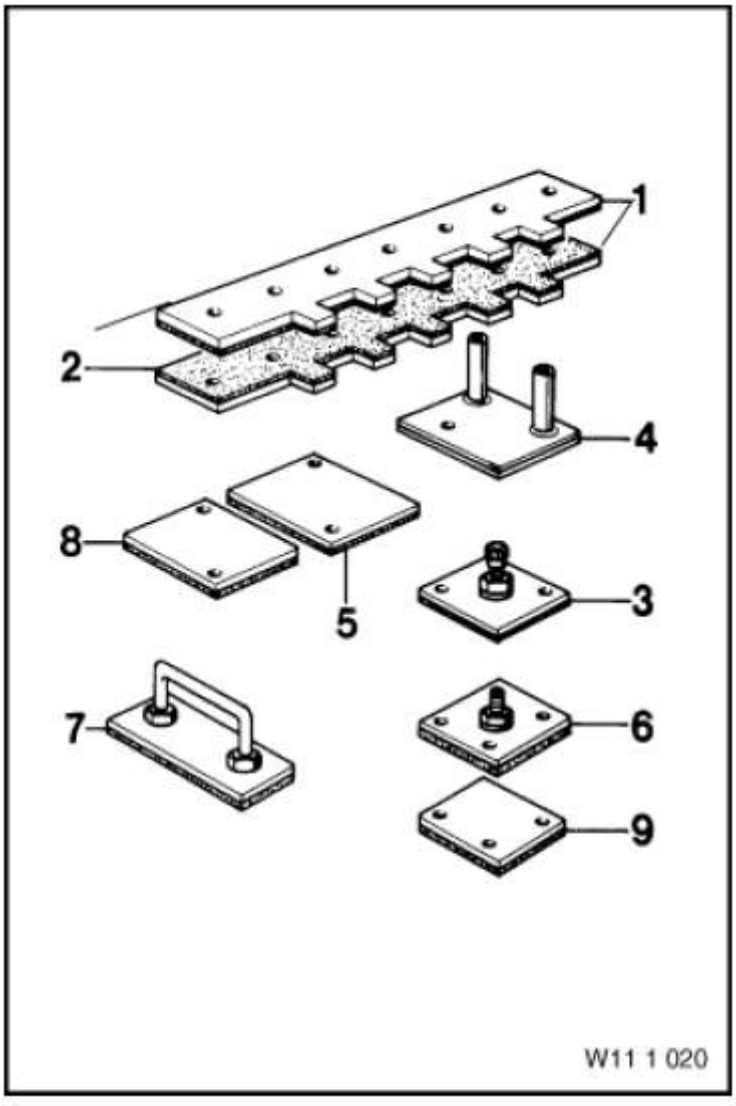


Fig. 35: Identifying Adapter (0490666)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0490600 ADAPTER

0490600 110167 Adapter AM

Replaced by: 83300490613

NOTE: **(Test adapter extension) Discontinuation and replaced by 11 0 220 (0 490 613)**

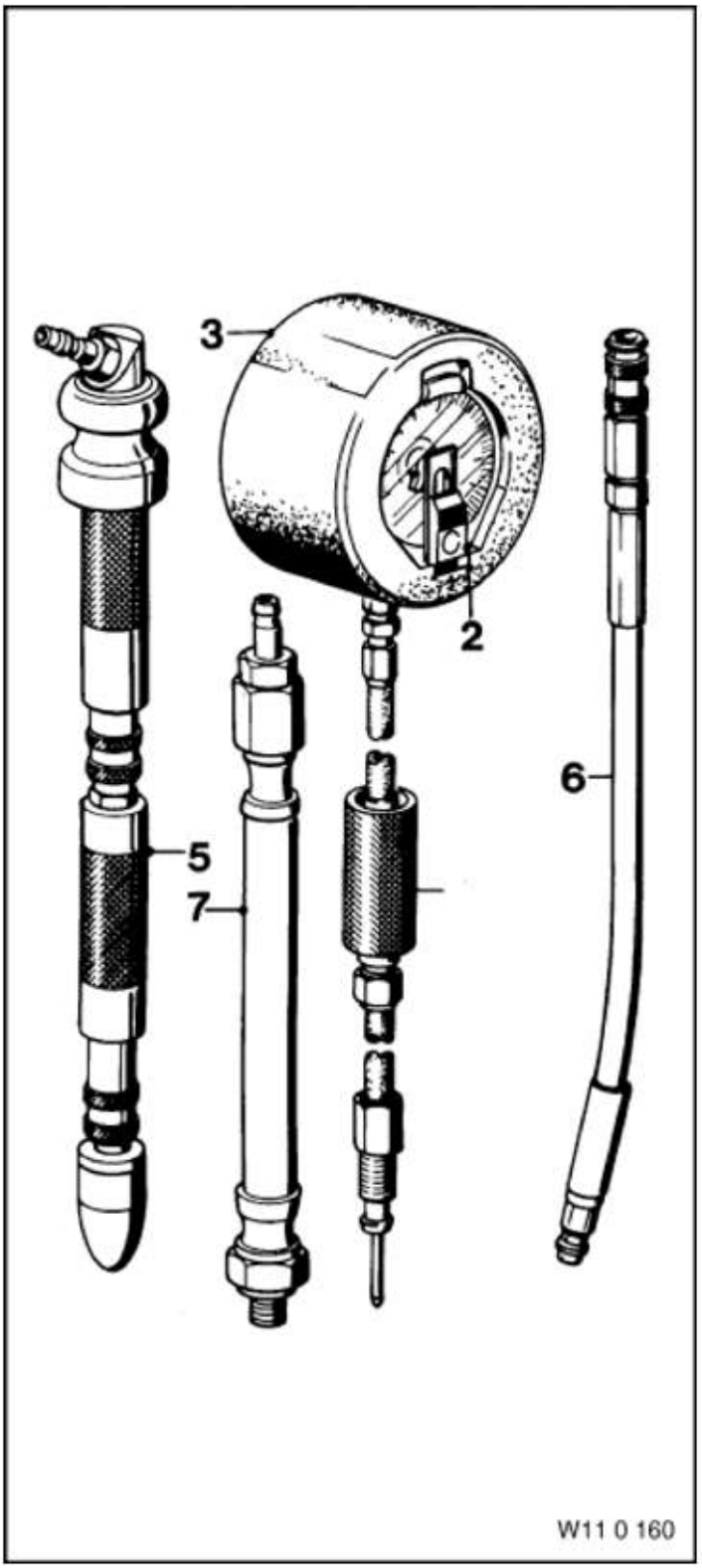


Fig. 36: Identifying Adapter (0490600)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496146 ADAPTER

0496146 118880 Adapter Minimum set: Mechanical tools Mechanical tool

NOTE: **For compression testing.**

SI number

01 05 07 (353)



Fig. 37: Identifying Adapter (0496146)
Courtesy of BMW OF NORTH AMERICA, INC.

0494517 ADAPTER

0494517 110237 Adapter Minimum set: Mechanical tools AM

NOTE: **Measuring "absolute compression" at all cylinders. Engine: W17**

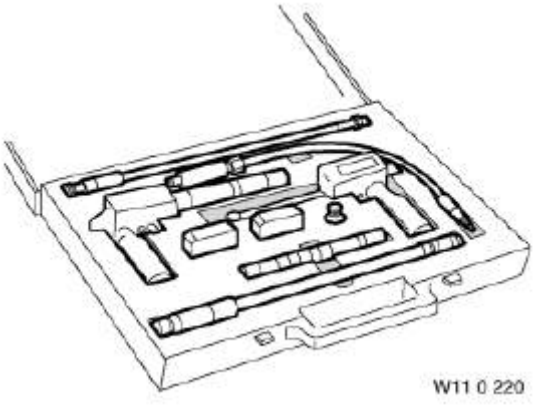


Fig. 38: Identifying Adapter (0494517)
Courtesy of BMW OF NORTH AMERICA, INC.

0491016 ADAPTER

0491016 114160 Adapter Mechanical tool

NOTE: **For pressure gauge 13 3 061 or BMW DIS; for checking oil pressure**

Storage Location

cardiagn.com

B3

SI number

01 09 94 (839)

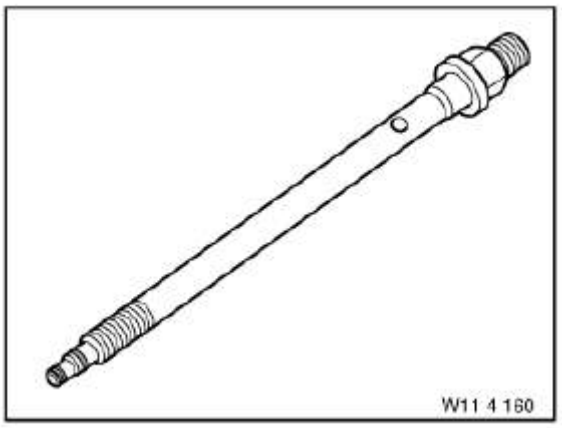


Fig. 39: Identifying Adapter (0491016)
Courtesy of BMW OF NORTH AMERICA, INC.

2212823 ADAPTER

2212823 Adapter Minimum set: Mechanical tools Mechanical tool

NOTE: **For oil pressure measurement.**

Storage Location

A29

SI number

01 05 11 (692)



Fig. 40: Identifying Adapter (2212823)
Courtesy of BMW OF NORTH AMERICA, INC.

2349111 ADAPTER CABLE

2349111 Adapter cable Minimum set: Measuring and testing equipment MP

cardiagn.com

NOTE: **Diagnosis at SCR control unit (Selective Catalytic Reduction)**

SI number

02 01 13 (896)

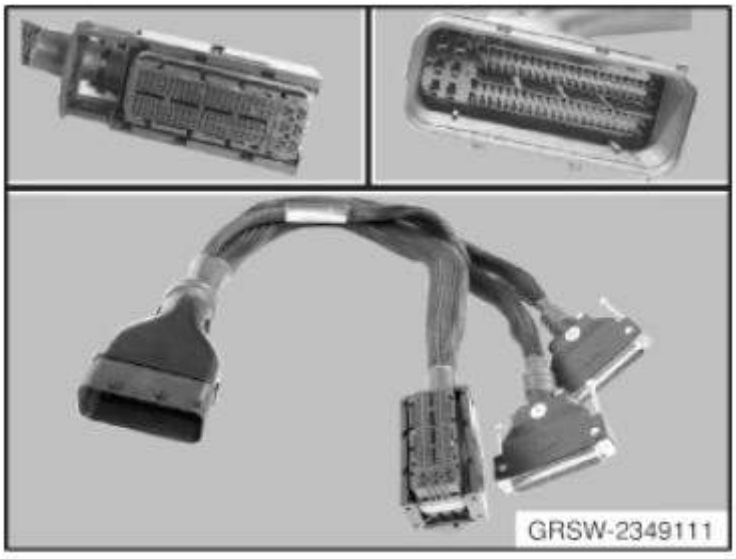


Fig. 41: Identifying Adapter Cable (2349111)
Courtesy of BMW OF NORTH AMERICA, INC.

0496870 ADAPTER PLATE

0496870 116281 Adapter plate AM

NOTE: **Only available as part of complete tool set 11 6 280 (83 30 0 496 857).**

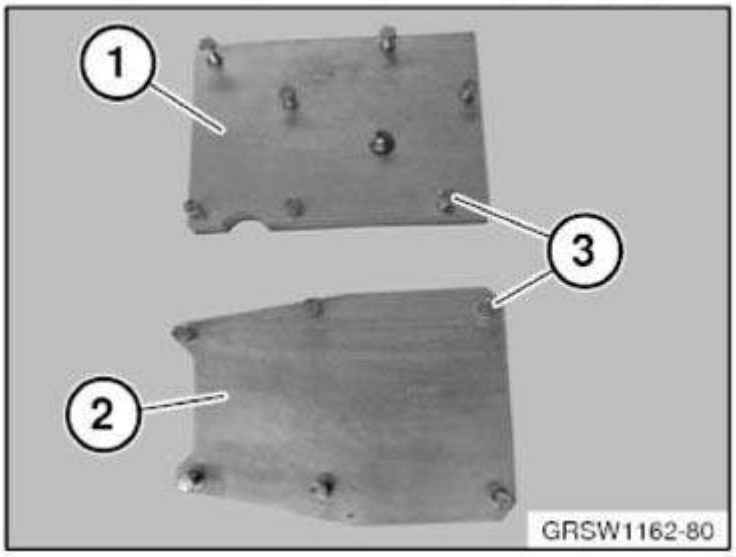


Fig. 42: Identifying Adapter Plate (0496870)
Courtesy of BMW OF NORTH AMERICA, INC.

0496871 ADAPTER PLATE

0496871 116282 Adapter plate AM

NOTE: **Only available as part of complete tool set 11 6 280 (83 30 0 496 857).**

cardiagn.com

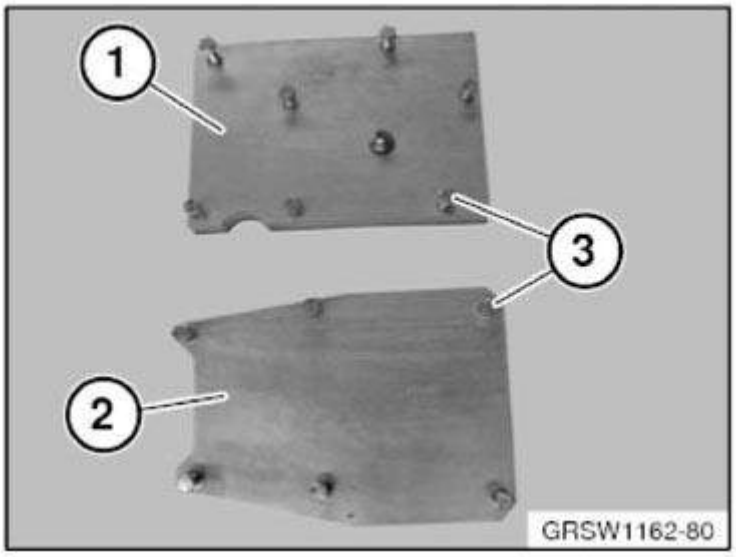


Fig. 43: Identifying Adapter Plate (0496871)
Courtesy of BMW OF NORTH AMERICA, INC.

0496865 ADAPTER PLATE

0496865 116231 Adapter plate AM

NOTE: **Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**

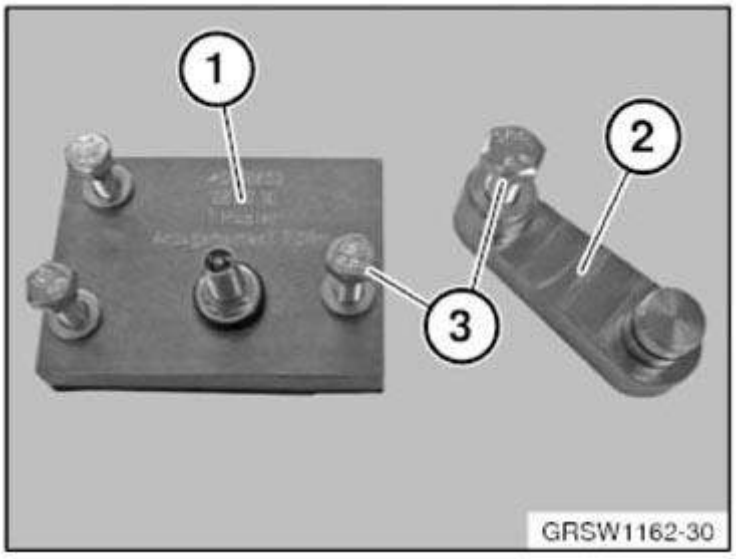


Fig. 44: Identifying Adapter Plate (0496865)
Courtesy of BMW OF NORTH AMERICA, INC.

0495748 ASSEMBLY TOOL

0495748 118590 Assembly tool Mechanical tool

NOTE: **For installing piston with connecting rod in cylinder head.**

Storage Location

A20

B20

SI number

cardiagn.com

01 20 06 (299)

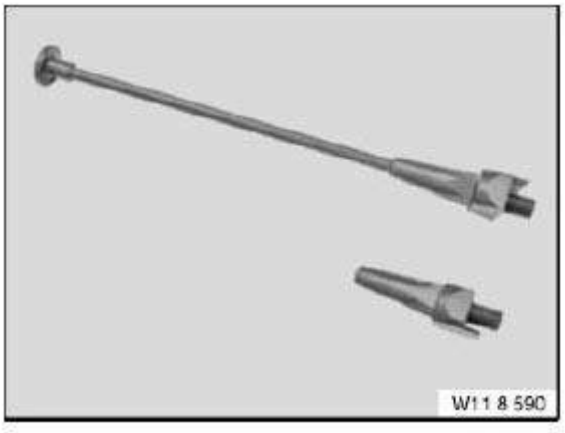


Fig. 45: Identifying Assembly Tool (0495748)
Courtesy of BMW OF NORTH AMERICA, INC.

0494863 ASSEMBLY TOOL

0494863 118330 Assembly tool Mechanical tool

NOTE: **For installing and removing connecting rod with piston**

Storage Location

A47

B47

SI number

01 02 04 (069)

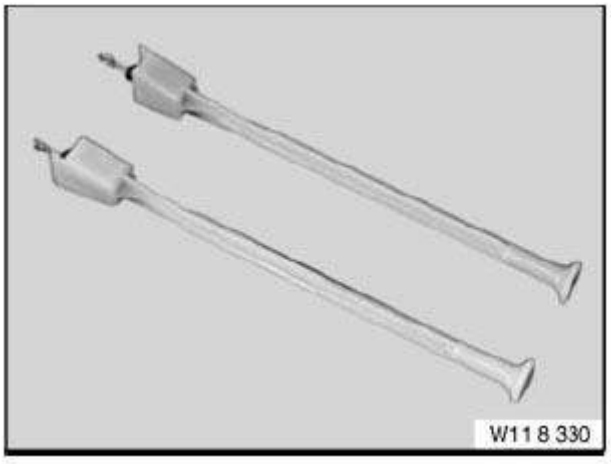


Fig. 46: Identifying Assembly Tool (0494863)
Courtesy of BMW OF NORTH AMERICA, INC.

0495372 ASSEMBLY TOOL

0495372 115480 Assembly tool Mechanical tool

NOTE: **For installing and removing connecting rods with pistons.**

Storage Location

cardiagn.com

A20

B20

SI number

01 14 05 (198)

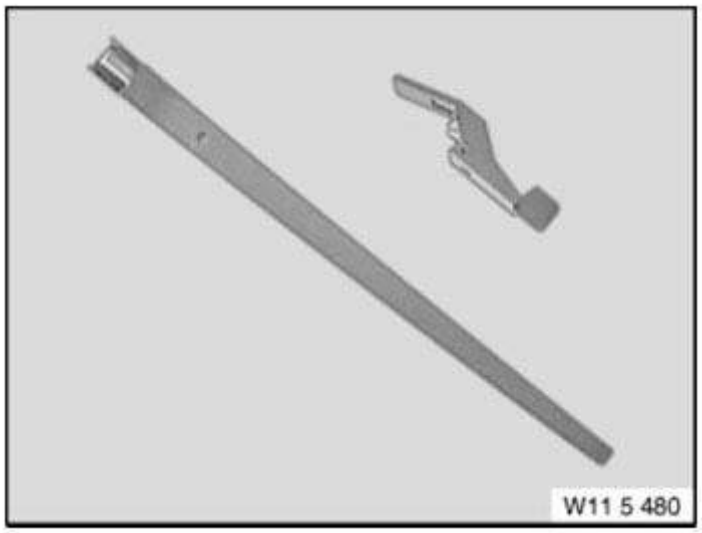


Fig. 47: Identifying Assembly Tool (0495372)
Courtesy of BMW OF NORTH AMERICA, INC.

0496144 ASSEMBLY TOOL

0496144 118860 Assembly tool Mechanical tool

NOTE: **For installing piston with connecting rod in crankcase.**

Storage Location

B24

SI number

01 05 07 (353)

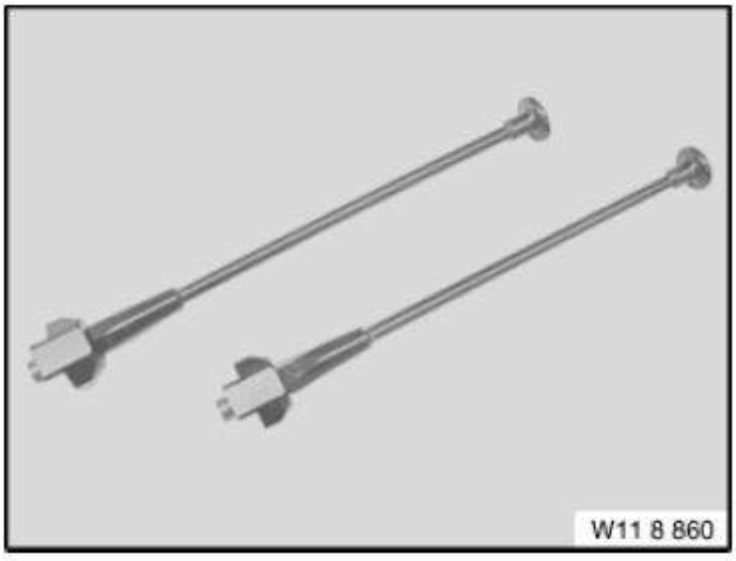


Fig. 48: Identifying Assembly Tool (0496144)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0496133 BASIC BODY

0496133 118811 Basic body Minimum set: Mechanical tools AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 8 810 = 83 30 0 496 132 - as of 09.12.2011**

SI number

01 05 07 (353)

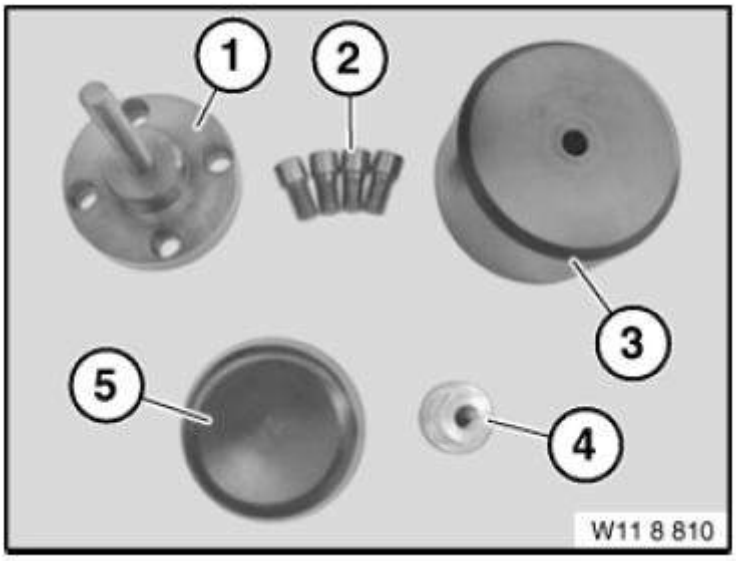


Fig. 49: Identifying Basic Body (0496133)
Courtesy of BMW OF NORTH AMERICA, INC.

0494434 BASIC BODY

0494434 118183 Basic body Minimum set: Mechanical tools AM

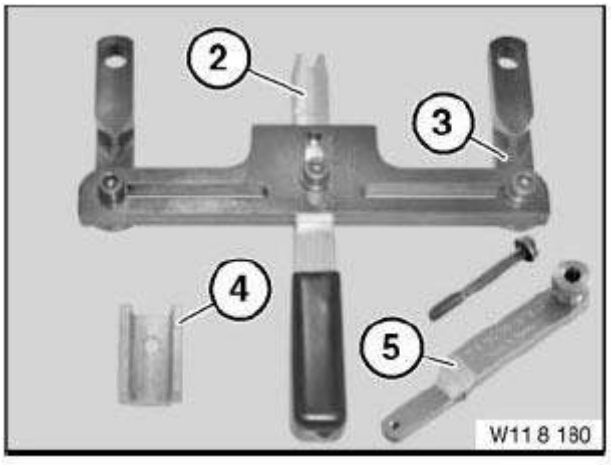


Fig. 50: Identifying Basic Body (0494434)
Courtesy of BMW OF NORTH AMERICA, INC.

0495472 BASIC BODY

0495472 119511 Basic body AM

0495616 BASIC BODY

cardiagn.com

0495616 113171 Basic body AM

NOTE: **Not available individually, but as part of complete tool set 0490945 = 11 3 170 only.**

0496128 BASIC BODY

0496128 118801 Basic body Minimum set: Mechanical tools AM

NOTE: **Available only as a complete tool set 11 8 800 = 83 30 0 496 127 - as of 30.11.2011**

SI number

01 05 07 (353)

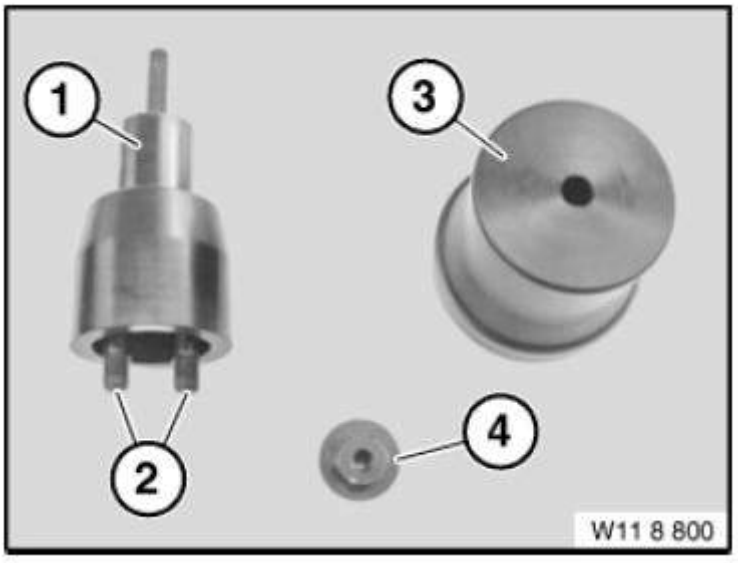


Fig. 51: Identifying Basic Body (0496128)
Courtesy of BMW OF NORTH AMERICA, INC.

0495166 BASIC BODY

0495166 115311 Basic body Minimum set: Mechanical tools AM

NOTE: **Remaining inventories will be sold off, then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 125 (special tool number 11 5 310).**

cardiagn.com

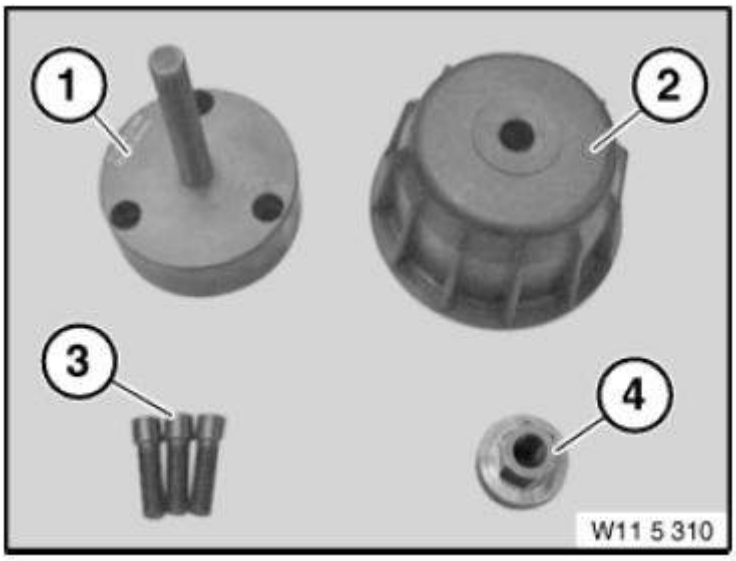


Fig. 52: Identifying Basic Body (0495166)
Courtesy of BMW OF NORTH AMERICA, INC.

0495154 BASIC BODY

0495154 115241 Basic body AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 5 240 (83 30 0 495 118) - as of 13.01.12**

SI number

01 02 05 (173)

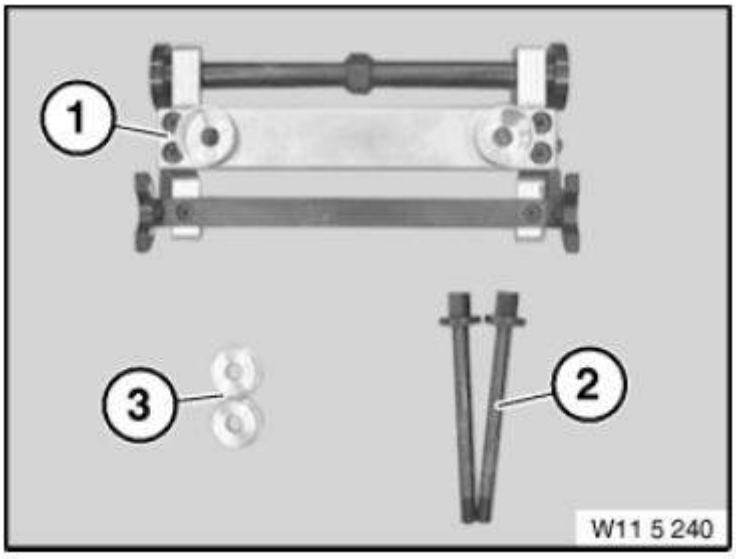


Fig. 53: Identifying Basic Body (0495154)
Courtesy of BMW OF NORTH AMERICA, INC.

2354962 BASIC BODY

2354962 Basic body AM

NOTE: **For riveting the top timing chain on the N47. (included in tool set 2 354 985).**

cardiagn.com



Fig. 54: Identifying Basic Body (2354962)
Courtesy of BMW OF NORTH AMERICA, INC.

2354983 BASIC BODY

2354983 Basic body AM

NOTE: For opening the timing chain on exchange (included in tool set 2 354 985).



Fig. 55: Identifying Basic Body (2354983)
Courtesy of BMW OF NORTH AMERICA, INC.

0495170 BASIC BODY

0495170 115331 Basic body Minimum set: Mechanical tools AM

NOTE: Can no longer be ordered separately. Only available as part of set 11 5 330 = 83 30 0 495 127.

cardiagn.com

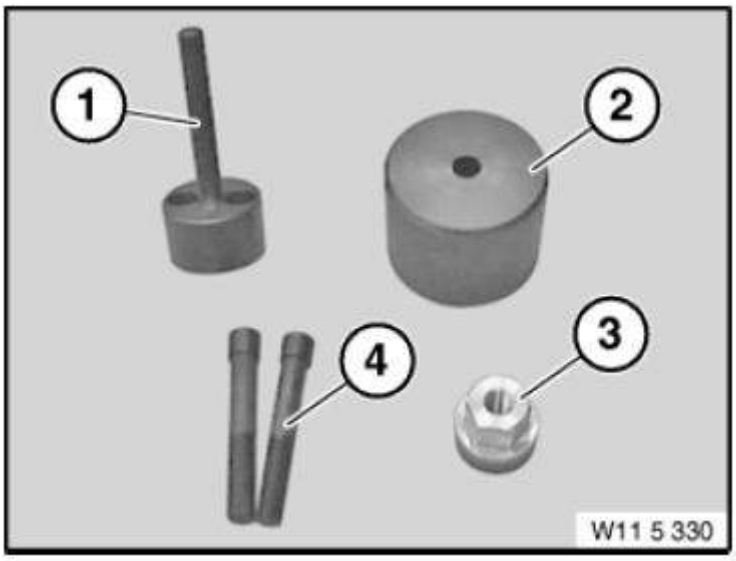


Fig. 56: Identifying Basic Body (0495170)
Courtesy of BMW OF NORTH AMERICA, INC.

0495613 BASIC BODY

0495613 113151 Basic body AM

NOTE: **Not available individually, but as part of complete tool set 11 3 150 = 0490941 only.**

0494432 BASIC BODY

0494432 118181 Basic body Minimum set: Mechanical tools AM

Replaced by: 83300494434

NOTE: **(Basic body) E65/M67, E38/M67 Discontinuation Replaced by 11 8 183 (0 494 434)**

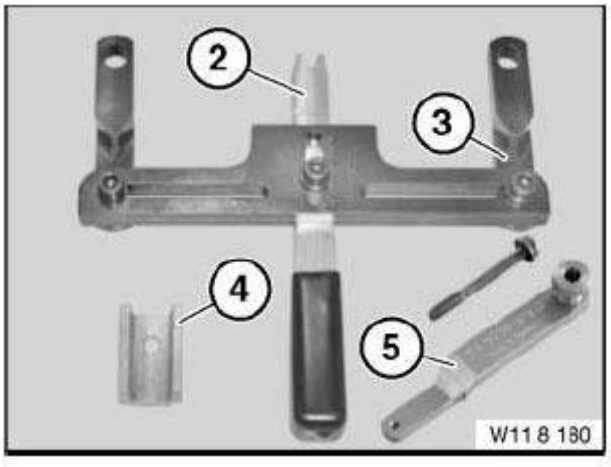


Fig. 57: Identifying Basic Body (0494432)
Courtesy of BMW OF NORTH AMERICA, INC.

0496572 BASIC BODY

0496572 118911 Basic body AM

cardiagn.com

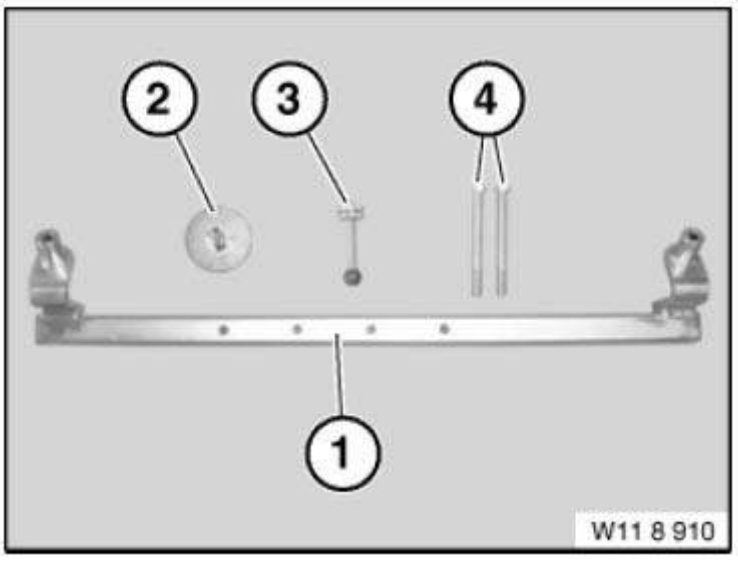


Fig. 58: Identifying Basic Body (0496572)
Courtesy of BMW OF NORTH AMERICA, INC.

0490650 BASKET

0490650 110344 Basket AM

NOTE: (valve spring cage) Replaced by 11 0345, engine: M52

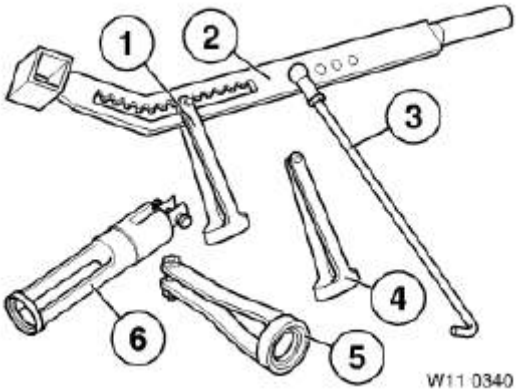


Fig. 59: Identifying Basket (0490650)
Courtesy of BMW OF NORTH AMERICA, INC.

0490610 BASKET

0490610 110212 Basket AM

NOTE: (Valve spring cage) Engine: M60

cardiagn.com

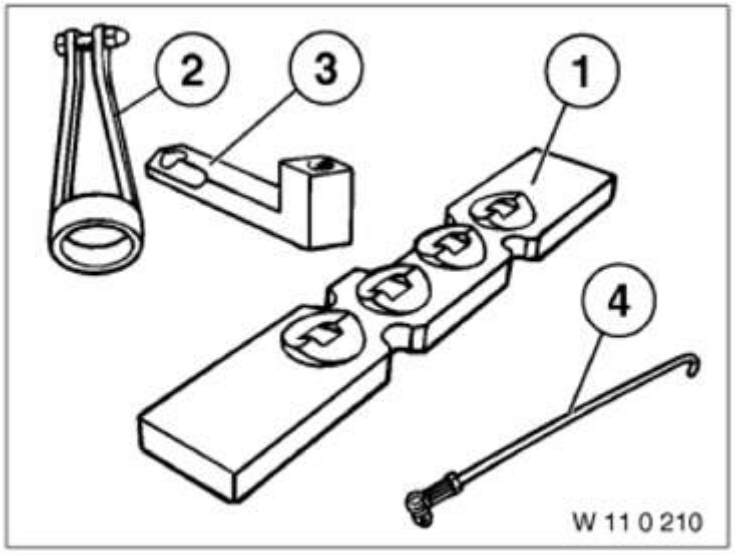


Fig. 60: Identifying Basket (0490610)
Courtesy of BMW OF NORTH AMERICA, INC.

0493285 BASKET

0493285 110346 Basket AM

NOTE: (Valve spring cage) Engine: M47, M47TU, M57, N40, N42, M67, M67TU

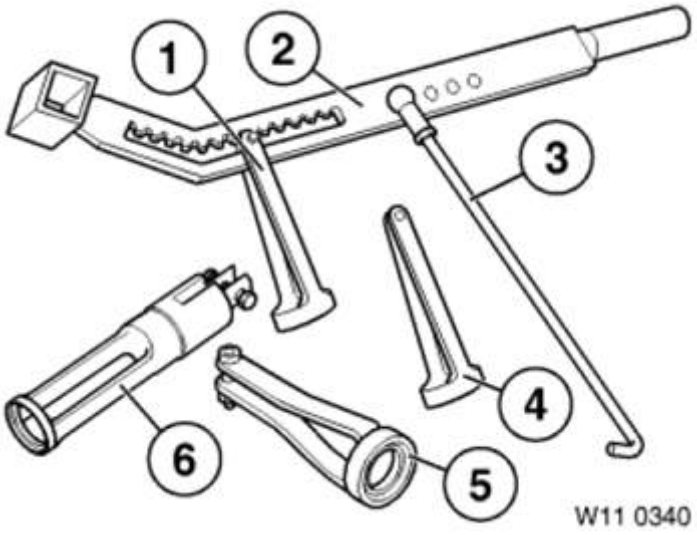


Fig. 61: Identifying Basket (0493285)
Courtesy of BMW OF NORTH AMERICA, INC.

0491060 BASKET

0491060 115132 Basket AM

NOTE: (Compression fixture) sale of existing inventory and then available as part of set of special tools 11 5 130 = 83 30 0 491 058 only - as of 29.11.2011

0495028 BASKET

0495028 119017 Basket Minimum set: Mechanical tools AM

NOTE: (Valve spring cage) Engine N52

cardiagn.com



Fig. 62: Identifying Basket (0495028)
Courtesy of BMW OF NORTH AMERICA, INC.

0494376 BASKET

0494376 119012 Basket Minimum set: Mechanical tools AM

NOTE: **(Valve spring cage) Engine M41, M51, S50**

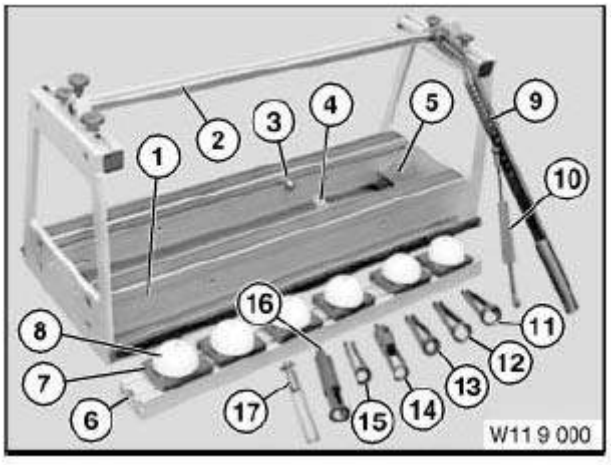


Fig. 63: Identifying Basket (0494376)
Courtesy of BMW OF NORTH AMERICA, INC.

0490930 BASKET

0490930 113122 Basket AM

cardiagn.com

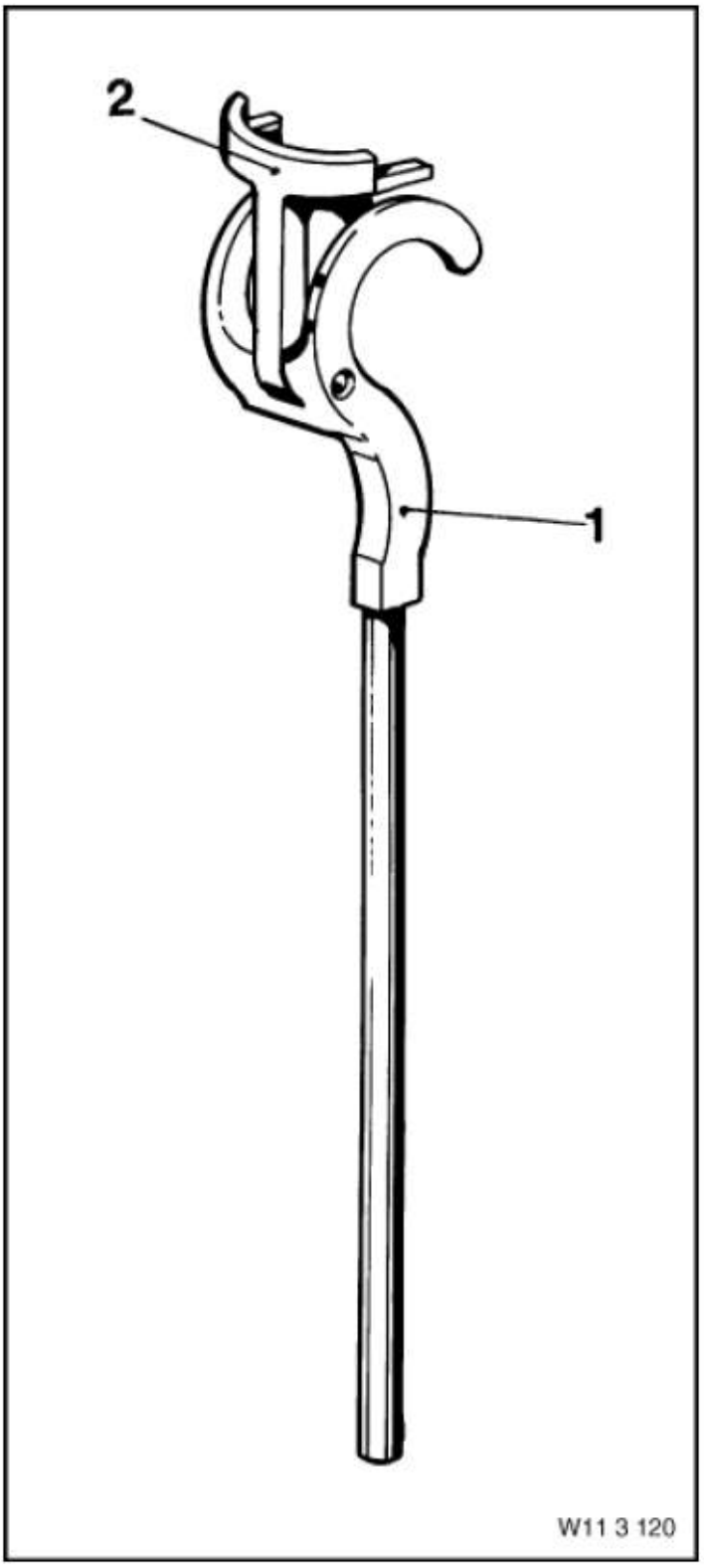


Fig. 64: Identifying Basket (0490930)
Courtesy of BMW OF NORTH AMERICA, INC.

0494380 BASKET

0494380 119016 Basket Minimum set: Mechanical tools AM

NOTE: (Valve spring cage) Engine M21, M40

cardiagn.com

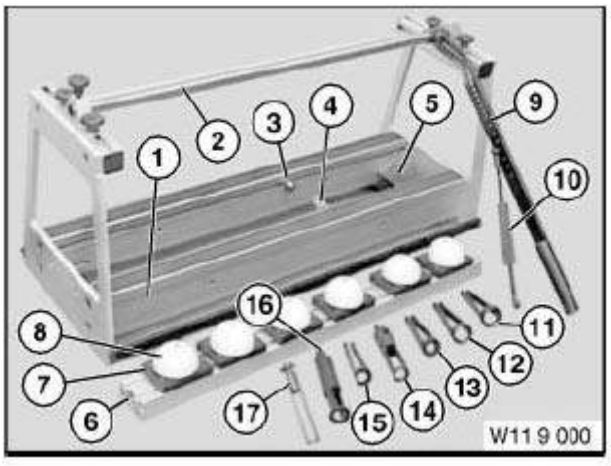


Fig. 65: Identifying Basket (0494380)
Courtesy of BMW OF NORTH AMERICA, INC.

0496143 BASKET

0496143 118840 Basket Mechanical tool

NOTE: **(Valve spring cage) For removing and fitting the valves.**

SI number

01 05 07 (353)



Fig. 66: Identifying Basket (0496143)
Courtesy of BMW OF NORTH AMERICA, INC.

0490647 BASKET

0490647 110341 Basket AM

NOTE: **(Valve spring cage) Engine: M43, M73**

cardiagn.com

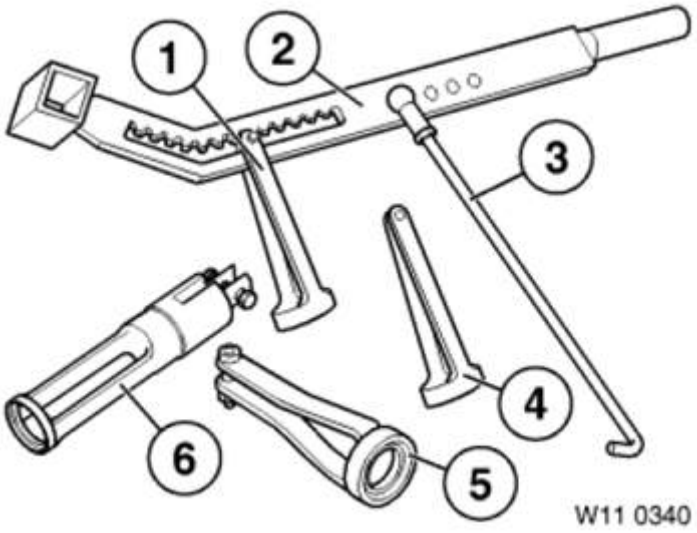


Fig. 67: Identifying Basket (0490647)
Courtesy of BMW OF NORTH AMERICA, INC.

0490651 BASKET

0490651 110345 Basket AM

Replaced by: 83300494362

NOTE: **(Valve spring cage) Engine: M44, M52, M62, S62, S54 Replaced by 11 9 000 (0 494 362)**

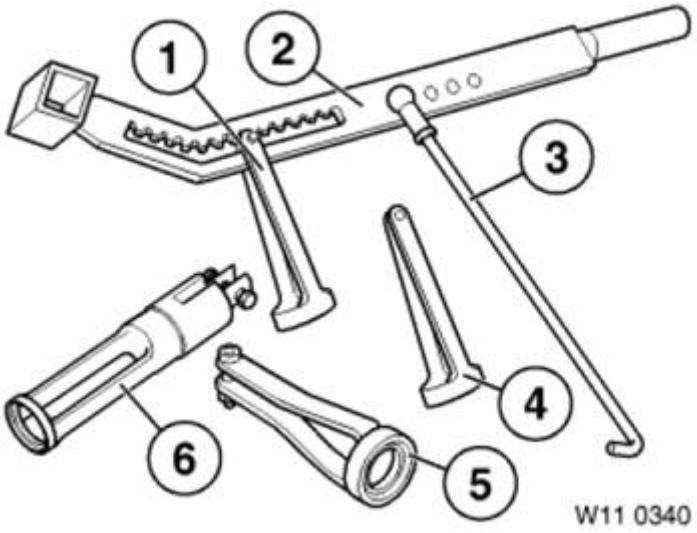


Fig. 68: Identifying Basket (0490651)
Courtesy of BMW OF NORTH AMERICA, INC.

0494379 BASKET

0494379 119015 Basket Minimum set: Mechanical tools AM

NOTE: **(Valve spring cage) Engine M47, M47TU, M57, M57TU, N40, N42, N62, N73**

cardiagn.com

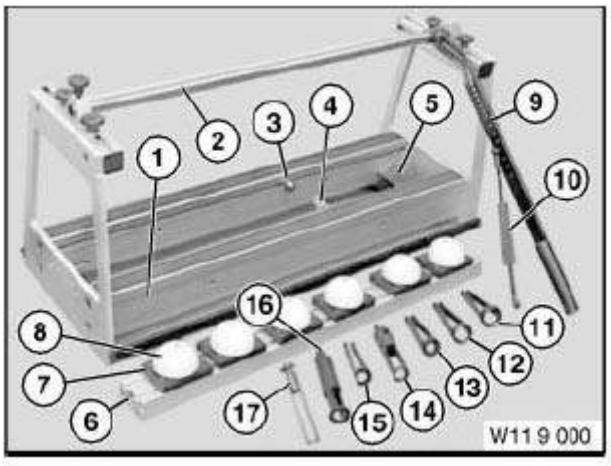


Fig. 69: Identifying Basket (0494379)
Courtesy of BMW OF NORTH AMERICA, INC.

0494377 BASKET

0494377 119013 Basket Minimum set: Mechanical tools AM

NOTE: **(Valve spring cage) Engine M43, M73**

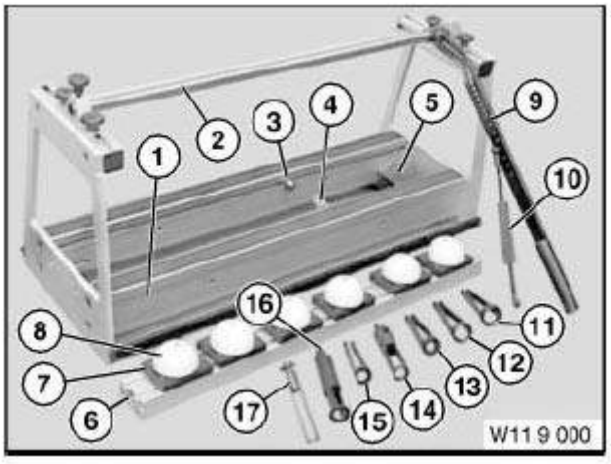


Fig. 70: Identifying Basket (0494377)
Courtesy of BMW OF NORTH AMERICA, INC.

0494378 BASKET

0494378 119014 Basket Minimum set: Mechanical tools AM

NOTE: **(Valve spring cage) Engine M44, M52, M54, M56, M62, S52, S54, S62**

cardiagn.com

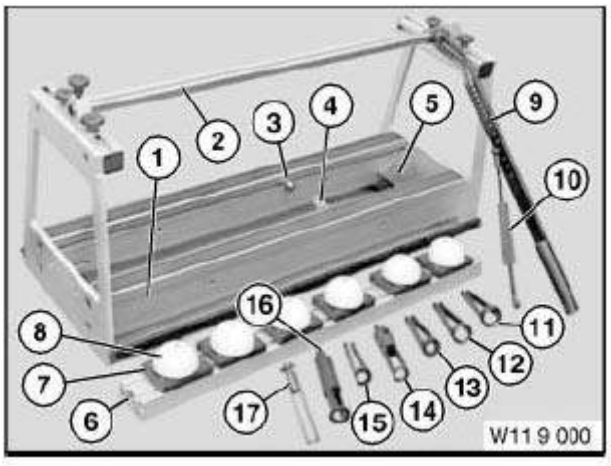


Fig. 71: Identifying Basket (0494378)
Courtesy of BMW OF NORTH AMERICA, INC.

0490693 BASKET

0490693 111052 Basket AM

NOTE: (Valve spring cage) Engine: S14, S38, M50

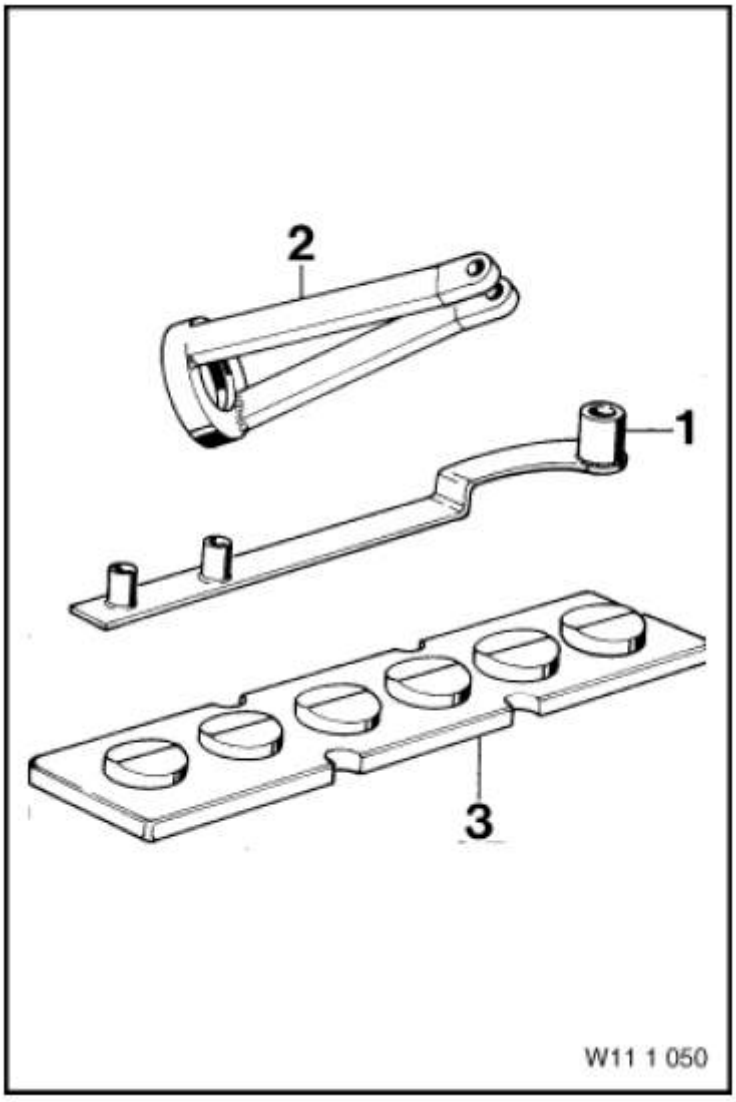


Fig. 72: Identifying Basket (0490693)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

2356969 BEAM PROBE

2356969 Beam probe AM

In conjunction with: **BLASTING TOOL 81292208034**

NOTE: **For cleaning of the intake ports and the intake valves.**

SI number

08 25 13 (059)

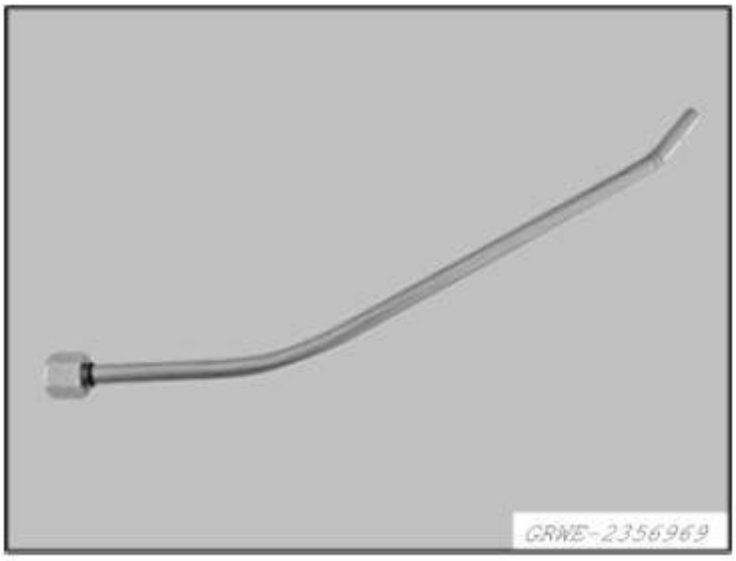


Fig. 73: Identifying Beam Probe (2356969)
Courtesy of BMW OF NORTH AMERICA, INC.

0496275 BELL HOUSING

0496275 110371 Bell housing Minimum set: Mechanical tools AM

NOTE: **(thread housing)**



Fig. 74: Identifying Bell Housing (0496275)
Courtesy of BMW OF NORTH AMERICA, INC.

2208034 BLASTING MATERIAL DEVICE

cardiagn.com

2208034 Blasting material device Mechanical tool

NOTE: **For cleaning of the intake ports and the intake valves.**

SI number

08 02 10 (650)



Fig. 75: Identifying Blasting Material Device (2208034)
Courtesy of BMW OF NORTH AMERICA, INC.

0490578 BOLT

0490578 110062 Bolt AM

NOTE: **(Stud bolts (14 x))**

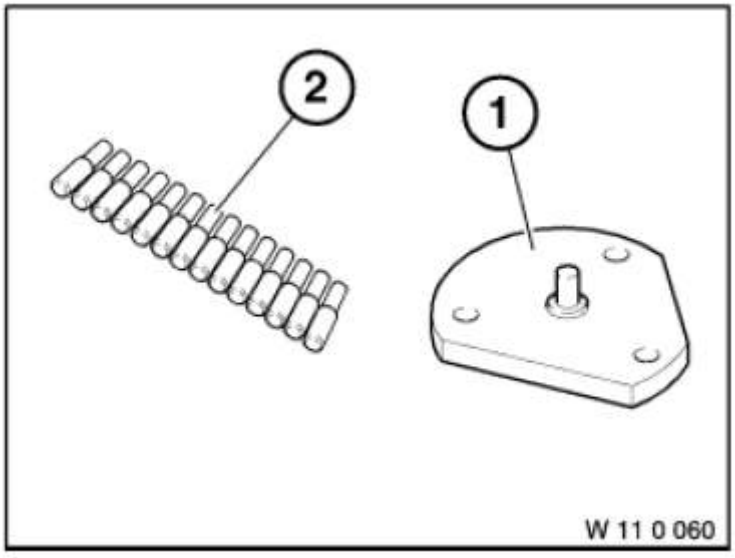


Fig. 76: Identifying Bolt (0490578)
Courtesy of BMW OF NORTH AMERICA, INC.

0496177 BOLT

0496177 118825 Bolt AM

NOTE: **(Stud bolt) Only available as part of complete tool set 11 8 820 (=83 30 0 496**

cardiagn.com

138).

SI number

01 05 07 (353)

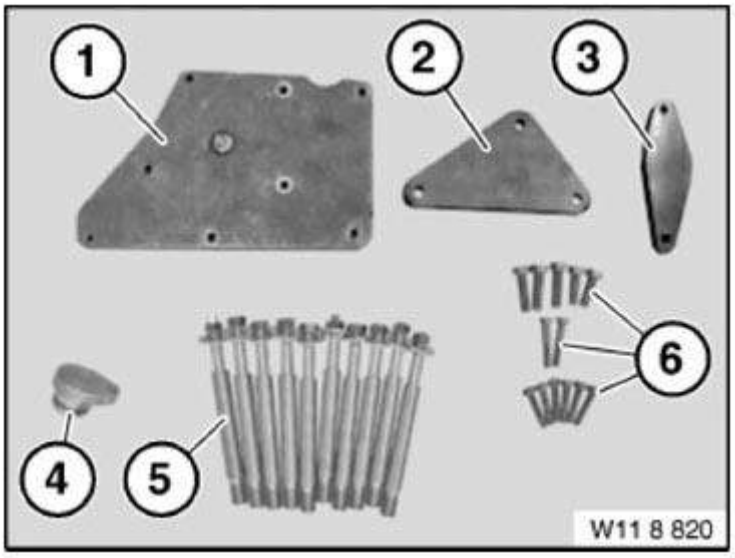


Fig. 77: Identifying Bolt (0496177)
Courtesy of BMW OF NORTH AMERICA, INC.

2318439 BRACE

2318439 Brace Mechanical tool

NOTE: **For retaining the flywheel (N55 Hybrid).**

Storage Location

C33

SI number

01 05 12 (799)



Fig. 78: Identifying Brace (2318439)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496701 BRACE

0496701 117220 Brace Minimum set: Mechanical tools AM

NOTE: **Counter support for (dis) assembly of the vibration absorber.**

Storage Location

A27

B27

SI number

01 19 09 (580)

Consisting of:

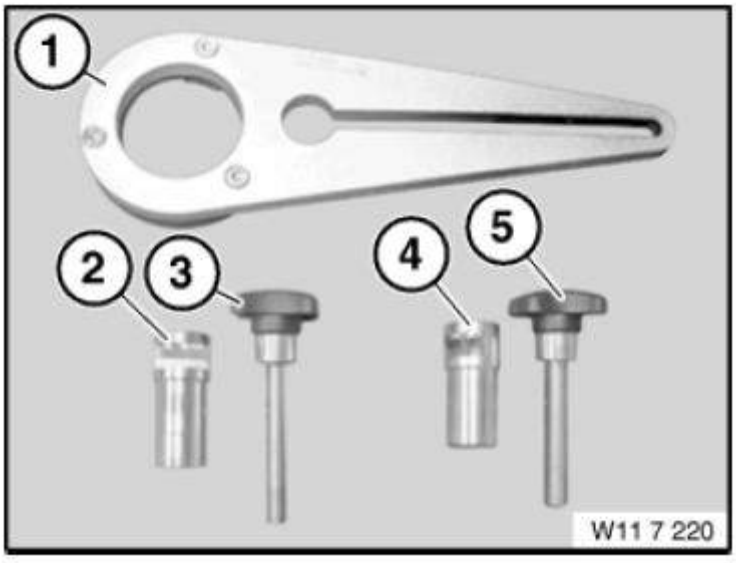


Fig. 79: Identifying Brace (0496701)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0496796 Brace

   NOTE: **Discontinued, can only be ordered using complete tool**

2. 0496811 Holding sleeve

   NOTE: **M8 for N47/N57 discontinued, available as part of set of special tools only**

3. 0496812 Screw

   NOTE: **M8 for N47/N57 discontinued, available as part of set of special tools only**

4. 0496813 Holding sleeve

   NOTE: **M10 for N47TU/N57TU discontinued, available as part of set of special tools only**

5. 0496814 Screw

   NOTE: **M10 for N47TU/N57TU discontinued, available as part of set of special**

cardiagn.com

tools only

0496796 BRACE

0496796 117221 Brace Minimum set: Mechanical tools AM

NOTE: **Discontinued, can only be ordered using complete tool**

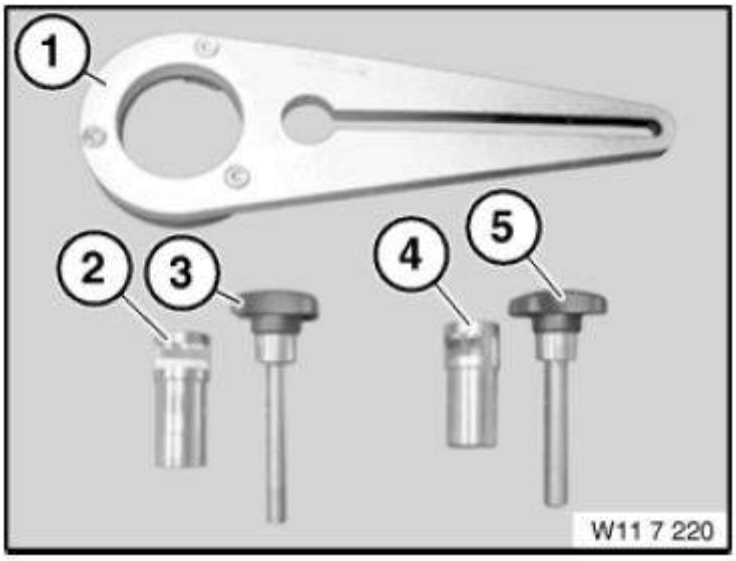


Fig. 80: Identifying Brace (0496796)
Courtesy of BMW OF NORTH AMERICA, INC.

2303793 BRACE

2303793 Brace Minimum set: Mechanical tools Mechanical tool

NOTE: **For removing and fitting the motor timing chain to the oil pump.**

Storage Location

A33

SI number

01 06 12 (800)



cardiagn.com

Fig. 81: Identifying Brace (2303793)
Courtesy of BMW OF NORTH AMERICA, INC.

2318117 BRACE

2318117 Brace Minimum set: Mechanical tools Mechanical tool

NOTE: **For removing and fitting the oil pump.**

Storage Location

B33

SI number

01 07 12 (801)



Fig. 82: Identifying Brace (2318117)
Courtesy of BMW OF NORTH AMERICA, INC.

0496673 BRIDGE

0496673 114285 Bridge Minimum set: Mechanical tools AM

NOTE: **For securing camshaft at TDC.**

Storage Location

A27

B27

SI number

01 18 09 (578)

cardiagn.com

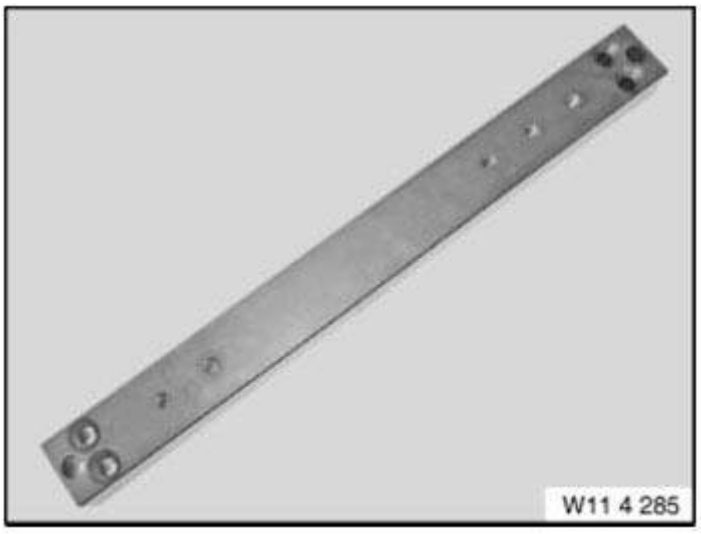


Fig. 83: Identifying Bridge (0496673)
Courtesy of BMW OF NORTH AMERICA, INC.

0491098 BRIDGE

0491098 117458 Bridge AM

NOTE: **(Bridge) Only available as part of complete set**

Storage Location

K 102

0490661 BRIDGE

0490661 111018 Bridge AM

NOTE: **Engine: M30**

cardiagn.com

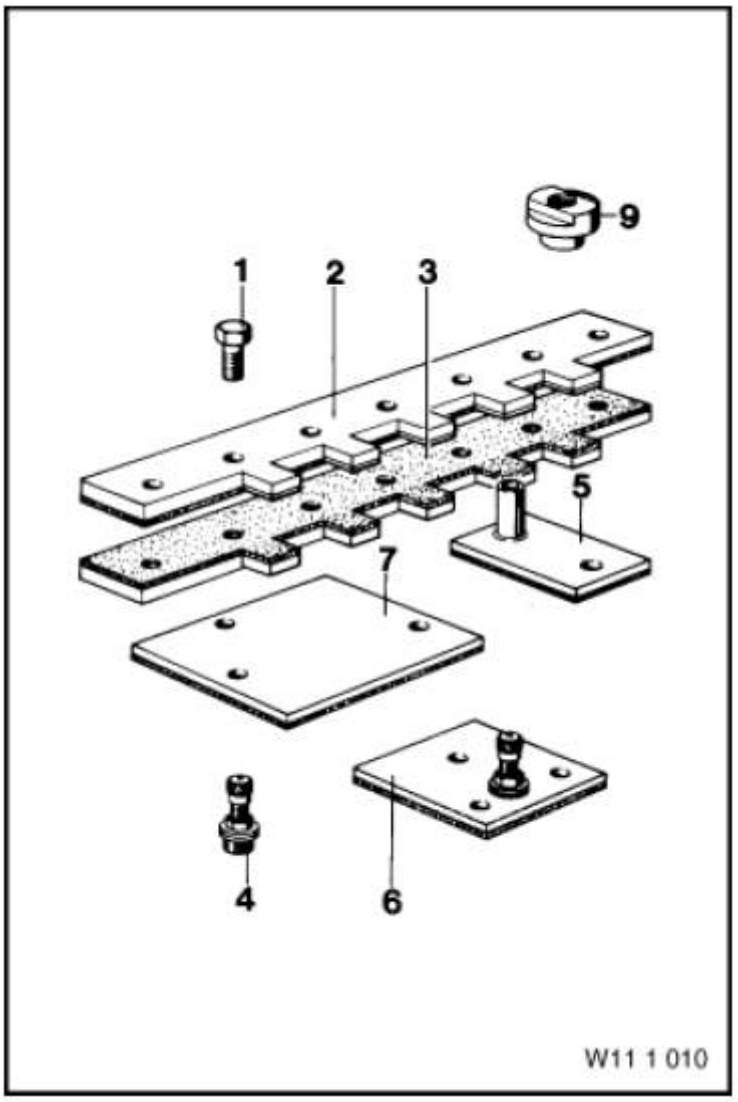


Fig. 84: Identifying Bridge (0490661)
Courtesy of BMW OF NORTH AMERICA, INC.

0490767 BRIDGE

0490767 111436 Bridge AM

NOTE: **With rubber seal and 2 screws - engine: M42, M44 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011**

0494028 BUSH

0494028 119181 Bush Minimum set: Mechanical tools AM

cardiagn.com



Fig. 85: Identifying Bush (0494028)
Courtesy of BMW OF NORTH AMERICA, INC.

0494043 BUSH

0494043 117400 Bush Minimum set: Mechanical tools Mechanical tool

NOTE: **(Slip bush) For installing the radial shaft seal in the bottom timing case cover**

Storage Location

B46

SI number

01 10 01 (733)



Fig. 86: Identifying Bush (0494043)
Courtesy of BMW OF NORTH AMERICA, INC.

0495373 BUSH

0495373 116240 Bush AM

NOTE: **(Assembly bush set) For fitting pistons (diameter 82 mm) with connecting rod into the crankcase. Engine: N52 B25**

cardiagn.com

SI number

01 02 06 (244)

Consisting of:

1. 0495526 Bush

NOTE: **(Assembly bush 82.00 mm)**

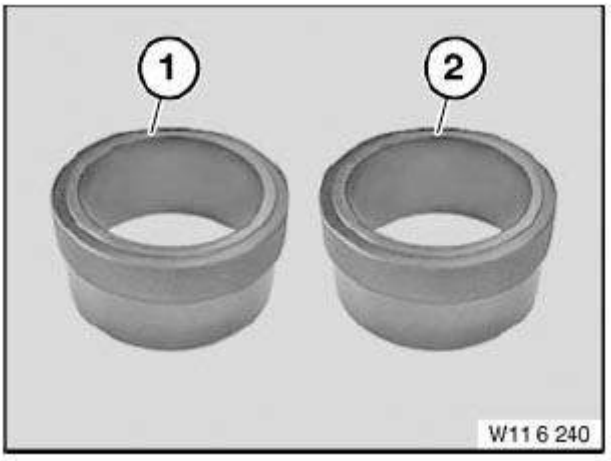


Fig. 87: Identifying Bush (0495373)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0495527 Bush

NOTE: **(Assembly bush 82.25 mm)**

0490882 BUSH

0490882 112390 Bush Mechanical tool

NOTE: **(slip bush) To prevent damage to the radial sealing ring when fitting the rear end cover**

Storage Location

A6

SI number

01 05 92 (507)

cardiagn.com

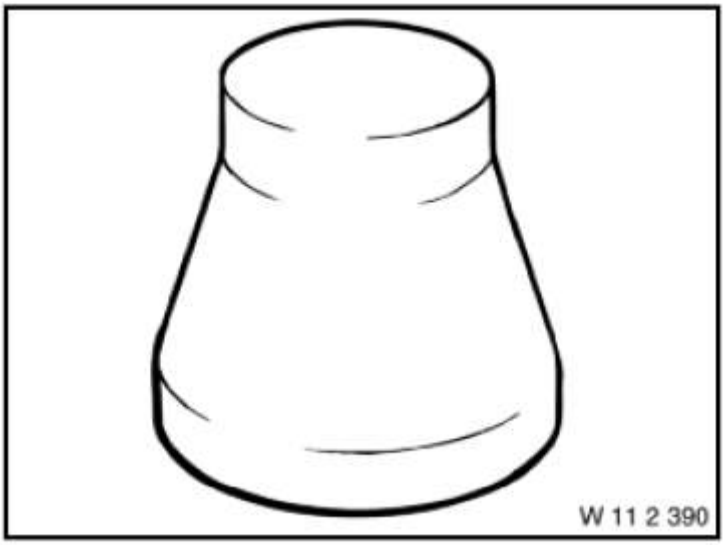


Fig. 88: Identifying Bush (0490882)
Courtesy of BMW OF NORTH AMERICA, INC.

0493138 BUSH

0493138 116260 Bush AM

NOTE: (Assembly bushes with case) For installing pistons of 85 mm diameter (urgently required for pistons with U-Flex ring)

Consisting of:

1 = 0493139 Bush

NOTE: (Assembly bush) Diameter 85.00 mm

2 = 0493140 Bush

NOTE: (Assembly bush) Diameter 85.08 mm, repair



Fig. 89: Identifying Bush (0493138)
Courtesy of BMW OF NORTH AMERICA, INC.

3 = 0493141 Bush

NOTE: (Assembly bush) Diameter 85.25 mm, stage 1

4 = 0493142 Bush

cardiagn.com

NOTE: **(Assembly bush) Diameter 85.50 mm, stage 2**

9 = 0493323 Case

NOTE: **(Case) For storing assembly bushes, gauge 11 6 270 and lever dial gauge 11 6 250**

0493847 BUSH

0493847 117240 Bush Mechanical tool

NOTE: **(Slip bush) For installation of the radial shaft seal in the gear case cover**

Storage Location

B42

SI number

01 15 00 (609)



Fig. 90: Identifying Bush (0493847)
Courtesy of BMW OF NORTH AMERICA, INC.

0493142 BUSH

0493142 116264 Bush AM

NOTE: **(Assembly bush) Diameter 85.50 mm, stage 2**



Fig. 91: Identifying Bush (0493142)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496704 BUSH

0496704 118538 Bush Minimum set: Mechanical tools AM

In conjunction with: 11 8 530 = 0495728

NOTE: **Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.**

Storage Location

C20

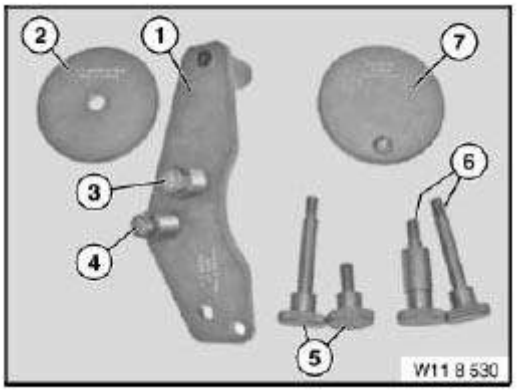


Fig. 92: Identifying Bush (0496704)
Courtesy of BMW OF NORTH AMERICA, INC.

0494395 BUSH

0494395 118142 Bush AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 8140 (83 30 0 493 582) - as of 12.03.12**



Fig. 93: Identifying Bush (0494395)
Courtesy of BMW OF NORTH AMERICA, INC.

0493588 BUSH

0493588 117230 Bush Mechanical tool

cardiagn.com

NOTE: **(Slip bush) For fitting the radial shaft seal in the crankcase - front of crankshaft**

Storage Location

B8

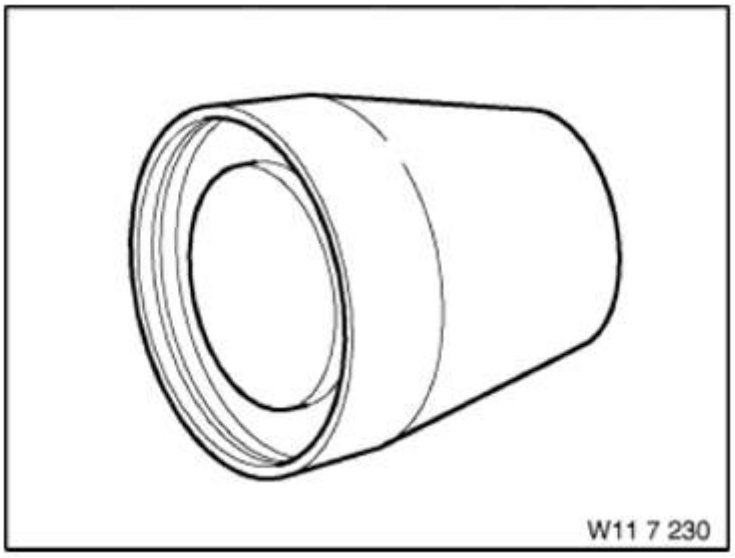


Fig. 94: Identifying Bush (0493588)
Courtesy of BMW OF NORTH AMERICA, INC.

0490851 BUSH

0490851 112212 Bush AM

NOTE: **(Slip bushes (intermediate shaft, camshaft)) Engine: M20, M21**

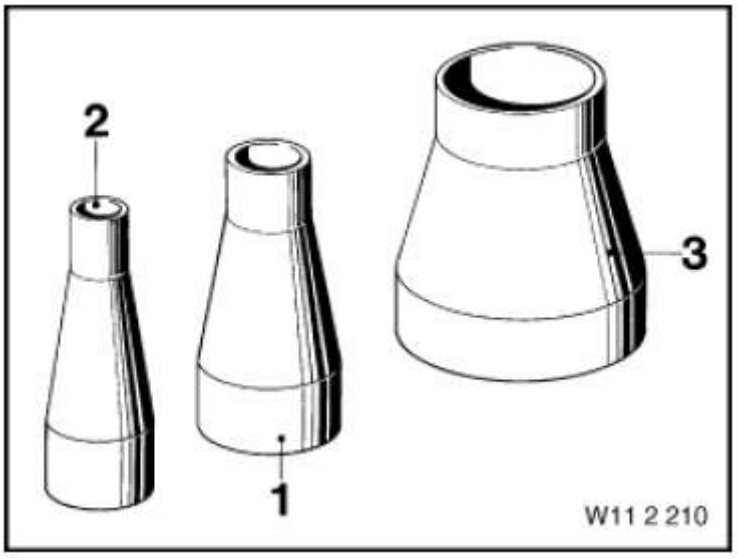


Fig. 95: Identifying Bush (0490851)
Courtesy of BMW OF NORTH AMERICA, INC.

0493586 BUSH

0493586 118162 Bush Minimum set: Mechanical tools AM

NOTE: **(Slip bush)**

Storage Location

cardiagn.com

B4

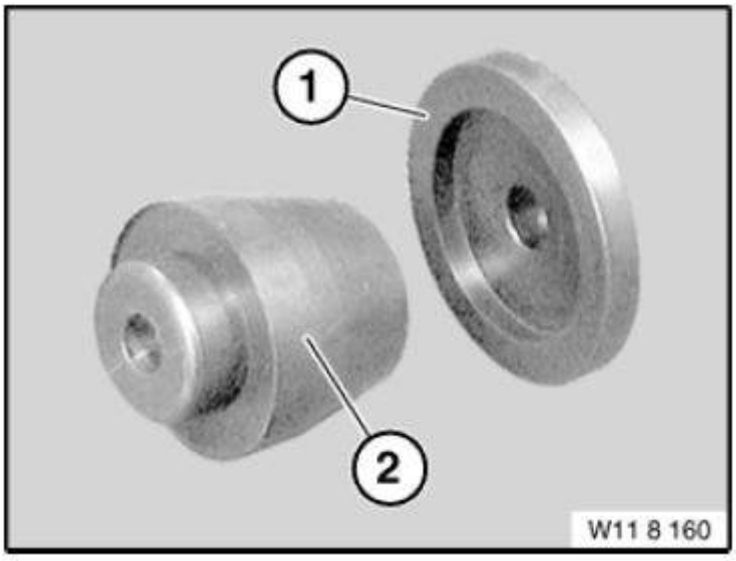


Fig. 96: Identifying Bush (0493586)
Courtesy of BMW OF NORTH AMERICA, INC.

0493140 BUSH

0493140 116262 Bush AM

NOTE: **(Assembly bush) Diameter 85.08 mm, repair**



Fig. 97: Identifying Bush (0493140)
Courtesy of BMW OF NORTH AMERICA, INC.

0495365 BUSH

0495365 115450 Bush Mechanical tool

NOTE: **(Assembly bush) For installing piston (diameter 87 mm) with connecting rod. Engine: M67TU; N62TU B40;**

SI number

01 14 05 (198)

cardiagn.com



Fig. 98: Identifying Bush (0495365)
Courtesy of BMW OF NORTH AMERICA, INC.

0494396 BUSH

0494396 118143 Bush AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 8140 (83 30 0 493 582) - as of 12.03.12**



Fig. 99: Identifying Bush (0494396)
Courtesy of BMW OF NORTH AMERICA, INC.

0490849 BUSH

0490849 112210 Bush AM

NOTE: **(Slip bush) For preventing damage to the radial seal when mounting. May not be used with radial shaft seals with a PDFE sealing lip.**

Storage Location

X1

Consisting of:

1. 0490850 Bush

cardiagn.com

NOTE: **(Slip bushes (front crankshaft)) Engine: M20**

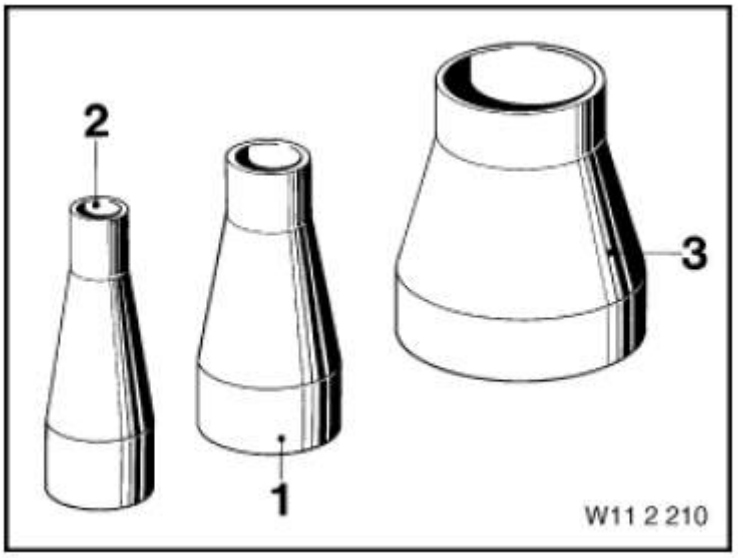


Fig. 100: Identifying Bush (0490849)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0490851 Bush

NOTE: **(Slip bushes (intermediate shaft, camshaft)) Engine: M20, M21**

3. 0490852 Bush

NOTE: **(Slip bushes) End cover, crankshaft, rear, discontinued: Slip bush is supplied in the parts service, i.e. the radial shaft seal, end cover and slip bush are delivered together.**

0493139 BUSH

0493139 116261 Bush AM

NOTE: **(Assembly bush) Diameter 85.00 mm**



Fig. 101: Identifying Bush (0493139)
Courtesy of BMW OF NORTH AMERICA, INC.

0493141 BUSH

0493141 116263 Bush AM

cardiagn.com

NOTE: **(Assembly bush) Diameter 85.25 mm, stage 1**



Fig. 102: Identifying Bush (0493141)
Courtesy of BMW OF NORTH AMERICA, INC.

0495527 BUSH

0495527 116242 Bush AM

NOTE: **(Assembly bush 82.25 mm)**

SI number

01 02 06 (244)

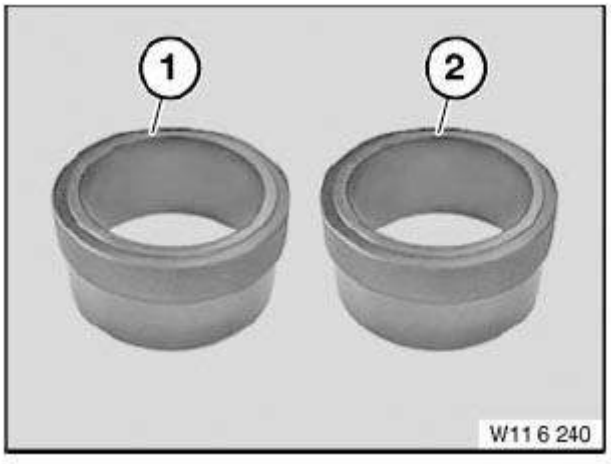


Fig. 103: Identifying Bush (0495527)
Courtesy of BMW OF NORTH AMERICA, INC.

0491032 BUSH

0491032 115000 Bush Mechanical tool

NOTE: **To press out the water pump shaft**

0493619 BUSH

0493619 117214 Bush AM

NOTE: **(draw-in bushing)**

cardiagn.com

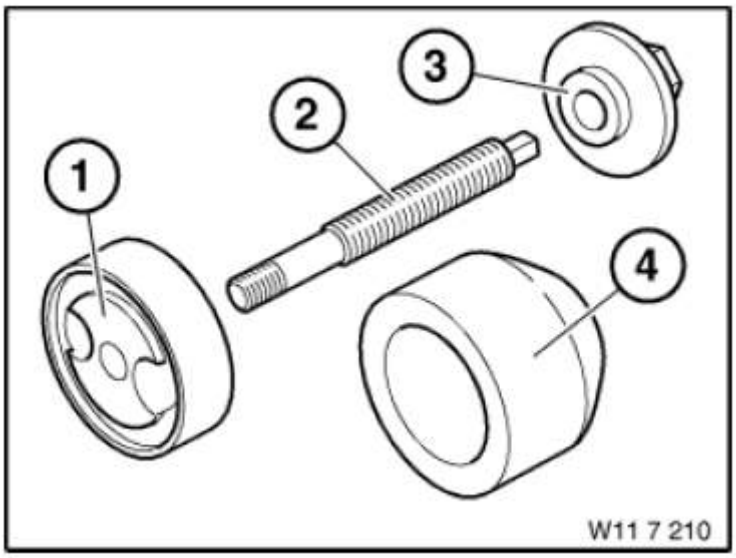


Fig. 104: Identifying Bush (0493619)
Courtesy of BMW OF NORTH AMERICA, INC.

0491014 BUSH

0491014 114140 Bush Mechanical tool

NOTE: **(Assembly bush) For installation of the chain tensioner piston**

Storage Location

C6

SI number

01 12 93 (701)

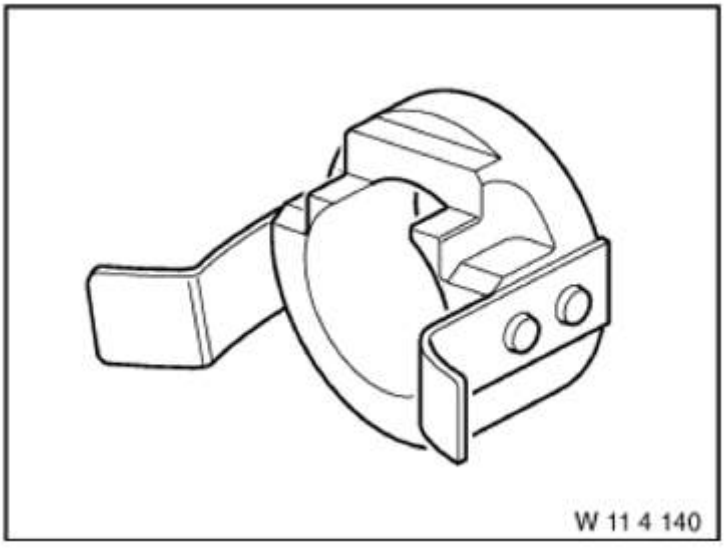


Fig. 105: Identifying Bush (0491014)
Courtesy of BMW OF NORTH AMERICA, INC.

0494021 BUSH

0494021 119231 Bush Minimum set: Mechanical tools AM

cardiagn.com

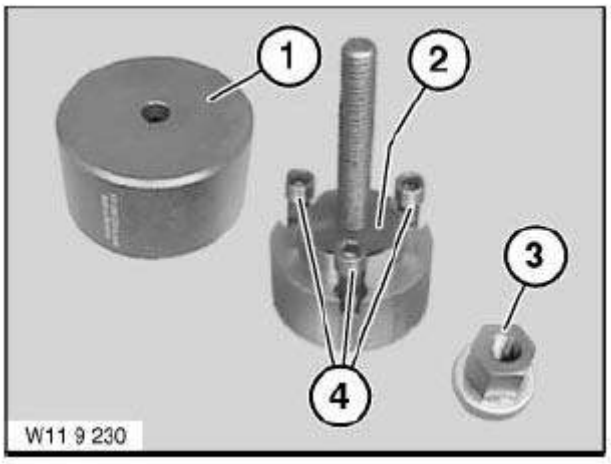


Fig. 106: Identifying Bush (0494021)
Courtesy of BMW OF NORTH AMERICA, INC.

0490950 BUSH

0490950 113220 Bush Mechanical tool

NOTE: **(Slip bush) For installing the top gear case cover on the camshaft**

Storage Location

A15

SI number

01 04 87 (780)

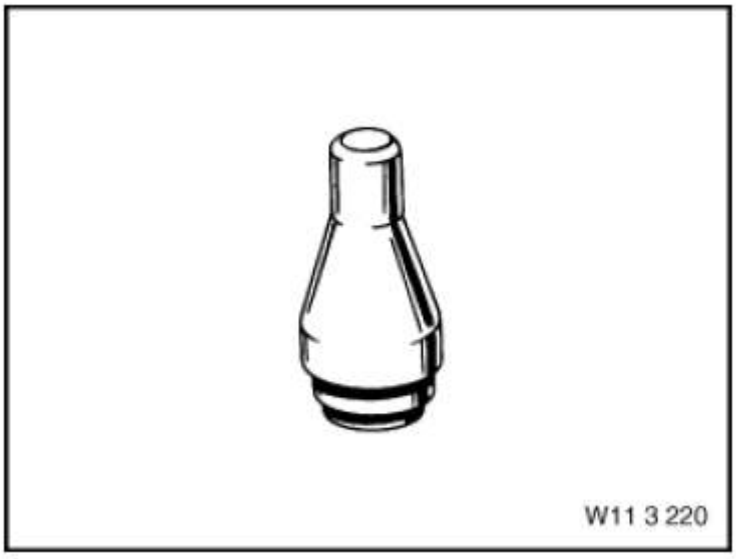


Fig. 107: Identifying Bush (0490950)
Courtesy of BMW OF NORTH AMERICA, INC.

0490866 BUSH

0490866 112320 Bush Mechanical tool

NOTE: **(Draw-in bushing) For radial shaft seal in gear case cover (front crankshaft)**

Storage Location

cardiagn.com

A17

SI number

01 03 87 (739)

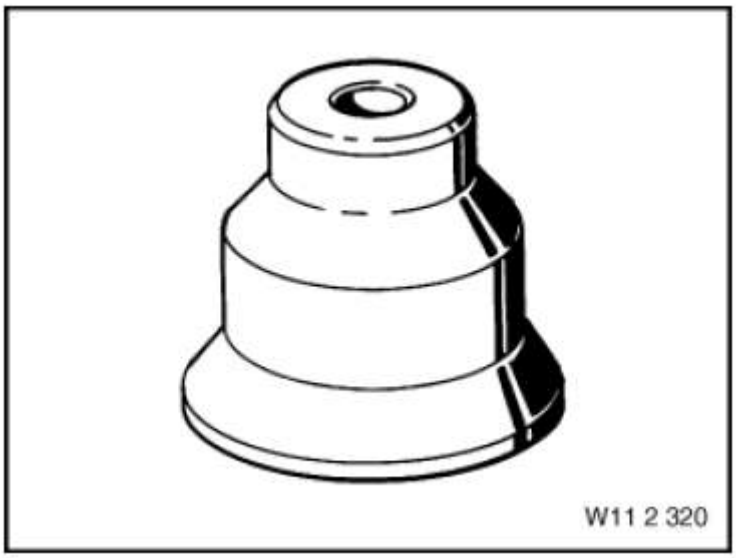


Fig. 108: Identifying Bush (0490866)
Courtesy of BMW OF NORTH AMERICA, INC.

0494394 BUSH

0494394 118141 Bush AM

NOTE: **Bush for piston installation 84.00 mm**



Fig. 109: Identifying Bush (0494394)
Courtesy of BMW OF NORTH AMERICA, INC.

2288403 BUSH

2288403 Bush Mechanical tool

NOTE: **Slip bush for mounting the piston. engine N47C16**

SI number

cardiagn.com



Fig. 110: Identifying Bush (2288403)
Courtesy of BMW OF NORTH AMERICA, INC.

0490817 BUSH

0490817 112025 Bush AM

NOTE: (Threaded bush)

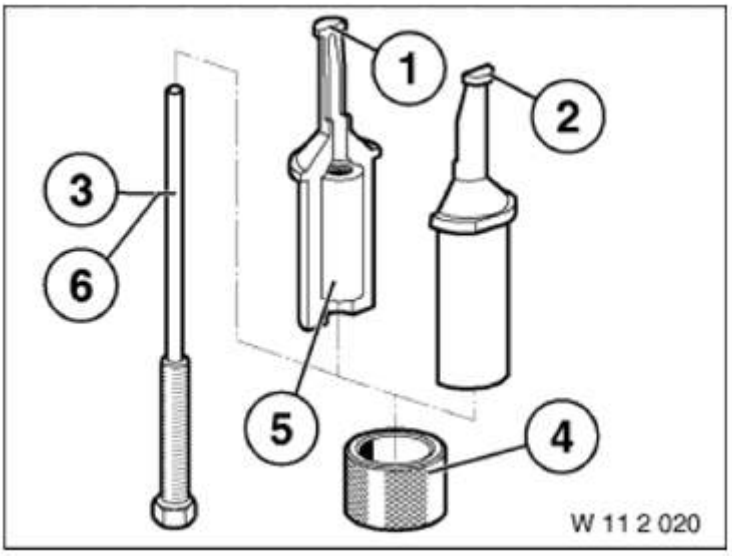


Fig. 111: Identifying Bush (0490817)
Courtesy of BMW OF NORTH AMERICA, INC.

0491015 BUSH

0491015 114150 Bush Mechanical tool

NOTE: (Draw-in bushing) For fitting the radial seal in the gear case cover at the bottom

Storage Location

C18

SI number

cardiagn.com

01 12 93 (701)

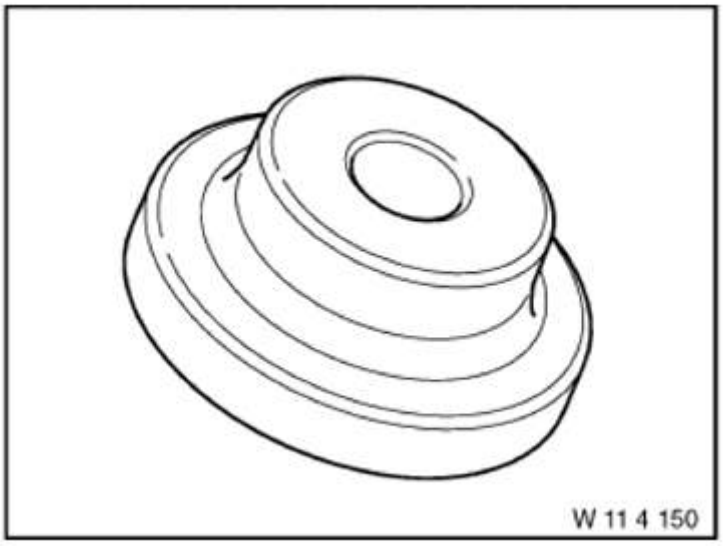


Fig. 112: Identifying Bush (0491015)
Courtesy of BMW OF NORTH AMERICA, INC.

0493249 BUSH

0493249 116380 Bush Mechanical tool

NOTE: **For fitting valve stem seal**

Storage Location

B15

SI number

01 06 98 (306)

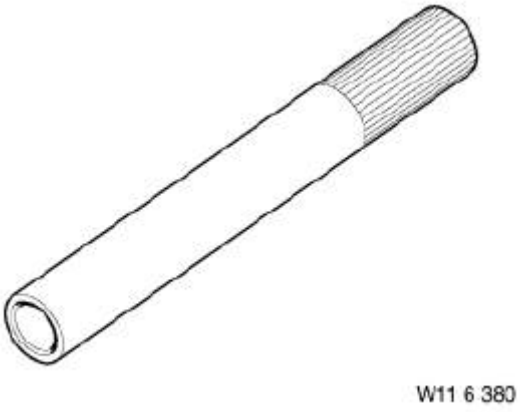


Fig. 113: Identifying Bush (0493249)
Courtesy of BMW OF NORTH AMERICA, INC.

0494129 BUSH

0494129 119263 Bush Minimum set: Mechanical tools AM

NOTE: **(Bush for counter support) For counter support, for retaining flywheel when gearbox is removed Engine: N62, N73**

cardiagn.com

Storage Location

A45

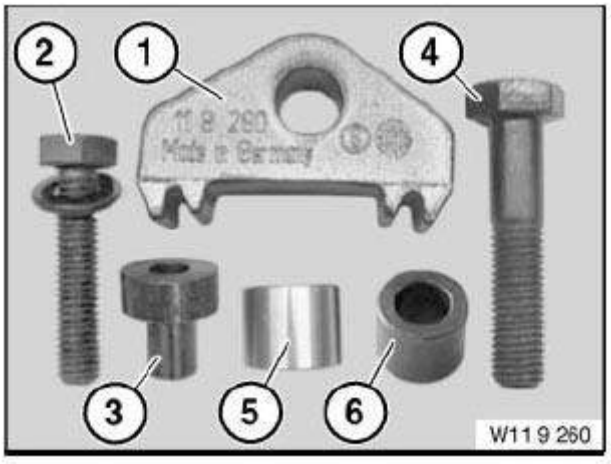


Fig. 114: Identifying Bush (0494129)
Courtesy of BMW OF NORTH AMERICA, INC.

0490909 BUSH

0490909 113062 Bush AM

NOTE: (Impact bush) Only available as part of complete set

0494793 BUSH

0494793 119265 Bush Minimum set: Mechanical tools AM

Storage Location

C44



Fig. 115: Identifying Bush (0494793)
Courtesy of BMW OF NORTH AMERICA, INC.

0495216 BUSH

0495216 119266 Bush Minimum set: Mechanical tools AM

NOTE: For counter support, for retaining flywheel when gearbox is removed Engine:

cardiagn.com

Storage Location

B44

SI number

01 05 05 (180)

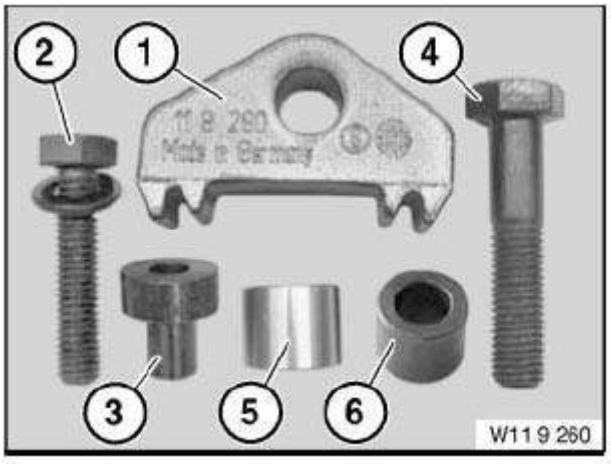


Fig. 116: Identifying Bush (0495216)
Courtesy of BMW OF NORTH AMERICA, INC.

0490850 BUSH

0490850 112211 Bush AM

NOTE: **(Slip bushes (front crankshaft)) Engine: M20**

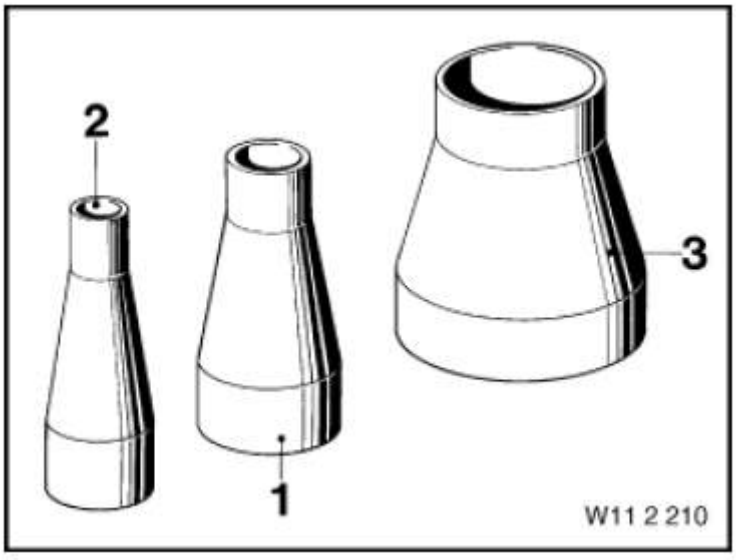


Fig. 117: Identifying Bush (0490850)
Courtesy of BMW OF NORTH AMERICA, INC.

0495526 BUSH

0495526 116241 Bush AM

NOTE: **(Assembly bush 82.00 mm)**

cardiagn.com

SI number

01 02 06 (244)



Fig. 118: Identifying Bush (0495526)
Courtesy of BMW OF NORTH AMERICA, INC.

0493582 BUSH

0493582 118140 Bush AM

NOTE: **(Assembly bushes) For installing the pistons**

SI number

01 12 99 (452)

Consisting of:

1. 0494394 Bush

   NOTE: **Bush for piston installation 84.00 mm**

2. 0494395 Bush

   NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 81 40 (83 30 0 493 582) - as of 12.03.12**



cardiagn.com

Fig. 119: Identifying Bush (0493582)
Courtesy of BMW OF NORTH AMERICA, INC.

3. 0494396 Bush

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 81 40 (83 30 0 493 582) - as of 12.03.12**

0491024 BUSH

0491024 114210 Bush Mechanical tool

NOTE: **(draw-in bushing) For drawing in the crankshaft radial sealing ring in the gear case cover**

Storage Location

C5

SI number

01 09 94 (839)

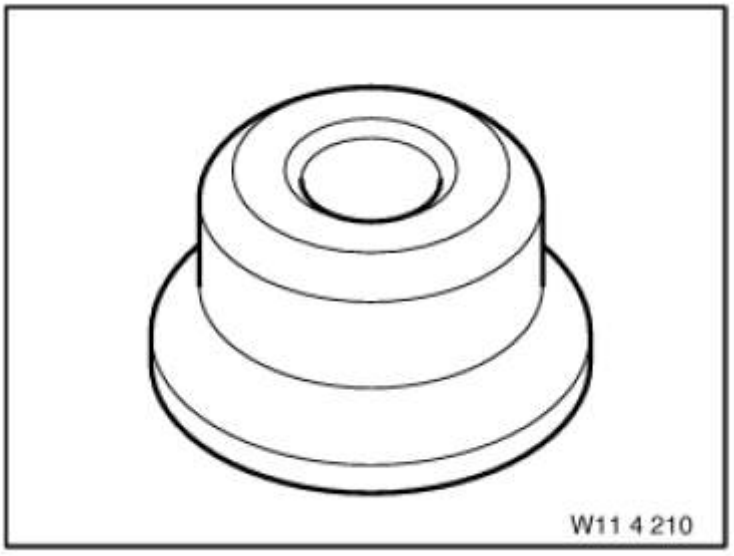


Fig. 120: Identifying Bush (0491024)
Courtesy of BMW OF NORTH AMERICA, INC.

0490810 BUSH

0490810 112015 Bush AM

NOTE: **(Threaded bush) Engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

cardiagn.com

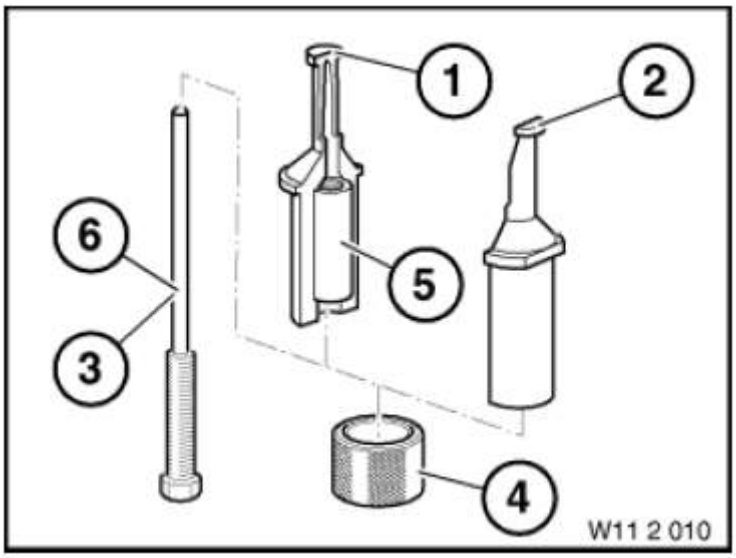


Fig. 121: Identifying Bush (0490810)
Courtesy of BMW OF NORTH AMERICA, INC.

0490852 BUSH

0490852 112213 Bush AM

NOTE: (Slip bushes) End cover, crankshaft, rear, discontinued: Slip bush is supplied in the parts service, i.e. the radial shaft seal, end cover and slip bush are delivered together.

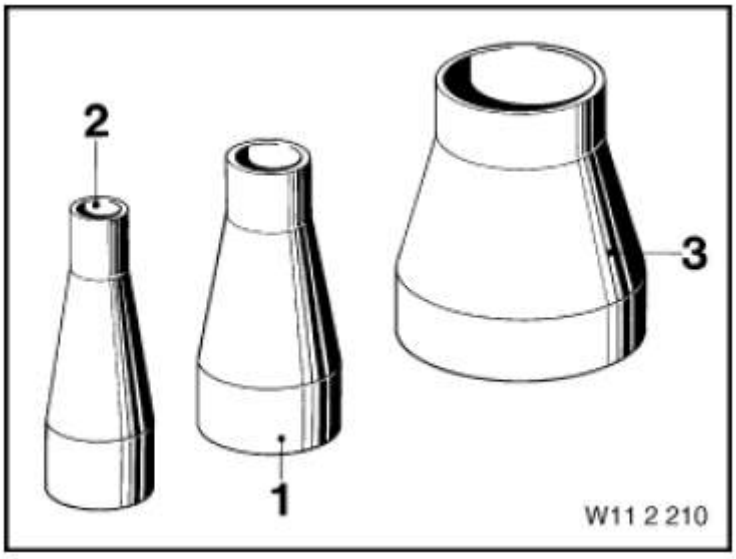


Fig. 122: Identifying Bush (0490852)
Courtesy of BMW OF NORTH AMERICA, INC.

0490965 BUSH

0490965 113280 Bush Mechanical tool

NOTE: (Draw-in bushing) For fitting the radial seal in the gear case at the bottom

Storage Location

Y7

SI number

cardiagn.com

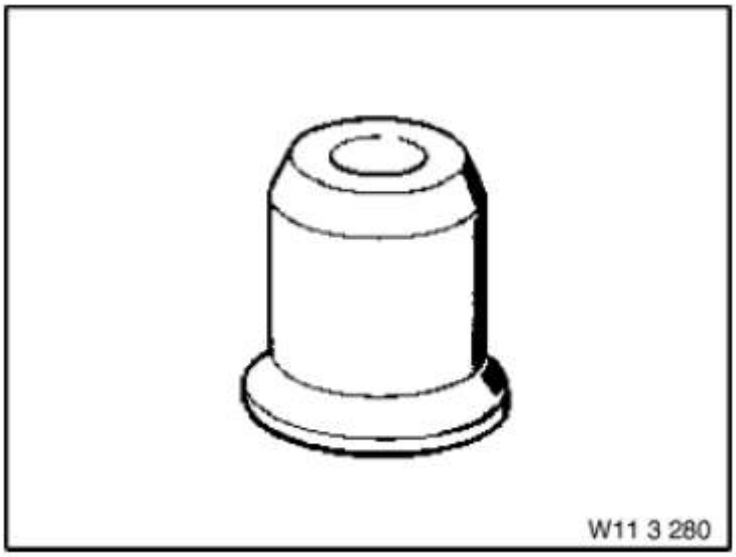


Fig. 123: Identifying Bush (0490965)
Courtesy of BMW OF NORTH AMERICA, INC.

0493585 BUSH

0493585 118161 Bush Minimum set: Mechanical tools AM

NOTE: **(draw-in bushing)**

Storage Location

B4

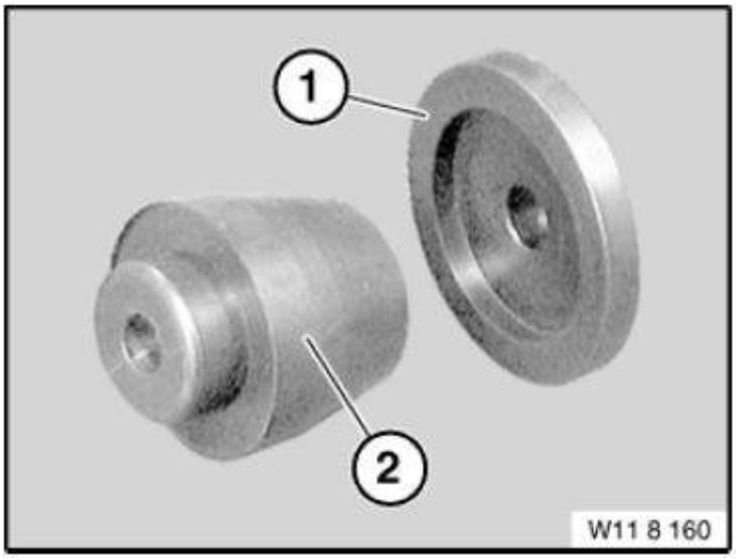


Fig. 124: Identifying Bush (0493585)
Courtesy of BMW OF NORTH AMERICA, INC.

0491093 CABLE

0491093 117452 Cable AM

NOTE: **(Cable) 4-pin, encoding A Connection to wiring harness and oxygen sensor - engine: M40, M42, M43, M50, M70 available as part of set of special tools only**

cardiagn.com

Storage Location

K 102

0490622 CARD

0490622 110229 Card Minimum set: Mechanical tools AM

NOTE: **(Cards) 100 pieces For recording compression tester 11 0 224**

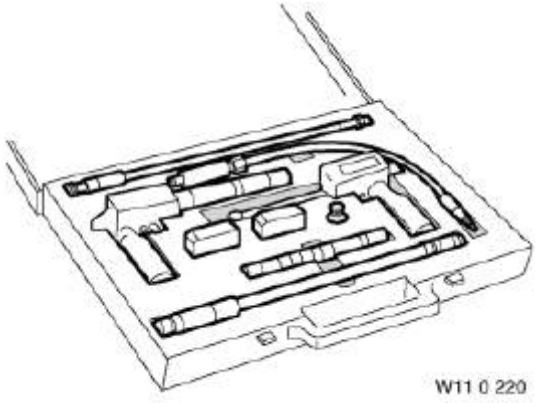


Fig. 125: Identifying Card (0490622)
Courtesy of BMW OF NORTH AMERICA, INC.

0490594 CARD

0490594 110161 Card AM

Replaced by: 83300490613

NOTE: **(Cards) For compression pressure inscriber Discontinuation and replaced by 11 0 220 (0 490 613)**

cardiagn.com

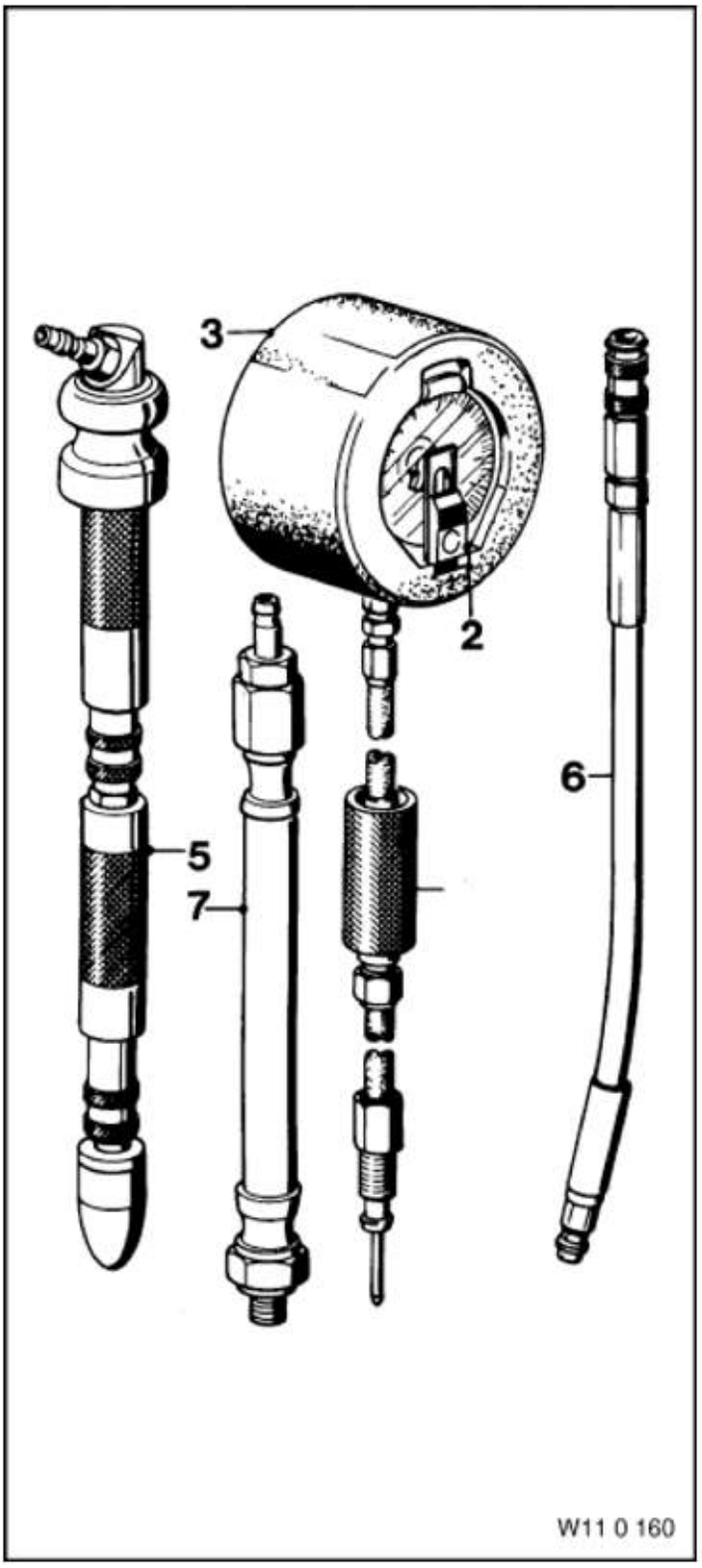


Fig. 126: Identifying Card (0490594)
Courtesy of BMW OF NORTH AMERICA, INC.

0490616 CARD

0490616 110223 Card Minimum set: Mechanical tools AM

NOTE: (Cards) 100 pieces For recording compression tester 11 0 221

cardiagn.com

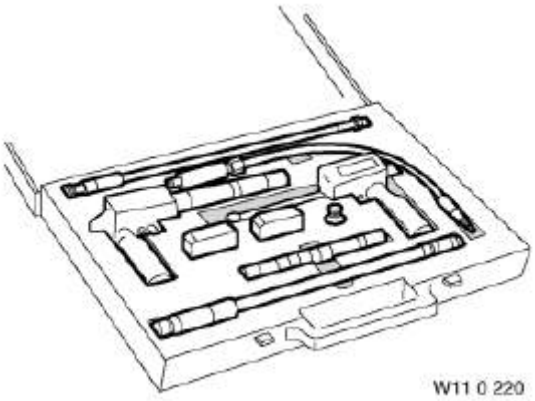


Fig. 127: Identifying Card (0490616)
Courtesy of BMW OF NORTH AMERICA, INC.

0493323 CASE

0493323 116269 Case AM

NOTE: (Case) For storing assembly bushes, gauge 11 6 270 and lever dial gauge 11 6 250

0490958 CASE

0490958 113252 Case AM

NOTE: (Case)



Fig. 128: Identifying Case (0490958)
Courtesy of BMW OF NORTH AMERICA, INC.

0493634 CASE

0493634 110231 Case Minimum set: Mechanical tools AM

NOTE: With foam insert for recording compression tester

cardiagn.com

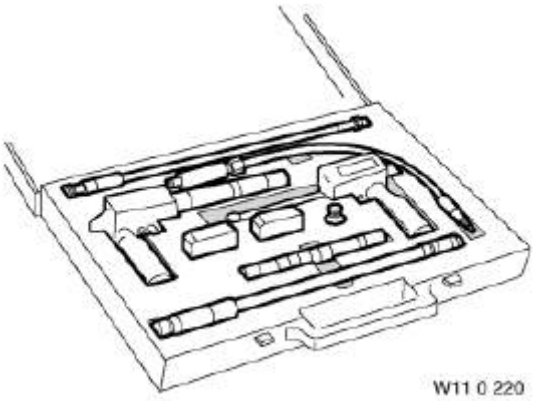


Fig. 129: Identifying Case (0493634)
Courtesy of BMW OF NORTH AMERICA, INC.

0493374 CASE

0493374 114309 Case AM

NOTE: (Case)

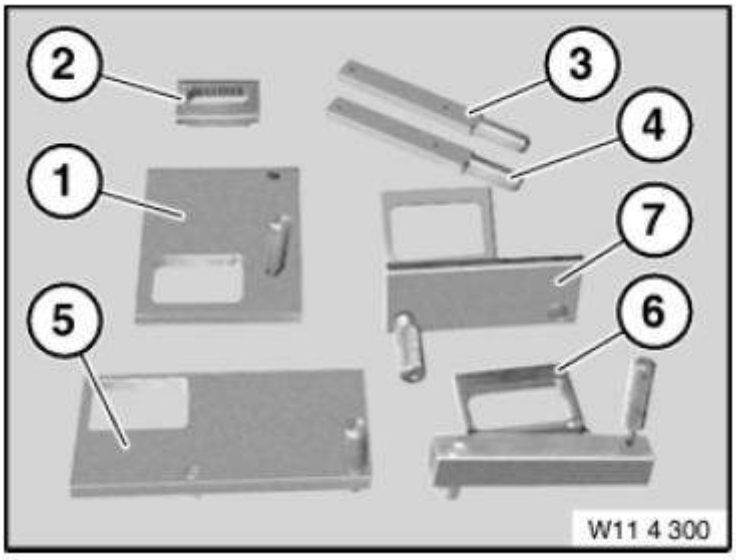


Fig. 130: Identifying Case (0493374)
Courtesy of BMW OF NORTH AMERICA, INC.

0490571 CHAIN

0490571 110024 Chain Minimum set: Mechanical tools AM

NOTE: (Chain) Version: short As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.

0490569 CHAIN

0490569 110022 Chain Minimum set: Mechanical tools AM

NOTE: (Chain) As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.

0490581 CHAIN

cardiagn.com

0490581 110072 Chain Minimum set: Mechanical tools AM

NOTE: (Chain) Version: long As of 08/2011, only available as a complete set via 11 0 070 = 0490579. Delivered with TUV inspection certificate and operating instructions.

0493456 CHAIN

0493456 110263 Chain AM

NOTE: (Chain) Version: short

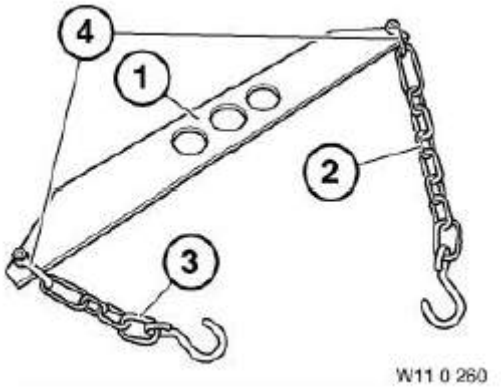


Fig. 131: Identifying Chain (0493456)
Courtesy of BMW OF NORTH AMERICA, INC.

0490582 CHAIN

0490582 110073 Chain Minimum set: Mechanical tools AM

NOTE: (Chain) Version: short As of 08/2011, only available as a complete set via 11 0 070 = 0490579. Delivered with TUV inspection certificate and operating instructions.

0490564 CHAIN

0490564 110003 Chain Minimum set: Mechanical tools AM

NOTE: (Chain) Version: short As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TUV inspection certificate and operating instructions.

0490570 CHAIN

0490570 110023 Chain Minimum set: Mechanical tools AM

NOTE: (Chain) Version: long As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.

0490563 CHAIN

0490563 110002 Chain Minimum set: Mechanical tools AM

NOTE: (Chain) Version: long As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TUV inspection certificate and operating instructions.

cardiagn.com

0493455 CHAIN

0493455 110262 Chain AM

NOTE: (Chain) Version: long

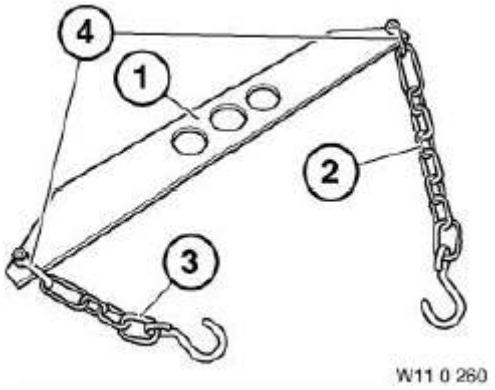


Fig. 132: Identifying Chain (0493455)
Courtesy of BMW OF NORTH AMERICA, INC.

0493428 CLAMP

0493428 117140 Clamp Mechanical tool

NOTE: (Holding clamps (2 x)) For blocking the secondary chain tensioner

Storage Location

X6

SI number

01 23 98 (390)

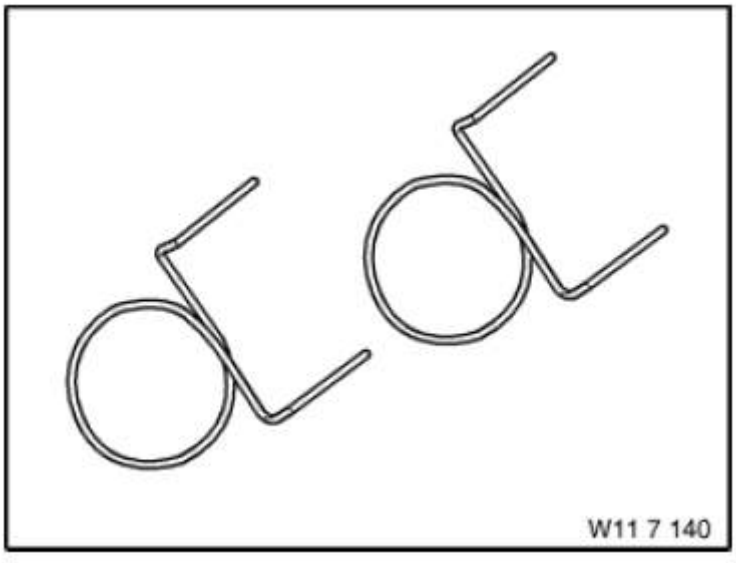


Fig. 133: Identifying Clamp (0493428)
Courtesy of BMW OF NORTH AMERICA, INC.

0490967 CLAMP

0490967 113291 Clamp Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **(Detachment clamp) Engine: M50 sale of existing inventory and then available as part of set of special tools 11 3 290 = 83 30 0 490 966 only - as of 29.11.2011**

0490970 CLAMP

0490970 113310 Clamp Mechanical tool

NOTE: **(Detachment clamp (2 pieces)) For secondary chain tensioner for blocking the chain tensioner piston when removing and installing the camshaft sprocket**

Storage Location

A5

SI number

01 04 96 (049)

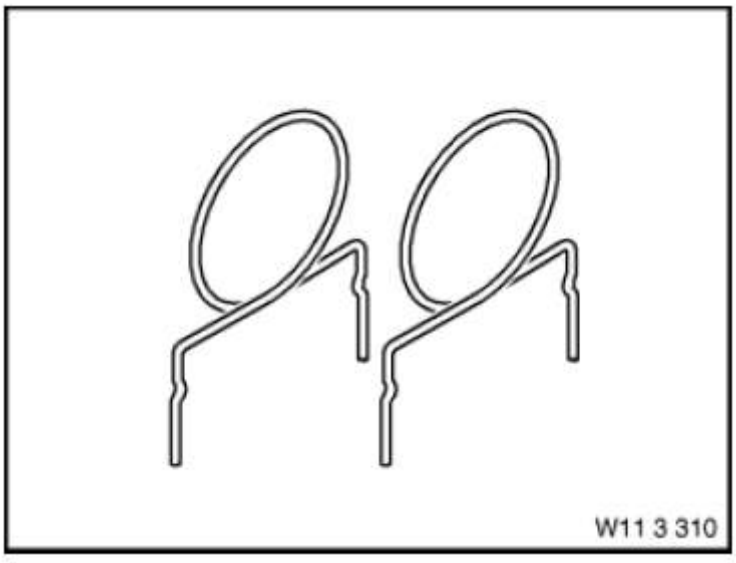


Fig. 134: Identifying Clamp (0490970)
Courtesy of BMW OF NORTH AMERICA, INC.

0490992 CLAMP

0490992 113420 Clamp Mechanical tool

NOTE: **(Lock pin clip) For secondary chain tensioner (2 pieces) for locking the chain tensioner piston e.g. when removing or fitting the camshaft sprockets**

Storage Location

C5

SI number

01 05 92 (507)

cardiagn.com

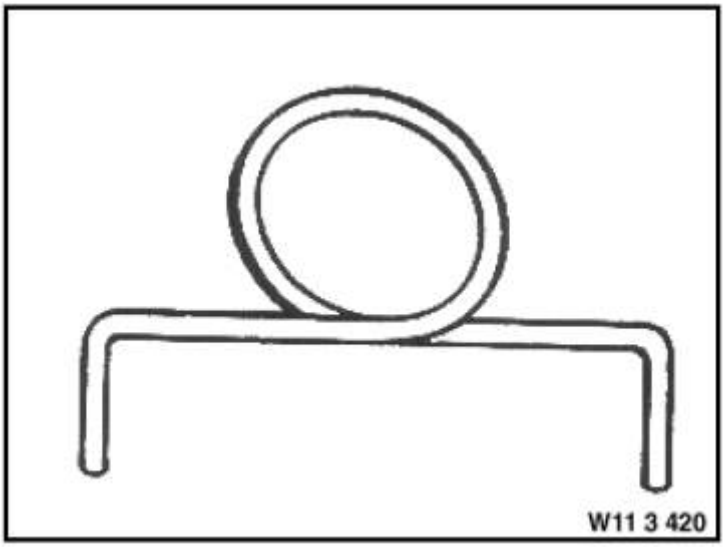
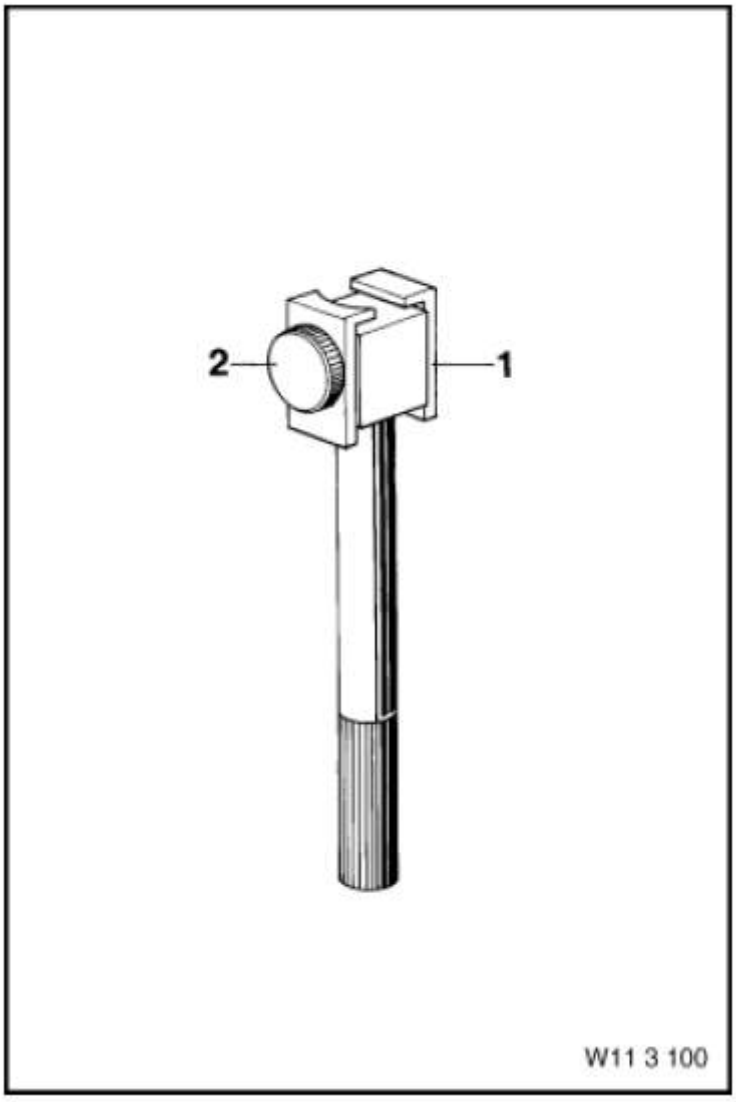


Fig. 135: Identifying Clamp (0490992)
Courtesy of BMW OF NORTH AMERICA, INC.

0490919 CLAW

0490919 113101 Claw AM

NOTE: **(driver claw (2 pieces))**



cardiagn.com

Fig. 136: Identifying Claw (0490919)
Courtesy of BMW OF NORTH AMERICA, INC.

0490807 CLAW

0490807 112012 Claw AM

NOTE: (Remover claw II) engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.

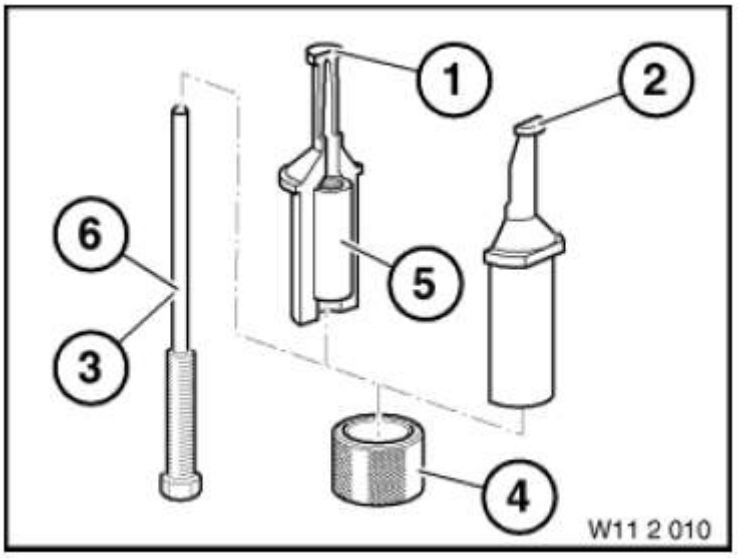


Fig. 137: Identifying Claw (0490807)
Courtesy of BMW OF NORTH AMERICA, INC.

0490916 CLAW

0490916 113093 Claw AM

NOTE: (Claw B)

cardiagn.com

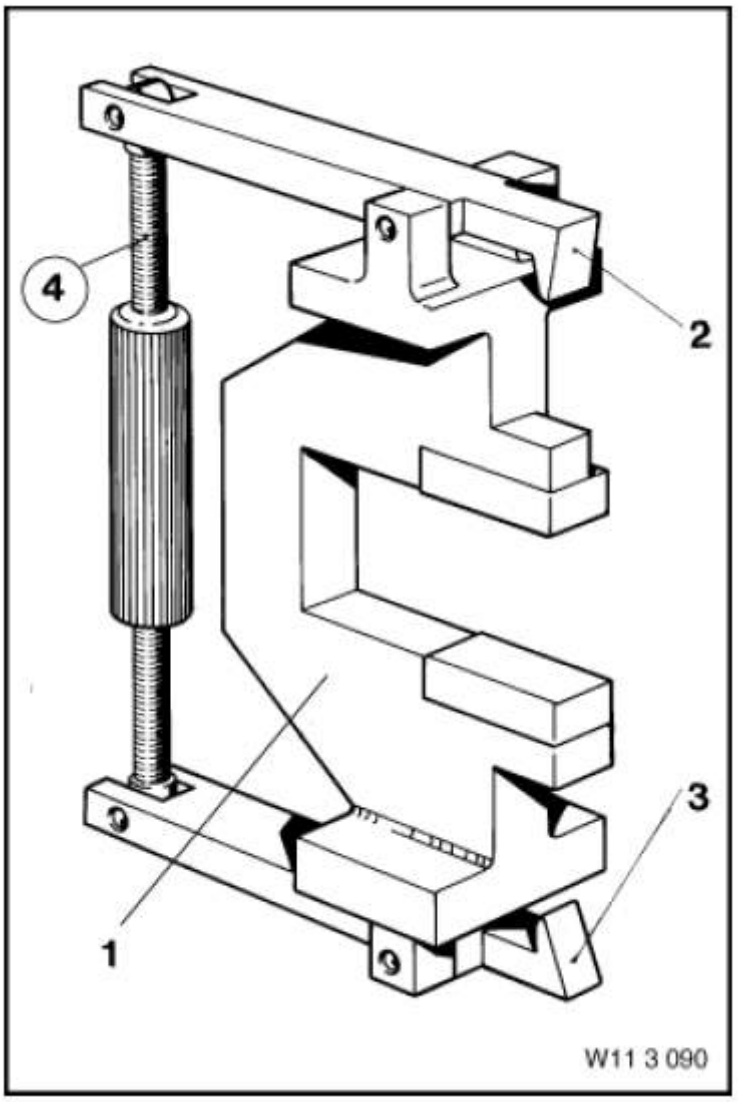
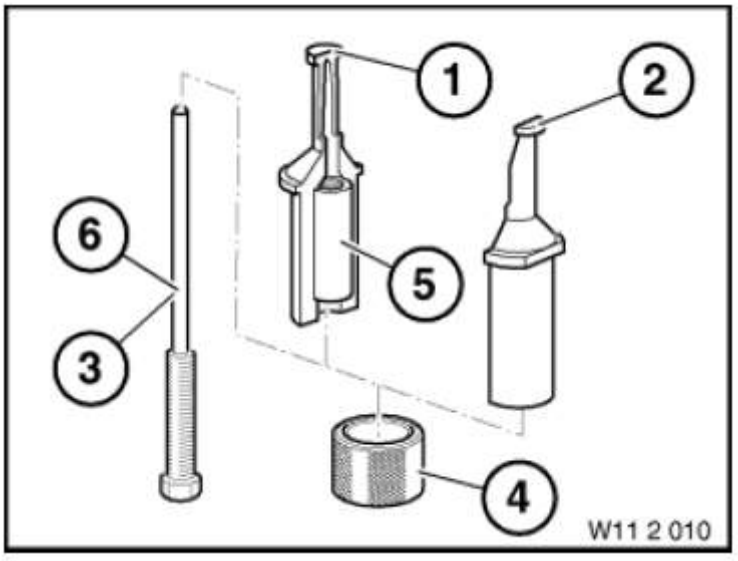


Fig. 138: Identifying Claw (0490916)
Courtesy of BMW OF NORTH AMERICA, INC.

0490806 CLAW

0490806 112011 Claw AM

NOTE: (Remover claw I) With threaded bush - engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.



cardiagn.com

Fig. 139: Identifying Claw (0490806)
Courtesy of BMW OF NORTH AMERICA, INC.

0490813 CLAW

0490813 112021 Claw AM

NOTE: (Extraction claw I) With threaded bush

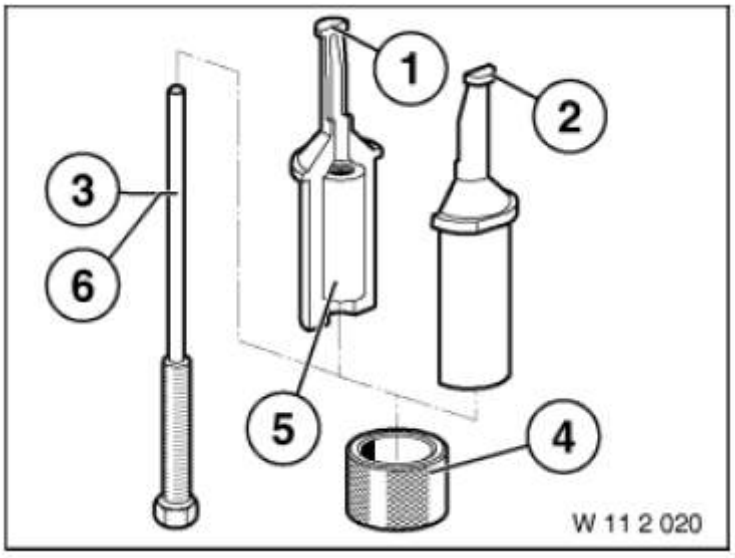


Fig. 140: Identifying Claw (0490813)
Courtesy of BMW OF NORTH AMERICA, INC.

0490814 CLAW

0490814 112022 Claw AM

NOTE: (Extraction claw II)

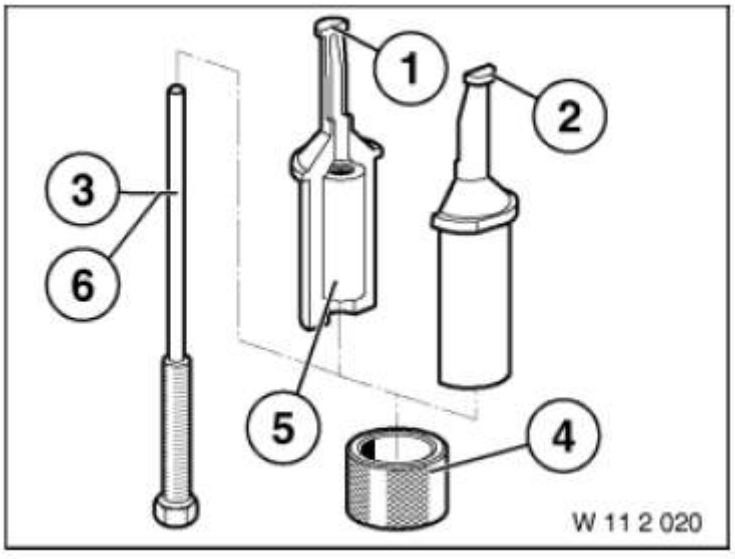


Fig. 141: Identifying Claw (0490814)
Courtesy of BMW OF NORTH AMERICA, INC.

0490915 CLAW

0490915 113092 Claw AM

cardiagn.com

NOTE: (Claw A)

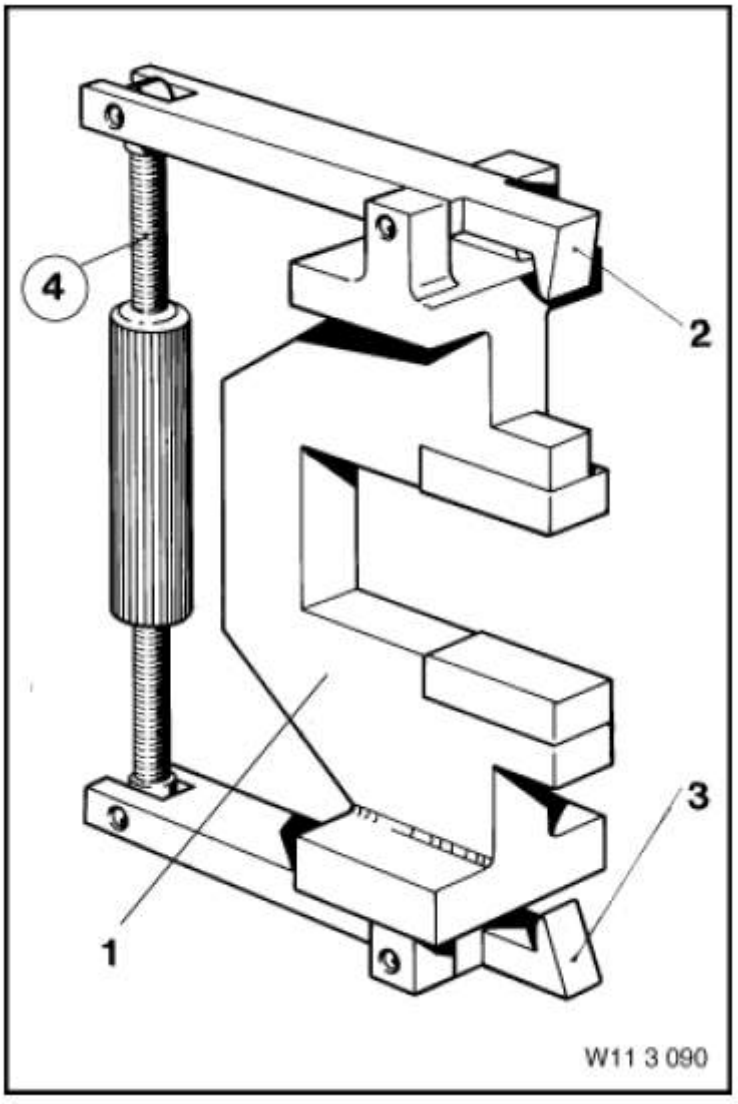


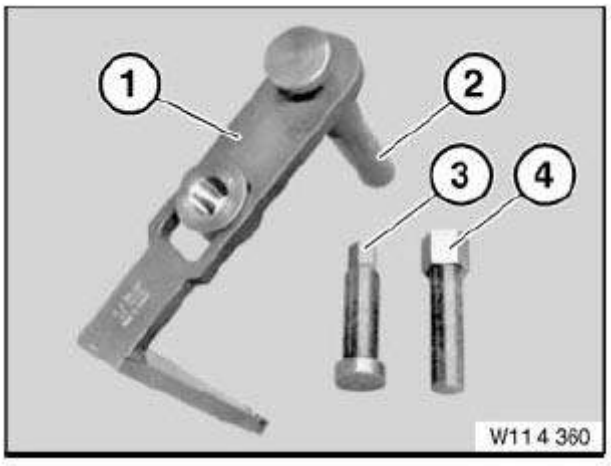
Fig. 142: Identifying Claw (0490915)
Courtesy of BMW OF NORTH AMERICA, INC.

0495020 CLIP

0495020 114361 Clip Minimum set: Mechanical tools AM

Storage Location

B51



cardiagn.com

Fig. 143: Identifying Clip (0495020)
Courtesy of BMW OF NORTH AMERICA, INC.

0490692 CLIP

0490692 111051 Clip AM

NOTE: (Guide bracket, cropped) Engine: S38

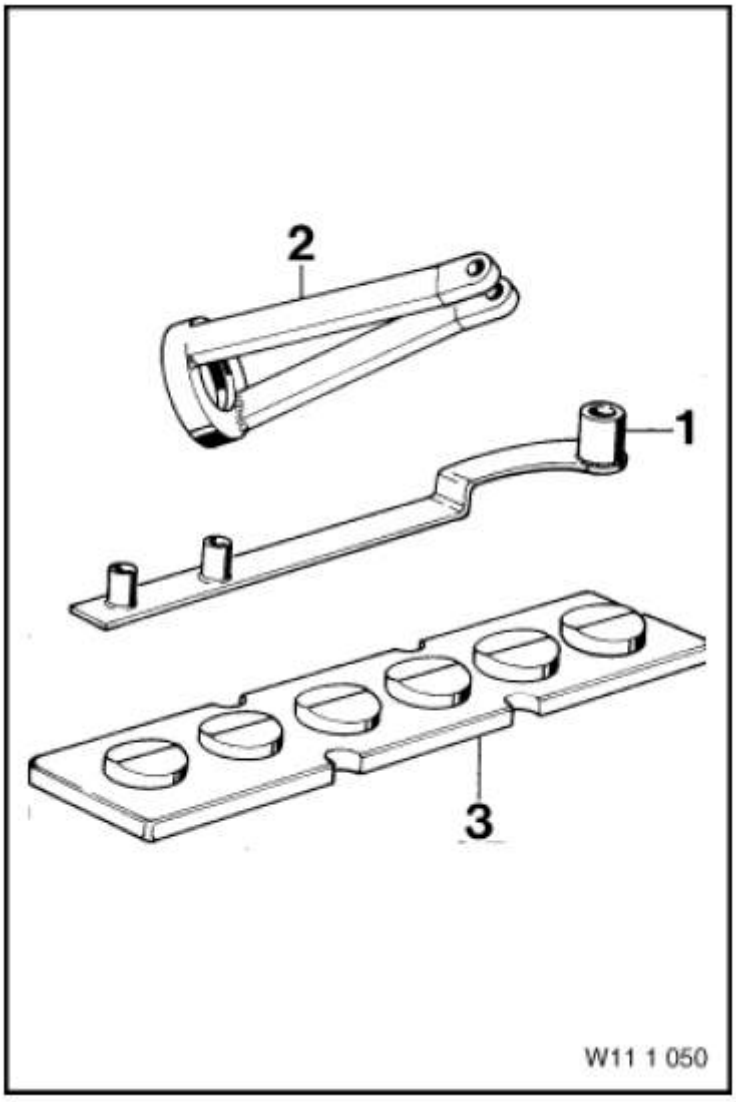


Fig. 144: Identifying Clip (0490692)
Courtesy of BMW OF NORTH AMERICA, INC.

0495007 CLIP

0495007 114283 Clip Minimum set: Mechanical tools AM

cardiagn.com



Fig. 145: Identifying Clip (0495007)
Courtesy of BMW OF NORTH AMERICA, INC.

0495072 CLIP

0495072 110320 Clip Mechanical tool

NOTE: **(Removal and fitting tool) For removing and installing cylinder head.**

Storage Location

B51

SI number

01 17 04 (130)

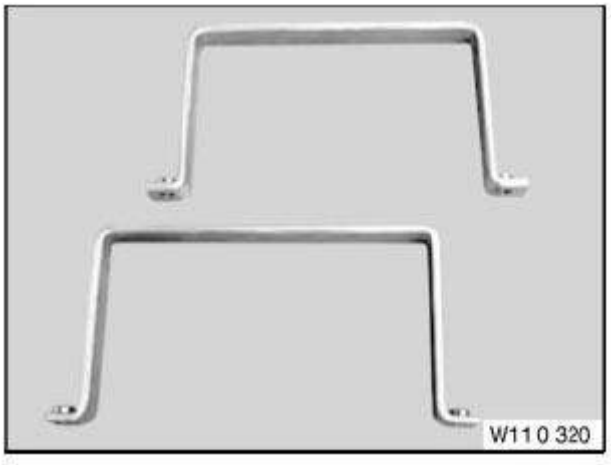


Fig. 146: Identifying Clip (0495072)
Courtesy of BMW OF NORTH AMERICA, INC.

0490617 COMPRESSION TESTER

0490617 110224 Compression tester Minimum set: Mechanical tools AM

NOTE: **(Compression tester) For petrol engines.**

cardiagn.com



Fig. 147: Identifying Compression Tester (0490617)
Courtesy of BMW OF NORTH AMERICA, INC.

2166582 COMPRESSION TESTER

2166582 Compression tester MP

NOTE: **Electronic compression pressure-measuring device used for measurements on petrol and diesel engines. The device's measuring range is 0-50 bar.**

SI number

08 15 09 (579)



Fig. 148: Identifying Compression Tester (2166582)
Courtesy of BMW OF NORTH AMERICA, INC.

0490593 COMPRESSION TESTER

0490593 110160 Compression tester AM

Replaced by: 83300490613

NOTE: **(Compression recorder) manufacturer VDO - Replaced by 11 0 220 (0 490 613)**

cardiagn.com

Consisting of:

1. **0490594** Card

   NOTE: **(Cards) For compression pressure inscriber Discontinuation and replaced by 11 0 220 (0 490 613)**

2. **0490595** Pressure gauge

   NOTE: **Compression pressure inscriber Discontinuation and replaced by 11 0 220 (0 490 613)**

3. **0490596** Guard

   NOTE: **(Rubber protection) Still available as replacement Discontinuation and replaced by 11 0 220 (0 490 613)**

4. **0490597** Line

   NOTE: **Discontinuation and replaced by 11 0 220 (0 490 613)**

5. **0490598** Adapter

   NOTE: **(test adapter for petrol engine: all, except M70 Discontinuation and replaced by 11 0 220 (0 490 613)**

6. **0490599** Adapter

   NOTE: **(test adapter for petrol engine: M70 Discontinuation and replaced by 11 0 220 (0 490 613)**

7. **0490600** Adapter

   NOTE: **(Test adapter extension) Discontinuation and replaced by 11 0 220 (0 490 613)**

cardiagn.com

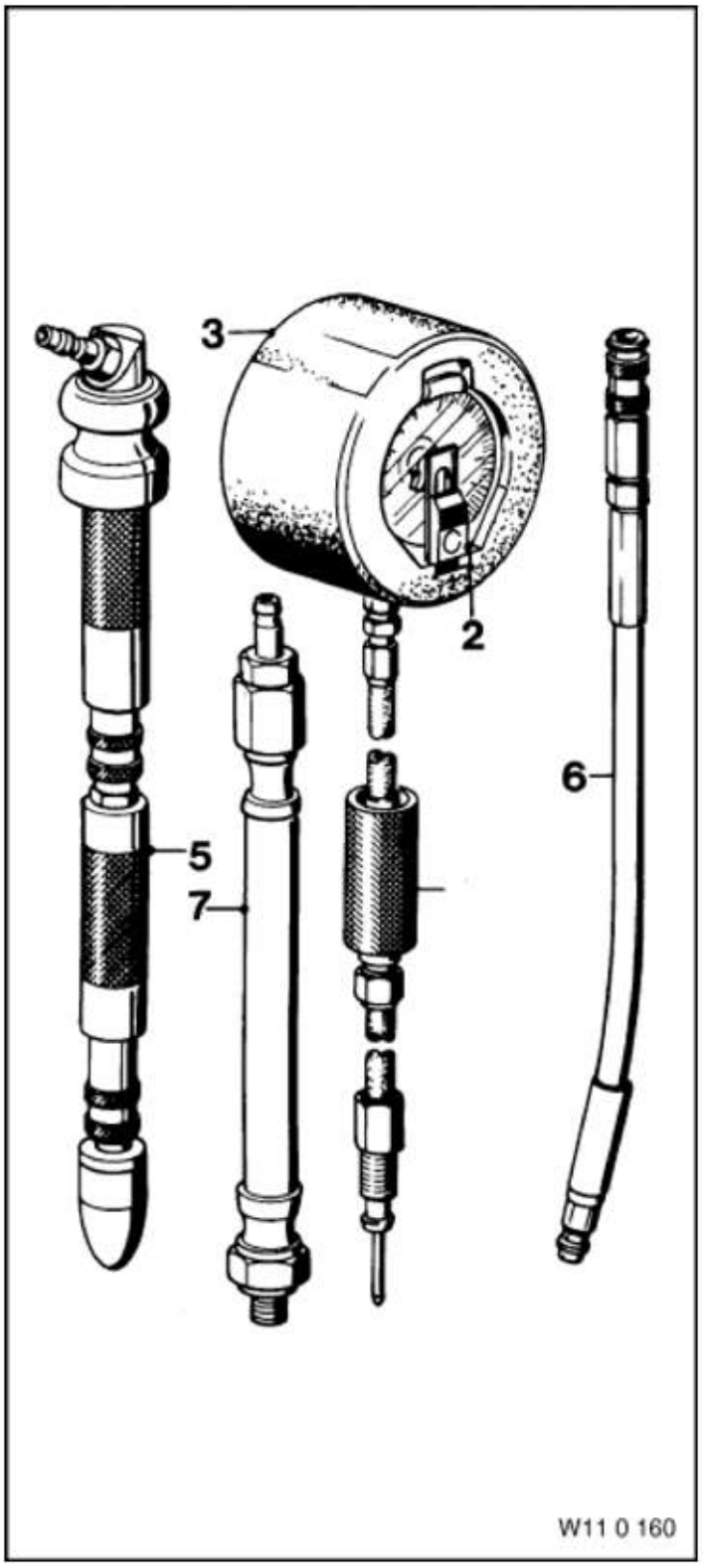


Fig. 149: Identifying Compression Tester (0490593)
Courtesy of BMW OF NORTH AMERICA, INC.

0490614 COMPRESSION TESTER

0490614 110221 Compression tester Minimum set: Mechanical tools AM

NOTE: **(Compression tester) For diesel engines.**

cardiagn.com

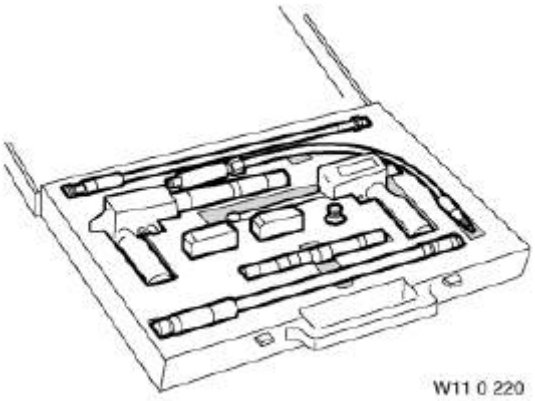


Fig. 150: Identifying Compression Tester (0490614)
Courtesy of BMW OF NORTH AMERICA, INC.

0490613 COMPRESSION TESTER

0490613 110220 Compression tester Minimum set: Mechanical tools AM

NOTE: **(compression pressure testing set) For all petrol and diesel engines.**

SI number

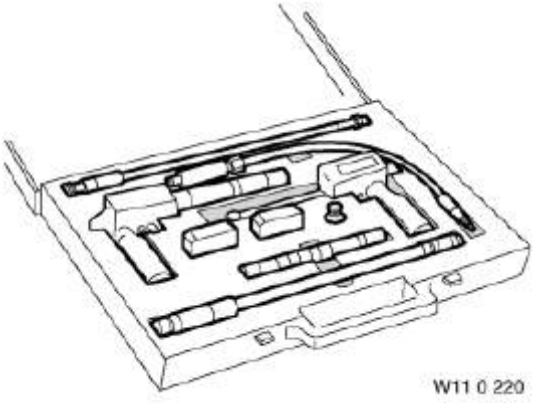


Fig. 151: Identifying Compression Tester (0490613)
Courtesy of BMW OF NORTH AMERICA, INC.

01 09 92 (558)

Consisting of:

2 = 0493634 Case

NOTE: **With foam insert for recording compression tester**

2 = 0494517 Adapter

NOTE: **Measuring "absolute compression" at all cylinders. Engine: W17**

16 = 0495279 Adapter

NOTE: **M67, M67TU engine**

4 = 0490614 Compression tester

NOTE: **(Compression tester) For diesel engines.**

cardiagn.com

4 = 0490615 Sensor

NOTE: **(Test probe) For recording compression testers 11 0 221 and 11 0 160 / engine: M21, M41, M47, M51, M57, M57T2**

4 = 0490616 Card

NOTE: **(Cards) 100 pieces For recording compression tester 11 0 221**

4 = 0490617 Compression tester

NOTE: **(Compression tester) For petrol engines.**

4 = 0490618 Hose

NOTE: **(Extension hose) For rubber tapered section with fitting 11 0 228**

4 = 0490619 Sensor

NOTE: **(Test probe) For recording compression testers 11 0 224 and 11 0 160 / engine: M10, M20, M30, M40, M42, M43, M44, M50, M52, M60, M62, M70, M73, N62, S50US, S52US, S62**

4 = 0490620 Sensor

NOTE: **(Test probe) For recording compression testers 11 0 224 and 11 0 160 / engine: S14, S38, S50 - Replaced by 11 0 235 (0 493 129)**

4 = 0490621 Tapered section

NOTE: **(Rubber tapered section) For recording compression testers 11 0 224 and 11 0 160.**

4 = 0490622 Card

NOTE: **(Cards) 100 pieces For recording compression tester 11 0 224**

4 = 0490625 Valve

NOTE: **(Non-return valve)**

4 = 0490626 Filter

NOTE: **(Filter) 3 x 3 mm**

9 = 0493129 Sensor

NOTE: **(Test probe, screw-in) For measuring "absolute compression" at all cylinders, engine: S14, S38, S50B30, S50B32, S50US, S52US, S54, S85**

2 = 0493387 Sensor

NOTE: **(Test probe) For recording compression tester 11 0 221 or DIS pressure sensor / engine: M47, M57, M57TU, M57T2**

0491080 CONNECTION

cardiagn.com

0491080 117330 Connection AM

NOTE: **(Test connection and modified oil filter key) to measure the oil pressure. Beginning from 03/2011 only available as oil filter key 11 7 331 (0491081). Oil pressure measurement with oil pressure switch.**

Storage Location

A4

B4

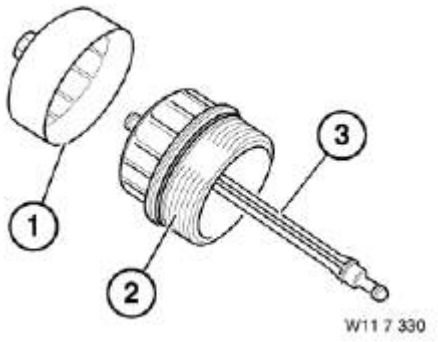


Fig. 152: Identifying Connection (0491080)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number

01 21 00 (642)

Consisting of:

1. **0491081** Oil filter wrench
2. **0491082** Lid

   NOTE: **(Oil filter cover with connection thread M12)**

3. **0491083** Rod

   NOTE: **(Center rod)**

0490657 CONNECTION

0490657 111014 Connection AM

NOTE: **(Air connection with reducer) Engine: M10**

cardiagn.com

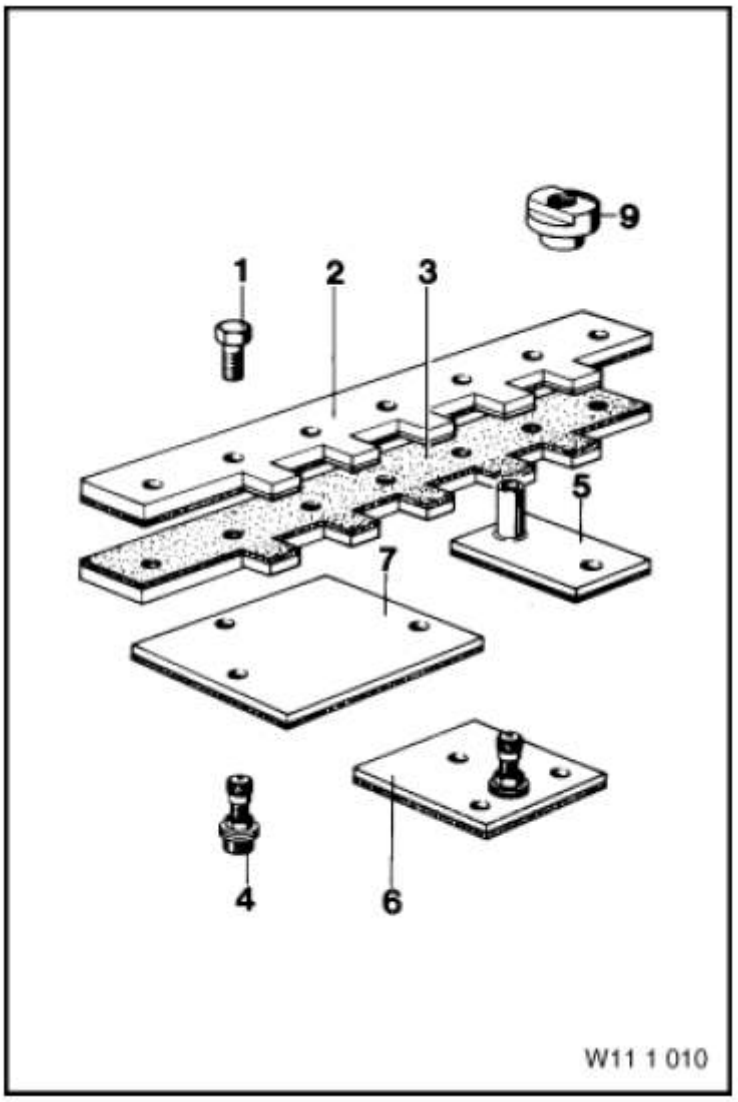


Fig. 153: Identifying Connection (0490657)
Courtesy of BMW OF NORTH AMERICA, INC.

0490715 CONNECTION

0490715 111113 Connection AM

NOTE: (Air connection)

Fig. 154: Identifying Connection (0490715)
Courtesy of BMW OF NORTH AMERICA, INC.

0490679 CONNECTION

0490679 111036 Connection AM

NOTE: (Air connection)

Fig. 155: Identifying Connection (0490679)
Courtesy of BMW OF NORTH AMERICA, INC.

0491105 CONNECTION

0491105 118004 Connection AM

cardiagn.com

NOTE: **For compressed air in spark plug bore holes.**

0490659 CONNECTION

0490659 111016 Connection AM

NOTE: **(Air connection) Engine: M30**

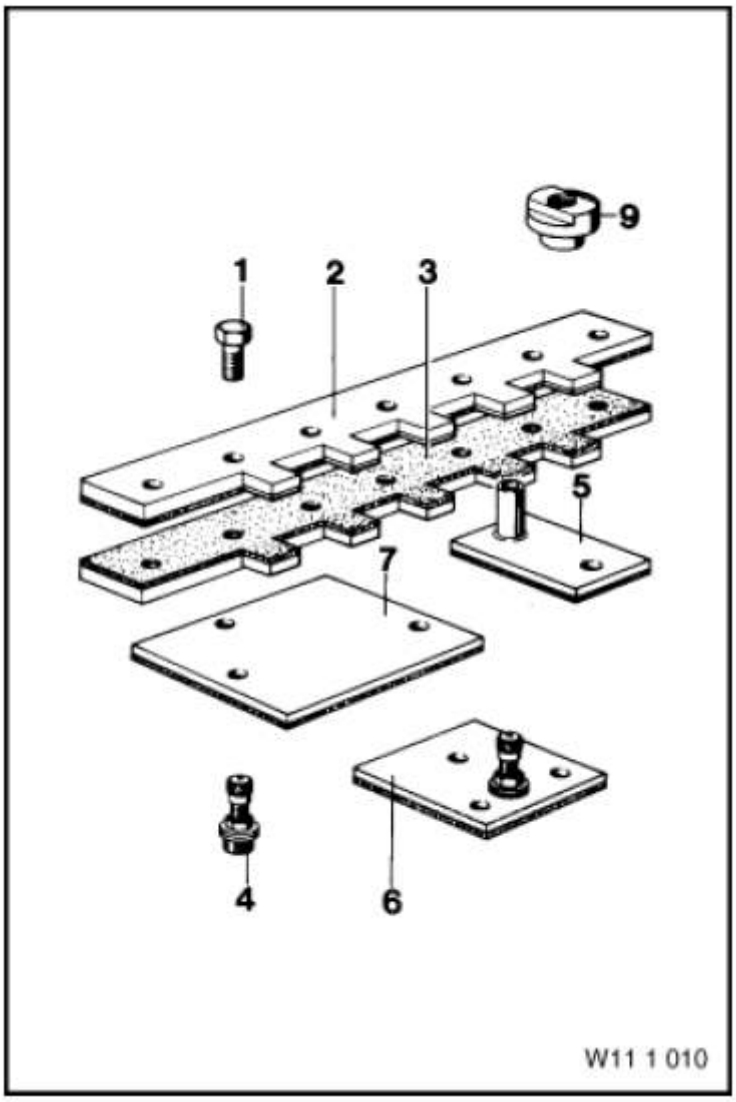


Fig. 156: Identifying Connection (0490659)
Courtesy of BMW OF NORTH AMERICA, INC.

0491087 CONNECTION

0491087 117350 Connection Mechanical tool

NOTE: **For pressurizing the VANOS adjuster with compressed air during installation**

Storage Location

X2

SI number

01 07 95 (964)

Fig. 157: Identifying Connection (0491087)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0493380 CONNECTOR

0493380 116480 Connector Minimum set: Mechanical tools Mechanical tool

NOTE: **For turning over engine at crankshaft hub (vibration absorber) when adjusting valve timing**

Storage Location

B7

SI number

01 11 98 (338)

Fig. 158: Identifying Connector (0493380)
Courtesy of BMW OF NORTH AMERICA, INC.

0493430 CONNECTOR

0493430 117130 Connector Mechanical tool

NOTE: **For compressed air hose for pressurizing the VANOS unit during installation**

Storage Location

X1

SI number

01 23 98 (390)

Fig. 159: Identifying Connector (0493430)
Courtesy of BMW OF NORTH AMERICA, INC.

0491110 CONTAINER

0491110 119100 Container Mechanical tool

NOTE: **(Container) Plastic bottle with hose for checking the cooling system for gas leak tightness**

Fig. 160: Identifying Container (0491110)
Courtesy of BMW OF NORTH AMERICA, INC.

0490641 COVER

0490641 110314 Cover AM

NOTE: **(Cover for water pump connection) Engine: M43 Only available as part of complete set**

0490643 COVER

0490643 110316 Cover AM

cardiagn.com

NOTE: **(Cover for heater connection) available as part of complete set only**

0495115 COVER

0495115 115210 Cover Mechanical tool

NOTE: **(Protective cover) For injection nozzle bores on cylinder head.**

Storage Location

B71

SI number

01 02 05 (173)

Fig. 161: Identifying Cover (0495115)
Courtesy of BMW OF NORTH AMERICA, INC.

0490658 COVER

0490658 111015 Cover AM

NOTE: **(cover for branch flange) Engine: M10**

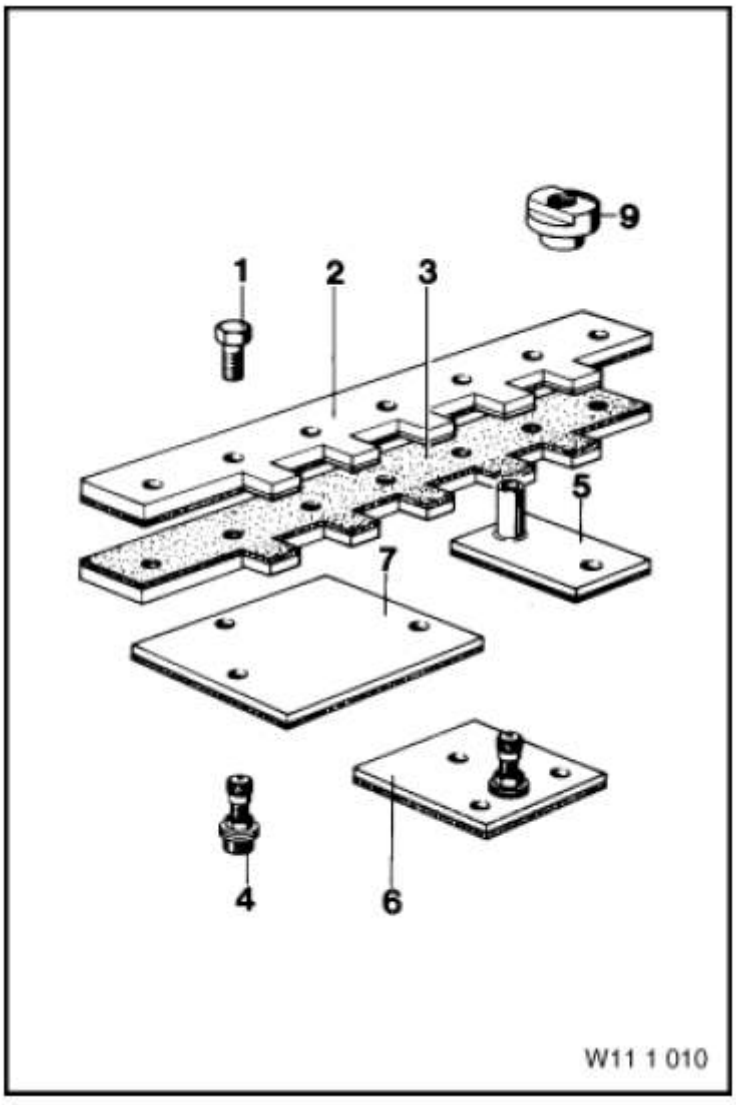


Fig. 162: Identifying Cover (0490658)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0490642 COVER

0490642 110315 Cover AM

NOTE: (Cover for radiator connection with valve) Engine: M43 Only available as part of complete set

0490660 COVER

0490660 111017 Cover AM

NOTE: (cover for branch flange) Engine: M30

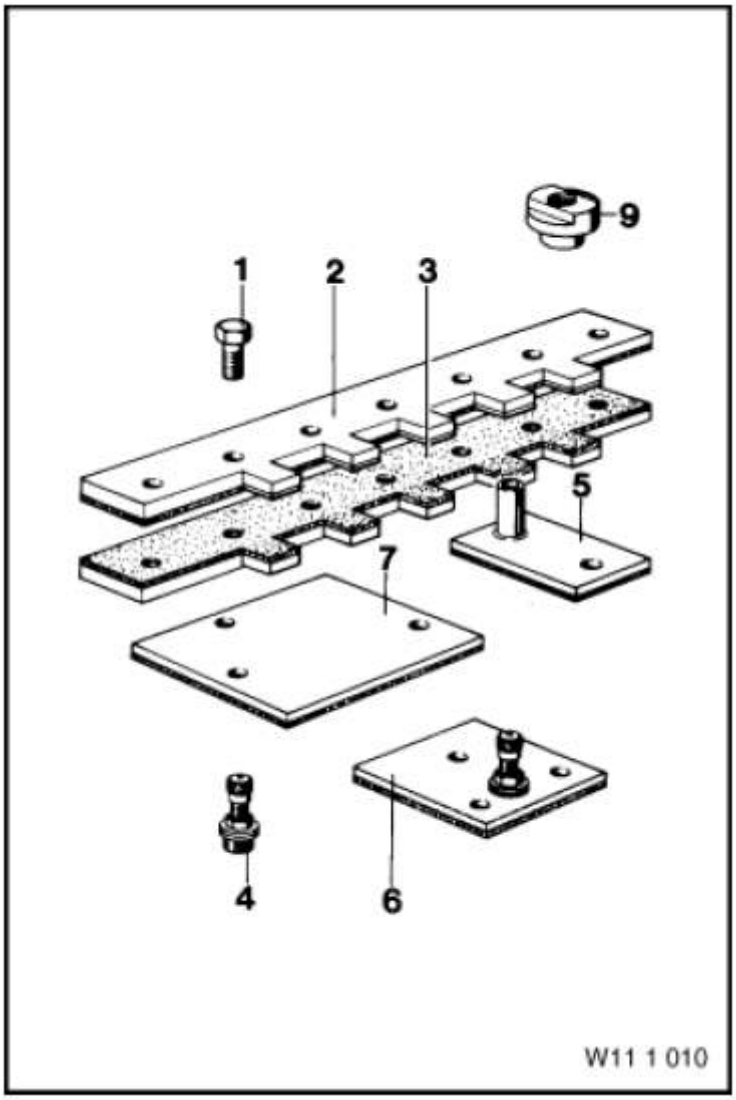


Fig. 163: Identifying Cover (0490660)
Courtesy of BMW OF NORTH AMERICA, INC.

0495116 COVER

0495116 115220 Cover Mechanical tool

NOTE: (Protective covers) For throttle valve intake assembly (10x)

Storage Location

B71

cardiagn.com

SI number

01 02 05 (173)

Fig. 164: Identifying Cover (0495116)
Courtesy of BMW OF NORTH AMERICA, INC.

0495133 COVER

0495133 115390 Cover Mechanical tool

NOTE: **(Protective cover (10 pcs.)) For spark plug holes in cylinder heads.**

Storage Location

B71

SI number

01 02 05 (173)

Fig. 165: Identifying Cover (0495133)
Courtesy of BMW OF NORTH AMERICA, INC.

0490781 COVER

0490781 111463 Cover AM

NOTE: **For coolant pump connection**

Fig. 166: Identifying Cover (0490781)
Courtesy of BMW OF NORTH AMERICA, INC.

0490677 COVER

0490677 111034 Cover AM

NOTE: **(Cover for branch flange)**

Fig. 167: Identifying Cover (0490677)
Courtesy of BMW OF NORTH AMERICA, INC.

0490667 COVER

0490667 111024 Cover AM

NOTE: **(cover for branch flange) Engine: M20**

cardiagn.com

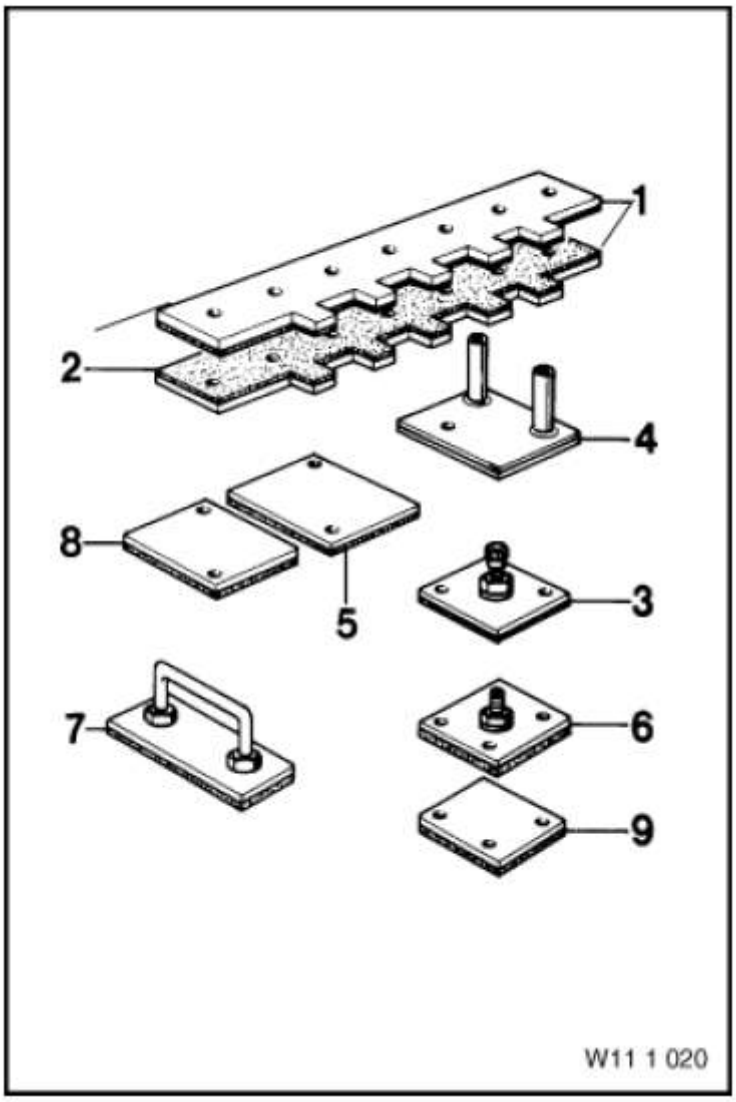


Fig. 168: Identifying Cover (0490667)
Courtesy of BMW OF NORTH AMERICA, INC.

0490678 COVER

0490678 111035 Cover AM

NOTE: (Cover for connection heating)

Fig. 169: Identifying Cover (0490678)
Courtesy of BMW OF NORTH AMERICA, INC.

0490901 DEVICE

0490901 113020 Device Mechanical tool

NOTE: For barring the camshaft and the crankshaft when adjusting the valves

Storage Location

Y3

Y4

Fig. 170: Identifying Device (0490901)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0495117 DEVICE

0495117 115230 Device AM

NOTE: **(Pressure testing fixture) For testing cylinder heads for leaks.**

SI number

01 02 05 (173)

Consisting of:

1. 0495146 Plate

   NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

   Fig. 171: Identifying Device (0495117)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. 0495147 Gasket

   NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

3. 0495148 Plate

   NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

4. 0495149 Gasket

   NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

5. 0495150 Plate

   NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

6. 0495151 Gasket

   NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

7. 0495152 Screw

   NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

0496672 DEVICE

0496672 117100 Device Mechanical tool

NOTE: **For pressing down the second cylinder and currentless (dis)assembly of the**

cardiagn.com

exhaust camshaft.

Storage Location

A27

SI number

01 18 09 (578)

Fig. 172: Identifying Device (0496672)
Courtesy of BMW OF NORTH AMERICA, INC.

0490960 DEVICE

0490960 113261 Device AM

NOTE: **(Mounting device). Beginning from 10/2010 only available as tool set 11 3 260 (0490959).**

Fig. 173: Identifying Device (0490960)
Courtesy of BMW OF NORTH AMERICA, INC.

0490975 DEVICE

0490975 113360 Device AM

NOTE: **For pressing in the chain tensioner piston for locking and releasing the chain tensioner**

Storage Location

B1

C1

SI number

01 09 91 (416)

Fig. 174: Identifying Device (0490975)
Courtesy of BMW OF NORTH AMERICA, INC.

0496183 DEVICE

0496183 118890 Device AM

NOTE: **(Pressure testing fixture) For leakage test on cylinder head.**

SI number

01 05 07 (353)

Consisting of:

1. **0496184** Plate

NOTE: **(Base plate with gasket)**

cardiagn.com

2. 0496185 Plate

NOTE: **(Adapter plate with valve) Only available as part of complete tool set 11 8 890 -> (83 30 0 496 183).**

Fig. 175: Identifying Device (0496183)
Courtesy of BMW OF NORTH AMERICA, INC.

3. 0496186 Screw

NOTE: **(Set of screws) Can only be ordered as part of complete tool 11 9 660 = 0495955**

4. 0496187 Gasket

NOTE: **(Gasket for base plate 11 8 891) Only available as part of complete tool set 11 8 890 -> (83 30 0 496 183).**

5. 0496188 Gasket

NOTE: **(Gasket for adapter plate 11 8 892) Only available as part of complete tool set 11 8890 -> (83 30 0 496 183).**

0493243 DEVICE

0493243 116180 Device Minimum set: Mechanical tools AM

NOTE: **For preinstalling the secondary chain wheels with chain on the camshafts**

Storage Location

B9

C9

SI number

01 05 98 (305)

Fig. 176: Identifying Device (0493243)
Courtesy of BMW OF NORTH AMERICA, INC.

0491007 DEVICE

0491007 114070 Device Mechanical tool

NOTE: **For installing the dipstick guide tube**

Fig. 177: Identifying Device (0491007)
Courtesy of BMW OF NORTH AMERICA, INC.

0496138 DEVICE

0496138 118820 Device AM

NOTE: **(Pressure testing fixture) For checking crankcase for leaks.**

cardiagn.com

SI number

01 05 07 (353)

Consisting of:

1. **0496173** Plate

   NOTE: **(Cover plate 1) Only available as part of complete tool set 11 8 820 (= 83 30 0 496 138).**

   Fig. 178: Identifying Device (0496138)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. **0496174** Plate

   NOTE: **(Cover plate 2) Only available as part of complete tool set 11 8 820 (= 83 30 0 496 138).**

3. **0496175** Plate

   NOTE: **(Cover plate 3) Only available as part of complete tool set 11 8 820 (= 83 30 0 496 138).**

4. **0496176** Plug

   NOTE: **Only available as part of complete tool set 11 8 820 (= 83 30 0 496 138).**

5. **0496177** Bolt

   NOTE: **(Stud bolt) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

6. **0496178** Screw

   NOTE: **(Set of screws) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

7. **0496179** Gasket

   NOTE: **(Gasket for cover plate 1) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

8. **0496180** Gasket

   NOTE: **(Gasket for cover plate 2) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

9. **0496181** Gasket

   NOTE: **(Gasket for cover plate 3) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

0490745 DEVICE

0490745 111370 Device Mechanical tool

cardiagn.com

NOTE: **For fitting the oil dipstick guide tube in the crankcase / model year: 80 to 83**

Fig. 179: Identifying Device (0490745)
Courtesy of BMW OF NORTH AMERICA, INC.

0490914 DEVICE

0490914 113091 Device AM

NOTE: **(Holding fixture with inserts)**

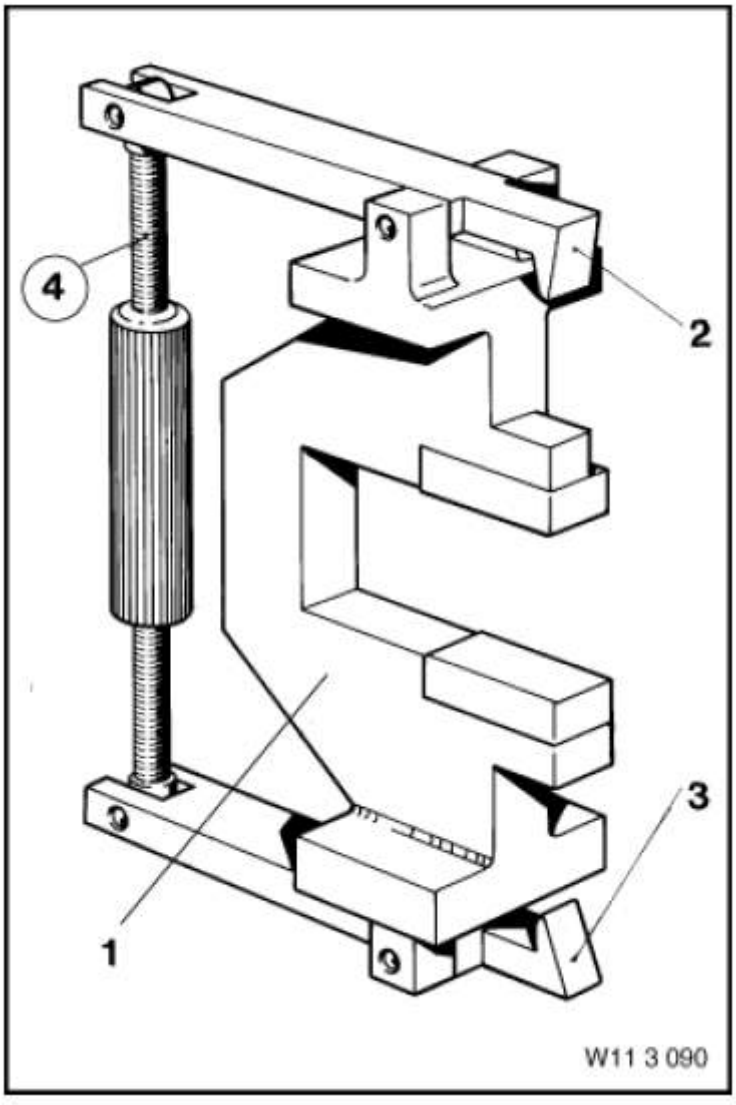


Fig. 180: Identifying Device (0490914)
Courtesy of BMW OF NORTH AMERICA, INC.

0495739 DEVICE

0495739 118550 Device Minimum set: Mechanical tools AM

NOTE: **(Locking device) For holding the bearing strips in place when fitting intake camshaft.**

Storage Location

C19

SI number

cardiagn.com

01 20 06 (299)

Consisting of:

1. 0495740 Tool

Fig. 181: Identifying Device (0495739)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Tool to press down) discontinued, available as part of set of special tools only**

2. 0495741 Screw

NOTE: **(Knurled screw (4 pieces))**

3. 0495742 Synchronizing key

NOTE: **Thrust piece (1 piece)**

0495520 DEVICE

0495520 110470 Device AM

NOTE: **(Pressure testing fixture) For sealing coolant openings when pressure-testing cylinder head on watertightness.**

SI number

01 04 06 (246)

Consisting of:

1. 0495521 Plate

NOTE: **(Base plate with gasket) Only to be ordered via complete tool set 11 0 470 (83 30 0 495 520) - as of 21.08.12.**

Fig. 182: Identifying Device (0495520)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0495522 Gasket

NOTE: **(Gasket for base plate) Only to be ordered via complete tool set 11 0 470 (83 30 0 495 520) - as of 21.08.12.**

3. 0495523 Plate

NOTE: **(Adapter plate with gasket and valve) Only available as part of complete tool set 11 0 470 (83 30 0 495 520).**

4. 0495524 Gasket

NOTE: **(Gasket for adapter plate) Only to be ordered via complete tool set 11 0 470 (83 30 0 495 520) - as of 21.08.12.**

cardiagn.com

5. 0495525 Screw

NOTE: **(Set of screws) Only available as part of complete tool set 11 0 470 (83 30 0 495 520).**

0490736 DEVICE

0490736 111300 Device AM

NOTE: **For driving in the needle bearing in the crankcase**

Storage Location

X7

Consisting of:

1. 0490737 Mandrel

NOTE: **(Drift)**

2. 0490738 Holding sleeve

NOTE: **(Guide sleeve) Replaced by 00 9 120 (0 490 504)**

Fig. 183: Identifying Device (0490736)
Courtesy of BMW OF NORTH AMERICA, INC.

0493971 DEVICE

0493971 119340 Device Minimum set: Mechanical tools AM

NOTE: **(Device) For tensioning timing chain when adjusting timing**

Storage Location

B43

SI number

01 01 01 (662)

Consisting of:

1. 0494032 Screw

NOTE: **Available only as a complete tool set 11 9 340 = 83 30 0 493 971 - as of 29.11.2011**

Fig. 184: Identifying Device (0493971)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0494033 Spindle

NOTE: **Available only as a complete tool set 11 9 340 = 83 30 0 493 971 - as of 29.11.2011**

cardiagn.com

0490993 DEVICE

0490993 113430 Device Mechanical tool

NOTE: **(Turning device) For turning installed camshaft into removal position**

Storage Location

C11

SI number

01 05 92 (507)

Fig. 185: Identifying Device (0490993)
Courtesy of BMW OF NORTH AMERICA, INC.

0495118 DEVICE

0495118 115240 Device AM

NOTE: **(Press down device) For pressing down the camshaft when removing or fitting.**

SI number

01 02 05 (173)

Consisting of:

1. 0495154 Basic body

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 5 240 (83 30 0 495 118) - as of 13.01.12**

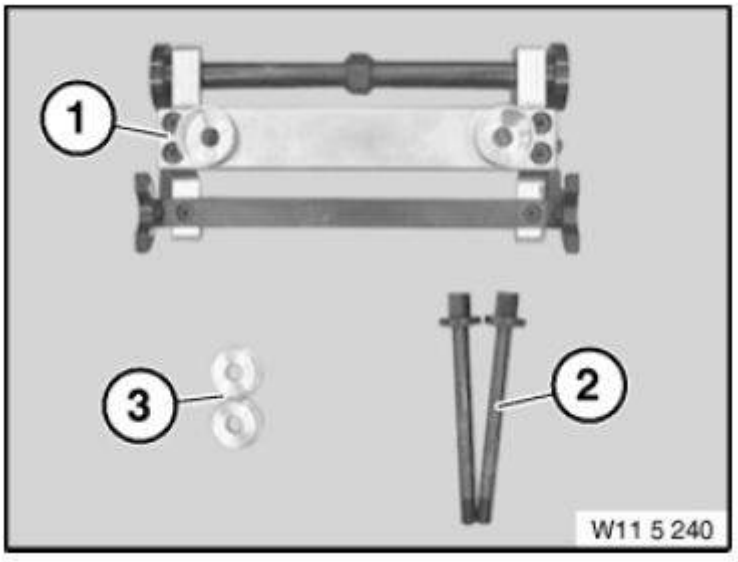


Fig. 186: Identifying Device (0495118)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0495155 Screw

NOTE: **Available only as a complete tool set 11 5 240 (83 30 0 495 118) - as of 13.01.12**

cardiagn.com

3. 0495156 Adapter

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 5 240 (83 30 0 495 118) - as of 13.01.12**

0491026 DEVICE

0491026 114300 Device AM

NOTE: **(Device/engine identification) to imprint the engine number and engine identification**

Consisting of:

1 = 0491027 Holder

NOTE: **(Die holder) engine: M50, M52**

2 = 0491028 Die-plate

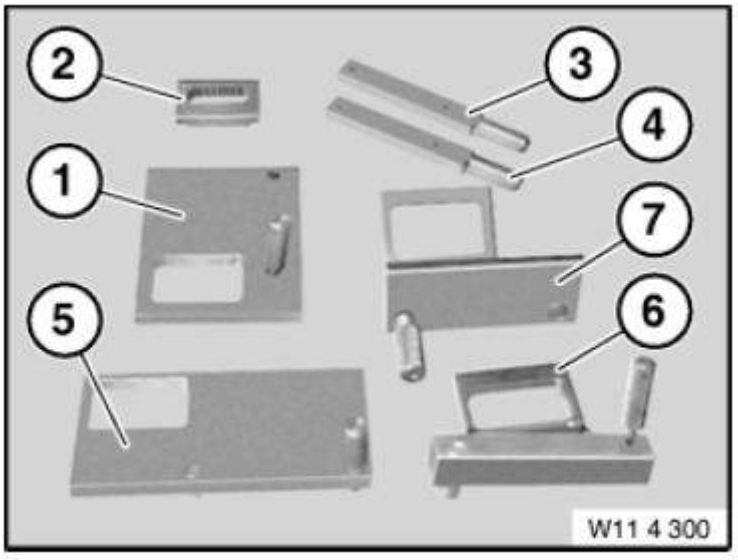


Fig. 187: Identifying Device (0491026)
Courtesy of BMW OF NORTH AMERICA, INC.

3 = 0491029 Punch element

NOTE: **(Embossing stamps 0...9, separate embossing stamps) 0...9, list digits individually**

4 = 0491030 Punch element

NOTE: **(Embossed letters) embossed letters A, E, S Indication of the letter is required engine: M70, M73 - letter A, S engine: M40, M43 - letter E engine: M42, M44, M50, M52, M60, M62 - letter S**

5 = 0493371 Holder

NOTE: **(Die holder) engine: M40, M42, M43, M44**

6 = 0493372 Holder

cardiagn.com

NOTE: **(Die holder) engine: M60, M62**

7 = **0493373** Holder

NOTE: **(Die holder) engine: M70, M73**

9 = **0493374** Case

NOTE: **(Case)**

0490982 DEVICE

0490982 113390 Device AM

Replaced by: 83300493548

NOTE: **(Device) For tensioning the primary chain when adjusting the timing - Replaced by 11 4 230 (0 493 548)**

SI number

01 05 92 (507)

Consisting of:

3 = **0493623** Holding sleeve

Fig. 188: Identifying Device (0490982)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Replaced by 11 4 230 (0 493 548)**

1 = **0490983** Holding sleeve

NOTE: **Replaced by 11 3 393**

2 = **0490984** Spindle

NOTE: **Replaced by 11 4 230 (0 493 548)**

0493581 DEVICE

0493581 118130 Device Mechanical tool

NOTE: **(pressure testing fixture) For leakage test of the cylinder head**

SI number

01 12 99 (452)

Fig. 189: Identifying Device (0493581)
Courtesy of BMW OF NORTH AMERICA, INC.

0495003 DEVICE

0495003 114270 Device Minimum set: Mechanical tools Mechanical tool

cardiagn.com

Replaced by: 83300496671

NOTE: **(Assembly and disassembly tool) For removing and installing pressure spring for intermediate lever. Is replaced by 11 7 110 (0 496 671)**

Storage Location

B51

C51

Fig. 190: Identifying Device (0495003)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number

01 17 04 (130)

0494366 DEVICE

0494366 119001 Device Minimum set: Mechanical tools AM

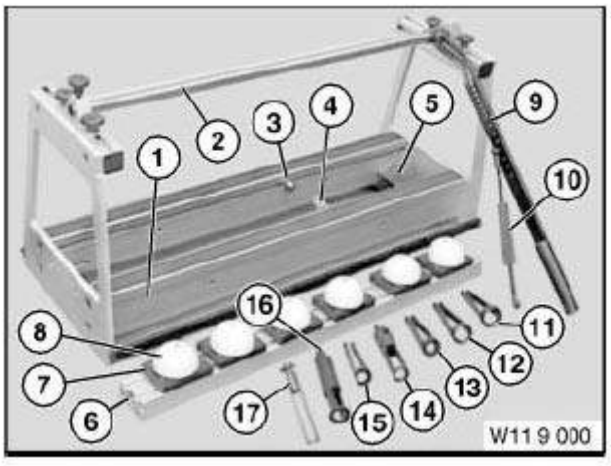


Fig. 191: Identifying Device (0494366)
Courtesy of BMW OF NORTH AMERICA, INC.

0496442 DEVICE

0496442 114320 Device AM

Replaced by: 83302318429

NOTE: **(holding fixture) For removing and installing timing chains. Replaced by 83 30 2 318 429.**

Storage Location

B26

C26

SI number

01 08 08 (445)

cardiagn.com

Fig. 192: Identifying Device (0496442)
Courtesy of BMW OF NORTH AMERICA, INC.

0490673 DEVICE

0490673 111030 Device AM

NOTE: (Device) For pressure-testing the cylinder head.

Consisting of:

1. 0490674 Strip

   NOTE: (Sealing strip with rubber padding)

2. 0490675 Strip

   NOTE: (Sealing strip with rubber padding)

3. 0490676 Upholstery

   NOTE: (Rubber padding (2 pieces))

4. 0490677 Cover

   NOTE: (Cover for branch flange)

5. 0490678 Cover

   NOTE: (Cover for connection heating)

6. 0490679 Connection

   NOTE: (Air connection)

7. 0490680 Screw

   NOTE: (Screw plugs (2 x))

Fig. 193: Identifying Device (0490673)
Courtesy of BMW OF NORTH AMERICA, INC.

0490900 DEVICE

0490900 113010 Device Mechanical tool

NOTE: For uniformly pressing down the camshaft when releasing and tightening the camshaft bearing cap

Fig. 194: Identifying Device (0490900)
Courtesy of BMW OF NORTH AMERICA, INC.

0491054 DEVICE

0491054 115080 Device Mechanical tool

cardiagn.com

NOTE: **(Holding fixture) For fixing the camshaft in place when adjusting the valve timing.**

Storage Location

Y7

SI number

01 12 92 (606)

Fig. 195: Identifying Device (0491054)
Courtesy of BMW OF NORTH AMERICA, INC.

0490787 DEVICE

0490787 111470 Device AM

NOTE: **(Pressure testing fixture) For pressure-testing the cylinder head**

SI number

01 05 92 (507)

Consisting of:

1. 0490788 Strip

   NOTE: **(Sealing strip) With rubber seal (wide version) Only orderable as a complete tool set 11 1 470 (83 30 0 490 787) - as of 09.07.13.**

   Fig. 196: Identifying Device (0490787)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. 0490789 Strip

   NOTE: **(Sealing strip) With rubber seal (narrow version) - Replaced by 11 1 477 (0 490 794)**

3. 0490790 Plate

   NOTE: **(Sealing plate for cylinder row 1...4) Replaced by 11 1 493 (0 493 447)**

4. 0490791 Plate

   NOTE: **(Sealing plate for cylinder row 5...8) Replaced by 11 1 494 (0 493 448)**

5. 0490792 Rubber seal

   NOTE: **(Rubber seal for sealing strip 11 1 471) available as part of set of special tools only**

6. 0490793 Rubber seal

   NOTE: **(Rubber seal for sealing strip 11 1 472) Replaced by 11 1 478 (0 490 795)**

7. 0490794 Strip

cardiagn.com

NOTE: **(Sealing strip) With rubber seal (narrow version) Only available as part of complete set**

8. 0490795 Rubber seal

NOTE: **(Rubber seal for sealing strip 11 1 477) available as part of set of special tools only**

0490971 DEVICE

0490971 113320 Device Mechanical tool

NOTE: **For disconnecting the camshaft when adjusting the timing**

Storage Location

B6

SI number

01 09 91 (416)

Fig. 197: Identifying Device (0490971)
Courtesy of BMW OF NORTH AMERICA, INC.

0494362 DEVICE

0494362 119000 Device Minimum set: Mechanical tools AM

In conjunction with: 002300 = 0495187

NOTE: **(Cylinder head expander tool)**

Storage Location

Individual

SI number

01 03 02 (833)

Consisting of:

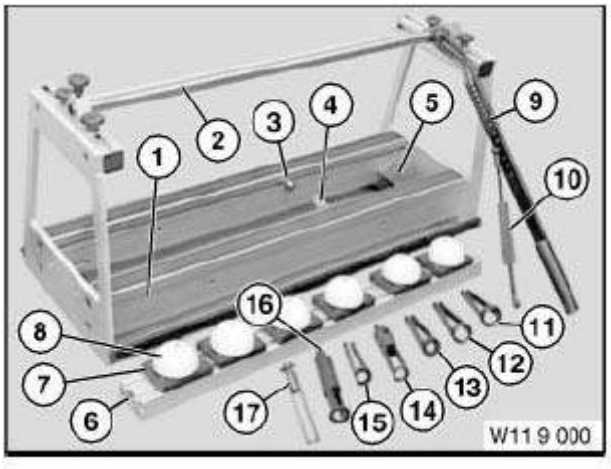


Fig. 198: Identifying Device (0494362)

cardiagn.com

1 = 0494366 Device
2 = 0494367 Rod
3 = 0494368 Adapter

NOTE: **(Sliding block)**

4 = 0494369 Tab
5 = 0494370 Quick fastener
6 = 0494371 Insert

NOTE: **(Aluminum strip)**

7 = 0494372 Shaped part

NOTE: **(Shaped part)**

8 = 0494373 Shaped part

NOTE: **(Shaped part) Shaped part made of plastic**

9 = 0494374 Lever
10 = 0494375 Hook
11 = 0494376 Basket

NOTE: **(Valve spring cage) Engine M41, M51, S50**

12 = 0494377 Basket

NOTE: **(Valve spring cage) Engine M43, M73**

13 = 0494378 Basket

NOTE: **(Valve spring cage) Engine M44, M52, M54, M56, M62, S52, S54, S62**

14 = 0494379 Basket

NOTE: **(Valve spring cage) Engine M47, M47TU, M57, M57TU, N40, N42, N62, N73**

15 = 0494380 Basket

NOTE: **(Valve spring cage) Engine M21, M40**

17 = 0495028 Basket

NOTE: **(Valve spring cage) Engine N52**

0493935 DEVICE

0493935 119230 Device Minimum set: Mechanical tools AM

NOTE: **(Pulling device) For RSS at front of engine block**

Storage Location

cardiagn.com

C43

SI number

01 01 01 (662)

Consisting of:

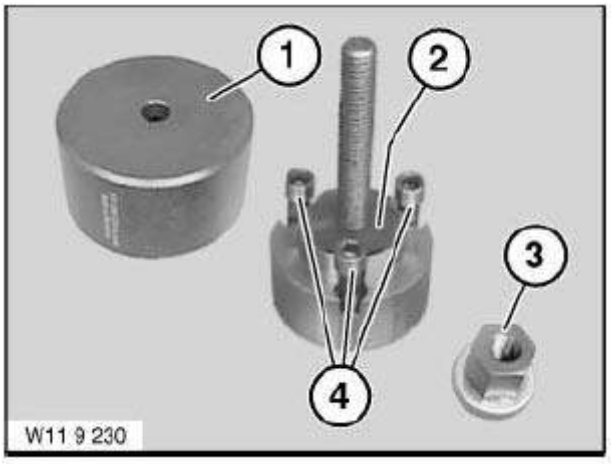


Fig. 199: Identifying Device (0493935)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0494021 Bush
2. 0494022 Spindle
3. 0494023 Nut
4. 0494024 Screw

NOTE: **(screws (3 x))**

5. 0496670 Spindle

NOTE: **N55**

0491009 DEVICE

0491009 114090 Device Mechanical tool

NOTE: **For installing the dipstick guide tube**

Fig. 200: Identifying Device (0491009)
Courtesy of BMW OF NORTH AMERICA, INC.

0490913 DEVICE

0490913 113090 Device AM

NOTE: **For aligning the camshaft**

Storage Location

Y9

Consisting of:

cardiagn.com

1. 0490914 Device

   NOTE: **(Holding fixture with inserts)**

2. 0490915 Claw

   NOTE: **(Claw A)**

3. 0490916 Claw

   NOTE: **(Claw B)**

4. 0490917 Spindle

   NOTE: **(spindle with nut)**

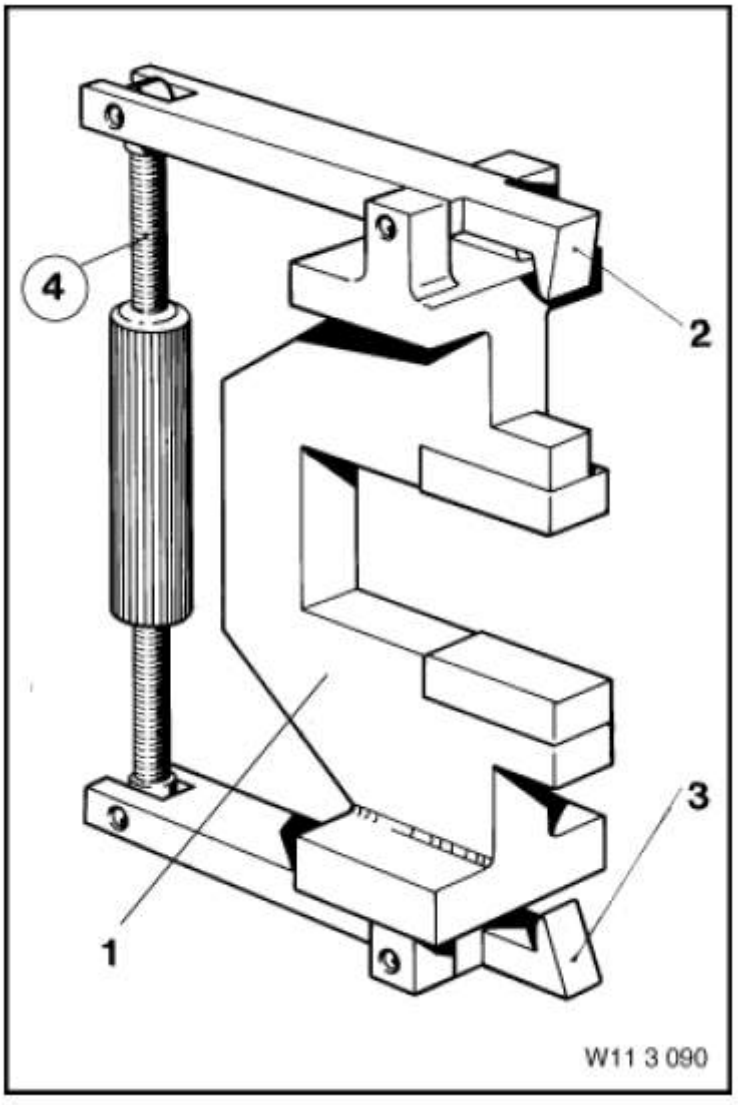


Fig. 201: Identifying Device (0490913)
Courtesy of BMW OF NORTH AMERICA, INC.

0490921 DEVICE

0490921 113110 Device AM

NOTE: **For barring the engine (single-row timing chain)**

cardiagn.com

Storage Location

Z1

Z2

Consisting of:

1. **0490922** Handle
2. **0490923** Shaped part

   NOTE: (Shaped part) Engine: M10

3. **0490924** Shaped part

   NOTE: (Shaped part) Engine: M10

4. **0490925** Shaped part

   NOTE: (Shaped part) Engine: M30

5. **0490926** Shaped part

   NOTE: (Shaped part) Engine: M30

6. **0490927** Nut

   NOTE: (Knurled nut) Replaced by 00 9 120 (0 490 504)

Fig. 202: Identifying Device (0490921)
Courtesy of BMW OF NORTH AMERICA, INC.

0495456 DEVICE

0495456 117040 Device AM

NOTE: (Pressure testing fixture) For sealing coolant openings when pressure-testing cylinder head on watertightness.

SI number

01 14 05 (198)

Consisting of:

1. **0495463** Plate

   NOTE: (Adapter plate (large) with gasket) Deletion, only available via tool set

Fig. 203: Identifying Device (0495456)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **0495464** Gasket

   NOTE: (Gasket for 11 7 041) discontinued, available as part of set of special tools only

cardiagn.com

3. **0495465** Plate

NOTE: **(Adapter plate (small) with gasket) discontinued, available as part of set of special tools only**

4. **0495466** Gasket

NOTE: **(Gasket for 11 7 043) discontinued, available as part of set of special tools only**

5. **0495467** Screw

NOTE: **(Set of screws) discontinued, available as part of set of special tools only**

0495129 DEVICE

0495129 115350 Device AM

NOTE: **(Retainer device) For retaining and pre-tensioning the timing chains.**

Storage Location

B71

SI number

01 02 05 (173)

Consisting of:

1. **0495176** Device

NOTE: **(Holding device cylinder 1-5) Liquidation of existing inventory and then available only as a complete tool set 11 5 350 = 83 30 0 495 129 - as of 29.11.2011**

Fig. 204: Identifying Device (0495129)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **0495177** Device

NOTE: **(Holding device cylinder 6-10) Liquidation of existing inventory and then available only as a complete tool set 11 5 350 = 83 30 0 495 129 - as of 29.11.2011**

0490959 DEVICE

0490959 113260 Device AM

NOTE: **For uniformly pressing down the camshaft (with bearing cap) when releasing and tightening the camshaft bearing cap**

SI number

01 05 89 (099)

Consisting of:

cardiagn.com

1. 0490960 Device

Fig. 205: Identifying Device (0490959)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Mounting device). Beginning from 10/2010 only available as tool set 11 3 260 (0490959).**

2. 0490961 Screw

NOTE: **(Mounting bolt (2 x))**

0490826 DEVICE

0490826 112110 Device AM

Replaced by: 83300490504

NOTE: **For retightening the connecting rod and cylinder head bolts - Replaced by 00 9 120 (0 490 504)**

Consisting of:

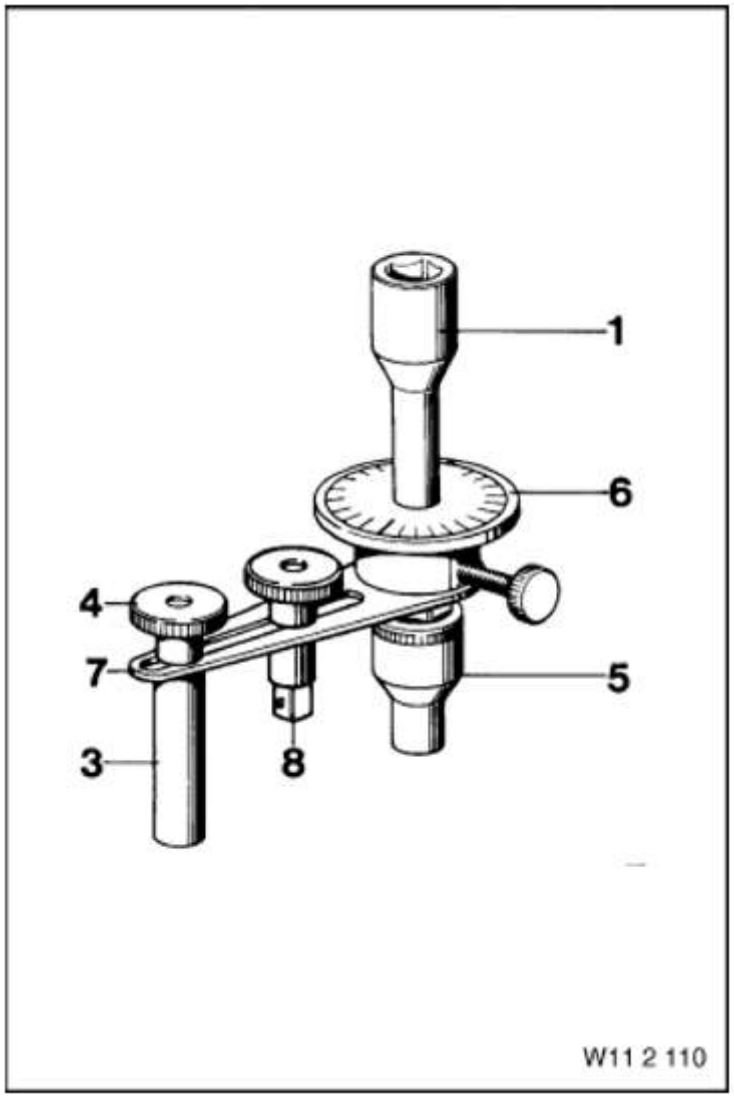


Fig. 206: Identifying Device (0490826)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

1. 0490827 Extension

   NOTE: (Extension 1/1") Replaced by 00 9 120 (0 490 504)

2. 0490828 Washer

   NOTE: (Graduated disc 180Â°) Replaced by 00 9 120 (0 490 504)

3. 0490829 Holding sleeve

   NOTE: (Guide sleeve) Replaced by 00 9 120 (0 490 504)

4. 0490830 Nut

   NOTE: (Knurled nut) Replaced by 00 9 120 (0 490 504)

5. 0490831 Socket wrench insert

   NOTE: (Socket wrench insert WAF 10) Replaced by 00 9 120 (0 490 504)

6. 0490832 Washer

   NOTE: (Graduated disc up to 270Â°) Replaced by 00 9 120 (0 490 504)

7. 0490833 Tab

   NOTE: For counter-holding on the cylinder head Replaced by 00 9 120 (0 490 504)

8. 0490834 Adapter

   NOTE: (Adapter) Replaced by 00 9 120 (0 490 504)

0495176 DEVICE

0495176 115351 Device AM

NOTE: (Holding device cylinder 1-5) Liquidation of existing inventory and then available only as a complete tool set 11 5 350 = 83 30 0 495 129 - as of 29.11.2011

Fig. 207: Identifying Device (0495176)
Courtesy of BMW OF NORTH AMERICA, INC.

0494715 DEVICE

0494715 117420 Device AM

NOTE: (Pressure testing fixture) For checking the cylinder head for watertightness

Consisting of:

1. 0494725 Plate

   NOTE: (Sealing plate with rubber seal) Can no longer be ordered separately; only available as part of set 11 7 420 = 83 30 0 494 517.

cardiagn.com

2. 0494726 Plug

NOTE: **(Seal plug with clamps and hose). Can no longer be ordered separately; only available as part of set 11 7 420 = 83 30 0 494 517.**

3. 0494727 Screw

NOTE: **(Set of screws (10 x)) Can no longer be ordered separately; only available as part of set 11 7 420 = 83 30 0 494 715.**

4. 0495619 Screw

NOTE: **(Set of screws (10 pieces)) Can no longer be ordered separately; only available as part of set 11 7 420 = 83 30 0 494 517.**

0490576 DEVICE

0490576 110060 Device AM

NOTE: **(Pressure testing fixture) For crankcase**

Consisting of:

1. 0490577 Plate

NOTE: **(Cover plate) For water pump with valve**

2. 0490578 Bolt

NOTE: **(Stud bolts (14 x))**

Fig. 208: Identifying Device (0490576)
Courtesy of BMW OF NORTH AMERICA, INC.

0490761 DEVICE

0490761 111430 Device AM

NOTE: **For pressure-testing cylinder head**

SI number

01 05 89 (099)

Consisting of:

1. 0490762 Strip

NOTE: **(sealing strip) With 5 spigots and rubber seal - Engine: M42, M44, M50, M52, S54 sale of existing inventory, then available as part of set of special tools 11 1 430 = 83 30 0 490 761 only - as of 29.11.2011**

Fig. 209: Identifying Device (0490761)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0490763 Rubber seal

cardiagn.com

NOTE: **(rubber seal) For sealing strip 11 1 431 - Engine: M42, M44, M50, M52 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011**

3. 0490764 Strip

NOTE: **(sealing strip) With 7 spigots and rubber seal - Engine: M42, M44, M50, M52, S54 sale of existing inventory, then available as part of set of special tools 11 1 430 = 83 30 0 490 761 only - as of 29.11.2011**

4. 0490765 Rubber seal

NOTE: **(rubber seal) For sealing strip 11 1 433 - Engine: M42, M44, M50, M52 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011**

5. 0490766 Plate

NOTE: **(formed plate) With rubber seal - Engine: M42, M44 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011**

6. 0490767 Bridge

NOTE: **With rubber seal and 2 screws - engine: M42, M44 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011**

7. 0490768 Plug

NOTE: **(seal plugs) With valve and standard clip - Engine: M42, M44, M50, M52, S50 available as part of set of special tools only**

8. 0490769 Plug

NOTE: **(seal plugs and standard clip) Engine: M42, M44, M50, M52 available as part of set of special tools only**

9. 0490770 Tool

NOTE: **(standard parts)**
Engine: M42, M44, M50, M52 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011

0495049 DEVICE

0495049 114450 Device Mechanical tool

NOTE: **(Locating fixture) For securing sliding blocks during installation.**

Storage Location

A52

SI number

cardiagn.com

01 17 04 (130)

Fig. 210: Identifying Device (0495049)
Courtesy of BMW OF NORTH AMERICA, INC.

0490947 DEVICE

0490947 113190 Device Mechanical tool

NOTE: **(Holding fixture) For fixing the camshaft in place when adjusting the valve timing.**

Storage Location

B6

SI number

01 02 87 (721)

Fig. 211: Identifying Device (0490947)
Courtesy of BMW OF NORTH AMERICA, INC.

0491034 DEVICE

0491034 115011 Device AM

NOTE: **(Clamping bush) discontinued, available as part of set of special tools only**

Fig. 212: Identifying Device (0491034)
Courtesy of BMW OF NORTH AMERICA, INC.

0496132 DEVICE

0496132 118810 Device Minimum set: Mechanical tools AM

NOTE: **(Pulling device) For installing rear radial shaft seal.**

Storage Location

C24

SI number

01 05 07 (353)

Consisting of:

1. **0496133** Basic body

cardiagn.com

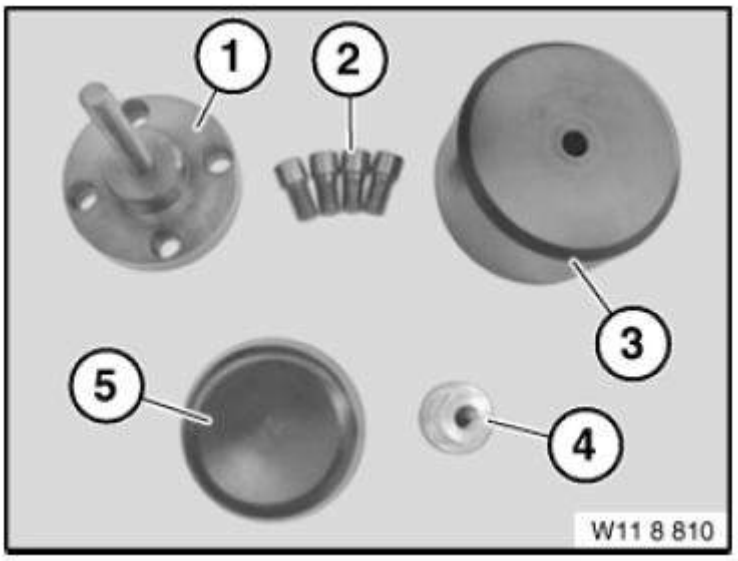


Fig. 213: Identifying Device (0496132)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 8 810 = 83 30 0 496 132 - as of 09.12.2011**

2. 0496134 Screw

NOTE: **(Screw set) Liquidation of existing inventory and then available only via complete tool set 11 8 810 = 83 30 0 496 132 - status 09.12.2011**

3. 0496135 Holding sleeve

NOTE: **(Thrust sleeve) Liquidation of existing inventory and then available only via complete tool set 11 8 810 = 83 30 0 496 132 - status 09.12.2011**

4. 0496136 Nut

NOTE: **(Nut with bearing) Liquidation of existing inventory and then available only via complete tool set 11 8 810 = 83 30 0 496 132 - status 09.12.2011**

5. 0496137 Holding sleeve

NOTE: **(Slip sleeve) Liquidation of existing inventory and then available only via complete tool set 11 8 810 = 83 30 0 496 132 - status 09.12.2011**

0491033 DEVICE

0491033 115010 Device AM

NOTE: **(Device) For toothed belt tensioner when removing water pump**

Storage Location

Y2

Consisting of:

1. 0491034 Device

NOTE: **(Clamping bush) discontinued, available as part of set of special tools**

cardiagn.com

only

Fig. 214: Identifying Device (0491033)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0491035 Screw

0496656 DEVICE

0496656 117190 Device AM

In conjunction with: 11 4 342; 11 4 344 = 0495724

NOTE: For water tightness check of cylinder head.

Fig. 215: Identifying Device (0496656)
Courtesy of BMW OF NORTH AMERICA, INC.

0495014 DEVICE

0495014 114340 Device AM

NOTE: (Pressure testing fixture) For pressure-testing cylinder head.

SI number

01 17 04 (130)

Consisting of:

1. 0495015 Plate

NOTE: (Base plate with gasket) Liquidation of existing inventory and then available only via complete tool set 11 4 340 = 83 30 0 495 014 - status 29.11.2011

Fig. 216: Identifying Device (0495014)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0495016 Plate

NOTE: (Plate with thrust piece) Available only as a complete tool set 11 4 340 = 83 30 0 495 014 - as of 29.11.2011

3. 0495017 Hose

NOTE: (Hose with air connection) Liquidation of existing inventory and then available only via complete tool set 11 4 340 = 83 30 0 495 014 - status 29.11.2011

4. 0495724 Plate

NOTE: (Adapter plate with valve) N54 Liquidation of existing inventory and then available only via complete tool set 11 4 340 = 83 30 0 495 014 - status 29.11.2011

cardiagn.com

5. 0495725 Screw

NOTE: **(Screw set) N54 sale of existing inventory then available as part of set of special tools 11 4 340 = 83 30 0 495 014 only - as of 29.11.2011**

0493444 DEVICE

0493444 111490 Device AM

NOTE: **(Pressure testing fixture) For pressure-testing the cylinder head for watertightness. Not available as complete special tool, only as separate components.**

SI number

01 23 98 (390)

Consisting of:

5 = 0493443 Screw

NOTE: **(Mounting bolts (9 pieces)) M6 x 20 From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available**

Fig. 217: Identifying Device (0493444)
Courtesy of BMW OF NORTH AMERICA, INC.

1 = 0493445 Strip

NOTE: **(Sealing strip cylinder row 1 - 4) From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available.**

2 = 0493446 Strip

NOTE: **(Sealing strip cylinder row 5 - 8) From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available**

3 = 0493447 Plate

NOTE: **(Sealing plate cylinder row 1 - 4) From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available**

4 = 0493448 Plate

NOTE: **(Sealing plate cylinder row 5 - 8) From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available**

0490972 DEVICE

0490972 113330 Device Mechanical tool

NOTE: **For uniformly pressing down the camshaft (with bearing cap) when releasing**

cardiagn.com

and tightening the camshaft bearing cap

SI number

01 09 91 (416)

Fig. 218: Identifying Device (0490972)
Courtesy of BMW OF NORTH AMERICA, INC.

0490730 DEVICE

0490730 111270 Device AM

NOTE: **For pressing in the radial shaft seal in the gear case cover**

Storage Location

X1

Consisting of:

1. 0490731 Nut

   NOTE: **Engine: M10**

2. 0490732 Nut

   NOTE: **(Nut) Engine: M30**

3. 0490733 Ring

   NOTE: **(Thrust ring) Engine: M10, M30, M42**

Fig. 219: Identifying Device (0490730)
Courtesy of BMW OF NORTH AMERICA, INC.

0491008 DEVICE

0491008 114080 Device Mechanical tool

Replaced by: 83300491007

NOTE: **For installation of the dipstick guide tube - Replaced by 11 4 070 (0 491 007)**

0490748 DEVICE

0490748 111400 Device AM

NOTE: **(Pressure testing fixture) For pressure-testing cylinder head. 09/2011 only separate components available - after which it will be discontinued.**

SI number

01 12 92 (606)

Consisting of:

3 = 0493756 Plate

cardiagn.com

Fig. 220: Identifying Device (0490748)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Sealing plate) For a leakage test of the cylinder head - engine: S54 09/2011 remaining inventories will be sold off and then no longer available.**

1 = 0490749 Plate

NOTE: **(Cover plate) Only S50 09/2011 remaining inventories will be sold off and then no longer available.**

2 = 0490750 Screw

NOTE: **(Screws (13 pieces)) Engine: M10, S54/S50 09/2011 remaining inventories will be sold off and then no longer available.**

2 = 0490751 Hose

NOTE: **(Sealing hose with clamp) Diameter 24 mm 09/2011 remaining inventories will be sold off and then no longer available.**

0495177 DEVICE

0495177 115352 Device AM

NOTE: **(Holding device cylinder 6-10) Liquidation of existing inventory and then available only as a complete tool set 11 5 350 = 83 30 0 495 129 - as of 29.11.2011**

Fig. 221: Identifying Device (0495177)
Courtesy of BMW OF NORTH AMERICA, INC.

0490735 DEVICE

0490735 111290 Device Mechanical tool

NOTE: **For holding the venting tube**

Storage Location

X8

Fig. 222: Identifying Device (0490735)
Courtesy of BMW OF NORTH AMERICA, INC.

0490962 DEVICE

0490962 113270 Device AM

NOTE: **For uniformly pressing down the camshaft (with bearing cap) when releasing and tightening the camshaft bearing cap**

SI number

01 01 90 (165)

cardiagn.com

Consisting of:

1. 0490963 Device

NOTE: **(Mounting device). Beginning from 10/2010 only available as tool set 11 3 260 (0490959).**

Fig. 223: Identifying Device (0490962)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0490964 Screw

NOTE: **(Mounting bolt)**

0493740 DEVICE

0493740 114381 Device AM

NOTE: **Available only as a complete tool set 11 4 380 (83 30 0 493 739) - as of 22.02.12.**

Fig. 224: Identifying Device (0493740)
Courtesy of BMW OF NORTH AMERICA, INC.

0490774 DEVICE

0490774 111450 Device AM

NOTE: **For pressure-testing cylinder head**

SI number

01 01 90 (165)

Consisting of:

1. 0490775 Plate

NOTE: **(Mounting plate) available as part of set of special tools only**

2. 0490776 Spindle

NOTE: **Only available as part of complete set**

3. 0490777 O-ring

NOTE: **Only available as part of complete set**

Fig. 225: Identifying Device (0490774)
Courtesy of BMW OF NORTH AMERICA, INC.

0491106 DEVICE

0491106 118020 Device AM

NOTE: **(device) For holding the engine in position during removal and installation of the transmission**

cardiagn.com

SI number

01 12 92 (606)

Consisting of:

1. **0491107** Holder

   NOTE: **(holder) Engine: S50/B30 Only available as part of complete set**

2. **0491108** Holder

Fig. 226: Identifying Device (0491106)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Holder) E36/M51/M52, E46/M52TU/M54, E85/M54, E46/M57TU Only available as part of complete set**

0490918 DEVICE

0490918 113100 Device AM

NOTE: **For barring the engine with two-row timing chain**

Storage Location

Y1

Y2

Consisting of:

1. **0490919** Claw

   NOTE: **(driver claw (2 pieces))**

2. **0490920** Screw

   NOTE: **(Knurled screw)**

cardiagn.com

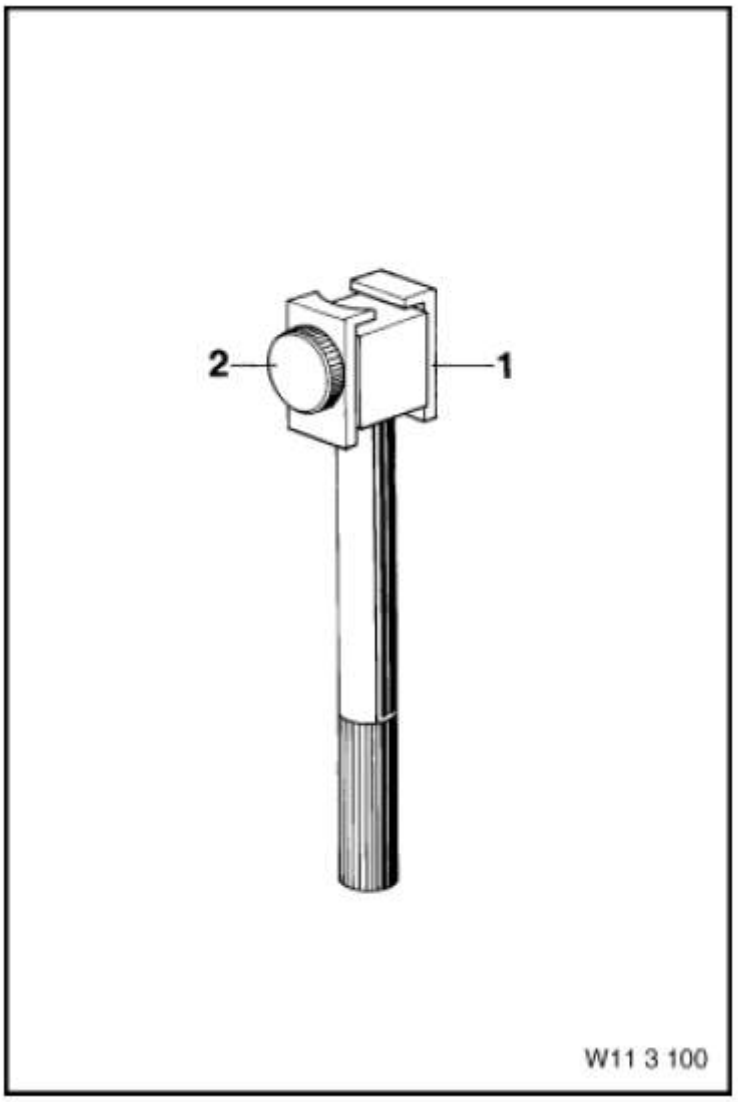


Fig. 227: Identifying Device (0490918)
Courtesy of BMW OF NORTH AMERICA, INC.

0490653 DEVICE

0490653 111010 Device AM

NOTE: For pressure-testing cylinder head

Consisting of:

1. 0490654 Screw

   NOTE: (screws (14 pieces))

2. 0490655 Strip

   NOTE: (sealing strips (2 pieces))

3. 0490656 Upholstery

   NOTE: (Rubber padding (2 pieces))

4. 0490657 Connection

   NOTE: (Air connection with reducer) Engine: M10

cardiagn.com

5. 0490658 Cover

NOTE: (cover for branch flange) Engine: M10

6. 0490659 Connection

NOTE: (Air connection) Engine: M30

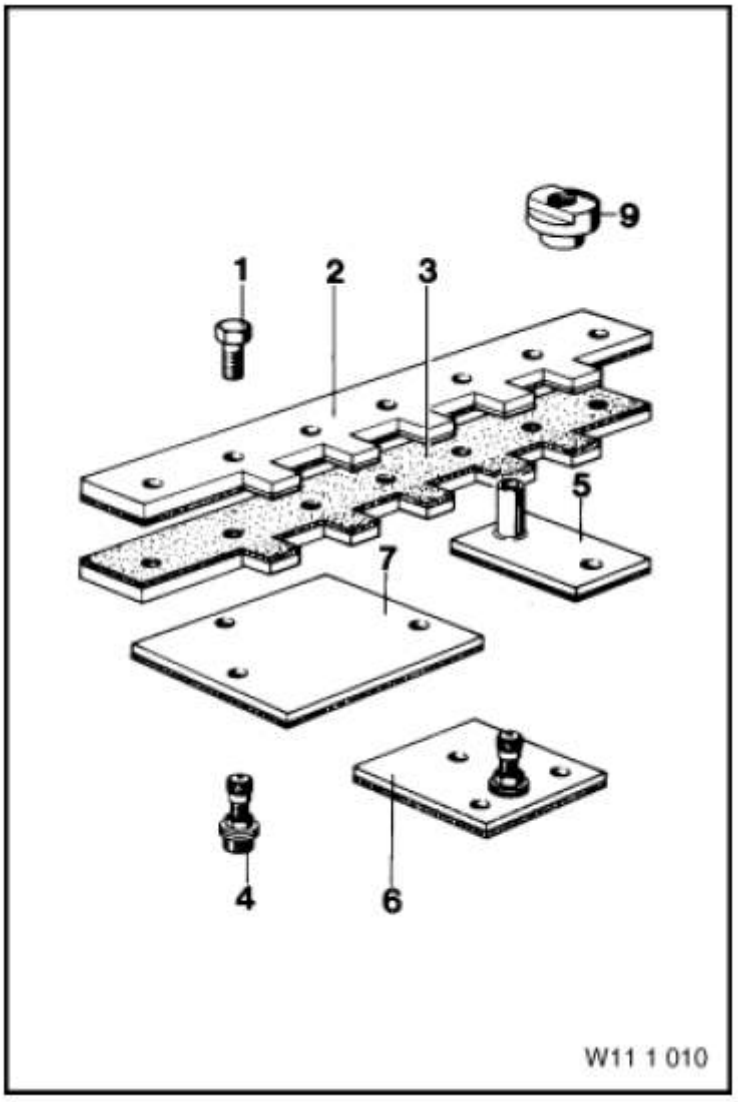


Fig. 228: Identifying Device (0490653)
Courtesy of BMW OF NORTH AMERICA, INC.

7. 0490660 Cover

NOTE: (cover for branch flange) Engine: M30

8. 0490661 Bridge

NOTE: Engine: M30

9. 0490662 Adapter

NOTE: (Adapter) Replaced by 00 9 120 (0 490 504)

0491055 DEVICE

cardiagn.com

0491055 115090 Device Mechanical tool

NOTE: **For fitting radial shaft seal on crankshaft in gear case cover**

Storage Location

B4

SI number

01 12 92 (606)

Fig. 229: Identifying Device (0491055)
Courtesy of BMW OF NORTH AMERICA, INC.

0491025 DEVICE

0491025 114220 Device Minimum set: Mechanical tools AM

NOTE: **(Device) For tensioning the primary chain when adjusting the timing**

Storage Location

B7

SI number

01 10 94 (840)

Consisting of:

1. **0493627** Holding sleeve

Fig. 230: Identifying Device (0491025)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Available only as a complete tool set 11 4 220 (83 30 0 491 025) - as of 30.01.12.**

2. 0493629 Spindle

NOTE: **Replaced by 11 4 223**

3. **0494482** Spindle

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 4 220 (83 30 0 491 025) - as of 30.01.12**

0490867 DEVICE

0490867 112330 Device AM

NOTE: **(Mounting plate) For gear case cover without removing the cylinder head (M42, M43, M44), as well as for installation of the upper gear case cover (M43, M44)**

Storage Location

B7

cardiagn.com

C7

SI number

01 05 89 (099)

Fig. 231: Identifying Device (0490867)
Courtesy of BMW OF NORTH AMERICA, INC.

0495024 DEVICE

0495024 114370 Device Mechanical tool

NOTE: **(pressing fixture) For pressing out sealant for bedplate.**

Storage Location

A52

SI number

01 17 04 (130)

Fig. 232: Identifying Device (0495024)
Courtesy of BMW OF NORTH AMERICA, INC.

0490778 DEVICE

0490778 111460 Device AM

NOTE: **For pressure-testing cylinder head**

SI number

01 09 94 (839)

Consisting of:

1. 0490779 Strip

   NOTE: **(Sealing strip) With rubber seal (wide version)**

2. 0490780 Strip

   NOTE: **(Sealing strip) With rubber seal (narrow version)**

Fig. 233: Identifying Device (0490778)
Courtesy of BMW OF NORTH AMERICA, INC.

3. 0490781 Cover

   NOTE: **For coolant pump connection**

4. 0490782 Hose

   NOTE: **(Screw hose) Engine: M51**

cardiagn.com

5. **0490783** Hose

   NOTE: **(Screw hose) With valve Engine: M51**

6. **0490784** Rubber seal

   NOTE: **(Rubber seals for sealing strips)**

7. **0490785** Hose

   NOTE: **(Screw hose) With valve Engine: M41**

8. **0490786** Screw

   NOTE: **(Screw plugs (2 x))**

0493548 DEVICE

0493548 114230 Device Minimum set: Mechanical tools AM

NOTE: **(Device) For tensioning the primary chain when adjusting the timing**

Storage Location

B7

SI number

01 15 99 (483)

Consisting of:

1. **0493630** Nut

   NOTE: **With external thread Deletion, only available via tool set**

Fig. 234: Identifying Device (0493548)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **0493631** Spindle

   NOTE: **Discontinued, can only be ordered using complete tool**

0496671 DEVICE

0496671 117110 Device Mechanical tool

NOTE: **For removing and installing throttle return springs for intermediate levers.**

Storage Location

B27

C27

SI number

01 18 09 (578)

cardiagn.com

Fig. 235: Identifying Device (0496671)
Courtesy of BMW OF NORTH AMERICA, INC.

0493390 DEVICE

0493390 116451 Device AM

NOTE: **(Holding fixture for cylinders 1...4), only available via tool set 11 6 450.**

Storage Location

B5

0495019 DEVICE

0495019 114360 Device Minimum set: Mechanical tools AM

NOTE: **(Removal and mounting device) For removal and installation of cover of vacuum pump.**

Storage Location

B51

SI number

01 17 04 (130)

Consisting of:



Fig. 236: Identifying Device (0495019)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0495020 Clip
2. 0495021 Adapter

   NOTE: **(Adapter with knurled screw)**

3. 0495022 Spindle

   NOTE: **(Pressure spindle)**

4. 0495023 Spindle

cardiagn.com

NOTE: **(Drawing spindle)**

0490937 DEVICE

0490937 113140 Device AM

NOTE: **For pulling off the ball pins in the cylinder head**

Storage Location

Y2

Consisting of:

1. 0490938 Holding sleeve
2. 0490939 Spindle

NOTE: **(Pull-off spindle)**

3. 0490940 Nut

Fig. 237: Identifying Device (0490937)
Courtesy of BMW OF NORTH AMERICA, INC.

0491071 DEVICE

0491071 116140 Device Mechanical tool

NOTE: **(Testing device) for checking the charging pressure control valve**

0490755 DEVICE

0490755 111420 Device AM

NOTE: **For pressure-testing cylinder head**

SI number

01 04 88 (906)

Consisting of:

1. 0490756 Strip

NOTE: **(sealing strip with 7 spigots)**

2. 0490757 Strip

NOTE: **(sealing strip with 2 spigots)**

Fig. 238: Identifying Device (0490755)
Courtesy of BMW OF NORTH AMERICA, INC.

3. 0490758 Plate

NOTE: **(cover plate) Engine: M70, M73**

cardiagn.com

4. 0490759 Plate

   NOTE: **(cover plate with valve) Engine: M70, M73**

5. 0490760 Rubber seal

   NOTE: **(rubber seal) For sealing strips 11 1 421, 11 1 422**

0490637 DEVICE

0490637 110310 Device AM

NOTE: **(Pressure testing fixture) For leakage test of cylinder head**

SI number

01 12 93 (701)

Consisting of:

1. 0490638 Strip

   NOTE: **(Sealing strip) Engine: M43 Only available as part of complete set**

2. 0490639 Strip

Fig. 239: Identifying Device (0490637)
Courtesy of BMW OF NORTH AMERICA, INC.

   NOTE: **(Sealing strip) Replaced by 11 0 318 (0 490 645)**

3. 0490640 Upholstery

   NOTE: **(Rubber padding (2 pieces)) Engine: M43 Only available as part of complete set**

4. 0490641 Cover

   NOTE: **(Cover for water pump connection) Engine: M43 Only available as part of complete set**

5. 0490642 Cover

   NOTE: **(Cover for radiator connection with valve) Engine: M43 Only available as part of complete set**

6. 0490643 Cover

   NOTE: **(Cover for heater connection) available as part of complete set only**

7. 0490644 Screw

   NOTE: **(Screw plug (2 pieces)) Engine: M43 Only available as part of complete set**

8. 0490645 Strip

cardiagn.com

NOTE: **(Sealing strip) Engine: M43 Only available as part of complete set**

0493391 DEVICE

0493391 116452 Device AM

NOTE: **(Holding fixture for cylinders 5...8), only available via tool set 11 6 450.**

Storage Location

B5

0495050 DEVICE

0495050 114460 Device AM

NOTE: **(locating fixture) For locating upper and lower bearing strips when installing exhaust camshaft.**

Storage Location

C51

SI number

01 17 04 (130)

Consisting of:

1. 0495099 Tool

   NOTE: **(press-down tool, 2nd cylinder)**

   Fig. 240: Identifying Device (0495050)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. 0495100 Screw

   NOTE: **(screws M7 (2 x))**

3. 0495101 Synchronizing key

   NOTE: **(synchronizing keys 6 x)**

0495471 DEVICE

0495471 119510 Device AM

NOTE: **For mounting the radial shaft seal of the crankshaft, front.**

Consisting of:

1. 0495472 Basic body
2. 0495473 Screw

   NOTE: **(screws (2 x))**

3. 0495474 Holding sleeve

cardiagn.com

NOTE: **(Sliding sleeve)**

4. 0495475 Holding sleeve

NOTE: **(Pressure sleeve) Can no longer be ordered separately. Only available as part of set 11 5 330 = 83 30 0 495 127.**

5. 0495476 Nut

NOTE: **(Nut with bearing) Can no longer be ordered separately. Only available as part of set 31 2 120 = 83 30 0 491 909.**

0493739 DEVICE

0493739 114380 Device AM

NOTE: **(Press-down device) For pressing down the camshaft**

SI number

01 15 00 (609)

Consisting of:

1. **0493740** Device

NOTE: **Available only as a complete tool set 11 4 380 (83 30 0 493 739) - as of 22.02.12.**

Fig. 241: Identifying Device (0493739)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **0494020** Screw

NOTE: **(screws (1 x))**

0490712 DEVICE

0490712 111110 Device AM

NOTE: **For pressure-testing cylinder head**

Consisting of:

1. **0490713** Rail

NOTE: **(Cover rail with spacer buffer)**

2. **0490714** Screw

NOTE: **(screws (14 x))**

3. **0490715** Connection

NOTE: **(Air connection)**

cardiagn.com

Fig. 242: Identifying Device (0490712)
Courtesy of BMW OF NORTH AMERICA, INC.

0490952 DEVICE

0490952 113240 Device AM

NOTE: (Holding fixture) For fixing the camshaft in place when adjusting the valve timing.

Storage Location

Y9

SI number

01 05 89 (099)

Consisting of:

1. 0490953 Gauge

   NOTE: (Gauge for inlet side)

2. 0490954 Gauge

Fig. 243: Identifying Device (0490952)
Courtesy of BMW OF NORTH AMERICA, INC.

   NOTE: (Gauge for exhaust side)

3. 0490955 Tab

   NOTE: (Securing clip) Replaced by 11 3 244 with launch of M52TU Replaced by 11 3 244 (0 493 283)

4. 0493283 Holder

   NOTE: For securing the camshaft holding fixture on the cylinder head

2285671 DEVICE

2285671 Device Minimum set: Mechanical tools Mechanical tool

NOTE: For positioning the high-pressure pump relative to the crankshaft.

Storage Location

B32

C32

SI number

01 53 13 (057)

Fig. 244: Identifying Device (2285671)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0490963 DEVICE

0490963 113271 Device AM

NOTE: **(Mounting device). Beginning from 10/2010 only available as tool set 11 3 260 (0490959).**

Fig. 245: Identifying Device (0490963)
Courtesy of BMW OF NORTH AMERICA, INC.

0493580 DEVICE

0493580 118120 Device AM

NOTE: **(Holding fixture (2 pieces)) For the camshafts of both cylinder**

Storage Location

A6

SI number

01 12 99 (452)

Consisting of:

1. 0494603 Gauge

   NOTE: **(Gauge with thread). Beginning from 10/2010 only available as tool set 11 8 120 (0493580).**

   Fig. 246: Identifying Device (0493580)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. 0494604 Gauge

   NOTE: **(Gauge with bore hole). Beginning from 10/2010 only available as tool set 11 8 120 (0493580).**

3. 0494605 Screw

   NOTE: **(Screw with washer)**

0490663 DEVICE

0490663 111020 Device AM

NOTE: **(Tool for pressure-testing cylinder head)**

Consisting of:

1. 0490664 Strip

   NOTE: **(sealing strips (2 pieces))**

2. 0490665 Upholstery

cardiagn.com

NOTE: **(Rubber padding (2 pieces))**

3. 0490666 Adapter

NOTE: **(Adapter) Engine: M20**

4. 0490667 Cover

NOTE: **(cover for branch flange) Engine: M20**

5. 0490668 Adapter

NOTE: **(Adapter) Engine: M20**

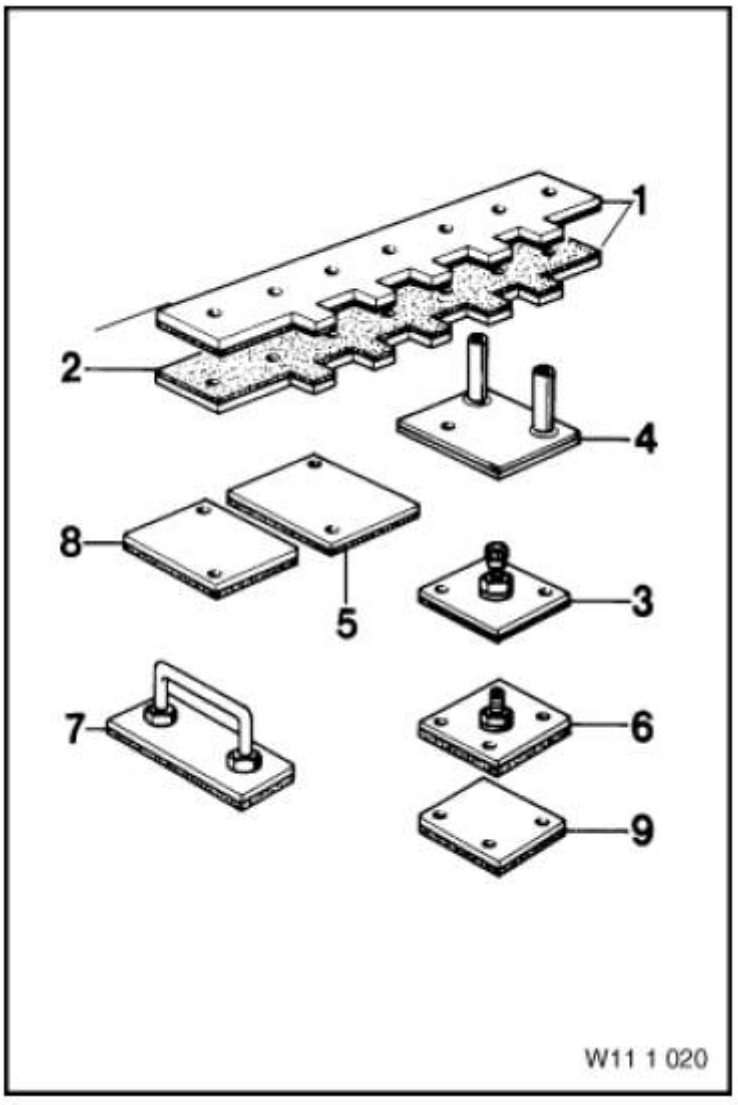


Fig. 247: Identifying Device (0490663)
Courtesy of BMW OF NORTH AMERICA, INC.

6. 0490669 Adapter

NOTE: **(Adapter) Engine: M40**

7. 0490670 Plate

NOTE: **(Cover plate) For connection duct to water pump - Engine: M40**

cardiagn.com

8. 0490671 Plate

NOTE: **(Cover plate for radiator flange connection) Engine: M40**

9. 0490672 Plate

NOTE: **(Cover plate for heater connection) Engine: M40**

0496127 DEVICE

0496127 118800 Device Minimum set: Mechanical tools AM

NOTE: **(Pulling device) For installing front radial shaft seal.**

Storage Location

C24

SI number

01 05 07 (353)

Consisting of:

1. 0496128 Basic body

NOTE: **Available only as a complete tool set 11 8 800 = 83 30 0 496 127 - as of 30.11.2011**

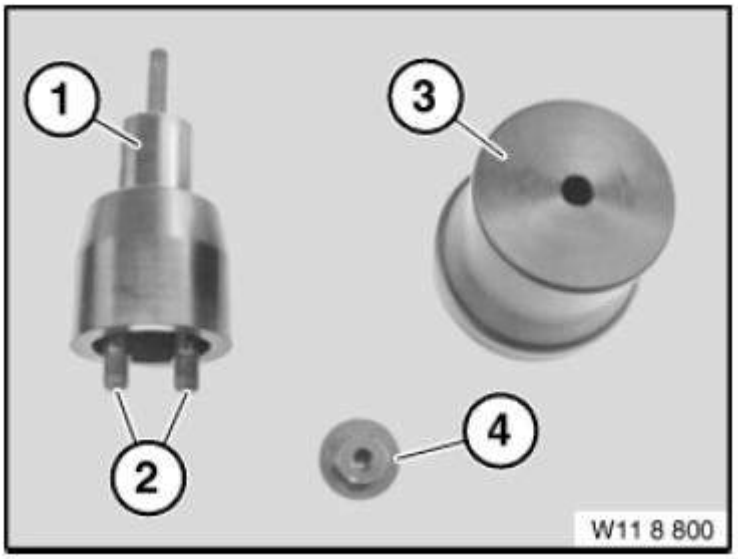


Fig. 248: Identifying Device (0496127)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0496129 Screw

NOTE: **(Set of screws) Can only be ordered as part of complete tool 11 9 660 = 0495955**

3. 0496130 Holding sleeve

NOTE: **(Thrust piece) sale of existing inventory and then available as part of complete tool set 11 8 800 = 83 30 0 496 127 only - as of 30.11.2011**

cardiagn.com

4. 0496131 Nut

NOTE: **(Nut with collar) available as part of set of tools 11 8 800 = 83 30 0 496 127 only - as of 30.11.2011**

0496368 DEVICE

0496368 118910 Device AM

NOTE: **(Fixing device) For limiting the tilting motion of the engine when the transmission is removed or installed.**

SI number

01 24 08 (501)

Consisting of:

1. 0496572 Basic body
2. 0496573 Upholstery
3. 0496574 Spindle
4. 0496575 Screw

NOTE: **(screws (2 x))**

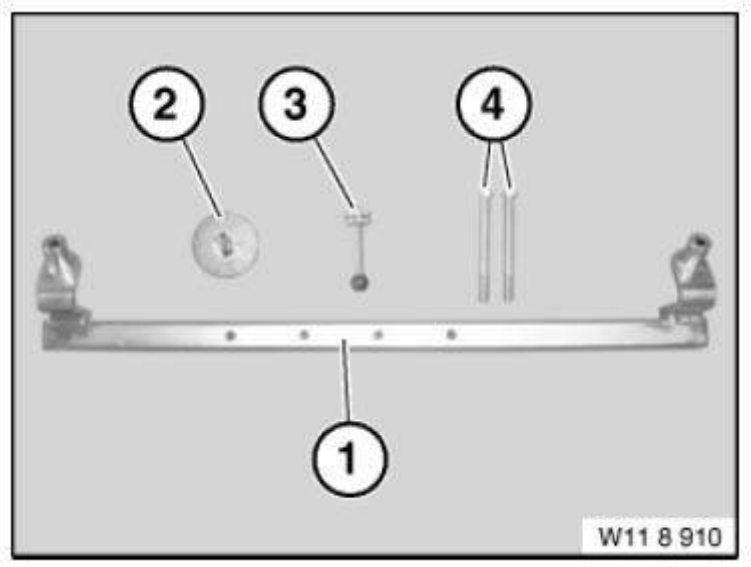


Fig. 249: Identifying Device (0496368)
Courtesy of BMW OF NORTH AMERICA, INC.

0491010 DEVICE

0491010 114100 Device Mechanical tool

Replaced by: 83300491020

NOTE: **(Centering device for oil pump) Replaced by 11 4 200 (0 491 020)**

Fig. 250: Identifying Device (0491010)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0493389 DEVICE

0493389 116450 Device AM

NOTE: **(Holding fixture) For fixing the camshaft multi-pole sensor gear when installing**

Storage Location

B5

SI number

01 21 98 (383)

Consisting of:

1. **0493390** Device

   NOTE: **(Holding fixture for cylinders 1...4), only available via tool set 11 6 450.**

2. **0493391** Device

   NOTE: **(Holding fixture for cylinders 5...8), only available via tool set 11 6 450.**

Fig. 251: Identifying Device (0493389)
Courtesy of BMW OF NORTH AMERICA, INC.

0490985 DEVICE

0490985 113400 Device AM

NOTE: **(Camshaft press-down device) For even pressing down of the camshaft when slackening and tightening the intake camshaft bearing cap**

SI number

01 12 92 (606)

Consisting of:

1. 0490986 Device

   NOTE: **Available only as a complete tool set 11 3 400 (83 30 0 490 985) - as of 14.01.13.**

2. **0490987** Screw

   NOTE: **(Mounting bolts (3 x))**

Fig. 252: Identifying Device (0490985)
Courtesy of BMW OF NORTH AMERICA, INC.

0490887 DEVICE

0490887 112440 Device AM

NOTE: **(Holding fixture) For fixing the camshaft in place when adjusting the valve timing.**

cardiagn.com

SI number

01 05 92 (507)

Consisting of:

1. **0490888** Gauge

   NOTE: (Gauge for intake side 1...4)

2. **0490889** Gauge

   NOTE: (Gauge for intake side 5...8)

3. **0490890** Plate

   NOTE: (Mounting plate (2 pieces))

4. **0490891** Screw

   NOTE: (Special screw (2 pieces))

5. **0490892** Gauge

   NOTE: (Gauge for exhaust side 1...4) Setpoint value 3.5Â°

6. **0490893** Gauge

   NOTE: (Gauge for exhaust side 5...8) Setpoint value 3.5Â°

Fig. 253: Identifying Device (0490887)
Courtesy of BMW OF NORTH AMERICA, INC.

0490994 DEVICE

0490994 113440 Device Mechanical tool

NOTE: (Holding fixture) For vibration damper 45Â°- pre-TDC setting when installing the cylinder head - This prevents the valves from coming into contact with the piston

Storage Location

A6

SI number

01 05 92 (507)

Fig. 254: Identifying Device (0490994)
Courtesy of BMW OF NORTH AMERICA, INC.

0493711 DEVICE

0493711 117390 Device AM

cardiagn.com

NOTE: **(Pressure testing fixture, complete) For sealing coolant openings when pressure-testing cylinder head for watertightness**

Consisting of:

1. **0493712** Strip

   NOTE: **(Sealing strip with 7 tabs) liquidation of current inventory and then available only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

Fig. 255: Identifying Device (0493711)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **0493713** Strip

   NOTE: **(Sealing strip with 5 tabs) liquidation of current inventory and then available only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

3. **0493714** Plate

   NOTE: **(Cover plate) For cylinder head joint surface, liquidation of remaining inventory and then only available with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

4. **0493715** Holder

   NOTE: **Liquidation of current inventory with pressure spindle and mounting screw for 11 7 393 then available for ordering only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

5. **0493716** Plug

   NOTE: **(Plug) Liquidation of current inventory with air connection fitting and then available for ordering only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

6. **0493717** Plate

   NOTE: **(Cover plate, end face) Liquidation of current inventory and then available for ordering only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

7. **0493718** Spindle

   NOTE: **Liquidation of current inventory with thrust piece for 11 7 396 and then available only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

8. **0493719** Screw

   NOTE: **(Threaded plug, intake side) Liquidation of current inventory and then available for ordering only with complete tool set 11 7 30 (83 30 0 493 711) Status 11.09.12.**

cardiagn.com

0493144 DIAL GAUGE

0493144 116251 Dial gauge AM

NOTE: (Dial gauge) With 0.8 mm measuring range in each direction

Fig. 256: Identifying Dial Gauge (0493144)
Courtesy of BMW OF NORTH AMERICA, INC.

2354976 DIE-PLATE

2354976 Die-plate AM

NOTE: For riveting the top timing chain on the N47-2 units. (included in tool set 2 354 985).

Fig. 257: Identifying Die-Plate (2354976)
Courtesy of BMW OF NORTH AMERICA, INC.

0491028 DIE-PLATE

0491028 114302 Die-plate AM

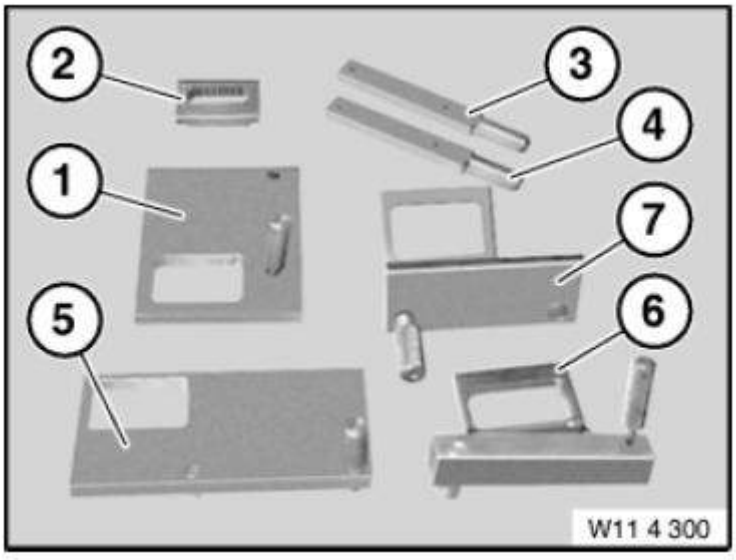


Fig. 258: Identifying Die-Plate (0491028)
Courtesy of BMW OF NORTH AMERICA, INC.

0491069 EXTENSION

0491069 116060 Extension Mechanical tool

NOTE: 400 mm with magnet - for removing and installing the intake pipe

Storage Location

B11

B12

SI number

01 02 87 (721)

cardiagn.com

Fig. 259: Identifying Extension (0491069)
Courtesy of BMW OF NORTH AMERICA, INC.

0493751 EXTENSION

0493751 119150 Extension Minimum set: Mechanical tools Mechanical tool

NOTE: **(Socket wrench extension) For loosening and tightening the oxygen sensor**

Storage Location

A42

SI number

01 15 00 (609)

Fig. 260: Identifying Extension (0493751)
Courtesy of BMW OF NORTH AMERICA, INC.

0490827 EXTENSION

0490827 112111 Extension AM

Replaced by: 83300490504

NOTE: **(Extension 1/1") Replaced by 00 9 120 (0 490 504)**

Fig. 261: Identifying Extension (0490827)
Courtesy of BMW OF NORTH AMERICA, INC.

0493933 EXTRACTOR

0493933 119200 Extractor Minimum set: Mechanical tools Mechanical tool

NOTE: **For dismantling from RWD at rear of crankcase.**

Storage Location

C43

SI number

01 01 01 (662)

Fig. 262: Identifying Extractor (0493933)
Courtesy of BMW OF NORTH AMERICA, INC.

0494312 EXTRACTOR

0494312 118500 Extractor AM

NOTE: **For extracting the guide tube for the spark plugs**

Storage Location

A84

cardiagn.com

B84

SI number

01 02 02 (823)

Consisting of:

1. 0494357 Weight

Fig. 263: Identifying Extractor (0494312)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: (Weight) Only available as part of complete tool set 11 8 500 (83 30 0 494 312).

2. 0494358 Shaped part

NOTE: (Shaped part) 4 pieces Only available as part of complete tool set 11 8 500 (83 30 0 494 312).

3. 0494530 Screw

NOTE: (Screw with hexagon socket) Only available as part of complete tool set 11 8 500 (83 30 0 494 312).

4. 0494531 Adapter

NOTE: Only available as part of complete tool set 11 8500 (83 30 0 494 312).

5. 0494532 Holding sleeve

NOTE: Only available as part of complete tool set 11 8 500 (83 30 0 494 312).

6. 0494533 Tapered section

NOTE: (Cone with washer and nut) Only available as part of complete tool set 11 8 500 (83 30 0 494 312).

0493934 EXTRACTOR

0493934 119220 Extractor Minimum set: Mechanical tools AM

NOTE: For RSS out of engine block at front

Storage Location

C43

SI number

01 01 01 (662)

Consisting of:

1 = 0494039 Synchronizing key

NOTE: Discontinued; can only be ordered as part of complete tool 11 9 220 = 83

cardiagn.com

30 0 493 934.

1 = **0494040** Screw

1 = **0494041** Screw

NOTE: **(Screws (6 pieces)) Liquidation of existing inventory, then deletion and available only via complete special tool 11 9 220 = 83 30 0 493 934**

4 = **0494042** Screw

NOTE: **(Screws (3 pieces)) Liquidation of existing inventory, then deletion and available only via complete special tool 11 9 220 = 83 30 0 493 934**

5 = **0496261** Screw

NOTE: **Discontinued; can only be ordered as part of complete tool 11 9 220 = 83 30 0 493 934.**

6 = **0496262** Puller

NOTE: **Discontinued; can only be ordered as part of complete tool 11 9 220 = 83 30 0 493 934.**

Fig. 264: Identifying Extractor (0493934)
Courtesy of BMW OF NORTH AMERICA, INC.

0495104 EXTRACTOR

0495104 114472 Extractor Minimum set: Mechanical tools AM

NOTE: **(grindstone)**

Storage Location

B52

Fig. 265: Identifying Extractor (0495104)
Courtesy of BMW OF NORTH AMERICA, INC.

0493803 EXTRACTOR

0493803 118210 Extractor Minimum set: Mechanical tools Mechanical tool

NOTE: **For pulling off the vibration damper**

Storage Location

C41

SI number

01 08 00 (579)

Fig. 266: Identifying Extractor (0493803)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496725 EXTRACTOR

0496725 118030 Extractor Minimum set: Mechanical tools AM

NOTE: **For dismantling high pressure pump (replaces special tool 11 8 740 from 08/2009)**

Storage Location

A49

Consisting of:

1. 0496757 Holding sleeve

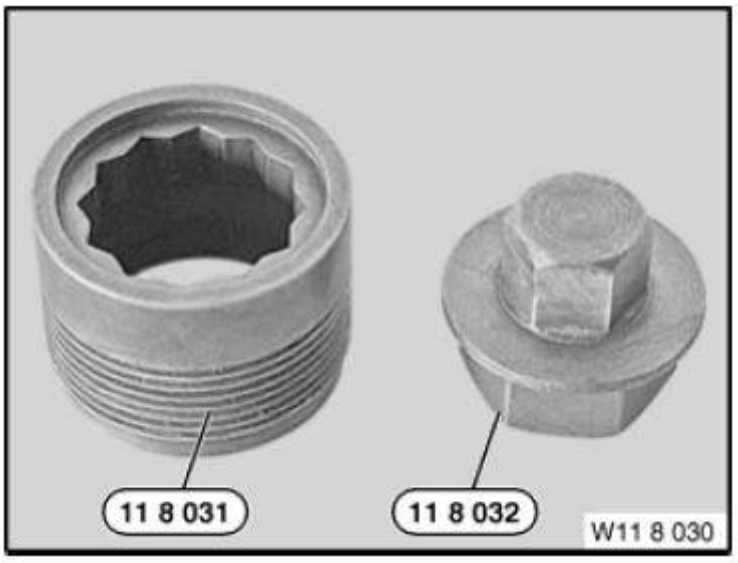


Fig. 267: Identifying Extractor (0496725)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Replaces SWZ11 8 741 from 08/2009, 09/2011 no longer available individually. Can only be ordered as part of the complete tool 83 30 0 496 725 (special tool number 11 8 030).**

2. 0496758 Adapter

NOTE: **Replaces special tool 11 8 742 from 08/2009, 09/2011 remaining inventories will be sold off - no longer available individually. Can only be ordered as part of the complete tool 83 30 0 496 725 (special tool number 11 8 030).**

0490626 FILTER

0490626 110234 Filter Minimum set: Mechanical tools AM

NOTE: **(Filter) 3 x 3 mm**

cardiagn.com

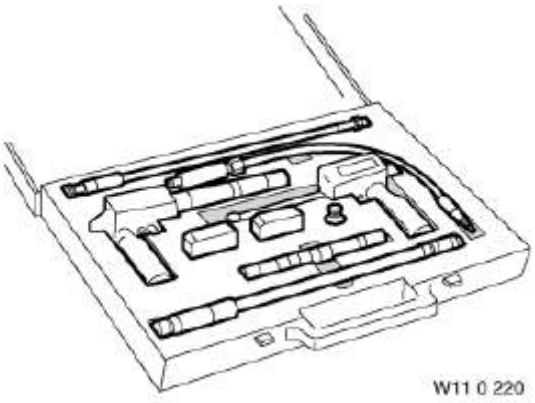


Fig. 268: Identifying Filter (0490626)
Courtesy of BMW OF NORTH AMERICA, INC.

0495377 FITTING AID

0495377 110331 Fitting aid Minimum set: Mechanical tools AM

NOTE: **(Mounting tool) Remaining inventories will be sold off followed by discontinuation - then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 334 (special tool number 11 0 330).**

Fig. 269: Identifying Fitting Aid (0495377)
Courtesy of BMW OF NORTH AMERICA, INC.

0495334 FITTING AID

0495334 110330 Fitting aid Minimum set: Mechanical tools AM

NOTE: **(Mounting tool) For installing elasto-belt.**

Storage Location

B53

C53

SI number

01 13 05 (197)

Consisting of:

1. 0495377 Fitting aid

Fig. 270: Identifying Fitting Aid (0495334)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Mounting tool) Remaining inventories will be sold off followed by discontinuation - then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 334 (special tool number 11 0 330).**

2. 0495378 Ring

cardiagn.com

NOTE: **(Adapter ring) Remaining inventories will be sold off followed by discontinuation - then longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 334 (special tool number 11 0 330).**

0496084 FITTING AID

0496084 111240 Fitting aid Minimum set: Mechanical tools AM

NOTE: **(Installation set) For installing elasto-belt.**

Storage Location

A22

SI number

01 01 07 (333)

Consisting of:

1. 0496085 Fitting aid

NOTE: **Available only as a complete tool set 11 1 240 (83 30 0 496 084) - as of 30.01.12.**

Fig. 271: Identifying Fitting Aid (0496084)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0496086 Guard

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 1 240 (83 30 0 496 084) - as of 30.01.12**

0490646 FITTING AID

0490646 110340 Fitting aid AM

Replaced by: 83300494362

NOTE: **(Installation accessory) For removing and installing valve springs. Replaced by 11 9 000 (0 494 362)**

SI number

01 12 93 (701)

Consisting of:

1. 0490647 Basket

NOTE: **(Valve spring cage) Engine: M43, M73**

cardiagn.com

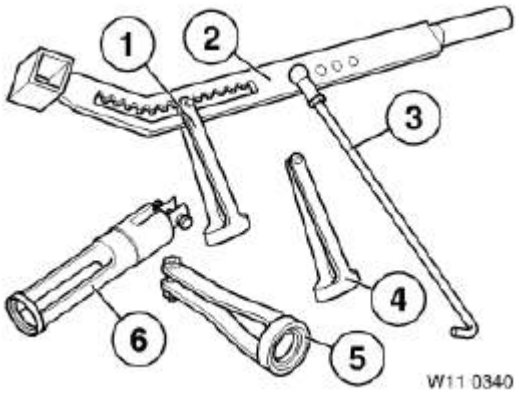


Fig. 272: Identifying Fitting Aid (0490646)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0490648 Lever

NOTE: **(compression lever) Engine: all, except M10**

3. 0490649 Hook

NOTE: **(hook) Length 220 mm - Engine: all, except M10 Replaced by 11 9 000 (0 494 362)**

4. 0490650 Basket

NOTE: **(valve spring cage) Replaced by 11 0345, engine: M52**

5. 0490651 Basket

NOTE: **(Valve spring cage) Engine: M44, M52, M62, S62, S54 Replaced by 11 9 000 (0 494 362)**

6. 0493285 Basket

NOTE: **(Valve spring cage) Engine: M47, M47TU, M57, N40, N42, M67, M67TU**

0490601 FITTING AID

0490601 110180 Fitting aid Mechanical tool

NOTE: **(Mounting accessory) For removing and installing the valve springs Replaced by 11 9 000 (0 494 362)**

SI number

01 12 93 (701)

Fig. 273: Identifying Fitting Aid (0490601)
Courtesy of BMW OF NORTH AMERICA, INC.

0496439 FITTING AID

0496439 110350 Fitting aid AM

NOTE: **For installing retaining clip on intermediate plate from electrical actuator to exhaust turbocharger.**

cardiagn.com

Storage Location

B18

Fig. 274: Identifying Fitting Aid (0496439)
Courtesy of BMW OF NORTH AMERICA, INC.

0496139 FITTING AID

0496139 118830 Fitting aid AM

NOTE: **(Installation set) For installing gudgeon pin circlips.**

Storage Location

B24

SI number

01 05 07 (353)

Consisting of:

1. 0496140 Holder

   NOTE: **(Installation bracket)**

   Fig. 275: Identifying Fitting Aid (0496139)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. 0496141 Mandrel

   NOTE: **(Installation drift)**

0495123 FITTING AID

0495123 115290 Fitting aid AM

NOTE: **(mounting tool) For fitting the tensioning rail bearing journal.**

Storage Location

B71

SI number

01 02 05 (173)

Consisting of:

1. 0495162 Socket wrench
2. 0495163 Screw

Fig. 276: Identifying Fitting Aid (0495123)
Courtesy of BMW OF NORTH AMERICA, INC.

0496085 FITTING AID

cardiagn.com

0496085 111241 Fitting aid Minimum set: Mechanical tools AM

NOTE: **Available only as a complete tool set 11 1 240 (83 30 0 496 084) - as of 30.01.12.**

Storage Location

A22

SI number

01 01 07 (333)

Fig. 277: Identifying Fitting Aid (0496085)
Courtesy of BMW OF NORTH AMERICA, INC.

0490691 FITTING AID

0490691 111050 Fitting aid AM

Replaced by: 83300494362

NOTE: **(Mounting accessory) For removing and installing the valve springs Replaced by 11 9 000 (0 494 362)**

Consisting of:

1 = 0490692 Clip

NOTE: **(Guide bracket, cropped) Engine: S38**

2 = 0490693 Basket

NOTE: **(Valve spring cage) Engine: S14, S38, M50**

3 = 0490694 oddments tray

NOTE: **(Board) Engine: S14, S38**

9 = 0490695 Nut

NOTE: **(Nut (4 pieces) for pressure frame) Engine: M20, M30**

cardiagn.com

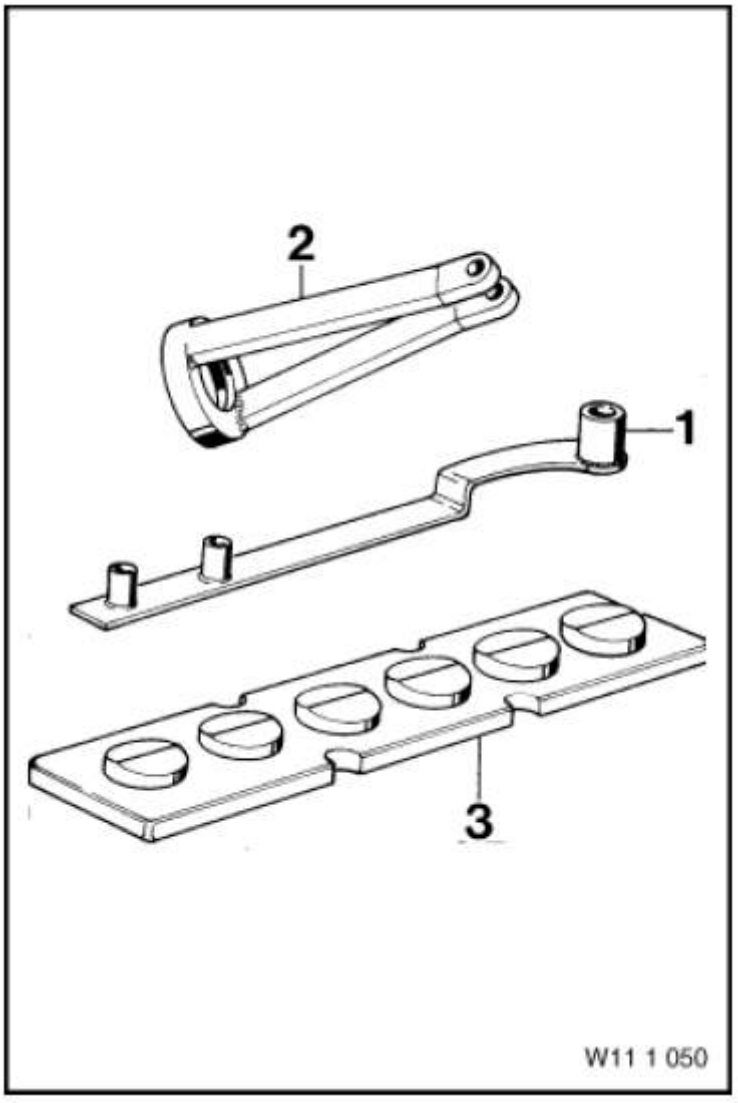


Fig. 278: Identifying Fitting Aid (0490691)
Courtesy of BMW OF NORTH AMERICA, INC.

0490608 FITTING AID

0490608 110210 Fitting aid AM

Replaced by: 83300494362

NOTE: **(Installation accessory for valve springs) For removal and installation of valve springs Replaced by 11 9 000 (0 494 362)**

SI number

01 05 92 (507)

Consisting of:

1. 0490609 oddments tray

NOTE: **(Board for cylinder head) Engine: M60, M62, S62 Replaced by 11 9 000 (0 494 362)**

cardiagn.com

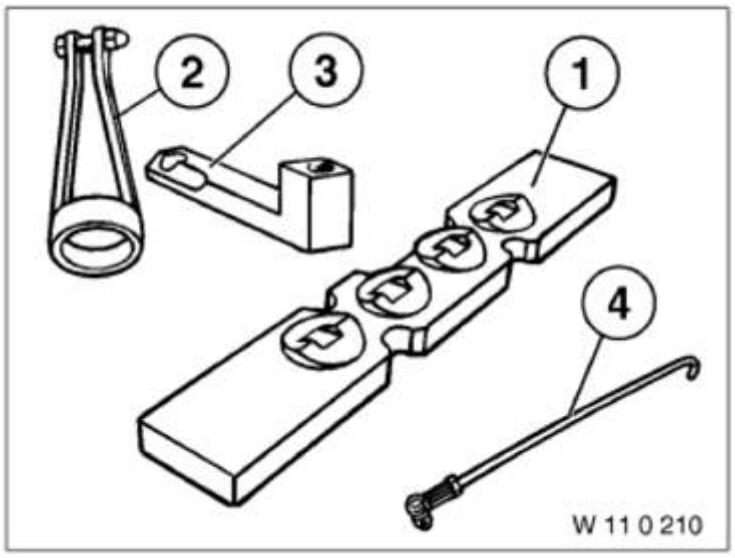


Fig. 279: Identifying Fitting Aid (0490608)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0490610 Basket

NOTE: **(Valve spring cage) Engine: M60**

3. 0490611 Tab

NOTE: **(Retaining tab) Engine: M60, M62, S62**

4. 0490612 Hook

NOTE: **Replaced by 11 0 343 / Engine: M60 Replaced by 11 9 000 (0 494 362)**

0490988 FITTING AID

0490988 113410 Fitting aid AM

NOTE: **(Installation accessory for valve springs) For removal and installation of valve springs Replaced by 11 9 000 (0 494 362)**

SI number

01 12 92 (606)

Consisting of:

1. 0490989 oddments tray

NOTE: **(Board) Replaced by 11 9 000 (0 494 362)**

Fig. 280: Identifying Fitting Aid (0490988)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0490990 Screw

NOTE: **(screws (2 x))**

3. 0490991 Hook

cardiagn.com

NOTE: **Length 130 mm Engine: S50 replaced by 00 3 271 (0 490 362)**

0495127 FITTING AID

0495127 115330 Fitting aid Minimum set: Mechanical tools AM

NOTE: **(Mounting tool) For fitting the front radial shaft seal.**

Storage Location

A53

SI number

01 02 05 (173)

Consisting of:

1. 0495170 Basic body

   NOTE: **Can no longer be ordered separately. Only available as part of set 11 5 330 = 83 30 0 495 127.**

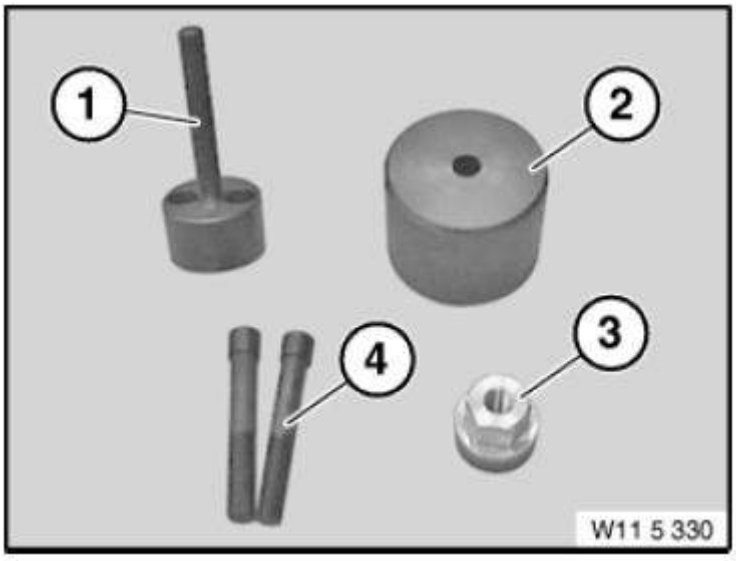


Fig. 281: Identifying Fitting Aid (0495127)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0495171 Holding sleeve

   NOTE: **(Pressure sleeve) Can no longer be ordered separately. Only available as part of set 11 5 330 = 83 30 0 495 127.**

3. 0495172 Nut

   NOTE: **(Nut with bearing) Can no longer be ordered separately. Only available as part of set 31 2 120 = 83 30 0 491 909.**

4. 0495260 Screw

   NOTE: **(Set of screws (2 x)) Can no longer be ordered separately. Only available as part of set 11 5 330 = 83 30 0 495 127.**

cardiagn.com

0490592 FIXTURE

0490592 110140 Fixture Mechanical tool

NOTE: **(Fixture for engine) Miscellaneous: Sweden and USA only**

0493565 FIXTURE

0493565 118100 Fixture Mechanical tool

NOTE: **(Fixtures) For mounting the engine on the assembly stand**

SI number

01 12 99 (452)

Fig. 282: Identifying Fixture (0493565)
Courtesy of BMW OF NORTH AMERICA, INC.

0495218 FIXTURE

0495218 116100 Fixture Mechanical tool

NOTE: **(Engine fixture) For supporting the engine on the assembly stand**

SI number

01 06 05 (181)

Fig. 283: Identifying Fixture (0495218)
Courtesy of BMW OF NORTH AMERICA, INC.

0495736 FIXTURE

0495736 118540 Fixture AM

NOTE: **(Fixture) For mounting engine on assembly stand.**

SI number

01 20 06 (299)

Consisting of:

1. **0495737** Fixture

   NOTE: **(Engine support)**

2. **0495738** Screw

   NOTE: **(Set of screws (4 x))**

Fig. 284: Identifying Fixture (0495736)
Courtesy of BMW OF NORTH AMERICA, INC.

0490589 FIXTURE

0490589 110110 Fixture Mechanical tool

cardiagn.com

NOTE: **(Fixture for diesel engine)**

Fig. 285: Identifying Fixture (0490589)
Courtesy of BMW OF NORTH AMERICA, INC.

0496117 FIXTURE

0496117 118770 Fixture AM

In conjunction with: **00 2 300; 00 2 320 = 0495196**

NOTE: **(Fixture) For mounting engine on assembly stand.**

SI number

01 05 07 (353)

Consisting of:

1. **0496118** Plate

   NOTE: **(Engine fixture I) Deletion, only available via tool set**

   Fig. 286: Identifying Fixture (0496117)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. **0496119** Plate

   NOTE: **(Engine fixture II) Deletion, only available via tool set**

3. **0496147** Screw

   NOTE: **(Set of screws)**

0494803 FIXTURE

0494803 118062 Fixture AM

NOTE: **(Engine support 2) Only available as part of complete tool set 11 8 060 (83 30 0 494 801).**

Fig. 287: Identifying Fixture (0494803)
Courtesy of BMW OF NORTH AMERICA, INC.

0494802 FIXTURE

0494802 118061 Fixture AM

NOTE: **(Engine support 1 with flange) Only available as part of complete tool set 11 8 060 (83 30 0 494 801).**

Fig. 288: Identifying Fixture (0494802)
Courtesy of BMW OF NORTH AMERICA, INC.

0490584 FIXTURE

cardiagn.com

0490584 110080 Fixture AM

NOTE: **Engine fixture, for mounting the engine on the assembly stand.**

SI number

01 05 92 (507)

Consisting of:

1. **0490585** Plate

   NOTE: **(Fixture with adjusting flange)**

2. **0490586** Plate

   NOTE: **(Fixture)**

Fig. 289: Identifying Fixture (0490584)
Courtesy of BMW OF NORTH AMERICA, INC.

0490591 FIXTURE

0490591 110130 Fixture Mechanical tool

NOTE: **(Fixture for engine) Miscellaneous: USA only**

Fig. 290: Identifying Fixture (0490591)
Courtesy of BMW OF NORTH AMERICA, INC.

0495217 FIXTURE

0495217 116090 Fixture Mechanical tool

NOTE: **(Engine fixture) For supporting the engine on the assembly stand**

SI number

01 05 05 (180)

Fig. 291: Identifying Fixture (0495217)
Courtesy of BMW OF NORTH AMERICA, INC.

0496926 FIXTURE

0496926 119030 Fixture AM

In conjunction with: **00 2 300; 00 2 320 = 0495196**

NOTE: **For mounting the N47C on the assembly stand.**

Fig. 292: Identifying Fixture (0496926)
Courtesy of BMW OF NORTH AMERICA, INC.

0490588 FIXTURE

cardiagn.com

0490588 110100 Fixture Mechanical tool

NOTE: **(Fixture for engine)**

Fig. 293: Identifying Fixture (0490588)
Courtesy of BMW OF NORTH AMERICA, INC.

0494801 FIXTURE

0494801 118060 Fixture AM

NOTE: **(Fixture) For securing the engine on the assembly stand**

SI number

01 06 05 (181)

Consisting of:

1. **0494802** Fixture

   NOTE: **(Engine support 1 with flange) Only available as part of complete tool set 11 8 060 (83 30 0 494 801).**

   Fig. 294: Identifying Fixture (0494801)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. **0494803** Fixture

   NOTE: **(Engine support 2) Only available as part of complete tool set 11 8 060 (83 30 0 494 801).**

2212832 FIXTURE

2212832 Fixture AM

In conjunction with: **00 2 300 = 0495187**

NOTE: **For accommodating engine on assembly stand.**

SI number

01 05 11 (692)

Fig. 295: Identifying Fixture (2212832)
Courtesy of BMW OF NORTH AMERICA, INC.

0495737 FIXTURE

0495737 118541 Fixture AM

NOTE: **(Engine support)**

Fig. 296: Identifying Fixture (0495737)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0490590 FIXTURE

0490590 110120 Fixture Mechanical tool

NOTE: **(Fixture for engine)**

Fig. 297: Identifying Fixture (0490590)
Courtesy of BMW OF NORTH AMERICA, INC.

0495464 GASKET

0495464 117042 Gasket AM

NOTE: **(Gasket for 11 7 041) discontinued, available as part of set of special tools only**

SI number

01 14 05 (198)

Fig. 298: Identifying Gasket (0495464)
Courtesy of BMW OF NORTH AMERICA, INC.

0495524 GASKET

0495524 110474 Gasket AM

NOTE: **(Gasket for adapter plate) Only to be ordered via complete tool set 11 0 470 (83 30 0 495 520) - as of 21.08.12.**

SI number

01 04 06 (246)

Fig. 299: Identifying Gasket (0495524)
Courtesy of BMW OF NORTH AMERICA, INC.

0496187 GASKET

0496187 118894 Gasket AM

NOTE: **(Gasket for base plate 11 8 891) Only available as part of complete tool set 11 8 890 -> (83 30 0 496 183).**

SI number

01 05 07 (353)

Fig. 300: Identifying Gasket (0496187)
Courtesy of BMW OF NORTH AMERICA, INC.

0495151 GASKET

0495151 115236 Gasket AM

NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

cardiagn.com

Fig. 301: Identifying Gasket (0495151)
Courtesy of BMW OF NORTH AMERICA, INC.

0496188 GASKET

0496188 118895 Gasket AM

NOTE: **(Gasket for adapter plate 11 8 892) Only available as part of complete tool set 11 8 890 -> (83 30 0 496 183).**

SI number

01 05 07 (353)

0496869 GASKET

0496869 116235 Gasket AM

NOTE: **Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**

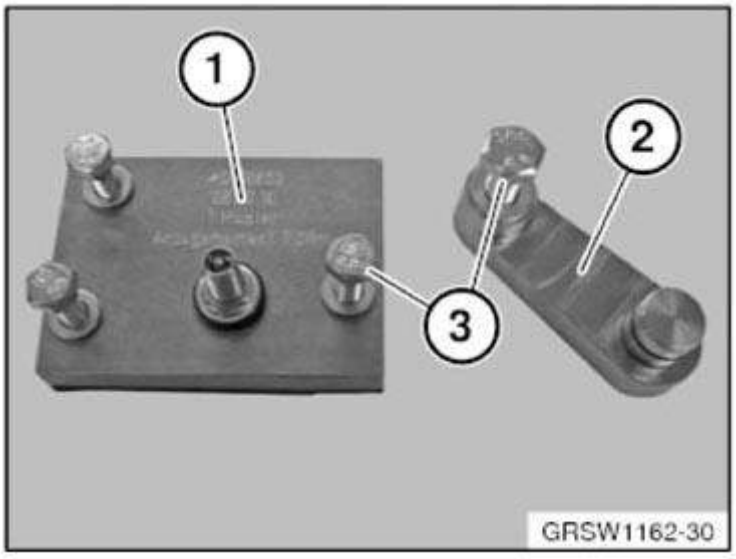


Fig. 302: Identifying Gasket (0496869)
Courtesy of BMW OF NORTH AMERICA, INC.

0496179 GASKET

0496179 118827 Gasket AM

NOTE: **(Gasket for cover plate 1) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

SI number

01 05 07 (353)

Fig. 303: Identifying Gasket (0496179)
Courtesy of BMW OF NORTH AMERICA, INC.

0496868 GASKET

0496868 116234 Gasket AM

NOTE: **Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**

cardiagn.com

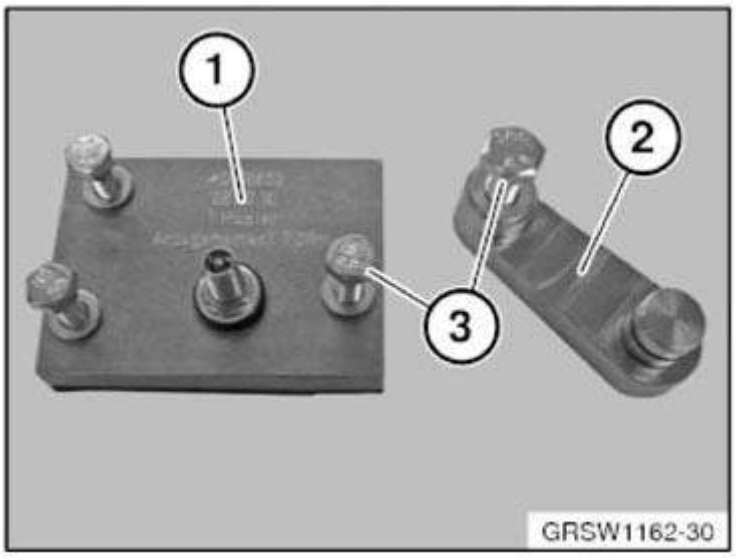


Fig. 304: Identifying Gasket (0496868)
Courtesy of BMW OF NORTH AMERICA, INC.

0496181 GASKET

0496181 118829 Gasket AM

NOTE: **(Gasket for cover plate 3) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

SI number

01 05 07 (353)

Fig. 305: Identifying Gasket (0496181)
Courtesy of BMW OF NORTH AMERICA, INC.

0495149 GASKET

0495149 115234 Gasket AM

NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

Fig. 306: Identifying Gasket (0495149)
Courtesy of BMW OF NORTH AMERICA, INC.

0496180 GASKET

0496180 118828 Gasket AM

NOTE: **(Gasket for cover plate 2) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

SI number

01 05 07 (353)

Fig. 307: Identifying Gasket (0496180)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496873 GASKET

0496873 116284 Gasket AM

NOTE: Only available as part of complete tool set 11 6 280 (83 30 0 496 857).

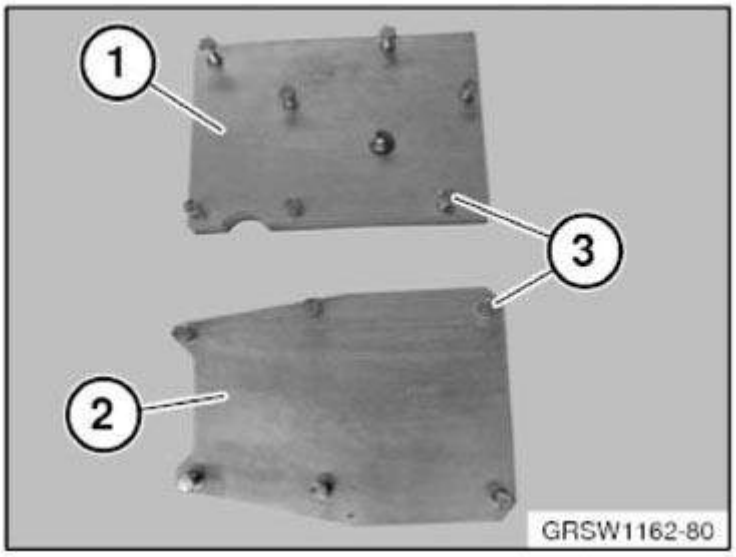


Fig. 308: Identifying Gasket (0496873)
Courtesy of BMW OF NORTH AMERICA, INC.

0496874 GASKET

0496874 116285 Gasket AM

NOTE: Only available as part of complete tool set 11 6 280 (83 30 0 496 857).

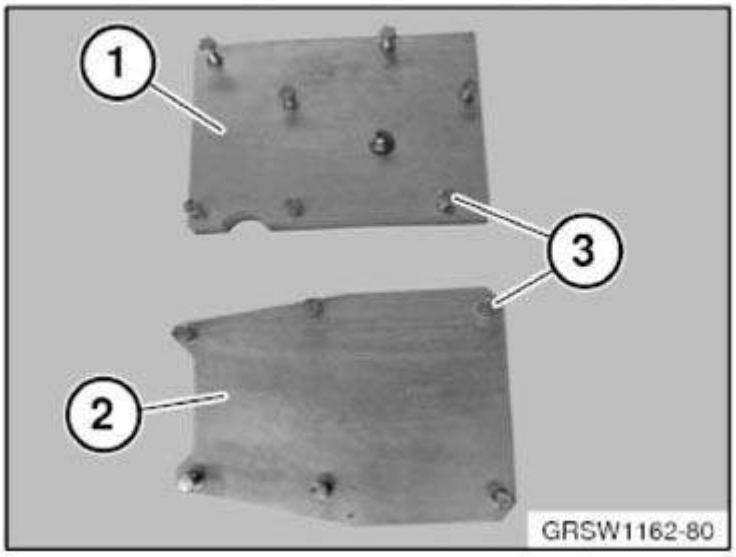


Fig. 309: Identifying Gasket (0496874)
Courtesy of BMW OF NORTH AMERICA, INC.

0495147 GASKET

0495147 115232 Gasket AM

NOTE: Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12

cardiagn.com

Fig. 310: Identifying Gasket (0495147)
Courtesy of BMW OF NORTH AMERICA, INC.

0495466 GASKET

0495466 117044 Gasket AM

NOTE: **(Gasket for 11 7 043) discontinued, available as part of set of special tools only**

SI number

01 14 05 (198)

Fig. 311: Identifying Gasket (0495466)
Courtesy of BMW OF NORTH AMERICA, INC.

0495522 GASKET

0495522 110472 Gasket AM

NOTE: **(Gasket for base plate) Only to be ordered via complete tool set 11 0 470 (83 30 0 495 520) - as of 21.08.12.**

SI number

01 04 06 (246)

Fig. 312: Identifying Gasket (0495522)
Courtesy of BMW OF NORTH AMERICA, INC.

0496123 GAUGE

0496123 118790 Gauge AM

NOTE: **For aligning crankshaft at BDC.**

Storage Location

C23

C24

SI number

01 05 07 (353)

Consisting of:

Fig. 313: Identifying Gauge (0496123)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0496124 Gauge
2. 0496125 Screw

   NOTE: **(Knurled screw with synchronizing key)**

3. 0496126 Screw

cardiagn.com

NOTE: **(Set of screws (2 x))**

0491084 GAUGE

0491084 117340 Gauge AM

NOTE: **(Gauge (1.5Â°) with lock pin) For adjusting camshaft lead angle (timing diagram) during installation of VANOS unit**

Storage Location

A6

SI number

01 07 95 (964)

Consisting of:

Fig. 314: Identifying Gauge (0491084)
Courtesy of BMW OF NORTH AMERICA, INC.

1. **0491085** Gauge

   NOTE: **(Gauge 1.5Â° (basic body)) Engine: S50**

2. **0491086** Pin

   NOTE: **(Lock pin) Engine: S50, S54**

0494307 GAUGE

0494307 117250 Gauge AM

NOTE: **For fixing camshaft in TDC setting**

Storage Location

B53

Consisting of:

1. **0494488** Gauge

   NOTE: **(Gauge, exhaust side)**

Fig. 315: Identifying Gauge (0494307)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **0494489** Gauge

   NOTE: **(Gauge, intake side)**

3. **0494490** Screw

   NOTE: **(Knurled screw)**

cardiagn.com

4. 0494690 Screw

NOTE: **(Screws M6x30, 3 x)**

0490893 GAUGE

0490893 112446 Gauge AM

NOTE: **(Gauge for exhaust side 5...8) Setpoint value 3.5Â°**

Fig. 316: Identifying Gauge (0490893)
Courtesy of BMW OF NORTH AMERICA, INC.

0495005 GAUGE

0495005 114281 Gauge Minimum set: Mechanical tools AM

NOTE: **2 pieces per packaging unit**

Fig. 317: Identifying Gauge (0495005)
Courtesy of BMW OF NORTH AMERICA, INC.

0495180 GAUGE

0495180 115381 Gauge AM

NOTE: **(Gauge, cylinder 1-5). Remaining inventories will be sold off, followed by discontinuation and then available as part of complete special tool 11 5 380 = 0495132 only.**

Fig. 318: Identifying Gauge (0495180)
Courtesy of BMW OF NORTH AMERICA, INC.

0495561 GAUGE

0495561 110490 Gauge AM

NOTE: **For fixing camshaft in TDC setting.**

Storage Location

A19

A20

SI number

01 04 06 (246)

Consisting of:

1. 0495562 Gauge

Fig. 319: Identifying Gauge (0495561)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

NOTE: **(Gauge, intake side) Only available via complete tool set 11 0 490 = 83 30 0 495 561 - status 29.11.2011**

2. **0495563** Gauge

NOTE: **(Gauge, exhaust side) Only available via complete tool set 11 0 490 = 83 30 0 495 561 - status 29.11.2011**

3. **0495564** Screw

NOTE: **(Screw set) Liquidation of existing inventory and then available only via complete tool set 11 0 490 = 83 30 0 495 561 - status 29.11.2011**

0495165 GAUGE

0495165 115302 Gauge AM

NOTE: **(Gauge, cylinder 6-10). Can no longer be ordered separately. Only available as part of set 11 5 300 = 83 30 0 495 124.**

Storage Location

A71

A72

Fig. 320: Identifying Gauge (0495165)
Courtesy of BMW OF NORTH AMERICA, INC.

0495562 GAUGE

0495562 110491 Gauge AM

NOTE: **(Gauge, intake side) Only available via complete tool set 11 0 490 = 83 30 0 495 561 - status 29.11.2011**

SI number

01 04 06 (246)

Fig. 321: Identifying Gauge (0495562)
Courtesy of BMW OF NORTH AMERICA, INC.

0493305 GAUGE

0493305 116270 Gauge Mechanical tool

NOTE: **For securing the counterbalance shafts in the working position**

SI number

01 04 98 (304)

Fig. 322: Identifying Gauge (0493305)
Courtesy of BMW OF NORTH AMERICA, INC.

0493754 GAUGE

cardiagn.com

0493754 113163 Gauge AM

NOTE: **(feeler gauges (2 x)) 0.15 / 0.20 mm - engine: S54 Can be ordered only as a set (order number 0 490 942).**

SI number

01 15 00 (609)

Fig. 323: Identifying Gauge (0493754)
Courtesy of BMW OF NORTH AMERICA, INC.

2212831 GAUGE

2212831 Gauge Minimum set: Mechanical tools Mechanical tool

NOTE: **For securing camshaft at TDC.**

Storage Location

A30

SI number

01 05 11 (692)

Fig. 324: Identifying Gauge (2212831)
Courtesy of BMW OF NORTH AMERICA, INC.

0493370 GAUGE

0493370 119110 Gauge Mechanical tool

NOTE: **(Tracing gauge 6 degrees) For fixing the intake camshaft when adjusting the timing - engine with idle vibration**

Storage Location

B5

SI number

01 07 98 (332)

Fig. 325: Identifying Gauge (0493370)
Courtesy of BMW OF NORTH AMERICA, INC.

0494606 GAUGE

0494606 119131 Gauge AM

NOTE: **(Gauge, 1 degree). Beginning from 10/2010 only available as tool set 11 9 130 (0493749).**

Fig. 326: Identifying Gauge (0494606)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

2212829 GAUGE

2212829 Gauge AM

NOTE: **To position the oil spray nozzles in the crankcase during installation.**

Storage Location

A30

SI number

01 05 11 (692)

Fig. 327: Identifying Gauge (2212829)
Courtesy of BMW OF NORTH AMERICA, INC.

0490999 GAUGE

0490999 113490 Gauge Mechanical tool

NOTE: **(Adjusting gauge) For adjusting the timing diagram when installing the VANOS unit**

Storage Location

Y2

SI number

01 12 92 (606)

Fig. 328: Identifying Gauge (0490999)
Courtesy of BMW OF NORTH AMERICA, INC.

0494999 GAUGE

0494999 114250 Gauge AM

NOTE: **(Gauge with adapter plate) For securing the oil spray nozzles.**

Storage Location

A52

SI number

01 17 04 (130)

Consisting of:

1. 0495000 Gauge

NOTE: **Available only as a complete tool set 11 4 250 (83 30 0 494 999) - as of 22.02.12.**

Fig. 329: Identifying Gauge (0494999)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

2. 0495001 Plate

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 4 250 (83 30 0 494 999) - as of 22.02.12**

0490942 GAUGE

0490942 113160 Gauge AM

NOTE: **(feeler gauges) For adjusting valves**

Storage Location

A6

Consisting of:

3 = 0493754 Gauge

NOTE: **(feeler gauges (2 x)) 0.15 / 0.20 mm - engine: S54 Can be ordered only as a set (order number 0 490 942).**

1 = 0490943 Holder

NOTE: **Can be ordered only as a set (order number 0 490 942).**

2 = 0490944 Gauge

NOTE: **(Feeler gauges (5 Each)) 0.25 / 0.30 / 0.35 / 0.40 / 0.45 mm Available as a complete set only (order number 0 490 942).**

Fig. 330: Identifying Gauge (0490942)
Courtesy of BMW OF NORTH AMERICA, INC.

0495726 GAUGE

0495726 118510 Gauge Mechanical tool

NOTE: **For securing oil spray nozzles**

Storage Location

B20

SI number

01 20 06 (299)

Fig. 331: Identifying Gauge (0495726)
Courtesy of BMW OF NORTH AMERICA, INC.

0490892 GAUGE

0490892 112445 Gauge AM

NOTE: **(Gauge for exhaust side 1...4) Setpoint value 3.5Â°**

cardiagn.com

Fig. 332: Identifying Gauge (0490892)
Courtesy of BMW OF NORTH AMERICA, INC.

0490944 GAUGE

0490944 113162 Gauge AM

Fig. 333: Identifying Gauge (0490944)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Feeler gauges (5 Each)) 0.25 / 0.30 / 0.35 / 0.40 / 0.45 mm Available as a complete set only (order number 0 490 942).**

0490951 GAUGE

0490951 113230 Gauge Mechanical tool

NOTE: **(Angle of rotation master disc) For fitting onto the vibration damper during torsion angle adjustment of the central bolt**

Storage Location

Z5

SI number

01 07 88 (972)

Fig. 334: Identifying Gauge (0490951)
Courtesy of BMW OF NORTH AMERICA, INC.

0495237 GAUGE

0495237 115410 Gauge Mechanical tool

NOTE: **(Gauge) For VANOS removal.**

Storage Location

A71

A72

SI number

01 02 05 (173)

Fig. 335: Identifying Gauge (0495237)
Courtesy of BMW OF NORTH AMERICA, INC.

0496111 GAUGE

0496111 118750 Gauge Mechanical tool

NOTE: **For positioning counterbalance shaft.**

Storage Location

cardiagn.com

B23

B24

SI number

01 05 07 (353)

Fig. 336: Identifying Gauge (0496111)
Courtesy of BMW OF NORTH AMERICA, INC.

0494603 GAUGE

0494603 118121 Gauge AM

NOTE: **(Gauge with thread). Beginning from 10/2010 only available as tool set 11 8 120 (0493580).**

Fig. 337: Identifying Gauge (0494603)
Courtesy of BMW OF NORTH AMERICA, INC.

0494488 GAUGE

0494488 117251 Gauge AM

NOTE: **(Gauge, exhaust side)**

Storage Location

B53

Fig. 338: Identifying Gauge (0494488)
Courtesy of BMW OF NORTH AMERICA, INC.

0491079 GAUGE

0491079 117320 Gauge Mechanical tool

NOTE: **(Gauge (8Â°)) For adjusting hook-type nozzles in crankcase during assembly**

Storage Location

B6

SI number

01 13 95 (002)

Fig. 339: Identifying Gauge (0491079)
Courtesy of BMW OF NORTH AMERICA, INC.

0495181 GAUGE

0495181 115382 Gauge AM

NOTE: **(Gauge, cylinder 6-10). Available as part of complete special tool 11 5 380 = 0495132 only.**

cardiagn.com

Fig. 340: Identifying Gauge (0495181)
Courtesy of BMW OF NORTH AMERICA, INC.

0490953 GAUGE

0490953 113241 Gauge AM

NOTE: **(Gauge for inlet side)**

Fig. 341: Identifying Gauge (0490953)
Courtesy of BMW OF NORTH AMERICA, INC.

0495004 GAUGE

0495004 114280 Gauge Minimum set: Mechanical tools AM

NOTE: **For locating camshaft in TDC setting.**

Storage Location

B52

SI number

01 17 04 (130)

Consisting of:

1. 0495005 Gauge

   NOTE: **2 pieces per packaging unit**

   Fig. 342: Identifying Gauge (0495004)
   Courtesy of BMW OF NORTH AMERICA, INC.

2. 0495006 Adapter
3. 0495007 Clip
4. 0495723 Screw

   NOTE: **2 pieces per packaging unit = set of screws M6 engine: N54**

5. 0496673 Bridge

   NOTE: **For securing camshaft at TDC.**

0493749 GAUGE

0493749 119130 Gauge AM

NOTE: **(Setting gauge) With lead angles for timing diagram**

Storage Location

B42

SI number

cardiagn.com

01 15 00 (609)

Consisting of:

1. 0494606 Gauge

NOTE: **(Gauge, 1 degree). Beginning from 10/2010 only available as tool set 11 9 130 (0493749).**

Fig. 343: Identifying Gauge (0493749)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0494607 Pin

NOTE: **(Lock pin) (not shown). Beginning from 10/2010 only available as tool set 11 9 130 (0493749).**

0490954 GAUGE

0490954 113242 Gauge AM

NOTE: **(Gauge for exhaust side)**

Fig. 344: Identifying Gauge (0490954)
Courtesy of BMW OF NORTH AMERICA, INC.

0491085 GAUGE

0491085 117341 Gauge AM

NOTE: **(Gauge 1.5Â° (basic body)) Engine: S50**

Fig. 345: Identifying Gauge (0491085)
Courtesy of BMW OF NORTH AMERICA, INC.

0495132 GAUGE

0495132 115380 Gauge AM

NOTE: **For VANOS basic setting.**

Storage Location

A71

SI number

01 02 05 (173)

Consisting of:

1. 0495180 Gauge

NOTE: **(Gauge, cylinder 1-5). Remaining inventories will be sold off, followed by discontinuation and then available as part of complete special tool 11 5 380 = 0495132 only.**

cardiagn.com

Fig. 346: Identifying Gauge (0495132)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **0495181** Gauge

NOTE: **(Gauge, cylinder 6-10). Available as part of complete special tool 11 5 380 = 0495132 only.**

0495563 GAUGE

0495563 110492 Gauge AM

NOTE: **(Gauge, exhaust side) Only available via complete tool set 11 0 490 = 83 30 0 495 561 - status 29.11.2011**

SI number

01 04 06 (246)

Fig. 347: Identifying Gauge (0495563)
Courtesy of BMW OF NORTH AMERICA, INC.

0490889 GAUGE

0490889 112442 Gauge AM

NOTE: **(Gauge for intake side 5...8)**

Fig. 348: Identifying Gauge (0490889)
Courtesy of BMW OF NORTH AMERICA, INC.

0494489 GAUGE

0494489 117252 Gauge AM

NOTE: **(Gauge, intake side)**

Storage Location

B53

Fig. 349: Identifying Gauge (0494489)
Courtesy of BMW OF NORTH AMERICA, INC.

2212830 GAUGE

2212830 Gauge Minimum set: Mechanical tools Mechanical tool

NOTE: **To secure the variable camshaft timing control (VANOS) at top dead center.**

Storage Location

A29

A30

SI number

cardiagn.com

01 05 11 (692)

Fig. 350: Identifying Gauge (2212830)
Courtesy of BMW OF NORTH AMERICA, INC.

0490888 GAUGE

0490888 112441 Gauge AM

NOTE: **(Gauge for intake side 1...4)**

Fig. 351: Identifying Gauge (0490888)
Courtesy of BMW OF NORTH AMERICA, INC.

0495008 GAUGE

0495008 114290 Gauge Minimum set: Mechanical tools Mechanical tool

NOTE: **For disconnecting camshaft sensor gears.**

Storage Location

A51

A52

SI number

01 17 04 (130)

Fig. 352: Identifying Gauge (0495008)
Courtesy of BMW OF NORTH AMERICA, INC.

0495219 GAUGE

0495219 116300 Gauge Minimum set: Mechanical tools Mechanical tool

NOTE: **For adjusting distance dimension of U-socket on turbocharger. Application: Engine M57TU 535d (Top)**

Storage Location

C52

SI number

01 05 05 (180)

Fig. 353: Identifying Gauge (0495219)
Courtesy of BMW OF NORTH AMERICA, INC.

0494306 GAUGE

0494306 117260 Gauge Mechanical tool

NOTE: **For disconnecting camshaft sensor wheels**

cardiagn.com

Storage Location

A53

A54

Fig. 354: Identifying Gauge (0494306)
Courtesy of BMW OF NORTH AMERICA, INC.

2212825 GAUGE

2212825 Gauge Minimum set: Mechanical tools Mechanical tool

NOTE: **For disconnecting oil pump/balancing shaft at top dead center.**

Storage Location

A30

SI number

01 05 11 (692)

Fig. 355: Identifying Gauge (2212825)
Courtesy of BMW OF NORTH AMERICA, INC.

0495164 GAUGE

0495164 115301 Gauge AM

NOTE: **(Gauge, cylinder 1-5). Can no longer be ordered separately. Only available as part of set 11 5 300 = 83 30 0 495 124.**

Storage Location

A71

Fig. 356: Identifying Gauge (0495164)
Courtesy of BMW OF NORTH AMERICA, INC.

0495124 GAUGE

0495124 115300 Gauge AM

NOTE: **For locating camshaft in TDC setting.**

Storage Location

A71

SI number

01 02 05 (173)

Consisting of:

1. 0495164 Gauge

cardiagn.com

Fig. 357: Identifying Gauge (0495124)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: (Gauge, cylinder 1-5). Can no longer be ordered separately. Only available as part of set 11 5 300 = 83 30 0 495 124.

2. 0495165 Gauge

NOTE: (Gauge, cylinder 6-10). Can no longer be ordered separately. Only available as part of set 11 5 300 = 83 30 0 495 124.

0495000 GAUGE

0495000 114251 Gauge AM

NOTE: Available only as a complete tool set 11 4 250 (83 30 0 494 999) - as of 22.02.12.

Storage Location

A52

Fig. 358: Identifying Gauge (0495000)
Courtesy of BMW OF NORTH AMERICA, INC.

0490895 GAUGE

0490895 112460 Gauge Mechanical tool

NOTE: (Test gauge for camshafts)

Fig. 359: Identifying Gauge (0490895)
Courtesy of BMW OF NORTH AMERICA, INC.

2288054 GAUGE

2288054 Gauge Mechanical tool

NOTE: For positioning the counterbalance shafts during installation.

Storage Location

C56

SI number

01 06 14 (076)

Fig. 360: Identifying Gauge (2288054)
Courtesy of BMW OF NORTH AMERICA, INC.

0494604 GAUGE

0494604 118122 Gauge AM

NOTE: (Gauge with bore hole). Beginning from 10/2010 only available as tool set 11 8 120 (0493580).

cardiagn.com

Fig. 361: Identifying Gauge (0494604)
Courtesy of BMW OF NORTH AMERICA, INC.

0496112 GAUGE

0496112 118760 Gauge Minimum set: Mechanical tools Mechanical tool

NOTE: **For securing camshaft at TDC.**

Storage Location

B24

SI number

01 05 07 (353)

Fig. 362: Identifying Gauge (0496112)
Courtesy of BMW OF NORTH AMERICA, INC.

0496124 GAUGE

0496124 118791 Gauge AM

SI number

01 05 07 (353)

Fig. 363: Identifying Gauge (0496124)
Courtesy of BMW OF NORTH AMERICA, INC.

0490886 GAUGE

0490886 112430 Gauge Mechanical tool

NOTE: **For checking the camshaft insertion position when removing and installing the camshafts**

Storage Location

C5

SI number

01 05 92 (507)

Fig. 364: Identifying Gauge (0490886)
Courtesy of BMW OF NORTH AMERICA, INC.

0496086 GUARD

0496086 111242 Guard Minimum set: Mechanical tools AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 11 1 240 (83 30 0 496 084) - as of 30.01.12**

Storage Location

A22

cardiagn.com

SI number

01 01 07 (333)

Fig. 365: Identifying Guard (0496086)
Courtesy of BMW OF NORTH AMERICA, INC.

0490596 GUARD

0490596 110163 Guard AM

Replaced by: 83300490613

NOTE: **(Rubber protection) Still available as replacement Discontinuation and replaced by 11 0 220 (0 490 613)**

cardiagn.com

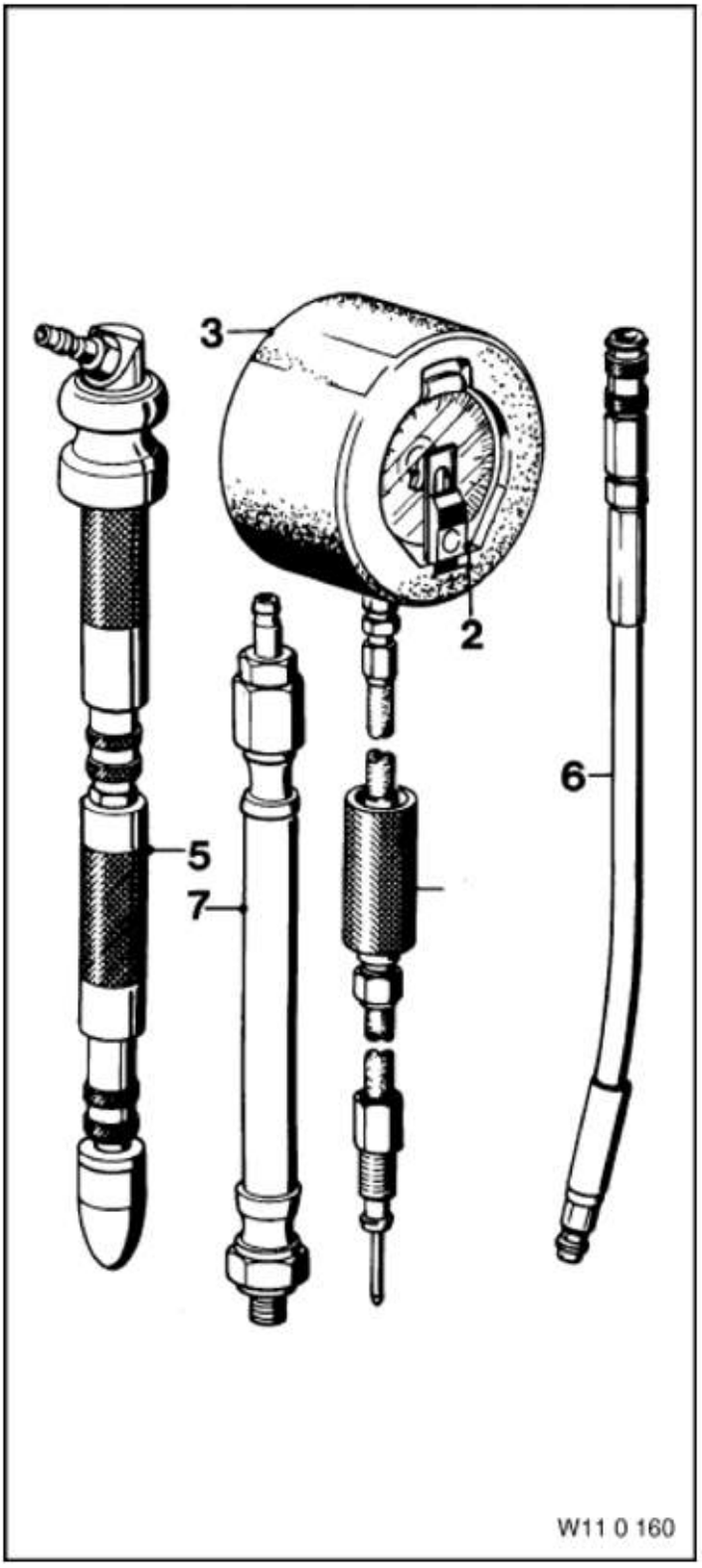


Fig. 366: Identifying Guard (0490596)
Courtesy of BMW OF NORTH AMERICA, INC.

0490607 GUARD

0490607 110200 Guard Mechanical tool

NOTE: **(plastic protector) For the guide for the HVA (hydraulic valve clearance adjuster) elements (12 pieces)**

SI number

01 09 91 (416)

cardiagn.com

Fig. 367: Identifying Guard (0490607)
Courtesy of BMW OF NORTH AMERICA, INC.

0490922 HANDLE

0490922 113111 Handle AM

Storage Location

Z1

Z2

Fig. 368: Identifying Handle (0490922)
Courtesy of BMW OF NORTH AMERICA, INC.

0490929 HANDLE

0490929 113121 Handle AM

cardiagn.com

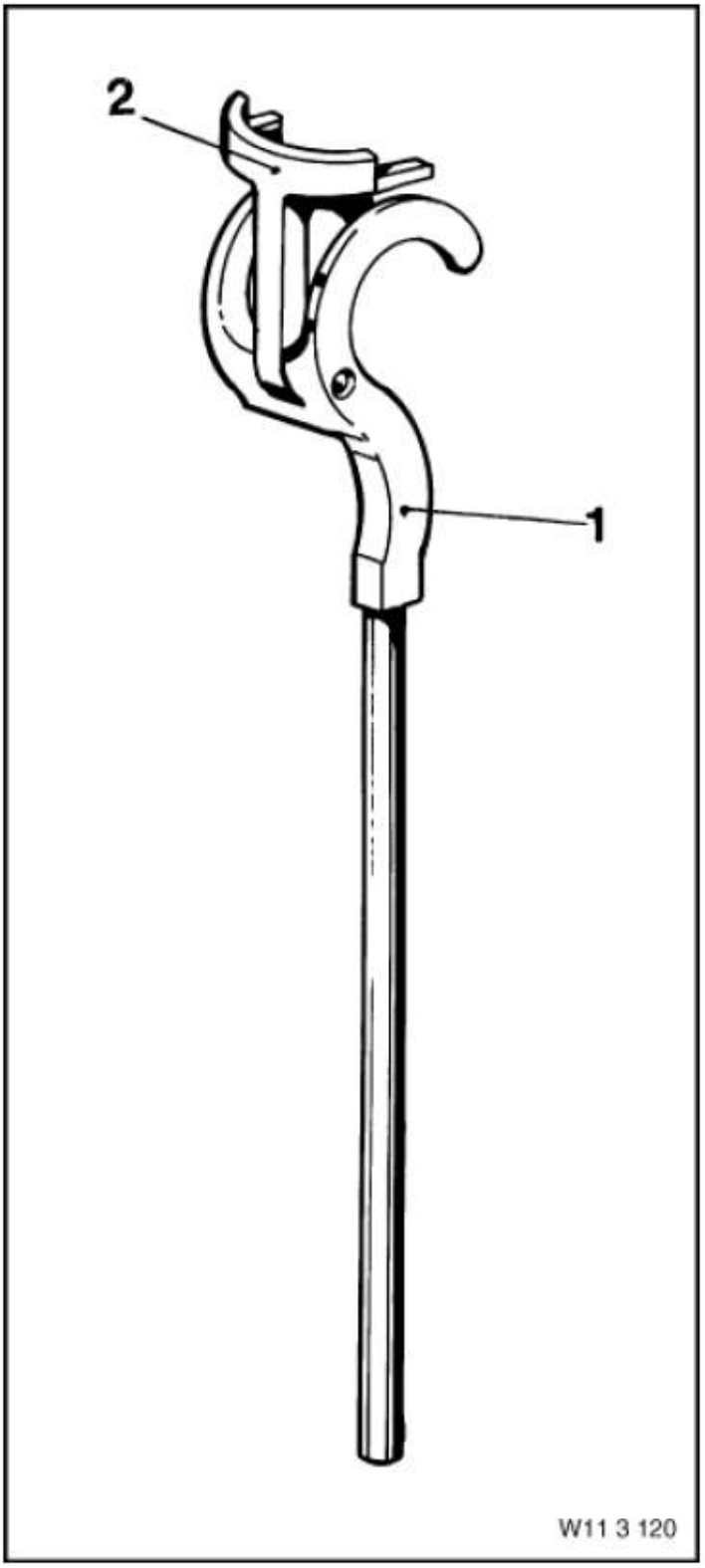


Fig. 369: Identifying Handle (0490929)
Courtesy of BMW OF NORTH AMERICA, INC.

0496661 HEXAGON SOCKET

0496661 117170 Hexagon socket Minimum set: Mechanical tools Mechanical tool

NOTE: **Hexagon socket wrench SW4, for blocking Valvetronic servomotor when dismantling cylinder head.**

Storage Location

B27

cardiagn.com

SI number

01 18 09 (578)

Fig. 370: Identifying Hexagon Socket (0496661)
Courtesy of BMW OF NORTH AMERICA, INC.

0490841 HOLDER

0490841 112150 Holder AM

NOTE: **(Counter support) For locking the crankshaft when slackening and tightening the central bolt**

Storage Location

B2

C2

Fig. 371: Identifying Holder (0490841)
Courtesy of BMW OF NORTH AMERICA, INC.

0490898 HOLDER

0490898 112490 Holder Mechanical tool

NOTE: **(Counter support) for retaining the vibration damper when releasing and tightening central bolt, sale of existing inventories and then discontinue**

Storage Location

X10

SI number

01 12 92 (606)

Fig. 372: Identifying Holder (0490898)
Courtesy of BMW OF NORTH AMERICA, INC.

0490854 HOLDER

0490854 112230 Holder AM

NOTE: **(Counter support) For locking vibration damper in position when releasing and tightening central bolt**

Storage Location

X1

Y1

SI number

01 02 87 (721)

cardiagn.com

Fig. 373: Identifying Holder (0490854)
Courtesy of BMW OF NORTH AMERICA, INC.

0490855 HOLDER

0490855 112240 Holder AM

NOTE: **(counter support) For locking the hub when loosening or tightening the central bolt**

Storage Location

X1

Y1

SI number

01 07 88 (972)

Fig. 374: Identifying Holder (0490855)
Courtesy of BMW OF NORTH AMERICA, INC.

0495753 HOLDER

0495753 118660 Holder Minimum set: Mechanical tools Mechanical tool

NOTE: **(Counter support) For locking flywheel with A-transmission installed.**

Storage Location

A19

B19

C19

SI number

01 20 06 (299)

Fig. 375: Identifying Holder (0495753)
Courtesy of BMW OF NORTH AMERICA, INC.

0490845 HOLDER

0490845 112190 Holder AM

NOTE: **(Counter support) For retaining the intermediate shaft and camshaft**

Consisting of:

1. 0490846 Holder
2. 0490847 Screw

NOTE: **(Screw (2 pieces))**

cardiagn.com

Fig. 376: Identifying Holder (0490845)
Courtesy of BMW OF NORTH AMERICA, INC.

0491107 HOLDER

0491107 118021 Holder AM

NOTE: (holder) Engine: S50/B30 Only available as part of complete set

Fig. 377: Identifying Holder (0491107)
Courtesy of BMW OF NORTH AMERICA, INC.

0496140 HOLDER

0496140 118831 Holder AM

NOTE: (Installation bracket)

Storage Location

B24

SI number

01 05 07 (353)

Fig. 378: Identifying Holder (0496140)
Courtesy of BMW OF NORTH AMERICA, INC.

0493802 HOLDER

0493802 118200 Holder Minimum set: Mechanical tools Mechanical tool

NOTE: (Counter support (part 2)) For gripping and pulling off from the vibration damper

Storage Location

C41

SI number

01 08 00 (579)

Fig. 379: Identifying Holder (0493802)
Courtesy of BMW OF NORTH AMERICA, INC.

0495010 HOLDER

0495010 114491 Holder AM

NOTE: (Installation bracket)

Storage Location

A51

cardiagn.com

Fig. 380: Identifying Holder (0495010)
Courtesy of BMW OF NORTH AMERICA, INC.

0493715 HOLDER

0493715 117394 Holder AM

NOTE: **Liquidation of current inventory with pressure spindle and mounting screw for 11 7 393 then available for ordering only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

0491102 HOLDER

0491102 118001 Holder AM

NOTE: **(Holder) Discontinuation and replaced by 36 1 030. (0 493 829)**

0491108 HOLDER

0491108 118022 Holder AM

NOTE: **(Holder) E36/M51/M52, E46/M52TU/M54, E85/M54, E46/M57TU Only available as part of complete set**

Fig. 381: Identifying Holder (0491108)
Courtesy of BMW OF NORTH AMERICA, INC.

0490941 HOLDER

0490941 113150 Holder AM

NOTE: **For pressing down bucket tappets while removing and installing valve setting plates - Models without catalytic converter**

Storage Location

X2

Y2

Consisting of:

1. 0495613 Basic body

   NOTE: **Not available individually, but as part of complete tool set 11 3 150 = 0490941 only.**

2. 0495614 Hook

   NOTE: **(Hook on exhaust side) Not available individually, but only via complete tool set 11 3 150 = 0490941.**

Fig. 382: Identifying Holder (0490941)
Courtesy of BMW OF NORTH AMERICA, INC.

3. 0495615 Hook

cardiagn.com

NOTE: **(Hook on intake side) not available individually, as part of set of special tools 11 3 150 = 0490941 only.**

0490894 HOLDER

0490894 112450 Holder Mechanical tool

NOTE: **(counter support) For locking the hub when loosening or tightening the central bolt**

Storage Location

A1

B1

SI number

01 07 93 (674)

Fig. 383: Identifying Holder (0490894)
Courtesy of BMW OF NORTH AMERICA, INC.

0493442 HOLDER

0493442 110270 Holder Mechanical tool

NOTE: **(Counter support) For gripping when releasing and tightening the central bolt**

Storage Location

B14

SI number

01 23 98 (390)

Fig. 384: Identifying Holder (0493442)
Courtesy of BMW OF NORTH AMERICA, INC.

0493372 HOLDER

0493372 114306 Holder AM

NOTE: **(Die holder) engine: M60, M62**

cardiagn.com

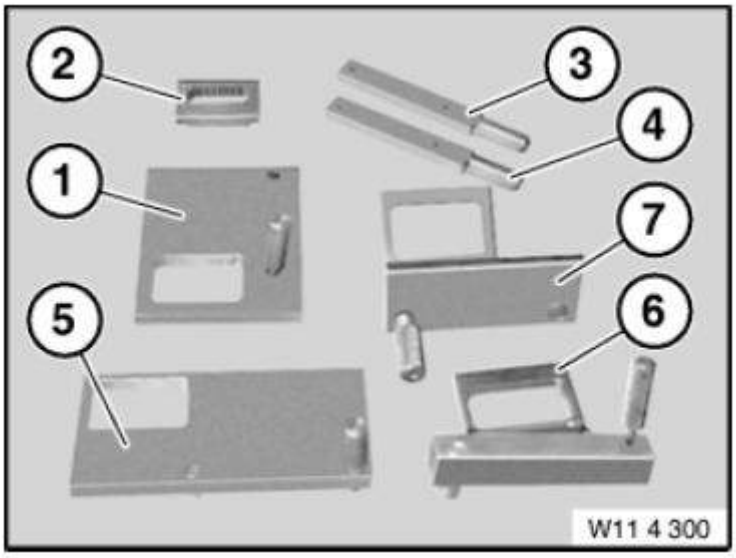


Fig. 385: Identifying Holder (0493372)
Courtesy of BMW OF NORTH AMERICA, INC.

0490846 HOLDER

0490846 112191 Holder AM

Fig. 386: Identifying Holder (0490846)
Courtesy of BMW OF NORTH AMERICA, INC.

0495752 HOLDER

0495752 118650 Holder Minimum set: Mechanical tools AM

NOTE: **(Counter support) For removing and installing ring gear of oil pump drive.**

Storage Location

C19

C20

SI number

01 20 06 (299)

Fig. 387: Identifying Holder (0495752)
Courtesy of BMW OF NORTH AMERICA, INC.

0490822 HOLDER

0490822 112070 Holder Mechanical tool

NOTE: **(Counter support) For locking the flywheel**

Storage Location

C5

SI number

cardiagn.com

01 02 87 (721)

Fig. 388: Identifying Holder (0490822)
Courtesy of BMW OF NORTH AMERICA, INC.

2354958 HOLDER

2354958 Holder AM

NOTE: **For exchanging the top timing chain (included in tool set 2 354 985).**

SI number

01 24 13 (990)

Fig. 389: Identifying Holder (2354958)
Courtesy of BMW OF NORTH AMERICA, INC.

0495744 HOLDER

0495744 118561 Holder AM

NOTE: **(Assembly holder) Remaining inventories will be sold off followed by discontinuation - then longer available individually. Available in complete special tool set 83 30 0 495 743 - 11 8 560 only.**

Storage Location

A19

A20

Fig. 390: Identifying Holder (0495744)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number

01 20 06 (299)

0491027 HOLDER

0491027 114301 Holder AM

NOTE: **(Die holder) engine: M50, M52**

cardiagn.com

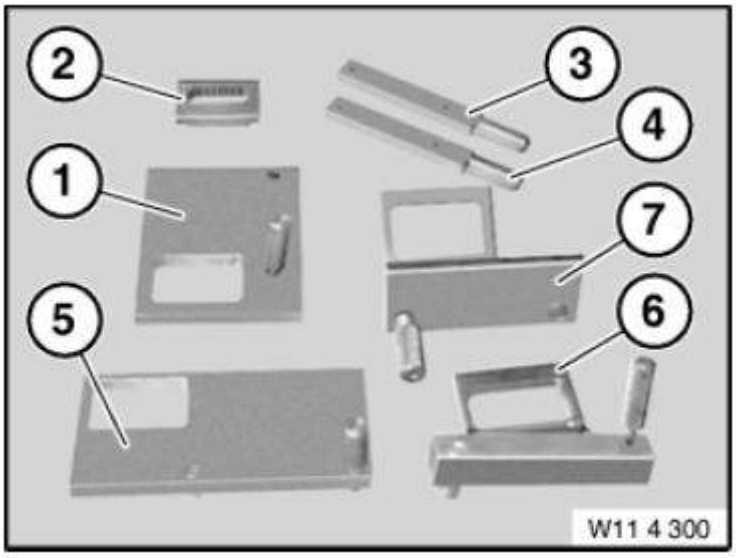


Fig. 391: Identifying Holder (0491027)
Courtesy of BMW OF NORTH AMERICA, INC.

0490859 HOLDER

0490859 112280 Holder Mechanical tool

NOTE: **(Counter support) For locking the toothed belt pulley on the intermediate shaft - model year: from 87**

Storage Location

Z3

SI number

01 01 87 (670)

Fig. 392: Identifying Holder (0490859)
Courtesy of BMW OF NORTH AMERICA, INC.

0490943 HOLDER

0490943 113161 Holder AM

Fig. 393: Identifying Holder (0490943)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Can be ordered only as a set (order number 0 490 942).**

0495275 HOLDER

0495275 116111 Holder AM

NOTE: **(Assembly holder) Not available individually, but as part of set 11 6 110 (0495274) only.**

Storage Location

C52

cardiagn.com

Fig. 394: Identifying Holder (0495275)
Courtesy of BMW OF NORTH AMERICA, INC.

0493710 HOLDER

0493710 118190 Holder Minimum set: Mechanical tools AM

NOTE: **(Counter support (part 1)) For counter-holding on vibration damper**

Storage Location

A41

B41

C41

SI number

01 08 00 (579)

Fig. 395: Identifying Holder (0493710)
Courtesy of BMW OF NORTH AMERICA, INC.

0491103 HOLDER

0491103 118002 Holder AM

NOTE: **(Holder) Discontinuation and replaced by 36 1 030. (0 493 829)**

0493283 HOLDER

0493283 113244 Holder AM

NOTE: **For securing the camshaft holding fixture on the cylinder head**

Storage Location

Y9

Z9

Fig. 396: Identifying Holder (0493283)
Courtesy of BMW OF NORTH AMERICA, INC.

0490853 HOLDER

0490853 112220 Holder Mechanical tool

Replaced by: 83300490855

NOTE: **(Counter support) - Nov. 88 Replaced by 11 2 240 (0 490 855)**

0493371 HOLDER

0493371 114305 Holder AM

NOTE: **(Die holder) engine: M40, M42, M43, M44**

cardiagn.com

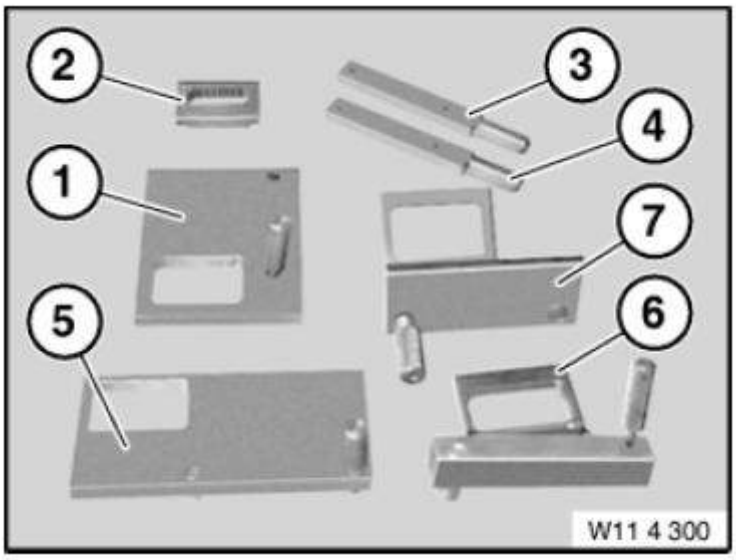


Fig. 397: Identifying Holder (0493371)
Courtesy of BMW OF NORTH AMERICA, INC.

0493373 HOLDER

0493373 114307 Holder AM

NOTE: **(Die holder) engine: M70, M73**

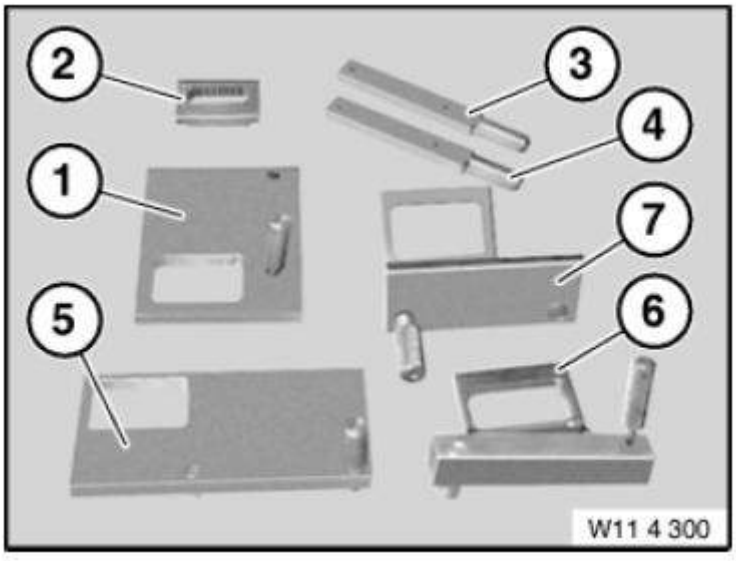


Fig. 398: Identifying Holder (0493373)
Courtesy of BMW OF NORTH AMERICA, INC.

0493843 HOLDER

0493843 110280 Holder Mechanical tool

NOTE: **(Counter support) For gripping when releasing and tightening the central bolt**

Storage Location

A42

SI number

01 15 00 (609)

cardiagn.com

Fig. 399: Identifying Holder (0493843)
Courtesy of BMW OF NORTH AMERICA, INC.

0494034 HOLDER

0494034 119261 Holder Minimum set: Mechanical tools AM

NOTE: (Individual counter support)

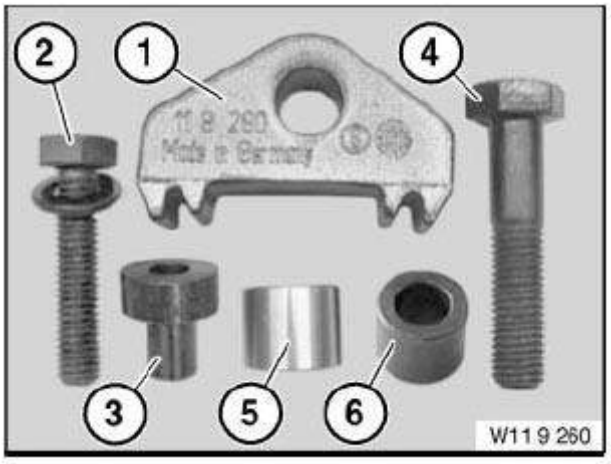


Fig. 400: Identifying Holder (0494034)
Courtesy of BMW OF NORTH AMERICA, INC.

0490848 HOLDER

0490848 112200 Holder Mechanical tool

Replaced by: 83300490855

NOTE: (Counter support) For retaining the vibration damper hub -, model year: 86 Replaced by 11 2 240 (0 490 855)

Fig. 401: Identifying Holder (0490848)
Courtesy of BMW OF NORTH AMERICA, INC.

0490840 HOLDER

0490840 112140 Holder Mechanical tool

NOTE: (Counter support) For locking flywheel in position with transmission removed

Fig. 402: Identifying Holder (0490840)
Courtesy of BMW OF NORTH AMERICA, INC.

0493587 HOLDER

0493587 118180 Holder Minimum set: Mechanical tools AM

NOTE: (Counter support) Blocking flywheel when releasing and tightening down central bolts on vibration absorber

Storage Location

cardiagn.com

C45

C46

SI number

01 12 99 (452)

Consisting of:

1. 0494432 Basic body

   NOTE: (Basic body) E65/M67, E38/M67 Discontinuation Replaced by 11 8 183 (0 494 434)

2. 0494433 Shaped part

   NOTE: (Shaped part)

3. 0494434 Basic body
4. 0494435 Adapter

   NOTE: E65/M67

5. 0494716 Adapter

   NOTE: (Adapter with adjusting sleeve) E46 M47TU

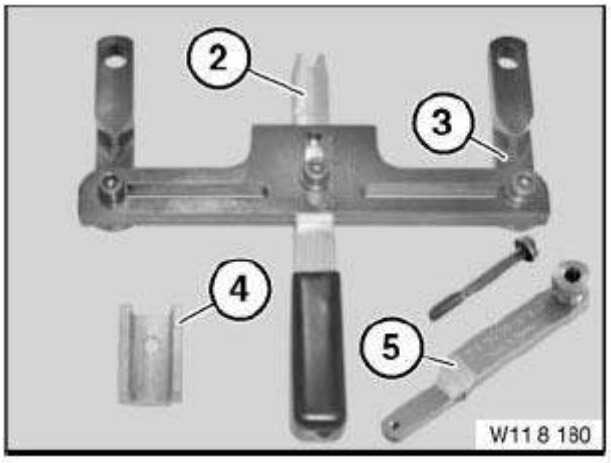


Fig. 403: Identifying Holder (0493587)
Courtesy of BMW OF NORTH AMERICA, INC.

0490835 HOLDER

0490835 112120 Holder AM

NOTE: (Counter support) For locking flywheel in position with transmission installed

Storage Location

X2

Y2

cardiagn.com

Fig. 404: Identifying Holder (0490835)
Courtesy of BMW OF NORTH AMERICA, INC.

0493938 HOLDER

0493938 119260 Holder Minimum set: Mechanical tools AM

NOTE: **(Counter support with screw connection) For holding the flywheel when gearbox is removed**

Storage Location

B43

SI number

01 01 01 (662)

Consisting of:

1. 0494034 Holder

   NOTE: **(Individual counter support)**

2. 0494035 Screw

   NOTE: **(Bolt (thread M10) with washer) For screwing counter support**

3. 0494129 Bush

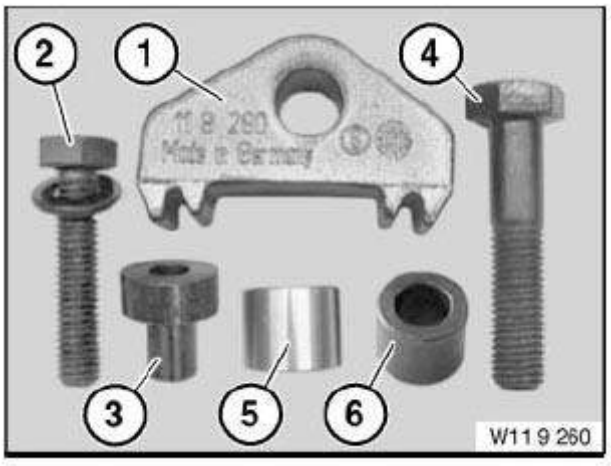
   NOTE: **(Bush for counter support) For counter support, for retaining flywheel when gearbox is removed Engine: N62, N73**

4. 0494130 Screw

   NOTE: **(Bolt (thread M12)) For counter support for retaining flywheel when gearbox is removed**

5. 0494793 Bush
6. 0495216 Bush

   NOTE: **For counter support, for retaining flywheel when gearbox is removed Engine: M57TU2**



cardiagn.com

Fig. 405: Identifying Holder (0493938)
Courtesy of BMW OF NORTH AMERICA, INC.

0495173 HOLDER

0495173 115341 Holder AM

NOTE: (Installation bracket)

Storage Location

A72

Fig. 406: Identifying Holder (0495173)
Courtesy of BMW OF NORTH AMERICA, INC.

0493940 HOLDER

0493940 119280 Holder Minimum set: Mechanical tools AM

NOTE: (Counter support) For the crankshaft when releasing/tightening the central bolt

Storage Location

A43

B43

C43

SI number

01 01 01 (662)

Fig. 407: Identifying Holder (0493940)
Courtesy of BMW OF NORTH AMERICA, INC.

0490885 HOLDER

0490885 112420 Holder AM

NOTE: (Counter support) For locking vibration damper in position when releasing and tightening central bolt

Storage Location

X1

Y1

SI number

01 11 94 (858)

Fig. 408: Identifying Holder (0490885)
Courtesy of BMW OF NORTH AMERICA, INC.

0496595 HOLDER

cardiagn.com

0496595 116130 Holder Mechanical tool

NOTE: **(counter support) For securing flywheel when releasing and tightening down screw connection of vibration absorber. Series: E90, E91, E92 with 4WD.**

Storage Location

A26

SI number

01 05 09 (519)

Fig. 409: Identifying Holder (0496595)
Courtesy of BMW OF NORTH AMERICA, INC.

0491046 HOLDER

0491046 115030 Holder Minimum set: Mechanical tools Mechanical tool

NOTE: **(counter support) For belt pulley on the water pump for loosening or tightening the fan / Model year: from 80**

Storage Location

B1

C1

Fig. 410: Identifying Holder (0491046)
Courtesy of BMW OF NORTH AMERICA, INC.

0490819 HOLDER

0490819 112040 Holder Mechanical tool

NOTE: **(Counter support) to loosen and tighten the belt pulley on the intermediate shaft**

Storage Location

X2

Fig. 411: Identifying Holder (0490819)
Courtesy of BMW OF NORTH AMERICA, INC.

0490825 HOLDER

0490825 112100 Holder Mechanical tool

NOTE: **(Counter support) For locking flywheel in position with transmission installed**

Storage Location

X2

Y2

cardiagn.com

Fig. 412: Identifying Holder (0490825)
Courtesy of BMW OF NORTH AMERICA, INC.

0495071 HOLDER

0495071 110290 Holder Minimum set: Mechanical tools Mechanical tool

NOTE: **(Counter support) For removing and installing triangular drive (vacuum pump) on crankcase.**

Storage Location

A52

SI number

01 17 04 (130)

Fig. 413: Identifying Holder (0495071)
Courtesy of BMW OF NORTH AMERICA, INC.

0496109 HOLDING SLEEVE

0496109 118741 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **(Extractor sleeve) replaced by 11 8 031 (0 496 725)**

SI number

01 05 07 (353)

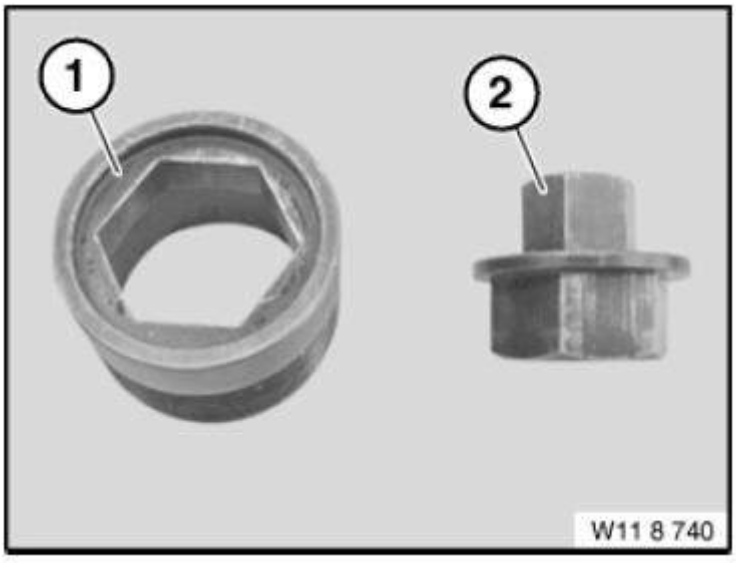


Fig. 414: Identifying Holding Sleeve (0496109)
Courtesy of BMW OF NORTH AMERICA, INC.

0496813 HOLDING SLEEVE

0496813 117224 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **M10 for N47TU/N57TU discontinued, available as part of set of special tools only**

cardiagn.com

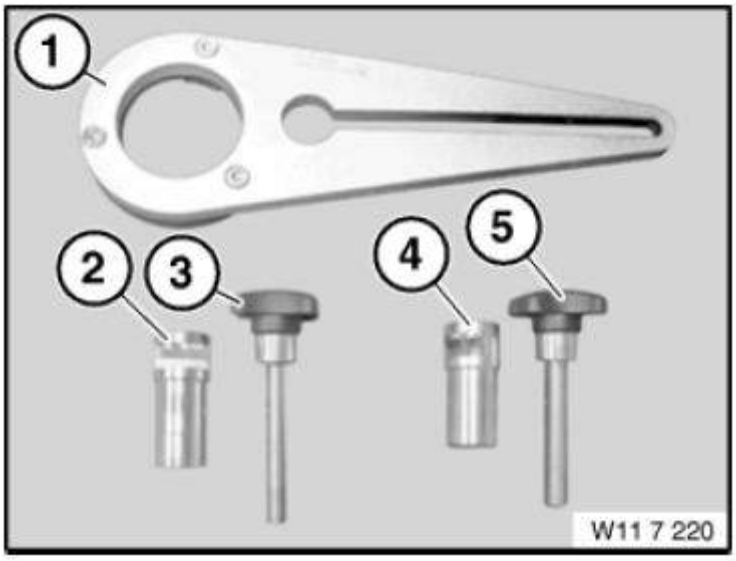


Fig. 415: Identifying Holding Sleeve (0496813)
Courtesy of BMW OF NORTH AMERICA, INC.

0496757 HOLDING SLEEVE

0496757 118031 Holding sleeve Minimum set: Mechanical tools AM

NOTE: Replaces SWZ11 8 741 from 08/2009, 09/2011 no longer available individually. Can only be ordered as part of the complete tool 83 30 0 496 725 (special tool number 11 8 030).

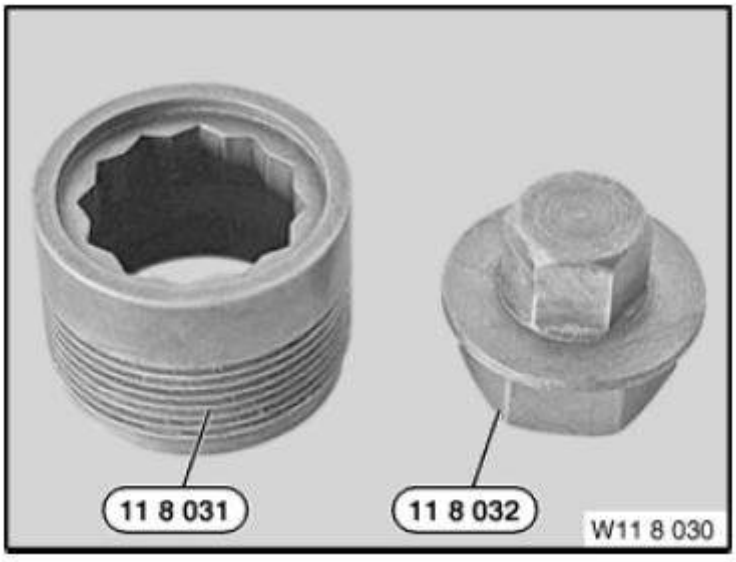


Fig. 416: Identifying Holding Sleeve (0496757)
Courtesy of BMW OF NORTH AMERICA, INC.

0493627 HOLDING SLEEVE

0493627 114221 Holding sleeve Minimum set: Mechanical tools AM

NOTE: Available only as a complete tool set 11 4 220 (83 30 0 491 025) - as of 30.01.12.

Fig. 417: Identifying Holding Sleeve (0493627)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496137 HOLDING SLEEVE

0496137 118815 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **(Slip sleeve) Liquidation of existing inventory and then available only via complete tool set 11 8 810 = 83 30 0 496 132 - status 09.12.2011**

SI number

01 05 07 (353)

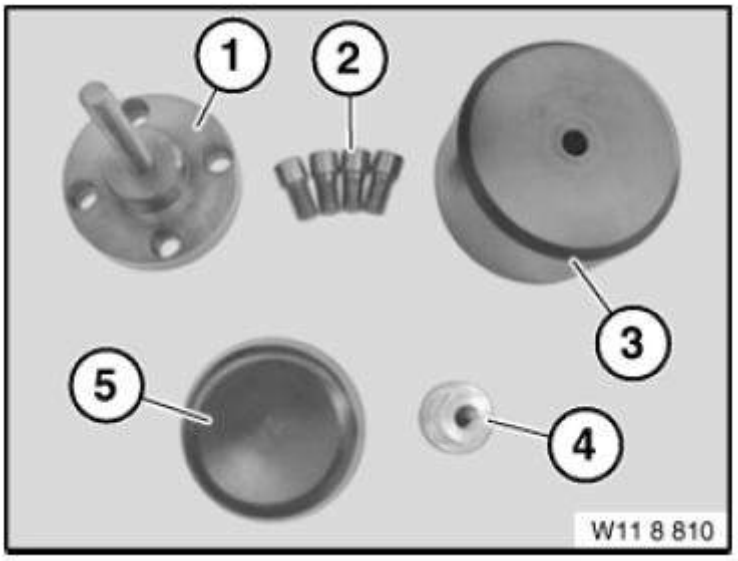


Fig. 418: Identifying Holding Sleeve (0496137)
Courtesy of BMW OF NORTH AMERICA, INC.

0493980 HOLDING SLEEVE

0493980 118220 Holding sleeve Minimum set: Mechanical tools Mechanical tool

NOTE: **(sliding sleeve) For WDR (rear crankshaft)**

Storage Location

C81

SI number

01 05 01 (718)

Fig. 419: Identifying Holding Sleeve (0493980)
Courtesy of BMW OF NORTH AMERICA, INC.

0490938 HOLDING SLEEVE

0490938 113141 Holding sleeve AM

Fig. 420: Identifying Holding Sleeve (0490938)
Courtesy of BMW OF NORTH AMERICA, INC.

0496130 HOLDING SLEEVE

0496130 118803 Holding sleeve Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **(Thrust piece) sale of existing inventory and then available as part of complete tool set 11 8 800 = 83 30 0 496 127 only - as of 30.11.2011**

SI number

01 05 07 (353)

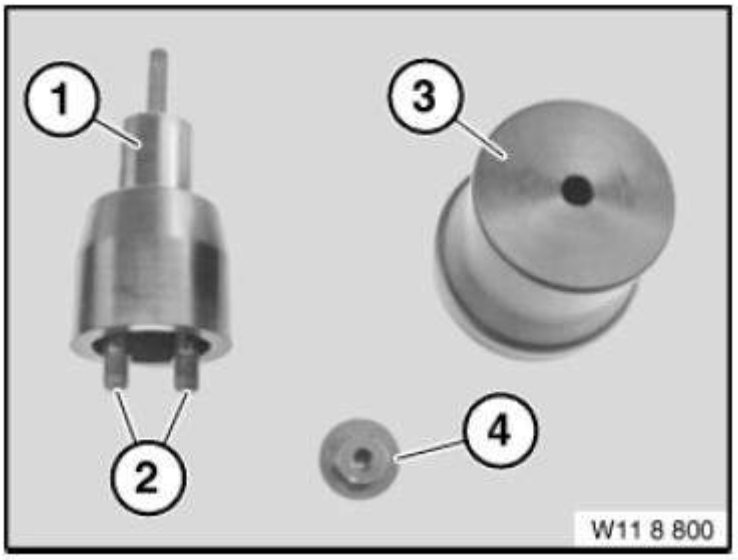


Fig. 421: Identifying Holding Sleeve (0496130)
Courtesy of BMW OF NORTH AMERICA, INC.

0490744 HOLDING SLEEVE

0490744 111360 Holding sleeve Mechanical tool

NOTE: **(Assembly sleeve) For fitting the valve stem seal, diameter 7 mm**

Fig. 422: Identifying Holding Sleeve (0490744)
Courtesy of BMW OF NORTH AMERICA, INC.

0496135 HOLDING SLEEVE

0496135 118813 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **(Thrust sleeve) Liquidation of existing inventory and then available only via complete tool set 11 8 810 = 83 30 0 496 132 - status 09.12.2011**

SI number

01 05 07 (353)

cardiagn.com

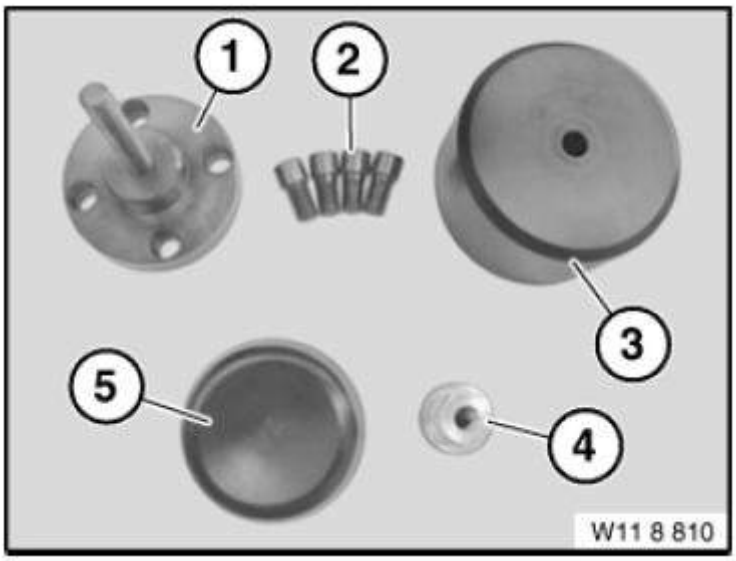


Fig. 423: Identifying Holding Sleeve (0496135)
Courtesy of BMW OF NORTH AMERICA, INC.

0491065 HOLDING SLEEVE

0491065 116020 Holding sleeve Mechanical tool

NOTE: **(Centering sleeves) for exhaust turbocharger exhaust manifold - discontinued since January 84**

0490743 HOLDING SLEEVE

0490743 111350 Holding sleeve Mechanical tool

Replaced by: 83300490744

NOTE: **(Assembly sleeves) For fitting the valve stem seal - Replaced by 11 1 360 (0 490 744)**

0494532 HOLDING SLEEVE

0494532 118505 Holding sleeve AM

NOTE: **Only available as part of complete tool set 11 8 500 (83 30 0 494 312).**

0490809 HOLDING SLEEVE

0490809 112014 Holding sleeve AM

NOTE: **Engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

cardiagn.com

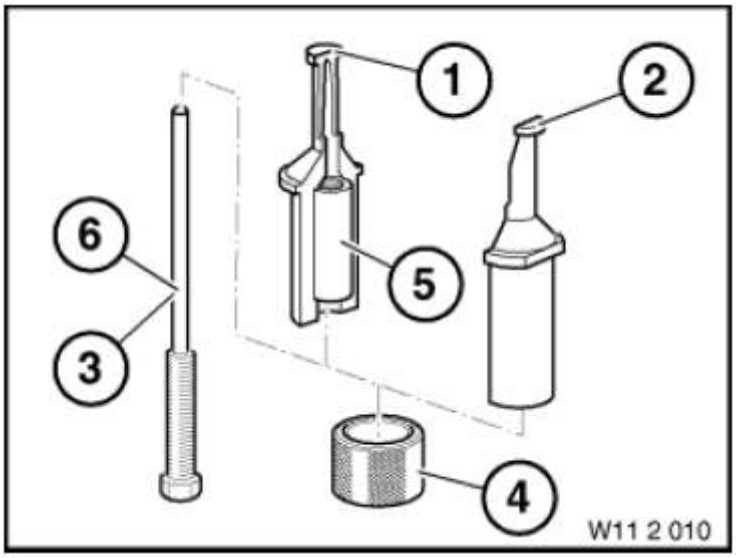


Fig. 424: Identifying Holding Sleeve (0490809)
Courtesy of BMW OF NORTH AMERICA, INC.

0490816 HOLDING SLEEVE

0490816 112024 Holding sleeve AM

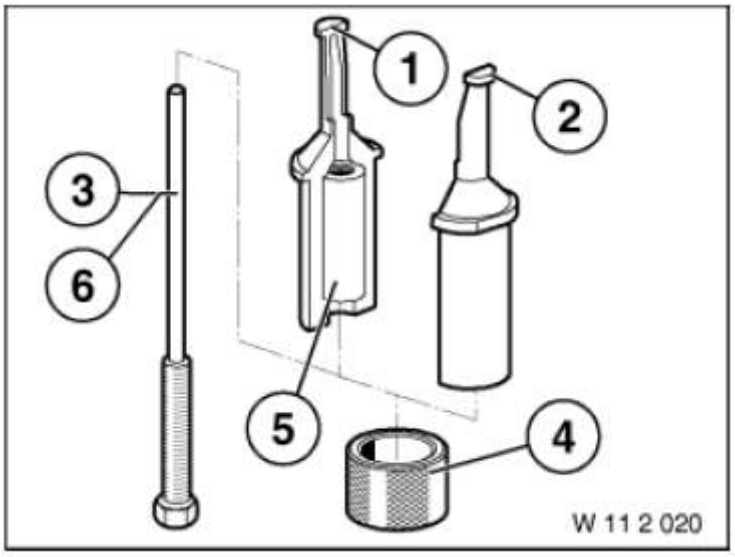


Fig. 425: Identifying Holding Sleeve (0490816)
Courtesy of BMW OF NORTH AMERICA, INC.

0490726 HOLDING SLEEVE

0490726 111220 Holding sleeve Minimum set: Mechanical tools Mechanical tool

NOTE: **(Pull-in sleeve) For radial seal ring in gear case cover (front crankshaft)**

Storage Location

A15

SI number

01 02 87 (721)

cardiagn.com

Fig. 426: Identifying Holding Sleeve (0490726)
Courtesy of BMW OF NORTH AMERICA, INC.

0493623 HOLDING SLEEVE

0493623 113393 Holding sleeve AM

Replaced by: 83300493548

NOTE: **Replaced by 11 4 230 (0 493 548)**

Fig. 427: Identifying Holding Sleeve (0493623)
Courtesy of BMW OF NORTH AMERICA, INC.

0495167 HOLDING SLEEVE

0495167 115312 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **(Pressure sleeve) Remaining inventories will be sold off, then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 125 (special tool number 11 5 310).**

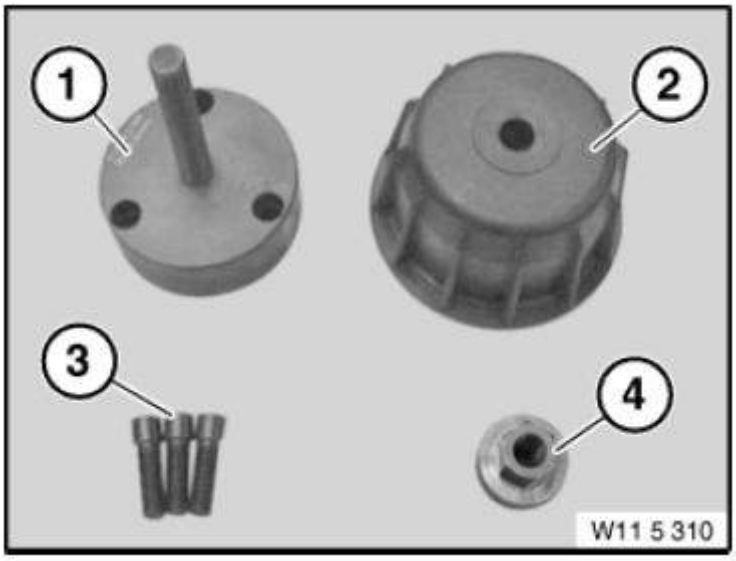


Fig. 428: Identifying Holding Sleeve (0495167)
Courtesy of BMW OF NORTH AMERICA, INC.

0490829 HOLDING SLEEVE

0490829 112113 Holding sleeve AM

Replaced by: 83300490504

NOTE: **(Guide sleeve) Replaced by 00 9 120 (0 490 504)**

cardiagn.com

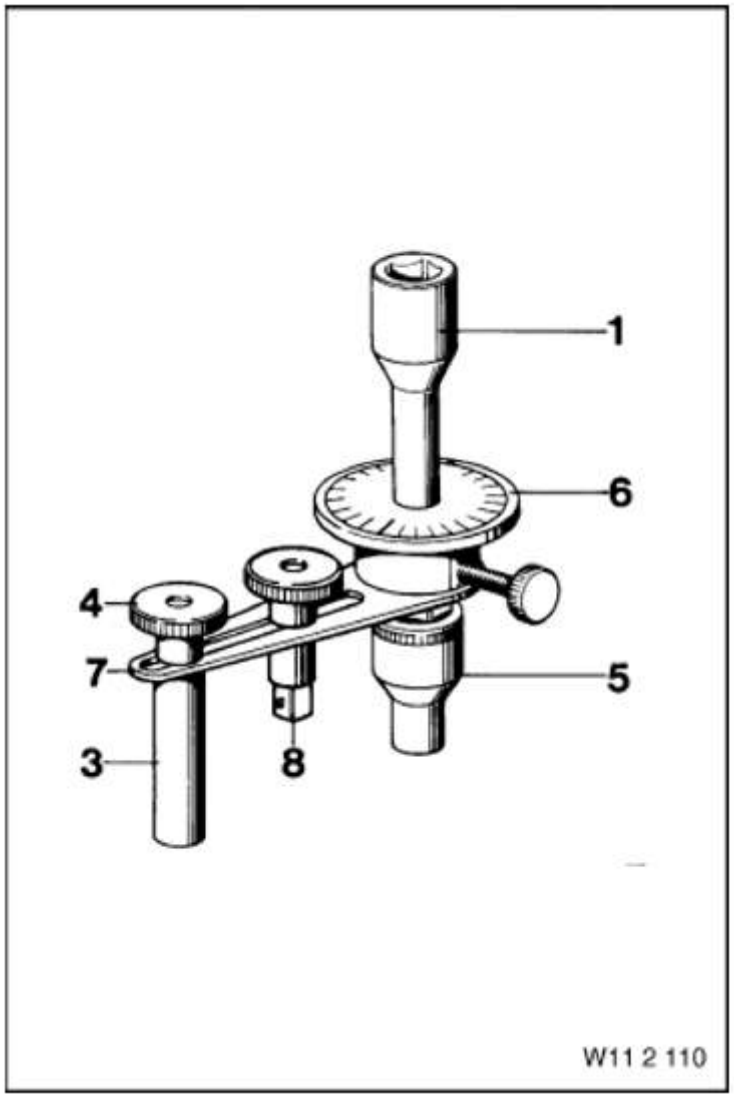


Fig. 429: Identifying Holding Sleeve (0490829)
Courtesy of BMW OF NORTH AMERICA, INC.

0490746 HOLDING SLEEVE

0490746 111380 Holding sleeve Mechanical tool

NOTE: **(Assembly sleeve) For fitting the valve stem seal, diameter 7 mm**

Fig. 430: Identifying Holding Sleeve (0490746)
Courtesy of BMW OF NORTH AMERICA, INC.

0490742 HOLDING SLEEVE

0490742 111340 Holding sleeve Mechanical tool

NOTE: **(assembly sleeve) For fitting the valve stem seal, diameter 8 mm**

Fig. 431: Identifying Holding Sleeve (0490742)
Courtesy of BMW OF NORTH AMERICA, INC.

0490738 HOLDING SLEEVE

0490738 111302 Holding sleeve AM

cardiagn.com

NOTE: **(Guide sleeve) Replaced by 00 9 120 (0 490 504)**

Fig. 432: Identifying Holding Sleeve (0490738)
Courtesy of BMW OF NORTH AMERICA, INC.

0490949 HOLDING SLEEVE

0490949 113210 Holding sleeve Mechanical tool

NOTE: **(Centering sleeve) For installation of the gear case cover at top of the camshaft**

Storage Location

X5

SI number

01 04 87 (780)

Fig. 433: Identifying Holding Sleeve (0490949)
Courtesy of BMW OF NORTH AMERICA, INC.

0495171 HOLDING SLEEVE

0495171 115332 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **(Pressure sleeve) Can no longer be ordered separately. Only available as part of set 11 5 330 = 83 30 0 495 127.**

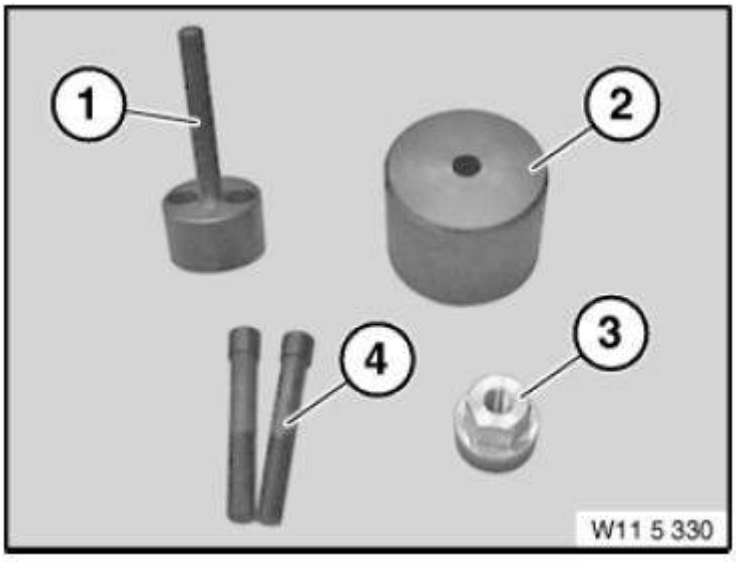


Fig. 434: Identifying Holding Sleeve (0495171)
Courtesy of BMW OF NORTH AMERICA, INC.

0496811 HOLDING SLEEVE

0496811 117222 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **M8 for N47/N57 discontinued, available as part of set of special tools only**

cardiagn.com

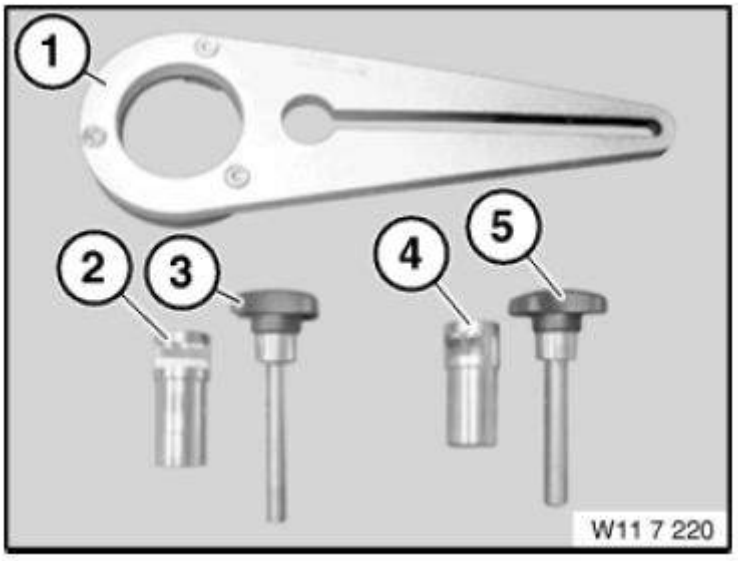


Fig. 435: Identifying Holding Sleeve (0496811)
Courtesy of BMW OF NORTH AMERICA, INC.

0490983 HOLDING SLEEVE

0490983 113391 Holding sleeve AM

Replaced by: 83300493623

NOTE: **Replaced by 11 3 393**

Fig. 436: Identifying Holding Sleeve (0490983)
Courtesy of BMW OF NORTH AMERICA, INC.

0490991 HOOK

0490991 113413 Hook AM

Replaced by: 83300494362

NOTE: **Length 130 mm Engine: S50 replaced by 00 3 271 (0 490 362)**

Fig. 437: Identifying Hook (0490991)
Courtesy of BMW OF NORTH AMERICA, INC.

0495615 HOOK

0495615 113153 Hook AM

NOTE: **(Hook on intake side) not available individually, as part of set of special tools 11 3 150 = 0490941 only.**

0490649 HOOK

0490649 110343 Hook AM

Replaced by: 83300494362

NOTE: **(hook) Length 220 mm - Engine: all, except M10 Replaced by 11 9 000 (0 494 362)**

cardiagn.com

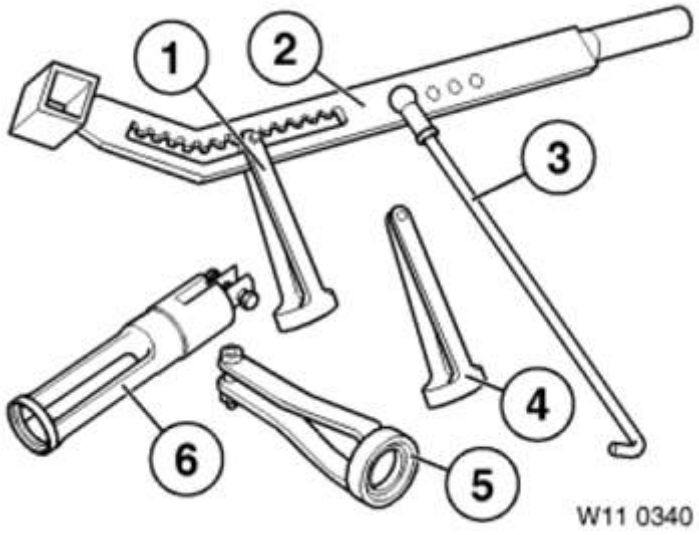


Fig. 438: Identifying Hook (0490649)
Courtesy of BMW OF NORTH AMERICA, INC.

0495617 HOOK

0495617 113172 Hook AM

NOTE: (Hook on exhaust side) Not available individually, but only as part of complete tool set 0490945 = 11 3 170.

0494375 HOOK

0494375 119011 Hook Minimum set: Mechanical tools AM

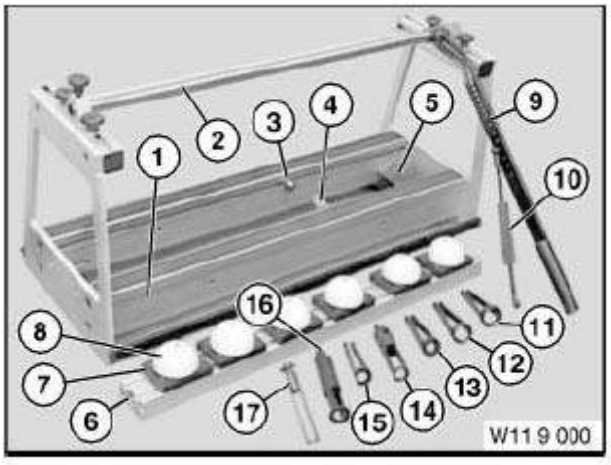


Fig. 439: Identifying Hook (0494375)
Courtesy of BMW OF NORTH AMERICA, INC.

0495614 HOOK

0495614 113152 Hook AM

NOTE: (Hook on exhaust side) Not available individually, but only via complete tool set 11 3 150 = 0490941.

0490911 HOOK

0490911 113070 Hook Mechanical tool

cardiagn.com

NOTE: **For adjusting the valves**

Storage Location

Y2

Fig. 440: Identifying Hook (0490911)
Courtesy of BMW OF NORTH AMERICA, INC.

0490612 HOOK

0490612 110214 Hook AM

Replaced by: 83300494362

NOTE: **Replaced by 11 0 343 / Engine: M60 Replaced by 11 9 000 (0 494 362)**

Fig. 441: Identifying Hook (0490612)
Courtesy of BMW OF NORTH AMERICA, INC.

0495618 HOOK

0495618 113173 Hook AM

NOTE: **(Hook on intake side) Not available individually, but only as part of complete tool set 0490945 = 11 3 170.**

0493805 HOOK WRENCH

0493805 117160 Hook wrench Mechanical tool

NOTE: **For adjusting the spline hub on the camshaft when feeding in the helical-cut splines of the VANOS unit**

Storage Location

A42

SI number

01 15 00 (609)

Fig. 442: Identifying Hook Wrench (0493805)
Courtesy of BMW OF NORTH AMERICA, INC.

0493432 HOOK WRENCH

0493432 117150 Hook wrench Mechanical tool

NOTE: **For adjusting the spline hub on the camshaft when feeding in the helical-cut splines of the VANOS unit**

Storage Location

X3

SI number

cardiagn.com

01 23 98 (390)

Fig. 443: Identifying Hook Wrench (0493432)
Courtesy of BMW OF NORTH AMERICA, INC.

0491073 HOSE

0491073 117010 Hose Mechanical tool

NOTE: **(moulded hose) For testing the control valve.**

Storage Location

Z1

Z2

Fig. 444: Identifying Hose (0491073)
Courtesy of BMW OF NORTH AMERICA, INC.

0490618 HOSE

0490618 110225 Hose Minimum set: Mechanical tools AM

NOTE: **(Extension hose) For rubber tapered section with fitting 11 0 228**

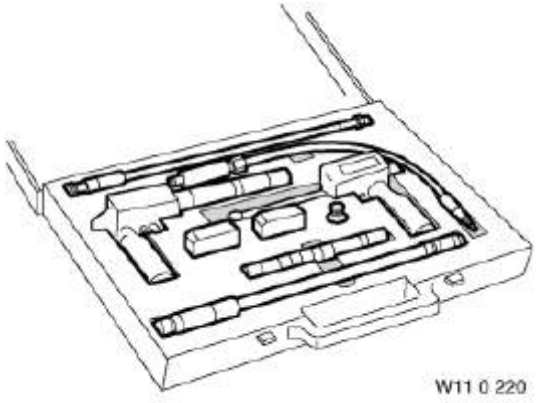


Fig. 445: Identifying Hose (0490618)
Courtesy of BMW OF NORTH AMERICA, INC.

0495017 HOSE

0495017 114343 Hose AM

NOTE: **(Hose with air connection) Liquidation of existing inventory and then available only via complete tool set 11 4 340 = 83 30 0 495 014 - status 29.11.2011**

SI number

01 20 06 (299)

Fig. 446: Identifying Hose (0495017)
Courtesy of BMW OF NORTH AMERICA, INC.

0490751 HOSE

cardiagn.com

0490751 111403 Hose AM

NOTE: (Sealing hose with clamp) Diameter 24 mm 09/2011 remaining inventories will be sold off and then no longer available.

Fig. 447: Identifying Hose (0490751)
Courtesy of BMW OF NORTH AMERICA, INC.

0490785 HOSE

0490785 111467 Hose AM

NOTE: (Screw hose) With valve Engine: M41

Fig. 448: Identifying Hose (0490785)
Courtesy of BMW OF NORTH AMERICA, INC.

0490783 HOSE

0490783 111465 Hose AM

NOTE: (Screw hose) With valve Engine: M51

Fig. 449: Identifying Hose (0490783)
Courtesy of BMW OF NORTH AMERICA, INC.

0490782 HOSE

0490782 111464 Hose AM

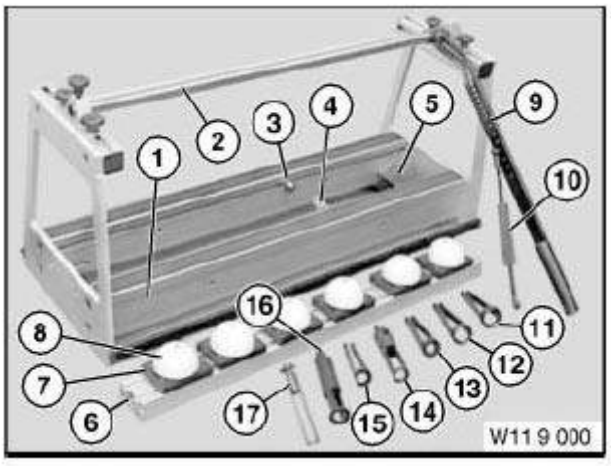
NOTE: (Screw hose) Engine: M51

Fig. 450: Identifying Hose (0490782)
Courtesy of BMW OF NORTH AMERICA, INC.

0494371 INSERT

0494371 119006 Insert Minimum set: Mechanical tools AM

NOTE: (Aluminum strip)



cardiagn.com

Fig. 451: Identifying Insert (0494371)
Courtesy of BMW OF NORTH AMERICA, INC.

2353954 LEAK DETECTOR

2353954 Leak detector MP

NOTE: "BMW Smoke diagnosis tester" leak detector for the tightness diagnosis of closed systems such as fuel tanks, intake air passages, etc.. (1) "BMW Smoke diagnosis tester", (2) "UltraTracer", (3) cylinder with pressure reducer, (4) diverse adapter, (5) coupling kit for compressed air connection, (6) torch with white and UV light including special glasses, (7) power pack

Fig. 452: Identifying Leak Detector (2353954)
Courtesy of BMW OF NORTH AMERICA, INC.

Storage Location

Alternatively

SI number

02 11 13 (958)

0491013 LEVER

0491013 114130 Lever AM

NOTE: For pushing down the valve when removing and installing the rocker arm

Storage Location

B10

C10

SI number

01 12 93 (701)

Fig. 453: Identifying Lever (0491013)
Courtesy of BMW OF NORTH AMERICA, INC.

0491062 LEVER

0491062 115490 Lever Mechanical tool

NOTE: (Lever) For turning the camshaft sprockets when removing and installing the VANOS unit

Storage Location

X10

SI number

01 06 95 (963)

cardiagn.com

Fig. 454: Identifying Lever (0491062)
Courtesy of BMW OF NORTH AMERICA, INC.

0491053 LEVER

0491053 115070 Lever Mechanical tool

NOTE: **For pressing down the bucket tappets when removing and installing the valve adjusting plates**

Storage Location

X2

Y2

SI number

01 12 92 (606)

Fig. 455: Identifying Lever (0491053)
Courtesy of BMW OF NORTH AMERICA, INC.

0490945 LEVER

0490945 113170 Lever AM

NOTE: **For pressing down bucket tappets while removing and installing valve setting plates - Models with catalytic converter**

Storage Location

X2

Y2

Consisting of:

1. 0495616 Basic body

   NOTE: **Not available individually, but as part of complete tool set 0490945 = 11 3 170 only.**

2. 0495617 Hook

   NOTE: **(Hook on exhaust side) Not available individually, but only as part of complete tool set 0490945 = 11 3 170.**

3. 0495618 Hook

   NOTE: **(Hook on intake side) Not available individually, but only as part of complete tool set 0490945 = 11 3 170.**

Fig. 456: Identifying Lever (0490945)
Courtesy of BMW OF NORTH AMERICA, INC.

0491058 LEVER

cardiagn.com

0491058 115130 Lever AM

NOTE: **For pushing down the valve when removing and installing the rocker arm**

Storage Location

B10

C10

SI number

01 13 95 (002)

Consisting of:

Fig. 457: Identifying Lever (0491058)
Courtesy of BMW OF NORTH AMERICA, INC.

1. **0491059** Lever

   NOTE: **Available only as a complete tool set 11 5 130 = 83 30 0 491 058 - as of 29.11.2011**

2. **0491060** Basket

   NOTE: **(Compression fixture) sale of existing inventory and then available as part of set of special tools 11 5 130 = 83 30 0 491 058 only - as of 29.11.2011**

3. **0491061** Spring

   NOTE: **Available only as a complete tool set 11 5 130 = 83 30 0 491 058 - as of 29.11.2011**

0490928 LEVER

0490928 113120 Lever AM

NOTE: **For removing and installing the rocker arms**

Storage Location

X2

Y2

Consisting of:

1. **0490929** Handle
2. **0490930** Basket

cardiagn.com

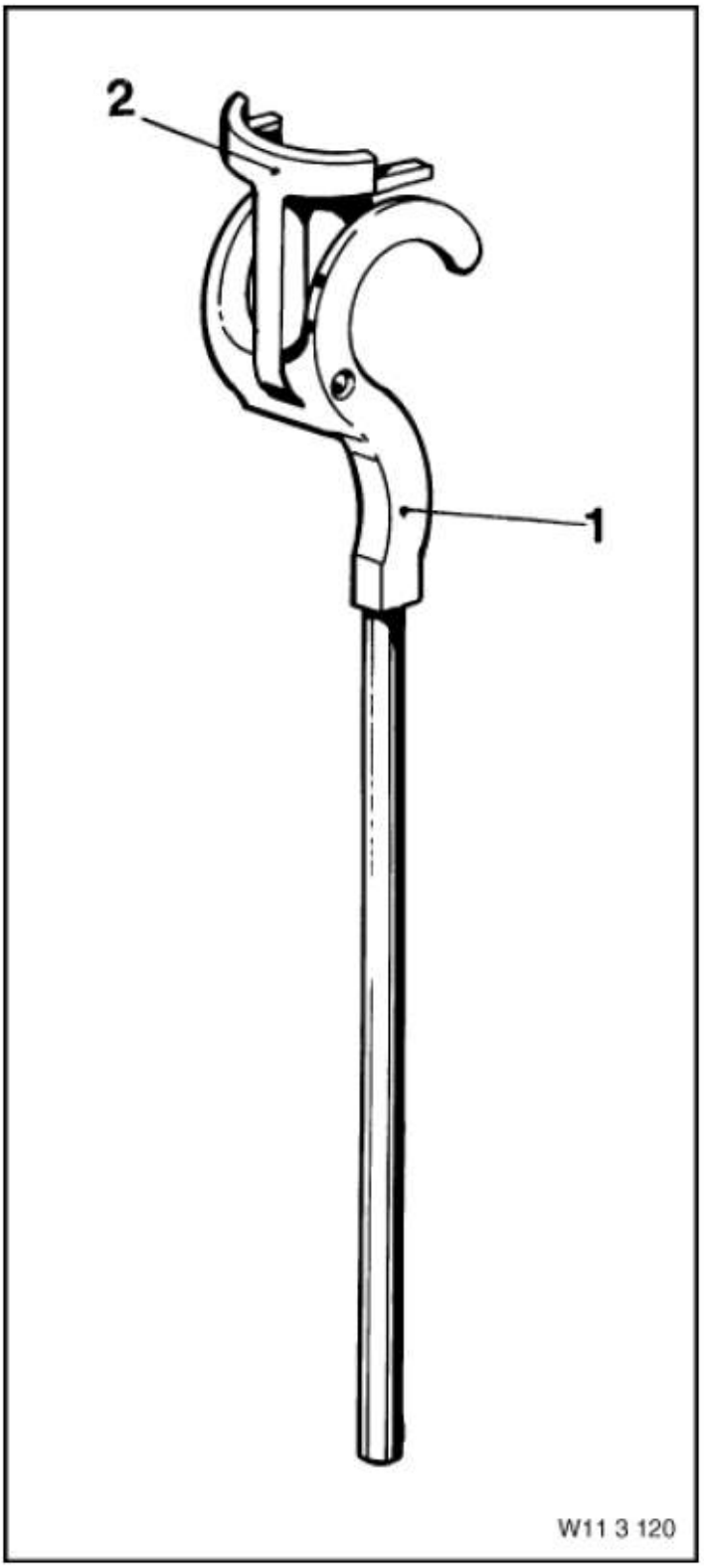


Fig. 458: Identifying Lever (0490928)
Courtesy of BMW OF NORTH AMERICA, INC.

0491059 LEVER

0491059 115131 Lever AM

NOTE: **Available only as a complete tool set 11 5 130 = 83 30 0 491 058 - as of 29.11.2011**

0490648 LEVER

0490648 110342 Lever AM

cardiagn.com

NOTE: (compression lever) Engine: all, except M10

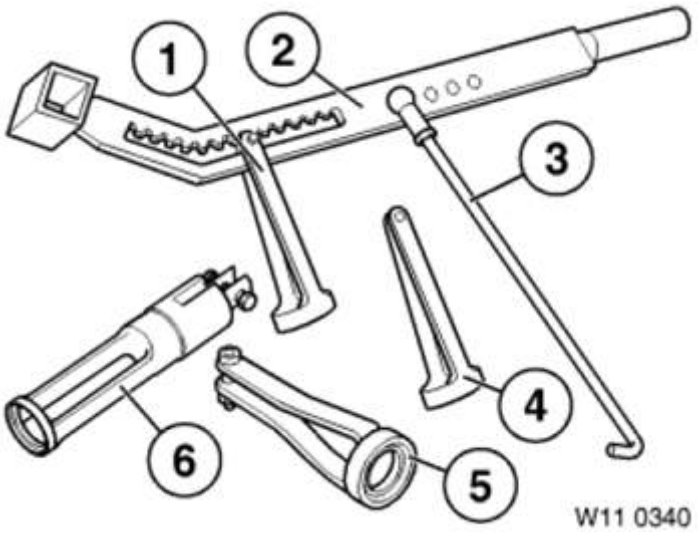


Fig. 459: Identifying Lever (0490648)
Courtesy of BMW OF NORTH AMERICA, INC.

0494374 LEVER

0494374 119009 Lever Minimum set: Mechanical tools AM

Fig. 460: Identifying Lever (0494374)
Courtesy of BMW OF NORTH AMERICA, INC.

0490946 LEVER

0490946 113180 Lever Mechanical tool

NOTE: For pushing down the valve when removing and installing the rocker arm

Storage Location

X2

Y2

SI number

01 02 87 (721)

Fig. 461: Identifying Lever (0490946)
Courtesy of BMW OF NORTH AMERICA, INC.

0496326 LID

0496326 119880 Lid Minimum set: Mechanical tools Mechanical tool

NOTE: (Sealing cap with measuring connection) For measuring pressure in engine compartment.

Storage Location

B48

cardiagn.com

SI number

01 22 07 (411)

Fig. 462: Identifying Lid (0496326)
Courtesy of BMW OF NORTH AMERICA, INC.

0491082 LID

0491082 117332 Lid AM

NOTE: **(Oil filter cover with connection thread M12)**

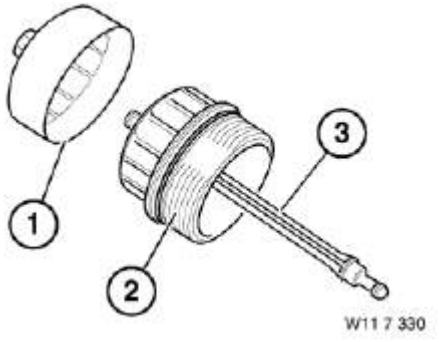


Fig. 463: Identifying Lid (0491082)
Courtesy of BMW OF NORTH AMERICA, INC.

0493937 LID

0493937 119250 Lid Minimum set: Mechanical tools Mechanical tool

NOTE: **For measuring oil pressure via oil filter housing.**

Storage Location

B43

SI number

01 01 01 (662)

Fig. 464: Identifying Lid (0493937)
Courtesy of BMW OF NORTH AMERICA, INC.

0490580 LIFTING GEAR

0490580 110071 Lifting gear Minimum set: Mechanical tools AM

NOTE: **(Cross member) As of 08/2011, only available as a complete set via 11 0 070 = 0490579. Delivered with TUV inspection certificate and operating instructions.**

0490561 LIFTING GEAR

0490561 110000 Lifting gear Minimum set: Mechanical tools AM

NOTE: **(Hoisting gear) For removing and installing engines. As of 08/2011 only available as a complete set. Delivered with TUV inspection certificate and operating instructions. No delivery of separate parts.**

cardiagn.com

SI number

01 13 94 (888)

Consisting of:

1. **0490562** Lifting gear

Fig. 465: Identifying Lifting Gear (0490561)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Cross member) As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TUV inspection certificate and operating instructions.**

2. **0490563** Chain

NOTE: **(Chain) Version: long As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TUV inspection certificate and operating instructions.**

3. **0490564** Chain

NOTE: **(Chain) Version: short As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TUV inspection certificate and operating instructions.**

4. **0490565** Shackle

NOTE: **(Shackle) 2 pieces. As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TUV inspection certificate and operating instructions.**

0493454 LIFTING GEAR

0493454 110261 Lifting gear AM

NOTE: **(Cross-member)**

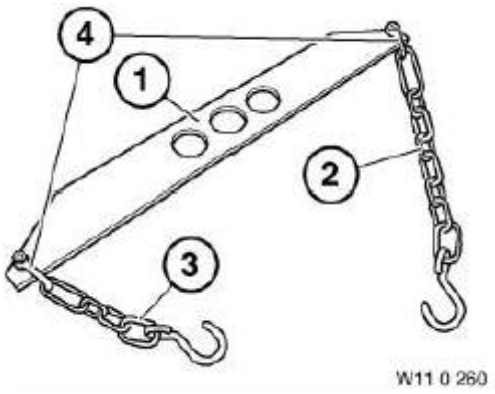


Fig. 466: Identifying Lifting Gear (0493454)
Courtesy of BMW OF NORTH AMERICA, INC.

0490567 LIFTING GEAR

0490567 110020 Lifting gear Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **For removing and installing engines. 08/2011 only available as a complete set. Delivered with TUV inspection certificate and operating instructions. No delivery of separate parts.**

SI number

01 13 94 (888)

Consisting of:

1. **0490568** Lifting gear

Fig. 467: Identifying Lifting Gear (0490567)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Cross member) As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.**

2. **0490569** Chain

NOTE: **(Chain) As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.**

3. **0490570** Chain

NOTE: **(Chain) Version: long As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.**

4. **0490571** Chain

NOTE: **(Chain) Version: short As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.**

5. **0490572** Shackle

NOTE: **(Shackle) 2 pieces As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.**

0490568 LIFTING GEAR

0490568 110021 Lifting gear Minimum set: Mechanical tools AM

NOTE: **(Cross member) As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.**

0490562 LIFTING GEAR

0490562 110001 Lifting gear Minimum set: Mechanical tools AM

NOTE: **(Cross member) As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TUV inspection certificate and operating instructions.**

cardiagn.com

0493464 LIFTING GEAR

0493464 110260 Lifting gear AM

NOTE: **(Lifting gear) For removing and installing the engine.**

SI number

01 23 98 (390)

Consisting of:

1. 0493454 Lifting gear

   NOTE: **(Cross-member)**

2. 0493455 Chain

   NOTE: **(Chain) Version: long**

3. 0493456 Chain

   NOTE: **(Chain) Version: short**

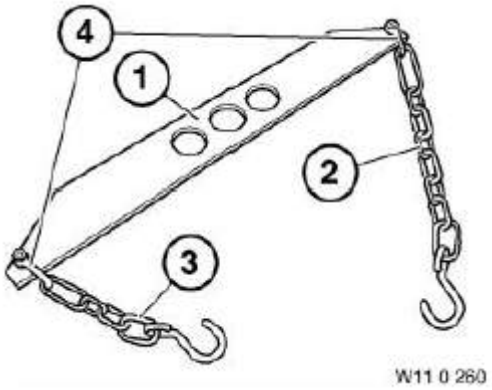


Fig. 468: Identifying Lifting Gear (0493464)
Courtesy of BMW OF NORTH AMERICA, INC.

4. 0493457 Shackle

   NOTE: **(Shackle) 2 x**

0490579 LIFTING GEAR

0490579 110070 Lifting gear Minimum set: Mechanical tools AM

NOTE: **(Lifting gear) For removing and installing engines As of 08/2011, only available as a complete set, no separate components! Delivered with TUV inspection certificate and operating instructions.**

SI number

01 16 96 (107)

Consisting of:

cardiagn.com

Fig. 469: Identifying Lifting Gear (0490579)
Courtesy of BMW OF NORTH AMERICA, INC.

4 = **0493753** Shackle

NOTE: **(Shackle) 2 pieces As of 08/2011, only available as a complete set via 11 0 070 = 0490579. Delivered with TUV inspection certificate and operating instructions.**

1 = **0490580** Lifting gear

NOTE: **(Cross member) As of 08/2011, only available as a complete set via 11 0 070 = 0490579. Delivered with TUV inspection certificate and operating instructions.**

2 = **0490581** Chain

NOTE: **(Chain) Version: long As of 08/2011, only available as a complete set via 11 0 070 = 0490579. Delivered with TUV inspection certificate and operating instructions.**

3 = **0490582** Chain

NOTE: **(Chain) Version: short As of 08/2011, only available as a complete set via 11 0 070 = 0490579. Delivered with TUV inspection certificate and operating instructions.**

0490597 LINE

0490597 110164 Line AM

Replaced by: 83300490613

NOTE: **Discontinuation and replaced by 11 0 220 (0 490 613)**

cardiagn.com

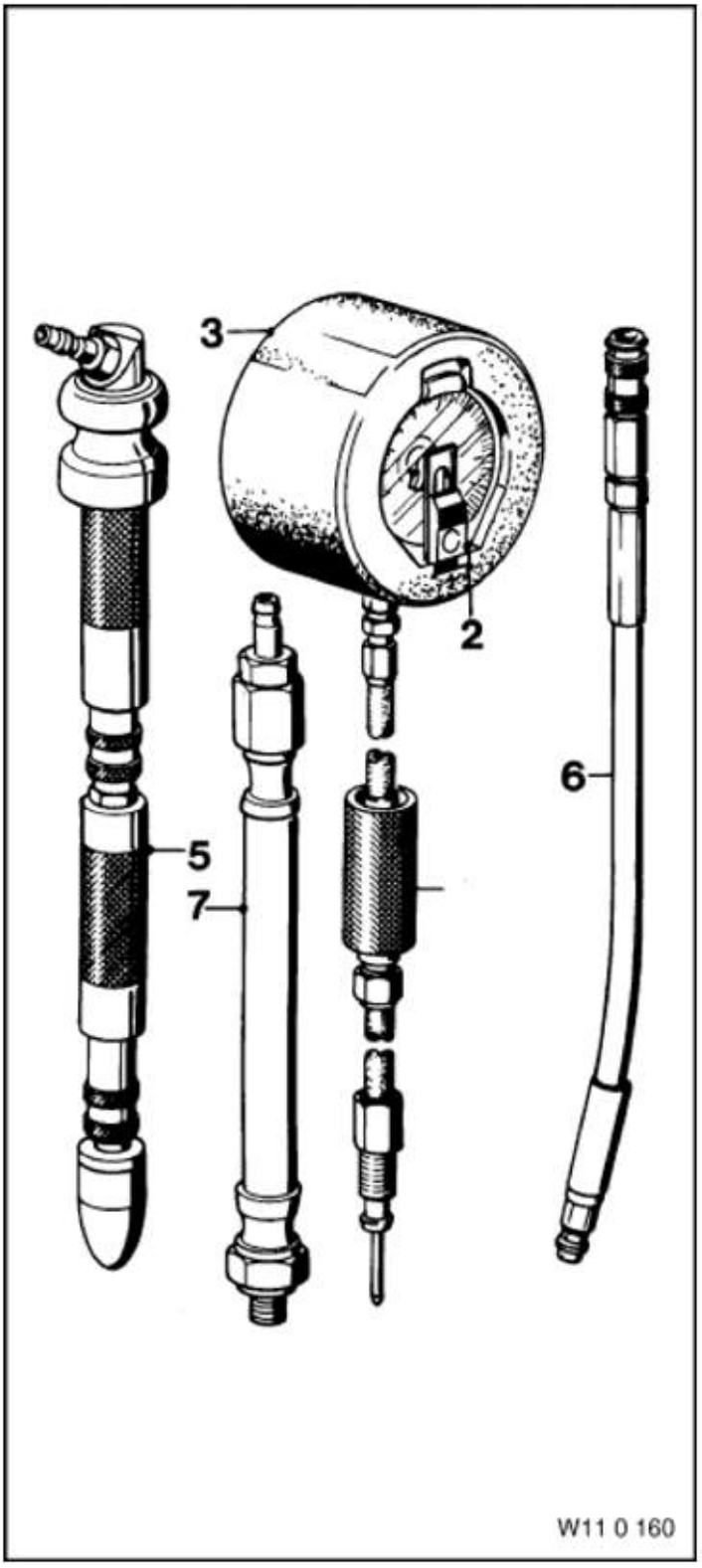


Fig. 470: Identifying Line (0490597)
Courtesy of BMW OF NORTH AMERICA, INC.

0493743 MAGNETIC LIFTER

0493743 114400 Magnetic lifter AM

NOTE: (Magnetic lifter) For removing and installing valve adjustment discs

Storage Location

A42

cardiagn.com

B42

SI number

01 15 00 (609)

Fig. 471: Identifying Magnetic Lifter (0493743)
Courtesy of BMW OF NORTH AMERICA, INC.

0490737 MANDREL

0490737 111301 Mandrel AM

NOTE: **(Drift)**

Fig. 472: Identifying Mandrel (0490737)
Courtesy of BMW OF NORTH AMERICA, INC.

0490721 MANDREL

0490721 111170 Mandrel Mechanical tool

Replaced by: 83300490724

NOTE: **(Drift) Replaced by 11 1 200 (0 490 724)**

0490720 MANDREL

0490720 111160 Mandrel Mechanical tool

NOTE: **(Drift) for separated valve guides - discontinued since April 93**

0496141 MANDREL

0496141 118832 Mandrel AM

NOTE: **(Installation drift)**

Storage Location

B24

C24

SI number

01 05 07 (353)

Fig. 473: Identifying Mandrel (0496141)
Courtesy of BMW OF NORTH AMERICA, INC.

0490912 MANDREL

0490912 113080 Mandrel Mechanical tool

NOTE: **(Drift) For driving in the radial seal on the camshaft**

Storage Location

cardiagn.com

Fig. 474: Identifying Mandrel (0490912)
Courtesy of BMW OF NORTH AMERICA, INC.

0490904 MANDREL

0490904 113041 Mandrel AM

NOTE: (Drift for deflecting element)

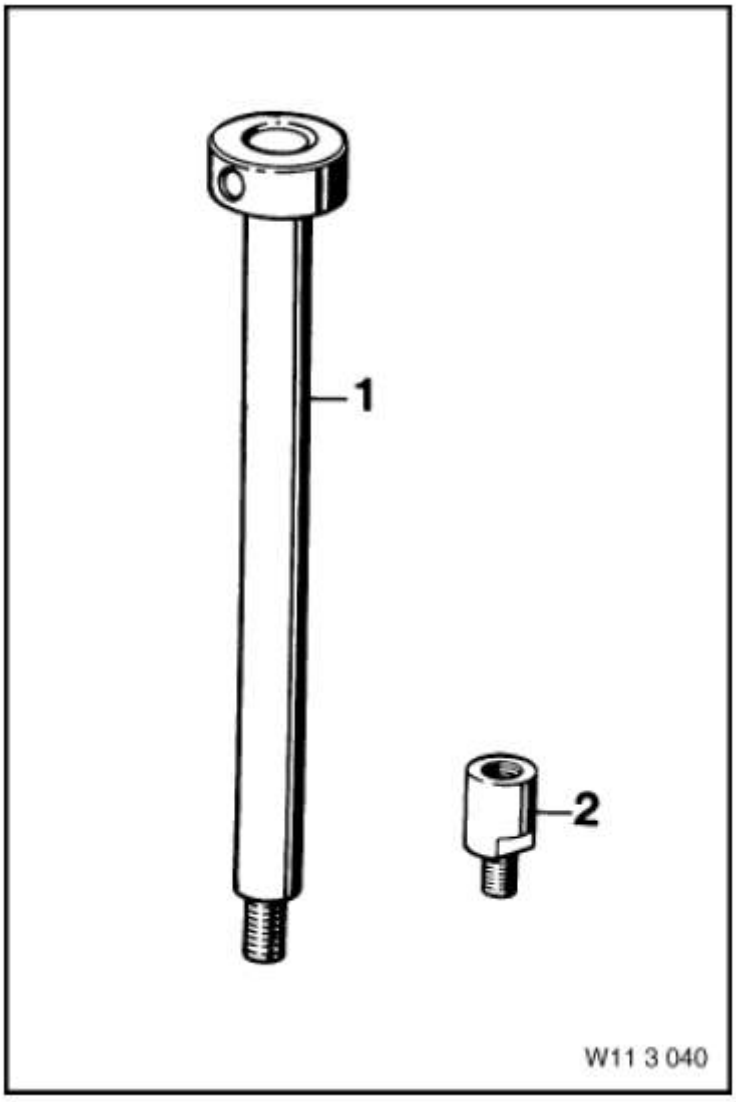


Fig. 475: Identifying Mandrel (0490904)
Courtesy of BMW OF NORTH AMERICA, INC.

0490716 MANDREL

0490716 111120 Mandrel Mechanical tool

NOTE: (Pressing-in drive) for non-offset valve guides for pressing in the valve guides in 4 and 6-cylinder engines - discontinued since April 93

0490717 MANDREL

0490717 111130 Mandrel Mechanical tool

NOTE: (Drift) For pressing valve stem seals on non-stepped valve guides

cardiagn.com

Storage Location

B15

Fig. 476: Identifying Mandrel (0490717)
Courtesy of BMW OF NORTH AMERICA, INC.

0490906 MANDREL

0490906 113050 Mandrel AM

NOTE: **(Drift for rocker shaft)**

Storage Location

X1

Y1

Z1

Fig. 477: Identifying Mandrel (0490906)
Courtesy of BMW OF NORTH AMERICA, INC.

0495070 MANDREL

0495070 110300 Mandrel Minimum set: Mechanical tools Mechanical tool

NOTE: **(alignment pin) For securing flywheel at TDC setting**

Storage Location

A52

SI number

01 17 04 (130)

Fig. 478: Identifying Mandrel (0495070)
Courtesy of BMW OF NORTH AMERICA, INC.

0490741 MANDREL

0490741 111330 Mandrel Mechanical tool

NOTE: **(Drive out drift for valve guide) discontinued since April 93**

0495013 MANDREL

0495013 114494 Mandrel AM

NOTE: **(Installation drift)**

Storage Location

A51

cardiagn.com

Fig. 479: Identifying Mandrel (0495013)
Courtesy of BMW OF NORTH AMERICA, INC.

0490873 MANDREL

0490873 112350 Mandrel Mechanical tool

NOTE: **(drift) For fitting the crankshaft guide bearing**

Storage Location

A15

SI number

01 05 90 (207)

Fig. 480: Identifying Mandrel (0490873)
Courtesy of BMW OF NORTH AMERICA, INC.

0490718 MANDREL

0490718 111140 Mandrel Mechanical tool

Replaced by: 83300490724

NOTE: **(Drift) Replaced by 11 1 200 (0 490 724)**

0490724 MANDREL

0490724 111200 Mandrel Mechanical tool

NOTE: **(Drift) For fitting valve stem seals**

Storage Location

B16

Fig. 481: Identifying Mandrel (0490724)
Courtesy of BMW OF NORTH AMERICA, INC.

0490948 MANDREL

0490948 113200 Mandrel Mechanical tool

NOTE: **(Drift) For driving in the radial seal ring in the gear case cover, top**

Storage Location

A15

SI number

01 04 87 (780)

Fig. 482: Identifying Mandrel (0490948)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

2219548 MANDREL

2219548 Mandrel Minimum set: Mechanical tools AM

NOTE: **For disconnecting the crankshaft at TDC.**

Storage Location

B29

C29

SI number

01 05 11 (692)

Fig. 483: Identifying Mandrel (2219548)
Courtesy of BMW OF NORTH AMERICA, INC.

0490734 MANDREL

0490734 111280 Mandrel Mechanical tool

NOTE: **(Drift) For fitting the radial seal in the top of the gear case cover**

Storage Location

A15

Fig. 484: Identifying Mandrel (0490734)
Courtesy of BMW OF NORTH AMERICA, INC.

0490727 MANDREL

0490727 111230 Mandrel Mechanical tool

NOTE: **(Drift) For radial shaft seal in crankshaft end cover, rear**

Storage Location

A15

SI number

01 02 87 (721)

Fig. 485: Identifying Mandrel (0490727)
Courtesy of BMW OF NORTH AMERICA, INC.

0496658 MANDREL

0496658 118564 Mandrel AM

NOTE: **For installing circlip on gudgeon pin (N55).**

Storage Location

A27

cardiagn.com

SI number

01 18 09 (578)

Fig. 486: Identifying Mandrel (0496658)
Courtesy of BMW OF NORTH AMERICA, INC.

0490723 MANDREL

0490723 111190 Mandrel Mechanical tool

Replaced by: 83300490724

NOTE: **(Drift) Replaced by 11 1 200 (0 490 724)**

0493542 MANDREL

0493542 115180 Mandrel Minimum set: Mechanical tools Mechanical tool

NOTE: **(Alignment pin, angled) For securing the flywheel at the TDC setting**

Storage Location

B15

SI number

01 15 99 (483)

Fig. 487: Identifying Mandrel (0493542)
Courtesy of BMW OF NORTH AMERICA, INC.

0490896 MANDREL

0490896 112470 Mandrel Mechanical tool

NOTE: **(Guide mandrel (2 x)) For installation of connecting rod with piston**

Storage Location

C2

SI number

01 05 92 (507)

Fig. 488: Identifying Mandrel (0490896)
Courtesy of BMW OF NORTH AMERICA, INC.

0495277 MANDREL

0495277 116113 Mandrel AM

NOTE: **(Assembly mandrel) Remaining inventories will be sold off, followed by discontinuation and then not available individually, but as part of set 11 6 110 (0495274) only.**

Storage Location

cardiagn.com

C51

Fig. 489: Identifying Mandrel (0495277)
Courtesy of BMW OF NORTH AMERICA, INC.

0495119 MANDREL

0495119 115250 Mandrel Mechanical tool

NOTE: **(Guide mandrels (2 pieces)) For installing and removing connecting rod with piston.**

Storage Location

A72

SI number

01 02 05 (173)

Fig. 490: Identifying Mandrel (0495119)
Courtesy of BMW OF NORTH AMERICA, INC.

0490709 MANDREL

0490709 111080 Mandrel Mechanical tool

NOTE: **(Mandrel) for valve stem seal**

0495126 MANDREL

0495126 115320 Mandrel Minimum set: Mechanical tools Mechanical tool

NOTE: **(Alignment pin) For locking crankshaft in TDC position.**

Storage Location

A53

SI number

01 02 05 (173)

Fig. 491: Identifying Mandrel (0495126)
Courtesy of BMW OF NORTH AMERICA, INC.

0490711 MANDREL

0490711 111100 Mandrel Mechanical tool

NOTE: **For pressing out valve guides for 4 and 6-cylinder engines - Deletion since April 93**

0490821 MANDREL

0490821 112060 Mandrel Mechanical tool

NOTE: **(Guide mandrels) For installing connecting rods with pistons**

cardiagn.com

Storage Location

A16

Fig. 492: Identifying Mandrel (0490821)
Courtesy of BMW OF NORTH AMERICA, INC.

0495121 MANDREL

0495121 115270 Mandrel Mechanical tool

NOTE: **(Drift) For fitting valve stem seal.**

Storage Location

A72

SI number

01 02 05 (173)

Fig. 493: Identifying Mandrel (0495121)
Courtesy of BMW OF NORTH AMERICA, INC.

0493882 MANDREL

0493882 119190 Mandrel Minimum set: Mechanical tools Mechanical tool

NOTE: **(alignment pin) For securing flywheel at TDC setting**

Storage Location

B43

SI number

01 01 01 (662)

Fig. 494: Identifying Mandrel (0493882)
Courtesy of BMW OF NORTH AMERICA, INC.

0490998 MANDREL

0490998 113480 Mandrel Mechanical tool

NOTE: **(guide mandrel (2 pieces)) For fitting the connecting rods with pistons NOTE: With the introduction of the S50B32 engine the guide mandrels were modified and adapted to the new connecting rods.**

Storage Location

C2

SI number

01 12 92 (606)

cardiagn.com

Fig. 495: Identifying Mandrel (0490998)
Courtesy of BMW OF NORTH AMERICA, INC.

0495175 MANDREL

0495175 115344 Mandrel AM

NOTE: **(Installation drift)**

Storage Location

A72

Fig. 496: Identifying Mandrel (0495175)
Courtesy of BMW OF NORTH AMERICA, INC.

0490710 MANDREL

0490710 111090 Mandrel Mechanical tool

NOTE: **(Drift) for valve stem seal with offset valve guides**

0490740 MANDREL

0490740 111320 Mandrel Mechanical tool

NOTE: **(Drive in drift for valve guide) discontinued since April 93**

0495215 MANDREL

0495215 116080 Mandrel Minimum set: Mechanical tools Mechanical tool

NOTE: **(alignment pin) For securing flywheel at TDC setting**

Storage Location

C52

SI number

01 05 05 (180)

Fig. 497: Identifying Mandrel (0495215)
Courtesy of BMW OF NORTH AMERICA, INC.

0495746 MANDREL

0495746 118563 Mandrel AM

NOTE: **(Assembly mandrel) Remaining inventories will be sold off followed by discontinuation - then longer available individually. Available in complete special tool set 83 30 0 495 743 - 11 8 560 only.**

Storage Location

A20

B20

cardiagn.com

Fig. 498: Identifying Mandrel (0495746)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number

01 20 06 (299)

0493973 MANDREL

0493973 119360 Mandrel Minimum set: Mechanical tools Mechanical tool

NOTE: **For driving valve into engine block (sealing compound)**

Storage Location

A43

SI number

01 01 01 (662)

Fig. 499: Identifying Mandrel (0493973)
Courtesy of BMW OF NORTH AMERICA, INC.

0490747 MANDREL

0490747 111390 Mandrel Mechanical tool

NOTE: **(Drift) For fitting the dip stick guide tube**

Fig. 500: Identifying Mandrel (0490747)
Courtesy of BMW OF NORTH AMERICA, INC.

2353281 MEASUREMENT AID

2353281 Measurement aid Minimum set: Mechanical tools Mechanical tool

NOTE: **For measurement of the wear limit of the timing chain. N14, N47 engine**

SI number

01 24 13 (990)

Fig. 501: Identifying Measurement Aid (2353281)
Courtesy of BMW OF NORTH AMERICA, INC.

0491043 MEASUREMENT AID

0491043 115027 Measurement aid AM

NOTE: **(scale) Scale in the specific language, individual indication of the language required**

Fig. 502: Identifying Measurement Aid (0491043)
Courtesy of BMW OF NORTH AMERICA, INC.

2405341 MEASURING ADAPTER

cardiagn.com

2405341 Measuring adapter Minimum set: Measuring and testing equipment MP

NOTE: **for locating interference noise**

SI number

02 16 14 (195)

Fig. 503: Identifying Measuring Adapter (2405341)
Courtesy of BMW OF NORTH AMERICA, INC.

0491050 MEASURING DEVICE

0491050 115061 Measuring device AM

NOTE: **(Device) Old type: TTX 1090 / new type: TFN 1093**

Fig. 504: Identifying Measuring Device (0491050)
Courtesy of BMW OF NORTH AMERICA, INC.

0491049 MEASURING DEVICE

0491049 115060 Measuring device AM

NOTE: **(Temperature sensor) For measuring cylinder head temperature when replacing toothed belt**

Consisting of:

1 = **0491050** Measuring device

NOTE: **(Device) Old type: TTX 1090 / new type: TFN 1093**

2 = **0491051** Sensor

NOTE: **(Sensor)**

9 = **0491052** Operating instructions

Fig. 505: Identifying Measuring Device (0491049)
Courtesy of BMW OF NORTH AMERICA, INC.

0493143 MEASURING DEVICE

0493143 116250 Measuring device AM

NOTE: **(Measuring device) Sensing arm measuring device With small tripod for measuring tooth flank and side clearance on counterbalance shafts, camshafts and crankshafts.**

SI number

01 04 98 (304)

Consisting of:

4 = **0495214** Plate

cardiagn.com

Fig. 506: Identifying Measuring Device (0493143)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Fixture) Engine: M47T2; M57T2; S85**

5 = 0495468 Plate

NOTE: **(Fixture M7) Engine camshaft: M67TU**

6 = 0495470 Plate

NOTE: **(Fixture M8) Engine crankshaft: M67TU**

1 = 0493144 Dial gauge

NOTE: **(Dial gauge) With 0.8 mm measuring range in each direction**

2 = 0493145 Tripod

NOTE: **(Small hydraulic tripod with magnetic base)**

3 = 0493146 Sensor

NOTE: **(Sensor) Sensor arm 11.5 mm**

0491044 MEASURING DEVICE

0491044 115028 Measuring device AM

NOTE: **(Test rod)**

Fig. 507: Identifying Measuring Device (0491044)
Courtesy of BMW OF NORTH AMERICA, INC.

2184136 MOBILE EQUIPMENT TABLE LIFT

2184136 Mobile equipment table lift Mechanical tool

NOTE: **Table lift Gruse MHT 1200**

SI number

06 01 10 (649)

Fig. 508: Identifying Mobile Equipment Table Lift (2184136)
Courtesy of BMW OF NORTH AMERICA, INC.

0491045 NEEDLE

0491045 115029 Needle AM

Fig. 509: Identifying Needle (0491045)
Courtesy of BMW OF NORTH AMERICA, INC.

0494030 NUT

cardiagn.com

0494030 119183 Nut Minimum set: Mechanical tools AM

Fig. 510: Identifying Nut (0494030)
Courtesy of BMW OF NORTH AMERICA, INC.

0490839 NUT

0490839 112133 Nut AM

NOTE: (Knurled nut) Replaced by 00 9 120 (0 490 504)

Fig. 511: Identifying Nut (0490839)
Courtesy of BMW OF NORTH AMERICA, INC.

0490940 NUT

0490940 113143 Nut AM

Fig. 512: Identifying Nut (0490940)
Courtesy of BMW OF NORTH AMERICA, INC.

0495172 NUT

0495172 115333 Nut Minimum set: Mechanical tools AM

NOTE: (Nut with bearing) Can no longer be ordered separately. Only available as part of set 31 2 120 = 83 30 0 491 909.

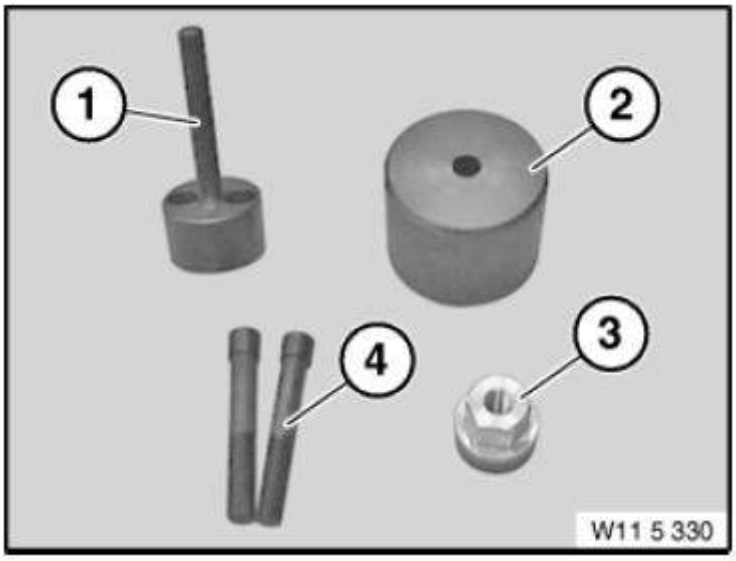


Fig. 513: Identifying Nut (0495172)
Courtesy of BMW OF NORTH AMERICA, INC.

0490927 NUT

0490927 113116 Nut AM

NOTE: (Knurled nut) Replaced by 00 9 120 (0 490 504)

Storage Location

Z1

cardiagn.com

Fig. 514: Identifying Nut (0490927)
Courtesy of BMW OF NORTH AMERICA, INC.

0496136 NUT

0496136 118814 Nut Minimum set: Mechanical tools AM

NOTE: **(Nut with bearing) Liquidation of existing inventory and then available only via complete tool set 11 8 810 = 83 30 0 496 132 - status 09.12.2011**

SI number

01 05 07 (353)

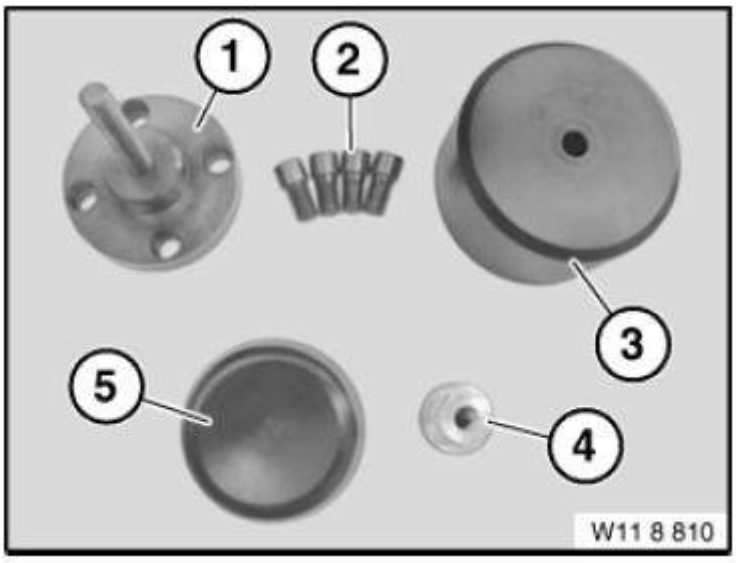


Fig. 515: Identifying Nut (0496136)
Courtesy of BMW OF NORTH AMERICA, INC.

0490731 NUT

0490731 111271 Nut AM

NOTE: **Engine: M10**

Fig. 516: Identifying Nut (0490731)
Courtesy of BMW OF NORTH AMERICA, INC.

0493618 NUT

0493618 117213 Nut AM

NOTE: **(Thrust nut)**

cardiagn.com

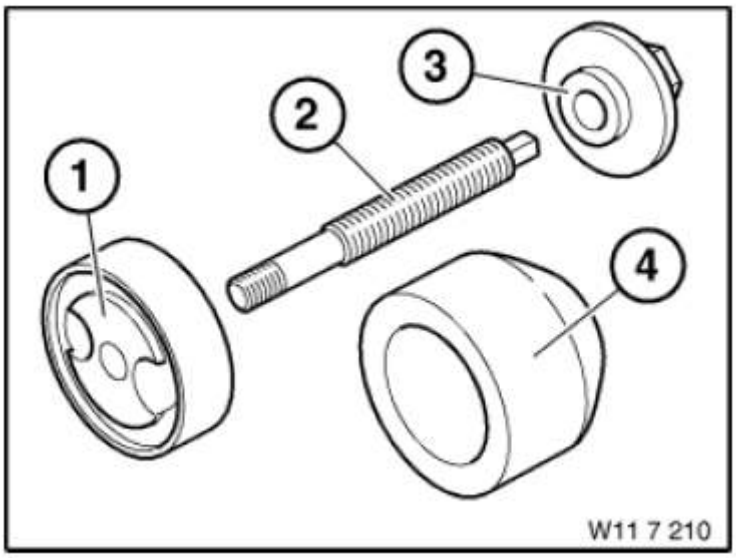
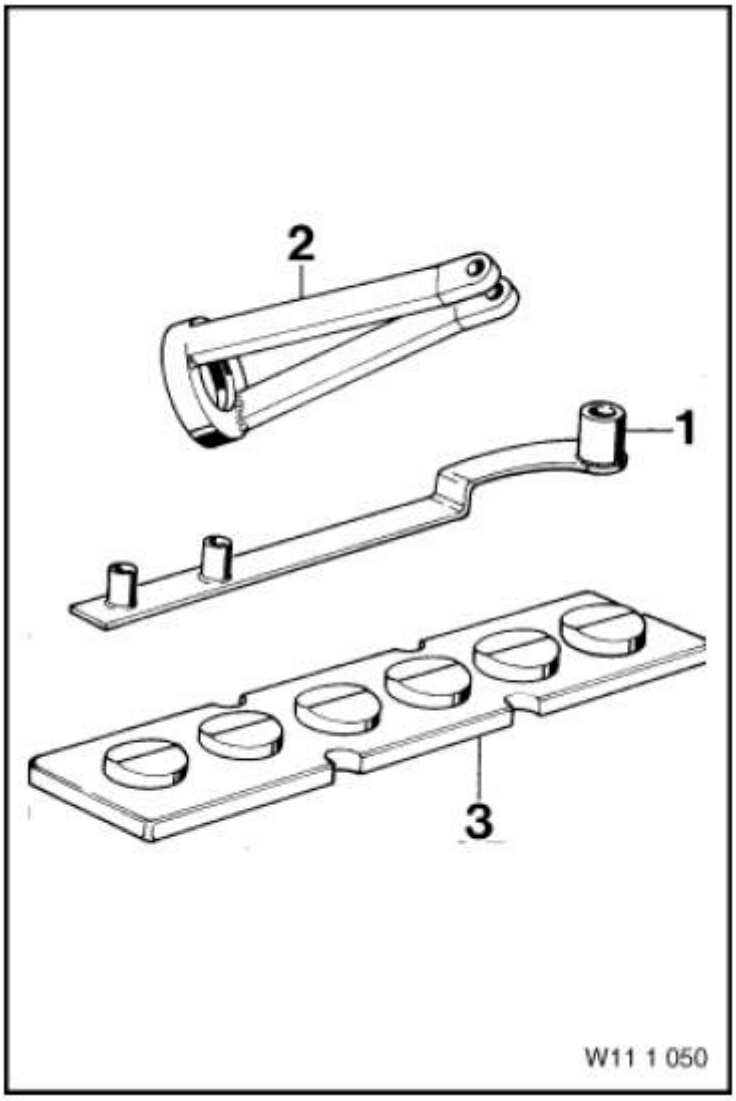


Fig. 517: Identifying Nut (0493618)
Courtesy of BMW OF NORTH AMERICA, INC.

0490695 NUT

0490695 111059 Nut AM

NOTE: **(Nut (4 pieces) for pressure frame) Engine: M20, M30**



cardiagn.com

Fig. 518: Identifying Nut (0490695)
Courtesy of BMW OF NORTH AMERICA, INC.

0494023 NUT

0494023 119233 Nut Minimum set: Mechanical tools AM

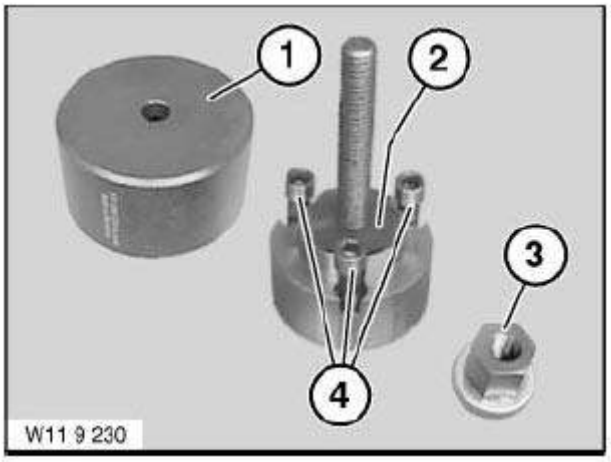


Fig. 519: Identifying Nut (0494023)
Courtesy of BMW OF NORTH AMERICA, INC.

0496131 NUT

0496131 118804 Nut Minimum set: Mechanical tools AM

NOTE: **(Nut with collar) available as part of set of tools 11 8 800 = 83 30 0 496 127 only - as of 30.11.2011**

SI number

01 05 07 (353)

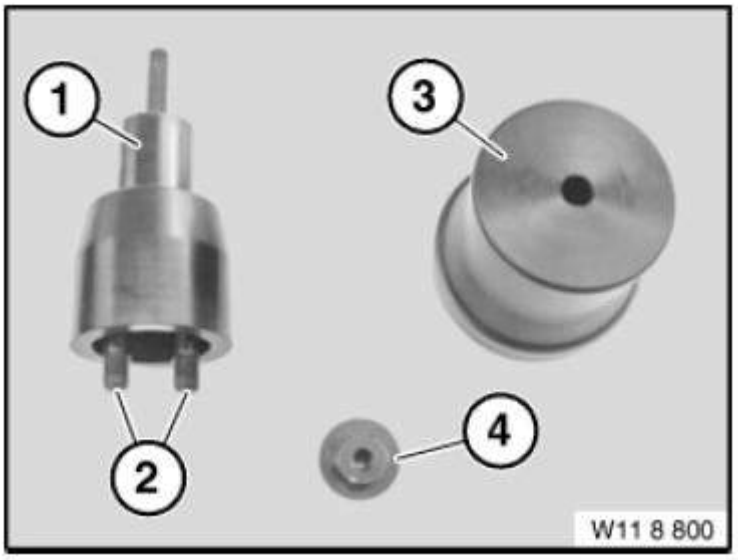


Fig. 520: Identifying Nut (0496131)
Courtesy of BMW OF NORTH AMERICA, INC.

0490732 NUT

0490732 111272 Nut AM

cardiagn.com

NOTE: **(Nut) Engine: M30**

Fig. 521: Identifying Nut (0490732)
Courtesy of BMW OF NORTH AMERICA, INC.

0490830 NUT

0490830 112114 Nut AM

Replaced by: 83300490504

NOTE: **(Knurled nut) Replaced by 00 9 120 (0 490 504)**

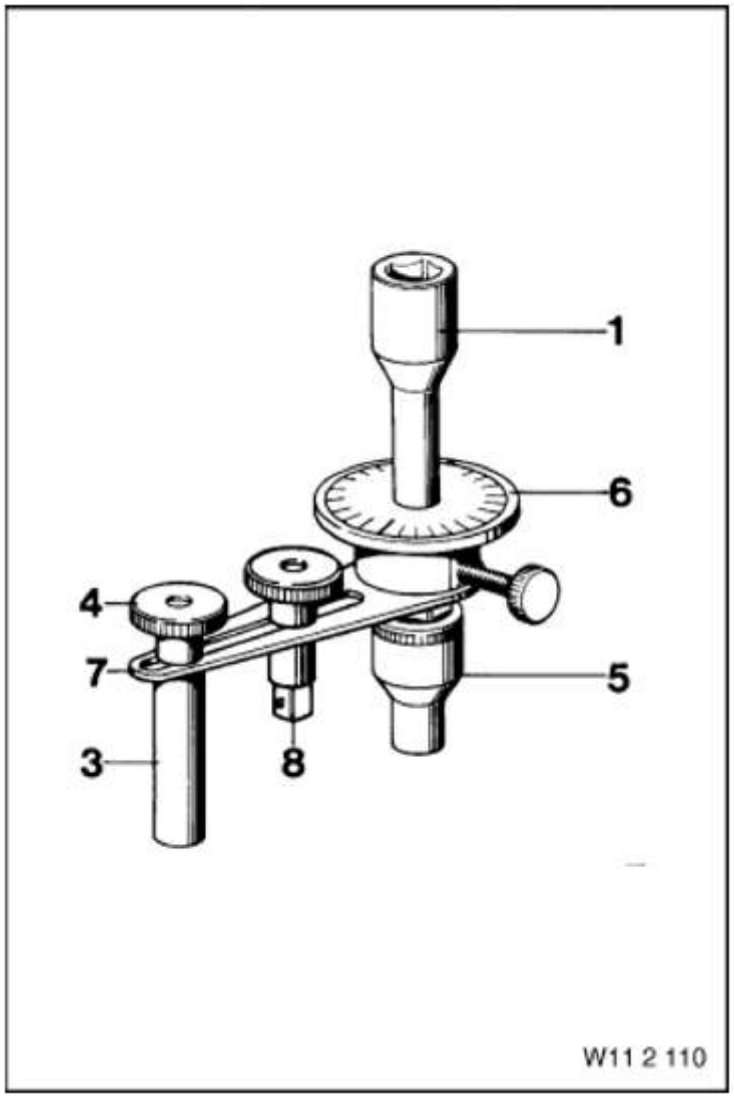


Fig. 522: Identifying Nut (0490830)
Courtesy of BMW OF NORTH AMERICA, INC.

0493630 NUT

0493630 114231 Nut Minimum set: Mechanical tools AM

NOTE: **With external thread Deletion, only available via tool set**

Fig. 523: Identifying Nut (0493630)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0495262 NUT

0495262 115363 Nut AM

NOTE: (Set of lock nuts (2 x))

Storage Location

A71

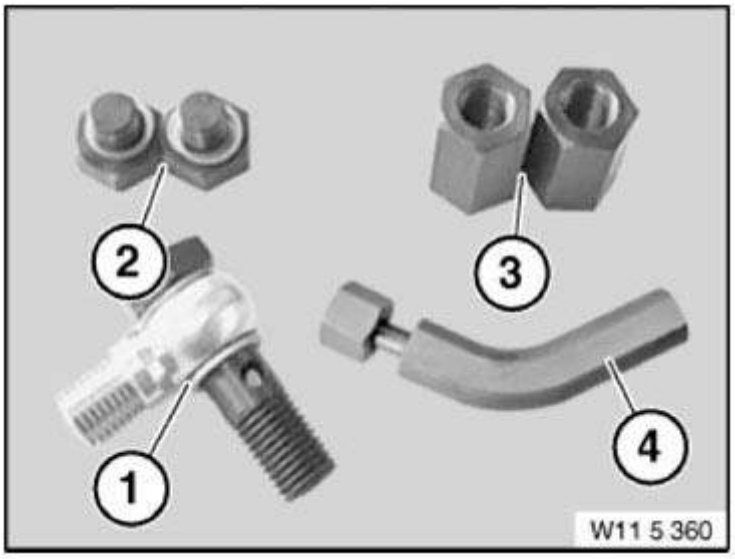


Fig. 524: Identifying Nut (0495262)
Courtesy of BMW OF NORTH AMERICA, INC.

0495168 NUT

0495168 115313 Nut Minimum set: Mechanical tools AM

NOTE: (Nut with bearing) Remaining inventories will be sold off, then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 125 (special tool number 11 5 310).

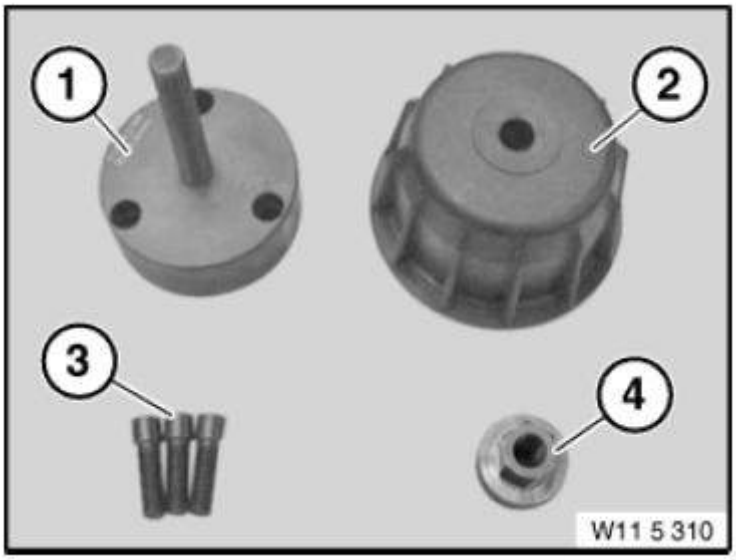


Fig. 525: Identifying Nut (0495168)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0490777 O-RING

0490777 111453 O-ring AM

NOTE: **Only available as part of complete set**

0491081 OIL FILTER WRENCH

0491081 117331 Oil filter wrench AM

Fig. 526: Identifying Oil Filter Wrench (0491081)
Courtesy of BMW OF NORTH AMERICA, INC.

0495448 OIL FILTER WRENCH

0495448 114650 Oil filter wrench Mechanical tool

NOTE: **For releasing and tightening down oil filter screw connection.**

Storage Location

B11

Fig. 527: Identifying Oil Filter Wrench (0495448)
Courtesy of BMW OF NORTH AMERICA, INC.

0491002 OIL FILTER WRENCH

0491002 114020 Oil filter wrench Mechanical tool

NOTE: **(Oil filter key) series: All, excl. all-wheel drive vehicles**

Storage Location

Z3

Fig. 528: Identifying Oil Filter Wrench (0491002)
Courtesy of BMW OF NORTH AMERICA, INC.

0493936 OIL FILTER WRENCH

0493936 119240 Oil filter wrench Minimum set: Mechanical tools Mechanical tool

NOTE: **For unfastening and tightening oil filter cover**

Storage Location

A43

SI number

01 01 01 (662)

Fig. 529: Identifying Oil Filter Wrench (0493936)
Courtesy of BMW OF NORTH AMERICA, INC.

0491001 OIL FILTER WRENCH

cardiagn.com

0491001 114010 Oil filter wrench Mechanical tool

NOTE: **(Oil filter wrench) discontinued since January of 84**

0492027 OPEN-END WRENCH

0492027 322100 Open-end wrench Mechanical tool

NOTE: **(open-end wrench WAF 27) For adjusting left track rod on rack**

Storage Location

Y4

Fig. 530: Identifying Open-End Wrench (0492027)
Courtesy of BMW OF NORTH AMERICA, INC.

0490575 OPEN-END WRENCH

0490575 110050 Open-end wrench Mechanical tool

NOTE: **For tensioning the drive belt - For series only, H. Laub**

0491099 OPERATING INSTRUCTIONS

0491099 117459 Operating instructions AM

Fig. 531: Identifying Operating Instructions (0491099)
Courtesy of BMW OF NORTH AMERICA, INC.

0491052 OPERATING INSTRUCTIONS

0491052 115069 Operating instructions AM

Fig. 532: Identifying Operating Instructions (0491052)
Courtesy of BMW OF NORTH AMERICA, INC.

0496268 PIN

0496268 110390 Pin Minimum set: Mechanical tools Mechanical tool

NOTE: **(roll pin) For securing new tensioning pulley (poly-V belt)**

Storage Location

C23

SI number

01 15 07 (390)

Fig. 533: Identifying Pin (0496268)
Courtesy of BMW OF NORTH AMERICA, INC.

0493386 PIN

0493386 117120 Pin Mechanical tool

cardiagn.com

NOTE: **(Lock pin (4 x)) For locking the camshaft when adjusting the timing**

Storage Location

X3

SI number

01 23 98 (390)

Fig. 534: Identifying Pin (0493386)
Courtesy of BMW OF NORTH AMERICA, INC.

0491011 PIN

0491011 114110 Pin Mechanical tool

NOTE: **(Pin (4 pieces)) For fixing the metal gasket at the top of the gear case cover during installation**

Storage Location

B16

SI number

01 13 95 (002)

Fig. 535: Identifying Pin (0491011)
Courtesy of BMW OF NORTH AMERICA, INC.

0495261 PIN

0495261 115342 Pin AM

NOTE: **(Set of guide pin (2x))**

Storage Location

A72

Fig. 536: Identifying Pin (0495261)
Courtesy of BMW OF NORTH AMERICA, INC.

0490973 PIN

0490973 113340 Pin Minimum set: Mechanical tools Mechanical tool

NOTE: **(lock pin (2 pieces)) For retaining the chain tensioner piston (e.g. when removing and installing the cylinder head) and to lock the drive belt tensioner**

Storage Location

B5

C5

cardiagn.com

Fig. 537: Identifying Pin (0490973)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number

01 09 91 (416)

0491086 PIN

0491086 117342 Pin AM

NOTE: **(Lock pin) Engine: S50, S54**

Fig. 538: Identifying Pin (0491086)
Courtesy of BMW OF NORTH AMERICA, INC.

0490966 PIN

0490966 113290 Pin Minimum set: Mechanical tools AM

NOTE: **(Retaining pins) For the secondary chain tensioner for blocking the chain tensioner piston, e.g. when removing and installing the camshaft sprockets**

Storage Location

A5

SI number

01 01 90 (165)

Consisting of:

1. 0490967 Clamp

Fig. 539: Identifying Pin (0490966)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Detachment clamp) Engine: M50 sale of existing inventory and then available as part of set of special tools 11 3 290 = 83 30 0 490 966 only - as of 29.11.2011**

2. 0490968 Pin

NOTE: **(Lock pin) Engine: M52, M52TU, M54, M56 sale of existing inventory, then available as part of set of special tools 11 3 290 = 83 30 0 490 966 only - as of 29.11.2011**

0491012 PIN

0491012 114120 Pin Minimum set: Mechanical tools Mechanical tool

NOTE: **(lock pin) For chain tensioners, for locking the chain tensioner piston (e.g. during cylinder head removal and fitting)**

Storage Location

B5

cardiagn.com

C5

SI number

01 12 93 (701)

Fig. 540: Identifying Pin (0491012)
Courtesy of BMW OF NORTH AMERICA, INC.

0490968 PIN

0490968 113292 Pin Minimum set: Mechanical tools AM

NOTE: **(Lock pin) Engine: M52, M52TU, M54, M56 sale of existing inventory, then available as part of set of special tools 11 3 290 = 83 30 0 490 966 only - as of 29.11.2011**

Fig. 541: Identifying Pin (0490968)
Courtesy of BMW OF NORTH AMERICA, INC.

0494607 PIN

0494607 119132 Pin AM

NOTE: **(Lock pin) (not shown). Beginning from 10/2010 only available as tool set 11 9 130 (0493749).**

Fig. 542: Identifying Pin (0494607)
Courtesy of BMW OF NORTH AMERICA, INC.

0491064 PIN WRENCH

0491064 116010 Pin wrench Mechanical tool

NOTE: **For ring nut on exhaust manifold**

Fig. 543: Identifying Pin Wrench (0491064)
Courtesy of BMW OF NORTH AMERICA, INC.

0490858 PISTON RING COMPRESSOR

0490858 112270 Piston ring compressor Mechanical tool

NOTE: **For compressing piston rings while installing pistons**

Storage Location

Z9

Fig. 544: Identifying Piston Ring Compressor (0490858)
Courtesy of BMW OF NORTH AMERICA, INC.

0493756 PLATE

0493756 111404 Plate AM

cardiagn.com

NOTE: **(Sealing plate) For a leakage test of the cylinder head - engine:, S54 09/2011 remaining inventories will be sold off and then no longer available.**

SI number

01 15 00 (609)

Fig. 545: Identifying Plate (0493756)
Courtesy of BMW OF NORTH AMERICA, INC.

0490791 PLATE

0490791 111474 Plate AM

NOTE: **(Sealing plate for cylinder row 5...8) Replaced by 11 1 494 (0 493 448)**

Fig. 546: Identifying Plate (0490791)
Courtesy of BMW OF NORTH AMERICA, INC.

0495730 PLATE

0495730 118532 Plate Minimum set: Mechanical tools AM

NOTE: **(pressure plate) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.**

Storage Location

C20

SI number

01 20 06 (299)

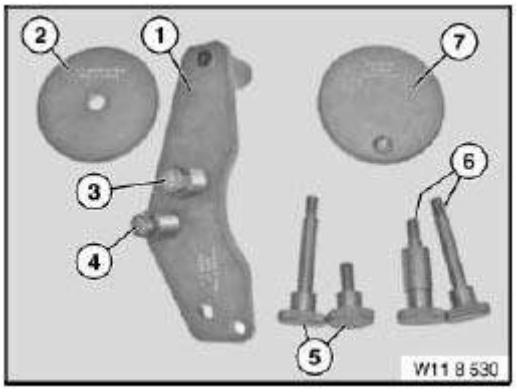


Fig. 547: Identifying Plate (0495730)
Courtesy of BMW OF NORTH AMERICA, INC.

0495468 PLATE

0495468 116255 Plate AM

NOTE: **(Fixture M7) Engine camshaft: M67TU**

Storage Location

cardiagn.com

B20

SI number

01 14 05 (198)

Fig. 548: Identifying Plate (0495468)
Courtesy of BMW OF NORTH AMERICA, INC.

0490585 PLATE

0490585 110081 Plate AM

NOTE: **(Fixture with adjusting flange)**

Fig. 549: Identifying Plate (0490585)
Courtesy of BMW OF NORTH AMERICA, INC.

0493717 PLATE

0493717 117396 Plate AM

NOTE: **(Cover plate, end face) Liquidation of current inventory and then available for ordering only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

0490749 PLATE

0490749 111401 Plate AM

NOTE: **(Cover plate) Only S50 09/2011 remaining inventories will be sold off and then no longer available.**

Fig. 550: Identifying Plate (0490749)
Courtesy of BMW OF NORTH AMERICA, INC.

0495729 PLATE

0495729 118531 Plate Minimum set: Mechanical tools AM

NOTE: **(base plate) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.**

Storage Location

B20

C20

SI number

01 20 06 (299)

cardiagn.com

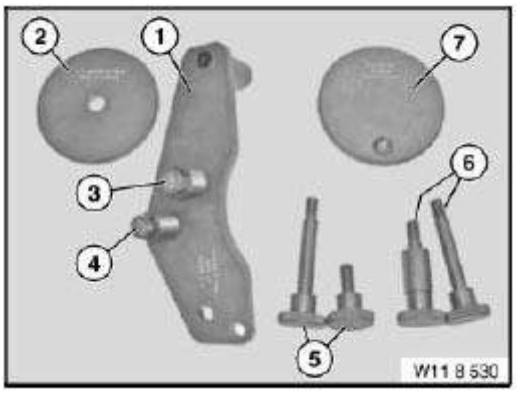


Fig. 551: Identifying Plate (0495729)
Courtesy of BMW OF NORTH AMERICA, INC.

0490758 PLATE

0490758 111423 Plate AM

NOTE: **(cover plate) Engine: M70, M73**

Fig. 552: Identifying Plate (0490758)
Courtesy of BMW OF NORTH AMERICA, INC.

2318119 PLATE

2318119 Plate Minimum set: Mechanical tools AM

In conjunction with: 11 8 530, 2318118

NOTE: **For fitting the sealing cap in the crankcase (N55 with HDP5).**

Storage Location

A33

SI number

01 06 12 (800)

Fig. 553: Identifying Plate (2318119)
Courtesy of BMW OF NORTH AMERICA, INC.

0495521 PLATE

0495521 110471 Plate AM

NOTE: **(Base plate with gasket) Only to be ordered via complete tool set 11 0 470 (83 30 0 495 520) - as of 21.08.12.**

SI number

01 04 06 (246)

Fig. 554: Identifying Plate (0495521)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496174 PLATE

0496174 118822 Plate AM

NOTE: **(Cover plate 2) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

SI number

01 05 07 (353)

Fig. 555: Identifying Plate (0496174)
Courtesy of BMW OF NORTH AMERICA, INC.

0496173 PLATE

0496173 118821 Plate AM

NOTE: **(Cover plate 1) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

SI number

01 05 07 (353)

Fig. 556: Identifying Plate (0496173)
Courtesy of BMW OF NORTH AMERICA, INC.

0490586 PLATE

0490586 110082 Plate AM

NOTE: **(Fixture)**

Fig. 557: Identifying Plate (0490586)
Courtesy of BMW OF NORTH AMERICA, INC.

0496175 PLATE

0496175 118823 Plate AM

NOTE: **(Cover plate 3) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

SI number

01 05 07 (353)

Fig. 558: Identifying Plate (0496175)
Courtesy of BMW OF NORTH AMERICA, INC.

0490969 PLATE

0490969 113300 Plate Mechanical tool

Replaced by: 83300491109

cardiagn.com

NOTE: (Fixture) Replaced by 11 8 040 (0 491 109)

Fig. 559: Identifying Plate (0490969)
Courtesy of BMW OF NORTH AMERICA, INC.

0495150 PLATE

0495150 115235 Plate AM

NOTE: Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12

Fig. 560: Identifying Plate (0495150)
Courtesy of BMW OF NORTH AMERICA, INC.

0495001 PLATE

0495001 114252 Plate AM

NOTE: Liquidation of existing inventory and then available only as a complete tool set 11 4 250 (83 30 0 494 999) - as of 22.02.12

Storage Location

A52

Fig. 561: Identifying Plate (0495001)
Courtesy of BMW OF NORTH AMERICA, INC.

0496185 PLATE

0496185 118892 Plate AM

NOTE: (Adapter plate with valve) Only available as part of complete tool set 11 8 890 - > (83 30 0 496 183).

SI number

01 05 07 (353)

Fig. 562: Identifying Plate (0496185)
Courtesy of BMW OF NORTH AMERICA, INC.

0495015 PLATE

0495015 114341 Plate AM

NOTE: (Base plate with gasket) Liquidation of existing inventory and then available only via complete tool set 11 4 340 = 83 30 0 495 014 - status 29.11.2011

SI number

01 20 06 (299)

Fig. 563: Identifying Plate (0495015)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0493130 PLATE

0493130 116150 Plate Minimum set: Mechanical tools Mechanical tool

NOTE: **(adjusting plate) For adjusting valve timing on engines with twin VANOS**

Storage Location

C5

C6

SI number

01 05 98 (305)

Fig. 564: Identifying Plate (0493130)
Courtesy of BMW OF NORTH AMERICA, INC.

2212824 PLATE

2212824 Plate AM

In conjunction with: 11 4 344, 11 7 191, 11 4 342 = 0495016

NOTE: **For water tightness check of cylinder head.**

SI number

01 05 11 (692)

Fig. 565: Identifying Plate (2212824)
Courtesy of BMW OF NORTH AMERICA, INC.

0495214 PLATE

0495214 116254 Plate AM

NOTE: **(Fixture) Engine: M47T2; M57T2; S85**

SI number

01 05 05 (180)

Fig. 566: Identifying Plate (0495214)
Courtesy of BMW OF NORTH AMERICA, INC.

0495724 PLATE

0495724 114344 Plate AM

NOTE: **(Adapter plate with valve) N54 Liquidation of existing inventory and then available only via complete tool set 11 4 340 = 83 30 0 495 014 - status 29.11.2011**

SI number

01 20 06 (299)

cardiagn.com

Fig. 567: Identifying Plate (0495724)
Courtesy of BMW OF NORTH AMERICA, INC.

0490671 PLATE

0490671 111028 Plate AM

NOTE: (Cover plate for radiator flange connection) Engine: M40

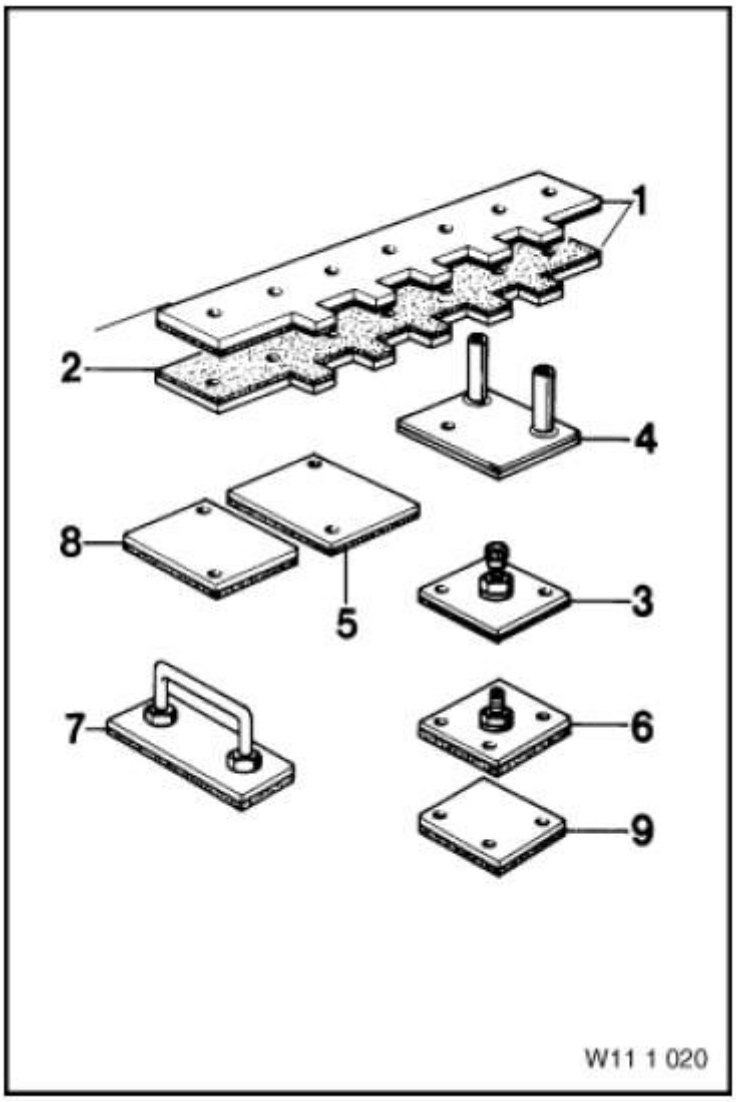


Fig. 568: Identifying Plate (0490671)
Courtesy of BMW OF NORTH AMERICA, INC.

0495016 PLATE

0495016 114342 Plate AM

NOTE: (Plate with thrust piece) Available only as a complete tool set 11 4 340 = 83 30 0 495 014 - as of 29.11.2011

SI number

01 20 06 (299)

Fig. 569: Identifying Plate (0495016)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496122 PLATE

0496122 118782 Plate AM

NOTE: **(Mounting plate, long) Discontinued; only available via set 11 8 780 = 0496120.**

SI number

01 05 07 (353)

Fig. 570: Identifying Plate (0496122)
Courtesy of BMW OF NORTH AMERICA, INC.

0490672 PLATE

0490672 111029 Plate AM

NOTE: **(Cover plate for heater connection) Engine: M40**

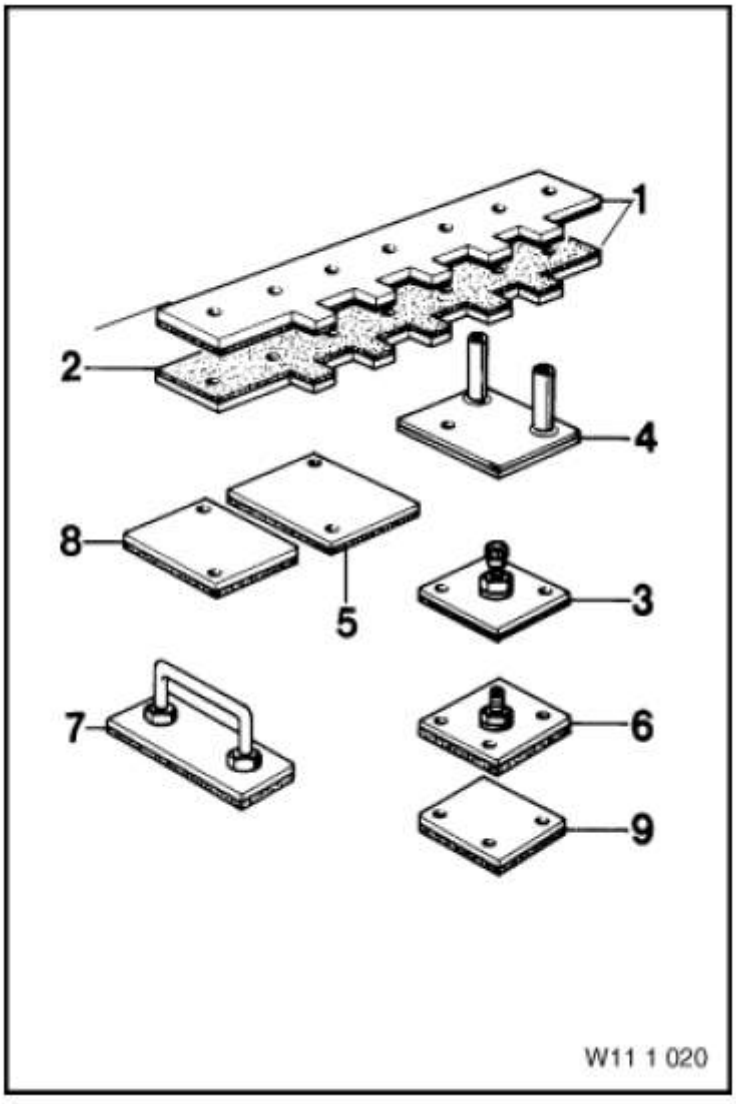


Fig. 571: Identifying Plate (0490672)
Courtesy of BMW OF NORTH AMERICA, INC.

0490670 PLATE

0490670 111027 Plate AM

cardiagn.com

NOTE: (Cover plate) For connection duct to water pump - Engine: M40

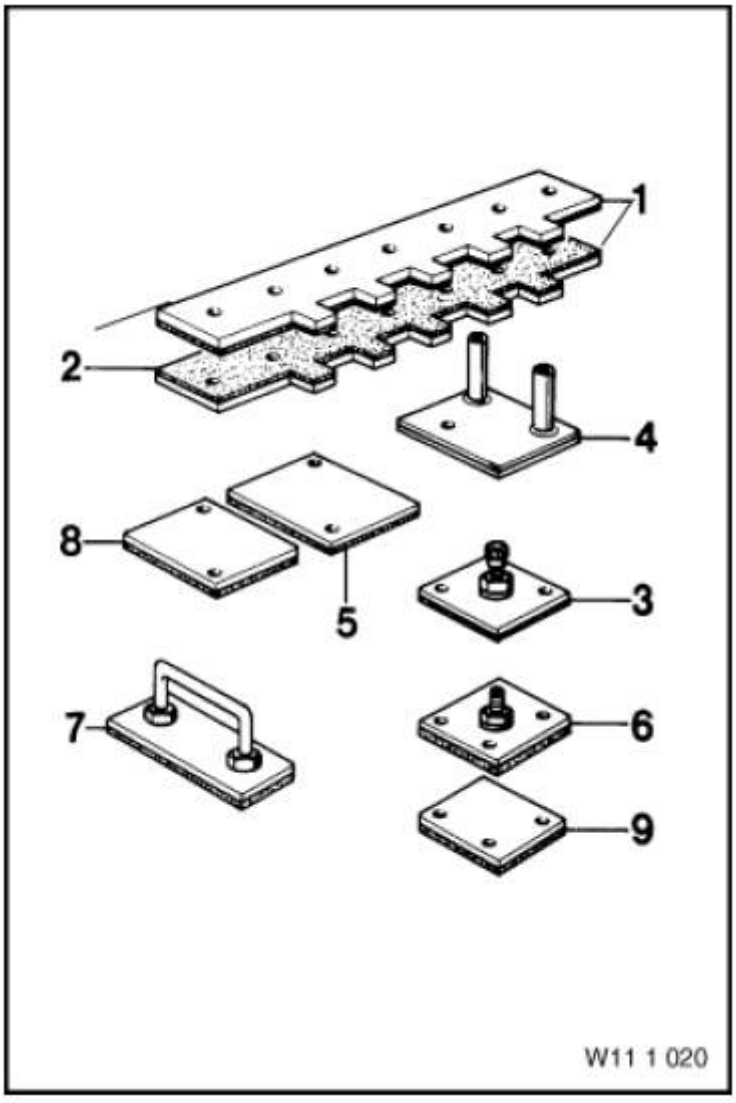


Fig. 572: Identifying Plate (0490670)
Courtesy of BMW OF NORTH AMERICA, INC.

0490766 PLATE

0490766 111435 Plate AM

NOTE: (formed plate) With rubber seal - Engine: M42, M44 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011

0490775 PLATE

0490775 111451 Plate AM

NOTE: (Mounting plate) available as part of set of special tools only

0490587 PLATE

0490587 110090 Plate Mechanical tool

NOTE: Engine fixture, for mounting the engine on the assembly stand.

SI number

cardiagn.com

01 03 87 (738)

Fig. 573: Identifying Plate (0490587)
Courtesy of BMW OF NORTH AMERICA, INC.

0495465 PLATE

0495465 117043 Plate AM

NOTE: **(Adapter plate (small) with gasket) discontinued, available as part of set of special tools only**

SI number

01 14 05 (198)

Fig. 574: Identifying Plate (0495465)
Courtesy of BMW OF NORTH AMERICA, INC.

0496119 PLATE

0496119 118772 Plate AM

NOTE: **(Engine fixture II) Deletion, only available via tool set**

SI number

01 05 07 (353)

Fig. 575: Identifying Plate (0496119)
Courtesy of BMW OF NORTH AMERICA, INC.

0494725 PLATE

0494725 117421 Plate AM

NOTE: **(Sealing plate with rubber seal) Can no longer be ordered separately; only available as part of set 11 7 420 = 83 30 0 494 517.**

0495735 PLATE

0495735 118537 Plate Minimum set: Mechanical tools AM

NOTE: **(unmounting plate) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.**

Storage Location

C20

SI number

01 20 06 (299)

cardiagn.com

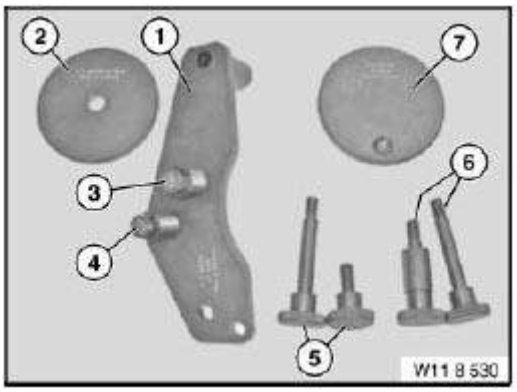


Fig. 576: Identifying Plate (0495735)
Courtesy of BMW OF NORTH AMERICA, INC.

0490890 PLATE

0490890 112443 Plate AM

NOTE: **(Mounting plate (2 pieces))**

Fig. 577: Identifying Plate (0490890)
Courtesy of BMW OF NORTH AMERICA, INC.

0496120 PLATE

0496120 118780 Plate AM

NOTE: **(Mounting plates) For securing transmission oil sump when gearbox is removed.**

Storage Location

B24

C24

SI number

01 05 07 (353)

Fig. 578: Identifying Plate (0496120)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0496121 Plate

   NOTE: **(Mounting plate, short) Discontinued; only available via set 11 8 780 = 0496120.**

2. 0496122 Plate

   NOTE: **(Mounting plate, long) Discontinued; only available via set 11 8 780 = 0496120.**

0496121 PLATE

cardiagn.com

0496121 118781 Plate AM

NOTE: **(Mounting plate, short) Discontinued; only available via set 11 8 780 = 0496120.**

SI number

01 05 07 (353)

Fig. 579: Identifying Plate (0496121)
Courtesy of BMW OF NORTH AMERICA, INC.

0496118 PLATE

0496118 118771 Plate AM

NOTE: **(Engine fixture I) Deletion, only available via tool set**

SI number

01 05 07 (353)

Fig. 580: Identifying Plate (0496118)
Courtesy of BMW OF NORTH AMERICA, INC.

0495470 PLATE

0495470 116256 Plate AM

NOTE: **(Fixture M8) Engine crankshaft: M67TU**

Storage Location

B20

SI number

01 14 05 (198)

Fig. 581: Identifying Plate (0495470)
Courtesy of BMW OF NORTH AMERICA, INC.

0490577 PLATE

0490577 110061 Plate AM

NOTE: **(Cover plate) For water pump with valve**

Fig. 582: Identifying Plate (0490577)
Courtesy of BMW OF NORTH AMERICA, INC.

0495048 PLATE

0495048 114440 Plate Mechanical tool

Replaced by: 83300495736

NOTE: **(Fixture) For mounting engine on assembly stand. Is replaced by 11 8 540 (0 495**

cardiagn.com

736)

SI number

01 17 04 (130)

Fig. 583: Identifying Plate (0495048)
Courtesy of BMW OF NORTH AMERICA, INC.

0493447 PLATE

0493447 111493 Plate AM

NOTE: **(Sealing plate cylinder row 1 - 4) From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available**

Fig. 584: Identifying Plate (0493447)
Courtesy of BMW OF NORTH AMERICA, INC.

0495148 PLATE

0495148 115233 Plate AM

NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

Fig. 585: Identifying Plate (0495148)
Courtesy of BMW OF NORTH AMERICA, INC.

0493448 PLATE

0493448 111494 Plate AM

NOTE: **(Sealing plate cylinder row 5 - 8) From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available**

Fig. 586: Identifying Plate (0493448)
Courtesy of BMW OF NORTH AMERICA, INC.

0490790 PLATE

0490790 111473 Plate AM

Replaced by: 83300493447

NOTE: **(Sealing plate for cylinder row 1...4) Replaced by 11 1 493 (0 493 447)**

Fig. 587: Identifying Plate (0490790)
Courtesy of BMW OF NORTH AMERICA, INC.

0496373 PLATE

0496373 115420 Plate Mechanical tool

NOTE: **(engine mounting plates)**

cardiagn.com

Fig. 588: Identifying Plate (0496373)
Courtesy of BMW OF NORTH AMERICA, INC.

0495463 PLATE

0495463 117041 Plate AM

NOTE: **(Adapter plate (large) with gasket) Deletion, only available via tool set**

SI number

01 14 05 (198)

Fig. 589: Identifying Plate (0495463)
Courtesy of BMW OF NORTH AMERICA, INC.

0496184 PLATE

0496184 118891 Plate AM

NOTE: **(Base plate with gasket)**

SI number

01 05 07 (353)

Fig. 590: Identifying Plate (0496184)
Courtesy of BMW OF NORTH AMERICA, INC.

0495523 PLATE

0495523 110473 Plate AM

NOTE: **(Adapter plate with gasket and valve) Only available as part of complete tool set 11 0 470 (83 30 0 495 520).**

SI number

01 04 06 (246)

Fig. 591: Identifying Plate (0495523)
Courtesy of BMW OF NORTH AMERICA, INC.

0493714 PLATE

0493714 117393 Plate AM

NOTE: **(Cover plate) For cylinder head joint surface, liquidation of remaining inventory and then only available with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

0490759 PLATE

0490759 111424 Plate AM

NOTE: **(cover plate with valve) Engine: M70, M73**

cardiagn.com

Fig. 592: Identifying Plate (0490759)
Courtesy of BMW OF NORTH AMERICA, INC.

0495146 PLATE

0495146 115231 Plate AM

NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

Fig. 593: Identifying Plate (0495146)
Courtesy of BMW OF NORTH AMERICA, INC.

0495308 PLIERS

0495308 115430 Pliers Mechanical tool

NOTE: **(Piston ring pliers) Diameter 93 mm Engine N62TU B48**

Storage Location

A20

B20

Fig. 594: Identifying Pliers (0495308)
Courtesy of BMW OF NORTH AMERICA, INC.

0493433 PLIERS

0493433 117180 Pliers AM

NOTE: **(Piston ring pliers) use 11 2 260 to insert the pistons into cylinders of the crankcase.**

Storage Location

Z9

SI number

01 01 99 (416)

Fig. 595: Identifying Pliers (0493433)
Courtesy of BMW OF NORTH AMERICA, INC.

0495745 PLIERS

0495745 118562 Pliers AM

NOTE: **(Assembly pliers) Remaining inventories will be sold off followed by discontinuation - then longer available individually. Available in complete special tool set 83 30 0 495 743 - 11 8 560 only.**

Storage Location

B20

SI number

cardiagn.com

01 20 06 (299)

Fig. 596: Identifying Pliers (0495745)
Courtesy of BMW OF NORTH AMERICA, INC.

0495011 PLIERS

0495011 114492 Pliers AM

NOTE: **(Dismantling pliers)**

Storage Location

A51

Fig. 597: Identifying Pliers (0495011)
Courtesy of BMW OF NORTH AMERICA, INC.

0493134 PLIERS

0493134 116170 Pliers Minimum set: Mechanical tools Mechanical tool

NOTE: **(pliers for double VANOS) For removing and fitting the plastic sealing caps on the double VANOS.**

Storage Location

A13

SI number

01 05 98 (305)

Fig. 598: Identifying Pliers (0493134)
Courtesy of BMW OF NORTH AMERICA, INC.

0495450 PLIERS

0495450 116190 Pliers Mechanical tool

NOTE: **For turning the double VANOS.**

0493755 PLIERS

0493755 119160 Pliers Mechanical tool

NOTE: **For opening and closing hose clamps on air intake system**

Storage Location

A42

SI number

01 15 00 (609)

Fig. 599: Identifying Pliers (0493755)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0490824 PLIERS

0490824 112090 Pliers Mechanical tool

Replaced by: 83300490796

NOTE: **For removal of the valve stem seals - Replaced by 11 1 480 (0 490 796)**

Fig. 600: Identifying Pliers (0490824)
Courtesy of BMW OF NORTH AMERICA, INC.

0495276 PLIERS

0495276 116112 Pliers AM

NOTE: **(Assembly pliers) Not available individually, but as part of set 11 6 110 (0495274) only.**

Storage Location

C51

Fig. 601: Identifying Pliers (0495276)
Courtesy of BMW OF NORTH AMERICA, INC.

0495174 PLIERS

0495174 115343 Pliers AM

NOTE: **(Installation pliers)**

Storage Location

A72

Fig. 602: Identifying Pliers (0495174)
Courtesy of BMW OF NORTH AMERICA, INC.

0491000 PLIERS

0491000 114000 Pliers Mechanical tool

NOTE: **(Special pliers for oil filter element), discontinued since January 84**

0495012 PLIERS

0495012 114493 Pliers AM

NOTE: **(Installation pliers)**

Storage Location

A51

Fig. 603: Identifying Pliers (0495012)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0490728 PLIERS

0490728 111250 Pliers Mechanical tool

Replaced by: 83300490796

NOTE: **For removing and installing the valve stem seal. Only free for motorcycle! Replaced by 11 1 480 (0 490 796)**

0493709 PLIERS

0493709 114240 Pliers AM

NOTE: **(Decoupling pliers) For oil filter lines**

Storage Location

A41

B41

SI number

01 09 00 (580)

Fig. 604: Identifying Pliers (0493709)
Courtesy of BMW OF NORTH AMERICA, INC.

0490796 PLIERS

0490796 111480 Pliers Minimum set: Mechanical tools Mechanical tool

NOTE: **For removing valve stem seal**

Storage Location

B10

SI number

01 01 93 (621)

Fig. 605: Identifying Pliers (0490796)
Courtesy of BMW OF NORTH AMERICA, INC.

0490769 PLUG

0490769 111438 Plug AM

NOTE: **(seal plugs and standard clip) Engine: M42, M44, M50, M52 available as part of set of special tools only**

0495027 PLUG

0495027 114430 Plug Minimum set: Mechanical tools Mechanical tool

NOTE: **(Seal plugs (2x)) For sealing off oil holes in oil pump.**

cardiagn.com

Storage Location

A52

SI number

01 17 04 (130)

Fig. 606: Identifying Plug (0495027)
Courtesy of BMW OF NORTH AMERICA, INC.

0494726 PLUG

0494726 117422 Plug AM

NOTE: **(Seal plug with clamps and hose). Can no longer be ordered separately; only available as part of set 11 7 420 = 83 30 0 494 517.**

0490768 PLUG

0490768 111437 Plug AM

NOTE: **(seal plugs) With valve and standard clip - Engine: M42, M44, M50, M52, S50 available as part of set of special tools only**

0493716 PLUG

0493716 117395 Plug AM

NOTE: **(Plug) Liquidation of current inventory with air connection fitting and then available for ordering only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

2364711 PLUG

2364711 Plug Minimum set: Mechanical tools AM

NOTE: **For closing the pressure oil holes for cleaning the cylinder head sealing surfaces.**

SI number

01 50 14 (203)

Fig. 607: Identifying Plug (2364711)
Courtesy of BMW OF NORTH AMERICA, INC.

0496176 PLUG

0496176 118824 Plug AM

NOTE: **Only available as part of complete tool set 11 8 820 (= 83 30 0 496 138).**

SI number

01 05 07 (353)

Fig. 608: Identifying Plug (0496176)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0490595 PRESSURE GAUGE

0490595 110162 Pressure gauge AM

Replaced by: 83300490613

NOTE: **Compression pressure inscriber Discontinuation and replaced by 11 0 220 (0 490 613)**

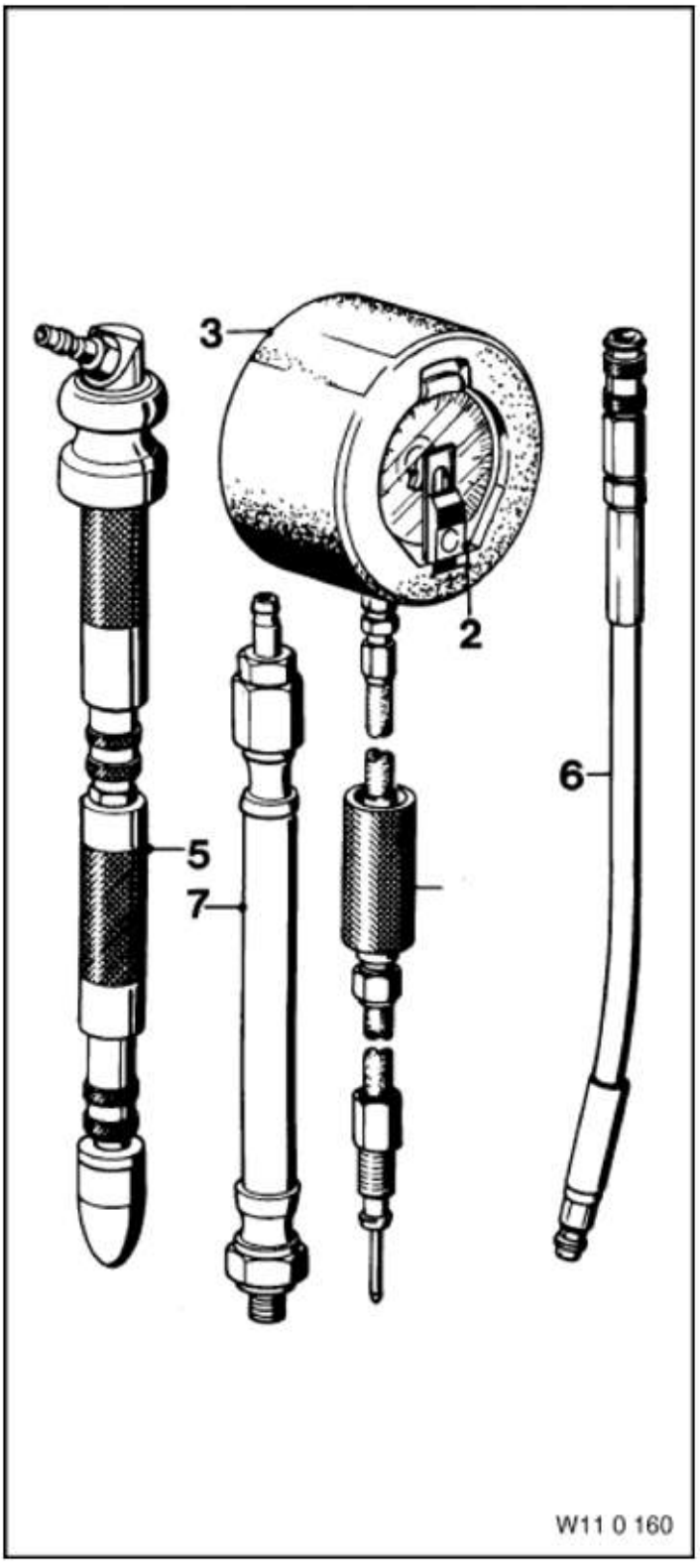


Fig. 609: Identifying Pressure Gauge (0490595)

Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496266 PULLER

0496266 110370 Puller Minimum set: Mechanical tools AM

NOTE: For dismantling front radial shaft seal.

Storage Location

C23

SI number

01 15 07 (390)

Consisting of:

1. 0496275 Bell housing

   NOTE: (thread housing)

2. 0496276 Spindle

Fig. 610: Identifying Puller (0496266)
Courtesy of BMW OF NORTH AMERICA, INC.

0493579 PULLER

0493579 118110 Puller Mechanical tool

NOTE: For crankshaft radial shaft seal

Storage Location

B12

SI number

01 12 99 (452)

Fig. 611: Identifying Puller (0493579)
Courtesy of BMW OF NORTH AMERICA, INC.

0490812 PULLER

0490812 112020 Puller AM

NOTE: For reducing bush in the crankshaft (guide bearing)

Storage Location

Z8

Consisting of:

1. 0490813 Claw

   NOTE: (Extraction claw I) With threaded bush

2. 0490814 Claw

cardiagn.com

NOTE: **(Extraction claw II)**

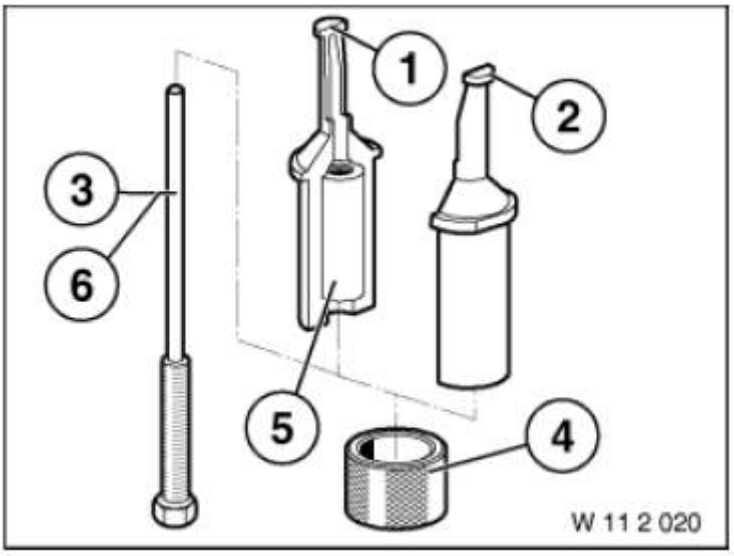


Fig. 612: Identifying Puller (0490812)
Courtesy of BMW OF NORTH AMERICA, INC.

3. **0490815** Spindle

NOTE: **(Pressure spindle)**

4. **0490816** Holding sleeve
5. **0490817** Bush

NOTE: **(Threaded bush)**

0490805 PULLER

0490805 112010 Puller AM

NOTE: **(Puller) For removing guide bearing in crankshaft, shaft diameter 12 mm.**

Storage Location

C11

Consisting of:

1. **0490806** Claw

cardiagn.com

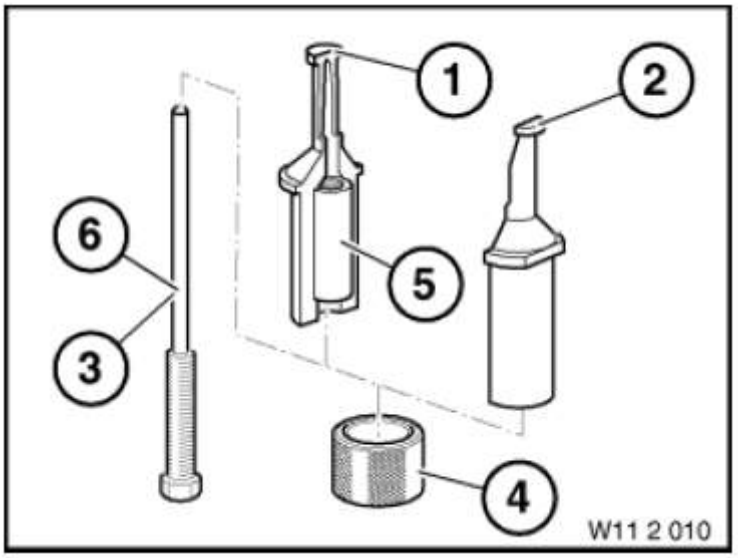


Fig. 613: Identifying Puller (0490805)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Remover claw I) With threaded bush - engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

2. 0490807 Claw

NOTE: **(Remover claw II) engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

3. 0490808 Spindle

NOTE: **(Pressure spindle) Engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

4. 0490809 Holding sleeve

NOTE: **Engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

5. 0490810 Bush

NOTE: **(Threaded bush) Engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

6. 0490811 Spindle

NOTE: **(Pressure spindle) Engine: M60/B30, M62, S62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

0490863 PULLER

0490863 112311 Puller AM

NOTE: **Only available as part of complete set**

0496262 PULLER

cardiagn.com

0496262 119226 Puller Minimum set: Mechanical tools AM

NOTE: Discontinued; can only be ordered as part of complete tool 11 9 220 = 83 30 0 493 934.

0491029 PUNCH ELEMENT

0491029 114303 Punch element AM

NOTE: (Embossing stamps 0...9, separate embossing stamps) 0...9, list digits individually

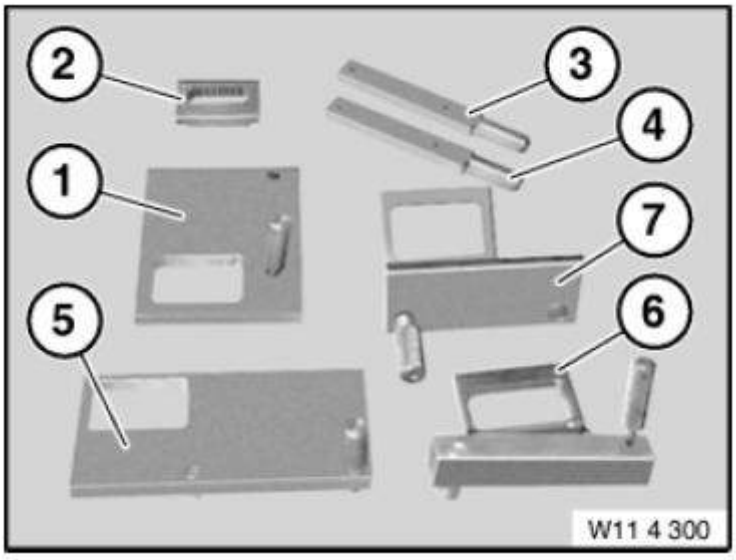


Fig. 614: Identifying Punch Element (0491029)
Courtesy of BMW OF NORTH AMERICA, INC.

0491030 PUNCH ELEMENT

0491030 114304 Punch element AM

NOTE: (Embossed letters) embossed letters A, E, S Indication of the letter is required engine: M70, M73 - letter A, S engine: M40, M43 - letter E engine: M42, M44, M50, M52, M60, M62 - letter S

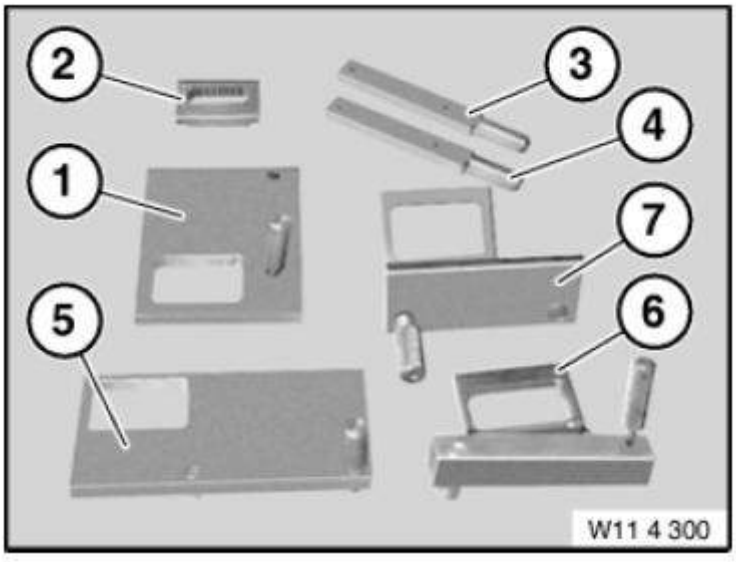


Fig. 615: Identifying Punch Element (0491030)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0494370 QUICK FASTENER

0494370 119005 Quick fastener Minimum set: Mechanical tools AM

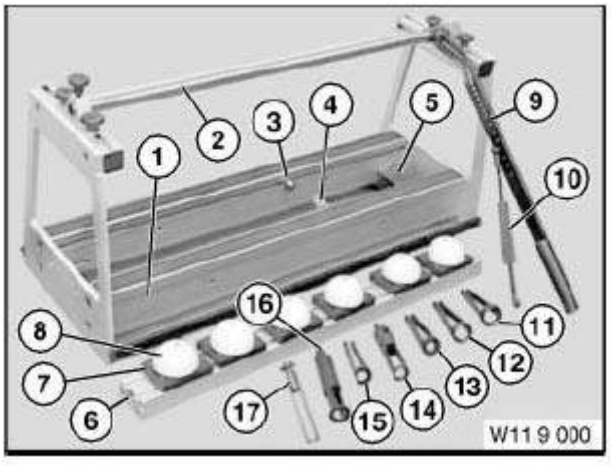


Fig. 616: Identifying Quick Fastener (0494370)
Courtesy of BMW OF NORTH AMERICA, INC.

0490713 RAIL

0490713 111111 Rail AM

NOTE: **(Cover rail with spacer buffer)**

Fig. 617: Identifying Rail (0490713)
Courtesy of BMW OF NORTH AMERICA, INC.

0495565 REMOVAL AND FITTING AID

0495565 110400 Removal and fitting aid Mechanical tool

NOTE: **(removal and mounting tool) For dismantling and installing rocker arm shaft.**

Storage Location

C19

SI number

01 04 06 (246)

Fig. 618: Identifying Removal And Fitting Aid (0495565)
Courtesy of BMW OF NORTH AMERICA, INC.

0495728 REMOVAL AND FITTING AID

0495728 118530 Removal and fitting aid Minimum set: Mechanical tools AM

NOTE: **(Removal and mounting tool) For removal and installation of sealing cap of vacuum pump.**

Storage Location

cardiagn.com

B20

C20

SI number

01 20 06 (299)

Consisting of:

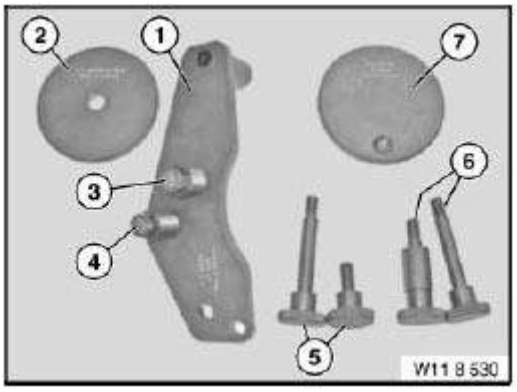


Fig. 619: Identifying Removal And Fitting Aid (0495728)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0495729 Plate

   NOTE: (base plate) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.

2. 0495730 Plate

   NOTE: (pressure plate) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.

3. 0495731 Spindle

   NOTE: (spindle (pressure plate)) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.

4. 0495732 Spindle

   NOTE: (spindle (unmounting plate)) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.

5. 0495733 Screw

   NOTE: (Set of screws M10 (N54)) Available with complete set 11 8 530 = 83 30 0 495 728 only.

6. 0495734 Screw

   NOTE: (Set of screws M11 encl. sleeve (N53)) Liquidation of existing inventory

cardiagn.com

and then available with complete set 11 8 530 = 83 30 0 495 728 only.

7. **0495735** Plate

NOTE: **(unmounting plate) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.**

8. **0496704** Bush

NOTE: **Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.**

In conjunction with: **11 8 530 = 0495728**

2212827 RING

2212827 Ring Minimum set: Mechanical tools Mechanical tool

NOTE: **Spacer ring for installation of the rear RWD.**

Storage Location

A29

SI number

01 05 11 (692)

Fig. 620: Identifying Ring (2212827)
Courtesy of BMW OF NORTH AMERICA, INC.

0490733 RING

0490733 111273 Ring AM

NOTE: **(Thrust ring) Engine: M10, M30, M42**

Fig. 621: Identifying Ring (0490733)
Courtesy of BMW OF NORTH AMERICA, INC.

0496660 RING

0496660 119185 Ring Minimum set: Mechanical tools AM

NOTE: **For installation shaft seal - rim offset 6.6 mm (N55).**

Storage Location

B27

C27

SI number

01 18 09 (578)

cardiagn.com

Fig. 622: Identifying Ring (0496660)
Courtesy of BMW OF NORTH AMERICA, INC.

0495378 RING

0495378 110332 Ring Minimum set: Mechanical tools AM

NOTE: **(Adapter ring) Remaining inventories will be sold off followed by discontinuation - then longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 334 (special tool number 11 0 330).**

Fig. 623: Identifying Ring (0495378)
Courtesy of BMW OF NORTH AMERICA, INC.

0496306 RING

0496306 118732 Ring Minimum set: Mechanical tools AM

NOTE: **(Sealing ring) For secure connection of test probe 11 0 222 and adapter 11 8 730/731.**

SI number

01 16 07 (392)

0496327 RING SPANNER

0496327 118600 Ring spanner Mechanical tool

NOTE: **For tightening down exhaust turbocharger screw connection with torque wrench.**

Storage Location

C48

SI number

01 23 07 (412)

Fig. 624: Identifying Ring Spanner (0496327)
Courtesy of BMW OF NORTH AMERICA, INC.

0490574 RING SPANNER

0490574 110040 Ring spanner Mechanical tool

NOTE: **For tensioning the drive belt - For series only, H. Laub**

116000 RING SPANNER

0491063 116000 Ring spanner Mechanical tool

NOTE: **(Special ring spanner) For exhaust manifold**

0491066 RING SPANNER

0491066 116030 Ring spanner Mechanical tool

cardiagn.com

NOTE: **(Ring spanner for exhaust manifold)**

Fig. 625: Identifying Ring Spanner (0491066)
Courtesy of BMW OF NORTH AMERICA, INC.

0491072 RING SPANNER

0491072 117000 Ring spanner Mechanical tool

NOTE: **(Open ring spanner AF 24) for exhaust-gas recirculation valve**

Fig. 626: Identifying Ring Spanner (0491072)
Courtesy of BMW OF NORTH AMERICA, INC.

0490722 RING SPANNER

0490722 111180 Ring spanner Mechanical tool

NOTE: **For fittings screws on the rocker arm**

Storage Location

X4

Fig. 627: Identifying Ring Spanner (0490722)
Courtesy of BMW OF NORTH AMERICA, INC.

0490719 RING SPANNER

0490719 111150 Ring spanner Mechanical tool

NOTE: **For fitting screws on the rocker arms**

Storage Location

X4

Fig. 628: Identifying Ring Spanner (0490719)
Courtesy of BMW OF NORTH AMERICA, INC.

2354959 RIVETING TOOL

2354959 Riveting tool AM

NOTE: **For riveting the top timing chain (included in tool set 2 354 985). Consisting of: 2354962 basic body (1) 2354976 dies (2)**

SI number

01 24 13 (990)

Consisting of:

1. **2354962** Basic body

Fig. 629: Identifying Riveting Tool (2354959)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **For riveting the top timing chain on the N47. (included in tool set 2 354 985).**

2. **2354976** Die-plate

NOTE: **For riveting the top timing chain on the N47-2 units. (included in tool set 2 354 985).**

2354981 RIVETING TOOL

2354981 Riveting tool AM

NOTE: **For opening the top timing chain during the exchange (included in tool set 2 354 985). Consisting of: 2354983 basic body (1) 2354984 spindle (2)**

SI number

01 24 13 (990)

Consisting of:

1. **2354983** Basic body

NOTE: **For opening the timing chain on exchange (included in tool set 2 354 985).**

Fig. 630: Identifying Riveting Tool (2354981)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **2354984** Spindle

NOTE: **Pressure spindle for opening the timing chain on exchange (included in tool set 2 354 985).**

2354985 RIVETING TOOL SET

2354985 Riveting tool set Minimum set: Mechanical tools AM

NOTE: **For opening and riveting the top timing chain at replacement. Consisting of: 2354958 holder, 2354981 riveting tool for opening the timing chain 2354959 riveting tool for riveting the timing chain**

SI number

01 24 13 (990)

Consisting of:

Fig. 631: Identifying Riveting Tool Set (2354985)
Courtesy of BMW OF NORTH AMERICA, INC.

1 = 2354958
3 = 2354981
2 = 2354959

0491104 ROD

cardiagn.com

0491104 118003 Rod AM

0491083 ROD

0491083 117333 Rod AM

NOTE: (Center rod)

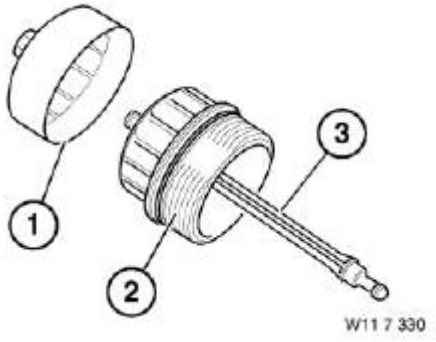


Fig. 632: Identifying Rod (0491083)
Courtesy of BMW OF NORTH AMERICA, INC.

0494367 ROD

0494367 119002 Rod Minimum set: Mechanical tools AM

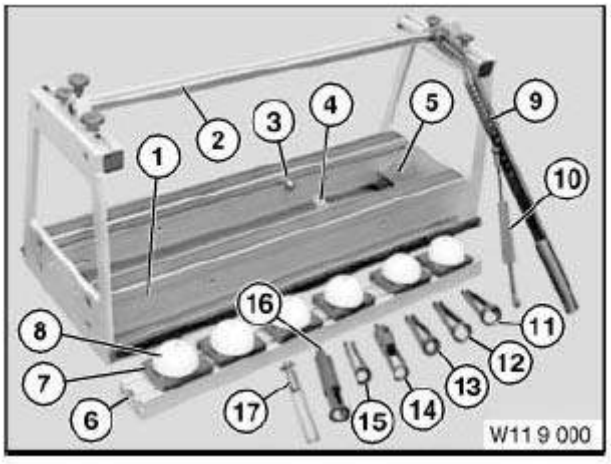


Fig. 633: Identifying Rod (0494367)
Courtesy of BMW OF NORTH AMERICA, INC.

0490792 RUBBER SEAL

0490792 111475 Rubber seal AM

NOTE: (Rubber seal for sealing strip 11 1 471) available as part of set of special tools only

0490763 RUBBER SEAL

0490763 111432 Rubber seal AM

NOTE: (rubber seal) For sealing strip 11 1 431 - Engine: M42, M44, M50, M52 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011

0490793 RUBBER SEAL

cardiagn.com

0490793 111476 Rubber seal AM

Replaced by: 83300490795

NOTE: **(Rubber seal for sealing strip 11 1 472) Replaced by 11 1 478 (0 490 795)**

Fig. 634: Identifying Rubber Seal (0490793)
Courtesy of BMW OF NORTH AMERICA, INC.

0490784 RUBBER SEAL

0490784 111466 Rubber seal AM

NOTE: **(Rubber seals for sealing strips)**

Fig. 635: Identifying Rubber Seal (0490784)
Courtesy of BMW OF NORTH AMERICA, INC.

0490765 RUBBER SEAL

0490765 111434 Rubber seal AM

NOTE: **(rubber seal) For sealing strip 11 1 433 - Engine: M42, M44, M50, M52 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011**

0490760 RUBBER SEAL

0490760 111425 Rubber seal AM

NOTE: **(rubber seal) For sealing strips 11 1 421, 11 1 422**

Fig. 636: Identifying Rubber Seal (0490760)
Courtesy of BMW OF NORTH AMERICA, INC.

0490795 RUBBER SEAL

0490795 111478 Rubber seal AM

NOTE: **(Rubber seal for sealing strip 11 1 477) available as part of set of special tools only**

0495103 SCRAPER

0495103 114471 Scraper Minimum set: Mechanical tools AM

Storage Location

B52

Fig. 637: Identifying Scraper (0495103)
Courtesy of BMW OF NORTH AMERICA, INC.

0491004 SCREW

0491004 114040 Screw Mechanical tool

cardiagn.com

NOTE: **For bleeding the oil circuit on all engines with a non-return valve in the oil filter housing upper section**

Storage Location

Y3

Fig. 638: Identifying Screw (0491004)
Courtesy of BMW OF NORTH AMERICA, INC.

0496575 SCREW

0496575 118914 Screw AM

NOTE: **(screws (2 x))**

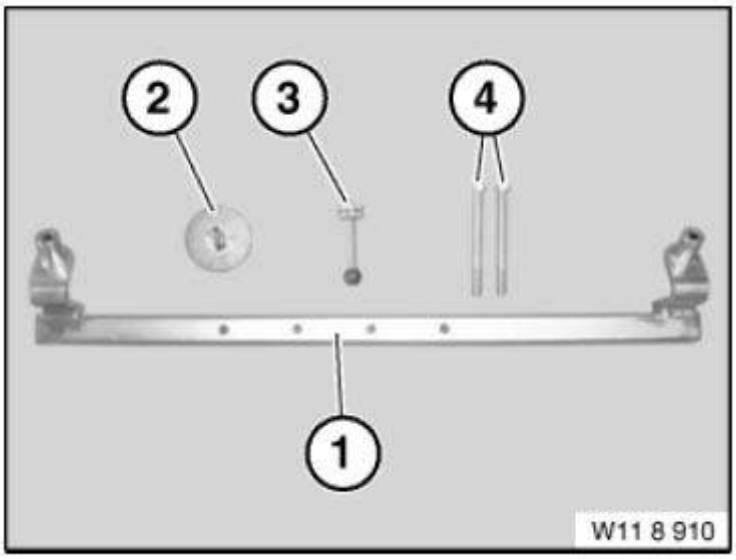


Fig. 639: Identifying Screw (0496575)
Courtesy of BMW OF NORTH AMERICA, INC.

0494031 SCREW

0494031 119184 Screw Minimum set: Mechanical tools AM

NOTE: **(screws (2 x))**

Fig. 640: Identifying Screw (0494031)
Courtesy of BMW OF NORTH AMERICA, INC.

0493443 SCREW

0493443 111495 Screw AM

NOTE: **(Mounting bolts (9 pieces)) M6 x 20 From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available**

Fig. 641: Identifying Screw (0493443)
Courtesy of BMW OF NORTH AMERICA, INC.

0494727 SCREW

cardiagn.com

0494727 117423 Screw AM

NOTE: **(Set of screws (10 x)) Can no longer be ordered separately; only available as part of set 11 7 420 = 83 30 0 494 715.**

0495741 SCREW

0495741 118552 Screw Minimum set: Mechanical tools AM

NOTE: **(Knurled screw (4 pieces))**

Storage Location

C19

SI number

01 20 06 (299)

Fig. 642: Identifying Screw (0495741)
Courtesy of BMW OF NORTH AMERICA, INC.

0495178 SCREW

0495178 115361 Screw AM

NOTE: **(Banjo bolt with ring connector)**

Storage Location

A71

Fig. 643: Identifying Screw (0495178)
Courtesy of BMW OF NORTH AMERICA, INC.

0490680 SCREW

0490680 111037 Screw AM

NOTE: **(Screw plugs (2 x))**

Fig. 644: Identifying Screw (0490680)
Courtesy of BMW OF NORTH AMERICA, INC.

0494044 SCREW

0494044 117410 Screw Mechanical tool

NOTE: **For installing the radial shaft seal**

Storage Location

C45

SI number

01 10 01 (733)

cardiagn.com

Fig. 645: Identifying Screw (0494044)
Courtesy of BMW OF NORTH AMERICA, INC.

0496129 SCREW

0496129 118802 Screw Minimum set: Mechanical tools AM

NOTE: **(Set of screws) Can only be ordered as part of complete tool 11 9 660 = 0495955**

SI number

01 05 07 (353)

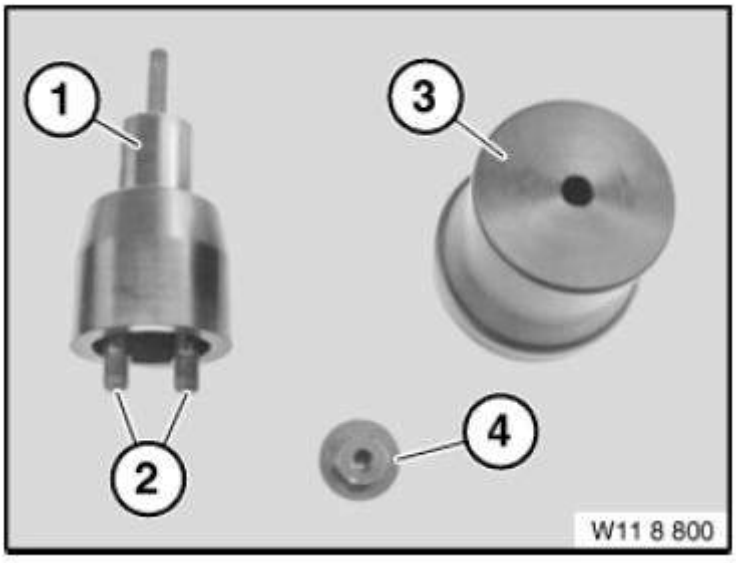


Fig. 646: Identifying Screw (0496129)
Courtesy of BMW OF NORTH AMERICA, INC.

0494530 SCREW

0494530 118503 Screw AM

NOTE: **(Screw with hexagon socket) Only available as part of complete tool set 11 8 500 (83 30 0 494 312).**

0490847 SCREW

0490847 112192 Screw AM

NOTE: **(Screw (2 pieces))**

Fig. 647: Identifying Screw (0490847)
Courtesy of BMW OF NORTH AMERICA, INC.

0494020 SCREW

0494020 114382 Screw AM

NOTE: **(screws (1 x))**

Fig. 648: Identifying Screw (0494020)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0495467 SCREW

0495467 117045 Screw AM

NOTE: **(Set of screws) discontinued, available as part of set of special tools only**

SI number

01 14 05 (198)

Fig. 649: Identifying Screw (0495467)
Courtesy of BMW OF NORTH AMERICA, INC.

0495473 SCREW

0495473 119512 Screw AM

NOTE: **(screws (2 x))**

0494041 SCREW

0494041 119223 Screw Minimum set: Mechanical tools AM

NOTE: **(Screws (6 pieces)) Liquidation of existing inventory, then deletion and available only via complete special tool 11 9 220 = 83 30 0 493 934**

Fig. 650: Identifying Screw (0494041)
Courtesy of BMW OF NORTH AMERICA, INC.

0496134 SCREW

0496134 118812 Screw Minimum set: Mechanical tools AM

NOTE: **(Screw set) Liquidation of existing inventory and then available only via complete tool set 11 8 810 = 83 30 0 496 132 - status 09.12.2011**

SI number

01 05 07 (353)

Fig. 651: Identifying Screw (0496134)
Courtesy of BMW OF NORTH AMERICA, INC.

0490987 SCREW

0490987 113402 Screw AM

NOTE: **(Mounting bolts (3 x))**

Fig. 652: Identifying Screw (0490987)
Courtesy of BMW OF NORTH AMERICA, INC.

0490920 SCREW

0490920 113102 Screw AM

NOTE: **(Knurled screw)**

cardiagn.com

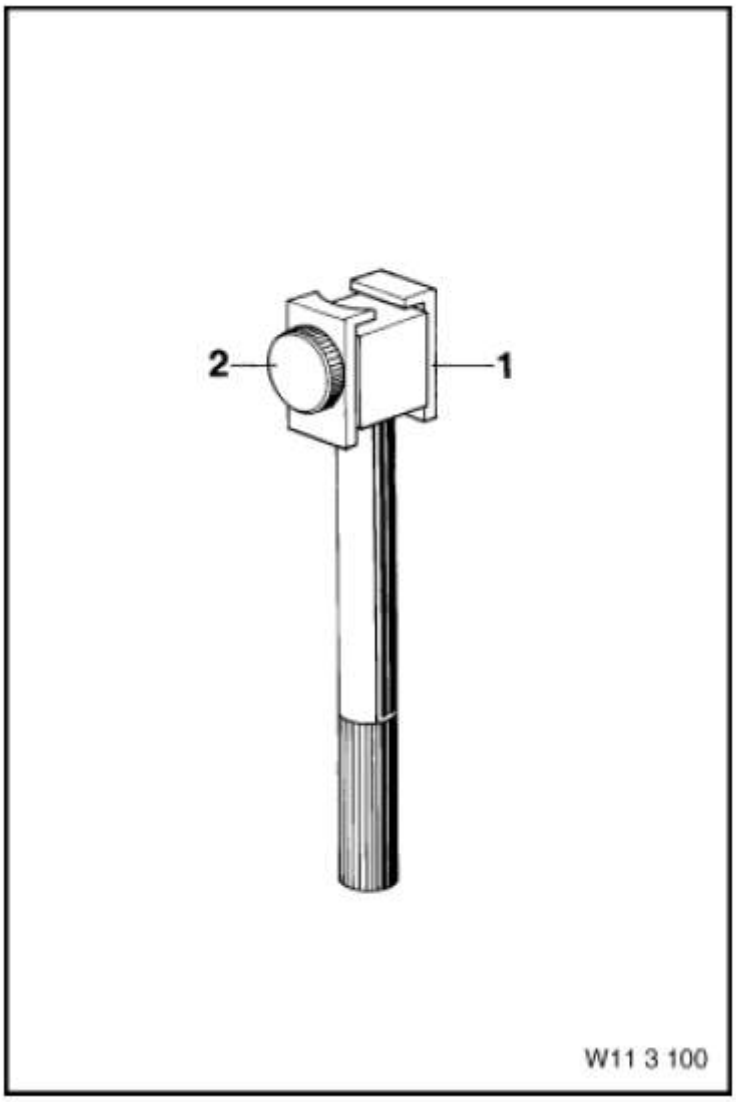


Fig. 653: Identifying Screw (0490920)
Courtesy of BMW OF NORTH AMERICA, INC.

0495169 SCREW

0495169 115314 Screw Minimum set: Mechanical tools AM

NOTE: **(Screw set (3 pieces)) Remaining inventories will be sold off, then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 125 (special tool number 11 5 310).**

cardiagn.com

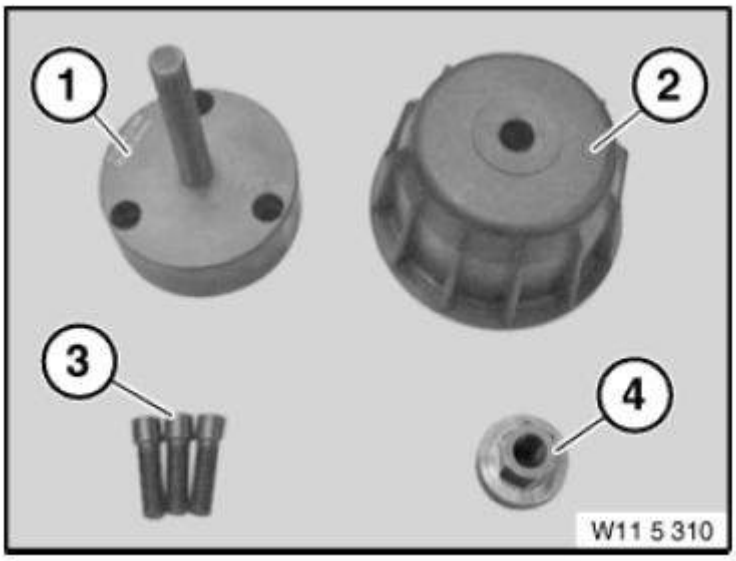


Fig. 654: Identifying Screw (0495169)
Courtesy of BMW OF NORTH AMERICA, INC.

0494042 SCREW

0494042 119224 Screw Minimum set: Mechanical tools AM

NOTE: **(Screws (3 pieces)) Liquidation of existing inventory, then deletion and available only via complete special tool 11 9 220 = 83 30 0 493 934**

Fig. 655: Identifying Screw (0494042)
Courtesy of BMW OF NORTH AMERICA, INC.

0490654 SCREW

0490654 111011 Screw AM

NOTE: **(screws (14 pieces))**

cardiagn.com

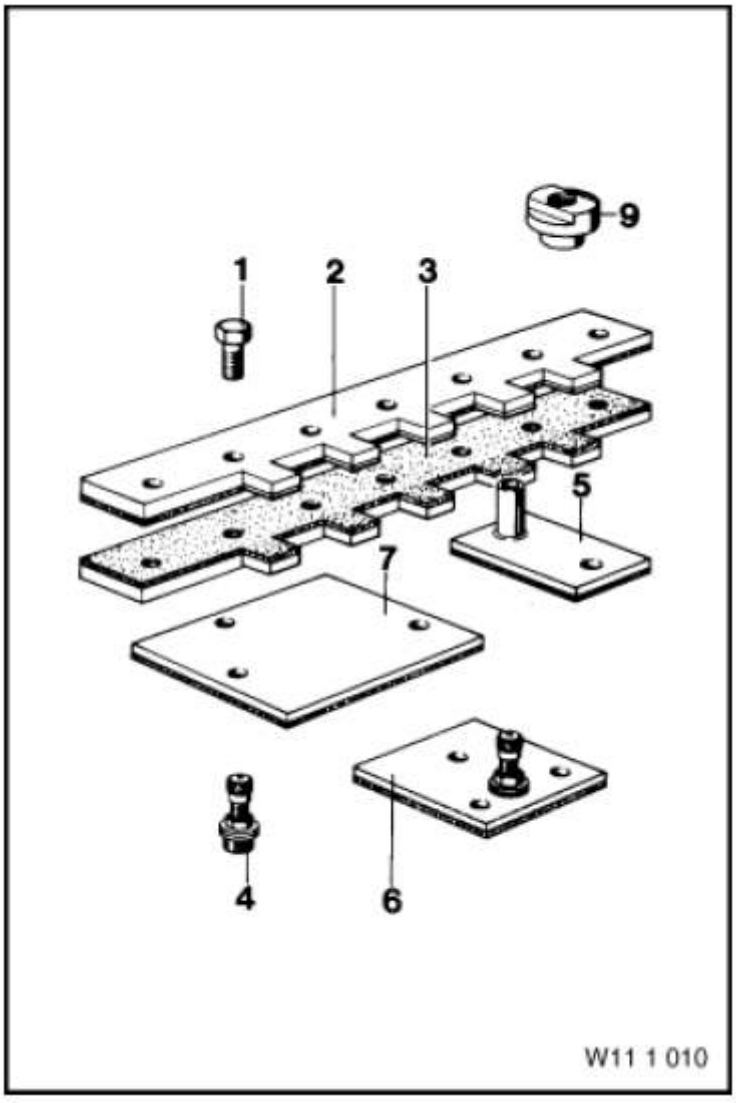


Fig. 656: Identifying Screw (0490654)
Courtesy of BMW OF NORTH AMERICA, INC.

0490891 SCREW

0490891 112444 Screw AM

NOTE: (Special screw (2 pieces))

Fig. 657: Identifying Screw (0490891)
Courtesy of BMW OF NORTH AMERICA, INC.

0495734 SCREW

0495734 118536 Screw Minimum set: Mechanical tools AM

NOTE: (Set of screws M11 encl. sleeve (N53)) Liquidation of existing inventory and then available with complete set 11 8 530 = 83 30 0 495 728 only.

Storage Location

C20

SI number

01 20 06 (299)

cardiagn.com

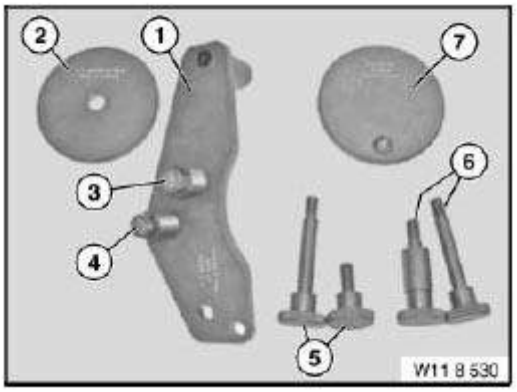


Fig. 658: Identifying Screw (0495734)
Courtesy of BMW OF NORTH AMERICA, INC.

0495163 SCREW

0495163 115292 Screw AM

Fig. 659: Identifying Screw (0495163)
Courtesy of BMW OF NORTH AMERICA, INC.

0491035 SCREW

0491035 115012 Screw AM

Fig. 660: Identifying Screw (0491035)
Courtesy of BMW OF NORTH AMERICA, INC.

0494490 SCREW

0494490 117253 Screw AM

NOTE: **(Knurled screw)**

Storage Location

B53

Fig. 661: Identifying Screw (0494490)
Courtesy of BMW OF NORTH AMERICA, INC.

0490750 SCREW

0490750 111402 Screw AM

NOTE: **(Screws (13 pieces)) Engine: M10, S54/S50 09/2011 remaining inventories will be sold off and then no longer available.**

Fig. 662: Identifying Screw (0490750)
Courtesy of BMW OF NORTH AMERICA, INC.

0495152 SCREW

0495152 115237 Screw AM

cardiagn.com

NOTE: **Available only as a complete tool set 11 5 230 (83 30 0 495 117) - as of 27.01.12**

Fig. 663: Identifying Screw (0495152)
Courtesy of BMW OF NORTH AMERICA, INC.

0494032 SCREW

0494032 119341 Screw Minimum set: Mechanical tools AM

NOTE: **Available only as a complete tool set 11 9 340 = 83 30 0 493 971 - as of 29.11.2011**

0496186 SCREW

0496186 118893 Screw AM

NOTE: **(Set of screws) Can only be ordered as part of complete tool 11 9 660 = 0495955**

SI number

01 05 07 (353)

Fig. 664: Identifying Screw (0496186)
Courtesy of BMW OF NORTH AMERICA, INC.

0495525 SCREW

0495525 110475 Screw AM

NOTE: **(Set of screws) Only available as part of complete tool set 11 0 470 (83 30 0 495 520).**

SI number

01 04 06 (246)

Fig. 665: Identifying Screw (0495525)
Courtesy of BMW OF NORTH AMERICA, INC.

0490990 SCREW

0490990 113412 Screw AM

NOTE: **(screws (2 x))**

Fig. 666: Identifying Screw (0490990)
Courtesy of BMW OF NORTH AMERICA, INC.

0496812 SCREW

0496812 117223 Screw Minimum set: Mechanical tools AM

NOTE: **M8 for N47/N57 discontinued, available as part of set of special tools only**

cardiagn.com

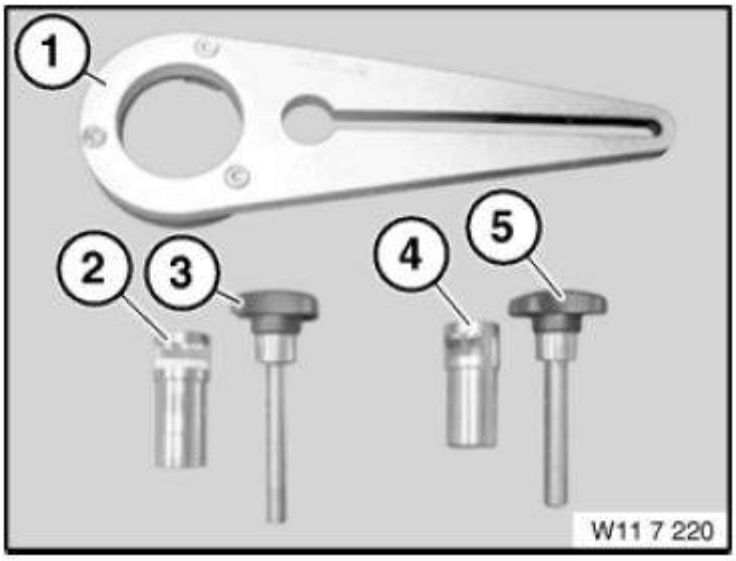


Fig. 667: Identifying Screw (0496812)
Courtesy of BMW OF NORTH AMERICA, INC.

0494035 SCREW

0494035 119262 Screw Minimum set: Mechanical tools AM

NOTE: **(Bolt (thread M10) with washer) For screwing counter support**

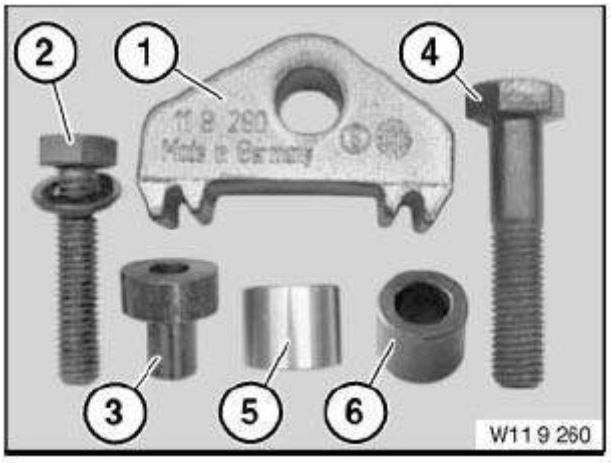


Fig. 668: Identifying Screw (0494035)
Courtesy of BMW OF NORTH AMERICA, INC.

0495725 SCREW

0495725 114345 Screw AM

NOTE: **(Screw set) N54 sale of existing inventory then available as part of set of special tools 11 4 340 = 83 30 0 495 014 only - as of 29.11.2011**

SI number

01 20 06 (299)

Fig. 669: Identifying Screw (0495725)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0490786 SCREW

0490786 111468 Screw AM

NOTE: **(Screw plugs (2 x))**

Fig. 670: Identifying Screw (0490786)
Courtesy of BMW OF NORTH AMERICA, INC.

0494690 SCREW

0494690 117254 Screw AM

NOTE: **(Screws M6x30, 3 x)**

Storage Location

B53

Fig. 671: Identifying Screw (0494690)
Courtesy of BMW OF NORTH AMERICA, INC.

0494040 SCREW

0494040 119222 Screw Minimum set: Mechanical tools AM

Fig. 672: Identifying Screw (0494040)
Courtesy of BMW OF NORTH AMERICA, INC.

0496126 SCREW

0496126 118793 Screw AM

NOTE: **(Set of screws (2 x))**

SI number

01 05 07 (353)

Fig. 673: Identifying Screw (0496126)
Courtesy of BMW OF NORTH AMERICA, INC.

0495619 SCREW

0495619 117424 Screw AM

NOTE: **(Set of screws (10 pieces)) Can no longer be ordered separately; only available as part of set 11 7 420 = 83 30 0 494 517.**

0494605 SCREW

0494605 118123 Screw AM

NOTE: **(Screw with washer)**

Fig. 674: Identifying Screw (0494605)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0495100 SCREW

0495100 114462 Screw AM

NOTE: **(screws M7 (2 x))**

Storage Location

C51

Fig. 675: Identifying Screw (0495100)
Courtesy of BMW OF NORTH AMERICA, INC.

0495733 SCREW

0495733 118535 Screw Minimum set: Mechanical tools AM

NOTE: **(Set of screws M10 (N54)) Available with complete set 11 8 530 = 83 30 0 495 728 only.**

Storage Location

C20

SI number

01 20 06 (299)

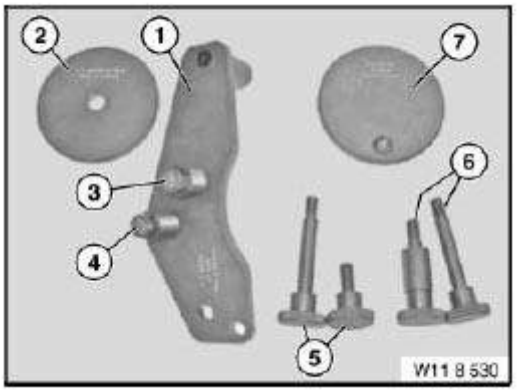


Fig. 676: Identifying Screw (0495733)
Courtesy of BMW OF NORTH AMERICA, INC.

0496814 SCREW

0496814 117225 Screw Minimum set: Mechanical tools AM

NOTE: **M10 for N47TU/N57TU discontinued, available as part of set of special tools only**

cardiagn.com

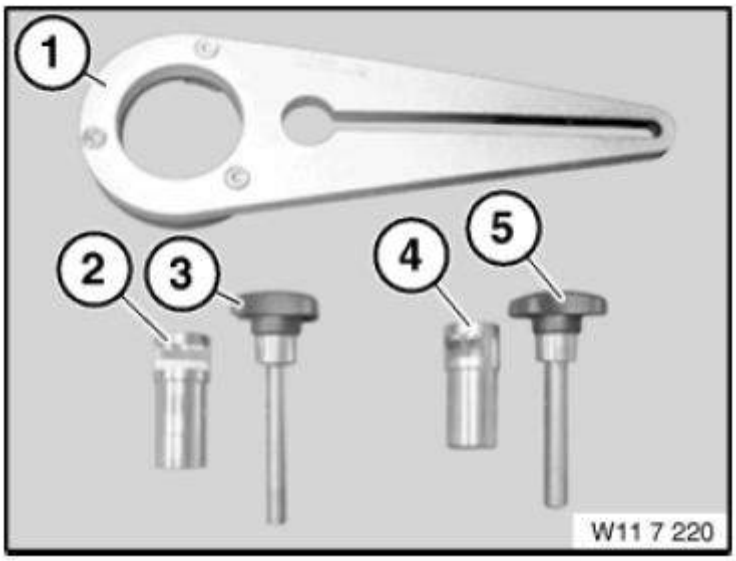


Fig. 677: Identifying Screw (0496814)
Courtesy of BMW OF NORTH AMERICA, INC.

0496178 SCREW

0496178 118826 Screw AM

NOTE: **(Set of screws) Only available as part of complete tool set 11 8 820 (=83 30 0 496 138).**

SI number

01 05 07 (353)

Fig. 678: Identifying Screw (0496178)
Courtesy of BMW OF NORTH AMERICA, INC.

0496145 SCREW

0496145 118870 Screw Mechanical tool

NOTE: **(Bolt M20x1) For removal of counterbalance shafts.**

Storage Location

C24

SI number

01 05 07 (353)

Fig. 679: Identifying Screw (0496145)
Courtesy of BMW OF NORTH AMERICA, INC.

0495738 SCREW

0495738 118542 Screw AM

NOTE: **(Set of screws (4 x))**

cardiagn.com

Fig. 680: Identifying Screw (0495738)
Courtesy of BMW OF NORTH AMERICA, INC.

0490644 SCREW

0490644 110317 Screw AM

NOTE: (Screw plug (2 pieces)) Engine: M43 Only available as part of complete set

0496867 SCREW

0496867 116233 Screw AM

NOTE: Set consisting of: 1x M8x30 3x M6x25 Only available as part of complete tool set 11 6 230 (83 30 0 496 853).

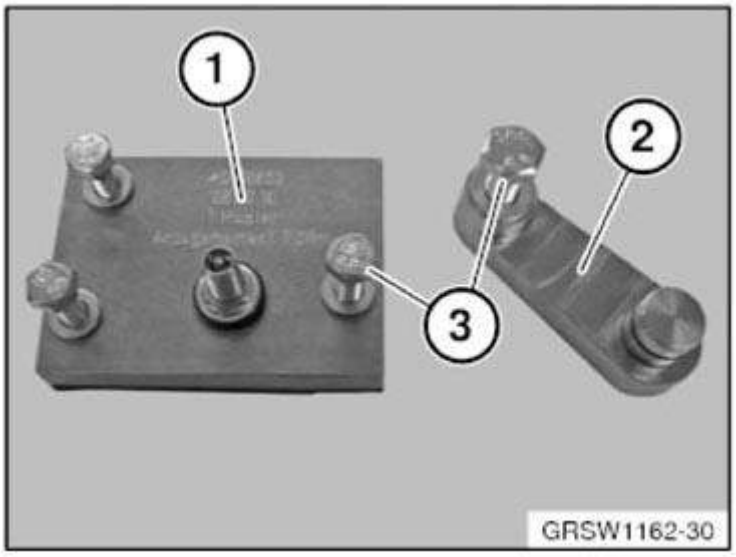


Fig. 681: Identifying Screw (0496867)
Courtesy of BMW OF NORTH AMERICA, INC.

0490714 SCREW

0490714 111112 Screw AM

NOTE: (screws (14 x))

Fig. 682: Identifying Screw (0490714)
Courtesy of BMW OF NORTH AMERICA, INC.

0496261 SCREW

0496261 119225 Screw Minimum set: Mechanical tools AM

NOTE: Discontinued; can only be ordered as part of complete tool 11 9 220 = 83 30 0 493 934.

0495179 SCREW

0495179 115362 Screw AM

NOTE: (Set of screw plugs (2 x))

cardiagn.com

Storage Location

A71

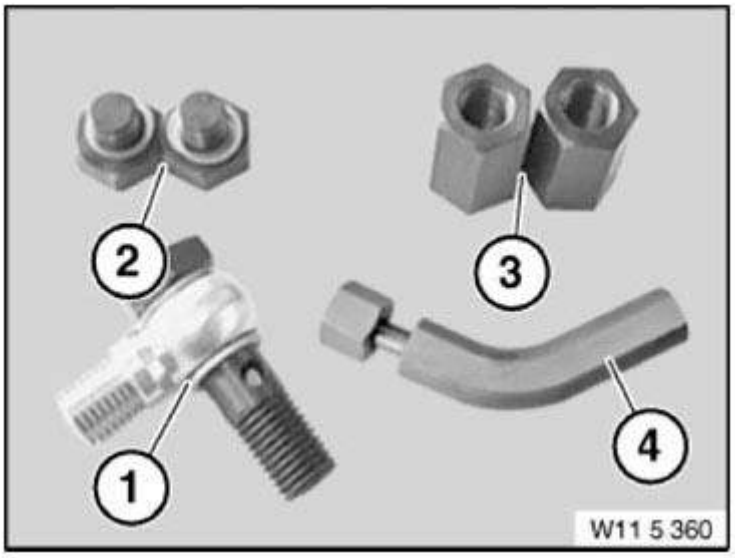


Fig. 683: Identifying Screw (0495179)
Courtesy of BMW OF NORTH AMERICA, INC.

0495260 SCREW

0495260 115334 Screw Minimum set: Mechanical tools AM

NOTE: **(Set of screws (2 x)) Can no longer be ordered separately. Only available as part of set 11 5 330 = 83 30 0 495 127.**

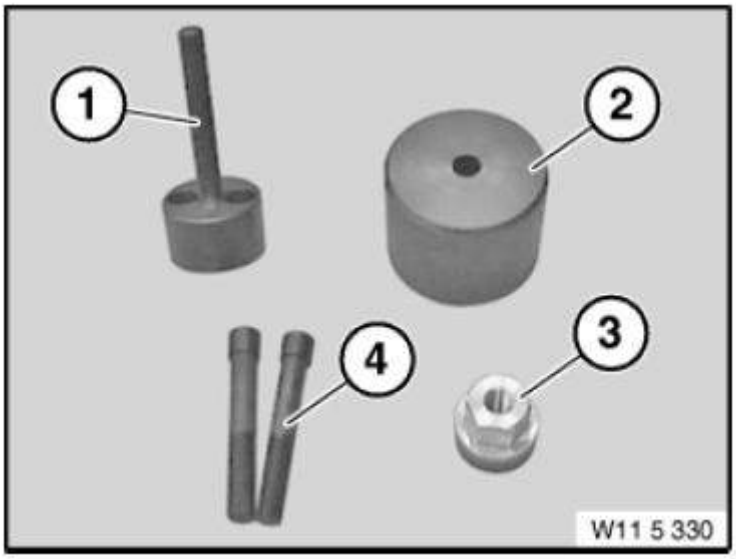


Fig. 684: Identifying Screw (0495260)
Courtesy of BMW OF NORTH AMERICA, INC.

0493719 SCREW

0493719 117398 Screw AM

NOTE: **(Threaded plug, intake side) Liquidation of current inventory and then available for ordering only with complete tool set 11 7 30 (83 30 0 493 711) Status 11.09.12.**

cardiagn.com

0490961 SCREW

0490961 113262 Screw AM

NOTE: **(Mounting bolt (2 x))**

0490964 SCREW

0490964 113272 Screw AM

NOTE: **(Mounting bolt)**

Fig. 685: Identifying Screw (0490964)
Courtesy of BMW OF NORTH AMERICA, INC.

0495723 SCREW

0495723 114284 Screw Minimum set: Mechanical tools AM

NOTE: **2 pieces per packaging unit = set of screws M6 engine: N54**

Storage Location

A20

SI number

01 20 06 (299)

Fig. 686: Identifying Screw (0495723)
Courtesy of BMW OF NORTH AMERICA, INC.

0495211 SCREW

0495211 115202 Screw Minimum set: Mechanical tools AM

NOTE: **(Screws M8x40 mm (3 pieces)) Liquidation of existing inventory and then available only via complete tool set 11 5 200 = 83 30 0 495 111 - status 29.11.2011**

Fig. 687: Identifying Screw (0495211)
Courtesy of BMW OF NORTH AMERICA, INC.

0496125 SCREW

0496125 118792 Screw AM

NOTE: **(Knurled screw with synchronizing key)**

SI number

01 05 07 (353)

Fig. 688: Identifying Screw (0496125)
Courtesy of BMW OF NORTH AMERICA, INC.

0494130 SCREW

cardiagn.com

0494130 119264 Screw Minimum set: Mechanical tools AM

NOTE: **(Bolt (thread M12)) For counter support for retaining flywheel when gearbox is removed**

Storage Location

A45

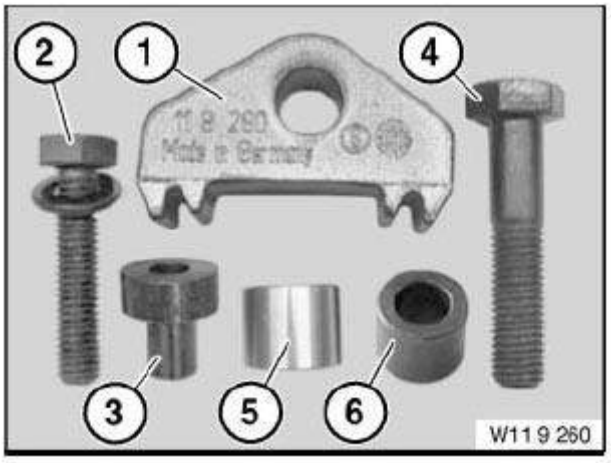


Fig. 689: Identifying Screw (0494130)
Courtesy of BMW OF NORTH AMERICA, INC.

0496147 SCREW

0496147 118773 Screw AM

NOTE: **(Set of screws)**

SI number

01 05 07 (353)

Fig. 690: Identifying Screw (0496147)
Courtesy of BMW OF NORTH AMERICA, INC.

0496872 SCREW

0496872 116283 Screw AM

NOTE: **Set consisting of: 2x M6x35 (used for the guide sleeves) 11x M6x30 Only available as part of complete tool set 11 6 280 (83 30 0 496 857).**

cardiagn.com

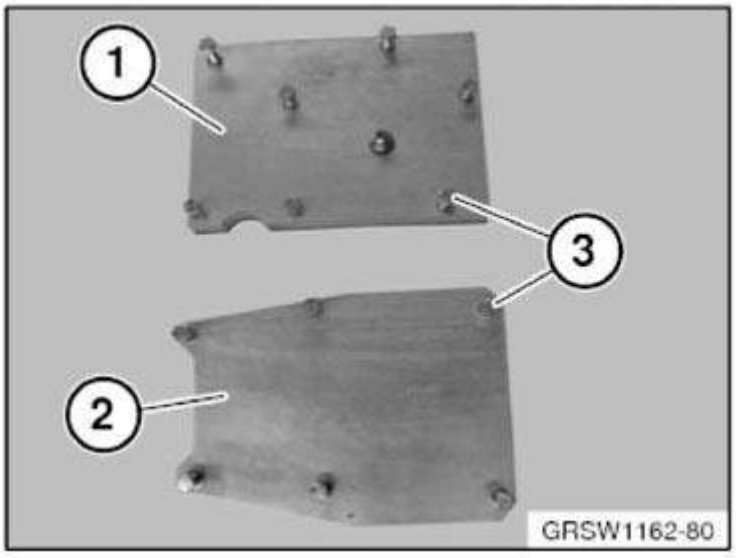


Fig. 691: Identifying Screw (0496872)
Courtesy of BMW OF NORTH AMERICA, INC.

0495564 SCREW

0495564 110493 Screw AM

NOTE: **(Screw set) Liquidation of existing inventory and then available only via complete tool set 11 0 490 = 83 30 0 495 561 - status 29.11.2011**

SI number

01 04 06 (246)

Fig. 692: Identifying Screw (0495564)
Courtesy of BMW OF NORTH AMERICA, INC.

0495155 SCREW

0495155 115242 Screw AM

NOTE: **Available only as a complete tool set 11 5 240 (83 30 0 495 118) - as of 13.01.12**

SI number

01 02 05 (173)

cardiagn.com

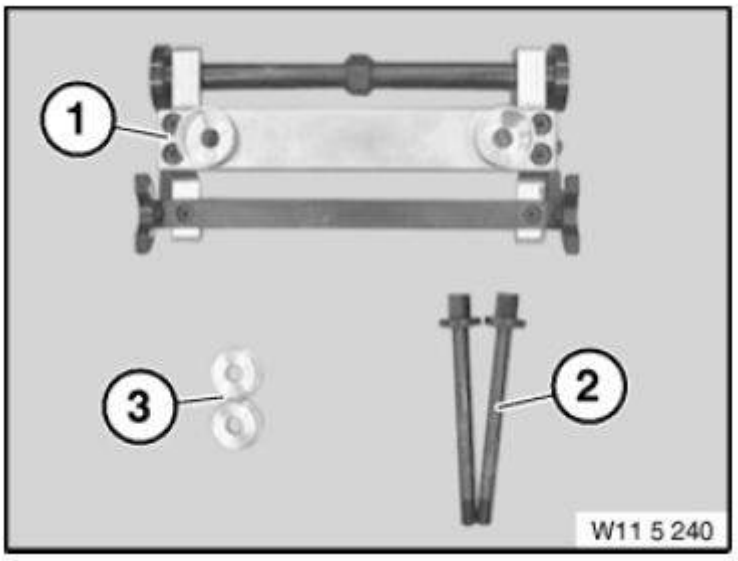


Fig. 693: Identifying Screw (0495155)
Courtesy of BMW OF NORTH AMERICA, INC.

0494024 SCREW

0494024 119234 Screw Minimum set: Mechanical tools AM

NOTE: (screws (3 x))

Fig. 694: Identifying Screw (0494024)
Courtesy of BMW OF NORTH AMERICA, INC.

0490619 SENSOR

0490619 110226 Sensor Minimum set: Mechanical tools AM

NOTE: (Test probe) For recording compression testers 11 0 224 and 11 0 160 / engine: M10, M20, M30, M40, M42, M43, M44, M50, M52, M60, M62, M70, M73, N62, S50US, S52US, S62

Fig. 695: Identifying Sensor (0490619)
Courtesy of BMW OF NORTH AMERICA, INC.

0493129 SENSOR

0493129 110235 Sensor Minimum set: Mechanical tools AM

NOTE: (Test probe, screw-in) For measuring "absolute compression" at all cylinders, engine: S14, S38, S50B30, S50B32, S50US, S52US, S54, S85

Fig. 696: Identifying Sensor (0493129)
Courtesy of BMW OF NORTH AMERICA, INC.

0491051 SENSOR

0491051 115062 Sensor AM

NOTE: (Sensor)

cardiagn.com

Fig. 697: Identifying Sensor (0491051)
Courtesy of BMW OF NORTH AMERICA, INC.

0490615 SENSOR

0490615 110222 Sensor Minimum set: Mechanical tools AM

NOTE: **(Test probe) For recording compression testers 11 0 221 and 11 0 160 / engine: M21, M41, M47, M51, M57, M57T2**

Fig. 698: Identifying Sensor (0490615)
Courtesy of BMW OF NORTH AMERICA, INC.

0493146 SENSOR

0493146 116253 Sensor AM

NOTE: **(Sensor) Sensor arm 11.5 mm**

Fig. 699: Identifying Sensor (0493146)
Courtesy of BMW OF NORTH AMERICA, INC.

0493387 SENSOR

0493387 110236 Sensor Minimum set: Mechanical tools AM

NOTE: **(Test probe) For recording compression tester 11 0 221 or DIS pressure sensor / engine: M47, M57, M57TU, M57T2**

Fig. 700: Identifying Sensor (0493387)
Courtesy of BMW OF NORTH AMERICA, INC.

0490620 SENSOR

0490620 110227 Sensor Minimum set: Mechanical tools AM

Replaced by: 83300493129

NOTE: **(Test probe) For recording compression testers 11 0 224 and 11 0 160 / engine: S14, S38, S50 - Replaced by 11 0 235 (0 493 129)**

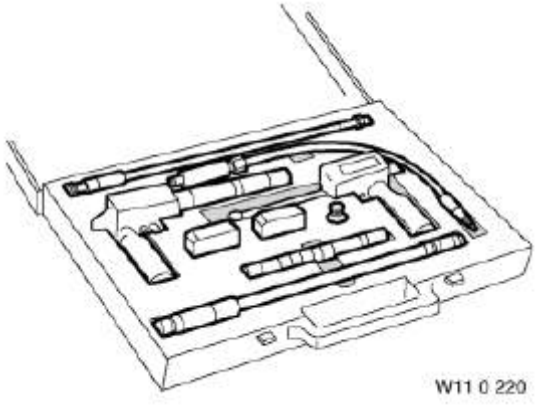


Fig. 701: Identifying Sensor (0490620)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0490572 SHACKLE

0490572 110029 Shackle Minimum set: Mechanical tools AM

NOTE: (Shackle) 2 pieces As of 08/2011, only available as a complete set via 11 0 020 = 0490567. Delivered with TUV inspection certificate and operating instructions.

0490565 SHACKLE

0490565 110009 Shackle Minimum set: Mechanical tools AM

NOTE: (Shackle) 2 pieces. As of 08/2001, only available as a complete set via 11 0 000 = 0490561. Delivered with TUV inspection certificate and operating instructions.

Fig. 702: Identifying Shackle (0490565)
Courtesy of BMW OF NORTH AMERICA, INC.

0493457 SHACKLE

0493457 110264 Shackle AM

NOTE: (Shackle) 2 x

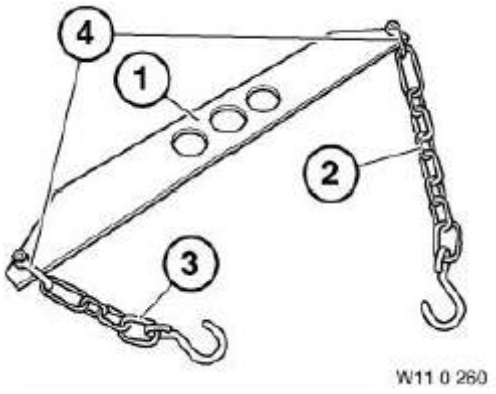


Fig. 703: Identifying Shackle (0493457)
Courtesy of BMW OF NORTH AMERICA, INC.

0493753 SHACKLE

0493753 110079 Shackle Minimum set: Mechanical tools AM

NOTE: (Shackle) 2 pieces As of 08/2011, only available as a complete set via 11 0 070 = 0490579. Delivered with TUV inspection certificate and operating instructions.

0490908 SHAFT

0490908 113061 Shaft AM

NOTE: Only available as part of complete set

0490924 SHAPED PART

0490924 113113 Shaped part AM

NOTE: (Shaped part) Engine: M10

Storage Location

cardiagn.com

Z1

Z2

Fig. 704: Identifying Shaped Part (0490924)
Courtesy of BMW OF NORTH AMERICA, INC.

0494433 SHAPED PART

0494433 118182 Shaped part Minimum set: Mechanical tools AM

NOTE: **(Shaped part)**

Fig. 705: Identifying Shaped Part (0494433)
Courtesy of BMW OF NORTH AMERICA, INC.

0494373 SHAPED PART

0494373 119008 Shaped part Minimum set: Mechanical tools AM

NOTE: **(Shaped part) Shaped part made of plastic**

Fig. 706: Identifying Shaped Part (0494373)
Courtesy of BMW OF NORTH AMERICA, INC.

0490926 SHAPED PART

0490926 113115 Shaped part AM

NOTE: **(Shaped part) Engine: M30**

Storage Location

Z1

Fig. 707: Identifying Shaped Part (0490926)
Courtesy of BMW OF NORTH AMERICA, INC.

0491090 SHAPED PART

0491090 117380 Shaped part Mechanical tool

NOTE: **(shaped part) For screwing in the chain tensioner with the upper right gear case cover removed**

Storage Location

C1

SI number

01 04 96 (049)

Fig. 708: Identifying Shaped Part (0491090)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0490883 SHAPED PART

0490883 112400 Shaped part Mechanical tool

NOTE: **(Shaped part) For screwing in the chain tensioner with the gear case cover removed**

Storage Location

C1

SI number

01 05 92 (507)

Fig. 709: Identifying Shaped Part (0490883)
Courtesy of BMW OF NORTH AMERICA, INC.

0490925 SHAPED PART

0490925 113114 Shaped part AM

NOTE: **(Shaped part) Engine: M30**

Storage Location

Z1

Fig. 710: Identifying Shaped Part (0490925)
Courtesy of BMW OF NORTH AMERICA, INC.

0494372 SHAPED PART

0494372 119007 Shaped part Minimum set: Mechanical tools AM

NOTE: **(Shaped part)**

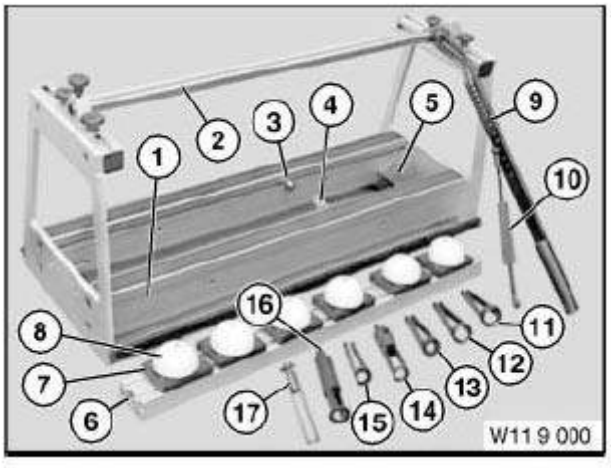


Fig. 711: Identifying Shaped Part (0494372)
Courtesy of BMW OF NORTH AMERICA, INC.

0490923 SHAPED PART

0490923 113112 Shaped part AM

cardiagn.com

NOTE: **(Shaped part) Engine: M10**

Storage Location

Z1

Z2

Fig. 712: Identifying Shaped Part (0490923)
Courtesy of BMW OF NORTH AMERICA, INC.

0494358 SHAPED PART

0494358 118502 Shaped part AM

NOTE: **(Shaped part) 4 pieces Only available as part of complete tool set 11 8 500 (83 30 0 494 312).**

2348135 SIMULATOR

2348135 Simulator Minimum set: Measuring and testing equipment MP

NOTE: **For permanent activation of the electric fan for faster engine cooling.**

SI number

02 08 13 (911)

Fig. 713: Identifying Simulator (2348135)
Courtesy of BMW OF NORTH AMERICA, INC.

0491091 SIMULATOR

0491091 117450 Simulator AM

NOTE: **For Bosch oxygen sensor**

Storage Location

K 102

SI number

02 07 93 (700)

Consisting of:

1 = **0491092** Simulator

NOTE: **(Simulator) Only available as part of complete set**

2 = **0491093** Cable

NOTE: **(Cable) 4-pin, encoding A Connection to wiring harness and oxygen sensor - engine: M40, M42, M43, M50, M70 available as part of set of special tools only**

3 = **0491094** connector

cardiagn.com

NOTE: **(Connector) 4-pin plug connection, encoding B Connection to oxygen sensor - engine: S50/B30 Only available as part of complete set**

4 = **0491095** connector

NOTE: **(Connector) 4-pin plug connection, encoding B Connection to wiring harness - engine: S50/B30 Only orderable as a complete tool set 11 7 450 (83 30 0 491 091) - as of 09.07.13.**

5 = **0491096** connector

NOTE: **(Connector) 1-pin and 3/4-pin plug Connection to oxygen sensor with Bosch or Cannon plug connection - engine: M10, M20, M30, S14 Only available as part of complete set**

6 = **0491097** connector

NOTE: **(Connector) 1-pin and 3/4-pin plug Connection to wiring harness with Bosch or Cannon plug connection - engine: M10, M20, M30, S14 Only available as part of complete set**

8 = **0491098** Bridge

NOTE: **(Bridge) Only available as part of complete set**

8 = **0491099** Operating instructions

Fig. 714: Identifying Simulator (0491091)
Courtesy of BMW OF NORTH AMERICA, INC.

0491092 SIMULATOR

0491092 117451 Simulator AM

NOTE: **(Simulator) Only available as part of complete set**

Storage Location

K 102

2318428 SOCKET WAF 46

2318428 Socket WAF 46 Minimum set: Mechanical tools Mechanical tool

NOTE: **T55 For removing and installing cylinder head.**

Storage Location

A34

SI number

01 07 12 (801)

Fig. 715: Identifying Socket WAF 46 (2318428)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496106 SOCKET WAF 46

0496106 118720 Socket WAF 46 Minimum set: Mechanical tools Mechanical tool

NOTE: **(Long socket SW24) For removal and installation of oil pressure sensor. (Stahlwille or HAZET)**

Storage Location

A24

SI number

01 04 07 (352)

Fig. 716: Identifying Socket WAF 46 (0496106)
Courtesy of BMW OF NORTH AMERICA, INC.

0496142 SOCKET WAF 46

0496142 118850 Socket WAF 46 Minimum set: Mechanical tools Mechanical tool

NOTE: **(Long socket SW17 (double hexagon)) For removal and installation of temperature sensor (Stahlwille)**

Storage Location

A24

SI number

01 05 07 (353)

Fig. 717: Identifying Socket WAF 46 (0496142)
Courtesy of BMW OF NORTH AMERICA, INC.

0491018 SOCKET WAF 46

0491018 114180 Socket WAF 46 Minimum set: Mechanical tools Mechanical tool

NOTE: **(screwdriver bit Torx T60) For releasing and tightening down dual-mass flywheel - model year: from Jan 94**

Storage Location

A11

SI number

01 02 94 (777)

Fig. 718: Identifying Socket WAF 46 (0491018)
Courtesy of BMW OF NORTH AMERICA, INC.

0493365 SOCKET WRENCH

0493365 116440 Socket wrench Mechanical tool

cardiagn.com

NOTE: **(Hook socket wrench) For adjusting the VANOS to left-hand stop on installation as well as adjusting the timing**

Storage Location

B11

SI number

01 21 98 (383)

Fig. 719: Identifying Socket Wrench (0493365)
Courtesy of BMW OF NORTH AMERICA, INC.

0495749 SOCKET WRENCH

0495749 118610 Socket wrench Minimum set: Mechanical tools Mechanical tool

NOTE: **(Wrench socket AF 5) For removing and installing the high-pressure pump (length 125 mm).**

Storage Location

A20

SI number

01 20 06 (299)

Fig. 720: Identifying Socket Wrench (0495749)
Courtesy of BMW OF NORTH AMERICA, INC.

0495002 SOCKET WRENCH

0495002 114260 Socket wrench Mechanical tool

NOTE: **For removing and installing lambda oxygen sensors.**

Storage Location

A52

SI number

01 17 04 (130)

Fig. 721: Identifying Socket Wrench (0495002)
Courtesy of BMW OF NORTH AMERICA, INC.

0495162 SOCKET WRENCH

0495162 115291 Socket wrench AM

Fig. 722: Identifying Socket Wrench (0495162)
Courtesy of BMW OF NORTH AMERICA, INC.

0493363 SOCKET WRENCH

cardiagn.com

0493363 116420 Socket wrench Minimum set: Mechanical tools Mechanical tool

NOTE: **(Socket wrench SW32) For removing and installing the solenoid valves. For installing the gasket of the eccentric shaft sensor (N51, N52, N52K).**

Storage Location

A9

SI number

01 12 98 (339)

Fig. 723: Identifying Socket Wrench (0493363)
Courtesy of BMW OF NORTH AMERICA, INC.

0495747 SOCKET WRENCH

0495747 118580 Socket wrench Minimum set: Mechanical tools Mechanical tool

NOTE: **(wrench socket Torx T60) For removing and installing cylinder head (outside diameter 13.5 mm).**

Storage Location

A20

B20

SI number

01 20 06 (299)

Fig. 724: Identifying Socket Wrench (0495747)
Courtesy of BMW OF NORTH AMERICA, INC.

0491070 SOCKET WRENCH INSERT

0491070 116070 Socket wrench insert Mechanical tool

NOTE: **With 9 WAF joint for releasing and tightening down the exhaust nuts**

Storage Location

B10

SI number

01 07 88 (972)

Fig. 725: Identifying Socket Wrench Insert (0491070)
Courtesy of BMW OF NORTH AMERICA, INC.

0490831 SOCKET WRENCH INSERT

0490831 112115 Socket wrench insert AM

Replaced by: 83300490504

cardiagn.com

NOTE: **(Socket wrench insert WAF 10) Replaced by 00 9 120 (0 490 504)**

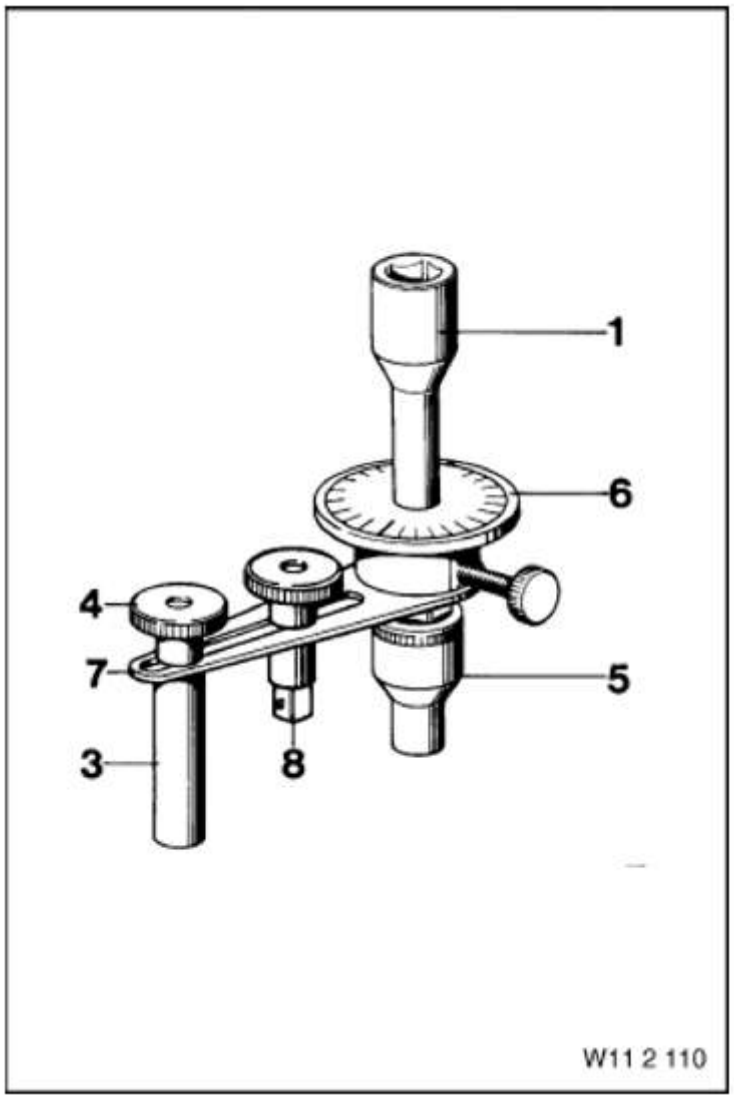


Fig. 726: Identifying Socket Wrench Insert (0490831)
Courtesy of BMW OF NORTH AMERICA, INC.

0491068 SOCKET WRENCH INSERT

0491068 116050 Socket wrench insert Mechanical tool

NOTE: **(Wrench socket AF 10) bi-hexagon/glow elements**

Storage Location

A9

SI number

01 06 98 (306)

Fig. 727: Identifying Socket Wrench Insert (0491068)
Courtesy of BMW OF NORTH AMERICA, INC.

2333891 SOCKET WRENCH INSERT

2333891 Socket wrench insert AM

cardiagn.com

In conjunction with: **81642333991**

NOTE: **For replacing the VANOS screw connection (in combination with 81 64 2 333 991).**

Fig. 728: Identifying Socket Wrench Insert (2333891)
Courtesy of BMW OF NORTH AMERICA, INC.

0491067 SOCKET WRENCH INSERT

0491067 116040 Socket wrench insert Mechanical tool

NOTE: **(Socket wrench insert AF 14) for removing and installing the exhaust turbocharger on the exhaust manifold, discontinued since January 84**

SI number

01 06 98 (306)

0490844 SOCKET WRENCH INSERT

0490844 112180 Socket wrench insert Mechanical tool

NOTE: **(Wrench socket insert WAF 36) For loosening and tightening the vibration damper on the crankshaft**

Storage Location

A9

Fig. 729: Identifying Socket Wrench Insert (0490844)
Courtesy of BMW OF NORTH AMERICA, INC.

0490997 SOCKET WRENCH INSERT

0490997 113470 Socket wrench insert Mechanical tool

NOTE: **(Screwdriver insert) Hexagon socket SW5/3/8" connection, shaft length 60 mm, for slackening and tightening chain sprockets on the camshaft**

Storage Location

X4

SI number

01 12 92 (606)

Fig. 730: Identifying Socket Wrench Insert (0490997)
Courtesy of BMW OF NORTH AMERICA, INC.

0491074 SOCKET WRENCH INSERT

0491074 117020 Socket wrench insert Minimum set: Mechanical tools Mechanical tool

NOTE: **(Socket wrench insert 22 mm) For loosening and tightening the oxygen sensor**

Storage Location

cardiagn.com

A9

Fig. 731: Identifying Socket Wrench Insert (0491074)
Courtesy of BMW OF NORTH AMERICA, INC.

0490566 SPACER

0490566 110010 Spacer Mechanical tool

NOTE: **For supporting engine during removal and installation of transmission**

Storage Location

Z1

SI number

01 05 90 (207)

Fig. 732: Identifying Spacer (0490566)
Courtesy of BMW OF NORTH AMERICA, INC.

0490897 SPACER

0490897 112480 Spacer Mechanical tool

NOTE: **For supporting engine during removal and installation of transmission**

Storage Location

Z2

SI number

01 08 92 (555)

Fig. 733: Identifying Spacer (0490897)
Courtesy of BMW OF NORTH AMERICA, INC.

0491089 SPACER

0491089 117370 Spacer Mechanical tool

NOTE: **For supporting engine during removal and installation of transmission**

Storage Location

C6

SI number

01 12 95 (992)

Fig. 734: Identifying Spacer (0491089)
Courtesy of BMW OF NORTH AMERICA, INC.

0493838 SPACER

cardiagn.com

0493838 119170 Spacer Mechanical tool

NOTE: **For maintaining a prescribed distance installing the VANOS unit**

Storage Location

B42

SI number

01 15 00 (609)

Fig. 735: Identifying Spacer (0493838)
Courtesy of BMW OF NORTH AMERICA, INC.

0490917 SPINDLE

0490917 113094 Spindle AM

NOTE: **(spindle with nut)**

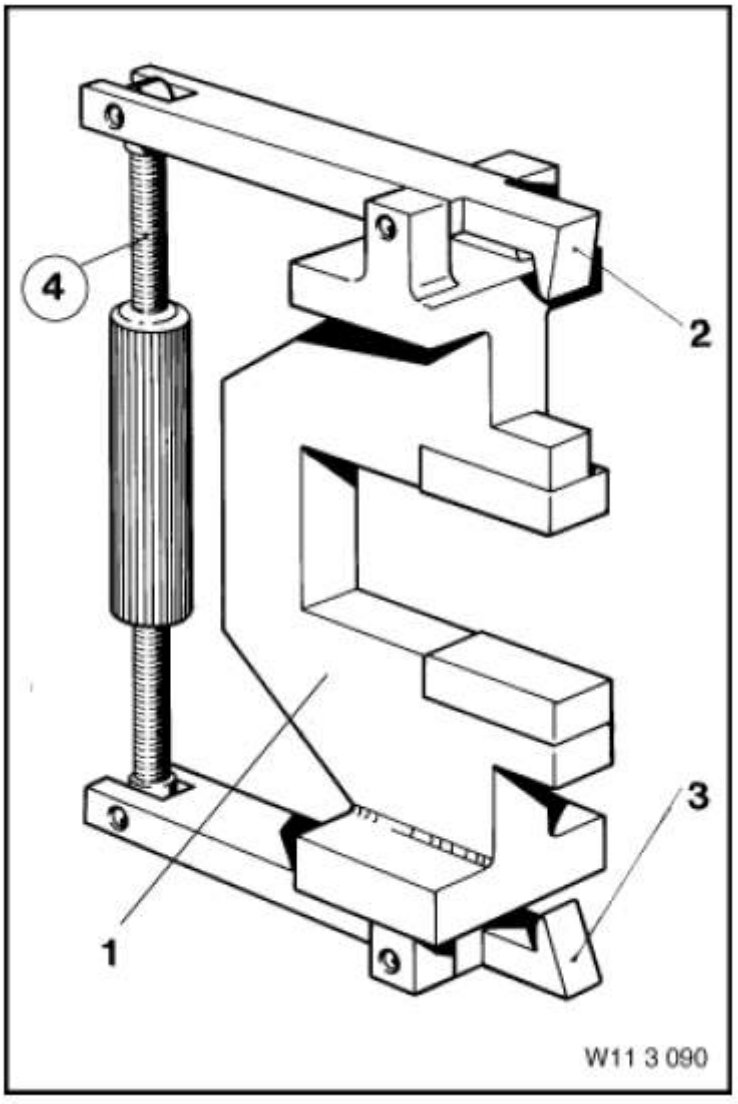


Fig. 736: Identifying Spindle (0490917)
Courtesy of BMW OF NORTH AMERICA, INC.

0490815 SPINDLE

cardiagn.com

0490815 112023 Spindle AM

NOTE: (Pressure spindle)

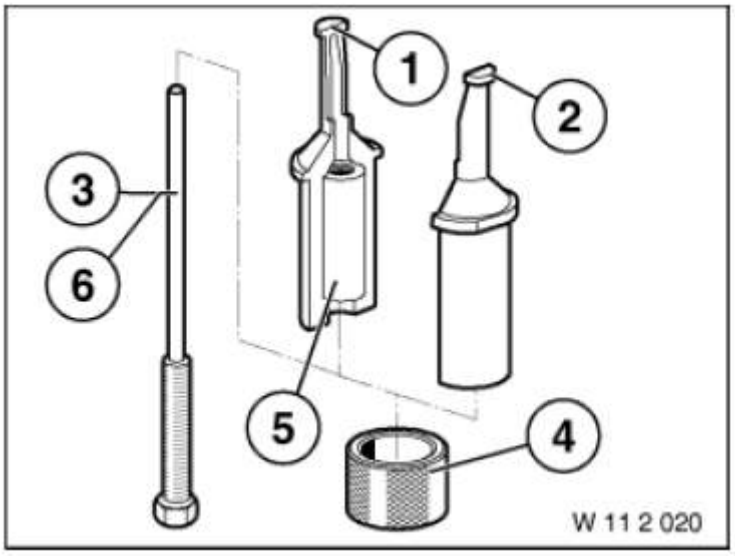


Fig. 737: Identifying Spindle (0490815)
Courtesy of BMW OF NORTH AMERICA, INC.

0494482 SPINDLE

0494482 114223 Spindle Minimum set: Mechanical tools AM

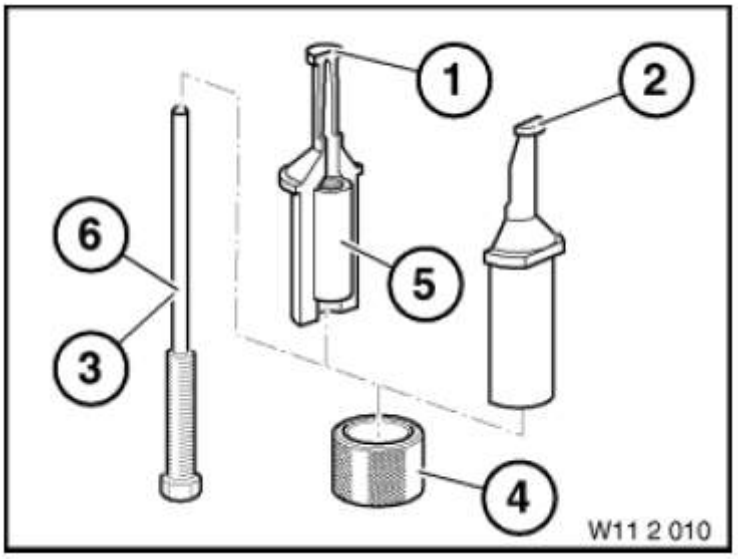
NOTE: Liquidation of existing inventory and then available only as a complete tool set 11 4 220 (83 30 0 491 025) - as of 30.01.12

Fig. 738: Identifying Spindle (0494482)
Courtesy of BMW OF NORTH AMERICA, INC.

0490808 SPINDLE

0490808 112013 Spindle AM

NOTE: (Pressure spindle) Engine: except M60, M62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.



cardiagn.com

Fig. 739: Identifying Spindle (0490808)
Courtesy of BMW OF NORTH AMERICA, INC.

0496670 SPINDLE

0496670 119235 Spindle Minimum set: Mechanical tools AM

NOTE: **N55**

Storage Location

B27

SI number

01 18 09 (578)

Fig. 740: Identifying Spindle (0496670)
Courtesy of BMW OF NORTH AMERICA, INC.

0490811 SPINDLE

0490811 112016 Spindle AM

NOTE: **(Pressure spindle) Engine: M60/B30, M62, S62. Can no longer be ordered separately. Only available as part of set 11 2 010 = 83 30 0 490 805.**

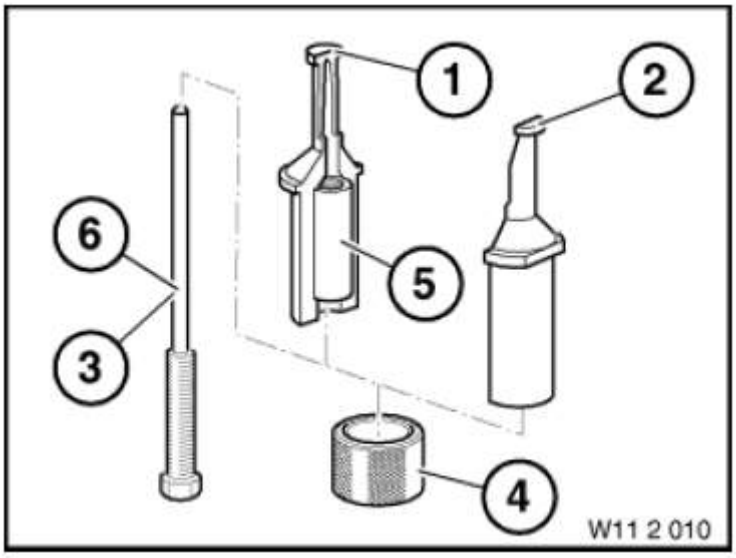


Fig. 741: Identifying Spindle (0490811)
Courtesy of BMW OF NORTH AMERICA, INC.

0495023 SPINDLE

0495023 114364 Spindle Minimum set: Mechanical tools AM

NOTE: **(Drawing spindle)**

Storage Location

B51

cardiagn.com



Fig. 742: Identifying Spindle (0495023)
Courtesy of BMW OF NORTH AMERICA, INC.

0490984 SPINDLE

0490984 113392 Spindle AM

Replaced by: 83300493548

NOTE: Replaced by 11 4 230 (0 493 548)

Fig. 743: Identifying Spindle (0490984)
Courtesy of BMW OF NORTH AMERICA, INC.

0496574 SPINDLE

0496574 118913 Spindle AM

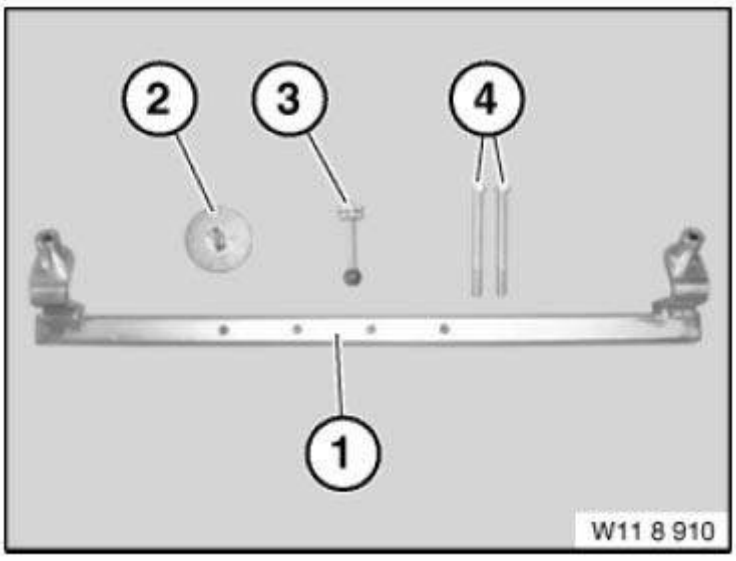


Fig. 744: Identifying Spindle (0496574)
Courtesy of BMW OF NORTH AMERICA, INC.

0495731 SPINDLE

0495731 118533 Spindle Minimum set: Mechanical tools AM

NOTE: (spindle (pressure plate)) Remaining inventories will be sold off followed by

cardiagn.com

discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.

Storage Location

C20

SI number

01 20 06 (299)

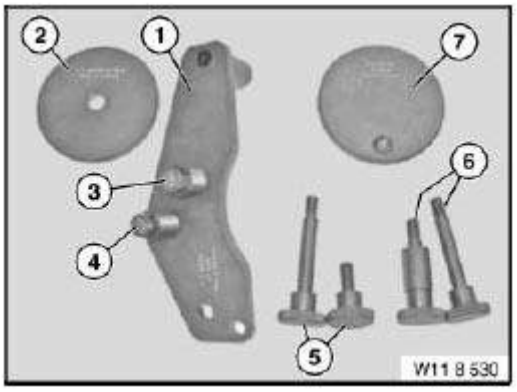


Fig. 745: Identifying Spindle (0495731)
Courtesy of BMW OF NORTH AMERICA, INC.

0493617 SPINDLE

0493617 117212 Spindle AM

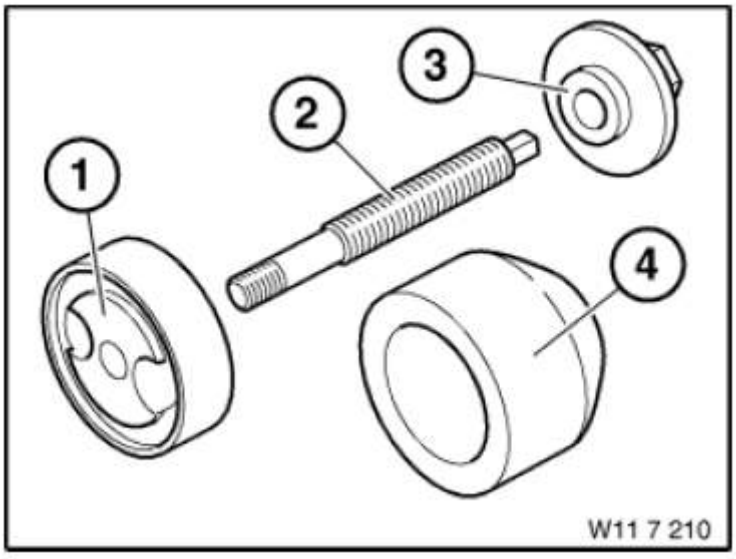


Fig. 746: Identifying Spindle (0493617)
Courtesy of BMW OF NORTH AMERICA, INC.

0496276 SPINDLE

0496276 110372 Spindle Minimum set: Mechanical tools AM

Fig. 747: Identifying Spindle (0496276)
Courtesy of BMW OF NORTH AMERICA, INC.

0493117 SPINDLE

cardiagn.com

0493117 112314 Spindle AM

NOTE: (Spindle M12x150)

Fig. 748: Identifying Spindle (0493117)
Courtesy of BMW OF NORTH AMERICA, INC.

0490939 SPINDLE

0490939 113142 Spindle AM

NOTE: (Pull-off spindle)

Fig. 749: Identifying Spindle (0490939)
Courtesy of BMW OF NORTH AMERICA, INC.

0490939 SPINDLE

0490939 113142 Spindle AM

NOTE: (Pull-off spindle)

Fig. 750: Identifying Spindle (0490939)
Courtesy of BMW OF NORTH AMERICA, INC.

0495732 SPINDLE

0495732 118534 Spindle Minimum set: Mechanical tools AM

NOTE: (spindle (unmounting plage)) Remaining inventories will be sold off followed by discontinuation and then available as part of complete set 11 8 530 = 83 30 0 495 728 only.

Storage Location

C20

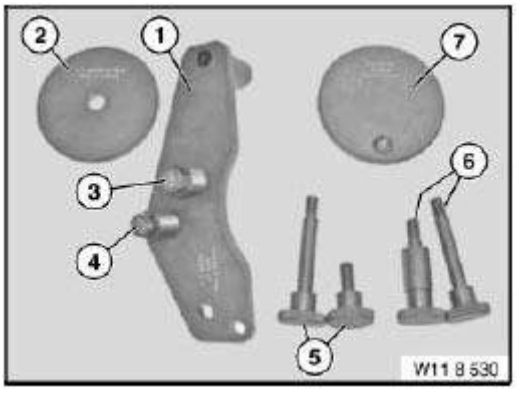


Fig. 751: Identifying Spindle (0495732)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number

01 20 06 (299)

cardiagn.com

0490776 SPINDLE

0490776 111452 Spindle AM

NOTE: **Only available as part of complete set**

0494033 SPINDLE

0494033 119342 Spindle Minimum set: Mechanical tools AM

NOTE: **Available only as a complete tool set 11 9 340 = 83 30 0 493 971 - as of 29.11.2011**

0493631 SPINDLE

0493631 114232 Spindle Minimum set: Mechanical tools AM

NOTE: **Discontinued, can only be ordered using complete tool**

Fig. 752: Identifying Spindle (0493631)
Courtesy of BMW OF NORTH AMERICA, INC.

0495022 SPINDLE

0495022 114363 Spindle Minimum set: Mechanical tools AM

NOTE: **(Pressure spindle)**

Storage Location

B51



Fig. 753: Identifying Spindle (0495022)
Courtesy of BMW OF NORTH AMERICA, INC.

0493718 SPINDLE

0493718 117397 Spindle AM

NOTE: **Liquidation of current inventory with thrust piece for 11 7 396 and then available only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

0490836 SPINDLE

cardiagn.com

0490836 112130 Spindle AM

NOTE: **For detaching the hub and the toothed belt pulley from the crankshaft**

Consisting of:

1. **0490837** Spindle

   NOTE: **(spindle with thread M6)**

2. **0490838** Spindle

   NOTE: **(spindle with thread M8)**

3. **0490839** Nut

   NOTE: **(Knurled nut) Replaced by 00 9 120 (0 490 504)**

Fig. 754: Identifying Spindle (0490836)
Courtesy of BMW OF NORTH AMERICA, INC.

0490837 SPINDLE

0490837 112131 Spindle AM

NOTE: **(spindle with thread M6)**

Fig. 755: Identifying Spindle (0490837)
Courtesy of BMW OF NORTH AMERICA, INC.

0490838 SPINDLE

0490838 112132 Spindle AM

NOTE: **(spindle with thread M8)**

Fig. 756: Identifying Spindle (0490838)
Courtesy of BMW OF NORTH AMERICA, INC.

2354984 SPINDLE

2354984 Spindle AM

NOTE: **Pressure spindle for opening the timing chain on exchange (included in tool set 2 354 985).**

Fig. 757: Identifying Spindle (2354984)
Courtesy of BMW OF NORTH AMERICA, INC.

0494022 SPINDLE

0494022 119232 Spindle Minimum set: Mechanical tools AM

cardiagn.com

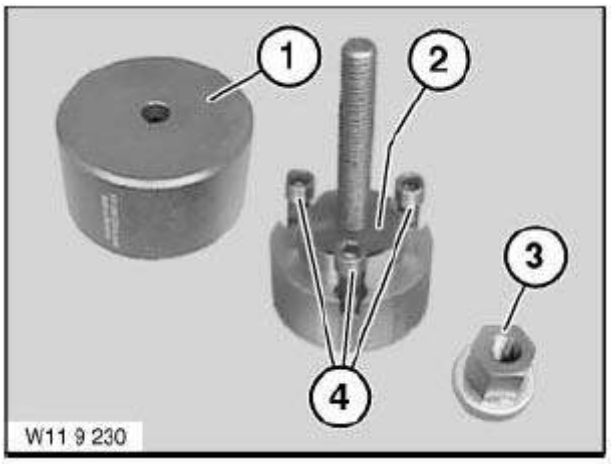


Fig. 758: Identifying Spindle (0494022)
Courtesy of BMW OF NORTH AMERICA, INC.

0491061 SPRING

0491061 115133 Spring AM

NOTE: **Available only as a complete tool set 11 5 130 = 83 30 0 491 058 - as of 29.11.2011**

0494610 SPRING

0494610 112082 Spring AM

NOTE: **(spring) Control spring**

Fig. 759: Identifying Spring (0494610)
Courtesy of BMW OF NORTH AMERICA, INC.

0490664 STRIP

0490664 111021 Strip AM

NOTE: **(sealing strips (2 pieces))**

cardiagn.com

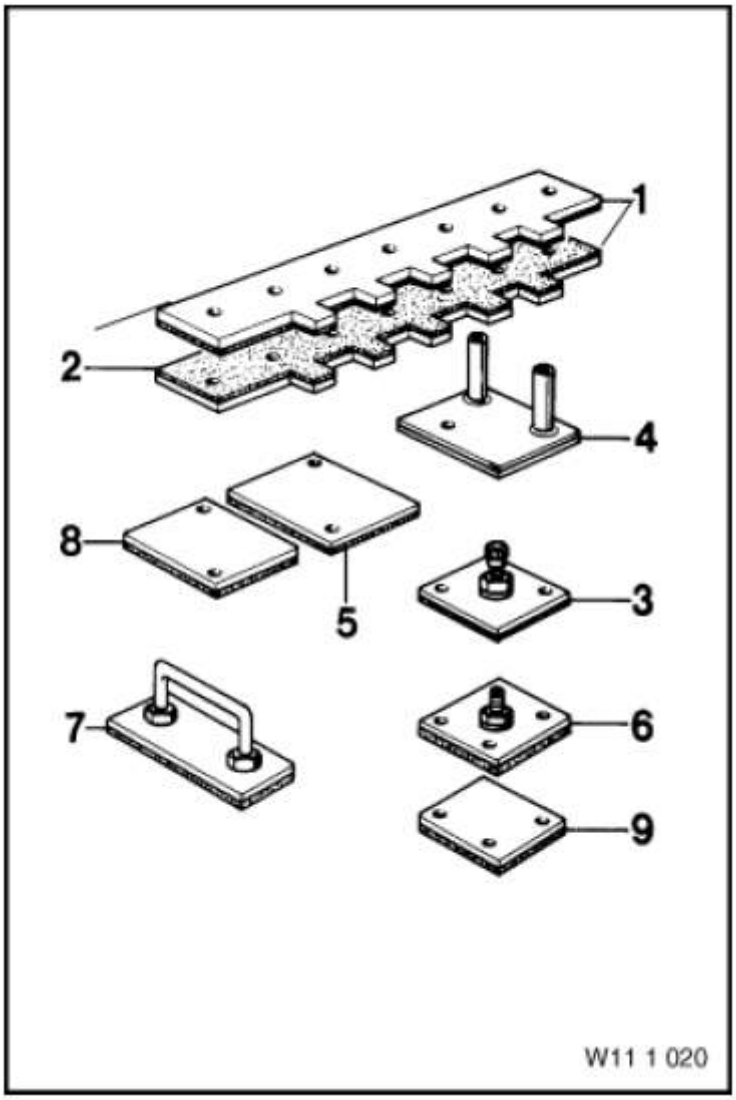


Fig. 760: Identifying Strip (0490664)
Courtesy of BMW OF NORTH AMERICA, INC.

0490754 STRIP

0490754 111412 Strip AM

NOTE: **(Profile strip for cylinder bank 5-8) Remaining inventories will be sold off, followed by discontinuation and then available as part of complete tool set 11 1 410 = 0490752 only.**

Fig. 761: Identifying Strip (0490754)
Courtesy of BMW OF NORTH AMERICA, INC.

0493712 STRIP

0493712 117391 Strip AM

NOTE: **(Sealing strip with 7 tabs) liquidation of current inventory and then available only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

0490788 STRIP

0490788 111471 Strip AM

NOTE: **(Sealing strip) With rubber seal (wide version) Only orderable as a complete**

cardiagn.com

tool set 11 1 470 (83 30 0 490 787) - as of 09.07.13.

0490762 STRIP

0490762 111431 Strip AM

NOTE: (sealing strip) With 5 spigots and rubber seal - Engine: M42, M44, M50, M52, S54 sale of existing inventory, then available as part of set of special tools 11 1 430 = 83 30 0 490 761 only - as of 29.11.2011

0490655 STRIP

0490655 111012 Strip AM

NOTE: (sealing strips (2 pieces))

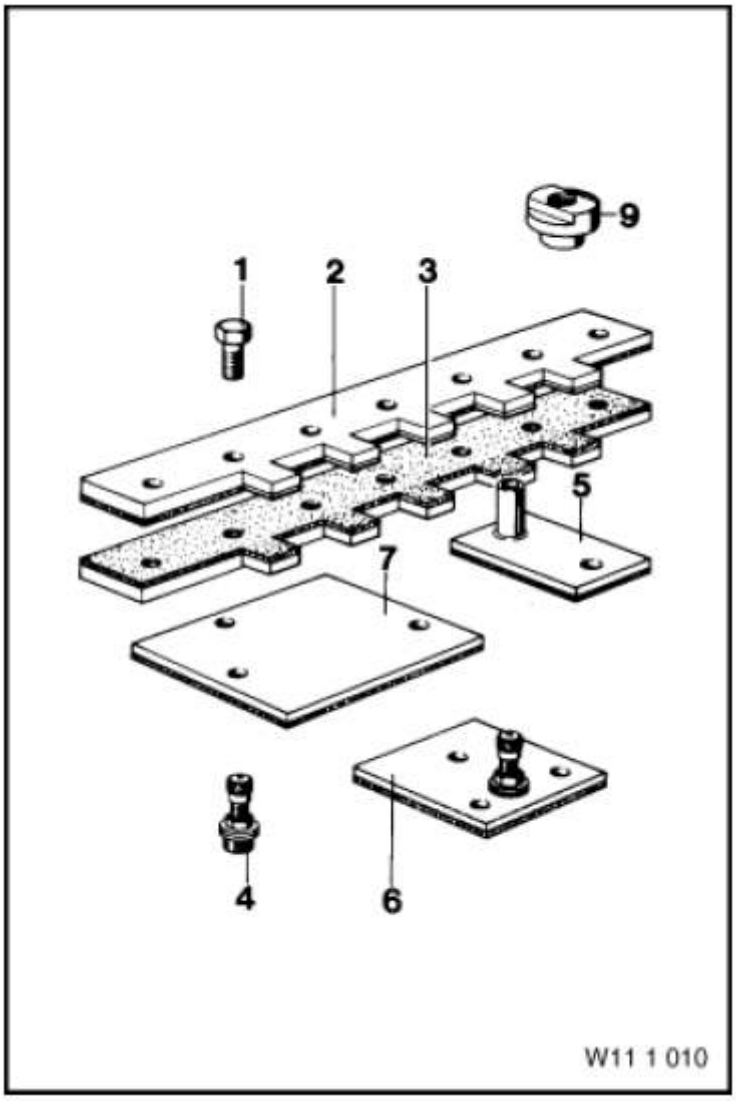


Fig. 762: Identifying Strip (0490655)
Courtesy of BMW OF NORTH AMERICA, INC.

0490780 STRIP

0490780 111462 Strip AM

NOTE: (Sealing strip) With rubber seal (narrow version)

cardiagn.com

Fig. 763: Identifying Strip (0490780)
Courtesy of BMW OF NORTH AMERICA, INC.

0490753 STRIP

0490753 111411 Strip AM

NOTE: **(Profile strip for cylinder bank 1-4) Remaining inventories will be sold off, followed by discontinuation and then available as part of complete tool set 11 1 410 = 0490752 only.**

Fig. 764: Identifying Strip (0490753)
Courtesy of BMW OF NORTH AMERICA, INC.

0490645 STRIP

0490645 110318 Strip AM

NOTE: **(Sealing strip) Engine: M43 Only available as part of complete set**

0493368 STRIP

0493368 116431 Strip AM

NOTE: **(Profile strip for bank 1...4)**

Fig. 765: Identifying Strip (0493368)
Courtesy of BMW OF NORTH AMERICA, INC.

0490789 STRIP

0490789 111472 Strip AM

Replaced by: 83300490794

NOTE: **(Sealing strip) With rubber seal (narrow version) - Replaced by 11 1 477 (0 490 794)**

Fig. 766: Identifying Strip (0490789)
Courtesy of BMW OF NORTH AMERICA, INC.

0490764 STRIP

0490764 111433 Strip AM

NOTE: **(sealing strip) With 7 spigots and rubber seal - Engine: M42, M44, M50, M52, S54 sale of existing inventory, then available as part of set of special tools 11 1 430 = 83 30 0 490 761 only - as of 29.11.2011**

0493364 STRIP

0493364 116430 Strip AM

NOTE: **(Profile strip) For inserting into the cylinder head cover while pressing the timing case down in the working position - cylinder bank 1 to 4 and 5 to 8**

SI number

cardiagn.com

01 21 98 (383)

Consisting of:

Fig. 767: Identifying Strip (0493364)
Courtesy of BMW OF NORTH AMERICA, INC.

1. **0493368** Strip

   NOTE: **(Profile strip for bank 1...4)**

2. **0493369** Strip

   NOTE: **(Profile strip for bank 5...8)**

0490756 STRIP

0490756 111421 Strip AM

NOTE: **(sealing strip with 7 spigots)**

Fig. 768: Identifying Strip (0490756)
Courtesy of BMW OF NORTH AMERICA, INC.

0490638 STRIP

0490638 110311 Strip AM

NOTE: **(Sealing strip) Engine: M43 Only available as part of complete set**

0490794 STRIP

0490794 111477 Strip AM

NOTE: **(Sealing strip) With rubber seal (narrow version) Only available as part of complete set**

0490674 STRIP

0490674 111031 Strip AM

NOTE: **(Sealing strip with rubber padding)**

Fig. 769: Identifying Strip (0490674)
Courtesy of BMW OF NORTH AMERICA, INC.

0490675 STRIP

0490675 111032 Strip AM

NOTE: **(Sealing strip with rubber padding)**

Fig. 770: Identifying Strip (0490675)
Courtesy of BMW OF NORTH AMERICA, INC.

0493446 STRIP

cardiagn.com

0493446 111492 Strip AM

NOTE: **(Sealing strip cylinder row 5 - 8) From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available**

Fig. 771: Identifying Strip (0493446)
Courtesy of BMW OF NORTH AMERICA, INC.

0490639 STRIP

0490639 110312 Strip AM

Replaced by: 83300490645

NOTE: **(Sealing strip) Replaced by 11 0 318 (0 490 645)**

Fig. 772: Identifying Strip (0490639)
Courtesy of BMW OF NORTH AMERICA, INC.

0493369 STRIP

0493369 116432 Strip AM

NOTE: **(Profile strip for bank 5...8)**

Fig. 773: Identifying Strip (0493369)
Courtesy of BMW OF NORTH AMERICA, INC.

0493445 STRIP

0493445 111491 Strip AM

NOTE: **(Sealing strip cylinder row 1 - 4) From 09/2011 remaining inventories will be sold off, followed by discontinuation. There is also no longer a set available.**

Fig. 774: Identifying Strip (0493445)
Courtesy of BMW OF NORTH AMERICA, INC.

0493713 STRIP

0493713 117392 Strip AM

NOTE: **(Sealing strip with 5 tabs) liquidation of current inventory and then available only with complete tool set 11 7 30 (83 30 0 493 711) Status as of 11.09.12.**

0490757 STRIP

0490757 111422 Strip AM

NOTE: **(sealing strip with 2 spigots)**

Fig. 775: Identifying Strip (0490757)
Courtesy of BMW OF NORTH AMERICA, INC.

0490752 STRIP

cardiagn.com

0490752 111410 Strip AM

NOTE: **(Profile strips) For inserting into the cylinder head covers when pressing down the gear case covers on bank 1...4 and 5...8**

SI number

01 04 96 (049)

Consisting of:

1. **0490753** Strip

Fig. 776: Identifying Strip (0490752)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Profile strip for cylinder bank 1-4) Remaining inventories will be sold off, followed by discontinuation and then available as part of complete tool set 11 1 410 = 0490752 only.**

2. **0490754** Strip

NOTE: **(Profile strip for cylinder bank 5-8) Remaining inventories will be sold off, followed by discontinuation and then available as part of complete tool set 11 1 410 = 0490752 only.**

0490779 STRIP

0490779 111461 Strip AM

NOTE: **(Sealing strip) With rubber seal (wide version)**

Fig. 777: Identifying Strip (0490779)
Courtesy of BMW OF NORTH AMERICA, INC.

0490957 SUCTION CUP

0490957 113251 Suction cup AM

NOTE: **(Suction cup) 8 x**



Fig. 778: Identifying Suction Cup (0490957)
Courtesy of BMW OF NORTH AMERICA, INC.

0490956 SUCTION CUP

cardiagn.com

0490956 113250 Suction cup AM

NOTE: **For lifting out tappets in cylinder head**

Storage Location

A 104

SI number

01 05 89 (099)

Consisting of:

1. 0490957 Suction cup

   NOTE: **(Suction cup) 8 x**

2. 0490958 Case

   NOTE: **(Case)**



Fig. 779: Identifying Suction Cup (0490956)
Courtesy of BMW OF NORTH AMERICA, INC.

0496857 SUPPLEMENT

0496857 116280 Supplement AM

In conjunction with: 11 8 891 BASE PLATE 11 8 825 BOLT = 0496177

NOTE: **N47TU; To check the crankcase for watertightness**

SI number

01 06 10 (633)

Consisting of:

1. 0496870 Adapter plate

   NOTE: **Only available as part of complete tool set 11 6 280 (83 30 0 496 857).**

Fig. 780: Identifying Supplement (0496857)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0496871 Adapter plate

cardiagn.com

NOTE: **Only available as part of complete tool set 11 6 280 (83 30 0 496 857).**

3. 0496872 Screw

NOTE: **Set consisting of: 2x M6x35 (used for the guide sleeves) 11x M6x30 Only available as part of complete tool set 11 6 280 (83 30 0 496 857).**

4. 0496873 Gasket

NOTE: **Only available as part of complete tool set 11 6 280 (83 30 0 496 857).**

5. 0496874 Gasket

NOTE: **Only available as part of complete tool set 11 6 280 (83 30 0 496 857).**

0496853 SUPPLEMENT

0496853 116230 Supplement AM

In conjunction with: **11 8 891 BASE PLATE 11 8 893 SCREWS = 0496186**

NOTE: **N47TU; To check the cylinder head for watertightness**

SI number

01 06 10 (633)

Consisting of:

1. 0496865 Adapter plate

NOTE: **Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**

2. 0496866 Adapter

NOTE: **Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**

3. 0496867 Screw

NOTE: **Set consisting of: 1x M8x30 3x M6x25 Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**

4. 0496868 Gasket

NOTE: **Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**

5. 0496869 Gasket

NOTE: **Only available as part of complete tool set 11 6 230 (83 30 0 496 853).**

cardiagn.com

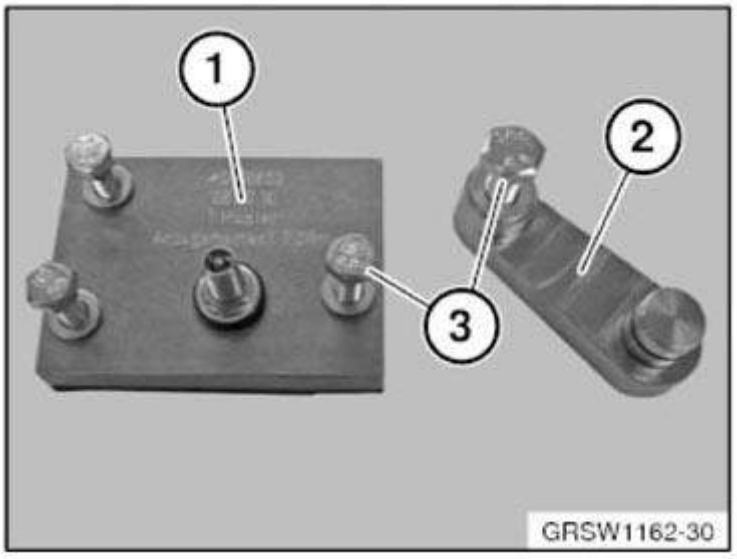


Fig. 781: Identifying Supplement (0496853)
Courtesy of BMW OF NORTH AMERICA, INC.

0490865 SYNCHRONIZING KEY

0490865 112313 Synchronizing key AM

NOTE: **(Synchronizing key) Engine: M42, M43, M44**

Storage Location

B12

Fig. 782: Identifying Synchronizing Key (0490865)
Courtesy of BMW OF NORTH AMERICA, INC.

0495101 SYNCHRONIZING KEY

0495101 114463 Synchronizing key AM

NOTE: **(synchronizing keys 6 x)**

Storage Location

C51

Fig. 783: Identifying Synchronizing Key (0495101)
Courtesy of BMW OF NORTH AMERICA, INC.

0494029 SYNCHRONIZING KEY

0494029 119182 Synchronizing key Minimum set: Mechanical tools AM

Fig. 784: Identifying Synchronizing Key (0494029)
Courtesy of BMW OF NORTH AMERICA, INC.

0494039 SYNCHRONIZING KEY

0494039 119221 Synchronizing key Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **Discontinued; can only be ordered as part of complete tool 11 9 220 = 83 30 0 493 934.**

Fig. 785: Identifying Synchronizing Key (0494039)
Courtesy of BMW OF NORTH AMERICA, INC.

0490864 SYNCHRONIZING KEY

0490864 112312 Synchronizing key AM

Replaced by: 83300490865

NOTE: **Engine: M40 Replaced by 11 2 313 (0 490 865)**

Fig. 786: Identifying Synchronizing Key (0490864)
Courtesy of BMW OF NORTH AMERICA, INC.

0495742 SYNCHRONIZING KEY

0495742 118553 Synchronizing key Minimum set: Mechanical tools AM

NOTE: **Thrust piece (1 piece)**

Storage Location

C19

SI number

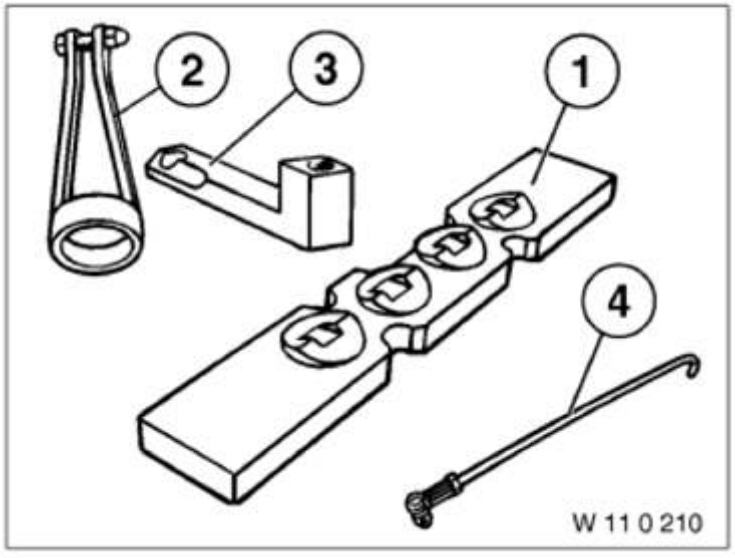
01 20 06 (299)

Fig. 787: Identifying Synchronizing Key (0495742)
Courtesy of BMW OF NORTH AMERICA, INC.

0490611 TAB

0490611 110213 Tab AM

NOTE: **(Retaining tab) Engine: M60, M62, S62**



cardiagn.com

Fig. 788: Identifying Tab (0490611)
Courtesy of BMW OF NORTH AMERICA, INC.

0494369 TAB

0494369 119004 Tab Minimum set: Mechanical tools AM

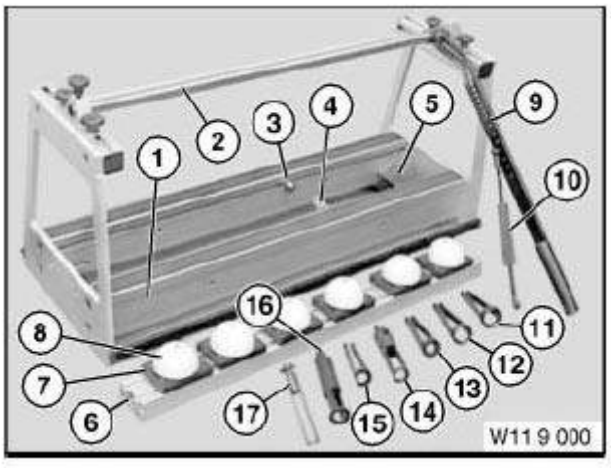


Fig. 789: Identifying Tab (0494369)
Courtesy of BMW OF NORTH AMERICA, INC.

0490955 TAB

0490955 113243 Tab AM

Replaced by: 83300493283

NOTE: **(Securing clip) Replaced by 11 3 244 with launch of M52TU Replaced by 11 3 244 (0 493 283)**

Fig. 790: Identifying Tab (0490955)
Courtesy of BMW OF NORTH AMERICA, INC.

0490875 TAB

0490875 112370 Tab Mechanical tool

NOTE: **For securing the engine when removing and installing the transmission**

Storage Location

C10

SI number

01 09 91 (416)

Fig. 791: Identifying Tab (0490875)
Courtesy of BMW OF NORTH AMERICA, INC.

0490833 TAB

0490833 112117 Tab AM

Replaced by: 83300490504

cardiagn.com

NOTE: **For counter-holding on the cylinder head Replaced by 00 9 120 (0 490 504)**

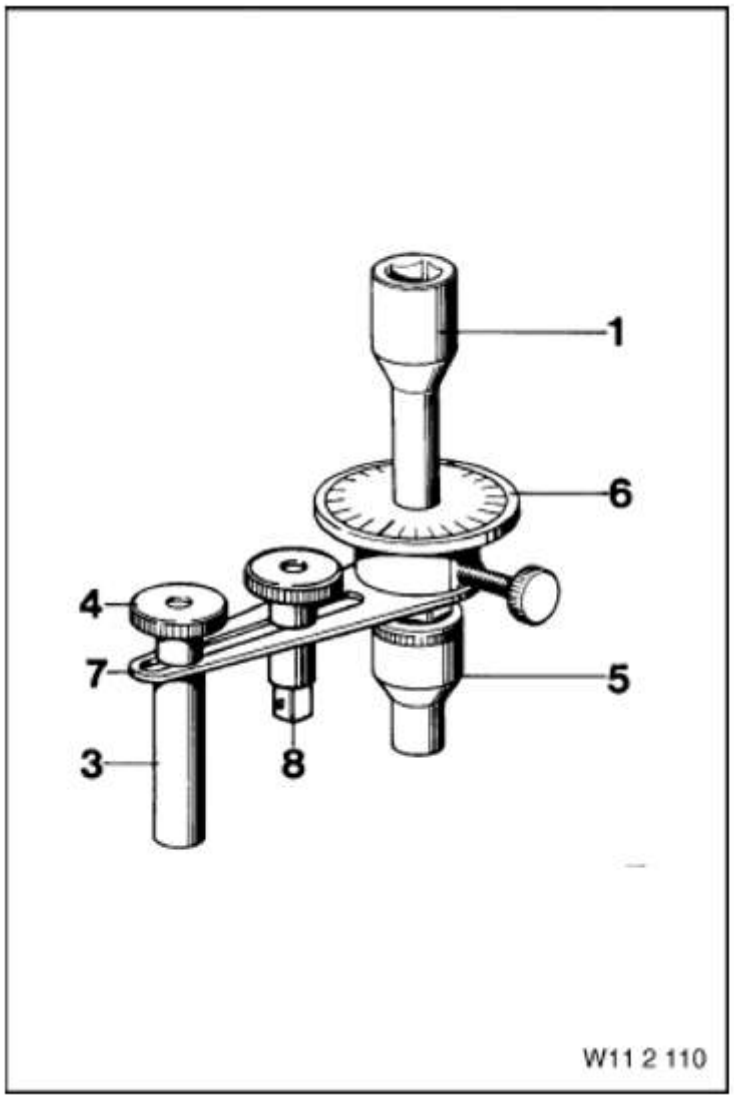


Fig. 792: Identifying Tab (0490833)
Courtesy of BMW OF NORTH AMERICA, INC.

0494533 TAPERED SECTION

0494533 118506 Tapered section AM

NOTE: **(Cone with washer and nut) Only available as part of complete tool set 11 8 500 (83 30 0 494 312).**

0490621 TAPERED SECTION

0490621 110228 Tapered section Minimum set: Mechanical tools AM

NOTE: **(Rubber tapered section) For recording compression testers 11 0 224 and 11 0 160.**

cardiagn.com

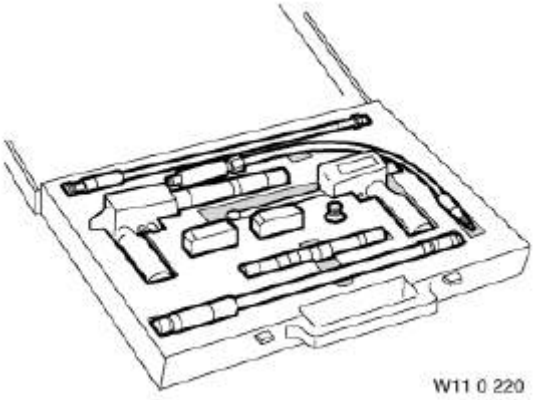


Fig. 793: Identifying Tapered Section (0490621)
Courtesy of BMW OF NORTH AMERICA, INC.

2285501 TEST SET

2285501 Test set AM

In conjunction with: **DIAGNOSTIC AUXILIARY DEVICE 81290426464**

NOTE: **Seal plug for leakage test of charge air duct of exhaust turbocharger.**

SI number

01 08 14 (087)

Fig. 794: Identifying Test Set (2285501)
Courtesy of BMW OF NORTH AMERICA, INC.

0491039 TESTER

0491039 115023 Tester AM

NOTE: **(Tester for V-belt tension) With scale in Dutch**

Fig. 795: Identifying Tester (0491039)
Courtesy of BMW OF NORTH AMERICA, INC.

0426464 TESTER

0426464 Tester MP

NOTE: **For localization of component defects in the charging system.**

Fig. 796: Identifying Tester (0426464)
Courtesy of BMW OF NORTH AMERICA, INC.

0491041 TESTER

0491041 115025 Tester AM

NOTE: **(Tester for V-belt tension) With scale in Italian**

Fig. 797: Identifying Tester (0491041)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0490823 TESTER

0490823 112080 Tester AM

NOTE: **(Tester) For measuring the toothed belt tension when replacing the toothed belt for the camshaft drive**

Storage Location

Z10

SI number

01 03 87 (739)

Consisting of:

1. **0494610** Spring

Fig. 798: Identifying Tester (0490823)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(spring) Control spring**

0491042 TESTER

0491042 115026 Tester AM

NOTE: **(Tester for V-belt tension) With scale in Spanish**

Fig. 799: Identifying Tester (0491042)
Courtesy of BMW OF NORTH AMERICA, INC.

0491038 TESTER

0491038 115022 Tester AM

NOTE: **(Tester for V-belt tension) With scale in French**

Fig. 800: Identifying Tester (0491038)
Courtesy of BMW OF NORTH AMERICA, INC.

0491040 TESTER

0491040 115024 Tester AM

NOTE: **(Tester for V-belt tension) With scale in Swedish**

Fig. 801: Identifying Tester (0491040)
Courtesy of BMW OF NORTH AMERICA, INC.

0491037 TESTER

0491037 115021 Tester AM

cardiagn.com

NOTE: **(Tester for V-belt tension) With scale in English**

Fig. 802: Identifying Tester (0491037)
Courtesy of BMW OF NORTH AMERICA, INC.

0428212 TESTER

0428212 Tester MP

NOTE: **For localization of component defects in the charging system.**

SI number

02 13 06 (324)

Fig. 803: Identifying Tester (0428212)
Courtesy of BMW OF NORTH AMERICA, INC.

0491036 TESTER

0491036 115020 Tester AM

NOTE: **(Tester for V-belt tension) With scale in German**

Storage Location

X10

Y10

Consisting of:

2 = 0491037 Tester

NOTE: **(Tester for V-belt tension) With scale in English**

2 = 0491038 Tester

NOTE: **(Tester for V-belt tension) With scale in French**

2 = 0491039 Tester

NOTE: **(Tester for V-belt tension) With scale in Dutch**

Fig. 804: Identifying Tester (0491036)
Courtesy of BMW OF NORTH AMERICA, INC.

2 = 0491040 Tester

NOTE: **(Tester for V-belt tension) With scale in Swedish**

2 = 0491041 Tester

NOTE: **(Tester for V-belt tension) With scale in Italian**

2 = 0491042 Tester

cardiagn.com

NOTE: **(Tester for V-belt tension) With scale in Spanish**

2 = **0491043** Measurement aid

NOTE: **(scale) Scale in the specific language, individual indication of the language required**

2 = **0491044** Measuring device

NOTE: **(Test rod)**

2 = **0491045** Needle

0490770 TOOL

0490770 111439 Tool AM

NOTE: **(standard parts) Engine: M42, M44, M50, M52 Liquidation of existing inventory and then available only via complete tool set 11 1 430 = 83 30 0 490 761 - status 29.11.2011**

0495125 TOOL

0495125 115310 Tool Minimum set: Mechanical tools AM

NOTE: **(Pulling device) For installing rear radial shaft seal on crankshaft.**

SI number

01 02 05 (173)

Consisting of:

1. **0495166** Basic body

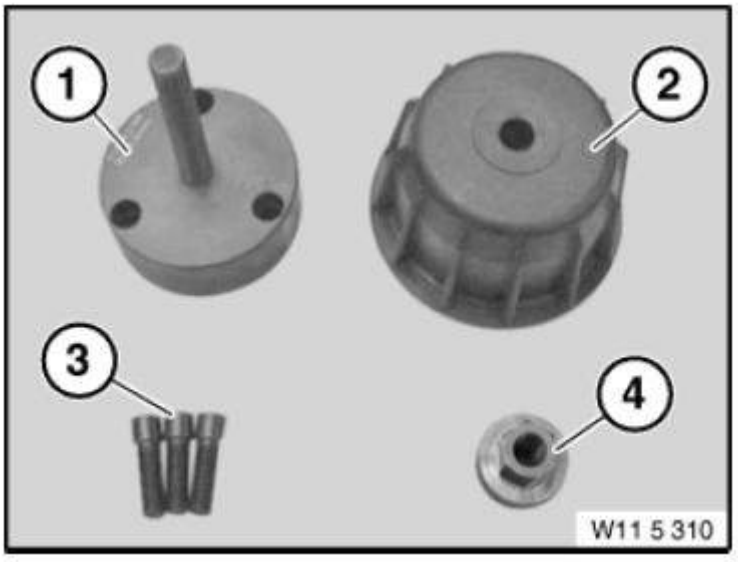


Fig. 805: Identifying Tool (0495125)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Remaining inventories will be sold off, then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 125 (special tool number 11 5 310).**

cardiagn.com

2. 0495167 Holding sleeve

NOTE: **(Pressure sleeve) Remaining inventories will be sold off, then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 125 (special tool number 11 5 310).**

3. 0495168 Nut

NOTE: **(Nut with bearing) Remaining inventories will be sold off, then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 125 (special tool number 11 5 310).**

4. 0495169 Screw

NOTE: **(Screw set (3 pieces)) Remaining inventories will be sold off, then no longer available individually. Can only be ordered as part of the complete special tool set 83 30 0 495 125 (special tool number 11 5 310).**

0496108 TOOL

0496108 118740 Tool Minimum set: Mechanical tools AM

Replaced by: 83300496725

NOTE: **(Dismantling tool) For removal of high pressure pump (2-piece). Is replaced by 11 8 030 = 0496725. Replaced by 11 8 030 (0 496 725)**

Storage Location

B24

SI number

01 05 07 (353)

Fig. 806: Identifying Tool (0496108)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0496109 Holding sleeve

NOTE: **(Extractor sleeve) replaced by 11 8 031 (0 496 725)**

2. 0496110 Adapter

NOTE: **(Hexagon head adapter) Replaced by 11 8 0 32 (0 496 758)**

0495102 TOOL

0495102 114470 Tool Minimum set: Mechanical tools AM

NOTE: **(cleaning kit) For cleaning sealing surfaces on magnesium crankcase/cylinder head.**

Storage Location

B52

cardiagn.com

SI number

01 17 04 (130)

Consisting of:

Fig. 807: Identifying Tool (0495102)
Courtesy of BMW OF NORTH AMERICA, INC.

1. **0495103** Scraper
2. **0495104** Extractor

NOTE: **(grindstone)**

0495740 TOOL

0495740 118551 Tool Minimum set: Mechanical tools AM

NOTE: **(Tool to press down) discontinued, available as part of set of special tools only**

Storage Location

C19

SI number

01 20 06 (299)

Fig. 808: Identifying Tool (0495740)
Courtesy of BMW OF NORTH AMERICA, INC.

0495099 TOOL

0495099 114461 Tool AM

NOTE: **(press-down tool, 2nd cylinder)**

Storage Location

C51

Fig. 809: Identifying Tool (0495099)
Courtesy of BMW OF NORTH AMERICA, INC.

0495131 TOOL

0495131 115370 Tool Mechanical tool

NOTE: **(Locating tool) For VANOS exhaust camshaft gear setting.**

Storage Location

A71

SI number

01 02 05 (173)

cardiagn.com

Fig. 810: Identifying Tool (0495131)
Courtesy of BMW OF NORTH AMERICA, INC.

0490907 TOOL

0490907 113060 Tool AM

NOTE: **For pulling out the rocker arm axes**

Storage Location

C11

C12

Consisting of:

Fig. 811: Identifying Tool (0490907)
Courtesy of BMW OF NORTH AMERICA, INC.

1. **0490908** Shaft

   NOTE: **Only available as part of complete set**

2. **0490909** Bush

   NOTE: **(Impact bush) Only available as part of complete set**

3. **0490910** Washer

   NOTE: **(Thrust washer) Only available as part of complete set**

0493589 TOOL

0493589 117210 Tool AM

NOTE: **(Pulling device) For installing radial shaft seal in crankcase - crankshaft at front**

Storage Location

Z9

SI number

01 01 99 (416)

Consisting of:

cardiagn.com

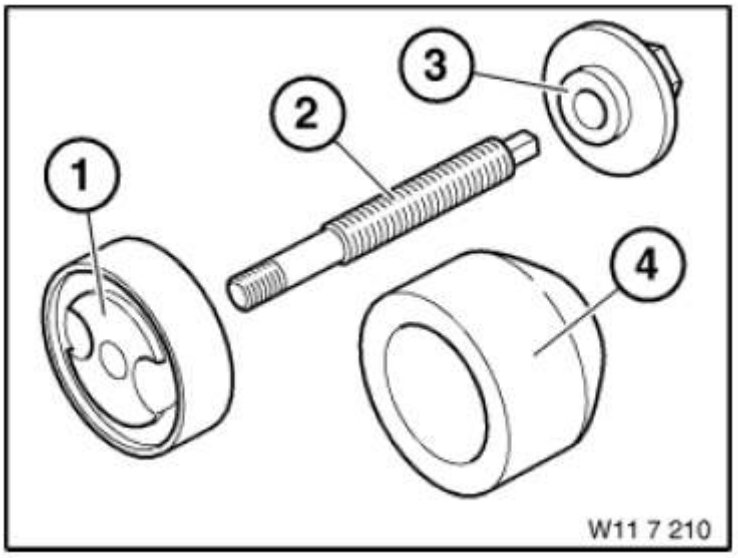


Fig. 812: Identifying Tool (0493589)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0493616 Washer
2. 0493617 Spindle
3. 0493618 Nut

NOTE: **(Thrust nut)**

4. 0493619 Bush

NOTE: **(draw-in bushing)**

0491101 TOOL

0491101 118000 Tool AM

NOTE: **(Device) to change the valve springs with mounted M88 engine cylinder head**

Consisting of:

1. 0491102 Holder

NOTE: **(Holder) Discontinuation and replaced by 36 1 030. (0 493 829)**

2. 0491103 Holder

NOTE: **(Holder) Discontinuation and replaced by 36 1 030. (0 493 829)**

3. 0491104 Rod
4. 0491105 Connection

NOTE: **For compressed air in spark plug bore holes.**

0493248 TOOL

0493248 116370 Tool Mechanical tool

NOTE: **(Extractor tool) For pulling off the valve stem seal**

cardiagn.com

Storage Location

B15

SI number

01 06 98 (306)

Fig. 813: Identifying Tool (0493248)
Courtesy of BMW OF NORTH AMERICA, INC.

0493881 TOOL

0493881 119180 Tool Minimum set: Mechanical tools AM

NOTE: **(pulling tool) For pulling radial shaft seal into engine block, rear**

Storage Location

C43

SI number

01 01 01 (662)

Consisting of:

Fig. 814: Identifying Tool (0493881)
Courtesy of BMW OF NORTH AMERICA, INC.

1. **0494028** Bush
2. **0494029** Synchronizing key
3. **0494030** Nut
4. **0494031** Screw

   NOTE: **(screws (2 x))**

5. **0496660** Ring

   NOTE: **For installation shaft seal - rim offset 6.6 mm (N55).**

0493584 TOOL

0493584 118160 Tool Minimum set: Mechanical tools AM

NOTE: **(fitting tool) For fitting the shaft sealing ring into the crankcase - front of crankshaft**

Storage Location

B4

SI number

01 12 99 (452)

Consisting of:

cardiagn.com

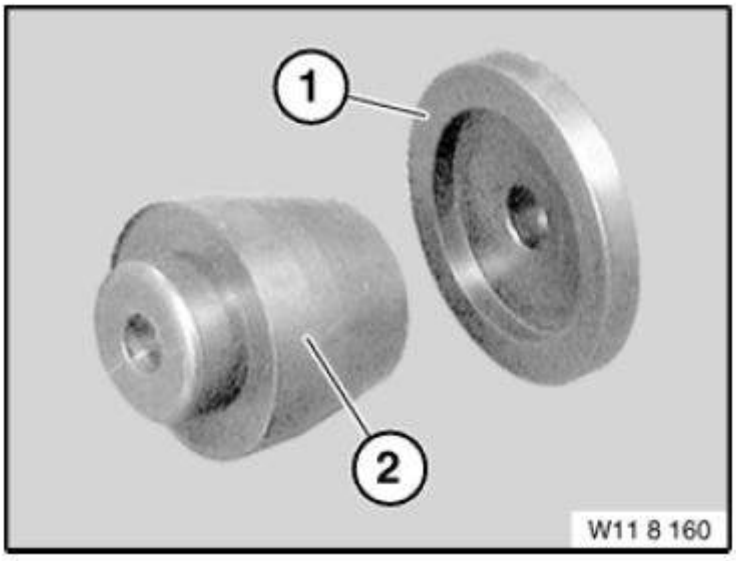


Fig. 815: Identifying Tool (0493584)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0493585 Bush

   NOTE: (draw-in bushing)

2. 0493586 Bush

   NOTE: (Slip bush)

0490862 TOOL

0490862 112310 Tool AM

NOTE: (extractor) For extracting the radial sealing ring in the bottom of the gear case cover

Storage Location

B12

SI number

01 03 87 (739)

Consisting of:

Fig. 816: Identifying Tool (0490862)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0490863 Puller

   NOTE: Only available as part of complete set

2. 0490864 Synchronizing key

   NOTE: Engine: M40 Replaced by 11 2 313 (0 490 865)

3. 0490865 Synchronizing key

cardiagn.com

NOTE: **(Synchronizing key) Engine: M42, M43, M44**

4. 0493117 Spindle

NOTE: **(Spindle M12x150)**

2288167 TOOL SET

2288167 Tool set Mechanical tool

NOTE: **For gudgeon pin circlip installation. Consists of counter support, mandrel and pliers.**

Storage Location

C74

SI number

01 28 14 (130)

Fig. 817: Identifying Tool Set (2288167)
Courtesy of BMW OF NORTH AMERICA, INC.

0495128 TOOL SET

0495128 115340 Tool set AM

NOTE: **(Tool set) For removal and installation of gudgeon pin circlips**

Storage Location

A72

SI number

01 02 05 (173)

Fig. 818: Identifying Tool Set (0495128)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1 = 0495173
3 = 0495174
4 = 0495175
2 = 0495261

0495743 TOOL SET

0495743 118560 Tool set AM

NOTE: **(Tool set) For removal and installation of gudgeon pin circlamps.**

Storage Location

A19

cardiagn.com

A20

A27

Fig. 819: Identifying Tool Set (0495743)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number

01 20 06 (299)

Consisting of:

1. **0495744** Holder

   NOTE: (Assembly holder) Remaining inventories will be sold off followed by discontinuation - then longer available individually. Available in complete special tool set 83 30 0 495 743 - 11 8 560 only.

2. **0495745** Pliers

   NOTE: (Assembly pliers) Remaining inventories will be sold off followed by discontinuation - then longer available individually. Available in complete special tool set 83 30 0 495 743 - 11 8 560 only.

3. **0495746** Mandrel

   NOTE: (Assembly mandrel) Remaining inventories will be sold off followed by discontinuation - then longer available individually. Available in complete special tool set 83 30 0 495 743 - 11 8 560 only.

4. **0496658** Mandrel

   NOTE: For installing circlip on gudgeon pin (N55).

0495274 TOOL SET

0495274 116110 Tool set AM

NOTE: (Tool set) For removal and installation of gudgeon pin circlamps.

Storage Location

C52

SI number

01 05 05 (180)

Consisting of:

1. **0495275** Holder

Fig. 820: Identifying Tool Set (0495274)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: (Assembly holder) Not available individually, but as part of set 11 6 110

cardiagn.com

(0495274) only.

2. 0495276 Pliers

NOTE: **(Assembly pliers) Not available individually, but as part of set 11 6 110 (0495274) only.**

3. 0495277 Mandrel

NOTE: **(Assembly mandrel) Remaining inventories will be sold off, followed by discontinuation and then not available individually, but as part of set 11 6 110 (0495274) only.**

0495009 TOOL SET

0495009 114490 Tool set Mechanical tool

NOTE: **(Tool set) For removal and installation of gudgeon pin circlips.**

Storage Location

A51

SI number

01 17 04 (130)

Consisting of:

Fig. 821: Identifying Tool Set (0495009)
Courtesy of BMW OF NORTH AMERICA, INC.

0495010

0495011

0495012

0495013

0495018 TORQUE WRENCH

0495018 114350 Torque wrench Minimum set: Mechanical tools AM

NOTE: **For installing camshaft bearing strips. Adjustment range 2 up to 6 Nm.**

Storage Location

A51

SI number

01 02 10 (618)

Fig. 822: Identifying Torque Wrench (0495018)
Courtesy of BMW OF NORTH AMERICA, INC.

0495750 TORX

cardiagn.com

0495750 118640 Torx Minimum set: Mechanical tools Mechanical tool

NOTE: **(Torx) E10 For removing and installing oil pump triangular drive.**

Storage Location

B19

SI number

01 20 06 (299)

Fig. 823: Identifying Torx (0495750)
Courtesy of BMW OF NORTH AMERICA, INC.

0495110 TORX

0495110 115190 Torx Minimum set: Mechanical tools Mechanical tool

Replaced by: 83300495747

NOTE: **(Torx) T60 For assembly and disassembly of cylinder head. Replaced by 11 8 580 (0 495 747)**

Storage Location

A51

SI number

01 17 04 (130)

Fig. 824: Identifying Torx (0495110)
Courtesy of BMW OF NORTH AMERICA, INC.

0495134 TORX

0495134 115400 Torx Mechanical tool

NOTE: **(Torx) T20 For screw connection of VANOS solenoid valves.**

Storage Location

A72

SI number

01 02 05 (173)

Fig. 825: Identifying Torx (0495134)
Courtesy of BMW OF NORTH AMERICA, INC.

0495026 TORX

0495026 114420 Torx Minimum set: Mechanical tools Mechanical tool

NOTE: **(Torx) T50 For assembly and disassembly of cylinder head.**

cardiagn.com

Storage Location

A51

SI number

01 17 04 (130)

Fig. 826: Identifying Torx (0495026)
Courtesy of BMW OF NORTH AMERICA, INC.

0493145 TRIPOD

0493145 116252 Tripod AM

NOTE: **(Small hydraulic tripod with magnetic base)**

Fig. 827: Identifying Tripod (0493145)
Courtesy of BMW OF NORTH AMERICA, INC.

0496573 UPHOLSTERY

0496573 118912 Upholstery AM

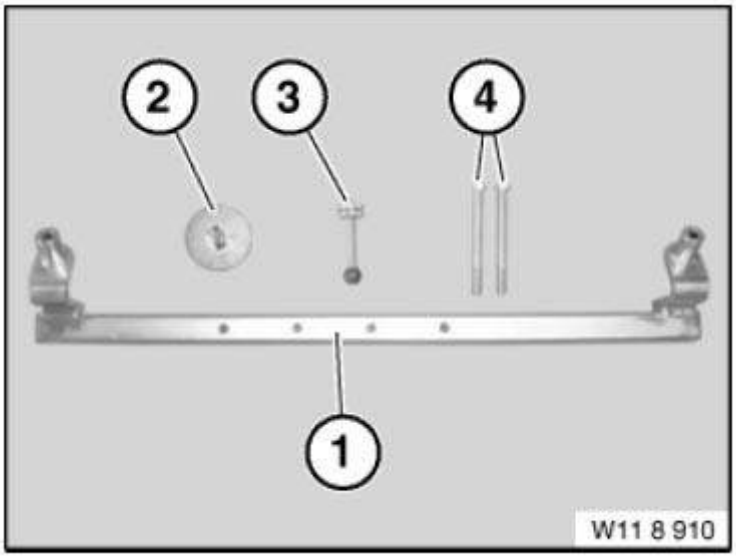


Fig. 828: Identifying Upholstery (0496573)
Courtesy of BMW OF NORTH AMERICA, INC.

0490899 UPHOLSTERY

0490899 113000 Upholstery Mechanical tool

NOTE: **(Support board) for removed camshafts, rocker arm axles, rocker arms, valve springs and valves**

0490676 UPHOLSTERY

0490676 111033 Upholstery AM

NOTE: **(Rubber padding (2 pieces))**

cardiagn.com

Fig. 829: Identifying Upholstery (0490676)
Courtesy of BMW OF NORTH AMERICA, INC.

0490652 UPHOLSTERY

0490652 111000 Upholstery Mechanical tool

NOTE: (Support board for cylinder head)

0490640 UPHOLSTERY

0490640 110313 Upholstery AM

NOTE: (Rubber padding (2 pieces)) Engine: M43 Only available as part of complete set

0490860 UPHOLSTERY

0490860 112290 Upholstery Mechanical tool

NOTE: (Support board) For setting down the piston with connecting rod

Fig. 830: Identifying Upholstery (0490860)
Courtesy of BMW OF NORTH AMERICA, INC.

0490656 UPHOLSTERY

0490656 111013 Upholstery AM

NOTE: (Rubber padding (2 pieces))

cardiagn.com

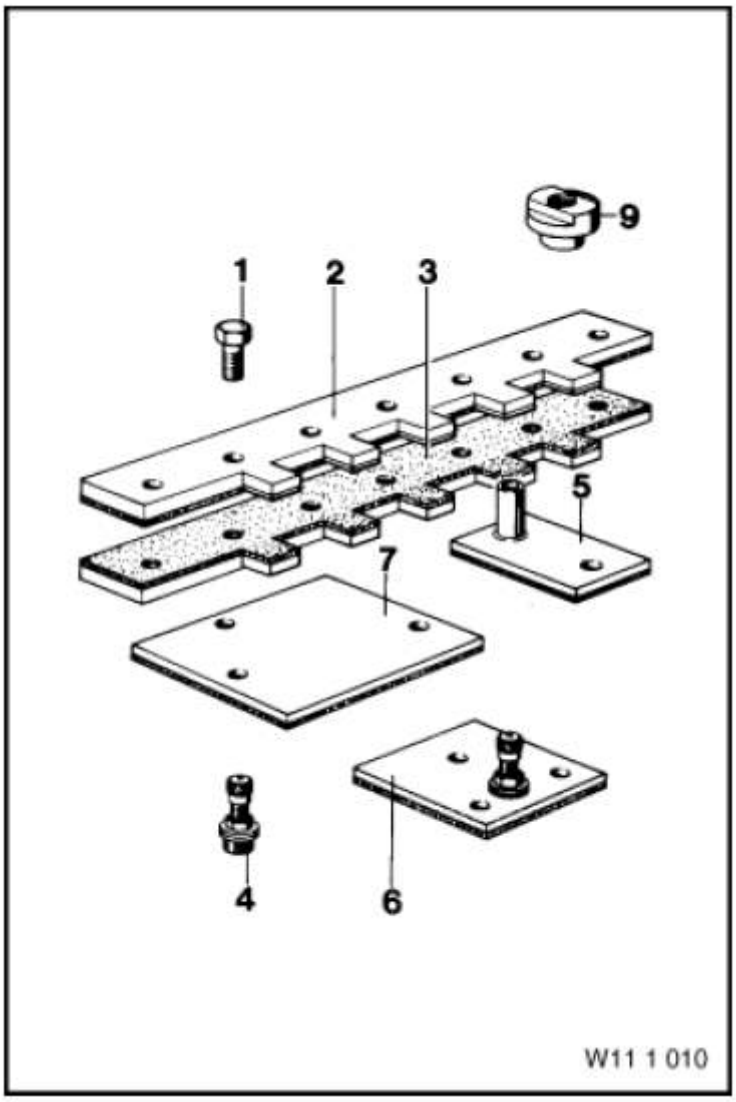


Fig. 831: Identifying Upholstery (0490656)
Courtesy of BMW OF NORTH AMERICA, INC.

0490665 UPHOLSTERY

0490665 111022 Upholstery AM

NOTE: **(Rubber padding (2 pieces))**

cardiagn.com

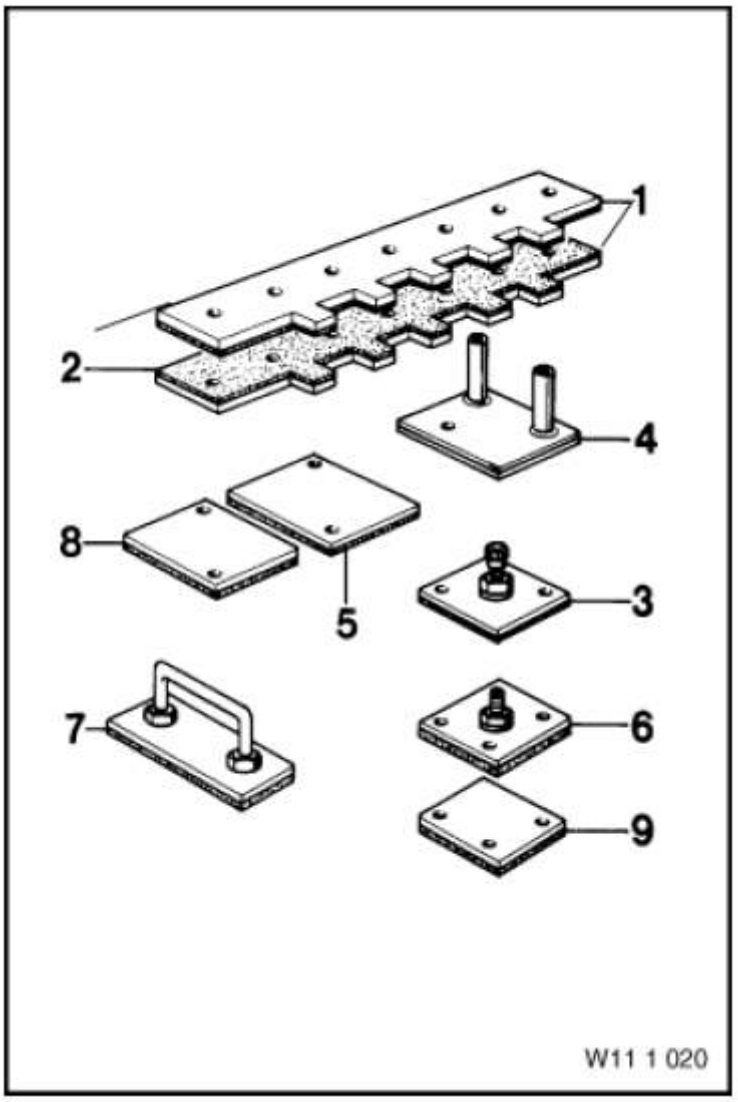


Fig. 832: Identifying Upholstery (0490665)
Courtesy of BMW OF NORTH AMERICA, INC.

0490625 VALVE

0490625 110233 Valve Minimum set: Mechanical tools AM

NOTE: **(Non-return valve)**

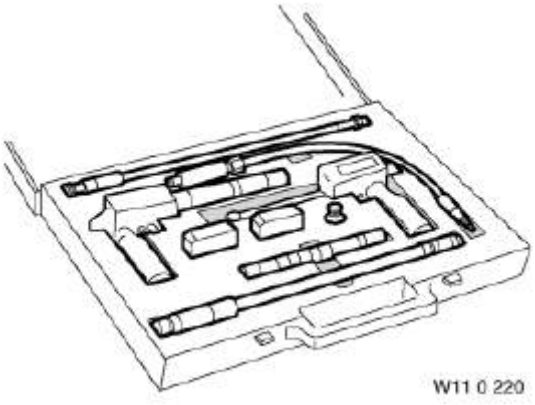


Fig. 833: Identifying Valve (0490625)
Courtesy of BMW OF NORTH AMERICA, INC.

0490828 WASHER

cardiagn.com

0490828 112112 Washer AM

Replaced by: 83300490504

NOTE: **(Graduated disc 180Â°) Replaced by 00 9 120 (0 490 504)**

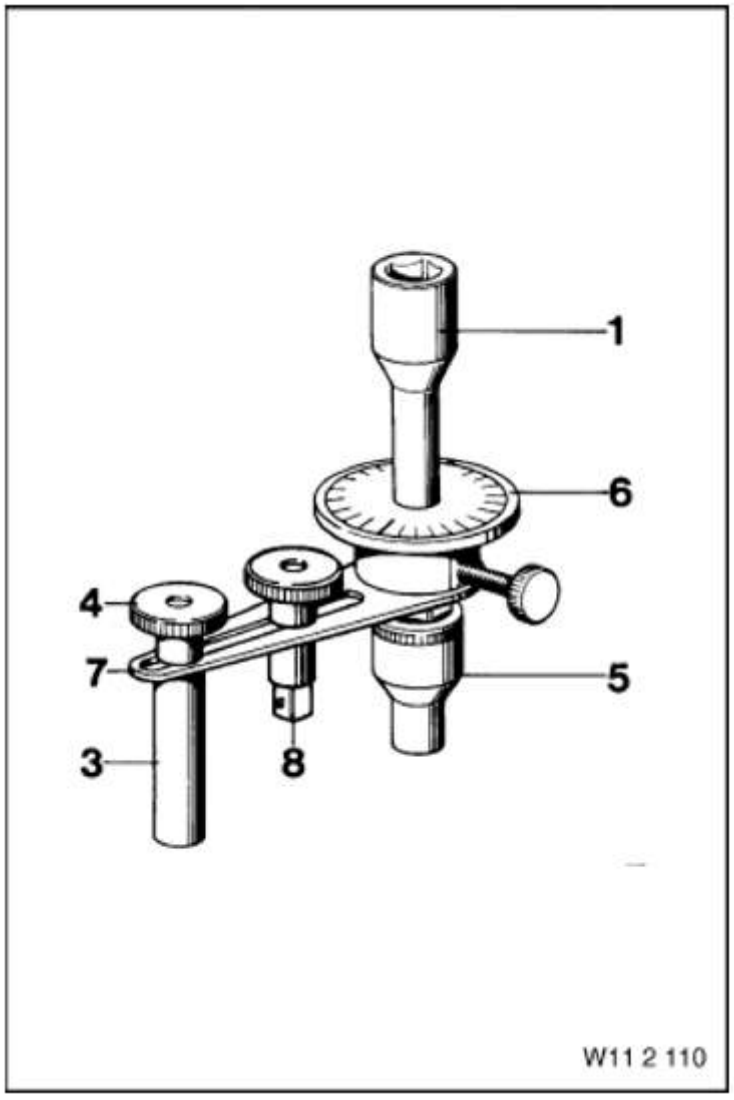


Fig. 834: Identifying Washer (0490828)
Courtesy of BMW OF NORTH AMERICA, INC.

2318118 WASHER

2318118 Washer Minimum set: Mechanical tools AM

In conjunction with: **11 8 530 = 0495728**

NOTE: **Shim for 11 8 530 for removing and fitting the vacuum pump sealing cap.**

Storage Location

A33

SI number

01 06 12 (800)

Fig. 835: Identifying Washer (2318118)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0495210 WASHER

0495210 115201 Washer Minimum set: Mechanical tools AM

NOTE: **(Shim) Liquidation of existing inventory and then available only via complete tool set 11 5 200 = 83 30 0 495 111 - status 29.11.2011**

Fig. 836: Identifying Washer (0495210)
Courtesy of BMW OF NORTH AMERICA, INC.

0490910 WASHER

0490910 113063 Washer AM

NOTE: **(Thrust washer) Only available as part of complete set**

0495111 WASHER

0495111 115200 Washer Minimum set: Mechanical tools AM

NOTE: **(Shim) For slackening and tightening the central bolt.**

Storage Location

B51

SI number

01 17 04 (130)

Consisting of:

1. 0495210 Washer

Fig. 837: Identifying Washer (0495111)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **(Shim) Liquidation of existing inventory and then available only via complete tool set 11 5 200 = 83 30 0 495 111 - status 29.11.2011**

2. 0495211 Screw

NOTE: **(Screws M8x40 mm (3 pieces)) Liquidation of existing inventory and then available only via complete tool set 11 5 200 = 83 30 0 495 111 - status 29.11.2011**

0490832 WASHER

0490832 112116 Washer AM

Replaced by: 83300490504

NOTE: **(Graduated disc up to 270Â°) Replaced by 00 9 120 (0 490 504)**

cardiagn.com

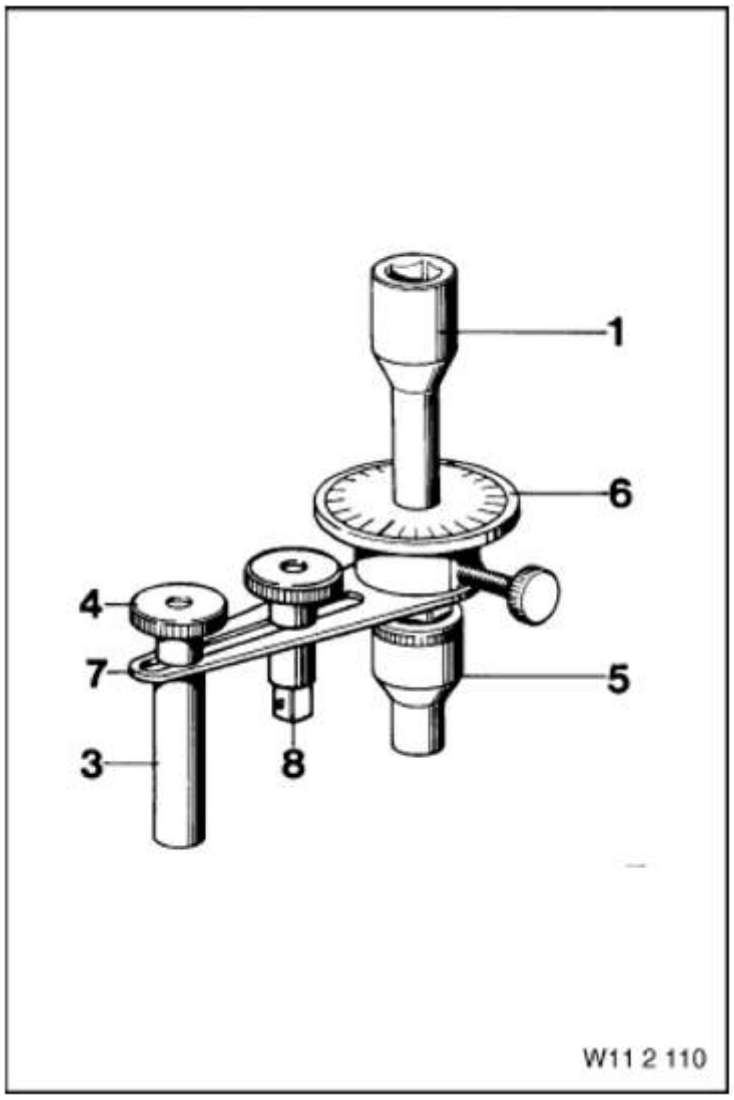


Fig. 838: Identifying Washer (0490832)
Courtesy of BMW OF NORTH AMERICA, INC.

0493616 WASHER

0493616 117211 Washer AM

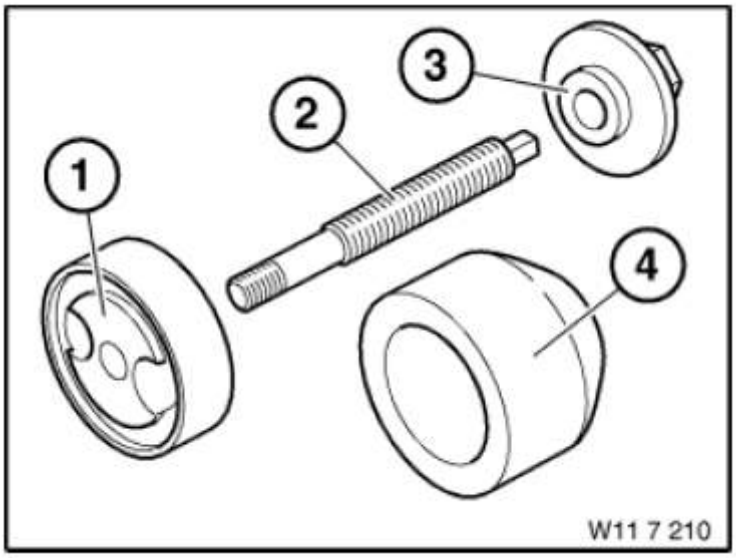


Fig. 839: Identifying Washer (0493616)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0490884 WASHER

0490884 112410 Washer Mechanical tool

NOTE: (Shim) For counter support to lock crankshaft in position when releasing and tightening central bolt

Storage Location

Y1

SI number

01 10 94 (840)

Fig. 840: Identifying Washer (0490884)
Courtesy of BMW OF NORTH AMERICA, INC.

0494357 WEIGHT

0494357 118501 Weight AM

NOTE: (Weight) Only available as part of complete tool set 11 8 500 (83 30 0 494 312).

0491096 CONNECTOR

0491096 117455 connector AM

NOTE: (Connector) 1-pin and 3/4-pin plug Connection to oxygen sensor with Bosch or Cannon plug connection - engine: M10, M20, M30, S14 Only available as part of complete set

Storage Location

K 102

0491095 CONNECTOR

0491095 117454 connector AM

NOTE: (Connector) 4-pin plug connection, encoding B Connection to wiring harness - engine: S50/B30 Only orderable as a complete tool set 11 7 450 (83 30 0 491 091) - as of 09.07.13.

Storage Location

K 102

0491097 CONNECTOR

0491097 117456 connector AM

NOTE: (Connector) 1-pin and 3/4-pin plug Connection to wiring harness with Bosch or Cannon plug connection - engine: M10, M20, M30, S14 Only available as part of complete set

Storage Location

K 102

cardiagn.com

0491094 CONNECTOR

0491094 117453 connector AM

NOTE: **(Connector) 4-pin plug connection, encoding B Connection to oxygen sensor - engine: S50/B30 Only available as part of complete set**

Storage Location

K 102

0490902 ODDMENTS TRAY

0490902 113030 oddments tray Mechanical tool

NOTE: **(Board for tappets)**

Fig. 841: Identifying Oddments Tray (0490902)
Courtesy of BMW OF NORTH AMERICA, INC.

0490989 ODDMENTS TRAY

0490989 113411 oddments tray AM

Replaced by: 83300494362

NOTE: **(Board) Replaced by 11 9 000 (0 494 362)**

Fig. 842: Identifying Oddments Tray (0490989)
Courtesy of BMW OF NORTH AMERICA, INC.

0495105 ODDMENTS TRAY

0495105 114480 oddments tray AM

NOTE: **(Boards (2 pieces)) For setting down the individual components of the cylinder head.**

SI number

01 17 04 (130)

Consisting of:

Fig. 843: Identifying Oddments Tray (0495105)
Courtesy of BMW OF NORTH AMERICA, INC.

1. **0495106** oddments tray

   NOTE: **(Board, intake side) Discontinued, only available as part of complete special tool 11 4 480 = 83 30 0 495 105**

2. **0495107** oddments tray

   NOTE: **(Board, exhaust side) Discontinued, only available as part of complete special tool 11 4 480 = 83 30 0 495 105**

cardiagn.com

0490694 ODDMENTS TRAY

0490694 111053 oddments tray AM

NOTE: (Board) Engine: S14, S38

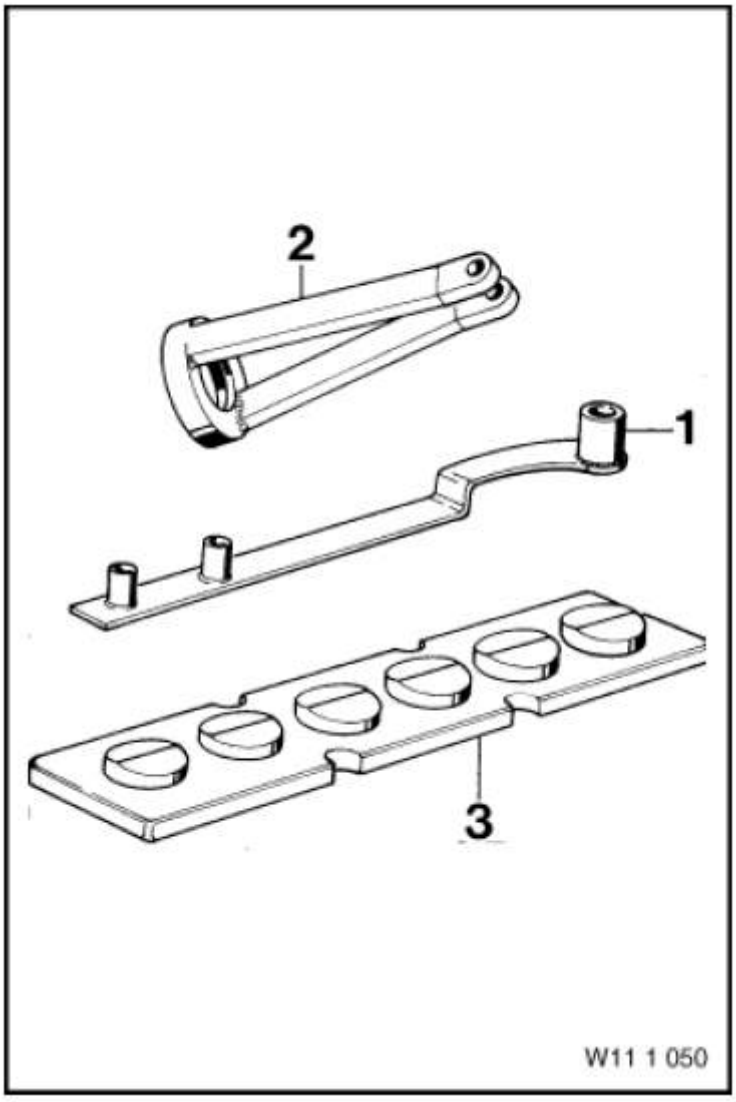


Fig. 844: Identifying Oddments Tray (0490694)
Courtesy of BMW OF NORTH AMERICA, INC.

0495106 ODDMENTS TRAY

0495106 114481 oddments tray AM

NOTE: (Board, intake side) Discontinued, only available as part of complete special tool 11 4 480 = 83 30 0 495 105

Fig. 845: Identifying Oddments Tray (0495106)
Courtesy of BMW OF NORTH AMERICA, INC.

0495107 ODDMENTS TRAY

0495107 114482 oddments tray AM

NOTE: (Board, exhaust side) Discontinued, only available as part of complete special tool 11 4 480 = 83 30 0 495 105

cardiagn.com

Fig. 846: Identifying Oddments Tray (0495107)
Courtesy of BMW OF NORTH AMERICA, INC.

0491077 ODDMENTS TRAY

0491077 117300 oddments tray Mechanical tool

NOTE: **(Board) For valves, valve springs, hydraulic valve lifter, rocker arm, etc. Sale and discontinuation.**

Fig. 847: Identifying Oddments Tray (0491077)
Courtesy of BMW OF NORTH AMERICA, INC.

0490609 ODDMENTS TRAY

0490609 110211 oddments tray AM

Replaced by: 83300494362

NOTE: **(Board for cylinder head) Engine: M60, M62, S62 Replaced by 11 9 000 (0 494 362)**

Fig. 848: Identifying Oddments Tray (0490609)
Courtesy of BMW OF NORTH AMERICA, INC.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702110

cardiagn.com

CAMSHAFT (N47)

11 31 CAMSHAFT N47T D20 UPPER POWER STAGE 1

CAMSHAFT SPECIFICATION

Radial runout	mm	0.047... 0.068
Axial play	mm	0.033... 0.150

CAMSHAFT (N52T)

11 31 CAMSHAFT N52T B30

CAMSHAFT SPECIFICATION

Guide bearing (width)	mm	20.000... 20.052
Radial play	mm	0.054... 0.099
Axial play	mm	0.020... 0.162

11 31 CAMSHAFT N52T B25

CAMSHAFT SPECIFICATION

Guide bearing (width)	mm	20.000... 20.052
Radial play	mm	0.054... 0.099
Axial play	mm	0.020... 0.162

CAMSHAFT (N20, N26, B20)

11 31 CAMSHAFT N20/N26 B20

CAMSHAFT SPECIFICATION

Intake camshaft guide bearing (width)	mm	19, 000... 19, 043
Radial runout	mm	0, 038... 0, 083
Side clearance	mm	0, 07... 0, 143
Exhaust camshaft guide bearing (width)	mm	19, 000... 19, 043
Radial runout	mm	0, 038... 0, 083
Side clearance	mm	0, 07... 0, 143

CONNECTING RODS AND BEARINGS (N47T)

11 24 CONNECTING RODS AND BEARINGS N47T D20 UPPER POWER STAGE 1

CONNECTING RODS AND BEARINGS SPECIFICATION

Ã˜ Large connecting rod eye (without bearing)	mm	53.600... 53.619
Conrod bushing: Inside diameter	mm	$31.700^{+0.05}_{-0.05}$
Permissible total deviation of connecting rods in one engine (without bearing shells)	g	Â±4

11 24 CONNECTING RODS AND BEARINGS N47T D20 LOWER POWER LEVEL 1

CONNECTING RODS AND BEARINGS SPECIFICATION

cardiagn.com

Ã˜ Large connecting rod eye (without bearing)	mm	53.600... 53.619
Conrod bush: Inner diameter	mm	$27,700^{+0,05}_{-0,05}$
Permissible total deviation of connecting rods in one engine (without bearing shells)	g	Â±4

CONNECTING RODS AND BEARINGS (N52T)

11 24 CONNECTING RODS AND BEARINGS N52T B30

CONNECTING RODS AND BEARINGS SPECIFICATION

Ã˜ Large connecting rod eye (without bearing)	mm	$53,600^{+0,016}$
Conrod bushing: Inside diameter	mm	$20,000^{+0,013}_{+0,004}$
Connecting rod bearing, installation clearance	mm	0.025... 0.061
Permissible total deviation of connecting rods in one engine (without bearing shells)	g	Â±5

11 24 CONNECTING RODS AND BEARINGS N52T B25

CONNECTING RODS AND BEARINGS SPECIFICATION

Ã˜ Large connecting rod eye (without bearing)	mm	$53,600^{+0,016}$
Conrod bushing: Inside diameter	mm	$20,000^{+0,013}_{+0,004}$
Connecting rod bearing, installation clearance	mm	0.025... 0.061
Permissible total deviation of connecting rods in one engine (without bearing shells)	g	Â±5

CONNECTING RODS AND BEARINGS (N55)

11 24 CONNECTING RODS AND BEARINGS N55 B30

CONNECTING RODS AND BEARINGS SPECIFICATION

Ã˜ Large connecting rod eye (without bearing)	mm	53.600... 53.616
Conrod bushing: Inside diameter	mm	22.004... 22.013
Permissible total deviation of connecting rods in one engine (without bearing shells)	g	Â±5

CONNECTING RODS AND BEARINGS (N20, N26, B20)

11 24 CONNECTING RODS AND BEARINGS N20/N26 B20

CONNECTING RODS AND BEARINGS SPECIFICATION

Ã˜ Large connecting rod eye (without bearing)	mm	53, 600... 53, 616
Conrod bush: Inner diameter	mm	22, 004... 22, 013
Permissible total deviation of connecting rods in one engine (without bearing shells)	g	Â±5

CRANKSHAFT AND BEARINGS (N47)

cardiagn.com

11 21 CRANKSHAFT AND BEARINGS N47T D20 UPPER POWER STAGE 1

CONROD BEARING JOURNAL SPECIFICATION

Ground sizes of conrod bearing journals	Â	Â
Original 0	mm	$50.00^{-0.009}_{-0.025}$
Stage 1	mm	$49.75^{-0.009}_{-0.025}$
Size 2	mm	$49.50^{-0.009}_{-0.025}$
Radial conrod bearing play	mm	0.015... 0.050

MAIN BEARING JOURNAL/GUIDE BEARING JOURNAL SPECIFICATION

Ground sizes of main bearing journals	Â	Main bearing journal/guide bearing journal
Stage 0 K1 (color Yellow)	mm	54.984... 54.990
Stage 0 K2 (color Green)	mm	54.977... 54.983
Stage 0 K3 (color White)	mm	54.971... 54.976
Grinding stage 1 K1 (color Yellow)	mm	54.734... 54.740
Grinding stage 1 K2 (color Green)	mm	54.727... 54.733
Grinding stage 1 K3 (color White)	mm	54.721... 54.726
Grinding stage 2 K1 (color Yellow)	mm	54.484... 54.490
Grinding stage 2 K2 (color Green)	mm	54.477... 54.483
Grinding stage 2 K3 (color White)	mm	54.471... 54.476
Crankshaft bearing clearance, radial	mm	0.023... 0.054
Crankshaft bearing clearance, axial	mm	0.060... 0.210
Maximum crankshaft friction coefficient, bearing section bolted	Nm	2

CRANKSHAFT GUIDE BEARING SPECIFICATION

Grinding stages, crankshaft guide bearing	Â	Â
Original	mm	$25.00^{+0.020}_{+0.053}$
Stage 1	mm	$25.20^{+0.020}_{+0.053}$
Size 2	mm	$25.40^{+0.020}_{+0.053}$
Crankshaft axial play	mm	0.060... 0.250

CRANKSHAFT AND BEARINGS (N52T)

11 21 CRANKSHAFT AND BEARINGS N52T B30

MAIN BEARING JOURNAL NUMBER (1) SPECIFICATION

Ground sizes of main bearing journals	Â	Main bearing journal number 1
Original (designation S1)	mm	55.989... 55.983
Original (designation S2)	mm	55.982... 55.977
Original (designation S3)	mm	55.976... 55.970
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.150

MAIN BEARING JOURNAL NUMBERS (2, 3, 4, 5, 6) SPECIFICATION

Ground sizes of main bearing journals	Â	Main bearing journal numbers 2, 3, 4, 5, 6
Original (designation S1)	mm	55.999... 55.993
Original (designation S2)	mm	55.992... 55.987

cardiagn.com

Original (designation S3)	mm	55.986... 55.980
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.150

GUIDE BEARING JOURNAL NUMBER (7) SPECIFICATION

Ground sizes of main bearing journals	Â	Guide bearing journal number 7
Original (designation S1)	mm	64.999... 64.993
Original (designation S2)	mm	64.992... 64.987
Original (designation S3)	mm	64.986... 64.980
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.150

CONROD BEARING JOURNALS SPECIFICATION

Ground sizes of conrod bearing journals	Â	Â
Stage (b)	mm	49.9820... 49.9924
Stage (r)	mm	49.9925... 50.0020
Radial conrod bearing play	mm	0.025... 0.070

CRANKSHAFT GUIDE BEARING SPECIFICATION

Grinding stages, crankshaft guide bearing	Â	Â
Original	mm	24.025... 24.064
Crankshaft axial play	mm	0.060... 0.250

11 21 CRANKSHAFT AND BEARINGS N52T B25

MAIN BEARING JOURNAL NUMBER (1) SPECIFICATION

Ground sizes of main bearing journals	Â	Main bearing journal number 1
Original (designation S1)	mm	55.989... 55.983
Original (designation S2)	mm	55.982... 55.977
Original (designation S3)	mm	55.976... 55.970
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.150

MAIN BEARING JOURNAL NUMBERS (2, 3, 4, 5, 6) SPECIFICATION

Ground sizes of main bearing journals	Â	Main bearing journal numbers 2, 3, 4, 5, 6
Original (designation S1)	mm	55.999... 55.993
Original (designation S2)	mm	55.992... 55.987
Original (designation S3)	mm	55.986... 55.980
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.150

GUIDE BEARING JOURNAL NUMBER (7) SPECIFICATION

Ground sizes of main bearing journals	Â	Guide bearing journal number 7
Original (designation S1)	mm	64.999... 64.993
Original (designation S2)	mm	64.992... 64.987
Original (designation S3)	mm	64.986... 64.980
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.150

CONROD BEARING JOURNALS SPECIFICATION

Ground sizes of conrod bearing journals	Â	Â

cardiagn.com

Stage (b)	mm	49.9820... 49.9924
Stage (r)	mm	49.9925... 50.0020
Radial conrod bearing play	mm	0.025... 0.070

CRANKSHAFT GUIDE BEARING SPECIFICATION

Grinding stages, crankshaft guide bearing	Â	Â
Original	mm	24.025... 24.064
Crankshaft axial play	mm	0.060... 0.250

CRANKSHAFT AND BEARINGS (N55)

11 21 CRANKSHAFT AND BEARINGS N55 B30

MAIN BEARING JOURNAL NUMBER (1) SPECIFICATION

Ground sizes of main bearing journals	Â	Main bearing journal number 1
Original (identification mark S/1)	mm	55.989... 55.983
Original (identification mark S/2)	mm	55.982... 55.977
Original (identification mark S/3)	mm	55.976... 55.970
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.15

MAIN BEARING JOURNAL NUMBERS (2, 3, 4, 5, 6) SPECIFICATION

Ground sizes of main bearing journals	Â	Main bearing journal numbers 2, 3, 4, 5, 6
Original (identification mark S/1)	mm	55.999... 55.993
Original (identification mark S/2)	mm	55.992... 55.987
Original (identification mark S/3)	mm	55.986... 55.980
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.15

GUIDE BEARING JOURNAL NUMBER (7) SPECIFICATION

Ground sizes of main bearing journals	Â	Guide bearing journal number 7
Original (identification mark S/1)	mm	64.999... 64.993
Original (identification mark S/2)	mm	64.992... 64.987
Original (identification mark S/3)	mm	64.986... 64.980
Crankshaft bearing clearance, radial	mm	0.020... 0.046
Max. permitted runout at center crankshaft journal	mm	0.15

CONROD BEARING JOURNALS SPECIFICATION

Ground sizes of conrod bearing journals	Â	Â
Identification mark (b)	mm	49.9730... 49.9834
Identification mark (R)	mm	49.9835... 49.9930
Stage 1	mm	No machining possible
Size 2	mm	No machining possible
Radial conrod bearing play	mm	0.025... 0.071

CRANKSHAFT GUIDE BEARING SPECIFICATION

Grinding stages, crankshaft guide bearing	Â	Â
Original	mm	24.020... 24.053
Stage 1	mm	No machining possible
Size 2	mm	No machining possible
Crankshaft axial play	mm	0.060... 0.250

cardiagn.com

Friction coefficient of crankshaft	Nm	2 to 2.5

CRANKSHAFT AND BEARINGS (N20, N26, B20)

11 21 CRANKSHAFT AND BEARINGS N20/N26 B20

MAIN BEARING JOURNAL NUMBER (1) SPECIFICATION

Grinding stage of main bearing journals	Â	Main bearing journal number 1
Original (identification mark S/1)	mm	49, 984... 49, 978
Original (identification mark S/2)	mm	49, 977... 49, 972
Original (identification mark S/3)	mm	49, 971... 49, 980
Crankshaft bearing clearance, radial	mm	0, 020... 0, 046
Max. permitted runout at main bearing journal	mm	0, 15

MAIN BEARING JOURNAL NUMBER (2, 3, 4, 5) SPECIFICATION

Grinding stage of main bearing journals	Â	Main bearing journal number 2, 3, 4, 5
Original (identification mark S/1)	mm	49, 999... 49, 993
Original (identification mark S/2)	mm	49, 992... 49, 987
Original (identification mark S/3)	mm	49, 986... 49, 980
Crankshaft bearing clearance, radial	mm	0, 020... 0, 046
Max. permitted runout at main bearing journal	mm	0, 15

CRANKSHAFT GUIDE BEARING SPECIFICATION

Grinding stages, crankshaft guide bearing	Â	Â
Original	mm	24, 020... 24, 053
Level 1	mm	No machining possible
Level 2	mm	No machining possible
Crankshaft side clearance	mm	0.060... 0.250
Coefficient of friction of crankshaft	Nm	2 to 2.5

CONNECTING ROD BEARING JOURNALS SPECIFICATION

Grinding stages connecting rod bearing journals	Â	Â
Identification mark (b)	mm	49, 9730...49, 9834
Identification mark (R)	mm	49, 9835...49, 9930
Level 1	mm	No machining possible
Level 2	mm	No machining possible
Radial connecting-rod bearing play	mm	0, 025... 0, 071

CYLINDER HEAD WITH COVER (N47T)

11 12 CYLINDER HEAD WITH COVER N47T D20 UPPER POWER STAGE 1

CYLINDER HEAD WITH COVER SPECIFICATION

Cylinder head height: Original dimension	mm	No machining possible
Machining limit, valve-inset clearance	mm	0.8 Â± 0.1
Â	Â	Â
Valve guides are not available as replacement parts.	Â	Â
Inside diameter of installed valve guide	Â	Â
Original	mm	$5.0^{-0.015}$
Tilt clearance, maximum (wear between valve and valve guide)	mm	can't be measured

cardiagn.com

CYLINDER HEAD WITH LID (N20, N26, B20)

11 12 CYLINDER HEAD WITH LID N20/N26 B20

CYLINDER HEAD WITH LID SPECIFICATION

Cylinder head height: Original dimension	mm	112, 5 Â± 0, 05
Machining limit	mm	112, 2 Â± 0, 05
Valve guides are not available as replacement parts.	Â	Â
Inner diameter of installed valve guide	Â	Â
Original intake valve	mm	5, 00... 5, 01
Original exhaust valve	mm	6, 00... 6, 01
Tilt clearance, maximum (wear between valve and valve guide)	mm	cannot be measured
Bearing of camshaft	Â	Â
Guide bearing intake camshaft (width)	mm	18, 90... 18, 93
Guide bearing eccentric shaft (width)	mm	33, 51... 33, 55

CYLINDER HEAD WITH LID (N52T)

11 12 CYLINDER HEAD WITH LID N52T B25

CYLINDER HEAD WITH LID SPECIFICATION

Cylinder head height: Original dimension	mm	112, 00 Â± 0, 05
Machining limit	mm	111, 70 Â± 0, 05
Valve guides are not available as replacement parts.	Â	Â
Inner diameter of installed valve guide	Â	Â
Original intake valve	mm	5, 00...5, 02
Original exhaust valve	mm	6, 00...6, 02

11 12 CYLINDER HEAD WITH LID N52T B30

CYLINDER HEAD WITH LID SPECIFICATION

Cylinder head height: Original dimension	mm	112, 00 Â± 0, 05
Machining limit	mm	111, 70 Â± 0, 05
Valve guides are not available as replacement parts.	Â	Â
Inner diameter of installed valve guide	Â	Â
Original intake valve	mm	5, 00...5, 02
Original exhaust valve	mm	6, 00...6, 02

CYLINDER HEAD WITH LID (N55, B30)

11 12 CYLINDER HEAD WITH LID N55 B30

CYLINDER HEAD WITH LID SPECIFICATION

Cylinder head height: Original dimension	mm	112, 00 Â± 0, 05
Machining limit	mm	111, 70 Â± 0, 05
Valve guides are not available as replacement parts.	Â	Â
Inner diameter of installed valve guide	Â	Â
Original intake valve	mm	5, 00... 5, 02
Original exhaust valve	mm	6, 00... 6, 02
Tilt clearance, maximum (wear between valve and valve guide)	mm	cannot be measured

cardiagn.com

Bearing of camshaft	Â	Â
Guide bearing (width)	mm	22, 00... 22, 05

CYLINDER HEAD WITH VALVE SEAT COVER (N47T)

11 12 CYLINDER HEAD WITH VALVE SEAT COVER N47T D20 UPPER POWER STAGE 1

CYLINDER HEAD WITH VALVE SEAT COVER SPECIFICATION

Valve seat angle	Â°	45
Correction angle: outer Intake and exhaust	Â°	15
Correction angle: inner Intake	Â°	36
Correction angle: inner Exhaust	Â°	60
Valve seat width: Intake	mm	$1.2^{Â±0.25}$
Valve seat width: Exhaust	mm	$1.4^{Â±0.25}$
Ã˜ Valve seat	Â	Â
Valve seat surface: Outside dia. inlet	mm	$25.9^{+0.1}$
Valve seat surface: Outside dia. exhaust	mm	$23.2^{+0.1}$

CYLINDER HEAD WITH VALVE SEAT COVER (N20, N26, B20)

11 12 CYLINDER HEAD WITH VALVE SEAT COVER N20/N26 B20

CYLINDER HEAD WITH VALVE SEAT COVER SPECIFICATION

Valve seat angle	Â°	45
Correction angle: outer	Â°	35
Correction angle: Inner, exhaust valve	Â°	60
Correction angle: Inner, intake valve	Â°	65
Valve seat width: Intake	mm	$1, 25^{+0, 2}$
Valve seat width: Exhaust	mm	$1, 65^{+0, 2}$
Ã˜ theoretical valve seat	Â	Â
Valve seat surface: Outer diameter, intake	mm	$30, 4^{+0, 1}$
Valve seat surface: Outer diameter, exhaust	mm	$26, 6^{+0.1}$

CYLINDER HEAD WITH VALVE SEAT COVER (N52T)

11 12 CYLINDER HEAD WITH VALVE SEAT COVER N52T B25

CYLINDER HEAD WITH VALVE SEAT COVER SPECIFICATION

Valve seat angle	Â°	45
Correction angle: outer	Â°	15
Correction angle: inner	Â°	60
Valve seat width: Intake	mm	$1, 0^{+0, 1}$
Valve seat width: Exhaust	mm	$1, 2^{+0, 1}$
Ã˜ Valve seat	Â	Â
Valve seat surface: Outside dia. inlet	mm	$27, 7^{+0, 1}$
Valve seat surface: Outside dia. exhaust	mm	$26, 6^{+0.1}$

cardiagn.com

11 12 CYLINDER HEAD WITH VALVE SEAT COVER N52T B30

CYLINDER HEAD WITH VALVE SEAT COVER SPECIFICATION

Valve seat angle	Â°	45
Correction angle: outer	Â°	15
Correction angle: inner	Â°	60
Valve seat width: Intake	mm	$1,0^{+0,1}$
Valve seat width: Exhaust	mm	$1,2^{+0,1}$
Ã˜ Valve seat	Â	Â
Valve seat surface: Outside dia. inlet	mm	$27,7^{+0,1}$
Valve seat surface: Outside dia. exhaust	mm	$26,6^{+0.1}$

CYLINDER HEAD WITH VALVE SEAT COVER (N55)

11 12 CYLINDER HEAD WITH VALVE SEAT COVER N55 B30

CYLINDER HEAD WITH VALVE SEAT COVER SPECIFICATION

Valve seat angle	Â°	45
Correction angle: outer	Â°	35
Correction angle: Inner, exhaust valve	Â°	60
Correction angle: Inner, inlet valve	Â°	65
Valve seat width: Intake	mm	$1,25^{+0,2}$
Valve seat width: Exhaust	mm	$1,65^{+0,2}$
Ã˜ theoretical valve seat	Â	Â
Valve seat surface: Outside dia. inlet	mm	$30,4^{+0,1}$
Valve seat surface: Outside dia. exhaust	mm	$26,6^{+0.1}$

ENGINE BLOCK, CYLINDER CRANKCASE (N20, N26, B20)

11 11 ENGINE BLOCK, CYLINDER CRANKCASE N20/N26 B20

ENGINE BLOCK, CYLINDER CRANKCASE SPECIFICATION

Bore Ã˜ stage 0(1)	mm	$84,000^{+0,02}$
Bore hole Ã˜ stage 00)	mm	No machining possible
Bore hole Ã˜ stage 1)	mm	No machining possible
Permitted out-of-round of cylinder bore (1)	mm	0, 01
Permitted conicity of cylinder bore (1)	mm	0, 01
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0, 15
(1) *New condition or reworking*		

ENGINE BLOCK, CYLINDER CRANKCASE SPECIFICATION

Grinding stages of main bearings	Â	Main bearing
Original (identification A)	mm	55, 00... 55, 01
Original (identification B)	mm	55, 00... 55, 01
Original (identification C)	mm	55, 01... 55, 02

cardiagn.com

ENGINE BLOCK, CYLINDER CRANKCASE (N47T, D20, UPPER POWER STAGE 1)

11 11 ENGINE BLOCK, CYLINDER CRANKCASE N47T D20 UPPER POWER STAGE 1

ENGINE BLOCK, CYLINDER CRANKCASE SPECIFICATION

Bore Ã˜ stage 0(1)	mm	$84,000^{+0,02}$
Bore Ã˜ stage 00 (1)	mm	%
Bore Ã˜ stage 1 (1)	mm	$84,250^{+0,02}$
Permitted out-of-round of cylinder bore (1)	mm	0.01
Permitted conicity of cylinder bore (1)	mm	0.01
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.15
(1) *New condition or reworking*		

ENGINE BLOCK, CYLINDER CRANKCASE (N52T)

11 11 ENGINE BLOCK, CYLINDER CRANKCASE N52T B25

ENGINE BLOCK, CYLINDER CRANKCASE SPECIFICATION

Bore Ã˜ stage 0(1)	mm	$82,000^{+0,02}$
Bore Ã˜ stage 00 (1)	mm	Â
Bore Ã˜ stage 1 (1)	mm	$82,250^{+0,02}$
Permitted out-of-round of cylinder bore (1)	mm	0.01
Permitted conicity of cylinder bore (1)	mm	0.01
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.15
(1) *New condition or reworking*		

11 11 ENGINE BLOCK, CYLINDER CRANKCASE N52T B30

ENGINE BLOCK, CYLINDER CRANKCASE SPECIFICATION

Bore Ã˜ stage 0(1)	mm	$85,007Â\pm^{0,02}$
Bore Ã˜ stage 00 (1)	mm	Â
Bore Ã˜ stage 1 (1)	mm	$85,257Â\pm^{0,02}$
Permitted out-of-round of cylinder bore (1)	mm	0.01
Permitted conicity of cylinder bore (1)	mm	0.01
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.15
(1) *New condition or reworking*		

ENGINE BLOCK, CYLINDER CRANKCASE (N55, B30)

11 11 ENGINE BLOCK, CYLINDER CRANKCASE N55 B30

ENGINE BLOCK, CYLINDER CRANKCASE SPECIFICATION

Bore Ã˜ stage 0(1)	mm	$84,000^{+0,02}$
Bore Ã˜ stage 00 (1)	mm	Â
Bore Ã˜ stage 1 (1)	mm	$84,250^{+0,02}$
Permitted out-of-round of cylinder bore (1)	mm	0.01

cardiagn.com

Permitted conicity of cylinder bore (1)	mm	0.01
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.15
(1) *New condition or reworking*		

ENGINE IN GENERAL (N47)

11 00 ENGINE IN GENERAL N47T D20 UPPER POWER STAGE 1

ENGINE IN GENERAL SPECIFICATION

Cylinder	Â	4
Bore	mm	84
Stroke	mm	90
Effective displacement	cm^3	1995
Compression ratio	:1	16.5
Breakaway speed	rpm	5000
Permissible constant speed	rpm	4400
Compression pressure (of all cylinders roughly same value)	bar	>16...

ENGINE IN GENERAL (N52T)

11 00 ENGINE IN GENERAL N52T B30 ROZ 87

ENGINE IN GENERAL SPECIFICATION

Cylinder	Â	6
Bore Ã˜	mm	85
Stroke	mm	88
Effective displacement	cm^3	2996
Compression ratio	:1	9.5
Max. permissible engine speed	rpm	6800Â±50
Permissible constant speed	rpm	6500
Compression pressure: Minimum and maximum values depending on position of Valvetronic.	Â	9... 18
Compression pressure: Maximum deviation of all cylinders to each other.	bar	2

11 00 ENGINE IN GENERAL N52T B25 ROZ 87

ENGINE IN GENERAL SPECIFICATION

Cylinder	Â	6
Bore Ã˜	mm	82
Stroke	mm	79
Effective displacement	cm^3	2497
Compression ratio	:1	9, 7
Max. permissible engine speed	rpm	6800Â±50
Permissible constant speed	rpm	6500
Compression pressure: Minimum and maximum values depending on position of Valvetronic.	Â	9... 18
Compression pressure: Maximum deviation of all cylinders to each other.	bar	2

11 00 ENGINE IN GENERAL N52T B30 ROZ 95

cardiagn.com

ENGINE IN GENERAL SPECIFICATION

Cylinder	Â	6
Bore Ã˜	mm	85
Stroke	mm	88
Effective displacement	cm^3	2996
Compression ratio	:1	10, 7
Max. permissible engine speed	rpm	6800Â±50
Permissible constant speed	rpm	6500
Compression pressure: Minimum and maximum values depending on position of Valvetronic.	Â	9... 18
Compression pressure: Maximum deviation of all cylinders to each other.	bar	2

11 00 ENGINE IN GENERAL N52T B25 ROZ 95

ENGINE IN GENERAL SPECIFICATION

Cylinder	Â	6
Bore Ã˜	mm	82
Stroke	mm	79
Effective displacement	cm^3	2497
Compression ratio	:1	11
Max. permissible engine speed	rpm	6800Â±50
Permissible constant speed	rpm	6500
Compression pressure: Minimum and maximum values depending on position of Valvetronic.	Â	9... 18
Compression pressure: Maximum deviation of all cylinders to each other.	bar	2

ENGINE IN GENERAL (N55)

11 00 ENGINE IN GENERAL N55 B30

ENGINE IN GENERAL SPECIFICATION

Cylinder	Â	6
Bore	mm	84
Stroke	mm	89, 6
Effective displacement	cm^3	2979
Compression ratio	:1	10, 2
Max. permissible engine speed	rpm	7000
Permissible constant speed	rpm	6500
Compression pressure: Minimum and maximum values, Valvetronic at full load.	Â	10... 16
Compression pressure: Maximum deviation of all cylinders to each other.	bar	2

ENGINE IN GENERAL (N20, N26, B20)

11 00 ENGINE IN GENERAL N20/N26 B20

ENGINE IN GENERAL SPECIFICATION

Cylinder	Â	4
Bore hole	mm	84

cardiagn.com

Stroke	mm	89, 6
Effective displacement	cm^3	1986
Compression ratio	:1	10, 0
Max. permissible engine speed	rpm	7000
Permissible constant speed	rpm	6500
Compression pressure: Minimum and maximum values, Valvetronic at full load.	Â	7...10
Compression pressure: Maximum deviation of all cylinders to each other.	bar	2

INTAKE CAMSHAFT (N55)

11 31 INTAKE CAMSHAFT N55 B30

INTAKE CAMSHAFT SPECIFICATION

Guide bearing (width)	mm	21.890... 21.920
Radial runout	mm	0.054... 0.099
Axial play	mm	0.08... 0.162

OIL PUMP WITH STRAINER AND DRIVE (N52T)

11 41 OIL PUMP WITH STRAINER AND DRIVE N52T B30

OIL PUMP WITH STRAINER AND DRIVE SPECIFICATION

Oil pressure at idle (engine at normal operating temperature)	min bar	1.5
Control pressure (engine at normal operating temperature)	bar	4.0... 6.0

11 41 OIL PUMP WITH STRAINER AND DRIVE N52T B25

OIL PUMP WITH STRAINER AND DRIVE SPECIFICATION

Oil pressure at idle (engine at normal operating temperature)	min bar	1.5
Control pressure (engine at normal operating temperature)	bar	4.0... 6.0

OIL PUMP WITH STRAINER AND DRIVE (N55)

11 41 OIL PUMP WITH STRAINER AND DRIVE N55 B30

OIL PUMP WITH STRAINER AND DRIVE SPECIFICATION

Oil pressure at idle speed with engine at operating temperature	min bar	1.5
Control pressure with engine at operating temperature	bar	4.0... 6.0

OIL PUMP WITH STRAINER AND DRIVE (N47T)

11 41 OIL PUMP WITH STRAINER AND DRIVE N47T D20 UPPER POWER STAGE 1

OIL PUMP WITH STRAINER AND DRIVE SPECIFICATION

Oil pressure at idle speed with engine at operating temperature	min bar	1.1
Control pressure with engine at operating temperature	bar	3.2... 6.0

OIL PUMP WITH STRAINER AND MOTOR (N20, N26, B20)

11 41 OIL PUMP WITH STRAINER AND MOTOR N20/N26 B20

cardiagn.com

OIL PUMP WITH STRAINER AND MOTOR SPECIFICATION

Oil pressure at idle speed with engine at operating temperature	min bar	1, 0
Control pressure with engine at operating temperature (observe Diagnosis instructions)	bar	2, 5...6, 5

OIL SUPPLY (N52T)

11 40 OIL SUPPLY N52T B25

OIL SUPPLY SPECIFICATION

Oil grades and consumption: see recommended engine oils for BMW Group engines. See **ENGINE -- OPERATING FLUIDS** .	Â	Â
Filling capacity, engine oil change with oil filter element	Liters	6.50
Filling capacity engine oil change with oil filter element for auxiliary engine oil cooler	Liters	7, 00

11 40 OIL SUPPLY N52T B30

OIL SUPPLY SPECIFICATION

Oil grades and consumption: see recommended engine oils for BMW Group engines. See **ENGINE -- OPERATING FLUIDS** .	Â	Â
Filling capacity, engine oil change with oil filter element	Liters	6.50
Filling capacity engine oil change with oil filter element for auxiliary engine oil cooler	Liters	7, 00

OIL SUPPLY (N55)

11 40 OIL SUPPLY N55 B30

OIL SUPPLY SPECIFICATION

Oil grades and consumption: see recommended engine oils for BMW Group engines. See **ENGINE -- OPERATING FLUIDS** .	Â	Â
Filling capacity, engine oil change with oil filter element	Liters	6.50

OIL SUPPLY (N47, D20 01)

11 40 OIL SUPPLY F25/N47 D20 01

OIL SUPPLY SPECIFICATION

Oil grades and consumption: see recommended engine oils for BMW Group engines. See **ENGINE -- OPERATING FLUIDS** .	Â	Â
Filling capacity, engine oil change with oil filter element	Liters	5.2

OIL SUPPLY (N20, N26, B20)

11 40 OIL SUPPLY N20/N26 B20 (2WD)

OIL SUPPLY SPECIFICATION

Oil grades and consumption: see recommended engine oils for BMW Group engines. See **ENGINE -- OPERATING FLUIDS** .	Â	Â
		5,

cardiagn.com

Capacity engine oil change with oil filter element 2WD	Liters	0

11 40 OIL SUPPLY N20/N26 B20 (AWD)

OIL SUPPLY SPECIFICATION

Oil grades and consumption: see recommended engine oils for BMW Group engines. See **ENGINE -- OPERATING FLUIDS** .	Â	Â
Capacity, engine oil change with oil filter element, AWD	Liters	4, 8

PISTONS WITH RINGS AND PINS (N47)

11 25 PISTONS WITH RINGS AND PINS N47T D20 UPPER POWER STAGE 1

PISTON AND PIN SPECIFICATION

Piston and pin are paired to each other - replace together only.	Â	Â
Piston diameter at measuring point "A"	mm	17
Original (new dimension)	mm	83, 95... 83, 97
Repair stage (new dimension)	mm	%
Oversize (new dimension)	mm	84, 20... 84, 22
Piston installation clearance (piston new)	mm	0, 03...0, 17
Piston installation clearance (piston worn)	mm	0, 20...0, 20
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.25

PISTON WITH RINGS SPECIFICATION

1st groove	Â	Â
End clearance	mm	0.20... 0.30
Axial play	mm	0.13... 0.17
2nd groove	Â	Â
End clearance	mm	0.30... 0.45
Axial play	mm	0.08... 0.12
3rd groove	Â	Â
End clearance	mm	can't be measured
Axial play	mm	can't be measured

PISTONS WITH RINGS AND PINS (N55)

11 25 PISTONS WITH RINGS AND PINS N55 B30

PISTON AND PIN SPECIFICATION

Piston and pin are paired to each other - replace together only.	Â	Â
Measuring point "A" (position)	mm	12
Piston diameter at measuring point "A"	Â	Â
Original (new dimension)	mm	83, 98... 84, 01
Repair stage (new dimension)	mm	84, 06... 84, 09
Oversize (new dimension)	mm	84, 23... 84, 26
Piston installation clearance (piston new)	mm	0, 01...0, 03
Piston installation clearance (piston worn)	mm	0, 02...0, 08
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.15

PISTON WITH RINGS SPECIFICATION

cardiagn.com

1st groove	Â	Â
End clearance	mm	0.15... 0.30
Axial play	mm	0.020... 0.060
2nd groove	Â	Â
End clearance	mm	0.30... 0.50
Axial play	mm	0.015... 0.060
3rd groove	Â	Â
End clearance	mm	0.20... 0.90
Axial play	mm	cannot be measured

PISTONS WITH RINGS AND PINS (N52T)

11 25 PISTONS WITH RINGS AND PINS N52T B25

PISTON AND PIN SPECIFICATION

Piston and pin are paired to each other - replace together only.	Â	Â
Measuring point "A" (position)	mm	10
Piston diameter at measuring point "A"	Â	Â
Original (new dimension)	mm	81, 985$^{Â±0, 014}$
Repair stage (new dimension)	mm	%
Oversize (new dimension)	mm	82, 235$^{Â±0, 014}$
Piston installation clearance (piston new)	mm	0.000... 0.043
Piston installation clearance (piston worn)	mm	0.020... 0.047
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.150

PISTON WITH RINGS SPECIFICATION

1st groove	Â	Â
End clearance	mm	0.150... 0.280
Axial play	mm	0.030... 0.070
2nd groove	Â	Â
End clearance	mm	0.300... 0.500
Axial play	mm	0.020... 0.060
3rd groove	Â	Â
End clearance	mm	cannot be measured
Axial play	mm	cannot be measured

11 25 PISTONS WITH RINGS AND PINS N52T B30

PISTON AND PIN SPECIFICATION

Piston and pin are paired to each other - replace together only.	Â	Â
Measuring point "A" (position)	mm	14
Piston diameter at measuring point "A"	Â	Â
Original (new dimension)	mm	84, 98... 85, 00
Repair stage (new dimension)	mm	%
Oversize (new dimension)	mm	85, 23.. 85, 25
Piston installation clearance (piston new)	mm	0, 00... 0, 03
Piston installation clearance (piston worn)	mm	0, 02... 0, 08
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0.15

PISTON WITH RINGS SPECIFICATION

1st groove	Â	Â

cardiagn.com

End clearance	mm	0.150... 0.300
Axial play	mm	0.020... 0.070
2nd groove	Â	Â
End clearance	mm	0.300... 0.500
Axial play	mm	0.015... 0.060
3rd groove	Â	Â
End clearance	mm	cannot be measured
Axial play	mm	cannot be measured

PISTONS WITH RINGS AND PINS (N20, N26, B20)

11 25 PISTONS WITH RINGS AND PINS N20/N26 B20

PISTON AND PIN SPECIFICATION

Piston and pin are paired to each other - replace together only.	Â	Â
Measuring point "A" (position)	mm	12
Piston diameter at measuring point "A"	Â	Â
Original (new dimension)	mm	83, 95... 83, 96
Repair stage (new dimension)	mm	%
Oversize (new dimension)	mm	%
Piston installation clearance (piston new)	mm	0, 01...0, 03
Piston installation clearance (piston worn)	mm	0, 02...0, 05
Permissible total wear tolerance between piston and cylinder (engine operated)	mm	0, 15

PISTON WITH RINGS SPECIFICATION

1st groove	Â	Â
End clearance	mm	0, 15...0, 30
Side clearance	mm	0, 03...0, 08
2nd groove	Â	Â
End clearance	mm	0, 30...0, 50
Side clearance	mm	0, 02..0, 06
3rd groove	Â	Â
End clearance	mm	0, 20...0, 90
Side clearance	mm	can't be measured

VACUUM PUMP (N55, B30)

11 66 VACUUM PUMP N55 B30

VACUUM PUMP SPECIFICATION

Vacuum pump pressure without consumer	mbar ≤	-950
Vacuum pump pressure with main consumer	mbar ≤ 7s	-550
Vacuum pump pressure with main consumer	mbar ≤ 15s	-800
Vacuum pump pressure with main consumer	mbar ≤ 120s	-900
Vacuum pump pressure with consumer	mbar ≤ 120s	-830

VALVES WITH SPRINGS (N55)

11 34 VALVES WITH SPRINGS N55 B30

VALVES WITH SPRINGS SPECIFICATION

Plate dia.	Â	Â

cardiagn.com

Intake	mm	32, 0Â±0, 05
Exhaust	Â	28.0 Â± 0.1
Stem Ã˜	Â	Â
Intake	mm	4, 968Â±0, 0075
Exhaust	mm	5, 960Â±0, 0075

VALVES WITH SPRINGS (N52T)

11 34 VALVES WITH SPRINGS N52T B25

VALVES WITH SPRINGS SPECIFICATION

Plate dia.	Â	Â
Intake	mm	32, 2Â±0, 05
Exhaust	mm	27.0Â± 0.1
Stem Ã˜	Â	Â
Intake	mm	4.9605... 4.9755
Exhaust	mm	5.9525... 5.9675

11 34 VALVES WITH SPRINGS N52T B30

VALVES WITH SPRINGS SPECIFICATION

Plate dia.	Â	Â
Intake	mm	34, 2Â±0, 05
Exhaust	mm	29, 0Â±0, 1
Stem Ã˜	Â	Â
Intake	mm	4.9605... 4.9755
Exhaust	mm	5.9525... 5.9675

VALVES WITH SPRINGS (N20, N26, B20)

11 34 VALVES WITH SPRINGS N20/N26 B20

VALVES WITH SPRINGS SPECIFICATION

Plate dia.	Â	Â
Intake	mm	32, 0Â±0, 05
Exhaust	Â	28, 0Â± 0, 1
Stem Ã˜	Â	Â
Intake	mm	4, 968Â±0, 0075
Exhaust	mm	5, 950Â±0, 0075

VIBRATION DAMPER (N52T)

11 23 VIBRATION DAMPER N52T B25

VIBRATION DAMPER SPECIFICATION

Max. permitted radial runout	mm	0, 100
Max. permitted axial runout	mm	0, 100

11 23 VIBRATION DAMPER N52T B30

VIBRATION DAMPER SPECIFICATION

cardiagn.com

Max. permitted radial runout	mm	0, 100
Max. permitted axial runout	mm	0, 100

VIBRATION DAMPER (N55)

11 23 VIBRATION DAMPER N55 B30

VIBRATION DAMPER SPECIFICATION

Max. permitted radial runout	mm	0.10
Max. permitted axial runout	mm	0.10

VIBRATION DAMPER (N47T)

11 23 VIBRATION DAMPER N47T D20 UPPER POWER STAGE 1

VIBRATION DAMPER SPECIFICATION

Max. permitted radial runout	mm	0.40
Max. permitted axial runout	mm	0.40

VIBRATION DAMPER (N20, N26, B20)

11 23 VIBRATION DAMPER N20/N26 B20

VIBRATION DAMPER SPECIFICATION

Max. permitted radial runout	mm	0, 10
Max. permitted lateral runout	mm	0, 10

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702142

cardiagn.com

ENGINE

Engine - Tightening Torques - X3 Utility

AIR PUMP, LINES AND CONTROL VALVES (N52T)

11 72 AIR PUMP, LINES AND CONTROL VALVES

TIGHTENING TORQUE SPECIFICATION - AIR PUMP, LINES AND CONTROL VALVES

Â	Type	Thread	Tightening specification	Measure
1AZ Closing plate to cylinder head	N52T	M6	Â	8 Nm

CAMSHAFT (N52T)

11 31 CAMSHAFT

TIGHTENING TORQUE SPECIFICATION - CAMSHAFT

Â	Type	Thread	Tightening specification	Measure
1AZ ASA screws Chain drive module, slide rail to cylinder head bearing cap.	N52T	M6 x 35	Â	8 Nm
2AZ Bearing pin Guide rail with tensioning rail to crankcase	N52T	M8	Â	20 Nm
3AZ Guide pin Guide rail to cylinder head	N52T	M7	Â	14 Nm
4AZ Chain tensioner Chain tensioner to cylinder head.	N52T	M22 x 1.5	Replace sealing ring. Lightly grease or oil thread.	55 Nm
5AZ Plug Assembly opening to cylinder head.	N52T	M18 x 1.5	Â	25 Nm
6AZ ASA screws Bearing strip to cylinder head (exhaust camshaft).	N52T	M7 x 70	Jointing torque Torque angle	8 Nm 60 Â°
9AZ ASA screws Camshaft bearing cap to cylinder head.	N52T	M6 x 30.5	Â	9 Nm

CAMSHAFT (N20)

11 31 CAMSHAFT

TIGHTENING TORQUE SPECIFICATION - CAMSHAFT

Â	Type	Thread	Tightening specifications	Dimension
1AZ Exhaust camshaft bearing cap to cylinder head	N20/N26	M6x50	Insert bolts dry.	12 Nm
2AZ Eccentric shaft bearing cap to cylinder head	N20/N26	M6x27	Â	10 Nm
3AZ Intake camshaft bearing cap to cylinder head	N20/N26	M6x30.5	Â	10 Nm
4AZ Chain drive module to cylinder head	N20/N26	M6x35	Â	10 Nm
5AZ Guide rail to crankcase	N20/N26	M8	Â	20 Nm
6AZ Guide rail to cylinder head	N20/N26	M7	Â	14 Nm
			Do not retighten the chain	

cardiagn.com

7AZ	Chain tensioner to cylinder head	N20/N26	M22 M22 x 1.5	tensioner. Replace sealing ring, thread lightly oiled.	80 Nm
8AZ	Screw plug in cylinder head	N20/N26	M18x1.5	Â	25 Nm
9AZ	Banjo bolt, oil pipe to cylinder head	N20/N26	M7x16	Replace sealing ring.	10 Nm

CAMSHAFT (N47)

11 31 CAMSHAFT

TIGHTENING TORQUE SPECIFICATION - CAMSHAFT

Â		Type	Thread	Tightening specification	Measure
1AZ	Sprocket wheel to fitted camshaft	N47D20 O1	M7x17.3	Â	14 Nm
2AZ	Inlet and exhaust camshafts in camshaft carrier	N47D20 O1	M6x31	Â	10 Nm
3AZ	Camshaft carrier to cylinder head	N47D20 O1	M7x35	Observe **tightening sequence** . See 11 31 025 REPLACING INTAKE CAMSHAFT (N47 D20 O1) or 11 31 028 REPLACING EXHAUST CAMSHAFT (N47D20 O1) .	13 Nm

CAMSHAFT (N55)

11 31 CAMSHAFT

TIGHTENING TORQUE SPECIFICATION - CAMSHAFT

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Upper and lower bearing strip of camshaft (steel screw 10.9)	N55	M7x70	Insert screws dry Jointing torque Angle of rotation	Â 8 Nm 60 Â°
2AZ	Eccentric shaft bearing cap to cylinder head	N55	M6x27	Â	8.5 Nm
3AZ	Camshaft bearing cap to cylinder head	N55	M6x30.5	Â	8.5 Nm
4AZ	Chain drive module to cylinder head	N55	M6x35	Â	8 Nm
5AZ	Guide rail to crankcase	N55	M8	Â	20 Nm
6AZ	Guide rail to cylinder head	N55	M7	Â	14 Nm
7AZ	Chain tensioner to cylinder head	N55	M22 x 1.5	Do not retighten the chain tensioner. Replace sealing ring, thread lightly oiled	55 Nm
8AZ	Screw plug in cylinder head	N55	M18x1.5	Â	25 Nm

CASE COVERS (N47)

11 14 CASE COVERS

TIGHTENING TORQUE SPECIFICATION - CASE COVERS

Â	Type	Thread	Tightening specification	Measure
1AZ Screw plug to timing case cover	N47D20 O1	M34x1.5	Replace sealing cap	20 Nm
2AZ End cover to crankcase	N47D20 O1	M6x31	1. Jointing torque 2. Angle of rotation	8 Nm 90 Â°

cardiagn.com

TRANSMISSION CLOSING PLATE (N52T)

11 14 TRANSMISSION CLOSING PLATE

TIGHTENING TORQUE SPECIFICATION - TRANSMISSION CLOSING PLATE

Â		Type	Thread	Tightening specification	Measure
1AZ	ASA screws Transmission cover plate to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M6 x 16	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 3 Nm 45 Â°

CONNECTING RODS AND BEARINGS (N52T)

11 24 CONNECTING RODS AND BEARINGS

TIGHTENING TORQUE SPECIFICATION - CONNECTING RODS AND BEARINGS

Â		Type	Thread	Tightening specification	Measure
1AZ	ASA screw (connecting rod bolt) Connecting rod bearing cap to connecting rod.	N52T	M8 x 47	Replace screw. Screw washed and oiled. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 20 Nm 120 Â°

CONNECTING RODS AND BEARINGS (N47)

11 24 CONNECTING RODS AND BEARINGS

TIGHTENING TORQUE SPECIFICATION - CONNECTING RODS AND BEARINGS

Â		Type	Thread	Tightening specification	Measure
1AZ	Connecting rod bolts	N47D20 O1	M9x47	Replace, wash and oil screws Jointing torque Torque angle	Â 20 Nm 70 Â°

CONNECTING RODS AND BEARINGS (N55)

11 24 CONNECTING RODS AND BEARINGS

TIGHTENING TORQUE SPECIFICATION - CONNECTING RODS AND BEARINGS

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Connecting rod bolts	N55	M9	Replace, wash and oil screws	Â
Â				Jointing torque	20 Nm
				Angle of rotation	70 Â°
				Angle of rotation	70 Â°

CONNECTING RODS AND BEARINGS (N20)

11 24 CONNECTING RODS AND BEARINGS

cardiagn.com

TIGHTENING TORQUE SPECIFICATION - CONNECTING RODS AND BEARINGS

Â	Type	Thread	Tightening specifications	Dimension
1AZ Connecting rod bolts	N20/N26	M9	Replace, wash and oil screws	Â
Â			Jointing torque	20 Nm
			Angle of rotation	70 Â°
			Angle of rotation	70 Â°

COOLANT CONNECTION (N47)

11 51 COOLANT CONNECTION

TIGHTENING TORQUE SPECIFICATION - COOLANT CONNECTION

Â	Type	Thread	Tightening specification	Measure
1AZ Coolant feed to cylinder head	N47D20 O1	M6x25	Â	10 Nm
2AZ Coolant pump to crankcase	N47D20 O1	M6	Â	10 Nm

COOLANT PUMP WITH DRIVE (N55)

11 51 COOLANT PUMP WITH DRIVE

TIGHTENING TORQUE SPECIFICATION - COOLANT PUMP WITH DRIVE

Â	Type	Thread	Tightening specifications	Dimension
1AZ Coolant pump to crankcase	N55	M8 x 26	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	Â 10 Nm 90 Â°
2AZ Coolant pump to holder (only for vehicles with holder).	N55	M8 x 27	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	Â 10 Nm 90 Â°
3AZ Coolant hose between coolant pump and coolant thermostat.	N55	L42-48	Â	3 Nm
4AZ Coolant hose between coolant pump and feed line.	N55	L42-48	Â	3 Nm
5AZ Auxiliary water pump holder for EME to retaining bracket	N55, F10h/F01h/F02h/F30h	M6 x 14	Â	10 Nm

COOLANT PUMP WITH DRIVE (N20)

11 51 COOLANT PUMP WITH DRIVE

TIGHTENING TORQUE SPECIFICATION - COOLANT PUMP WITH DRIVE

			Tightening	

cardiagn.com

Â		Type	Thread	specifications	Dimension
1AZ	Coolant pump to front axle support	N20/N26	M8	Â	19 Nm
2AZ	Coolant pump to crankcase	N20/N26	M8	Â	22 Nm
3AZ	Coolant hose between coolant pump and coolant thermostat.	N20/N26	L42-48	Â	3 Nm
4AZ	Coolant hose between coolant pump and feed line.	N20/N26	L42-48	Â	3 Nm

ELECTRIC WATER PUMP WITH DRIVE (N52T)

11 51 ELECTRIC WATER PUMP WITH DRIVE

TIGHTENING TORQUE SPECIFICATION - ELECTRIC WATER PUMP WITH DRIVE

Â		Type	Thread	Tightening specification	Measure
1AZ	ASA screws Electric water pump to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M8 x 32	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 10 Nm 90 Â°
2AZ	ASA screws Electric water pump to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M8 x 28	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 10 Nm 90 Â°

CRANKSHAFT AND BEARINGS (N55)

11 21 CRANKSHAFT AND BEARINGS

TIGHTENING TORQUE SPECIFICATION - CRANKSHAFT AND BEARINGS

Â		Type	Thread	Tightening specification	Measure
1AZ	Torsion damper (hub) to crankshaft (central bolt 12.9)	N55	M18x108	Replace screw Lightly oil screw and thread Jointing torque Torque angle	Â 100 Nm 270 Â°

CRANKSHAFT AND BEARINGS (N47)

cardiagn.com

11 21 CRANKSHAFT AND BEARINGS

TIGHTENING TORQUE SPECIFICATION - CRANKSHAFT AND BEARINGS

Â	Type	Thread	Tightening specification	Measure
1AZ Increment wheel on crankshaft	S54	M5 10.9	Replace screws Jointing torque Torque angle	Â 5.0 Nm 45 Â°
Increment wheel on crankshaft	Â	M5 10.9	Replace screws	13 Nm
Increment wheel on crankshaft	Â	M5 8.8	Replace screws	5.5 Nm

CRANKSHAFT AND BEARINGS (N52T)

11 21 CRANKSHAFT AND BEARINGS

TIGHTENING TORQUE SPECIFICATION - CRANKSHAFT AND BEARINGS

Â	Type	Thread	Tightening specification	Measure
1AZ Hexagon screw (central screw) Hub of vibration damper to crankshaft.	N52T	M16 x 80	Replace screw. Screw and thread are lightly oiled. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 100 Nm 360 Â°

CRANKSHAFT AND BEARINGS (N20)

11 21 CRANKSHAFT AND BEARINGS

TIGHTENING TORQUE SPECIFICATION - CRANKSHAFT AND BEARINGS

Â	Type	Thread	Tightening specifications	Dimension
1AZ Torsion damper (hub) to crankshaft (central bolt 12.9)	N20/N26	M18x108	Replace screw Lightly oil screw and thread Jointing torque Angle of rotation	Â 100 Nm 270 Â°

CYLINDER HEAD WITH CYLINDER HEAD COVER (N20)

11 12 CYLINDER HEAD WITH CYLINDER HEAD COVER

TIGHTENING TORQUE SPECIFICATION - CYLINDER HEAD WITH CYLINDER HEAD COVER

Â	Type	Thread	Tightening specifications	Dimension
1AZ Cylinder head bolt	N20/N26	M11 x 173	Replace screws. Jointing torque 1. Angle of rotation 2. Angle of rotation	Â 30 Nm 90 Â° 180 Â°
2AZ Cylinder head bolt	N20/N26	M9 x 173	Replace screws. Jointing torque 1. Angle of rotation 2. Angle of rotation	Â 30 Nm 90 Â° 180 Â°
3AZ Cylinder head bolt	N20/N26	M9 x 30 M9 x 70	Â	22 Nm
4AZ Cylinder head cover to cylinder head.	N20/N26	M6	Â	9 Nm
5AZ Towing lug to cylinder head	N20/N26	Â	Â	30 Nm
6AZ Ignition coils and injector slot to	N20/'N26	M6 x 35	Â	10 Nm

cardiagn.com

	cylinder head				
7AZ	Earth connection for cylinder head	N20/N26	M5	Earth connection	6 Nm
8AZ	Plug	N20/N26	M16 x 1.5	Replace screw with sealing ring.	27 Nm

CYLINDER HEAD WITH CYLINDER HEAD COVER (N55)

11 12 CYLINDER HEAD WITH CYLINDER HEAD COVER

TIGHTENING TORQUE SPECIFICATION - CYLINDER HEAD WITH CYLINDER HEAD COVER

Â		Type	Thread	Tightening specification	Measure
1AZ	Cylinder head bolt	N55	M11 x 173	Replace screws. Jointing torque 1. Angle of rotation 2. Angle of rotation	Â 30 Nm 90 Â° 180 Â°
2AZ	Cylinder head bolt	N55	M9 x 170	Replace screws. Jointing torque 1. Angle of rotation 2. Angle of rotation	Â 30 Nm 90 Â° 180 Â°
3AZ	Cylinder head bolt	N55	M9 x 30 M9 x 70	Â	22 Nm
4AZ	Cylinder head cover to cylinder head.	N55	M6	Â	8.5 Nm
5AZ	Towing lug to cylinder head	N55	Â	Â	30 Nm
6AZ	Ignition coil cover to cylinder head cover.	N55	M6 x 30	Â	4 Nm
7AZ	Metal bracket for ignition coil cover to cylinder head cover.	N55	M6 x 16	Â	8 Nm
8AZ	Ignition coils and injector slot to cylinder head	N55	M6 x 30	Â	8.5 Nm
9AZ	EMC plate to ignition coils and injector slot (EMC = electromagnetic compatibility)	N55	M6 x 20	Â	8.0 Nm
10AZ	EMC plate to ignition coils and injector slot (EMC = electromagnetic compatibility)	N55	M6 x 18.5	Earth connection	8.5 Nm
11AZ	Screw plug in oil chamber	N55	M16 x 1.5	Replace screw with sealing ring	27 Nm

CYLINDER HEAD WITH CYLINDER HEAD COVER (N52T)

11 12 CYLINDER HEAD WITH CYLINDER HEAD COVER

TIGHTENING TORQUE SPECIFICATION - CYLINDER HEAD WITH CYLINDER HEAD COVER

Â	Type	Thread	Tightening specification	Measure
ISA screws		M10 x	Replace screws. Tighten screws from inside outwards. Joining torque and angle of rotation must be observed	Â

cardiagn.com

1AZ	(cylinder head bolts) Cylinder head to crankcase.	N52T	125	without fail. Jointing torque 1. Angle of rotation 2. Angle of rotation 3. Angle of rotation	 30 Nm 90 Â° 90 Â° 45 Â°
2AZ	ISA screws (cylinder head bolts) Cylinder head to crankcase.	N52T	M9	Replace screws. Joining torque and angle of rotation must be observed without fail. Jointing torque 1. Angle of rotation 2. Angle of rotation 3. Angle of rotation	Â 30 Nm 90 Â° omitted 45 Â°
3AZ	Al screw Cylinder head to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M9 x 30	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 10 Nm 90 Â°
4AZ	ASA screws Cylinder head to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M9 x 70	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 10 Nm 135 Â°
5AZ	ASA screws Cylinder head cover to cylinder head.	N52T	M7	Â	9 Nm
6AZ	Fillister-head screws Ignition coil cover to cylinder head cover.	N52T	M6 x 20	Â	4 Nm
7AZ	ISA screws Bearing cap of eccentric shaft to cylinder head.	N52T	M6 x 30.5	Â	9 Nm
8AZ	ASA screws Bearing strip to cylinder head (exhaust camshaft).	N52T	M7 x 70	Jointing torque Torque angle	8 Nm 60 Â°
9AZ	ASA screws Camshaft bearing cap to cylinder head.	N52T	M6 x 30.5	Â	9 Nm
10AZ	Seal plugs Coolant duct in cylinder head.	N52T	M16 x 1.5	Thread must be oiled.	40 Nm
11AZ	Towing eye Towing eye to cylinder head.	N52T	M16	Use towing eye exclusively with M16 thread. Use towing eye for engine transportation only.	30 Nm

CYLINDER HEAD WITH LID (N47)

11 12 CYLINDER HEAD WITH LID

cardiagn.com

TIGHTENING TORQUE SPECIFICATION - CYLINDER HEAD WITH LID

Â	Type	Thread	Tightening specifications	Dimension
1AZ Cylinder head bolts (steel bolt)	N47D20 O1	M12x1.5 L204.5	Replace screws Tighten bolts from middle in diagonal sequence in outward direction. 1. Jointing torque 2. Release all screws from outside to inside 3. Jointing torque 4. Angle of rotation 5. Angle of rotation	Â 70 Nm 180 Â° 50 Nm 120 Â° 120 Â°
2AZ Cylinder head cover to cylinder head	N47D20 O1	M6	Â	10 Nm
3AZ Chain tensioner, top	N47D20 O1	M22x1.5	Replace sealing ring	70 Nm
4AZ Guide rail to cylinder head	N47D20 O1	M16x1.5	Bearing pin	20 Nm
5AZ Oil filler fitting to cylinder head cover	N47D20 O1	PT 50x19	Plastic screw	3, 6 Nm
6AZ Radiator supply connection fittings to cylinder head	N47D20 O1	M6x25	Replace seal	8 Nm

DUAL-MASS BALANCE (N20)

11 27 DUAL-MASS BALANCE

TIGHTENING TORQUE SPECIFICATION - DUAL-MASS BALANCE

Â	Type	Thread	Tightening specifications	Dimension
1AZ Camshaft sprocket to counterbalance shaft and crankcase	N20/N26	M10x1.5	12.9 screw	95 Nm
2AZ Counterbalance shaft housing to crankcase	N20/N26	M18 x 75 M8 x 40	Â	15 Nm
3AZ Counterbalance shaft housing to crankcase	N20/N26	M6 x 25	Â	10 Nm

DUAL-MASS BALANCE (N47)

11 27 DUAL-MASS BALANCE

TIGHTENING TORQUE SPECIFICATION - DUAL-MASS BALANCE

Â	Type	Thread	Tightening specification	Measure
1AZ Gearwheel to balancing shaft and crankcase	N47D20 O1	M10x1.5 1.	Jointing torque 2. Angle of rotation	40 Nm 90 Â°
2AZ Idler gear to crankcase	N47D20 O1	M12x1.5 10.9	Replace nut	70 Nm

EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR (N20)

11 78 EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR

TIGHTENING TORQUE SPECIFICATION - EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR

cardiagn.com

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Control sensor	N20/N26	M18 x 1.5	Universal oxygen sensor ADV	50 Nm
2AZ	Monitor sensor	N20/N26	M18 x 1.5	LSF 4.2	50 Nm
3AZ	Bracket, oxygen sensor, to cylinder head	N20/N26	M6 x 16	Â	10 Nm

EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR (N55)

11 78 EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR

TIGHTENING TORQUE SPECIFICATION - EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Control sensor	N55	M18 x 1.5	Universal oxygen sensor ADV	50 Nm
2AZ	Monitor sensor	N55	M18 x 1.5	LSF 4.2	50 Nm
3AZ	Bracket, oxygen sensor, to cylinder head	N55	M6 x 16	Â	8 Nm
4AZ	Bracket, oxygen sensor, to cylinder head cover	N55	K60 x 22	EJOT-PT self-tapping screw	8 Nm

EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR (N47)

11 78 EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR

TIGHTENING TORQUE SPECIFICATION - EMISSIONS CONTROL, CONTROL SENSOR/MONITORING SENSOR

Â		Type	Thread	Tightening specification	Measure
1AZ	Control sensor/monitoring sensor	N47	M18 x 1.5	Â	50 Nm
2AZ	Bracket, oxygen sensor, to cylinder head cover	N47	M6	Â	10 Nm

EXHAUST GAS CONTROL, LAMBDA CONTROL SENSOR/LAMBDA MONITOR SENSOR (N52T)

11 78 EXHAUST GAS CONTROL, LAMBDA CONTROL SENSOR/LAMBDA MONITOR SENSOR

TIGHTENING TORQUE SPECIFICATION - EXHAUST GAS CONTROL, LAMBDA CONTROL SENSOR/LAMBDA MONITOR SENSOR

Â		Type	Thread	Tightening specification	Measure
1AZ	Lambda control sensor LSU 4.9 Lambda monitor sensor LSF 4.2	N52T	M18 x 1.5	Â	50 Nm
2AZ	ASA screws (2 x) Bracket, lambda	N52T	M6 x 12	Â	8 Nm

cardiagn.com

	control sensors, to cylinder head.				
3AZ	Hexagon screw (1 x) Bracket, lambda monitor sensors, side, to transmission.	N52T	M8 x 16	Â	19 Nm
4AZ	Bracket, plug connection, lambda monitor sensors, bottom, to transmission.	N52T	Â	Â	Â

CRANKCASE (N52T)

11 11 CRANKCASE

TIGHTENING TORQUE SPECIFICATION - CRANKCASE

Â		Type	Thread	Tightening specification	Measure
1AZ	Hexagon screws Bedplate to crankcase.	N52T	M10 x 100	Replace screws. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 20 Nm 70 Â°
2AZ	ASA screws Bedplate to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M10 x 27	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 15 Nm 90 Â°
3AZ	ASA screws Bedplate to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M8 x 37	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 8 Nm 90 Â°
4AZ	ASA screws	N52T	M10 x 41	Replace screws.	Â

cardiagn.com

	Bedplate to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).			Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	 15 Nm 90 Â°
5AZ	Oil spray nozzles Oil spray nozzles in crankcase.	N52T	M8 x 1	Â	12 Nm
6AZ	Plug Coolant drain to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M14 x 1.5	Replace screw and sealing ring. Thread repairs are not permitted!	50 Nm
7AZ	Plug Coolant drain to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M22 x 1.5	Replace screw and sealing ring. Thread repairs are not permitted!	50 Nm
8AZ	Plug Mounting hole, gear case to bedplate. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M16 x 1.5	Replace screw. Thread repairs are not permitted!	27 Nm

ENGINE BLOCK (N55)

11 11 ENGINE BLOCK

TIGHTENING TORQUE SPECIFICATION - ENGINE BLOCK

Â		Type	Thread	Tightening specification	Measure
1AZ	Main bearing bolts (steel bolts 10.9)	N55	M10x100	Replace screws Jointing torque Torque angle	Â 20 Nm 70 Â°
2AZ	Bedplate Aluminum screws/bolts	N55	M10x27	Replace screws Thread repairs exclusively with Al Helicoil. Jointing torque and angle of rotation must be observed without fail.	Â

cardiagn.com

				Jointing torque Torque angle	15 Nm 90 Â°
3AZ	Bedplate Aluminum screws/bolts	N55	M8x37	Replace screws Thread repairs exclusively with Al Helicoil. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 8 Nm 90 Â°
4AZ	Bedplate Aluminum screws/bolts are marked with blue paint.	N55	M10x41	Replace screws Thread repairs exclusively with Al Helicoil. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 15 Nm 90 Â°
5AZ	Oil spray nozzles to engine block	N55	Â	Hollow bolt	12 Nm
6AZ	Screw plug, coolant drain plug	N55	M14x1.5	Replace screw with sealing ring	25 Nm
7AZ	Screw plug, timing case upper section	N55	M22x1.5	Replace screw with sealing ring	50 Nm
8AZ	Screw plug, timing case upper section	N55	M33x1.5	Replace screw with sealing ring	50 Nm
9AZ	Screw plug, timing case lower section	N55	M16x1.5	Replace screw with sealing ring	27 Nm

ENGINE BLOCK (N20)

11 11 ENGINE BLOCK

TIGHTENING TORQUE SPECIFICATION - ENGINE BLOCK

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Main bearing bolts (steel bolts 10.9)	N20/N26	M10x100	Replace screws. Jointing torque Angle of rotation	Â 20 Nm 90 Â°
2AZ	Screws on the crankcase lower section to upper part.	N20/N26	M8x40	Â	22 Nm
3AZ	Oil spray nozzles to engine block	N20/N26	Â	Hollow bolt	12 Nm
4AZ	Screw plug for upper part of gear case	N20/N26	M22x1.5	Replace screw with sealing ring.	50 Nm

ENGINE BLOCK (N47)

11 11 ENGINE BLOCK

TIGHTENING TORQUE SPECIFICATION - ENGINE BLOCK

Â		Type	Thread	Tightening specification	Measure
1AZ	Main bearing bolts (steel bolts 12.9 PHR)	N47D20 O1	M10x85 12.9	Replace screws 1. Jointing torque 2. Jointing torque 3. Angle of rotation 4. Angle of rotation	Â 25 Nm 50 Nm 60 Â° 60 Â°

cardiagn.com

2AZ	Coolant drain plug to crankcase (if installed).	N47D20 O1	M14x1.5	Replace sealing ring	25 Nm
3AZ	Clamping rail/guide rail	N47D20 O1	M8	Bearing pin	20 Nm
4AZ	Chain tensioner, bottom	N47D20 O1	M6	Â	10 Nm
5AZ	Oil spray nozzle for chain drive	N47D20 O1	M6	Â	10 Nm

EXHAUST MANIFOLD (N55, N20, N52)

11 62 EXHAUST MANIFOLD

TIGHTENING TORQUE SPECIFICATION - EXHAUST MANIFOLD

Â	Type	Thread	Tightening specification	Measure
1AZ Exhaust manifold to cylinder head Coat screw connections with CRC copper paste	All	M6	Replace nuts	10 Nm
	M50/M52/M52TU/M54/M56/S52/S50 US	M7	Replace nuts	20 Nm
	All/others	M7	Replace nuts	15 Nm
	M10	M8	Upper row of stay bolts installed with bolt cement Â	Â 23 Nm
	M21	M8	Â Replace nuts Retighten after 2000 km Slacken nuts by a 1/4 turn Â	12 Nm Â 12 Nm
	M41/M47/M47TU/M51/M57/M57TU	M8	Replace nuts	20 Nm
	All/others	M8	Replace nuts	23 Nm

EXHAUST MANIFOLD (N47)

11 62 EXHAUST MANIFOLD

TIGHTENING TORQUE SPECIFICATION - EXHAUST MANIFOLD

Â	Type	Thread	Tightening specification	Measure
1AZ Exhaust manifold to cylinder head Coat screw connections with CRC copper paste	N47D20 O1	M7 SW10	Replace nuts	13 Nm

EXHAUST-GAS RECIRCULATION (N47)

11 71 EXHAUST-GAS RECIRCULATION

TIGHTENING TORQUE SPECIFICATION - EXHAUST-GAS RECIRCULATION

Â	Type	Thread	Tightening specification	Measure
1AZ EGR pipe to exhaust manifold	N47D20 O1	M8x28	Â	30 Nm

cardiagn.com

FAN (N52, N55, N20, N47)

11 52 FAN

TIGHTENING TORQUE SPECIFICATION - FAN

Â		Type	Thread	Tightening specification	Measure
1AZ	Fan clutch on water pump Coupling nut (left-hand threads)	All	Â	Â	40 Nm
		M54	Â	Â	45 Nm
2AZ	Fan to fan clutch	All	Â	Â	10 Nm

FLYWHEEL (N47)

11 22 FLYWHEEL

TIGHTENING TORQUE SPECIFICATION - FLYWHEEL

Â		Type	Thread	Tightening specification	Measure
1AZ	Flywheel to crankshaft (automatic)	N47D20 O1	M12x1.5x25.5	Replace screws	120 Nm
2AZ	Dual-mass flywheel to crankshaft (manual gearbox)	N47D20 O1	M12x1.5x26 T60	Replace screws	120 Nm

FLYWHEEL (N20)

11 22 FLYWHEEL

TIGHTENING TORQUE SPECIFICATION - FLYWHEEL

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Flywheel to crankshaft (automatic transmission)	N20/N26	M12x 19	Replace screws. 1. Jointing torque 2. Final torque	Â 60 Nm 45 Â°
2AZ	Dual-mass flywheel to crankshaft (manual gearbox)	N20/N26	M12x 25	Replace screw. 1. Jointing torque 2. Final torque	Â 60 Nm 45 Â°

FLYWHEEL (N55)

11 22 FLYWHEEL

TIGHTENING TORQUE SPECIFICATION - FLYWHEEL

Â		Type	Thread	Tightening specification	Measure
1AZ	Flywheel to crankshaft (automatic transmission)	N55	M12x 19	Replace screws 1. Jointing torque 2. Final tightening	Â 60 Nm 45 Â°
2AZ	DM flywheel to crankshaft (manual transmission)	N55	M12x 25	Replace screw 1. Jointing torque 2. Final tightening	Â 60 Nm 45 Â°

cardiagn.com

FLYWHEEL (N52T)

11 22 FLYWHEEL

TIGHTENING TORQUE SPECIFICATION - FLYWHEEL

Â	Type	Thread	Tightening specification	Measure
Hexagon screws 1AZ Flywheel to crankshaft for automatic transmission.	N52T	M12 x 25.5	Replace screws. Jointing torque and angle of rotation must be observed without fail. 1. Jointing torque 2. Angle of rotation	Â 60 Nm 45 Â°
ISA screws 2AZ Flywheel to crankshaft for manual gearbox.	N52T	M12 x 25	Replace screws. Jointing torque and angle of rotation must be observed without fail. 1. Jointing torque 2. Angle of rotation	Â 60 Nm 45 Â°

AIR INTAKE MANIFOLD (N52T)

11 61 AIR INTAKE MANIFOLD

TIGHTENING TORQUE SPECIFICATION - AIR INTAKE MANIFOLD

Â		Type	Thread	Tightening specification	Measure
1AZ	Hexagon screw Air intake manifold to cylinder head.	N52T	M7 x 50	Â	15 Nm
2AZ	Hexagon nut Air intake manifold to cylinder head.	N52T	AM7 (to DIN 439)	Â	15 Nm
3AZ	Hose clamp Clean-air gaiter to connection, throttle valve assembly.	N52T	L80-100	Â	3 Nm
4AZ	Ejot screw Fuel line to intake manifold	N52T	50 x 20	Â	6 Nm
5AZ	Oval-head screw Holder, engine wiring harness, to intake manifold.	N52T	M6 x 10	Â	8 Nm

INTAKE MANIFOLD (N55)

11 61 INTAKE MANIFOLD

TIGHTENING TORQUE SPECIFICATION - INTAKE MANIFOLD

Â	Type	Thread	Tightening specifications	Dimension
1AZ Air intake manifold to cylinder head.	N55	M7	Hexagon nut	15 Nm
2AZ Air intake manifold to cylinder head.	N55	M7x50	Â	15 Nm
3AZ Gaiter to charge air line	N55	Â	Hose clamp	3 Nm

cardiagn.com

INTAKE MANIFOLD (N20)

11 61 INTAKE MANIFOLD

TIGHTENING TORQUE SPECIFICATION - INTAKE MANIFOLD

Â	Type	Thread	Tightening specifications	Dimension
1AZ Intake plenum to cylinder head.	N20/N26	M7	Hexagon nut	15 Nm

INTAKE PLENUM (N47)

11 61 INTAKE PLENUM

TIGHTENING TORQUE SPECIFICATION - INTAKE PLENUM

Â	Type	Thread	Tightening specification	Measure
1AZ Intake manifold to cylinder head	N47D20 O1	M6x76 M6x114	Observe TIGHTENING SEQUENCE . 1. Join 2. Final tightening	Â 5 Nm 10 Nm
2AZ Air intake system to exhaust gas recirculation (EGR) cooler	N47D20 O1	Â	. 1. Join 2. Final tightening	Â 4 Nm 10 Nm

OIL FILTER AND LINES (N55)

11-42 OIL FILTER AND LINES

TIGHTENING TORQUE SPECIFICATION - OIL FILTER AND LINES

Â	Type	Thread	Tightening specifications	Dimension
1AZ Oil filter cap to oil filter housing	N55	Â	Â	25 Nm
2AZ Oil filter housing to cylinder head	N55	M8 x 78 M8 x 43 M8 x 28	Â	22 Nm
3AZ Oil-coolant heat exchanger to oil filter housing.	N55	M8 x 20	Â	16 Nm
4AZ Oil feed line (exhaust turbocharger) to crankcase-upper part.	N55	M6x16	Â	8 Nm
5AZ Oil feed line to exhaust turbocharger.	N55	M6 x 12	Â	8 Nm
6AZ Oil return line to turbocharger	N55	M6 x 16	Â	8 Nm
7AZ Oil return line to crankcase bottom section	N55	M6 x 16	Â	8 Nm
8AZ Screw plug to oil filter housing	N55	M20	Â	40 Nm

OIL FILTER AND LINES (N20)

11-42 OIL FILTER AND LINES

cardiagn.com

TIGHTENING TORQUE SPECIFICATION - OIL FILTER AND LINES

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Oil filter cap to oil filter housing	N20/N26	Â	Â	25 Nm
2AZ	Oil filter housing to cylinder head	N20/N26	M8 x 55 M8 x 43 M8 x 28	Â	22 Nm
3AZ	Oil feed line (exhaust turbocharger) to crankcase-upper part.	N20/N26	M6x 16	Â	10 Nm
4AZ	Oil feed line to exhaust turbocharger.	N20/N26	M6 x 12	Â	10 Nm
5AZ	Oil return line to turbocharger	N20/N26	M6 x 16	Â	10 Nm
6AZ	Oil return line to crankcase bottom section	N20/N26	M6 x 16	Â	10 Nm

OIL FILTER AND PIPES (N47)

11-42 OIL FILTER AND PIPES

TIGHTENING TORQUE SPECIFICATION - OIL FILTER AND PIPES

Â		Type	Thread	Tightening specification	Measure
1AZ	Oil filter cap to oil filter housing	N47D20 O1	Â	Â	25 Nm
2AZ	Engine cooler to oil module	N47D20 O1	Â	Â	6 Nm
3AZ	Oil supply line, exhaust turbocharger, to crankcase	N47D20 O1	M10	Hollow bolt Replace all sealing rings	22 Nm
4AZ	Oil return line, exhaust turbocharger, to crankcase	N47D20 O1	L16-30	Hose clamp	3 Nm
5AZ	Temperature sensor to cylinder head	N47D20 O1	Â	Â	13.5 Nm

OIL FILTER ELEMENT WITH CONNECTIONS (N52T)

11-42 OIL FILTER ELEMENT WITH CONNECTIONS

TIGHTENING TORQUE SPECIFICATION - OIL FILTER ELEMENT WITH CONNECTIONS

Â		Type	Thread	Tightening specification	Measure
1AZ	Oil filter cap Oil filter cap to oil-filter housing.	N52T	Â	Replace sealing ring.	25 Nm
2AZ	ASA screws Oil filter housing to cylinder head.	N52T	M8	Replace seal.	22 Nm
3AZ	ASA screws Oil-coolant heat exchanger to oil	N52T	M8 x 20	Replace seal.	16 Nm

cardiagn.com

	filter housing.				
4AZ	Hose clamp Coolant hose to heat exchanger	N52T	Â	Â	3 Nm
5AZ	Hexagon screw with washer Coolant hose to cylinder head	N52T	M6 x 23	Replace seal	8 Nm

OIL PUMP WITH STRAINER AND DRIVE (N52T)

11 41 OIL PUMP WITH STRAINER AND DRIVE

TIGHTENING TORQUE SPECIFICATION - OIL PUMP WITH STRAINER AND DRIVE

Â	Type	Thread	Tightening specification	Measure
1AZ ASA screws Suction pipe to bedplate.	N52T	M6 x 30	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 4 Nm 100 Â°
2AZ ASA screw Oil pump to bedplate. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M8 x 123	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 10 Nm 180 Â°
3AZ ASA screws Oil pump to bedplate. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M8 x 31	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 10 Nm 90 Â°
4AZ ASA screw Chain module to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M6 x 16	Replace screw. Thread repairs are not permitted! Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 4 Nm 45 Â°
5AZ ASA screws Chain module to oil pump. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M6 x 16	Replace screws. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed	Â

cardiagn.com

				without fail. Jointing torque Torque angle	 4 Nm 45 Â°
6AZ	Fillister head bolt Sprocket to oil pump.	N52T	M8 x 20	Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 20 Nm 45 Â°

OIL PUMP WITH STRAINER AND MOTOR (N20)

11 41 OIL PUMP WITH STRAINER AND MOTOR

TIGHTENING TORQUE SPECIFICATION - OIL PUMP WITH STRAINER AND MOTOR

Â	Type	Thread	Tightening specifications	Dimension
1AZ Intake pipe on oil pump housing	N20/N26	M6	Â	10 Nm
2AZ Counterbalance shafts module to bedplate	N20/N26	M8x75/M8x40	Jointing torque Angle of rotation	19 Nm 90 Â°
3AZ Chain module to crankcase and oil pump	N20/N26	M6x30	Â	10 Nm
4AZ Hydraulic valve of oil pump to crankcase	N20/N26	M6x14	Â	10 Nm
5AZ Camshaft sprocket to counterbalance shaft	N20/N26	M10x30	Replace screw Jointing torque Torque	Â 20 Nm 95 Nm
6AZ Counterbalance shafts module to bedplate	N20/N26	M6x25	Â	10 Nm
7AZ Oil pump to counterbalance shaft housing	N20/N26	M6x70	Â	10 Nm

OIL PUMP WITH STRAINER AND MOTOR (N55)

11 41 OIL PUMP WITH STRAINER AND MOTOR

TIGHTENING TORQUE SPECIFICATION - OIL PUMP WITH STRAINER AND MOTOR

Â	Type	Thread	Tightening specifications	Dimension
1AZ Intake pipe with oil deflector to crankcase lower section (bedplate)	N55	M6x30	Replace screws Thread repairs exclusively with Al Helicoil. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	 Â 4 Nm 90 Â°
2AZ Oil pump to bedplate	N55	M8x123	Replace screws Thread repairs exclusively with Al Helicoil. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	 Â 10 Nm 180 Â°
			Replace screws Thread repairs exclusively with Al Helicoil. Jointing torque and angle of	 Â

cardiagn.com

		N55	M8x31 M8x37	rotation must be observed without fail. Jointing torque Angle of rotation	 10 Nm 90 Â°
3AZ	Chain module to crankcase and oil pump	N55	M6x16	Replace screws Thread repairs exclusively with Al Helicoil. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	Â 4 Nm 45 Â°
4AZ	Hydraulic valve of oil pump to crankcase	N55	M6x16	Jointing torque Angle of rotation	4 Nm 45 Â°
5AZ	Sprocket to oil pump	N55	M8	Jointing torque Angle of rotation	20 Nm 45 Â°
6AZ	Triangular drive to oil pump	N55	M6x16	Jointing torque Angle of rotation	4 Nm 45 Â°
7AZ	Chain tensioner to crankcase	N55	M6x16	Â	10 Nm

OIL PUMP WITH STRAINER AND MOTOR (N47)

11 41 OIL PUMP WITH STRAINER AND MOTOR

TIGHTENING TORQUE SPECIFICATION - OIL PUMP WITH STRAINER AND MOTOR

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Oil and vacuum pump at crankcase	N47D20 O1	M8x30	Â	20 Nm
2AZ	Oil and vacuum pump to bearing cap	N47D20 O1	M8x45	Replace screw Jointing torque Angle of rotation	Â 15 Nm 90 Â°
3AZ	Camshaft sprocket to oil/vacuum pump	N47D20 O1	M8x35	Replace screw Important - left-hand thread Jointing torque Angle of rotation	Â 5 Nm 90 Â°

OIL SUMP (N52T)

11 13 OIL SUMP

TIGHTENING TORQUE SPECIFICATION - OIL SUMP

Â		Type	Thread	Tightening specification	Measure
1AZ	Plug Oil drain to oil sump.	N52T	M12 x 1.5	Replace sealing ring.	25 Nm
2AZ	ASA screw Oil sump (aluminum) to crankcase lower half.	N52T	M8 x 26	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 8 Nm 60 Â°
	ASA screw			Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert.	Â

cardiagn.com

3AZ	Oil sump (aluminum) to crankcase lower half.	N52T	M8 x 112	Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	 8 Nm 60 Â°
4AZ	ASA screw Oil sump (aluminum) to crankcase lower half.	N52T	M8 x 92	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 8 Nm 180 Â°
5AZ	ASA screw Oil sump (aluminum) to crankcase lower half.	N52T/All	M8 x 40	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 8 Nm 90 Â°
6AZ	ASA screw Oil sump (aluminum) to crankcase lower half.	N52T/All	M8 x 36	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 8 Nm 90 Â°
7AZ	ASA screw Oil sump (sheet metal) to crankcase lower half.	N52T	M8 x 24	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Joining torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 8 Nm 60 Â°
8AZ	ASA screw Transmission to oil sump.	N52T	M8 x 50	Â	19 Nm
9AZ	Hexagon nut Oil level sensor to oil sump.	N52T	M6	Â	8 Nm
10AZ	Screw Transmission oil line to oil sump.	N52T	M6	Â	10 Nm
11AZ	Oil deflector to bed plate	N52T	M6 x 20	Â Jointing torque Torque angle	Â 4 Nm 90 Â°

OIL SUMP (N47)

11 13 OIL SUMP

TIGHTENING TORQUE SPECIFICATION - OIL SUMP

Â		Type	Thread	Tightening specification	Measure
1AZ	Oil drain plug	N47D20 O1	M12 x 1.5	Replace sealing ring	25 Nm
2AZ	Oil sump to crankcase	N47D20 O1	M8	Â	20 Nm

OIL SUMP (N55)

cardiagn.com

11 13 OIL SUMP

TIGHTENING TORQUE SPECIFICATION - OIL SUMP

Â	Type	Thread	Tightening specifications	Dimension
1AZ Oil drain plug to oil sump	N55	M12x1.5	Replace sealing ring.	25 Nm
2AZ Oil sump (aluminum) to crankcase lower half.	N55	M8x26	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	Â 8 Nm 90 Â°
3AZ Oil sump (aluminum) to crankcase lower half.	N55	M8x92 M8x112	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	Â 8 Nm 180 Â°
4AZ Oil sump (aluminum) to crankcase lower half (AWD)	N55	M8x36	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	Â 8 Nm 90 Â°
5AZ Oil deflector to crankcase lower half.	N55	M6x20	Replace screw. Thread repairs exclusively with aluminum Helicoil threaded insert. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	Â 4 Nm 90 Â°
6AZ Transmission to oil sump.	N55	M8x50 8.8	Â	19 Nm
7AZ Oil level sensor to oil sump.	N55	M6	Â	8 Nm

OIL SUMP (N20)

11 13 OIL SUMP

TIGHTENING TORQUE SPECIFICATION - OIL SUMP

Â	Type	Thread	Tightening specifications	Dimension
1AZ Oil drain plug to oil sump of all-wheel drive vehicle.	N20/N26	M12 x 1.5	Replace sealing ring.	25 Nm
2AZ Oil drain plug to oil sump without all-wheel drive vehicle.	N20/N26	M12 x 1.5	Replace plastic screw.	8 Nm
3AZ Oil sump (plastic) to crankcase lower section.	N20/N26	M6 x 25	Â	10 Nm
4AZ Oil sump (aluminum) to crankcase lower section (all-wheel drive vehicle).	N20/N26	M6 x 25 M6 x 80 M6 x 120	Â	10 Nm
6AZ Transmission to oil sump.	N20/N26	M8 x 50 8.8	Â	22 Nm
7AZ Oil level sensor to oil sump.	N20/N26	M6	Â	8 Nm

cardiagn.com

STANDARD SCREW CONNECTION (N55)

11 00 STANDARD SCREW CONNECTION

TIGHTENING TORQUE SPECIFICATION - STANDARD SCREW CONNECTION

Â	Type	Thread	Tightening specification	Measure
1AZ Screws and nuts	Â	M5	Â	5 Nm Â± 0.5
2AZ Screws and nuts	Â	M6	Â	8 Nm Â±1
3AZ Screws and nuts	Â	M7	Â	13 Nm Â± 2
4AZ Screws and nuts	Â	M8	Â	19 Nm Â± 3
5AZ Screws and nuts	Â	M10	Â	38 Nm Â± 5
6AZ Hose clamp, WAF 5	Â	Â	Â	1.0 to 1.5 Nm
7AZ Hose clamp, WAF 6	Â	Â	Â	2.5 up to 3.5 Nm

STANDARD SCREW CONNECTION (N47)

11 00 STANDARD SCREW CONNECTION

TIGHTENING TORQUE SPECIFICATION - STANDARD SCREW CONNECTION

Â	Type	Thread	Tightening specification	Measure
1AZ Screws and nuts	Â	M5	Â	5 Nm Â± 0.5
2AZ Screws and nuts	Â	M6	Â	8 Nm Â± 1
3AZ Screws and nuts	Â	M7	Â	13 Nm Â± 2
4AZ Screws and nuts	Â	M8	Â	19 Nm Â± 3
5AZ Screws and nuts	Â	M10	Â	38 Nm Â± 5
6AZ Hose clamp, WAF 5	Â	Â	Â	1.0 to 1.5 Nm
7AZ Hose clamp, WAF 6	Â	Â	Â	2.5 up to 3.5 Nm

STANDARD SCREW CONNECTION (N20)

11 00 STANDARD SCREW CONNECTION

TIGHTENING TORQUE SPECIFICATION - STANDARD SCREW CONNECTION

Â	Type	Thread	Tightening specifications	Dimension
1AZ Screws and nuts	N20/N26	M5	Â	5 Nm Â± 0.5
2AZ Screws and nuts	N20/N26	M6	Â	8 Nm Â± 1
3AZ Screws and nuts	N20/N26	M7	Â	13 Nm Â± 2
4AZ Screws and nuts	N20/N26	M8	Â	19 Nm Â± 3
5AZ Screws and nuts	N20/N26	M10	Â	38 Nm Â± 5
6AZ Screws and nuts	N20/N26	M12	Â	66 Nm Â± 5
7AZ Hose clamp, WAF 5	N20/N26	Â	Â	1.0 to 1.5 Nm
8AZ Hose clamp, WAF 6	N20/N26	Â	Â	2, 5 up to 3, 5 Nm

THERMOSTAT AND CONNECTIONS (N20)

11 53 THERMOSTAT AND CONNECTIONS

TIGHTENING TORQUE SPECIFICATION - THERMOSTAT AND CONNECTIONS

Â	Type	Thread	Tightening specifications	Dimension
1AZ Thermostat housing to crankcase.	N20/N26	M6 x 25	Â	10 Nm

cardiagn.com

2AZ	Holder on radiator	N20/N26	Â	Self-tapping screw	3 Nm
3AZ	Feed line to crankcase.	N20/N26	M6x16	Â	10 Nm
4AZ	Feed line to coolant pump.	N20/N26	L42-48	Hose clamp	3 Nm
5AZ	Coolant line to cylinder head (short-circuit line).	N20/N26	M6 x 23	Â	10 Nm
6AZ	Coolant hose from thermostat to coolant pump	N20/N26	L42-48	Â	3 Nm
7AZ	Coolant supply and drain line to exhaust turbocharger	N20/N26	M6 x 16	Â	10 Nm
8AZ	Coolant return line to crankcase.	N20/N26	M6 x 16	Â	10 Nm

THERMOSTAT AND CONNECTIONS (N52T)

11 53 THERMOSTAT AND CONNECTIONS

TIGHTENING TORQUE SPECIFICATION - THERMOSTAT AND CONNECTIONS

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Thermostat housing to water pump	N52	M6x25	Â	8 Nm
2AZ	Feed lines to crankcase	N52	M6x16	Â	9 Nm
3AZ	Feed line to water pump	N52	L42-48	Hose clamp	3 Nm
4AZ	Coolant hose to cylinder head	N52	M6x25	Â	8 Nm
5AZ	Bracket, coolant hoses, to crankcase Aluminum screws/bolts are permitted with and without color coding (blue).	N52	Â	Replace screws Thread repairs exclusively with Al Helicoil. Jointing torque and angle of rotation must be observed without fail. Jointing torque Angle of rotation	Â 4 Nm 45 Â°

THERMOSTAT AND CONNECTIONS (N55)

11 53 THERMOSTAT AND CONNECTIONS

TIGHTENING TORQUE SPECIFICATION - THERMOSTAT AND CONNECTIONS

Â		Type	Thread	Tightening specification	Measure
1AZ	Thermostat housing to coolant pump.	N55	M6 x 25	Â	8 Nm
2AZ	Thermostat housing to holder.	N55	Â	Â	9 Nm
3AZ	Holder to radiator	N55	Â	Self-tapping screw	3 Nm
4AZ	Feed line to crankcase.	N55	M6x16	Â	8.5 Nm
5AZ	Feed line to coolant pump.	N55	L42-48	Hose clamp	3 Nm
6AZ	Oil-to-water heat exchanger (OWWT) feed line.	N55	L18-24	Hose clamp	3 Nm
7AZ	Coolant line to cylinder head (short-circuit line).	N55	M6 x 23	Â	8.5 Nm
8AZ	Coolant line to thermostat.	N55	Â	Hose clamp with corrugated spring	3 Nm
9AZ	Coolant hose from thermostat to coolant pump	N55	L42-48	Â	3 Nm
10AZ	Radiator supply and drain line to exhaust turbocharger	N55	M6 x 16	Â	8 Nm
11AZ	Coolant return line to crankcase.	N55	M6 x	Â	8 Nm

cardiagn.com

		16		

TURBOCHARGER AND CONTROL (N20)

11 65 TURBOCHARGER AND CONTROL

TIGHTENING TORQUE SPECIFICATION - TURBOCHARGER AND CONTROL

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Exhaust turbocharger to cylinder head	N20/N26	M7	Replace flange nut.	13 Nm
2AZ	Heat shield/retaining plate to crankcase upper part	N20/N26	M6 x 16	Â	10 Nm
3AZ	Pressure converter (EPDW) to cylinder head.	N20/N26	M6 x 16	Â	10 Nm
4AZ	Vacuum unit (wastegate valve) on exhaust turbocharger (N20). Electric wastegate actuator on exhaust turbocharger (N20/N26).	N20/N26	M8	Â	20 Nm
5AZ	Heat shield to cylinder head	N20/N26	M8x16	Â	19 Nm
6AZ	Blow-off valve to exhaust turbocharger	N20/N26	M6x14	Â	10 Nm

TURBOCHARGER AND CONTROL (N55)

11 65 TURBOCHARGER AND CONTROL

TIGHTENING TORQUE SPECIFICATION - TURBOCHARGER AND CONTROL

Â		Type	Thread	Tightening specification	Measure
1AZ	Exhaust turbocharger to cylinder head	N55	M7	Replace flange nut.	13 Nm
2AZ	Heat shield/retaining plate to crankcase top section	N55	M6 x 16	Â	8 Nm
3AZ	Pressure converter (EPDW) to cylinder head.	N55	M6 x 16	Â	8.5 Nm
4AZ	Pressure converter (EPDW) to holder with heat shield.	N55	M6 x 16	Â	9 Nm
5AZ	Vacuum unit (wastegate valve) to bracket	N55	M6	Â	7 Nm
6AZ	Lock nut to vacuum unit (wastegate valve) linkage	N55	M6	Â	7 Nm
7AZ	Bracket, vacuum unit (wastegate valve), to turbocharger	N55	M8	Â	7 Nm
8AZ	Holder to exhaust turbocharger.	N55	M8	Â	20 Nm
9AZ	Exhaust turbocharger holder to cylinder crankcase.	N55	M8	Replace microencapsulated screws	20 Nm

TURBOCHARGER AND CONTROL (N47)

11 65 TURBOCHARGER AND CONTROL

TIGHTENING TORQUE SPECIFICATION - TURBOCHARGER AND CONTROL

Â		Type	Thread	Tightening specification	Measure
1AZ	Grease exhaust turbocharger to exhaust manifold, screw connection, with Molykote HSC.	N47D20O1	M8x20	Bihexagonal head bolt	25 Nm

RIBBED V-BELT WITH TENSION AND DEFLECTION SYSTEM (N52T)

cardiagn.com

11 28 RIBBED V-BELT WITH TENSION AND DEFLECTION SYSTEM

TIGHTENING TORQUE SPECIFICATION - RIBBED V-BELT WITH TENSION AND DEFLECTION SYSTEM

Â		Type	Thread	Tightening specification	Measure
1AZ	ASA screw Belt tensioner to crankcase. Aluminum screws/bolts are permitted with and without color coding (blue).	N52T	M11 x 65	Replace screw. Thread repairs are not permitted! Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 25 Nm 90 Â°
3AZ	Hexagon screw Deflection pulley to alternator.	N52T	M10 x 45	Â	38 Nm

V-RIBBED BELT WITH TENSION AND DEFLECTION ELEMENT (N20)

11 28 V-RIBBED BELT WITH TENSION AND DEFLECTION ELEMENT

TIGHTENING TORQUE SPECIFICATION - V-RIBBED BELT WITH TENSION AND DEFLECTION ELEMENT

Â		Type	Thread	Tightening specifications	Dimension
Standard belt drive		Â	Â	Â	Â
1AZ	Belt tensioner with deflection pulley to engine block.	N20/N26	M8 x 35	Â	19 Nm

V-RIBBED BELT WITH TENSION AND DEFLECTION ELEMENT (N55)

11 28 V-RIBBED BELT WITH TENSION AND DEFLECTION ELEMENT

TIGHTENING TORQUE SPECIFICATION - V-RIBBED BELT WITH TENSION AND DEFLECTION ELEMENT

Â		Type	Thread	Tightening specification	Measure
Standard belt drive		Â	Â	Â	Â
1AZ	Belt tensioner with deflection pulley to engine block.	N55	M10 x 90	Â	38 Nm
AZ	Belt tensioner with deflection pulley to engine block.	N55	M10 x 103	Â	38 Nm
2AZ	Deflection pulley 65 x 32	N55	M10 x 55	Â	60 Nm
3AZ	Deflection pulley 75 x 32	N55	M10 x 55	Â	60 Nm
4AZ	Holder for deflecting element to oil sump	N55	M10 x 37	Â	38 Nm
5AZ	Holder for deflecting element to oil sump	N55	M10 x 30	Â	38 Nm
6AZ	Deflecting element 75	N55	M10 x 55	Â	56 Nm

cardiagn.com

7AZ	Deflecting element 90	N55	M10 x 55	Â	56 Nm
SGR belt (start alternator belt)		Â	Â	Â	Â
8AZ	Belt tensioner to crankcase (operating tensioner)	N55	M10 x 90	Â	38 Nm
9AZ	Belt tensioner to crankcase (start tensioner)	N55	M10 x 55	Â	38 Nm
10AZ	Deflecting element 75	N55	M10 x 55	Â	56 Nm
11AZ	Holder for deflecting element to oil sump	N55	M10 x 37	ASA screw (exterior star handle)	38 Nm
12AZ	Holder for deflecting element to oil sump	N55	M10 x 30	ISA countersunk screw (interior star handle)	38 Nm

VACUUM PUMP (N20)

11 66 VACUUM PUMP

TIGHTENING TORQUE SPECIFICATION - VACUUM PUMP

Â	Type	Thread	Tightening specifications	Dimension
1AZ Vacuum pump to cylinder head cover	N20/N26	M6x40	Â	10 Nm

VACUUM PUMP (N55)

11 66 VACUUM PUMP

TIGHTENING TORQUE SPECIFICATION - VACUUM PUMP

Â	Type	Thread	Tightening specifications	Dimension
1AZ Vacuum pump to crankcase	N55	M6x40	Flat mushroom head screw 10.9 Replace screws	10 Nm
2AZ Sprocket wheel to vacuum pump	N55	M10x30	Screw 12.9 washed and oiled	66 Nm

VACUUM PUMP (N52T)

11 66 VACUUM PUMP

TIGHTENING TORQUE SPECIFICATION - VACUUM PUMP

Â	Type	Thread	Tightening specification	Measure
1AZ ISA flat mushroom head screws 10.9 Vacuum pump to crankcase.	N52T	M6 x 40	Â	10 Nm
ISA flat mushroom head screws 8.8 Vacuum pump to crankcase	N52T	M6 x 40	Â	8 Nm
2AZ ISA screw Sprocket wheel to vacuum pump.	N52T	M10 x 30	Â	66 Nm

VARIABLE CAMSHAFT CONTROL (N55)

11 36 VARIABLE CAMSHAFT CONTROL

TIGHTENING TORQUE SPECIFICATION - VARIABLE CAMSHAFT CONTROL

Â	Type	Thread	Tightening specification	Measure
1AZ VANOS with sensor wheel to inlet and exhaust camshafts	N55	M10x94	Replace screw Jointing torque	Â 20 Nm

cardiagn.com

			Torque angle	180 Â°
2AZ Non-return valve VANOS to cylinder head	N55	M14 x 1.5	Â	13 Nm
3AZ Solenoid valve holder to cylinder head	N55	M6x12	Â	9 Nm

VARIABLE CAMSHAFT CONTROL (N20)

11 36 VARIABLE CAMSHAFT CONTROL

TIGHTENING TORQUE SPECIFICATION - VARIABLE CAMSHAFT CONTROL

Â	Type	Thread	Tightening specifications	Dimension
1AZ variable camshaft timing control (VANOS) with sensor gear to E and exhaust camshafts	N20/N26	M14x1.25	Â Jointing torque Angle of rotation	Â 55 Nm 55 Â°
2AZ Solenoid valve holder to cylinder head cover	N20/N26	P 3.5	Â	5, 5 Nm

VARIABLE CAMSHAFT CONTROL VANOS (N52T)

11 36 VARIABLE CAMSHAFT CONTROL VANOS

TIGHTENING TORQUE SPECIFICATION - VARIABLE CAMSHAFT CONTROL VANOS

Â	Type	Thread	Tightening specification	Measure
1AZ Hexagon screws (central bolts) VANOS with sensor gear to inlet and exhaust camshafts.	N52T	M10 x 94	Replace screws. Grip inlet and exhaust camshafts at dihedron when tightening. Jointing torque and angle of rotation must be observed without fail. Jointing torque Torque angle	Â 20 Nm 180 Â°
2AZ Non-return valve Non-return valve for VANOS to cylinder head	N52T	M14 x 1.5	Replace sealing ring.	13 Nm
3AZ Hexagon screws Inlet and exhaust solenoid valve with holder to cylinder head.	N52T	M6 x 12	Replace support and sealing rings.	9 Nm

VARIABLE VALVE GEAR (N52T)

11 37 VARIABLE VALVE GEAR

TIGHTENING TORQUE SPECIFICATION - VARIABLE VALVE GEAR

Â	Type	Thread	Tightening specification	Measure
1AZ ASA screws Guide block to timing case.	N52T	M6 x 23	Only one screw (inside) plus the oil spray nozzle are fitted on cylinder no. 3.	10 Nm
2AZ ASA screws Torsion spring to cylinder head.	N52T	M6 x 20	Â	10 Nm
			1. Join screws hand-tight to cylinder head. 2. Join screw hand-tight to cylinder	

cardiagn.com

3AZ	ASA screws Electric servomotor to cylinder head and to cylinder head cover.	N52T	M6 x 16	head cover. 3. Jointing torque on cylinder head. 4. Jointing torque on cylinder head cover.	10 Nm
4AZ	ASA screw Oil spray nozzle to guide block.	N52T	M6 x 30	Oil spray nozzle is fitted on cylinder no. 3 (outside).	10 Nm
5AZ	Stop screw Stop screw of eccentric shaft to cylinder head.	N52T	M6	Â	10 Nm

VARIABLE VALVE GEAR (N55)

11 37 VARIABLE VALVE GEAR

TIGHTENING TORQUE SPECIFICATION - VARIABLE VALVE GEAR

Â	Type	Thread	Tightening specification	Measure
1AZ Slide block to cylinder head.	N55	M6x23	Â	10 Nm
2AZ Torsion spring (throttle return spring) to cylinder head.	N55	M6x20	Â	10 Nm
3AZ Electrical servomotor to cylinder head.	N55	M6x16	Â	10 Nm
4AZ Oil spray nozzle to guide block.	N55	M6x30	Â	10 Nm
5AZ Stop screw of eccentric shaft to cylinder head.	N55	M6	Â	10 Nm
6AZ Valvetronic sensor to holder.	N55	M6x20	Â	8 Nm
7AZ Holder for valvetronic sensor.	N55	M6x20	Â	8 Nm

VARIABLE VALVE GEAR (N20)

11 37 VARIABLE VALVE GEAR

TIGHTENING TORQUE SPECIFICATION - VARIABLE VALVE GEAR

Â	Type	Thread	Tightening specifications	Dimension
1AZ Slide block to cylinder head.	N20/N26	M6x23	Â	10 Nm
2AZ Torsion spring (throttle return spring) to cylinder head.	N20/N26	M6x20	Â	10 Nm
3AZ Electrical servomotor to cylinder head.	N20/N26	M6x16	Â	10 Nm
4AZ Oil spray nozzle to gate.	N20/N26	M6x30	Â	10 Nm
5AZ Stop screw of eccentric shaft to cylinder head.	N20/N26	M6	Â	10 Nm

VIBRATION DAMPER (N55)

11 23 VIBRATION DAMPER

TIGHTENING TORQUE SPECIFICATION - VIBRATION DAMPER

Â	Type	Thread	Tightening specification	Measure
1AZ Vibration damper to crankshaft hub.	N55	M8 x 16 screw 10.9	Â	35 Nm

VIBRATION DAMPER (N52T)

cardiagn.com

11 23 VIBRATION DAMPER

TIGHTENING TORQUE SPECIFICATION - VIBRATION DAMPER

Â		Type	Thread	Tightening specification	Measure
1AZ	ASA screws Vibration damper to hub.	N52T	M8 x 16	Â	35 Nm

VIBRATION DAMPER (N47)

11 23 VIBRATION DAMPER

TIGHTENING TORQUE SPECIFICATION - VIBRATION DAMPER

Â		Type	Thread	Tightening specification	Measure
1AZ	Torsion damper to crankshaft IMPORTANT: Never allow engine to run without ribbed V-belt (risk of damage).	N47/N47S	M10x65	Replace screws 1. Jointing torque 2. Angle of rotation	Â 40 Nm 120 Â°

VIBRATION DAMPER (N20)

11 23 VIBRATION DAMPER

TIGHTENING TORQUE SPECIFICATION - VIBRATION DAMPER

Â	Type	Thread	Tightening specifications	Dimension
1AZ Vibration damper to crankshaft hub.	N20/N26	M8 x 16 screw 10.9	Â	35 Nm

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702157

cardiagn.com

ENGINE MOUNTING

22 11 011 REPLACING LEFT ENGINE MOUNT (N20)

Necessary preliminary tasks:

- Remove **LEFT ENGINE SUPPORT ARM**.

Release screws (1) and remove engine mount (2).

Tightening torque **22 11 1AZ** .

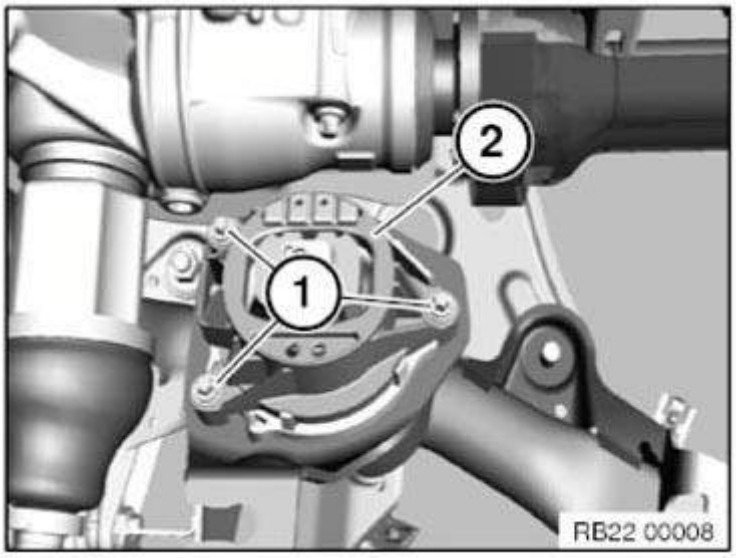


Fig. 1: Identifying Engine Mount Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rubber buffer (1) on engine mount must point towards center of vehicle.

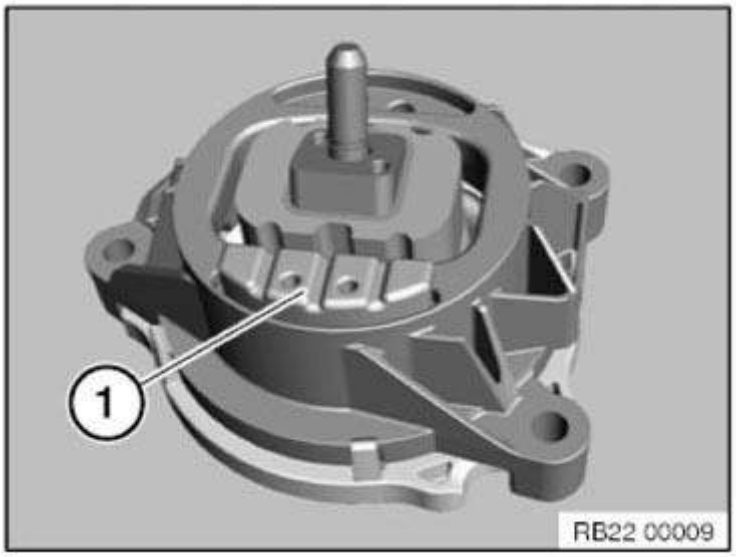


Fig. 2: Identifying Engine Mount Buffer

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

22 11 011 REPLACING LEFT ENGINE MOUNT (N47)

Necessary preliminary tasks:

- Remove **LEFT ENGINE SUPPORT ARM**.

Release screws (1) and remove engine mount (2).

Tightening torque **22 11 1AZ** .

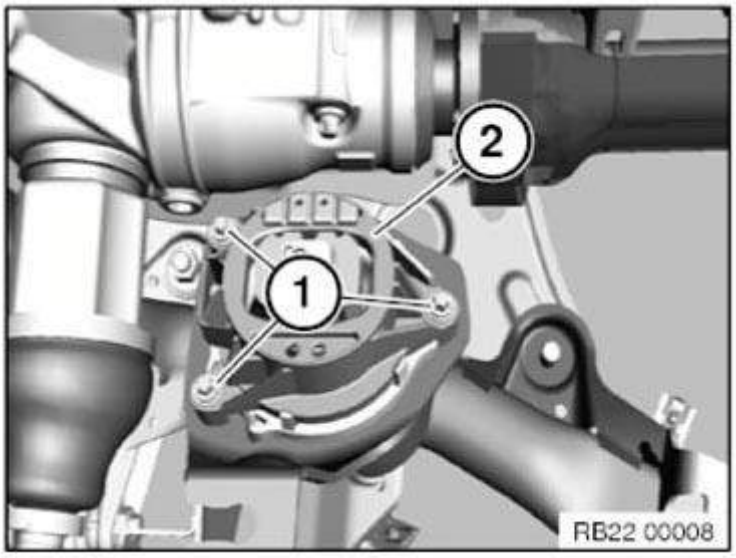


Fig. 3: Identifying Engine Mount Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rubber buffer (1) on engine mount must point towards center of vehicle.

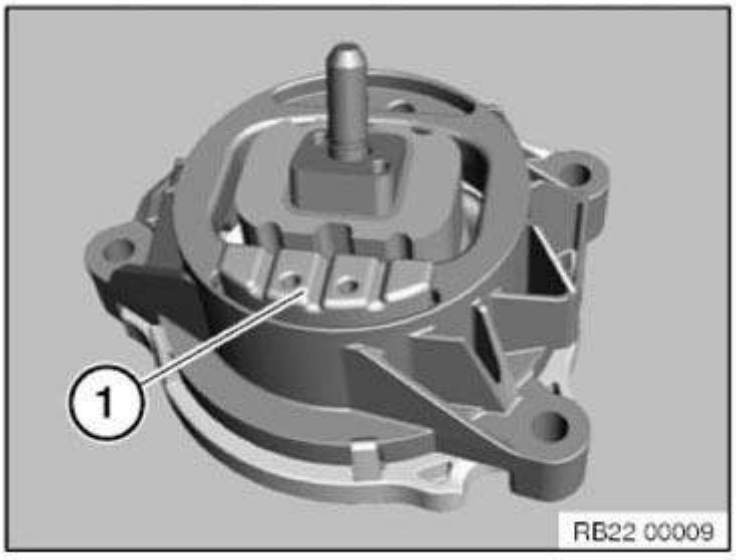


Fig. 4: Identifying Engine Mount Buffer
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 011 REPLACING LEFT ENGINE MOUNT (N52)

Necessary preliminary work:

cardiagn.com

- Remove **LEFT ENGINE SUPPORT ARM**.

Release screws (1) and remove engine mount (2).

Tightening torque **22 11 1AZ** .

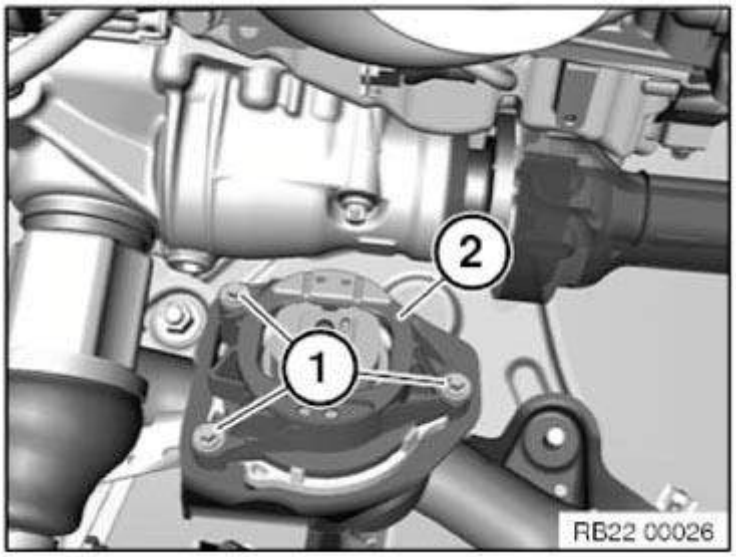


Fig. 5: Identifying Engine Mount Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rubber buffer (1) on engine mount must point towards center of vehicle.

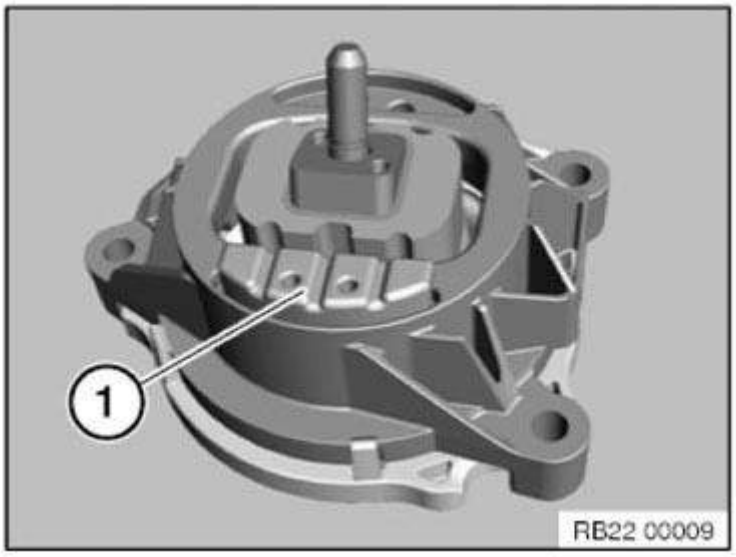


Fig. 6: Identifying Engine Mount Buffer
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 011 REPLACING LEFT ENGINE MOUNT (N55)

Necessary preliminary work:

- Remove **LEFT ENGINE SUPPORT ARM**.

Release screws (1) and remove engine mount (2).

Tightening torque **22 11 1AZ** .

cardiagn.com

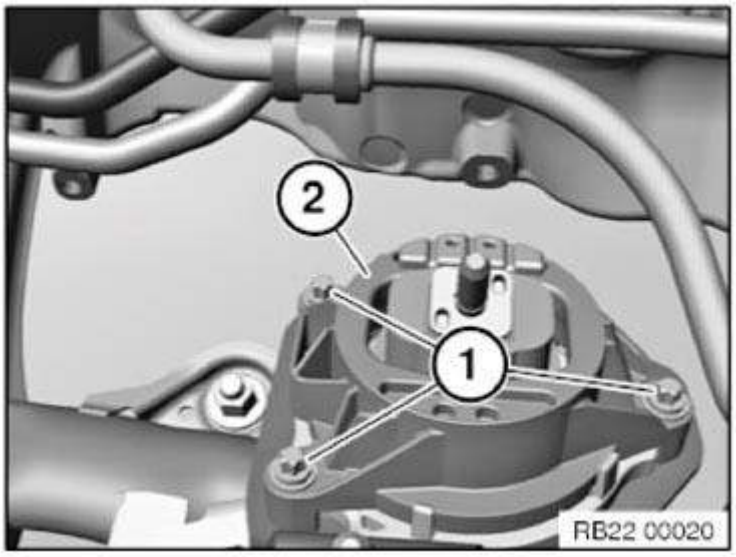


Fig. 7: Identifying Engine Mount Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rubber buffer (1) on engine mount must point towards center of vehicle.

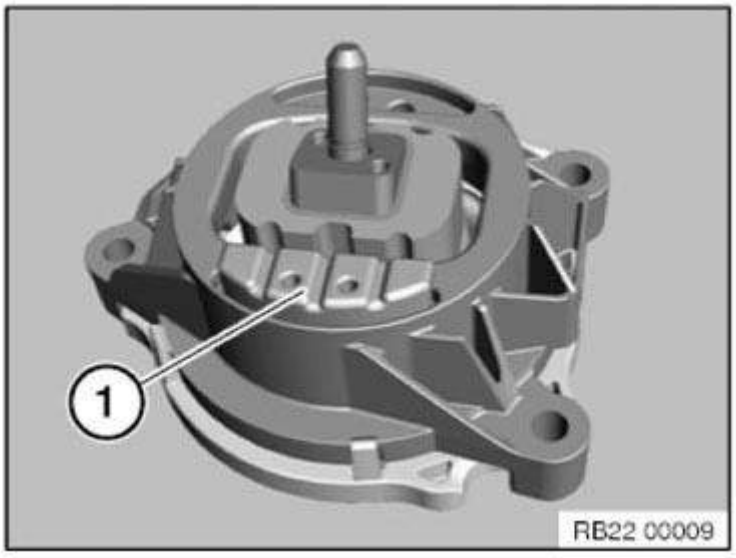


Fig. 8: Identifying Engine Mount Buffer
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 110 REPLACING LEFT ENGINE SUPPORT ARM (N20)

Necessary preliminary tasks:

- Secure engine in **INSTALLATION POSITION**
- Remove rear **UNDERBODY PROTECTION ASSEMBLY**
- Remove **REINFORCEMENT PLATE**
- Partially detach wheel arch trim panel on rear left

Release screws (1).

Remove engine support arm.

Tightening torque **22 11 3AZ** .

cardiagn.com

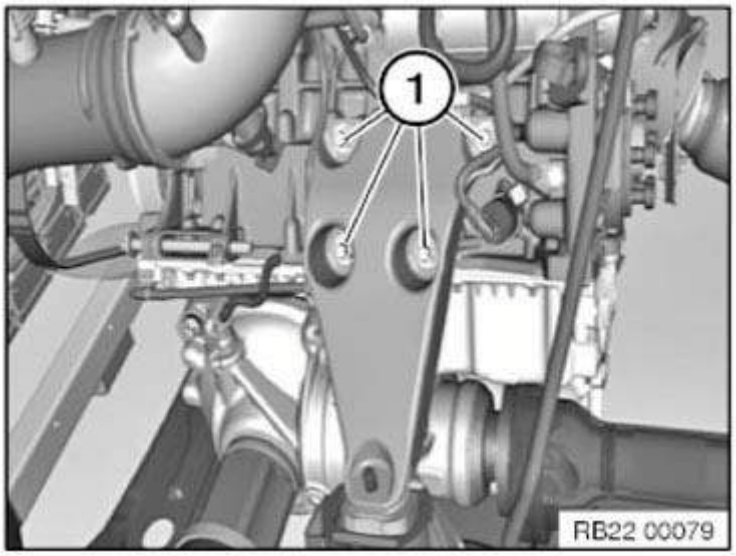


Fig. 9: Identifying Engine Support Arm Screws
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 110 REPLACING LEFT ENGINE SUPPORT ARM (N47)

Necessary preliminary tasks:

- Secure engine in **INSTALLATION POSITION** .
- Remove **GUIDE TUBE** of dip stick.
- Remove rear underbody protection.
- Partially detaching the front left wheel arch panel.

Release screws (1).

Remove engine support arm.

Tightening torque **22 11 3AZ** .

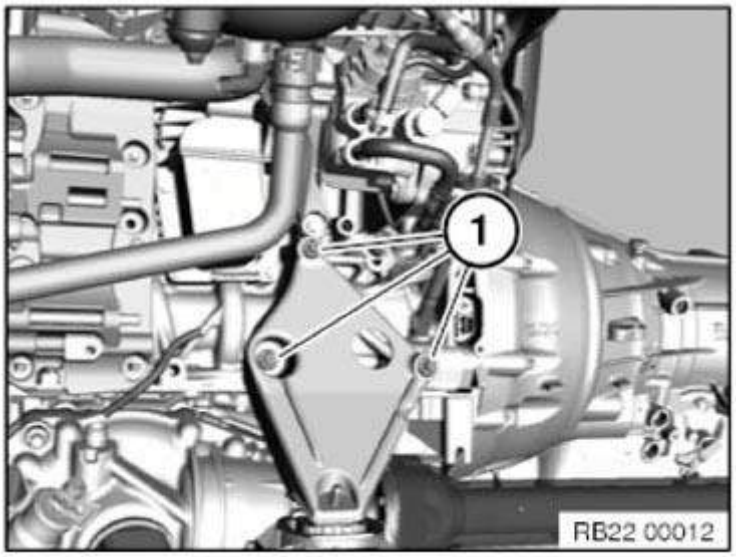


Fig. 10: Identifying Engine Support Arm Screws
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 110 REPLACING LEFT ENGINE SUPPORT ARM (N52)

cardiagn.com

Necessary preliminary work:

- Secure engine in **INSTALLATION POSITION**
- Remove **THROTTLE BODY**
- Remove rear underguard
- Remove **REINFORCEMENT PLATE**
- Partially detach wheel arch trim panel on rear left

Release screw (1).

Unfasten screws (2).

Remove engine support arm.

Tightening torque **22 11 3AZ** .

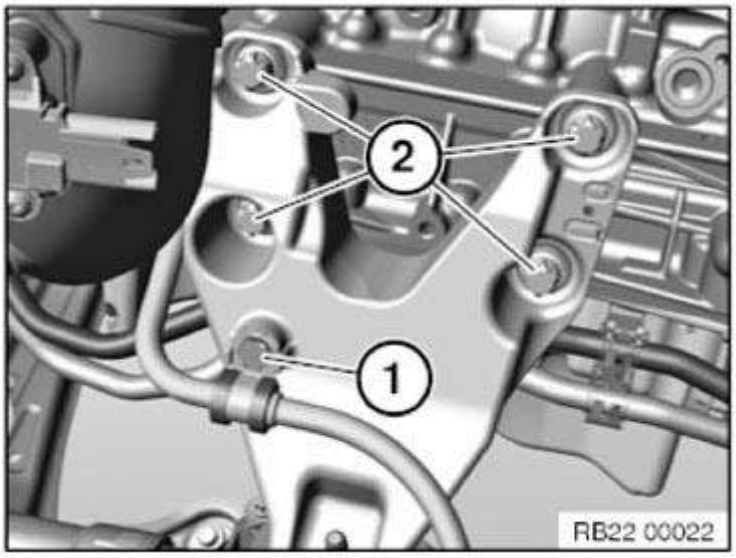


Fig. 11: Identifying Engine Support Arm Screws
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 110 REPLACING LEFT ENGINE SUPPORT ARM (N55)

Necessary preliminary work:

- Secure engine in **INSTALLATION POSITION**
- Remove left **CHARGE AIR DUCT**
- Remove rear underguard
- Remove **REINFORCEMENT PLATE**
- Partially detach wheel arch trim panel on rear left

Release screw (1).

Unfasten screws (2).

Remove engine support arm.

Tightening torque **22 11 3AZ** .

cardiagn.com

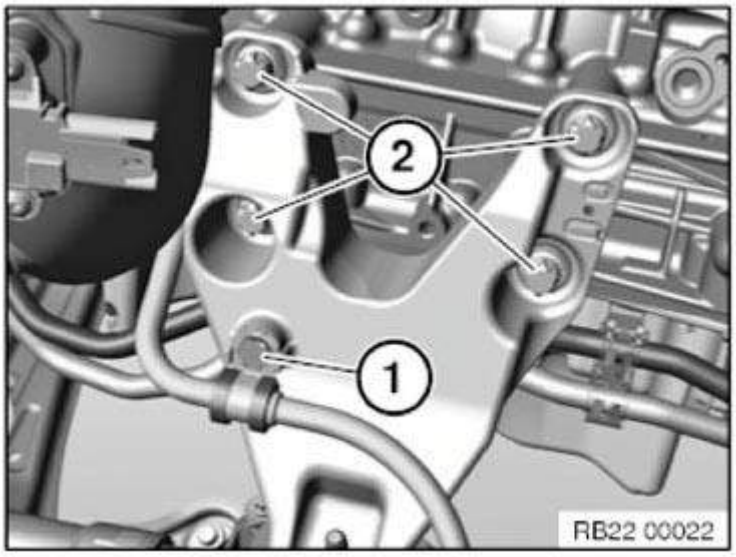


Fig. 12: Identifying Engine Support Arm Screws
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 001 REPLACING RIGHT ENGINE MOUNT (N20)

Necessary preliminary tasks:

- Remove **RIGHT ENGINE SUPPORT ARM**

Release screws (1) and remove engine mount (2).

Tightening torque **22 11 1AZ** .

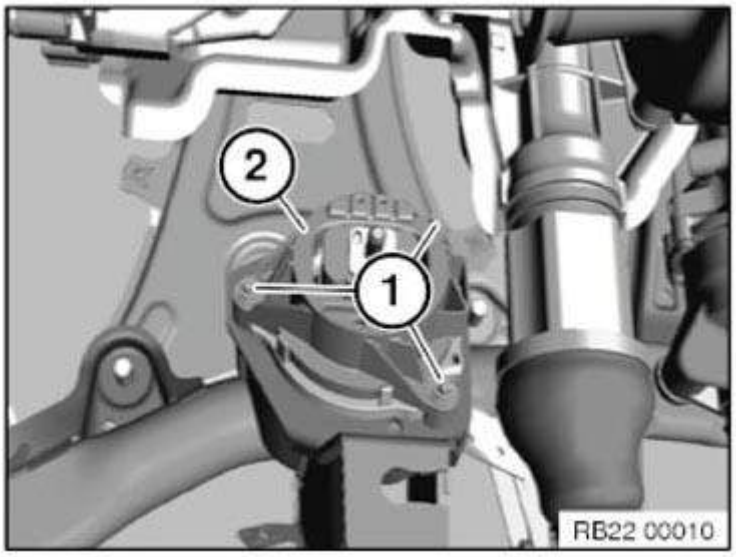


Fig. 13: Identifying Engine Mount Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rubber buffer (1) on engine mount must point towards center of vehicle.

cardiagn.com

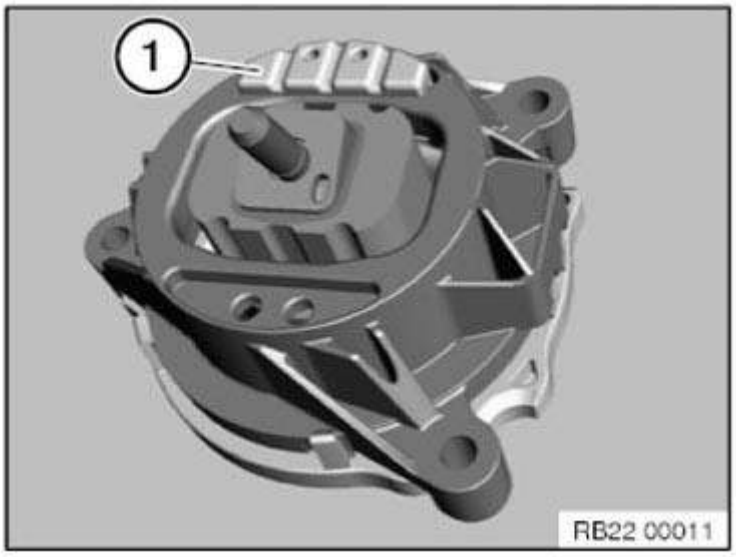


Fig. 14: Identifying Engine Mount Buffer
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 001 REPLACING RIGHT ENGINE MOUNT (N47)

Necessary preliminary tasks:

- **REMOVE** right engine support arm.

Release screws (1) and remove engine mount (2).

Tightening torque **22 11 1AZ** .

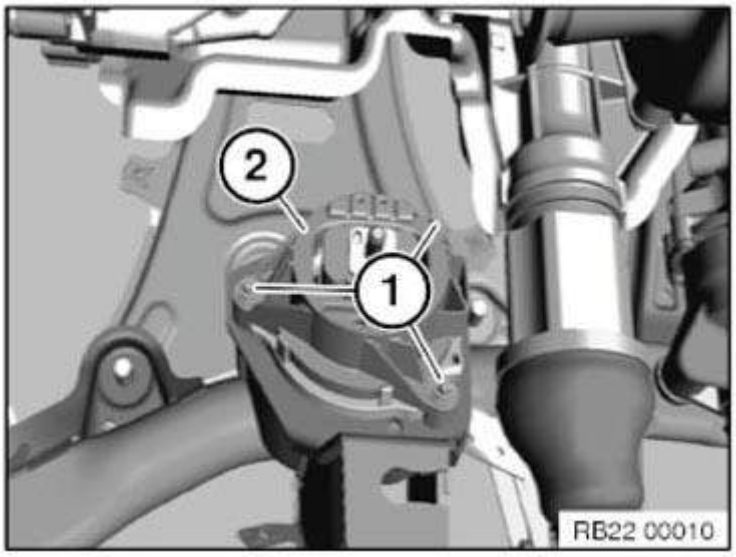


Fig. 15: Identifying Engine Mount Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rubber buffer (1) on engine mount must point towards center of vehicle.

cardiagn.com

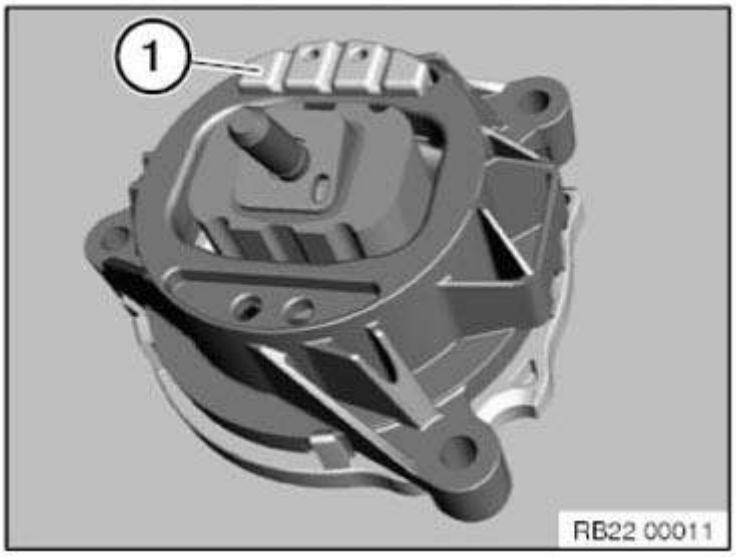


Fig. 16: Identifying Engine Mount Buffer
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 001 REPLACING RIGHT ENGINE MOUNT (N52)

Necessary preliminary work:

- Remove **RIGHT ENGINE SUPPORT ARM**

Release screws (1) and remove engine mount (2).

Tightening torque **22 11 1AZ** .

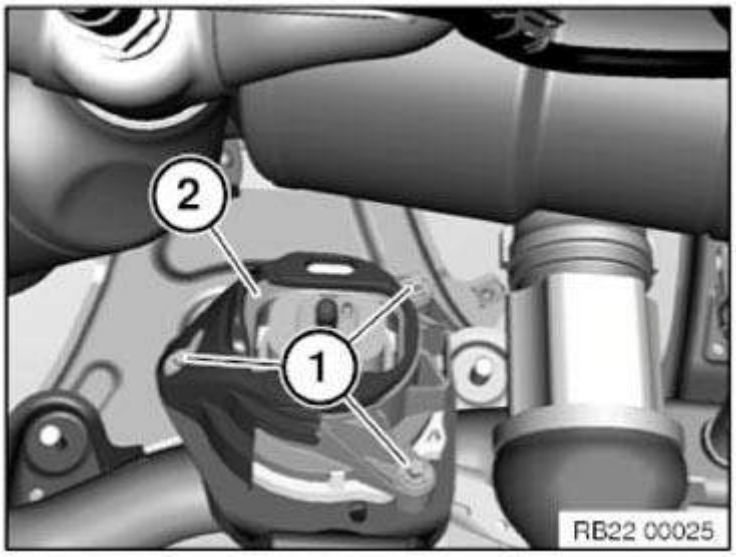


Fig. 17: Identifying Engine Mount Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rubber buffer (1) on engine mount must point towards center of vehicle.

cardiagn.com

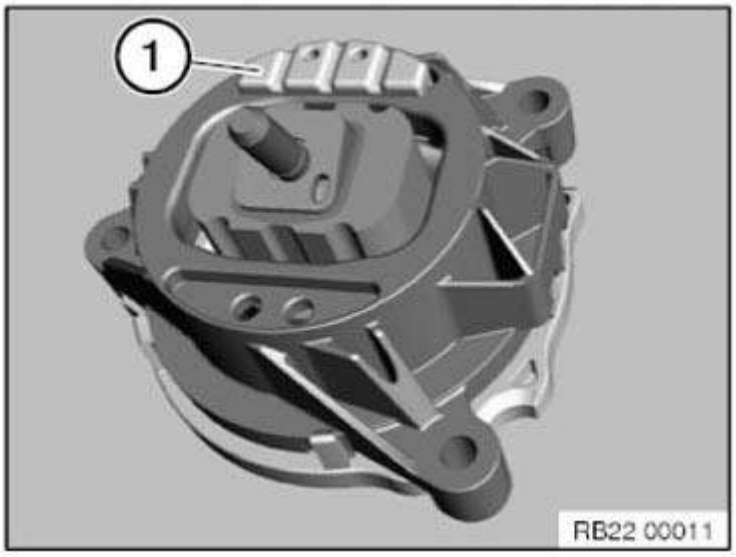


Fig. 18: Identifying Engine Mount Buffer
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 001 REPLACING RIGHT ENGINE MOUNT (N55)

Necessary preliminary work:

- Remove **RIGHT ENGINE SUPPORT ARM**

Release screws (1) and remove engine mount (2).

Tightening torque **22 11 1AZ** .

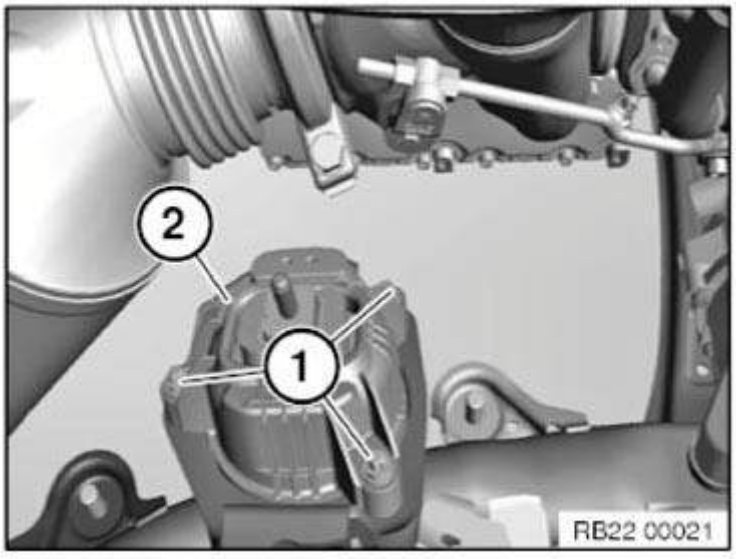


Fig. 19: Identifying Engine Mount Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Rubber buffer (1) on engine mount must point towards center of vehicle.

cardiagn.com

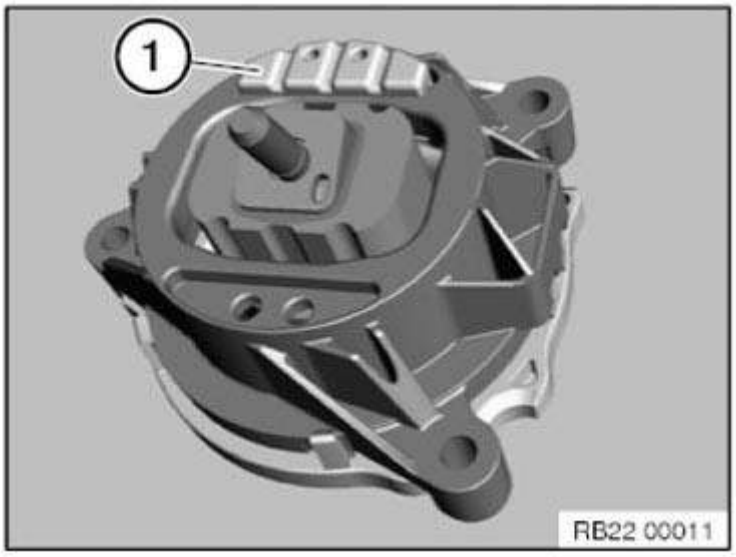


Fig. 20: Identifying Engine Mount Buffer
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 100 REPLACING RIGHT ENGINE SUPPORT ARM (N20)

Necessary preliminary tasks:

- Secure engine in **INSTALLATION POSITION**
- Remove the **REAR UNDERBODY PROTECTION**
- Remove **REINFORCEMENT PLATE**

Release screws (1).

Remove engine support arm.

Tightening torque **22 11 3AZ** .

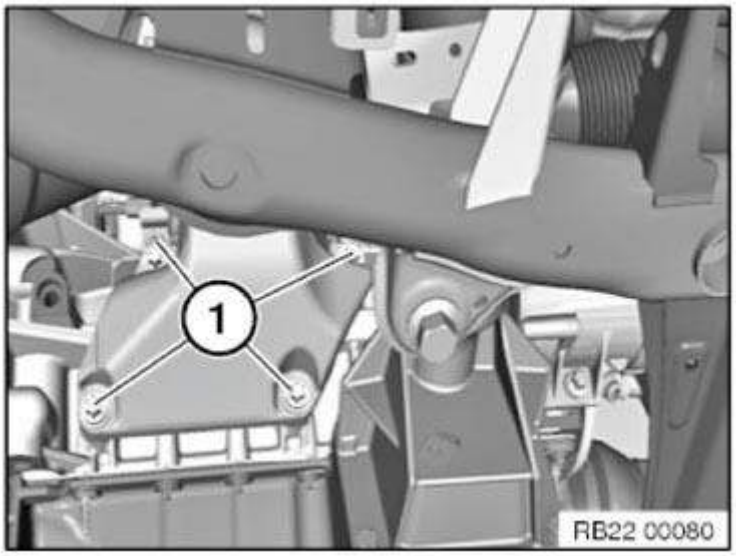


Fig. 21: Identifying Engine Support Arm Screws
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 100 REPLACING RIGHT ENGINE SUPPORT ARM (N47)

Necessary preliminary tasks:

cardiagn.com

- Secure engine in **INSTALLATION POSITION** .
- Remove **REINFORCEMENT PLATE** .

Release screws (1).

Remove engine support arm.

Tightening torque **22 11 3AZ** .

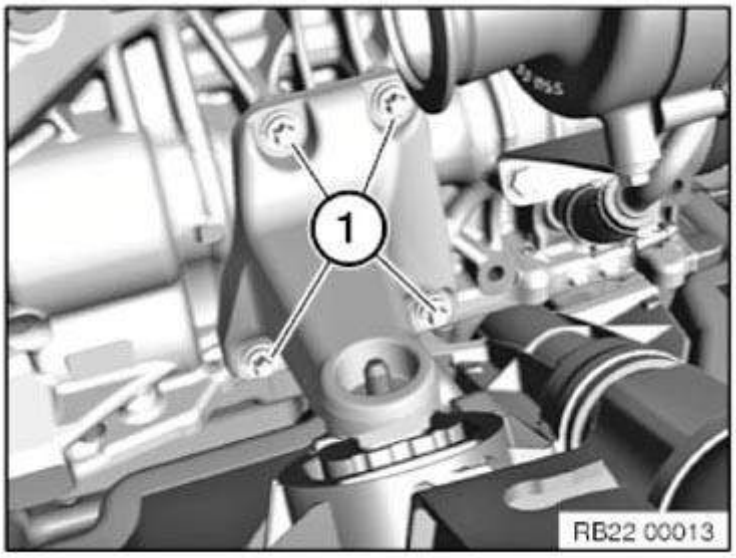


Fig. 22: Identifying Engine Support Arm Screws
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 100 REPLACING RIGHT ENGINE SUPPORT ARM (N52)

Necessary preliminary work:

- Secure engine in **INSTALLATION POSITION**
- Remove rear underguard
- Remove **REINFORCEMENT PLATE**

Release screws (1).

Remove engine support arm.

Tightening torque **22 11 3AZ** .

cardiagn.com

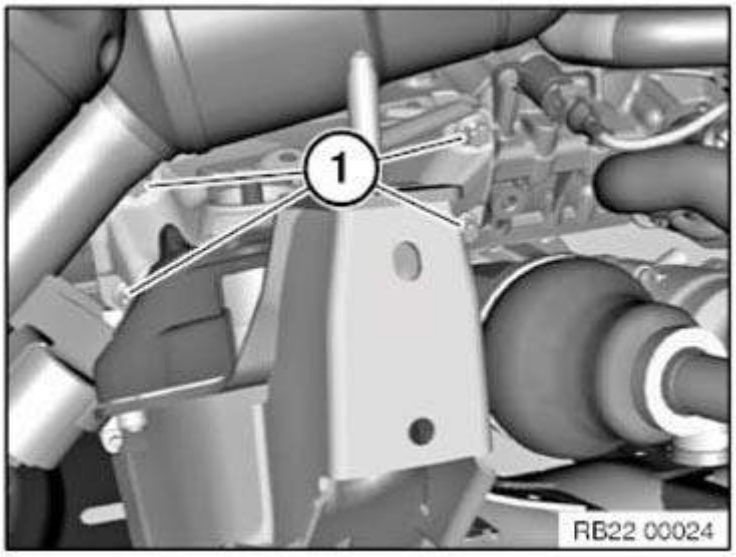


Fig. 23: Identifying Engine Support Arm Screws
Courtesy of BMW OF NORTH AMERICA, INC.

22 11 100 REPLACING RIGHT ENGINE SUPPORT ARM (N55)

Necessary preliminary work:

- Secure engine in **INSTALLATION POSITION**
- Remove rear underguard
- Remove **REINFORCEMENT PLATE**

Release screws (1).

Remove engine support arm.

Tightening torque **22 11 3AZ** .

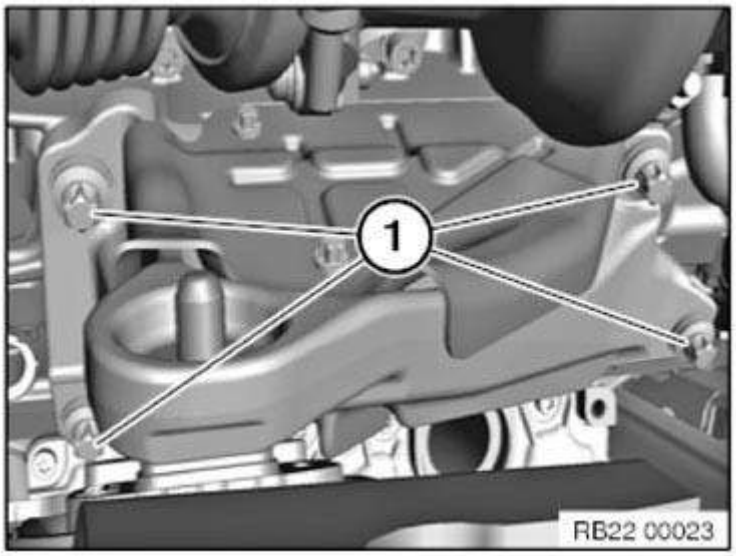


Fig. 24: Identifying Engine Support Arm Screws
Courtesy of BMW OF NORTH AMERICA, INC.

TRANSMISSION SUSPENSION, AUTOMATIC. TRANSMISSION

22 32 050 REPLACING CROSS MEMBER FOR TRANSMISSION MOUNTING

cardiagn.com

Special tools required:

- 00 2 030
- 23 4 050

Necessary preliminary tasks:

- Remove REAR UNDERBODY PROTECTION .
- Remove LEFT UNDERBODY PANELLING .

Supporting transmission:

Support transmission with special tools 23 4 050 , 00 2 030 .

Secure transmission to mounting with tensioning strap (1).

Tasks are described in GEARBOX HOLDER .

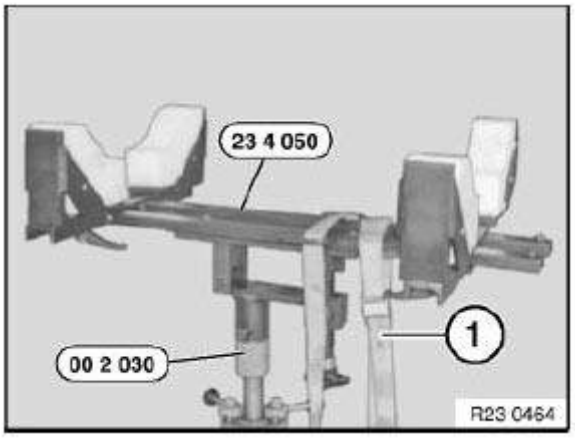


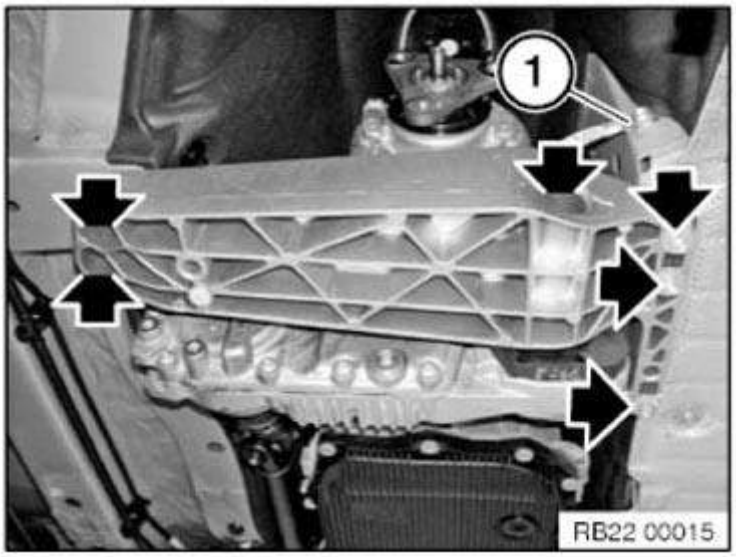
Fig. 25: Supporting Transmission Using Special Tools (23 4 050)
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten ground strap (1).

Release screws.

Remove cross member.

Tightening torque 22 32 3/6AZ .



cardiagn.com

Fig. 26: Locating Transmission Mounting Ground Strap
Courtesy of BMW OF NORTH AMERICA, INC.

22 31 001 REPLACING RUBBER MOUNT FOR TRANSMISSION MOUNTING

Special tools required:

- 22 1 051
- 22 1 052
- 33 4 465
- 33 4 466
- 22 1 046
- 22 1 053

Necessary preliminary tasks:

- Remove CROSS MEMBER for transmission mounting.

Attach special tool 22 1 051 with screw (1) on the housing.

Pull out rubber mount with special tools 22 1 052 /33 4 465 and 33 4 466 .

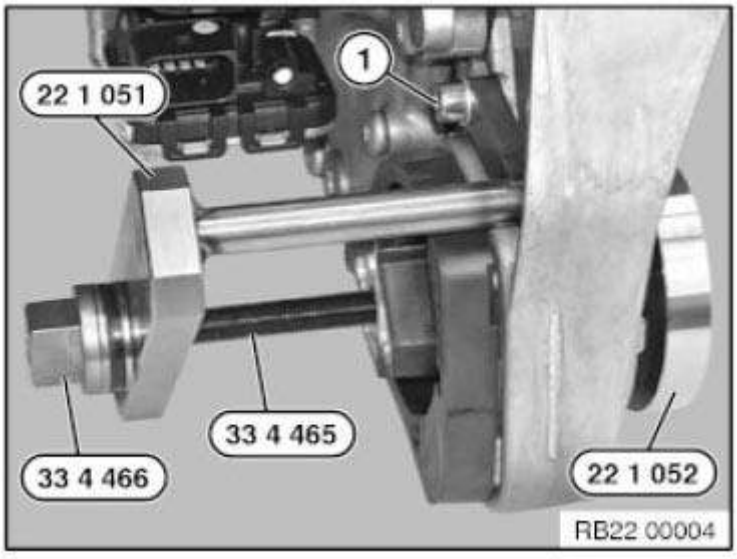


Fig. 27: Attaching Special Tool (22 1 051)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Observe installation position of rubber mount.

Arrow on rubber mount must point to arrow on housing.

Coat housing bore and rubber mount with Circolight.

cardiagn.com



Fig. 28: Identifying Rubber Mount Installation Position
Courtesy of BMW OF NORTH AMERICA, INC.

Insert special tool **22 1 046** with bolt into recesses of rubber mount.

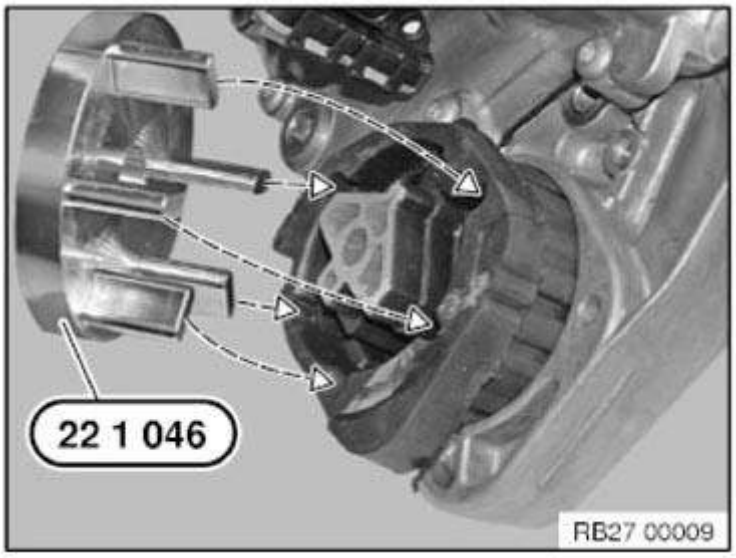


Fig. 29: Inserting Special Tool (22 1 046)
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in rubber mount with special tools **22 1 046** /**22 1 053** /**33 4 465** and **33 4 466** .

cardiagn.com

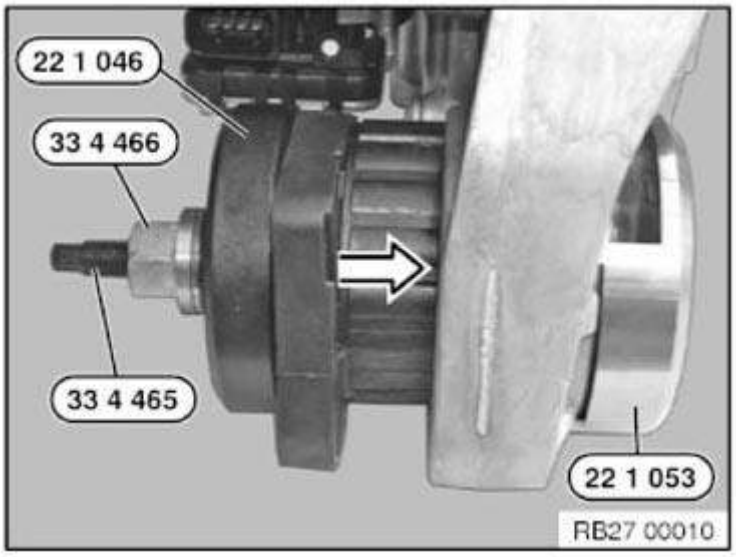


Fig. 30: Installing Rubber Mount Using Special Tools (22 1 046)
Courtesy of BMW OF NORTH AMERICA, INC.

22 32 001 REPLACING RUBBER MOUNT FOR TRANSMISSION MOUNTING (ATC 450)

Special tools required:

- 22 1 051
- 22 1 052
- 33 4 465
- 33 4 466
- 22 1 046
- 22 1 053

Necessary preliminary work:

- Remove CROSS MEMBER for transmission mounting

Attach special tool 22 1 051 with screw (1) on the housing.

Pull out rubber mount with special tools 22 1 052 /33 4 465 and 33 4 466 .

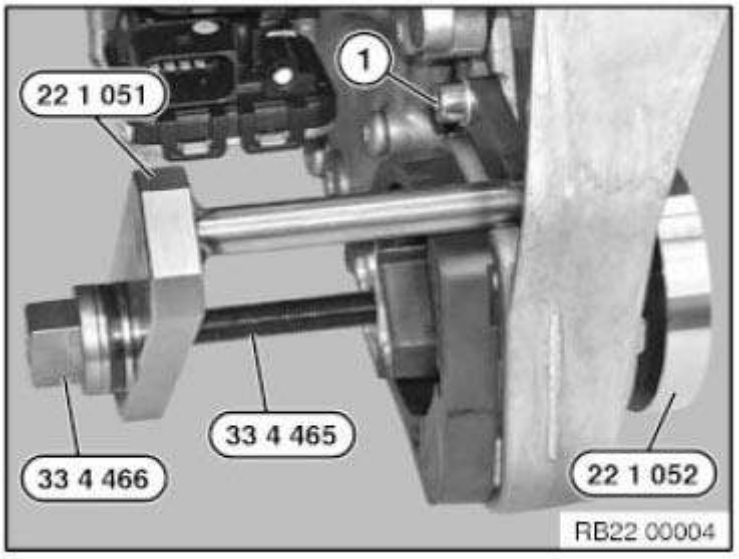


Fig. 31: Attaching Special Tool (22 1 051)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Observe installation position of rubber mount.

Arrow on rubber mount must point to arrow on housing.

Coat housing bore and rubber mount with Circolight.



Fig. 32: Identifying Rubber Mount Installation Position
Courtesy of BMW OF NORTH AMERICA, INC.

Insert special tool **22 1 046** with bolt into recesses of rubber mount.

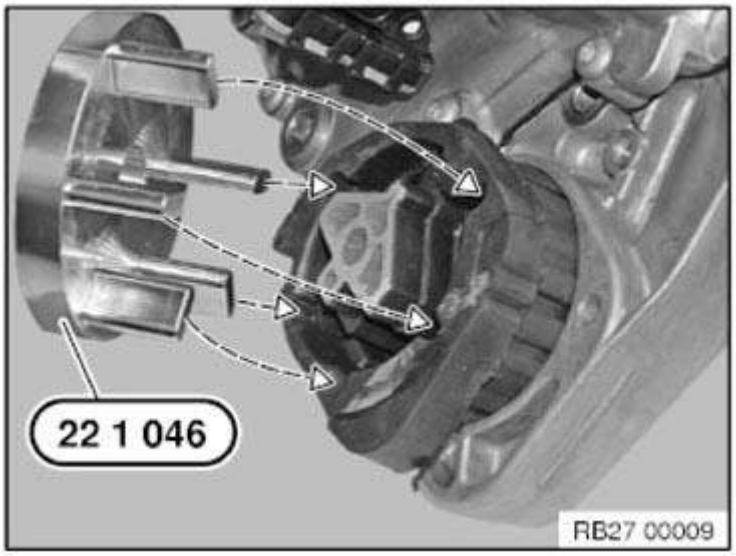


Fig. 33: Inserting Special Tool (22 1 046)
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in rubber mount with special tools **22 1 046** /**22 1 053** /**33 4 465** and **33 4 466** .

cardiagn.com

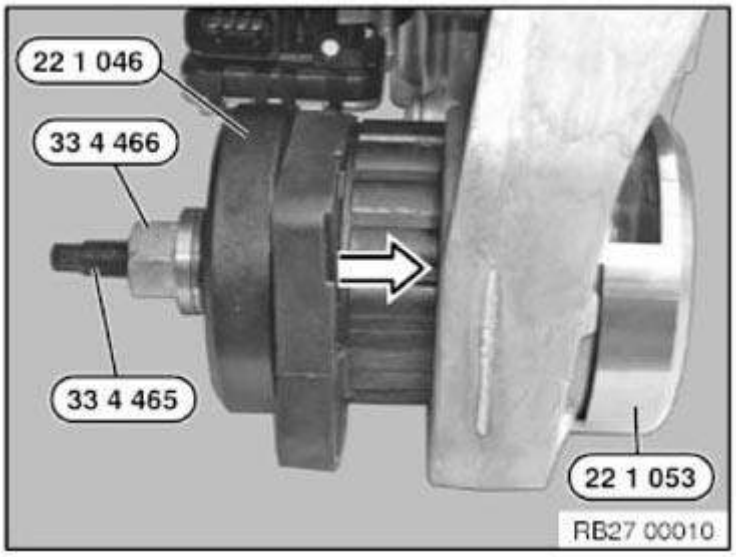


Fig. 34: Installing Rubber Mount Using Special Tools (22 1 046)
Courtesy of BMW OF NORTH AMERICA, INC.

22 32 001 REPLACING RUBBER MOUNT FOR TRANSMISSION MOUNTING (ATC 45L)

Special tools required:

- 22 1 051
- 22 1 052
- 33 4 465
- 33 4 466
- 22 1 046
- 22 1 053

Necessary preliminary tasks:

- Remove CROSS MEMBER for transmission mounting

Attach special tool 22 1 051 with screw (1) on the housing.

Pull out rubber mount with special tools 22 1 052 /33 4 465 and 33 4 466 .

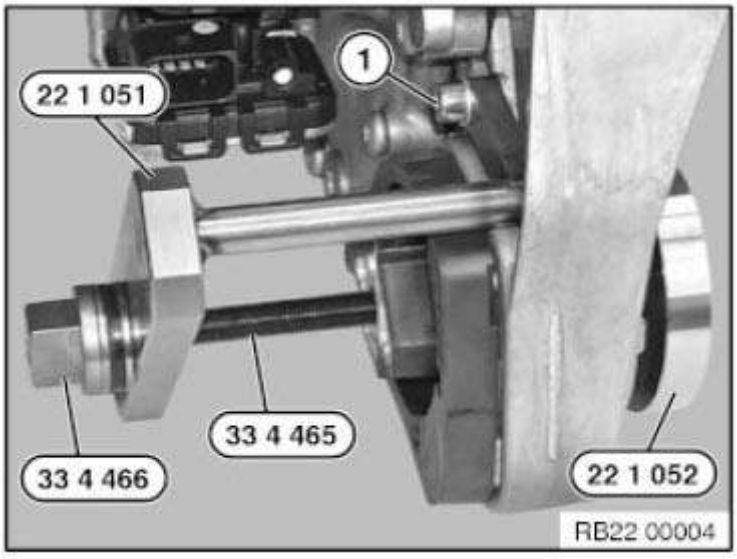


Fig. 35: Attaching Special Tool (22 1 051)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Observe installation position of rubber mount.

Arrow on rubber mount must point to arrow on housing.

Coat housing bore and rubber mount with Circolight.



Fig. 36: Identifying Rubber Mount Installation Position
Courtesy of BMW OF NORTH AMERICA, INC.

Insert special tool **22 1 046** with bolt into recesses of rubber mount.

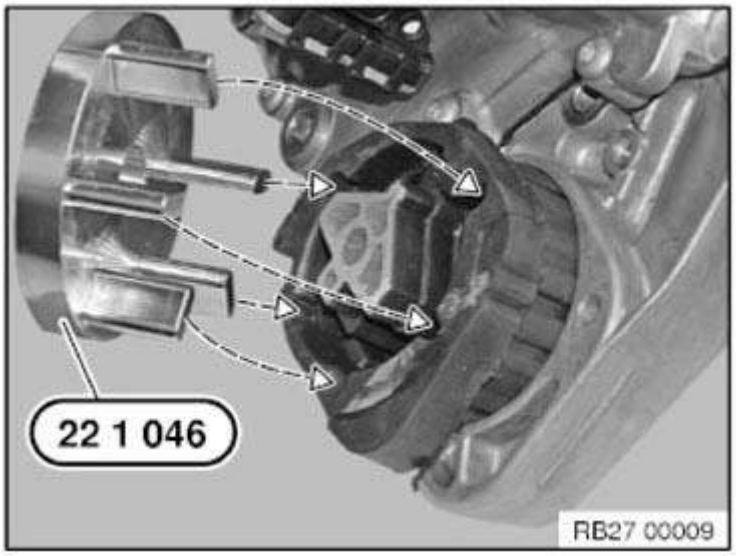


Fig. 37: Inserting Special Tool (22 1 046)
Courtesy of BMW OF NORTH AMERICA, INC.

Draw in rubber mount with special tools **22 1 046** /**22 1 053** /**33 4 465** and **33 4 466** .

cardiagn.com

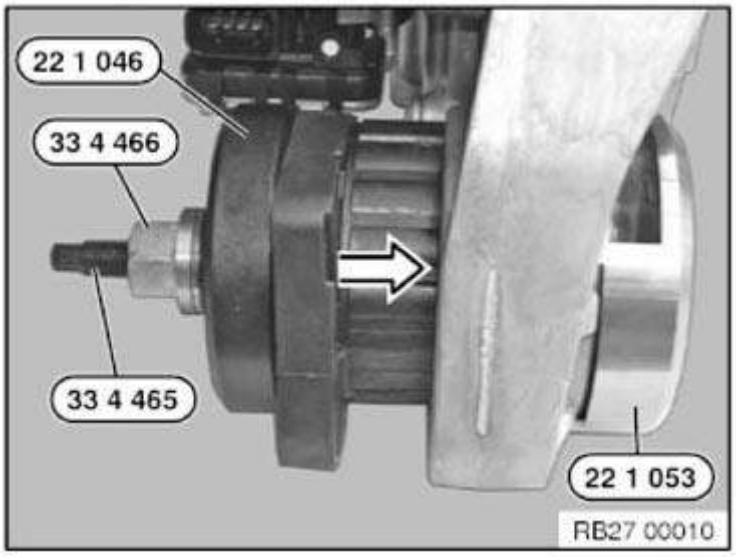


Fig. 38: Installing Rubber Mount Using Special Tools (22 1 046)
Courtesy of BMW OF NORTH AMERICA, INC.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702205

cardiagn.com

ENGINE AND GEARBOX SUSPENSION

0493702 BRIDGE

0493702 221016 Bridge Minimum set: Mechanical tools AM

NOTE: For pulling out the transfer box rubber mount. Series: E46/16, E83

Storage Location

B9

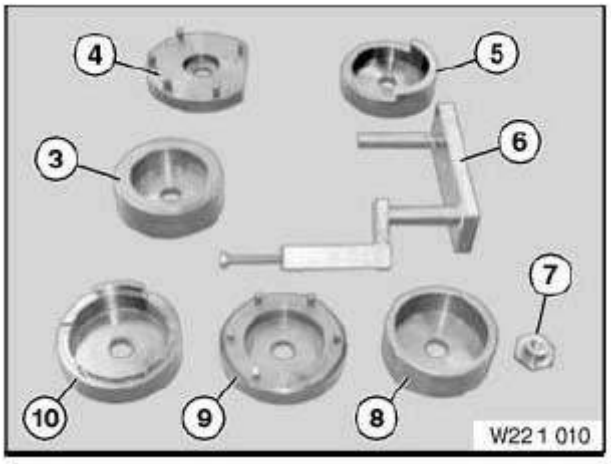


Fig. 1: Identifying Bridge (0493702)
Courtesy of BMW OF NORTH AMERICA, INC.

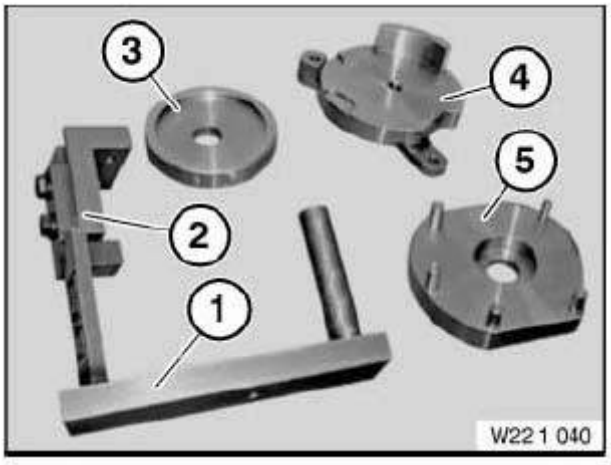
0495263 BRIDGE

0495263 221041 Bridge Minimum set: Mechanical tools AM

NOTE: Available as part of set of special tools 22 1 040-22 1 040 -> (83 30 0 495 240) only.

Storage Location

B50



cardiagn.com

Fig. 2: Identifying Bridge (0495263)
Courtesy of BMW OF NORTH AMERICA, INC.

0496928 BRIDGE

0496928 221051 Bridge AM

NOTE: **For removing rubber mount.**

Storage Location

C28



Fig. 3: Identifying Bridge (0496928)
Courtesy of BMW OF NORTH AMERICA, INC.

0493807 BUSH

0493807 221018 Bush Minimum set: Mechanical tools AM

NOTE: **For pulling out the transfer box rubber mount - series: E53, E83, E90**

Storage Location

C9



cardiagn.com

Fig. 4: Identifying Bush (0493807)
Courtesy of BMW OF NORTH AMERICA, INC.

0496851 DEVICE

0496851 221050 Device AM

In conjunction with: 33 4 465/466, 22 1 102, 22 1 046 = 0496792

NOTE: **For removing and installing the rubber mount.**

Storage Location

C28

SI number

01 03 10 (619)

Consisting of:



Fig. 5: Identifying Device (0496851)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0496928 Bridge

   NOTE: **For removing rubber mount.**

2. 0496929 Washer

   NOTE: **For removing rubber mount**

3. 0496930 Washer

   NOTE: **For fitting rubber mount.**

0495240 DEVICE

0495240 221040 Device Minimum set: Mechanical tools AM

NOTE: **For removing and installing rubber mount on transfer box: ATC300, ATC350, ATC450**

cardiagn.com

Storage Location

B50

SI number

01 04 05 (175)

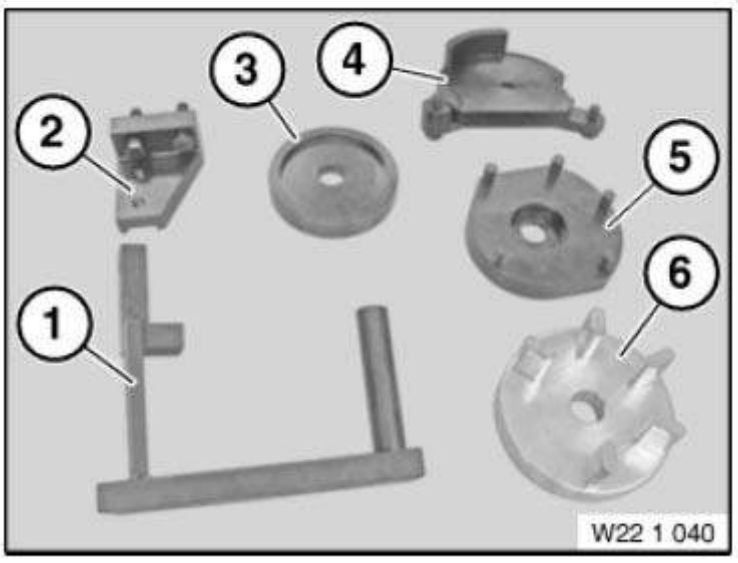


Fig. 6: Identifying Device (0495240)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0495263 Bridge

   NOTE: Available as part of set of special tools 22 1 040-22 1 040 -> (83 30 0 495 240) only.

2. 0495264 Holder

   NOTE: Available as part of set of special tools 22 1 040-22 1 040 -> (83 30 0 495 240) only.

3. 0495265 Washer

   NOTE: (Thrust washer) Available as part of set of special tools 22 1 040-22 1 040 -> (83 30 0 495 240) only.

4. 0495266 Washer

   NOTE: (Profile washer) Only available via complete tool set 22 1 040 -> (83 30 0 495 240).

5. 0495267 Washer

   NOTE: (Washer with cylindrical pins) Only available via complete tool set 22 1 040 -> (83 30 0 495 240).

6. 0496792 Washer

cardiagn.com

NOTE: **For installing rubber mount in transfer box housing.**

In conjunction with: 22 1 044, 33 4 465/466 = 0495266

0495264 HOLDER

0495264 221042 Holder Minimum set: Mechanical tools AM

NOTE: **Available as part of set of special tools 22 1 040-22 1 040 -> (83 30 0 495 240) only.**

Storage Location

B50

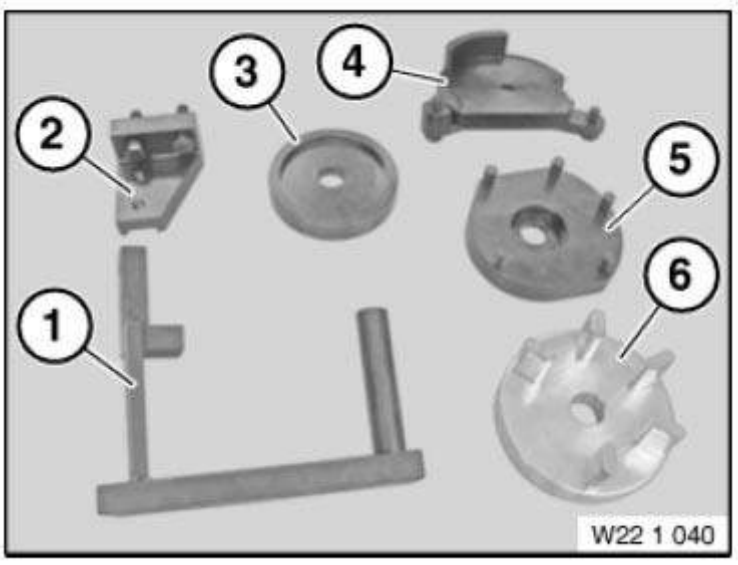


Fig. 7: Identifying Holder (0495264)
Courtesy of BMW OF NORTH AMERICA, INC.

2184136 MOBILE EQUIPMENT TABLE LIFT

2184136 Mobile equipment table lift Mechanical tool

NOTE: **Table lift Gruse MHT 1200**

SI number

06 01 10 (649)

cardiagn.com

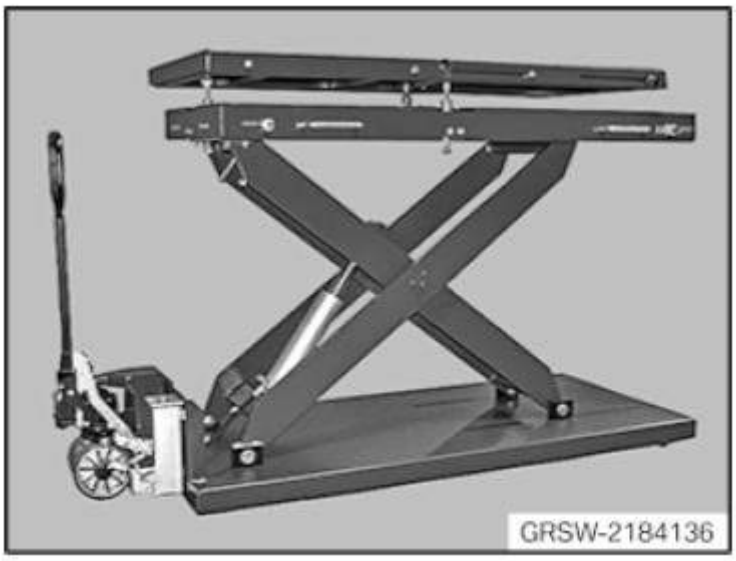


Fig. 8: Identifying Mobile Equipment Table Lift (2184136)
Courtesy of BMW OF NORTH AMERICA, INC.

0493806 NUT

0493806 221017 Nut Minimum set: Mechanical tools AM

NOTE: **For installing and removing the transfer box rubber mount - series: E46/16**

Storage Location

B9



Fig. 9: Identifying Nut (0493806)
Courtesy of BMW OF NORTH AMERICA, INC.

0493700 SYNCHRONIZING KEY

0493700 221013 Synchronizing key Minimum set: Mechanical tools AM

NOTE: **For installing the transfer box rubber mount - series: E53**

Storage Location

B9

cardiagn.com

C9

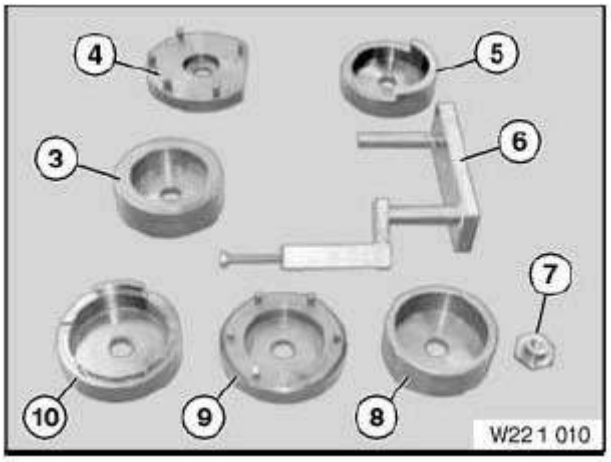


Fig. 10: Identifying Synchronizing Key (0493700)
Courtesy of BMW OF NORTH AMERICA, INC.

0493701 SYNCHRONIZING KEY

0493701 221014 Synchronizing key Minimum set: Mechanical tools AM

NOTE: **For installing the transfer box rubber mount - series: E46/16, E83**

Storage Location

B9

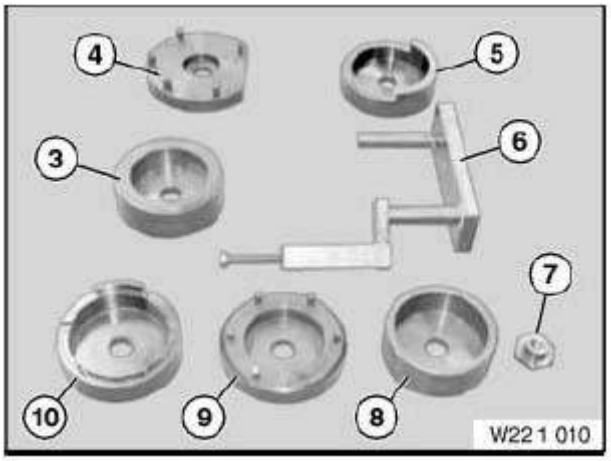


Fig. 11: Identifying Synchronizing Key (0493701)
Courtesy of BMW OF NORTH AMERICA, INC.

0493698 SYNCHRONIZING KEY

0493698 221011 Synchronizing key Minimum set: Mechanical tools AM

Replaced by: 83300493807

NOTE: **For pulling out the transfer box rubber mount - Replaced by 22 1 018 (0 493 807)**

cardiagn.com

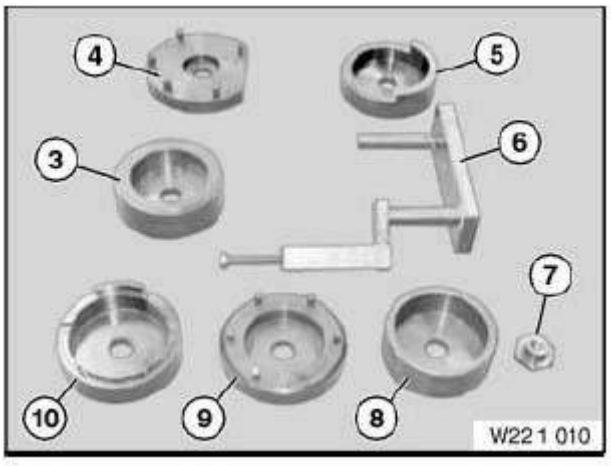


Fig. 12: Identifying Synchronizing Key (0493698)
Courtesy of BMW OF NORTH AMERICA, INC.

0493597 TOOL

0493597 221010 Tool Minimum set: Mechanical tools AM

NOTE: **(Tool set) For removing and installing the transfer box rubber mount 22 1 018 for E46/16, E67 and RR**

Storage Location

B9

SI number

01 15 99 (483)

Consisting of:

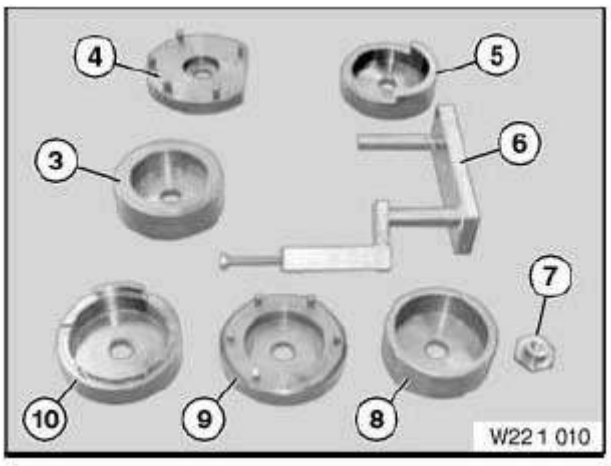


Fig. 13: Identifying Tool (0493597)
Courtesy of BMW OF NORTH AMERICA, INC.

3 = 0493698 Synchronizing key

NOTE: **For pulling out the transfer box rubber mount - Replaced by 22 1 018 (0 493 807)**

3 = 0493699 Washer

cardiagn.com

NOTE: **(Support disc) For installing the transfer box rubber mount - series: E53 - Replaced by 22 1 019 (0 493 808)**

3 = **0493700** Synchronizing key

NOTE: **For installing the transfer box rubber mount - series: E53**

4 = **0493701** Synchronizing key

NOTE: **For installing the transfer box rubber mount - series: E46/16, E83**

6 = **0493702** Bridge

NOTE: **For pulling out the transfer box rubber mount. Series: E46/16, E83**

5 = **0493746** Washer

NOTE: **Series: E46/16**

7 = **0493806** Nut

NOTE: **For installing and removing the transfer box rubber mount - series: E46/16**

8 = **0493807** Bush

NOTE: **For pulling out the transfer box rubber mount - series: E53, E83, E90**

9 = **0493808** Washer

NOTE: **For installing the transfer box rubber mount - series: E53**

10 = **0494780** Washer

NOTE: **For installing the rubber mount in the transfer box-transfer box: ATC400 Model series: E83**

0493746 WASHER

0493746 221015 Washer Minimum set: Mechanical tools AM

NOTE: **Series: E46/16**

Storage Location

B9

C9

cardiagn.com

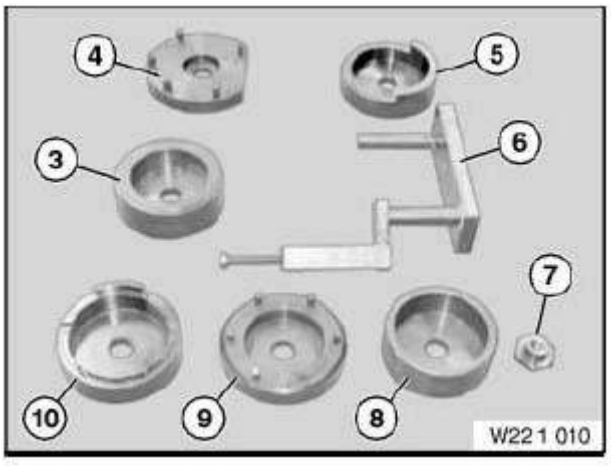


Fig. 14: Identifying Washer (0493746)
Courtesy of BMW OF NORTH AMERICA, INC.

0493808 WASHER

0493808 221019 Washer Minimum set: Mechanical tools AM

NOTE: **For installing the transfer box rubber mount - series: E53**

Storage Location

C9

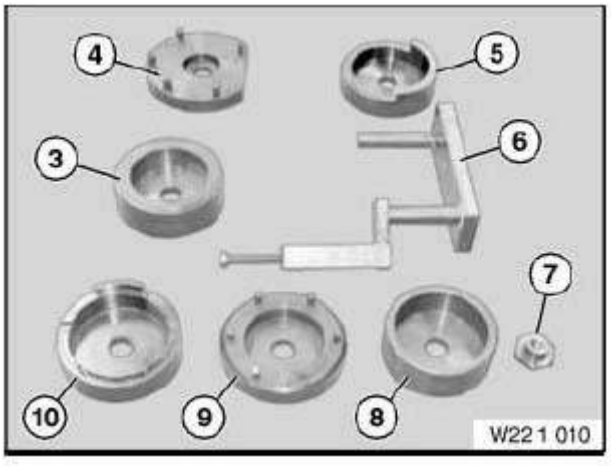


Fig. 15: Identifying Washer (0493808)
Courtesy of BMW OF NORTH AMERICA, INC.

0495267 WASHER

0495267 221045 Washer Minimum set: Mechanical tools AM

NOTE: **(Washer with cylindrical pins) Only available via complete tool set 22 1 040 - > (83 30 0 495 240).**

Storage Location

B50

cardiagn.com

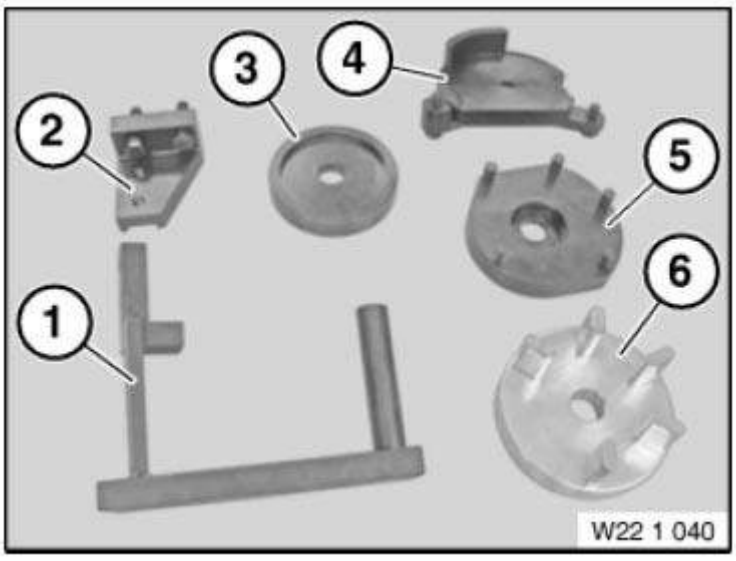


Fig. 16: Identifying Washer (0495267)
Courtesy of BMW OF NORTH AMERICA, INC.

0496792 WASHER

0496792 221046 Washer Minimum set: Mechanical tools AM

In conjunction with: 22 1 044, 33 4 465/466 = 0495266

NOTE: **For installing rubber mount in transfer box housing.**

Storage Location

B28

SI number

01 25 09 (591)



Fig. 17: Identifying Washer (0496792)
Courtesy of BMW OF NORTH AMERICA, INC.

0494780 WASHER

0494780 221021 Washer Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **For installing the rubber mount in the transfer box-transfer box: ATC400 Model series: E83**

Storage Location

C9



Fig. 18: Identifying Washer (0494780)
Courtesy of BMW OF NORTH AMERICA, INC.

0495265 WASHER

0495265 221043 Washer Minimum set: Mechanical tools AM

NOTE: **(Thrust washer) Available as part of set of special tools 22 1 040-22 1 040 -> (83 30 0 495 240) only.**

Storage Location

B50

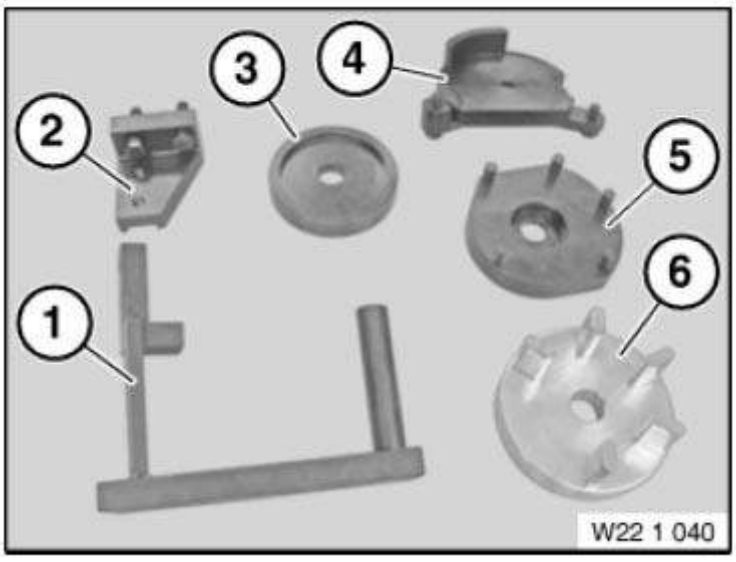


Fig. 19: Identifying Washer (0495265)
Courtesy of BMW OF NORTH AMERICA, INC.

0495266 WASHER

cardiagn.com

0495266 221044 Washer Minimum set: Mechanical tools AM

NOTE: **(Profile washer) Only available via complete tool set 22 1 040 -> (83 30 0 495 240).**

Storage Location

C50

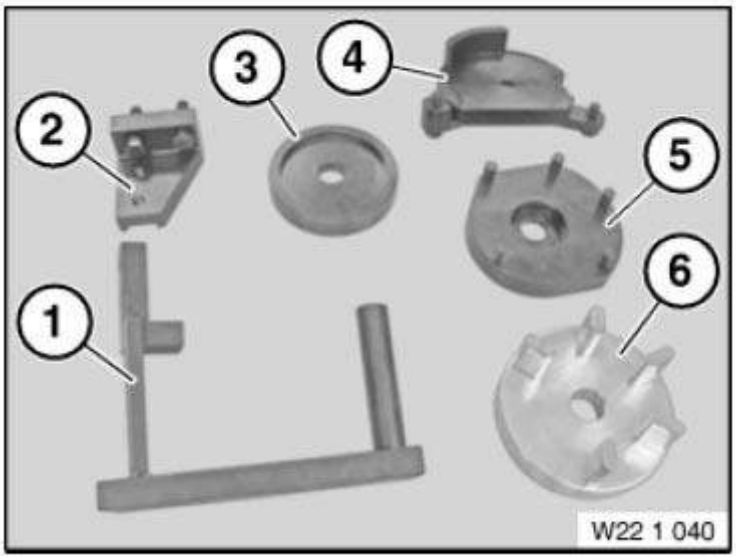


Fig. 20: Identifying Washer (0495266)
Courtesy of BMW OF NORTH AMERICA, INC.

0493699 WASHER

0493699 221012 Washer Minimum set: Mechanical tools AM

Replaced by: 83300493808

NOTE: **(Support disc) For installing the transfer box rubber mount - series: E53 - Replaced by 22 1 019 (0 493 808)**

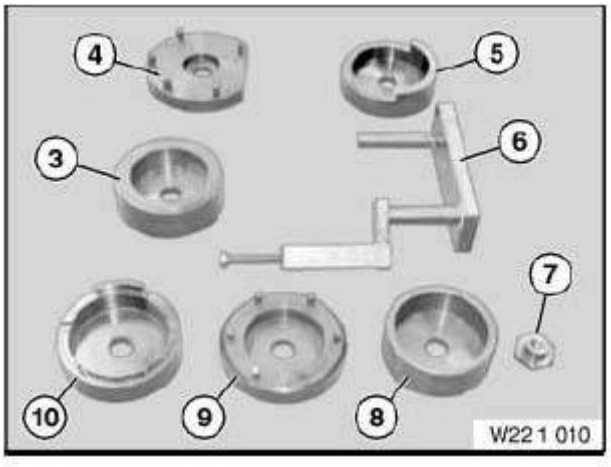


Fig. 21: Identifying Washer (0493699)
Courtesy of BMW OF NORTH AMERICA, INC.

0496929 WASHER

0496929 221052 Washer AM

cardiagn.com

NOTE: **For removing rubber mount**

Storage Location

C28

0496930 WASHER

0496930 221053 Washer AM

NOTE: **For fitting rubber mount.**

Storage Location

C28

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702117

cardiagn.com

ENGINE MOUNTING

22 11 ENGINE MOUNTING

TIGHTENING TORQUE SPECIFICATION - ENGINE MOUNTING

Â		Type	Thread	Tightening specifications
1AZ	Engine mount to front axle support	F01/F02/F03/F04/F06/F07/F10/F10 HY/F11/F12/F13/F18/F20/F21/F22/F23/F25 N57/F30/F30 HY/F31/F32/F33/F34/F35/F36/F80/F82/F83/F18 PHEV	M8 8.8	Â
		F25/F26	M8X45	Â
		F15/F16/F26/F25	M10X30	Â
2AZ	Engine mount to engine support arm	F01/F02/F03/F04/F06/F07/F10/F10 HY/F11/F12/F13/F18/F80/F82/F83/F18 PHEV	M12 10.9	Â
		F15 F16 N57 (right engine mount)/F25/F30 N57 (right engine mount)	M12 10.9	Â
		F20/F21/F22/F23/F25/F30 (without N57)/F32/F33/F34/F36/F80/F82/F83	M10	Â
		F25, F30 N57 (left engine mount)	M10	Â
		F25/F26	M12	Â
		F30, F31 N47T/F30 HY	M10	Â
		F35	M10	Â
		F15, F16 N57 (left engine mount)/F15, F16 N63/F15, F16 N55	M12	Â
3AZ	Engine support arm to engine	F01/F02/F03/F04/F06/F07/F10/F10 HY/F11/F12/F13/F15, F16 N63/F18/F20/F21/F22/F23/F25/F26/F30/F31/F32/F33 N47/F34/F35/F36/F80/F82/F83/F18 PHEV	M10 8.8	Â
		F01 N54/F02 N54/F07 N55/F10 N55/F11 N55/F15, F16 N55/F20 N55/F21 N55/F22 N55/F23 N55/F25 N55/F26 N55/F30 N55/F30 HY/F34 N55/F33 N55/F80/F82/F83	M12 8.8	Â
		F01/F02/F10, F11 N52T, F10/F11, N53/F25 N52T	M12x46	Replace screws, jointing torque and angle of rotation must be observed without fail. 1. Jointing torque 2. Angle of rotation
		F20 N13/F30 N13/F31 N13	M10x70, M10x35	Â
		F15 F16 N57 (right engine support arm)	M10 10.9	Â
		F15 F16 N57 (left engine support arm)	M10 8.8	Â
		F80/F82	M10 10.9	Â
4AZ	Additional mass to engine support arm, left	F01/F02/F06/F07/F10/F10 HY/F11/F18/F15/F16/F25/F26/F30/F31/F80/F82/F83	M8 8.8	Replace screw
5AZ	Engine support arm to front axle differential (reinforcing plate)	F01, F02, F07/F25, (all-wheel drive vehicle)	M8	Â
6AZ	Tank ventilation line to engine support arm	F20/F21/F30/F31/F33/F34/F35	M6	Â
7AZ	Holder, electric vacuum pump to engine support arm	F30Hyb.	Â	Â

TRANSMISSION MOUNTING

22 32 TRANSMISSION MOUNTING

TIGHTENING TORQUE SPECIFICATION - TRANSMISSION MOUNTING

Â		Type	Thread	Ti sp
1AZ	Transmission bearing support to transmission	F01/F02/F03/F04/F06/F07/F10/F11/F12/F13/F15/F16/F18/F20/F21/F22/F23/F25/F26/F30/F31/F32/F33/F34/F35/F36/F80/F82/F83/F18 PHEV	M10	Â
2AZ	Rubber mount to transmission bearing support	F01/F02/F03/F04/F06/F07/F10/F11/F12/F13/F18/F20/F21/F22/F23/F25/F26/F30/F31/F32/F33/F34/F35/F36/F80/F82/F83/F18 PHEV	M8	Â
3AZ	Transmission cross member to body	F01/F02/F03/F04/F06/F07/F10/F11/F12/F13/F18/F20/F21/F22/F23/F25/F26/F30/F31/F32/F33/F34/F35/F36/F80/F82/F83/F18 PHEV	M8	Â
4AZ	Transmission cross member to rubber mounts	F01/F02/F03/F04/F06/F07/F10/F11/F12/F13/F18/F20/F21/F22/F23/F25/F26/F30/F31/F32/F33/F34/F35/F36/F80/F82/F83/F18 PHEV	M8	Â
5AZ	Vibration absorber to transmission cross	F01/F02 N54/F10	Â	Â

cardiagn.com

	member			
6AZ	Transmission cross member to rubber mounts (AWD)	F01/F02/F06/F07/F10/F11/F25/F12/F13/F15/F16/F20/F21/F30/F31/F32/F34/F36/F80/F82/F83	M12	Â
7AZ	Transmission bearing block to transmission (AWD)	F01/F06/F07/F10/F11	M8	Â
8AZ	Rubber mount to transmission bearing block (AWD)	F01/F06/F07/F10/F11	M8	Â
9AZ	Rubber mount to transmission bearing block (AWD)	F01/F06/F07/F10/F11	M8	Â
10AZ	Transmission bearing block to body (AWD)	F01/F06/F07/F10/F11	M8	Â
11AZ	Transmission cross member to body	F15/F16/F15 PHEV	M10	Â

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702166

cardiagn.com

TROUBLESHOOTING

61 20... BATTERY REPLACEMENT INFORMATION

A vehicle battery is constructed for the installation location and the individual power requirements of the particular vehicle. These individual power requirements depend on the motorization and different types of equipment. The individually assigned vehicle battery is the ideal compromise between the power requirements of the vehicle electrical system and the weight and service life of the vehicle battery.

Vehicles with the automatic engine start-stop function or particular engine types and optional equipment are equipped with a special vehicle battery (AGM battery), since only this battery type can provide elevated power requirements over the extended service life. Installing a different vehicle battery can cause problems with vehicle electronics, can reduce functions or can cause leakage of battery acid.

In the event of an accident where the airbags are deployed in vehicles with a vehicle battery in the luggage compartment, the electrical connection between the vehicle battery and the trigger is automatically disconnected through pyrotechnics. This prevents possible short-circuiting.

Proper operation of all of these safety and convenience functions requires a battery that conforms with specifications and that is properly registered in vehicles with energy management systems (IBS, power module).

Vehicles with energy management systems (IBS, power module): Register battery replacement

The vehicle electrical system is informed about the vehicle battery characteristic data, such as type, size, age and current power capacity. Therefore, there will always be only one work scope provided that is permitted by the current status of information.

If the performance readiness drops below a defined minimum, a Check Control message will be generated to advise the driver that the battery must be replaced.

When installing a new vehicle battery, the battery must be registered and thus must also be registered with the vehicle electrical system.

NOTE: **Only this registration/logon will ensure that the corresponding Check Control message will go out again.**

Diagnosis system:

Register battery replacement

- Service functions
- Body
- Voltage supply
- Register battery replacement

When retrofitting, a more powerful battery may be used. Standard batteries may always be replaced by AGM batteries with the same specifications.

When installing a battery of a different size or a different battery type, this change in vehicle data must be programmed into the vehicle data in accordance with specifications.

Programming system:

cardiagn.com

- Battery retrofitting

61 13... BUTT CONNECTOR FOR REPAIRING A PLUG CONNECTION

Special tools required:

- 61 0 300
- 61 4 340
- 61 0 240

IMPORTANT:

1. Identify cause of damage (e.g. sharp-edged body components, faulty electrical loads, jammed mechanisms, corrosion caused by ingress of water, etc.).
2. Read out fault memory
3. Eliminate cause of damage.
4. Disconnect battery negative terminal
5. Make sure that no safety-related system according to circuit diagram (e.g. antilock braking system, active rear-axle kinematics, airbags, etc.) are influenced. Otherwise replace faulty wiring harness or use repair cable (sourcing reference: BMW Parts Department)
6. Carry out function test and read out fault memories again
7. Eliminate new faults if applicable and clear fault memories

NOTE: **The repair range IV for vehicle electrical system contained the required special tools and individual parts for retrofitting and repair work with the aid of fan connectors.**

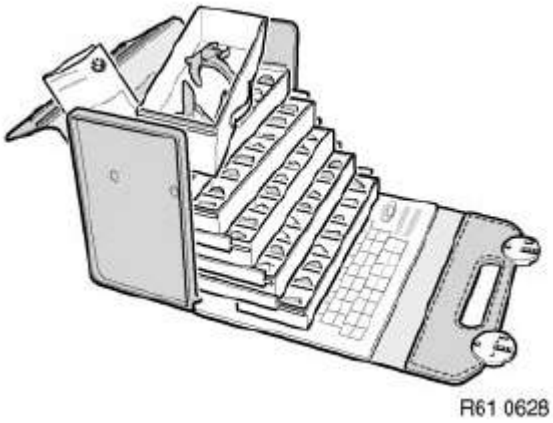


Fig. 1: Identifying Vehicle Repair Kit
Courtesy of BMW OF NORTH AMERICA, INC.

Choose repair kit.

Example: Repair kit, circular connector system D 2.5.

cardiagn.com

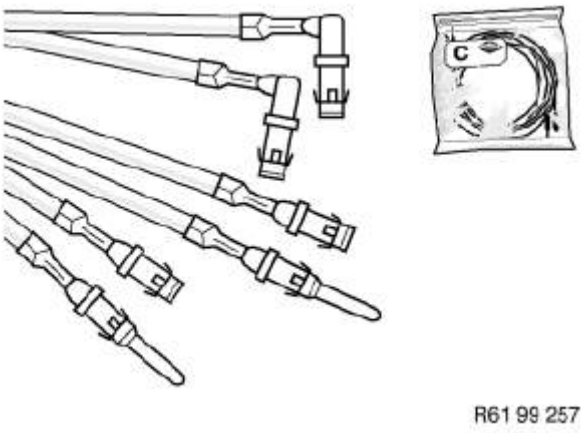


Fig. 2: Identifying Circular Connector Of Repair Kit
Courtesy of BMW OF NORTH AMERICA, INC.

Remove following parts:

1. Pre-packaged end of cable with requisite wire cross-section
2. Crimp connector for selected wire cross-section
3. Shrink-fit hose

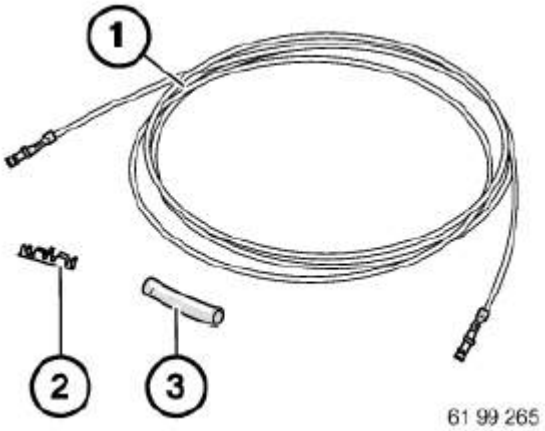


Fig. 3: Identifying Cable, Crimp Connector And Shrink-Fit Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Open secondary lock on housing.

Mark damaged contact (4) with socket number of housing and press it out of housing using appropriate special tool contained in special tool set **61 0 300**).

See repair instructions

NOTES FOR OPENING CONTACTS AND LOCKS of different plug contact systems.

cardiagn.com

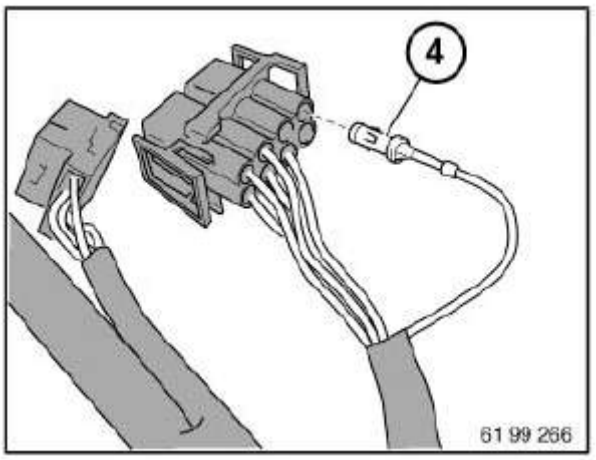


Fig. 4: Identifying Socket Number Of Housing
Courtesy of BMW OF NORTH AMERICA, INC.

- Check maximum length of repair cable
- If more than one wire is to be repaired, the individual interfaces must be offset so that the wiring harness is not too thick at the repaired point.

IMPORTANT:

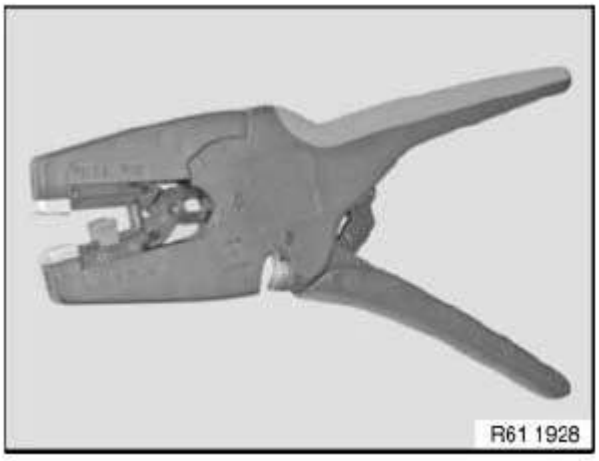


Fig. 5: Identifying Wire Cutting Plier
Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to following procedure:

- Cut off wire with faulty contact at point which is easily accessible
- Strip insulation from end of wire at wiring harness end
- Cut preassembled wire end to length and strip insulation

Refer also to repair instruction:

CUTTING TO LENGTH AND STRIPPING INSULATION FROM CABLES

Crimp butt connector on preassembled wire end.

Special tools:

- **61 4 340** (0.35 - 2.5 sq mm)
- **61 0 240** (4.0 - 6.0 sq mm)

cardiagn.com

See repair instructions

CRIMPING ON STOP PARTS

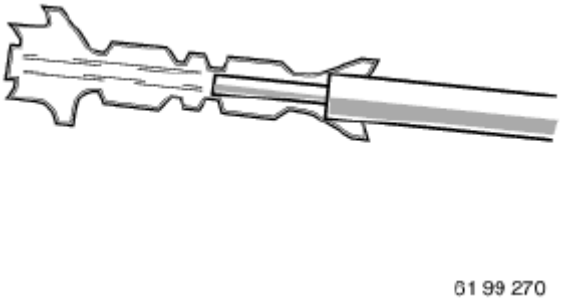


Fig. 6: Identifying Special Tools (61 4 340)
Courtesy of BMW OF NORTH AMERICA, INC.

Push shrink-fit hose (8) onto free wire end.

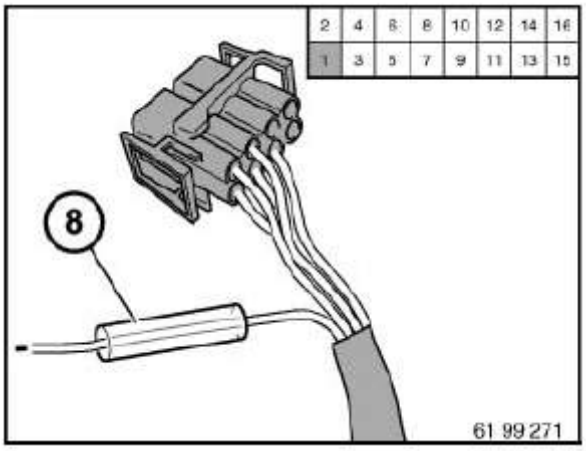


Fig. 7: Identifying Shrink-Fit Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Crimp unused wire end to butt connector.

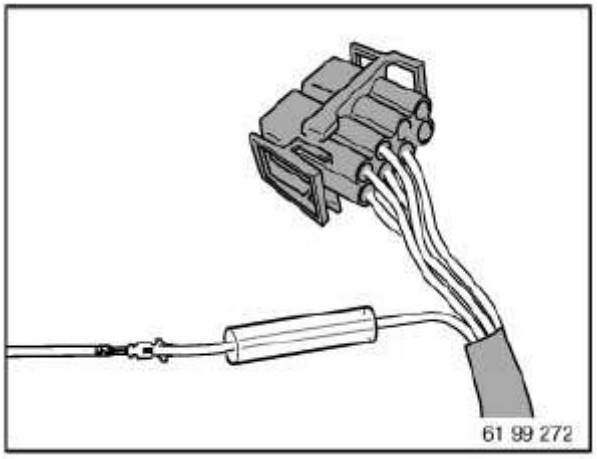


Fig. 8: Identifying Crimp Wire End To Butt Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Pull shrink-on sleeve over butt connector.

cardiagn.com

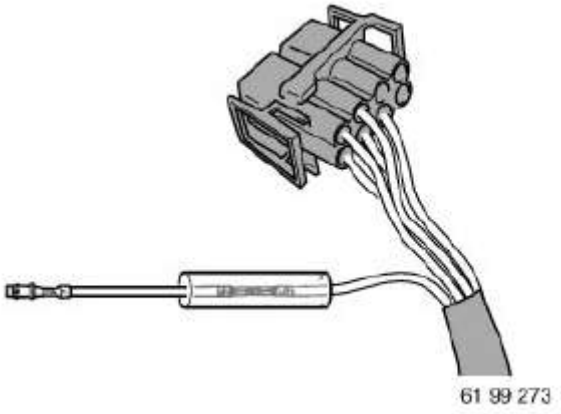


Fig. 9: Identifying Shrink On Sleeve Butt Connector
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Do not burn shrink-on sleeve.

With hot air blower, shrink the shrink-on sleeve on both sides (9) of shrink-fit hose until glue emerges uniformly all round.

Insert contact in housing.

Close secondary lock on housing.

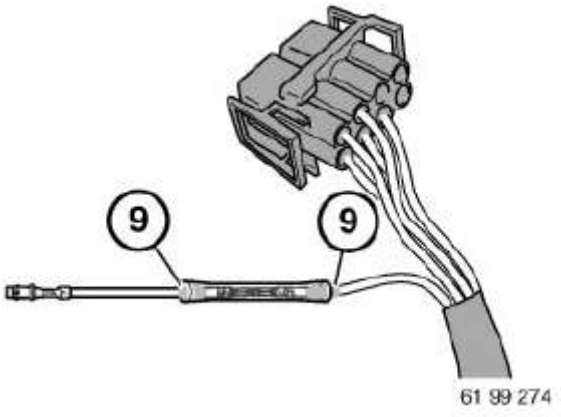


Fig. 10: Identifying Shrink-Fit Hose
Courtesy of BMW OF NORTH AMERICA, INC.

12 00 CONTENTS OF ENGINE ELECTRICAL SYSTEM GENERAL

General Information -> **WORKING ON IGNITION SYSTEM**

-> **REMOVING AND INSTALLING ELECTRONIC CONTROL UNITS**

-> **WELDING WORK** (overload protection of control units)

-> Disconnecting and connecting battery

-> **DISCONNECTING AND CONNECTING TEST EQUIPMENT**

-> **COMPONENT INSPECTION**

-> **EXTERNAL JUMP-STARTING AID**

-> Compression testing

cardiagn.com

11 00... HANDLING COMPONENTS AFTER FLOOD DAMAGE

Flood damage can occur if the permissible fording depth of a vehicle is exceeded. Ingress of water can cause damage to the engine (water shock) or components.

Because dirt particles generally enter into the component with the water (e.g. starter motor, wiring harness), the components need to be thoroughly inspected.

Residual moisture in the components leads to corrosion (increased contact resistance in the component), which can lead to a component failure at a later time.

If water ingress into the electrical components cannot be ruled out, it is recommended to replace the component to ensure correct functioning through the vehicle lifetime.

12 00... INSTRUCTIONS FOR WELDING WORK (OVERLOAD PROTECTION OF CONTROL UNITS)

CAUTION: **Follow instructions for body repairs.**

When performing welding work on installed control units, to avoid any defects in the electronic control units, observe the following steps:

- Observe instructions for disconnecting and connecting battery.
- Detach terminal of battery negative lead from car battery and second battery if fitted. Cover negative terminal posts.
- If welding is to be performed near the battery/batteries, first remove battery/batteries from vehicle (flying sparks - combustion of explosive gas).
- Fit return clamp on welding unit as close as possible to welding point (maximum distance approx. 1 m).
- Never connect return clamp to ground pin on body which has ground wires attached!

12 00... INSTRUCTIONS ON COMPONENT TESTING

NOTE:

- **During all inspections and work on engine electrics and electronics, always observe safety regulations and accident prevention specifications.**
- **Always disconnect connectors of control units or components before checking electric wires.**

Testing Aids:

- Schematics, refer to Diagnosis Information System (DIS).
- Only ever use test lines, adapters, terminals and test tips manufactured by specialists, refer to Diagnosis Information System, Repair Manual.
- The inspection values for component testing are located in the Diagnosis Information System (DIS).
- For further technical information, refer to Technical Data.

12 00... INSTRUCTIONS FOR CONNECTING AND DISCONNECTING TEST UNITS

When connecting and disconnecting:

- Service Tester
- testing devices
- test leads and
- when replacing control units

cardiagn.com

it is essential to **turn off the ignition!**

FOLLOW INSTRUCTIONS FOR REMOVING AND INSTALLING ELECTRONIC CONTROL UNITS.

Follow operating instructions for testing devices.

Make sure that connected test leads cannot make contact with rotating parts (e.g.: fans, ribbed V-belts, etc.).

12 00... INSTRUCTIONS FOR REMOVAL AND REPLACEMENT OF CONTROL UNITS

IMPORTANT:

- Disconnecting the vehicle battery will cancel the fault memories of control units. Consequently, before disconnecting the car's battery, always interrogate the fault memories. Investigate stored faults and, once any faults have been remedied, cancel the fault memory.
- Control unit plugs should only ever be connected and disconnected while the ignition is turned off.
- The removal and installation of components, relays, fuses etc. can cause faults to be stored in fault memories capable of self diagnosis. Always interrogate the fault memories after completing work on the electrical system.
- Investigate stored faults and, once any faults have been remedied, cancel the fault memory.
- If necessary, initialize power window regulator Initialize power window regulator

On replacement of the DME/DDE control unit note the following:

- In every case use the diagnosis system to read out the hardware/software version of the corresponding control unit.

  Comply with the diagnosis system instructions for the encoding and programming work operations.

  On vehicles with an electronic immobiliser, comply with the diagnosis system instructions.

- In every control unit certain mean values are stored that are the basic values. The control unit receives different input values according to the engine condition. The teachable system compares the input values against the stored basic values and then forms the associated control commands. The control commands are forwarded to the corresponding actuators.
- When the DME control unit is de-energized for a long period (over one hour), the teachable system then loses the stored values. When a deleted control unit is returned to service or a new control unit is installed, the teachable system itself must read in and store the input value of the associated engine as new basic values.
- This process may cause uneven idle and faults in coasting mode after starting. Depending on the engine characteristics, it may take some time until all values have been compared with the engine condition.
- Therefore, comply with the following procedure before replacement or reinstallation of a DME/DDE control unit is carried out:
  1. If possible, bring the engine up to its operating temperature prior to replacement of the control unit.
  2. Change control units and drive the vehicle with changing engine speeds.

12 00... INSTRUCTIONS FOR WORKING ON THE IGNITION SYSTEM

CAUTION: **Always switch off ignition before working on ignition system.**
Use only test leads which have been approved and belong to these testing instruments (e.g. DIS Tester).
Comply with operating instructions of the respective testing instrument used.

cardiagn.com

Comply with the country-specific safety regulations.
Never touch components under current with engine running!
Comply with instructions of DIS tester.
Do not connect any suppression capacitors or inspection lamps to terminal 1 on the ignition coil.
Terminal 1 of ignition coil must not be connected to ground or battery positive lead.
If an alarm system is subsequently installed, lead of terminal 1 must not be used for start prevention.
When working on ignition system, always disconnect supply leads to ignition coils.

High tension! - High tension!

IMPORTANT: Hazardous voltages occur at:

- Ignition lead
- spark-plug connectors
- spark plugs
- Ignition coil (high voltage at terminal 4 is approx. 40 kV)
- Lead of terminal 1 from ignition coil to DME control unit (high voltage approx. 350 V)

61 00... NOTES FOR DISCONNECTING AND CONNECTING BATTERY

Observe **SAFETY INFORMATIONS FOR HANDLING VEHICLE BATTERY** .

Before disconnecting battery:

Turn off the ignition and other electrical loads/consumers to prevent sparking when reconnecting.

NOTE: **If the ignition is not turned off when the battery is disconnected, fault memories may be set in some control units.**

IMPORTANT:

- There is a danger of mixing up battery cables: If the battery positive and negative leads are the same color and you are in doubt, follow the polarity to the battery, then mark and cover the leads.
- The on-board computer and clock may lose your data.

General notes on disconnecting battery:

- Do not disconnect battery leads and leads from alternator and starter motor while engine is running.
- Disconnect terminal of **BATTERY EARTH LEAD** from the battery. Cover battery negative terminal(s) and secure.
- Disconnect both battery earth leads in version with auxiliary battery. Cover battery negative terminal(s) and secure.
- When work is carried out on the electrical system, faults may be caused in the fault memories of some control units when the battery is connected.
- When installing battery terminal: Tightening torque **61 21 1AZ** .

Only lead AGM battery:

- On vehicles with IBS at negative battery terminal:

  Do not under any circumstances pull/lever off pole shoes by force.

cardiagn.com

Do not under any circumstances release socket-head cap screw of IBS.

After connecting battery:

IMPORTANT: The scope of application of some systems may be restricted after an open circuit.
Personal Profiles may also be lost.
Settings or activations must be carried out, depending on the equipment specification.

For example:

- Activate **slide/tilt sunroof** . See 54 10... NOTES ON GLASS SLIDE/TILT SUNROOF (INITIALIZATION/NORMALIZATION/LEARNING OF CHARACTERISTIC CURVE) or 54 0... NOTES ON PANORAMA GLASS ROOF (INITIALIZATION/NORMALIZATION/LEARNING OF CHARACTERISTIC CURVE) , if necessary
- Activate **power window** . See 67 62... NOTES ON INITIALIZING POWER WINDOWS , 67 62 020 REMOVING AND INSTALLING/REPLACING FLAT MOTOR FOR REAR LEFT OR RIGHT POWER WINDOW REGULATOR or 67 62 000 REMOVING AND INSTALLING OR REPLACING FLAT MOTOR FOR FRONT LEFT OR RIGHT POWER WINDOW REGULATOR , if necessary

Refer to the diagnosis system for further vehicle-specific information.

61 13... NOTES FOR OPENING CONTACTS AND LOCKS OF DIFFERENT PLUG CONTACT SYSTEMS

Special tools required:

- 61 0 300
- 61 0 400
- 61 1 100

Abbreviations of contacts and what they mean:	
ELA	**Strand seal**
D 1.5/2.5/3.5	**Round contacts with 1.5 mm, 2.5 mm or 3.5 mm diameter**
MDK	**Miniature double flat spring contact**
JPT	Junior Power timer
DFK	Double flat spring contacts
Elo	Electronic contacts
Elo Power	Electronic contacts for heavy load
MQS	Micro Quadlock system
MPQ	Micro Power Quadlock
MLK	Mini laminated contact
SLK	Sensor laminated contact
LSK	Load current contact
MLK	Mini laminated contact
Mcon	Multi contact

IMPORTANT: The contacts can be changed on ultrasonically welded connectors (1).
Ultrasonically welded connectors (1) must be replaced completely.
Ultrasonic-welded connectors (1) can be identified by the welds (2) on their longitudinal side.

cardiagn.com

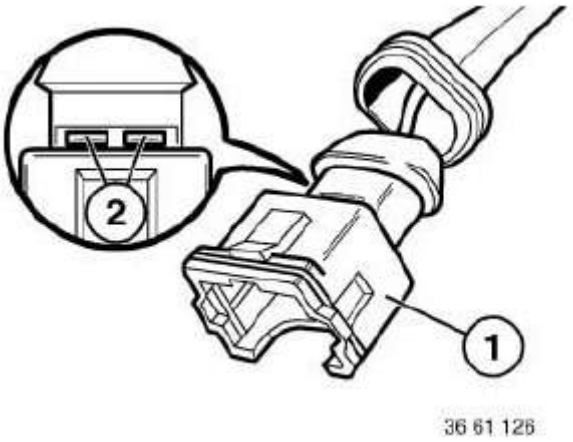


Fig. 11: Identifying Ultrasonic-Welded Connectors And Welds
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Special tools referred to in the repair instructions below are contained in the following special tool sets:**

- **Unlocking and pressing-off tool 61 1 150 is replaced as of 09/2005 by 61 0 300 (BMW) and 61 0 400 (MINI)**
- **Release and pressing-off tool 61 1 100 (engine)**

Repair instructions for opening connector housings and removing contacts of different connector systems:

Connector system D 1.5/D 2.5:

- CIRCULAR CONNECTORS, 7- OR 8-PIN, SYSTEM D 2.5
- CIRCULAR CONNECTORS, 13-PIN, SYSTEM D 2.5
- CIRCULAR CONNECTORS, 20-PIN, SYSTEM D 2.5
- CIRCULAR CONNECTORS, 4-, 7-, 10-, 12- OR 25-PIN, SYSTEM D 1.5/D 2.5
- IN-LINE CONNECTORS, 15-PIN, SYSTEM D 2.5
- IN-LINE CONNECTORS, 8-, 12-PIN, SYSTEM D 2.5
- IN-LINE CONNECTORS, 30-PIN, SYSTEM D 2.5
- IN-LINE CONNECTORS, 20-PIN, SYSTEM D 2.5

Connector system JPT/MDK/DFK:

- IN-LINE CONNECTORS, 2-PIN, SYSTEM JPT ELA
- IN-LINE PLUGS, 2-PIN, SYSTEM MDK 3 PLUS 2.8
- IN-LINE PLUGS, 4-PIN, SYSTEM DFK ELA

Connector system Elo/Elo Power:

- INLINE PLUGS, 4-, 10-PIN, SYSTEM ELO
- IN-LINE CONNECTORS, 6- TO 50-PIN, SYSTEM ELO
- INLINE PLUGS, 3-, 6-PIN, SYSTEM ELO-POWER 2.8

Connector system LSK:

- CONNECTOR HOUSING LSK CONTACT

Connector system MQS/MPQ:

cardiagn.com

- INLINE CONNECTORS, 6-, 8-PIN, SYSTEM MQS
- INLINE PLUGS, 2-PIN, SYSTEM MPQ 2.8
- CONTROL UNIT CONNECTORS, 25-, 35-, 55-, 83-, 88-PIN
- IN-LINE PLUGS, 24-PIN, HYBRID SYSTEM MQS/MPQ
- SOCKET HOUSING 42-, 43-PIN, HYBRID SYSTEM MQS/MPQ
- SOCKET HOUSINGS 2X21-, 2X27-PIN, HYBRID SYSTEM MQS/MPQ, ELO/ELO POWER
- IN-LINE CONNECTORS, 30-PIN, HYBRID SYSTEM MQS/MPQ
- SOCKET HOUSINGS, 5-, 8-PIN, SYSTEM MQS/MPQ
- SOCKET HOUSING (RADIO CONNECTOR), HYBRID SYSTEM MQS/MPQ

61 00... NOTES ON HANDLING WIRING HARNESSES AND CABLES

The following applies in general:

To avoid damage, observe the following instructions:

- Avoid compressive and tensile loads
- To ensure professional repairs, perform repair work only with BMW-approved or recommended special tools and spare parts
- Make sure cables are laid without kinks or abrasions
- Ensure non-contacting routing at sharp-edged body parts; use edge protection if necessary
- Secure additionally laid cables/leads with cable ties

The following additionally applies

Shielded cables

Contact points in the shield can cause problems with regard to noise radiation and interference immunity. Consequently, distinctions have to be drawn between the following types:

Coaxial cable

- Shielded RTK031 coaxial lines may only be repaired with special crimping tools.

CVBS cables

- CVBS cables may not be repaired.
- CVBS cables must be replaced in their entirety.

HSD cables

- HSD cables may not be repaired.
- HSD cables must be replaced in their entirety.

Fibre-optic cables:

NOTE: **Optical fibre cables are colored differently as follows:**

- **Green = MOST (M edia O riented S ystems T ransport) optical fibre**
- **Yellow = ISIS (I ntelligent S afety I ntegration S ystem) optical fibres**
- **Orange=repair fibre-optic cables**

cardiagn.com

IMPORTANT:

- Optical fibres are permitted to show only **one** junction point (bridge). Replace optical fibres if necessary
- Smallest permissible bending radius is 25 mm
- Avoid effects of heat ≥ 85 Â°

Treating cables and fibre-optic cables . See **61 13... CUTTING OFF, STRIPPING INSULATION AND CUTTING OPTICAL FIBRES TO LENGTH** or **61 13... CRIMPING OPTICAL FIBRES**

FlexRay:

It is possible to repair the FlexRay. In the event of damage, the cables can be joined with conventional **BUTT CONNECTORS AND HEAT-SHRINK TUBING**.

NOTE:

- **FlexRay lines may only reveal one separation point (bride); renew complete line if necessary.**
- **The cable is a twisted cable. If possible, maintain twisted cable after repair.**

Airbag lines:

REPAIRING AIRBAG CABLES

12 00... NOTES/INFORMATION ON START ASSISTANCE (JUMP STARTING)

Do not start the engine with help of starting sprays.

Preparation:

Conform with the following when starting the engine with a jump starting cable.

- Ensure that the jump starting cable wires are of appropriate cross-section size.
- Only use fuse-protected jump starting cables.
- Check whether the current-supplying battery has 12 V voltage.
- If the engine is started from the battery of another vehicle, ensure that there is no contact between the bodies of both vehicles.

IMPORTANT: Never touch electrically live ignition system components: high voltage - danger of injury!

If the battery in the vehicle supplying power is weak, start the engine of this vehicle and let it run at idling speed.

Operation:

It is essential to conform to the procedures so as to avoid injury to persons or damage to parts.

- Automatic transmission: select drive position "P", apply parking brake.
- Manual transmission: move gear lever to neutral position, apply parking brake.
- Ensure that the jump leads cannot get caught in rotating parts, e.g. fan.
- First connect both positive poles of the batteries with one jump starting cable (red).
- Use the battery positive terminal in the engine compartment for vehicles with the battery in the luggage compartment.
- Then use the second jump starting cable (black) to connect the negative post of the current-supplying battery with the earth/ground point (not the negative pole or the body) of the vehicle to be started.

cardiagn.com

IMPORTANT: Do not connect the second jump starting cable (black) with the negative pole of the battery in the vehicle to be started. Produced gas could be ignited by sparks.

Risk of explosion!

After the engine of the vehicle to be started has fired, first disconnect the jump starting cable between the negative pole and the earth/ground point. Then remove the starting cable from the positive poles.

00 SAFETY INFORMATION FOR WORKING ON VEHICLES WITH AUTOMATIC ENGINE START-STOP FUNCTION (MSA)

WARNING: **If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.**
An automatic engine start is possible.

Observe safety precautions when working on MSA vehicles.

Before carrying out practical work on the engine, always ensure that the MSA functionality is deactivated so as to prevent automatic engine starting while work is being carried out in the engine compartment.

MSA function is deactivated by:

- Deactivate MSA by means of button (1) in passenger compartment
- Open seat belt buckle and driver's door

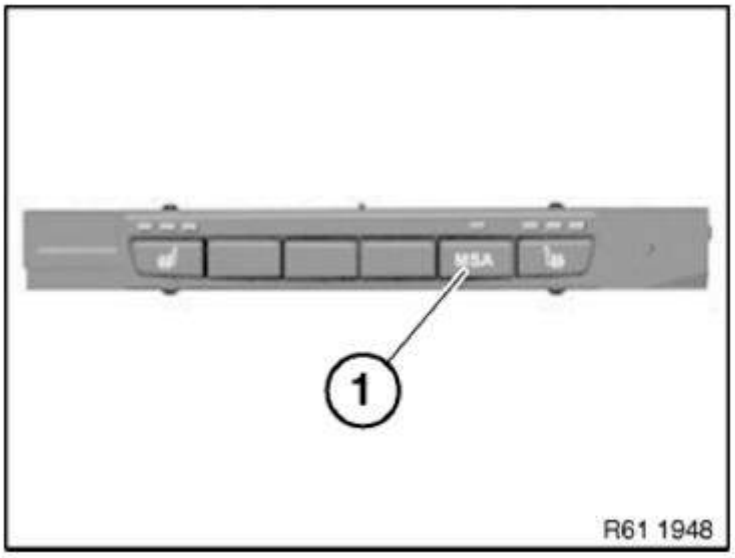


Fig. 12: Identifying MSA Button In Passenger Compartment
Courtesy of BMW OF NORTH AMERICA, INC.

- Open engine bonnet/hood and ensure that engine hood/bonnet contact is not in workshop mode
  - Workshop mode

    A = 10 mm

  - Basic setting (engine hood/bonnet open)

    B = 7 mm

cardiagn.com

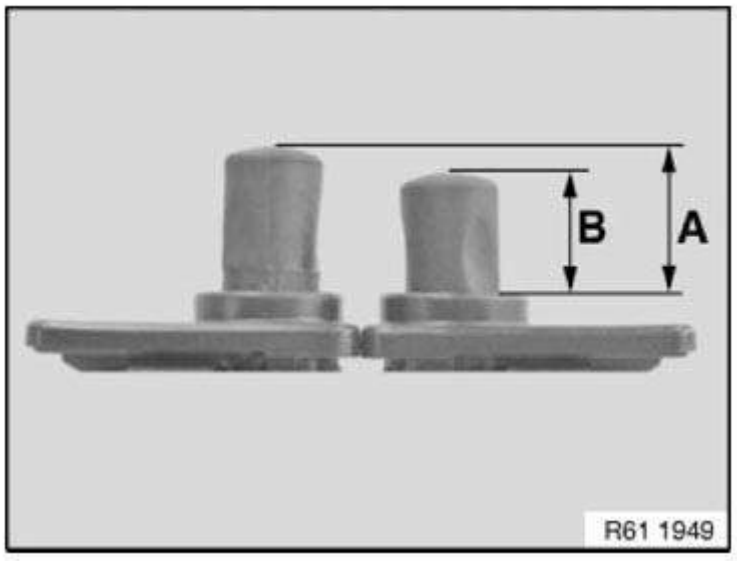


Fig. 13: Identifying Engine Bonnet/Hood Dimension
Courtesy of BMW OF NORTH AMERICA, INC.

To make sure that the engine hood/bonnet contact is at the basic setting, if necessary press the hood/bonnet contact up to the limit position before starting work and slowly release.

When working with diagnosis tools:

- Observe instructions in diagnosis tool

IGNITION WIRES, SPARK PLUGS

12 12 011 REMOVE AND INSTALL/REPLACE ALL SPARK PLUGS (N52T)

Special tools required:

- 12 1 171

Necessary preliminary tasks:

- Switch off ignition.
- Remove IGNITION COILS.

IMPORTANT: Wear safety goggles.
Oil and dirt particles may get into your eyes!

Clean spark plug slot with compressed air.

1. Remove dirt contamination from the spark plug shaft. The plug shaft must be cleaned with compressed air after the ignition coils have been removed but before the spark plugs have been dismounted. After removing the spark plugs, check the sealing surface again for dirt contamination and if necessary, clean with a damp cloth or again with compressed air.

   NOTE: Deposits that are not removed according to instructions may enter the combustion chamber and lead to uncontrolled combustion. Remaining deposits in the area of the spark plug seal can lead to leaks and to the spark plugs coming loose during engine operation.

2. Do not grease/oil thread or use any graphite or copper grease. Adhere to the torque values of the packaging information or regulation.

cardiagn.com

NOTE: **If these instructions are not followed, especially with regard to greasing, this may result in mechanical damage to the spark plug housing/thread. Spark plugs that are not tightened sufficiently lead to leaks and to the spark plugs coming loose during engine operation.**

Unscrew spark plugs with special tool 12 1 171 and an extension with a joint.

Flexible ratchet extensions must always be used. If rigid mounting tools are used, there is a risk of insulator breakages.

NOTE: **Also do not use a variable plug connection with locking capability as this also poses a risk of insulator breakages.**

Installation note:

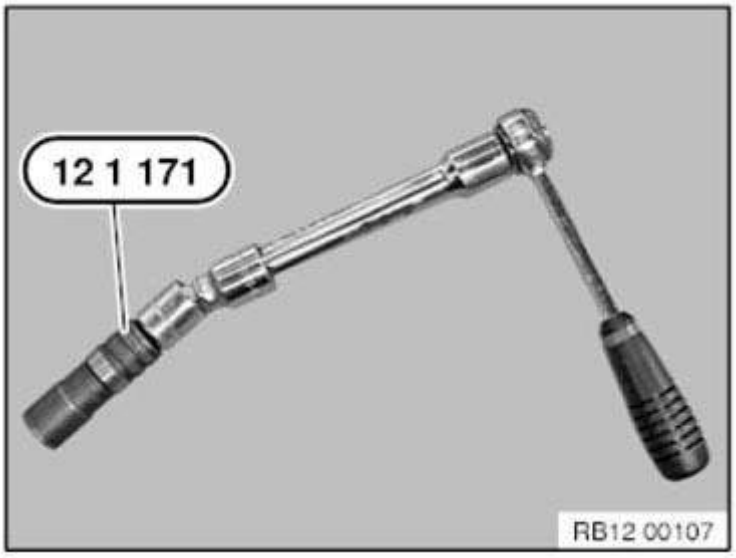


Fig. 14: Identifying Special Tool (12 1 171)
Courtesy of BMW OF NORTH AMERICA, INC.

Do not let spark plugs fall into the spark plug shaft. This can lead to a reduction of the electrode gap and so impair the smooth running of the engine, especially in idle mode.

First, hand-tighten the spark plugs with special tool 12 1 171 and with an extension with a joint into the engine.

Then tighten the spark plugs using a torque wrench, special tool 12 1 171 and an extension with a joint.

Observe tightening torque.

Tightening torque 12 12 1AZ .

12 12 011 REMOVING AND INSTALLING/RENEWING ALL SPARK PLUGS (N20, N26)

Special tools required:

- 12 1 220
- 12 1 230

Necessary preliminary tasks:

- Switch off ignition.
- Remove IGNITION COILS.
- **F20, F21, F22, F23, F30, F31, F32, F33, F34, F35, F36 only:**

cardiagn.com

Remove tension struts.

IMPORTANT: Wear safety goggles.
Oil and dirt particles may get into your eyes!

Clean spark plug slot with compressed air.

1. Remove dirt contamination from the spark plug shaft. The plug shaft must be cleaned with compressed air after the ignition coils have been removed but before the spark plugs have been dismounted. After removing the spark plugs, check the sealing surface again for dirt contamination and if necessary, clean with a damp cloth or again with compressed air.

   NOTE: Deposits that are not removed according to instructions may enter the combustion chamber and lead to uncontrolled combustion. Remaining deposits in the area of the spark plug seal can lead to leaks and to the spark plugs coming loose during engine operation.

2. Do not grease/oil thread or use any graphite or copper grease. Adhere to the torque values of the packaging information or regulation.

   NOTE: If these instructions are not followed, especially with regard to greasing, this may result in mechanical damage to the spark plug housing/thread. Spark plugs that are not tightened sufficiently lead to leaks and to the spark plugs coming loose during engine operation.

Unscrew spark plugs with special tool **12 1 220** and extension with min. 8Â° bend.

Flexible ratchet extensions must always be used. If rigid mounting tools are used, there is a risk of insulator breakages.

NOTE: Also do not use a variable plug connection with locking capability as this also poses a risk of insulator breakages.

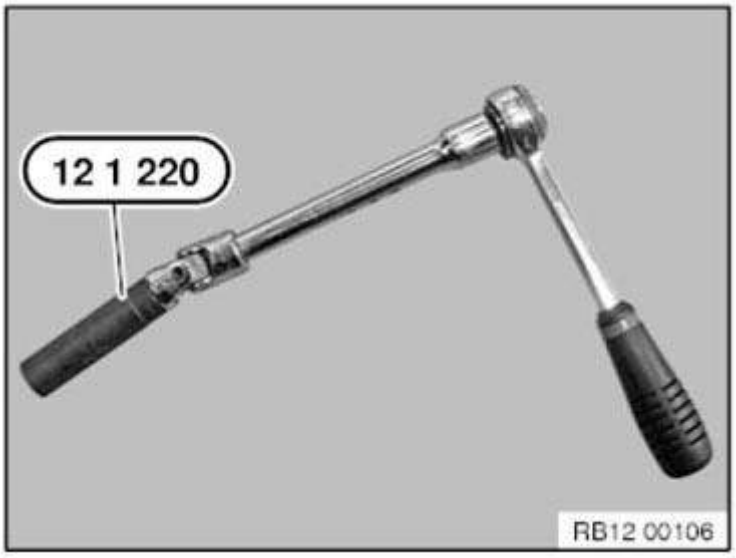


Fig. 15: Identifying Special Tool (12 1 220)
Courtesy of BMW OF NORTH AMERICA, INC.

Attach new spark plug (1) to special tool **12 1 230** .

IMPORTANT: Do not let spark plugs fall into the spark plug shaft. This can lead to a reduction of the electrode gap and so impair the smooth running of the engine, especially in idle mode.

cardiagn.com

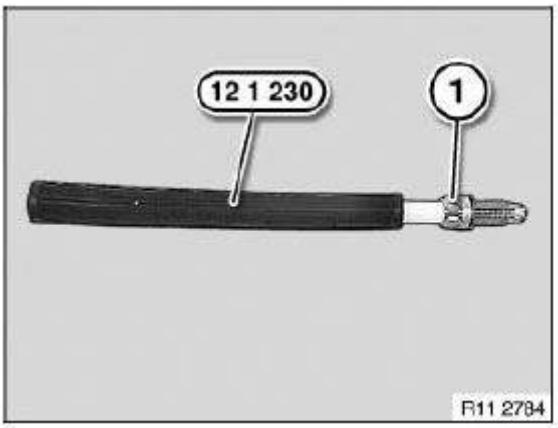


Fig. 16: Attaching Spark Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Screw spark plug into the plug thread hand-tight with special tool **12 1 230** until it reaches the limit position.

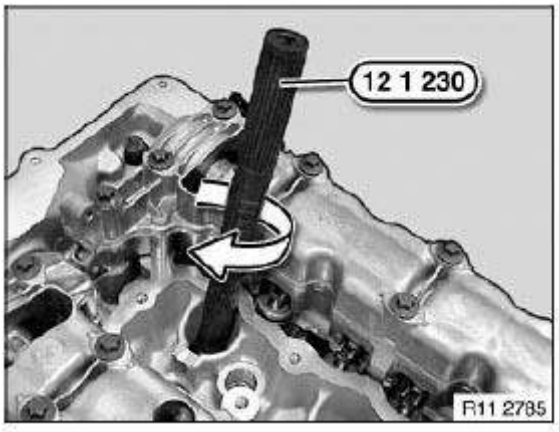


Fig. 17: Turning Spark Plug Using Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Tighten spark plugs with torque wrench, special tool **12 1 220** and extension with min. 8Â° bend.

Flexible ratchet extensions must always be used. If rigid mounting tools are used, there is a risk of insulator breakages.

NOTE: **Also do not use a variable plug connection with locking capability as this also poses a risk of insulator breakages.**

Observe tightening torque.

Tightening torque **12 12 1AZ** .

cardiagn.com

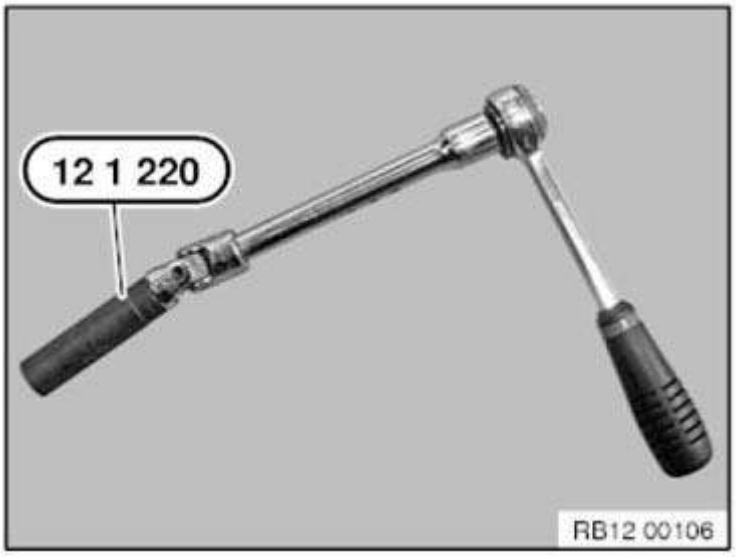


Fig. 18: Identifying Special Tool (12 1 220)
Courtesy of BMW OF NORTH AMERICA, INC.

12 12 011 REMOVING AND INSTALLING/RENEWING ALL SPARK PLUGS (N55)

Special tools required:

- 12 1 220
- 12 1 230

Necessary preliminary tasks:

- Switch off ignition.
- Remove IGNITION COILS.

IMPORTANT: Wear safety goggles.
Oil and dirt particles may get into your eyes!

Clean spark plug slot with compressed air.

1. Remove dirt contamination from the spark plug shaft. The plug shaft must be cleaned with compressed air after the ignition coils have been removed but before the spark plugs have been dismounted. After removing the spark plugs, check the sealing surface again for dirt contamination and if necessary, clean with a damp cloth or again with compressed air.

   NOTE: Deposits that are not removed according to instructions may enter the combustion chamber and lead to uncontrolled combustion. Remaining deposits in the area of the spark plug seal can lead to leaks and to the spark plugs coming loose during engine operation.

2. Do not grease/oil thread or use any graphite or copper grease. Adhere to the torque values of the packaging information or regulation.

   NOTE: If these instructions are not followed, especially with regard to greasing, this may result in mechanical damage to the spark plug housing/thread. Spark plugs that are not tightened sufficiently lead to leaks and to the spark plugs coming loose during engine operation.

Unscrew spark plugs with special tool 12 1 220 and extension with min. 8Â° bend.

cardiagn.com

Flexible ratchet extensions must always be used. If rigid mounting tools are used, there is a risk of insulator breakages.

NOTE: **Also do not use a variable plug connection with locking capability as this also poses a risk of insulator breakages.**

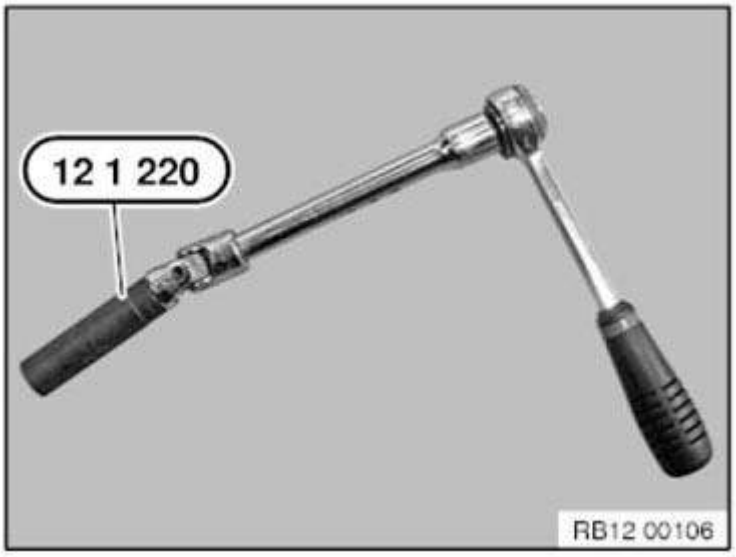


Fig. 19: Identifying Special Tool (12 1 220)
Courtesy of BMW OF NORTH AMERICA, INC.

Attach new spark plug (1) to special tool **12 1 230** .

IMPORTANT: Do not let spark plugs fall into the spark plug shaft. This can lead to a reduction of the electrode gap and so impair the smooth running of the engine, especially in idle mode.

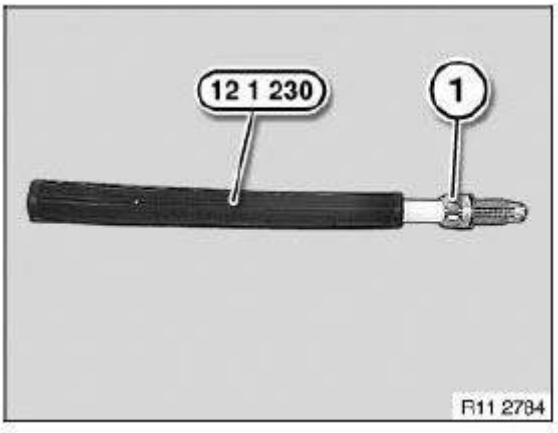


Fig. 20: Attaching Spark Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Screw spark plug with special tool **12 1 230** hand-tight into cylinder head plug thread as far as it will go.

cardiagn.com

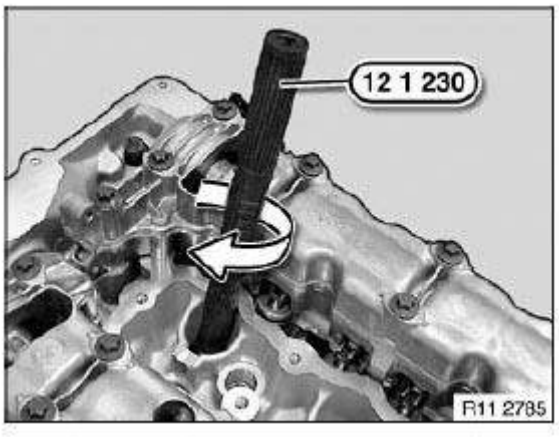


Fig. 21: Turning Spark Plug Using Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Tighten spark plugs with torque wrench, special tool **12 1 220** and extension with min. 8Â° bend.

Flexible ratchet extensions must always be used. If rigid mounting tools are used, there is a risk of insulator breakages.

NOTE: Also do not use a variable plug connection with locking capability as this also poses a risk of insulator breakages.

Observe tightening torque.

Tightening torque **12 12 2AZ** .

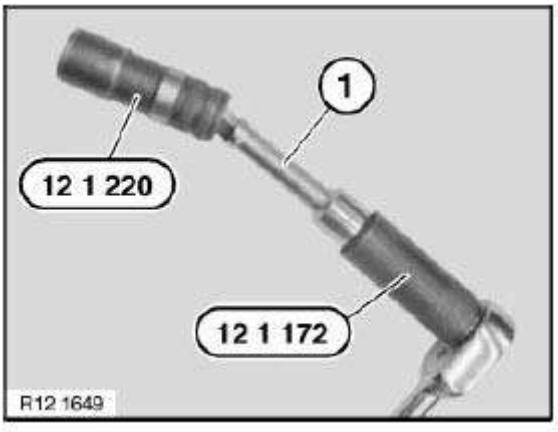


Fig. 22: Identifying Spark Plug Special Tool (12 1 220)
Courtesy of BMW OF NORTH AMERICA, INC.

IGNITION COIL

12 13 011 REPLACING IGNITION COILS (N20)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Check stored fault messages and process procedure.
- Switch off ignition.
- Remove **ACOUSTIC COVER**

cardiagn.com

IMPORTANT: Ignition coils must not be contaminated by fuel.
The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail!
The silicone tube of the spark plug connector is coated with talc to reduce the pulling forces.
The silicone tube must NOT be oiled or greased. This would greatly reduce the durability of the silicone material, which can lead to a malfunction of the ignition coil.

Unlock plug catch (1) of ignition coil (2) and disconnect plug.

Ensure that cables are not crushed or damaged.

Repair damaged cable.

Pull ignition coil (2) up and out.

NOTE: There is a possibility that the silicone tube will tear and therefore be destroyed. This procedure is applicable to all ignition coils.

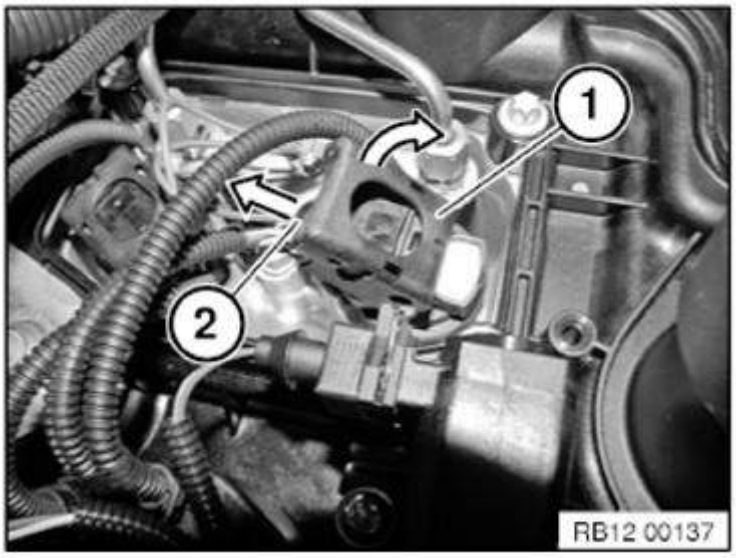


Fig. 23: Pulling Ignition Coil
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Position the ignition coil and gently push it to the limit position, if necessary by twisting it back and forth slightly. Then check anti-twist lock.

The rubber cap must completely surround the sealing collar of the cylinder head cover.

NOTE: If rubber parts are squashed, the ignition coil can slip out again during engine operation.

cardiagn.com

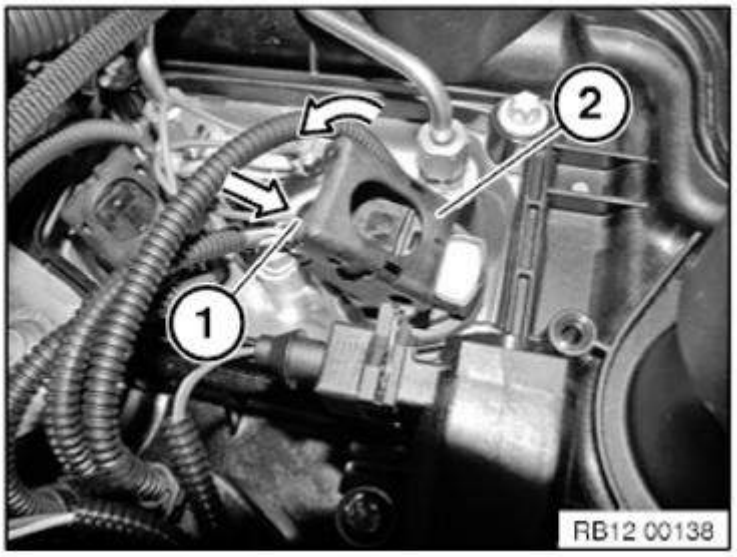


Fig. 24: Pushing Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Push connector (1) with connector catch (2) open onto ignition coil.
Carefully close connector catch (2) in direction of arrow.
Ensure that cables are not crushed or damaged.
Repair damaged cable.
The connector must be positioned on the counter piece with hardly any gaps when the locking lever is being closed. In the process, the cheeks of the lever are positioned inside the counter piece.

NOTE: **The locking lever can become deformed if it is not installed correctly. This means that there is no longer a safety lock on the plug connection. As a result, the connector can slip out during engine operation (loose contact, misfiring). The connector catch must snap into place without great effort.**

NOTE: **Clear diagnostic fault entries from fault memory.**
Assemble engine.

12 13 511 REPLACING IGNITION COILS (N55)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Check stored fault messages and process procedure.
- Switch off ignition.
- Remove **IGNITION COIL COVER**.
- Remove **CLEAN AIR PIPE** .

IMPORTANT: Ignition coils must not be contaminated by fuel.
The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail!
The silicone tube of the spark plug connector is coated with talc to reduce the pulling forces.
The silicone tube must NOT be oiled or greased. This would greatly reduce the durability of the silicone material, which can lead to a malfunction of the ignition coil.

Release screws (1).

cardiagn.com

Slide cable channel (2) to one side.

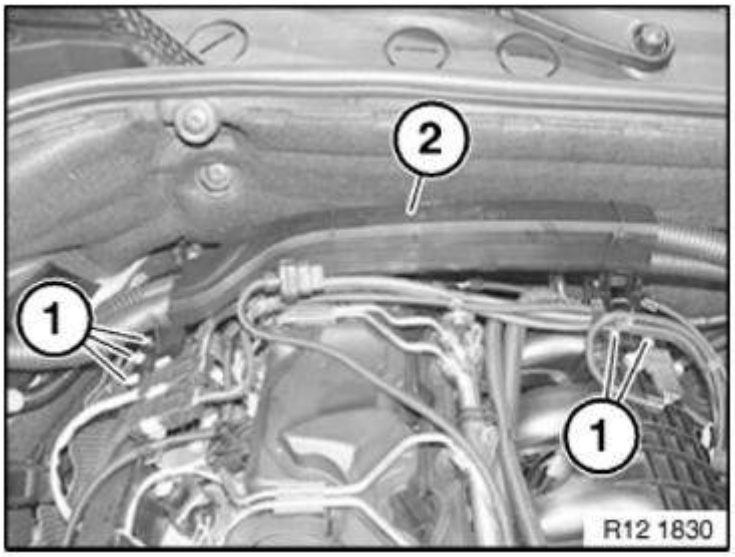


Fig. 25: Identifying Cable Channel And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release oxygen sensor connector (1) from bracket.

Release screw (2).

Put cable clip aside.

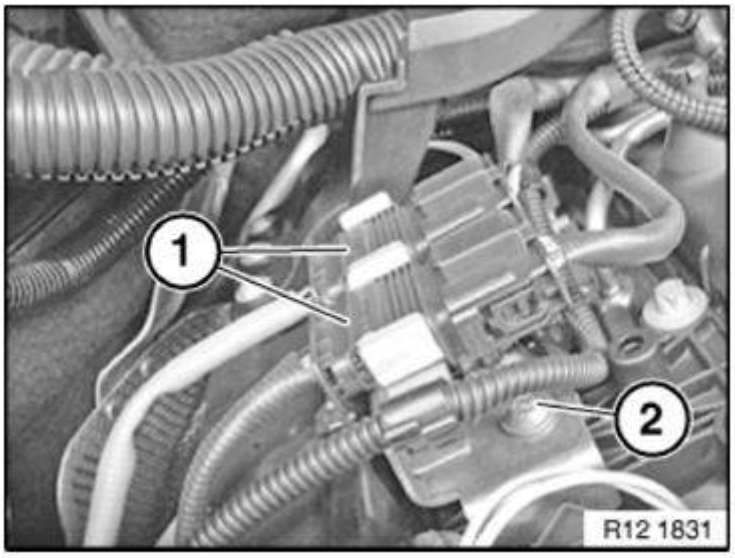


Fig. 26: Identifying Oxygen Sensor Connector And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock plug catch (1) of ignition coil (2) and disconnect plug.

Ensure that cables are not crushed or damaged.

Repair damaged cable.

Pull out the ignition coil (2) slowly in a smooth upwards movement.

NOTE: **There is a possibility that the silicone tube will tear and therefore be destroyed. This procedure is applicable to all ignition coils.**

cardiagn.com

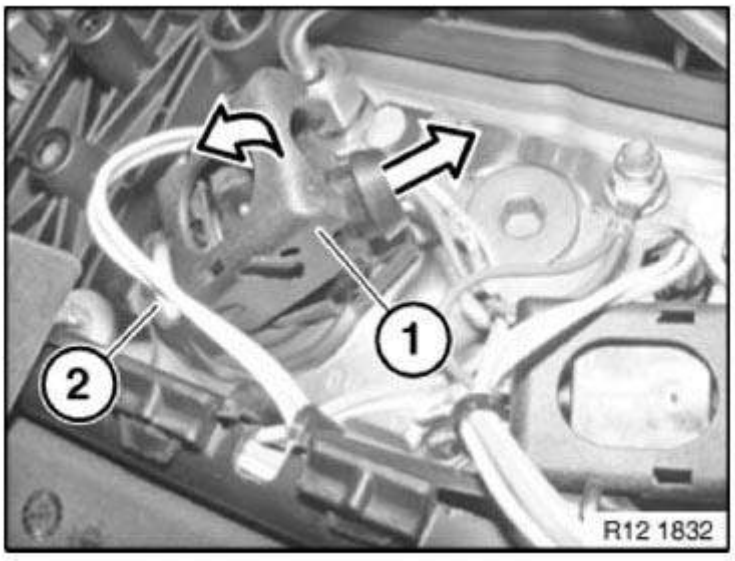


Fig. 27: Pulling Out Ignition Coil
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Position the ignition coil and gently push it to the limit position, if necessary by twisting it back and forth slightly. Then check anti-twist lock.

The rubber cap must completely surround the sealing collar of the cylinder head cover.

NOTE: **If rubber parts are squashed, the ignition coil can slip out again during engine operation.**
Push connector (1) with connector catch (2) open onto ignition coil.
Carefully close connector catch (2) in direction of arrow.

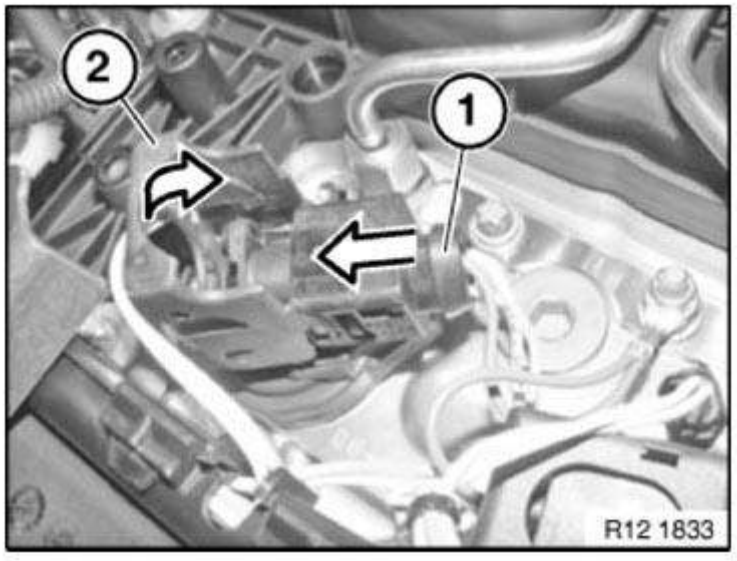


Fig. 28: Pushing Connector
Courtesy of BMW OF NORTH AMERICA, INC.

The connector catch must snap into place without great effort.
Ensure that cables are not crushed or damaged.
Repair damaged cable.
The connector must be positioned on the counter piece with hardly any gaps when the locking lever is being closed. In the process, the cheeks of the lever

cardiagn.com

are positioned inside the counter piece.

NOTE: **The locking lever can become deformed if it is not installed correctly. This means that there is no longer a safety lock on the plug connection. As a result, the connector can slip out during engine operation (loose contact, misfiring).**

NOTE: **Clear diagnostic fault entries from fault memory.**
Assemble engine.

12 13 511 REPLACING IGNITION COILS (N52T)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Check stored fault messages and process procedure.
- Switch off ignition.
- Remove **IGNITION COIL COVER** .

IMPORTANT: Ignition coils must not be contaminated by fuel.
The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail!
The silicone tube of the spark plug connector is coated with talc to reduce the pulling forces.
The silicone tube must NOT be oiled or greased. This would greatly reduce the durability of the silicone material, which can lead to a malfunction of the ignition coil.

Release positive battery cable (1) from holder (3) and lay to one side.

Unfasten screws (2).

Tightening torque **12 52 1AZ** .

Remove bracket (3).

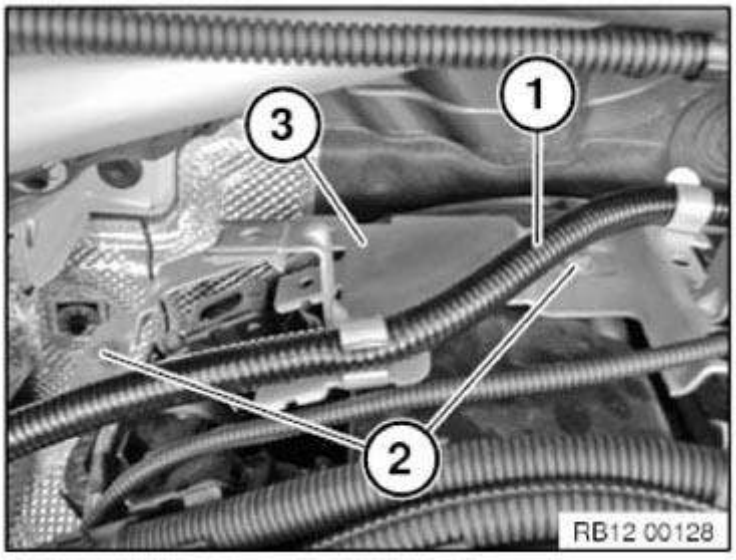


Fig. 29: Identifying Positive Battery Cable, Holder And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock connector fastener of ignition coil (1) and disconnect connector.

Slowly pull the ignition coil (1) up and out without jerking it.

cardiagn.com

NOTE: **There is a possibility that the silicone tube will tear and therefore be destroyed. This procedure is applicable to all ignition coils.**

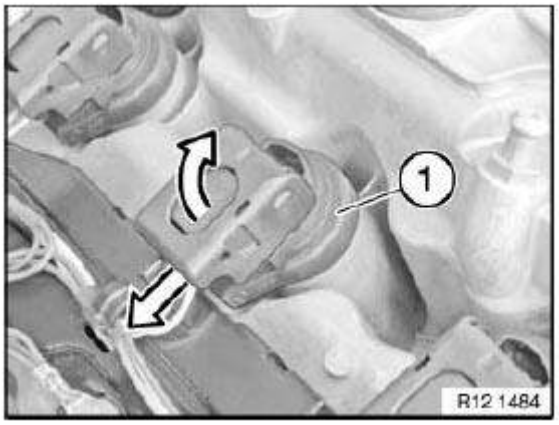


Fig. 30: Pulling Ignition Coil
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Position the ignition coil (1) and gently push it to the limit position, if necessary by twisting it back and forth slightly. Then check anti-twist lock.

The rubber cap must completely surround the sealing collar of the cylinder head cover.

NOTE: **If rubber parts are squashed, the ignition coil can slip out again during engine operation.**

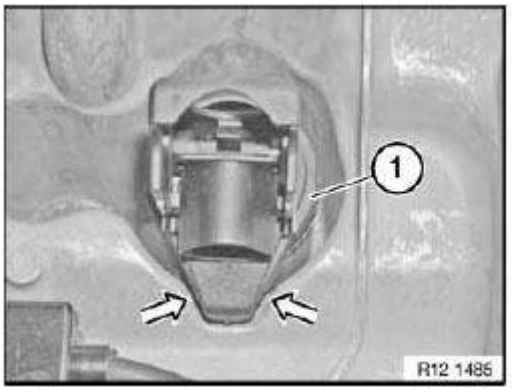


Fig. 31: Positioning Ignition Coil
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Push connector (1) with connector catch (2) open onto ignition coil.

Carefully close connector catch (2) in direction of arrow.

The connector must be positioned on the counter piece with hardly any gaps when the locking lever is being closed. In the process, the cheeks of the lever are positioned inside the counter piece.

NOTE: **The locking lever can become deformed if it is not installed correctly. This means that there is no longer a safety lock on the plug connection. As a result, the connector can slip out during engine operation (loose contact, misfiring).**

cardiagn.com

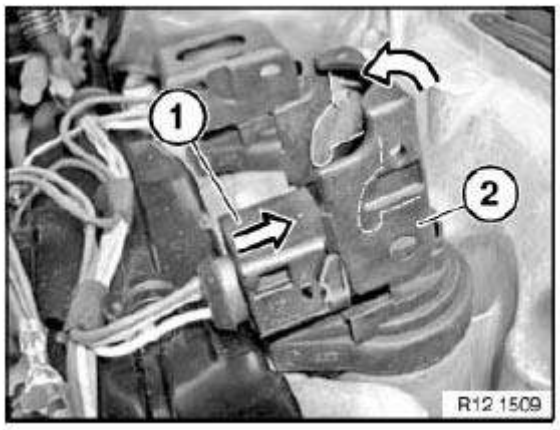


Fig. 32: Pushing Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The connector fastener must snap into place without great effort.

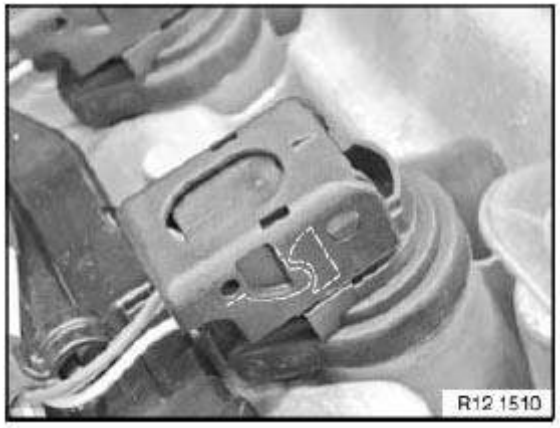
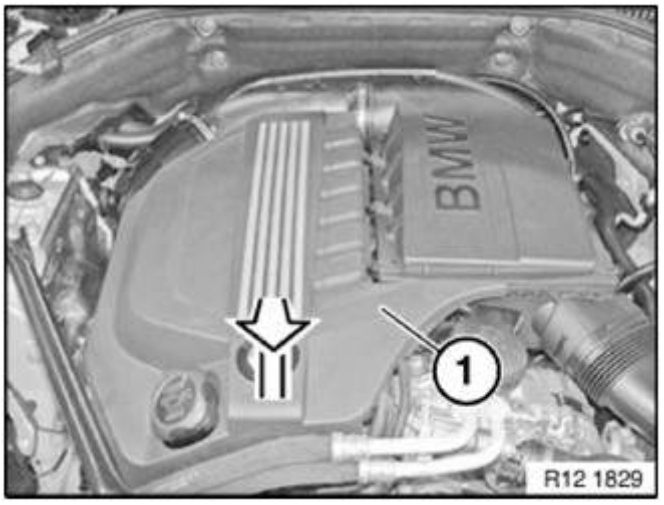


Fig. 33: Identifying Connector Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Delete fault memory.

12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55)

Pull ignition coil cover (1) off of rubber mounts and remove in direction of travel.



cardiagn.com

Fig. 34: Pulling Ignition Coil Cover
Courtesy of BMW OF NORTH AMERICA, INC.

12..... REMOVING AND INSTALLING/REPLACING REAR IGNITION COIL COVER (N55)

Necessary preliminary work:

- Remove **CLEAN AIR PIPE** .

Pull off ignition coil cover (1) upward and remove.

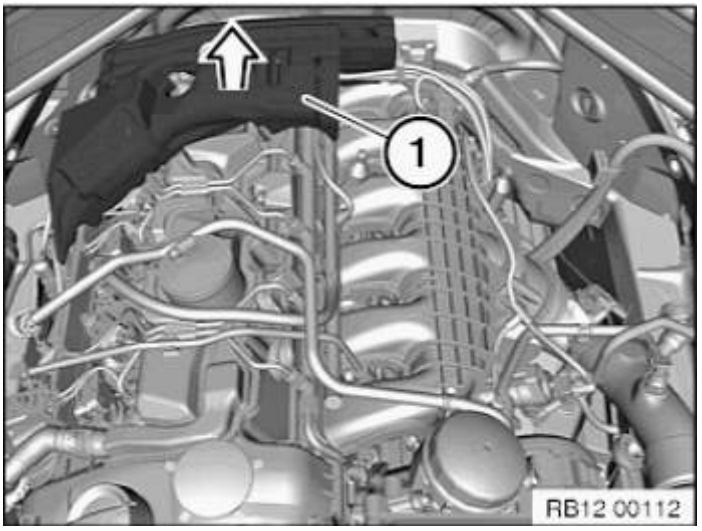


Fig. 35: Removing Rear Ignition Coil Cover
Courtesy of BMW OF NORTH AMERICA, INC.

ELECTRONIC SWITCHING OR CONTROL UNITS

12 14 700 CODING CONTROL MODULE (DME/DDE)

Switch on ignition.

Connect MoDiC or DIS/GT1 Tester.

Select "Coding" program.

For subsequent procedure, follow instructions in MoDiC or DIS/GT1 Tester.

Carry out adjustment of following control units:

- EWS (electronic immobilizer)
- DME (Digital Motor Electronics) or
- DDE (Digital Diesel Electronics)

Refer to "Diagnosis and Coding" service information bulletins on subject of coding.

12 14 705 PROGRAMMING CONTROL UNIT (DME/DDE)

Switch on ignition.

Connect MoDiC or DIS/GT1 Tester.

Select "Programming".

For subsequent procedure, follow instructions in MoDiC or DIS/GT1 Tester.

cardiagn.com

Carry out adjustment of following control units:

- EWS (electronic immobilizer)
- DME (Digital Motor Electronics) or
- DDE (Digital Diesel Electronics)

Refer to "Diagnosis and Coding" service information bulletins on subject of programming.

12 14 602 REMOVING/REPLACING KNOCK SENSOR (1ST AND 2ND CYLINDER) (N20, N26)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **THROTTLE VALVE ASSEMBLY** .

Unlock connector (1) and remove.

Release bolt (2) on knock sensor.

Tightening torque **13 62 4AZ** .

Remove knock sensor for 1st and 2nd cylinder.

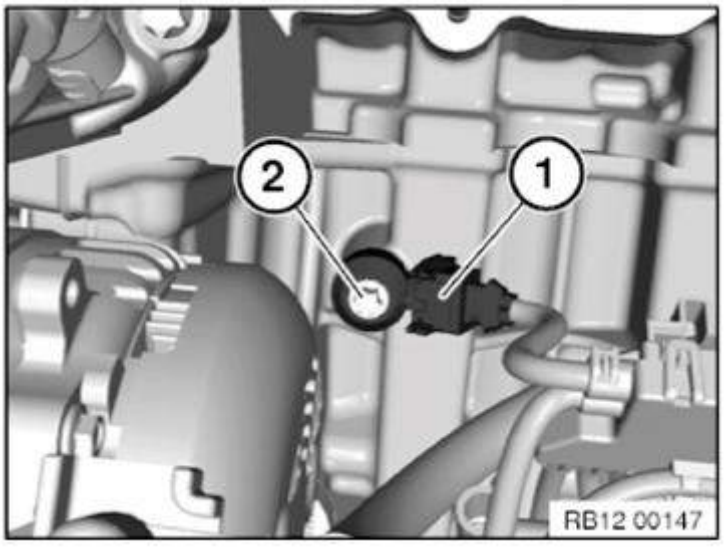


Fig. 36: Identifying Connector And Bolt On Knock Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean contact surface of knock sensors on engine block.

cardiagn.com

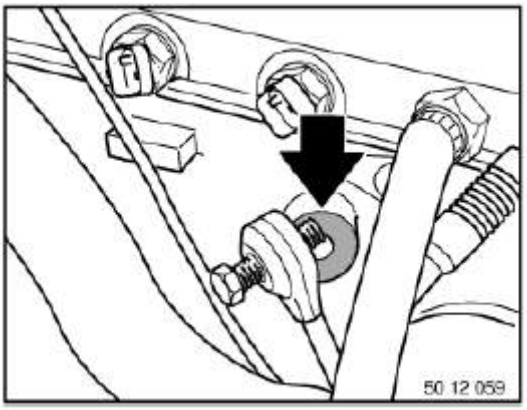


Fig. 37: Locating Contact Surface Of Knock Sensors On Engine Block
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault message.
Delete fault memory.

12 14 600 REMOVING/REPLACING KNOCK SENSOR (3RD AND 4TH CYLINDER) (N20, N26)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **STARTER MOTOR**.

Unlock connector (1) and remove.

Release bolt (2) on knock sensor.

Tightening torque **13 62 4AZ** .

Remove knock sensor for 3rd and 4th cylinders.

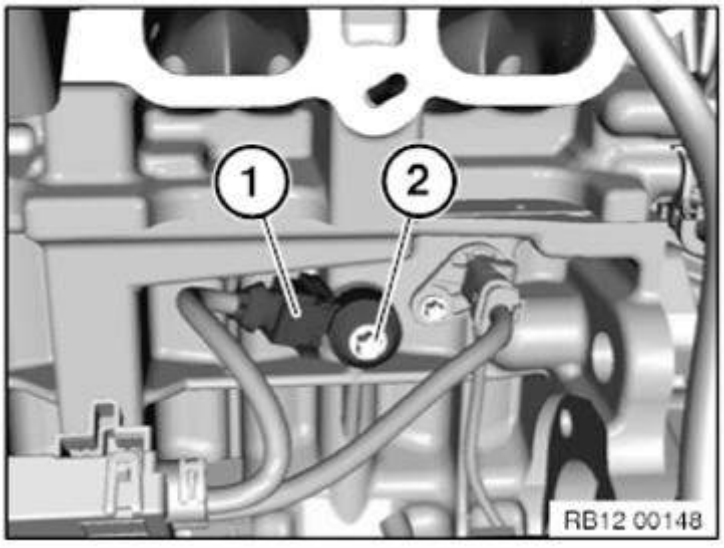


Fig. 38: Identifying Connector And Bolt On Knock Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

cardiagn.com

Clean contact surface of knock sensor on engine block.

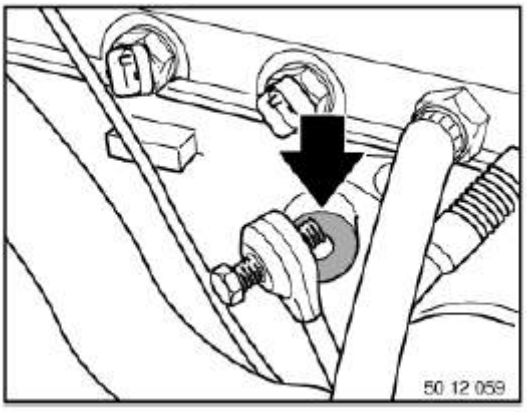


Fig. 39: Locating Contact Surface Of Knock Sensors On Engine Block
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault message.
Delete fault memory.

12 14 600 REMOVING/REPLACING KNOCK SENSORS (N52T)

IMPORTANT:
Aluminum-magnesium materials.
No steel screws/bolts may be used due to the threat of electrochemical corrosion.
A magnesium crankcase requires aluminum screws/bolts exclusively.
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **INTAKE PLENUM** .

Unlock connector (1) and remove.

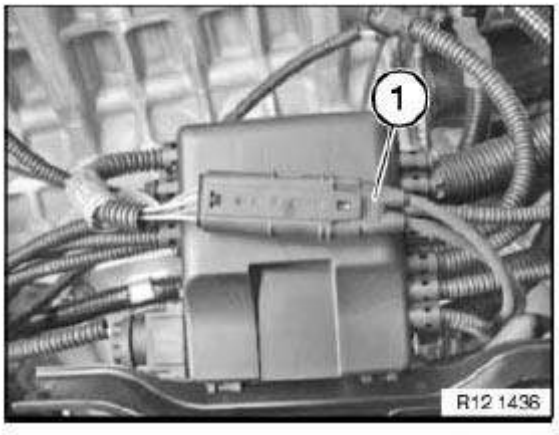


Fig. 40: Identifying Connector
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release screws on both knock sensors (1) and remove knock sensors (1).

Installation note:

Replace aluminum screws.

Tightening torque **13 62 3AZ** .

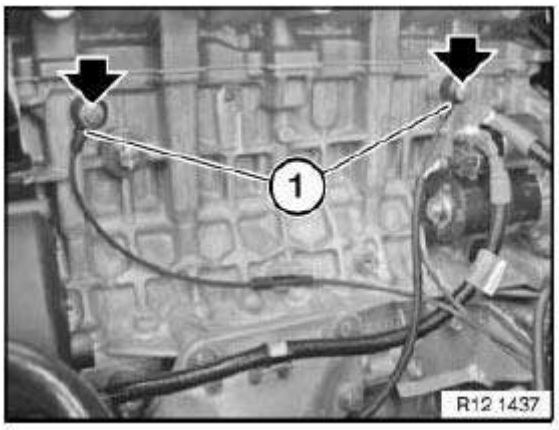


Fig. 41: Locating Knock Sensors
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean contact surface of knock sensors on engine block.

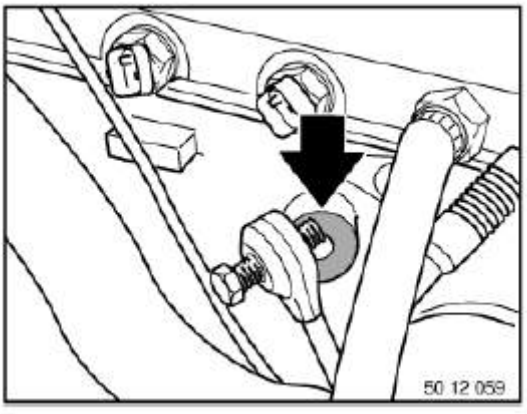


Fig. 42: Locating Contact Surface Of Knock Sensors On Engine Block
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Clear diagnostic fault entries from fault memory.

12 14 600 REMOVING/REPLACING KNOCK SENSORS (N55)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **INTAKE PLENUM** .
- **Vehicles with the Bosch high pressure pump only** :

Remove **HIGH PRESSURE PUMP** .

cardiagn.com

Unlock connector (1) and remove.

Feed out connector (1) behind feed line, remove **FEED LINE** if necessary.

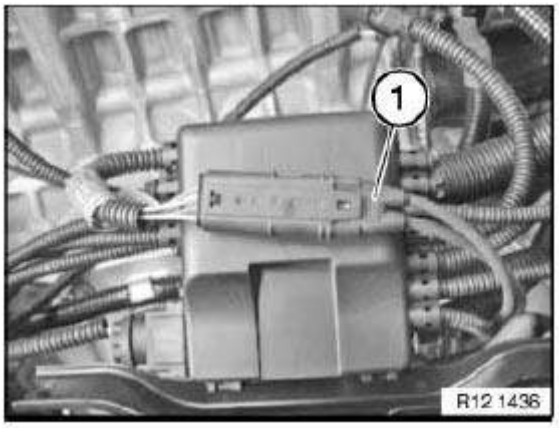


Fig. 43: Identifying Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws on both knock sensors (1) and remove knock sensors (1).

Tightening torque **13 62 3AZ** .

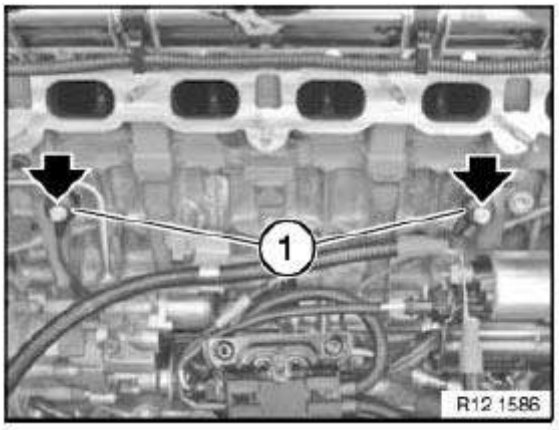


Fig. 44: Locating Knock Sensors
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean contact surface of knock sensors on engine block.

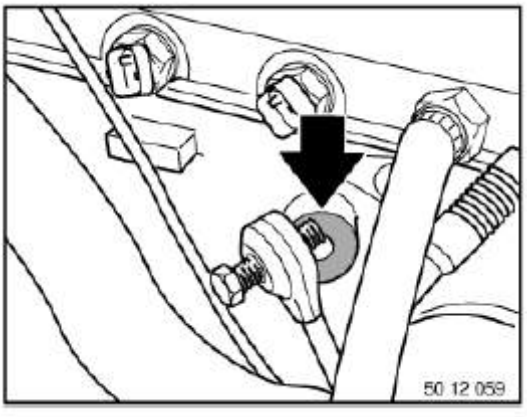


Fig. 45: Locating Contact Surface Of Knock Sensors On Engine Block

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored error/fault messages.
Clear diagnostic fault entries from fault memory.

13 61 501 REPLACING (DDE) CONTROL UNIT (N47 D20 O1)

IMPORTANT: Read and comply with **NOTES** on protection against electrostatic damage (ESD protection).

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- **FOLLOW INSTRUCTIONS FOR REMOVING AND INSTALLING CONTROL UNITS**.

Replacement:

- Carry out programming/encoding.
- If no data can be read out from the previous control unit, carry out injection quantity compensation (description at end of instructions).

IMPORTANT: It is absolutely essential to read out the fault memory with the BMW diagnosis system and to create a fault memory printout.

Switch off ignition.

Release screws (1).

Detach coolant hose from cover of electronics box.

Remove electronics box cover (3).

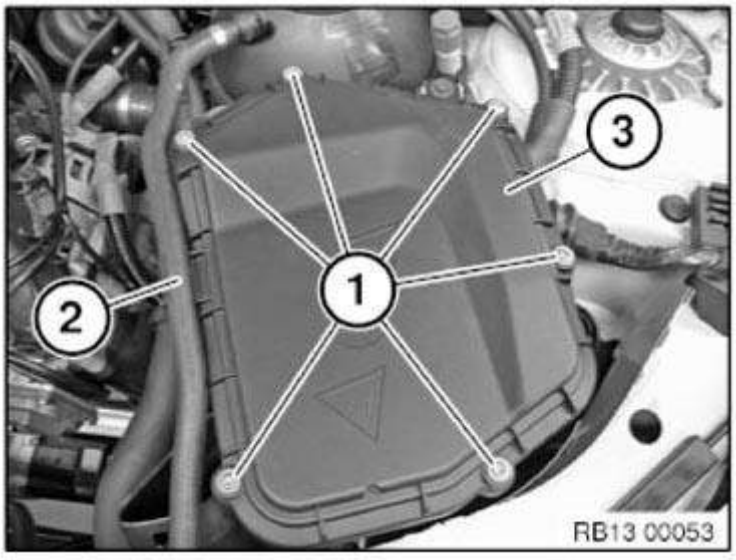


Fig. 46: Identifying Electronics Box Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock all connectors (1) from control unit and disconnect.

Detach rubber grommets (2) from electronics box. Place wiring harnesses to the side.

cardiagn.com

Installation note:

Make sure grommets are correctly fitted (watertightness).

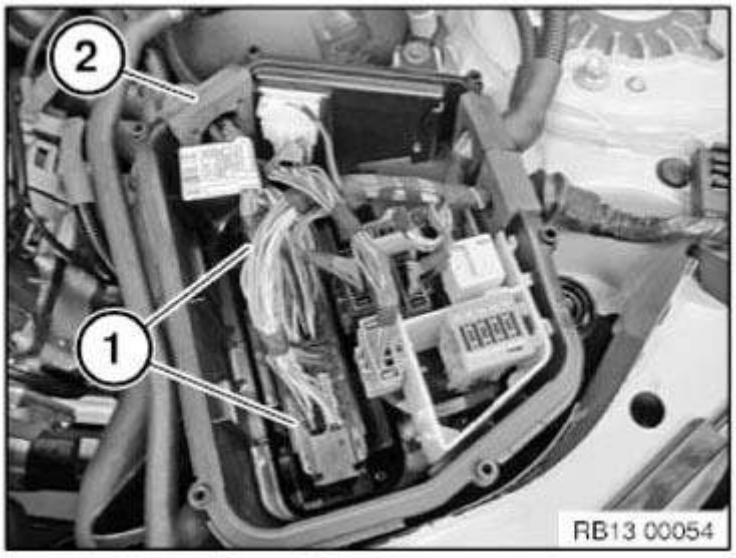


Fig. 47: Identifying Connectors And Rubber Grommets
Courtesy of BMW OF NORTH AMERICA, INC.

Release retainers (1) on control unit.

Pull out control unit (2) towards top.

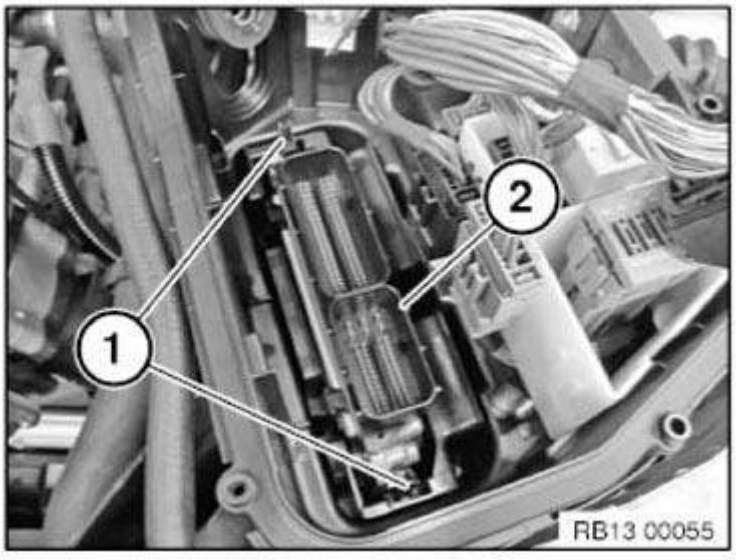


Fig. 48: Identifying Retainers And Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Injector adjustment:

If the DDE control unit has been replaced, it will also be necessary to carry out injection quantity compensation!

The adjustment value (7-position letter/number code) is engraved on each injector.

Enter the numbers/letters according to the installation position (cylinder) of the injectors.

cardiagn.com

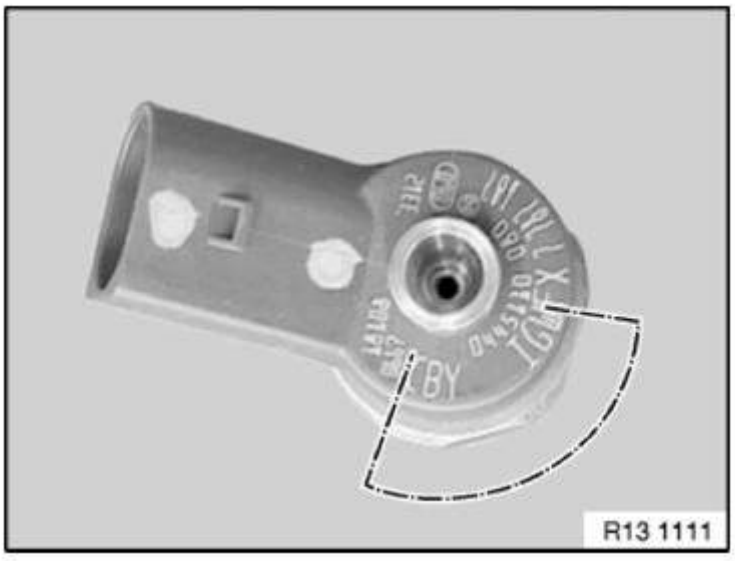


Fig. 49: Identifying Injector Number Code
Courtesy of BMW OF NORTH AMERICA, INC.

- Select "DDE".
- Select "Adjustment, injection quantity compensation"
- Select "Test plan"

The adjustment must be entered for each injector.

It is necessary to adjust the injectors to ensure their full operability.

NOTE: **Check stored fault messages.**
Delete fault memory.

12 14 550 REPLACING CONTROL UNIT (DME) (N20, N26)

IMPORTANT: Read and comply with notes on protection against electrostatic damage (ESD protection)

Necessary preliminary tasks:

- Switch off ignition.
- Disconnect **BATTERY NEGATIVE LEAD** .
- Remove **ACOUSTIC COVER**

IMPORTANT: Follow **INSTRUCTIONS** for removing and installing control units

Replacement:

- Carry out programming/encoding
- If no data can be read out from the previous control unit, carry out injection quantity compensation (description at end of instructions).

IMPORTANT: It is absolutely essential to read out the fault memory with the BMW diagnosis system and to create a fault memory printout.

Switch off ignition.

Unlock and pull off all connectors (1) from the DME control unit (2).

cardiagn.com

Release screws.

Tightening torque **12 14 1AZ** .

Remove DME control unit.

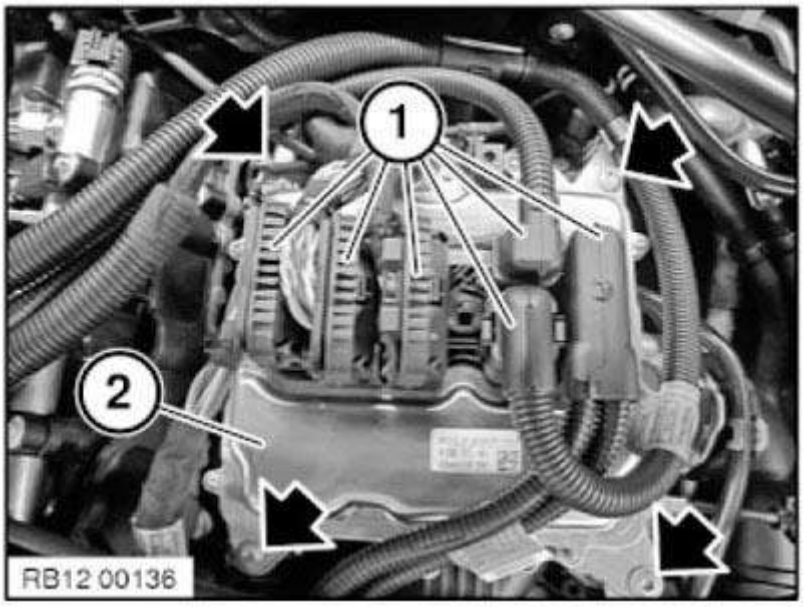


Fig. 50: Locating Connectors Of DME Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Injection quantity compensation:

If the DME control unit has been replaced, it will also be necessary to carry out adjustment of the injectors!

Injection quantity compensation is carried out with the aid of so-called adjustment values.

The adjustment value is printed on each injector in three digits.

The adjustment values must be stored in the new control unit!

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

Read off the adjustment values and enter according to the installation location (cylinder) of the injectors:

- Connect BMW diagnosis system
- Identify vehicle
- Select "Function selection"
- Select "Service functions"

cardiagn.com



Fig. 51: Identifying Injector Adjustment Values
Courtesy of BMW OF NORTH AMERICA, INC.

- Select "Engine electronics"
- Select "Adjustment function"
- Select "Adjust injectors"
- Select "Test plan"
- The adjustment value must be entered for each cylinder.

NOTE: **Check stored fault message.**
Delete fault memory.

12 14 550 REPLACING CONTROL UNIT (DME) (N52T)

IMPORTANT: Read and comply with notes on **PROTECTION AGAINST ELECTROSTATIC DISCHARGE (ESD PROTECTION)**

Necessary preliminary work:

- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove **ACOUSTIC COVER**

IMPORTANT: **FOLLOW INSTRUCTIONS FOR REMOVING AND INSTALLING CONTROL UNITS**.

Replacement:

- **CARRY OUT PROGRAMMING/ENCODING**

IMPORTANT: It is absolutely essential to read out the fault memory with the BMW diagnosis system and to create a fault memory printout.

Switch off ignition.

Unlock all plugs from control unit (1) and detach.

Unfasten screws (2).

cardiagn.com

Tightening torque **12 90 1AZ** .

Remove control unit.

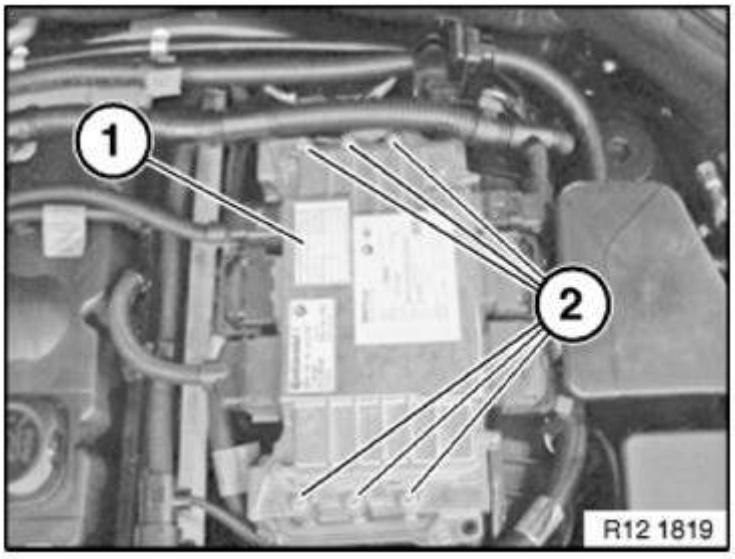


Fig. 52: Identifying Plugs From Control Unit And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Delete fault memory.

12 14 550 REPLACING CONTROL UNIT (DME) (N55)

IMPORTANT: Read and comply with notes on protection against electrostatic discharge (ESD protection).

Necessary preliminary tasks:

- Switch off ignition.
- Disconnect **BATTERY NEGATIVE LEAD** .
- Remove **INTAKE PLENUM** .

IMPORTANT: **FOLLOW INSTRUCTIONS FOR REMOVING AND INSTALLING CONTROL UNITS**.

Replacement:

- Carry out programming/encoding
- If no data can be read out from the previous control unit, carry out injection quantity compensation (description at end of instructions).

IMPORTANT: It is absolutely essential to read out the fault memory with the BMW diagnosis system and to create a fault memory printout.

Switch off ignition.

Release screws (1).

Tightening torque **12 14 2AZ** .

cardiagn.com

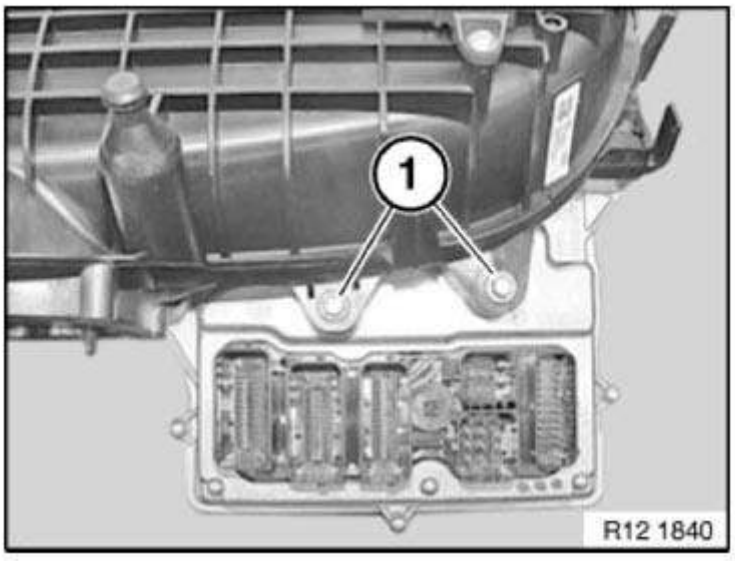


Fig. 53: Identifying Control Unit Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **12 14 1AZ** .

Remove control unit from intake plenum.

Installation note:

Renew gasket between intake plenum and control unit.

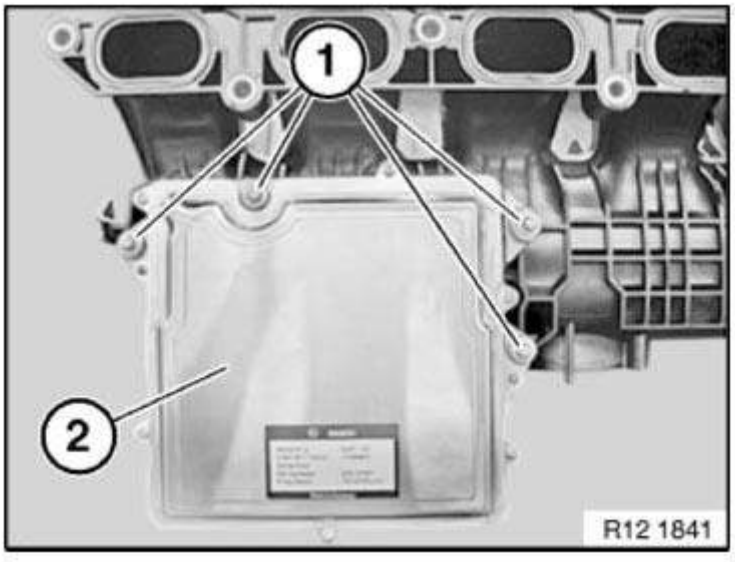


Fig. 54: Identifying Control Unit From Intake Plenum And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Injection quantity compensation:

If the DME control unit has been replaced, it will also be necessary to carry out adjustment of the injectors!

Injection quantity compensation is carried out with the aid of so-called adjustment values.

The adjustment value is printed on each injector in three digits.

If necessary, remove EMC panel.

cardiagn.com

The adjustment values must be stored in the new control unit!

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

Read off the adjustment values and enter according to the installation location (cylinder) of the injectors:

- Connect BMW diagnosis system
- Identify vehicle
- Select "Function selection"
- Select "Service functions"
- Select "Engine electronics"
- Select "Adjustment function"
- Select "Adjust injectors"
- Select "Test plan"
- The adjustment value must be entered for each cylinder.



Fig. 55: Identifying Injector Adjustment Values
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Clear diagnostic fault entries from fault memory.

12 14 521 REPLACING CRANKSHAFT PULSE SENSOR (N20, N26)

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **STARTER MOTOR**.

Unlock connector (1) and remove.

Release screw (2).

Tightening torque **13 62 2AZ** .

cardiagn.com

Remove connector housing from crankcase.

Release screw (3).

Tightening torque **13 62 3AZ** .

Pull pulse sensor from crankcase and remove.

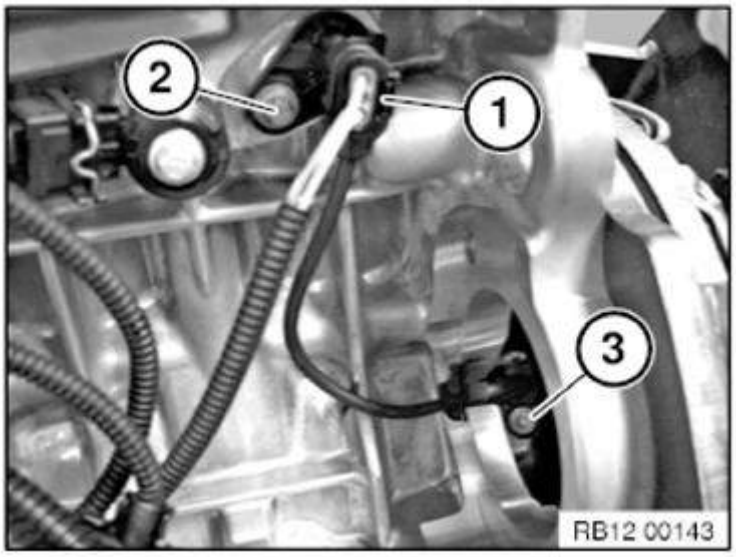


Fig. 56: Identifying Connector And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

During installation of pulse sensor make sure that guide pin (1) of pulse sensor is inserted in guiding groove (2) of crankcase.

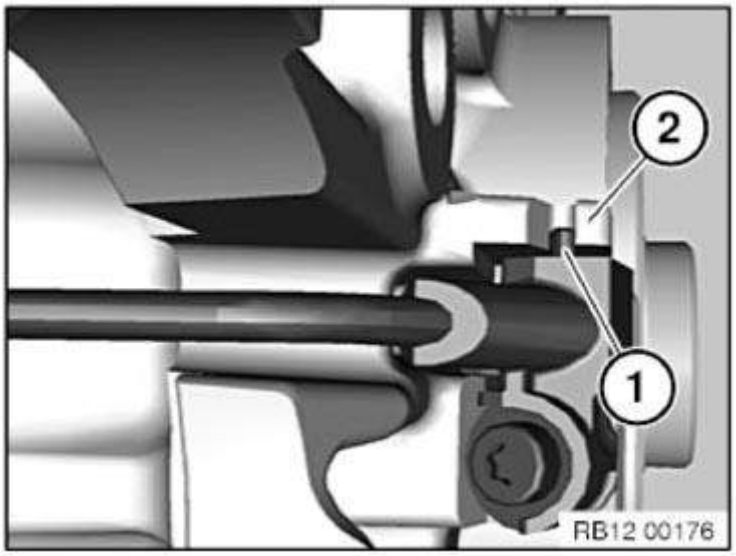


Fig. 57: Identifying Guide Pin And Groove Of Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Assemble engine.**
Check stored fault message.
Clear diagnostic fault entries from fault memory.

12 14 521 REPLACING CRANKSHAFT PULSE SENSOR (N52T)

cardiagn.com

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

IMPORTANT: Aluminum-magnesium materials.
No steel screws/bolts may be used due to the threat of electrochemical corrosion.
A magnesium crankcase requires aluminum screws/bolts exclusively.
Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Aluminum screws/bolts are **not magnetic** .
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **INTAKE PLENUM** .

NOTE: Installation location of pulse sensor for crankshaft is underneath starter motor.

Detach plug (1) from crankshaft pulse sensor (2).

Release screw.

Installation note:

Replace aluminum screws.

Tightening torque **13 62 2AZ** .

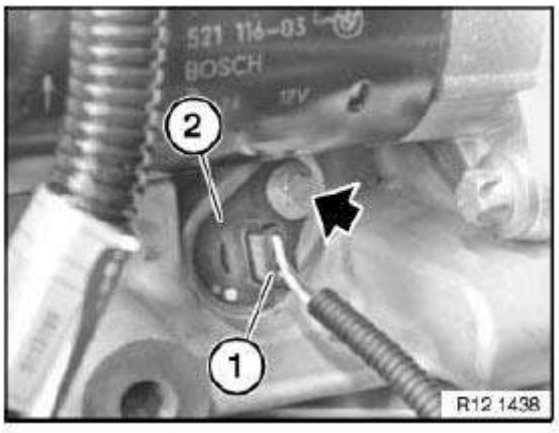


Fig. 58: Locating Screw Of Crankshaft Pulse Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Withdraw pulse sensor (2) from crankcase.

Installation note:

Replace sealing ring.

NOTE: Check stored fault messages.
Delete fault memory.

12 14 521 REPLACING CRANKSHAFT PULSE SENSOR (N55)

cardiagn.com

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **STARTER MOTOR**.

Unlock connector (1) and remove.

Release screw (2).

Tightening torque **13 62 2AZ** .

Remove connector housing from crankcase.

Release screw (3).

Tightening torque **13 62 8AZ** .

Pull pulse sensor from crankcase and remove.

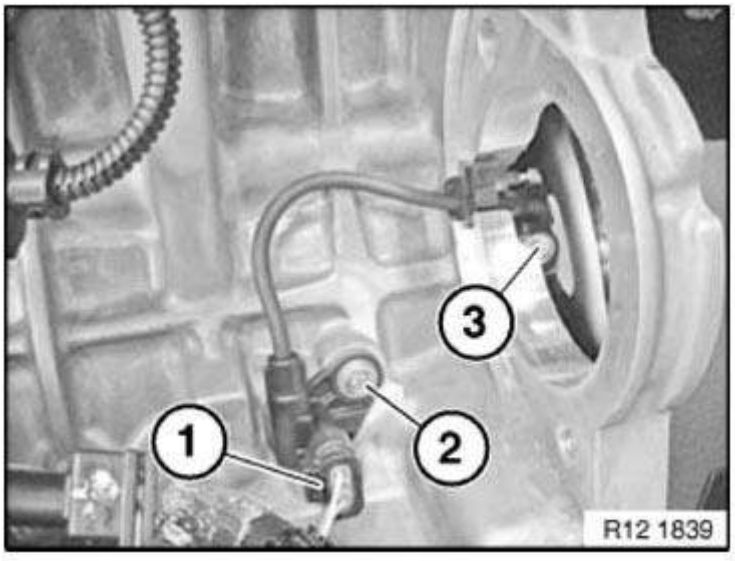


Fig. 59: Identifying Connector And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

During installation of pulse sensor make sure that guide pin (1) of pulse sensor is inserted in guiding groove (2) of crankcase.

cardiagn.com

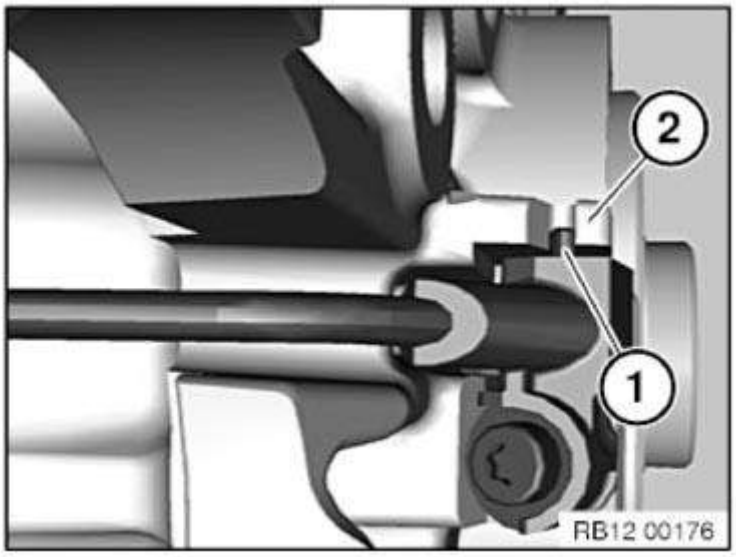


Fig. 60: Identifying Guide Pin And Groove Of Crankcase
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Assemble engine.**
Check stored fault message.
Delete fault memory.

12 14 524 REPLACING PULSE SENSOR ON EXHAUST CAMSHAFT (N20)

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.

Unlock connector (1) and remove.

Release screw (2).

Tightening torque **13 62 1AZ** .

Remove pulse sensor (2).

Check gasket, renew damaged gasket.

cardiagn.com

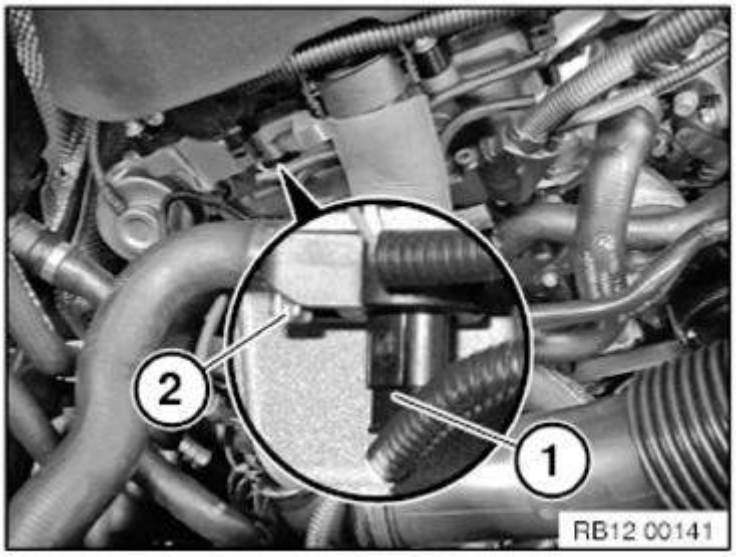


Fig. 61: Identifying Pulse Sensor And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

12 14 524 REPLACING PULSE SENSOR ON EXHAUST CAMSHAFT (N52T)

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

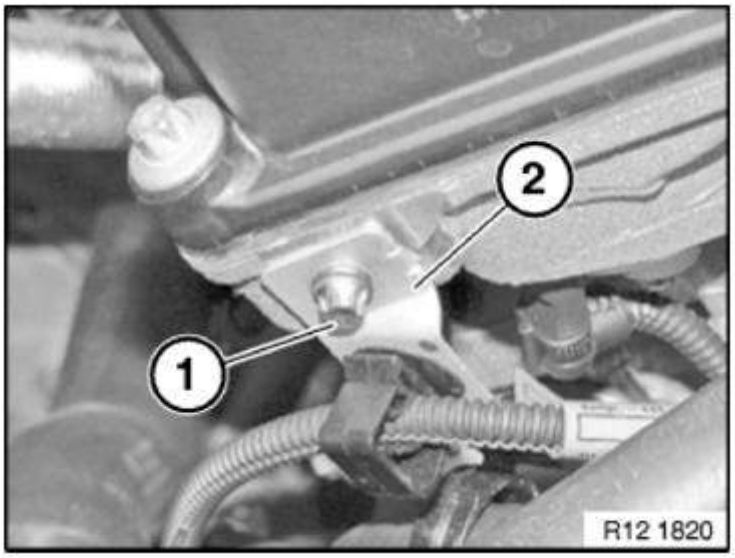
Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **ACOUSTIC COVER**

Release screw (1).

Tightening torque **12 90 2AZ** .

Release holder (2) from cylinder head.



cardiagn.com

Fig. 62: Identifying Holder From Cylinder Head And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release connector (1) and remove.

Release screw.

Installation note:

Replace screw.

Tightening torque **13 62 1AZ** .

Remove pulse sensor (2).

Installation note:

Replace gasket.

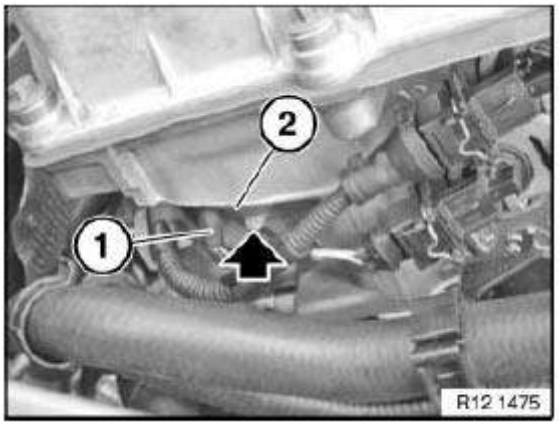


Fig. 63: Locating Screw Of Pulse Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Delete fault memory.

12 14 524 REPLACING PULSE SENSOR ON EXHAUST CAMSHAFT (N55)

IMPORTANT: Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

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

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **FAN COWL** .

Release connector (1) and remove.

Release screw.

cardiagn.com

Tightening torque **13 62 1AZ** .

Remove pulse sensor (2).

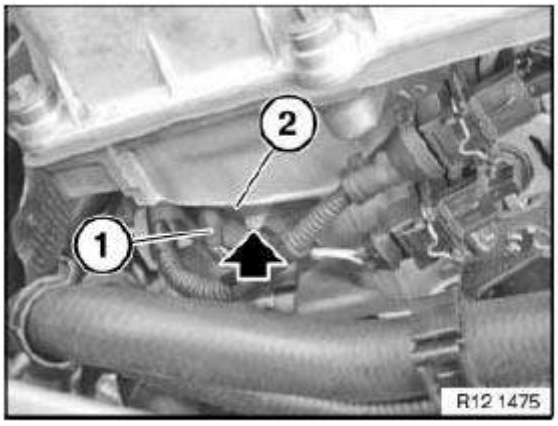


Fig. 64: Locating Screw Of Pulse Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

12 14 523 REPLACING PULSE SENSOR ON INTAKE CAMSHAFT (N20)

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.

Unlock connector (1) and remove.

Release screw.

Tightening torque **13 62 1AZ** .

Remove pulse sensor (2).

Check gasket, renew damaged gasket.

cardiagn.com

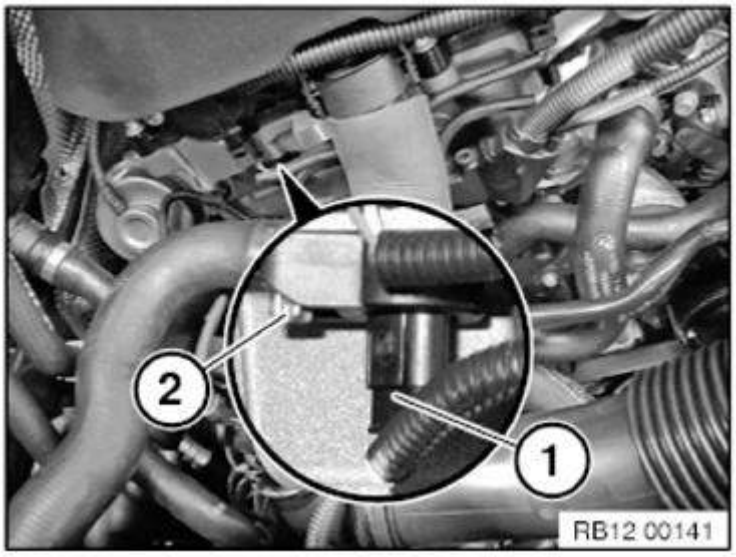


Fig. 65: Identifying Pulse Sensor And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

12 14 523 REPLACING PULSE SENSOR ON INTAKE CAMSHAFT (N52T)

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

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **ACOUSTIC COVER**

Release connector (1) and remove.

Release screw.

Installation note:

Replace screw.

Tightening torque **13 62 1AZ** .

Remove pulse sensor (2).

Installation note:

Replace sealing ring.

cardiagn.com

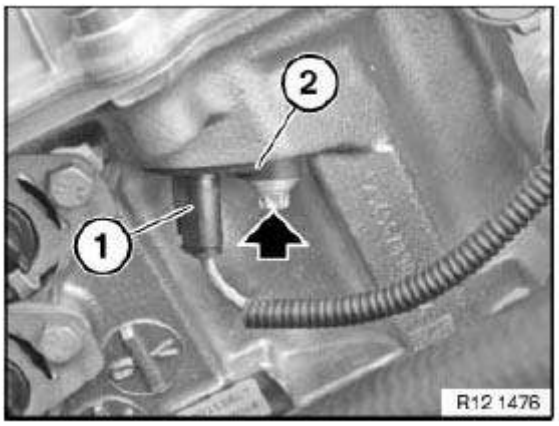


Fig. 66: Locating Pulse Sensor Screw
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Delete fault memory.

12 14 523 REPLACING PULSE SENSOR ON INTAKE CAMSHAFT (N55)

IMPORTANT: Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

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

Necessary preliminary work:

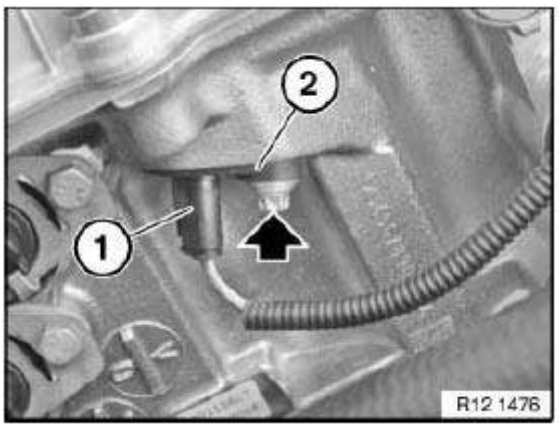
- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **FAN COWL** .

Release connector (1) and remove.

Release screw.

Tightening torque **13 62 1AZ** .

Remove pulse sensor (2).



cardiagn.com

Fig. 67: Locating Screw Of Pulse Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

12 14 650 REPLACING SUCTION PRESSURE SENSOR ON INTAKE PLENUM (N20, N26)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Partially undo the acoustic cover.

Unlock connector (1) and remove.

Unfasten screws (2).

Tightening torque 13 62 5AZ .

Pull out the vacuum pressure sensor (3) from the intake plenum.

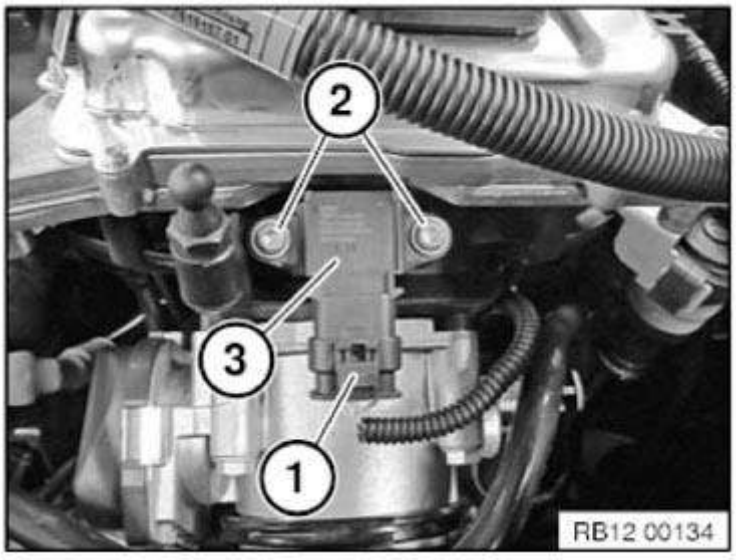


Fig. 68: Identifying Connector, Vacuum Pressure Sensor And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check sealing ring for damage. Replace damaged sealing ring.

When installing, coat sealing ring with suitable lubricant.

cardiagn.com

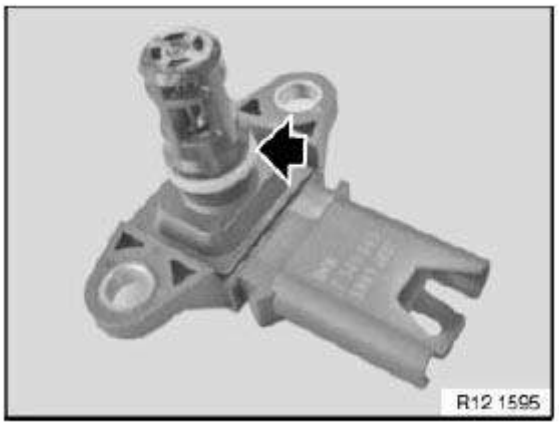


Fig. 69: Locating Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault message.
Delete fault memory.

12 14 650 REPLACING SUCTION PRESSURE SENSOR ON INTAKE PLENUM (N55)

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **INTAKE FILTER HOUSING** .

Release connector (1) and remove.

Release screws and pull suction pressure sensor (2) out of intake plenum.

Tightening torque **13 62 4AZ** .

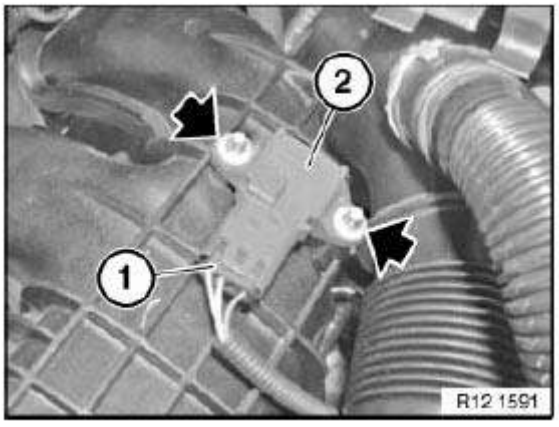


Fig. 70: Locating Suction Pressure Sensor Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check sealing ring for damage. Replace damaged sealing ring.

When installing, coat sealing ring with suitable lubricant.

cardiagn.com

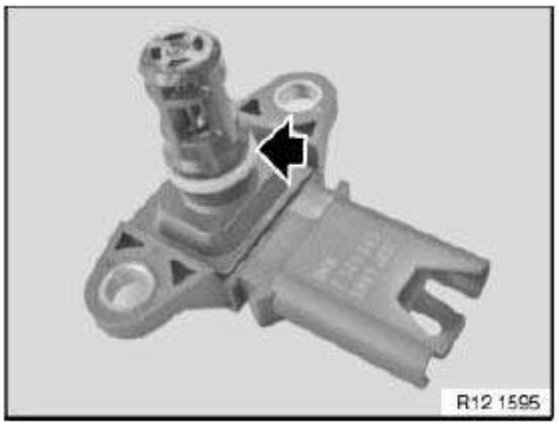


Fig. 71: Locating Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault message.
Delete fault memory.

12 14 650 REPLACING SUCTION PRESSURE SENSOR ON PRESSURE PIPE (N20, N26)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.

Unlock connector (1) and remove.

Unfasten screws (2).

Tightening torque **13 62 5AZ** .

Pull suction pressure sensor (3) out of pressure pipe.

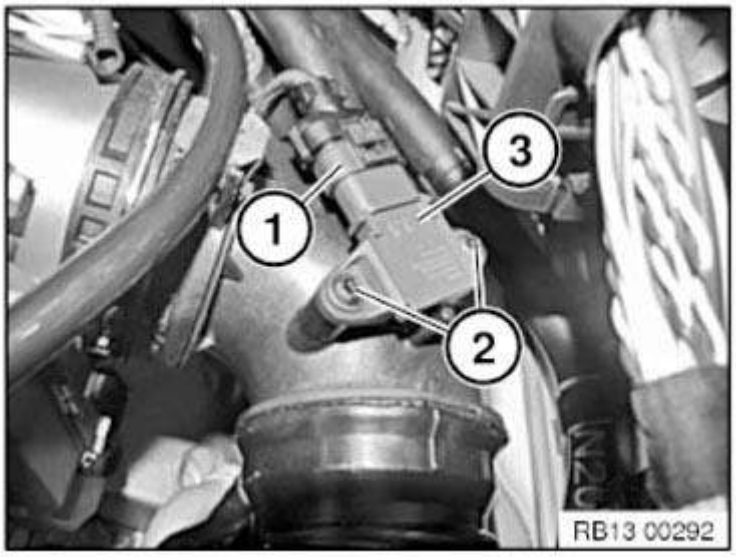


Fig. 72: Identifying Connector, Screws And Suction Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check sealing ring for damage. Replace damaged sealing ring.

cardiagn.com

When installing, coat sealing ring with suitable lubricant.

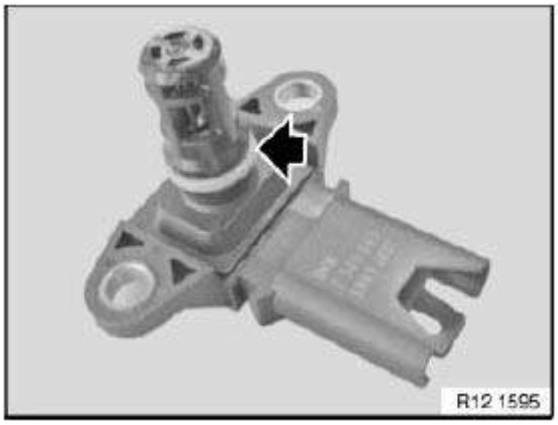


Fig. 73: Locating Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault message.
Delete fault memory.

PREHEATING RELAY

12 21 520 REPLACING PREHEATING CONTROL UNIT (N47D20 O1)

Necessary preliminary tasks:

- Switch off ignition.
- Remove INTAKE SILENCER HOUSING .

Release positive battery cable (1) from clamp.

Release expanding rivets (2).

Remove rear acoustic cover (3).

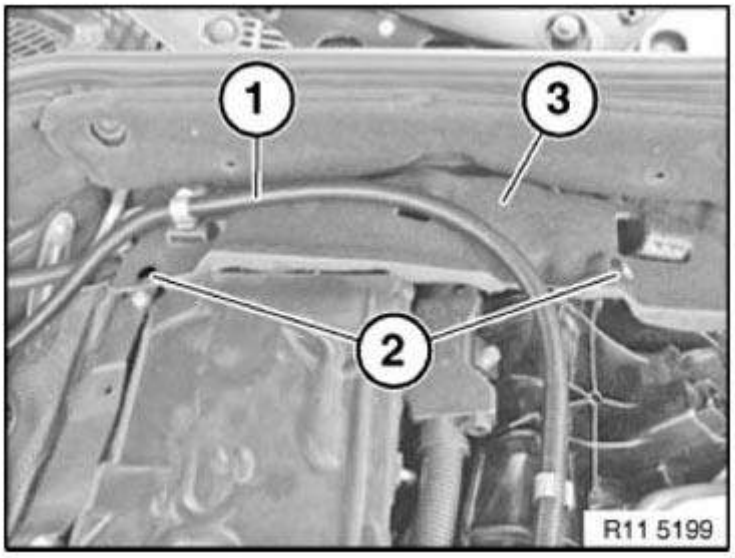


Fig. 74: Identifying Positive Battery Cable, Expanding Rivets And Rear Acoustic Cover
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Detach connector (1) from preheating control unit.

Release screw (2).

Tightening torque **12 23 2AZ** .

Remove preheating control unit (3).

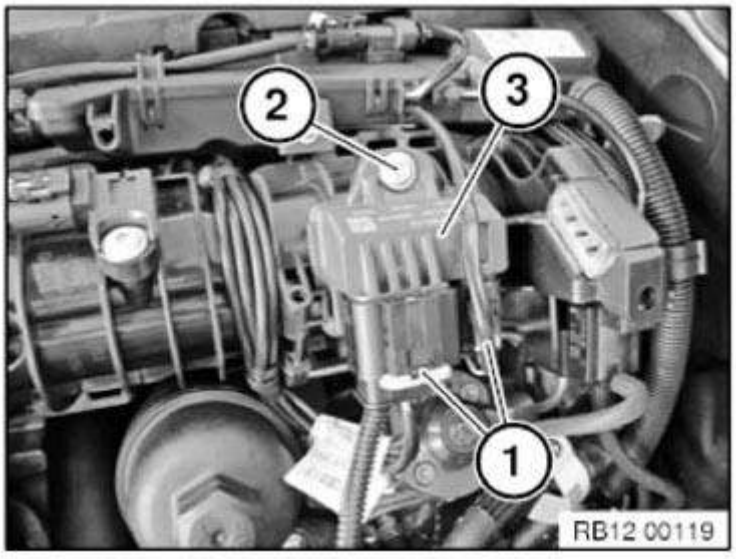


Fig. 75: Identifying Connector, Preheating Control Unit And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If the preheating control unit is replaced, the preheating control service function must be performed using the diagnosis system after it is replaced.**

Installation note:

Assemble engine.

PREHEATER PLUGS

12 23 505 REPLACING ALL GLOW ELEMENTS (N47 D20 O1)

Special tools required:

- **11 6 050**
- 12 2 300

NOTE: **When one or more glow elements are replaced, the preheating control service function must be started with the BMW diagnosis system before replacement and the "Security data record in the preheating control must be activated".**

NOTE: **If malfunctions have occurred at the glow elements, it is essential to check the safety fuse.**
Switch off ignition.

NOTE: **It is recommended to warm the engine up to operating temperature for easy removal of glow elements. In addition, spray glow element with DISASSEMBLY AGENT 5.1 and let it take effect for approx. 2 minutes.**

Removing glow elements from a cold engine may cause damage to the thread in the cylinder head.

cardiagn.com

IMPORTANT: Risk of burning! The use of gloves is mandatory!

Necessary preliminary tasks:

- Disconnect **BATTERY EARTH LEAD** .
- Remove **ACOUSTIC COVER** .
- Remove **INTAKE SILENCER HOUSING** .

Release positive battery cable (1) from clamp.

Release expanding rivets (2).

Remove acoustic cover (3).

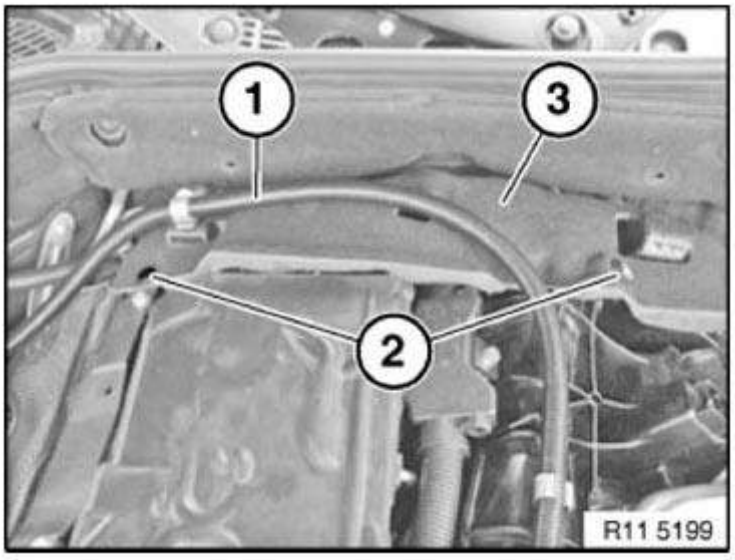


Fig. 76: Identifying Positive Battery Cable, Expanding Rivets And Rear Acoustic Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Unlock connector from cable channel and pull off. Slide cable channel (2) to one side.

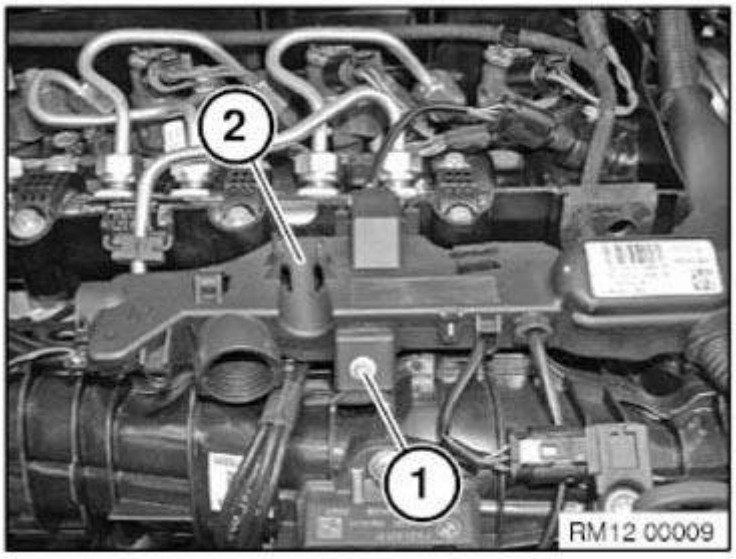


Fig. 77: Identifying Cable Channel And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Compress connector fastener (1) with special tool 12 2 300 and pull connectors from glow elements.

NOTE: For purposes of clarity, the intake plenum is shown removed.

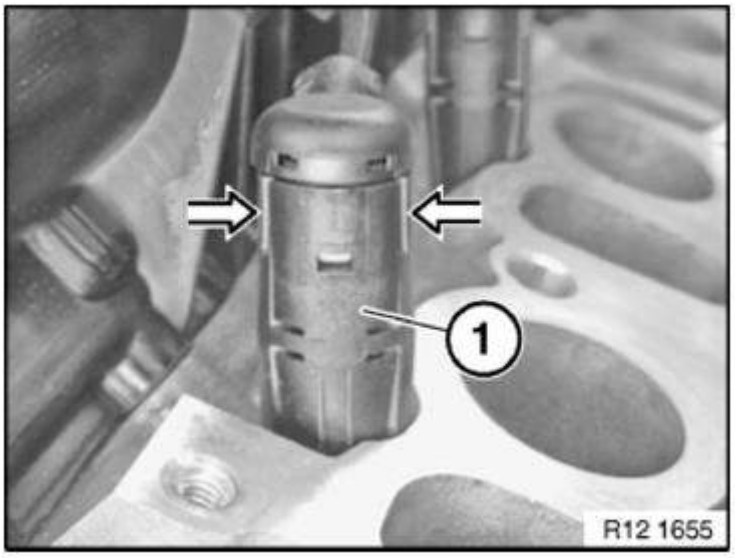


Fig. 78: Compressing Connector Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew glow elements with special tool **11 6 050** .

Tightening torque **12 23 1AZ** .

NOTE: For purposes of clarity, the intake plenum is shown removed.

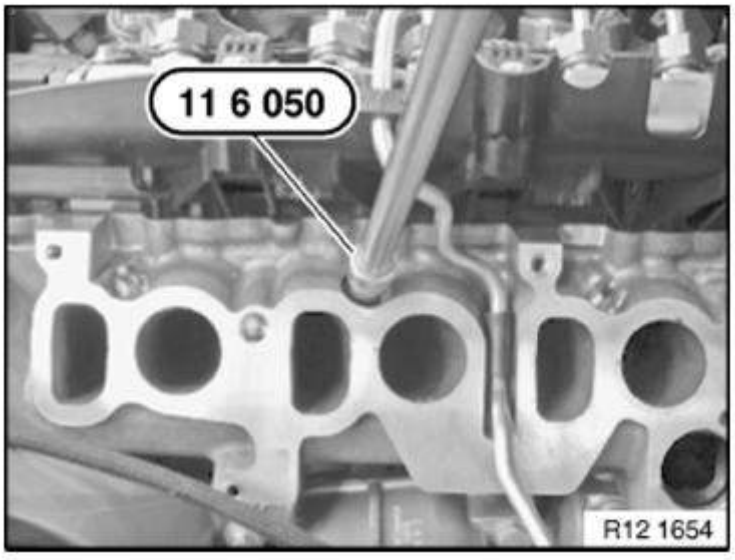


Fig. 79: Identifying Special Tool (11 6 050)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: If one or more glow elements are renewed, the preheating control service function must be performed using the diagnosis system after they are replaced.

Read out fault code memory in DDE control unit. Check stored fault message. Rectify fault. Delete fault memory.

ALTERNATOR WITH DRIVE AND MOUNTING

cardiagn.com

12 31 020 REMOVING AND INSTALLING ALTERNATOR (N52T)

IMPORTANT:	Aluminum-magnesium materials. No steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released** . Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic** . Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary work:

- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove **INTAKE SILENCER HOUSING** .
- Remove **ALTERNATOR DRIVE BELT** .

Release connector (1) and remove.

Slacken nut (2).

Installation note:

Tightening torque **12 42 1AZ** .

Disconnect positive battery cable from alternator.

Release screws (3) and remove alternator.

Installation note:

Replace aluminum screws.

Tightening torque **12 31 1AZ** .

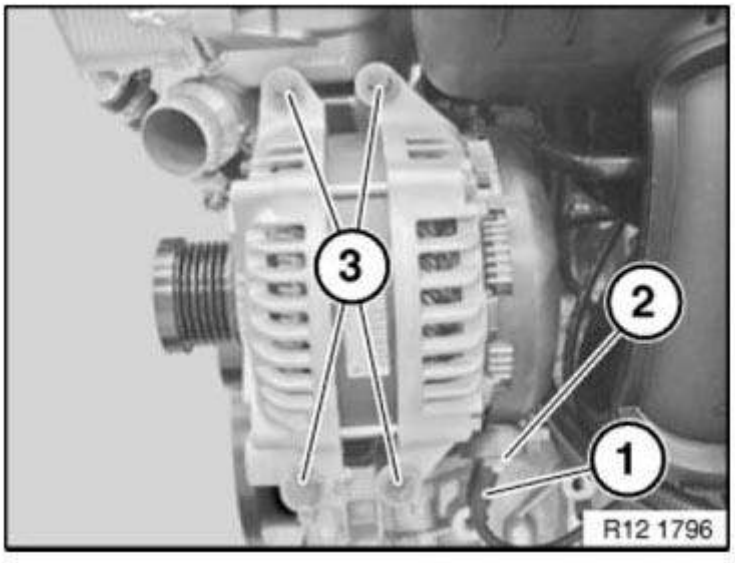


Fig. 80: Identifying Connector, Slacken Nut And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

cardiagn.com

12 31 020 REMOVING AND INSTALLING OR REPLACING ALTERNATOR (N20, N26)

Necessary preliminary tasks:

- Switch off ignition
- Disconnect **BATTERY EARTH LEAD** and cover.
- Remove **INTAKE SILENCER HOUSING** .
- Remove **CLEAN AIR PIPE** , top.
- Remove **TENSIONING DEVICE** for drive belt.

Release screws (1).

Tightening torque **12 31 1AZ** .

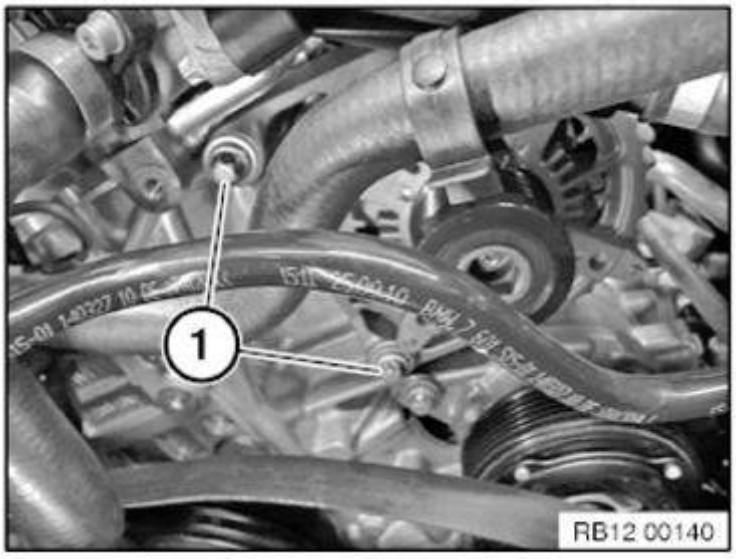


Fig. 81: Identifying Screws Of Alternator
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock connector (1) and remove.

Release nut (2) and remove the positive battery cable.

Tightening torque **12 42 1AZ** .

Disconnect tank ventilation line (3) and place to one side.

Feed out alternator (4) to the left and remove.

cardiagn.com

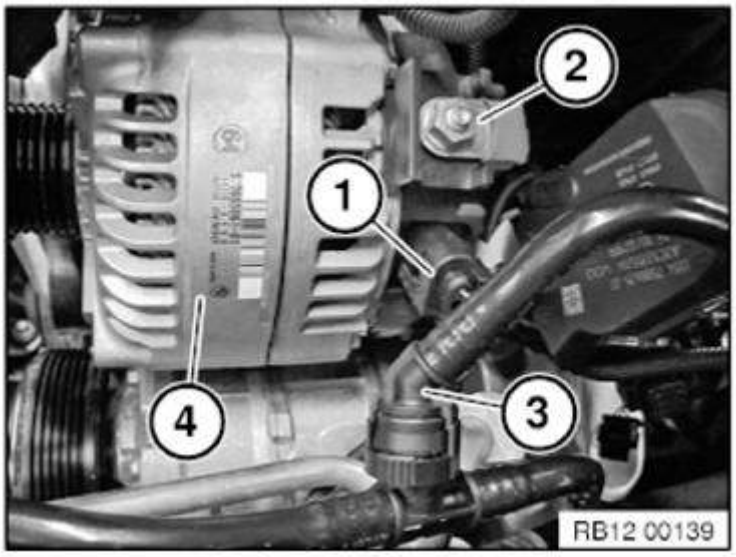


Fig. 82: Identifying Tank Ventilation Line, Alternator And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

12 31 020 REMOVING AND INSTALLING OR REPLACING ALTERNATOR (N55)

Necessary preliminary tasks:

- Switch off ignition
- Disconnect **BATTERY EARTH LEAD** and cover.
- **REMOVE LEFT CHARGE AIR DUCT** .
- Remove alternator **DRIVE BELT** .

NOTE: **In order to remove the alternator, it is necessary to remove . See 64 52 523 REPLACING AIR CONDITIONING SYSTEM COMPRESSOR (N55) or 64 52 523 REPLACING AIR CONDITIONING SYSTEM COMPRESSOR (N55) the air conditioning compressor .**
In so doing:

- **Do not draw off air conditioning refrigerant.**
- **Do not detach refrigerant lines from A/C compressor.**
- **Do not remove air conditioning compressor; instead, release from bracket only and place to one side.**

Release screws (1).

Tightening torque **12 31 1AZ** .

Release screw (2).

Tightening torque **12 31 2AZ** .

Release screw (3) and remove with holder (4).

Tightening torque **12 31 2AZ** .

cardiagn.com

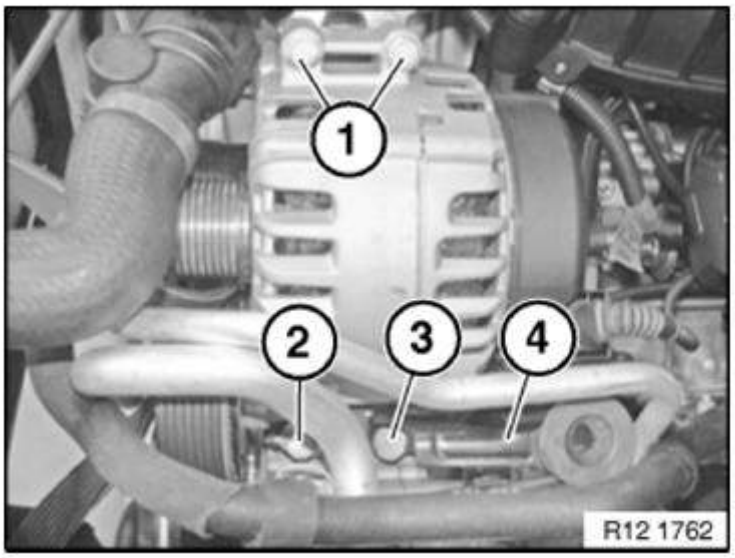


Fig. 83: Identifying Holder And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock connector (1) and remove.

Remove protective cap (2) and release nut underneath.

Tightening torque **12 42 1AZ** .

Remove positive battery cable(3).

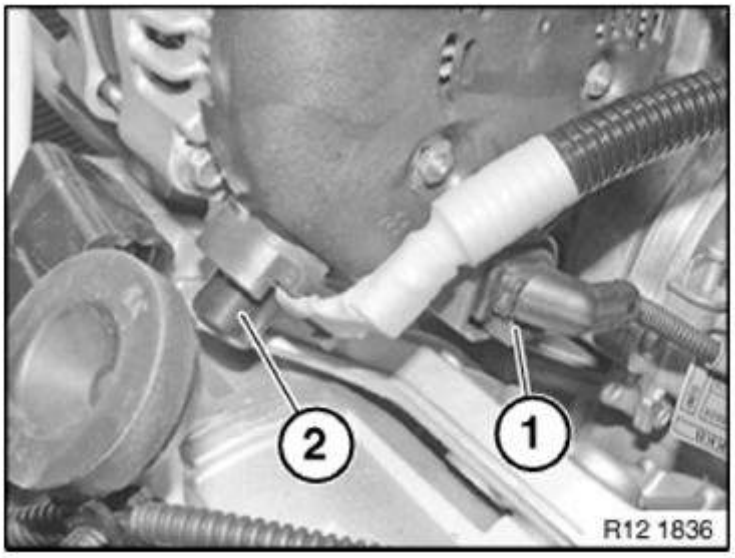


Fig. 84: Identifying Protective Cap And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **For purposes of improved clarity, illustrations and description show A/C compressor removed.**

Release screws (1) a few turns until bracket (2) is loose. Do not remove bracket (2).

Tightening torque **12 31 3AZ** .

Feed out alternator (3) and remove.

cardiagn.com

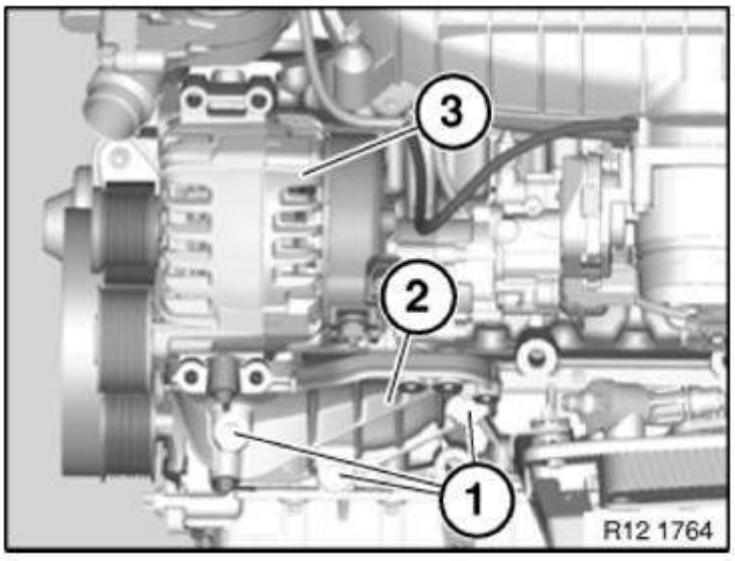


Fig. 85: Identifying Alternator, Screws And Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

12 31 020 REMOVING AND INSTALLING/REPLACING ALTERNATOR (N47 D20 O1)

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove **INTAKE FILTER HOUSING** .
- Remove **INTAKE PORT** .
- Remove **THROTTLE BODY** .
- Remove **INTAKE PLENUM** .
- **REMOVE** drive belt for alternator.

Release connector (1) and remove.

Slacken nut (2).

Tightening torque **12 52 2AZ** .

Disconnect positive battery cable from alternator.

cardiagn.com

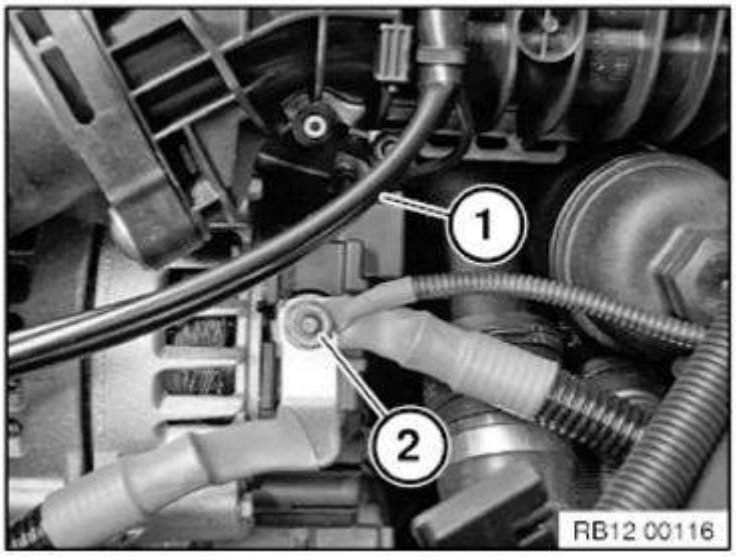


Fig. 86: Identifying Connector And Slacken Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Remove cover from idler pulley and undo bolt (1) beneath it.

Tightening torque **12 31 2AZ** .

Remove idler pulley.

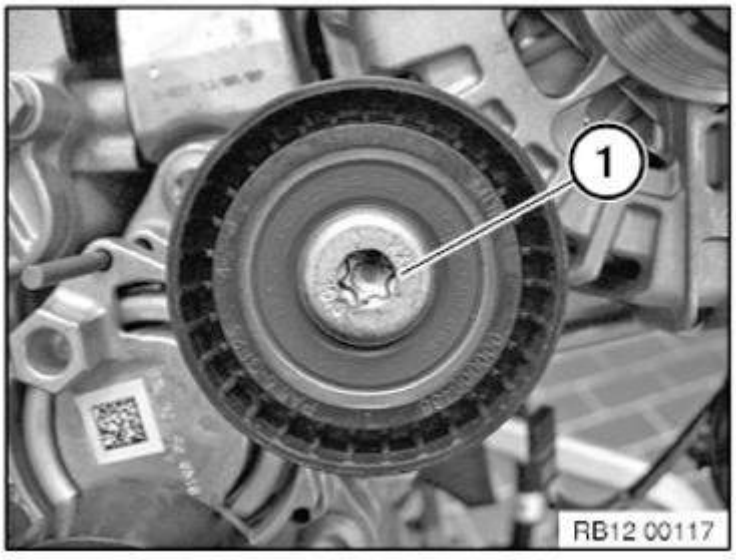


Fig. 87: Identifying Deflecting Element Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **12 31 1AZ** .

Feed out alternator upwards and remove.

cardiagn.com

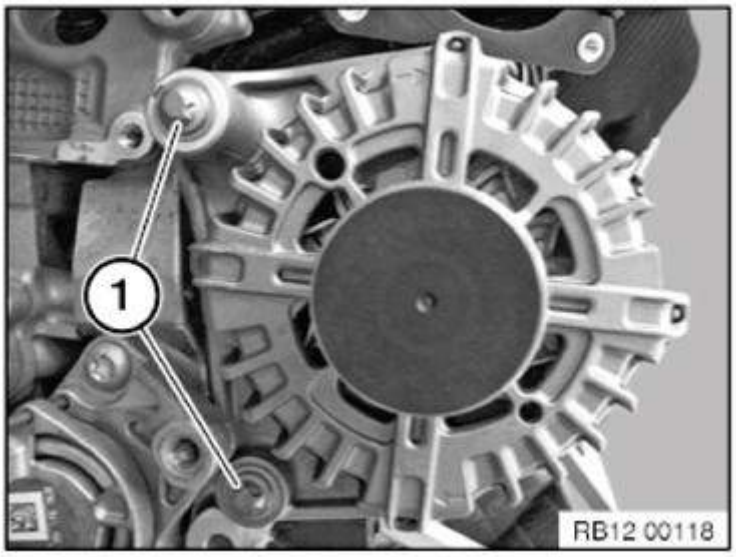


Fig. 88: Identifying Screws Of Alternator
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Delete fault memory.

CONTROLLER

12 32 501 REPLACING VOLTAGE REGULATOR

Necessary preliminary tasks:

- Switch off ignition
- Disconnect battery negative lead
- Notes on removing and installing electronic control units. Refer to **12 00... INSTRUCTIONS FOR CONNECTING AND DISCONNECTING TEST UNITS** or **12 00... INSTRUCTIONS ON COMPONENT TESTING**
- Remove alternator

Bosch:

Release protective caps (1).

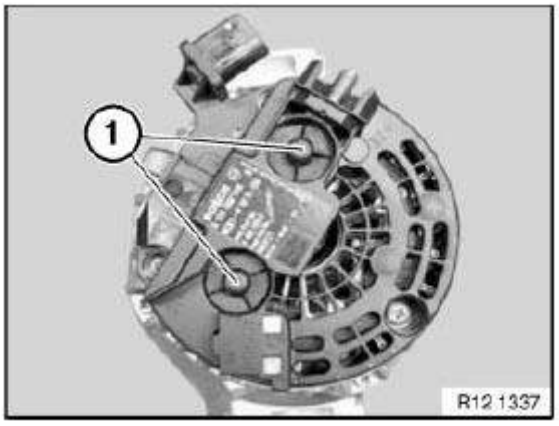


Fig. 89: Identifying Protective Caps
Courtesy of BMW OF NORTH AMERICA, INC.

Bosch:

cardiagn.com

Release screw (1) and nuts (2), remove cover.

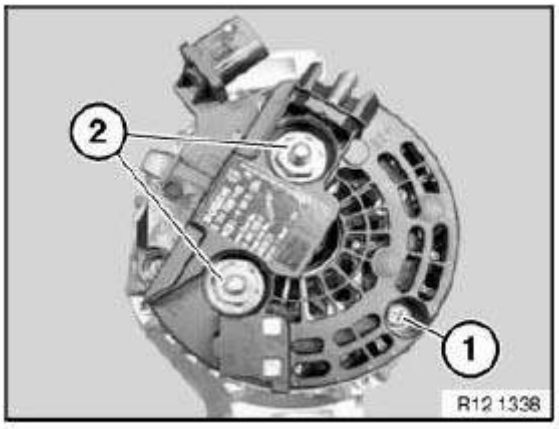


Fig. 90: Identifying Screw And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Bosch:

Release screws and remove regulator switch (1) in direction of arrow.

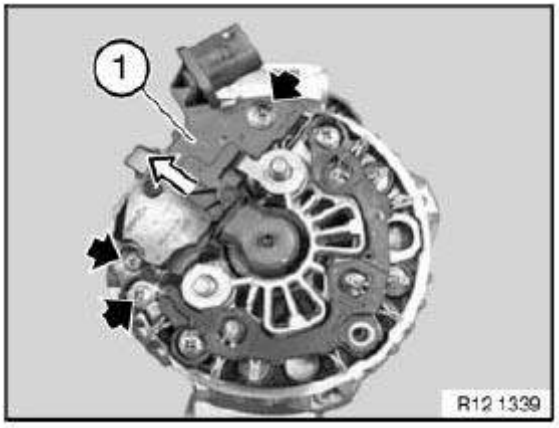


Fig. 91: Removing Regulator Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Bosch:

Installation:

Clean contact surfaces and check pretension of contact spring, replace regulator switch if necessary.

Measurement A = min. 5 mm.

Check collector ring for wear and recondition if necessary.

cardiagn.com

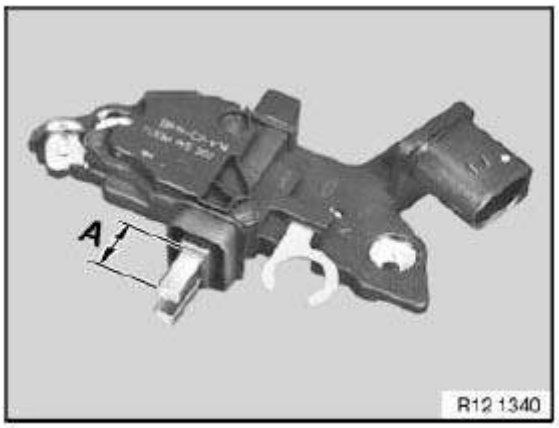


Fig. 92: Identifying Collector Ring Dimension
Courtesy of BMW OF NORTH AMERICA, INC.

Valeo:

Slacken nut (1).

Slacken nut (2).

Release screws (3).

Release cover (4).

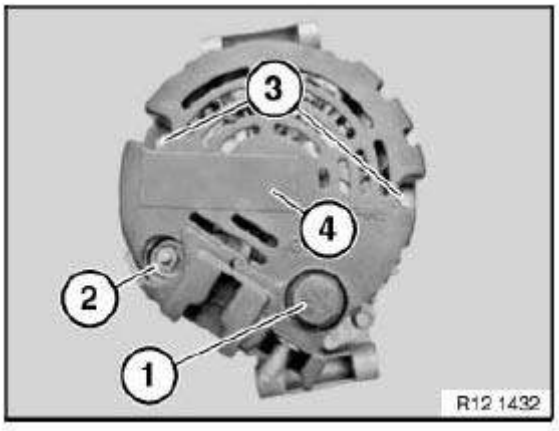


Fig. 93: Identifying Cover, Screws And Slacken Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Valeo:

Release screws.

Remove regulator switch (1) towards top.

cardiagn.com

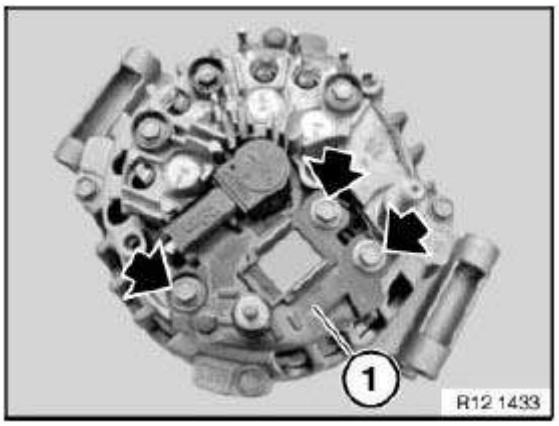


Fig. 94: Locating Regulator Switch Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Valeo:

Installation:

Clean contact surfaces and check pretension of contact spring, replace regulator switch if necessary.

Measurement A = min. 5 mm.

Check collector ring for wear and recondition if necessary.

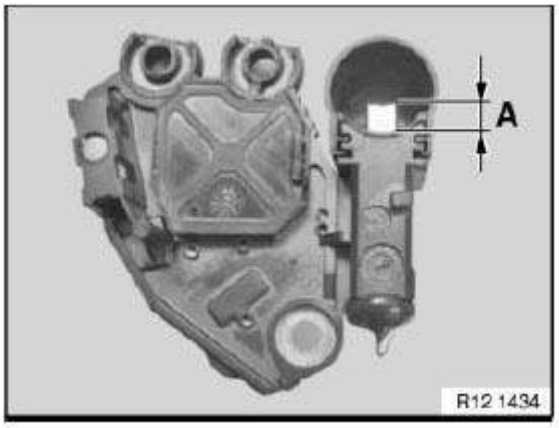


Fig. 95: Identifying Collector Ring Distance
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Fit new regulator (1) with attached mounting sleeve (2) or locked carbon brush.

Pull off mounting sleeve (2) and replace with cover (3).

cardiagn.com

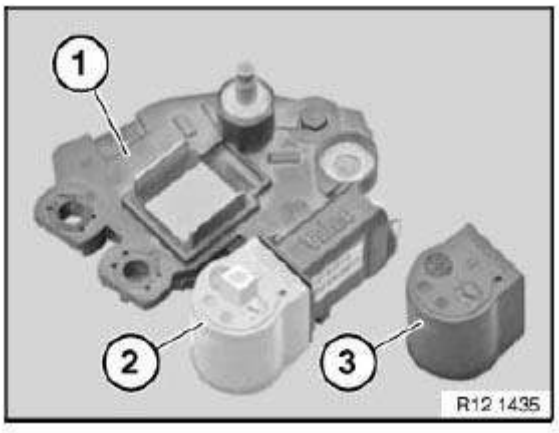


Fig. 96: Identifying Regulator, Mounting Sleeve And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

STARTER WITH MOUNTING

11 00... HANDLING COMPONENTS AFTER FLOOD DAMAGE

Flood damage can occur if the permissible fording depth of a vehicle is exceeded. Ingress of water can cause damage to the engine (water shock) or components.

Because dirt particles generally enter into the component with the water (e.g. starter motor, wiring harness), the components need to be thoroughly inspected.

Residual moisture in the components leads to corrosion (increased contact resistance in the component), which can lead to a component failure at a later time.

If water ingress into the electrical components cannot be ruled out, it is recommended to replace the component to ensure correct functioning through the vehicle lifetime.

12 41 020 REMOVING AND INSTALLING/REPLACING STARTER MOTOR (N20, N26)

Necessary preliminary tasks:

- Switch off ignition.
- Disconnect **BATTERY NEGATIVE LEAD** .
- Remove **INTAKE PLENUM** .

Unlock connector (1) and remove.

Release nuts (2) and disconnect positive battery cables.

Tightening torque **12 42 2AZ** .

Release screws (3).

Tightening torque **12 41 1AZ** .

Feed out starter motor and remove.

cardiagn.com

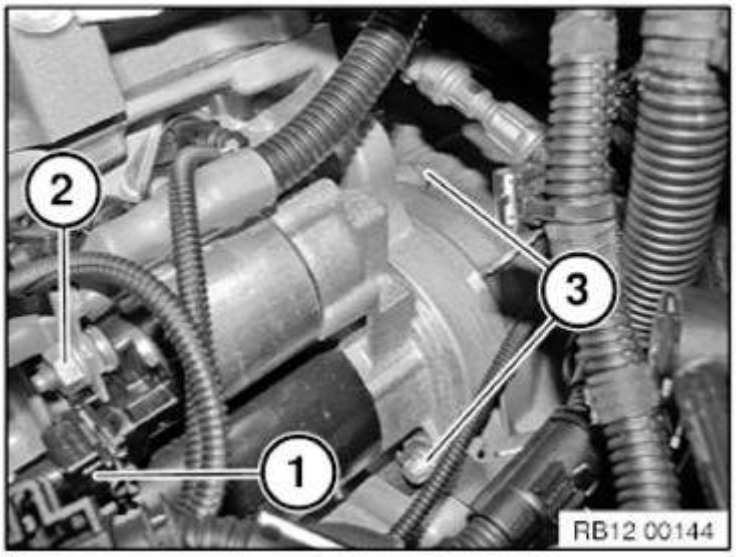


Fig. 97: Identifying Connector, Nuts And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check starter pinion and ring gear for damage. Replace starter motor if necessary.

Only during starter replacement and on vehicles with MSA (automatic engine start-stop function):

- Use BMW diagnosis system to reset the starter counter.

12 41 020 REMOVING AND INSTALLING/REPLACING STARTER MOTOR (N47 D20 O1)

Necessary preliminary tasks:

- Switch off ignition.
- Disconnect **BATTERY NEGATIVE LEAD** .
- Remove **REINFORCEMENT PLATE** .

Release nut (1) and remove cable.

Tightening torque **12 52 1AZ** .

Release nut (2) and remove the positive battery cable.

Tightening torque **12 52 3AZ** .

Release cable at clamp (3) from starter motor.

cardiagn.com

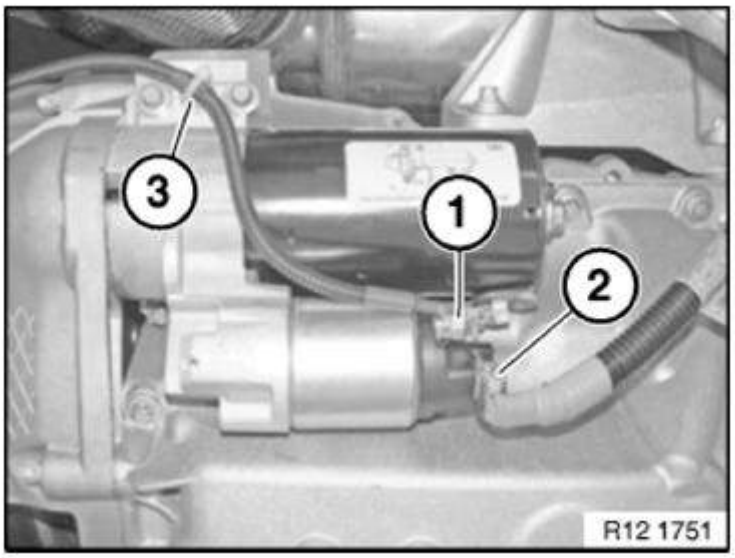


Fig. 98: Identifying Clamp And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1), (2) and (3).

Remove starter motor.

Installation note:

Observe screwing sequence.

Position and secure starter motor. Tighten down screws (1) and (2). Tighten down support screw (3).

Tightening torque **12 41 1AZ** .

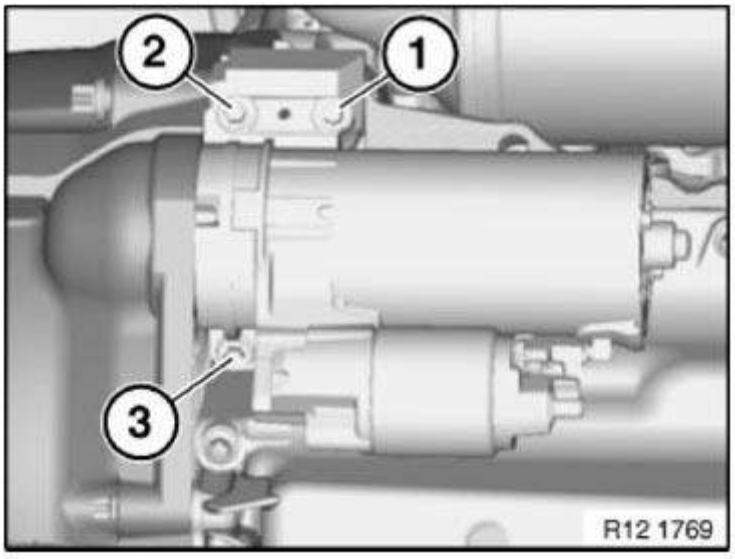


Fig. 99: Identifying Starter Motor Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check starter pinion and ring gear for damage.

Replace damaged starter motor.

Assemble engine.

cardiagn.com

Only during starter replacement and on vehicles with MSA (automatic engine start-stop function):

- Use BMW diagnosis system to reset the starter counter.

12 41 020 REMOVING AND INSTALLING/REPLACING STARTER MOTOR (N52T)

IMPORTANT:	Aluminum-magnesium materials. No steel screws/bolts may be used due to the threat of electrochemical corrosion. A magnesium crankcase requires aluminum screws/bolts exclusively. Aluminum screws/bolts must be replaced each time they are **released** . Aluminum screws/bolts are permitted with and without color coding (blue). For reliable identification: Aluminum screws/bolts are **not magnetic** . Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

Necessary preliminary tasks:

- Switch off ignition.
- Disconnect **BATTERY NEGATIVE LEAD** .
- Remove **INTAKE PLENUM** .

Unlock connector (1) and remove.

Unfasten nut.

Tightening torque **12 42 2AZ** .

Remove positive battery cable (2).

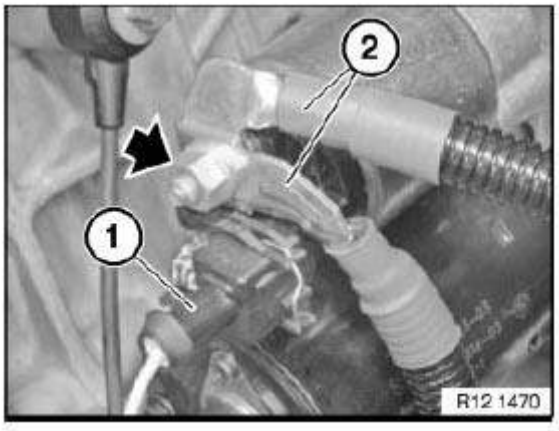


Fig. 100: Locating Positive Battery Cable Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Installation note:

Replace aluminum screws.

Tightening torque **12 41 1AZ** .

Unfasten screws (2).

Installation note:

Replace aluminum screws.

cardiagn.com

Tightening torque **12 41 2AZ** .

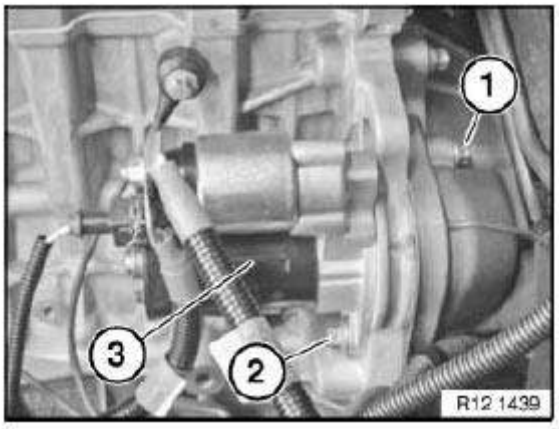


Fig. 101: Identifying Screw And Starter Motor
Courtesy of BMW OF NORTH AMERICA, INC.

Remove starter motor (3).

Installation note:

Check starter pinion and ring gear for damage. Replace starter motor if necessary.

Assemble engine.

Only during starter replacement and on vehicles with MSA (automatic engine start-stop function):

- Use BMW diagnosis system to reset the starter counter.

12 41 020 REMOVING AND INSTALLING/REPLACING STARTER MOTOR (N55)

Necessary preliminary tasks:

- Switch off ignition.
- Disconnect **BATTERY NEGATIVE LEAD** .
- Remove **INTAKE PLENUM** .

Unlock connector (1) and remove.

Release nuts (2) and disconnect positive battery cables.

Tightening torque **12 42 2AZ** .

Release screws (3).

Tightening torque **12 41 1AZ** .

Remove starter motor (4).

cardiagn.com

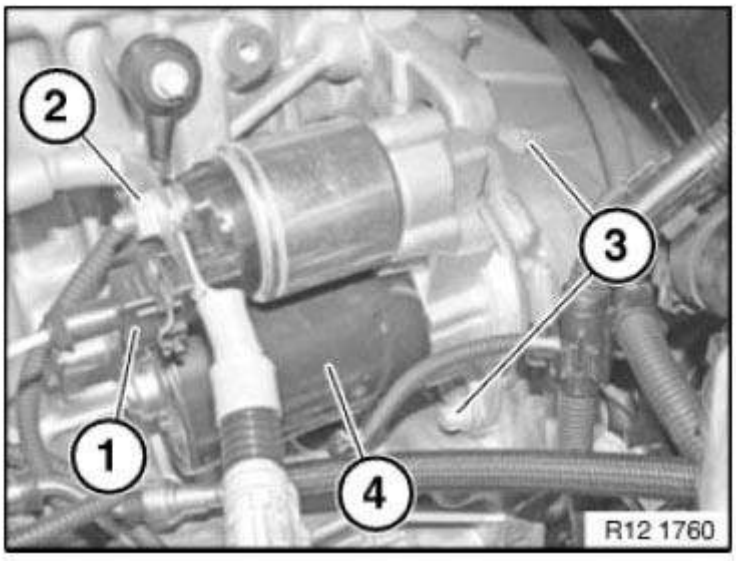


Fig. 102: Identifying Connector, Starter Motor And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check starter pinion and ring gear for damage. Replace starter motor if necessary.

Only during starter replacement and on vehicles with MSA (automatic engine start-stop function):

- Use BMW diagnosis system to reset the starter counter.

12 41 041 REPLACING SOLENOID SWITCH

Turn off ignition.

Remove starter motor.

Release nut (1).

Remove cable lug (2).

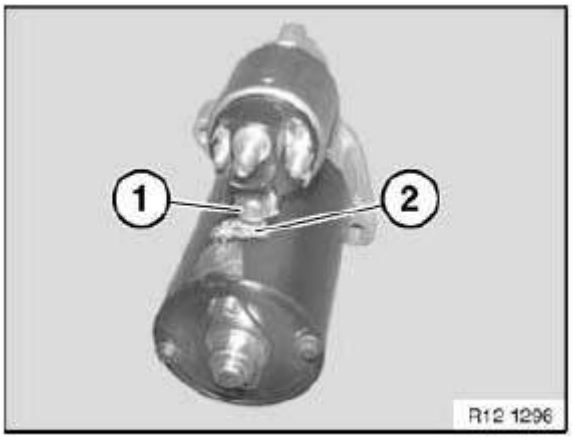


Fig. 103: Identifying Cable Lug And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

CAUTION: **Do not turn cable lug (2) while tightening down - risk of short circuit to starter motor housing.**
Tightening torque, 12 41 4AZ.

cardiagn.com

Release screws (1).

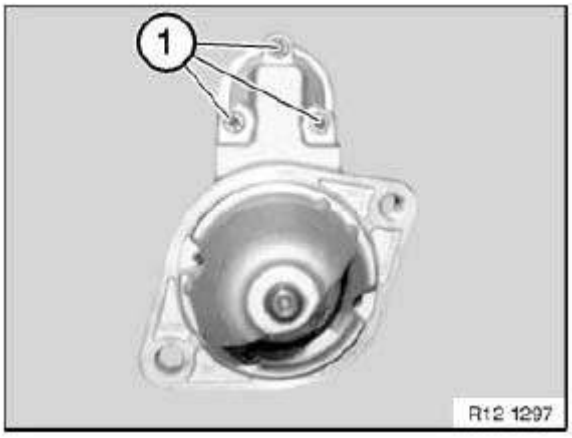


Fig. 104: Identifying Starter Motor Housing Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Remove solenoid switch (1) and spring (2).

Unhook pin (3).

Installation:

Check pin (3) for wear and apply grease.

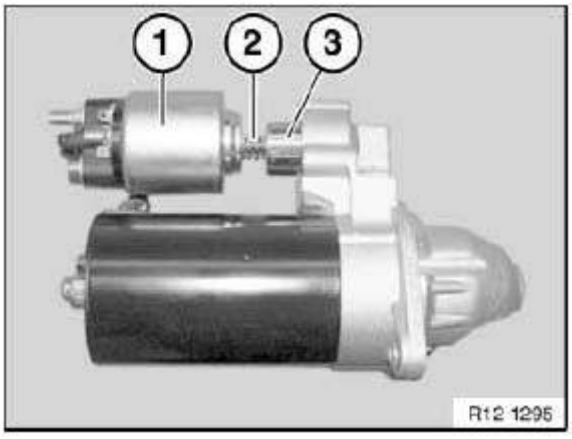


Fig. 105: Identifying Solenoid Switch, Spring And Pin
Courtesy of BMW OF NORTH AMERICA, INC.

STARTER LEAD

12 42 500 REPLACING BATTERY POSITIVE LEAD BETWEEN STARTER, ALTERNATOR AND BATTERY POSITIVE TERMINAL (N52T)

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove intake plenum.

Fold back cover (1).

cardiagn.com

Release nut underneath. Remove positive battery cable from positive battery connection point.

Tightening torque, **12 42 3AZ** .

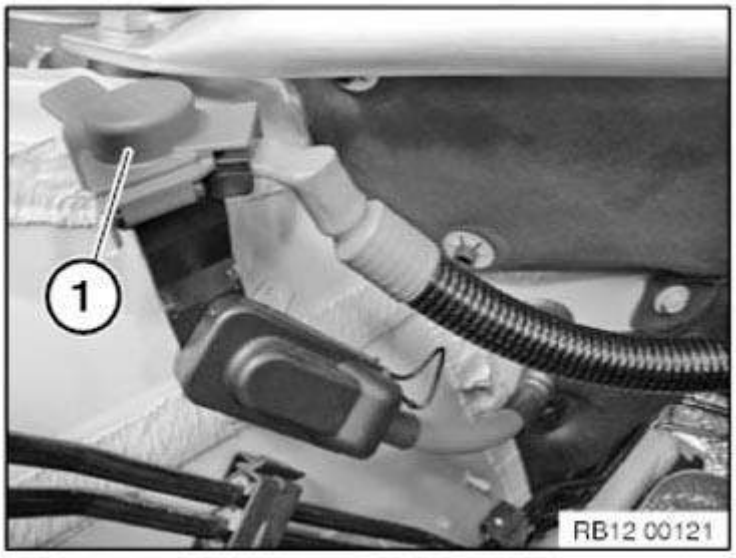


Fig. 106: Identifying Back Cover Of Positive Battery Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Release battery positive lead (1) from retainers (2).

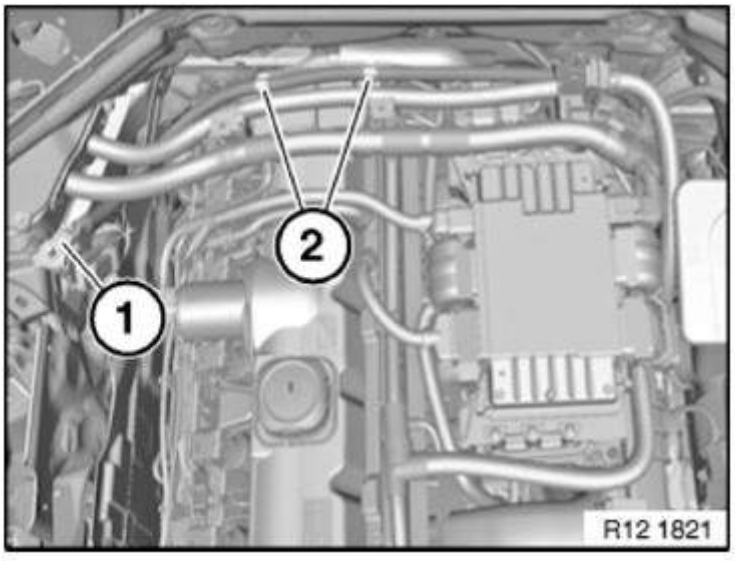


Fig. 107: Identifying Battery Positive Lead And Retainers
Courtesy of BMW OF NORTH AMERICA, INC.

Release clamp (1).

Release clamps (2).

Unlock tab (3) in direction of arrow. Remove top part of cable holder toward the top and uncover wiring harnesses.

cardiagn.com

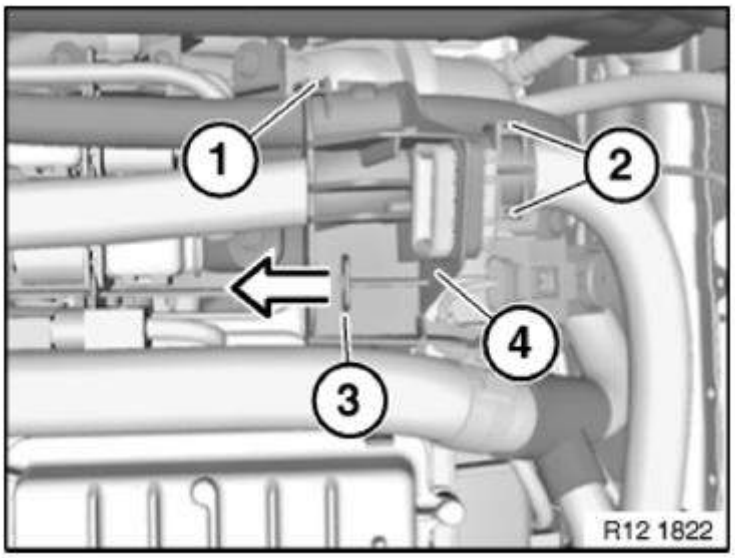


Fig. 108: Releasing Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten nut.

Tightening torque **12 42 2AZ** .

Disconnect positive battery cable (2) from starter motor.

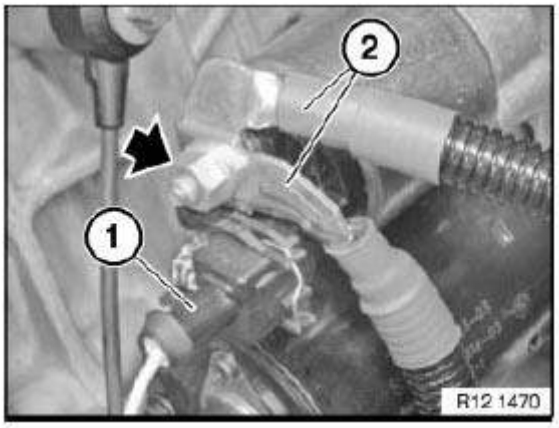


Fig. 109: Locating Positive Battery Cable Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap (2) and release nut underneath.

Tightening torque **12 42 1AZ** .

Remove battery positive lead from alternator and feed out.

cardiagn.com

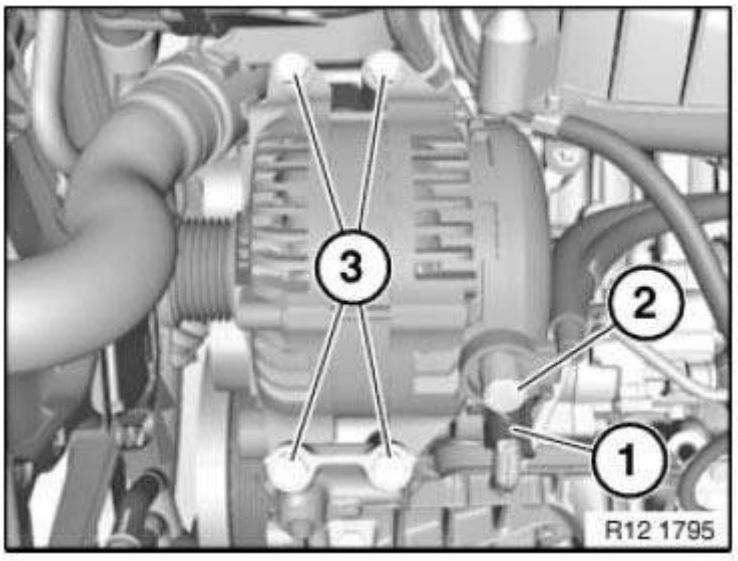


Fig. 110: Identifying Protective Cap, Alternator And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault messages.
Delete fault memory.

12 42 500 REPLACING POSITIVE BATTERY CABLE BETWEEN STARTER MOTOR, ALTERNATOR AND POSITIVE BATTERY CONNECTION POINT (N47 D20 O1)

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove **INTAKE FILTER HOUSING** .
- Remove **UNDERBODY PROTECTION**

Fold back cover (1).

Release nut underneath.

Tightening torque **12 52 4AZ** .

Remove positive battery cable from battery positive terminal.

cardiagn.com

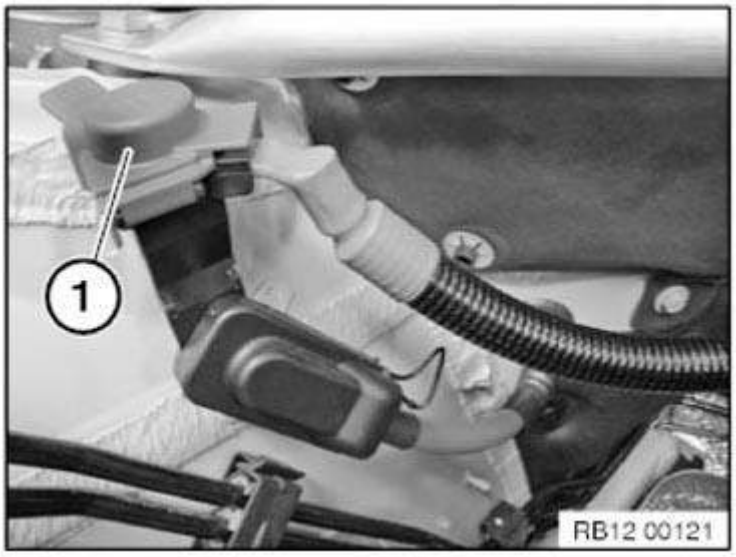


Fig. 111: Identifying Back Cover Of Positive Battery Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Release positive battery lead(1) from acoustic cover (3).

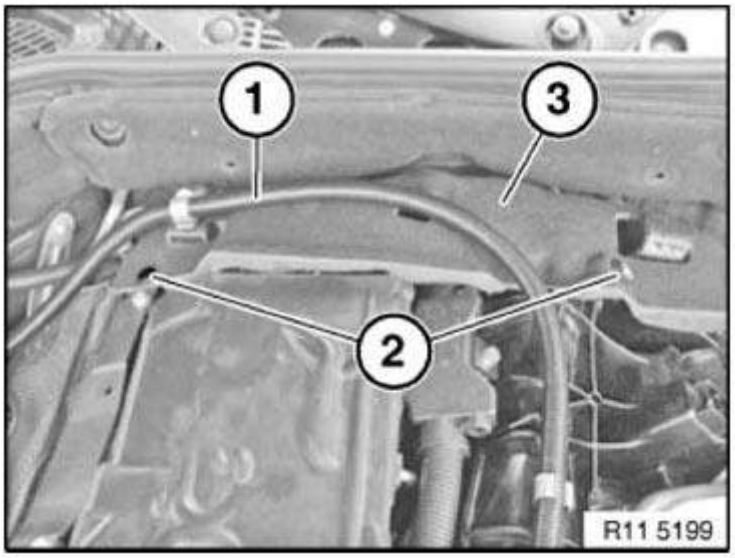


Fig. 112: Identifying Positive Battery Cable, Expanding Rivets And Rear Acoustic Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque **12 52 2AZ** .

Disconnect positive battery cable from alternator.

Release positive battery lead from retainer (2).

cardiagn.com

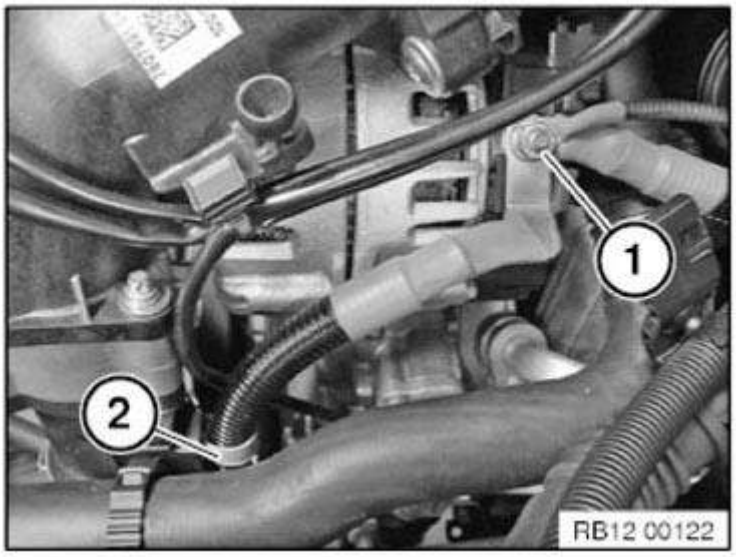


Fig. 113: Identifying Positive Battery Lead From Retainer And Slacken Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release retainers (1) and detach positive battery lead from guide.

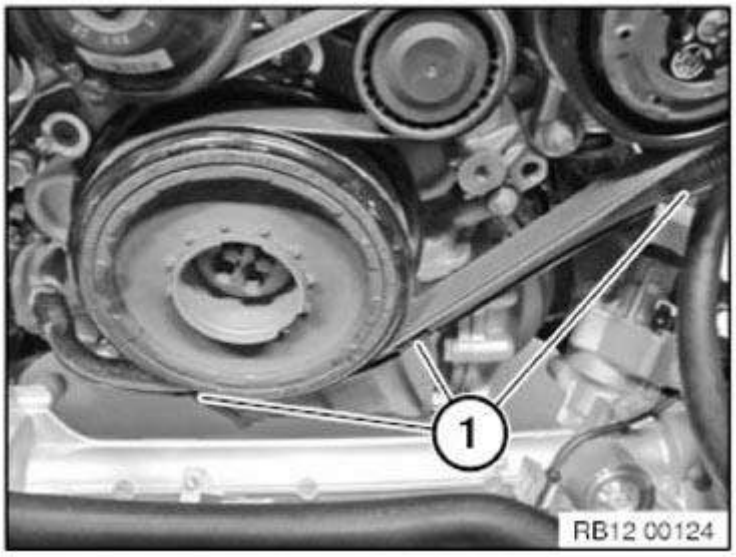


Fig. 114: Identifying Retainers Of Positive Battery Lead
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) on starter motor.

Tightening torque **12 52 3AZ** .

Disconnect positive battery cable from starter motor.

Release positive battery cable from retainers (2).

Feed out positive battery cable and remove.

cardiagn.com

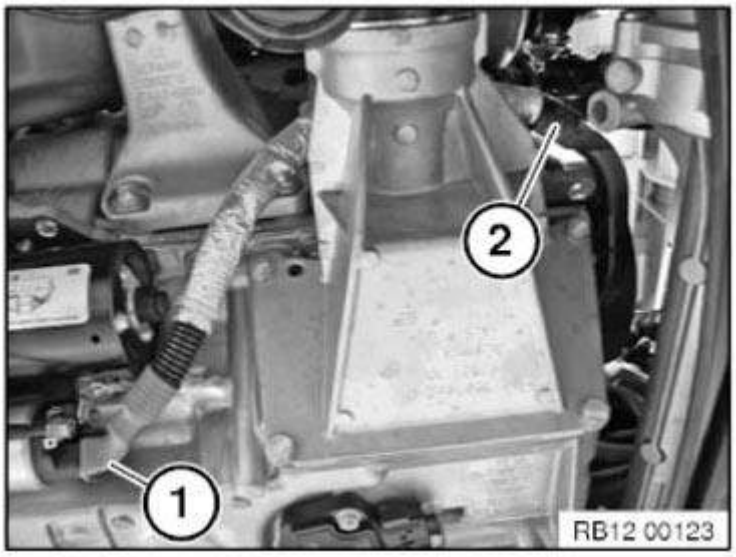


Fig. 115: Identifying Positive Battery Cable From Retainers And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault messages.
Delete fault memory.

12 42 500 REPLACING POSITIVE BATTERY CABLE BETWEEN STARTER MOTOR, ALTERNATOR AND POSITIVE BATTERY CONNECTION POINT (N55)

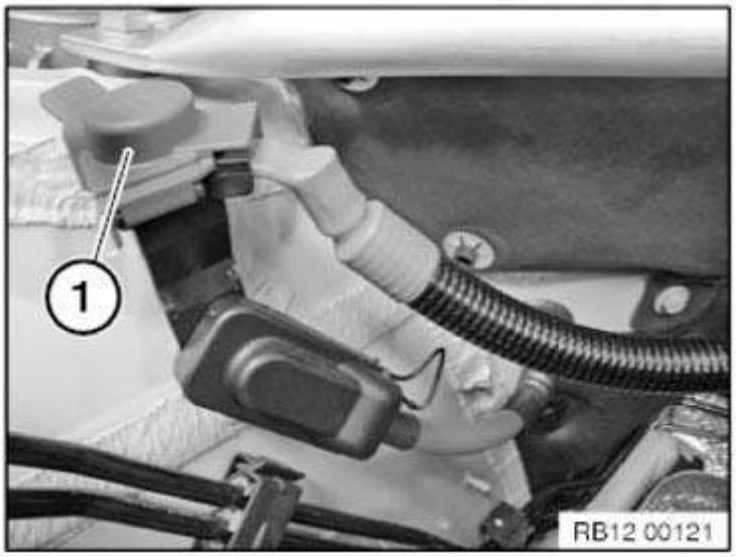
Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- **REMOVE** intake plenum.

Fold back cover (1).

Release nut underneath. Remove positive battery cable from battery positive terminal.

Tightening torque: **12 42 3AZ** .



cardiagn.com

Fig. 116: Identifying Back Cover Of Positive Battery Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap (2) and release nut underneath.

Tightening torque: **12 42 1AZ** .

Disconnect positive battery cable from alternator.

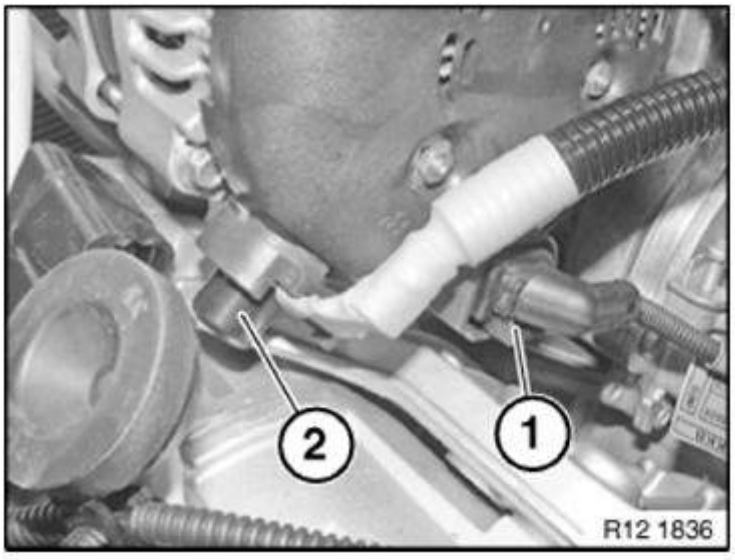


Fig. 117: Identifying Protective Cap And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip positive battery cable (1) from holder (2).

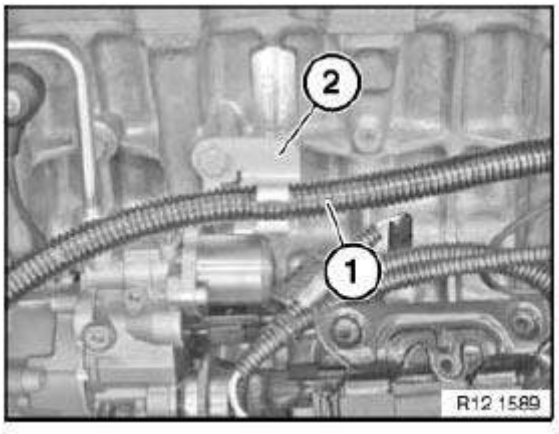


Fig. 118: Identifying Positive Battery Cable And Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (2) on starter motor only.

Tightening torque, **12 42 2AZ** .

Remove positive battery cable from starter motor and pull out.

cardiagn.com

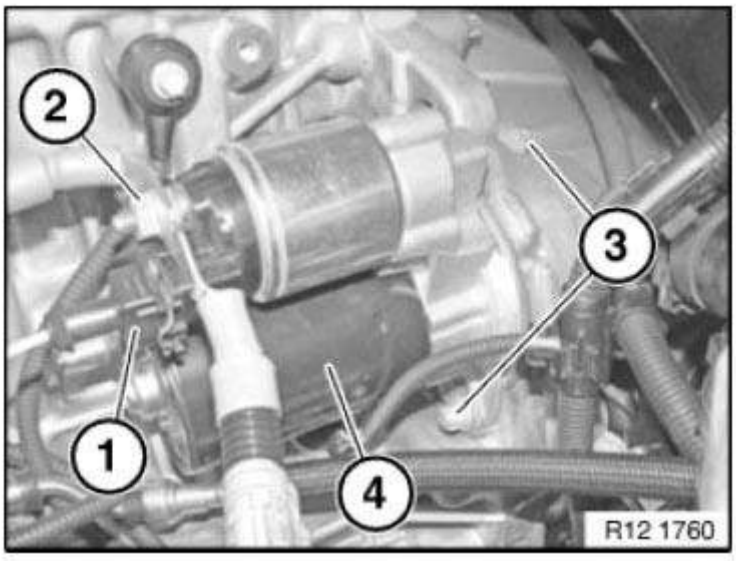


Fig. 119: Identifying Connector, Starter Motor And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault messages.
Delete fault memory.

12 42 500 REPLACING POSITIVE BATTERY CABLE BETWEEN STARTER MOTOR, ALTERNATOR AND POSITIVE BATTERY CONNECTION POINT (N20)

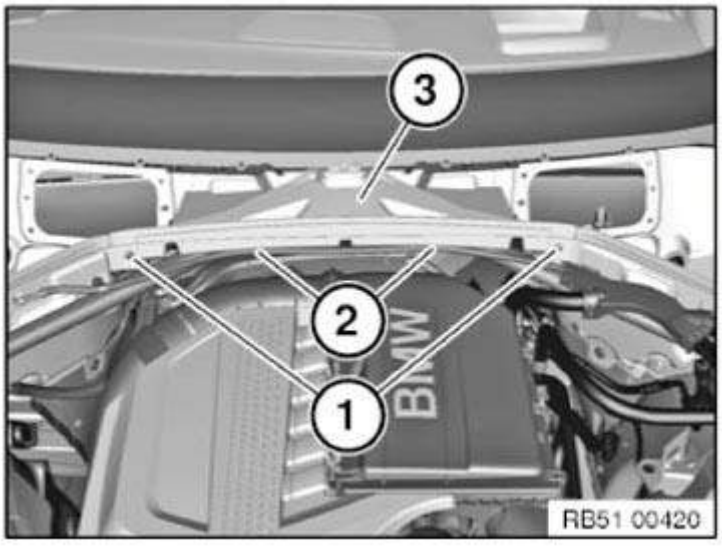
Necessary preliminary tasks:

- Switch off ignition.
- Disconnect **BATTERY NEGATIVE LEAD** .
- Remove **INTAKE PLENUM** .
- **REMOVE COVER FOR WINDSCREEN COWL PANEL** .

Release screw (1).

Lever out cable clip (2).

Remove cover (3).



cardiagn.com

Fig. 120: Identifying Cable Clip, Cover And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Fold back cover (1).

Release nut underneath. Remove positive battery cable from positive battery connection point.

Tightening torque **12 42 3AZ** .

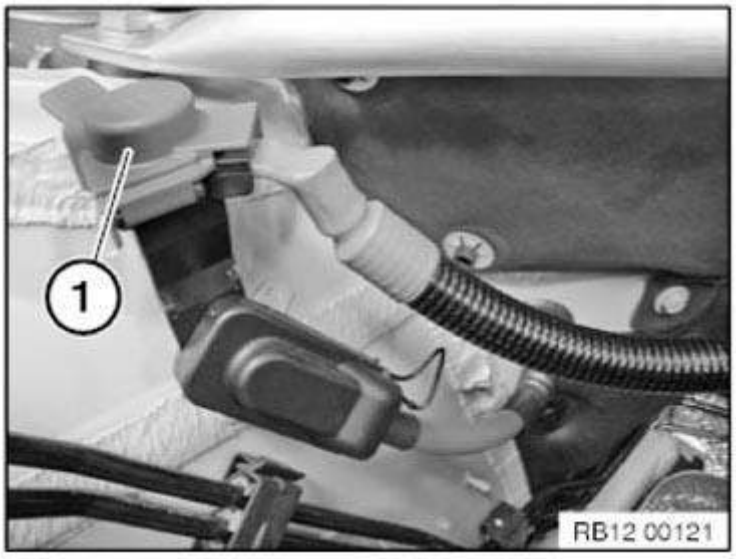


Fig. 121: Identifying Back Cover Of Positive Battery Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip positive battery cable (1) from brackets (2) at rear of engine block.

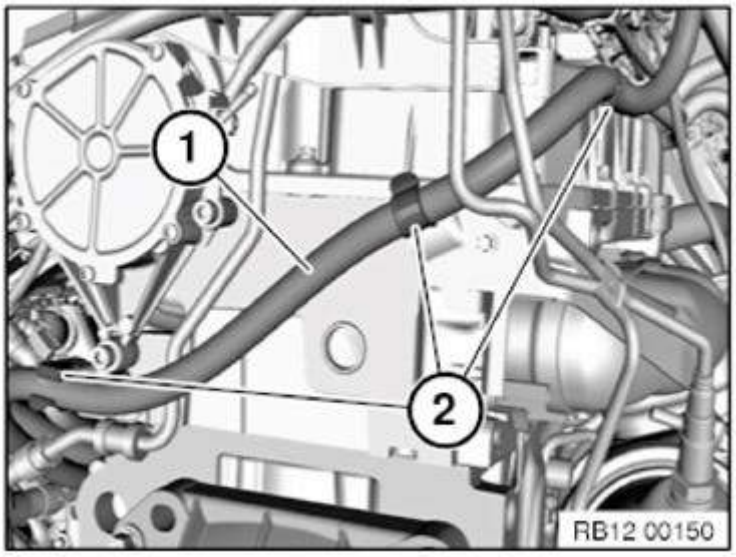


Fig. 122: Identifying Positive Battery Cable And Brackets
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap (1) and release nut underneath.

Tightening torque: **12 42 1AZ** .

Release nut (2) on starter.

Tightening torque **12 42 2AZ** .

cardiagn.com

Disconnect positive battery cable (3) from alternator and starter motor. Feed out positive battery cable (3) and remove.

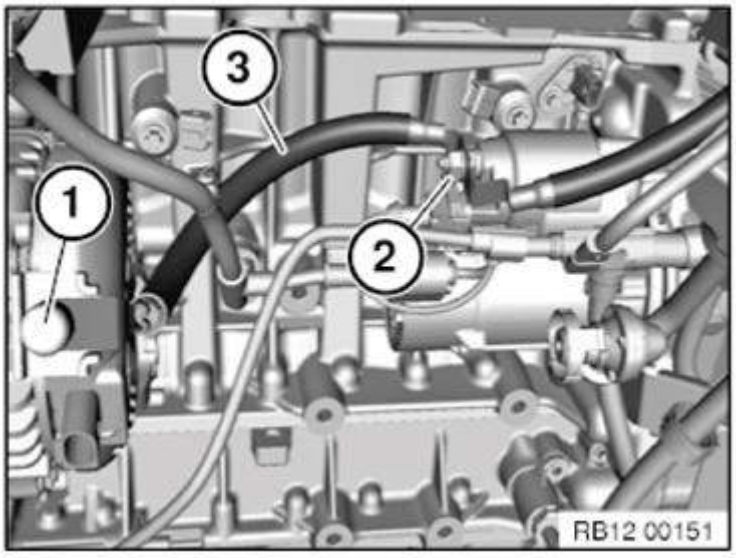


Fig. 123: Identifying Protective Cap, Positive Battery Cable And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Reassemble the vehicle.**
Check stored fault messages.
Delete fault memory.

12 42 540 REPLACING SAFETY BATTERY TERMINAL (SBK)

CAUTION: **Observe safety regulations.**
Investigate cause of triggering of safety battery terminal.
To do so, read out fault memory of airbag control unit. Note fault messages stored in memory. Rectify faults. Then clear fault memory.

Use of safety battery terminal:

- From model year 1998 in Series E38, E39, E46
- From 4/99 in E36/Z3
- in each of following new Series

The different models have different installation locations:

Battery in engine compartment

Safety battery terminal is replaced with cable up to battery positive support point.

Safety battery terminal is omitted as from 03/2002 from all E46 LHD models with 4-cylinder engines.

Battery in luggage compartment behind side trim panel

Remove side trim panel.

Follow instructions for disconnecting and connecting battery.

Disconnect and cover battery negative lead.

cardiagn.com

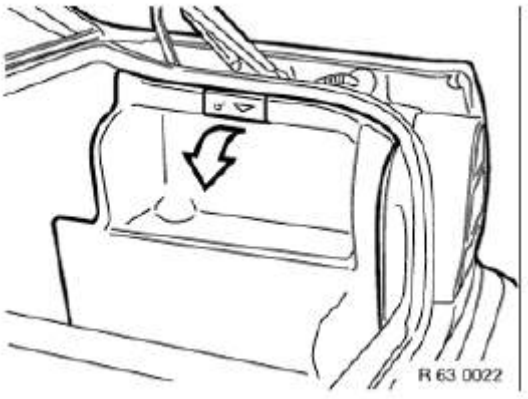


Fig. 124: Removing Side Trim Panel
Courtesy of BMW OF NORTH AMERICA, INC.

Release front side trim panel partly and fold forward.



Fig. 125: Releasing Front Side Trim Panel
Courtesy of BMW OF NORTH AMERICA, INC.

Battery in luggage compartment under floor trim panel

Follow instructions for disconnecting and connecting battery.

Fold back floor trim panel (1).

Lift cover (2) on battery negative lead.

Disconnect and cover battery negative lead (3).

Release nuts (4).

Remove battery cover.

cardiagn.com

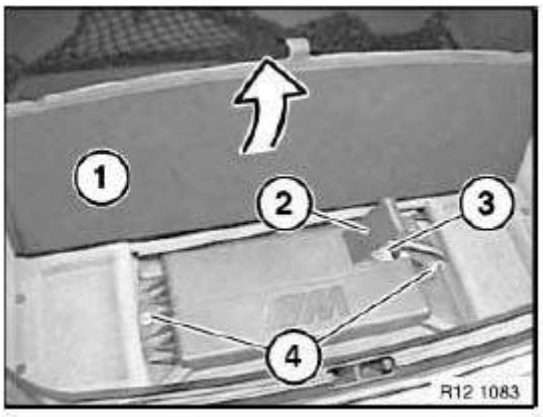


Fig. 126: Disconnecting Cover Battery Negative Lead
Courtesy of BMW OF NORTH AMERICA, INC.

Battery in luggage compartment under spare wheel

Remove spare wheel.

Release screws.

CAUTION: Do not kink air pipes.

Set air supply system (1) to one side.

Follow instructions for disconnecting and connecting battery.

Disconnect battery negative lead.

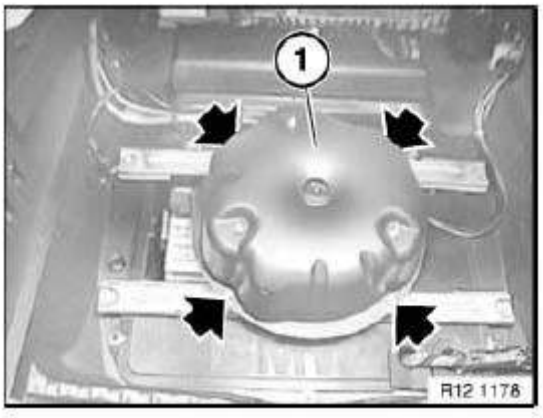


Fig. 127: Identifying Air Supply System Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect supply cable (1) for vehicle electrical system.

Installation:

Remove faulty fuses and carry out troubleshooting.

cardiagn.com

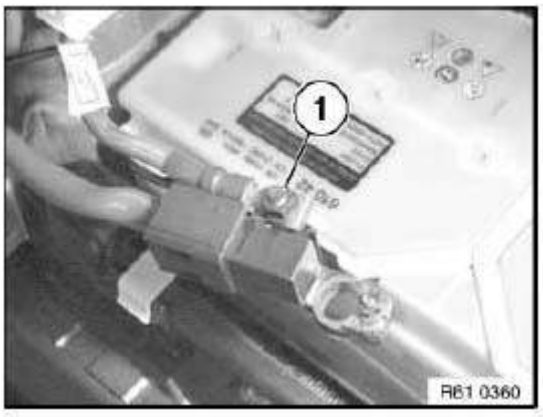


Fig. 128: Identifying Supply Cable
Courtesy of BMW OF NORTH AMERICA, INC.

CAUTION: Pay attention to interface.

The repair cable is always a standard length.

The heavy-current connector of the repair cable has a larger diameter than the battery positive lead.

In some Series (e.g. E46 touring), the heavy-current connector of the repair cable can lead to installation problems.

This is the case when the interface is in the area of the close-fitting trim panels.

Find matching interface (e.g. approx. 10 cm behind rear seat backrest in E46 touring).

Lay repair cable parallel to battery positive lead.

Mark interface of battery positive lead at end of repair cable.

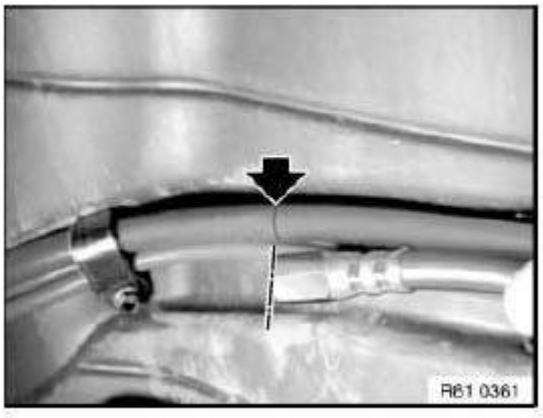


Fig. 129: Locating Battery Positive Lead Cable Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Release cable ties (1).

Disconnect plug connection (2).

cardiagn.com

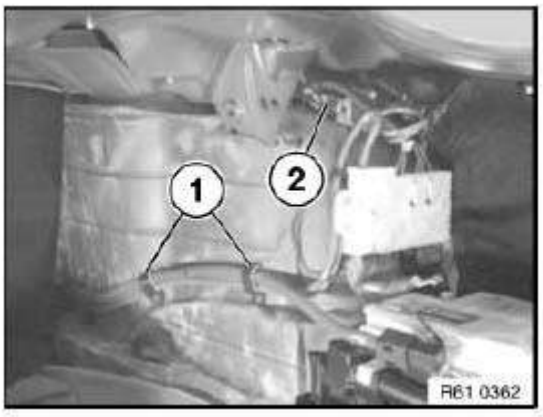


Fig. 130: Identifying Plug Connection And Cable Ties
Courtesy of BMW OF NORTH AMERICA, INC.

CAUTION: Do not use bolt cutters or similar tools to cut through the cable.

A cable end that has been squashed flat will no longer fit into the clamping sleeve.

Saw through battery positive cable at marked point with an iron saw.

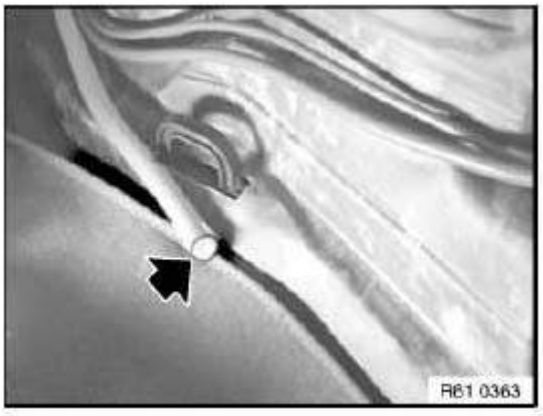


Fig. 131: Locating Battery Positive Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Strip insulation - length (A) - from cable end.

Distance (A) = 15 mm.

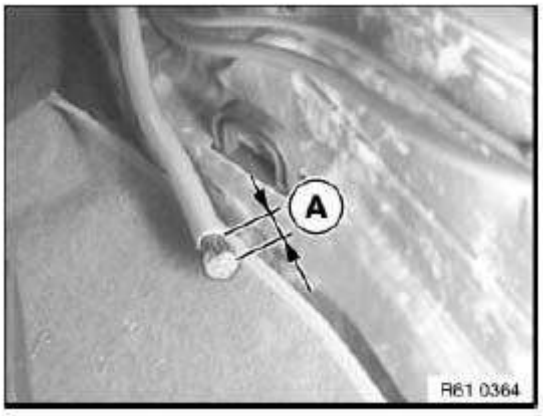


Fig. 132: Identifying Strip Insulation Distance
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Push heavy-current connector (1) over stripped cable end and screw into position.

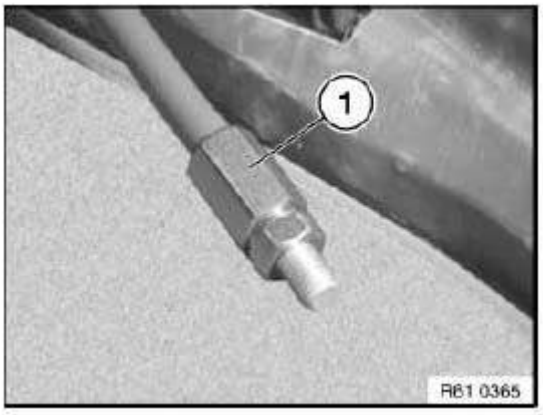


Fig. 133: Identifying Heavy-Current Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Push shrink-fit hose (3) over repair cable.

Screw threaded sleeve (1) of repair cable (2) to heavy-current connector.

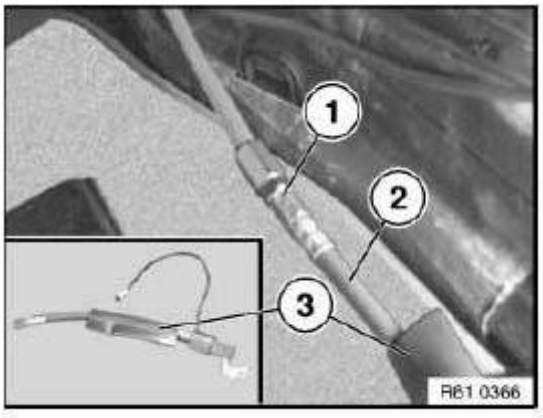


Fig. 134: Identifying Shrink-Fit Hose And Threaded Sleeve
Courtesy of BMW OF NORTH AMERICA, INC.

Push shrink-fit hose (1) over connecting point and shrink on with a hot-air blower (2).

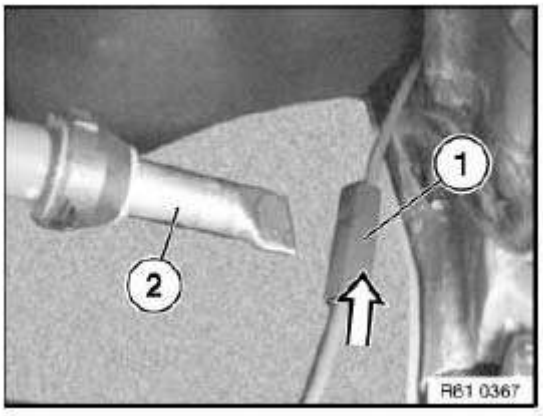


Fig. 135: Pushing Shrink-Fit Hose
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Heat up shrink-fit hose until it has settled completely around the connection point.**

cardiagn.com

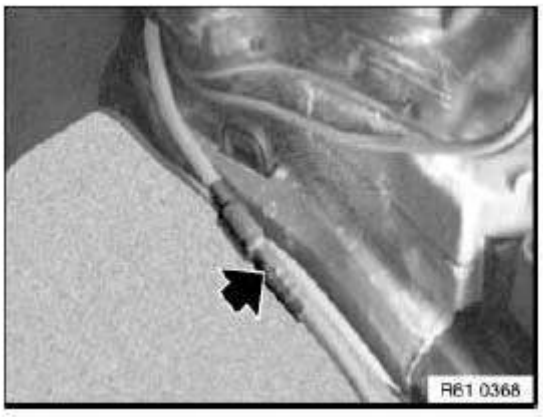


Fig. 136: Locating Connection Point Of Shrink-Fit Hose
Courtesy of BMW OF NORTH AMERICA, INC.

When laying the repaired battery positive cable, observe the following:

- The shrink-fit hose must not be scuffed during any movement.
- The repair cable must not cause any disturbing noises during driving operation.

NOTE: Offsetting cutting line by approx. 10 cm produces excess length of battery positive lead (1).

Lay battery positive lead (1) without kinks or abrasions.

(Shown on E46 touring.)

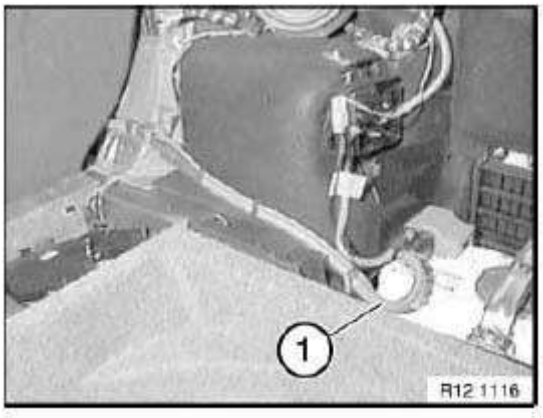


Fig. 137: Identifying Battery Positive Lead
Courtesy of BMW OF NORTH AMERICA, INC.

ENGINE WIRING LOOM

12 51 240 REMOVING AND INSTALLING/REPLACING ENGINE SENSOR SYSTEM MODULE 2 WIRING HARNESS (N20)

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove intake **PLENUM** .

cardiagn.com

- Release the **COOLANT THERMOSTAT** and set on the side. Do not drain the coolant and do not release the coolant hose.
- **REMOVE** bottom clean air pipe.
- Remove **ENGINE VENTILATION LINE** .

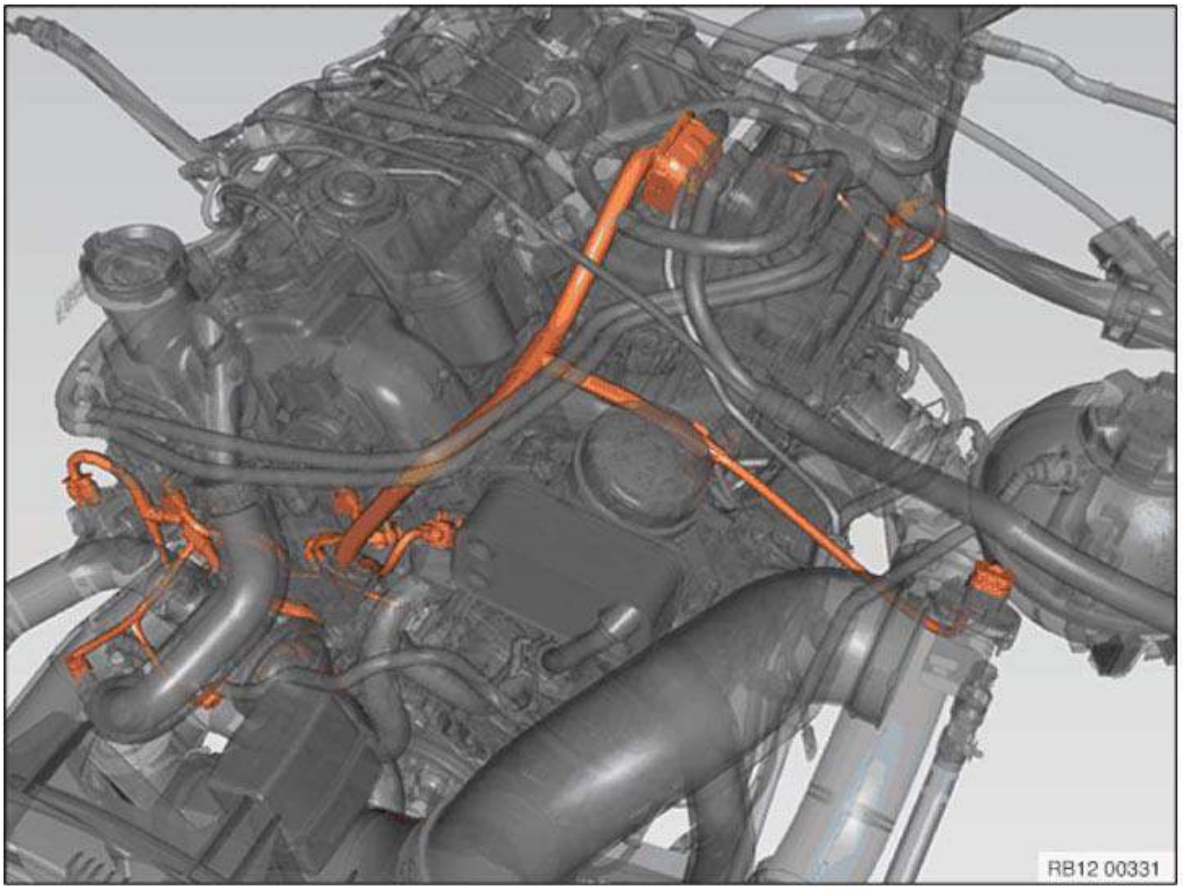


Fig. 138: Overview Of Engine Wiring Harness Sensor System Module 2
Courtesy of BMW OF NORTH AMERICA, INC.

Overview of engine wiring harness sensor system module 2.

Release screws (1).

Tightening torque **12 52 5AZ** .

Release cable channel (2).

Installation note:

Reconnect the earth connection.

cardiagn.com

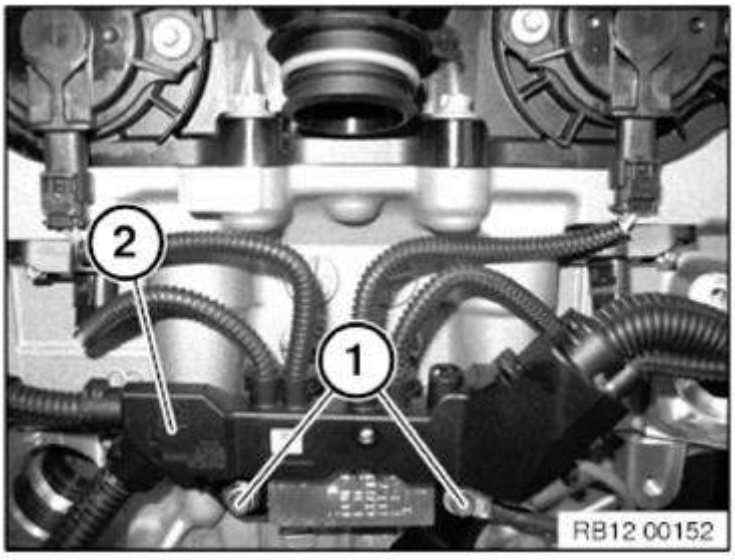


Fig. 139: Identifying Cable Channel And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and disconnect following connectors and lines	**Â**
Release connector from engine oil pressure-temperature sensor and pull off	Â
Unlock connector on hot film air mass meter and disconnect	Â
Unlock connector on tank vent valve and disconnect	Â
Release connector to wiring harness gearbox module and pull off	Â
Unlock connector on both camshaft adjustment solenoid valves and disconnect	Â
Unlock connector on coolant temperature sensor and disconnect	Â
Unlock connector on intake camshaft pulse sensor and disconnect	Â
Unlock connector on exhaust camshaft pulse sensor and disconnect	Â
Unlock connector on coolant thermostat and disconnect	Â
Unlock connector on exhaust turbocharger and disconnect	Â
Unlock connector on the coolant pump and disconnect	Â
Unlock connector on heating element for air duct and disconnect	Â

Release wiring harness if necessary from existing clips and clamps.

Feed out wiring harness and remove.

Installation note:

Check wiring harness installation arrangement.

Check plug connections for correct fit.

Check stored fault message.

Clear diagnostic fault entries from fault memory.

12 51 235 REMOVING AND INSTALLING/REPLACING ENGINE SENSOR SYSTEM WIRING HARNESS MODULE 1 (N20, N26)

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

Necessary preliminary tasks:

cardiagn.com

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **INTAKE PLENUM** .

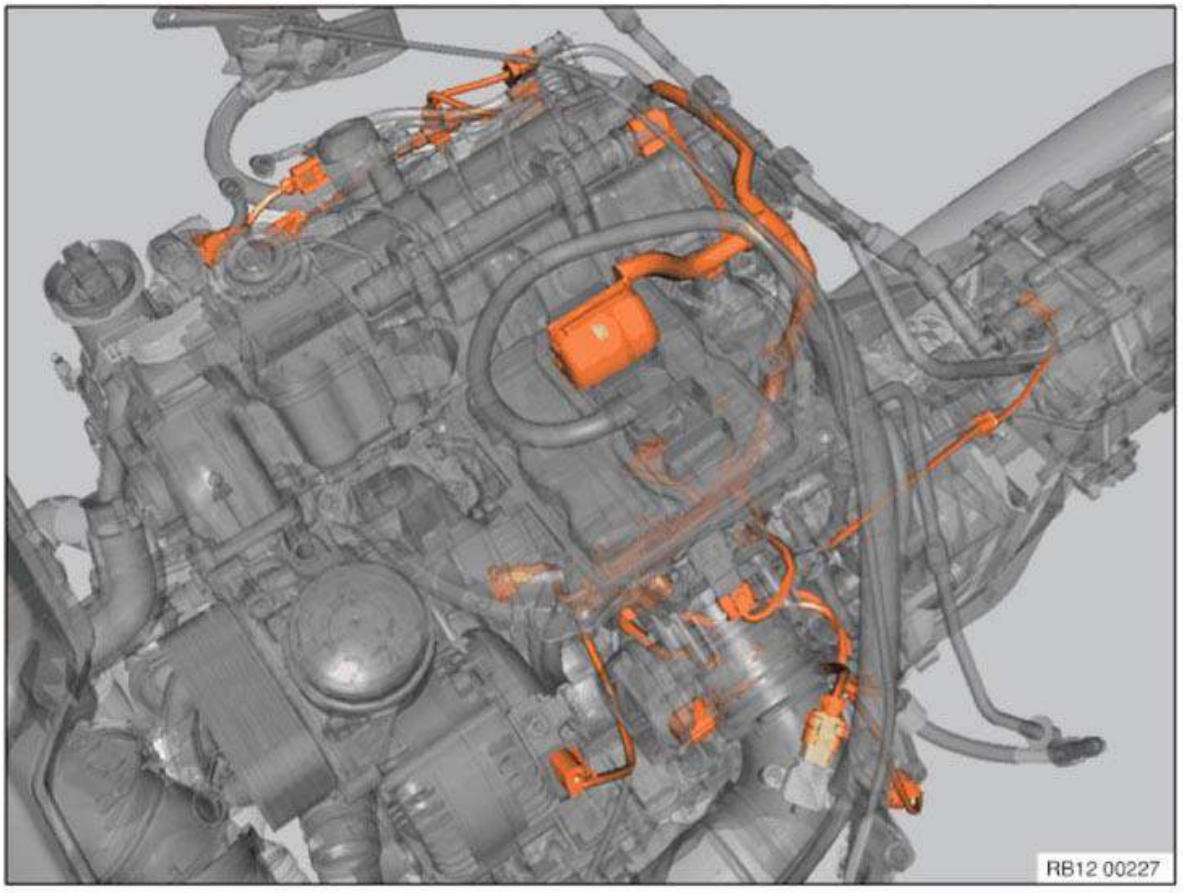


Fig. 140: Overview Of Engine Sensor System Wiring Harness Module 1
Courtesy of BMW OF NORTH AMERICA, INC.

Overview, engine sensor system wiring harness module 1.

Unlock and disconnect following connectors and lines	**Â**
Unlock connector from suction pressure sensor on the intake plenum and disconnect	Â
Unlock connector on the knock sensors and disconnect	Â
Unlock connector from suction pressure sensor on the pressure pipe and disconnect	Â
Unlock connector on throttle body and disconnect	Â
Unlock connector on oil level sensor and disconnect	Â
Unlock connector on zero-gear sensor and disconnect	Â
Unlock connector on hydraulic valve and disconnect	Â
Unlock connector on crankshaft sensor and disconnect	Â
Unlock connector on high-pressure fuel sensor and disconnect	Â
Unlock connector on oxygen sensor and disconnect	Â
Unlock connector on both knock sensors and disconnect	Â
Unlock connector on monitoring sensor and disconnect	Â
Unlock connector on high pressure pump and disconnect	Â
Unlock connector on pressure converter and disconnect	only N20

Release wiring harness if necessary from existing clips and clamps.

Feed out wiring harness and remove.

cardiagn.com

Installation note:

Check the wiring harness installation arrangement.

Check that the plug connections are correctly fitted.

Check stored fault message.

Clear diagnostic fault entries from fault memory.

12 51 001 REPLACING SECTION OF WIRING HARNESS FOR ENGINE (N47D20 O1)

IMPORTANT: Read and comply with notes on protection against electrostatic damage ESD protection).

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove **INTAKE FILTER HOUSING** .
- Remove **INTAKE PORT** .
- Remove rear acoustic cover.
- Remove sound insulation on injectors.
- Remove front **UNDERBODY PROTECTION** .

Release screws (1).

Detach coolant hose from cover of electronics box.

Remove electronics box cover (3).

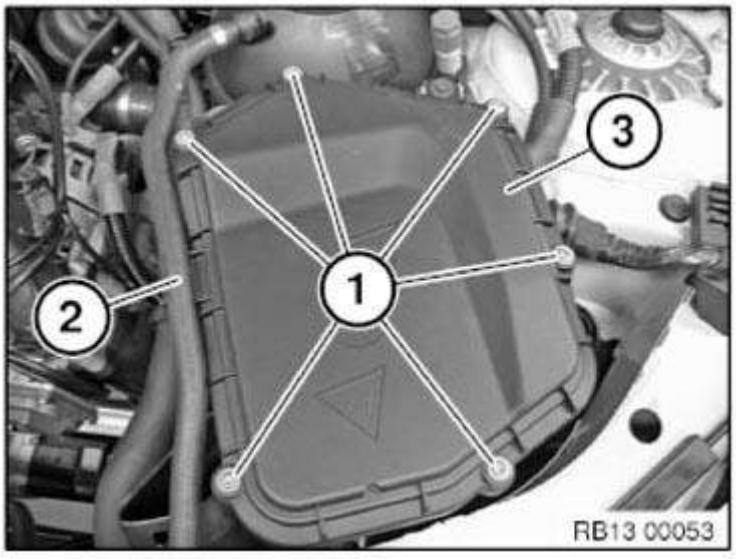


Fig. 141: Identifying Electronics Box Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock all connectors (1) from control unit and disconnect.

Detach rubber grommets (2) from electronics box. Place wiring harnesses to the side.

Installation note:

cardiagn.com

Make sure grommets are correctly fitted (watertightness).

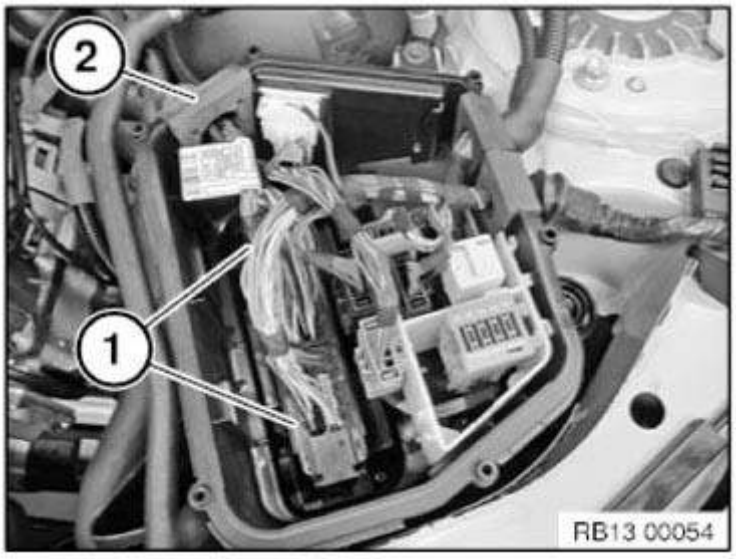


Fig. 142: Identifying Connectors And Rubber Grommets
Courtesy of BMW OF NORTH AMERICA, INC.

Pull out fasteners (1) in direction of arrow.

Push back sockets (2) and detach engine wiring harness from connector housing.

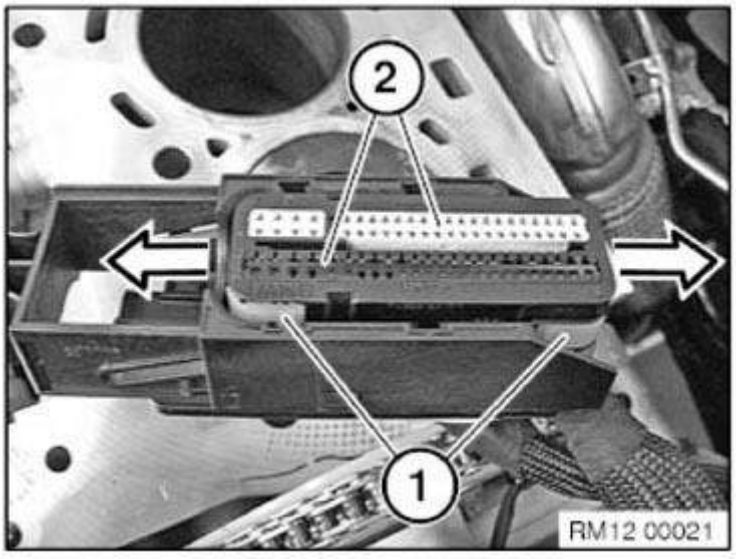


Fig. 143: Pulling Out Fasteners
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Release cable channel (2).

cardiagn.com

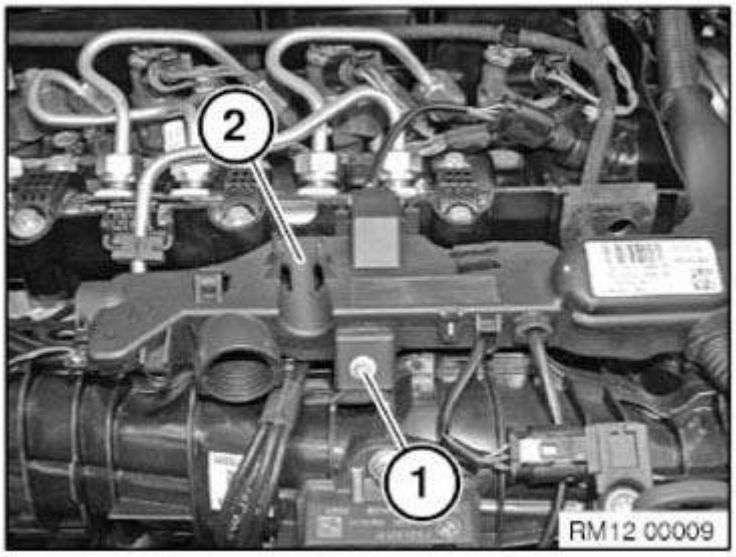


Fig. 144: Identifying Cable Channel And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and disconnect following connectors and lines	Note
Unlock connector on hot film air mass meter and disconnect	Â
Unlock connector on exhaust turbocharger and disconnect	Â
Unlock connector on all electric changeover valves on carrier plate and disconnect	Â
Release and unplug connector from exhaust pressure sensor	Â
Unlock connector on exhaust-gas temperature sensor and disconnect	Â
Unlock connector on oxygen sensor and disconnect	Â
Unlock connector on vacuum electric changeover valve (exhaust-gas recirculation) and disconnect	Â
Unlock connector on exhaust-gas recirculation valve and disconnect	Â
Unlock connector on coolant temperature sensor and disconnect	Â
Unlock connector on intake plenum intake adjuster and disconnect	Â
Unlock connector on intake pressure sensor and disconnect	Â
Unlock connector on rail pressure sensor and disconnect	Â
Unlock connector on rail pressure regulating valve and disconnect	If fitted:
Unlock connector on camshaft sensor and disconnect	Â
Unlock connector on alternator and disconnect	Â
Unlock connector on air conditioning compressor and disconnect	Â
Unlock connector on intake air temperature sensor and disconnect	Â
Unlock connector on oil pressure sensor and disconnect	Â
Release nut (1) on starter motor, detach cable (terminal 50)	Â
Unlock connector on transmission and disconnect	Automatic only
Unlock connector on crankshaft sensor and disconnect	Â
Unlock connector on throttle body and disconnect	Â
Unlock connector on exhaust-gas recirculation temperature sensor and disconnect	Â
Unlock connector on high pressure pump and disconnect	Â
Unlock connector on fuel pressure/temperature sensor and disconnect	Â
Release and unplug connector from preheating control unit	Â

Release wiring harness from clips and clamps.

Feed out wiring harness and remove.

cardiagn.com

Installation note:

Check wiring harness installation arrangement.

Check plug connections for correct fit.

Check stored fault message.

Delete fault memory.

12 51 200 REPLACING SECTION OF WIRING HARNESS FOR INJECTORS (N47 D20 O1)

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

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove **INTAKE FILTER HOUSING** .
- Remove rear acoustic cover.
- Remove sound insulation on injectors.
- Partially release **WIRING HARNESS** for engine.

Release screws (1).

Detach coolant hose from cover of electronics box.

Remove electronics box cover (3).

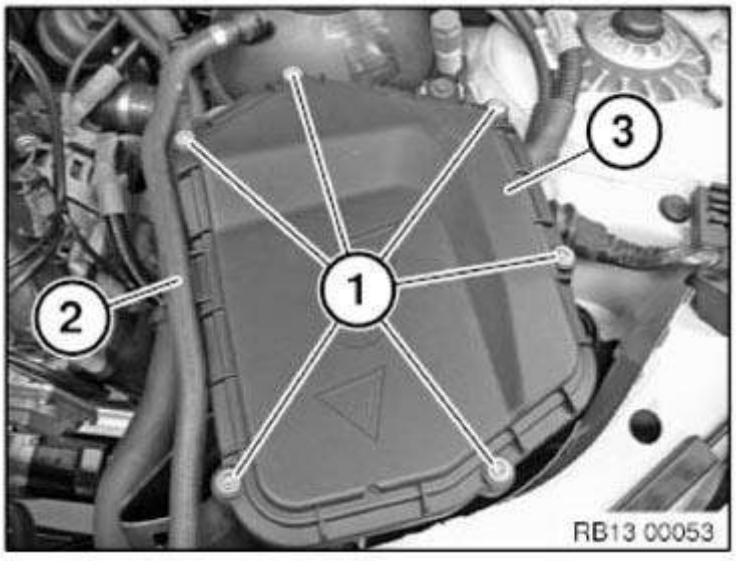


Fig. 145: Identifying Electronics Box Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock all connectors (1) from control unit and disconnect.

Detach rubber grommets (2) from electronics box. Place wiring harnesses to the side.

Installation note:

cardiagn.com

Make sure grommets are correctly fitted (watertightness).

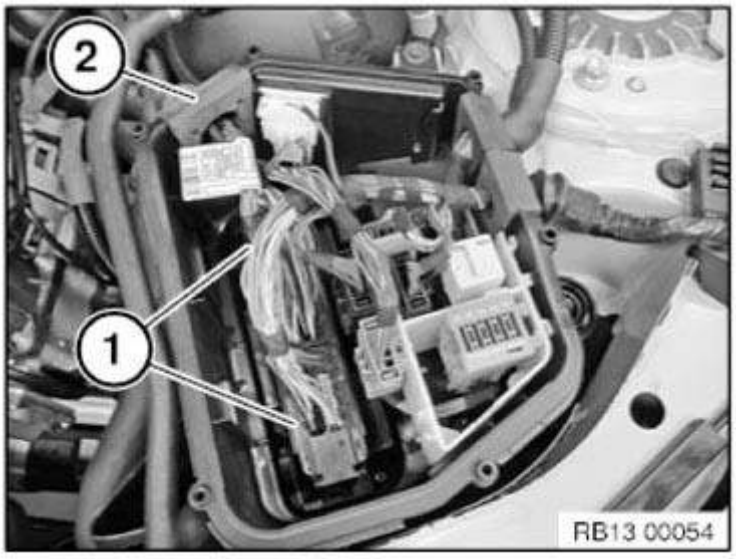


Fig. 146: Identifying Connectors And Rubber Grommets
Courtesy of BMW OF NORTH AMERICA, INC.

Release retaining element (1) in direction of arrow.

Press back socket (2) and remove wiring harness for injectors.

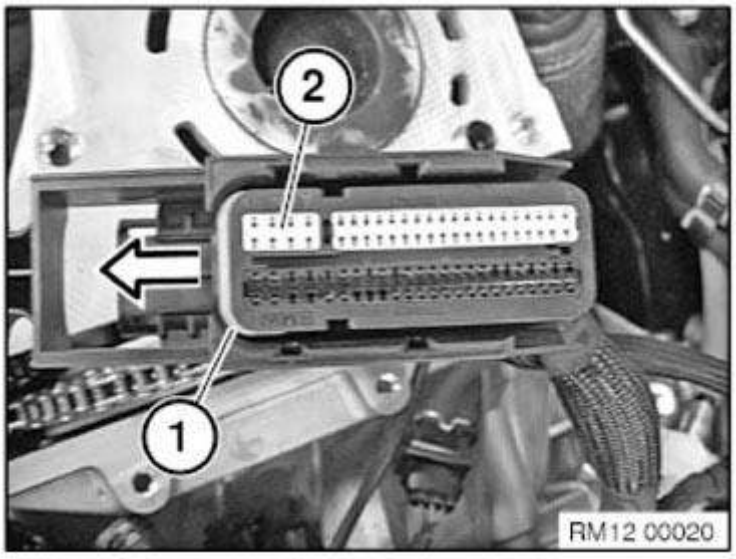


Fig. 147: Releasing Retaining Element
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock plugs (1) on injectors and disconnect. Release wiring harness from cylinder head cover, feed out and remove.

cardiagn.com

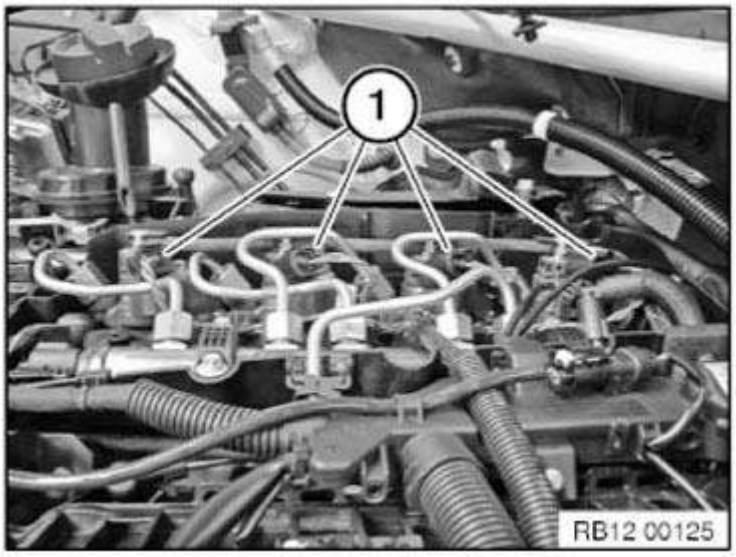


Fig. 148: Identifying Plugs On Injectors
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check wiring harness installation arrangement.**
Check plug connections for correct fit.
Reassemble the vehicle.
Read out the fault memory of the DDE control unit.
Check and rectify stored fault messages.
Delete fault memory.

12 51 245 REPLACING THE WIRING HARNESS SECTION FOR THE ENGINE TRANSMISSION MODULE (N20)

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove intake **PLENUM** .
- Remove rear **UNDERBODY PROTECTION** .
- Remove **cross member** . See **22 32 050 REPLACING CROSS MEMBER FOR TRANSMISSION MOUNTING** or 22 31 050 REPLACING CROSS MEMBER FOR TRANSMISSION MOUNTING for transmission mounting.

cardiagn.com

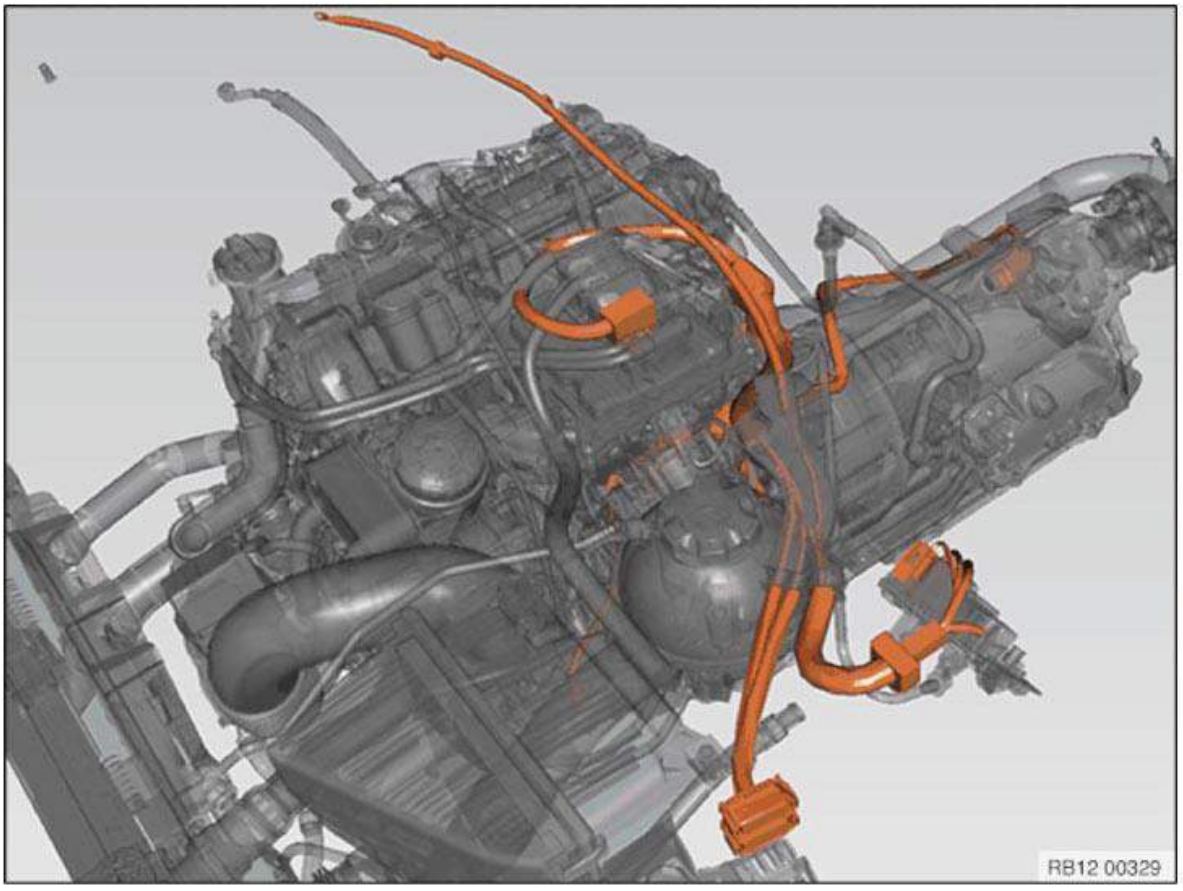


Fig. 149: Overview Of Wiring Harness Section For Engine Transmission Module
Courtesy of BMW OF NORTH AMERICA, INC.

Overview of wiring harness section for engine transmission module (graphic shows wiring harness for vehicles with automatic transmission and four-wheel drive).

Detach all connectors from Power Distribution Module (1). Release wiring harness from bulkhead.

Disconnect plug connection (2).

Release screws (3) and lay wiring harness to one side.

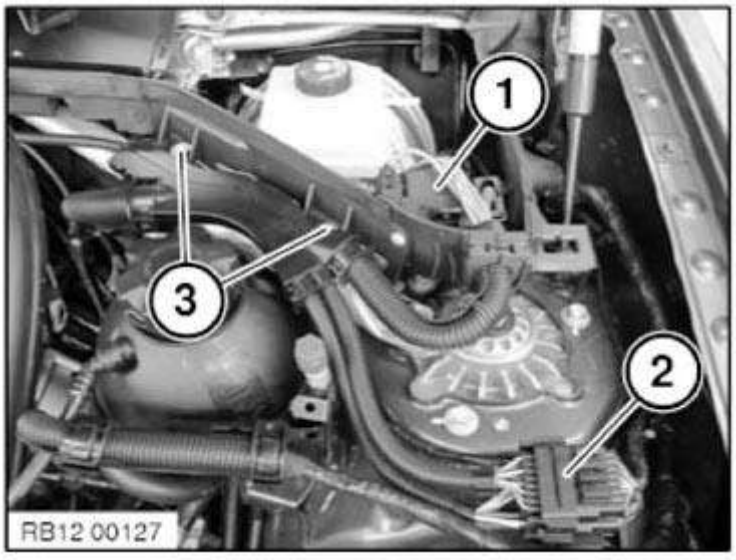


Fig. 150: Identifying Power Distribution Module, Plug Connection And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Unlock and disconnect following connectors and lines	**Â**
Unlock and disconnect connector on DME control unit	Â
Unlock connector on air conditioning compressor and disconnect	Â
Unlock connector on starter motor and disconnect	Â
Release ground cable	Â
Release positive wire from bulkhead panel	Â
Unlock and disconnect connector for wiring harness section of engine sensor system module 1	Â
Unlock and disconnect connector on reversing light switch	Manual gearbox only
Unlock connector on transmission and disconnect	Automatic transmission only

Release wiring harness if necessary from existing clips and clamps.

Feed out wiring harness and remove.

Installation note:

Check wiring harness installation arrangement.

Check plug connections for correct fit.

Check stored fault message.

Clear diagnostic fault entries from fault memory.

12 51 215 REPLACING WIRING HARNESS SECTION FOR VALVETRONIC SERVOMOTOR (N20, N26)

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **ACOUSTIC COVER**

cardiagn.com

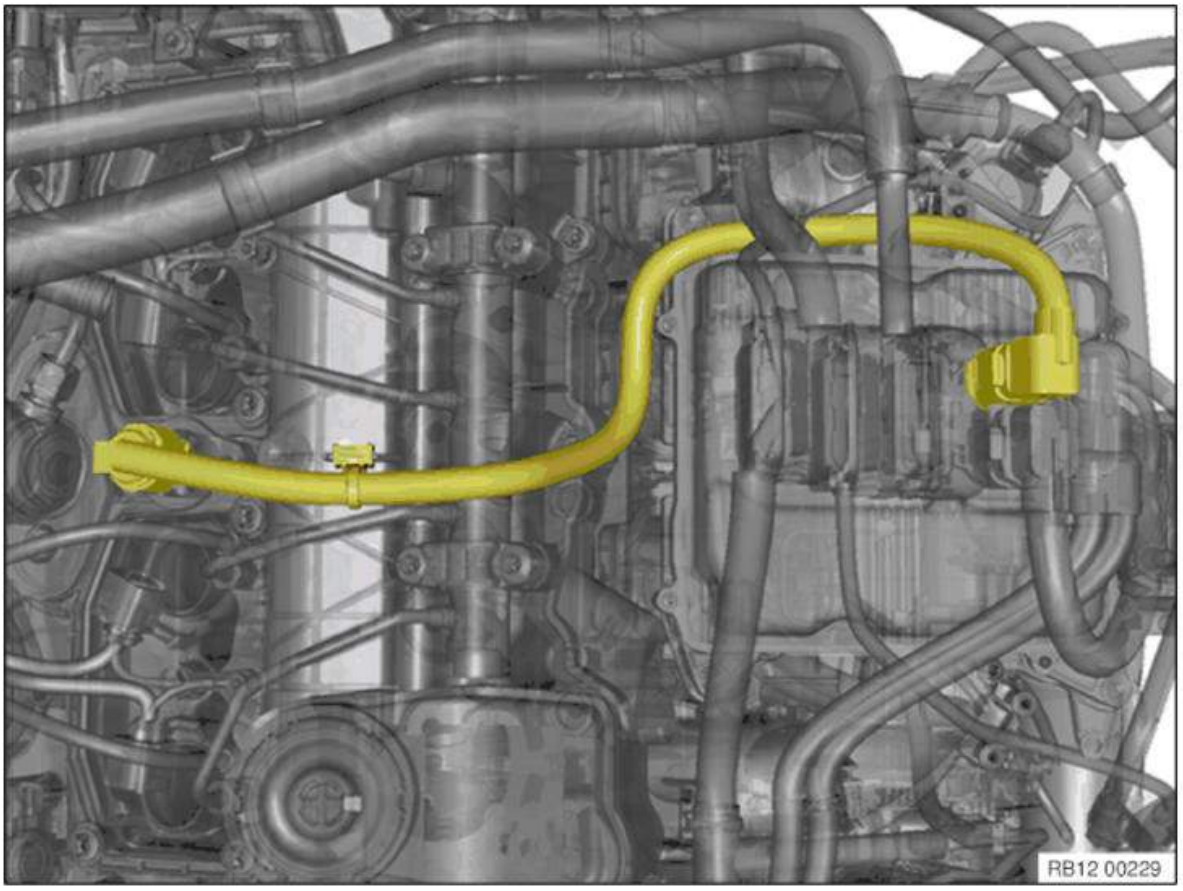


Fig. 151: Identifying Wiring Harness Section For Valvetronic Servomotor On DME Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Undo wiring harness section for Valvetronic servomotor on DME control unit and Valvetronic servomotor and pull off.

Undo, feed out and remove wiring harness section from clamps.

Installation note:

Check wiring harness installation arrangement.

Check plug connections for correct fit.

Check stored fault message.

Clear diagnostic fault entries from fault memory.

12 51 235 REPLACING WIRING HARNESS SECTION FOR ENGINE (N20)

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove intake **PLENUM** .

cardiagn.com

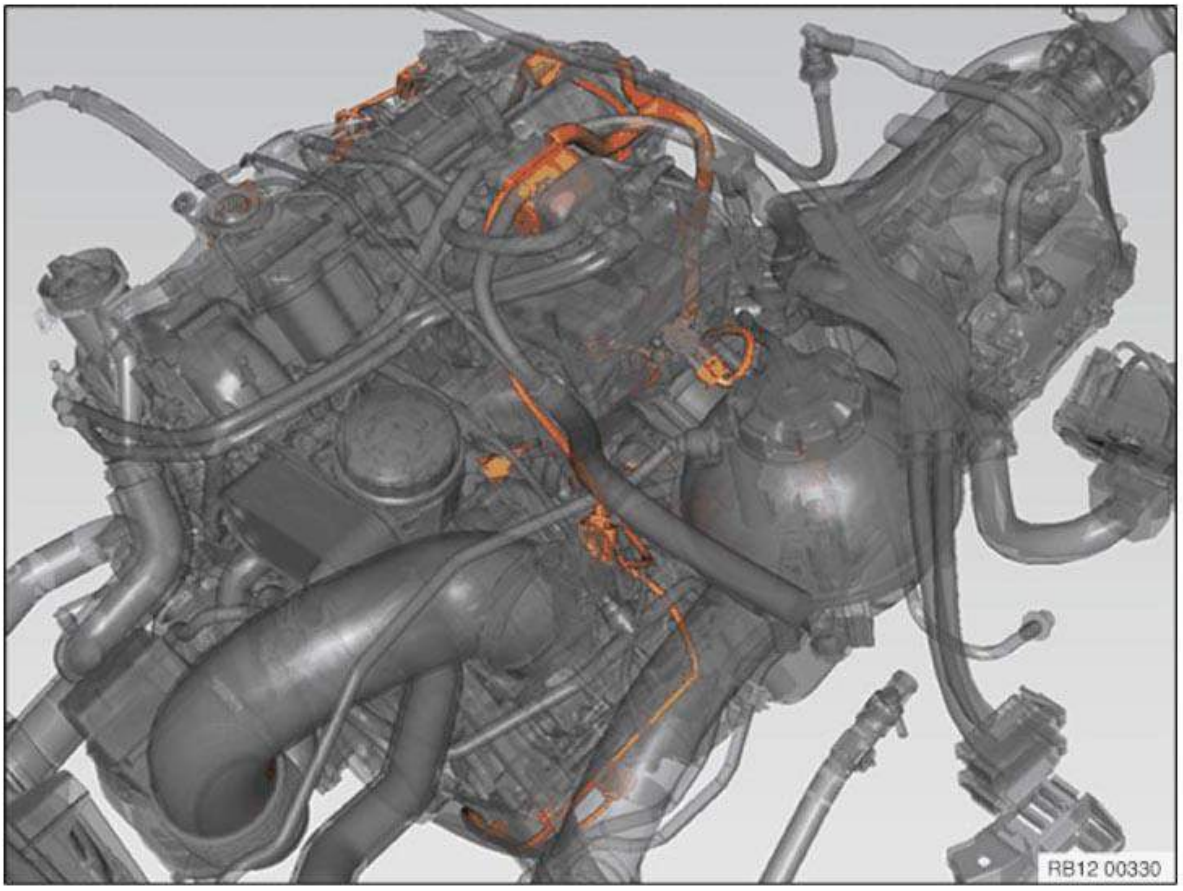


Fig. 152: Overview Of Engine Sensor System Wiring Harness Module 1
Courtesy of BMW OF NORTH AMERICA, INC.

Overview, engine sensor system wiring harness module 1.

Unlock and disconnect following connectors and lines	**Â**
Unlock connector from suction pressure sensor on the intake plenum and disconnect	Â
Unlock connector from suction pressure sensor on the pressure pipe and disconnect	Â
Unlock connector on throttle body and disconnect	Â
Unlock connector on oil level sensor and disconnect	Â
Unlock connector on zero-gear sensor and disconnect	Manual gearbox only
Unlock connector on hydraulic valve and disconnect	Â
Unlock connector on crankshaft sensor and disconnect	Â
Unlock connector on high-pressure fuel sensor and disconnect	Â
Unlock connector on oxygen sensor and disconnect	Â
Unlock connector on both knock sensors and disconnect	Â
Unlock connector on monitoring sensor and disconnect	Â
Unlock connector on high pressure pump and disconnect	Â
Unlock connector on pressure converter and disconnect	Â

Release wiring harness if necessary from existing clips and clamps.

Feed out wiring harness and remove.

Installation note:

Check wiring harness installation arrangement.

Check plug connections for correct fit.

cardiagn.com

Check stored fault message.

Clear diagnostic fault entries from fault memory.

12 51 001 REPLACING WIRING HARNESS SECTION FOR ENGINE (N55)

IMPORTANT: Aluminum screws/bolts must be replaced each time they are **released** .
Aluminum screws/bolts are permitted with and without color coding (blue).
For reliable identification:
Jointing torque and angle of rotation must be observed without fail **(risk of damage)** .

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

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove sound insulation at the rear of the engine.
- Remove intake **PLENUM** .
- Partially detach **WIRING HARNESS** for injectors and ignition coils.
- Remove **CLEAN AIR PIPE** .
- Remove **FAN COWL** .
- Remove front **UNDERBODY PROTECTION** .

Detach all connectors from Power Distribution Module (1). Release wiring harness from bulkhead.

Disconnect plug connection (2).

Release screws (3) and lay wiring harness to one side.

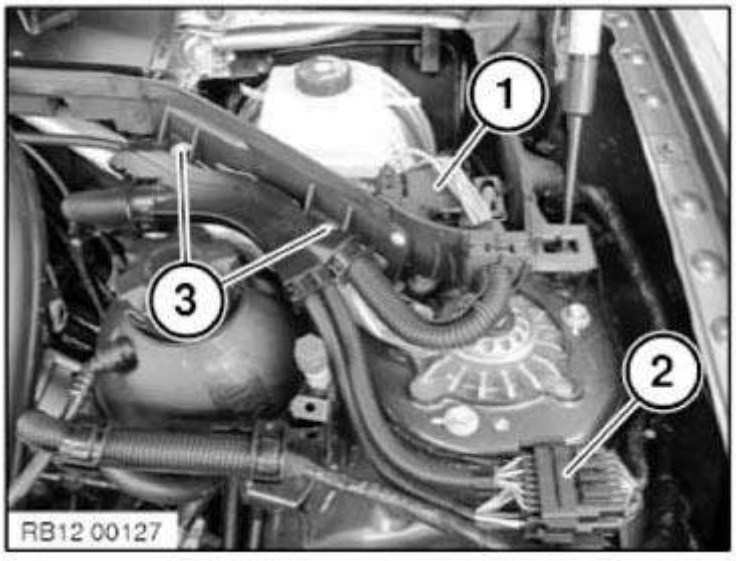


Fig. 153: Identifying Power Distribution Module, Plug Connection And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Unclip upper part of cable channel (2) and expose the wiring harnesses.

cardiagn.com

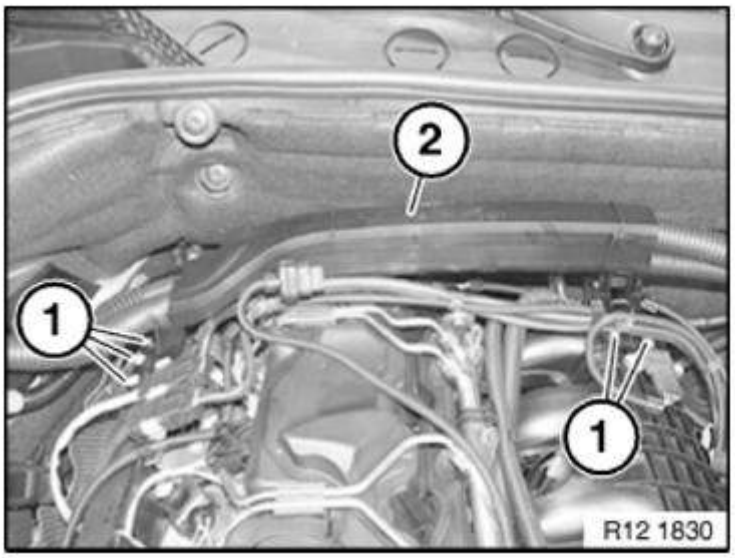


Fig. 154: Identifying Cable Channel And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock all connectors (1) from control unit and disconnect.

Installation note:

Make sure grommets are correctly fitted (watertightness).

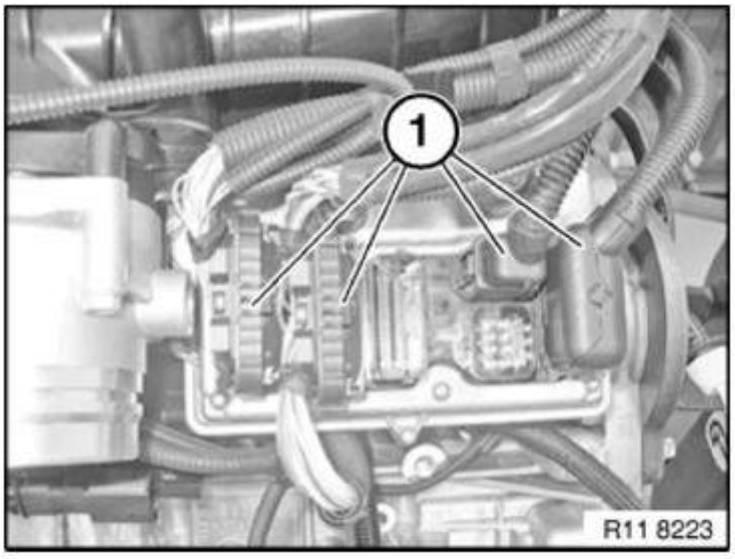


Fig. 155: Identifying Connectors From Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) below cable channel (2).

Replace aluminum screws.

Tightening torque **13 53 10AZ** .

cardiagn.com

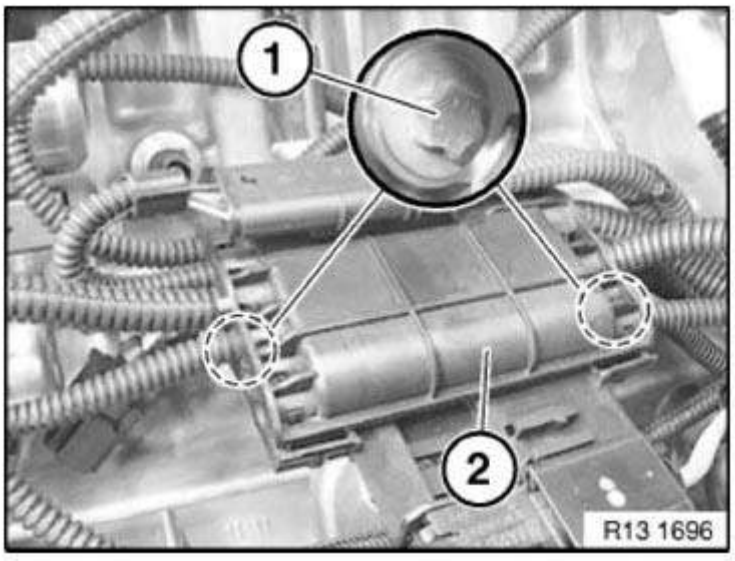


Fig. 156: Identifying Cable Channel And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque **12 90 4Z** .

Release cable channel (2).

Installation note:

Reconnect the earth connection.

Replace aluminum screws.

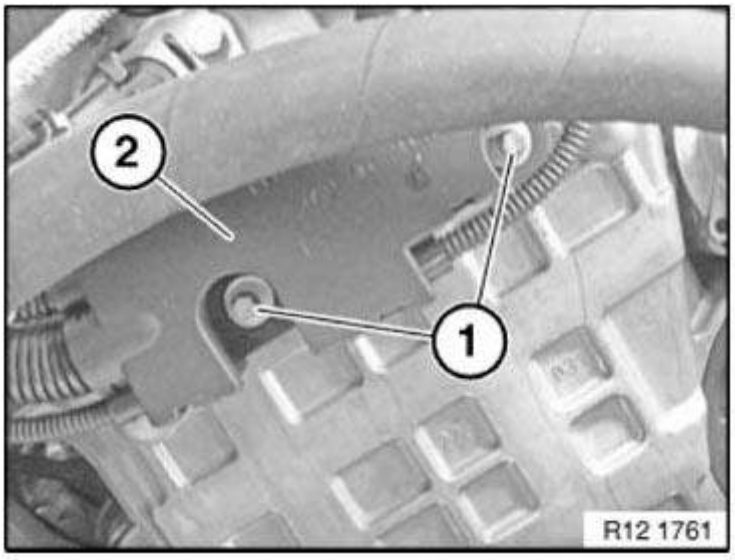


Fig. 157: Identifying Cable Channel And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and disconnect following connectors and lines	**Â**
Unlock connector on charging pressure sensor and disconnect	Â
Release connector on hot film air mass meter and disconnect	Â
Release connector on intake pressure sensor and disconnect	Â
Release connector on oxygen sensor and disconnect	Â

cardiagn.com

Unlock connector on monitoring sensor and disconnect	Â
Unlock connector on pressure converter and disconnect	Â
Unlock connector on high-pressure fuel sensor and disconnect	Â
Unlock connector on tank vent valve and disconnect	Â
Unlock connector on starter motor and disconnect	Â
Unlock connector on the knock sensors and disconnect	Â
Unlock connector on oil temperature sensor and disconnect	Â
Unlock connector on fuel low-pressure sensor and disconnect	Â
Release connector on throttle body and disconnect	Â
Release connector on high pressure pump and disconnect	Â
Release connector on alternator and disconnect	Â
Release connector on air conditioning compressor and disconnect	Â
Unlock connector on oil level sensor and disconnect	Â
Unlock connector on crankshaft sensor and disconnect	Â
Unlock connector on heating element for air duct and disconnect	Â
Unlock connector on coolant thermostat and disconnect	Â
Unlock connector on hydraulic valve and disconnect	Â
Unlock connector on the coolant pump and disconnect	Â
Release connector on exhaust turbocharger and disconnect	Â
Unlock connector on both camshaft adjustment solenoid valves and disconnect	Â
Release earth cable on crankcase lower section Tightening torque **12 90 2AZ** .	Â
Release earth cable at rear of cylinder head Tightening torque **12 90 3AZ** .	Â
Unlock connector on intake camshaft pulse sensor and disconnect	Â
Unlock connector on exhaust camshaft pulse sensor and disconnect	Â
Unlock connector on oil pressure switch and disconnect	Â
Unlock connector on servomotor for eccentric shaft and disconnect	Â

Release wiring harness if necessary from existing clips and clamps.

Feed out wiring harness and remove.

Installation note:

Check wiring harness installation arrangement.

Check plug connections for correct fit.

Check stored fault message.

Delete fault memory.

12 51 210 REPLACING WIRING HARNESS SECTION FOR IGNITION AND INJECTORS (N20)

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

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove **ACOUSTIC COVER**

cardiagn.com

- Remove the **PRESSURE CONVERTER** for the exhaust turbocharger

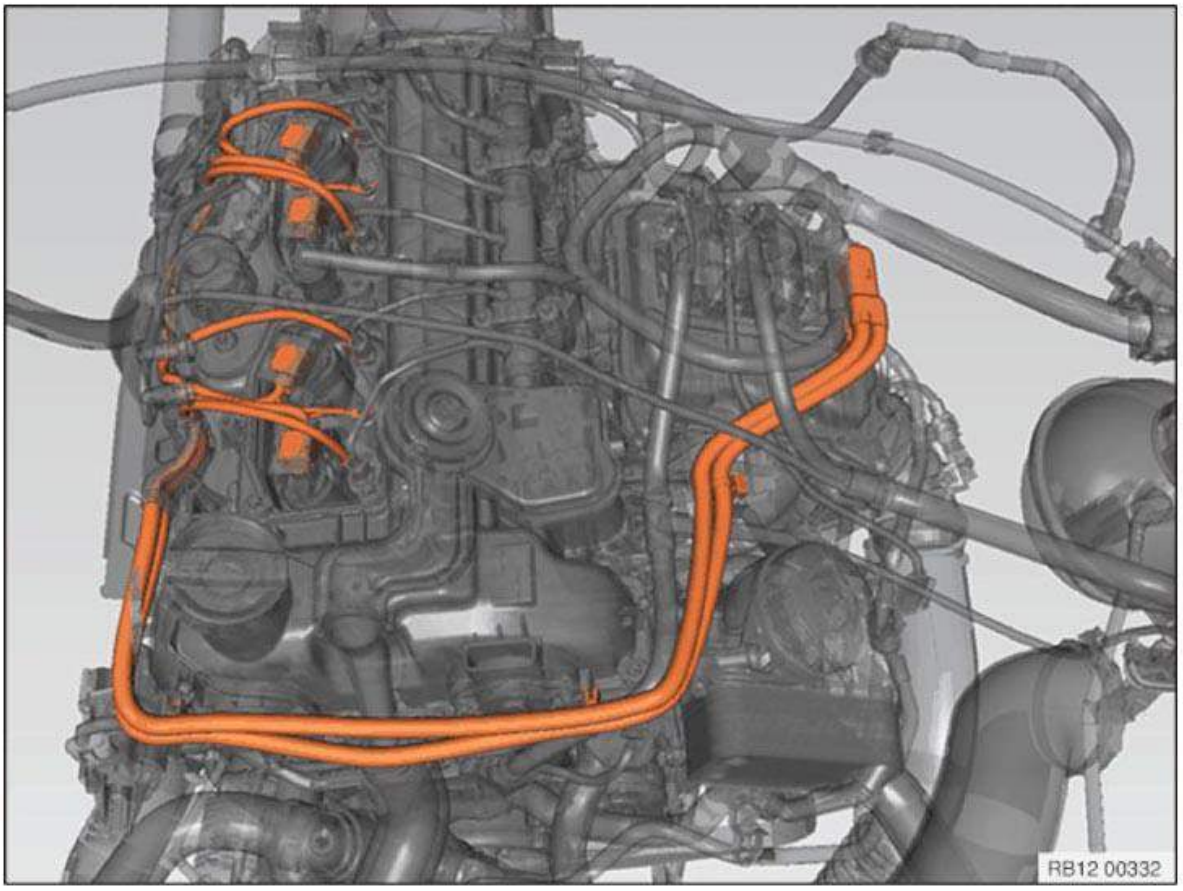


Fig. 158: Overview Of Wiring Harness Section For Ignition And Injectors
Courtesy of BMW OF NORTH AMERICA, INC.

Overview of wiring harness section for ignition and injectors.

Unlock and remove connector (1) from control unit.



Fig. 159: Identifying Connector From Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Release wiring harness from clamps (1).

cardiagn.com

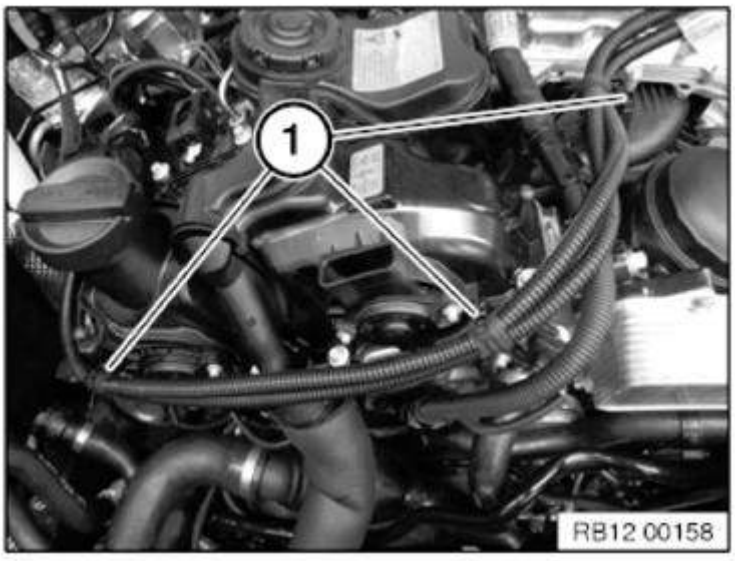


Fig. 160: Identifying Wiring Harness From Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: This procedure is applicable to all cylinders.

Unlock and disconnect connector (1) at injectors.

Slacken nut (1) and remove ground cable (3).

Tightening torque **12 52 2AZ** .

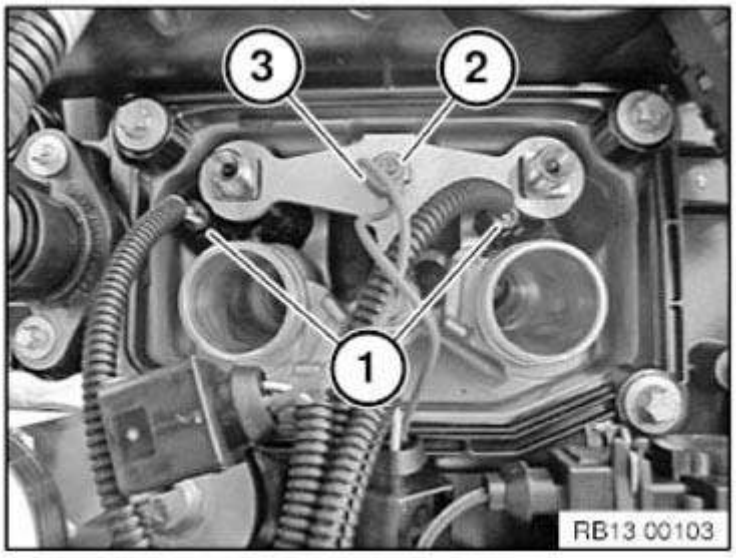


Fig. 161: Identifying Connector, Slacken Nut And Ground Cable
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: This procedure is applicable to all cylinders.

Release connector catch (1) at ignition coil (2) and pull off connector.

cardiagn.com

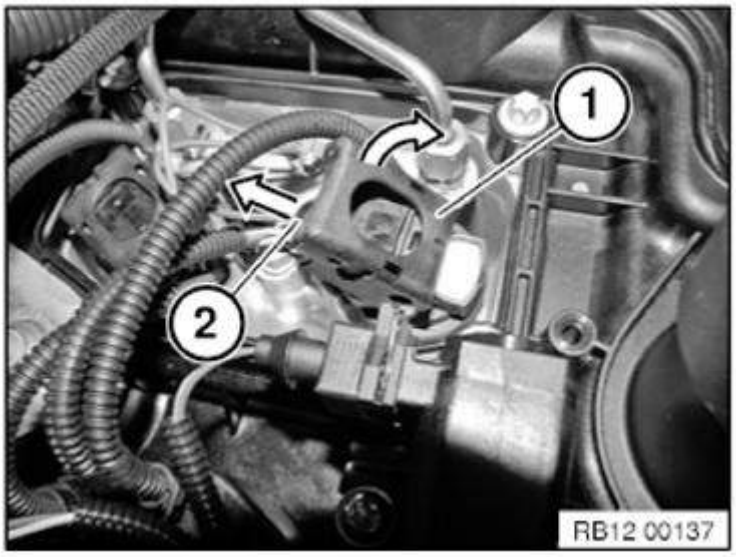


Fig. 162: Pulling Ignition Coil
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock retaining lug (1) in direction of arrow.

Pull cable channel (2) from cylinder head cover.

Pull out and remove wiring harness section for injectors and ignition coils.

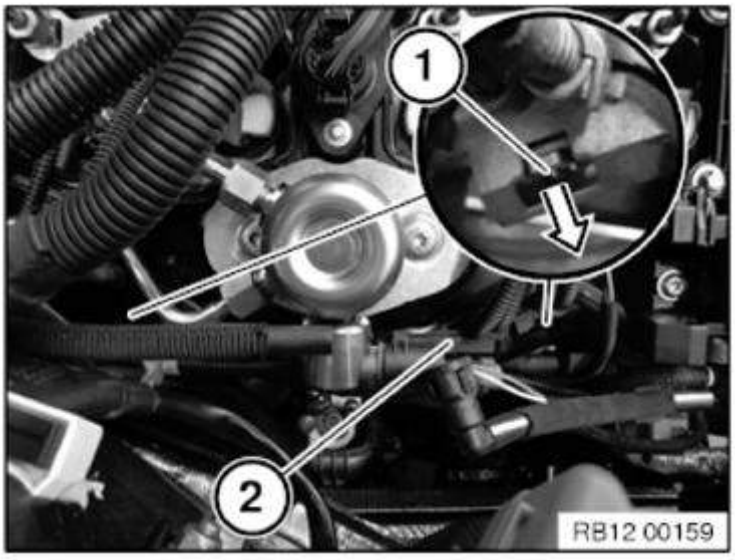


Fig. 163: Pulling Cable Channel
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Clear diagnostic fault entries from fault memory.

12 51 100 REPLACING WIRING HARNESS SECTION FOR IGNITION AND INJECTORS (N55)

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

Necessary preliminary work:

- Read out the fault memory of the DME control unit.

cardiagn.com

- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove **IGNITION COIL COVER**.
- Remove **CLEAN AIR PIPE** .
- Remove **REAR IGNITION COIL COVER**.

Unlock rear plug (1) from the control unit and disconnect.

Release rear wiring harness from intake plenum.

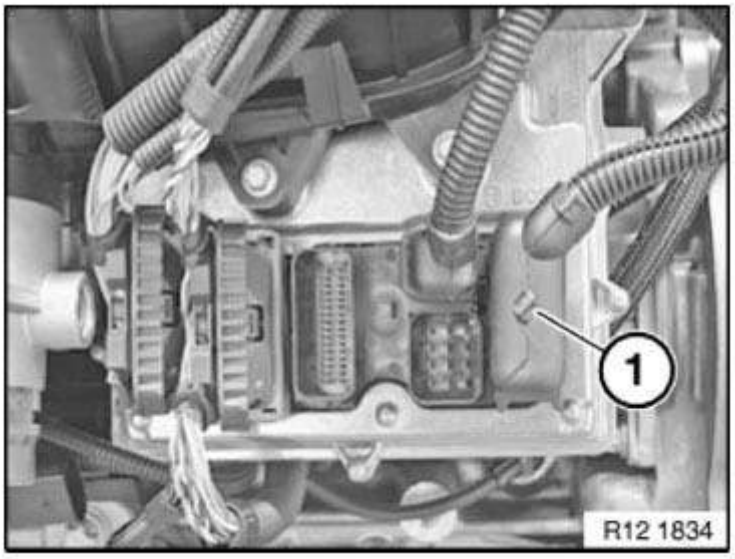


Fig. 164: Identifying Rear Plug From Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove earth cable.

Tightening torque **12 90 5AZ** .

Unlock all connectors from ignition coils and injectors and detach.

Unclip wiring harness (2), feed out and remove.

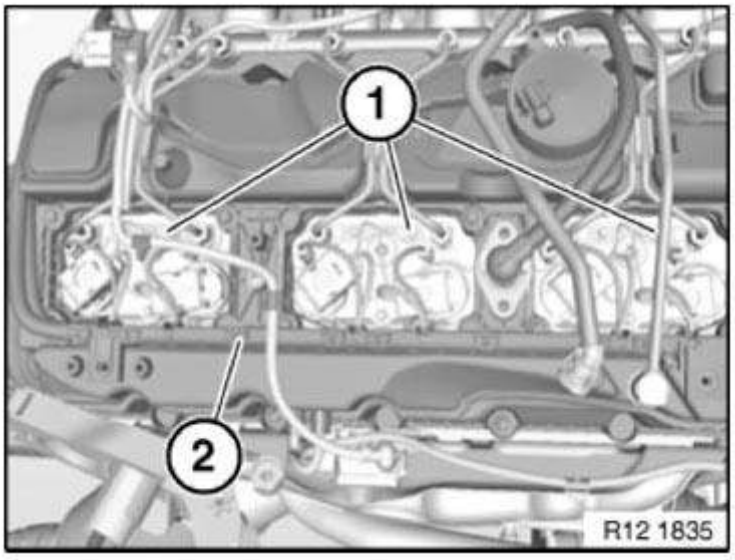


Fig. 165: Identifying Wiring Harness And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

NOTE: **Check stored fault messages.**
Delete fault memory.

OIL PRESSURE/OIL TEMPERATURE/OIL GAUGE

12 61 285 REMOVING AND INSTALLING/REPLACING OIL LEVEL SENSOR FOR ENGINE OIL (N47 D20 O1)

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

Necessary preliminary tasks:

- Switch off ignition
- Remove front **UNDERBODY PROTECTION** .
- Drain **ENGINE OIL** .

Unlock connector (1) and remove.

Unscrew nuts.

Tightening torque **12 61 2AZ** .

Remove oil level sensor (2).

Installation note:

Clean sealing surface on oil sump.

Replace seal on oil level sensor.

An excessively low torque value will result in oil leaks.

An excessively high torque value will result in damage to the oil level sensor.

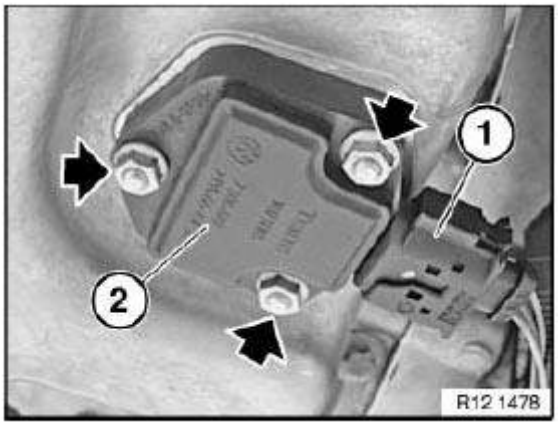


Fig. 166: Identifying Oil Level Sensor And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Top up engine oil.

NOTE: **Check stored fault messages.**
Delete fault memory.

12 61 285 REMOVING AND INSTALLING/RENEWING OIL LEVEL SENSOR FOR ENGINE OIL

cardiagn.com

(N55)

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

Necessary preliminary tasks:

- Switch off ignition.
- Remove **REINFORCEMENT PLATE** .
- Drain **ENGINE OIL** .

Unlock connector (1) and remove.

Unscrew nuts.

Tightening torque **12 61 2AZ** .

Remove oil level sensor (2).

Installation note:

Clean sealing surface on oil sump.

Replace seal on oil level sensor.

An excessively low torque value will result in oil leaks.

An excessively high torque value will result in damage to the oil level sensor.

Top up engine oil.

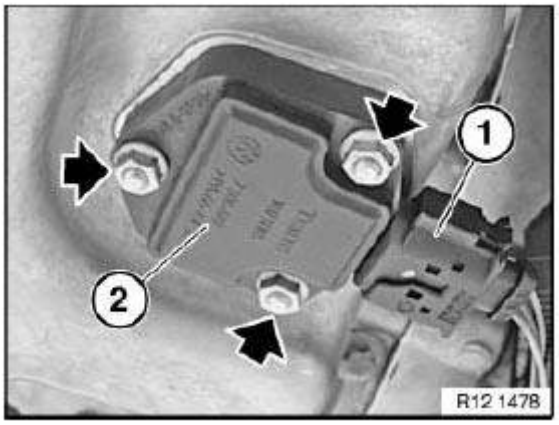


Fig. 167: Identifying Oil Level Sensor And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

12 61 588 REMOVING AND INSTALLING/REPLACING ENGINE OIL PRESSURE/TEMPERATURE SENSOR (N20, N26)

Special tools required:

- **34 5 160**

Necessary preliminary tasks:

cardiagn.com

- Switch off ignition.
- Remove **THROTTLE VALVE ASSEMBLY** .

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Unlock connector (1) and remove.

Release engine oil pressure/temperature sensor (2) with special tool **34 5 160** .

Tightening torque **12 61 1AZ** .

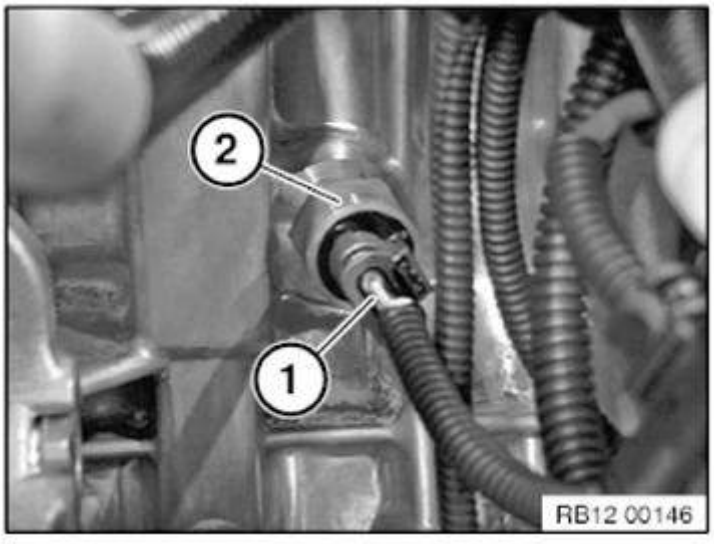


Fig. 168: Identifying Engine Oil Pressure/Temperature Sensor And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Add final details to vehicle**
Check engine oil level. Top up engine oil if necessary.

12 61 280 REMOVING AND INSTALLING/REPLACING OIL PRESSURE SENSOR (N52T)

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Necessary preliminary work:

- Remove **ACOUSTIC COVER**

Installation location:

Oil filter housing, front left.

Engine oil may emerge when oil pressure sensor is replaced; have a cleaning cloth ready.

Release connector (1) and remove.

Release oil pressure sensor (2).

Tightening torque **12 61 2AZ** .

Installation note:

Check oil level, top up engine oil if necessary.

cardiagn.com

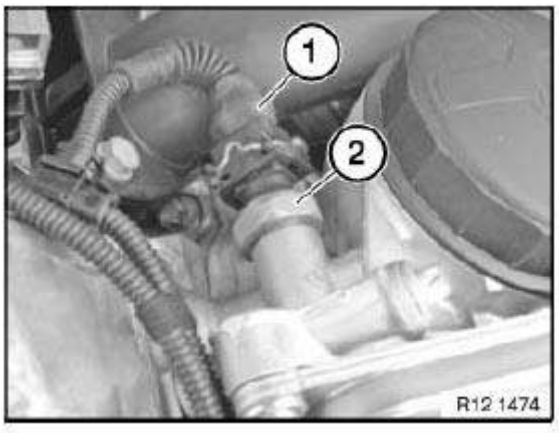


Fig. 169: Identifying Oil Pressure Sensor And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

12 61 280 REMOVING AND INSTALLING/REPLACING OIL PRESSURE SENSOR (N55)

Necessary preliminary work:

- Switch off ignition.
- Remove **IGNITION COIL COVER**.

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Installation location:

Oil filter housing, front left.

Engine oil may emerge when oil pressure sensor is replaced; have a cleaning cloth ready.

Release connector (1) and remove.

Release oil pressure sensor (2).

Tightening torque **12 61 1AZ** .

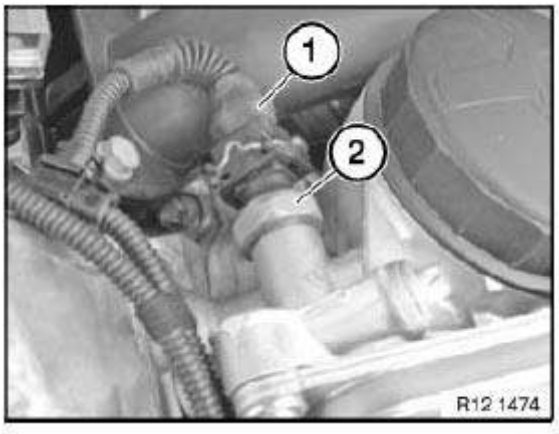


Fig. 170: Identifying Connector And Oil Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Add final details to vehicle**
Check oil level: Top up engine oil if necessary.

cardiagn.com

12 61 280 REMOVING AND INSTALLING/REPLACING OIL PRESSURE SWITCH (N47 D20 O1)

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

Necessary preliminary work:

- Remove **INTAKE SILENCER HOUSING** .
- Remove **INTAKE PORT** .
- Remove left **TRAILING LINK** .
- **REMOVE** left partition wall for units compartment.

NOTE: **The oil pressure switch is located beneath the high pressure pump.**

IMPORTANT: A small amount of engine oil emerges when oil pressure switch is removed.

Have a cleaning cloth ready.

Release connector and remove.

Release oil pressure switch.

Installation note:

Replace sealing ring.

Tightening torque **12 61 1AZ** .

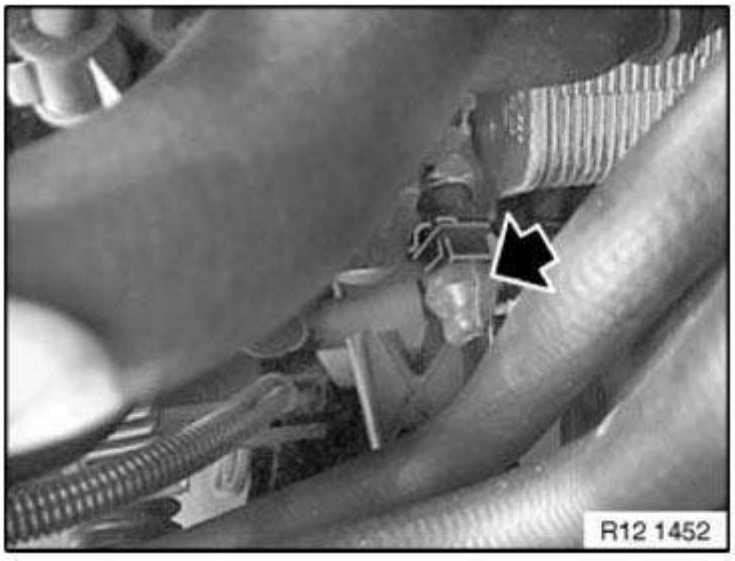


Fig. 171: Locating Oil Pressure Switch
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check engine oil level.

12 61 285 REPLACING ENGINE OIL LEVEL SENSOR (N52T)

IMPORTANT: Read and comply with notes on **PROTECTION AGAINST ELECTROSTATIC**

cardiagn.com

DISCHARGE (ESD PROTECTION) .

Necessary preliminary work:

- Switch off ignition.
- Remove REINFORCEMENT PLATE .
- Drain ENGINE OIL .

Release connector (1) and remove.

Unscrew nuts.

Tightening torque 12 61 2AZ .

Remove oil level sensor (2).

Installation note:

Clean sealing surface on oil sump.

Replace gasket on oil level sensor.

An excessively low torque value will result in oil leaks.

An excessively high torque value will result in damage to the oil level sensor.

Top up engine oil.

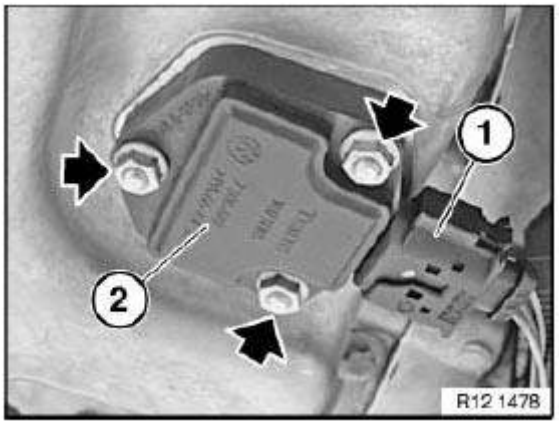


Fig. 172: Locating Oil Level Sensor Nut
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

SWITCHES AND RELAYS

12 63 586 REPLACING POWER DISTRIBUTION MODULE (N20, N52T, N55)

Necessary preliminary tasks:

- Switch off ignition.
- Disconnect BATTERY NEGATIVE LEAD .
- Remove left service flap on cowl panel cover.

cardiagn.com

Unlock and pull off all connectors (1) from power distribution module.

Remove cover (2).

Release nut beneath it and set positive battery cable aside.

Release lock (3).

Feed out and remove power distribution module in upward direction.

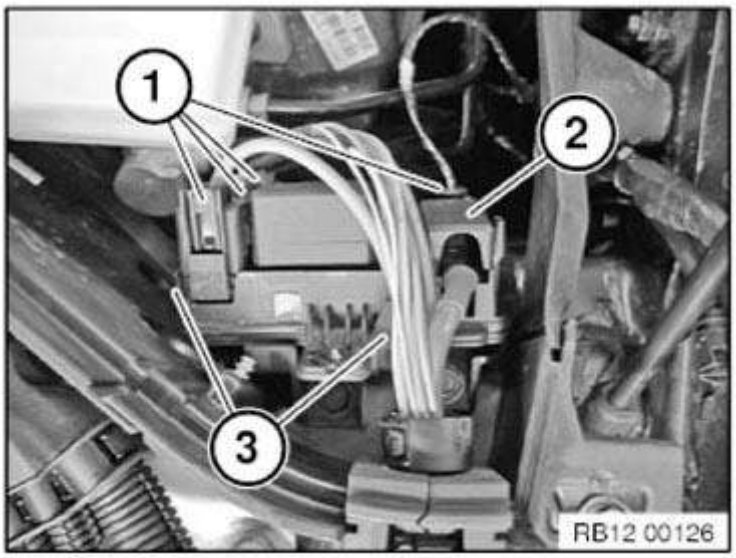


Fig. 173: Identifying Connectors, Cover And Lock Of Power Distribution Module
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702198

cardiagn.com

ENGINE ELECTRICAL SYSTEM

0491161 ADAPTER

0491161 127041 Adapter MP

NOTE: **(Single adapter (8 pieces)) Deletion, only available via tool set**

Storage Location

K 104

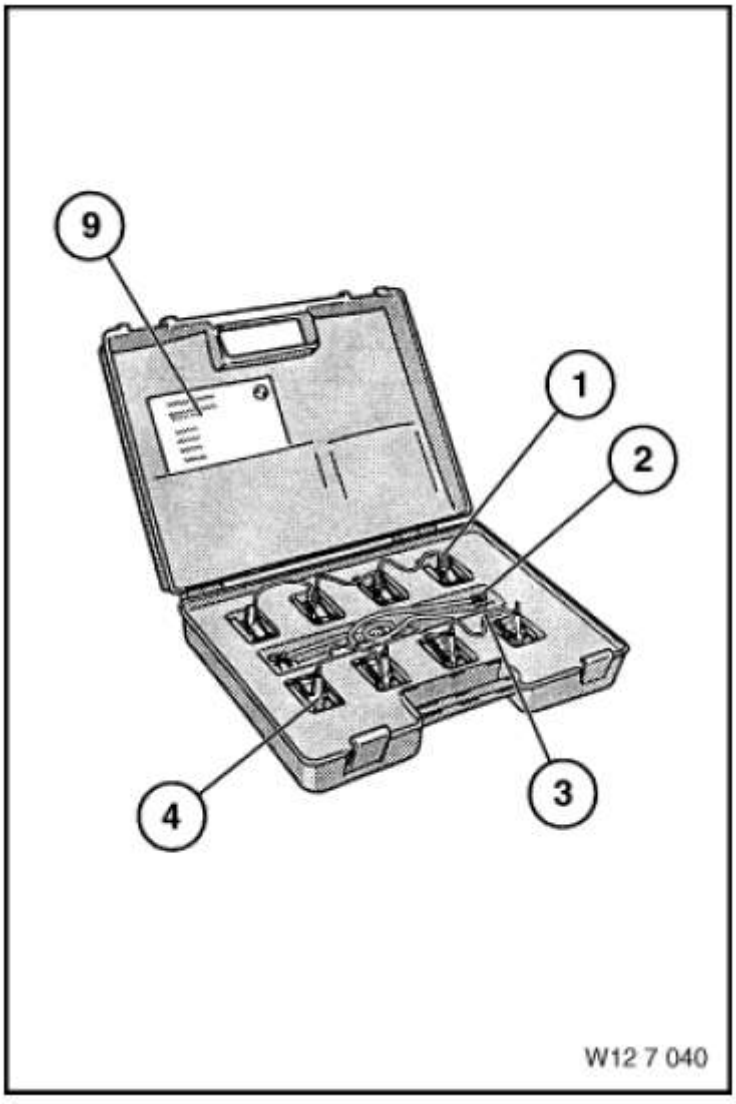


Fig. 1: Identifying Adapter (0491161)
Courtesy of BMW OF NORTH AMERICA, INC.

0491158 ADAPTER

0491158 127030 Adapter AM

NOTE: **For measuring secondary voltage during static ignition distribution**

Storage Location

cardiagn.com

I 110

SI number

02 04 91 (321)

Consisting of:

9 = **0491159** Operating instructions

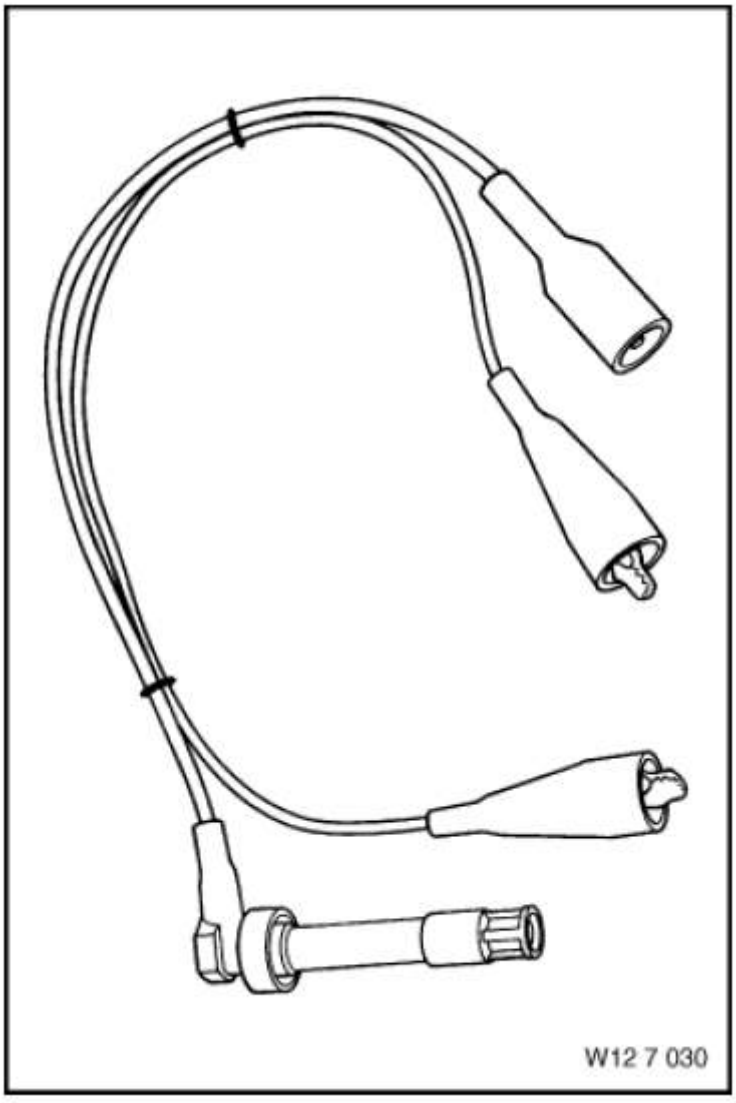


Fig. 2: Identifying Adapter (0491158)
Courtesy of BMW OF NORTH AMERICA, INC.

0491152 ADAPTER

0491152 127011 Adapter AM

NOTE: **(Electronic engine power control adapter) For checking of electronic engine power control safety circuit with 20-pin engine connector**

Storage Location

H 106

cardiagn.com

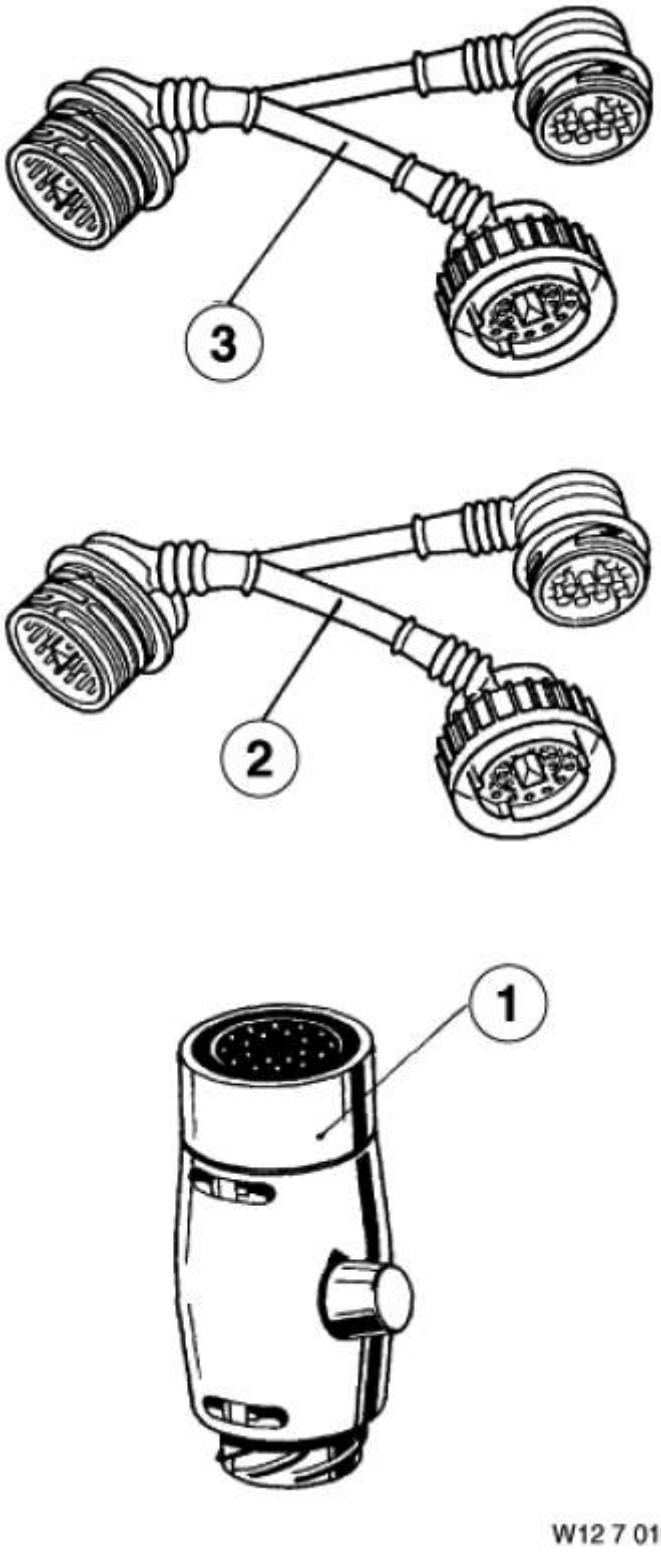


Fig. 3: Identifying Adapter (0491152)
Courtesy of BMW OF NORTH AMERICA, INC.

0491160 ADAPTER

0491160 127040 Adapter MP

NOTE: **(Adapter kit) For measuring secondary voltage during static ignition distribution**

Storage Location

K 104

cardiagn.com

SI number

02 06 92 (548)

Consisting of:

6 = **0493911** Plate

NOTE: **(Adapter plate) For engines with ignition coil block for measuring secondary voltage Deletion, only available via tool set**

9 = **0491161** Adapter

NOTE: **(Single adapter (8 pieces)) Deletion, only available via tool set**

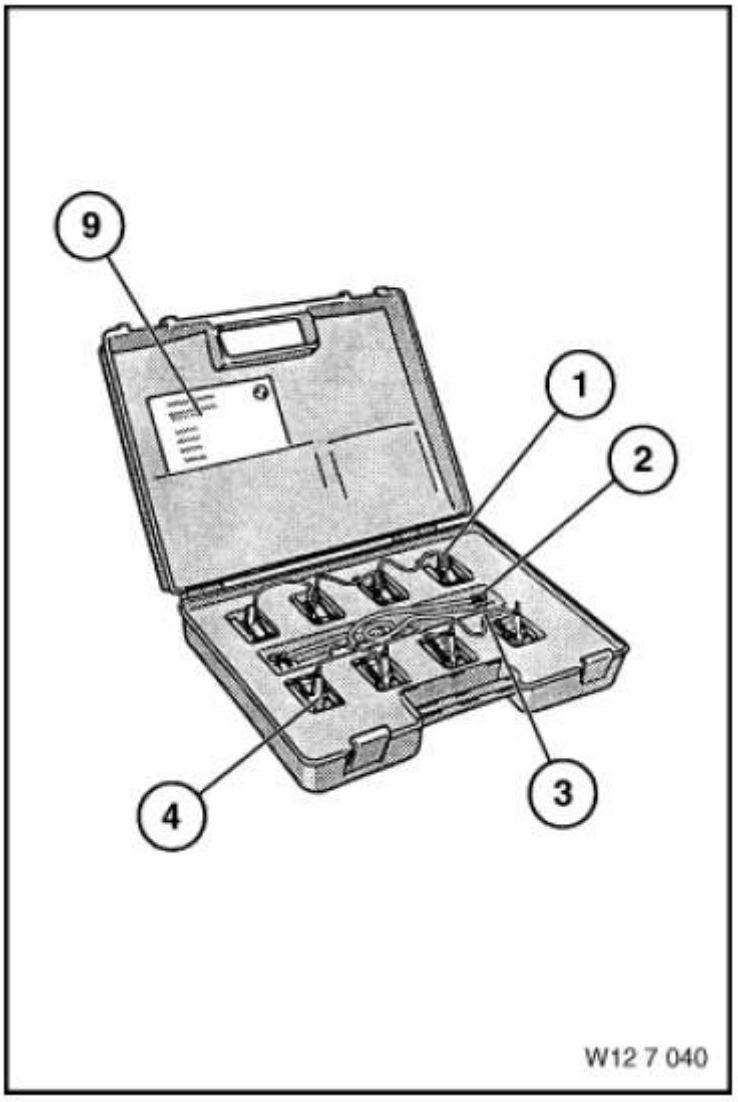


Fig. 4: Identifying Adapter (0491160)
Courtesy of BMW OF NORTH AMERICA, INC.

9 = **0491162** Cable

NOTE: **(Cable) For BMW SERVICE TEST Deletion, only available via tool set**

9 = **0491163** Cable

NOTE: **(Cable) Consisting of 7 individual cables Deletion, only available via tool set**

cardiagn.com

9 = 0491164 Clamp

NOTE: **(Clamp) 8 pieces For ignition coils - engine: M43, M44 Deletion, only available via tool set**

9 = 0491165 Operating instructions

0496727 ADAPTER

0496727 127123 Adapter AM

NOTE: **Adapter with multiple serrations (from 08/2009 as replacement for 12 7 121)**

Storage Location

A49



Fig. 5: Identifying Adapter (0496727)
Courtesy of BMW OF NORTH AMERICA, INC.

0491146 ADAPTER

0491146 125460 Adapter Mechanical tool

NOTE: **(Test adapter 35-pin) Universal wiring harness test adapter**

0491156 ADAPTER

0491156 127020 Adapter MP

NOTE: **For measuring primary voltage during static ignition distribution**

Storage Location

H 103

SI number

02 01 90 (155)

Consisting of:

cardiagn.com

2 = 0491157 Operating instructions

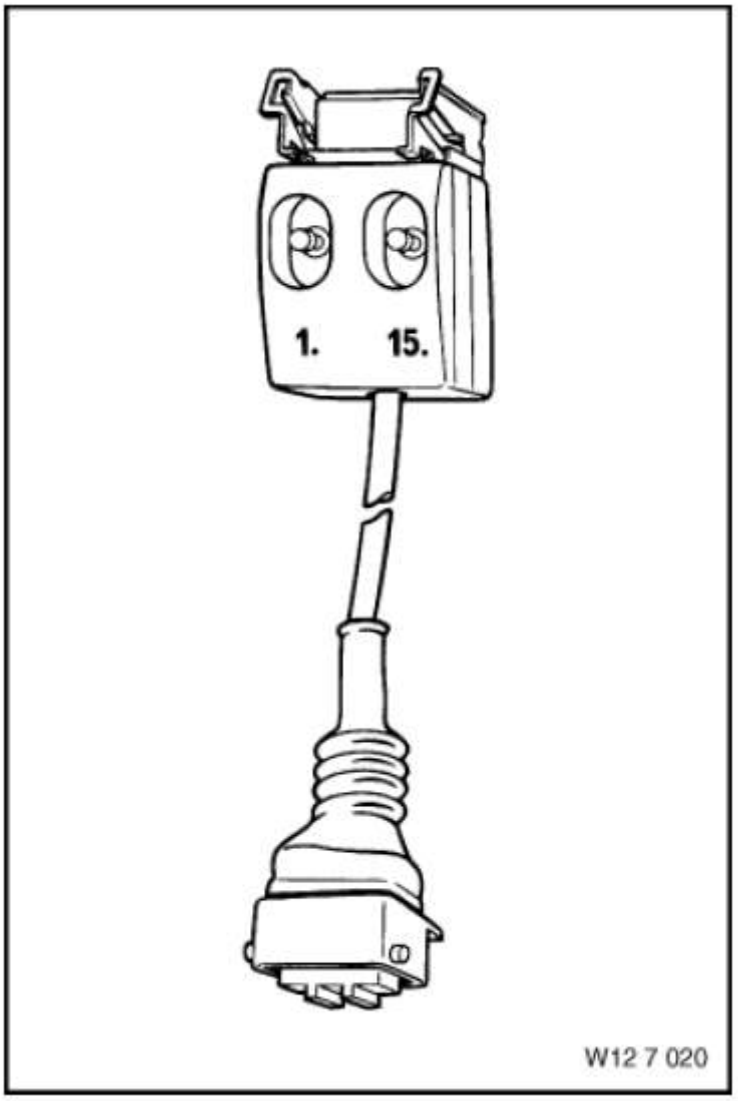


Fig. 6: Identifying Adapter (0491156)
Courtesy of BMW OF NORTH AMERICA, INC.

0491134 ADAPTER

0491134 121300 Adapter MP

NOTE: **(Adapter kit) For 134-pin module connector For diagnosis and troubleshooting in Digital Motor Electronics and transmission control unit - from model year 98**

SI number

02 04 97 (248)

Consisting of:

4 = 0495069 Cap

NOTE: **(Zero-encoded protective cap for test box, 52-pin (12 1300/304)) New connector in E61/E61/E63 and E64 on SGM control unit protective cap 12 1 300/305 for diagnosis on wiring harness. From 08/2004 protective cap will be supplied with test box.**

cardiagn.com

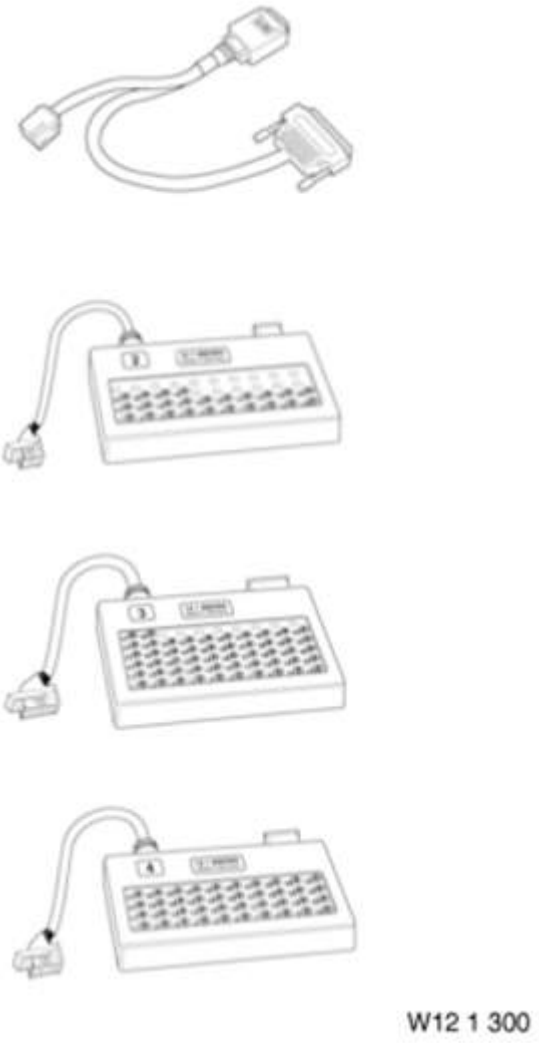


Fig. 7: Identifying Adapter (0491134)
Courtesy of BMW OF NORTH AMERICA, INC.

2 = **0491135** Adapter cable

NOTE: (Adapter cable) 9-pin

2 = **0491136** Measuring module

NOTE: (Measuring module) 24-pin

2 = **0491137** Measuring module

NOTE: (Measuring module) 40-pin

2 = **0491138** Measuring module

NOTE: (Measuring module) 52-pin Delivered from 08/2004 in combination with 12 1 305 (zero-encoded protective cap for new SGM control unit in E6x).

0491200 ADAPTER

0491200 128000 Adapter Mechanical tool

NOTE: (Test adapter, 56-pin) For checking the engine wiring harness on compressed natural gas vehicles

cardiagn.com

Storage Location

W 2..

SI number

01 14 95 (014)

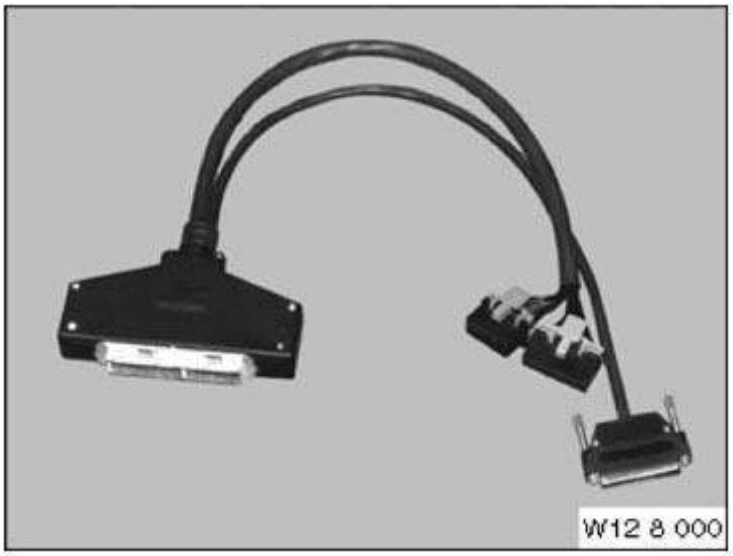


Fig. 8: Identifying Adapter (0491200)
Courtesy of BMW OF NORTH AMERICA, INC.

0491201 ADAPTER

0491201 128010 Adapter Mechanical tool

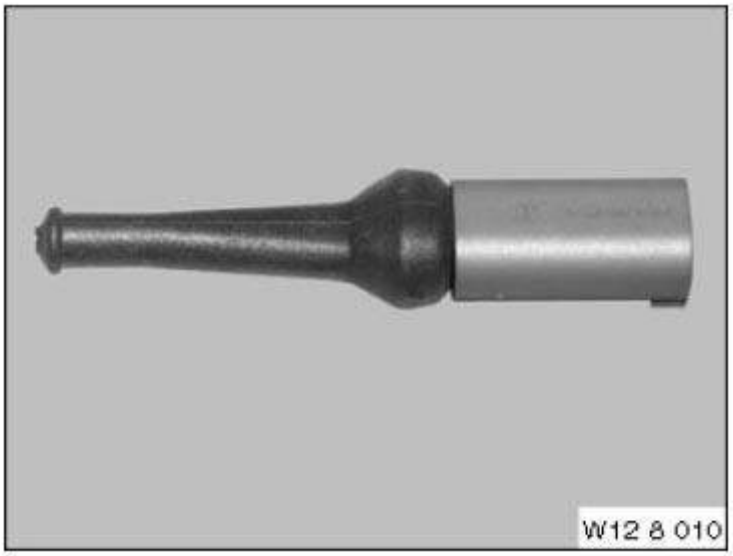
NOTE: **(plug adapter for CNG wiring harness) For reducing the gas pressure in the CNG system**

Storage Location

W 2..

SI number

01 14 95 (014)



cardiagn.com

Fig. 9: Identifying Adapter (0491201)
Courtesy of BMW OF NORTH AMERICA, INC.

0494146 ADAPTER CABLE

0494146 127420 Adapter cable Minimum set: Measuring and testing equipment MP

NOTE: **(V adapter cable set 58-pin) For diagnosis and troubleshooting on Digital Diesel Electronics 5.0 04/04 control unit; encoding with special probe (002250) removed - for N46, N52 and S85 engines. Set 12 7 420 consisting of 12 7 421 adapter cable and 12 7 422 cover plate 05/2004 set modification SI 2 03 04 (106)**

Storage Location

Q204

SI number

02 05 01 (479)

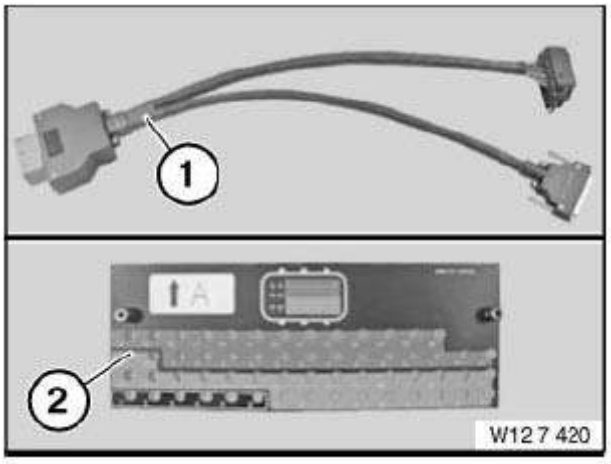


Fig. 10: Identifying Adapter Cable (0494146)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0494963 Adapter cable

   NOTE: **(Adapter cable 58-pin) Only available as part of complete special tool set 12 7 420 (83 30 0 494 146).**

2. 0494964 Plate

   NOTE: **(Cover plate for test box) For pin allocation on 105-pin test box (61 4 380)**

0492732 ADAPTER CABLE

0492732 611216 Adapter cable AM

NOTE: **For ignition timing simulator 12 1 460. Miscellaneous: USA only**

Storage Location

W 2..

0491135 ADAPTER CABLE

cardiagn.com

0491135 121301 Adapter cable MP

NOTE: **(Adapter cable) 9-pin**

Storage Location

N201

0491154 ADAPTER CABLE

0491154 127013 Adapter cable AM

NOTE: **(Adapter cable 25-pin) For checking/encoding B of electronic engine power control safety circuit - model series: E31/engine: M70**

Storage Location

H 102

cardiagn.com

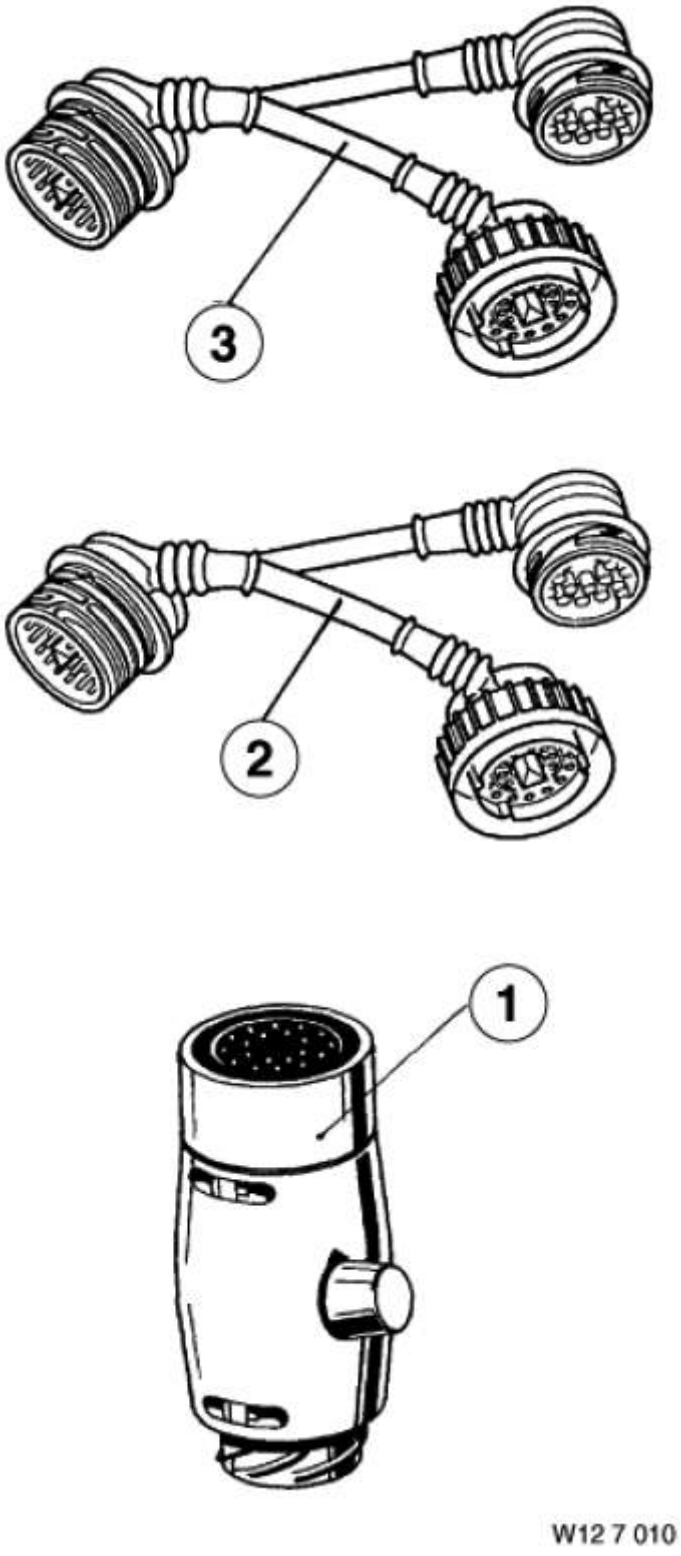


Fig. 11: Identifying Adapter Cable (0491154)
Courtesy of BMW OF NORTH AMERICA, INC.

0491153 ADAPTER CABLE

0491153 127012 Adapter cable AM

NOTE: **(Adapter cable, 25-pin) Encoding A**

Storage Location

H 102

cardiagn.com

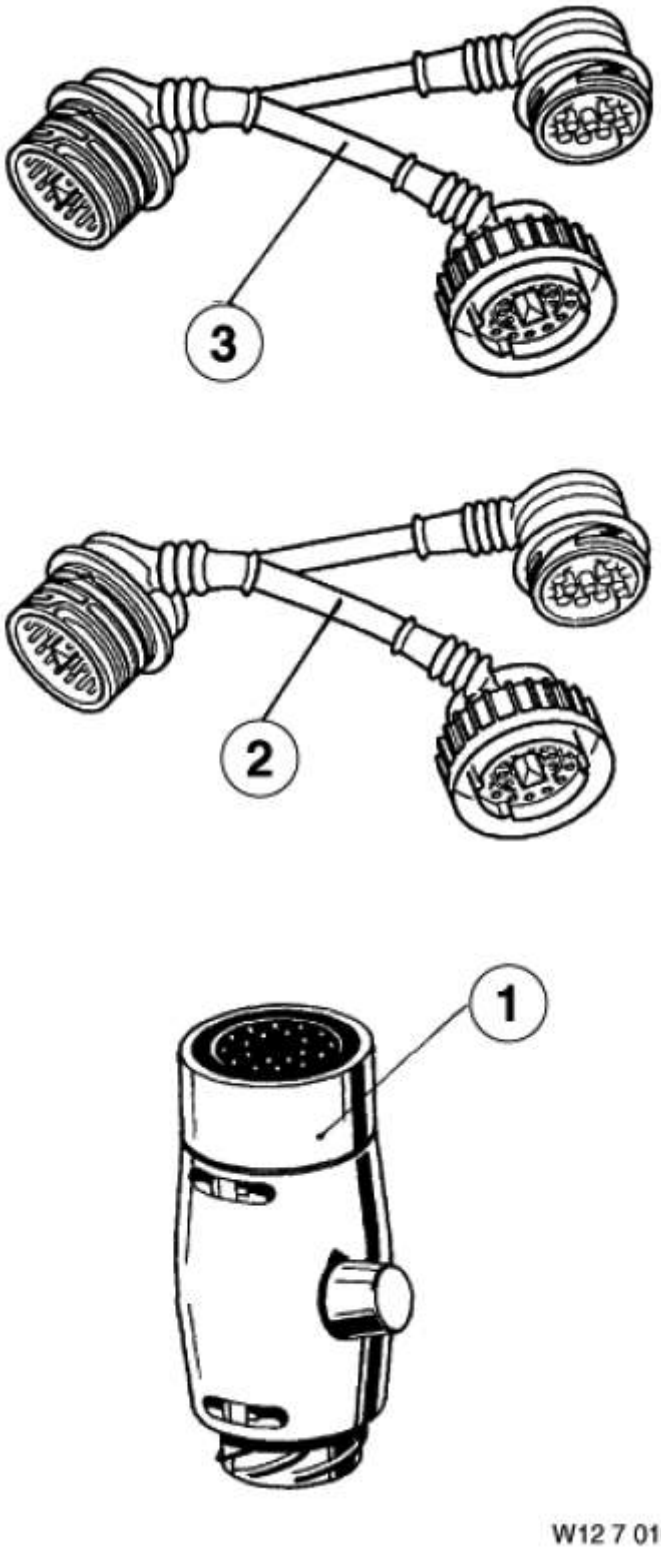


Fig. 12: Identifying Adapter Cable (0491153)
Courtesy of BMW OF NORTH AMERICA, INC.

0494383 ADAPTER CABLE

0494383 127050 Adapter cable MP

NOTE: **For engines with rod-type ignition coils for measuring secondary voltage**

Storage Location

I 110

cardiagn.com

SI number

02 01 01 (671)

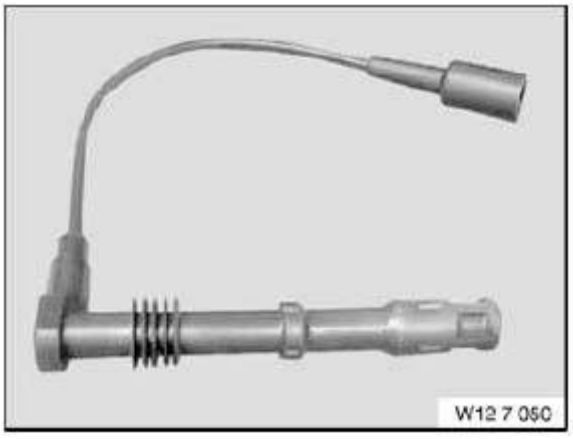


Fig. 13: Identifying Adapter Cable (0494383)
Courtesy of BMW OF NORTH AMERICA, INC.

0494145 ADAPTER CABLE

0494145 127410 Adapter cable Minimum set: Measuring and testing equipment MP

NOTE: **(V adapter cable 96-pin) For diagnosis and troubleshooting on DDE 5.0 control unit**

Storage Location

Q 203

SI number

02 05 01 (479)

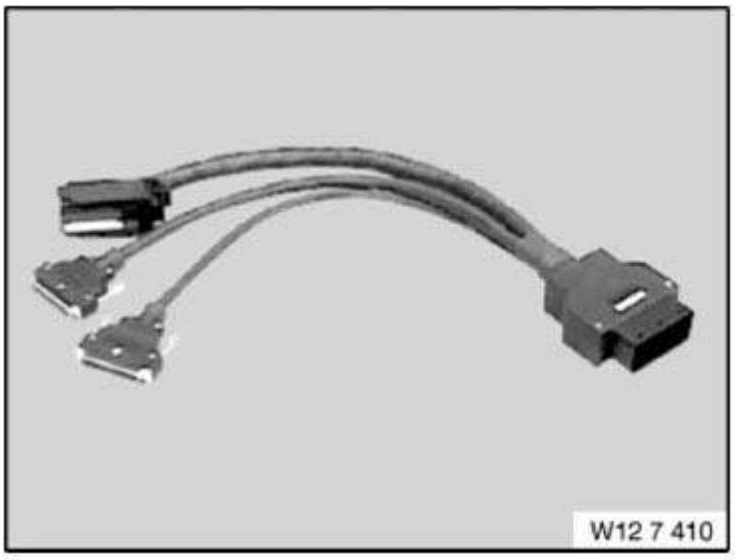


Fig. 14: Identifying Adapter Cable (0494145)
Courtesy of BMW OF NORTH AMERICA, INC.

0491149 ADAPTER CABLE

0491149 126411 Adapter cable MP

cardiagn.com

NOTE: **(Adapter cable with diode) For reverse polarity protected connection to a 12 volt-voltage source Engine: M50, M52, S62, S54. Only available as part of complete tool set 12 6 410 - (83 30 0 491 148).**

Storage Location

F107

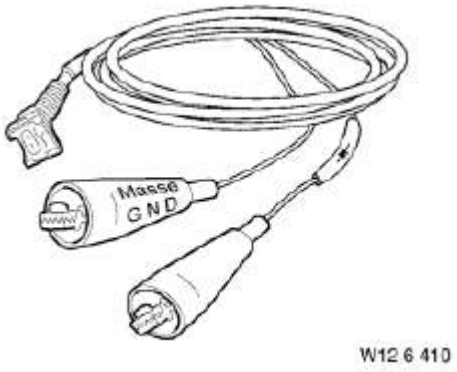


Fig. 15: Identifying Adapter Cable (0491149)
Courtesy of BMW OF NORTH AMERICA, INC.

0494963 ADAPTER CABLE

0494963 127421 Adapter cable Minimum set: Measuring and testing equipment MP

NOTE: **(Adapter cable 58-pin) Only available as part of complete special tool set 12 7 420 (83 30 0 494 146).**

Storage Location

Q204

SI number

02 03 04 (106)

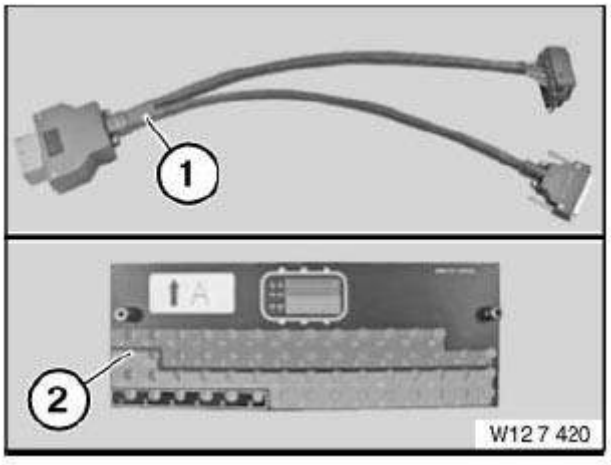


Fig. 16: Identifying Adapter Cable (0494963)
Courtesy of BMW OF NORTH AMERICA, INC.

0493915 ADAPTER CABLE

0493915 127300 Adapter cable Minimum set: Measuring and testing equipment MP

cardiagn.com

NOTE: **(V adapter cable, 9-pin) For diagnosis and troubleshooting on both sensors (VVT control unit)**

Storage Location

Q207

SI number

02 02 01 (695)

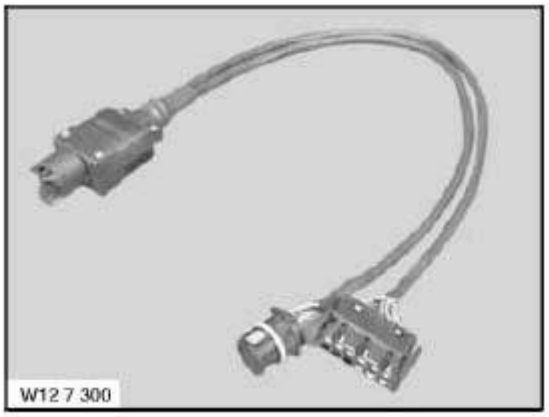


Fig. 17: Identifying Adapter Cable (0493915)
Courtesy of BMW OF NORTH AMERICA, INC.

0491148 ADAPTER CABLE

0491148 126410 Adapter cable MP

NOTE: **(Adapter cable and switching device) For external activation of VANOS unit during installation and for function check of shift valve**

SI number

01 08 92 (555)

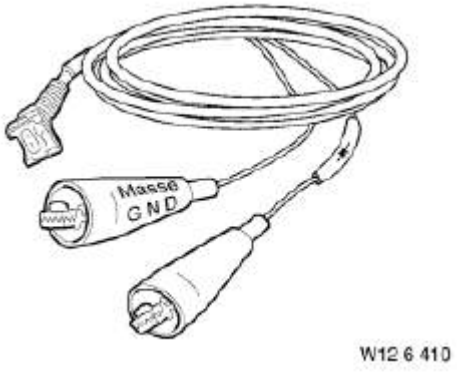


Fig. 18: Identifying Adapter Cable (0491148)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

3 = 0493625 Guard

NOTE: **(Reverse polarity protection) Retrofit kit with reverse polarity protection diode for installation into adapter cable 12 6 411, to adjust it to**

cardiagn.com

performance data of switching device 12 6 050. Identification: Red heat-shrink tubing Only available as part of complete tool set 12 6 410 - (83 30 0 491 148).

2 = **0491149** Adapter cable

NOTE: **(Adapter cable with diode) For reverse polarity protected connection to a 12 volt-voltage source Engine: M50, M52, S62, S54. Only available as part of complete tool set 12 6 410 - (83 30 0 491 148).**

2 = **0491150** Measuring device

NOTE: **(Switching device with cable connection) Engine: S50B32. Only available as part of complete tool set 12 6 410 (83 30 0 491 148).**

0491177 ANTISTATIC MAT

0491177 127192 Antistatic mat AM

Replaced by: 83300495054

NOTE: **(Antistatic mat) Is replaced by main number 12 7 060.**

0491145 BOLT

0491145 124010 Bolt Mechanical tool

NOTE: **(Adjusting bolt) For adjusting the circuit board switch on the DME control unit**

cardiagn.com

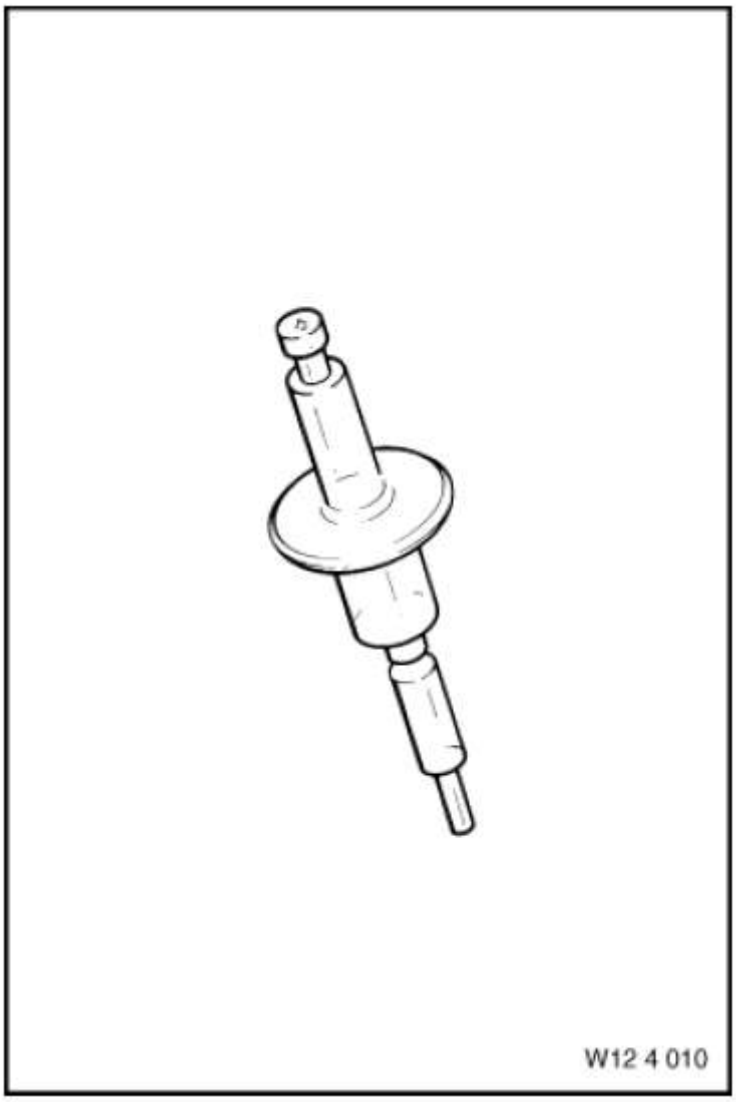


Fig. 19: Identifying Bolt (0491145)
Courtesy of BMW OF NORTH AMERICA, INC.

0491162 CABLE

0491162 127042 Cable MP

NOTE: **(Cable) For BMW SERVICE TEST Deletion, only available via tool set**

Storage Location

K 104

cardiagn.com

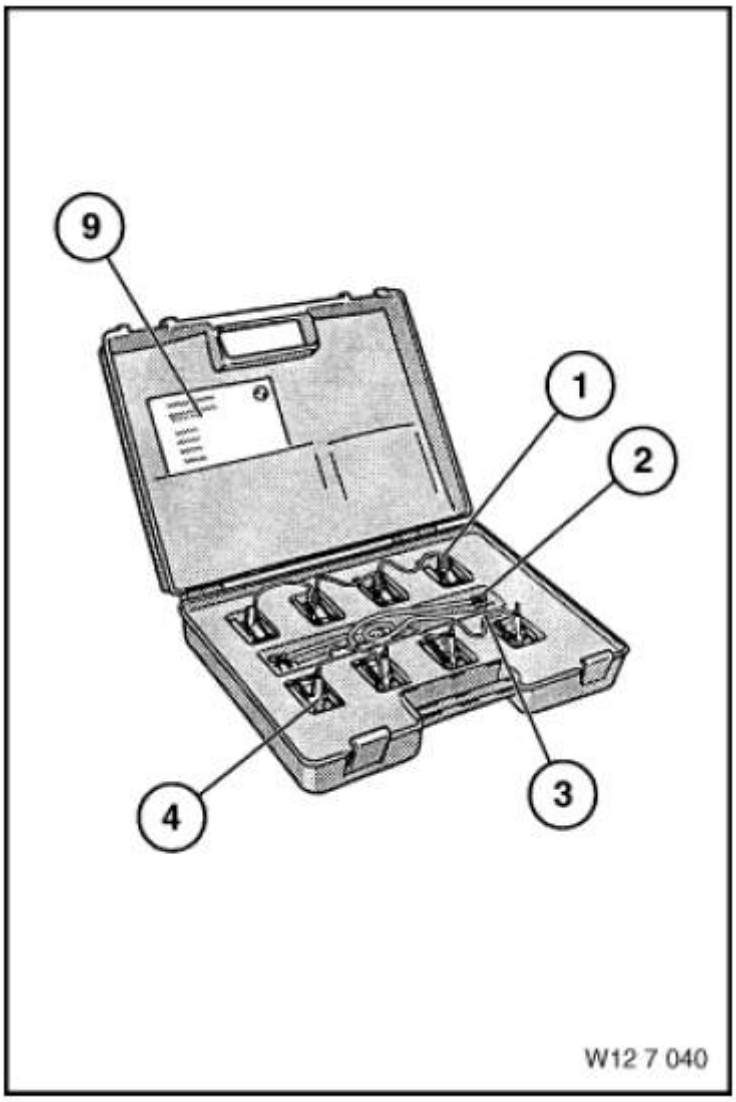


Fig. 20: Identifying Cable (0491162)
Courtesy of BMW OF NORTH AMERICA, INC.

0491163 CABLE

0491163 127043 Cable MP

NOTE: **(Cable) Consisting of 7 individual cables Deletion, only available via tool set**

Storage Location

K 104

cardiagn.com

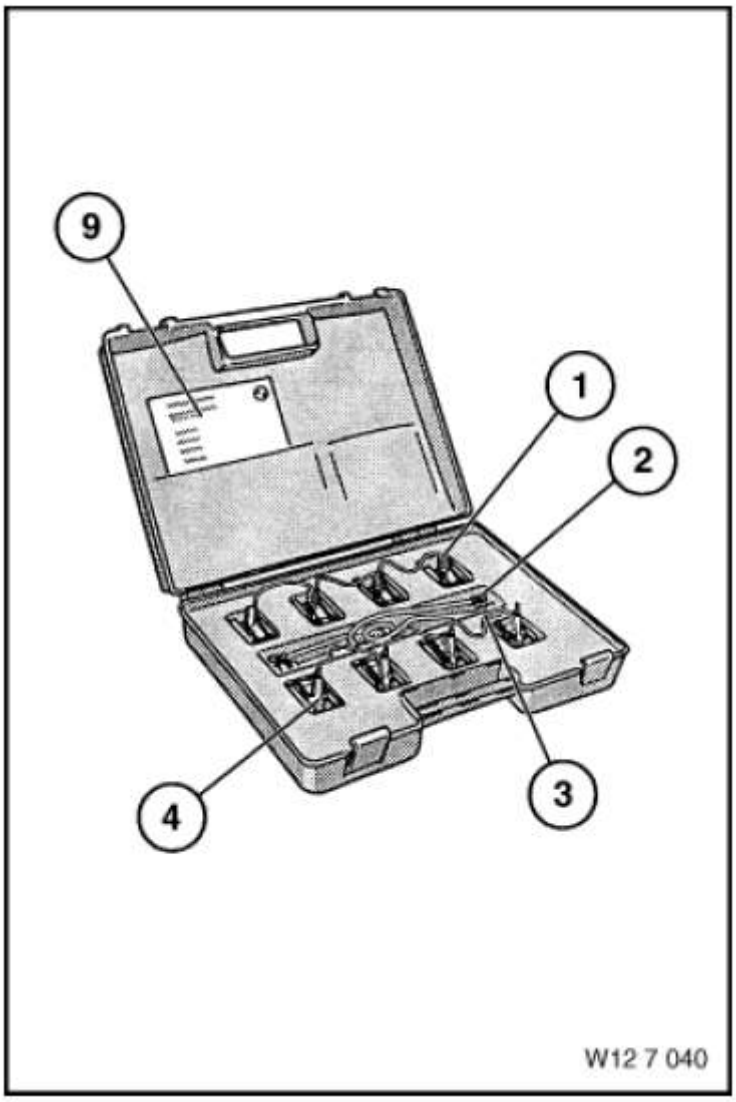


Fig. 21: Identifying Cable (0491163)
Courtesy of BMW OF NORTH AMERICA, INC.

0495069 CAP

0495069 121305 Cap MP

NOTE: **(Zero-encoded protective cap for test box, 52-pin (12 1300/304)) New connector in E61/E61/E63 and E64 on SGM control unit protective cap 12 1 300/305 for diagnosis on wiring harness. From 08/2004 protective cap will be supplied with test box.**

SI number

02 07 04 (138)

0491197 CASE

0491197 127229 Case AM

NOTE: **(Case)**

0491164 CLAMP

0491164 127045 Clamp MP

NOTE: **(Clamp) 8 pieces For ignition coils - engine: M43, M44 Deletion, only available**

cardiagn.com

via tool set

Storage Location

K 104

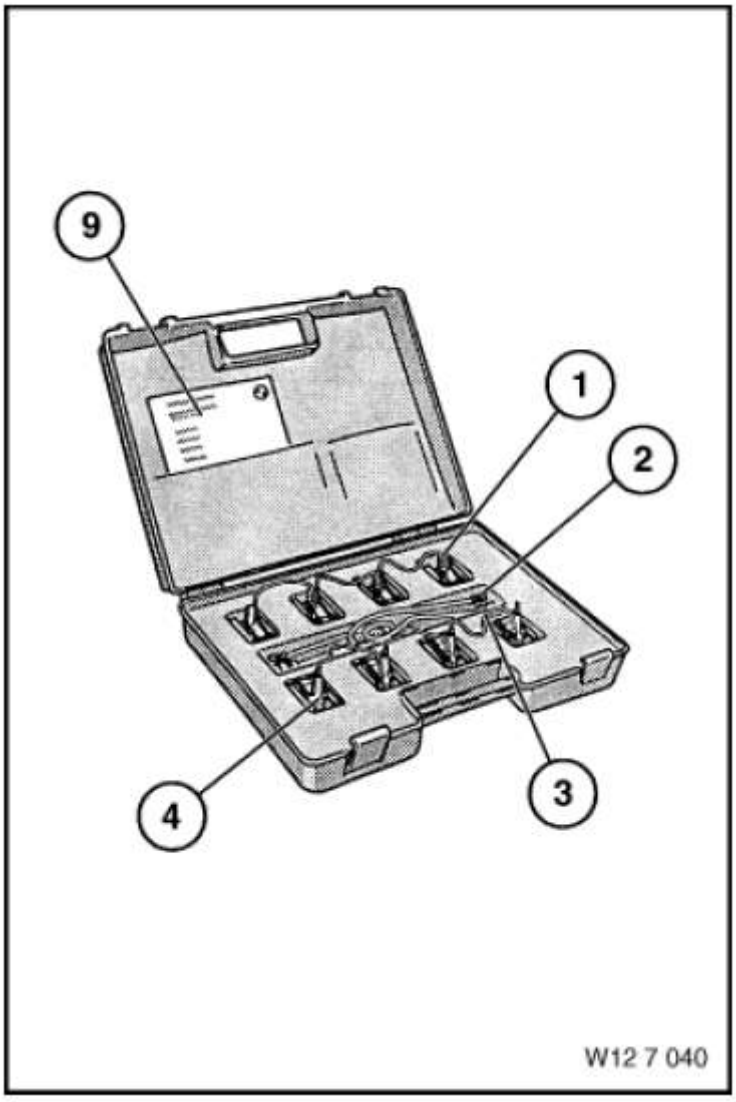


Fig. 22: Identifying Clamp (0491164)
Courtesy of BMW OF NORTH AMERICA, INC.

0491125 DEVICE

0491125 121130 Device Mechanical tool

NOTE: (Turning device) for ignition distributors - H. Korer

0491126 DEVICE

0491126 121150 Device Mechanical tool

NOTE: (retainer) For holding the ignition distributor during removal of the cotter pin on the distributor pinion

cardiagn.com

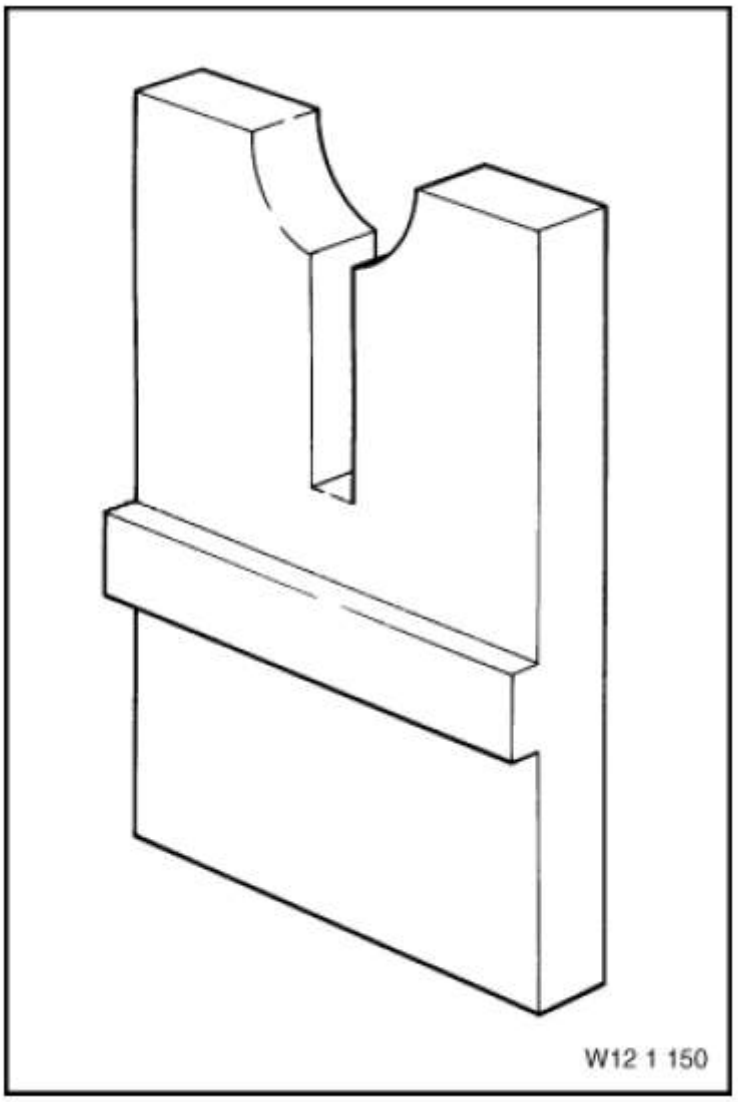


Fig. 23: Identifying Device (0491126)
Courtesy of BMW OF NORTH AMERICA, INC.

0491118 DIE-PLATE

0491118 121083 Die-plate AM

NOTE: **(set of dies) Cable 4 mm^2 /ignition lead**

Storage Location

K 103



cardiagn.com

Fig. 24: Identifying Die-Plate (0491118)
Courtesy of BMW OF NORTH AMERICA, INC.

0491192 EPROM

0491192 127224 EPROM AM

0491188 EPROM

0491188 127220 EPROM AM

NOTE: (Eprom set)

Consisting of:

1. **0491189** EPROM

   NOTE: (Eprom 128 K-type)

2. **0491190** EPROM

   NOTE: (Eprom 256 K-type)

3. **0491191** EPROM
4. **0491192** EPROM
5. **0491193** EPROM
6. **0491194** EPROM
7. **0491195** EPROM
8. **0491196** EPROM
9. **0491197** Case

   NOTE: (Case)

0491190 EPROM

0491190 127222 EPROM AM

NOTE: (Eprom 256 K-type)

0491189 EPROM

0491189 127221 EPROM AM

NOTE: (Eprom 128 K-type)

0491196 EPROM

0491196 127228 EPROM AM

0491195 EPROM

0491195 127227 EPROM AM

0491191 EPROM

0491191 127223 EPROM AM

0491193 EPROM

cardiagn.com

0491193 127225 EPROM AM

0491194 EPROM

0491194 127226 EPROM AM

0491174 ELECTRONICS BOX

0491174 127180 Electronics box Mechanical tool

NOTE: (Eprom deletion unit)

0491173 ELECTRONICS BOX

0491173 127170 Electronics box Mechanical tool

NOTE: (Eprom programming system)

0496065 FITTING AID

0496065 121230 Fitting aid Mechanical tool

NOTE: Fitting aid for spark plug installation. Original BERU ZMH 001 rubber hose 0 890 00 001.

SI number

01 04 07 (352)

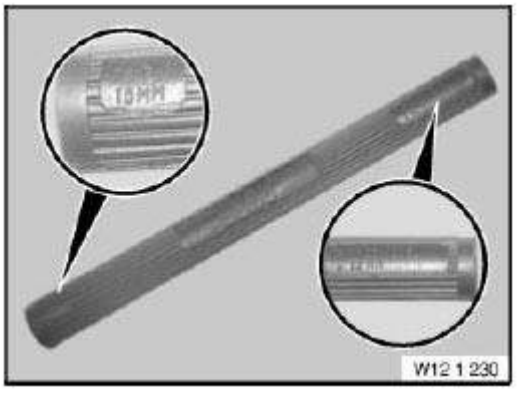


Fig. 25: Identifying Fitting Aid (0496065)
Courtesy of BMW OF NORTH AMERICA, INC.

0491124 FORK

0491124 121100 Fork Mechanical tool

NOTE: (Removal fork) For pressing vacuum hose off vacuum units of ignition distributors and carburetor

cardiagn.com

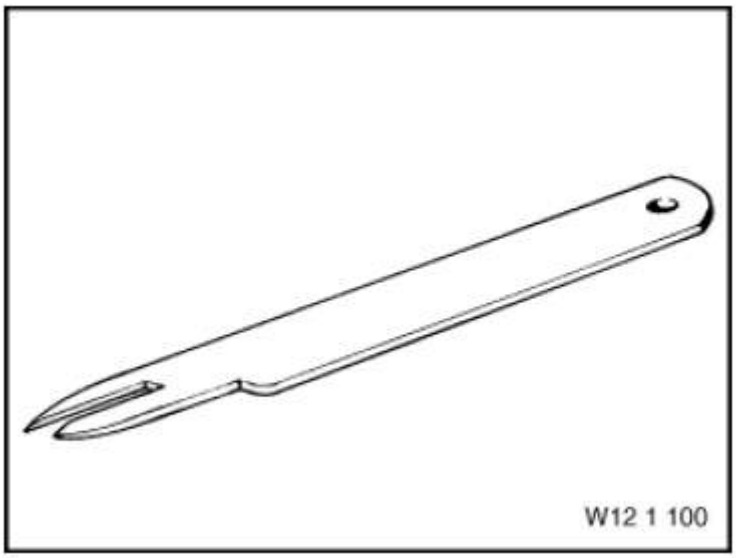


Fig. 26: Identifying Fork (0491124)
Courtesy of BMW OF NORTH AMERICA, INC.

0491166 GAUGE

0491166 127100 Gauge Mechanical tool

NOTE: **(Gauge for pedal sensor)**

Storage Location

Y3

SI number

01 04 87 (780)

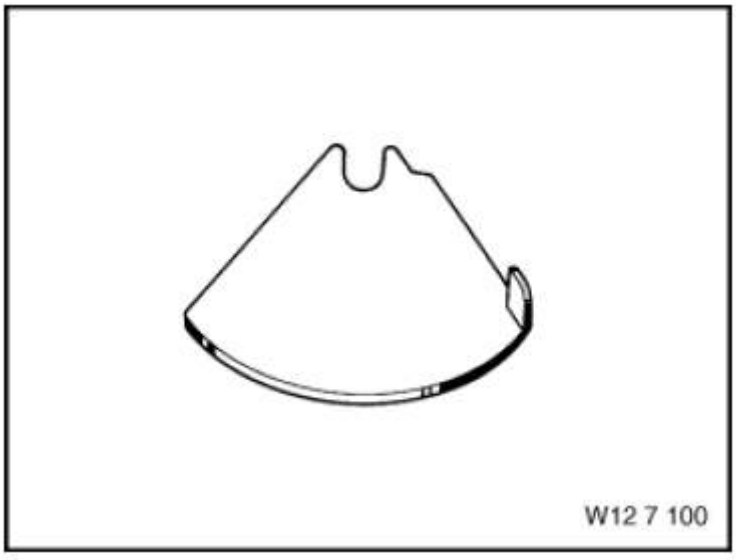


Fig. 27: Identifying Gauge (0491166)
Courtesy of BMW OF NORTH AMERICA, INC.

0491199 GAUGE

0491199 127400 Gauge Mechanical tool

NOTE: **(Test gauge) for wiring harness, pedal sensor**

cardiagn.com

0491120 GUARD

0491120 121087 Guard AM

NOTE: (Protective gloves)



Fig. 28: Identifying Guard (0491120)
Courtesy of BMW OF NORTH AMERICA, INC.

0493625 GUARD

0493625 126413 Guard MP

NOTE: (Reverse polarity protection) Retrofit kit with reverse polarity protection diode for installation into adapter cable 12 6 411, to adjust it to performance data of switching device 12 6 050. Identification: Red heat-shrink tubing Only available as part of complete tool set 12 6 410 - (83 30 0 491 148).

0495431 GUARD

0495431 121097 Guard AM

NOTE: (Protective gloves)

0494846 HOLDER

0494846 127120 Holder AM

NOTE: (Counter support for alternator with freewheel) Counter support for alternator with freewheel N42 engine (with external serrations)/from 08/2009, 12 7 121 will be replaced by 12 7 123

Storage Location

A49

SI number

01 28 03 (051)

cardiagn.com

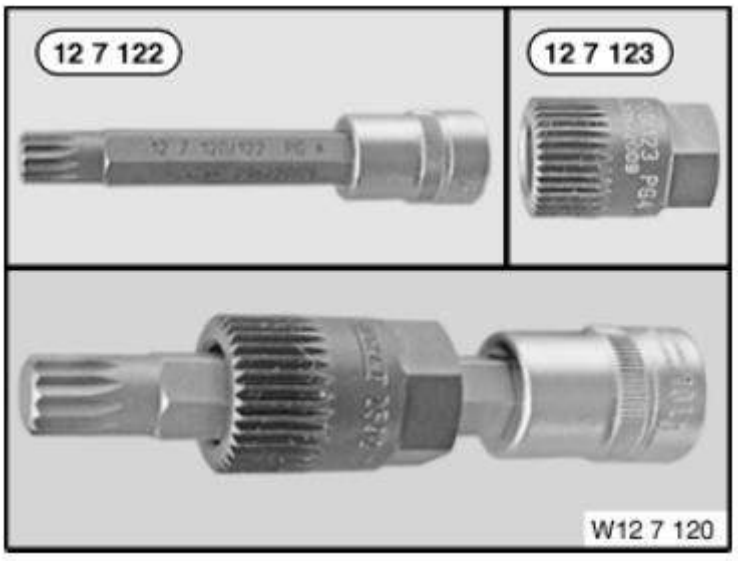


Fig. 29: Identifying Holder (0494846)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0494856 Holder

   NOTE: (Brace wrench) Alternator, N42 engine Replaced by 12 7 123 (0 496 727)

2. 0494857 Socket wrench

   NOTE: For screw with internal serrations (Hazet 8808 lg10)

3. 0496727 Adapter

   NOTE: Adapter with multiple serrations (from 08/2009 as replacement for 12 7 121)

0494856 HOLDER

0494856 127121 Holder AM

Replaced by: 83300496727

NOTE: (Brace wrench) Alternator, N42 engine Replaced by 12 7 123 (0 496 727)

Storage Location

A49

0491119 HOLDING SLEEVE

0491119 121086 Holding sleeve AM

NOTE: (Assembly sleeve)

Storage Location

K 103

cardiagn.com



Fig. 30: Identifying Holding Sleeve (0491119)
Courtesy of BMW OF NORTH AMERICA, INC.

0491186 LABELS

0491186 127211 Labels AM

NOTE: **(Official marks)**

0491178 LABELS

0491178 127193 Labels AM

NOTE: **(Eprom label)**

0491185 LABELS

0491185 127210 Labels AM

NOTE: **(Control unit sealer)**

Storage Location

J 106

Consisting of:

1. 0491186 Labels

   NOTE: **(Official marks)**

2. 0491187 Pliers

   NOTE: **(Punch pliers) For official mark dating**

0491182 LEVER

0491182 127202 Lever AM

NOTE: **For bending the sheet metal tabs**

0493902 LEVER

0493902 121120 Lever Mechanical tool

NOTE: **For unlocking the plug connector on the fuel injectors**

cardiagn.com

Storage Location

B42

SI number

01 15 00 (609)

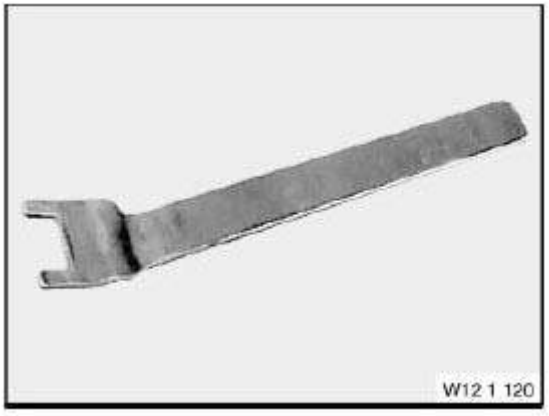


Fig. 31: Identifying Lever (0493902)
Courtesy of BMW OF NORTH AMERICA, INC.

0491121 LUBRICANT

0491121 121088 Lubricant AM

NOTE: **(Lubricant) sale of existing inventory and then to be ordered with 83 19 2 208 609 - silicone spray**

Storage Location

K 103



Fig. 32: Identifying Lubricant (0491121)
Courtesy of BMW OF NORTH AMERICA, INC.

0491150 MEASURING DEVICE

0491150 126412 Measuring device MP

NOTE: **(Switching device with cable connection) Engine: S50B32. Only available as part of complete tool set 12 6 410 (83 30 0 491 148).**

Storage Location

cardiagn.com

H 103

0493429 MEASURING DEVICE

0493429 126050 Measuring device MP

NOTE: **(Device) For activating solenoid valves of VANOS unit**

Storage Location

H 103

SI number

01 01 99 (416)

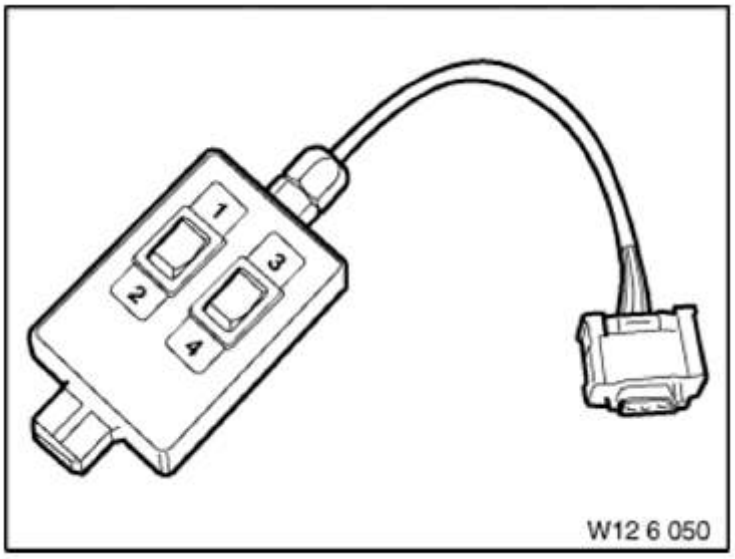


Fig. 33: Identifying Measuring Device (0493429)
Courtesy of BMW OF NORTH AMERICA, INC.

0491147 MEASURING DEVICE

0491147 126400 Measuring device Mechanical tool

NOTE: **(Device) mixture controlling device (integrator) for checking of mixture adjustment - oxygen=1. Other: only Japan and USA, tool is discontinued.**

cardiagn.com

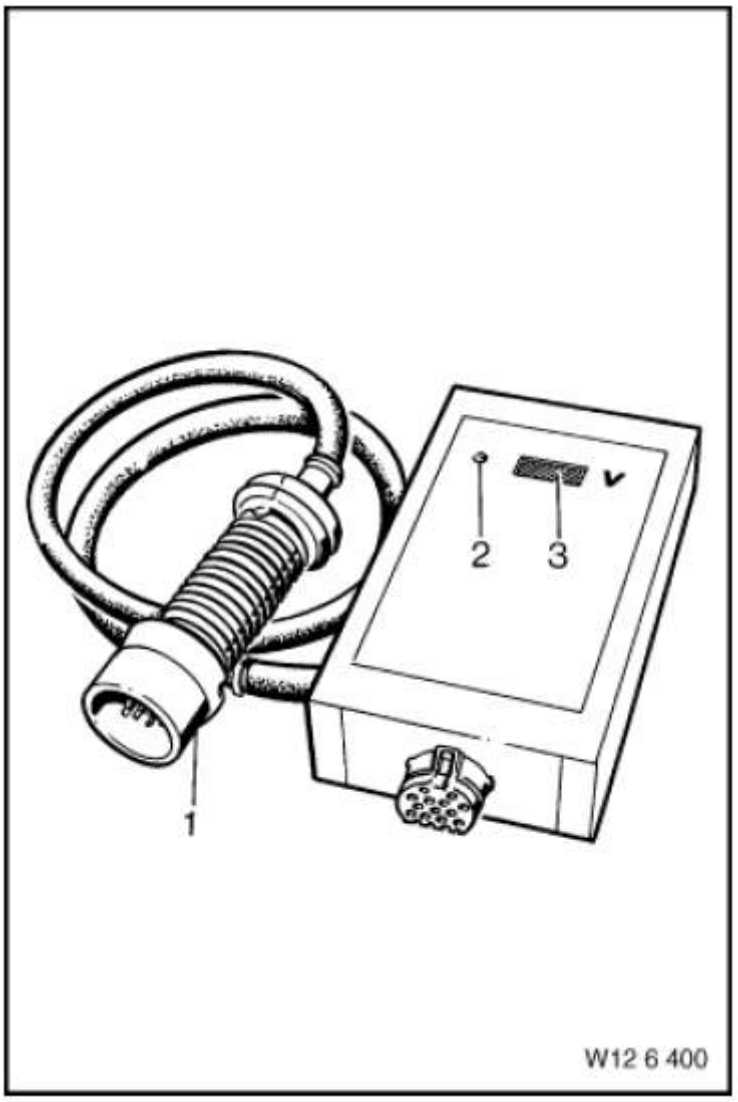


Fig. 34: Identifying Measuring Device (0491147)
Courtesy of BMW OF NORTH AMERICA, INC.

0491139 MEASURING DEVICE

0491139 121400 Measuring device Mechanical tool

NOTE: **(TDC sensor)**

Storage Location

W 2..

cardiagn.com

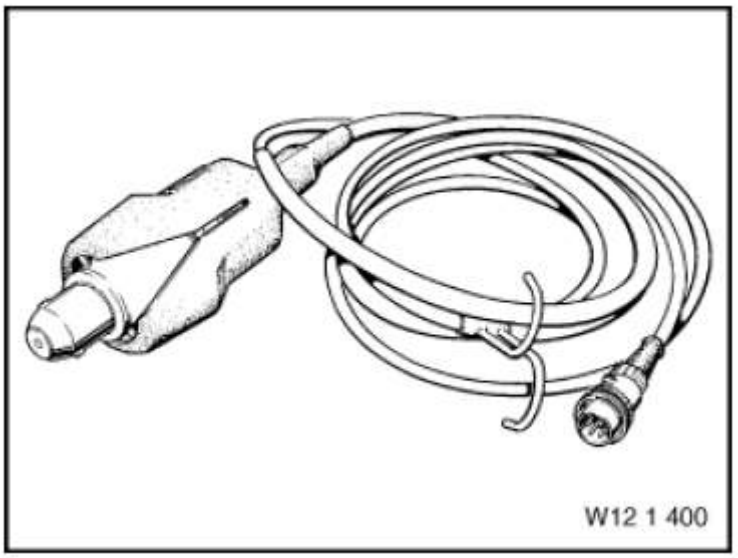


Fig. 35: Identifying Measuring Device (0491139)
Courtesy of BMW OF NORTH AMERICA, INC.

0491136 MEASURING MODULE

0491136 121302 Measuring module MP

NOTE: **(Measuring module) 24-pin**

Storage Location

N 202

0491138 MEASURING MODULE

0491138 121304 Measuring module MP

NOTE: **(Measuring module) 52-pin Delivered from 08/2004 in combination with 12 1 305 (zero-encoded protective cap for new SGM control unit in E6x).**

Storage Location

N204

0491137 MEASURING MODULE

0491137 121303 Measuring module MP

NOTE: **(Measuring module) 40-pin**

Storage Location

N 203

2184136 MOBILE EQUIPMENT TABLE LIFT

2184136 Mobile equipment table lift Mechanical tool

NOTE: **Table lift Gruse MHT 1200**

SI number

06 01 10 (649)

cardiagn.com

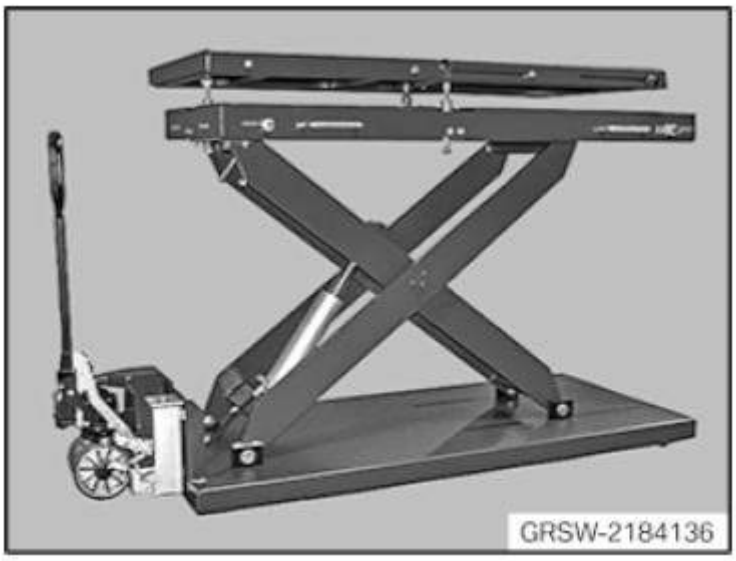


Fig. 36: Identifying Mobile Equipment Table Lift (2184136)
Courtesy of BMW OF NORTH AMERICA, INC.

0491159 OPERATING INSTRUCTIONS

0491159 127039 Operating instructions AM

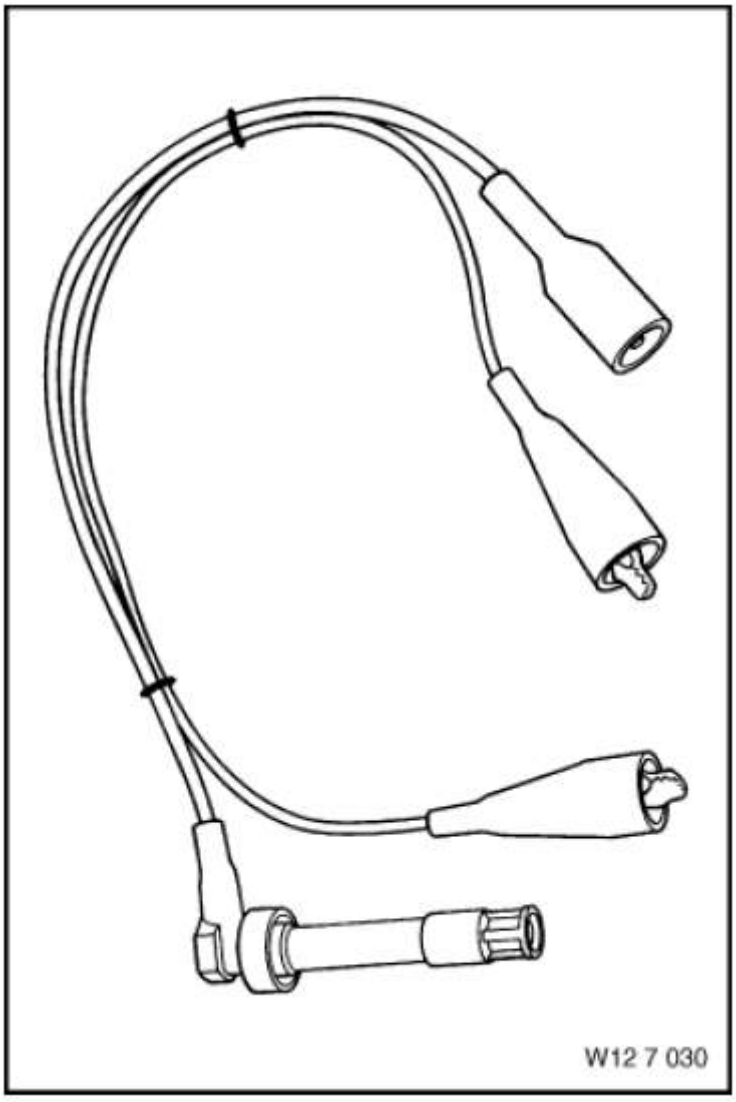


Fig. 37: Identifying Operating Instructions (0491159)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0491157 OPERATING INSTRUCTIONS

0491157 127029 Operating instructions MP

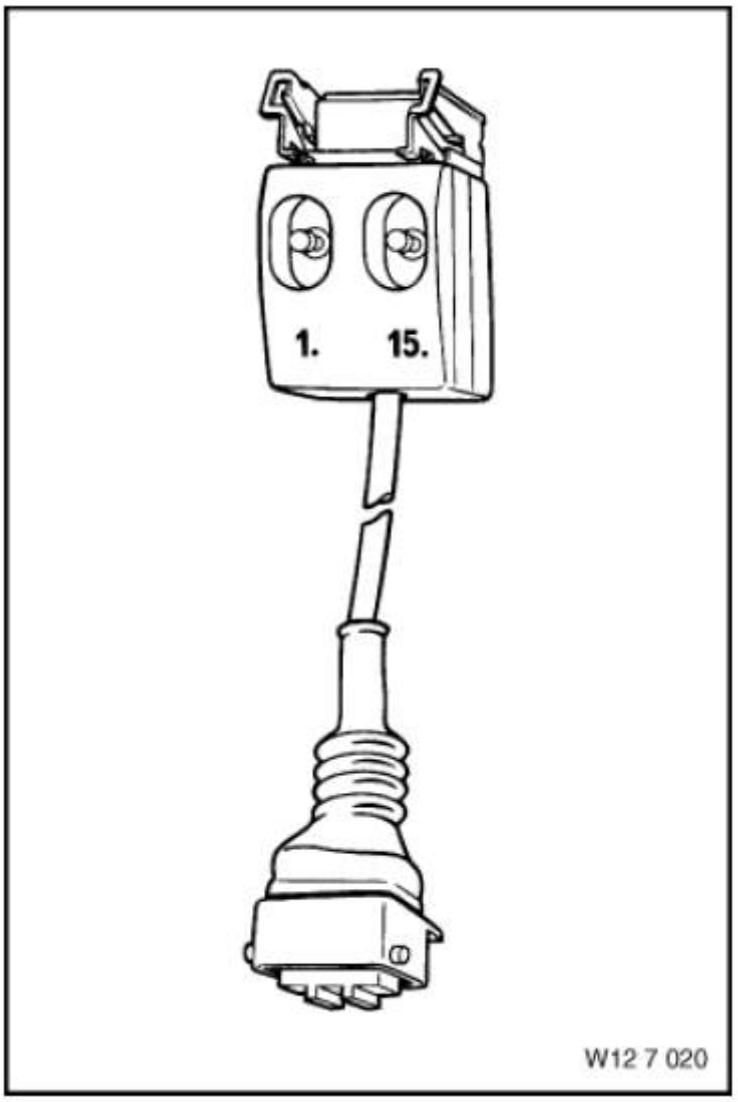


Fig. 38: Identifying Operating Instructions (0491157)
Courtesy of BMW OF NORTH AMERICA, INC.

0491165 OPERATING INSTRUCTIONS

0491165 127049 Operating instructions MP

cardiagn.com

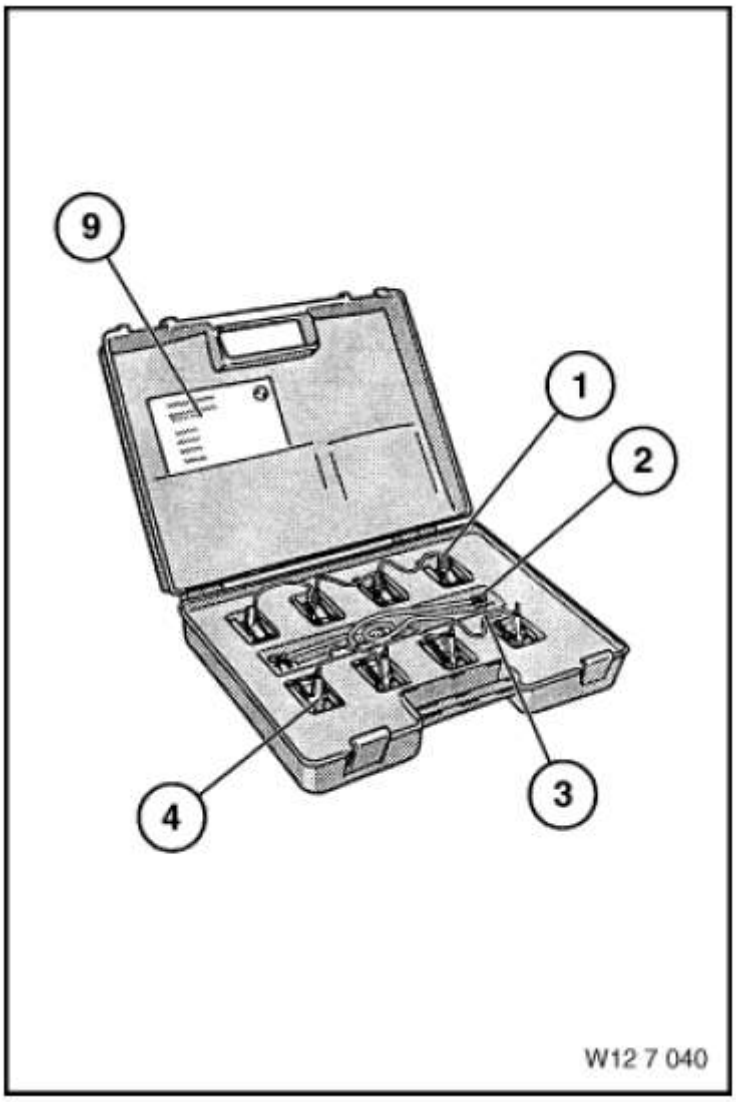


Fig. 39: Identifying Operating Instructions (0491165)
Courtesy of BMW OF NORTH AMERICA, INC.

0491155 OPERATING INSTRUCTIONS

0491155 127019 Operating instructions AM

cardiagn.com

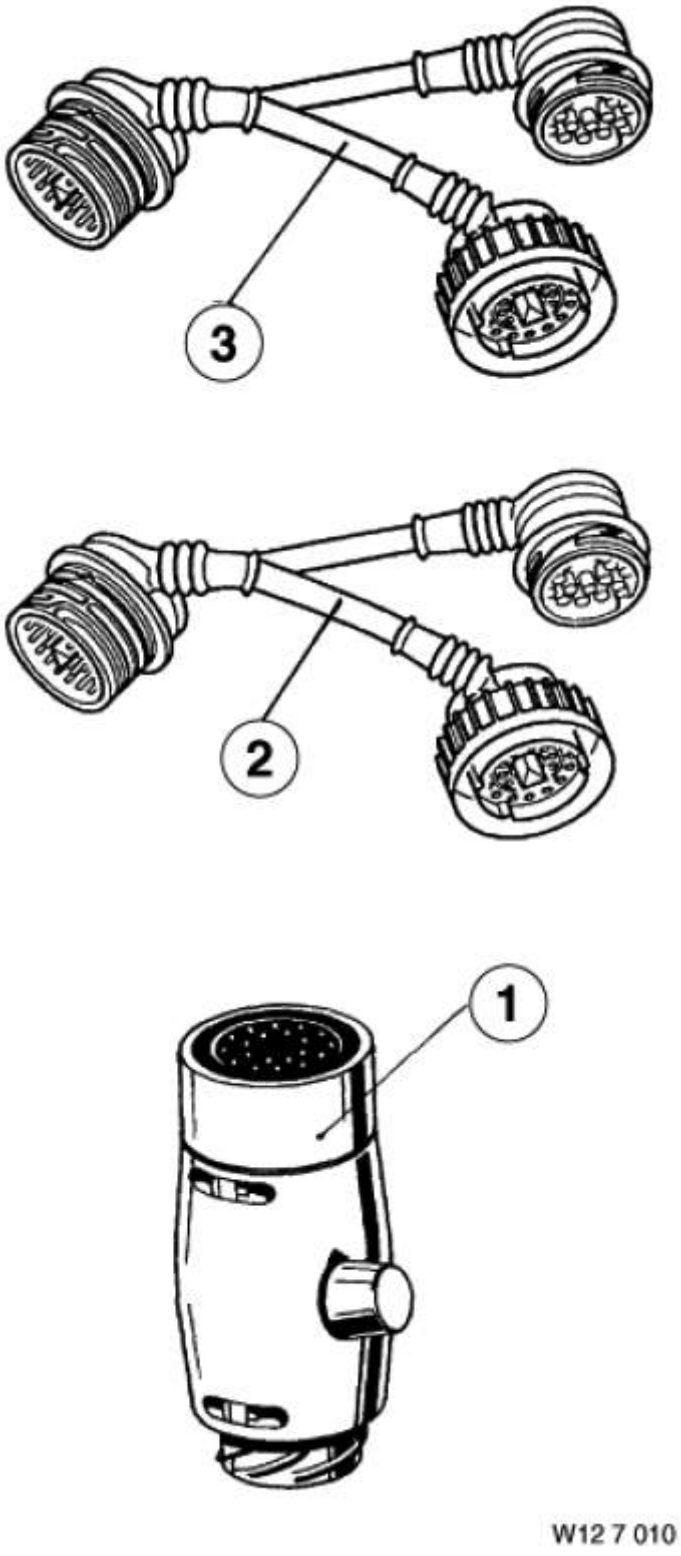


Fig. 40: Identifying Operating Instructions (0491155)
Courtesy of BMW OF NORTH AMERICA, INC.

0491122 OPERATING INSTRUCTIONS

0491122 121089 Operating instructions AM

cardiagn.com



Fig. 41: Identifying Operating Instructions (0491122)
Courtesy of BMW OF NORTH AMERICA, INC.

0493404 PIN

0493404 127206 Pin AM

NOTE: (Fine line pen) Black, waterproof

0494964 PLATE

0494964 127422 Plate Minimum set: Measuring and testing equipment MP

NOTE: (Cover plate for test box) For pin allocation on 105 - pin test box (61 4 380)

Storage Location

Q204

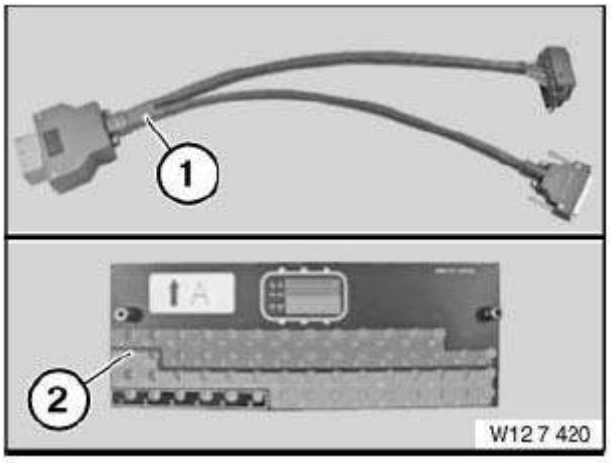


Fig. 42: Identifying Plate (0494964)
Courtesy of BMW OF NORTH AMERICA, INC.

0493911 PLATE

0493911 127046 Plate MP

NOTE: (Adapter plate) For engines with ignition coil block for measuring secondary voltage Deletion, only available via tool set

Storage Location

cardiagn.com

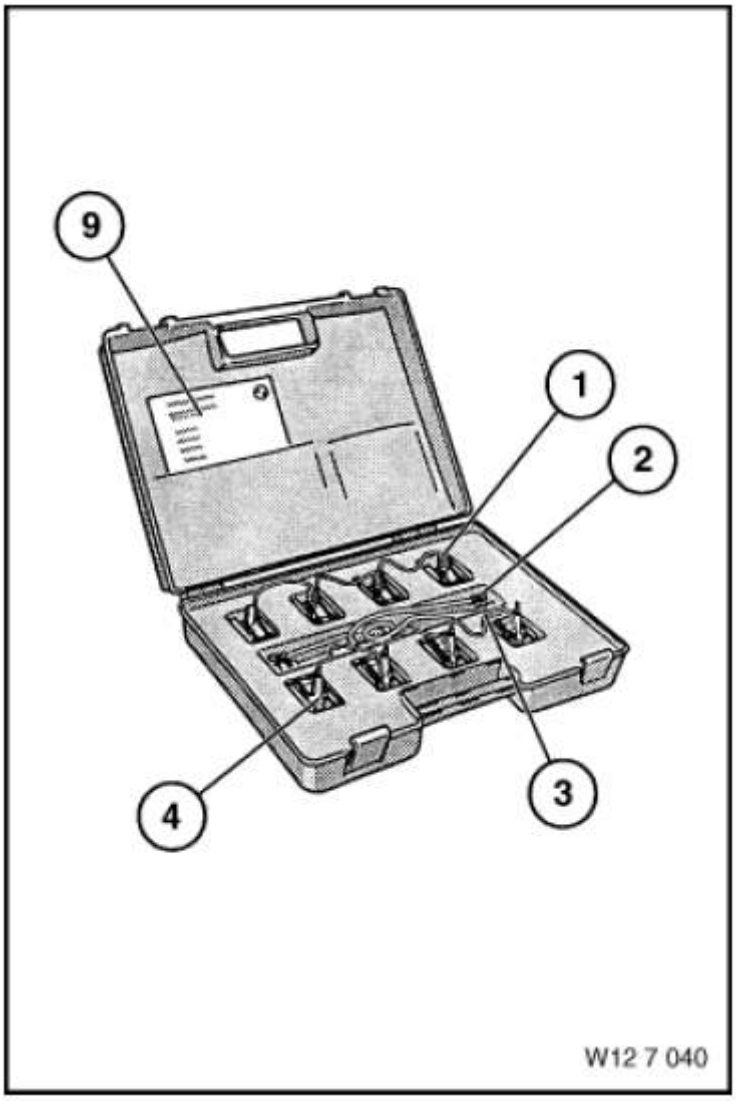


Fig. 43: Identifying Plate (0493911)
Courtesy of BMW OF NORTH AMERICA, INC.

0491181 PLIERS

0491181 127201 Pliers AM

NOTE: **For bending the sheet metal tabs open**

0491183 PLIERS

0491183 127203 Pliers AM

NOTE: **For closing the sheet metal tabs**

0491131 PLIERS

0491131 121180 Pliers Mechanical tool

NOTE: **For detaching spark plug connectors**

Storage Location

A9

cardiagn.com

B9

SI number

01 04 88 (906)

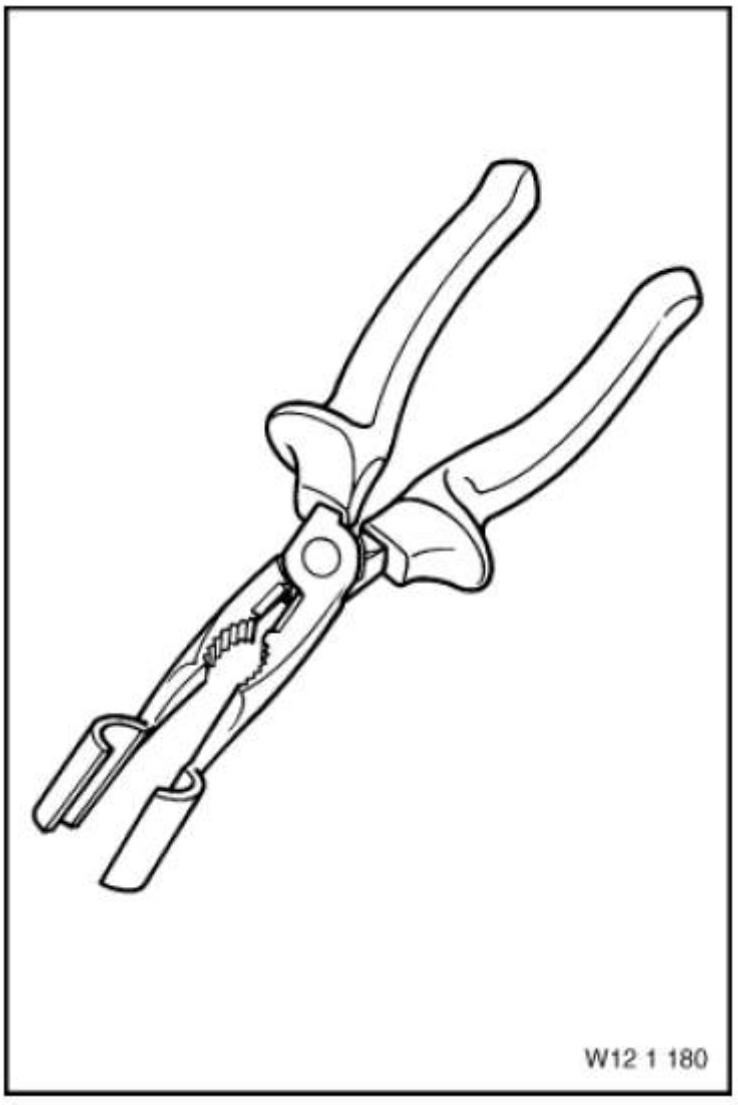


Fig. 44: Identifying Pliers (0491131)
Courtesy of BMW OF NORTH AMERICA, INC.

0491116 PLIERS

0491116 121081 Pliers AM

Storage Location

K 103

cardiagn.com



Fig. 45: Identifying Pliers (0491116)
Courtesy of BMW OF NORTH AMERICA, INC.

0491176 PLIERS

0491176 127191 Pliers AM

NOTE: **(Eprom extraction tool) No longer available. Antistatic mat can be ordered under special tool number 12 7 060.**

Storage Location

J101

0491187 PLIERS

0491187 127212 Pliers AM

NOTE: **(Punch pliers) For official mark dating**

0491123 REPAIR KIT

0491123 121090 Repair kit AM

Replaced by: 83300491115

NOTE: **(Repair kit) For ignition lead crimping tool for fitting the ignition leads onto the spark plug connectors - Replaced by 12 1 080 (0 491 115)**

Storage Location

K 103

Consisting of:

1. 0495431 Guard

NOTE: **(Protective gloves)**

cardiagn.com

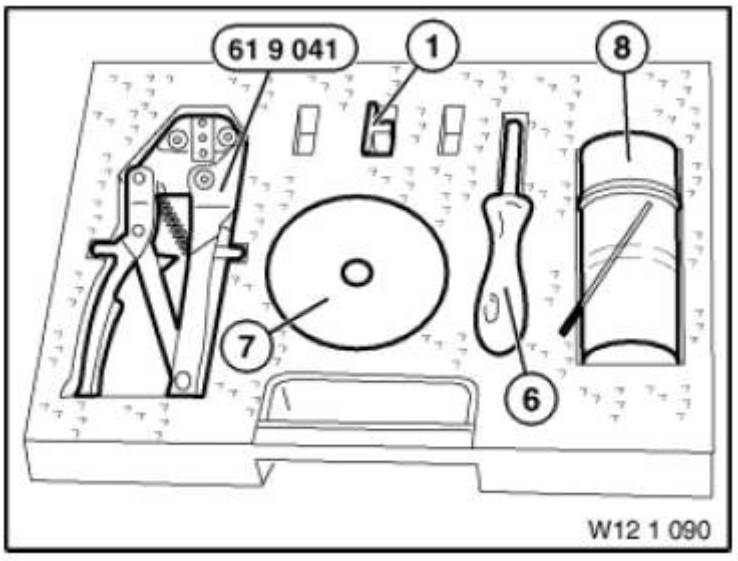


Fig. 46: Identifying Repair Kit (0491123)
Courtesy of BMW OF NORTH AMERICA, INC.

0491115 REPAIR KIT

0491115 121080 Repair kit AM

NOTE: For installation of spark plug connectors to ignition lead

Storage Location

K 103

SI number

01 03 89 (037)



Fig. 47: Identifying Repair Kit (0491115)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1 = 0491116 Pliers
2 = 0491117 Shaped part

NOTE: (Shaped part) Replaced by 12 1 083 (0 491 118)

3 = 0491118 Die-plate

cardiagn.com

NOTE: **(set of dies) Cable 4 mm^2 /ignition lead**

6 = **0491119** Holding sleeve

NOTE: **(Assembly sleeve)**

7 = **0491120** Guard

NOTE: **(Protective gloves)**

8 = **0491121** Lubricant

NOTE: **(Lubricant) sale of existing inventory and then to be ordered with 83 19 2 208 609 - silicone spray.**

9 = **0491122** Operating instructions

0491143 RING SPANNER

0491143 123000 Ring spanner Mechanical tool

NOTE: **(Ring spanner (counter support)) for the belt pulley on the alternator**

Storage Location

Z2

cardiagn.com

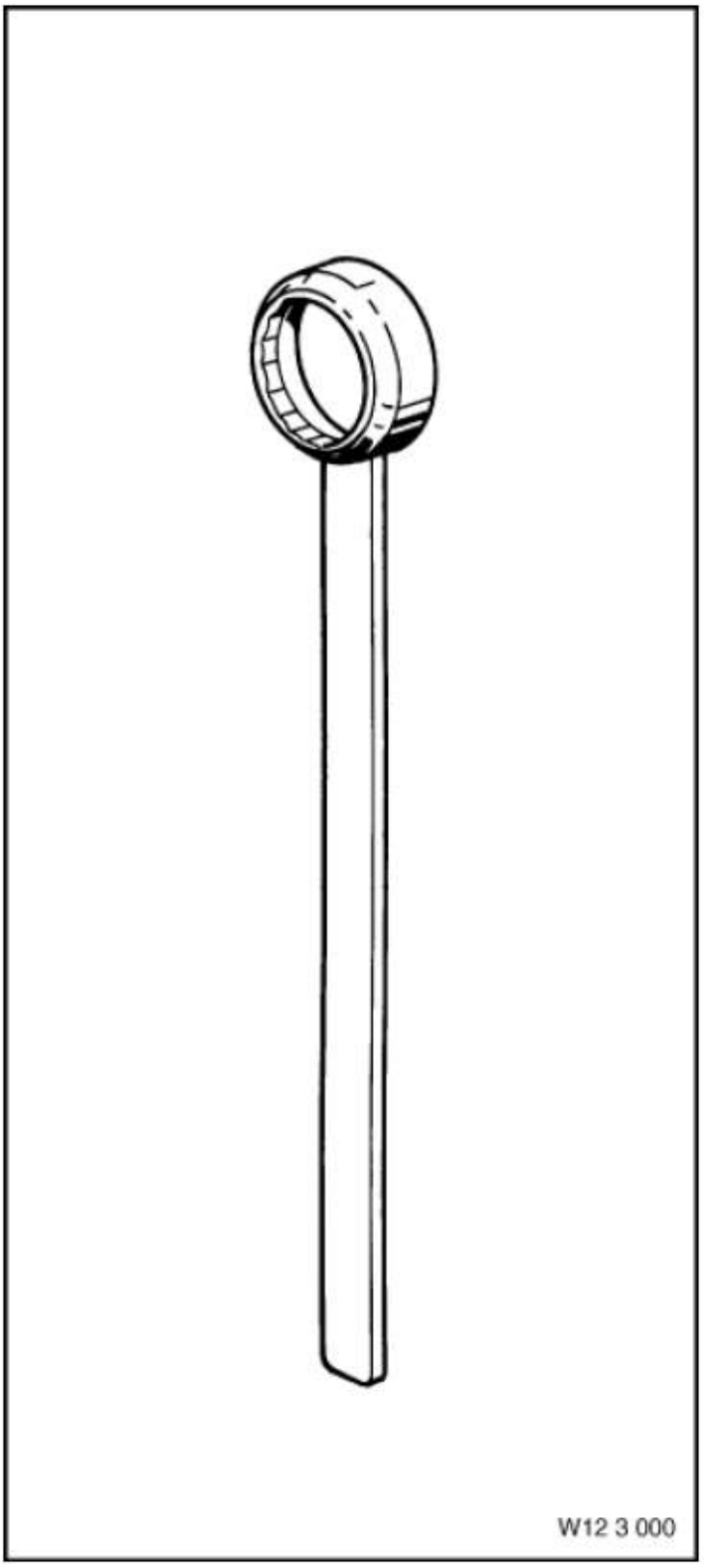


Fig. 48: Identifying Ring Spanner (0491143)
Courtesy of BMW OF NORTH AMERICA, INC.

0493405 SCREWDRIVER

0493405 127208 Screwdriver AM

NOTE: **(Screwdriver)**

0491117 SHAPED PART

0491117 121082 Shaped part AM

cardiagn.com

Replaced by: 83300491118

NOTE: **(Shaped part) Replaced by 12 1 083 (0 491 118)**



Fig. 49: Identifying Shaped Part (0491117)
Courtesy of BMW OF NORTH AMERICA, INC.

0491140 SIMULATOR

0491140 121450 Simulator Mechanical tool

NOTE: **(Simulator) For checking the switching function Miscellaneous: USA only**

Storage Location

W 2..

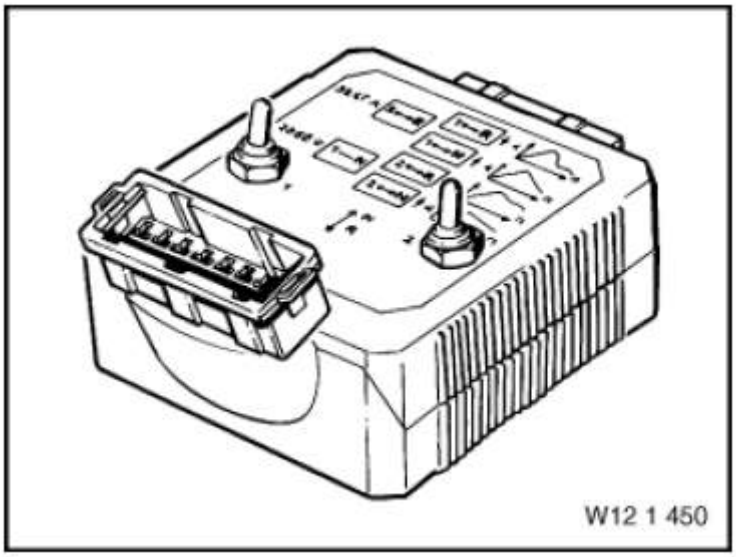


Fig. 50: Identifying Simulator (0491140)
Courtesy of BMW OF NORTH AMERICA, INC.

0491141 SIMULATOR

0491141 121460 Simulator AM

NOTE: **(Simulator) Miscellaneous: Japan and USA only**

Storage Location

cardiagn.com

W 2..

Consisting of:

2 = 0492732 Adapter cable

NOTE: **For ignition timing simulator 12 1 460. Miscellaneous: USA only**

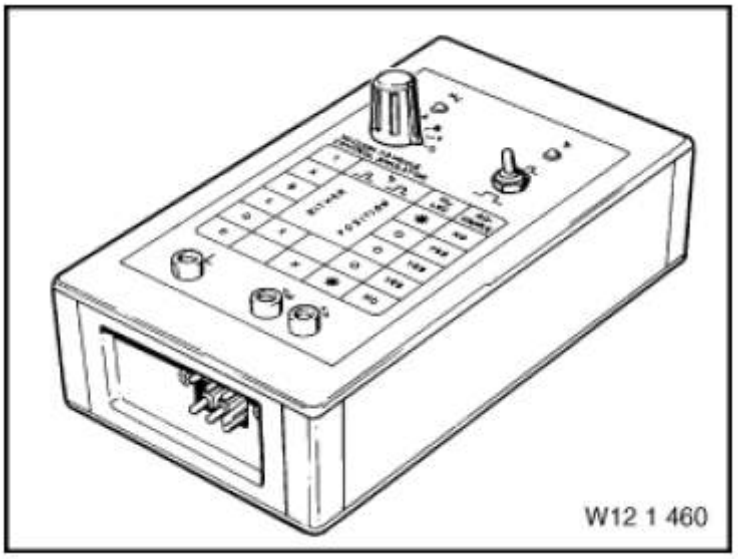


Fig. 51: Identifying Simulator (0491141)
Courtesy of BMW OF NORTH AMERICA, INC.

0491132 SOCKET WAF 46

0491132 121190 Socket WAF 46 Mechanical tool

NOTE: **(Socket) AF 18**

0491129 SOCKET WAF 46

0491129 121171 Socket WAF 46 Minimum set: Mechanical tools AM

NOTE: **(Spark plug wrench) WAF 16 mm S50, M40, M42, M43, M44, M50, M52, M60, M62, M70, M73, W10, W11, N40, N42, N43, N73, N73H**

Storage Location

A9

0491127 SOCKET WAF 46

0491127 121160 Socket WAF 46 Mechanical tool

NOTE: **(Socket) AF 17.5 mm For releasing and tightening the spark plugs**

Storage Location

A9

cardiagn.com

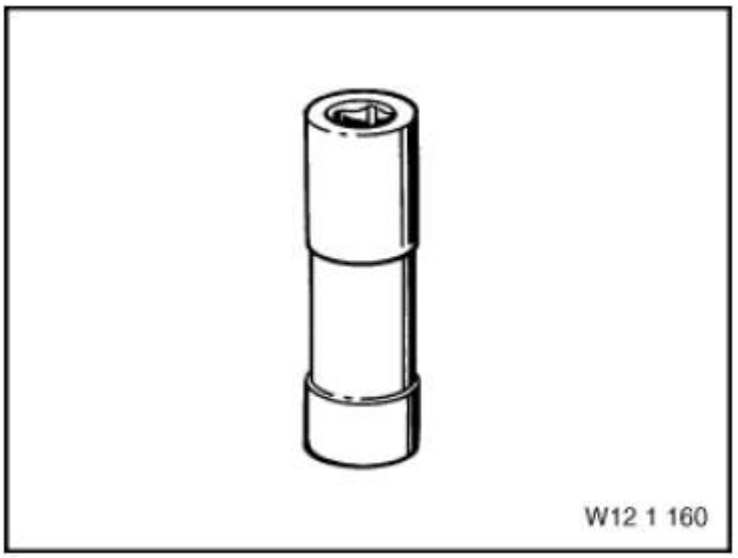


Fig. 52: Identifying Socket WAF 46 (0491127)
Courtesy of BMW OF NORTH AMERICA, INC.

0495560 SOCKET WAF 46

0495560 121220 Socket WAF 46 Minimum set: Mechanical tools AM

NOTE: **For removing and installing the spark plugs (WAF 14 bihexal).**

Storage Location

A20

A86

SI number

01 20 06 (299)



Fig. 53: Identifying Socket WAF 46 (0495560)
Courtesy of BMW OF NORTH AMERICA, INC.

0494857 SOCKET WRENCH

0494857 127122 Socket wrench AM

NOTE: **For screw with internal serrations (Hazet 8808 lg10)**

Storage Location

cardiagn.com

A49



Fig. 54: Identifying Socket Wrench (0494857)
Courtesy of BMW OF NORTH AMERICA, INC.

0491184 SOCKET WRENCH INSERT

0491184 127204 Socket wrench insert AM

NOTE: **(Torx socket wrench insert T20)**

0491167 SOCKET WRENCH INSERT

0491167 127110 Socket wrench insert Minimum set: Mechanical tools Mechanical tool

NOTE: **(Socket wrench insert WAF 24) For removing and installing the belt pulley on the alternator**

Storage Location

A12

SI number

01 12 93 (701)

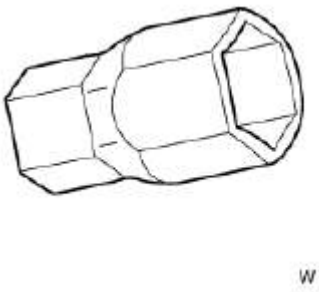


Fig. 55: Identifying Socket Wrench Insert (0491167)
Courtesy of BMW OF NORTH AMERICA, INC.

0491142 SOCKET WRENCH INSERT

0491142 122100 Socket wrench insert Mechanical tool

cardiagn.com

NOTE: **(socket wrench insert WAF 12) For removing and fitting the glow elements**

Storage Location

C10

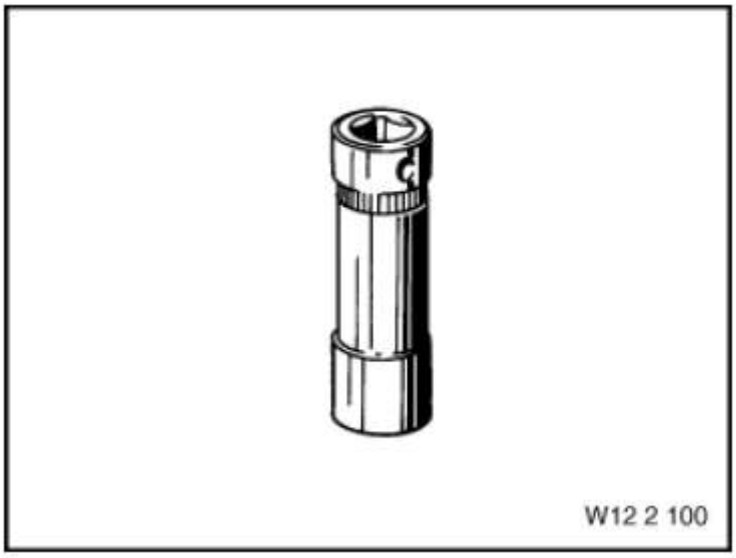


Fig. 56: Identifying Socket Wrench Insert (0491142)
Courtesy of BMW OF NORTH AMERICA, INC.

0493403 SOCKET WRENCH INSERT

0493403 127205 Socket wrench insert AM

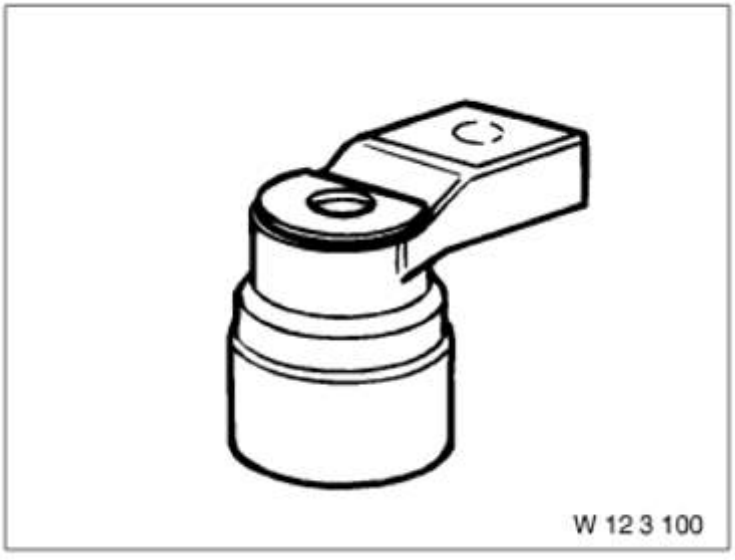
NOTE: **(Torx socket wrench insert T10)**

0491144 SOCKET WRENCH INSERT

0491144 123100 Socket wrench insert Mechanical tool

Replaced by: 83300491167

NOTE: **(Socket wrench insert WAF 24) For removal and installation of the belt pulley on the alternator - Replaced by 12 7 110 (0 491 167)**



cardiagn.com

Fig. 57: Identifying Socket Wrench Insert (0491144)
Courtesy of BMW OF NORTH AMERICA, INC.

0491179 SOFTWARE

0491179 127194 Software AM

NOTE: (Floppy disk) Printer software floppy disk For printing letters on the labels with a needle printer.

0491172 SUPPLEMENT

0491172 127160 Supplement Mechanical tool

NOTE: (EPROM set) For programming DME control units Comprising: 12 7 170, 12 7 180, 12 7 190

0491151 TEST SET

0491151 127010 Test set AM

NOTE: (Test set) For checking electronic engine power control safety circuit

Consisting of:

1 = 0491152
2 = 0491153
3 = 0491154
9 = 0491155

cardiagn.com

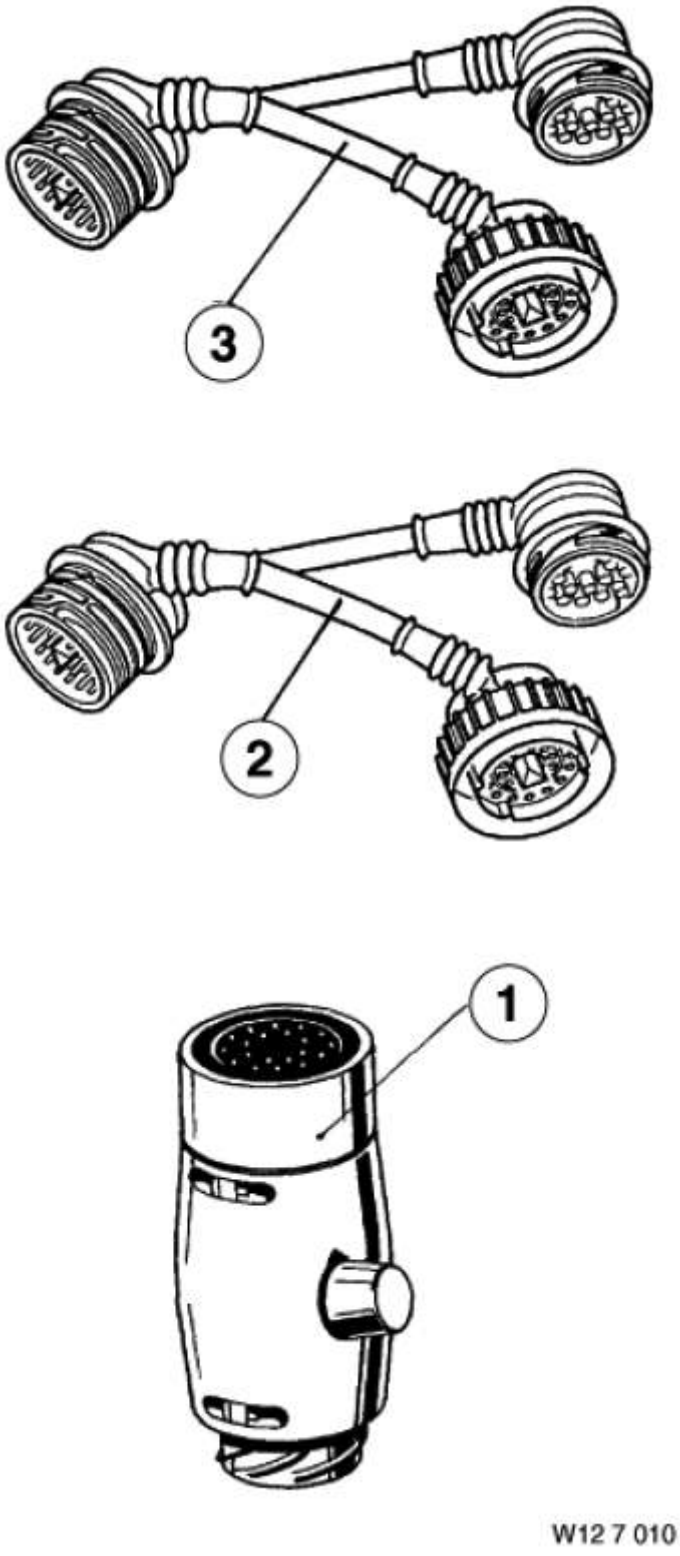


Fig. 58: Identifying Test Set (0491151)
Courtesy of BMW OF NORTH AMERICA, INC.

0491202 TESTER

0491202 129490 Tester Mechanical tool

NOTE: **(Capacitor) Test capacitor for DME/AGS relay KD action/model year: 94**

Storage Location

W 2..

cardiagn.com

0491114 TOOL

0491114 121070 Tool Mechanical tool

NOTE: **(Tool) for ignition timing adjustment (CIFI)**

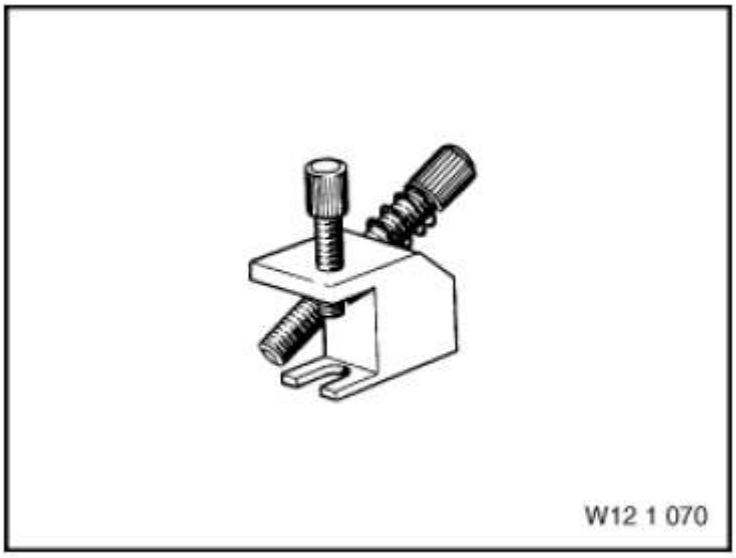


Fig. 59: Identifying Tool (0491114)
Courtesy of BMW OF NORTH AMERICA, INC.

0491180 TOOL

0491180 127200 Tool AM

NOTE: **(Tool set) to open and close the electronics box**

Storage Location

J 106

Consisting of:

1 = 0491181 Pliers

NOTE: **For bending the sheet metal tabs open**

2 = 0491182 Lever

NOTE: **For bending the sheet metal tabs**

3 = 0491183 Pliers

NOTE: **For closing the sheet metal tabs**

4 = 0491184 Socket wrench insert

NOTE: **(Torx socket wrench insert T20)**

5 = 0493403 Socket wrench insert

NOTE: **(Torx socket wrench insert T10)**

cardiagn.com

6 = **0493404** Pin

NOTE: **(Fine line pen) Black, waterproof**

8 = **0493405** Screwdriver

NOTE: **(Screwdriver)**

9 = **0493406** Tool

NOTE: **(Straightening tool) For Eprom connections**

0493406 TOOL

0493406 127209 Tool AM

NOTE: **(Straightening tool) For Eprom connections**

0491112 TOOL

0491112 121050 Tool Mechanical tool

NOTE: **(Tool) shorter version for adjusting the dynamic ignition timing and carburetor synchronization - discontinued from July 92/automatic transmission**

0491175 TOOL

0491175 127190 Tool AM

NOTE: **(Eprom tool) Set no longer available. Antistatic mat can be ordered under number 12 7 060.**

Storage Location

J101

Consisting of:

1. **0491176** Pliers

   NOTE: **(Eprom extraction tool) No longer available. Antistatic mat can be ordered under special tool number 12 7 060.**

2. **0491177** Antistatic mat

   NOTE: **(Antistatic mat) Is replaced by main number 12 7 060.**

3. **0491178** Labels

   NOTE: **(Eprom label)**

4. **0491179** Software

   NOTE: **(Floppy disk) Printer software floppy disk For printing letters on the labels with a needle printer.**

0491113 TOOL

cardiagn.com

0491113 121060 Tool Mechanical tool

NOTE: **(Tool) For adjusting the dynamic ignition timing - Deletion as of July 92**

0491111 TOOL

0491111 121040 Tool Mechanical tool

NOTE: **(Tool) longer version to adjust the dynamic ignition timing adjustment and carburetor synchronization - discontinued from July 92/manual gearbox**

0491128 TOOL

0491128 121170 Tool Minimum set: Mechanical tools AM

NOTE: **(Spark plug tool) For releasing spark plugs and for tightening to torque limitation, special tool is being discontinued without replacement!**

Storage Location

A9

Consisting of:

1. **0491129** Socket WAF 46

   NOTE: **(Spark plug wrench) WAF 16 mm S50, M40, M42, M43, M44, M50, M52, M60, M62, M70, M73, W10, W11, N40, N42, N43, N73, N73H**

2. 0491130 Torque limiter

   NOTE: **(Torque limiter) 23 Nm Â±3 Nm, engine: S14, S38, S50 Do not use the special tool any more because the torque will change.**

cardiagn.com

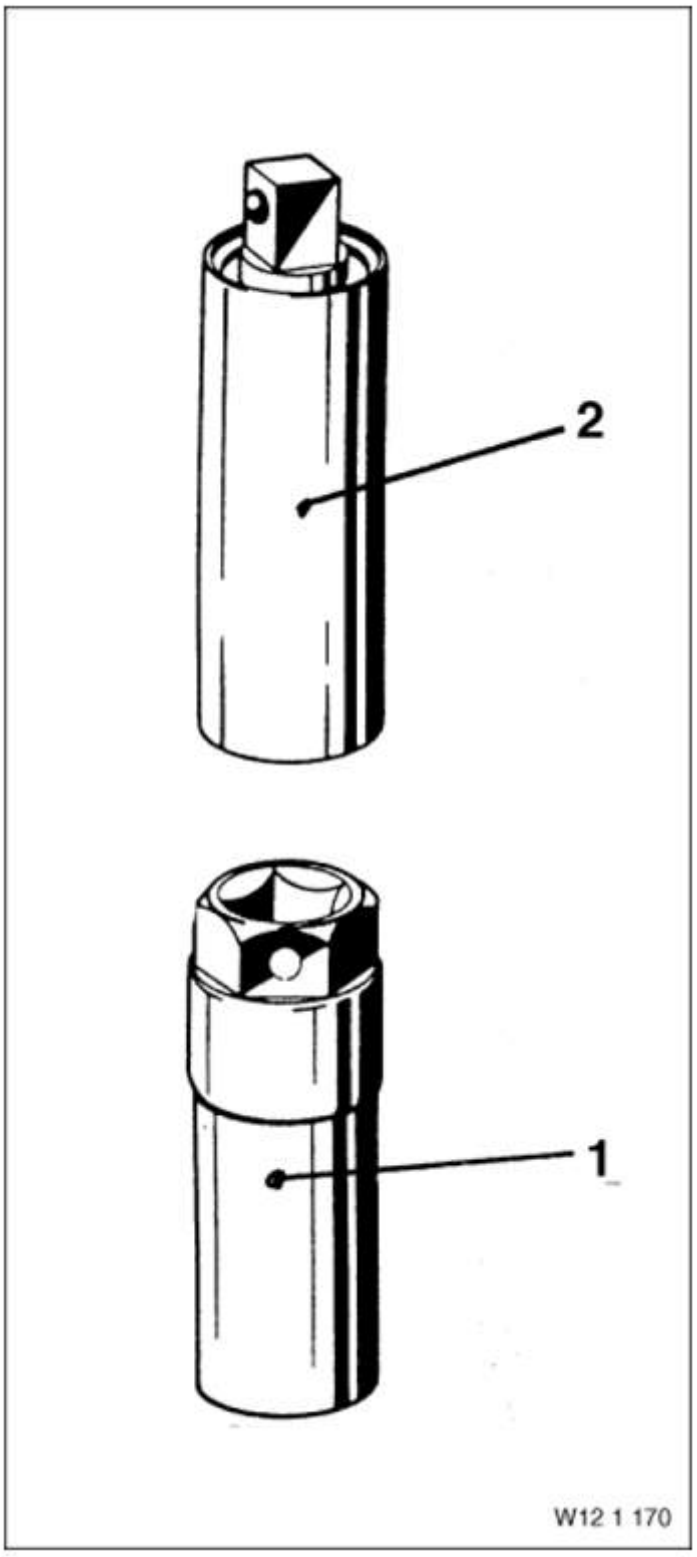


Fig. 60: Identifying Tool (0491128)
Courtesy of BMW OF NORTH AMERICA, INC.

0491133 TORQUE LIMITER

0491133 121200 Torque limiter Minimum set: Mechanical tools Mechanical tool

NOTE: **(torque limiter) 30 Nm For tightening the spark plugs to a limited torque setting**

Storage Location

A9

SI number

cardiagn.com

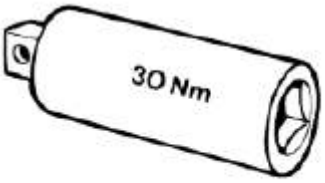


Fig. 61: Identifying Torque Limiter (0491133)
Courtesy of BMW OF NORTH AMERICA, INC.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702111

cardiagn.com

ENGINE

Engine Electrical System - Tightening Torques - X3 Utility

ALTERNATOR LEAD (N52T)

12 42 ALTERNATOR LEAD

TIGHTENING SPECIFICATION - ALTERNATOR LEAD

Â		Type	Thread	Tightening specifications	Measure
1AZ	Battery positive lead to alternator	N52T	M8	Â	19 Nm
2AZ	Battery positive lead to starter	N52T	M8	Â	13 Nm
3AZ	Battery positive lead to battery positive terminal	N52T	M8	Â	15 Nm
4AZ	Earth pin for positive battery connection point	N52T	Â	27 Nm	

ALTERNATOR LEAD (N55)

12 42 ALTERNATOR LEAD

TIGHTENING SPECIFICATION - ALTERNATOR LEAD

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Alternator lead to alternator	N55/N55 Hybrid	M8	Â	19 Nm
2AZ	Alternator lead to starter	N55/N55 Hybrid	M8	Â	13 Nm
3AZ	Alternator lead to battery positive terminal	N55/N55 Hybrid	M8	Â	15 Nm
			M6	Â	8 Nm

ALTERNATOR LEAD (N20)

12 42 ALTERNATOR LEAD

TIGHTENING TORQUE SPECIFICATION - ALTERNATOR LEAD

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Battery positive lead to alternator	N20/N26	M8	Â	19 Nm
2AZ	Battery positive lead to starter	N20/N26	M8	Â	13 Nm
3AZ	Battery positive lead to battery positive terminal	N20/N26	M8	Flange nut	15 Nm
			M6	Flange nut	8 Nm
4AZ	Battery positive lead to battery positive terminal	N20/N26	M6	Flange nut	10 Nm

ALTERNATOR WITH DRIVE AND MOUNTING PARTS (N55)

12 31 ALTERNATOR WITH DRIVE AND MOUNTING PARTS

cardiagn.com

TIGHTENING TORQUE SPECIFICATION - ALTERNATOR WITH DRIVE AND MOUNTING PARTS

Â	Type	Thread	Tightening specifications	Dimension
1AZ Alternator to crankcase, top	N55/N55 Hybrid	M8 x 85	Â	19 Nm
2AZ Alternator to crankcase with A/C compressor carrier	N55/N55 Hybrid	M8x105	Â	19 Nm
3AZ Holder, air conditioning compressor, to bedplate	N55/N55 Hybrid	M8	Â	19 Nm

ALTERNATOR WITH DRIVE AND MOUNTING PARTS (N52T)

12 31 ALTERNATOR WITH DRIVE AND MOUNTING PARTS

TIGHTENING TORQUE SPECIFICATION - ALTERNATOR WITH DRIVE AND MOUNTING PARTS

Â	Type	Thread	Tightening specification	Measure
1AZ Alternator to crankcase	N52T	M8x82	Replace screws Jointing torque Torque angle	Â 10 Nm 190 Â°

ALTERNATOR WITH MOUNTING (N20)

12 31 ALTERNATOR WITH MOUNTING

TIGHTENING TORQUE SPECIFICATION - ALTERNATOR WITH MOUNTING

Â	Type	Thread	Tightening specifications	Dimension
1AZ Alternator to crankcase	N20/N26	M10x125	Â	38 Nm
		M10x75	Â	38 Nm

ALTERNATOR WITH MOUNTING (N47)

12 31 ALTERNATOR WITH MOUNTING

TIGHTENING TORQUE SPECIFICATION - ALTERNATOR WITH MOUNTING

Â	Type	Thread	Tightening specifications	Dimension
1AZ Alternator to holder	N47 D20 O1	M10	Â	38 Nm
2AZ Deflecting element to belt tensioner	N47 D20 O1	M10	Â	38 Nm

ELECTRONIC SHIFT UNITS OR CONTROL UNITS (N20)

12 14 ELECTRONIC SHIFT UNITS OR CONTROL UNITS

TIGHTENING TORQUE SPECIFICATION - ELECTRONIC SHIFT UNITS OR CONTROL UNITS

Â	Type	Thread	Tightening specifications	Dimension
1AZ Control unit (DME) to intake plenum	N20/N26	M6	Â	12 Nm

ELECTRONIC SHIFT UNITS OR CONTROL UNITS (N55)

12 14 ELECTRONIC SHIFT UNITS OR CONTROL UNITS

TIGHTENING TORQUE SPECIFICATION - ELECTRONIC SHIFT UNITS OR CONTROL UNITS

			Tightening	

cardiagn.com

Â		Type	Thread	specifications	Dimension
1AZ	Control unit (DME) to intake plenum	N55/N55 Hybrid	Â	Â	10 Nm
2AZ	Control unit (DME) to intake plenum	N55/N55 Hybrid	M6	Â	12 Nm

ELECTRONICS BOX, WIRING HARNESS (N52T)

12 90 ELECTRONICS BOX, WIRING HARNESS (N52T)

TIGHTENING TORQUE SPECIFICATION - ELECTRONICS BOX, WIRING HARNESS

Â		Type	Thread	Tightening specification	Measure
1AZ	Control unit (DME) to mounting plate	N52T	Â	Â	8 Nm
2AZ	Cable clip to cylinder head	N52T	Â	Â	8 Nm

ELECTRONICS BOX, WIRING HARNESS (N55)

12 90 ELECTRONICS BOX, WIRING HARNESS

TIGHTENING TORQUE SPECIFICATION - ELECTRONICS BOX, WIRING HARNESS

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Cable channel to cylinder head cover	N55/N55 Hybrid	Â	Â	8 Nm
2AZ	Earth cable to crankcase lower section	N55/N55 Hybrid	M8	Replace aluminum screw. Jointing torque Angle of rotation	Â 8 Nm 45 Â°
3AZ	Earth cable to rear cylinder head	N55/N55 Hybrid	M6	Â	8 Nm
4AZ	Cable channel to engine block	N55/N55 Hybrid	M6	Replace aluminum screws.	8 Nm
5AZ	Earth cable for ignition coils	N55/N55 Hybrid	Â	Â	5 Nm

GLOW ELEMENTS (N47)

12 23 GLOW ELEMENTS (N47)

TIGHTENING TORQUE SPECIFICATION - GLOW ELEMENTS

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Glow elements	N47 D20 O1	Â	Â	13 Nm
2AZ	Preheating control unit to holder	N47 D20 O1	M6	Â	8 Nm

OIL PRESSURE SWITCH, OIL LEVEL SENSOR (N47)

12 61 OIL PRESSURE SWITCH, OIL LEVEL SENSOR (N47)

TIGHTENING TORQUE SPECIFICATION - OIL PRESSURE SWITCH, OIL LEVEL SENSOR

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Oil pressure switch to oil filter	N47 D20 O1	M12x1.5	Â	28 Nm
2AZ	Oil level sensor to oil sump	N47 D20 O1	M6	Â	8 Nm

cardiagn.com

OIL PRESSURE, OIL CONDITION DISPLAY (N52T)

12 61 ENGINE OIL PRESSURE, OIL CONDITION DISPLAY

TIGHTENING TORQUE SPECIFICATION - ENGINE OIL PRESSURE, OIL CONDITION

Â	Type	Thread	Tightening specification	Measure
1AZ Engine oil pressure switch	N52T	M12x1.5	Â Jointing torque Torque angle	Â 20 Nm 16 Â°
2AZ Oil condition sensor for engine oil	N52T	M6	Â	8.5 Nm

OIL PRESSURE, OIL LEVEL INDICATOR (N20)

12 61 OIL PRESSURE, OIL LEVEL INDICATOR

TIGHTENING TORQUE SPECIFICATION - OIL PRESSURE, OIL LEVEL INDICATOR

Â	Type	Thread	Tightening specifications	Dimension
1AZ Engine oil pressure/temperature sensor	N20/N26	M12x1.5	Â	15 Nm
2AZ Oil level sensor to oil sump	N20/N26	M6	Â	8, 5 Nm

OIL PRESSURE, OIL LEVEL INDICATOR (N55)

12 61 OIL PRESSURE, OIL LEVEL INDICATOR

TIGHTENING TORQUE SPECIFICATION - OIL PRESSURE, OIL LEVEL INDICATOR

Â	Type	Thread	Tightening specifications	Dimension
1AZ Engine oil pressure switch	N55/N55 Hybrid	M12x1.5	Â Jointing torque Angle of rotation	Â 20 Nm 16 Â°
2AZ Replacing engine oil level sensor	N55/N55 Hybrid	M6	Â	8, 5 Nm

PLUG CONNECTORS, TERMINALS (N52T)

12 52 PLUG CONNECTORS, TERMINALS

TIGHTENING TORQUE SPECIFICATION - PLUG CONNECTORS, TERMINALS

Â	Type	Thread	Tightening specification	Measure
1AZ Holder, wiring harness, to cylinder head cover	N52T	M6	Â	8 Nm

PLUG CONNECTIONS, TERMINALS, LOOSE COMPONENTS (N20, N55)

12 52 PLUG CONNECTIONS, TERMINALS, LOOSE COMPONENTS

TIGHTENING TORQUE SPECIFICATION - PLUG CONNECTIONS, TERMINALS, LOOSE COMPONENTS

Â	Type	Thread	Tightening specifications	Dimension
1AZ Bracket on cylinder head cover	N20/N26	Â	Â	5.5 Nm
2AZ Earth cable for ignition coils	N20/N26	M5	Â	4.5 Nm
3AZ Earth cable to crankcase (electr. coolant pump)	N20/N26	M6	Â	8 Nm
4AZ Earth cable to earth point	N20/N26	M6	Â	8 Nm
5AZ Cable channel to engine block	N20/N26	M6	Â	8 Nm

cardiagn.com

6AZ	VTC earth cable to jump start terminal point	N20/N26	M6	Â	8 Nm
7AZ	Positive battery cable to power distribution module	N20/N26/N55/N55 Hybrid	M6	Â	8 Nm

PLUG CONNECTIONS, TERMINALS, LOOSE PARTS (N47)

12 52 PLUG CONNECTIONS, TERMINALS, LOOSE PARTS (N47)

TIGHTENING TORQUE SPECIFICATION - PLUG CONNECTIONS, TERMINALS, LOOSE PARTS

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Wiring harness to starter motor (terminal 50)	N47 D20 O1	M6	Â	7 Nm
2AZ	Positive battery cable to alternator	N47 D20 O1	M8	Â	19 Nm
3AZ	Positive battery cable to starter motor	N47 D20 O1	M8	Â	13.4 Nm
4AZ	Positive battery cable to jump start terminal point	N47 D20 O1	M8 nut	Â	19 Nm
5AZ	Cable clip to starter motor	N47 D20 O1	M6	Â	8 Nm

SPARK PLUGS

12 12 SPARK PLUGS

TIGHTENING TORQUE SPECIFICATION - SPARK PLUGS

Â		Type	Thread	Tightening specification	Measure
1AZ	Spark plugs (ungreased)	All	M12x1.25	Â	23 Â± 3 Nm
		All	M14x1.25	Â	30 Â± 3 Nm

STARTER MOTOR WITH MOUNTING (N20)

12 41 STARTER MOTOR WITH MOUNTING

TIGHTENING TORQUE SPECIFICATION - STARTER MOTOR WITH MOUNTING

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Starter motor to crankcase	N20/N26	M10x30	Â	38 Nm
			M10x85	Â	38 Nm

STARTER MOTOR WITH MOUNTING (N52T)

12 41 STARTER MOTOR WITH MOUNTING

TIGHTENING TORQUE SPECIFICATION - STARTER MOTOR WITH MOUNTING

Â		Type	Thread	Tightening specification	Measure
1AZ	Starter motor	N52T	M10x85	Replace screw	Â

cardiagn.com

	mounting to crankcase			Jointing torque Torque angle	20 Nm 180 Â°
2AZ	Starter motor mounting to crankcase	N52T	M10x30	Replace screw Jointing torque Torque angle	Â 20 Nm 90 Â°

STARTER MOTOR WITH MOUNTING (N55)

12 41 STARTER MOTOR WITH MOUNTING

TIGHTENING TORQUE SPECIFICATION - STARTER MOTOR WITH MOUNTING

Â	Type	Thread	Tightening specifications	Dimension
1AZ Starter motor to crankcase	N55/N55 Hybrid	M10x30	Â	38 Nm
Starter motor to transmission housing		M10x85	Â	38 Nm

STARTER MOTOR WITH MOUNTING (N47)

12 41 STARTER MOTOR WITH MOUNTING

TIGHTENING TORQUE SPECIFICATION - STARTER MOTOR WITH MOUNTING

Â	Type	Thread	Tightening specifications	Dimension
1AZ Starter mounting to oil sump	N47 D20 O1	M8x60	Observe screwing sequence.	19 Nm

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702159

cardiagn.com

EXHAUST SYSTEM, COMPLETE

18 00 020 REMOVING AND INSTALLING COMPLETE EXHAUST SYSTEM (N20)

Special tools required:

- 31 2 220

WARNING: **Risk of burning!**
Only perform this repair work after engine has cooled down.
Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a second person.

Support exhaust system with jack and special tool 31 2 220 or with a suitable lever and secure against falling down.

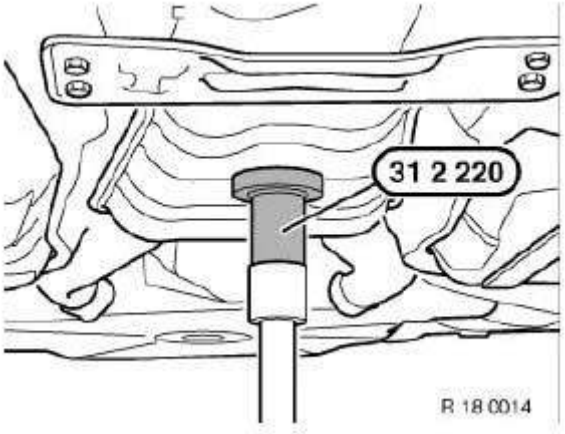
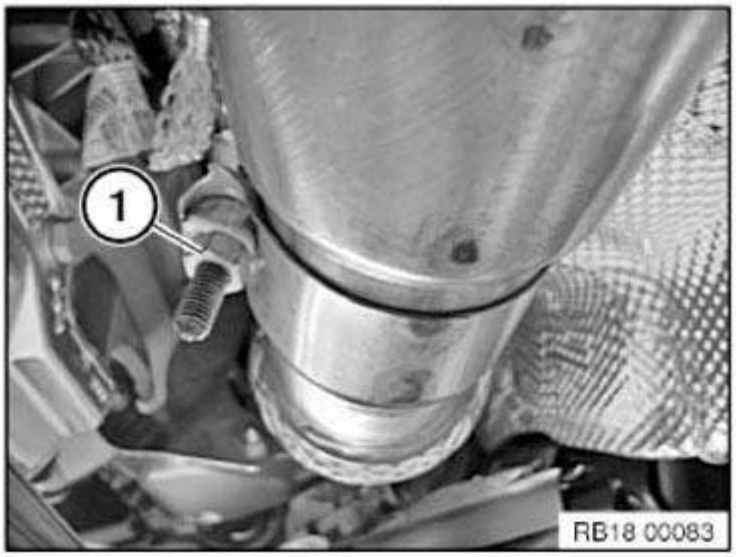


Fig. 1: Supporting Exhaust System Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

Release clamp (1).

Tightening torque: **18 31 1AZ** .



cardiagn.com

Fig. 2: Identifying Exhaust System Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut and remove holder (1).

Tightening torque: **18 31 3AZ** .

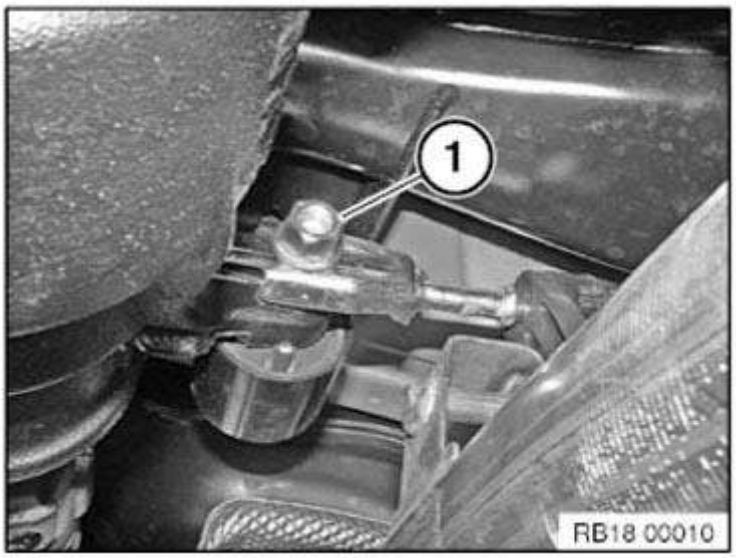


Fig. 3: Identifying Exhaust System Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove holder.

Tightening torque: **18 31 5AZ** .

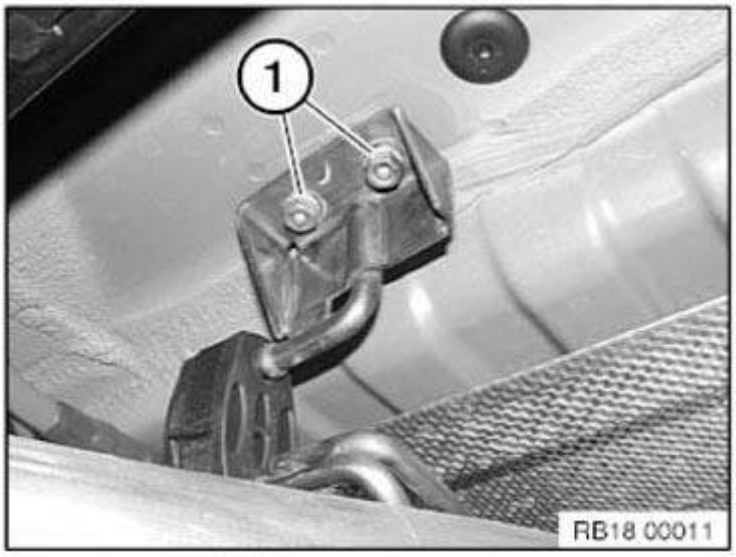


Fig. 4: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Only 20i:

Unscrew nuts (1).

Tightening torque: **18 31 5AZ** .

Lower and remove exhaust system carefully with assistance of a second person.

cardiagn.com

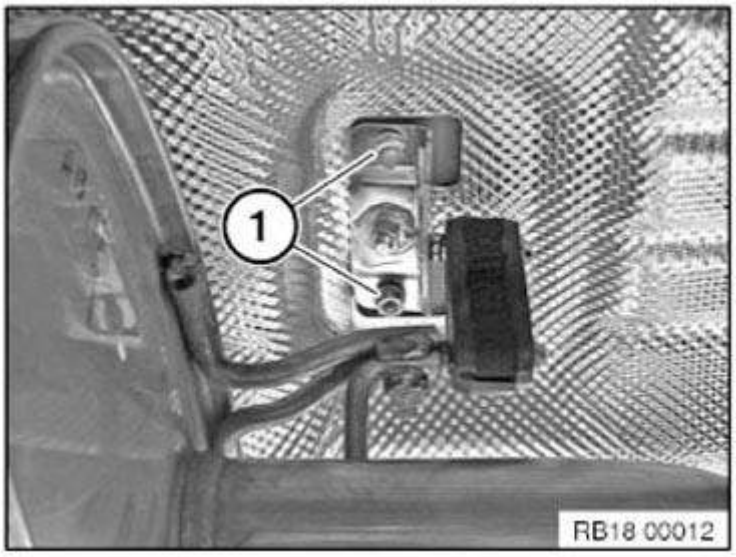


Fig. 5: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Only 28i:

Pull off vacuum hose (1).

Unscrew nuts (2).

Tightening torque: **18 31 5AZ** .

Lower and remove exhaust system carefully with assistance of a second person.

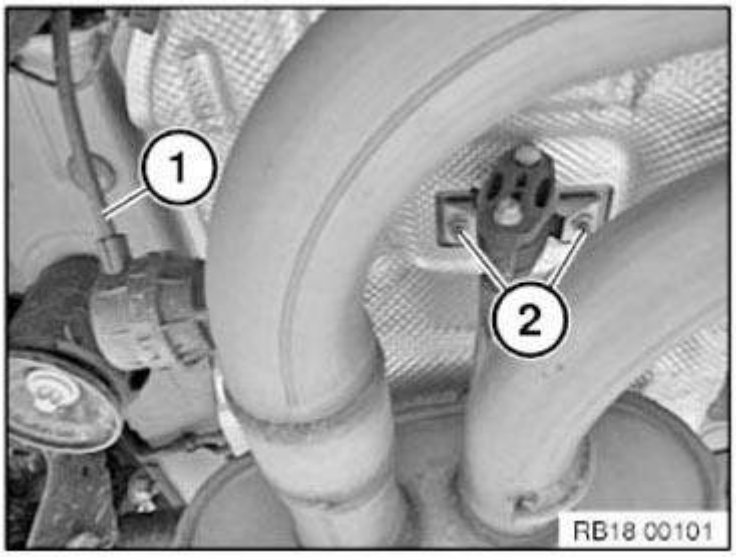


Fig. 6: Identifying Vacuum Hose And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage.

If necessary, replace damaged rubber mounts.

Check exhaust system for leak tightness.

cardiagn.com

Special tools required:

- 31 2 220

WARNING: **Risk of burning!**
Only perform this repair work after engine has cooled down.
Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a second person.

Support exhaust system with jack and special tool 31 2 220 and secure against falling out.

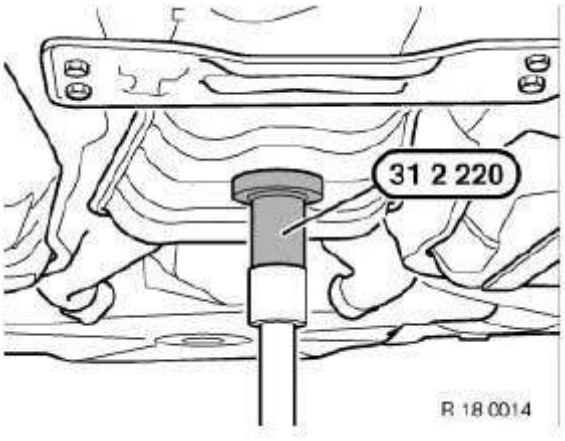


Fig. 7: Supporting Exhaust System Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten nut.

If necessary, replace clamp.

Part: Clamp

Tightening torque: **18 31 2AZ** .

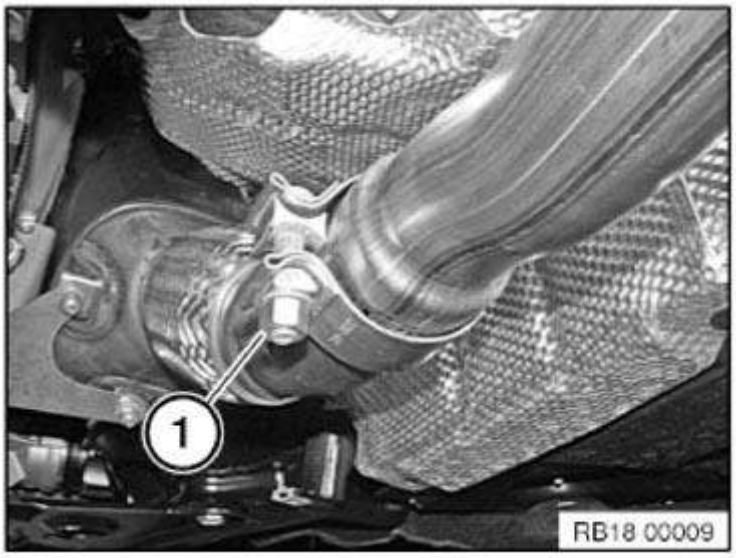


Fig. 8: Identifying Exhaust System Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolt and remove holder (1).

cardiagn.com

Tightening torque: **18 20 3AZ** .

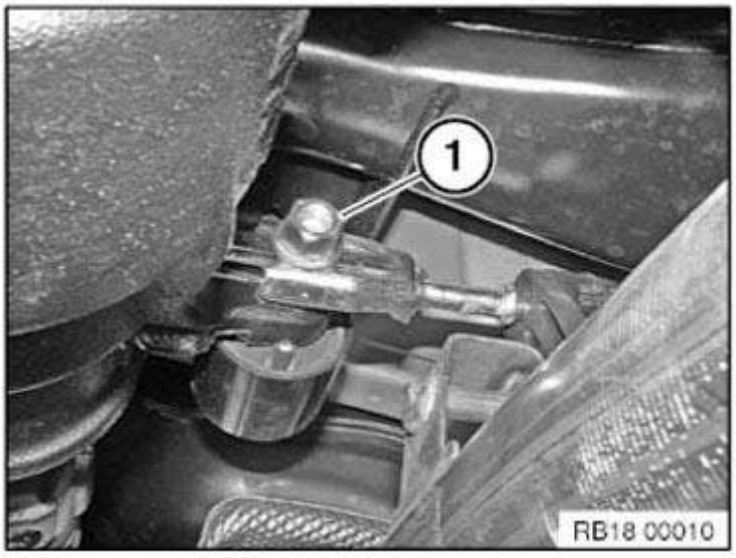


Fig. 9: Identifying Exhaust System Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove holder.

Tightening torque: **18 20 4AZ** .

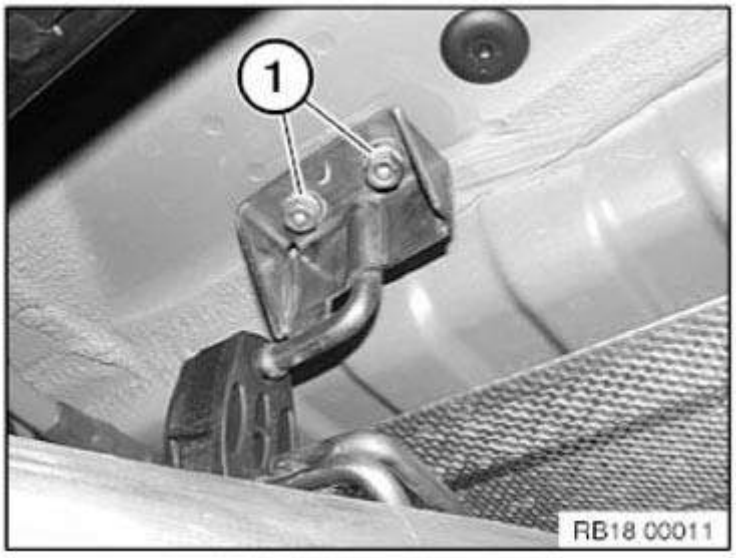


Fig. 10: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Tightening torque: **18 20 4AZ** .

Lower and remove exhaust system carefully with assistance of a second person.

cardiagn.com

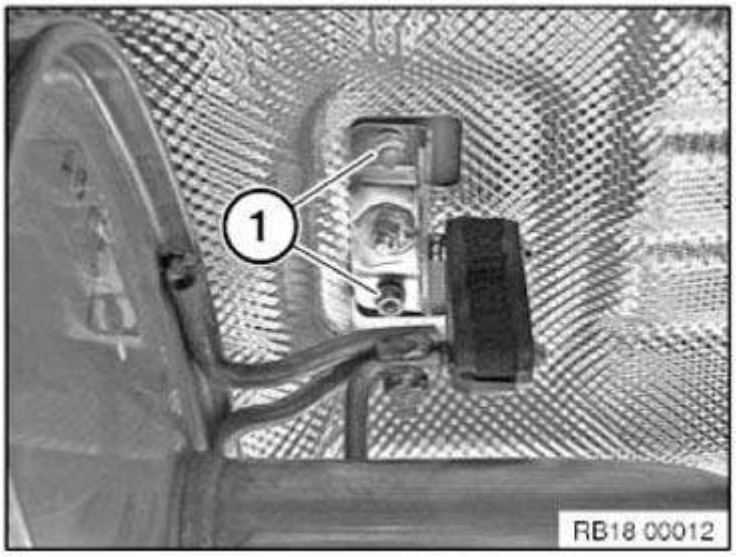


Fig. 11: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage, replace if necessary.

Check exhaust system for leaks.

18 00 020 REMOVING AND INSTALLING COMPLETE EXHAUST SYSTEM (N52T)

Special tools required:

- 31 2 220

WARNING: **Risk of burning!**
Only perform this repair work after engine has cooled down.
Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a second person.

Support exhaust system with jack and special tool 31 2 220 or with a suitable lever and secure against falling out.

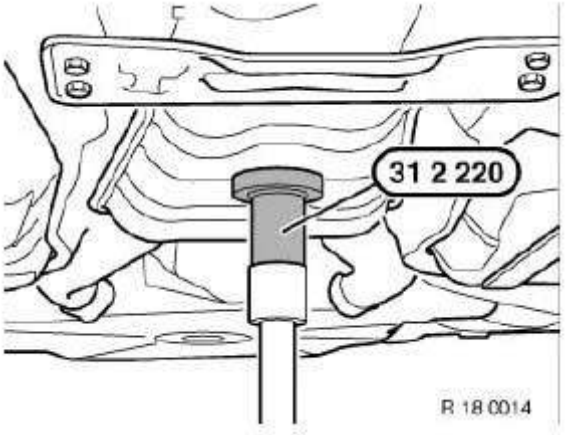


Fig. 12: Supporting Exhaust System Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts.

cardiagn.com

Installation note:

Replace self-locking nuts.

Replace gasket.

Tightening torque: **18 31 1AZ** .

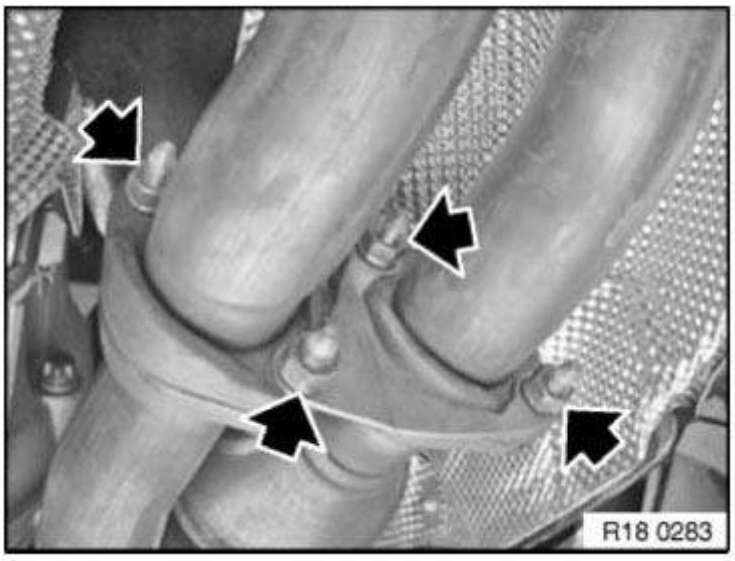


Fig. 13: Locating Self-Locking Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque: **18 31 3AZ** .

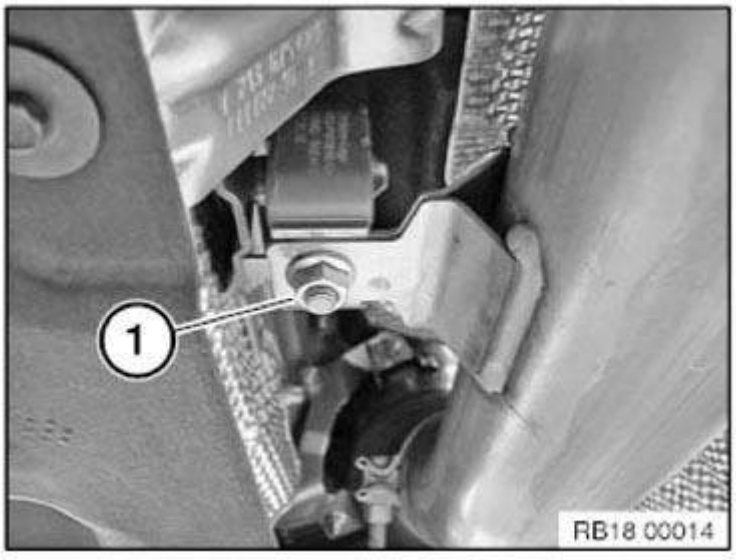


Fig. 14: Identifying Exhaust System Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut and remove holder (1).

Tightening torque: **18 20 2AZ** .

cardiagn.com

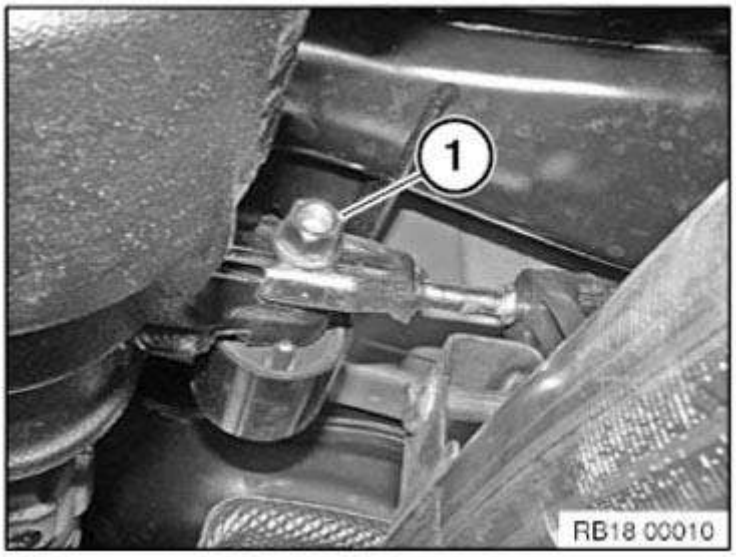


Fig. 15: Identifying Exhaust System Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove holder.

Tightening torque: **18 20 1AZ** .

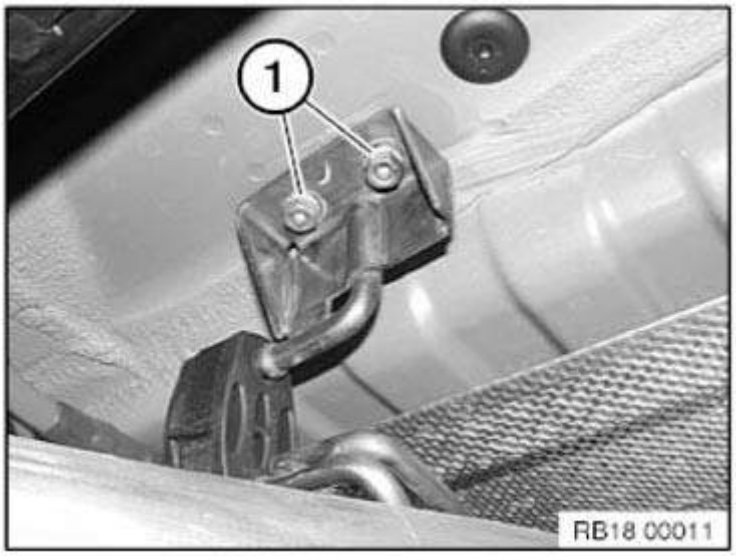


Fig. 16: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Tightening torque: **18 20 3AZ** .

Lower and remove exhaust system carefully with assistance of a second person.

cardiagn.com

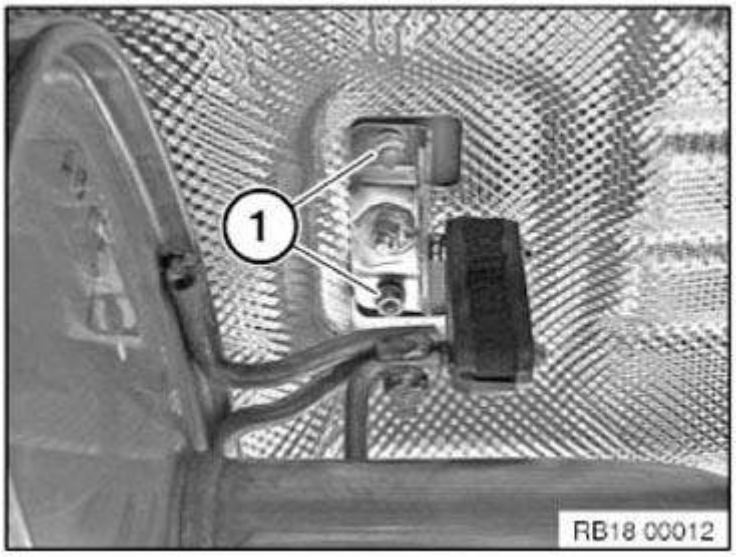


Fig. 17: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage.

If necessary, replace damaged rubber mounts.

Check exhaust system for leak tightness.

18 00 020 REMOVING AND INSTALLING COMPLETE EXHAUST SYSTEM (N55)

Special tools required:

- 31 2 220

WARNING: **Risk of burning!**
Only perform this repair work after engine has cooled down.
Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a second person.

Support exhaust system with jack and special tool 31 2 220 or with a suitable lever and secure against falling out.

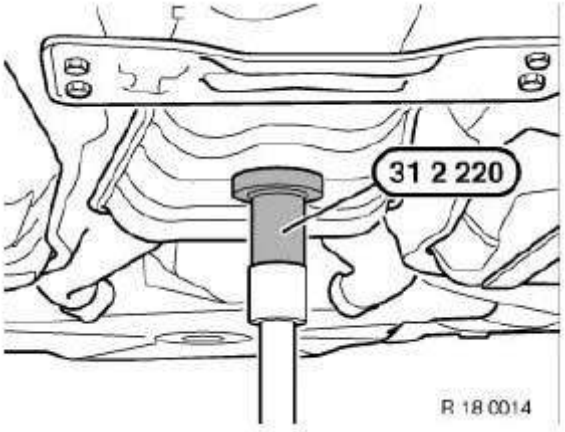


Fig. 18: Supporting Exhaust System Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release clamp (1).

Tightening torque: **18 31 1AZ** .

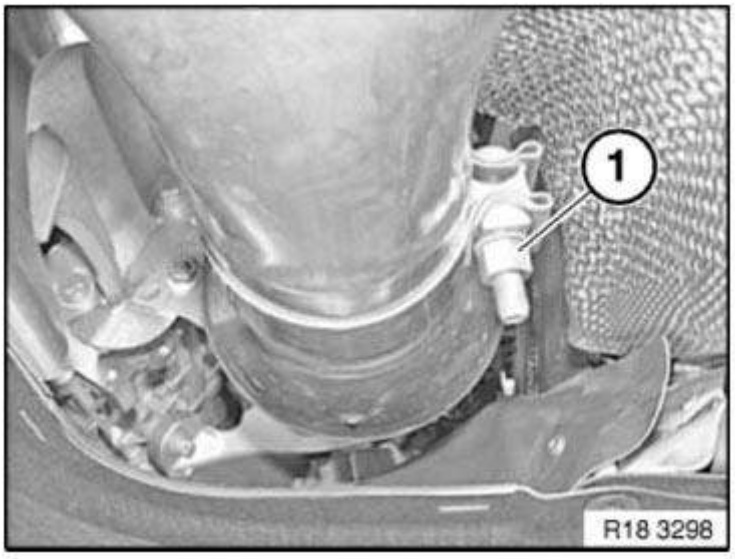


Fig. 19: Identifying Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque: **18 20 2AZ** .

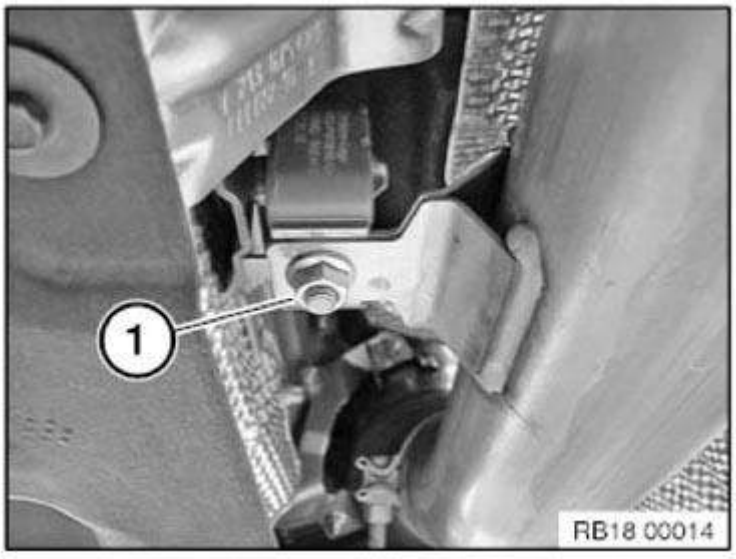


Fig. 20: Identifying Exhaust System Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut and remove holder (1).

Tightening torque: **18 20 3AZ** .

cardiagn.com

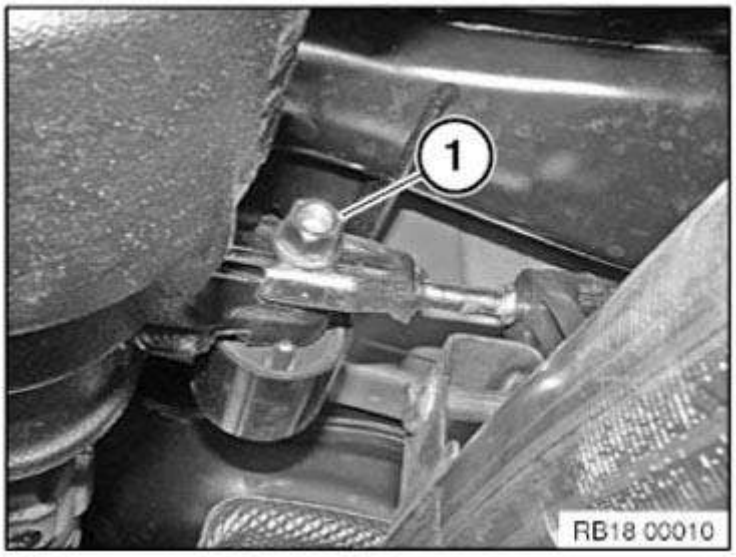


Fig. 21: Identifying Exhaust System Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove holder.

Tightening torque: **18 31 3AZ** .

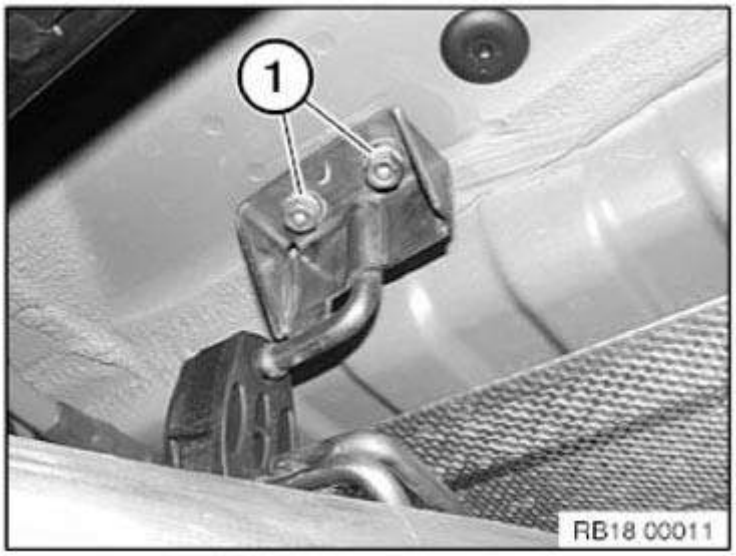


Fig. 22: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Pull off vacuum line (1).

cardiagn.com

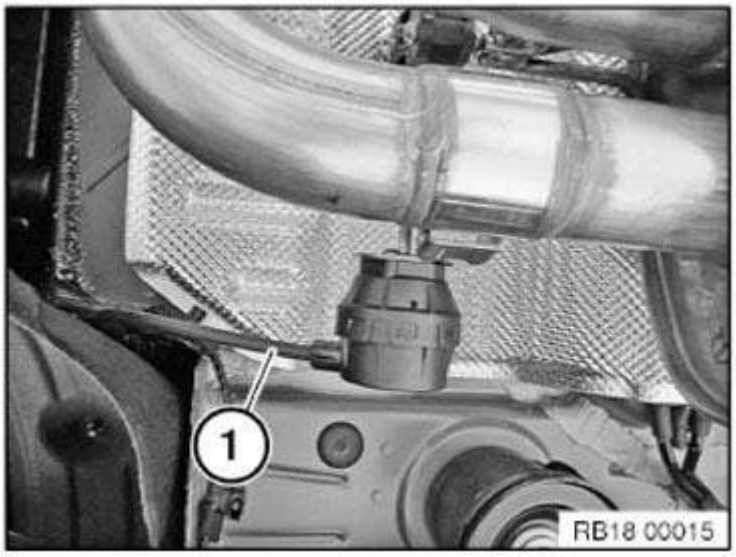


Fig. 23: Identifying Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Tightening torque: **18 31 3AZ** .

Lower and remove exhaust system carefully with assistance of a second person.

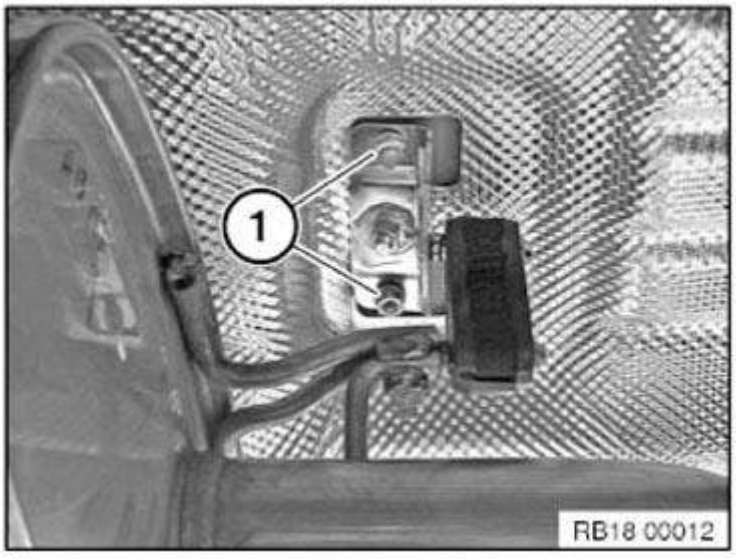


Fig. 24: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage.

If necessary, replace damaged rubber mounts.

Check exhaust system for leak tightness.

18 32 050 REMOVING AND INSTALLING/REPLACING CATALYTIC CONVERTER (N55)

See **18 32 050 REMOVING AND INSTALLING/REPLACING CATALYTIC CONVERTER (N55)**.

18 12 046 REPLACING FRONT SILENCER (N52T)

cardiagn.com

See 18 12 046 REPLACING FRONT SILENCER (N52T).

18 12 046 REPLACING FRONT SILENCER (N55)

See 18 12 046 REPLACING FRONT SILENCER (N55).

18 10 100 REPLACING INTERMEDIATE PIPE (N47 D20 O1)

See 18 10 100 REPLACING INTERMEDIATE PIPE (N47 D20 O1).

18 12 031 REPLACING REAR SILENCER (N52T)

See 18 12 031 REPLACING REAR SILENCER (N52T).

18 12 031 REPLACING REAR SILENCER (N55)

See 18 12 031 REPLACING REAR SILENCER (N55).

18 10 031 REPLACING THE REAR SILENCER (N47D20 O1)

See 18 10 031 REPLACING THE REAR SILENCER (N47D20 O1).

MUFFLERS, DIESEL

18 31 080 REMOVING AND INSTALLING/REPLACING DIESEL PARTICULATE FILTER (N47 D20 O1))

See 18 31 080 REMOVING AND INSTALLING/REPLACING DIESEL PARTICULATE FILTER (N47 D20 O1).

18 31 160 REPLACING FLEXIBLE TUBE FOR DIESEL PARTICULATE FILTER (N47)

See 18 31 160 REPLACING FLEXIBLE TUBE FOR DIESEL PARTICULATE FILTER (N47).

18 10 100 REPLACING INTERMEDIATE PIPE (N47 D20 O1)

Special tools required:

- 31 2 220

WARNING: **Risk of burning!**
Only perform this repair work after engine has cooled down.
Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a second person.

Support intermediate pipe with jack and special tool 31 2 220 and secure against falling out.

cardiagn.com

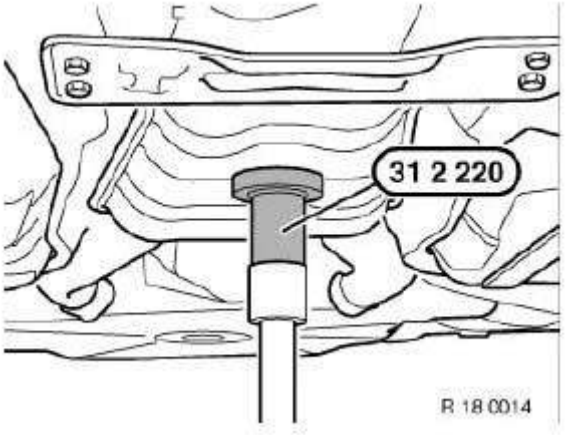


Fig. 25: Supporting Intermediate Pipe Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If the cutting line is not marked by a punch mark in the pipe, determine the cutting line by means of the pipe length on the new intermediate pipe.**

Carry over cutting line to defective intermediate pipe and mark.

Secure intermediate pipe against falling out.

Cut through exhaust pipes at marked point with a suitable tool.

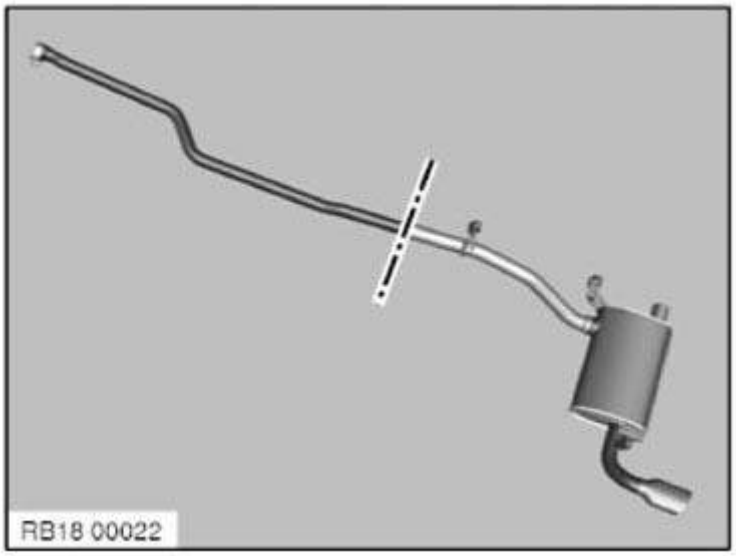


Fig. 26: Identifying Intermediate Pipe Mark
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten nut.

Tightening torque: **18 31 2AZ** .

Lower intermediate pipe and remove.

cardiagn.com

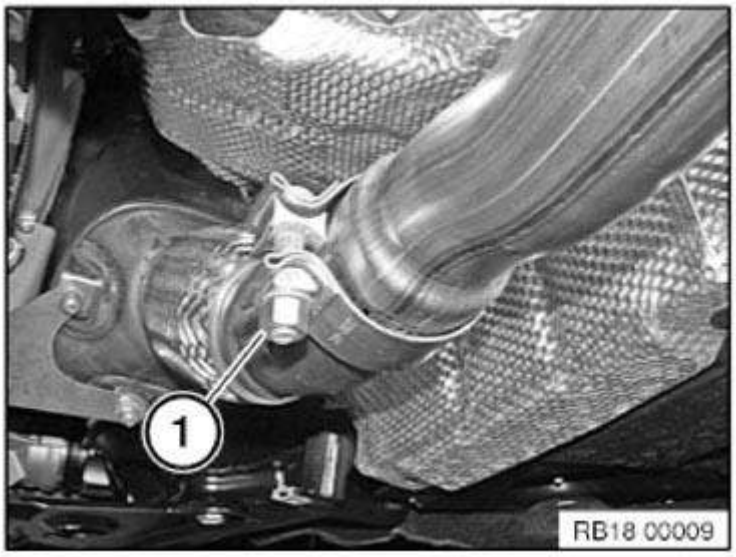


Fig. 27: Identifying Intermediate Pipe Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Adjust new intermediate pipe to fit and connect with clamps.

Center clamp and tighten down.

Tightening torque: **18 31 3AZ** .

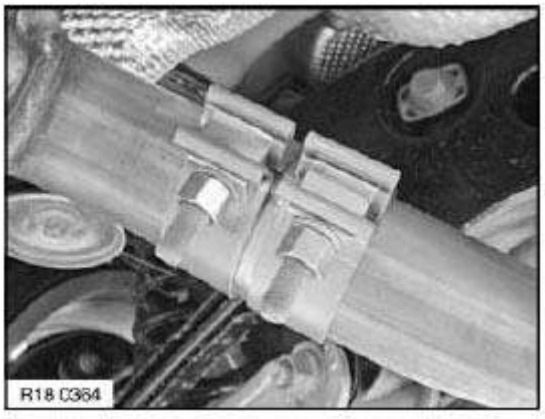


Fig. 28: Identifying Intermediate Pipe Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage, replace if necessary.

Check exhaust system for leak tightness.

18 10 031 REPLACING THE REAR SILENCER (N47D20 O1)

Special tools required:

- 31 2 220

WARNING: **Risk of burning!**
Only perform this repair work after engine has cooled down.
Danger of injury!

cardiagn.com

Removal of the exhaust system must be carried out with the assistance of a second person.

Support the rear silencer with a jack and special tool 31 2 220 and secure against falling out.

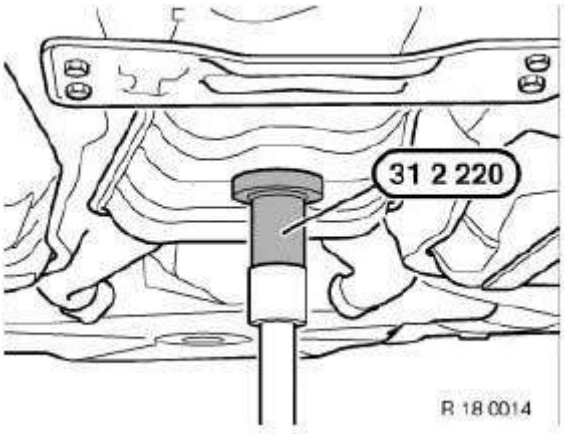


Fig. 29: Supporting Rear Silencer Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If the separation point line is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new rear silencer.**
Carry over separation point to faulty rear silencer and mark.
Secure rear silencer against falling off.
Cut through exhaust pipes at marked point with a suitable tool.

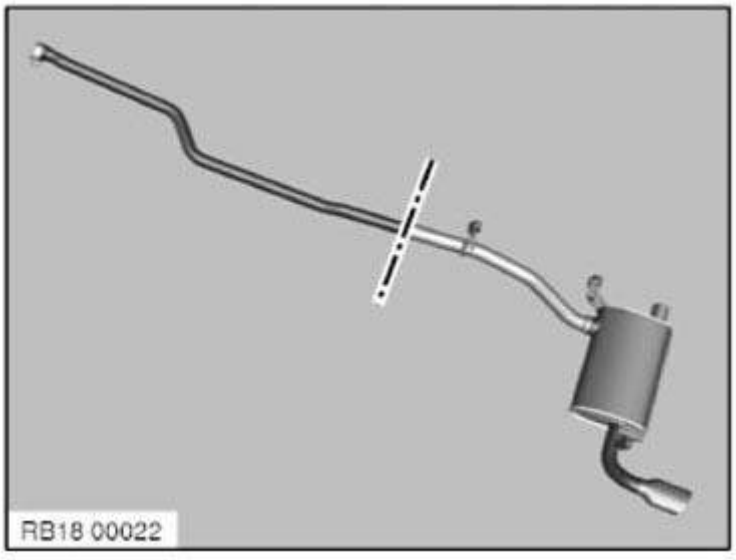


Fig. 30: Identifying Silencer Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolt and remove holder (1).

Tightening torque: **18 20 3AZ** .

cardiagn.com

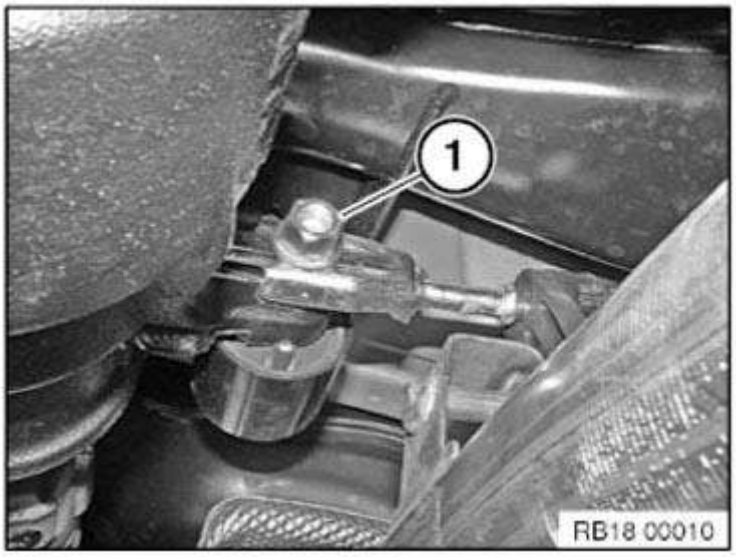


Fig. 31: Identifying Silencer Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove holder.

Tightening torque: **18 20 4AZ** .

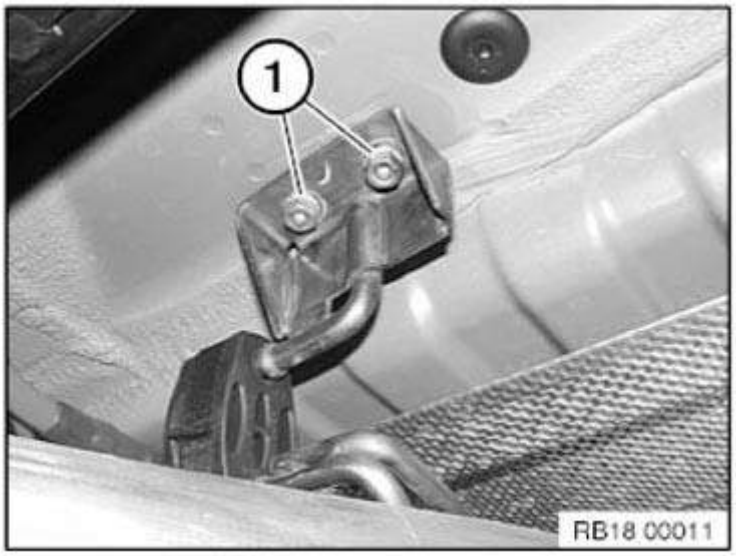


Fig. 32: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Tightening torque: **18 20 4AZ** .

Lower and remove the rear silencer carefully with assistance of a second person.

cardiagn.com

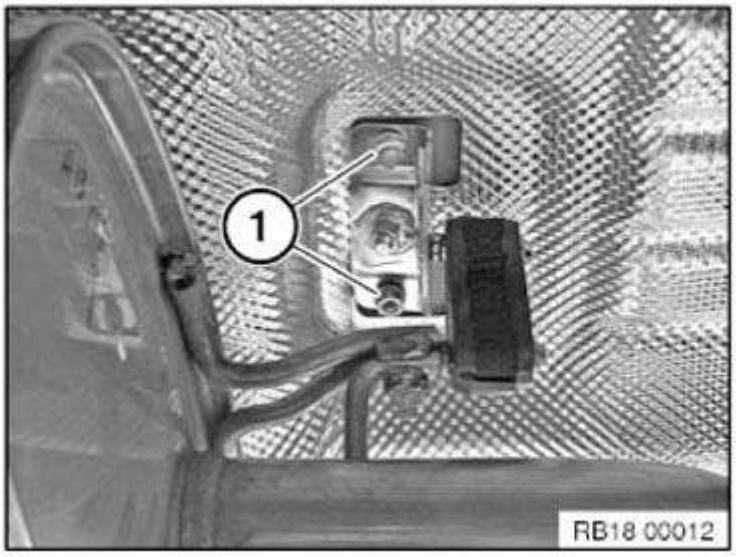


Fig. 33: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Adjust rear silencer and connect with clamp.

Center clamp and tighten down.

Tightening torque: **18 31 3AZ** .

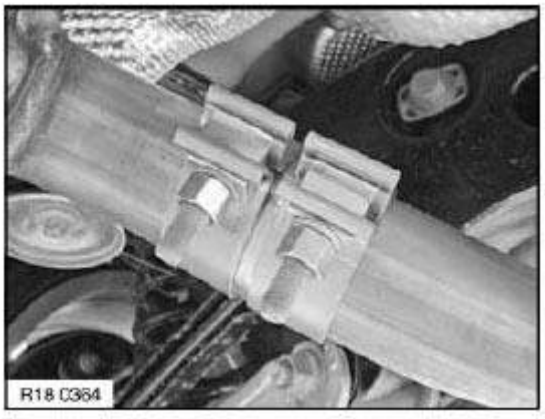


Fig. 34: Identifying Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage, replace if necessary.

Check exhaust system for leak tightness.

MUFFLERS, PETROL

18 12 046 REPLACING FRONT SILENCER (N20)

Special tools required:

- 31 2 220

cardiagn.com

WARNING: **Risk of burning!**
Only perform this repair work after the exhaust system has cooled down.

Support front silencer with special tool 31 2 220 and a suitable universal lifter, and secure against falling down.

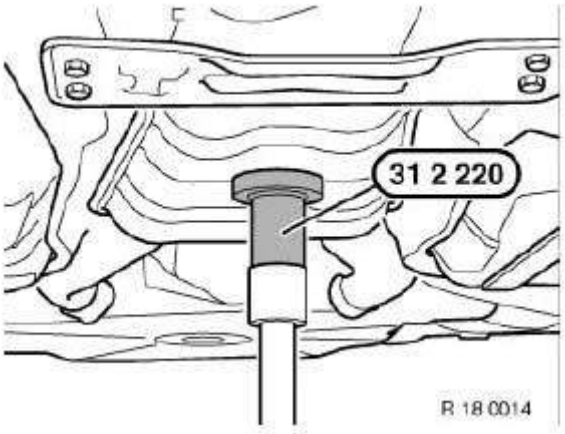


Fig. 35: Supporting Front Silencer Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If the separation point is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new front silencer.**
Carry over separation point to faulty front silencer and mark.
Secure front silencer against falling out.
Cut through exhaust pipes at marked point with a suitable tool.

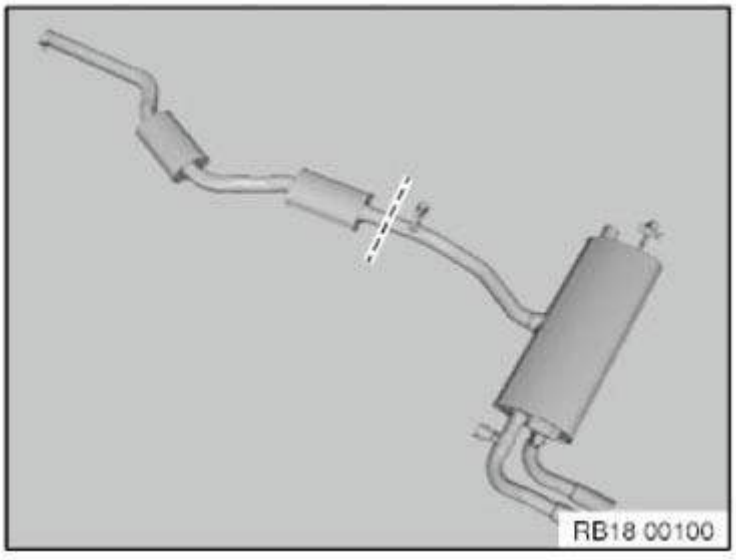


Fig. 36: Identifying Silencer Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

Release clamp (1).

Tightening torque: **18 31 1AZ** .

Feed out front silencer and remove.

cardiagn.com

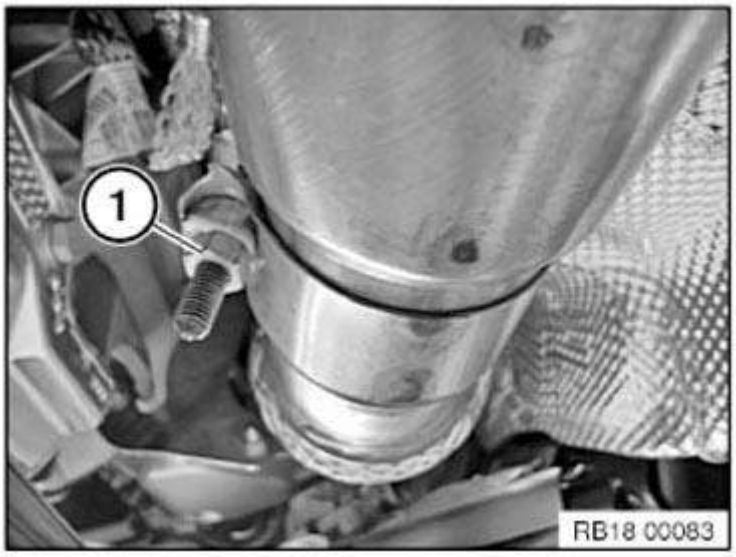


Fig. 37: Identifying Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Connect front silencer to rear silencer by means of clamp and align.

Center clamp and tighten down.

Tightening torque: **18 20 3AZ** .

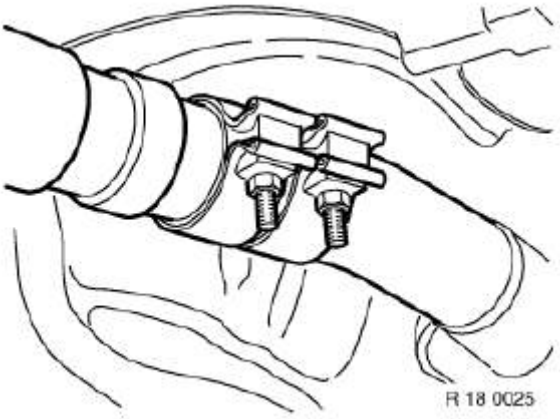


Fig. 38: Identifying Front Silencer To Rear Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Check exhaust system for leaks.

Check rubber mounts, renew damaged rubber mounts.

18 12 046 REPLACING FRONT SILENCER (N52T)

Special tools required:

- 31 2 220

WARNING: Risk of burning!
Only perform this repair work after engine has cooled down.
Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a

cardiagn.com

second person.

Support front silencer with special tool 31 2 220 or a suitable jack and protect from falling down.

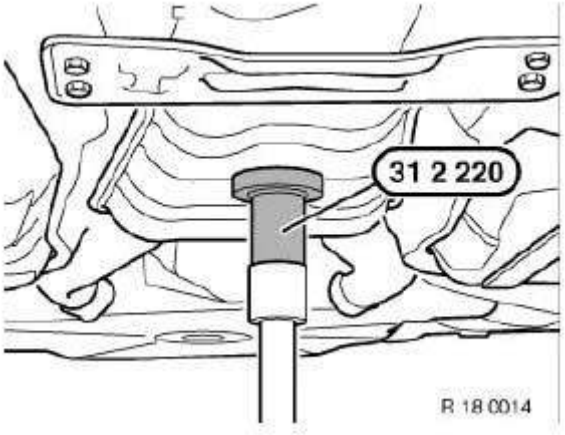


Fig. 39: Supporting Front Silencer Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

European version only:

NOTE: **If the separation point is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new front silencer.**
Carry over separation point to faulty front silencer and mark.
Secure front silencer against falling out.
Cut through exhaust pipes at marked point with a suitable tool.

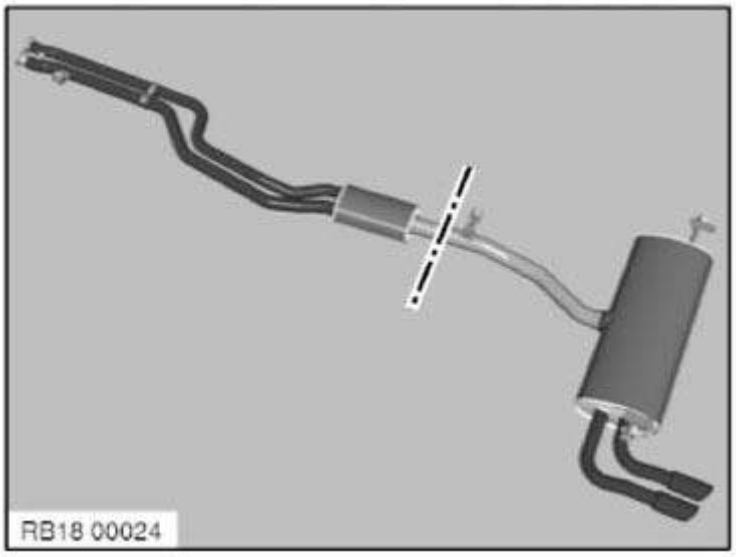


Fig. 40: Identifying Silencer Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

US version only

NOTE: **If the separation point is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new front silencer.**
Carry over separation point to faulty front silencer and mark.
Protect the front silencer and primary catalytic converter, left (1) and right (2) against falling down.
Cut through exhaust pipes at marked point with a suitable tool.

cardiagn.com

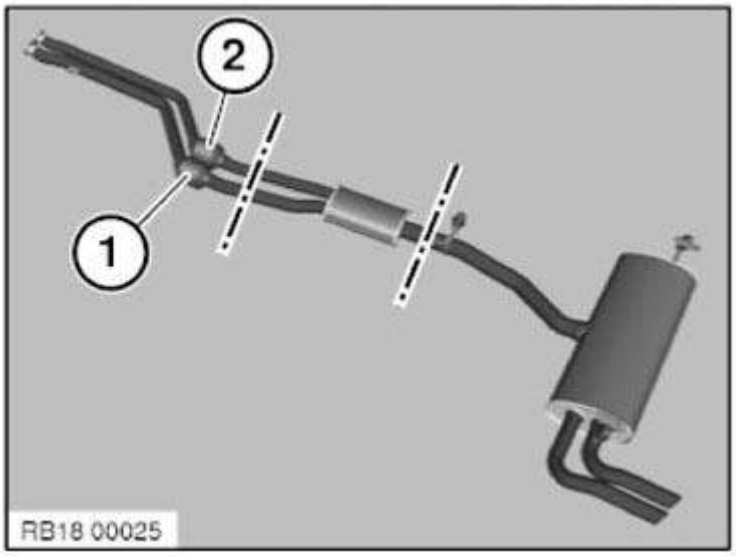


Fig. 41: Identifying Silencer Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts.

Installation note:

Replace self-locking nuts.

Replace gasket.

Tightening torque: **18 31 1AZ** .

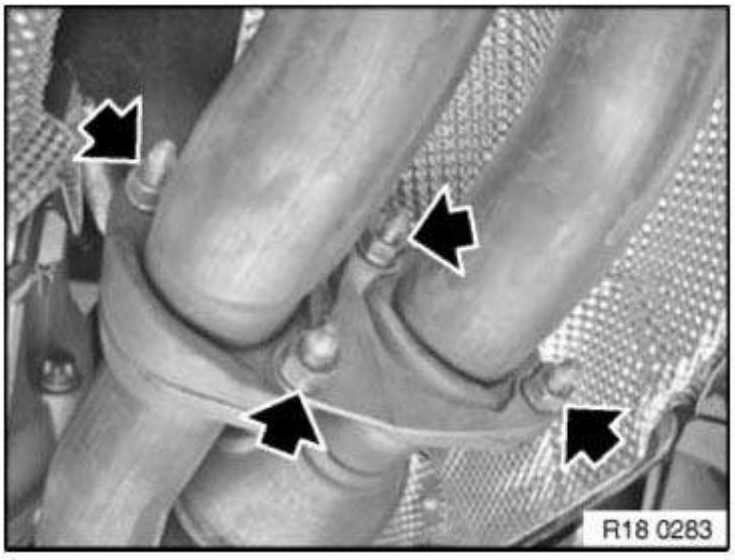


Fig. 42: Locating Self-Locking Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque: **18 31 3AZ** .

Lower and remove front silencer carefully with assistance of a second person.

cardiagn.com

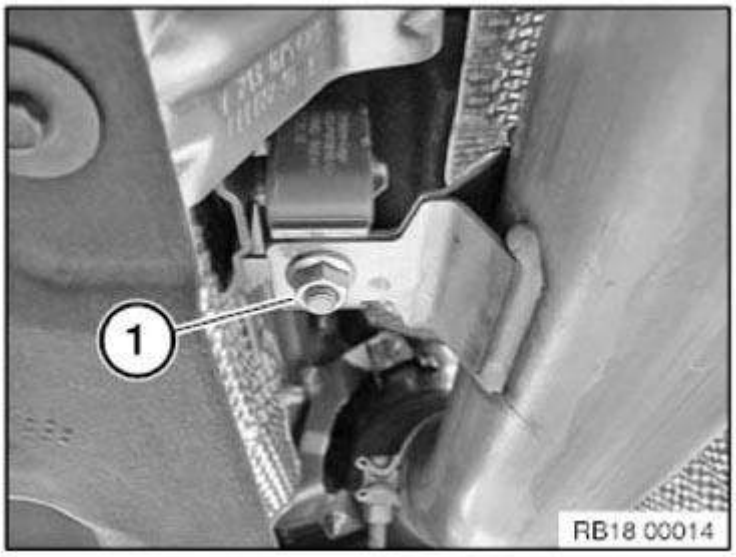


Fig. 43: Identifying Silencer Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Fit front silencer and connect with clamp.

Center clamp and tighten down.

Tightening torque: **18 31 4AZ** .

US version only

Fit front silencer and connect with clamp with primary catalytic converters and rear silencers.

Center clamp and tighten down.

Tightening torque: **18 31 4AZ** .

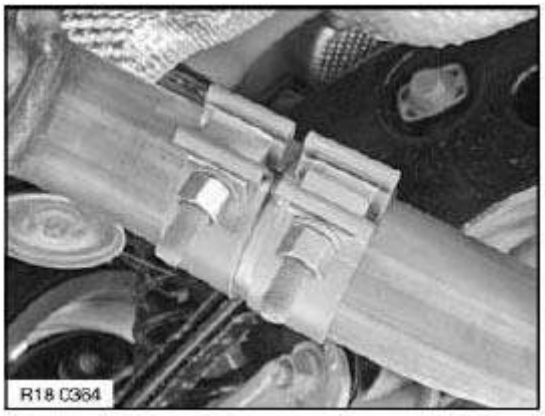


Fig. 44: Identifying Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage.

If necessary, replace damaged rubber mounts.

Check exhaust system for leak tightness.

cardiagn.com

18 12 046 REPLACING FRONT SILENCER (N55)

Special tools required:

- 31 2 220

WARNING: **Risk of burning!**
Only perform this repair work after engine has cooled down.
Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a second person.

Support front silencer with special tool 31 2 220 or a suitable jack and protect from falling down.

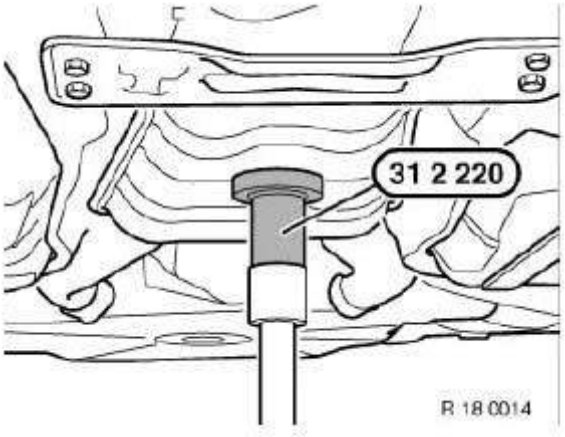


Fig. 45: Supporting Front Silencer Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If the separation point is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new front silencer.**
Carry over separation point to faulty front silencer and mark.
Secure front silencer against falling out.
Cut through exhaust pipes at marked point with a suitable tool.

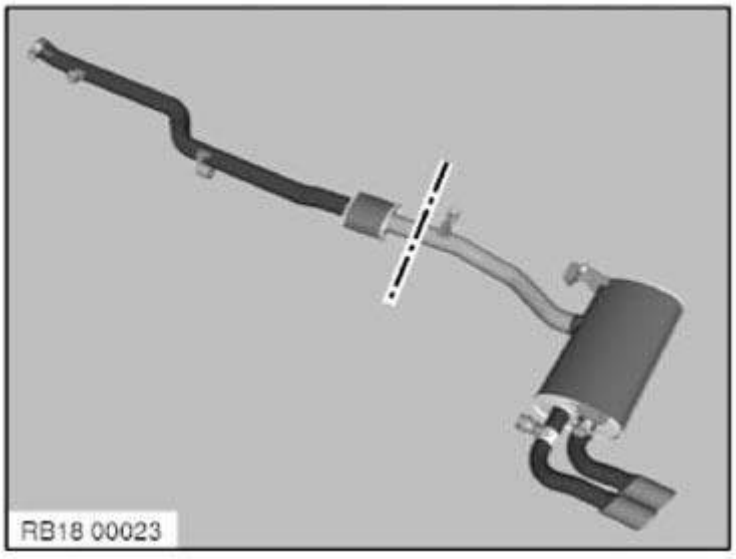


Fig. 46: Identifying Silencer Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

Release clamp (1).

cardiagn.com

Tightening torque: **18 31 1AZ** .

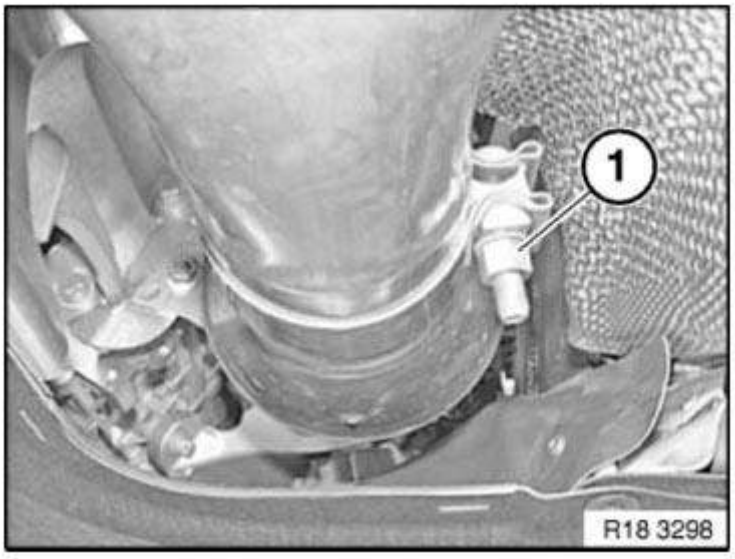


Fig. 47: Identifying Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque: **18 20 2AZ** .

Lower and remove front silencer carefully with assistance of a second person.

Modify vibration absorber.

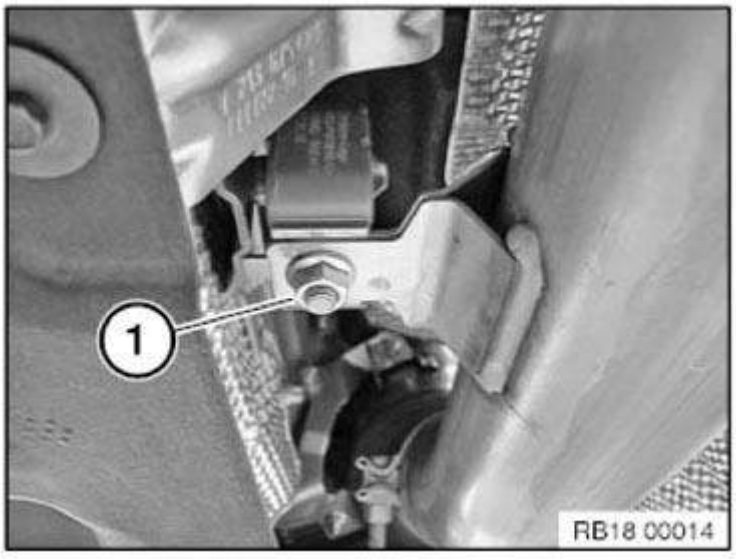


Fig. 48: Identifying Silencer Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Fit front silencer and connect with clamp.

Center clamp and tighten down.

Tightening torque: **18 31 5AZ** .

cardiagn.com

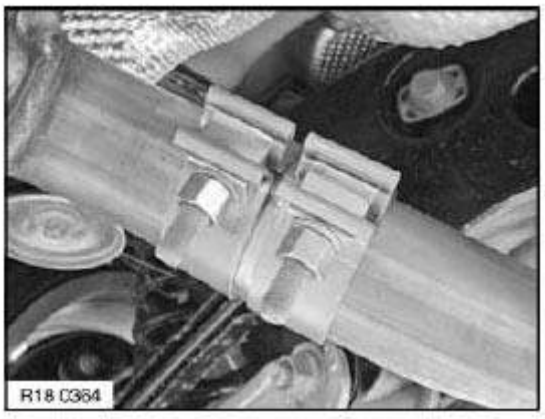


Fig. 49: Identifying Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage.

If necessary, replace damaged rubber mounts.

Check exhaust system for leak tightness.

18 12 031 REPLACING REAR SILENCER (N20)

Special tools required:

- 31 2 220

WARNING: **Risk of burning!**
Only perform this repair work after the exhaust system has cooled down.

Support rear silencer using special tool 31 2 220 or a suitable jack and secure against falling off.

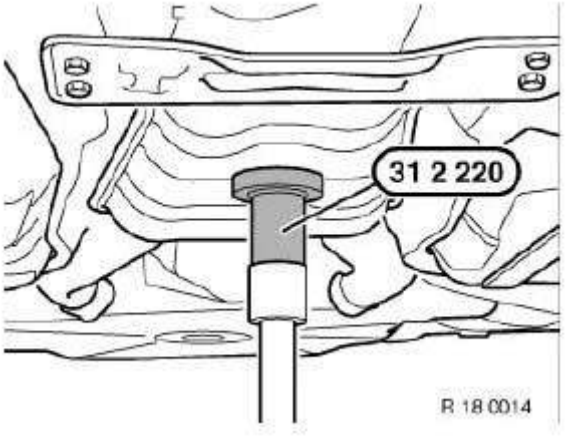


Fig. 50: Supporting Rear Silencer Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If the separation point line is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new rear silencer.**
Carry over separation point to faulty rear silencer and mark.
Secure rear silencer against falling off.
Cut through exhaust pipe at marked point with a suitable tool.

cardiagn.com

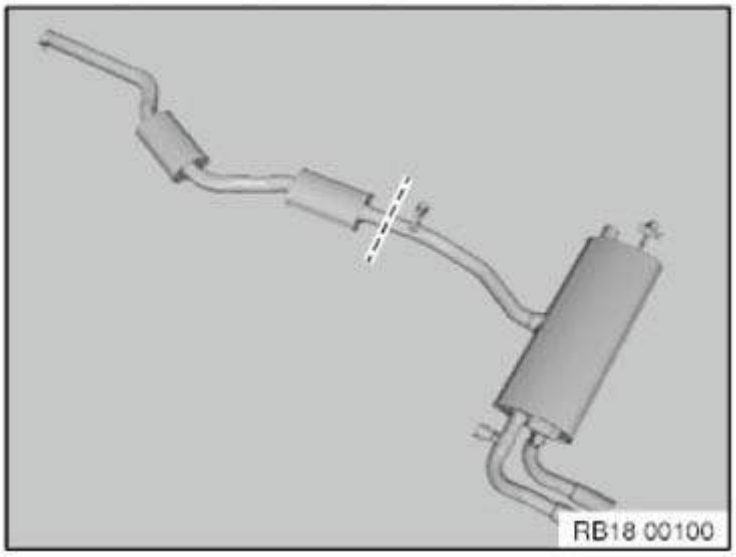


Fig. 51: Identifying Silencer Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut and remove holder (1).

Tightening torque: **18 31 3AZ** .

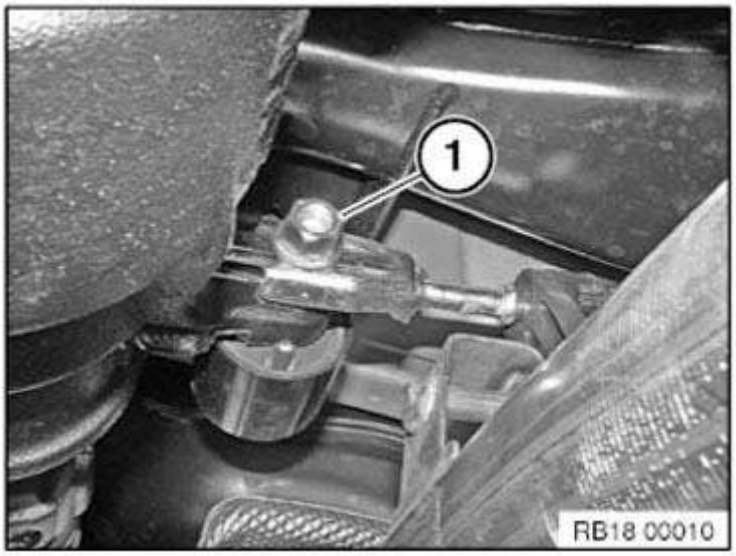


Fig. 52: Identifying Silencer Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove holder.

Tightening torque: **18 31 5AZ** .

cardiagn.com

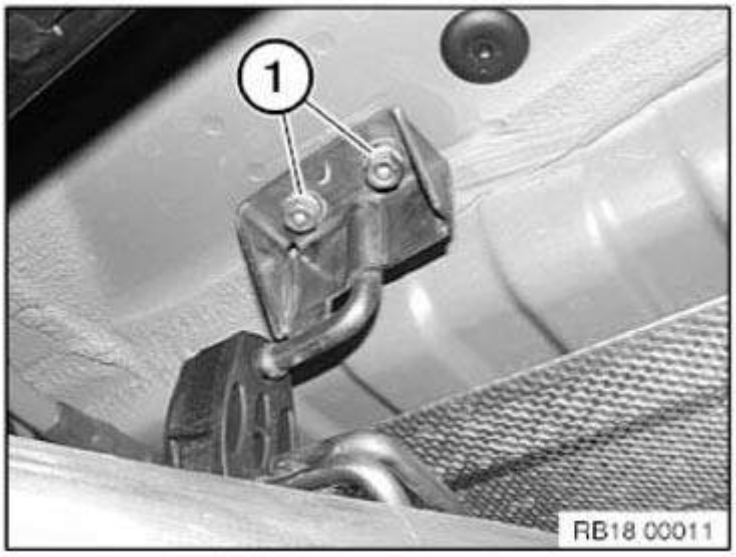


Fig. 53: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Only 20i:

Unscrew nuts (1).

Tightening torque: **18 31 5AZ** .

Lower and remove the rear silencer carefully with assistance of a second person.

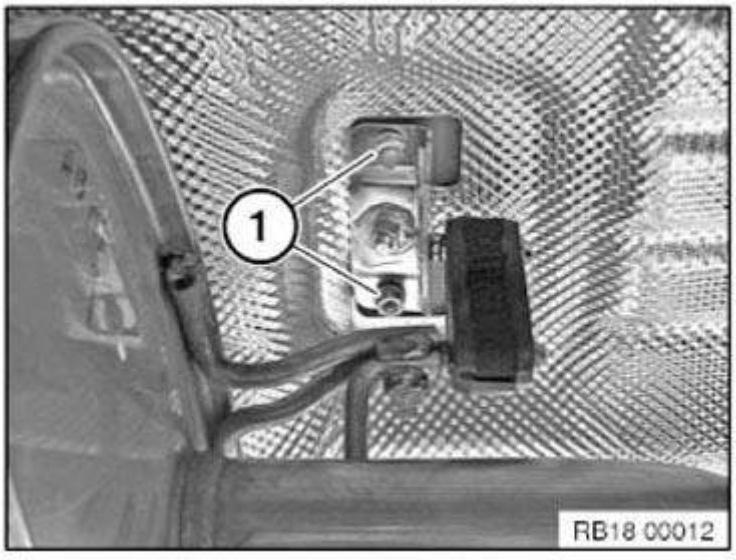


Fig. 54: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Only 28i:

Pull off vacuum hose (1).

Unscrew nuts (2).

Tightening torque: **18 31 5AZ** .

Lower and remove the rear silencer carefully with assistance of a second person.

cardiagn.com

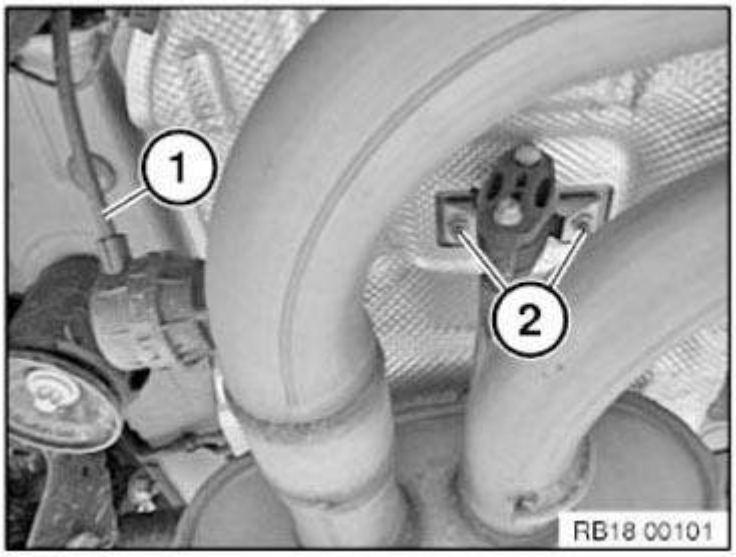


Fig. 55: Identifying Vacuum Hose And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Connect front silencer to rear silencer by means of clamp and align.

Center clamp and tighten down.

Tightening torque: **18 20 3AZ** .

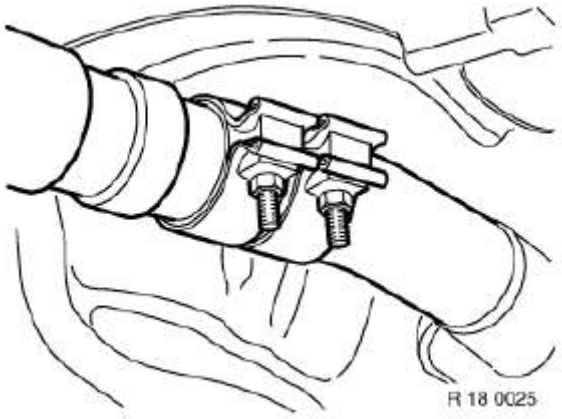


Fig. 56: Identifying Front Silencer To Rear Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Check rubber mount for damage.

Replace damaged rubber mount.

Check exhaust system for leaks.

18 12 031 REPLACING REAR SILENCER (N52T)

Special tools required:

- 31 2 220

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

cardiagn.com

Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a second person.

Support front silencer with special tool 31 2 220 or a suitable jack and protect from falling down.

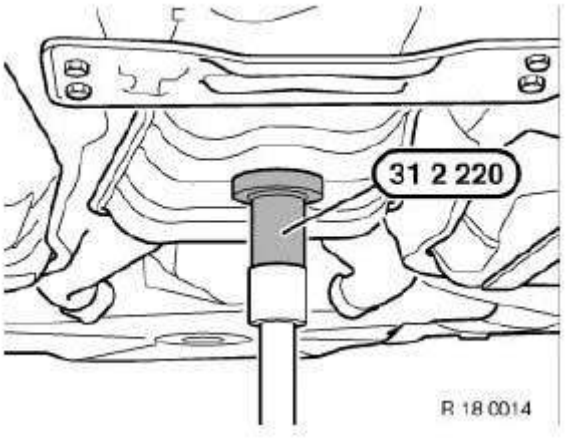


Fig. 57: Supporting Front Silencer Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If the separation point line is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new rear silencer.**
Carry over separation point to faulty rear silencer and mark.
Secure rear silencer against falling off.
Cut through exhaust pipes at marked point with a suitable tool.

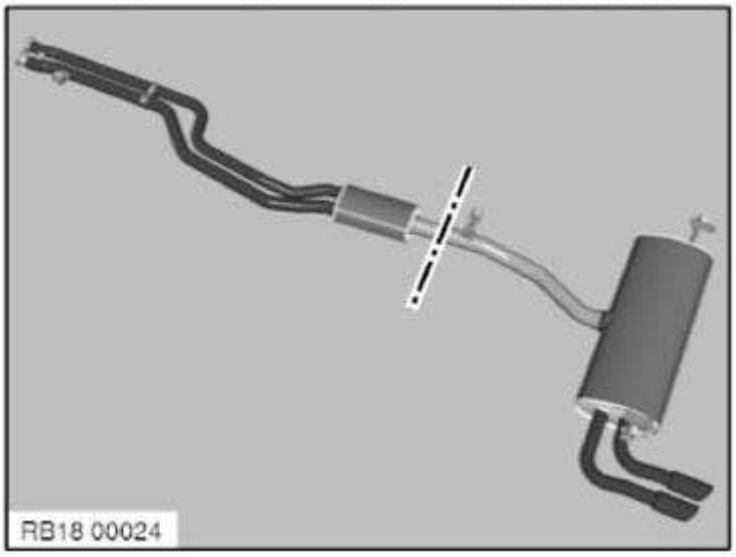


Fig. 58: Identifying Silencer Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut and remove holder (1).

Tightening torque: **18 20 2AZ** .

cardiagn.com

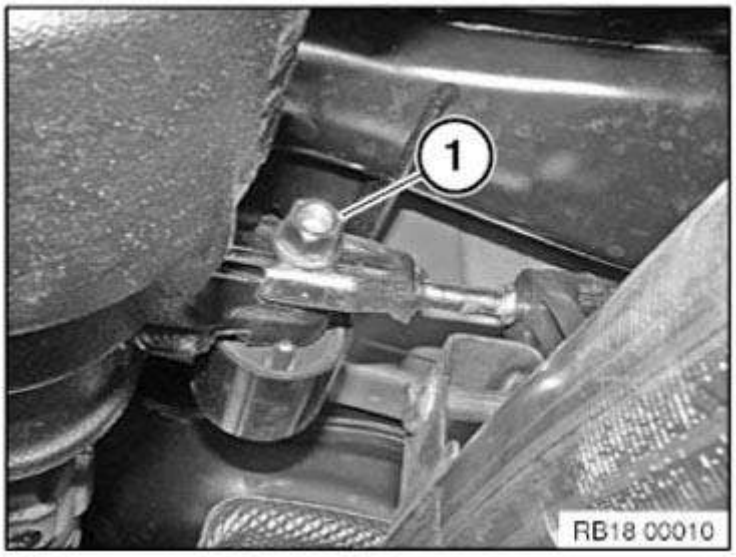


Fig. 59: Identifying Silencer Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove holder.

Tightening torque: **18 20 1AZ** .

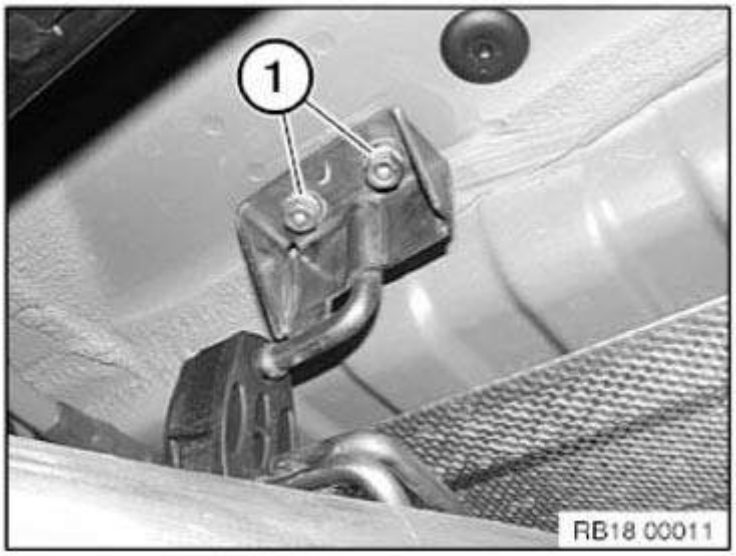


Fig. 60: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Tightening torque: **18 20 3AZ** .

cardiagn.com

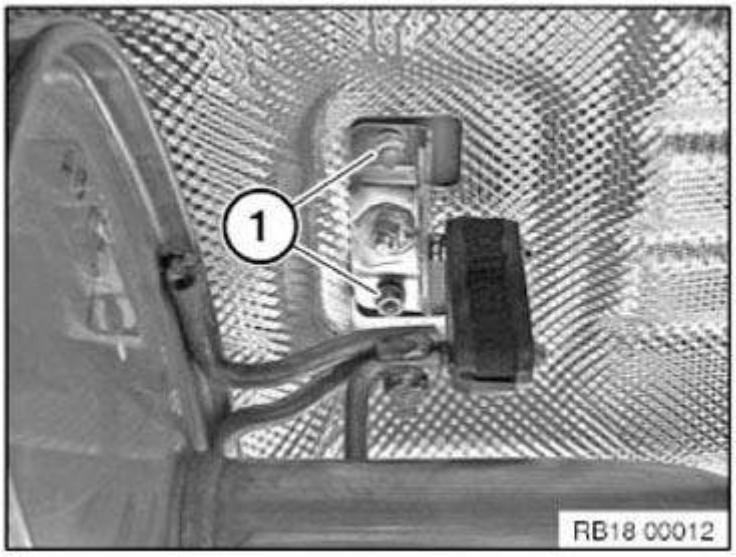


Fig. 61: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Adjust rear silencer and connect with clamp.

Center clamp and tighten down.

Tightening torque: **18 31 4AZ** .

Lower and remove the rear silencer carefully with assistance of a second person.

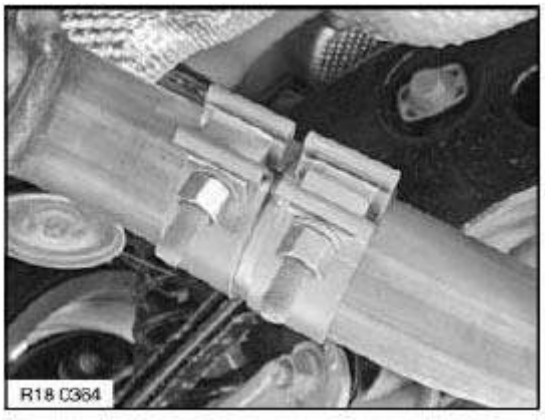


Fig. 62: Identifying Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage.

If necessary, replace damaged rubber mounts.

Check exhaust system for leak tightness.

18 12 031 REPLACING REAR SILENCER (N55)

Special tools required:

- 31 2 220

cardiagn.com

WARNING: **Risk of burning!**
Only perform this repair work after engine has cooled down.
Danger of injury!
Removal of the exhaust system must be carried out with the assistance of a second person.

Support rear silencer with special tool 31 2 220 or with a suitable jack and secure against falling out.

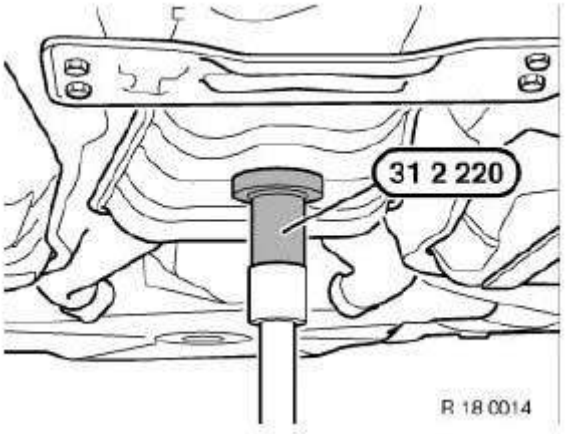


Fig. 63: Supporting Rear Silencer Using Special Tool (31 2 220)
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **If the separation point line is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new rear silencer.**
Carry over separation point to faulty rear silencer and mark.
Secure rear silencer against falling off.
Cut through exhaust pipes at marked point with a suitable tool.

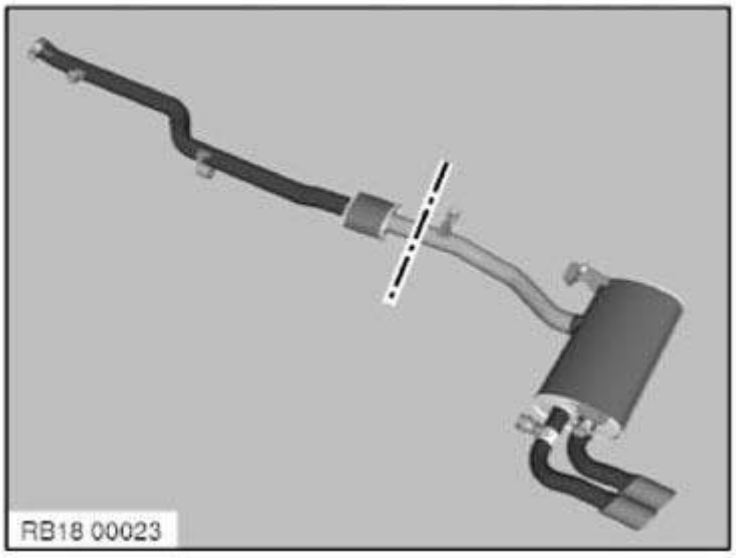


Fig. 64: Identifying Silencer Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut and remove holder (1).

Tightening torque: **18 20 3AZ** .

cardiagn.com

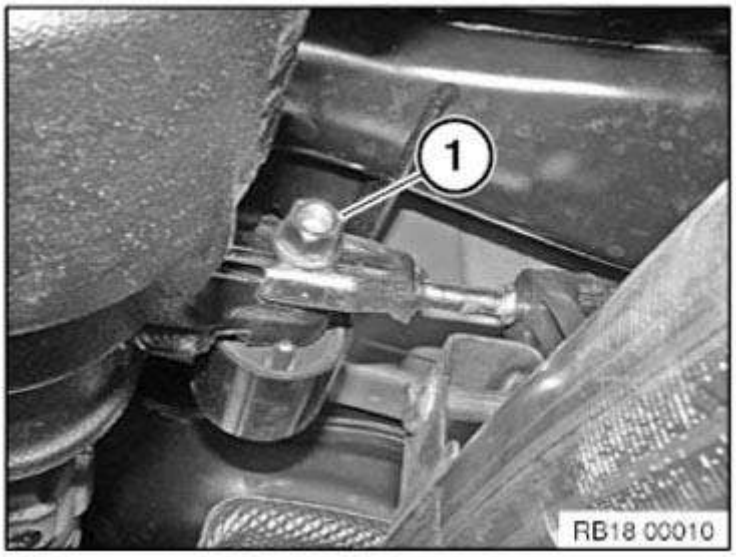


Fig. 65: Identifying Silencer Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1) and remove holder.

Tightening torque: **18 31 3AZ** .

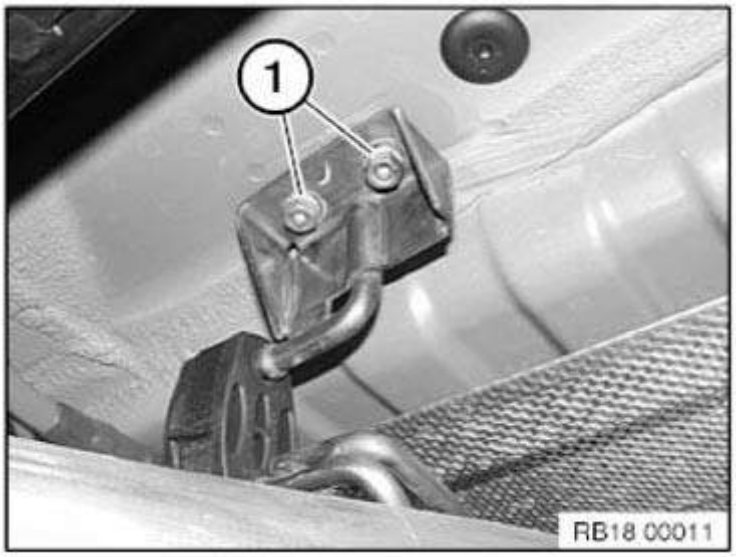


Fig. 66: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Pull off vacuum line (1).

cardiagn.com

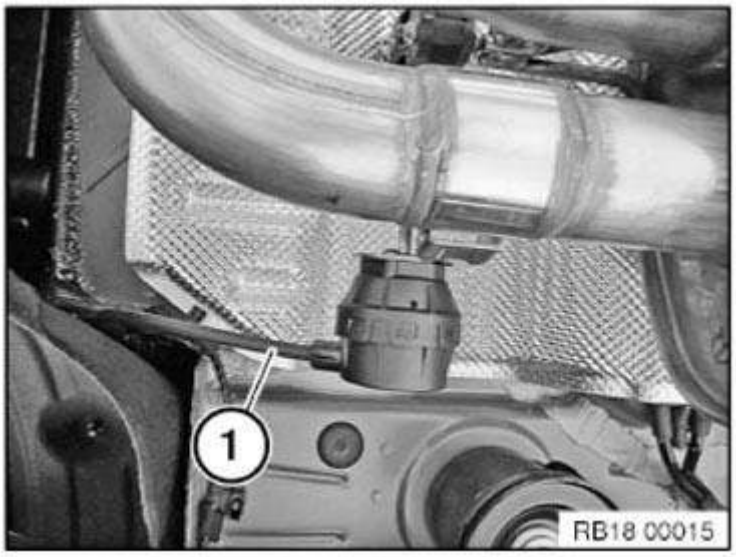


Fig. 67: Identifying Vacuum Line
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Tightening torque: **18 31 3AZ** .

Lower and remove the rear silencer carefully with assistance of a second person.

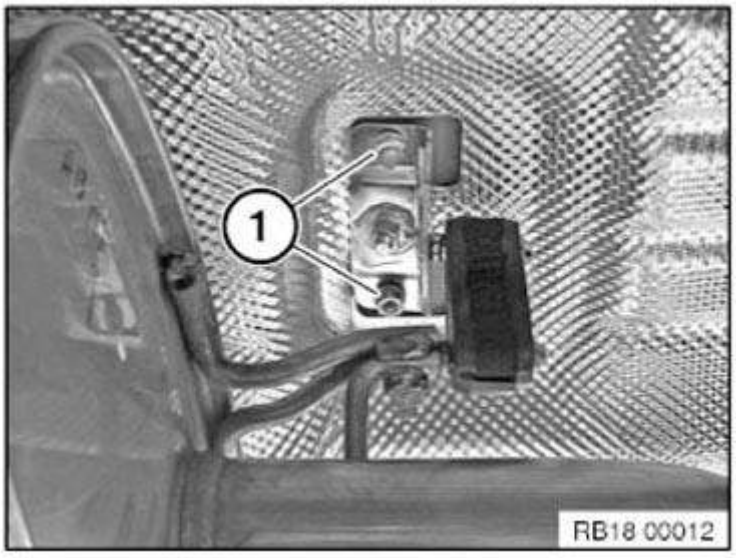


Fig. 68: Identifying Exhaust System Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Adjust rear silencer and connect with clamp.

Center clamp and tighten down.

Tightening torque: **18 31 5AZ** .

cardiagn.com

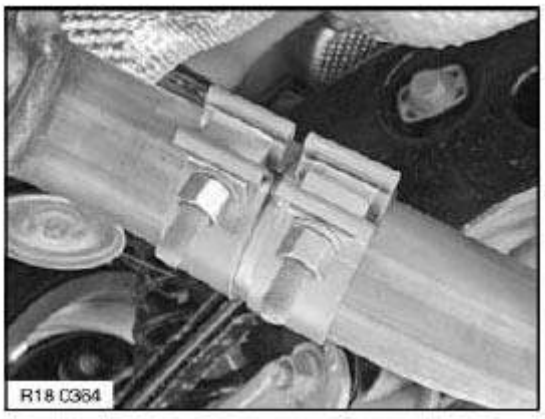


Fig. 69: Identifying Silencer Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check rubber mount for damage.

If necessary, replace damaged rubber mounts.

Check exhaust system for leak tightness.

EXHAUST PIPE WITH SUSPENSION

18 32 050 REMOVING AND INSTALLING/REPLACING CATALYTIC CONVERTER (N55)

See 18 32 050 REMOVING AND INSTALLING/REPLACING CATALYTIC CONVERTER (N55).

18 31 080 REMOVING AND INSTALLING/REPLACING DIESEL PARTICULATE FILTER (N47 D20 O1)

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

IMPORTANT: The pressure hoses between the diesel fuel particulate filter and the differential pressure sensor must be replaced when the diesel particulate filter or the differential pressure sensor is removed.

NOTE: **Some engine versions have only one pressure hose.**

cardiagn.com

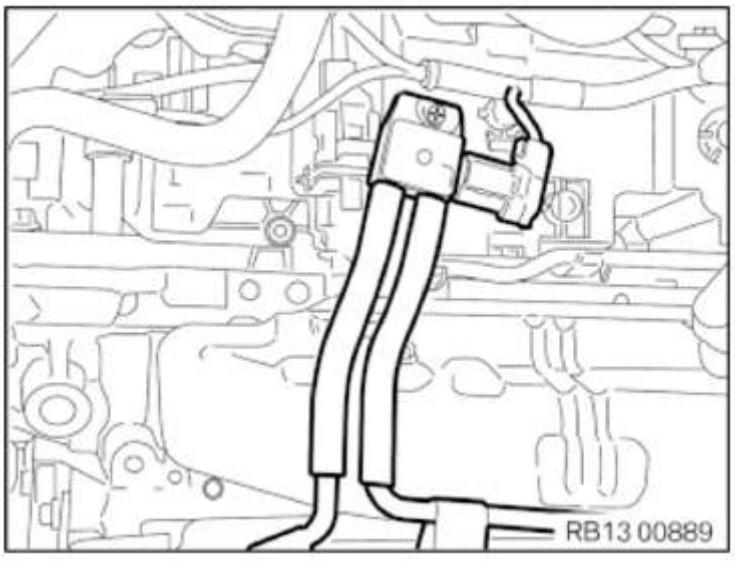


Fig. 70: Identifying Diesel Fuel Particulate Filter & Hoses
Courtesy of BMW OF NORTH AMERICA, INC.

Necessary preliminary tasks:

- Remove front **UNDERBODY PROTECTION** .
- Remove **EXHAUST SYSTEM**.

Release clamp (1).

Renew clamp and gasket.

Parts: clamp and gasket

Tightening torque: **18 31 1AZ** .

Release plug connections (2) from bracket.

Unlock and detach plug connections (2).

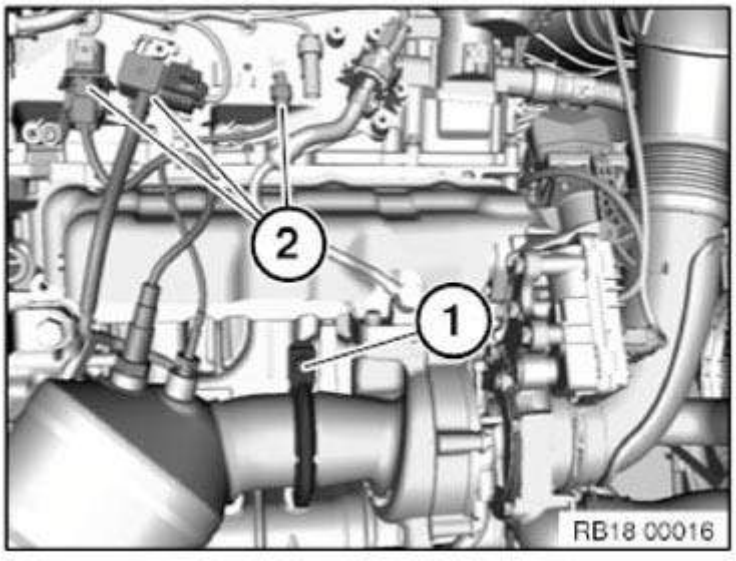


Fig. 71: Identifying Diesel Fuel Particulate Filter Plug Connection And Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

cardiagn.com

Tightening torque: **18 20 1AZ** .

Slacken nut (2).

Tightening torque: **18 20 2AZ** .

Remove diesel particle filter in downward direction.

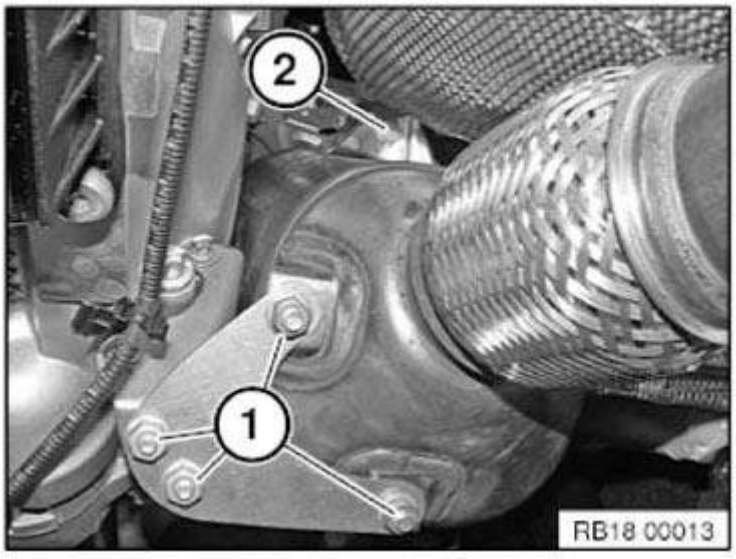


Fig. 72: Identifying Diesel Fuel Particulate Filter Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Only when replacing diesel particle filter:

- Remount **EXHAUST GAS PRESSURE SENSOR** (1).
- Remount the **OXYGEN SENSOR** (2).
- Remount the **EXHAUST TEMPERATURE SENSOR** (3).

Installation note:

Assemble engine.

Check exhaust system for leaks.

After replacing the diesel particle filter, reset adaptation via the BMW diagnosis system.

18 31 160 REPLACING FLEXIBLE TUBE FOR DIESEL PARTICULATE FILTER (N47)

NOTE: **In warranty cases this procedure is not allowed.**
In warranty cases replace diesel particulate filter.

Prerequisite:

To carry out this repair work, the mechanic must be trained in the use of welders.

Identify the part number of the diesel particulate filter fitted in the vehicle!

Additionally required:

- MAG (metal active gas) welder

cardiagn.com

- Stainless steel welding wire (if available), SG 2/3 also permitted.

  Ensure adequate corrosion protection.

- (Wire cannot be obtained through the BMW dealer organisation!)
- Mixed gas (82 % argon, 18 % carbon dioxide)

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Necessary preliminary tasks:

- Remove **DIESEL PARTICULATE FILTER**.

Removing faulty flexible tube:

NOTE: **Marks must be made to prevent changes to the installation position of the exhaust system.**

Align (1) flexible tube and affix adhesive tape (2) as shown.

Carry over reference marks (3) along the adhesive tape (2) to diesel particulate filter and exhaust pipe.

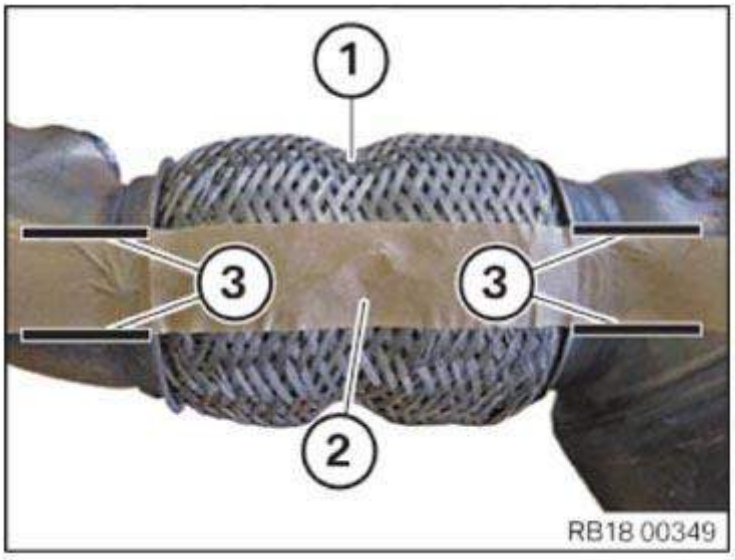


Fig. 73: Identifying Diesel Fuel Particulate Filter Reference Marks
Courtesy of BMW OF NORTH AMERICA, INC.

Cut in marking (1) along the weld seam (2) by 2 to 3 mm.

IMPORTANT: Do not completely cut through flexible tube; inner pipe must remain intact.
Make sure that cut lines (1) are parallel to flexible tube edge (3).

Perform process in the same way at other end of flexible tube.

cardiagn.com

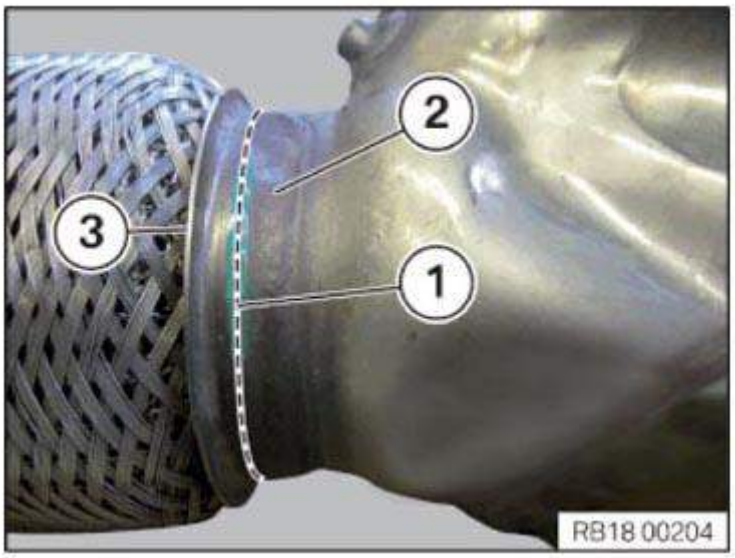


Fig. 74: Identifying Weld Seam Marking
Courtesy of BMW OF NORTH AMERICA, INC.

Cut uniformly all around until the flexible tube (1) can be disconnected from the weld seam (2) with a suitable tool (4).

Inner pipe (3) must stay on the weld seam (2).

Perform process in the same way at other end of flexible tube.

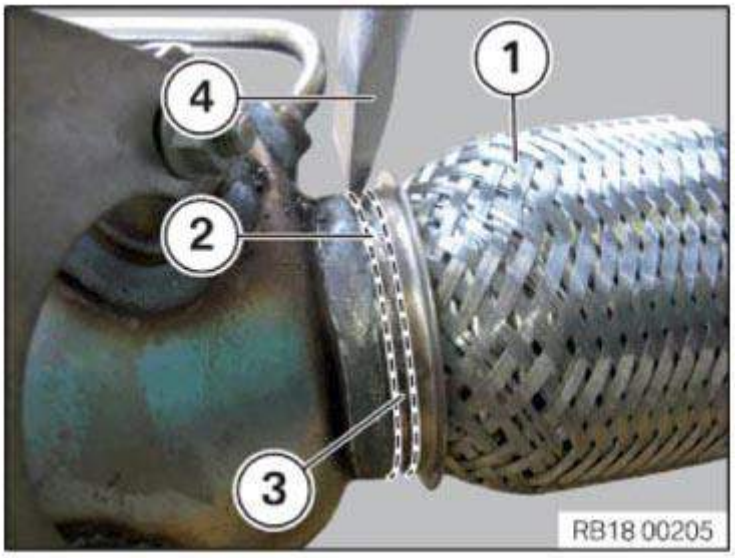


Fig. 75: Disconnecting Flexible Tube From Weld Seam Using Tool
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Inner pipe (1) on diesel particulate filter must remain intact.**
Inner pipe (2) on exhaust pipe must remain intact.

cardiagn.com

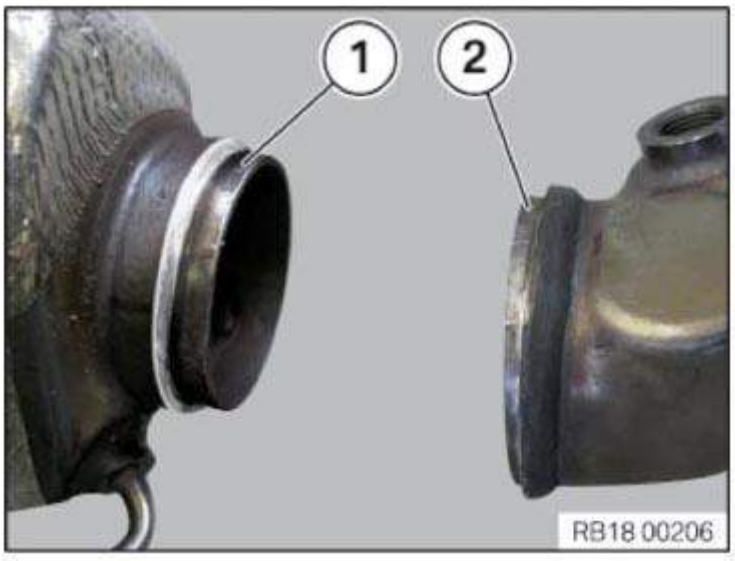


Fig. 76: Identifying Diesel Particulate Filter Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Installing new flexible tube:

Align adhesive tape (1) as shown and affix to new flexible tube (2).

Carry over reference marks (3) along the adhesive tape (1) to flexible tube.

Remove adhesive tape (1).

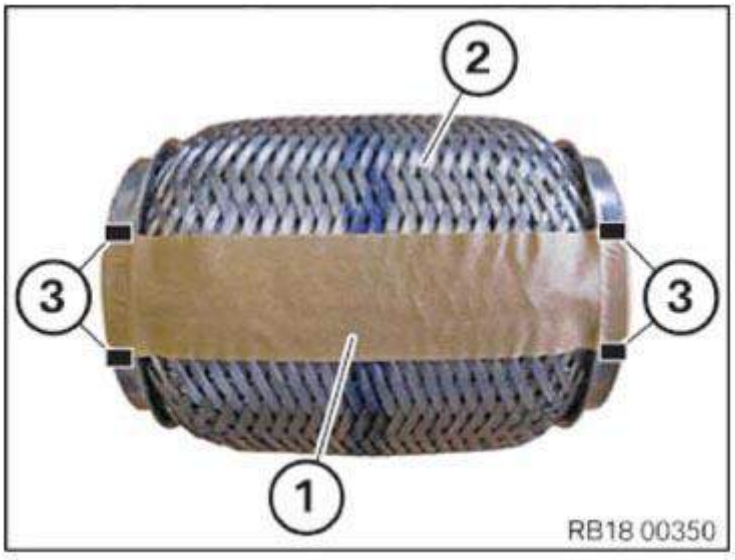


Fig. 77: Identifying Diesel Particulate Filter Reference Marks
Courtesy of BMW OF NORTH AMERICA, INC.

Connect new flexible tube to the inner pipe of the diesel particulate filter and align.

NOTE: Marks (1) must be aligned.

Make sure that flexible tube (2) is parallel to cutting edge (3).

Observe distance of approx. 1-2 mm between flexible tube (2) and weld seam (3).

Attach flexible tube with several welding spots.

cardiagn.com

Procedure identical on the opposite side.

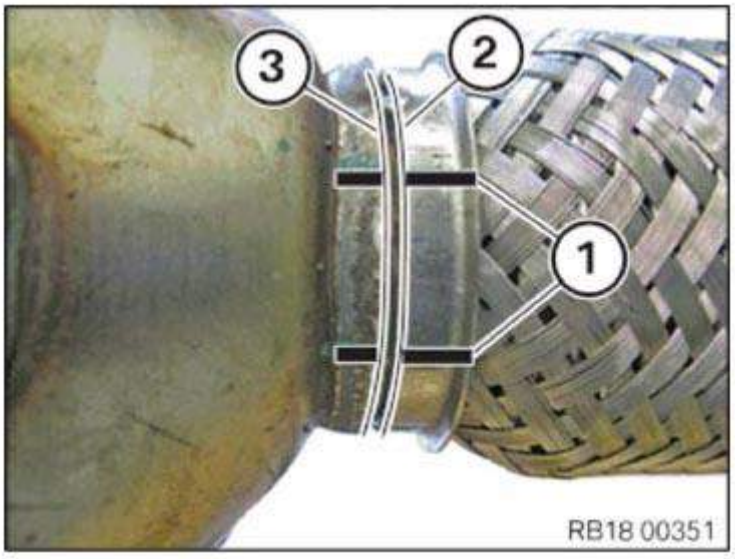


Fig. 78: Identifying Flexible Tube Marks
Courtesy of BMW OF NORTH AMERICA, INC.

Align marks and staple three times on each side.

Weld flexible tube (1) all around on both sides.

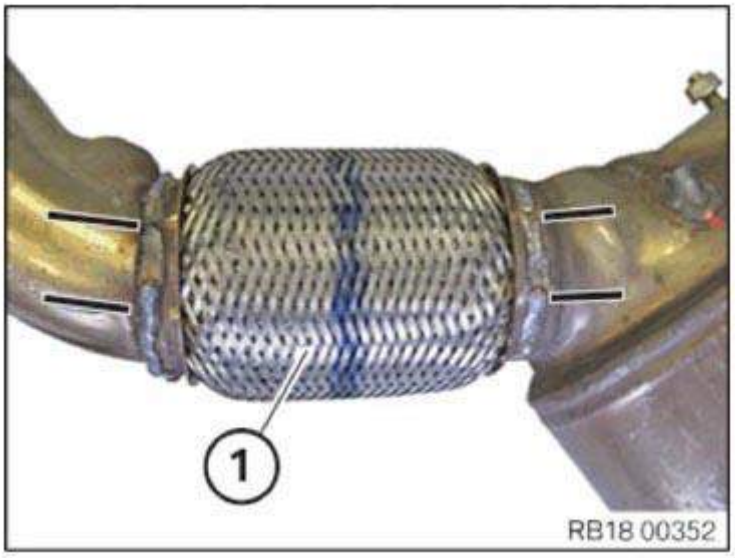


Fig. 79: Identifying Flexible Tube
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Assemble engine.

Check exhaust system for leaks.

EXHAUST CATALYTIC CONVERTER

18 32 050 REMOVING AND INSTALLING/REPLACING CATALYTIC CONVERTER (N20)

WARNING: **Risk of burning!**
Only perform this repair work after the exhaust system has cooled down.

cardiagn.com

Necessary preliminary tasks:

- Remove front **UNDERBODY PROTECTION** .
- Remove rear **UNDERBODY PROTECTION** .
- Remove **EXHAUST SYSTEM**.

NOTE: **When removing and installing the catalytic converter there is the risk of damage to the control sensor and monitoring sensor.**
REMOVE THE CONTROL SENSOR .
REMOVE MONITORING SENSOR .

Release clamp (1). The clamp must be renewed every time it is removed.

Tightening torque: **18 31 2AZ** .

Installation note:

Clean sealing surface. Renew clamp and seal.

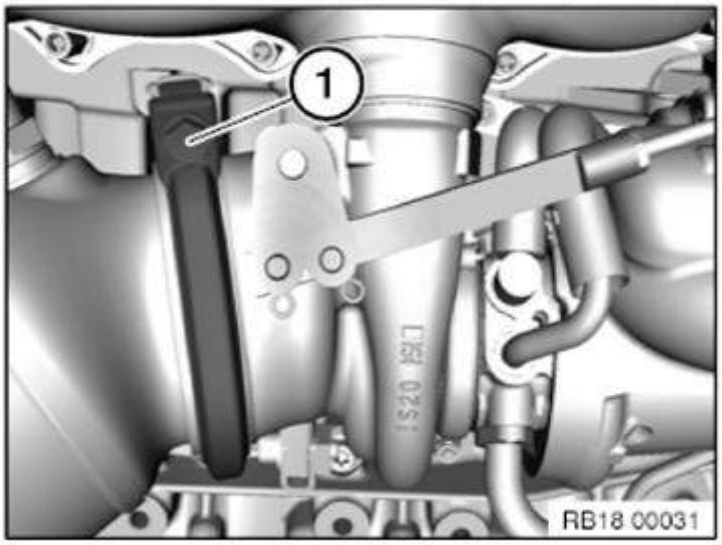


Fig. 80: Identifying Catalytic Converter Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

When installing the catalytic converter make sure that the separation point (1) of the V-band clamp is aligned with the center of the welding spot (2) on the catalytic converter.

This guarantees that the wastegate valve lever does not collide with the V-band clamp.

cardiagn.com

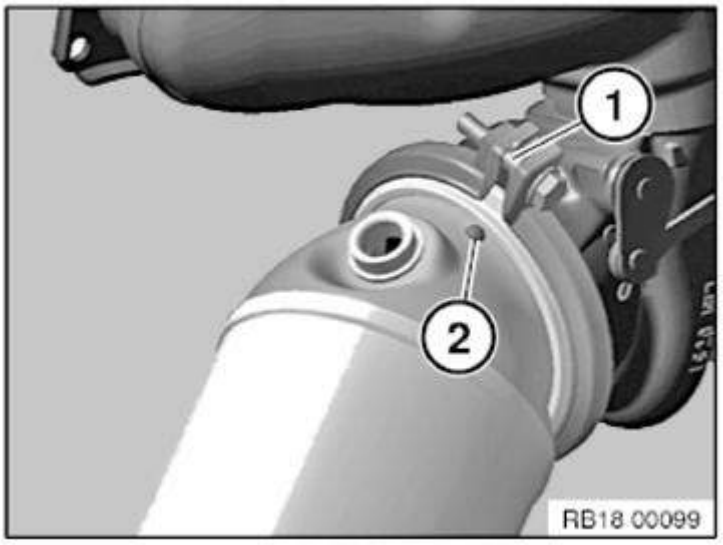


Fig. 81: Identifying Catalytic Converter Separation Point
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts (1).

Tightening torque: **18 20 1AZ** .

Unfasten screws (2).

Tightening torque: **18 20 2AZ** .

Unscrew nuts (3).

Tightening torque: **18 20 1AZ** .

Remove holder for catalytic converter.

Pull off rubber mounts from the catalytic converter.

Pull out catalytic converter towards the bottom and remove.

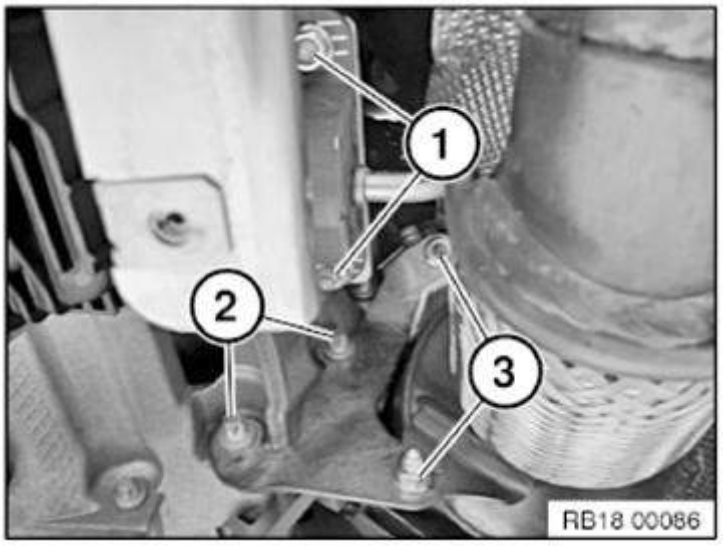


Fig. 82: Identifying Catalytic Converter Nut And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

cardiagn.com

Check exhaust system for leaks.

18 32 050 REMOVING AND INSTALLING/REPLACING CATALYTIC CONVERTER (N55)

WARNING: **Risk of burning!**
Only perform this repair work after the exhaust system has cooled down.

Necessary preliminary work:

- Remove front **UNDERBODY PROTECTION** .
- Remove **EXHAUST SYSTEM**.

NOTE: **There is a risk of damaging the oxygen sensor while removing and installing the catalytic converters.**

REMOVE THE CONTROL SENSOR .

Release clamp (1). The clamp must be renewed every time it is removed.

Tightening torque: **18 31 2AZ** .

Installation note:

Clean sealing surface. Renew clamp and seal.

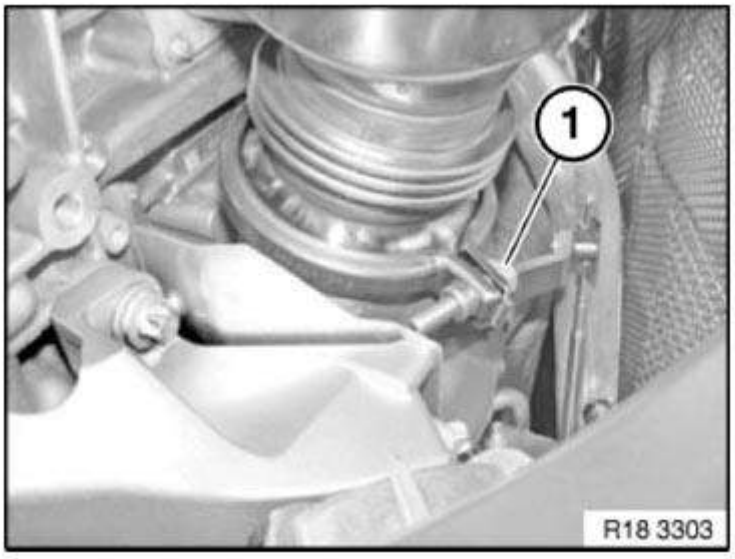


Fig. 83: Identifying Catalytic Converter Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip cable (2) from monitor sensor out of holder.

cardiagn.com

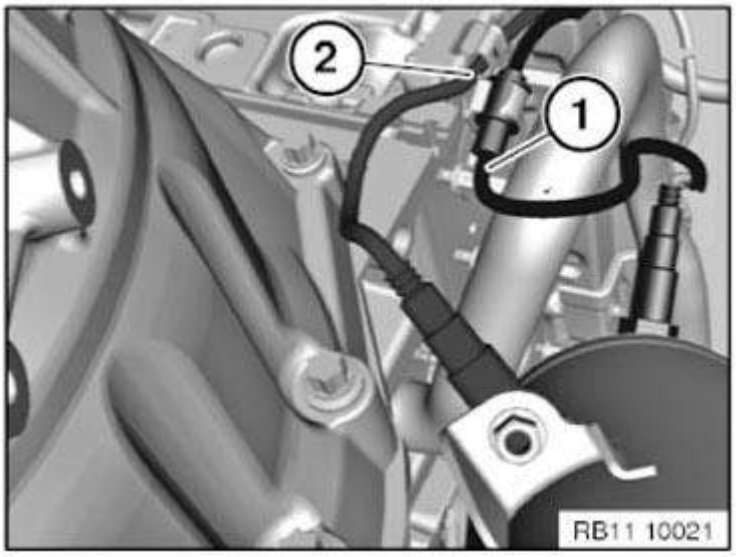


Fig. 84: Identifying Monitor Sensor Cable
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Tightening torque: **18 20 1AZ** .

Feed out catalytic converter (2) and remove.

In so doing, secure catalytic converter against falling out.

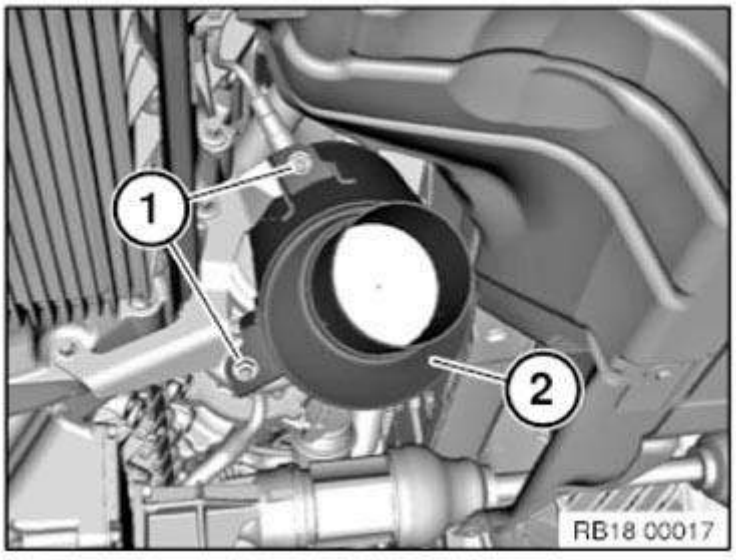


Fig. 85: Identifying Catalytic Converter And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Reinstall **MONITOR SENSOR** when replacing the catalytic converter.

Reassemble the vehicle.

Check exhaust system for leak tightness.

EXHAUST MANIFOLD WITH INTEGRATED CATALYTIC CONVERTER

18 40 040 REMOVING AND INSTALLING, SEALING/REPLACING EXHAUST MANIFOLD (N47 D20 O 1)

cardiagn.com

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Necessary preliminary tasks:

- Remove **EXHAUST TURBOCHARGER** .

Release screws (1).

Tightening torque: **11 71 1AZ** .

Do **not** release screws (2).

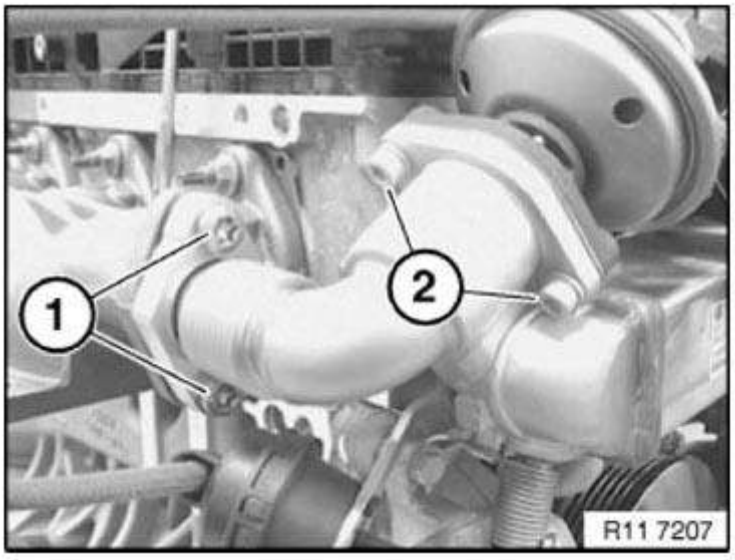


Fig. 86: Identifying Exhaust Manifold Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque: **18 31 5AZ** .

Unfasten banjo bolt (2).

Tightening torque: **13 62 7AZ** .

Replace sealing rings.

IMPORTANT: To ensure operational reliability, use stainless steel sealing washers.

Set exhaust pressure pipe onto its side.

Release screw (3).

Tightening torque: **18 31 6AZ** .

Remove heat shield (4).

cardiagn.com

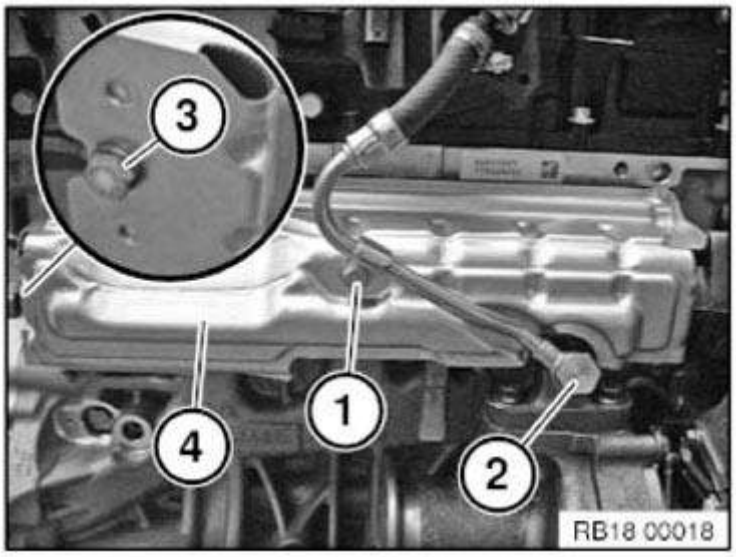


Fig. 87: Identifying Heat Shield, Banjo Bolt And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release nuts along dashed line (1).

Tightening torque: **11 62 1AZ** .

Remove exhaust manifold (2) from cylinder head.

Installation note:

Clean connection points.

Replace gaskets.

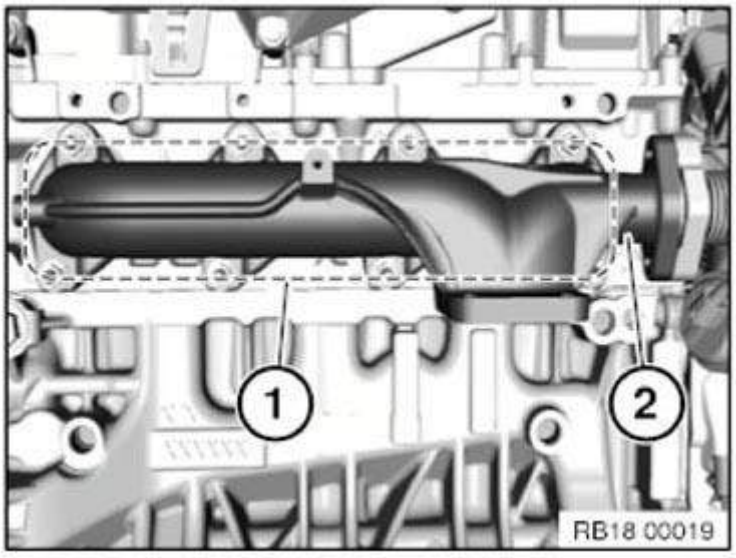


Fig. 88: Identifying Exhaust Manifold
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Manifold gaskets are graphite-coated on one side!

The graphite coating must be fitted on the manifold side.

cardiagn.com

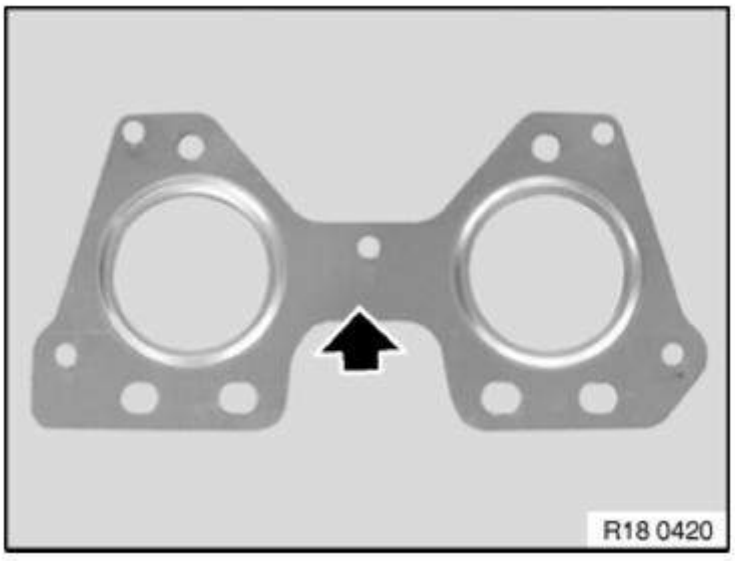


Fig. 89: Locating Manifold Gaskets
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check function of DDE.

18 40 050 REMOVING AND INSTALLING/REPLACING FRONT EXHAUST MANIFOLD (N52T)

Necessary preliminary work:

- Remove complete **EXHAUST SYSTEM**.
- Remove right **ENGINE SUPPORT ARM** .

NOTE: **The oxygen sensors are in danger of being damaged when the exhaust manifolds are removed and installed.**

Remove **CONTROL SENSOR** from cylinders 1 to 3.

Remove **MONITORING SENSOR** from cylinders 1 to 3.

Unscrew nuts.

Remove exhaust manifold (1).

Installation note:

Clean sealing surfaces and replace seals.

Replace nuts.

Tightening torque: **18 40 1AZ** .

cardiagn.com

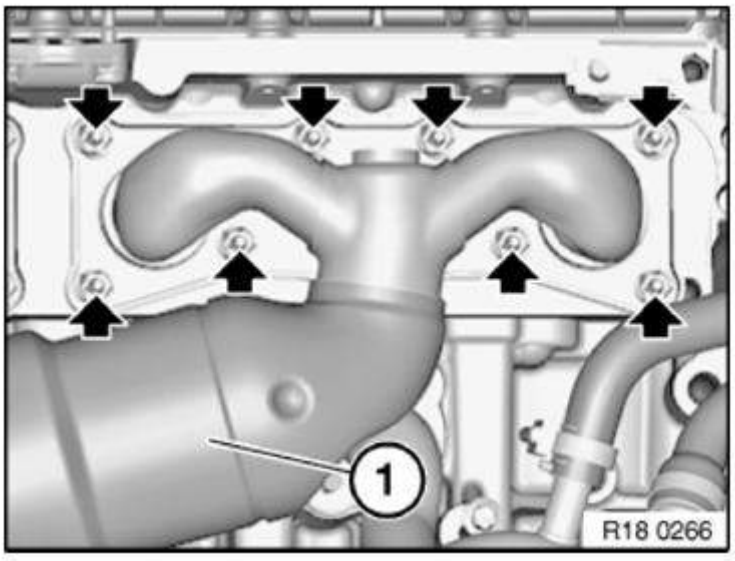


Fig. 90: Locating Exhaust Manifold Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check exhaust system for leak tightness.

18 40 060 REMOVING AND INSTALLING/REPLACING REAR EXHAUST MANIFOLD (N52T)

Necessary preliminary work:

- Remove **COMPLETE EXHAUST SYSTEM**.
- Remove **REINFORCEMENT PLATE** .
- Remove rear **UNDERBODY PROTECTION** .

NOTE: **The oxygen sensors are in danger of being damaged when the exhaust manifolds are removed and installed.**

Remove **CONTROL SENSOR** from cylinders 4 to 6.

Remove **MONITORING SENSOR** from cylinders 4 to 6.

Unscrew nuts.

Remove exhaust manifold (1).

Installation note:

Clean sealing surfaces and replace seals.

Replace nuts.

Tightening torque: **18 40 1AZ** .

cardiagn.com

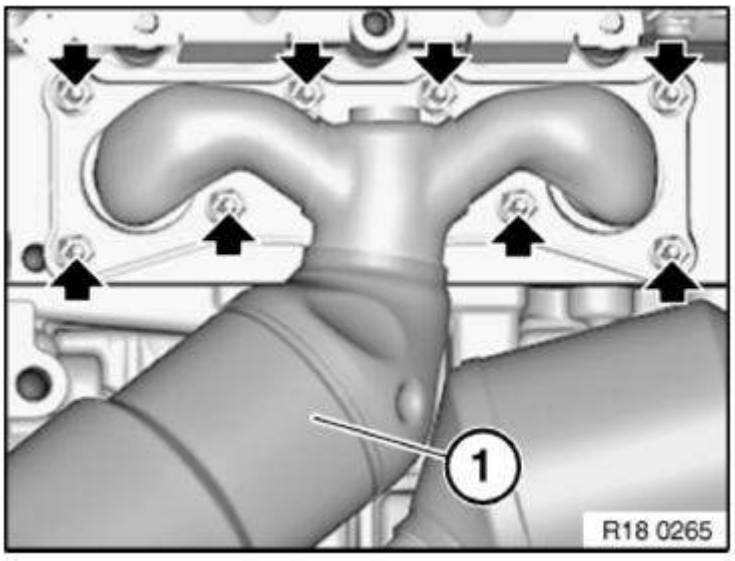


Fig. 91: Locating Exhaust Manifold Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check exhaust system for leak tightness.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702202

cardiagn.com

EXHAUST SYSTEM

0491415 ANGLE

0491415 180002 Angle AM

0493427 DEVICE

0493427 180050 Device Mechanical tool

NOTE: **(Pulling-off device) For pulling off connections of positive and negative lines on electrically heated catalytic converter**

Storage Location

A43

SI number

01 19 98 (370)

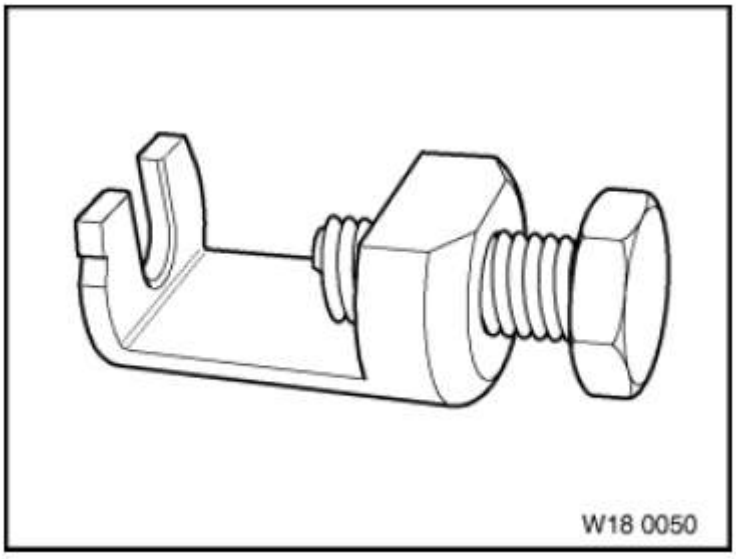


Fig. 1: Identifying Device (0493427)
Courtesy of BMW OF NORTH AMERICA, INC.

0491414 GAUGE

0491414 180001 Gauge AM

0491413 GAUGE

0491413 180000 Gauge AM

NOTE: **(Exhaust gauge) Model: 323i/model year: 80**

Consisting of:

1. 0491414 Gauge
2. 0491415 Angle

cardiagn.com

0495487 SOCKET WRENCH

0495487 180100 Socket wrench AM

NOTE: **(Socket wrench) Socket wrench set For removal and installation of the diesel particulate filter.**

Storage Location

A20

SI number

01 27 05 (235)

Consisting of:

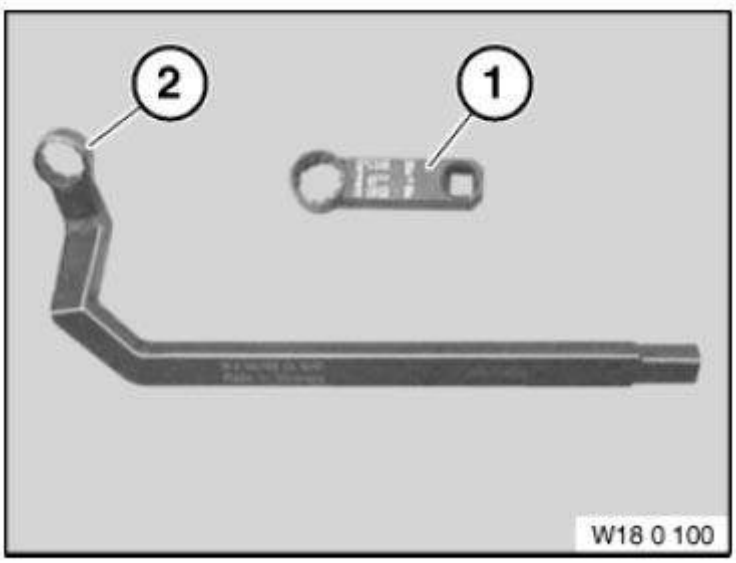


Fig. 2: Identifying Socket Wrench (0495487)
Courtesy of BMW OF NORTH AMERICA, INC.

1. 0495499 Socket wrench

   NOTE: **(Socket wrench) short version**

2. 0495500 Socket wrench

   NOTE: **(Socket wrench) offset version**

0495499 SOCKET WRENCH

0495499 180101 Socket wrench AM

NOTE: **(Socket wrench) short version**

SI number

01 27 05 (235)

cardiagn.com

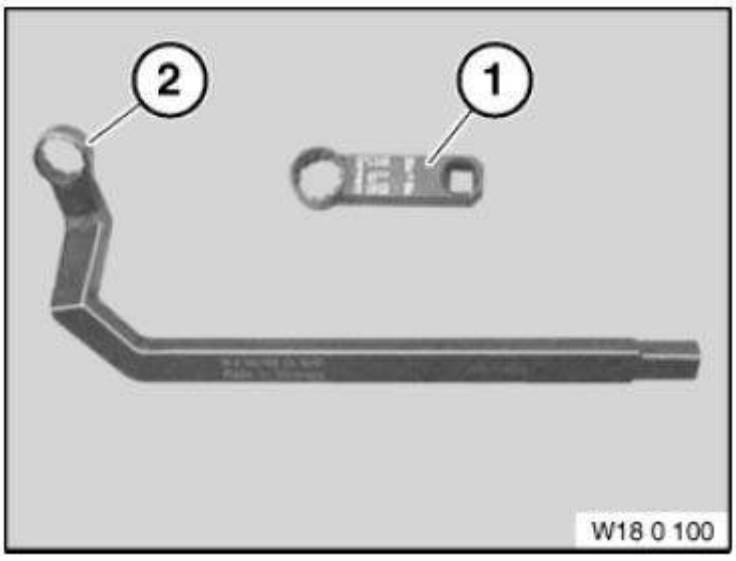


Fig. 3: Identifying Socket Wrench (0495499)
Courtesy of BMW OF NORTH AMERICA, INC.

0495500 SOCKET WRENCH

0495500 180102 Socket wrench AM

NOTE: **(Socket wrench) offset version**

SI number

01 27 05 (235)

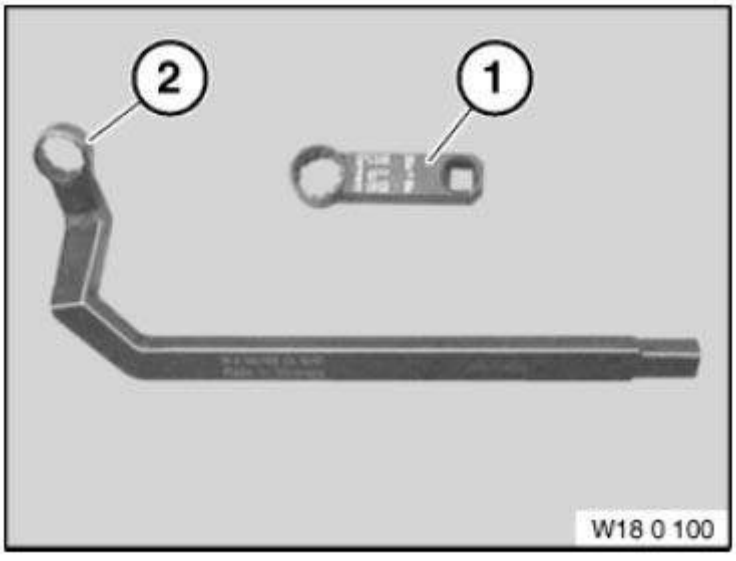


Fig. 4: Identifying Socket Wrench (0495500)
Courtesy of BMW OF NORTH AMERICA, INC.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702115

cardiagn.com

ENGINE

Exhaust System - Tightening Torques - X3 Utility

EXHAUST MANIFOLD (N52T)

18 40 EXHAUST MANIFOLD

TIGHTENING TORQUE SPECIFICATION - EXHAUST MANIFOLD

Â	Type	Thread	Tightening specifications	Dimension
1AZ Exhaust manifold to cylinder head	N52T	M7 nut	Replace nuts.	20 Nm

EXHAUST PIPE (N47)

18 31 EXHAUST PIPE (N47 D20 O1)

TIGHTENING TORQUE SPECIFICATION - EXHAUST PIPE (N47 D20 O1)

Â	Type	Thread	Tightening specifications	Dimension
1AZ Exhaust system to turbocharger	N47 D20 O1	M8	If necessary, replace clamp.	15 Nm
2AZ Diesel particulate filter/primary catalytic converter to exhaust system	N47 D20 O1	Clamp	If necessary, replace clamp.	55 Nm
3AZ Clamping sleeve	N47 D20 O1	Â	Â	45 Nm
4AZ Pressure hose to the exhaust backpressure sensor or exhaust backpressure pipe	N47 D20 O1	Â	Â	3 Nm
5AZ Pressure pipe to exhaust manifold	N47 D20 O1	M6	Â	8 Nm
6AZ Heat shield to exhaust manifold	N47 D20 O1	M6	Â	8 Nm

EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM (N55)

18 31 EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM

TIGHTENING TORQUE SPECIFICATION - EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM

Â	Type	Thread	Tightening specifications	Dimension
1AZ Exhaust system to catalytic converter	N55	Â	Clamp	55 Nm
2AZ Front pipe with catalytic converter to turbocharger	N55	M8 x 40	Replace V-band clamp.	13 Nm
3AZ Exhaust system to body	N55	M8	Â	21 Nm
4AZ Turbo module with exhaust manifold to cylinder head	N55	M7	Â	13 Nm
5AZ Clamp between center silencer and rear silencer	N55	M10	Â	45 Nm
6AZ Clamp between front pipe and center silencer	N55	M10	Â	45 Nm

EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM (N52T)

cardiagn.com

18 31 EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM

TIGHTENING TORQUE SPECIFICATION - EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Exhaust system to front pipe with exhaust manifold	N52T	M10	Â	45 Nm
2AZ	Exhaust system to body	N52T	M8	Â	21 Nm
3AZ	Preliminary pipe bracket to transmission	N52T	M6	Â	21 Nm
4AZ	Clamp to exhaust system	N52T	M10	Â	45 Nm

EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM (N20)

18 31 EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM

TIGHTENING TORQUE SPECIFICATION - EXHAUST PIPE WITH CATALYTIC CONVERTER/COMPLETE SYSTEM

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Exhaust system to catalytic converter	N20	M8	Â	26Â±2 Nm
		N26	M8	Â	25 Nm
2AZ	Catalytic converter to turbocharger	N20/N26	M8	Replace clamp	13 Nm
3AZ	Exhaust system to rear axle final drive	N20/N26	M12	Â	35 Nm
4AZ	Clamp	N20/N26	Â	Â	45 Nm
5AZ	Exhaust system to body	N20/N26	M8	Â	21 Nm
6AZ	Exhaust system on transmission cross-member	N20/N26	M8	Â	21 Nm
7AZ	Actuator drive for exhaust system to exhaust system	N20/N26	M6	Â	9 Nm

EXHAUST SUSPENSION (N47)

18 20 EXHAUST SUSPENSION (N47 D20 O1)

TIGHTENING TORQUE SPECIFICATION - EXHAUST SUSPENSION (N47 D20 O1)

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Diesel particulate filter to support	N47 D20 O1	M8 nut	Â	21 Nm
2AZ	Strut, top, to diesel particulate filter	N47 D20 O1	M8x20	Â	21 Nm
3AZ	Holder to rear axle final drive	N47 D20 O1	M12x20	Â	30 Nm
4AZ	Rear silencer to body	N47 D20 O1	M8	Â	21 Nm
5AZ	Diesel particulate filter holder to gearbox	N47 D20 O1	M8	Â	21 Nm

EXHAUST SYSTEM SUSPENSION (N52T)

18 20 EXHAUST SYSTEM SUSPENSION

TIGHTENING TORQUE SPECIFICATION - EXHAUST SYSTEM SUSPENSION

cardiagn.com

Â	Type	Thread	Tightening specifications	Dimension
1AZ Exhaust system to body	N52T	M8	Â	21 Nm
2AZ Exhaust system to rear axle final drive	N52T	M8	Â	21 Nm
3AZ Rear silencer to body	N52T	M8	Â	21 Nm

EXHAUST SYSTEM SUSPENSION (N20)

18 20 EXHAUST SYSTEM SUSPENSION

TIGHTENING TORQUE SPECIFICATION - EXHAUST SYSTEM SUSPENSION

Â	Type	Thread	Tightening specifications	Dimension
1AZ Catalytic converter to holder	N20/N26	M8	Â	28 Nm
2AZ Holder, catalytic converter to transmission	N20/N26	M10	Â	56 Nm
3AZ Clamp to exhaust system	N20/N26	M10	Â	45 Nm
4AZ Reinforcement plate to body	N20/N26	M8	Â	28 Nm
5AZ Tension strut to compression strut	N20/N26	Â	Replace screws. Jointing torque Angle of rotation	Â 100 Nm 90 Â°

EXHAUST SYSTEM SUSPENSION (N55)

18 20 EXHAUST SYSTEM SUSPENSION

TIGHTENING TORQUE SPECIFICATION - EXHAUST SYSTEM SUSPENSION

Â	Type	Thread	Tightening specifications	Dimension
1AZ Catalytic converter to holder	N55	M8	Â	19 Nm
2AZ Exhaust system to transmission	N55	M8	Â	21 Nm
3AZ Exhaust system to rear axle final drive	N55	M12	Â	35 Nm

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702164

cardiagn.com

ENGINE

Fuel Supply System - Repair - X3 Utility

DRAWING OFF OF FUEL, SYSTEM CLEANING

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.**

Necessary preliminary work:

- Remove rear right WHEEL ARCH TRIM .

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 Â°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.

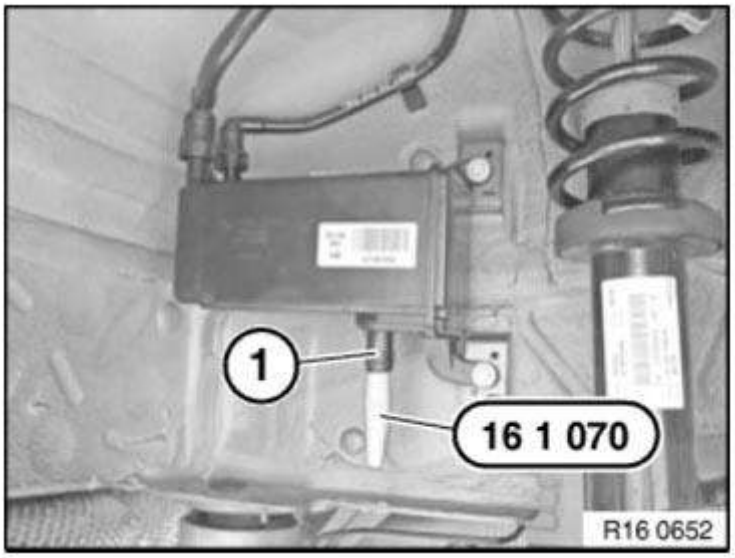


Fig. 1: Identifying Special Tool (16 1 070)
Courtesy of BMW OF NORTH AMERICA, INC.

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

Using thumbwheel (1), clamp special tool 16 1 174 to fuel filler neck.

cardiagn.com

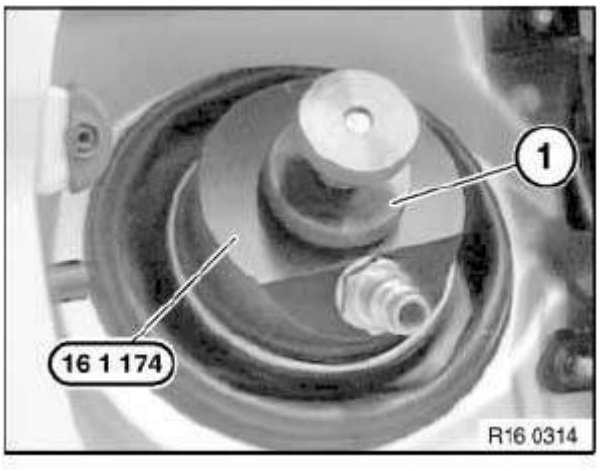


Fig. 2: Connecting Special Tool (16 1 174) To Fuel Filler Neck
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Turn pressure regulator on special tool **16 1 171** anticlockwise as far as the stop.

Using compressed air line (1), connect special tool **16 1 171** to workshop compressed air system (8... 10 bar).

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

IMPORTANT: Do **not** connect quick-release coupling (3) of special tool **16 1 171** as yet.

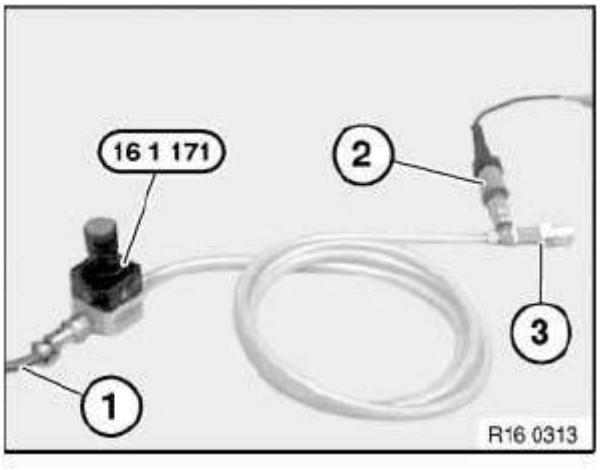


Fig. 3: Identifying Pressure Sensor, Air Line, Quick Release Coupling And Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

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** , increase pressure by 0.050 bar.

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

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

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 the fuel tank venting system.

Using special tool **13 3 010** , disconnect delivery line (1) from special tool **16 1 171** to fuel filler neck.

cardiagn.com

Allow a rest period of approx. 20 sec.

Read off and note down starting pressure value.

Approx. Wait 60 seconds.

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

Measurement evaluation:

Pressure drop between 0.008 and 0.010 bar.	**Repeat measurement.**
Pressure drop in 60 secs. greater than 0.010 bar.	System leaking beyond permitted levels. CARRY OUT LEAK TEST.

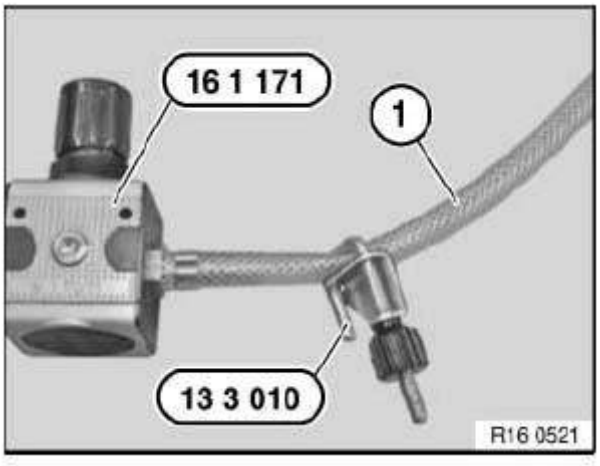


Fig. 4: Identifying Special Tool (13 3 010) And (16 1 171)
Courtesy of BMW OF NORTH AMERICA, INC.

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

On vehicles with tank leak diagnosis modules (DMTL), do not work with external pressurization as the tank ventilation system will leak under this condition.

IMPORTANT: On account of emerging fuel vapors, carry out all work in well ventilated rooms. Or use a suitable extractor system.
Observe country-specific accident prevention and occupational safety regulations.

NOTE: **The following procedure is only applicable to vehicles with the tank leak diagnosis module (DMTL).**
For vehicles without tank leak diagnosis module:
Pressurize FUEL TANK AND TANK VENTING SYSTEM.
During the leak test with a leak detector, be sure to follow the operating instructions of the equipment manufacturer.

NOTE: **Select "Tank leak diagnosis module (DMTL)" on Diagnosis and Information System (DIS).**

- **The leak diagnosis pump pressurizes the fuel tank and tank ventilation system for 30 sec.**
- **If pressure is needed for longer than 30 sec., press "Activate" button again after 30 sec.**

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

cardiagn.com

Possible causes may be:

- Tank cap leaking (check **TANK CAP PRESSURE RELIEF VALVE**)
- Tank ventilation lines leaky (fuel tank-activated carbon canister-tank ventilation valve)
- Tank ventilation valve leaky (engine compartment)
- Fuel level sensor flange on tank leaking

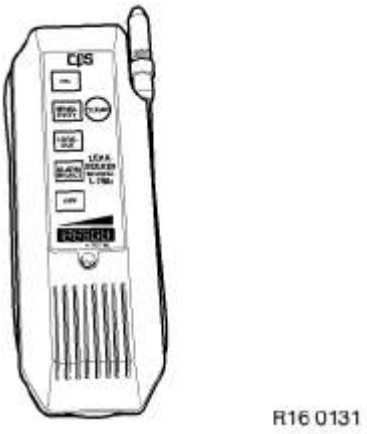


Fig. 5: Identifying Fuel Level Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

16 00 005 DRAINING AND FILLING FUEL TANK

Special tools required:

- **16 1 080**

Observe country-specific safety regulations.
Ensure adequate ventilation in the workbay!
Connect the exhaust and extraction systems to the exhaust tailpipe.
IMPORTANT: 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 fuel tank has been run dry or emptied, 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 re-pumped 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 amount is drawn off via the service opening.

Insert special tool **16 1 080** into fuel filler neck.

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

cardiagn.com

Slide extraction hose of extractor unit through special tool **16 1 080** into the fuel filler pipe, turning in the process if necessary.

Insertion length approx. 150 cm.

Draw off fuel with suction unit as far as possible.

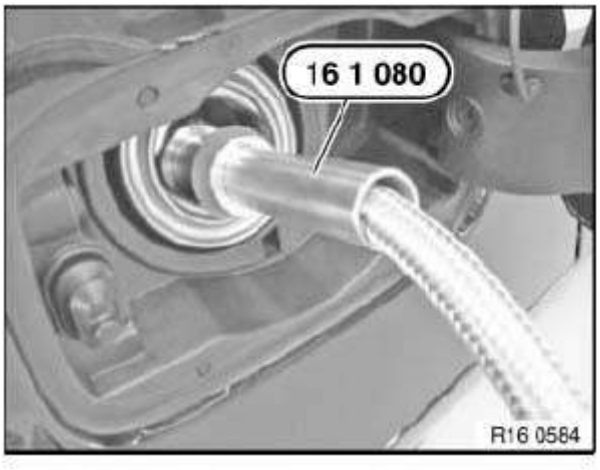


Fig. 6: Inserting Special Tool (16 1 080) Into Fuel Filler Neck
Courtesy of BMW OF NORTH AMERICA, INC.

Follow fuel extraction on fuel gauge in instrument cluster.

Drawing off residual fuel quantity:

Drawing off residual fuel amount is not included in the time value of this operation.

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

Remove **fuel pump** . See **16 14 200 REMOVING AND INSTALLING OR REPLACING FUEL PUMP**.

Draw off residual fuel quantity through service openings.

Fuel filling:

Insert special tool **16 1 080** into fuel filler neck.

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

Slide extraction hose of extractor unit, approx. 40 cm into fuel filler pipe.

Fill fuel from suction extractor unit.

cardiagn.com

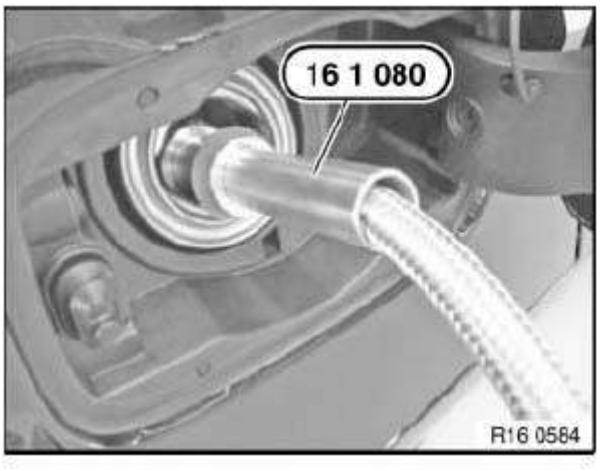


Fig. 7: Inserting Special Tool (16 1 080) Into Fuel Filler Neck
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Extracting fuel after a defect in the suction jet pump or fuel pump:
The fuel tank has only one service opening on the right.

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

Remove **fuel pump** . See **16 14 200 REMOVING AND INSTALLING OR REPLACING FUEL PUMP**.

Feed the fuel extraction hose through the service opening on the right into the left tank half.

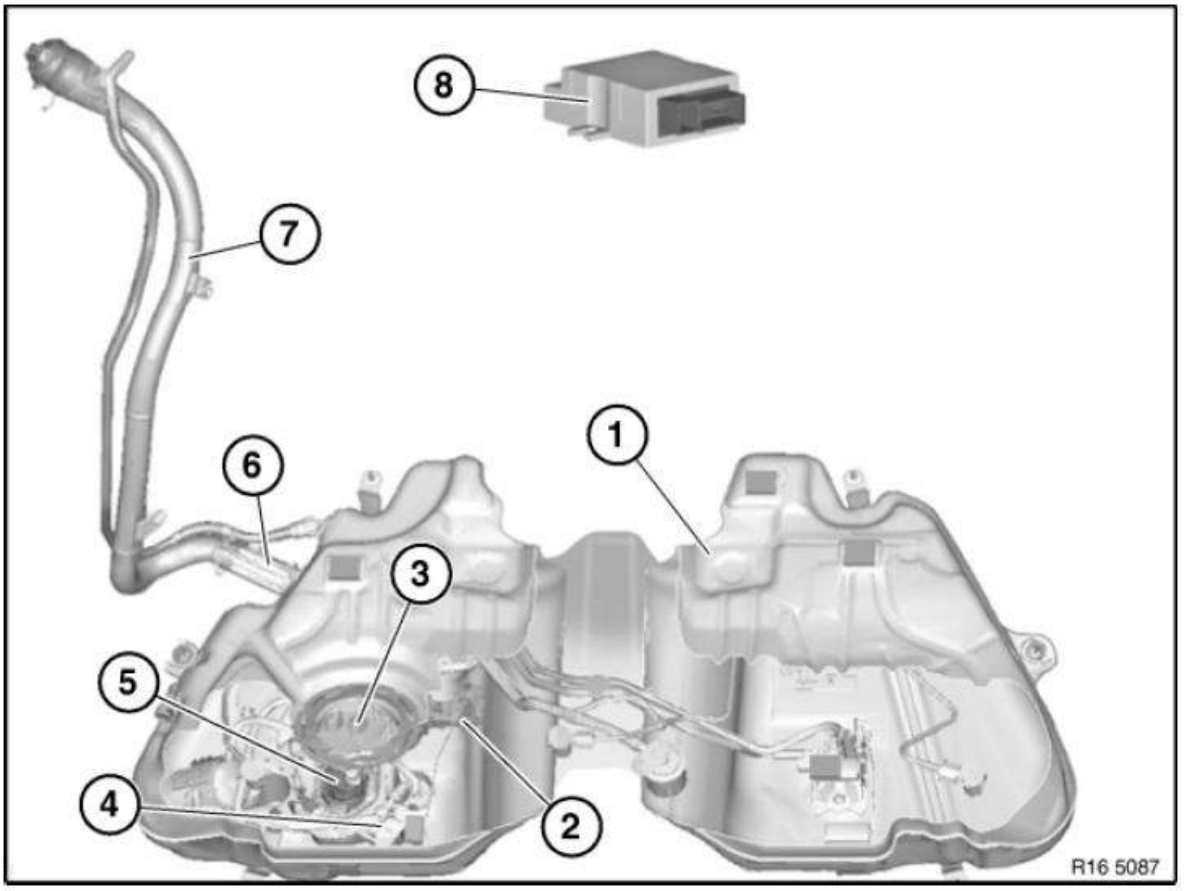
Extract as much fuel as possible.

16 19 075 FILLING SCR RESERVOIR

See **16 19 075 FILLING SCR RESERVOIR**.

16 00.. OVERVIEW OF FUEL SUPPLY SYSTEM (DIESEL)

cardiagn.com

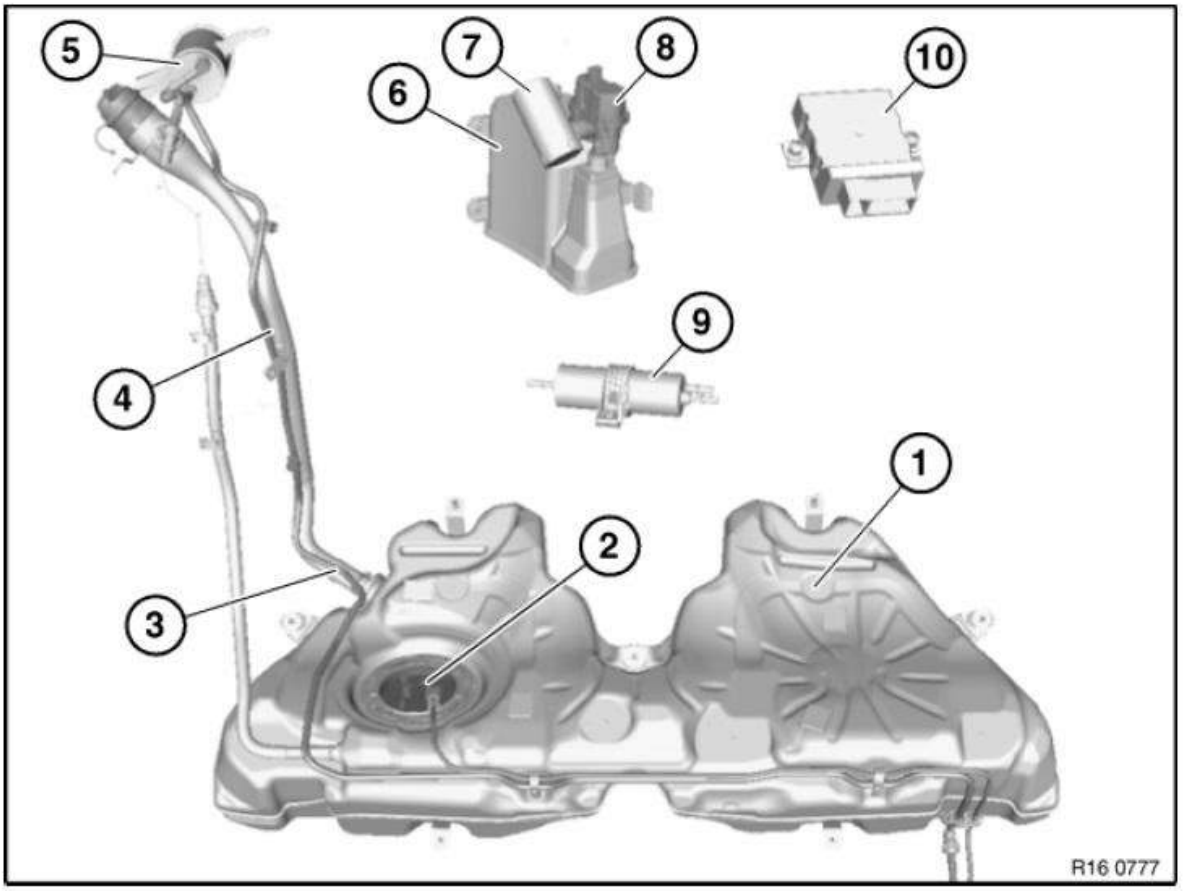


1	Fuel tank	5	Fuel pump
2	Tank fill level sensor	6	Filling hose
3	Flange cover	7	Fuel filler pipe
4	Pressure regulator	8	Control unit for electric fuel pump

Fig. 8: Overview Of Fuel Supply System (Diesel)
Courtesy of BMW OF NORTH AMERICA, INC.

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

cardiagn.com



1	Fuel tank	6	Carbon canister (US version)
2	Fuel pump Fuel level sensor	7	Dust filter (US version)
3	Filling hose	8	Tank leak diagnosis module (US version)
4	Fuel filler pipe	9	Fuel filter (outer)
5	Carbon canister	10	Control unit for electric fuel pump

Fig. 9: Overview Of Fuel Supply System (Petrol/Gasoline)
Courtesy of BMW OF NORTH AMERICA, INC.

FUEL TANK WITH MOUNTING

16 11 130 CHECKING FILLER CAP PRESSURE RELIEF VALVE

Special tools required:

- 13 3 010
- 16 1 171
- 16 1 172

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

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

Connect pressure sensor (2) from Diagnosis and Information System.

cardiagn.com

Connect special tool 16 1 172 to quick-release coupling (3).

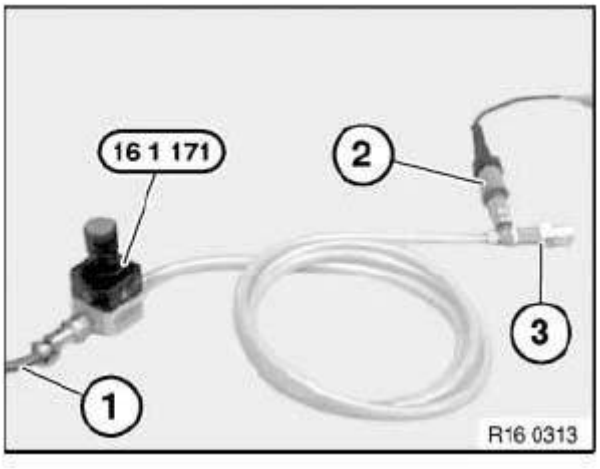


Fig. 10: Identifying Pressure Sensor, Air Line, Quick Release Coupling And Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

Install fuel filler cap on special tool 16 1 172 .



Fig. 11: Identifying Special Tools (16 1 172) And (16 1 173)
Courtesy of BMW OF NORTH AMERICA, INC.

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/Pressure" function on Diagnosis and Information System (DIS).

Using pressure regulator on special tool 16 1 171 , increase pressure by 0.2 bar.

Using special tool 13 3 010 clamp off feed line from special tool 16 1 171 .

Read off and note down pressure.

Wait 60 seconds.

Read off pressure again and compare with starting pressure value.

Measurement evaluation:

cardiagn.com

Pressure drop > 0.012 bar	Test equipment leaking. Check connection points for leaks.

Check fuel filler cap pressure relief valve!

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

Using pressure regulator on special tool **16 1 171** , increase pressure by 0.3 bar.

Using special tool **13 3 010** clamp off feed line from special tool **16 1 171** .

Read off and note down pressure.

Wait 60 seconds.

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

Measurement evaluation:

Pressure drop > 0.012 bar	Filler cap pressure relief valve faulty. Replace filler cap.

16 11 060 REMOVING AND INSTALLING OR REPLACING FUEL FILLER PIPE (DIESEL)

Recycling

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

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
Before starting the engine for the first time:

IMPORTANT:

- 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 work:

- Extract **FUEL** from fuel tank
- Remove **REAR RIGHT WHEEL ARCH TRIM** .
- Remove **REAR RIGHT UNDERBODY PANELLING** .

Unhook retaining strap (1) from tank flap.

Open cap and set to one side.

cardiagn.com

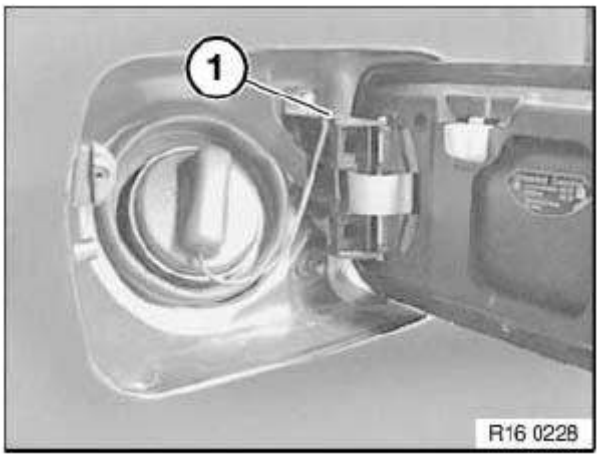


Fig. 12: Identifying Retaining Strap
Courtesy of BMW OF NORTH AMERICA, INC.

Release hexagon nut (2).

Installation note:

Tightening torque: **16 12 2AZ** .

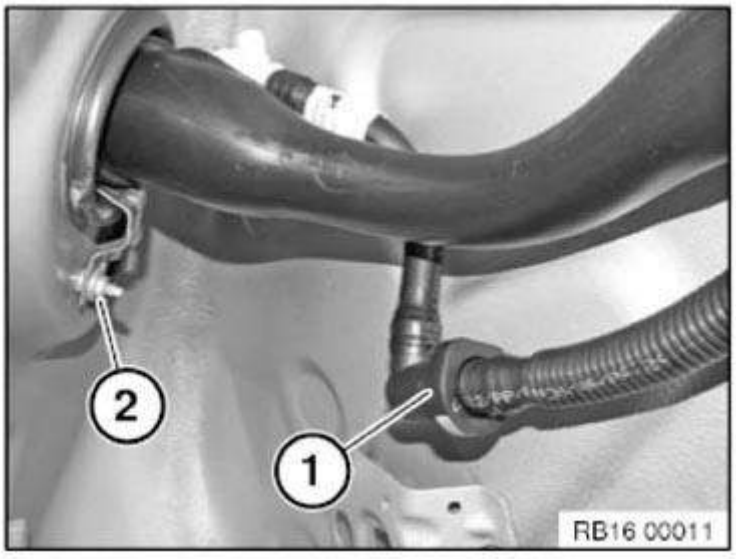


Fig. 13: Identifying Fuel Filler Pipe Hexagon Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip line holder (1).

Release plastic nut (2).

Installation note:

Check plastic nut (2), replace if necessary.

Tightening torque: **16 12 2AZ** .

cardiagn.com

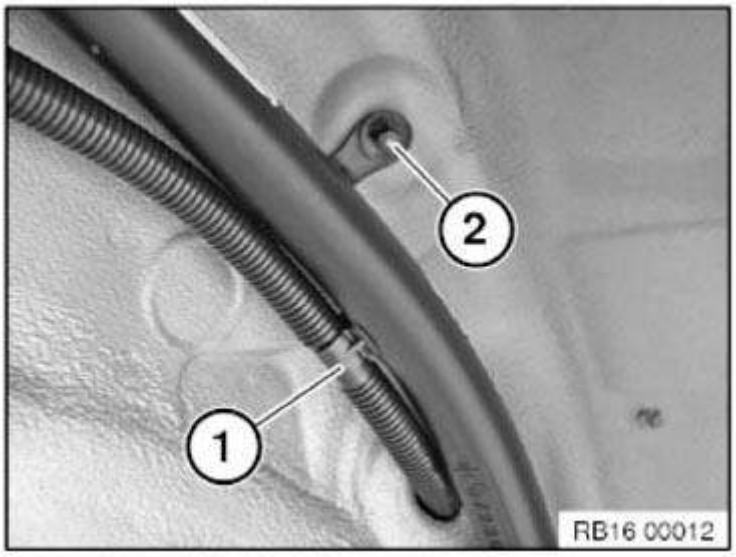


Fig. 14: Identifying Fuel Filler Pipe Line Holder And Plastic Nut
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: There may be residual amounts of fuel in the tank!
Catch escaping fuel in a suitable container.

Release hose clamp (1) and remove fuel filler neck.

Installation note:

Check hose clamp, replace if necessary.

Tightening torque: **16 12 1AZ** .

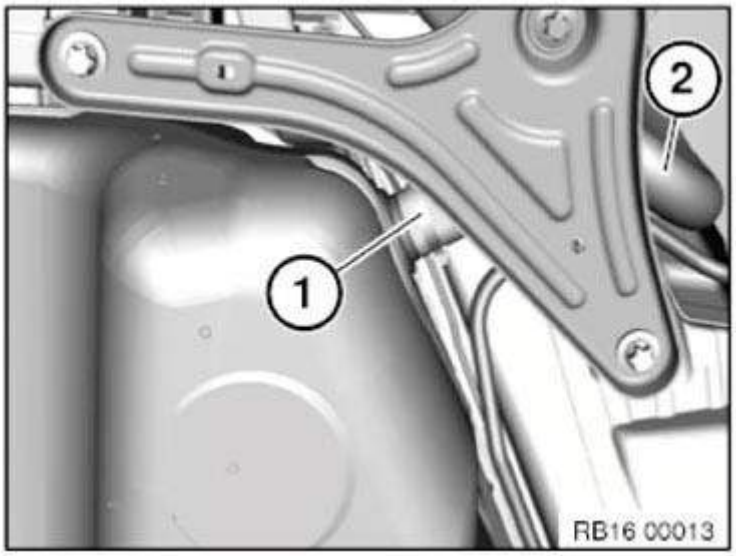


Fig. 15: Identifying Fuel Filler Hose Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Release ear hose clamp (1).

Installation note:

Replace ear hose clamp

cardiagn.com

Detach filler hose (2) from fuel filler pipe (3).

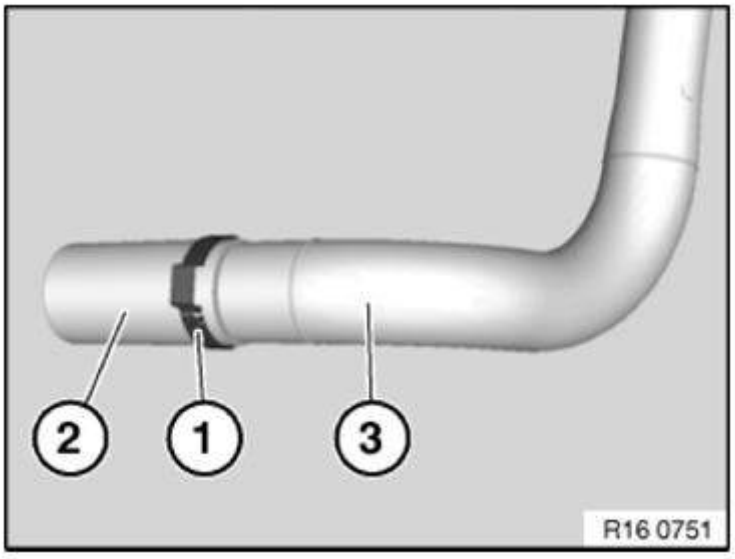


Fig. 16: Identifying Ear Hose Clamp, Filler Hose And Fuel Filler Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

16 11 060 REMOVING AND INSTALLING OR REPLACING FUEL FILLER PIPE (PETROL/GASOLINE)

Recycling

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

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
Before starting the engine for the first time:

IMPORTANT:

- 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 work:

- Extract **FUEL** from fuel tank.
- Remove **REAR RIGHT WHEEL ARCH TRIM** .
- **REMOVE** rear right underbody panelling.

Unhook retaining strap (1) from tank flap.

Open cap and set to one side.

cardiagn.com

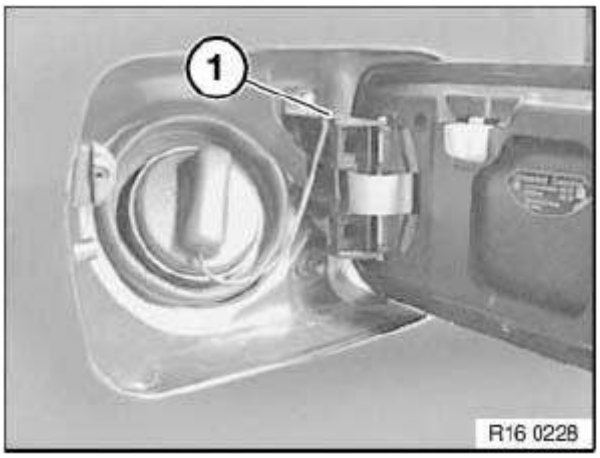


Fig. 17: Identifying Fuel Tank Retaining Strap
Courtesy of BMW OF NORTH AMERICA, INC.

Release hexagon nut (2).

Installation note:

Tightening torque: **16 12 2AZ** .

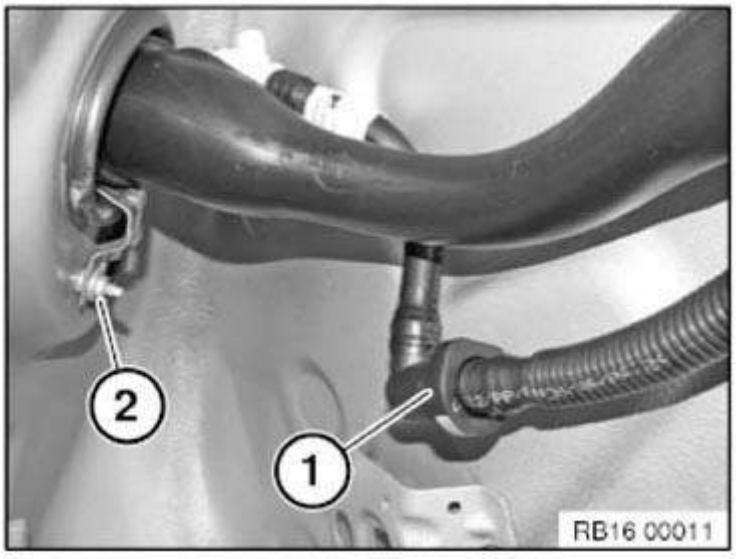


Fig. 18: Identifying Fuel Filler Pipe Hexagon Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip line holder (1).

Release plastic nut (2).

Installation note:

Check plastic nut (2), replace if necessary.

Tightening torque: **16 12 2AZ** .

cardiagn.com

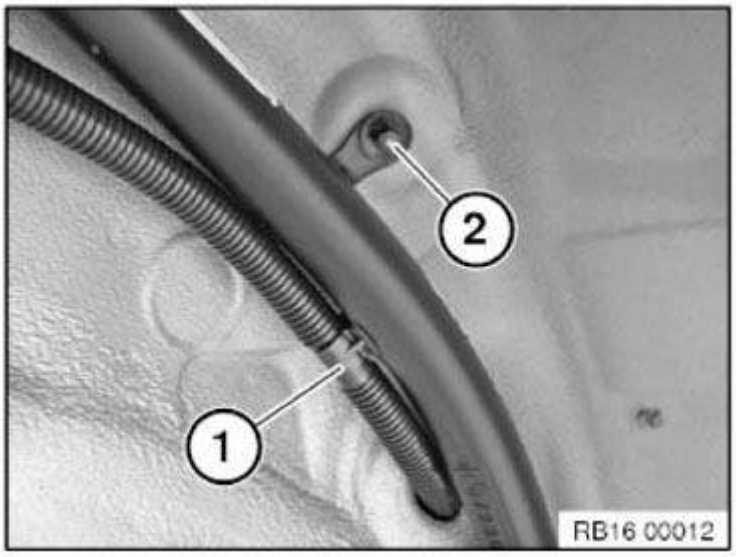


Fig. 19: Identifying Fuel Filler Pipe Line Holder And Plastic Nut
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: There may be residual amounts of fuel in the tank!
Catch escaping fuel in a suitable container.

Release hose clamp (1) and remove fuel filler neck.

Installation note:

Check hose clamp, replace if necessary.

Tightening torque: **16 12 1AZ** .

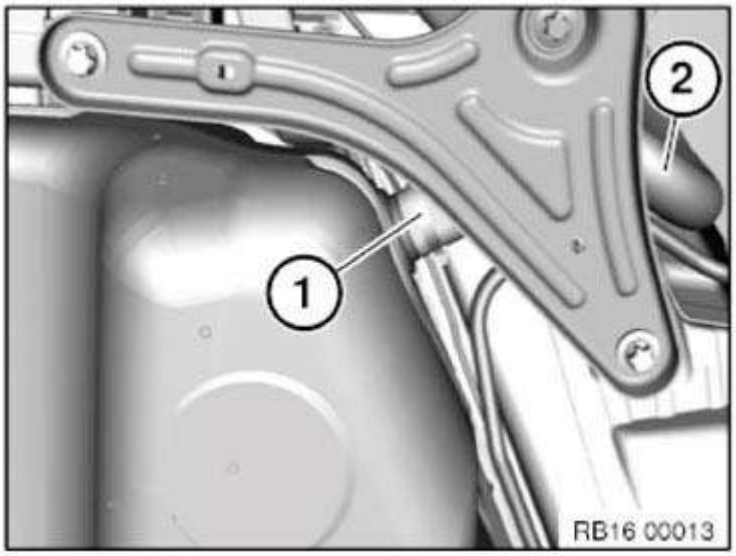


Fig. 20: Identifying Fuel Filler Hose Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

Release ear hose clamp (1).

Installation note:

Replace ear hose clamp

cardiagn.com

Detach filler hose (2) from fuel filler pipe (3).

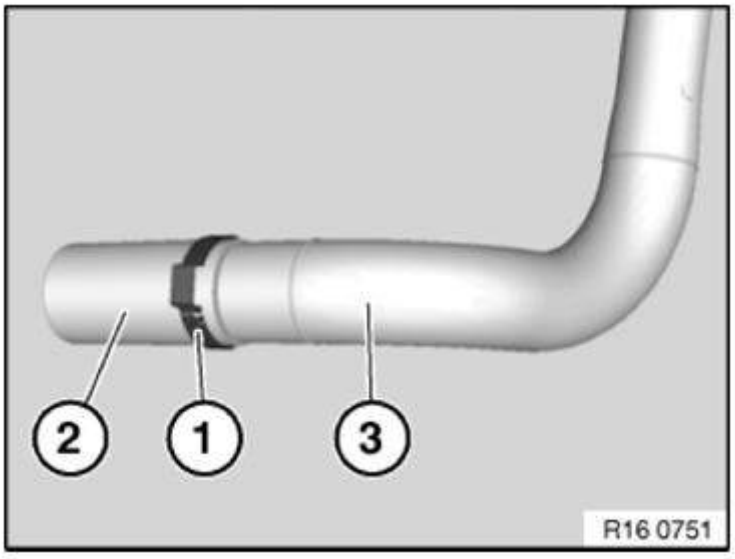


Fig. 21: Identifying Ear Hose Clamp, Filler Hose And Fuel Filler Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

16 11 030 REMOVING AND INSTALLING/REPLACING FUEL TANK (DIESEL)

Recycling

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

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
After installation of fuel tank/prior to first engine start-up:

IMPORTANT:

- Check earth 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.

Necessary preliminary tasks:

- Extract **FUEL** from fuel tank
- Remove **REAR SEAT BENCH** .
- Remove rear right **WHEEL ARCH PANEL** .
- Remove **PROPELLER SHAFT** .
- Remove **COMPRESSION STRUT** on left and right.
- Remove **UNDERBODY PANELLING** , rear left and right.

Fold floor trim (1) to one side.

Unscrew nuts (2).

Remove cover for service opening (3).

cardiagn.com

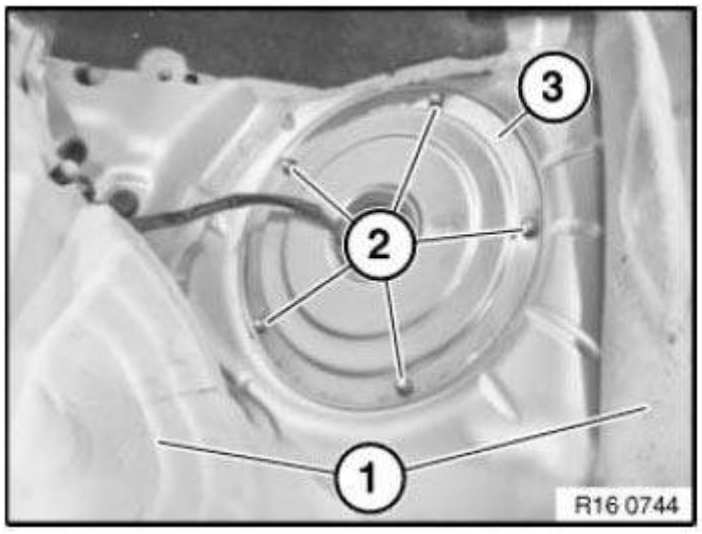


Fig. 22: Identifying Floor Trim Panels, Service Opening And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Disconnect fuel lines (2).

If necessary, disconnect fuel line for auxiliary heating.

Installation note:

Check gasket (3), replace if necessary.

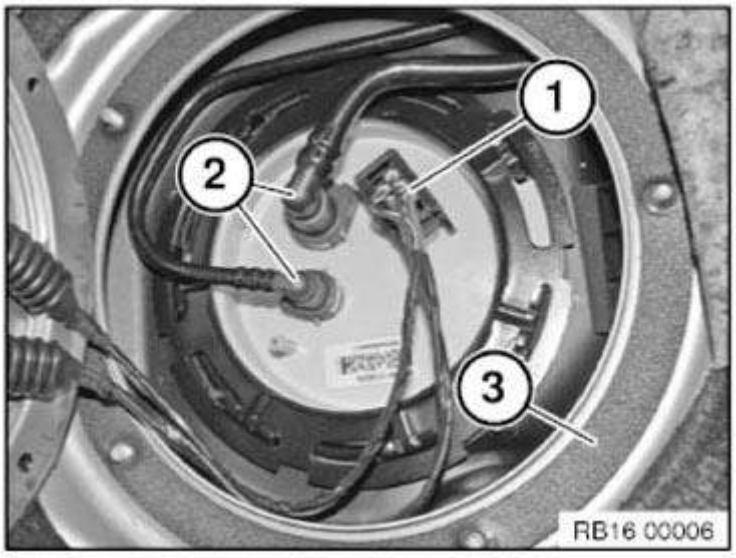


Fig. 23: Identifying Fuel Lines, Plug Connection And Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip line clip (1).

Release plastic nut (2).

Installation note:

Check plastic nut (2), replace if necessary.

Tightening torque: **16 12 2AZ** .

cardiagn.com

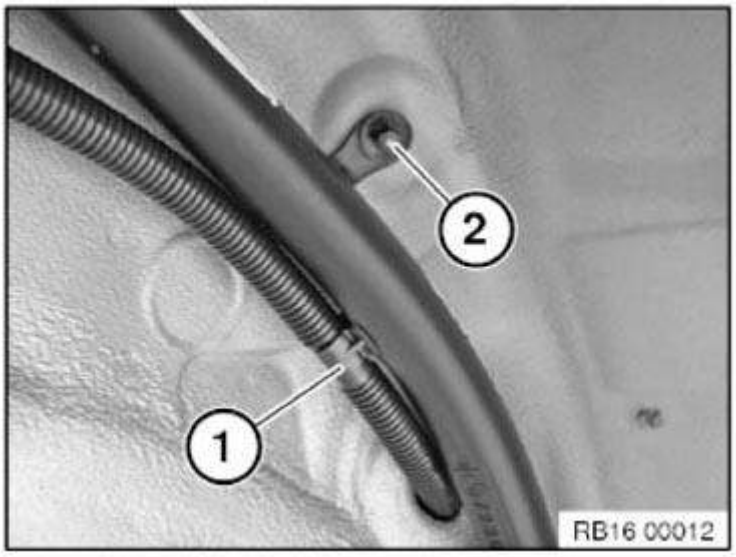


Fig. 24: Identifying Fuel Filler Pipe Line Holder And Plastic Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release quick-release coupling (1).

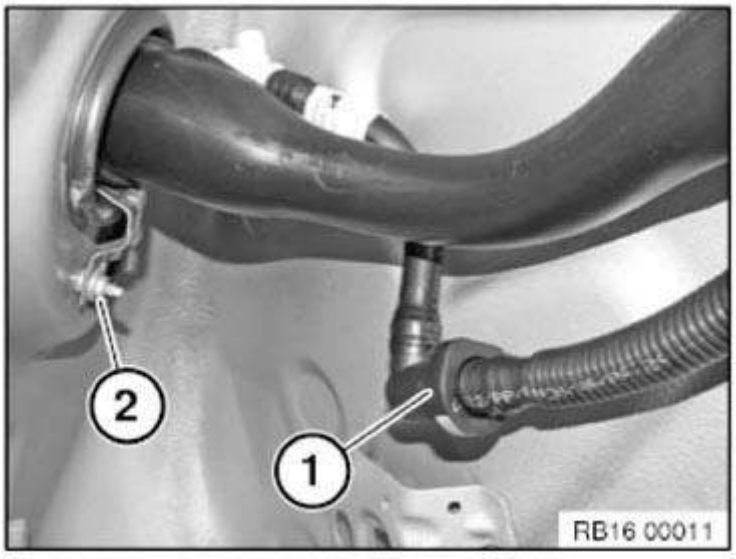


Fig. 25: Identifying Quick-Release Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: There may be residual amounts of fuel in the fuel tank!
Catch escaping fuel in a suitable collecting vessel.

Unfasten hose clamp (1).

Installation note:

Check hose clamp, replace if necessary.

Tightening torque: **16 12 1AZ** .

Detach fuel filler pipe (2) from fuel tank.

cardiagn.com

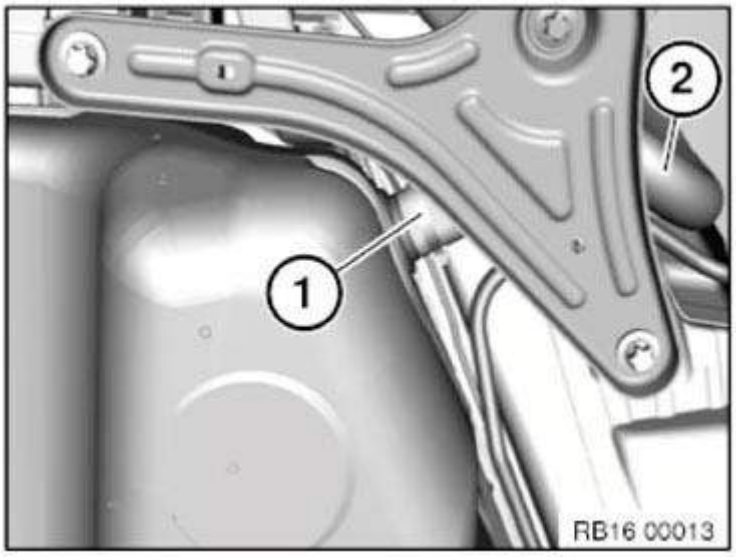


Fig. 26: Identifying Fuel Filler Hose Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Secure fuel tank against slipping and falling out.

Heavily support the fuel tank.

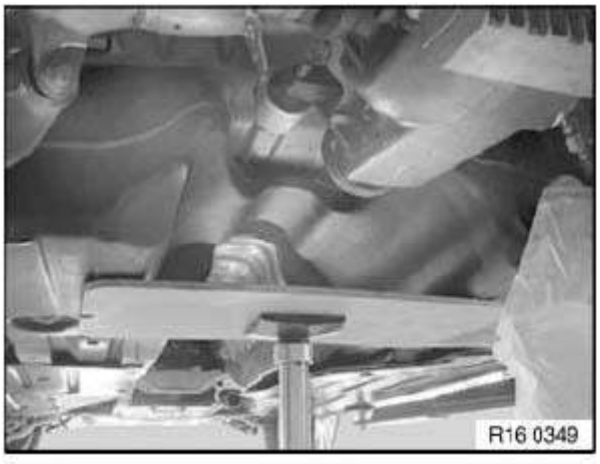


Fig. 27: Supporting Fuel Tank
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten nut.

Installation note:

Replace self-locking nut.

Tightening torque: **16 11 1AZ** .

cardiagn.com

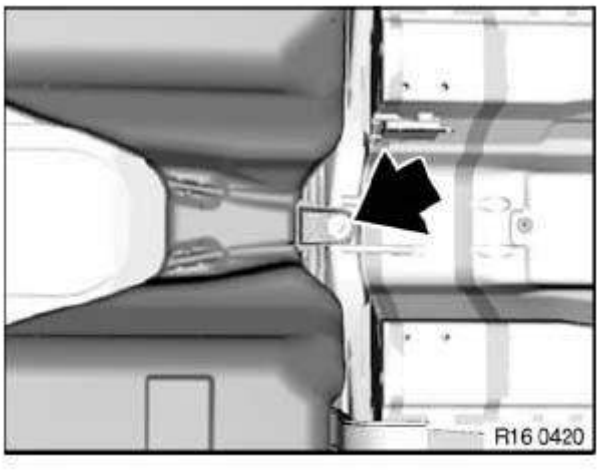


Fig. 28: Locating Self-Locking Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Undo nuts and bolts (1).

Installation note:

Tightening torque: **16 11 2AZ** .

Lower fuel tank.

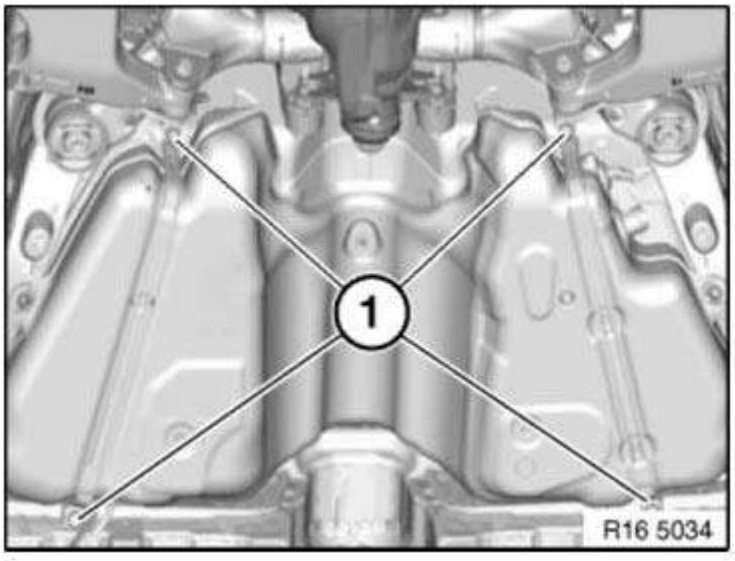


Fig. 29: Identifying Fuel Tank And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, disconnect fuel line for independent heating.

Feed fuel tank ventilation line through opening in body.

Remove fuel tank.

Replacement:

- Modify **fuel pump** . See **16 14 200 REMOVING AND INSTALLING OR REPLACING FUEL PUMP**.

16 11 030 REMOVING AND INSTALLING/REPLACING FUEL TANK (PETROL/GASOLINE)

Recycling

cardiagn.com

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

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
After installation of fuel tank/prior to first engine start-up:

IMPORTANT:

- 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.

Necessary preliminary work:

- Extract **FUEL** from fuel tank
- Remove **REAR SEAT BENCH** .
- Remove rear right **WHEEL ARCH TRIM** .
- Remove **PROPELLER SHAFT** .
- Remove **COMPRESSION STRUT** on left and right.
- Remove **UNDERBODY PANELLING** , rear left and right.

Fold floor trim (1) to one side.

Unscrew nuts (2).

Remove cover for service opening (3).

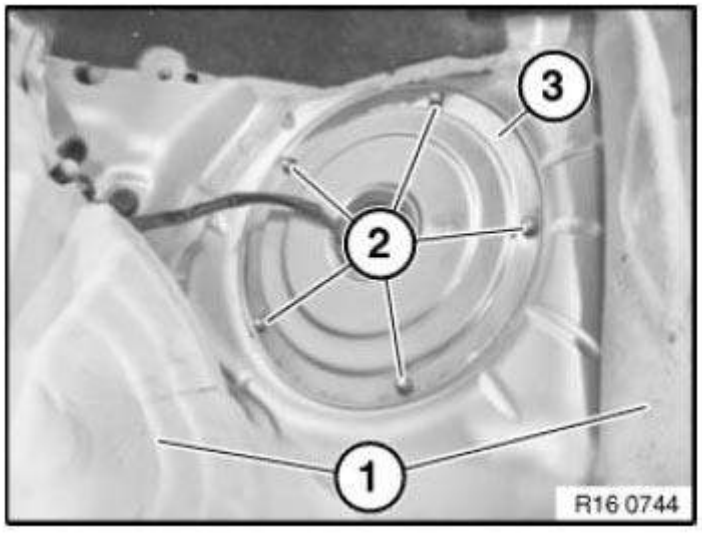


Fig. 30: Identifying Floor Trim Panels, Service Opening And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Disconnect fuel line (2).

If necessary, disconnect fuel line for auxiliary heating.

Installation note:

cardiagn.com

Check gasket (3), replace if necessary.

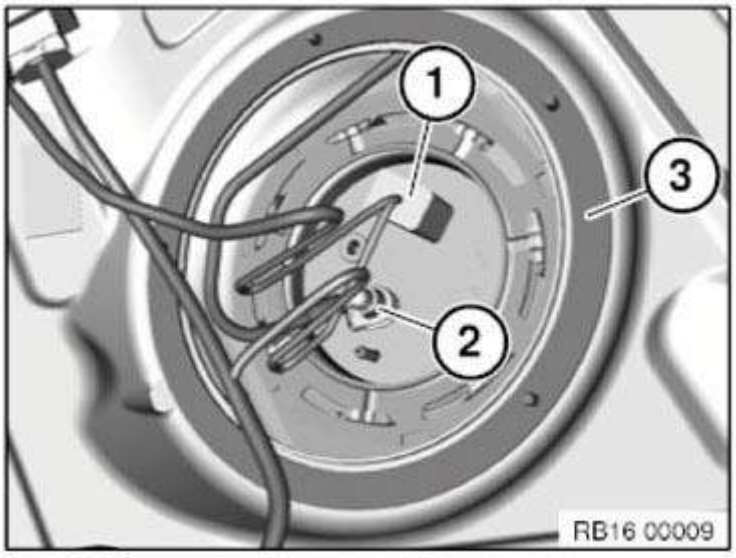


Fig. 31: Identifying Fuel Line, Plug Connection And Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Unclip line holder (1).

Release plastic nut (2).

Installation note:

Check plastic nut (2), replace if necessary.

Tightening torque: **16 12 2AZ** .

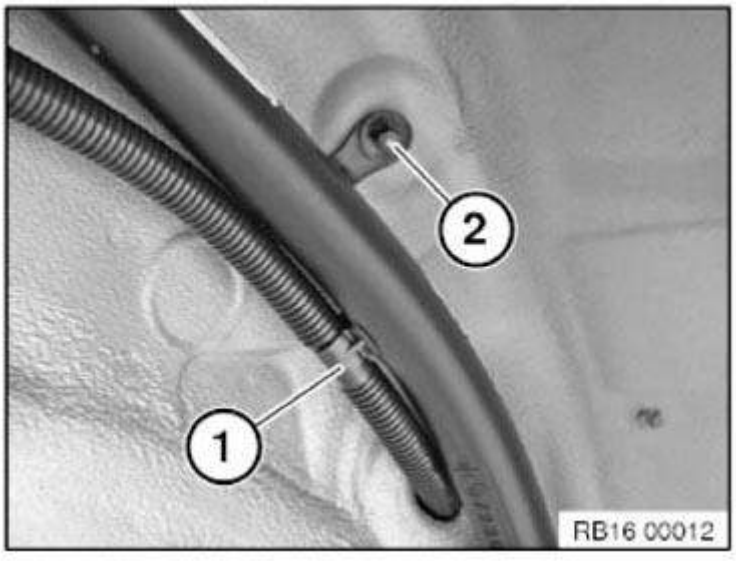


Fig. 32: Identifying Fuel Filler Pipe Line Holder And Plastic Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release quick-release coupling (1).

cardiagn.com

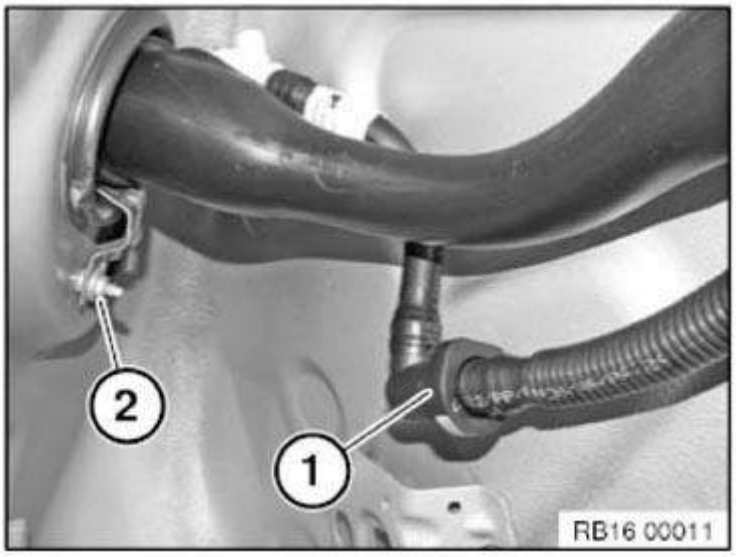


Fig. 33: Identifying Quick-Release Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: There may be residual amounts of fuel in the fuel tank! Catch escaping fuel in a suitable container.

Unfasten hose clamp (1).

Installation note:

Check hose clamp, replace if necessary.

Tightening torque: **16 12 1AZ** .

Detach fuel filler pipe (2) from fuel tank.

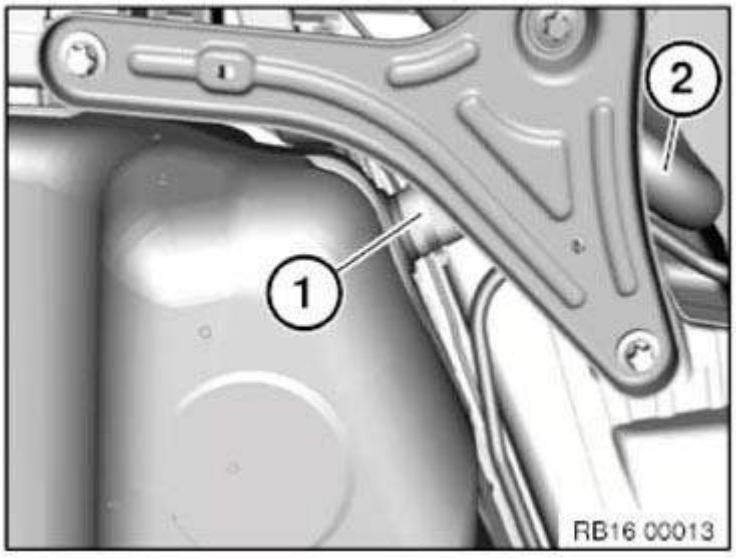


Fig. 34: Identifying Fuel Filler Hose Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Secure fuel tank against slipping and falling out.

Heavily support the fuel tank.

cardiagn.com

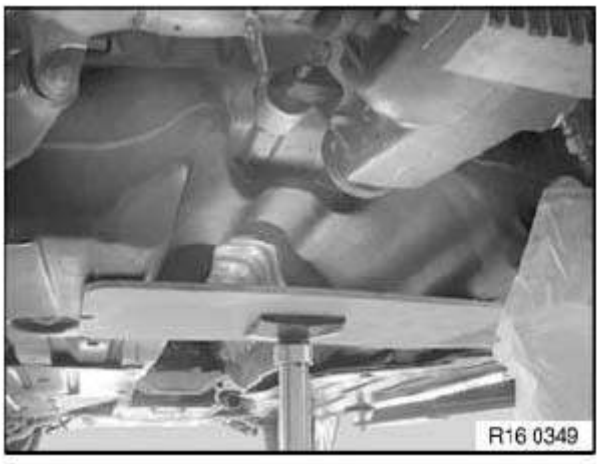


Fig. 35: Securing Fuel Tank
Courtesy of BMW OF NORTH AMERICA, INC.

Unfasten nut.

Installation note:

Replace self-locking nut.

Tightening torque: **16 11 1AZ** .

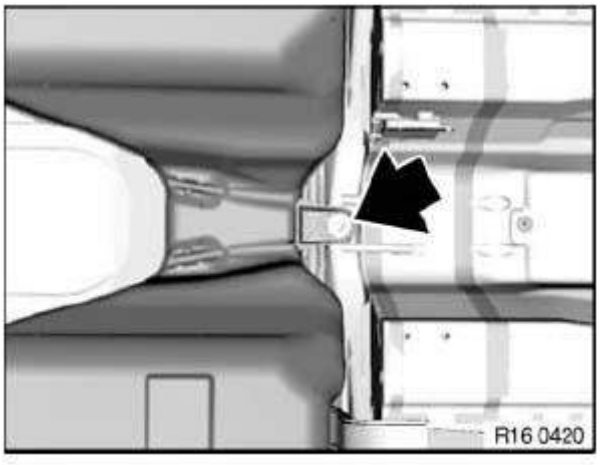


Fig. 36: Locating Self-Locking Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Undo nuts and bolts (1).

Installation note:

Tightening torque: **16 11 2AZ** .

Lower fuel tank.

cardiagn.com

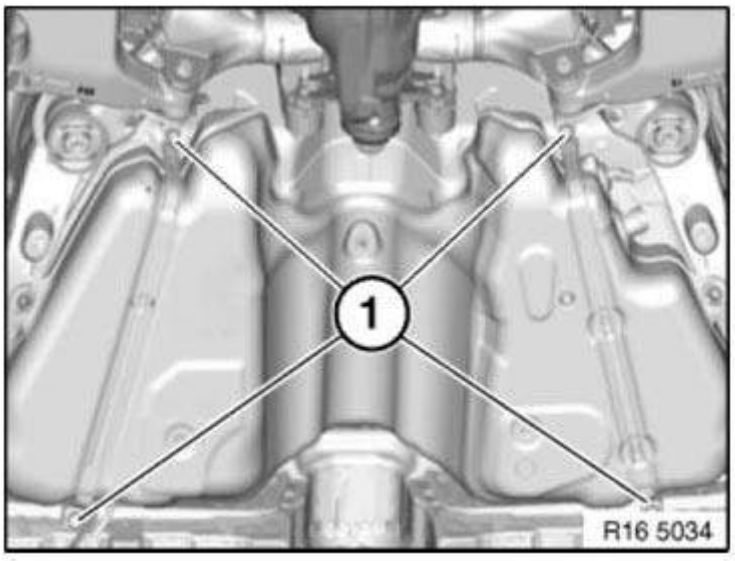


Fig. 37: Identifying Fuel Tank And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

If necessary, disconnect fuel line for independent heating.

Feed fuel tank ventilation line through opening in body.

Remove fuel tank.

Replacement:

- Modify **fuel pump** . See **16 14 200 REMOVING AND INSTALLING OR REPLACING FUEL PUMP**.

16 11 350 REPLACING CLAMPING BANDS FOR FUEL TANK

IMPORTANT: Secure fuel tank against slipping and falling out.

Generously support the fuel tank.

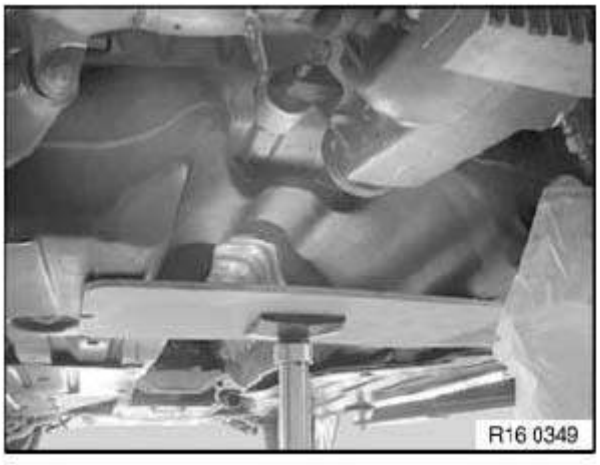


Fig. 38: Supporting Fuel Tank
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Installation note:

cardiagn.com

Tightening torque: **16 11 2AZ** .

Remove tightening strap (2).

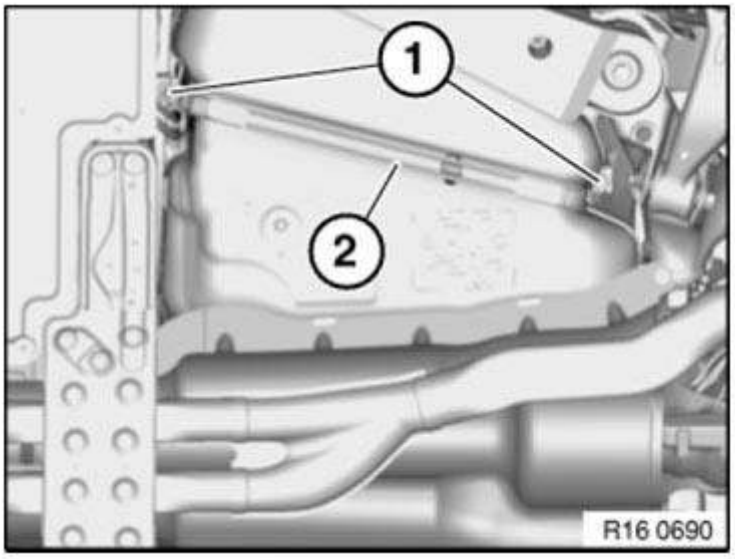


Fig. 39: Identifying Fuel Tank Strap And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

FUEL DELIVERY, SENSOR FOR DISPLAY

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

Necessary preliminary tasks:

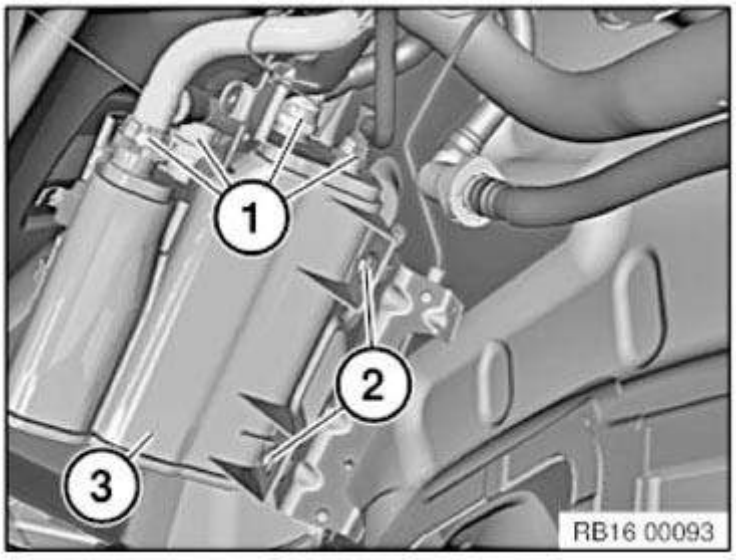
- Remove rear right **WHEEL ARCH PANEL** .

Unlock all snap fasteners (1) and disconnect tank ventilation lines.

Release screws (2) and swing out carbon canister (3).

Installation note:

Tightening torque: **16 13 1AZ** .



cardiagn.com

Fig. 40: Identifying Snap Fasteners, Carbon Canister And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary work:

- Remove rear right **WHEEL ARCH COVER** .

Disconnect plug connection (1).

Unlock quick-release fasteners (2) and disconnect vent lines.

Release screws (3) and swing out carbon canister (4).

Installation note:

Tightening torque: **16 13 1AZ** .

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

- **DUST FILTER**
- **DIAGNOSIS MODULE**

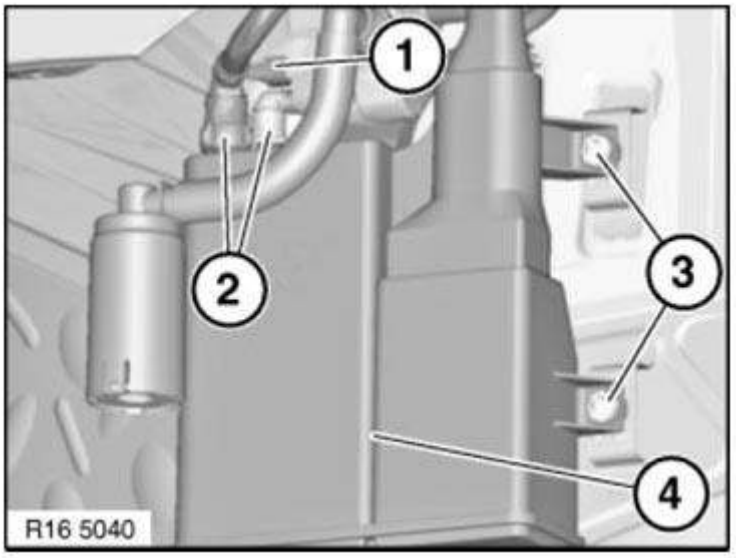


Fig. 41: Identifying Quick-Release Fasteners, Carbon Canister And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

16 12 000 REMOVING AND INSTALLING/REPLACING SENSOR FOR FUEL GAUGE

Necessary preliminary work:

- Remove **FUEL PUMP WITH FUEL LEVEL SENSOR**.

Release and disconnect plug connection (1) at fuel pump.

Installation note:

Check locking of plug connection by pulling.

cardiagn.com

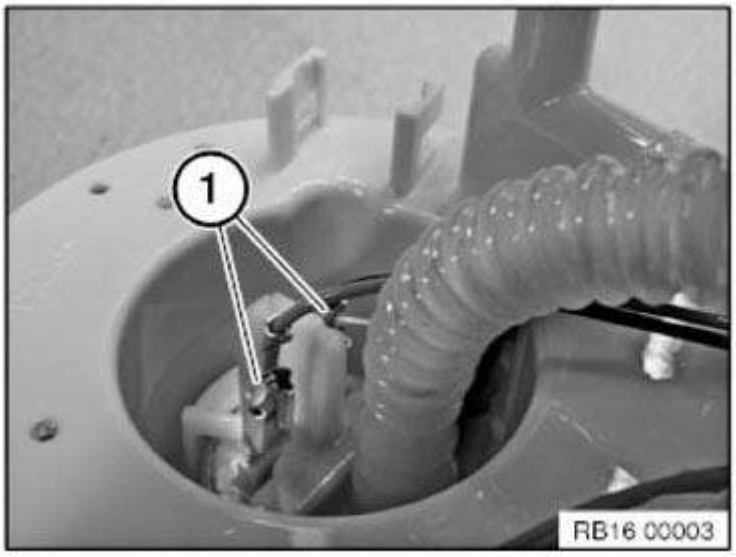


Fig. 42: Identifying Fuel Pump Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Release lugs (1) in direction of arrow.

Remove fuel level sensor (2) in direction of arrow.

Installation note:

Check that fuel level sensor (2) is locked in correctly.

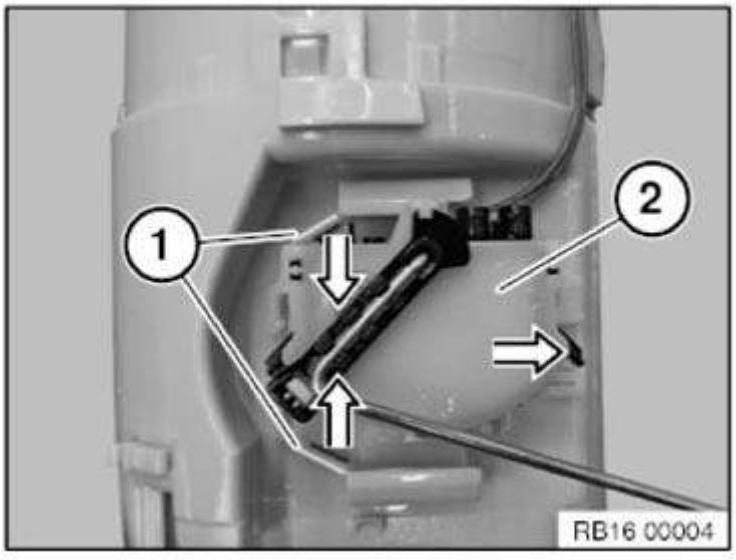


Fig. 43: Removing Fuel Level Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1) at flange cover.

Feed electrical lines (1) out of retaining fixtures and remove.

Installation note:

Ensure cable is installed and fitted in all holders correctly.

cardiagn.com

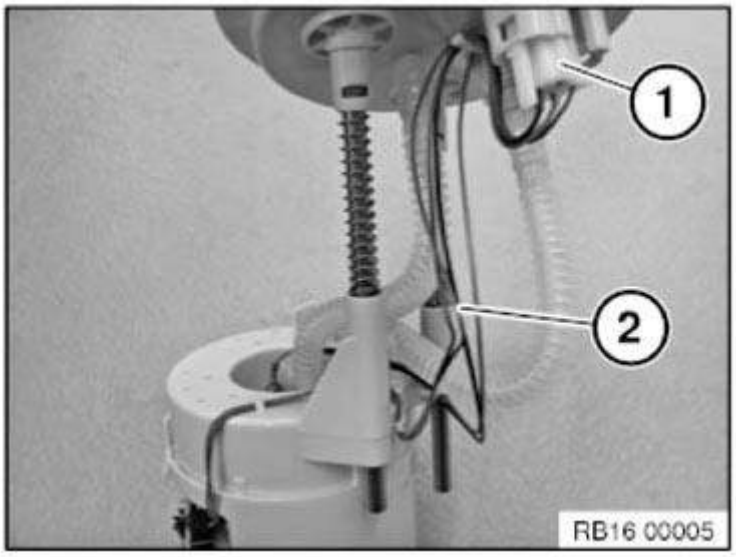


Fig. 44: Identifying Electrical Lines & Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

FUEL DEAERATION

16 13 521 REMOVING AND INSTALLING/REPLACING PRESSURE SWITCH FOR NATURAL VACUUM LEAK DETECTION (NVLD)

Necessary preliminary tasks:

- Remove **WHEEL ARCH PANEL** .

IMPORTANT: When replacing the pressure switch, the **DUST FILTER** must also always be replaced.

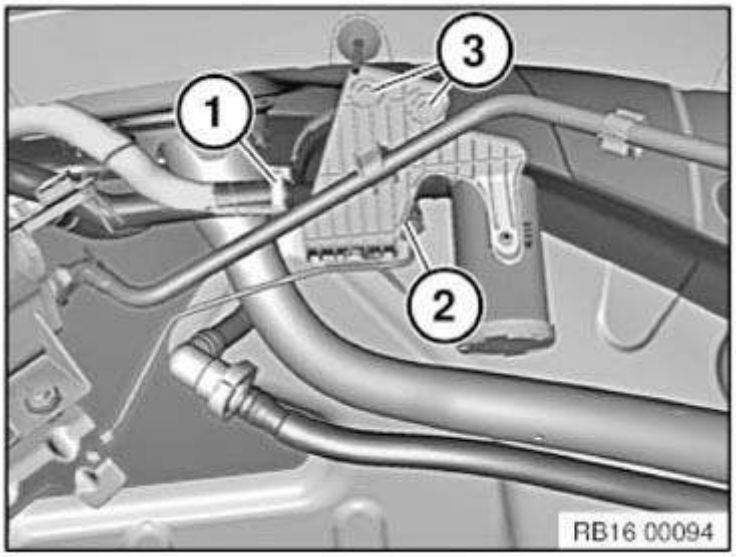
Release hose clamp (1) and pull off tank ventilation line.

Installation note:

Replace hose clamp.

Disconnect plug connection (2).

Release screws (3) and remove pressure switch with dust filter.



cardiagn.com

Fig. 45: Identifying Tank Ventilation Line Hose Clamp And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Pull off pressure switch (2).

Installation note:

Check gaskets and replace if necessary.

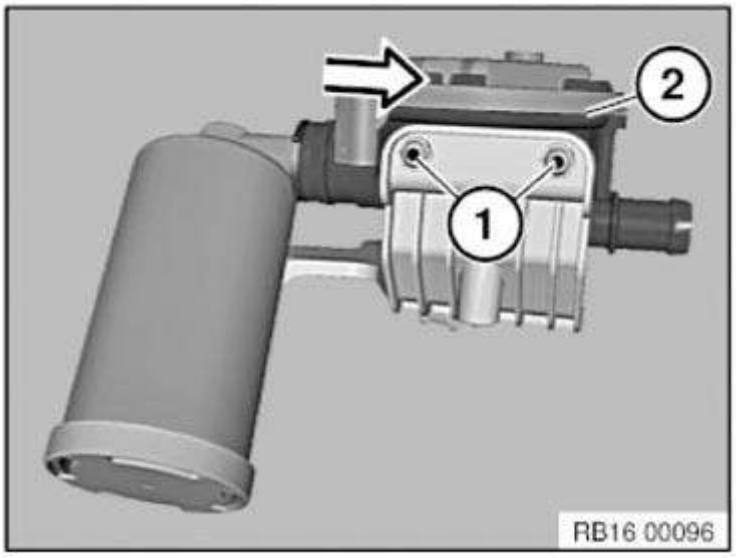


Fig. 46: Pulling Natural Vacuum Leak Detection Pressure Switch
Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary work:

- Remove **CARBON CANISTER**.

Detach line (1).

Undo screws (2).

Remove diagnosis module (3).

Installation note:

Replace gasket (3).

cardiagn.com

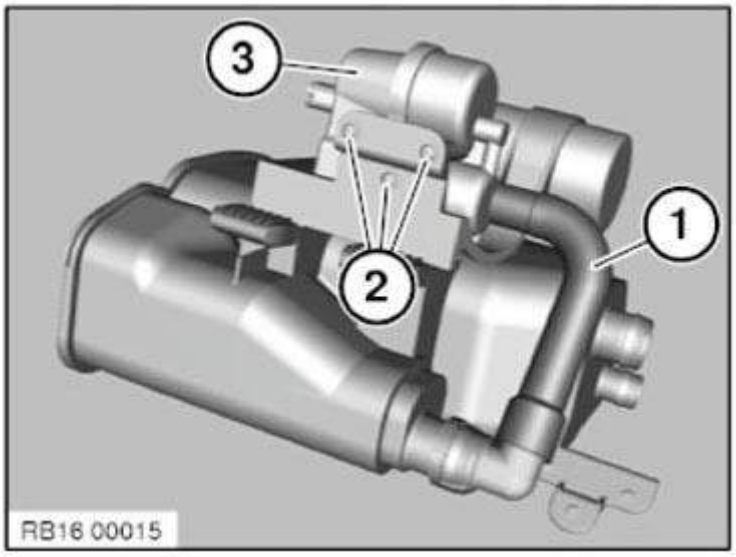


Fig. 47: Identifying Diagnosis Module, Line And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

16 13 522 REMOVING AND INSTALLING/REPLACING TEMPERATURE SENSOR FOR NATURAL VACUUM LEAK DETECTION (NVLD)

NOTE: **On this system the temperature sensor is integrated in the pressure switch. The procedure for removing and installing the pressure switch is described in: REMOVING AND INSTALLING PRESSURE SWITCH FOR NATURAL VACUUM LEAK DETECTION (NVLD).**

FUEL PUMP

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

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

Necessary preliminary work:

- Remove **REAR SEAT** .

Disconnect plug connection (1).

Loosen the nuts (2) and remove control unit for the electronic fuel pump.

Installation note:

Tightening torque: **16 14 1AZ** .

cardiagn.com

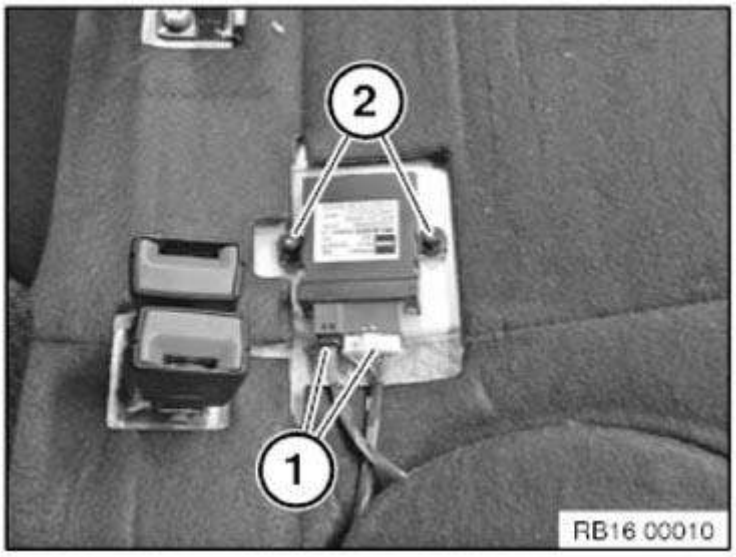


Fig. 48: Identifying Electronic Fuel Pump, Plug Connection And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement:

- Carry out programming/encoding

16 14 200 REMOVING AND INSTALLING OR REPLACING FUEL PUMP

Special tools required:

- **16 1 190**
- **33 5 070**

Recycling

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

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

IMPORTANT:	Ensure adequate ventilation in the workbay! Avoid skin contact (wear gloves)! Ensure absolute cleanliness when performing repair work on the open fuel system. Dirt contamination in the fuel tank can impair driving operation or may even result in vehicle breakdown! Ensure absolute cleanliness when working with fuel in the vehicle interior!

Necessary preliminary work:

- **DRAW OFF FUEL**.
- Remove **REAR SEAT** .

Fold floor trim (1) to one side.

Unscrew nuts (2).

Remove cover for service opening (3).

cardiagn.com

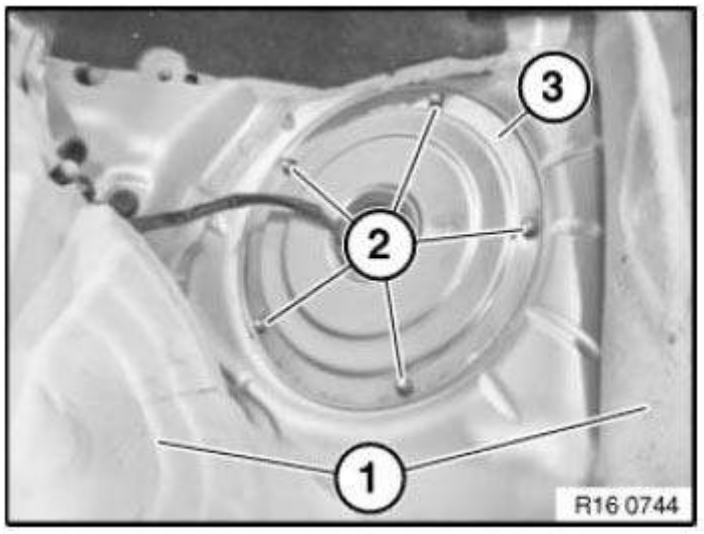


Fig. 49: Identifying Floor Trim Panels, Service Opening And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Disconnect plug connection (1).

Unlock and detach quick-connect couplings (2).

If necessary, release and detach fuel line for auxiliary heating.

Installation note:

Check gasket (3), replace if necessary.

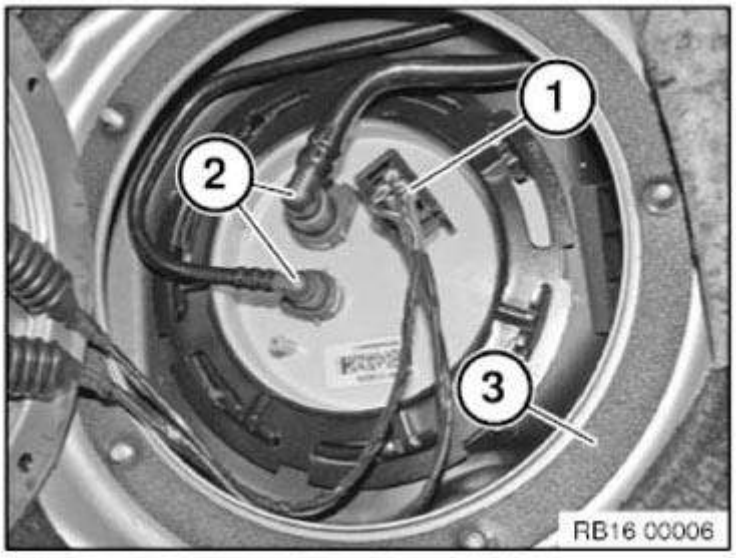


Fig. 50: Identifying Fuel Lines, Quick-Connect Couplings And Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool **16 1 190** with wide crank web (1) towards rear onto locking ring (2).

Connect special tool **33 5 070** to 1/2 inch reversible ratchet head (3) and position on special tool **16 1 190** .

Release locking ring (2) in anticlockwise direction.

cardiagn.com

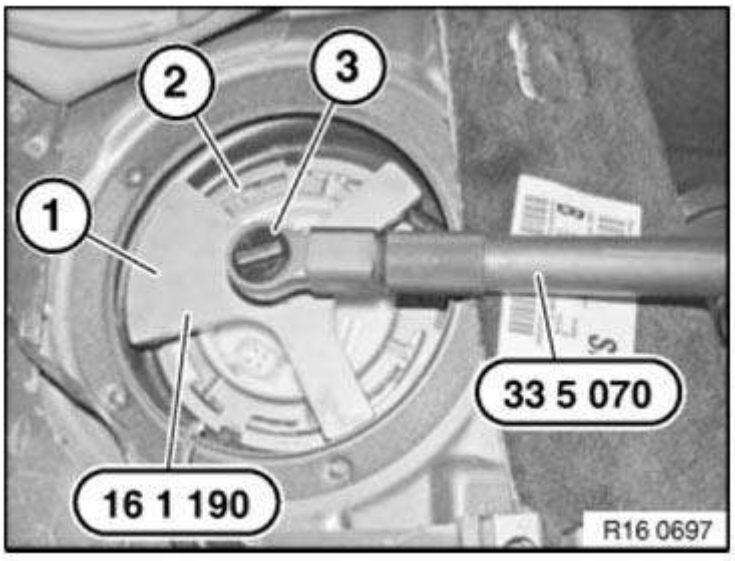


Fig. 51: Identifying Special Tool (16 1 190) & (33 5 070)
Courtesy of BMW OF NORTH AMERICA, INC.

Raise flange cover (1).

Disconnect plug connection (2) to left fuel level sensor.

Installation note:

Replace seal between fuel tank and flange cover (1).

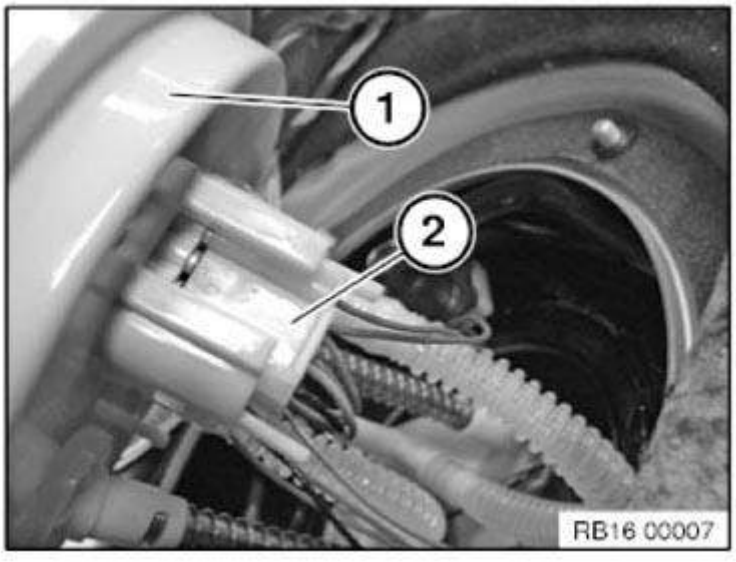


Fig. 52: Identifying Fuel Level Sensor, Plug Connection And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Raise fuel pump (1).

Unlock and disconnect quick-connect coupling (2).

Remove fuel pump together with fuel level sensor from fuel tank.

Installation note:

Make sure quick-release fastener is correctly engaged!

Make sure the fuel level sensor is not damaged when fitting in tank!

cardiagn.com

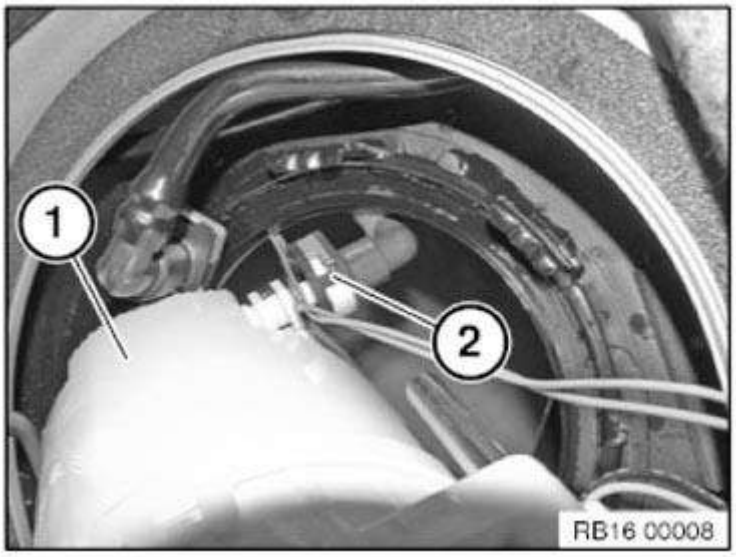


Fig. 53: Identifying Quick-Connect Coupling And Fuel Pump
Courtesy of BMW OF NORTH AMERICA, INC.

The following components must be reinstalled when replacing the fuel pump:

- **FUEL LEVEL SENSOR**

16 14 065 REMOVING AND INSTALLING/REPLACING DUST FILTER FOR NATURAL VACUUM LEAK DETECTION (NVLD)

Necessary preliminary work:

- Remove rear right **WHEEL ARCH PANEL** .

Release hose clamp (1) and pull off tank ventilation line.

Installation note:

Replace hose clamp.

Disconnect plug connection (2).

Release screws (3) and remove pressure switch with dust filter.

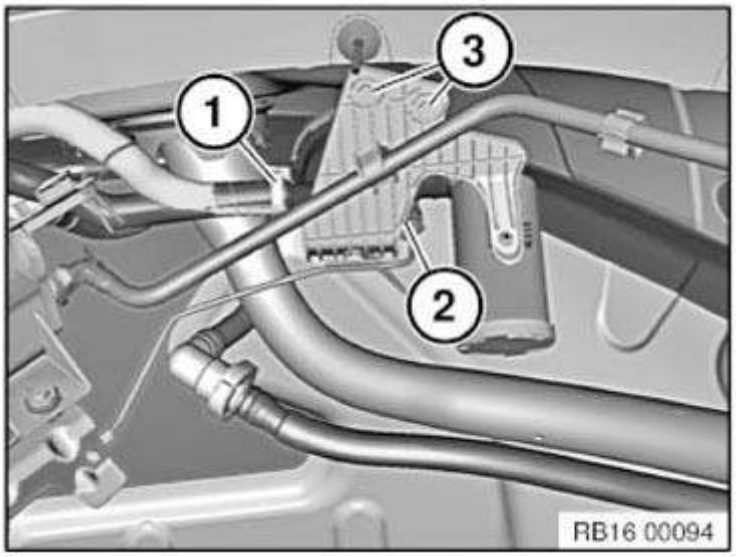


Fig. 54: Identifying Tank Ventilation Line Hose Clamp And Screw

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1) and pull off dust filter (2).

Installation note:

Check gasket at pressure switch and replace if necessary.

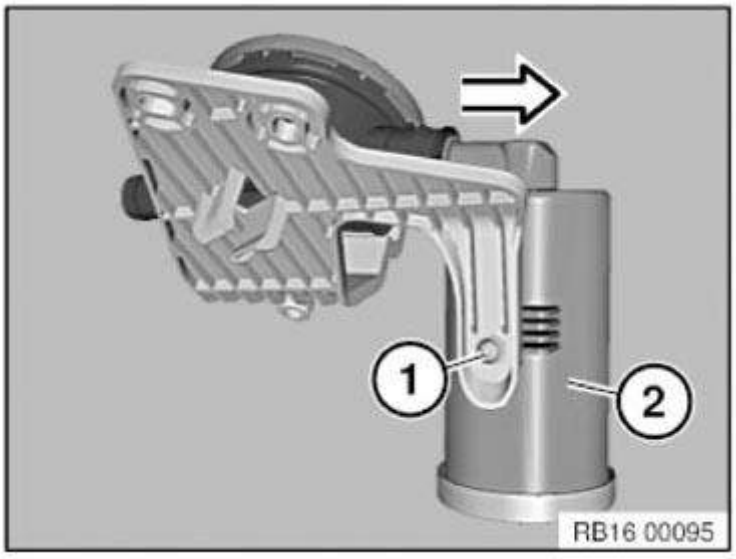


Fig. 55: Pulling Dust Filter
Courtesy of BMW OF NORTH AMERICA, INC.

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

Necessary preliminary work:

- Remove **CARBON CANISTER**.

Release screw (1).

Remove dust filter (2).

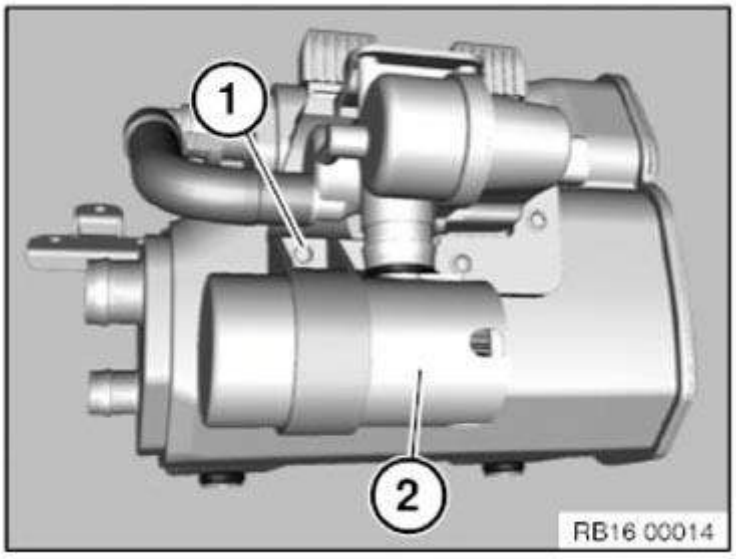


Fig. 56: Identifying Dust Filter Screws
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

SCR TECHNOLOGY

16 19 010 DRAWING OFF SCR ACTIVE RESERVOIR CONTENT

Special tools required:

- 2 302 782
- 2 302 919
- 2 355 173

IMPORTANT:
Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
Avoid eye contact (safety goggles)!
Urea/water mixture can escape when components carrying urea/water mixture are released.
Have a collecting vessel ready.
Observe country-specific waste disposal regulations.

IMPORTANT:
Maintain conditions of absolute cleanliness.
Connections and covers of lines carrying urea/water mixture must be cleaned thoroughly with water after each removal or before each installation!
Thoroughly clean the working area with water after repair work.
Use fluff-free cloths for cleaning.
Close connections and lines!
Thoroughly clean special tool with water after each use.

IMPORTANT:
Use extractor unit 2 302 782 (for 230V) or 2 302 919 (for 120V).
Attach adaptor hose 2 355 173 to the intake side of the extractor unit.
Before start-up of extractor unit urea/water mixture:
Comply with equipment manufacturer's operating instructions and safety regulations.
Note extraction direction (see arrow)!

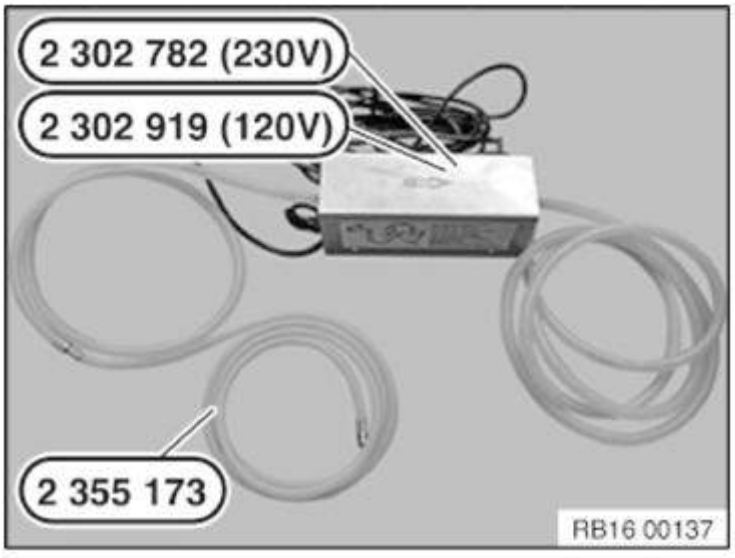


Fig. 57: Identifying Adaptor Hose (2 355 173)
Courtesy of BMW OF NORTH AMERICA, INC.

Feed adaptor hose 2 355 173 of the extractor unit into the filler pipe (1).

The extraction hose may need to be twisted when inserting it.

IMPORTANT: Insertion length of extraction hose 100 cm!

cardiagn.com

Draw off urea/water mixture.

NOTE: **Do not reuse drawn-off urea/water mixture.**

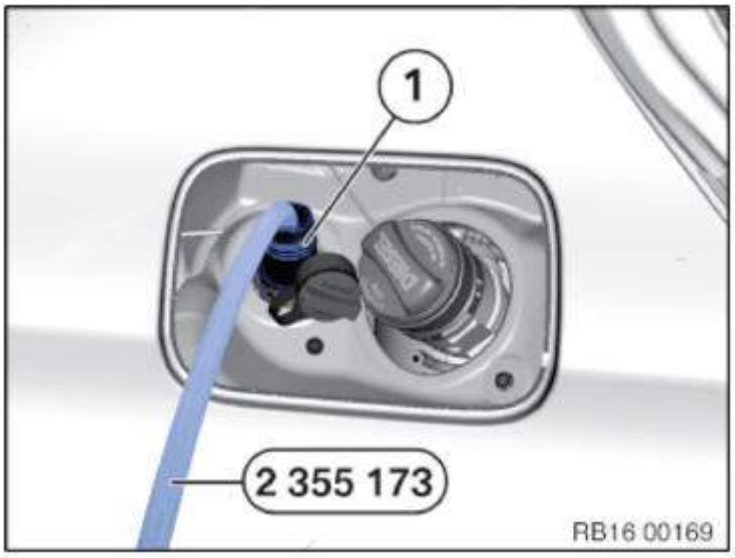


Fig. 58: Identifying Adaptor Hose (2 355 173)
Courtesy of BMW OF NORTH AMERICA, INC.

16 19 045 DRAWING OFF SCR PASSIVE TANK CONTENT

Special tools required:

- 2 302 782
- 2 302 919
- 2 355 173

IMPORTANT:
Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
Avoid eye contact (safety goggles)!
Urea/water mixture can escape when components carrying urea/water mixture are released.
Have a collecting vessel ready.
Observe country-specific waste disposal regulations.

IMPORTANT:
Maintain conditions of absolute cleanliness.
Connections and covers of lines carrying urea/water mixture must be cleaned thoroughly with water after each removal or before each installation!
Thoroughly clean the working area with water after repair work.
Use fluff-free cloths for cleaning.
Close connections and lines!
Thoroughly clean special tool with water after each use.

Necessary preliminary work:

- Remove rear right WHEEL ARCH PANEL .

Clamp off hose between passive tank and transfer pump (1) with hose clip (2).

Release hose clamp (3) and pull off hose (1) from transfer pump.

Installation note:

cardiagn.com

Replace hose clamp (3).

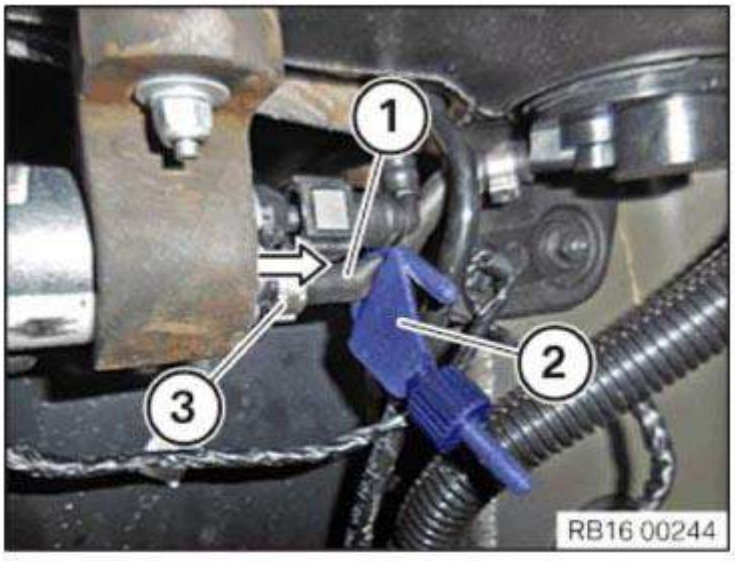


Fig. 59: Pulling Hose From Transfer Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Use extractor unit **2 302 782** (for 230V) or **2 302 919** (for 120V).
Attach adaptor hose **2 355 173** to the intake side of the extractor unit.
IMPORTANT: Before start-up of extractor unit urea/water mixture:
Comply with equipment manufacturer's operating instructions and safety regulations.
Note extraction direction (see arrow)!

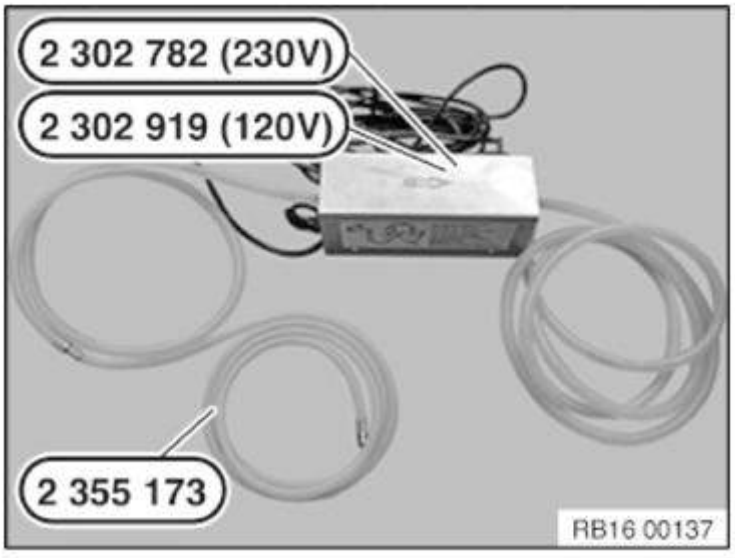


Fig. 60: Identifying Adaptor Hose (2 355 173)
Courtesy of BMW OF NORTH AMERICA, INC.

Connect adapter hose **2 355 173** of extractor unit on hose.

Remove hose clip (1).

Draw off urea/water mixture.

NOTE: **Do not reuse drawn-off urea/water mixture.**

cardiagn.com

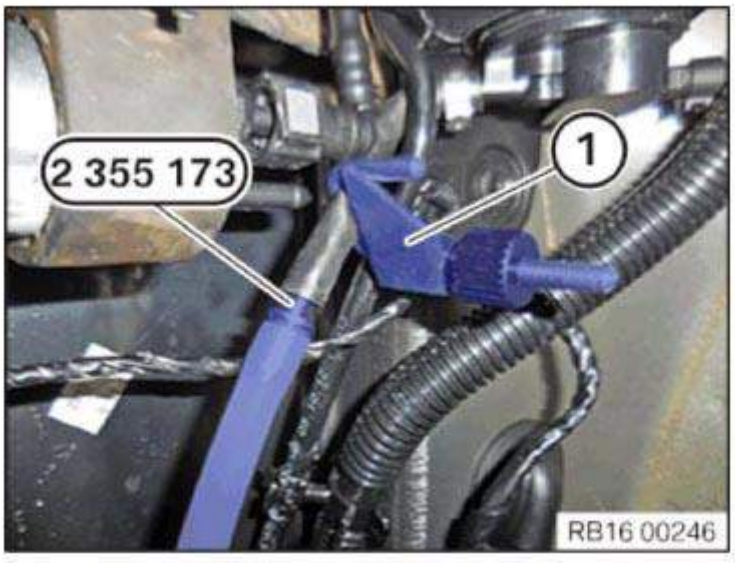


Fig. 61: Connecting Adapter Hose (2 355 173)
Courtesy of BMW OF NORTH AMERICA, INC.

16 19 075 FILLING SCR RESERVOIR

Special tools required:

- 2 302 783
- 2 355 172

IMPORTANT:
Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
Avoid eye contact (safety goggles)!
Urea/water mixture can escape when components carrying urea/water mixture are released.
Have a collecting vessel ready.
Observe country-specific waste disposal regulations.

IMPORTANT:
Maintain conditions of absolute cleanliness.
Connections and covers of lines carrying urea/water mixture must be cleaned thoroughly with water after each removal or before each installation!
Thoroughly clean the working area with water after repair work.
Use fluff-free cloths for cleaning.
Close connections and lines!
Thoroughly clean special tool with water after each use.

Screw filler hose 2 302 783 with the flatter connection onto the urea/water solution container.

Then connect the other end of filler hose 2 302 783 to the filler neck of the SCR reservoir.

Hook urea/water solution container onto stand 2 355 172 and fill SCR reservoir.

If the SCR reservoir is full before the urea/water solution container (1) is empty, set down the container (1) and unscrew the filler hose.

IMPORTANT:
When unscrewing filling hose, check for escaping urea/water mixture!
Immediately wash off all urea/water mixture with water!

cardiagn.com



Fig. 62: Connecting SCR Reservoir
Courtesy of BMW OF NORTH AMERICA, INC.

16 19 090 REMOVING AND INSTALLING/REPLACING SCR DELIVERY MODULE

IMPORTANT:
Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
Avoid eye contact (safety goggles)!
Urea/water mixture can escape when components carrying urea/water mixture are released.
Have a collecting vessel ready.
Observe country-specific waste disposal regulations.

IMPORTANT:
Maintain conditions of absolute cleanliness.
Connections and covers of lines carrying urea/water mixture must be cleaned thoroughly with water after each removal or before each installation!
Thoroughly clean the working area with water after repair work.
Use fluff-free cloths for cleaning.
Close connections and lines!
Thoroughly clean special tool with water after each use.

Necessary preliminary work:

- Draw off the **SCR ACTIVE TANK**.
- Remove **REAR RIGHT UNDERBODY PANELLING** .
- Remove rear right heat shield.

Removal:

Unlock snap fastener (1) and pull off feed line.

Disconnect plug connection (2).

cardiagn.com



Fig. 63: Removing SCR Delivery Module Snap Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Release the screws (1) and remove the SCR delivery module (2) through the bottom.

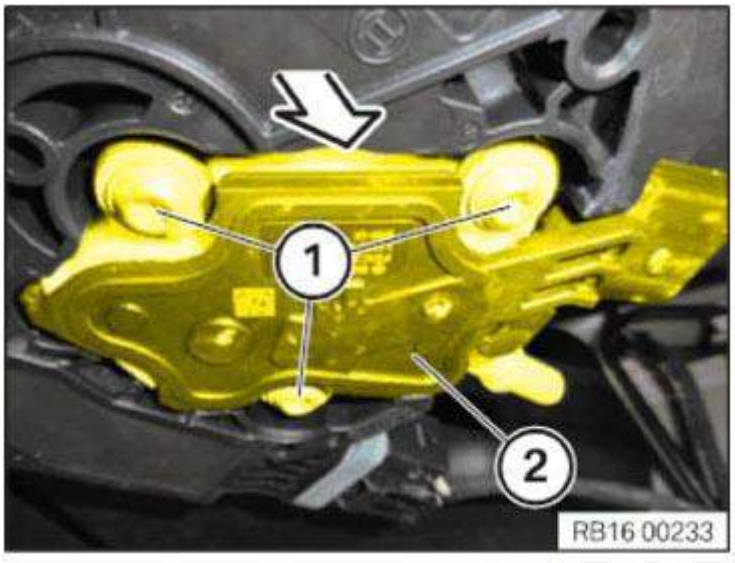


Fig. 64: Removing SCR Delivery Module Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Install the SCR delivery module (2).

Insert screws (1) and tighten.

cardiagn.com

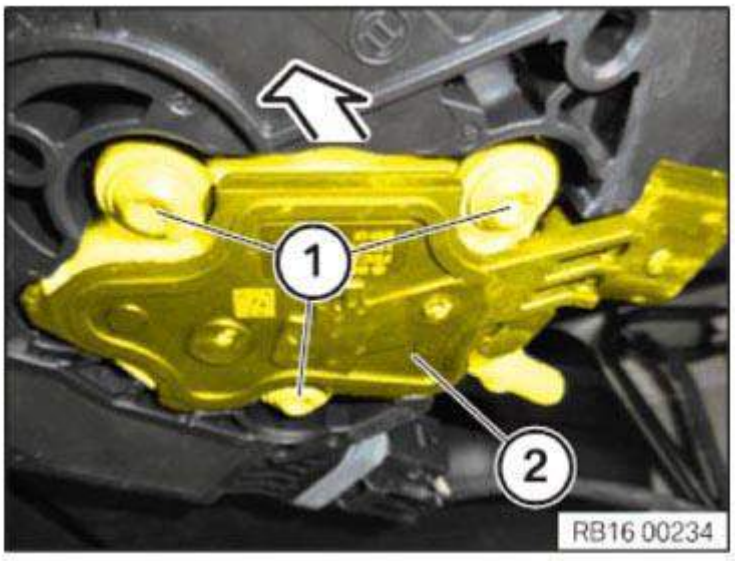


Fig. 65: Installing SCR Delivery Module Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Position the feed line and latch the snap fastener (1).

Connect plug connection (2).

NOTE: **Check correct engagement of snap fastener (1) by attempting to pull.**



Fig. 66: Connecting Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

Required follow-up work:

- Fill the **SCR RESERVOIR**.
- Install the rear right underbody panelling.
- Remove rear right heat shield.

16 19 020 REMOVING AND INSTALLING/REPLACING ACTIVE TANK

IMPORTANT:
Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
Avoid eye contact (safety goggles)!

cardiagn.com

Urea/water mixture can escape when components carrying urea/water mixture are released.
Have a collecting vessel ready.
Observe country-specific waste disposal regulations.

Maintain conditions of absolute cleanliness.
Connections and covers of lines carrying urea/water mixture must be cleaned thoroughly with water after each removal or before each installation!

IMPORTANT: Thoroughly clean the working area with water after repair work.
Use fluff-free cloths for cleaning.
Close connections and lines!
Thoroughly clean special tool with water after each use.

Necessary preliminary work:

- Draw off the **SCR ACTIVE TANK**.
- Remove rear right **WHEEL ARCH PANEL** .
- Remove **REAR RIGHT UNDERBODY PANELLING** .
- Remove rear right heat shield.

Removal:

Release the hose clamp (1) and pull off the filling hose from the active tank.

Unlock and disconnect snap fastener (2).

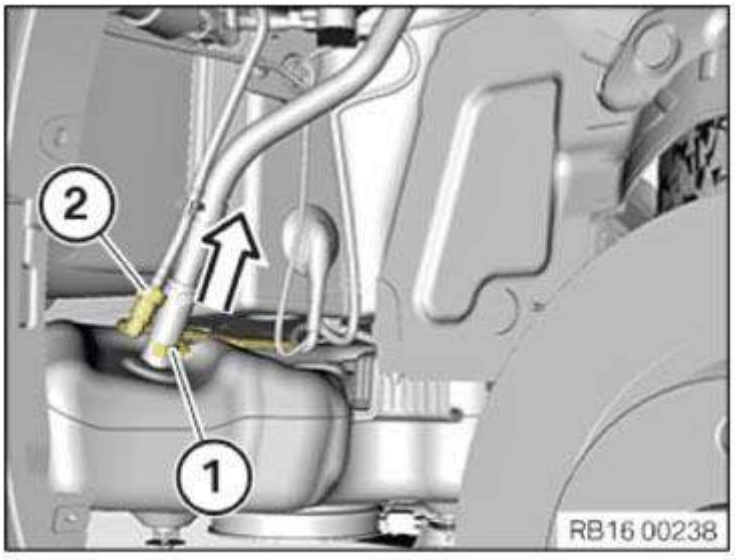


Fig. 67: Pulling Hose From Active Tank
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock snap fastener (1) and pull off feed line.

Disconnect plug connections (2).

cardiagn.com

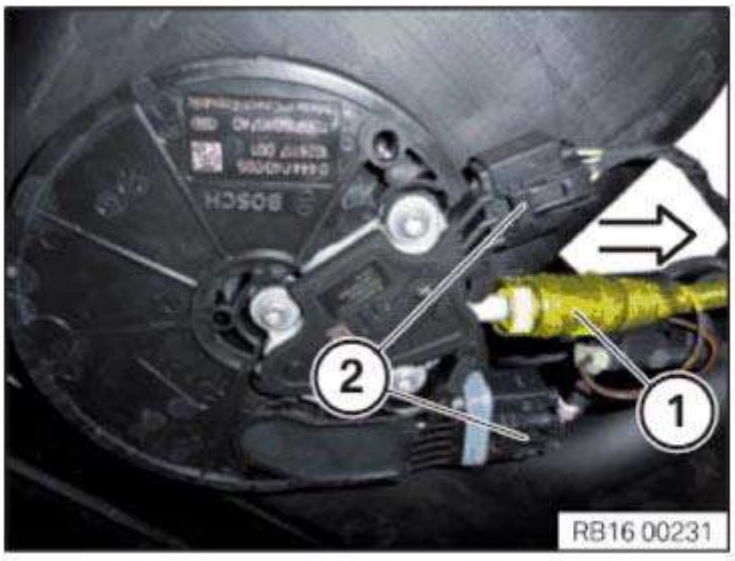


Fig. 68: Identifying Snap Fastener And Plug Connection
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Support fuel tank (1) with workshop jack across a large area!

Unfasten screws (2).

Remove active tank (1) downwards.

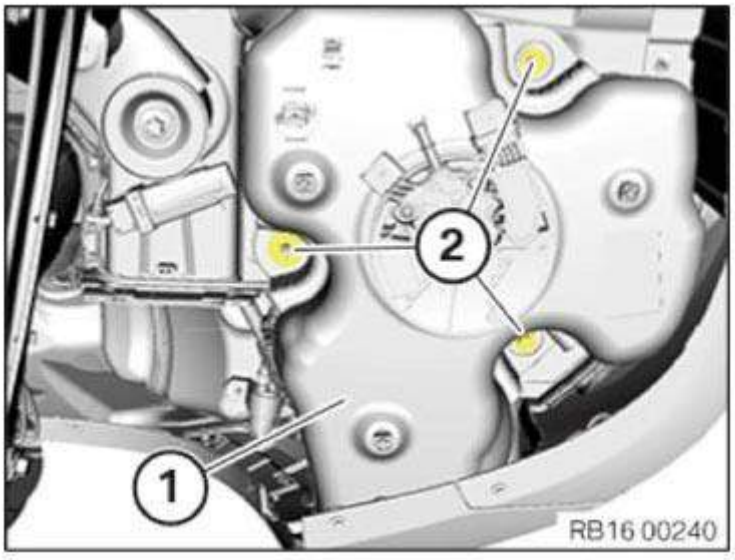


Fig. 69: Identifying Active Tank Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

IMPORTANT: Support active tank (1) with workshop jack across a large area!

Install the active tank (1).

Fit screws and nuts (2) and tighten.

Tightening torque: **16 19 1AZ** .

cardiagn.com

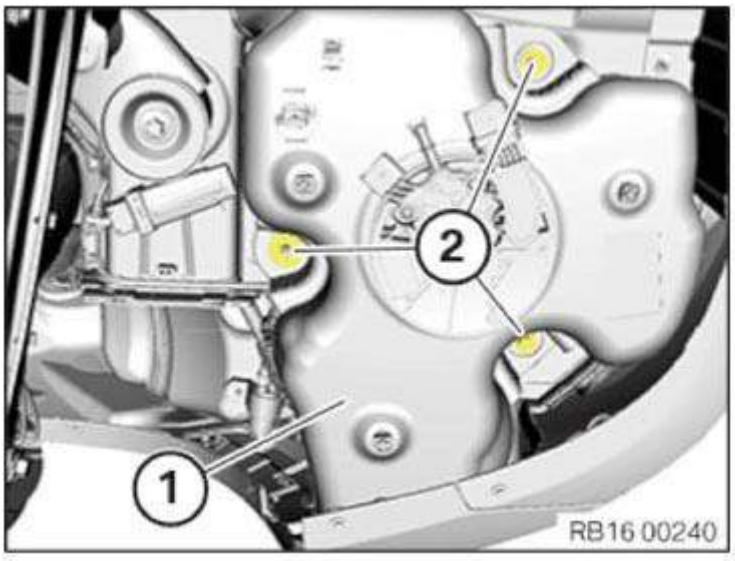


Fig. 70: Identifying Active Tank Screws And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Position the feed line and lock the snap fastener (1).

Connect plug connections (2).

NOTE: Check correct engagement of snap fastener (1) by attempting to pull.



Fig. 71: Connecting Plug Connections
Courtesy of BMW OF NORTH AMERICA, INC.

Mount the filling hose on the active tank.

Fit and lock hose clamp (1).

NOTE: Replace hose clamp (1).

Parts: Hose clamp

Position snap fastener (2) and lock.

cardiagn.com

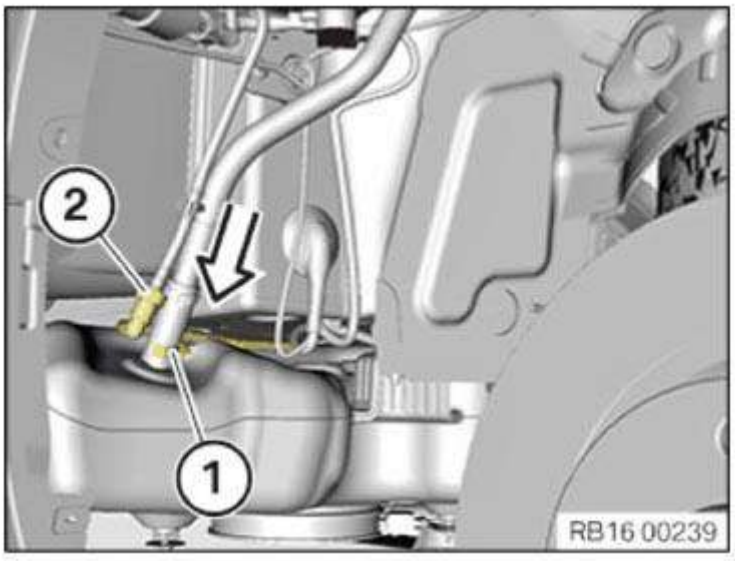


Fig. 72: Positioning Snap Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Required follow-up work:

- Fill the **SCR RESERVOIR**.
- Mounting the rear right **WHEEL ARCH PANEL** .
- Install the rear right underbody panelling.
- Mount rear right heat shield.

16 19 050 REMOVING AND INSTALLING/REPLACING PASSIVE TANK

IMPORTANT:
Ensure adequate ventilation in the workbay!
Avoid skin contact (wear gloves)!
Avoid eye contact (safety goggles)!
Urea/water mixture can escape when components carrying urea/water mixture are released.
Have a collecting vessel ready.
Observe country-specific waste disposal regulations.

IMPORTANT:
Maintain conditions of absolute cleanliness.
Connections and covers of lines carrying urea/water mixture must be cleaned thoroughly with water after each removal or before each installation!
Thoroughly clean the working area with water after repair work.
Use fluff-free cloths for cleaning.
Close connections and lines!
Thoroughly clean special tool with water after each use.

Necessary preliminary work:

- Draw off SCR **PASSIVE TANK**.
- Remove rear right **WHEEL ARCH PANEL** .

Removal:

Unlock and disconnect snap fastener (1).

Release hose clamp (2) and pull off hose from passive tank.

Release nut (3) and remove transfer pump.

cardiagn.com

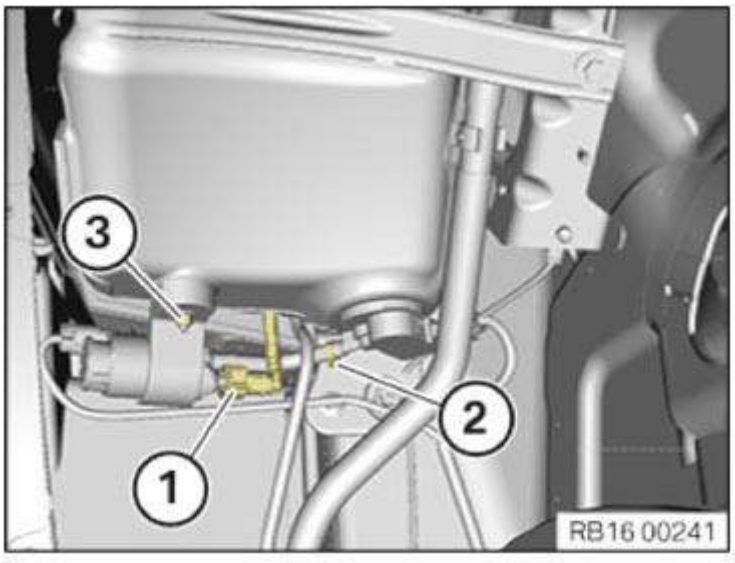


Fig. 73: Identifying Passive Tank Hose Clamp, Fastener And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and disconnect snap fastener (1).

Release hose clamp (2) and pull off filling hose from passive tank.

IMPORTANT: Support passive tank (4)!

Release screw (3) and remove tensioning strap.

Remove passive tank (4) downwards.

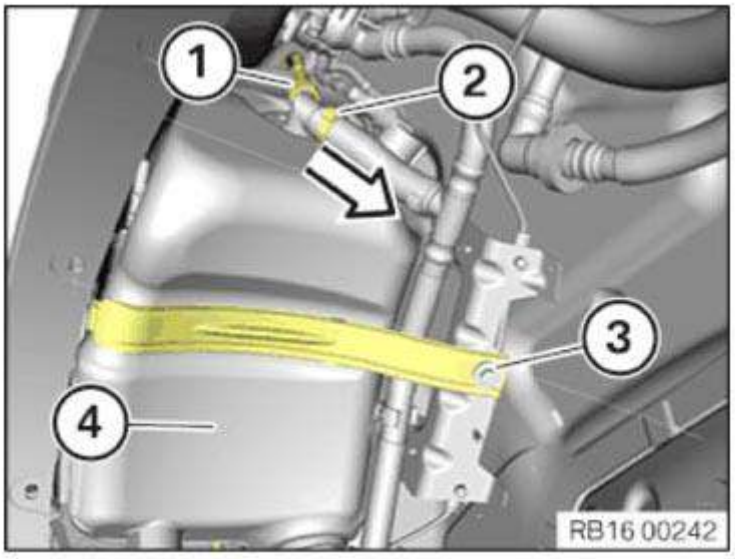


Fig. 74: Pulling Hose From Passive Tank
Courtesy of BMW OF NORTH AMERICA, INC.

Installation:

Install passive tank (4).

IMPORTANT: Support passive tank (4)!

Fit tensioning strap.

cardiagn.com

Fit bolt (3) and tighten.

Tightening torque: **16 19 2AZ** .

Position snap fastener (1) and lock.

Fit fuel filling hose on passive tank.

Mount and attach hose clamp (2).

Replace hose clamp (2).

Parts: Hose clamp

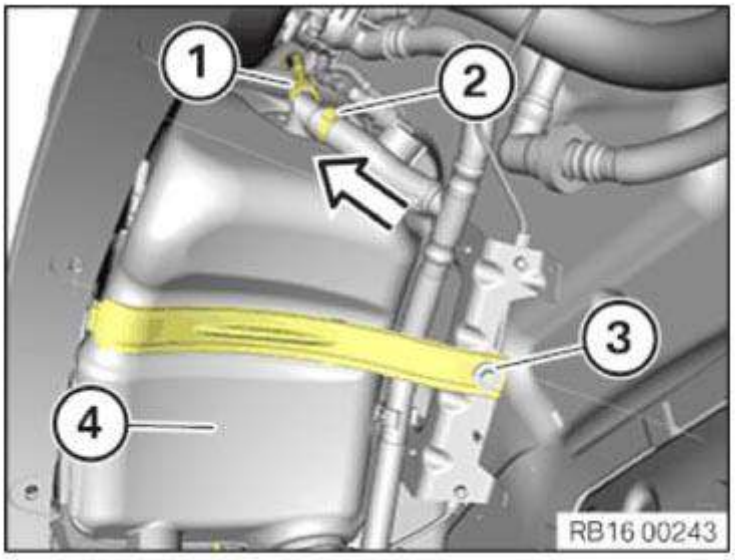


Fig. 75: Installing Passive Tank
Courtesy of BMW OF NORTH AMERICA, INC.

Position snap fastener (1) and lock.

Fit hose (2) on passive tank.

Mount and attach hose clamp (2).

Replace hose clamp (2).

Parts: Hose clamp

Mount transfer pump.

Fit nut (3) and tighten.

cardiagn.com

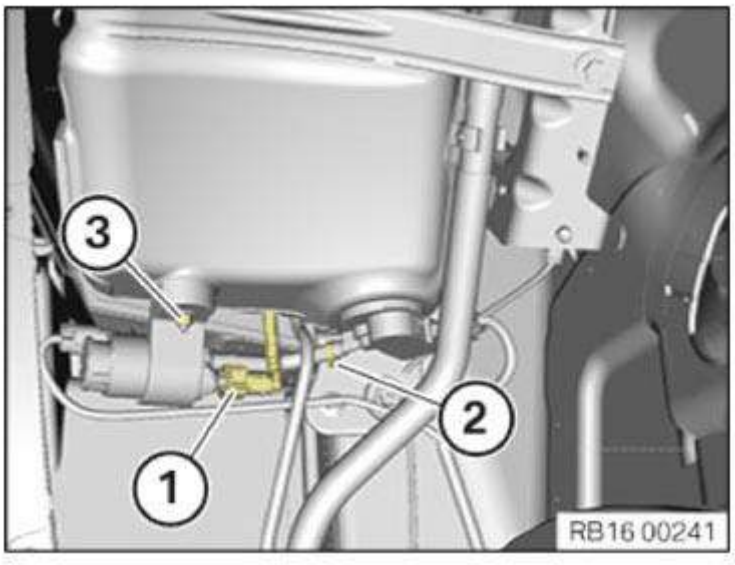


Fig. 76: Identifying Transfer Pump, Hose And Snap Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Required follow-up work:

- Fill the **SCR RESERVOIR**.
- Mounting the rear right **WHEEL ARCH PANEL** .

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702196

cardiagn.com

FUEL SUPPLY

0491382 ADAPTER

0491382 168010 Adapter Mechanical tool

NOTE: **For connecting the workshop compressed air supply to the CNG system via the CNG filling connection.**

SI number

01 14 95 (014)

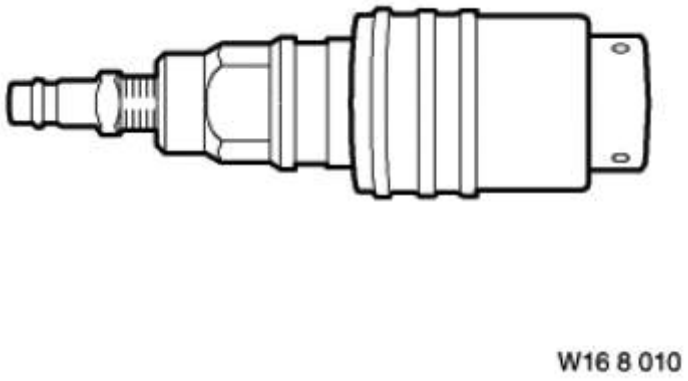


Fig. 1: Identifying Adapter (0491382)
Courtesy of BMW OF NORTH AMERICA, INC.

0493736 ADAPTER

0493736 161173 Adapter AM

NOTE: **(Test adapter for fuel filler cap) Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

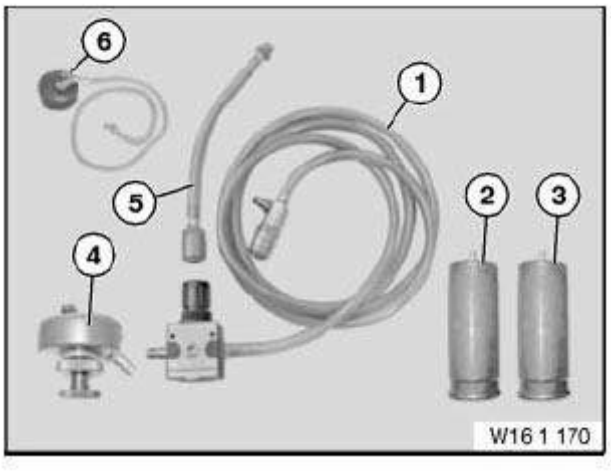


Fig. 2: Identifying Adapter (0493736)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0493735 ADAPTER

0493735 161172 Adapter AM

NOTE: **(Test adapter for fuel filler cap) Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

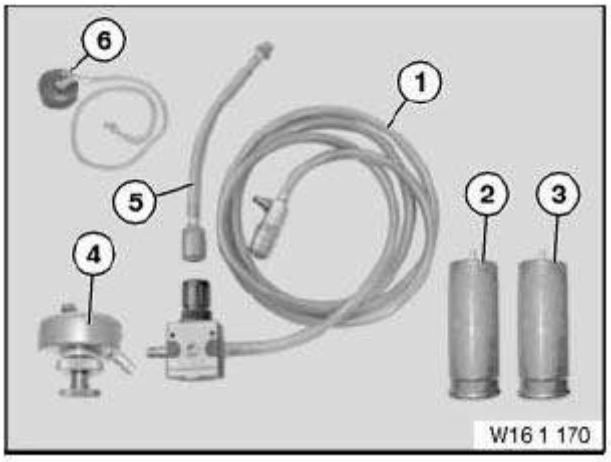


Fig. 3: Identifying Adapter (0493735)
Courtesy of BMW OF NORTH AMERICA, INC.

0493737 ADAPTER

0493737 161174 Adapter AM

NOTE: **(Test adapter for fuel tank) Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

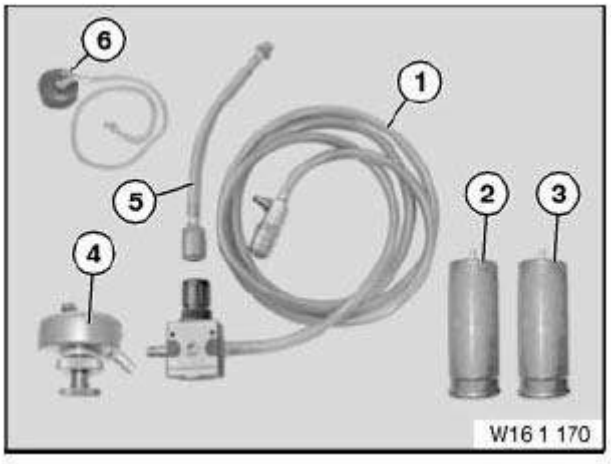


Fig. 4: Identifying Adapter (0493737)
Courtesy of BMW OF NORTH AMERICA, INC.

0491374 DEVICE

0491374 161150 Device AM

Replaced by: 83300494501

NOTE: **For checking the fuel system for leaks. Other: only USA Replaced by 16 1 170 (0 494 501)**

cardiagn.com

SI number

01 04 97 (180)

Consisting of:

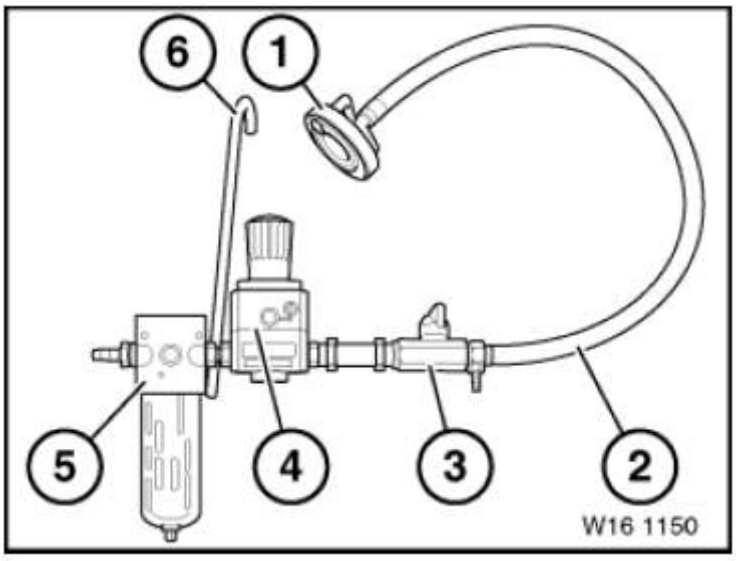


Fig. 5: Identifying Device (0491374)
Courtesy of BMW OF NORTH AMERICA, INC.

1. **0491375** Lid

   NOTE: **(Tank sealing cap) Replaced by 16 1 170 (0 494 501)**

2. **0491376** Hose

   NOTE: **(2.5 m hose with 2 clamps)**

3. **0491377** Valve

   NOTE: **(Valve) Replaced by 16 1 170 (0 494 501)**

4. **0491378** Pressure reducer

   NOTE: **Replaced by 16 1 170 (0 494 501)**

5. **0491379** Water separator

   NOTE: **Replaced by 16 1 170 (0 494 501)**

6. **0491380** Hook

   NOTE: **(Retaining hook) Replaced by 16 1 170 (0 494 501)**

7. **0493519** Plug

   NOTE: **(Sealing plug) Replaced by 16 1 176 (0 495 345)**

0493154 FASTENER

0493154 161162 Fastener AM

cardiagn.com

NOTE: **Sale of existing inventory and then available as part of set of special tools 11 6 160 (83 30 0 493 152) only - as of 02.02.12**

0493153 FASTENER

0493153 161161 Fastener AM

NOTE: **Available only as a complete tool set 11 6 160 (83 30 0 493 152) - as of 02.02.12.**

0493152 FASTENER

0493152 161160 Fastener AM

NOTE: **(seals) For leak-testing fuel tank ventilation system with OBD II - Seal for air filter and scavenging air line.**

SI number

01 25 97 (263)

Consisting of:

1. 0493153 Fastener

   NOTE: **Available only as a complete tool set 11 6 160 (83 30 0 493 152) - as of 02.02.12.**

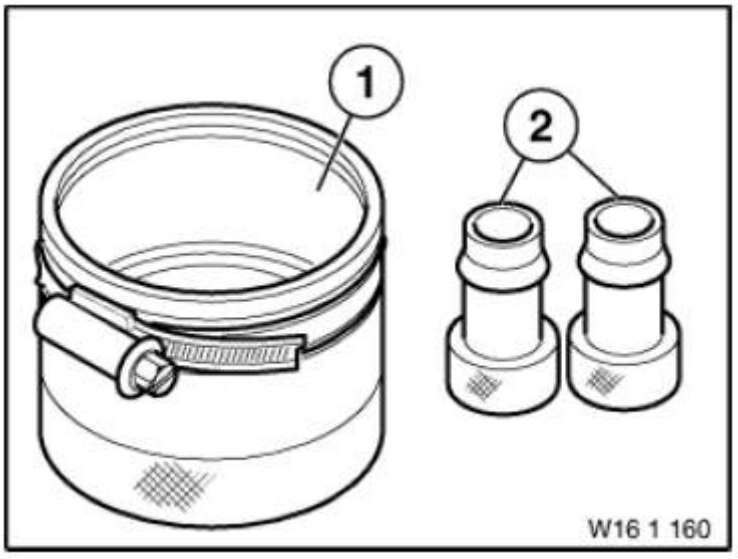


Fig. 6: Identifying Fastener (0493152)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0493154 Fastener

   NOTE: **Sale of existing inventory and then available as part of set of special tools 11 6 160 (83 30 0 493 152) only - as of 02.02.12**

2153909 FILLING DEVICE

2153909 Filling device Mechanical tool

NOTE: **AdBlue filler unit (filling device) for all BMW models (incl. E90 US version).**

SI number

cardiagn.com

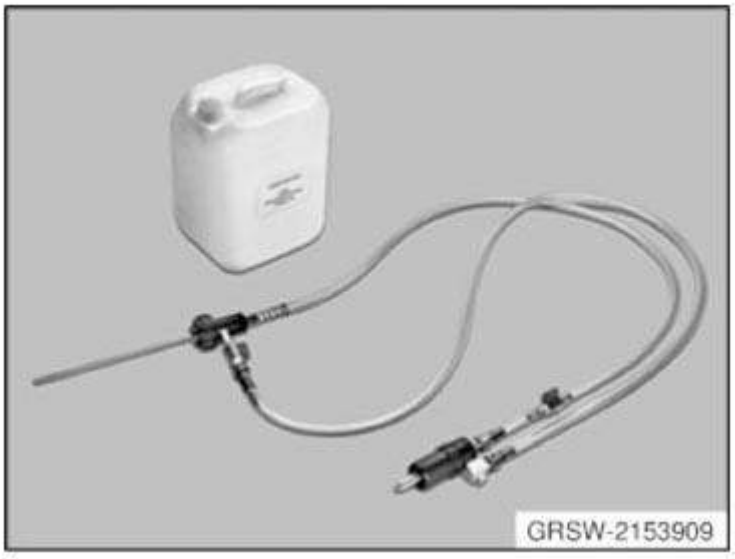


Fig. 7: Identifying Filling Device (2153909)
Courtesy of BMW OF NORTH AMERICA, INC.

0491368 FORK

0491368 161010 Fork Mechanical tool

NOTE: (removal fork) For pressing off the 8 mm diameter fuel hoses

Storage Location

Z1

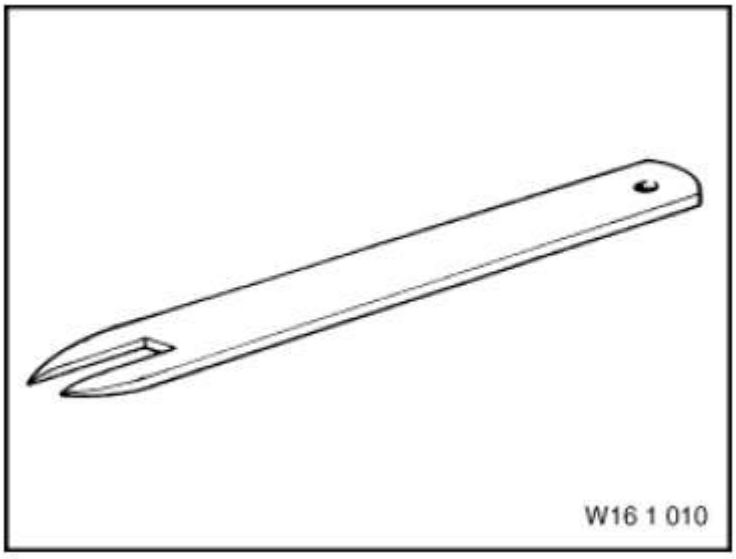


Fig. 8: Identifying Fork (0491368)
Courtesy of BMW OF NORTH AMERICA, INC.

0491367 FORK

0491367 161000 Fork AM

NOTE: (Press-off fork) For pressing off the fuel hose of 6 mm diameter

Storage Location

cardiagn.com

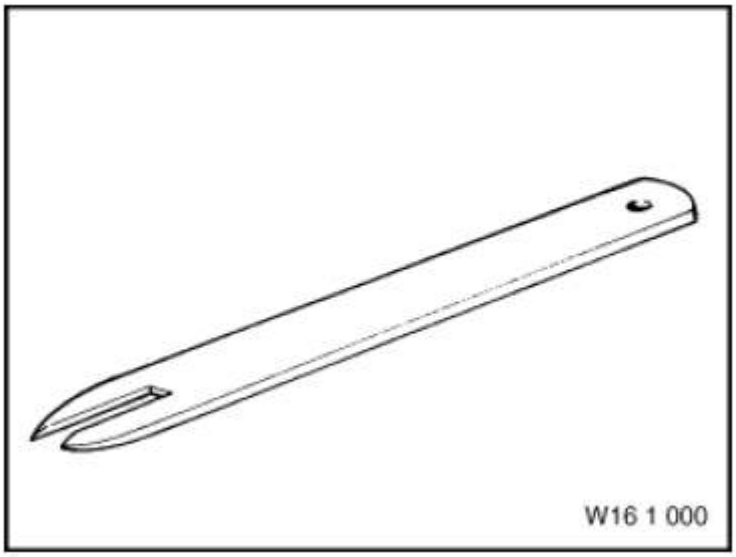


Fig. 9: Identifying Fork (0491367)
Courtesy of BMW OF NORTH AMERICA, INC.

0491380 HOOK

0491380 161156 Hook AM

Replaced by: 83300494501

NOTE: **(Retaining hook) Replaced by 16 1 170 (0 494 501)**

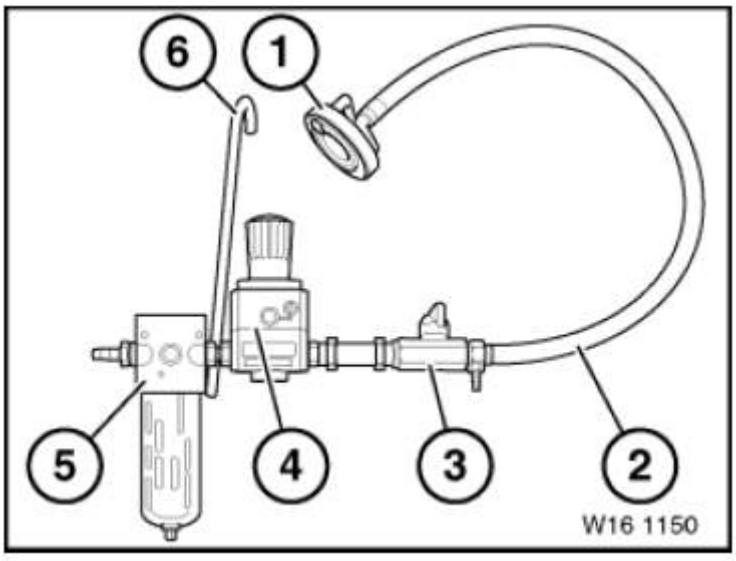


Fig. 10: Identifying Hook (0491380)
Courtesy of BMW OF NORTH AMERICA, INC.

2302783 HOSE

2302783 Hose AM

NOTE: **Filler hose (hose)) for drip-free filling of AdBlue in SCR vehicles (for all BMW models except E90 US version). (Disposable hose! Order new part in the case of wear!)**

SI number

cardiagn.com



Fig. 11: Identifying Hose (2302783)
Courtesy of BMW OF NORTH AMERICA, INC.

0491376 HOSE

0491376 161152 Hose AM

NOTE: **(2.5 m hose with 2 clamps)**

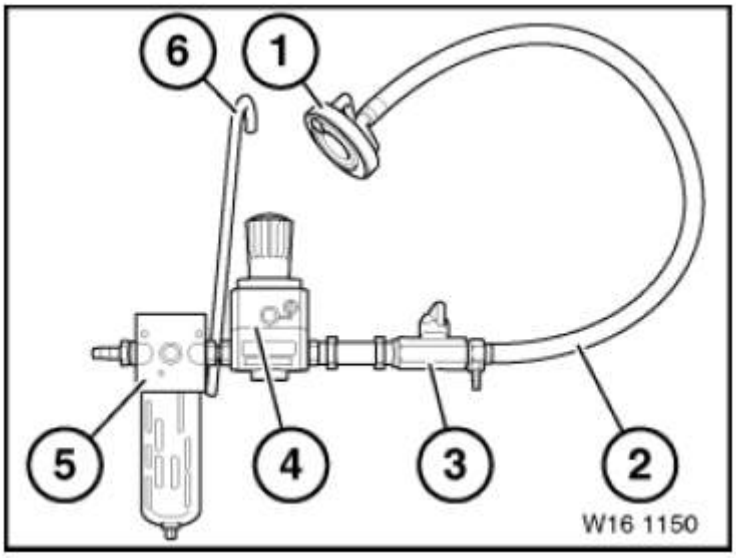


Fig. 12: Identifying Hose (0491376)
Courtesy of BMW OF NORTH AMERICA, INC.

2355173 HOSE

2355173 Hose Mechanical tool

NOTE: **Hose (hose extension) for AdBlue suction pump (81 39 2 302 782 or 81 39 2 302 919). This hose can be used to draw off AdBlueÂ® directly from the "SCR" active tank on the vehicle.**

SI number

01 12 13 (964)

cardiagn.com

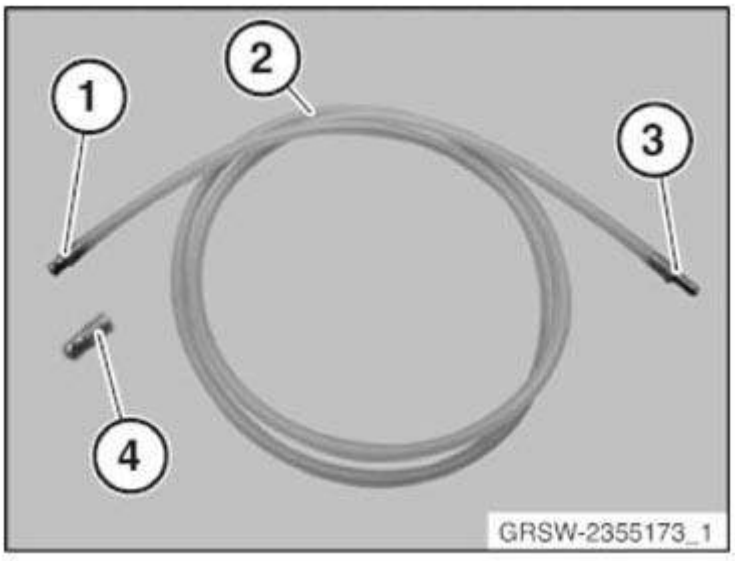


Fig. 13: Identifying Hose (2355173)
Courtesy of BMW OF NORTH AMERICA, INC.

0494557 HOSE

0494557 161175 Hose AM

NOTE: **(Connecting hose) Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

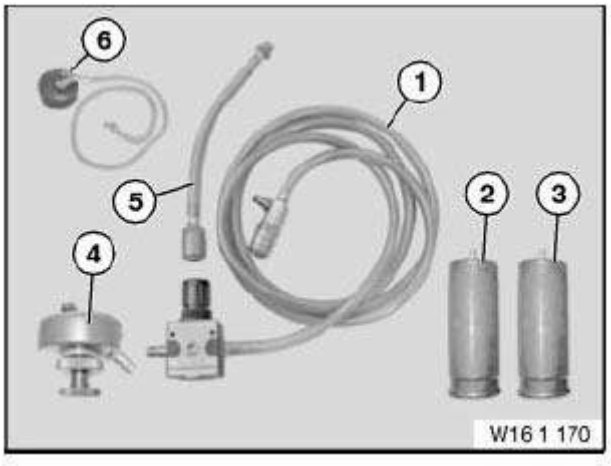


Fig. 14: Identifying Hose (0494557)
Courtesy of BMW OF NORTH AMERICA, INC.

2353954 LEAK DETECTOR

2353954 Leak detector MP

NOTE: **"BMW Smoke diagnosis tester" leak detector for the tightness diagnosis of closed systems such as fuel tanks, intake air passages, etc.. (1) "BMW Smoke diagnosis tester", (2) "UltraTracer", (3) cylinder with pressure reducer, (4) diverse adapter, (5) coupling kit for compressed air connection, (6) torch with white and UV light including special glasses, (7) power pack**

cardiagn.com



Fig. 15: Identifying Leak Detector (2353954)
Courtesy of BMW OF NORTH AMERICA, INC.

Storage Location

Alternatively

SI number

02 11 13 (958)

0491375 LID

0491375 161151 Lid AM

Replaced by: 83300494501

NOTE: **(Tank sealing cap) Replaced by 16 1 170 (0 494 501)**

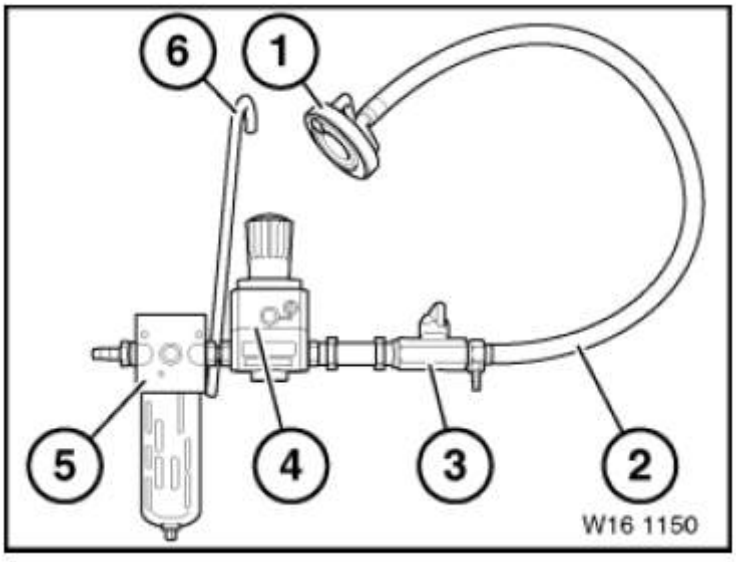


Fig. 16: Identifying Lid (0491375)
Courtesy of BMW OF NORTH AMERICA, INC.

0491383 LIFTING GEAR

0491383 168020 Lifting gear Mechanical tool

cardiagn.com

NOTE: **(Lifting beam) For removing and installing the gas tank**

SI number

01 14 95 (014)



W16 8 020

Fig. 17: Identifying Lifting Gear (0491383)
Courtesy of BMW OF NORTH AMERICA, INC.

0496321 PIN WRENCH

0496321 161190 Pin wrench Minimum set: Mechanical tools Mechanical tool

NOTE: **For opening screw cap on fuel level sensor/pump, fuel tank.**

Storage Location

A25

A26

SI number

01 18 08 (482)

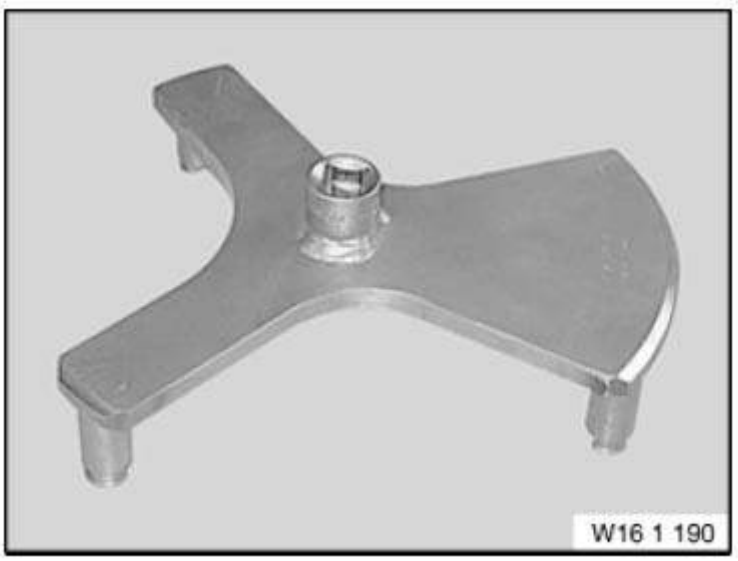


Fig. 18: Identifying Pin Wrench (0496321)
Courtesy of BMW OF NORTH AMERICA, INC.

0491370 PIN WRENCH

0491370 161030 Pin wrench Mechanical tool

cardiagn.com

NOTE: **For removing and installing the locking pin on the fuel filler flap**

Storage Location

X4

SI number

01 05 90 (207)

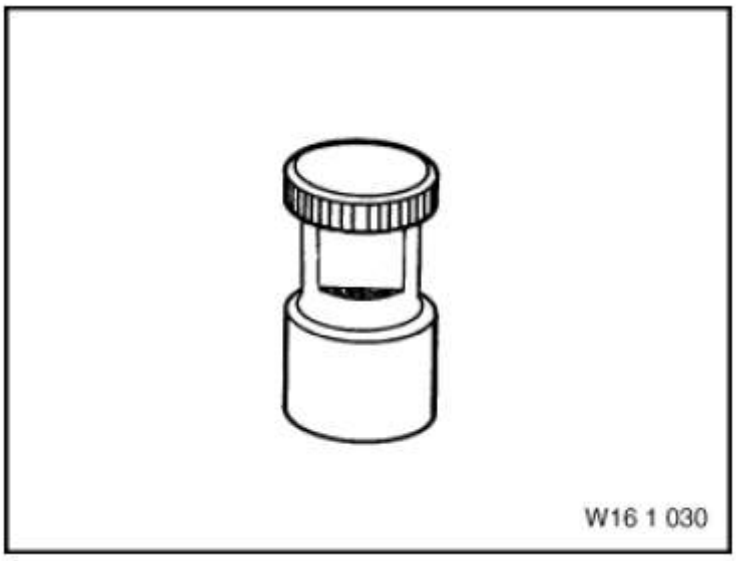


Fig. 19: Identifying Pin Wrench (0491370)
Courtesy of BMW OF NORTH AMERICA, INC.

0495588 PIPE

0495588 161080 Pipe Minimum set: Mechanical tools Mechanical tool

NOTE: **(Hose guide) For unlocking new fuel tank flap systems with safety lock (incorrect fuelling, diesel/petrol/gasoline)**

Storage Location

B19

SI number

01 16 06 (282)



cardiagn.com

Fig. 20: Identifying Pipe (0495588)
Courtesy of BMW OF NORTH AMERICA, INC.

0495345 PLUG

0495345 161176 Plug AM

NOTE: **(Seal plug)**

SI number

02 11 13 (958)



Fig. 21: Identifying Plug (0495345)
Courtesy of BMW OF NORTH AMERICA, INC.

0493519 PLUG

0493519 161157 Plug AM

Replaced by: 83300495345

NOTE: **(Sealing plug) Replaced by 16 1 176 (0 495 345)**

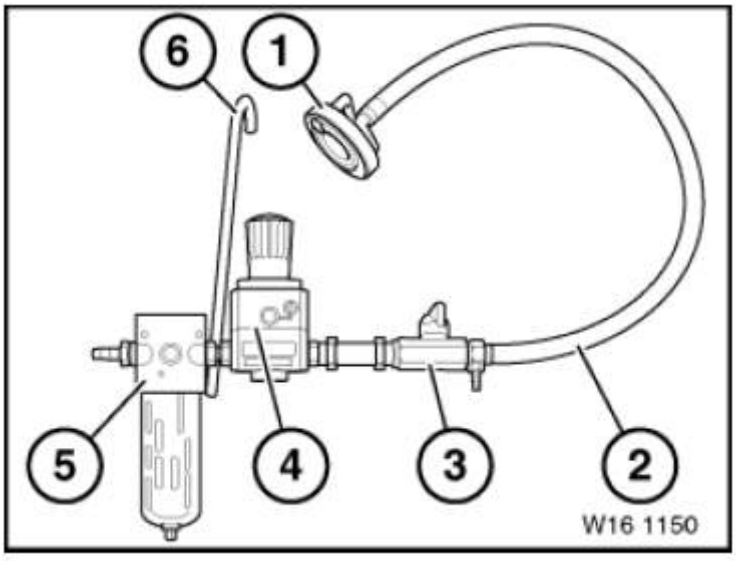


Fig. 22: Identifying Plug (0493519)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0494247 PLUG

0494247 161070 Plug Mechanical tool

NOTE: **(Plug (carbon canister)) For sealing the carbon canister (ECE) for leakage test**

Storage Location

C49

SI number

01 14 01 (766)

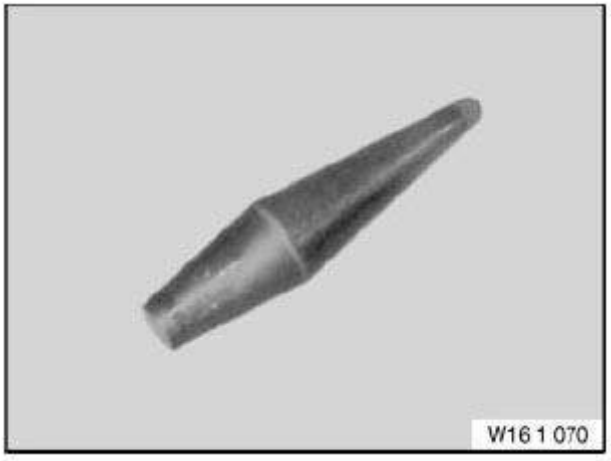


Fig. 23: Identifying Plug (0494247)
Courtesy of BMW OF NORTH AMERICA, INC.

0491378 PRESSURE REDUCER

0491378 161154 Pressure reducer AM

Replaced by: 83300494501

NOTE: **Replaced by 16 1 170 (0 494 501)**

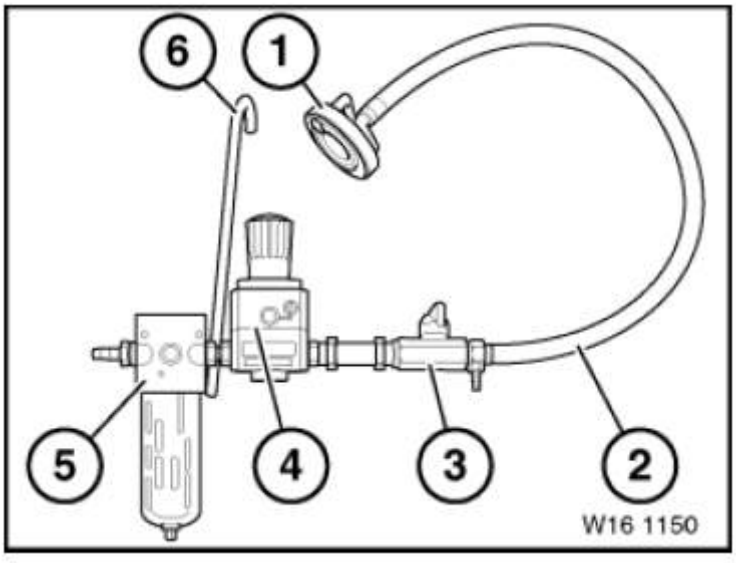


Fig. 24: Identifying Pressure Reducer (0491378)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

2302782 PUMP

2302782 Pump AM

NOTE: **AdBlue 230 exhaust pump for the extraction of the urea/water mixture (AdBlueÂ®).**

SI number

01 30 11 (767)



Fig. 25: Identifying Pump (2302782)
Courtesy of BMW OF NORTH AMERICA, INC.

2302919 PUMP

2302919 Pump AM

NOTE: **AdBlue 110V exhaust pump for the extraction of the urea/water mixture (AdBlueÂ®) from the vehicle-specific expansion tanks.**

SI number

01 30 11 (767)

cardiagn.com



Fig. 26: Identifying Pump (2302919)
Courtesy of BMW OF NORTH AMERICA, INC.

2296522 TESTER

2296522 Tester MP

NOTE: **Testgerat_Refraktometer for AdBlue for evaluating the AdBlue additive!**

SI number

01 30 11 (767)



Fig. 27: Identifying Tester (2296522)
Courtesy of BMW OF NORTH AMERICA, INC.

0493734 TESTER

0493734 161171 Tester AM

NOTE: **Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

cardiagn.com

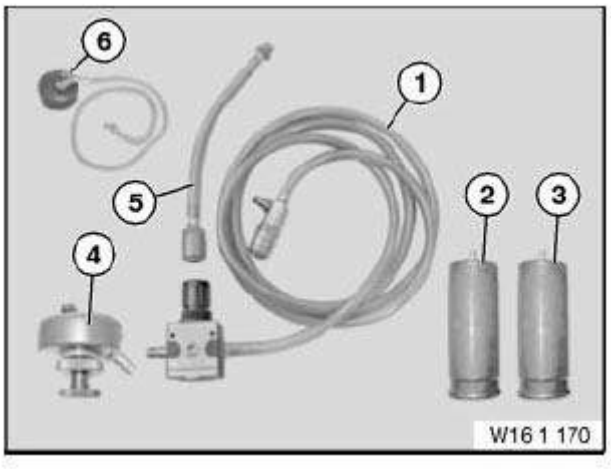


Fig. 28: Identifying Tester (0493734)
Courtesy of BMW OF NORTH AMERICA, INC.

0494501 TESTER

0494501 161170 Tester AM

NOTE: **(Tester with test adapter) leakage test for fuel tank and fuel filler cap. Sales and discontinuation - Replaced by smoke device.**

SI number

01 10 00 (593)

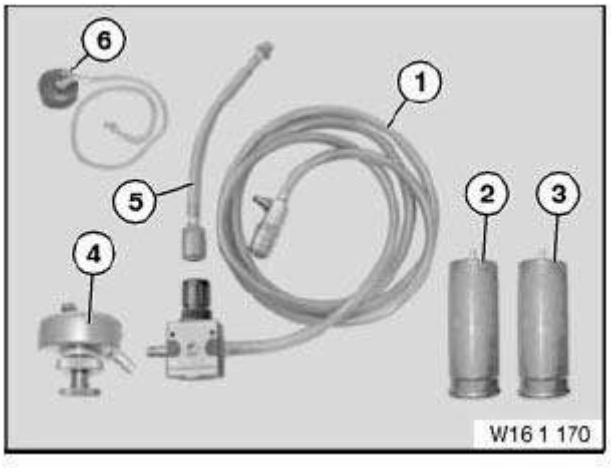


Fig. 29: Identifying Tester (0494501)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0493734 Tester

   NOTE: **Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

2. 0493735 Adapter

   NOTE: **(Test adapter for fuel filler cap) Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

cardiagn.com

3. 0493736 Adapter

NOTE: **(Test adapter for fuel filler cap) Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

4. 0493737 Adapter

NOTE: **(Test adapter for fuel tank) Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

5. 0494557 Hose

NOTE: **(Connecting hose) Remaining inventories will be sold off, followed by discontinuation - then no longer available separately, only via set 0494501 (16 1 170).**

6. 0495345 Plug

NOTE: **(Seal plug)**

0491372 TOOL

0491372 161050 Tool Mechanical tool

NOTE: **(combination tool) For releasing the line connections from the carbon canister, and the fuel lines from the engine**

Storage Location

B4

SI number

01 06 94 (801)

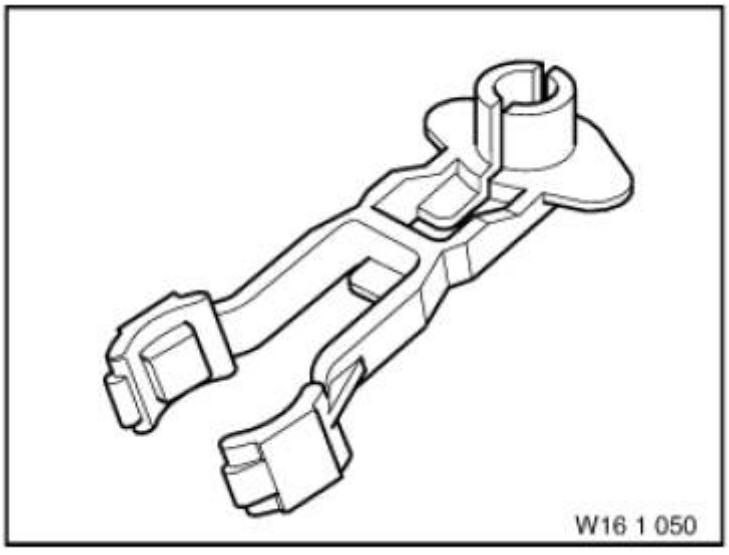


Fig. 30: Identifying Tool (0491372)
Courtesy of BMW OF NORTH AMERICA, INC.

0491377 VALVE

cardiagn.com

0491377 161153 Valve AM

Replaced by: 83300494501

NOTE: **(Valve) Replaced by 16 1 170 (0 494 501)**

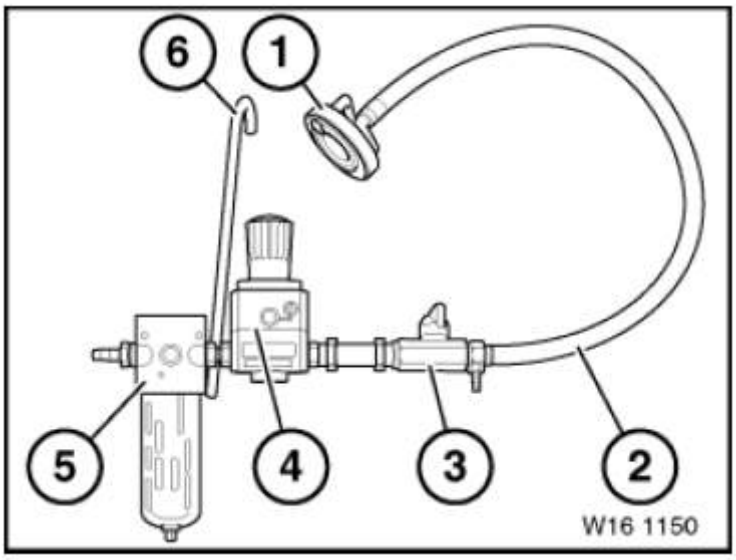


Fig. 31: Identifying Valve (0491377)
Courtesy of BMW OF NORTH AMERICA, INC.

0491379 WATER SEPARATOR

0491379 161155 Water separator AM

Replaced by: 83300494501

NOTE: **Replaced by 16 1 170 (0 494 501)**

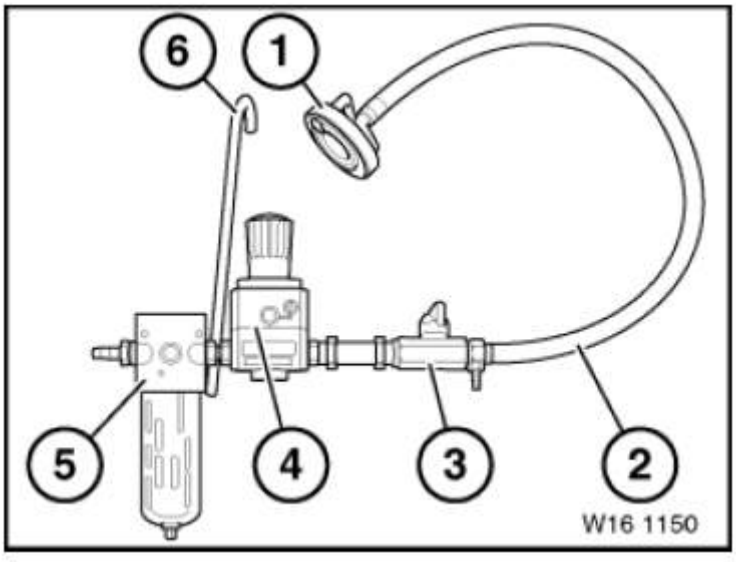


Fig. 32: Identifying Water Separator (0491379)
Courtesy of BMW OF NORTH AMERICA, INC.

0491371 WRENCH

0491371 161040 Wrench Mechanical tool

cardiagn.com

NOTE: **For releasing the line from the carbon canister to the fuel tank and for releasing the fuel feed lines at the fuel injection pipe - model year: from 96**

Storage Location

B3

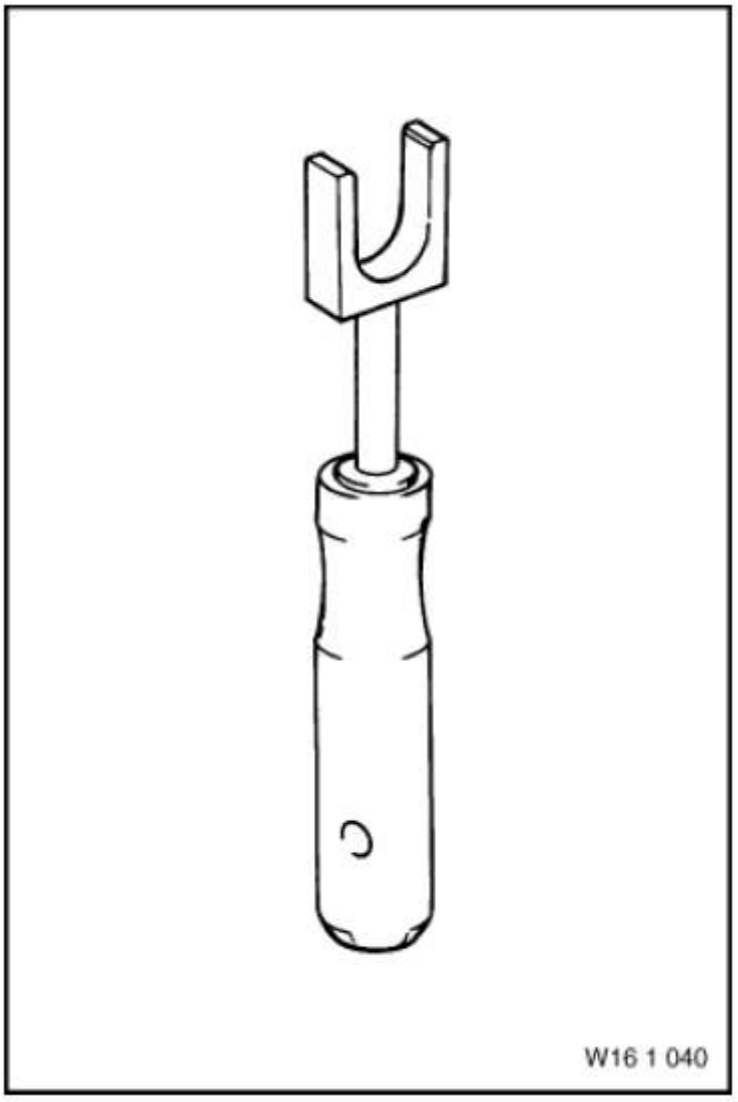


Fig. 33: Identifying Wrench (0491371)
Courtesy of BMW OF NORTH AMERICA, INC.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702113

cardiagn.com

ENGINE

Fuel Supply System - Tightening Torques - X3 Utility

FUEL DELIVERY

16 12 FUEL DELIVERY

TIGHTENING TORQUE SPECIFICATION - FUEL DELIVERY

Â	Type	Thread	Tightening specifications	Dimension
1AZ Hose clamp 42 - 48 mm dia.	F06/F07/F10/F11/F12/F13/F18/F25/F26	Â	Â	4 Nm
2AZ Fuel filler pipe to body	F06/F07/F10/F11/F12/F13/F25/F18/F26	M5	Plastic nut	4 Nm
	F06/F07/F10/F11/F12/F18/F13/F25/F26	M6	Hexagon nut	8 Nm

FUEL TANK AND MOUNTING PARTS

16 11 FUEL TANK AND MOUNTING PARTS

TIGHTENING TORQUE SPECIFICATION - FUEL TANK AND MOUNTING PARTS

Â	Type	Thread	Tightening specifications	Dimension
1AZ Fuel tank to body	F06/F07/F10/F11/F12/F13/F18/F25/F26	M8	Â	19 Nm
2AZ Clamping band to body	F06/F07/F10/F11/F12/F13/F18/F25/F26	M8	Replace screws	19 Nm

FUEL PUMP

16 14 FUEL PUMP

TIGHTENING TORQUE SPECIFICATION - FUEL PUMP

Â	Type	Thread	Tightening specifications	Dimension
1AZ El. fuel pump ECU to body	F06/F07/F10/F12/F11/F13/F18/F25/F25	Â	Replace plastic nut	4 Nm
2AZ Retaining ring to fuel tank	F10/M5	Â	Renew collar nut	5 Nm

FUEL TANK WITH BRACKET, SCR TECHNOLOGY

16 19 FUEL TANK WITH BRACKET, SCR TECHNOLOGY

TIGHTENING TORQUE SPECIFICATION - FUEL TANK WITH BRACKET, SCR TECHNOLOGY

Â	Type	Thread	Tightening specifications	Dimension
1AZ SCR active tank to body	F02/F07/F10/F11	M8	Â	19 Nm
		M6	Â	8 Nm

TANK VENTILATION

16 13 TANK VENTILATION

TIGHTENING TORQUE SPECIFICATION - TANK VENTILATION

Â	Type	Thread	Tightening	Dimension

cardiagn.com

			specifications	
1AZ Carbon canister to body	F06/F07/F10/F11/F12/F13/F18/F25/F26	M6	Â	8 Nm
2AZ Dust filter to body	F12/F13	Â	Replace plastic nut	4 Nm

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702162

cardiagn.com

ENGINE

Fuel System Operating Fluids

1.0 FUELS FOR GASOLINE ENGINES

Use only unleaded gasoline in vehicles equipped with a catalytic converter.

Fuels containing **up to and including 10%** of ethanol or other oxygenates with up to 2.8% oxygen by weight, that is, 15% MTBE (methyl tertiary butyl ether) or 3% methanol plus an equivalent amount of co-solvent, **will not void** the applicable warranties with respect to defects in materials or workmanship.

Although, usage of such alcohol fuel blends may result in driveability, starting, and stalling problems due to reduced volatility and lower energy content of the fuel. Those driveability problems may be especially evident under certain environmental conditions, such as: high or low ambient temperatures and high altitude.

Only specially adapted vehicles (FFV - Flexible Fuel Vehicles) can run on high alcohol fuel blends. BMW, for the various technical and environmental reasons explained below, does not offer FFV models.

Usage of E85, or any other high alcohol content blend (e. g. E30) in BMW vehicles, will cause various driveability complaints (cold start problems, stalling, reduced performance, poor fuel economy, etc.), may cause excessive emissions, and may cause irreversible damage to engine, emission control and fuel delivery systems due to incompatibility of materials with alcohols.

GENERAL NOTES REGARDING E85 FUEL

E85 fuel contains 85% (by volume) of ethanol and 15% of gasoline. Ethanol can be produced chemically from ethylene or biologically from grains, agricultural wastes, or any organic material containing starch or sugar. In the US, ethanol is mainly produced from corn and is classified as a renewable fuel.

Similar to gasoline, ethanol contains hydrogen and carbon; with additional oxygen molecules build into its chemical chain. This chemical structure makes ethanol's burning process slightly cleaner compared to the gasoline (lower tailpipe emissions).

On the other hand, due to lower carbon content, ethanol provides 27% less energy (for identical volume) then gasoline, resulting in the reduced fuel economy of E85 vehicles (approximately 22% higher consumption). Increased fuel consumption requires the appropriately enlarged fuel tank capacities (usually 30% increase), and the specific DME calibrations for the E85 lower Stoichiometric air/fuel ratio (10 compared to 14.7 for gasoline engines).

E85 fuel volatility is typically lower then gasoline (RVP 6-10 psi, compared to 8-15 psi for gasoline). Lower fuel volatility will reduce vehicle evaporative emissions, but it may cause cold starting problems especially with lower ambient temperatures.

Under certain environmental conditions, mainly lower ambient temperatures, ethanol separates from gasoline/alcohol mixture and absorbs water. The ethanol absorbed water molecules are heavier then gasoline or ethanol, they remain at the bottom of fuel tank and when introduced into combustion process they tend to form an extremely lean mixture resulting in misfire, rough idle and cold starting problems.

Certain materials, commonly used with gasoline are totally incompatible with alcohols. When these materials come in contact with ethanol, they may dissolve in the fuel, which may damage engine components and may result in poor vehicle driveability.

Some metals (e. g. zinc, brass, lead, aluminum) become degraded by long exposure to ethanol fuel blends. Also, some nonmetallic materials used in automotive industry such as: natural rubber, polyurethane, cork gasket material, leather, polyvinyl chloride (PVC), polyamides, methyl-methacrylate plastics, and certain thermo & thermoset plastics degrade when in contact with fuel ethanol.

In order to safely and effectively operate a motor vehicle running on E85, the vehicle must be compatible with

cardiagn.com

alcohol use. Some manufacturers have developed vehicles called FFV (Flexible Fuel Vehicle) that can operate on any blend of ethanol and gasoline (from 0% ethanol and 100% gasoline, up to 85% ethanol and 15% gasoline). Ethanol FFVs are similar to gasoline vehicles, with main differences in materials used in fuel management and delivery systems, and DME control module calibrations. In some cases, also E85 vehicles require special lubricating oils.

Aftermarket conversions of gasoline-powered vehicles to ethanol-fueled vehicles, although possible, are not recommended due to internal materials and DME software incompatibility, as well, as the high costs of conversion.

TOP TIER DETERGENT GASOLINE

Deposit-control additives have been required by the EPA in all gasoline from 1995, however, since the introduction of the lowest additive concentration (LAC) most gasoline manufacturers have actually reduced the concentration level of detergent additives by up to 50%.

Low content of cleaning additives results in an excessive accumulation of deposits on fuel injectors, the intake valves, the exhaust manifold or inside the combustion chamber. Due to deposits build-up, customers may experience various driveability problems (e. g. cold start problems, rough idle), increased emissions with Service Engine Soon light illumination, reduced engine performance and poor fuel economy.

In order to increase the level of detergent additives in gasoline, the TOP TIER Detergent Gasoline requirements were approved by four automotive companies (BMW, GM, Honda and Toyota).

Usage of the TOP TIER Gasoline will help keep engines cleaner, and will reduce deposits-related concerns.

A number of gasoline retailers have already met the TOP TIER Detergent Gasoline requirements and are offering this product in all octane grades in all of their respective marketing areas. The current TOP TIER Gasoline retailers are: QuickTripÂ®, ChevronTexacoÂ®; ConocoPhillipsÂ®; 76Â®; ShellÂ®; Entec StationsÂ®; MFA Oil CompanyÂ®; Kwik TripÂ®/Kwik StarÂ®; The Somerset Refinery, Inc.Â®; Aloha PetroleumÂ®; Jiffy MartÂ®; MahaloÂ®; Trip-Par Oil CompanyÂ®. All gasoline outlets carrying the brand of the approved retailer must conform to TOP TIER requirements on products advertised as such.

BMW **recommends using TOP TIER Detergent Gasoline** of minimum octane rating of AKI 91 and with alcohol content of less then 10% by volume (or any other oxygenates with up to 2.8% of oxygen by weight). Only the exclusive usage of TOP TIER Gasoline provides the full benefit of reducing deposits build-up.

ALCOHOL DETECTION PROCEDURE

Fuel Blends containing a high percentage (10% and above) of alcohol, mainly ethanol, are becoming more commercially available. Usage of E85, or any other high alcohol content blend (e. g. E30) in BMW vehicles, will cause various driveability complaints (cold start problems, stalling, reduced performance, poor fuel economy, etc.), may cause excessive emissions, and may cause irreversible damage to engine, emission control and fuel delivery systems due to incompatibility of materials with alcohols.

In order to correctly diagnose various driveability complaints caused by fuel blends with a high level of ethanol content, BMW is providing you with an alcohol detection test tool.

Distribution of the following tool will be through the Automatic Tool Shipment Program. Additional tools may be purchased through your PDC. All prices on this bulletin are introductory prices and are only valid during the Automatic Tool Shipment.

PROCEDURE

Safety Precautions:

Gasoline is highly flammable; observe normal precautions for working with flammable liquids. Perform all tests away from any source of ignition. A class B fire extinguisher must be available. Wear protective eye protection with side shields and Nitrile rubber gloves for handling syringe. Please adhere to any applicable

cardiagn.com

OSHA regulations when handling Gasoline.

Dispose of the mixture according to local, state and federal regulations.

Fill a clean container with gasoline drawn from the fuel system of the affected vehicle then fill another container with water. Only a small amount of fuel is needed to perform the test (5 ounces of each fluid).

Slowly draw 3cc of water into the syringe.

NOTE: **To remove air, draw at least 5cc to 6cc of water, invert the syringe and squirt the water out until the top rim of the rubber plunger is at the 3cc mark.**

Slowly draw gasoline into the syringe until the fluid reaches the 12cc mark.

Place your finger over the tip of the syringe, vigorously shake the syringe for one minute. Relieve built-up pressure by occasionally removing your finger.

Place the syringe on a flat surface with the nozzle pointing up, allow the syringe to stand for one minute.

If alcohol is present in the fuel, it will separate from the gasoline and dissolve in the water. This water/alcohol mixture will be in the lower part of the syringe. Record the reading at the boundary of the two liquids, refer to the table below to determine the percentage of alcohol in the fuel.

Empty the syringe and rinse thoroughly with water, allow drying and apply a silicone lubricant to the rubber plunger before storing.

SAFETY PRECAUTIONS CHART

Boundary Line	% Alcohol
9.0cc	0%
8.6cc	5%
8.1cc	10%
7.7cc	15%
7.2cc	20%
6.8cc	25%
6.3cc	30%
5.9cc	35%
5.4cc	40%
5.0cc	45%
4.5cc	55%
4.1cc	60%
3.6cc	65%
3.2cc	70%
2.7cc	75%
2.3cc	80%
1.8cc	85%
1.4cc	90%

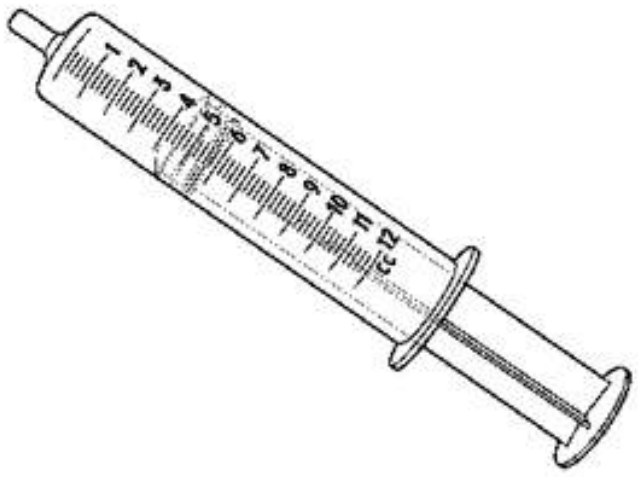
WARRANTY INFORMATION

Components damage/malfunctions, or any driveability problems caused by use of fuels containing more then 10% ethanol (or other oxygenates with more then 2.8% oxygen by weight) will not be covered under BMW warranties with respect to defects in materials or workmanship. Please document the results found on the vehicle repair order whenever performing this test.

WARRANTY INFORMATION CHART

	Alcohol Detection Test Tool

cardiagn.com

 S13 06 U01	Order PN 83 30 0 420 667

ANTI-KNOCK PROPERTIES

The anti-knock value is the quality rating for gasoline and is a requirement for controlled combustion. Anti-knock value is expressed with an octane number. A higher number indicates better anti-knock properties of a gasoline. Internationally approved methods are used to determine the Research Octane Number (RON) and the Motor Octane Number (MON). In the United States the Anti-Knock Index (AKI) is displayed at the gas pumps.

AKI = RON + MON/2

BOILING RANGE AND VAPOR PRESSURE

Gasolines must be highly volatile. The boiling range and vapor pressure values are used for evaluation. Gasolines do not have a boiling "point", but rather a boiling "line", since they are produced from a mixture of various hydrocarbon components.

The boiling line (boiling range) and therefore vapor pressure have influence on, for example,

- vapor lock
- starting behavior
- evaporation loss
- transition and driving behavior
- engine oil dilution
- perfect combustion

The boiling range is different for summer and winter gasolines. The vapor pressure test is another means of determining the behavior of a gasoline.

SPECIFIC GRAVITY

The specific gravity is determined by gasoline components. The volume changes with the temperature. Due to the different compositions there are different values for premium grade and regular grade gasolines.

CALORIFIC VALUE

The calorific value expresses the power content of a gasoline. The calorific value of a combustible fuel/air mixture is of prime importance for the power output of engines.

PURITY, COMBUSTION DEPOSITS

Gasolines must be free of contamination. Pumps, jets, injectors, valves and lines must not be clogged or plugged up. Residue and deposits in the intake system and combustion chamber will impair engine operation.

cardiagn.com

The solid residue from evaporation of gasoline provides information on the degree of contamination.

SULFUR CONTENT

The sulfur content of all gasolines should be as low as possible. In this manner there will be less sulfuric acids or sulfur acids in the combustion residue, which would lead to corrosion and sulfuric emissions on an engine running without reaching operating temperature.

1.1 MINIMUM OCTANE AND AKI RATINGS FOR GASOLINE ENGINES

Up to 2005 model year

MINIMUM OCTANE AND AKI RATINGS FOR GASOLINE ENGINES REFERENCE CHART

Â	Leaded Gasoline	
Â	Premium Grade	Regular Grade
RON (Research Octane No.)	Â	at least 91.0
MON (Motor Octane No.)	Â	at least 82.7
AKI*	at least 93.0	at least 87.0

MINIMUM OCTANE AND AKI RATINGS FOR GASOLINE ENGINES REFERENCE CHART

Â	Â		Unleaded Gasoline
Â	Premium Grade	Mid-Range	Grade Regular Grade
RON	at least 98.0	at least 95.0	at least 91.0
MON	at least 88.0	at least 85.0	at least 82.5
AKI, see (1)	at least 93.0	at least 90.0	at least 87.0

(1) Anti-Knock Index AKI = RON + MON/2

1.2 SUMMARY OF FUEL GRADE REQUIREMENTS

FUEL GRADE REQUIREMENTS REFERENCE CHART

Â	Â	Â	Â	Unleaded Gasoline	
Â	Â	Â	Â	Regular	Premium
Engine	Vehicle	Model	Model Year	(AKI at least 87.0)	(AKI at least 93.0)
M10	E30	318i	'84-'85	X	Â
M20	E30	325e/es	'85-'88	X	Â
Â	E30	325i/iX	thru '91	X	Â
Â	E30	325iC	thru '93	X	Â
Â	E28	528e	thru '88	X	Â
Â	E34	525i	'89-'90	X	Â
M30	E28	535i	'85-'88	X	Â
Â	E34	535i	thru '93	X	Â
Â	E24	635CSi, L6	thru '89	X	Â
Â	E23	735i/iL, L7	thru '87	X	Â
Â	E32	735i/iL	thru '92	X	Â
M42	E30	318i/is/iC	'91-'92	Â	X
Â	E36	318i/is/iC/ti	thru '95	Â	X
M44	E36	318i, Z3	'96-'98	Â	X
Â	E36	318is/iC	'96-'97	Â	X
Â	E36	318ti	'96-'99	Â	X
M50	E36	325i/is	'92	Â	X
Â	E34	525i/iT	'91-'92	Â	X
M50TU	E36	325i/is	'93-'95	Â	X
Â	E36	325iC	'94-'95	Â	X

cardiagn.com

Â	E34	525i/iT	'93-'95	Â	X

FUEL GRADE REQUIREMENTS REFERENCE CHART

Â	Â	Â	Â	Unleaded Gasoline	
Â	Â	Â	Â	Regular	Premium
Engine	Vehicle	Model	Model Year	(AKI at least 87.0)	(AKI at least 93.0)
M52	E36	323is/iC	'98-'99	Â	X
Â	E36	328i	'96-'98	Â	X
Â	E36	328is/iC	'96-'99	Â	X
Â	E36	Z3	'97-'98	Â	X
Â	E39	528i	'97-'98	Â	X
M52TU	E46	323i, 328i	'99-'00	Â	X
Â	E46	323Ci, 328Ci	'00	Â	X
Â	E36	Z3 2.3/2.8	'99-'00	Â	X
Â	E39	528i/iT	'99-'00	Â	X
N52	E60	525i, 530i	'05- present	Â	X
Â	E61	525xiT, 530xiT	'05- present	Â	X
Â	E90	325i, 330i	'05-present	Â	X
M54	E36	Z3	'01-'03	Â	X
Â	E46	325i/Ci/CiCiT	'01- present	Â	X
Â	E46	325xi/xiT	'01- present	Â	X
Â	E46	330i/Ci/CiC	'01- present	Â	X
Â	E46	330xi	'01- present	Â	X
Â	E39	525i/iT	'01- present	Â	X
Â	E39	530i	'01- present	Â	X
Â	E53	X5 3.0i	'01- present	Â	X
Â	E60	525i, 530i	'03- present	Â	X
Â	E83	X3	'04- present	Â	X
Â	E85	Z4	'03- present	Â	X
M60	E34	530i/iT, 540i	'94-'95	Â	X
Â	E32	740i/iL	'93-'94	Â	X
Â	E38	740i/iL	'95	Â	X
Â	E31	840Ci	'94-'95	Â	X
M62	E39	540i	'97-'03	Â	X
Â	E39	540iT	'99-'03	Â	X
Â	E38	740i/iL	'96-'01	Â	X
Â	E31	840Ci	'96-'97	Â	X
Â	E53	X5	'00-'03	Â	X
N62	E53	X5	'04-'05	Â	X
Â	E60	545i	'03-'05	Â	X
Â	E63	645Ci	'04-'05	Â	X
Â	E64	645CiC	'04-'05	Â	X
Â	E65	745i	'02-'05	Â	X
Â	E66	745Li	'02-'05	Â	X
N62TU	E53	X5	'05- present	Â	X
Â	E60	550i	'03- present	Â	X
Â	E63	650Ci	'04- present	Â	X
Â	E65	750i	'05- present	Â	X
Â	E66	750Li	'05- present	Â	X
M70	E32	750iL	'88-'94	Â	X
Â	E31	850i/Ci	'91-'94	Â	X

cardiagn.com

M73	E38	750iL	'95-'01	Â	X
Â	E31	850Ci	'95-'97	Â	X
N73	E66	760Li	'04- present	Â	X
S14	E30	M3	'88-'91	Â	X
S38	E24	M6	'87-'88	Â	X
Â	E28	M5	'88	Â	X
Â	E34	M5	'91-'93	Â	X
S50	E36	M3	'95	Â	X
S52	E36	M3	'96-'99	Â	X
Â	E36	MZ3	'98-'00	Â	X
S54	E36	MZ3	'01-'02	Â	X
Â	E46	M3	'01-'02	Â	X
S62	E39	M5	'00-'03	Â	X
Â	E52	Z8	'00- present	Â	X
S70	E31	850CSi	'94-'95	Â	X

2.0 FUEL SYSTEM CLEANER PLUS

Recent field experiences have shown a significant increase in various driveability complaints due to excessive carbon deposits in engine's combustion chambers, on the intake valves and fuel injectors.

The overall rise in carbon deposits accumulation is generally attributed to poor gasoline quality, namely, low level of cleaning additives and fuel contamination.

TECHNICAL BACKGROUND

Combustion chamber deposit formation is a by-product of the gasoline burning process. Fuel injector and intake valve deposits may become less troublesome with the recently introduced Top Tier Detergent Gasoline deposit control standards, which are exceeding the detergent requirements imposed by the EPA since 1995.

However, vehicles that do not exclusively use a Top Tier Detergent Gasoline, or are regularly driven in severe service conditions, such as stop-and-go traffic, high ambient temperatures, and high altitude can experience performance problems caused by intake system and combustion chamber deposits.

The most common customer complaints may include:

FUEL INJECTORS

Deposits at the injector's tip can impact fuel flow, upsetting the air/fuel mixture ratio.

Symptoms: Hesitation or stumble during acceleration, even loss of power. Poor fuel efficiency. Increased emissions of HC and CO. "Service Engine Soon" light illumination due to intermittent misfire faults, or lean mixture adaptation values

INTAKE VALVES

Deposits at the valves and on the intake manifold ports can absorb fuel during the warm-up phase, leaning out the air/fuel mixture ratio. Carbon build-up may disturb mixture flow at low throttle conditions/idle speeds.

Symptoms: Poor driveability, loss of power, unstable/rough idle, increased emissions of HC, CO and NOx. "Service Engine Soon" light illumination due to intermittent misfire faults.

COMBUSTION CHAMBER

Combustion Chamber Deposit Interference, or CCDI, occurs when there is a contact between carbon deposits on the piston crown and cylinder head. The noise can be confused or misdiagnosed as ping, knock or other noises that could indicate a mechanical failure. CCDI occurs first as a cold start noise that can fade as the

cardiagn.com

engine warms to operating temperature. The noise will reoccur at the next cold start. As deposits build, there is an increase in compression temperature that may cause pre-ignition detonations.

Symptoms: Knocking, pinging, run-on, poor acceleration, octane requirement increase, increased emissions of NOx, engine idle speed surges.

Depending on the manufacturer, fuels may contain various additives such as: oxidation and corrosion inhibitors, metal deactivators, emulsifiers, anti-icing agents & dyes, plus they are required to include some form of an intake system deposit control package. Unfortunately, not all fuels are created equal, and some additive packages are not effective enough to maintain integrity of the intake systems in high performance engines, or engines operating in severe environmental conditions. Even worse, the intake system deposit control additives in some fuels may actually contribute to the combustion chamber deposits accumulation, and to the problems associated with those deposits: knock, run-on and increased emissions of oxides of nitrogen.

RECOMMENDATION

BMW recommends using TOP TIER Detergent Gasoline of minimum octane rating of AKI 91 and with alcohol content of less then 10% by volume (or any other oxygenates with up to 2.8% of oxygen by weight). Only the exclusive usage of TOP TIER Detergent Gasoline provides the full benefit of reducing deposits formation.

If the TOP TIER Detergent Gasoline is unavailable, we recommend BMW Group Fuel System Cleaner Plus (PN 82 14 0 413 341) be added to the gas tank. For optimum cleaning and deposits control, add a 20 fl. oz. bottle every 3, 000 miles when refueling.

Regular use of BMW Group Fuel System Cleaner Plus can help address carbon deposits related symptoms listed above. By removing these deposits, an engine may experience restored power, performance and fuel efficiency, a smoother idle running, lower emissions, and reduced octane requirement.

BMW Group Fuel System Cleaner Plus uses polyether amine TECHRONÂ® based technology developed and patented by Chevron. BMW Group Fuel System Cleaner Plus has proven to clean up deposits in fuel injectors, ports & intake valves and reduces the harmful effects of combustion chamber deposits. It helps restore performance lost due to deposit build-up.

Chevron and BMW have run an extensive "no harm" tests with polyether amine technology. When used as directed, it will not harm catalytic converters, oxygen sensors, or any other mechanical components of the engine, or fuel delivery system.

The effectiveness of the additive depends on its presence in the gasoline in large concentrations for short periods of time. One treatment is usually sufficient, but a second treatment (one 20 oz bottle per each, consecutive full tank of gas) may give additional benefits. To keep your fuel intake system clean, we recommend usage at every 3000 miles.

Additionally, vehicle's fuel sending units equipped with silver plated resistor card/contacts are especially vulnerable to attacks by elemental sulfur and/or hydrogen sulfide found in fuels. Adding BMW Group Fuel System Cleaner Plus immediately upon noticing erratic fuel gauge behavior may, in many cases, restore proper performance due to the additive's ability to remove the harmful sulfur compounds from the sending unit's contact surface. Additionally, BMW Group Fuel System Cleaner Plus can help protect the fuel gauge from future malfunctioning by coating all metal surfaces of the fuel system.

BMW Group Fuel System Cleaner Plus.

PN 82 14 0 413 341,

1 bottle, 20 fl. oz.

Ordering in multiples of 6 bottles per case.

cardiagn.com



Fig. 1: Identifying BMW Group Fuel System Cleaner Plus Bottle
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **BMW Group Fuel System Cleaner Plus is the only BMW approved in tank additive. Using non approved fluids or tools can lead to premature component failure and will not be covered under Warranty.**

WARRANTY INFORMATION

Because carbon deposit build-up is related to fuel quality, it cannot be considered as a defect in vehicle's materials or workmanship. Consequently, usage of BMW Group Fuel System Cleaner Plus is not covered under the terms of the BMW New Vehicle Limited Warranty or maintenance plan.

3.0 FUEL INJECTION AND INDUCTION SYSTEM CLEANER CONCENTRATE

The BMW Group has developed a new special tool and cleaner concentrate to clean the fuel injectors, induction system and combustion chamber of harmful deposits.

Fuel Injector and Induction System Cleaner

Concentrate

PN 82 14 0 428 376

1 bottle, 16 fl. oz.



cardiagn.com

Fig. 2: Identifying Fuel Injector And Induction System Cleaner Bottle
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **BMW Group Fuel Injector and Induction System Cleaner is the only BMW approved fluid that can used to clean the fuel injection system, induction system and combustion chamber. Using non approved fluids or tools can lead to premature component failure and will not be covered under Warranty.**

4.0 FUELS FOR DIESEL M21 ENGINES (US MODEL 524TD ONLY)

Diesel fuel is obtained from distilled crude oil. The distilling process is highly complicated, involving precise control of temperatures and pressures. The diesel fuel quality will vary depending on the refining process and the crude oil source.

BMW of North America LLC recommends using automotive diesel Fuel No. 2 with a minimum cetane rating of 45 for use in the BMW 524td. Never use other fuels such as marine fuel or heating oil, since these fuels do not have the appropriate additives or cetane values.

The cetane number is a measure of the fuel's ignition quality, which influences both the ease of starting and combustion stability.

A high cetane number diesel fuel promotes spontaneous burning of the fuel, which is beneficial in a diesel.

Factors which are important qualities of diesel fuel are the Cloud Point (the temperature at which wax forms in diesel fuel) and the Pour Point (the temperature at which fuel stops flowing). These qualities become very important during low temperature operation. As the temperature drops, wax can sometimes form in the fuel tank, fuel lines and/or fuel filter. If this occurs, the fuel supply lines will become clogged and resulting hard starting and rough running problems.

Temperatures below 20Â°F (-7Â°C) are critical to the formation of wax crystals. The following guidelines should solve any cold weather problems which may arise:

NOTE: **BMW 524td's are equipped with an integral fuel heater, pre-delivery fuel pump, large capacity fuel filter/water separator, and block heater for cold weather operation which should be sufficient for all but the most extreme cold weather.**

If outside temperature is above 20Â°F (-7Â°C):

*Use Diesel Fuel No. 2

If outside temperature is below 20Â°F (-7Â°C):

- Diesel Fuel No. 1, if available, should be used.
- Customers should ask if diesel fuel is winterized.
- Diesel Fuel Flow Improver can be added to diesel fuel No. 2 to lower the Cloud Point of the fuel.

NOTE: **(One) 100 ml can of additive will treat 1 tank full of diesel fuel; additional quantities will not lower the Cloud Point any further.**

Diesel Fuel Flow Improver - Wurth Part No. 893532 (former BMW Part No. 81 22 9 407 289)

- Diesel Fuel No. 2 can be mixed with kerosene in the proportions shown on the graph. Engine performance will be reduced with more than a 50% mixture of kerosene.

cardiagn.com

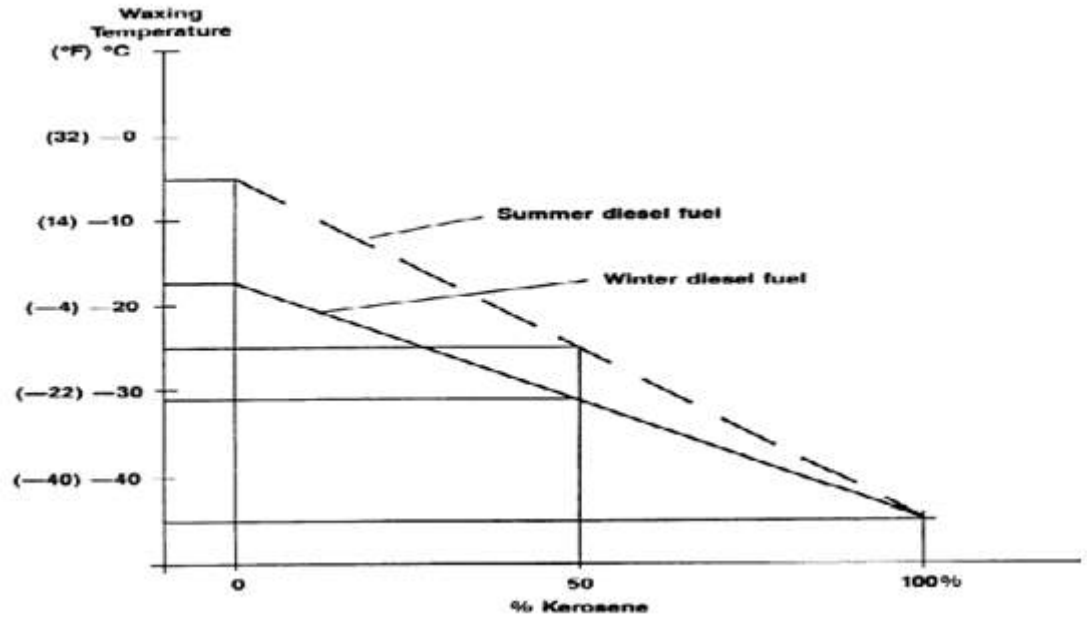


Fig. 3: Diesel Fuel Flow Temperature Graph
Courtesy of BMW OF NORTH AMERICA, INC.

- Significant improvement in operation can be achieved by using a combination of both kerosene and the diesel fuel flow improver since the kerosene lowers the point at which the wax formation occurs and the additive modifies the structure of the wax crystals for better flow.

5.0 FUELS FOR DIESEL M57 D30 T2 US ENGINE

Diesel fuel is obtained from distilled crude oil. The distilling process is highly complicated, involving precise control of temperatures and pressures. The diesel fuel quality will vary depending on the refining process and the crude oil source.

BMW of North America LLC recommends using automotive diesel with a minimum octane rating of 51 in the E90 335D and E70 X5 3.0D. Never use other fuels such as marine fuel or heating oil, since these fuels do not have the appropriate additives or octane values. The octane number is a measure of the fuel's ignition quality, which influences both the ease of starting and combustion stability. A high octane number diesel fuel promotes spontaneous burning of the fuel, which is beneficial in a diesel engine.

The only fuel approved is Ultra-Low Sulfur highway Diesel. ULSD contains a maximum of 15 parts per million (ppm) of sulfur. Low-sulfur diesel (LSD) should never be used, because it contains a much higher concentration of sulfur (up to 500 ppm), which can damage the diesel particulate filter (DPF) as well as increase exhaust emissions.

ULSD dispensing pumps are labeled accordingly:



Fig. 4: Identifying Ultra-Low Sulfur Highway Diesel Label

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

"B5" Biodiesel that consists of a maximum of 5% is approved for use.

The fuel filler neck has been designed with a misfueling feature that only allows the larger diameter diesel fuel filler nozzle to be inserted. The smaller diameter nozzle found on unleaded gasoline pumps cannot be inserted. Nevertheless, if any other fuel (i. e., biodiesel rated at B10 or higher, gasoline, or kerosene) has mistakenly been filled, do not start the engine, not even to move the car away from the fuel pump! Serious damage to the engine can result.

For cold weather operation, filling stations may use "winter diesel", which is an approved blend of ultra-low sulfur kerosene with ULSD. Such a blend will help prevent the diesel fuel from gelling at temperatures below approx. 20AÂ°F. Factors which are important qualities of diesel fuel are the Cloud Point (the temperature at which wax forms in diesel fuel) and the Pour Point (the temperature at which fuel stops flowing). These qualities become very important during low temperature operation. As the temperature drops, wax can sometimes form in the fuel tank, fuel lines and/or fuel filter. If this occurs, the fuel supply lines will become clogged and resulting hard starting and rough running problems.

DIESEL MISFUELING PROTECTION BYPASS ADAPTER

BMW Advanced Diesel vehicles are equipped with a fuel-filler neck that incorporates a misfueling protection system, to prevent gasoline from being mistakenly pumped into the vehicle. If the vehicle is started with gasoline in the fuel tank, internal engine damage will occur.

Only fuel nozzles of the recommended diameter for diesel passenger vehicles can be inserted into the filler neck. Most diesel fuel stations have fuel nozzles with the recommended diameter fitted to their passenger vehicle diesel fuel pumps. Unfortunately in some locations, fuel nozzles of different diameters may have been fitted to passenger vehicle diesel fuel pumps.

The DMBA (1) will enable refueling of the vehicle in emergency circumstances where the fuel station is using the approved Ultra-Low Sulfur Diesel (ULSD), but has a non-standard sized filling nozzle (i. e. gasoline nozzles have a smaller, 21mm diameter), or when using a larger diesel nozzle intended for use on commercial vehicles.

NOTE: Insert the DMBA into the filler neck so that the offset section is up.

ULSD has a maximum sulfur content of 15 parts per million (ppm) and is labeled accordingly on the fuel pump.

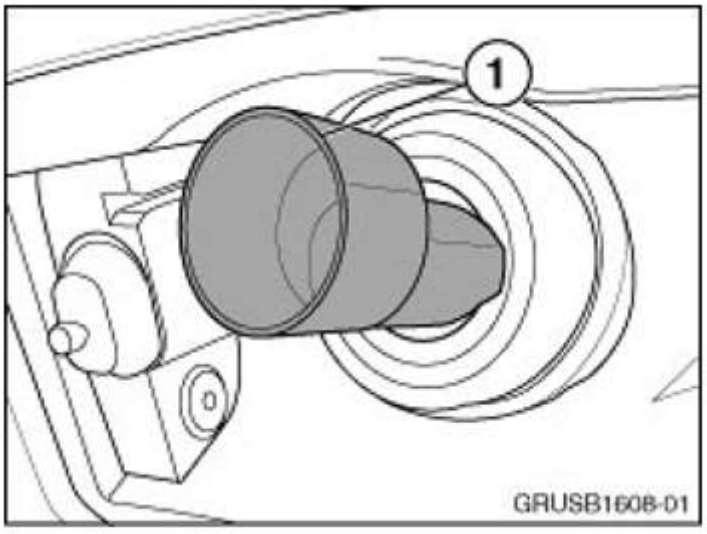


Fig. 5: Identifying DMBA
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

6.0 OTHER FLUIDS

The throttle housing studs are to be coated with Loctite 290 on 1991-92 E30 with M42 engine.

The throttle body assembly of M42 engines in E36 vehicles produced from 1/94-6/94 are to be lubricated with Optimoly Paste TA Spray, BMW Part No. 83 23 1 468 932.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00395989

cardiagn.com

CHECKING/SETTING ENGINE/EMISSION

00 SAFETY INFORMATION FOR WORKING ON VEHICLES WITH AUTOMATIC ENGINE START-STOP FUNCTION (MSA)

See 00 SAFETY INFORMATION FOR WORKING ON VEHICLES WITH AUTOMATIC ENGINE START-STOP FUNCTION (MSA) .

13..... REMOVING INTAKE PORT (N55)

Release screw (1).

Press in catches (2) on intake silencer housing.

Feed out intake duct (3) towards top.

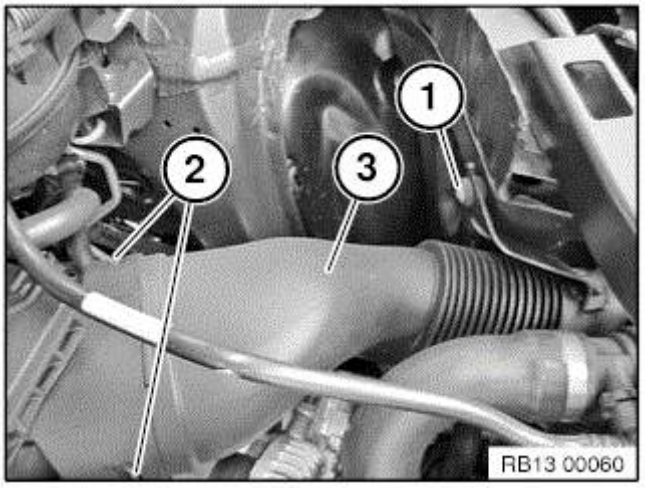


Fig. 1: Identifying Intake Duct, Catches & Screw
Courtesy of BMW OF NORTH AMERICA, INC.

FUEL PUMP WITH DRIVE AND LINE

13 31 032 CHECK FUEL PRESSURE

Special tools required:

- 13 0 290
- 13 3 060
- 11 4 310
- 13 0 291
- 13 0 292
- 13 0 293

Necessary preliminary work:

- Connect BMW diagnosis system.

IMPORTANT: Lines are under pressure!

cardiagn.com

Wear protective goggles and gloves.

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

Recycling:

Catch and dispose of escaping fuel with auxiliary materials.

Observe country-specific waste disposal regulations.

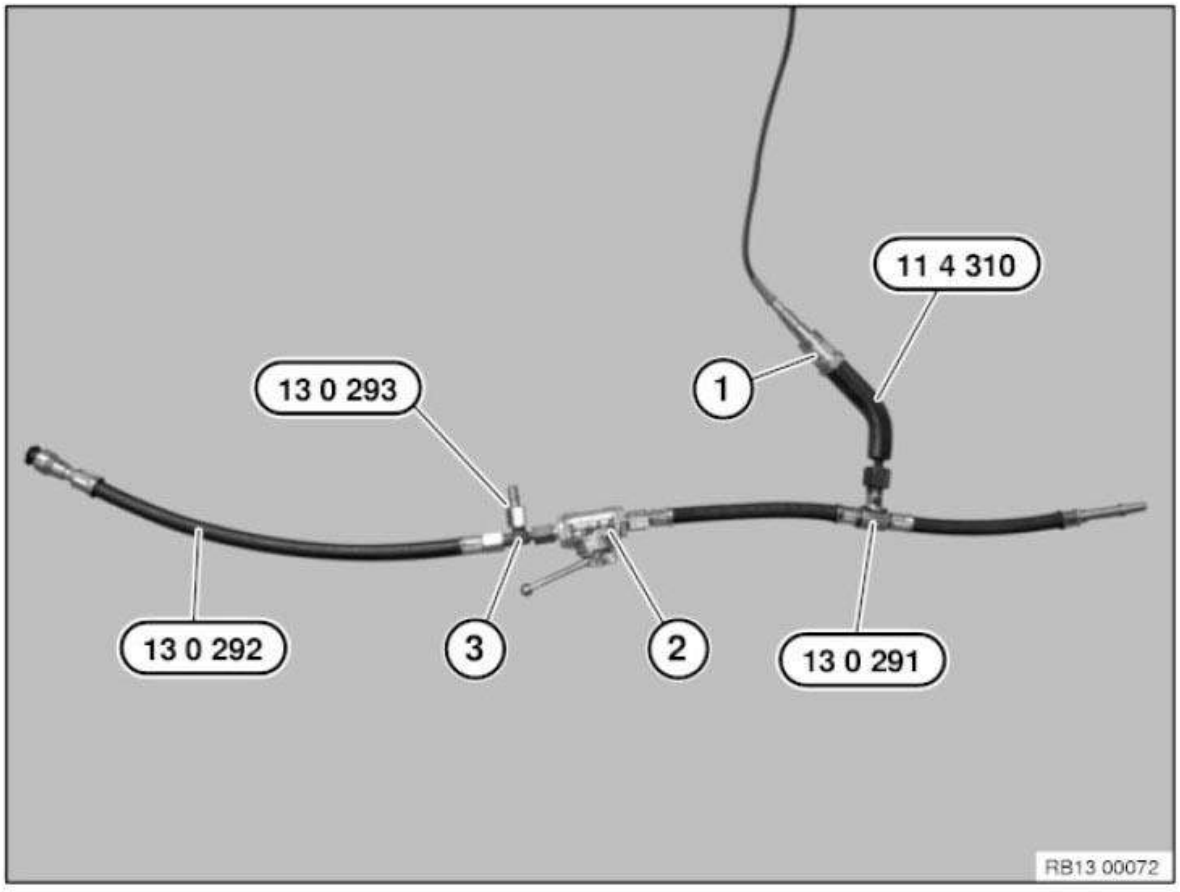


Fig. 2: Checking Fuel Delivery Pressure
Courtesy of BMW OF NORTH AMERICA, INC.

Check fuel delivery pressure:

To check the fuel delivery pressure, special tool **13 0 290** must be assembled as follows.

Screw adapter **11 4 310** onto line **13 0 291** . Screw the IMIB 100 bar pressure sensor (1) onto adapter **11 4 310** .

Alternatively, the pressure gauge from the set of special tools **13 3 060** can be screwed onto line **13 0 291** .

Between lines **13 0 291** and **13 0 292** , mount a shutoff tap (2) and a T-piece (3) from the set of special tools **13 3 060** .

Close up T-piece (3) from the set of special tools with the cap **13 0 293** .

NOTE: The graphic shows F07 The procedure is identical for other vehicles.

Remove circlip (1).

Unlock and detach fuel line (2) to fuel tank from fuel line (2) to high pressure pump.

cardiagn.com

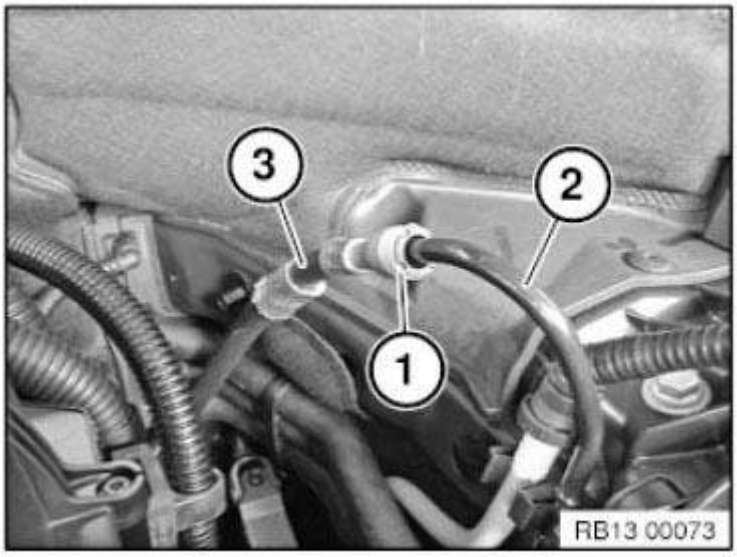


Fig. 3: Identifying Fuel Line And Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

Install special tool (1) **13 0 290** into detached fuel line with IMIB fuel pressure sensor (100 bar).

Connect IMIB with fuel pressure sensor.

Establish fuel delivery pressure. Read off fuel delivery pressure on IMIB and compare with values in diagnosis system.

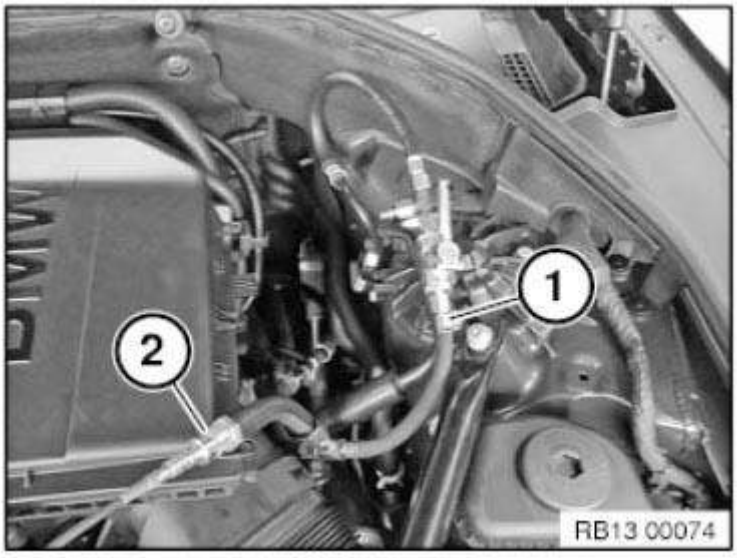


Fig. 4: Identifying Fuel Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

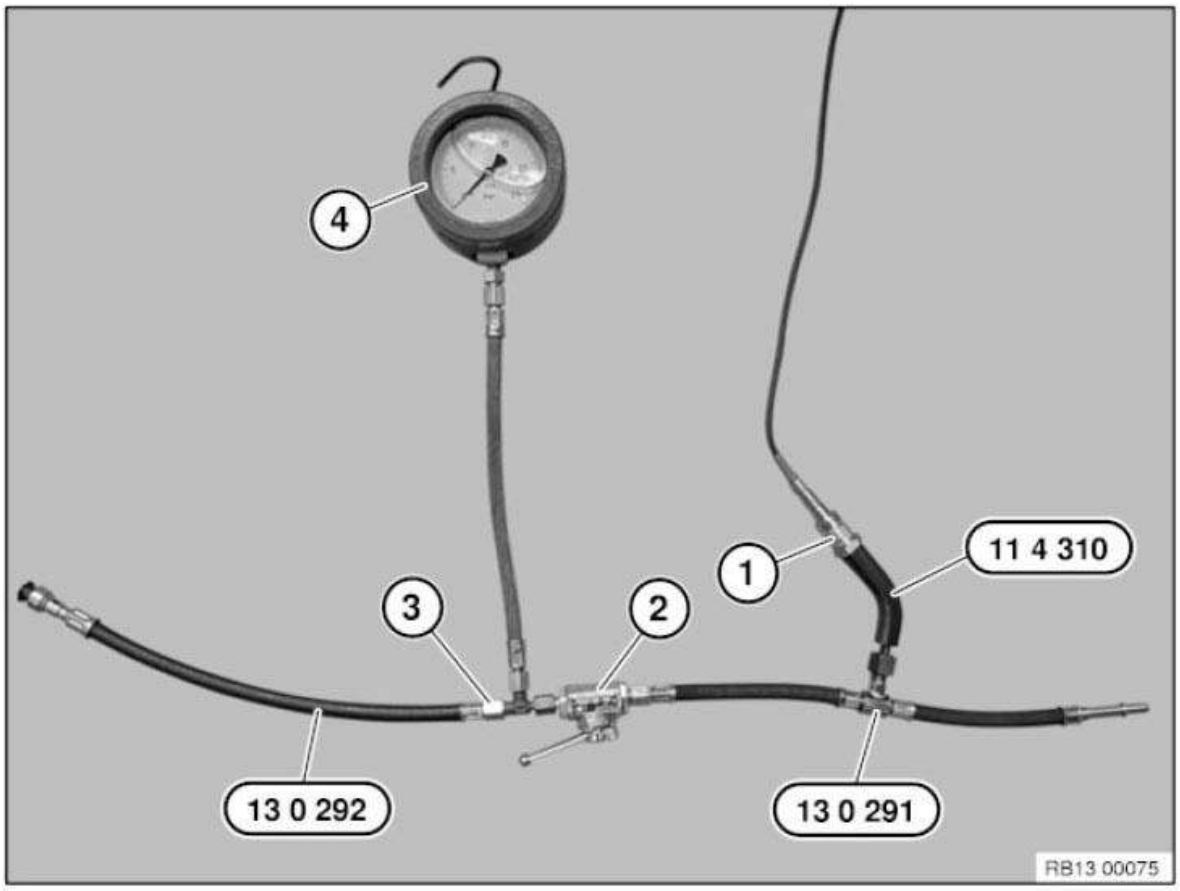


Fig. 5: Checking Fuel Holding Pressure
Courtesy of BMW OF NORTH AMERICA, INC.

Check fuel holding pressure:

To check the fuel holding pressure, special tool **13 0 290** must be assembled as follows.

Screw adapter **11 4 310** onto line **13 0 291** . Screw the IMIB 100 bar pressure sensor (1) onto adapter **11 4 310** .

Alternatively, the pressure gauge from the set of special tools **13 3 060** can be screwed onto line **13 0 291** .

Between lines **13 0 291** and **13 0 292** , mount a shutoff tap (2) and a T-piece (3) from the set of special tools **13 3 060** .

Mount pressure gauge (4) from special tool set **13 3 060** onto T-piece (3) from special tool set **13 3 060** .

NOTE: The graphic shows F07 The procedure is identical for other vehicles.

Remove circlip (1).

Unlock and detach fuel line (2) to fuel tank from fuel line (2) to high pressure pump.

cardiagn.com

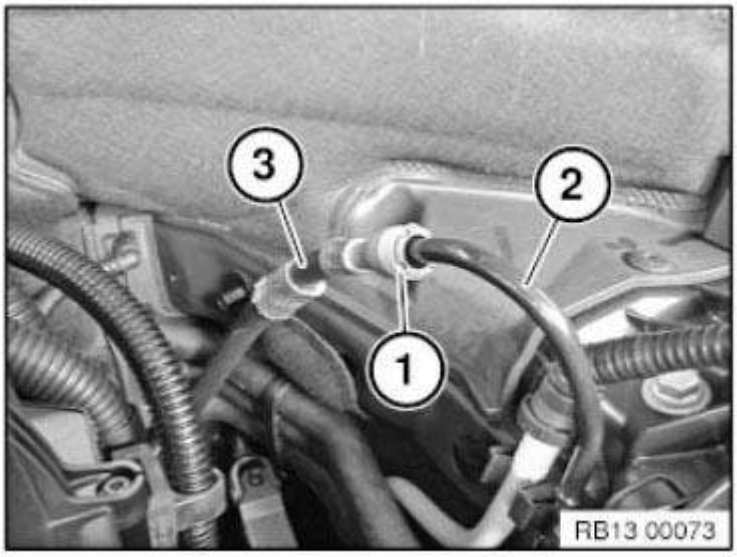


Fig. 6: Identifying Fuel Line And Circlip
Courtesy of BMW OF NORTH AMERICA, INC.

Install special tool (1) **13 0 290** with pressure gauge (2) and IMIB 100 bar fuel pressure sensor (3) into the detached fuel line.

Establish fuel delivery pressure.

Close shutoff tap (4) and switch off the engine.

Read off fuel holding pressure of high pressure pump from IMIB tester and compare with values in diagnosis system.

Read off fuel holding pressure to fuel tank on pressure gauge (2) and compare with values in diagnosis system.

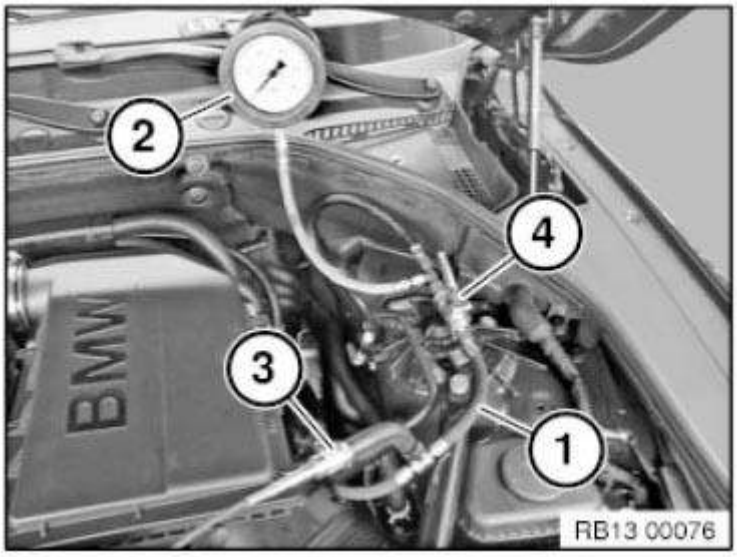


Fig. 7: Checking Fuel System For Leak
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for leak tightness.

13 31... NOTES REGARDING THE FUEL PRESSURE TEST (REFERENCE PRESSURE: SURROUNDING AREA)

cardiagn.com

The characteristic of this version with ambient pressure:

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

Test prerequisite:

The correct fuel pressure regulator has been installed.

- Use the Electronic Parts Catalogue to check whether the correct fuel pressure regulator has been installed for the vehicle:

  CONNECT TEST ADAPTER.

The regulating function of the fuel pressure regulator must be ensured under all operating conditions. The fuel pump must always be able to generate a fuel pressure that is higher than the pressure that is adjusted by the pressure regulator.

The DME controls the injection period for which the injection rate is adjusted.

The fuel return line is depressurized at engine standstill and ignition key position 0.

The pressure regulator will close at engine standstill and ignition key position 0. The fuel pressure in the feed will be maintained for an extended period of time. A non-return valve will close in the fuel pump. This measure will maintain the fuel pressure in the fuel system. Extended start times are thereby prevented.

- Let the engine run at idle and measure the fuel pressure.

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

- The line cross-sections in the fuel feed are constricted or the fuel filter is plugged,

  or

- The voltage supply to the fuel pump function is not OK: For example, as a result of high contact resistance (corrosion) in the plug connection between the wiring harness and the fuel pump.

When the measured value exceeds the nominal value + 0.2 bar:

- Stop the engine and then monitor the measured value.
- When the measured value drops to the nominal value, the line cross-sections in the fuel return line are constricted or plugged.
- Check the fuel lines for kinks.

If no kinks are visible:

- Replace the return lines.

When the measured value remains too high, the pressure regulator is most likely faulty.

Attention:

There is a low probability that the return line is completely closed due to obstruction. Fuel would then leak out under pressure when the pressure regulator is removed!

- Have a cleaning rag ready and catch and dispose of escaping fuel.
- Do not replace the pressure regulator. Replace the return line instead.
- Let the engine run briefly at idle and then stop the engine.
- Write down the measured value at engine standstill.

cardiagn.com

- Read the measured value again after about 20 to 30 minutes at engine standstill.

The following check requires special tool 13 3 010 (hose clip).

If the measured value dropped by more than 0.5 bar:

- Start the engine and wait briefly for stable pressure build-up
- Stop the engine and immediately disconnect the feed line just before the pressure gauge with special tool 13 3 010
- Write down the measured value
- Read the measured value again after about 20 to 30 minutes at engine standstill

The following faults may be present if the measured value now dropped less than 0.5 bar:

- Fault in the feed lines
- Fault in the internal tank feed hose
- Faulty pressure-maintaining stop valve in the fuel pump

Check components. Replace faulty components.

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

- Replace the pressure regulator
- All fuel hoses and their hose clamps that were loosened during the checks must be replaced.
- Read out fault memory of DME control unit. Check stored fault messages. Rectify fault. Clear diagnostic fault entries from fault memory.

FUEL FILTER

13 32 051 REPLACING FUEL FILTER (N47 D20 O1)

Necessary preliminary tasks:

- Remove **LEFT UNDERBODY PANELLING** .

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Release screw (1).

Release clamp (2).

Installation note:

Check clamp, replacing if necessary.

Pull off hose.

Pull out clamp (3).

Disconnect fuel preheating from fuel filter.

Remove fuel filter.

cardiagn.com

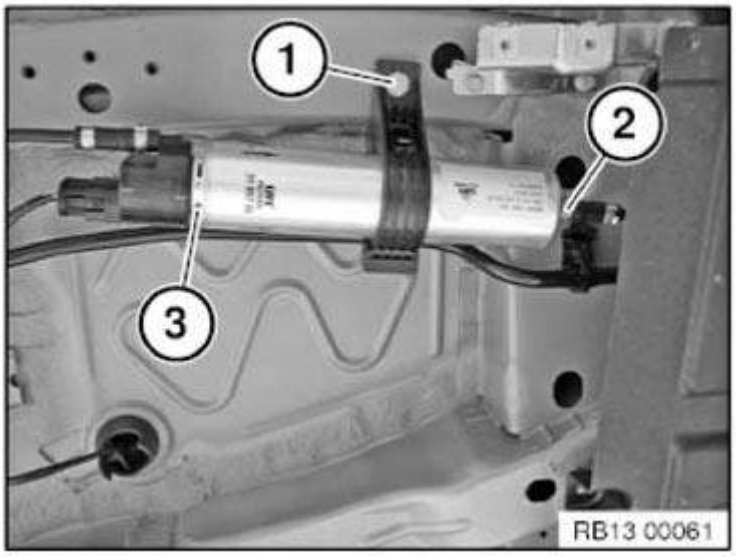


Fig. 8: Identifying Clamp, Fuel Filter And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check fuel system for tightness.

INJECTION PUMP, REGULATOR, MIXTURE REGULATOR

13 51 017 REMOVING AND INSTALLING/REPLACING HIGH-PRESSURE PUMP (N20, N26)

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short-circuiting on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

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

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

IMPORTANT:

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

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

Necessary preliminary tasks:

- Remove ACOUSTIC COVER
- Remove IGNITION COILS .
- Remove PRESSURE LINE on high pressure pump and renew.

cardiagn.com

- Release **FEED LINE** at high pressure pump, do **not** remove.

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Unlock connector (1) and remove.

Unfasten screws (2).

IMPORTANT: The bucket tappet can fall out when high pressure pump (3) is being pulled out!

Lift out high pressure pump (3).

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

Installation note:

Before installing the high pressure pump, the cam of the high pressure pump drive must be turned to **BDC** . To do this, twist the engine if necessary in the direction of engine rotation to the central bolt of the crankshaft.

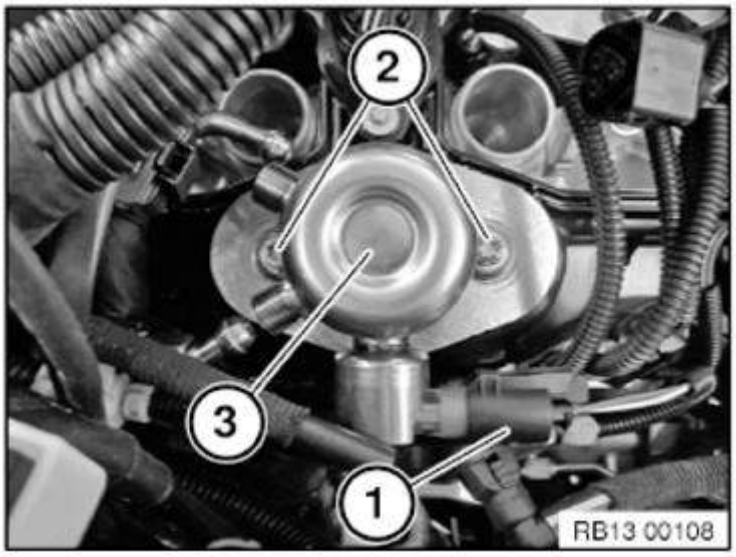


Fig. 9: Identifying High Pressure Pump, Connector And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening/torque sequence.

Lay depth gauge (1) flat on fuel pump flange.

Turn engine at central bolt in direction of engine rotation until the depth gauge shows that the camshaft has reached the **BDC position** .

cardiagn.com

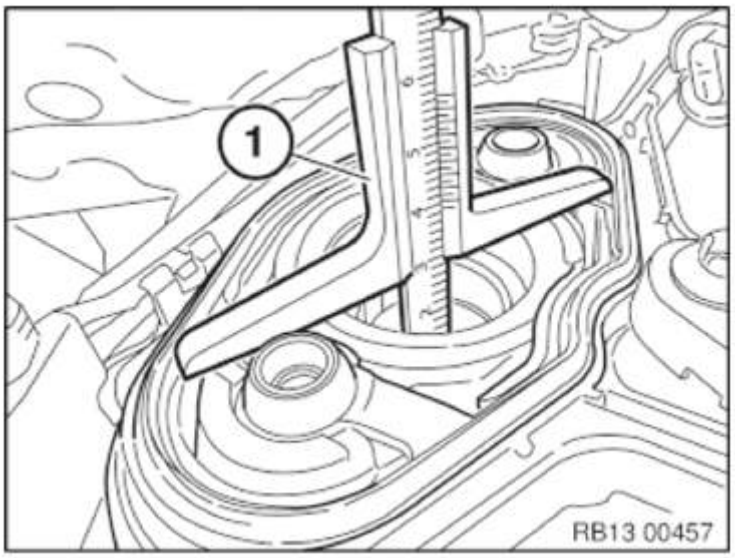


Fig. 10: Checking Flat On Fuel Pump Flange
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace gasket (1).

Clean contact surfaces at high pressure pump.

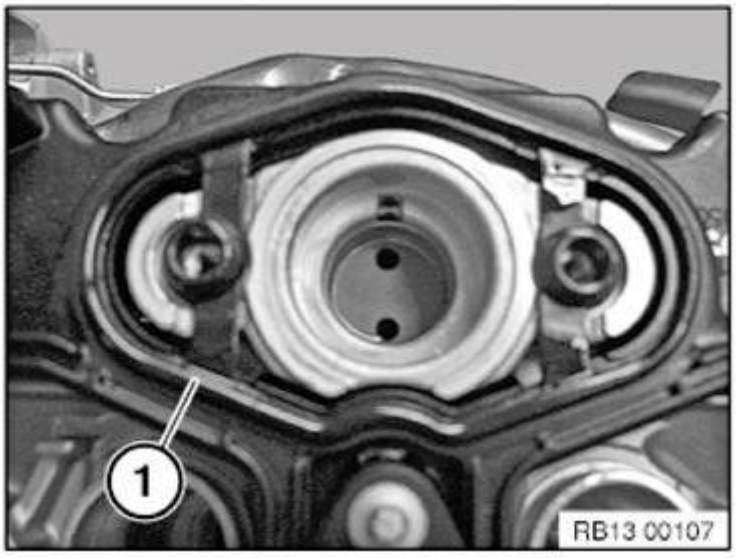


Fig. 11: Identifying Gasket
Courtesy of BMW OF NORTH AMERICA, INC.

Install high pressure pump (3).

Replace screws (2). Screws (2) are coated with sealing compound.

Installation note:

Provisionally fasten screws (2) of the high pressure pump (3) and tighten alternately in 90Â° increments until final torque, piston can otherwise break due to tilting!

Tightening torque: **13 51 1AZ** .

Connect connector (1).

cardiagn.com

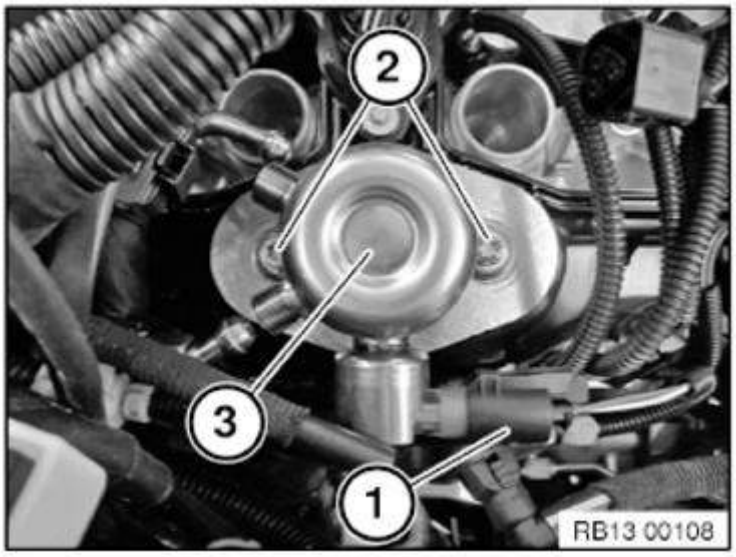


Fig. 12: Identifying High Pressure Pump, Screws And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Refit sound insulation (1) at the high pressure pump.

F20, F21, F30, F31 only:

Fit protective plate.

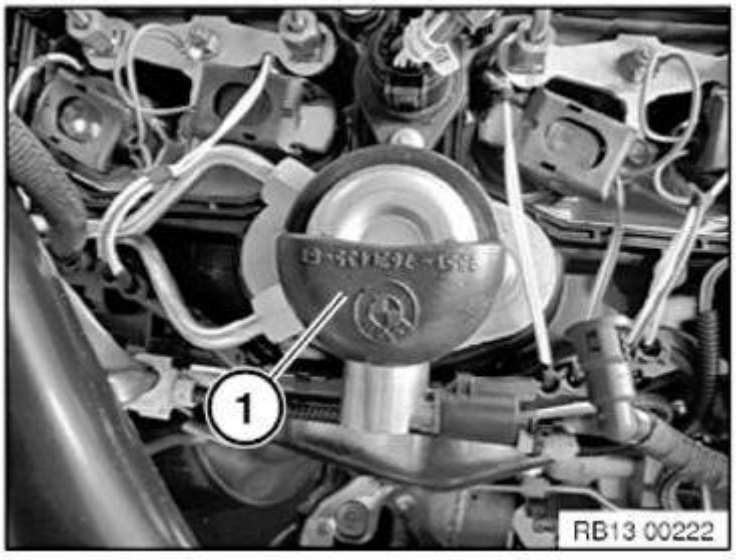


Fig. 13: Identifying Sound Insulation
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 51 017 REMOVING AND INSTALLING/REPLACING HIGH PRESSURE PUMP (BOSCH) (N55)

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short-circuiting

cardiagn.com

on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

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

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

IMPORTANT:

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

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

Necessary preliminary tasks:

- **REMOVE** feed line.
- Remove **PRESSURE LINE**.

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Release screws (1).

Remove high pressure pump (2).

When removing the high pressure pump, ensure that the pump tappet does not fall out.

Installation note:

Before installing the high pressure pump, the cam of the high pressure pump drive must be turned to **BDC** . To do this, twist the engine if necessary in the direction of engine rotation to the central bolt of the crankshaft.

Adhere to tightening/torque sequence.

cardiagn.com

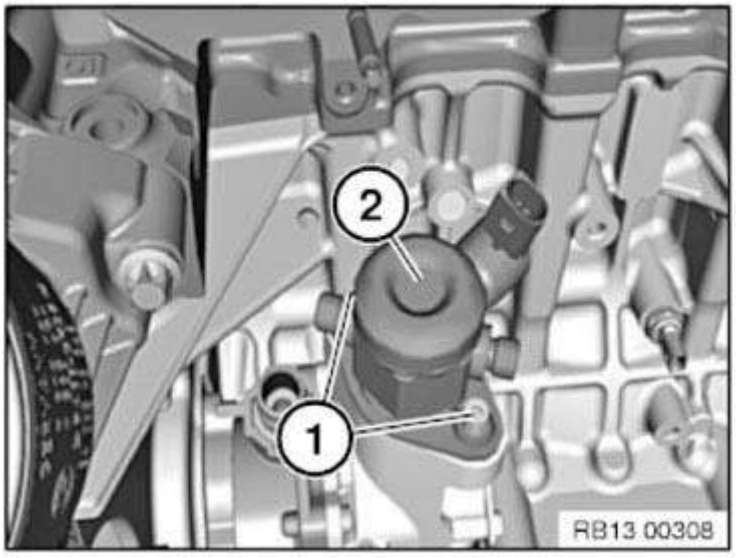


Fig. 14: Identifying High Pressure Pump And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Lay depth gauge (1) flat on high pressure pump flange.

Turn engine at central bolt in direction of engine rotation until the depth gauge shows that the camshaft has reached the **BDC position** .

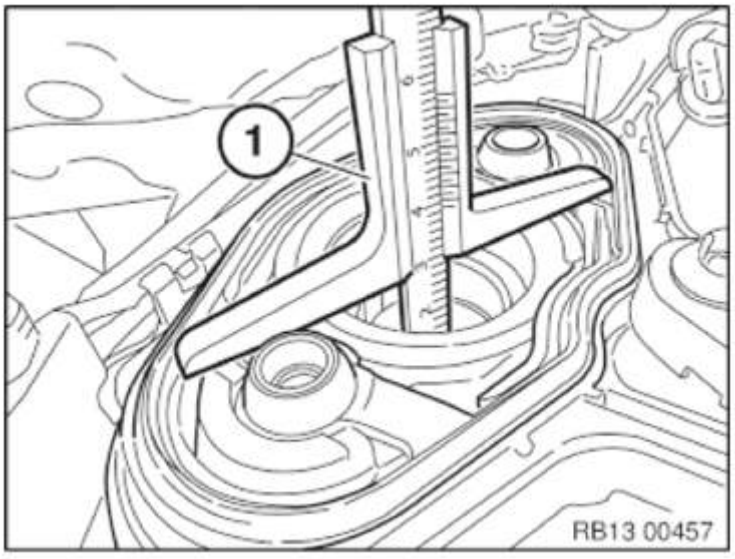


Fig. 15: Checking Flat On High Pressure Pump Flange
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace O-ring (1) and coat with engine oil.

Clean contact surfaces.

cardiagn.com

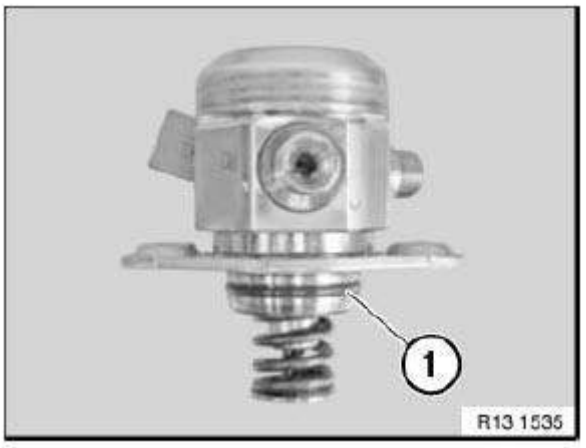


Fig. 16: Identifying O-Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Install high pressure pump (2).

Installation note:

Provisionally fasten screws (1) on high pressure pump (2) and tighten alternately in 90Â° increments until final tightening, otherwise the piston may break as a result of tilting!

Tightening torque: **13 53 1AZ** .

Attach connector.

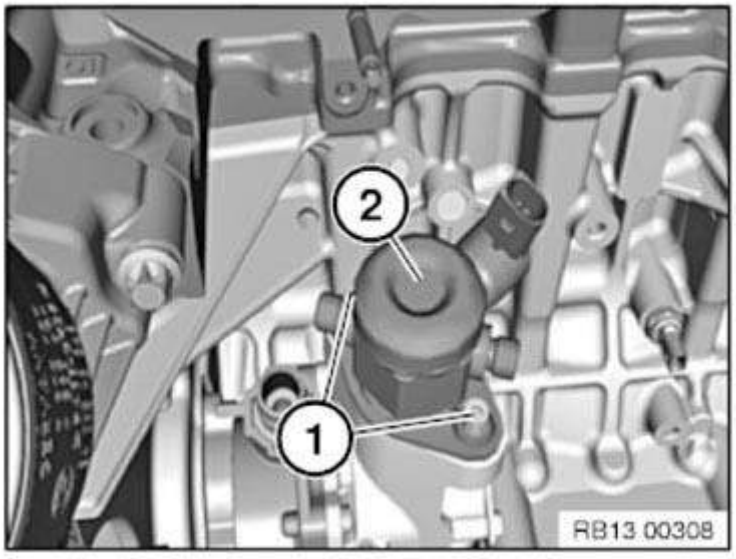


Fig. 17: Identifying Screws On High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 51 017 REMOVING AND INSTALLING/REPLACING HIGH PRESSURE PUMP (CONTINENTAL) (N55)

Special tools required:

cardiagn.com

- 11 8 610
- 13 5 020
- 13 5 161
- 13 5 162
- 32 1 270

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short-circuiting on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

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

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

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

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

Necessary preliminary tasks:

- Remove acoustic cover. See **12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55)** .
- Disconnect **BATTERY EARTH LEAD**
- Remove **TANK VENTING VALVE**

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Release screws (1) of holder (2). Take off holder.

cardiagn.com

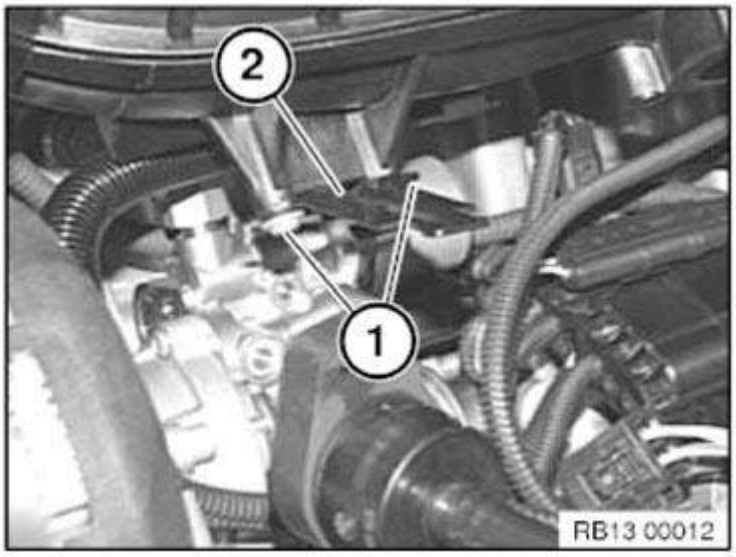


Fig. 18: Identifying Screws Of Holder
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) below cable channel (2).

Replace aluminum screws.

Installation note:

Adhere to tightening/torque sequence.

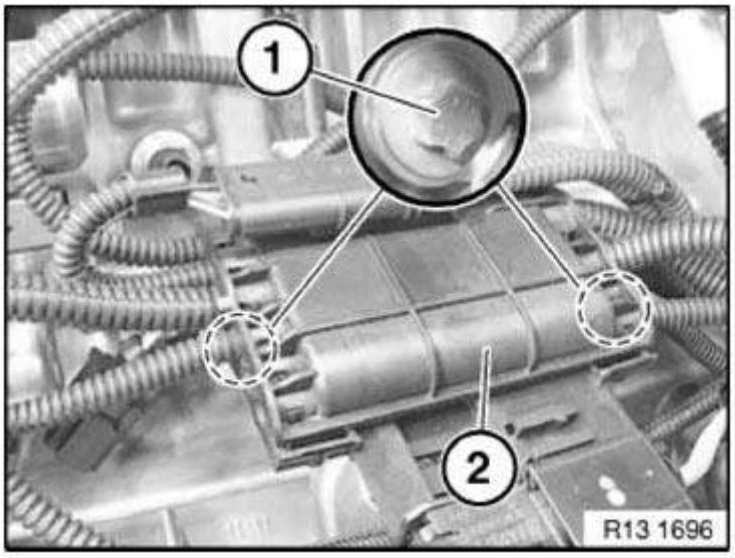


Fig. 19: Identifying Screws And Cable Channel
Courtesy of BMW OF NORTH AMERICA, INC.

Disengage connector (1) from the fuel low-pressure sensor, oil temperature sensor and the high pressure pump and remove.

cardiagn.com

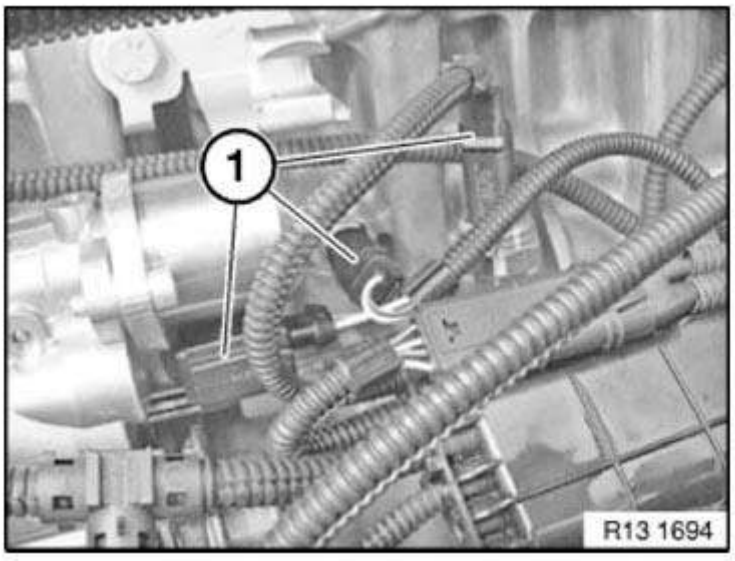


Fig. 20: Identifying Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Remove oil temperature sensor (1).

Tightening torque: **13 62 7AZ** .

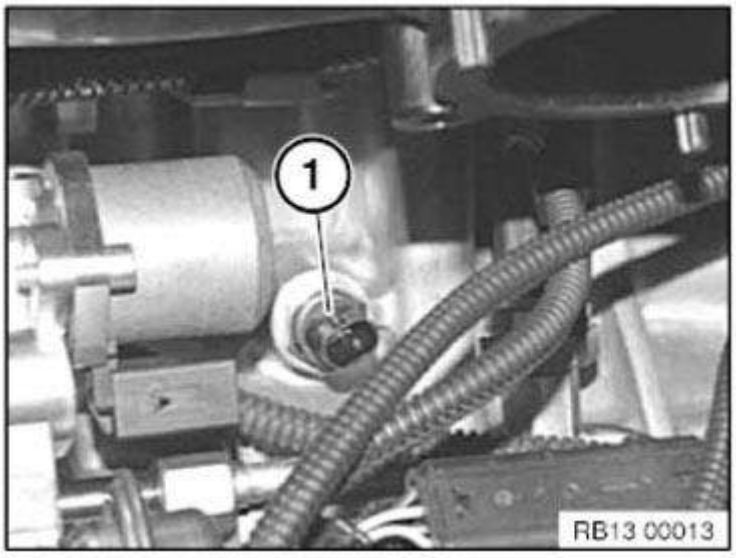


Fig. 21: Identifying Oil Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

WARNING: **Wear full face guard and protective gloves.**

Release fuel lines and seal off with special tools (1) **13 5 161** and (2) **13 5 162** .

cardiagn.com

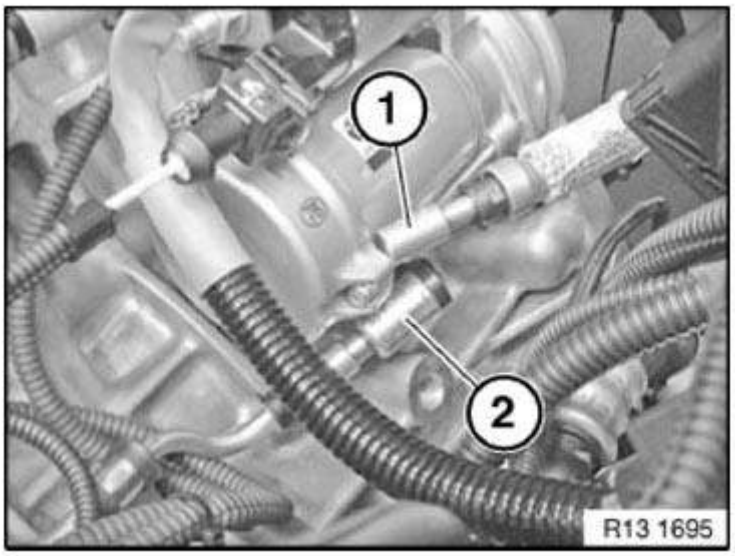


Fig. 22: Identifying Special Tools (13 5 161) And (13 5 162)
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) on high pressure pump.

Remove feed line (2).

Installation note:

Adhere to tightening/torque sequence.

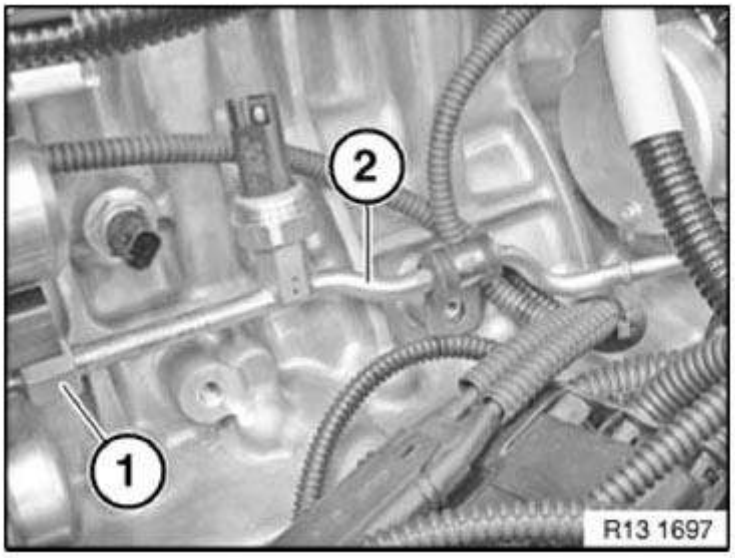


Fig. 23: Identifying Nut On High Pressure Pump And Feed Line
Courtesy of BMW OF NORTH AMERICA, INC.

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

cardiagn.com

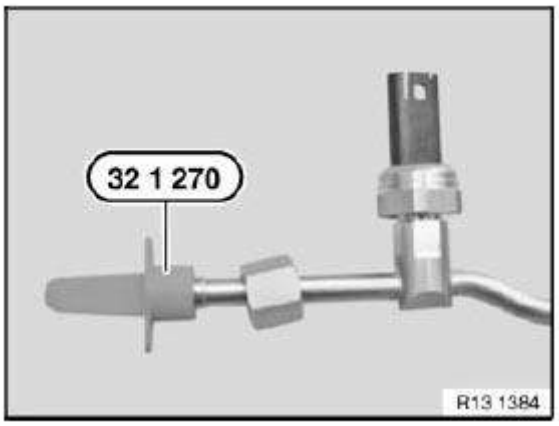


Fig. 24: Identifying Special Tool (32 1 270)
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) on high pressure line.

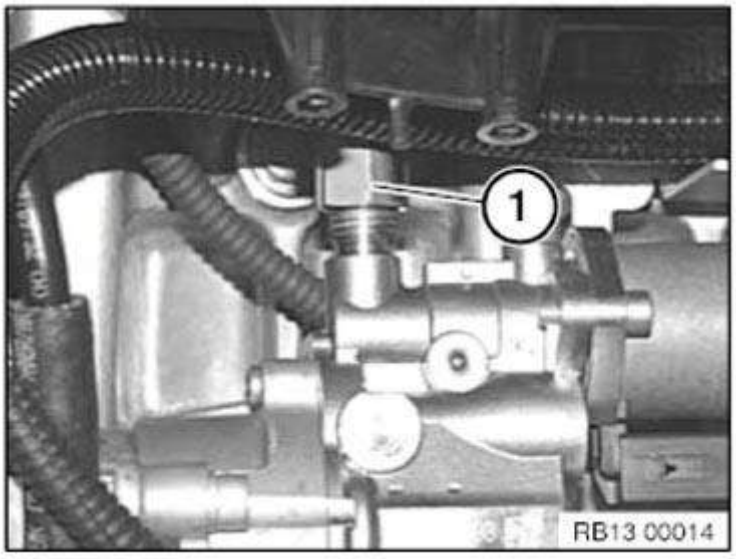
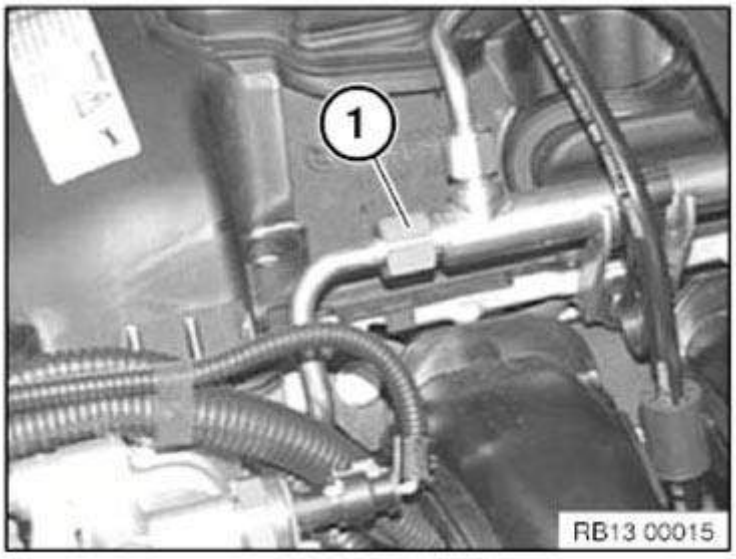


Fig. 25: Identifying Nut On High Pressure Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) of high pressure line on rail.



cardiagn.com

Fig. 26: Identifying Nut Of High Pressure Line On Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Seal fuel line connections of high pressure pump (1) with matching plugs from set of special tools **32 1 270** .

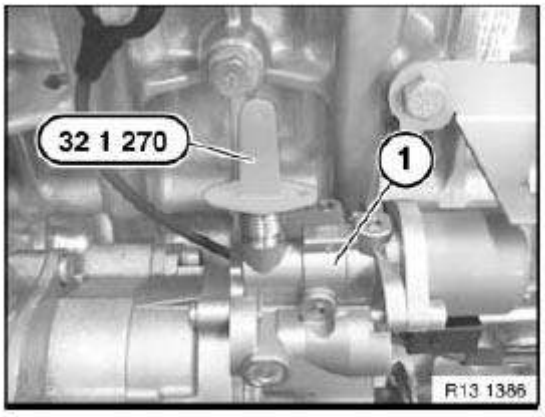


Fig. 27: Sealing Fuel Line Connections Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Release bolts with special tool **11 8 610** .

Detach high pressure pump (1) and remove.

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

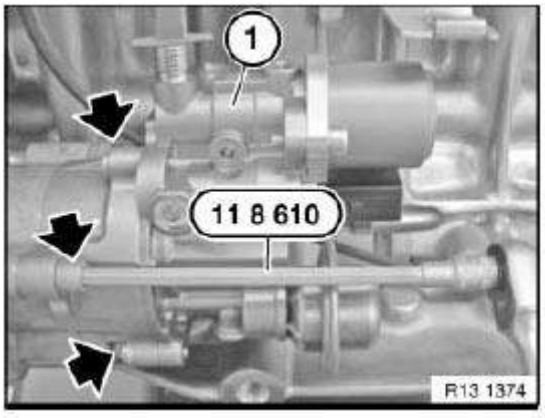


Fig. 28: Locating Bolts Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Installing high pressure pump:

Installation of high pressure pump is described separately from removal.

Replace sealing ring (1).

Clean contact surfaces.

cardiagn.com

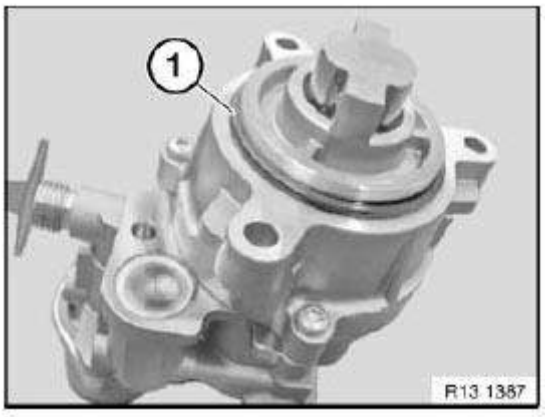


Fig. 29: Identifying Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

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

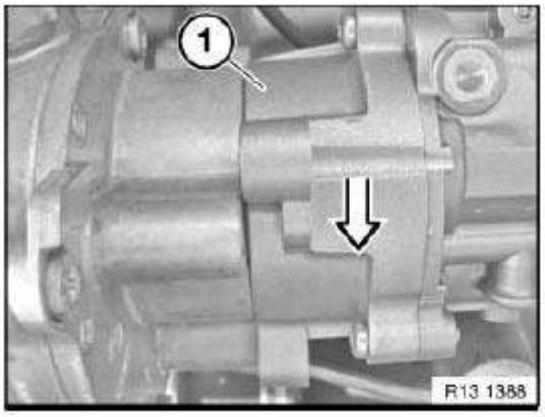
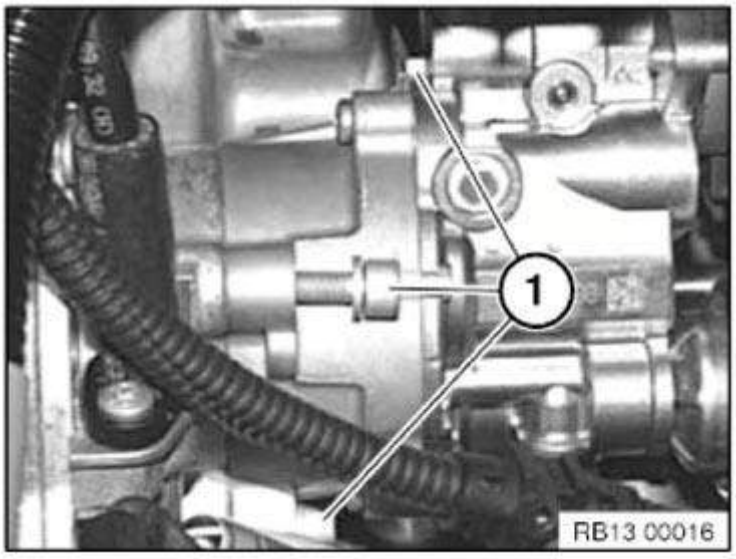


Fig. 30: Turning High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten screws of high pressure pump (1) with special tool 11 8 610 **hand-tight only.**
It must still be possible to **turn** the high pressure pump at the flange!
IMPORTANT: This helps ensure that no strain is produced when the high pressure line is tightened.
If reusing pressure line, lightly grease threads of pressure connections.
Threads of new pressure lines are already coated.



cardiagn.com

Fig. 31: Identifying Screws Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten nut (1) of high pressure line **only hand-tight.**

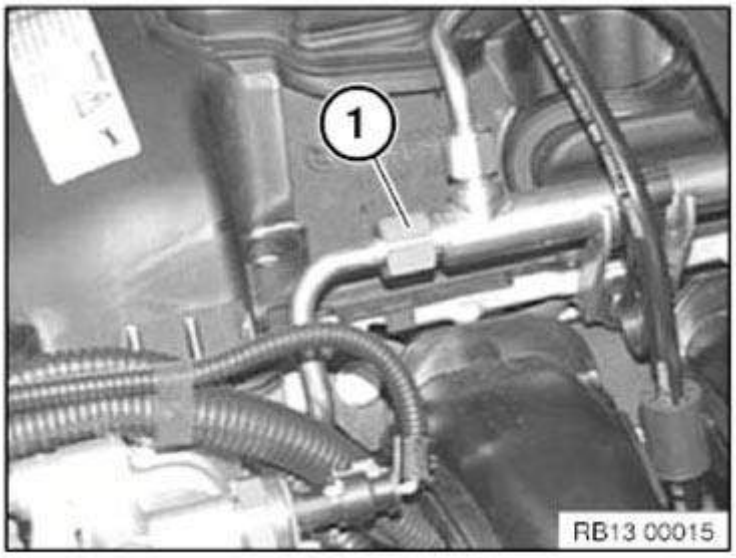


Fig. 32: Identifying Nut Of High Pressure Line
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten nut (1) of high pressure line **only hand-tight.**

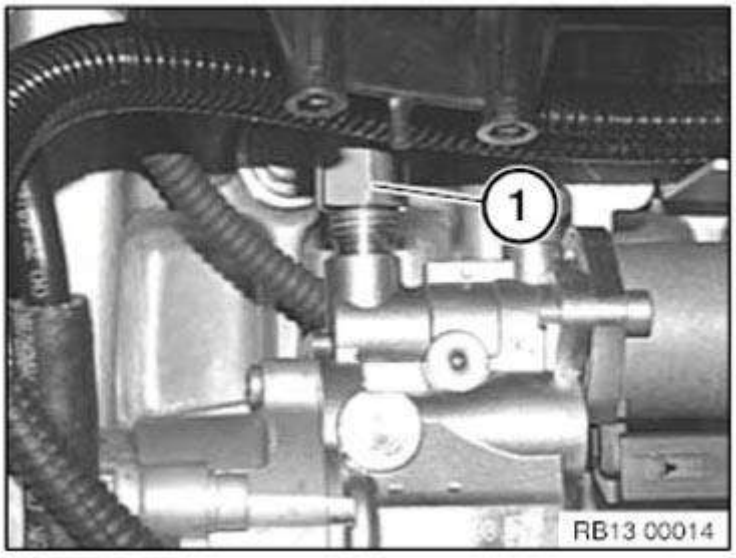


Fig. 33: Identifying Nut Of High Pressure Line
Courtesy of BMW OF NORTH AMERICA, INC.

Install feed line (2) at the high pressure pump.

Tighten nut (1) **only hand-tight.**

cardiagn.com

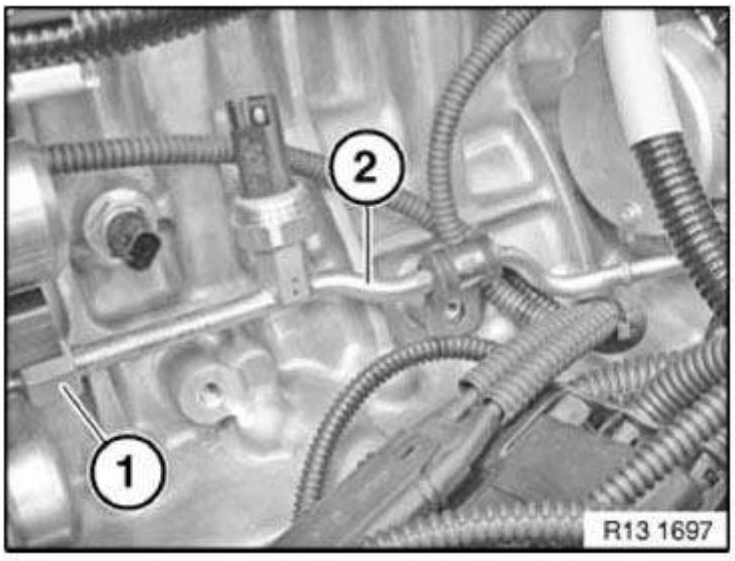


Fig. 34: Identifying Feed Line And Nut Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

When high pressure pump (1) has turned into position and is thus pre-assembled without strain with the high pressure line, tighten screws of high pressure pump (1) with special tool **11 8 610** .

Tightening torque: **13 53 1AZ** .

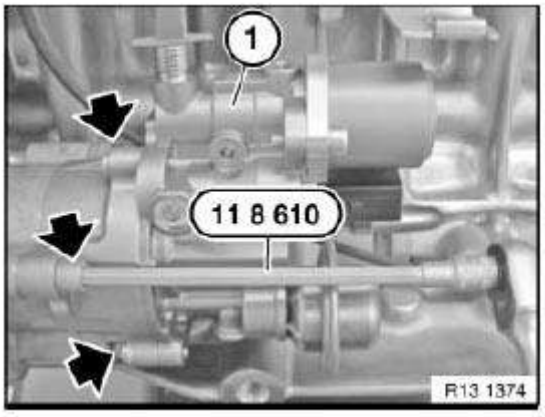


Fig. 35: Tightening Screws Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down nut (1) with special tool **13 5 020** .

Tightening torque: **13 53 8AZ** .

cardiagn.com

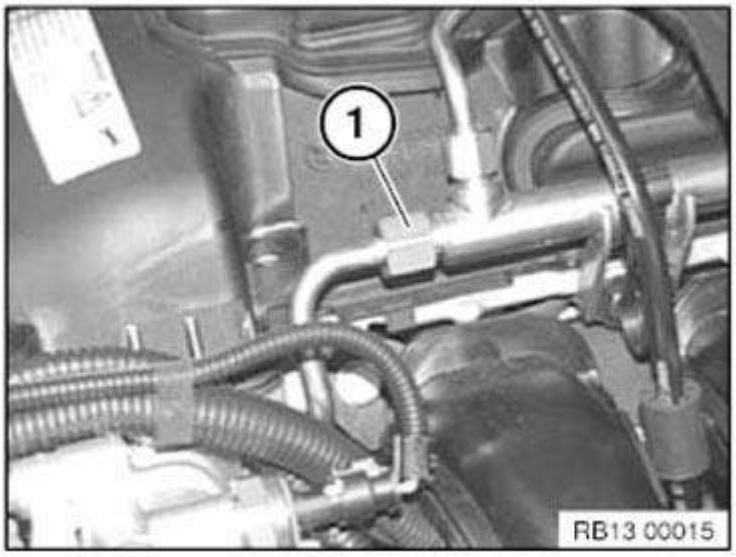


Fig. 36: Identifying Nut Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten nut (1).

Tightening torque: **13 53 8AZ** .

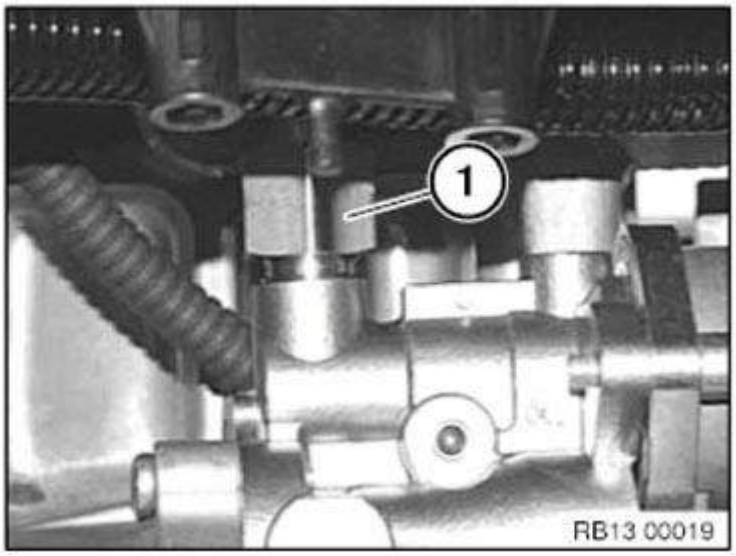


Fig. 37: Identifying Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down nut (1) with special tool **13 5 020** .

In doing so, hold against low-pressure sensor flange.

Tightening torque: **13 53 7AZ** .

cardiagn.com

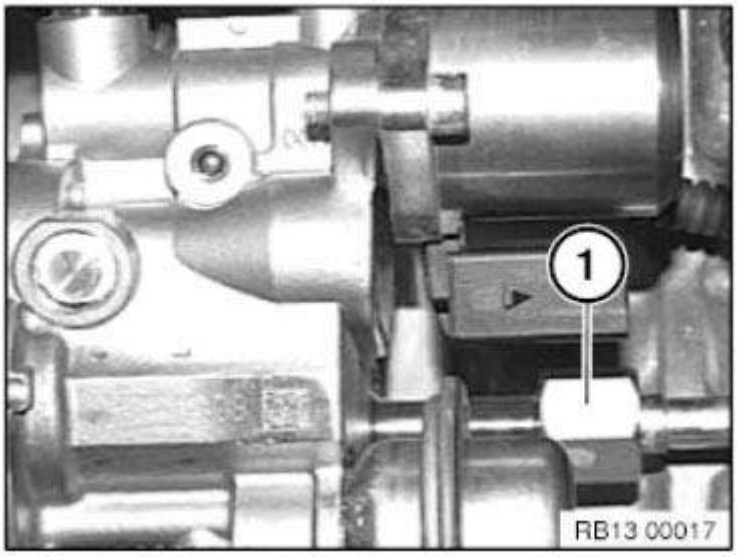


Fig. 38: Identifying Pressure Sensor Flange Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Install oil temperature sensor (1).

Tightening torque: **13 62 7AZ** .

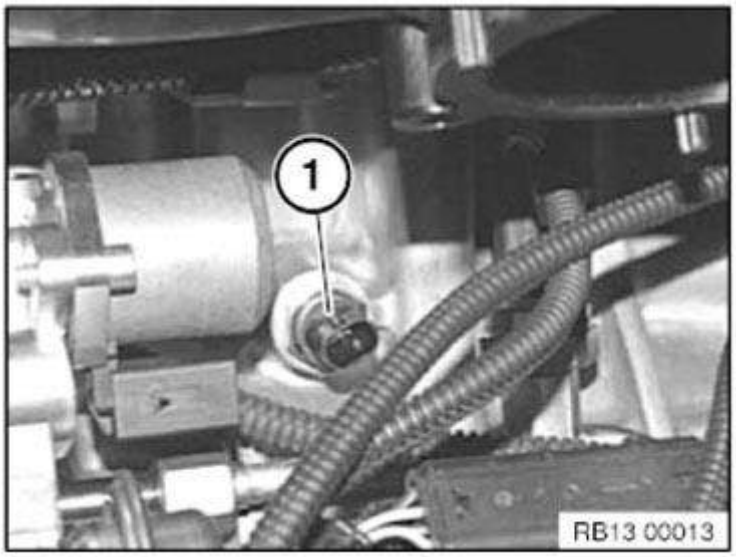


Fig. 39: Identifying Oil Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Position cable channel (1) in front of threaded holes (2) and tighten screws **hand-tight.**

Replace aluminum screws.

cardiagn.com

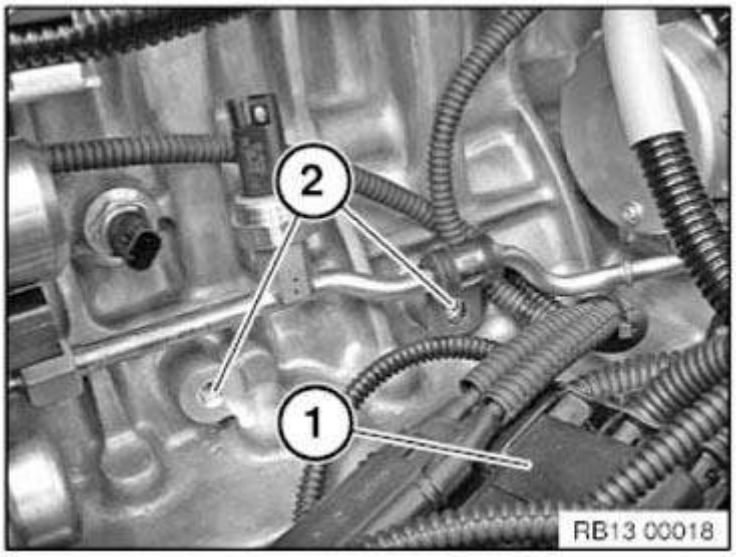


Fig. 40: Identifying Cable Channel And Front Of Threaded Holes
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten screws (1) below cable channel (2).

Tightening torque: **13 53 10AZ** .

Replace aluminum screw.

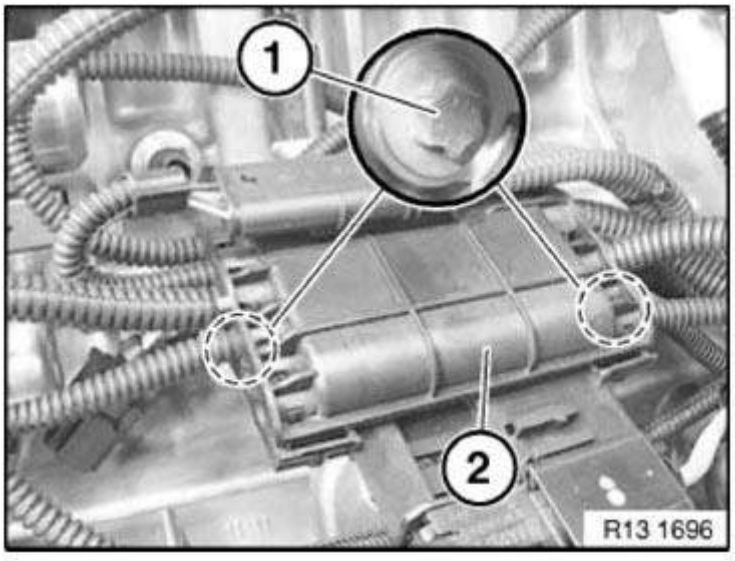


Fig. 41: Identifying Screws And Cable Channel
Courtesy of BMW OF NORTH AMERICA, INC.

Install connector (1) of fuel low-pressure sensor, oil temperature sensor and high pressure pump.

cardiagn.com

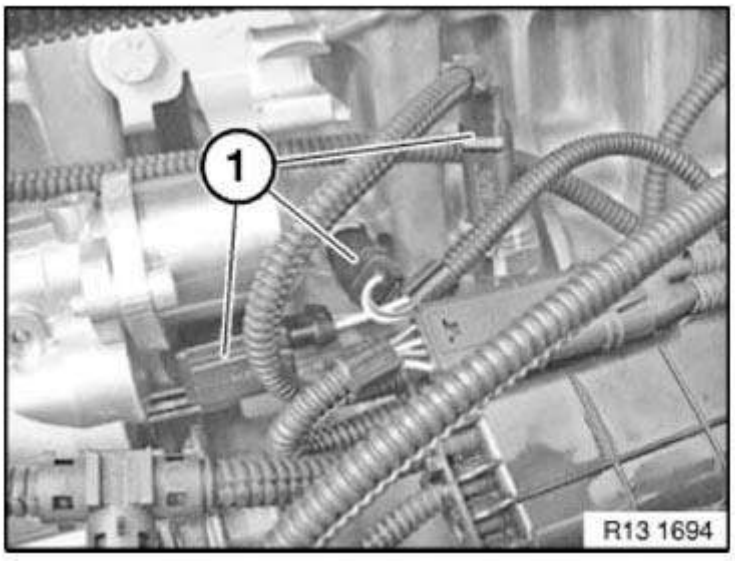


Fig. 42: Identifying Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Install holder (1) for tank vent valve.

Install tank vent valve in holder.

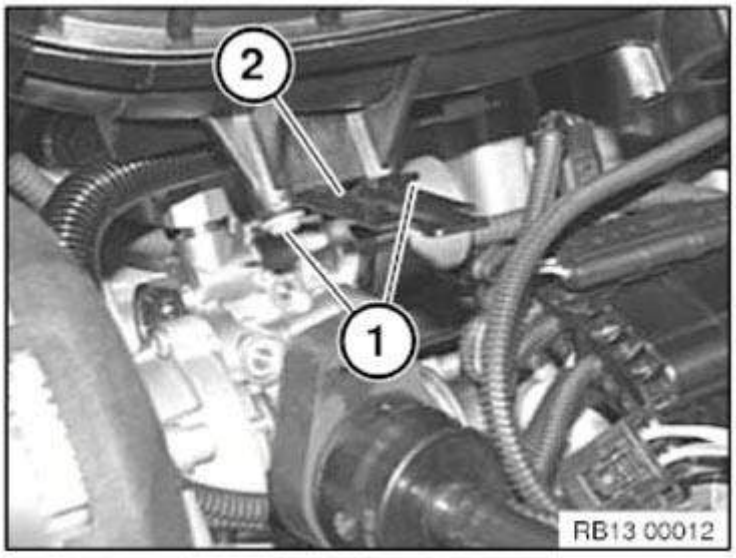


Fig. 43: Identifying Holder For Tank Vent Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 51 004 REMOVING AND INSTALLING/REPLACING HIGH PRESSURE PUMP (N47 D20 O1)

Special tools required:

- 11 8 740
- 11 8 741
- 11 8 742
- 32 1 270

cardiagn.com

Special tool 11 8 741 must - after it has been installed - without fail remain bolted in the camshaft sprocket until all repair work has been completed.

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

NOTE: **After disconnecting the fuel injection line, it is absolutely essential to seal the high pressure pump and the high-pressure accumulator with protective caps 32 1 270 .**
The position of the high pressure pump in relation to the valve gear does not affect its function. However, it must be taken into account on removal and installation.
For purposes of clarity, all pictures have been created to show the engine removed.

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Necessary preliminary tasks:

- Switch off ignition.
- Remove **INTAKE PLENUM** .
- Remove **PRESSURE LINE** between high pressure pump and pressure accumulator.
- Secure crankshaft position at firing TDC; for more information, refer to **CHECKING TIMING** .

Unlock connector (1) on metering unit and detach.

Detach fuel feed and return lines (2) of high pressure pump.

Installation note:

Replace clamps. Tightening torque: **13 51 3AZ** .

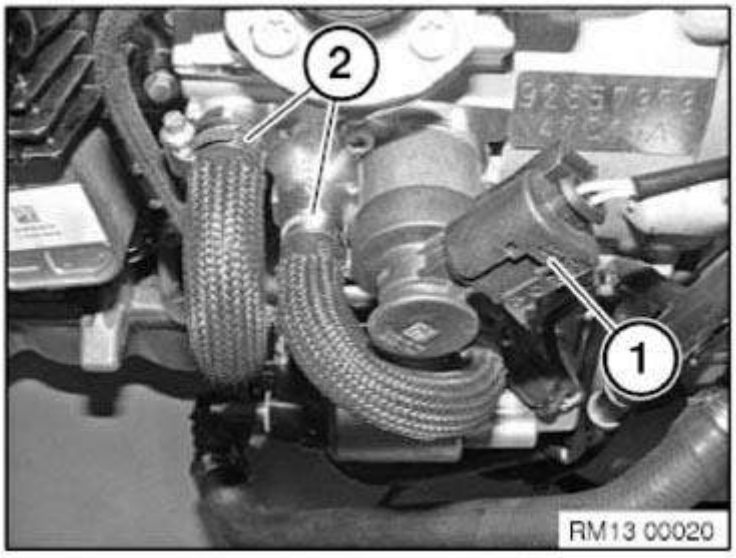


Fig. 44: Identifying Connector On Metering Unit And Return Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Release sealing cap in the timing case housing. Picture shows the sealing cap on the removed engine. Replace

cardiagn.com

sealing cap with O-ring.

Installation note:

Tightening torque: **11 14 1AZ** .

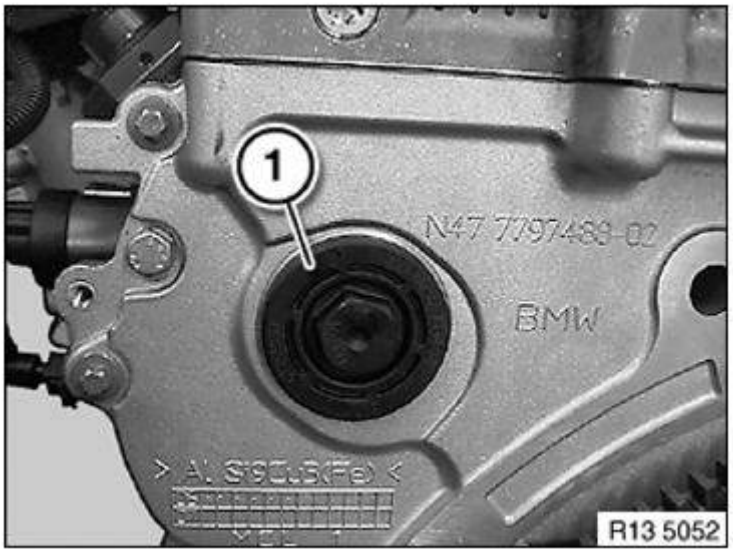


Fig. 45: Identifying O-Ring Of Sealing Cap
Courtesy of BMW OF NORTH AMERICA, INC.

Screw in special tool **11 8 741** for positioning the camshaft sprocket of the high pressure pump. The remove special tool **11 8 742** . Special tool **11 8 741** remains in the timing case housing until the end of the repair work.

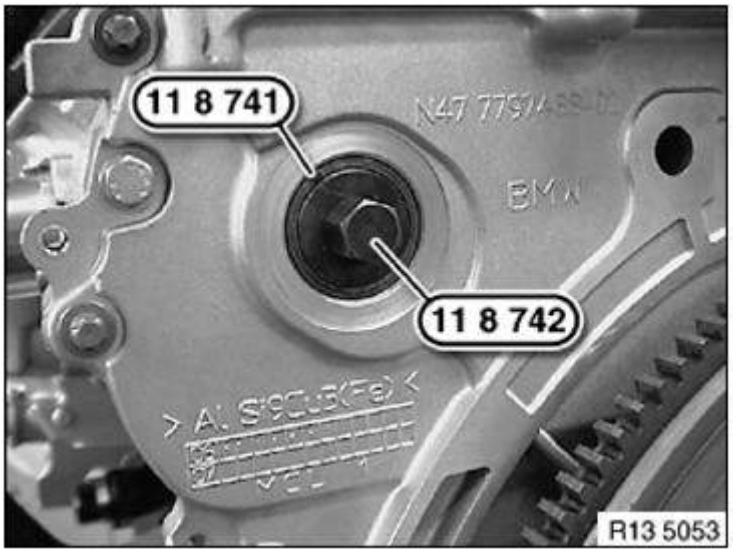


Fig. 46: Positioning Camshaft Sprocket Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1), (2), (3) and (4).

Remove high pressure pump support.

cardiagn.com

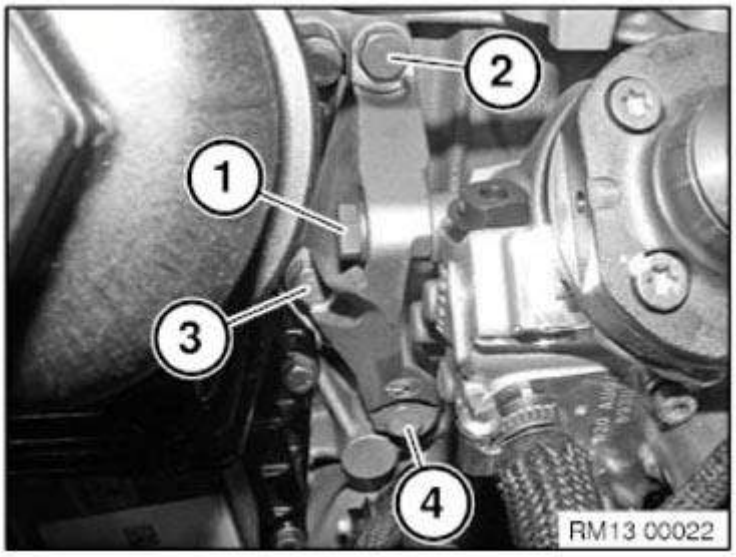


Fig. 47: Identifying Screws Of High Pressure Pump Support
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **13 51 4AZ** .

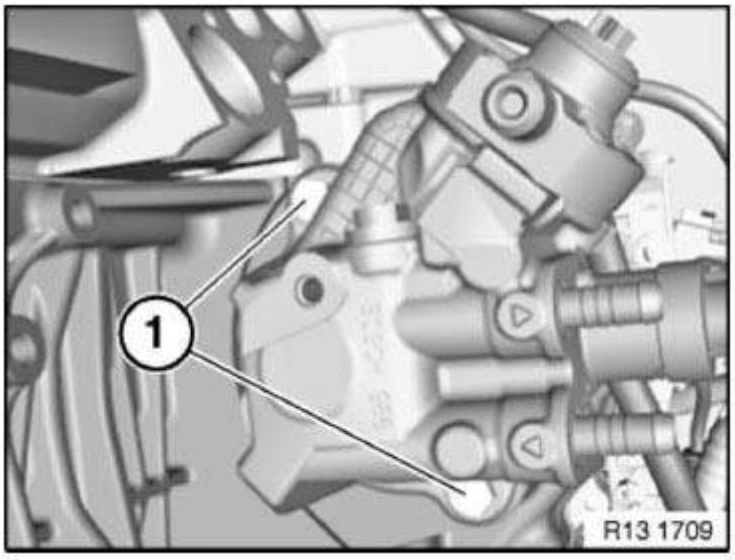


Fig. 48: Identifying Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Special tool **11 8 741** remains in timing case housing.
Central bolt remains in camshaft sprocket.

Release screw connection between high pressure pump and camshaft sprocket.

NOTE: **Central bolt is supported on special tool 11 8 740 until high pressure pump is pressed out.**

cardiagn.com

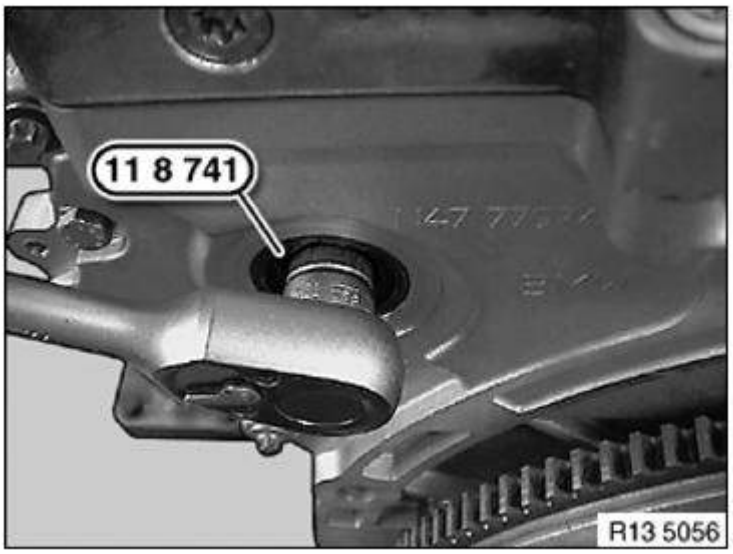


Fig. 49: Identifying Special Tool (11 8 741)
Courtesy of BMW OF NORTH AMERICA, INC.

Remove high pressure pump.

Installation note:

Tightening torque: **13 52 2AZ** .

To insert the high pressure pump shaft in the sprocket wheel (1), it may be necessary to swing the high pressure pump through several degrees (spline groove-lug fit, see arrow). Then rotate high pressure pump back into screwing position.

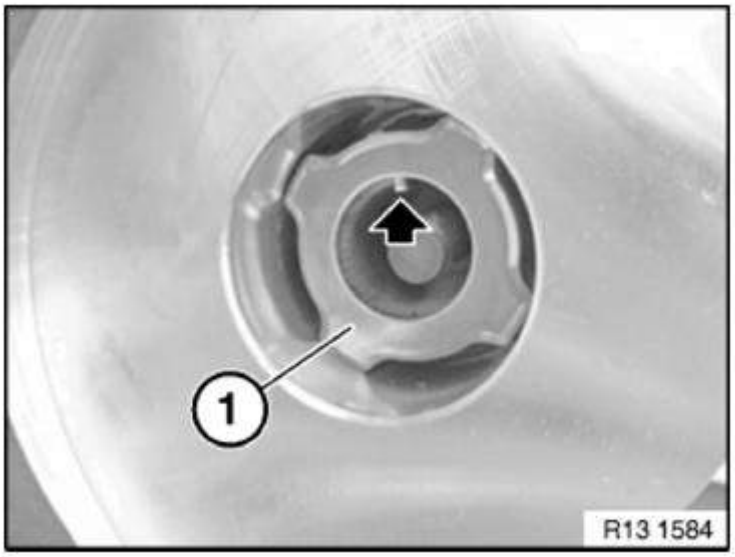


Fig. 50: Inserting High Pressure Pump Shaft In Sprocket Wheel
Courtesy of BMW OF NORTH AMERICA, INC.

Replacing high pressure pump:

When installing a **new** high pressure pump, adapt the high pressure pump camshaft sprocket assignment. To do so, turn back high pressure pump at **set-back** part of shaft 45Â° clockwise (top view). Do not damage the shaft, especially the taper.

cardiagn.com

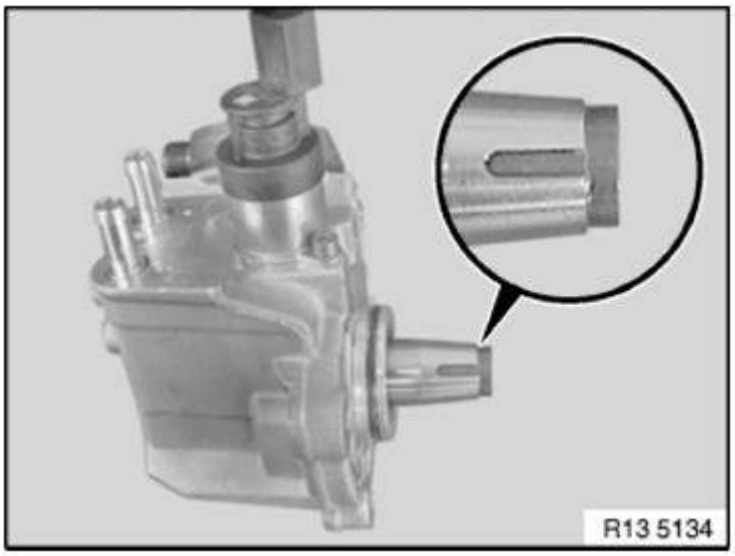


Fig. 51: Identifying High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

When installing the high pressure pump support, adhere to the screwing sequence.

Installation note:

1. Tighten down to head (gap-free) hand-tight, sequence 1-2-3-4
2. Tighten to final torque

Tightening sequence 2-3-4-1

Tightening torque: **13 51 2AZ** .

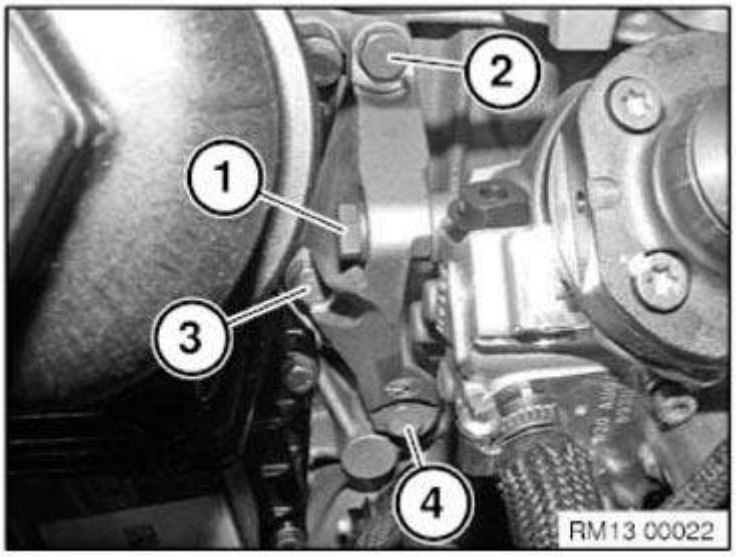


Fig. 52: Identifying High Pressure Pump Tightening Sequence
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Assemble engine.

Bleed fuel system using BMW diagnosis system.

Check fuel system for tightness.

cardiagn.com

Reset adaptation of electric fuel pump with BMW diagnosis system.

13 53 192 REMOVING AND INSTALLING/REPLACING A PRESSURE LINE (CONTINENTAL HIGH-PRESSURE PUMP) (N55)

See **13 53 192 REMOVING AND INSTALLING/REPLACING A PRESSURE LINE (CONTINENTAL HIGH-PRESSURE PUMP) (N55)**.

13 53 332 REMOVING AND INSTALLING/REPLACING FEED LINE (BOSCH HIGH PRESSURE PUMP) (N55)

See **13 53 332 REMOVING AND INSTALLING/REPLACING FEED LINE (BOSCH HIGH PRESSURE PUMP) (N55)**.

13 53 332 REMOVING AND INSTALLING/REPLACING FEED LINE (CONTINENTAL HIGH PRESSURE PUMP) (N55)

See **13 53 332 REMOVING AND INSTALLING/REPLACING FEED LINE (CONTINENTAL HIGH PRESSURE PUMP) (N55)**.

13 53 334 REMOVING AND INSTALLING/REPLACING PRESSURE LINE (BOSCH HIGH-PRESSURE PUMP) (N55)

See **13 53 334 REMOVING AND INSTALLING/REPLACING PRESSURE LINE (BOSCH HIGH-PRESSURE PUMP) (N55)**.

13 53 334 REMOVING AND INSTALLING/REPLACING PRESSURE LINE (CONTINENTAL HIGH PRESSURE PUMP) (N55)

See **13 53 334 REMOVING AND INSTALLING/REPLACING PRESSURE LINE (CONTINENTAL HIGH PRESSURE PUMP) (N55)**.

13 53 158 REMOVING AND INSTALLING/REPLACING RAIL (BOSCH HIGH PRESSURE PUMP) (N55)

See **13 53 158 REMOVING AND INSTALLING/REPLACING RAIL (BOSCH HIGH PRESSURE PUMP) (N55)**.

13 53 158 REMOVING AND INSTALLING/REPLACING RAIL (CONTINENTAL HIGH-PRESSURE PUMP) (N55)

See **13 53 158 REMOVING AND INSTALLING/REPLACING RAIL (CONTINENTAL HIGH-PRESSURE PUMP) (N55)**.

13 53 596 REPLACING HIGH-PRESSURE FUEL SENSOR (N55)

See **13 53 596 REPLACING HIGH-PRESSURE FUEL SENSOR (N55)**.

INJECTION NOZZLE AND LINES

13 53... REMOVE, INSTALL REPLACE ONE INJECTOR N55 AS FROM ENGINE NUMBER 14407685 (HOLD-DOWN DEVICE CONCEPT AT THE TOP)

Special tools required:

- **13 0 320**
- **00 9 170**
- **13 0 191**
- **13 0 283**

cardiagn.com

- 13 0 281
- 13 0 282

It is of vital importance to adhere to the **WARNINGS ON REMOVING THE INJECTORS**!

Necessary preliminary tasks:

- Disconnect **NEGATIVE BATTERY TERMINAL** (risk of fire due to short-circuiting on dismantling).
- Remove **IGNITION COIL** of corresponding cylinder.
- Disconnect **pressure lines** . See **13 53 192 REMOVING AND INSTALLING/REPLACING A PRESSURE LINE (CONTINENTAL HIGH-PRESSURE PUMP) (N55)** or **13 53 192 REMOVING AND INSTALLING/REPLACING A PRESSURE LINE (BOSCH HIGH-PRESSURE PUMP) (N55)** of corresponding cylinder.

NOTE: The following description applies to all injectors in cylinders 1-6.

Unlock connector (1) from injectors and detach.

Slacken nut (2).

Tightening torque: **12 90 5AZ** .

Remove ground cable (3).

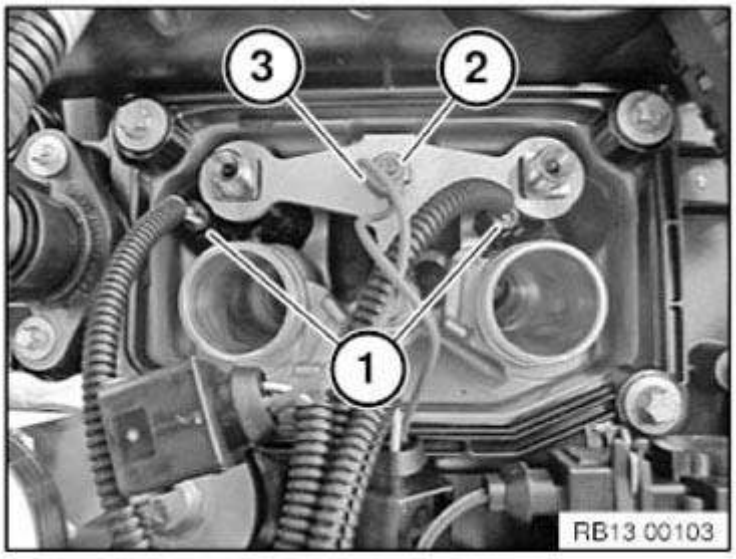


Fig. 53: Identifying Connector From Injectors And Slacken Nut
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: First, release screw (2). The, release screw (1). Otherwise, the hold-down device may tilt.

Remove holding-down element (3).

Pull injectors upward out of cylinder head and remove.

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

Mark injectors.

cardiagn.com

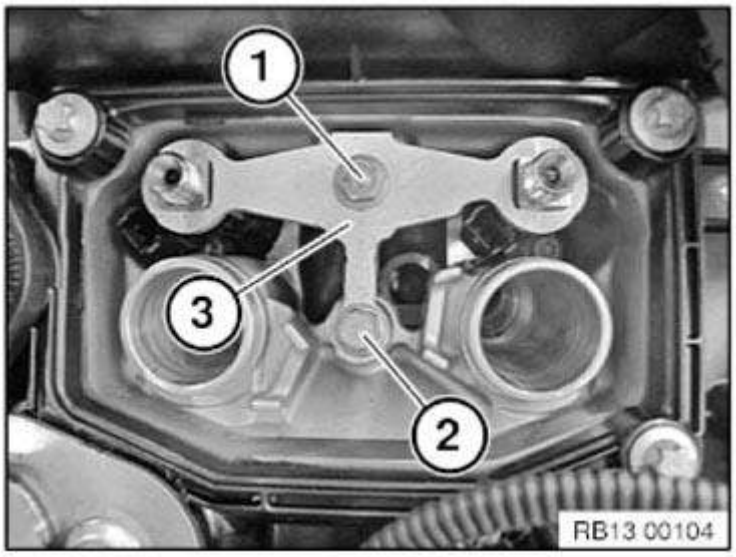


Fig. 54: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Procedure in event of stuck injector:

Use special tool **13 0 320** to remove injectors that are stuck.

Lightly oil pull-out thread (1) and unscrew completely (see **Fig. 55**) before using the special tool.

IMPORTANT: Pull-out thread (1) is a left-hand thread!

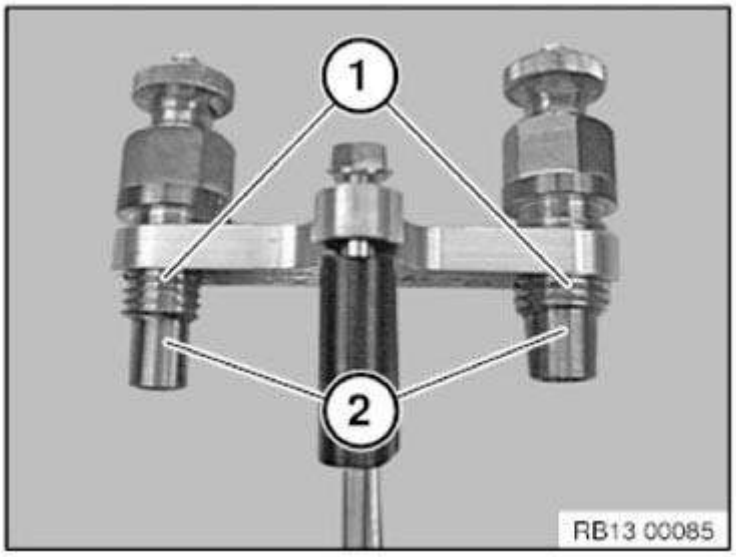


Fig. 55: Identifying Stuck Injector
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool (1) **13 0 320** on injector slot. Join screws (2) to injector slot by a few threads. Screw in pull-out thread (4) until it is possible to screw the threaded sleeves (3) onto the injectors. Screw threaded sleeves (3) onto injectors and tighten down.

Tighten down screws (2).

Tightening torque: **13 53 13AZ** .

cardiagn.com

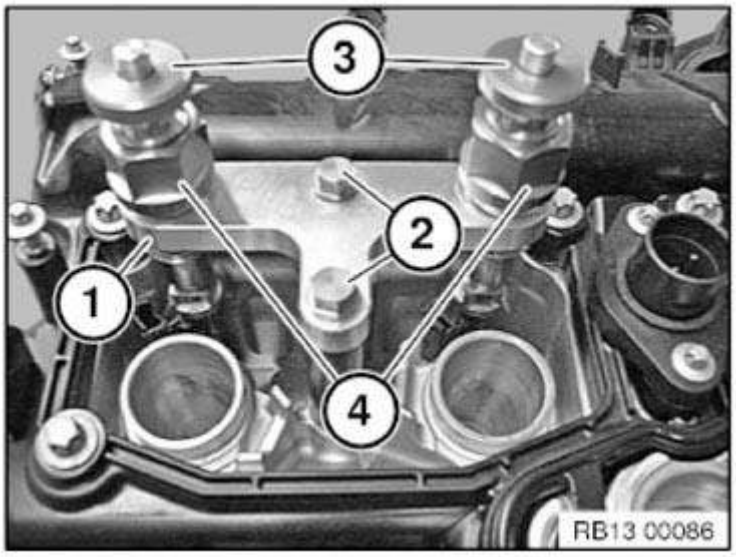


Fig. 56: Screwing Threaded Sleeves Onto Injectors
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Set torque wrench (1) to **5 Nm** clockwise rotation. Together with special tool **13 0 320** this corresponds to a tensile force of max. 2000 N. The injector must be replaced if the torque wrench is activated when the injector is pulled out!

Fit torque wrench (1) and special tool (2) **00 9 170** on hexagon head (3) of special tool **13 0 320** .

Turn torque wrench (1) in clockwise direction until the injector is pulled out.

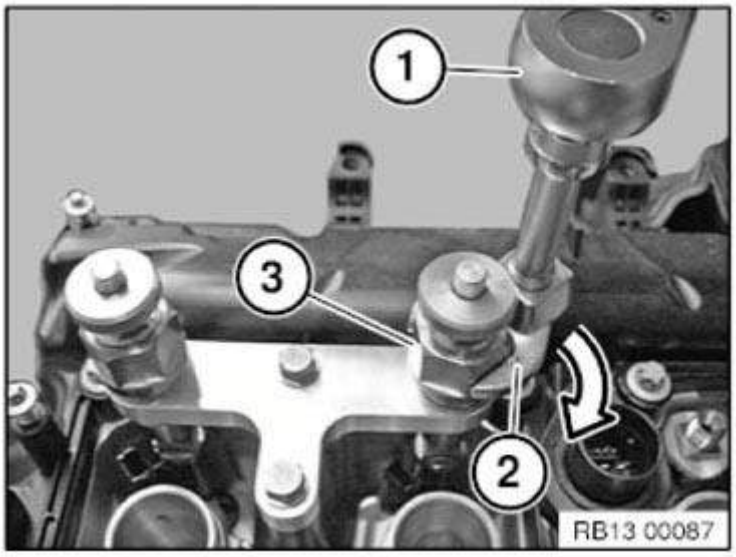


Fig. 57: Turning Torque Wrench In Clockwise Rotation
Courtesy of BMW OF NORTH AMERICA, INC.

After removing, fit protective caps (1 and 2) to injector tip and fuel line connection.

Installation note:

When installing a new injector:

- Replace decoupling element (3).

cardiagn.com

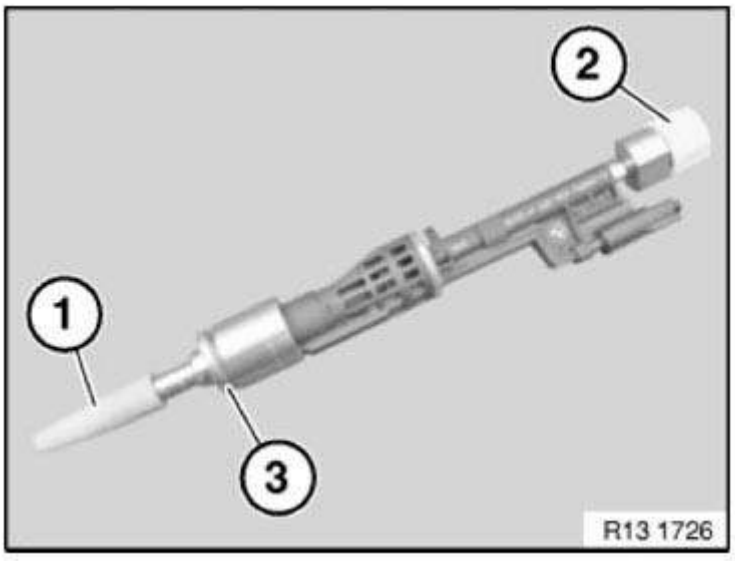


Fig. 58: Identifying Protective Caps And Decoupling Element
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

When reusing fuel injector:

- Replace decoupling element (1).
- Replace Teflon ring (2).

  A Teflon ring that has already been installed once in the cylinder head must be replaced before the injector is reinstalled.

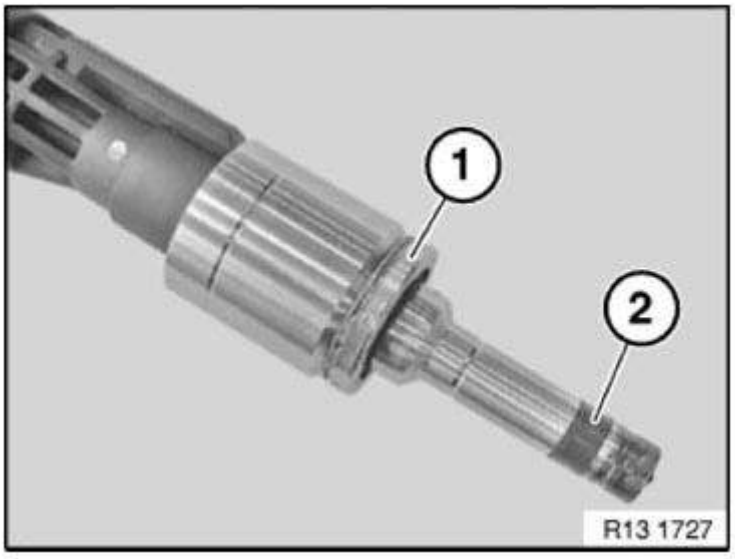


Fig. 59: Identifying Decoupling Element And Teflon Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Replace Teflon ring:

Before replacing the Teflon ring (1), make sure your hands and the work surface are clean and free of oil.

Avoid mechanical contact with injector tip (2).

cardiagn.com

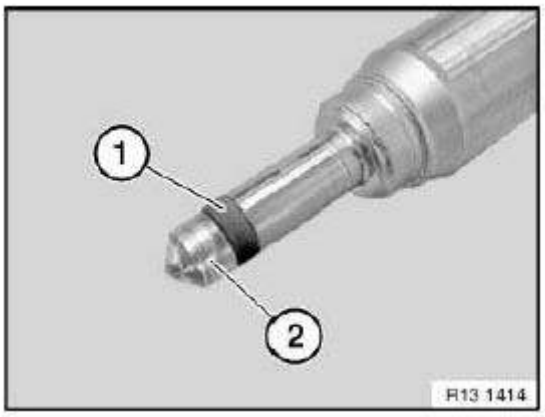


Fig. 60: Identifying Teflon Ring And Injector Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Remove Teflon ring (2) with special tool (3) **13 0 191** from injector (1).

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

Do not clean injector tip.

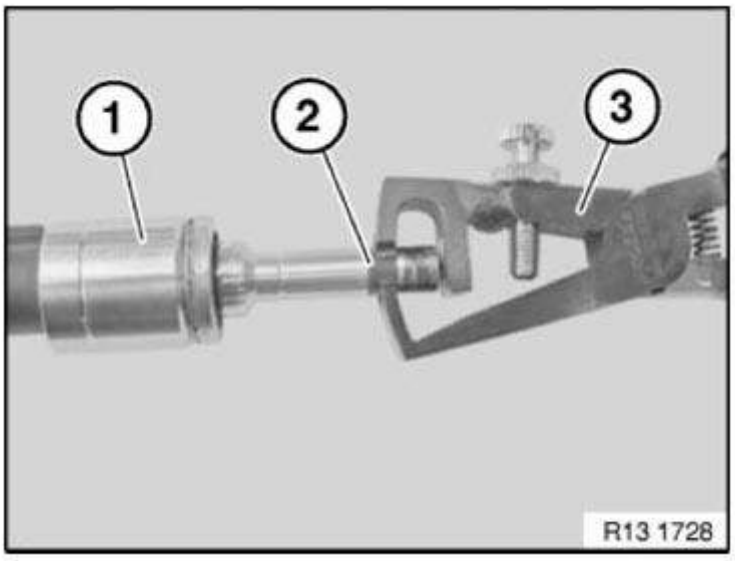


Fig. 61: Removing Teflon Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Push new Teflon ring (1) onto the installation cone (2) **13 0 283** .

cardiagn.com

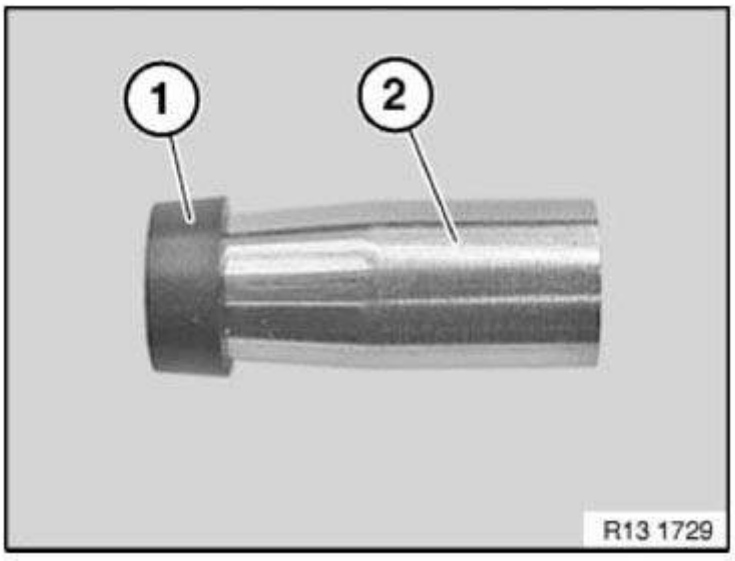


Fig. 62: Identifying Teflon Ring And Cone
Courtesy of BMW OF NORTH AMERICA, INC.

Mount Teflon ring (1) with installation cone (2) **13 0 283** onto injector tip (3).

NOTE:

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

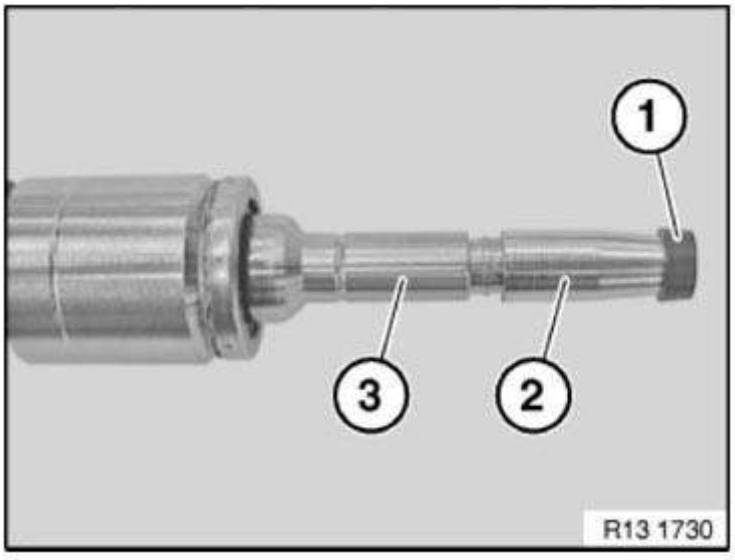


Fig. 63: Identifying Teflon Ring, Cone And Injector Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Using special tool (1) **13 0 281** push Teflon ring into injector groove (3).

cardiagn.com

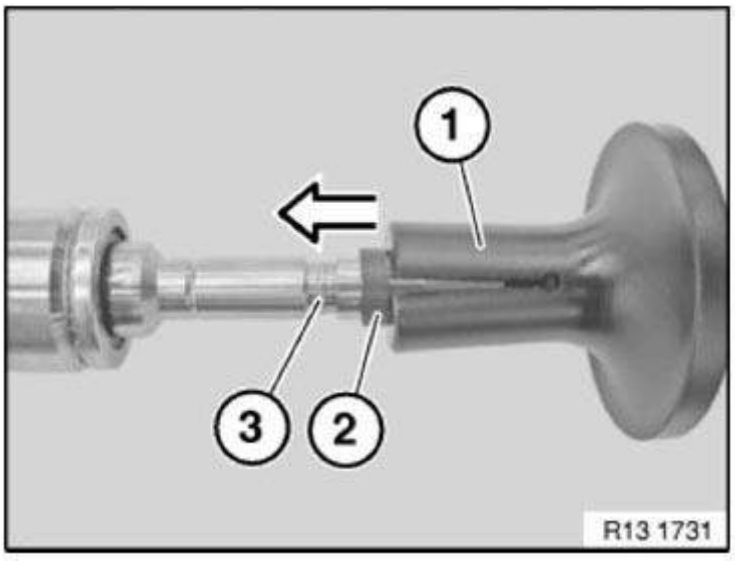


Fig. 64: Pushing Teflon Ring Into Injector Groove
Courtesy of BMW OF NORTH AMERICA, INC.

To bring the widened Teflon ring to installation size, push special tool (1) 13 0 282 as far as it will go onto injector (2).

Do not use any lubricating agents.

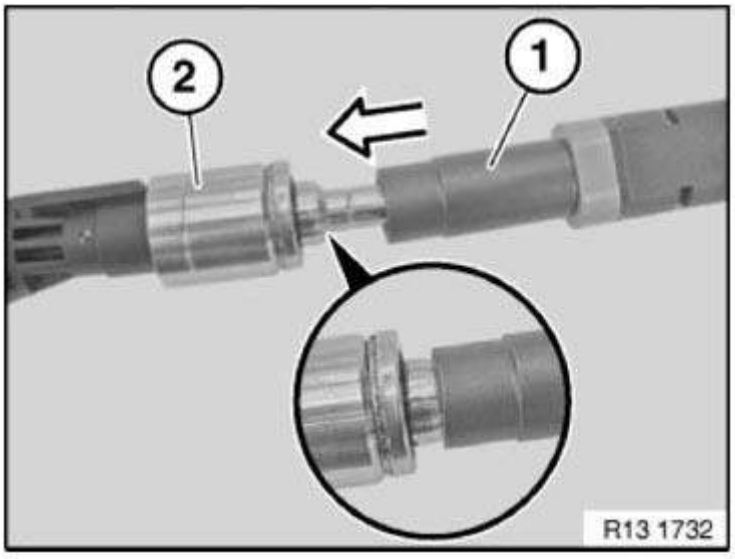


Fig. 65: Pushing Special Tool On Injector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Pull mounting tip (1) of special tool 13 0 282 towards rear to release mounting taper (2) 13 0 281 .**

cardiagn.com

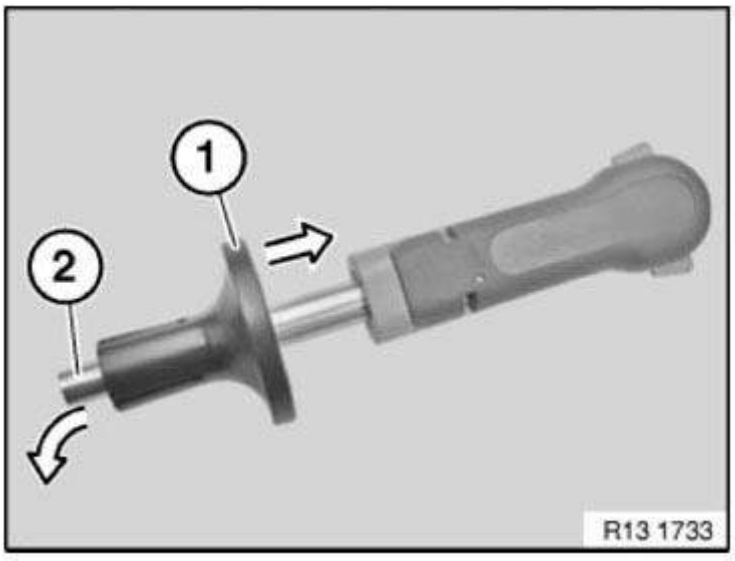


Fig. 66: Pulling Mounting Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Installing injector:

Before installing injector in engines that have been run:

IMPORTANT: Injectors must not be twisted to **6 Nm!**
The injector must be replaced if this value is exceeded!

- Check injector bore for dirt.

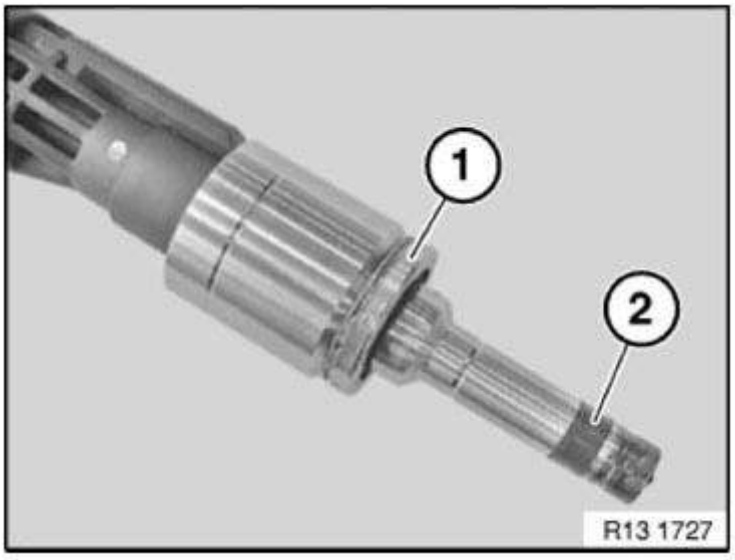
  Clean **only dirty** injector bores.

  Important - do not damage injector!

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

  The Teflon ring must subsequently be replaced.

- Clean contact surfaces of decoupling elements (1) in cylinder head.
- Replace decoupling element (1).



cardiagn.com

Fig. 67: Identifying Decoupling Element And Teflon Ring
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Injection quantity compensation!

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

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

The adjustment value is printed in three digits on the injector body.

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



Fig. 68: Identifying Injector Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

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

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

Injection quantity compensation is described at the end of these instructions.

Insert injectors in injector bores.

Fit special tool (1) **13 0 320** on injector slot. Join screws (2) to injector slot by a few threads. Screw in the pull-out thread (4) until the threaded sleeves (3) can be screwed onto the injectors. Screw threaded sleeves (3) onto injectors and tighten down.

Tighten down screws (2).

Tightening torque: **13 53 13AZ** .

cardiagn.com

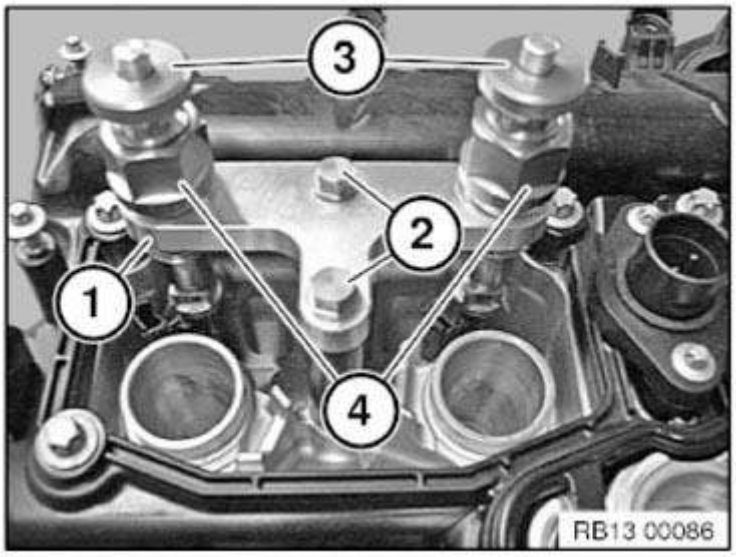


Fig. 69: Screwing Threaded Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Set torque wrench (1) to **2 Nm** counterclockwise rotation.

Fit torque wrench (1) and special tool (2) **00 9 170** on hexagon head (3) of special tool **13 0 320** .

Turn torque wrench (1) in counterclockwise direction until 2 Nm are reached.

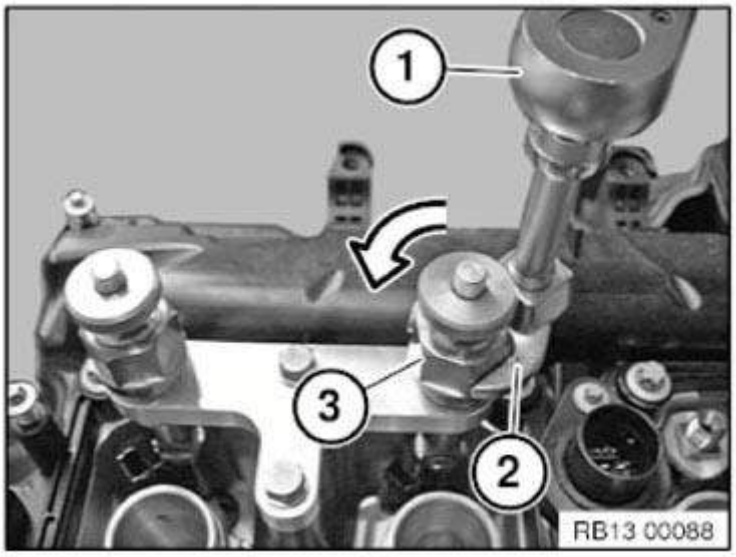


Fig. 70: Turning Torque Wrench Counterclockwise
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Install hold-down device (1) with curvatures (black arrows) downward.

cardiagn.com

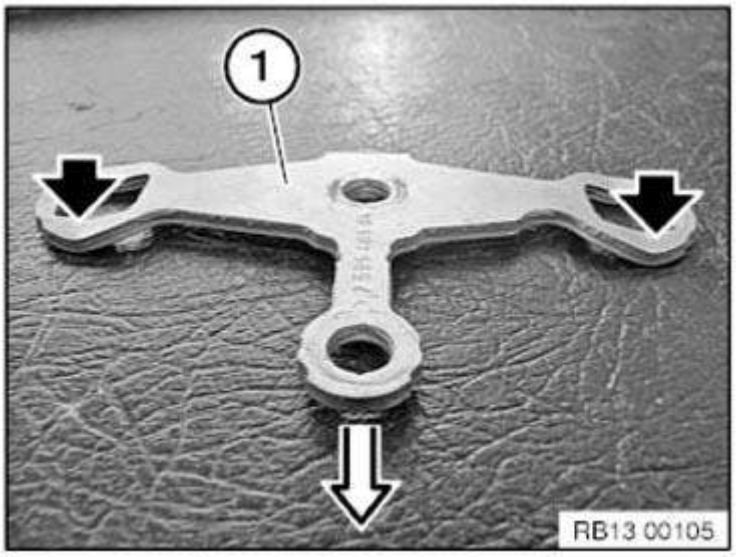


Fig. 71: Installing Hold Device With Curvatures
Courtesy of BMW OF NORTH AMERICA, INC.

Fit hold-down device (3) on injectors.

Tighten screws (1) and (2) only hand-tight.

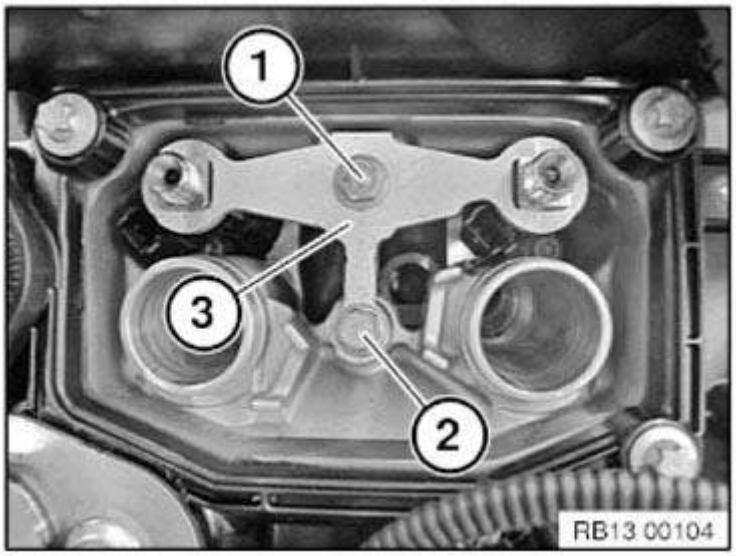


Fig. 72: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Install pressure lines on injectors and rail. Tighten nuts (1) and (2) manually only.

Installation note:

Reinstall line damper (3).

cardiagn.com

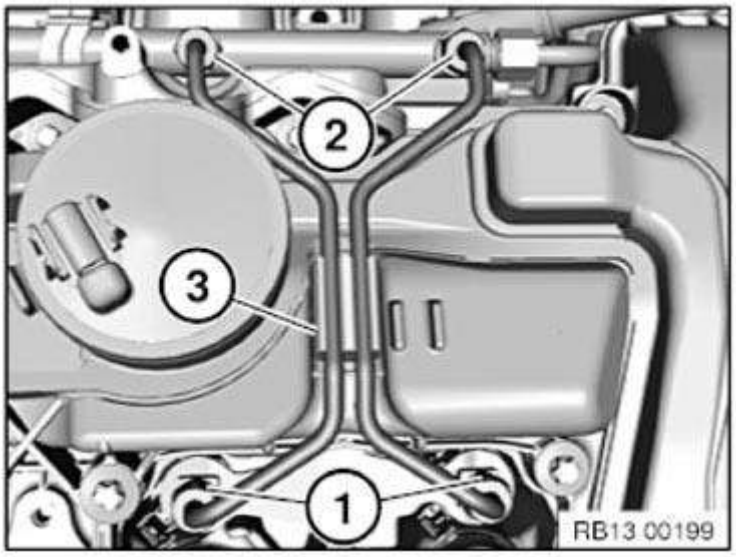


Fig. 73: Identifying Line Damper And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Firstly tighten screw (1).

Tightening torque: **13 53 6AZ** .

Then tighten down screw (2).

Tightening torque: **13 53 6AZ** .

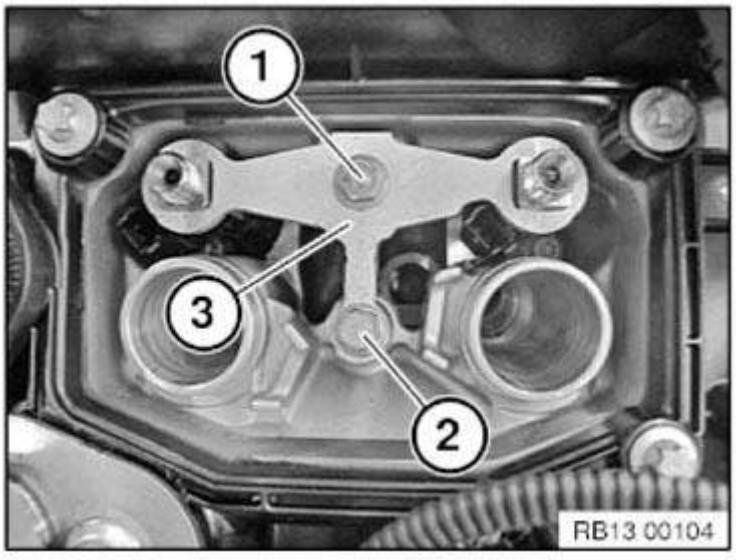


Fig. 74: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down pressure lines on injectors (1).

Tightening torque: **13 53 9AZ** .

Then tighten down pressure lines (2) on the rail.

Tightening torque: **13 53 9AZ** .

Installation note:

Reinstall line damper (3).

cardiagn.com

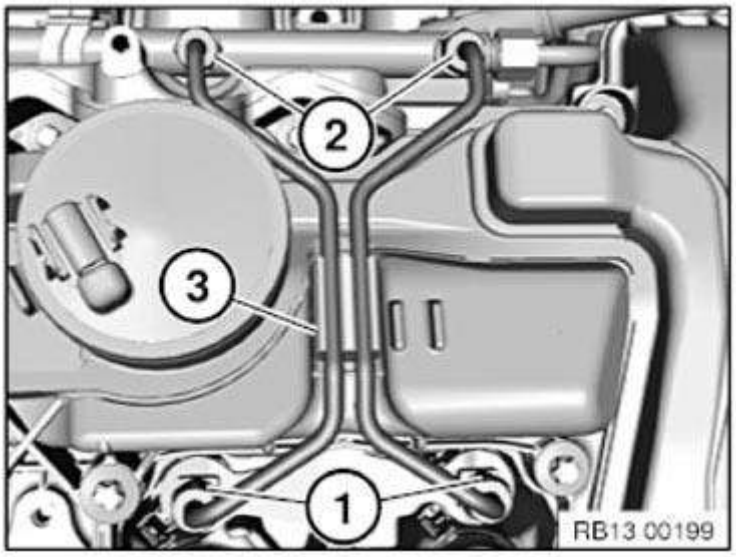


Fig. 75: Identifying Pressure Lines On Injectors And Line Damper
Courtesy of BMW OF NORTH AMERICA, INC.

Perform an injection quantity compensation:

The adjustment value is printed with three digits - depending on the version - on the injector body.

- Connect BMW diagnosis system.
- Identify vehicle.
- Select "Function selection."
- Select "Service functions."



Fig. 76: Identifying Injector Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

- Select "Engine electronics."
- Select "Adjustment functions."
- Select "Adjust injectors."
- Select "Test plan"
- For each replaced injector, the adjustment value must be entered according to the installation location (cylinder).

cardiagn.com

Clean spark plug slot.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 310 REMOVING AND INSTALLING OR REPLACING AN INJECTOR (N20, N26)

Special tools required:

- 00 9 170
- 13 0 320
- 13 0 190
- 13 0 280

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on removal).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

WARNING: **Wear full face guard and protective gloves.**
Fuel can emerge spontaneously at high velocity from the fuel injectors!
To reduce the fuel pressure, place rag over fuel injector and carefully tap against the fuel injector with a spanner.
There is a risk of injury if the fuel pressure is not reduced!

IMPORTANT: Wear safety goggles.
Oil and dirt particles may get into your eyes!

Before removing the injectors, clean or vacuum off injector slots.

IMPORTANT: Injectors may be pulled out with a maximum tensile force of **2000 N** and twisted only to **6 Nm** (torsion movement). If these values are exceeded, the injectors must be **replaced!**

IMPORTANT: When assembling, it is essential to adhere to screwing sequences and tightening torques!
Failure to comply with this requirement may result in leaks!

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

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

IMPORTANT: Carry out engine cleaning/washing only with ignition coil cover fitted.
No water may penetrate into injector slots and corrosion between injectors and cylinder head must be prevented.

NOTE:

cardiagn.com

- **Ignition coils must not become coated with fuel!**

  The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail! It is therefore essential to protect the spark plug slot against ingress of fuel with a cloth!

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

Necessary preliminary tasks:

- Remove **IGNITION COILS** .
- Remove and renew the **PRESSURE LINE** between rail and high pressure pump.

NOTE: **Removal and installation of injectors are described separately from each other. Observe screw fastening sequence without fail.**

Injector removal:

Unlock connector (1) and remove.

Unscrew nuts (2).

Release screws (3) a few threads until rail (4) is loose.

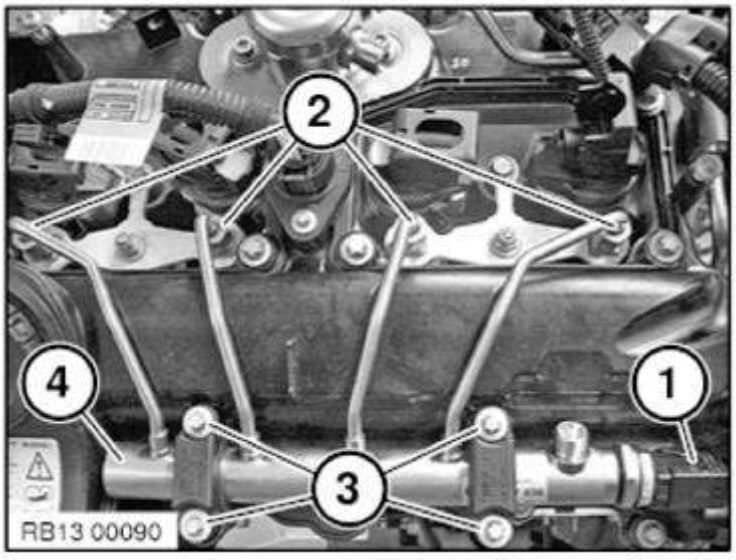


Fig. 77: Identifying Connector And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Turn rail (1) counter clockwise until injectors can be removed.

cardiagn.com

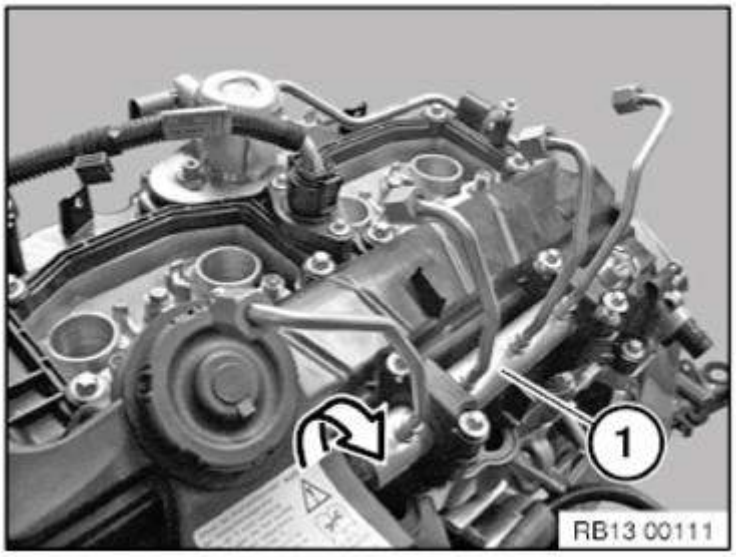


Fig. 78: Turning Rail Of Injectors
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: The following description applies to all injectors.

Unlock connector (1) from injectors and detach.

Slacken nut (2).

Tightening torque: **12 52 2AZ** .

Remove ground cable (3).

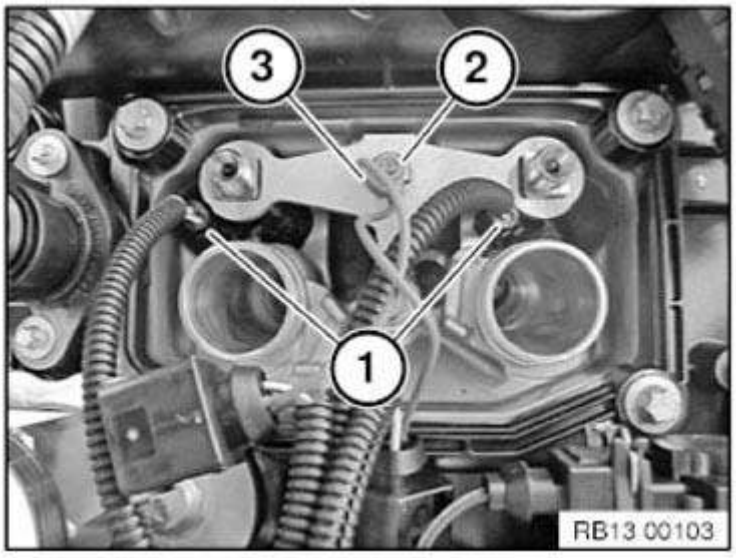


Fig. 79: Identifying Connector From Injectors And Ground Cable
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: First, release screw (2). The, release screw (1).
Otherwise, the hold-down device may tilt.

Remove holding-down element (3).

Pull injectors upward out of cylinder head and remove.

NOTE: If several injectors are removed, ensure that each injector is reinstalled in its

cardiagn.com

original location (cylinder).

Mark injectors.

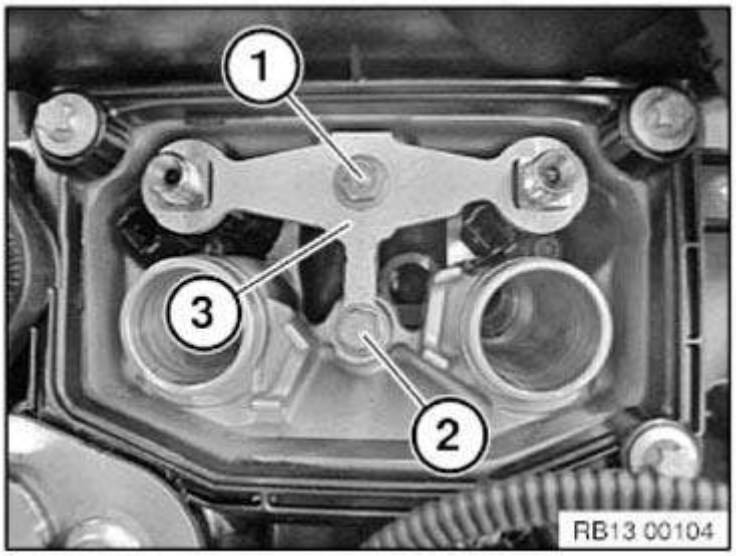


Fig. 80: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Procedure in event of stuck injector:

Use special tool **13 0 320** to remove injectors that are stuck.

Lightly oil pull-out thread (1) and unscrew completely (see **Fig. 81**) before using the special tool.

IMPORTANT: Pull-out thread (1) is a left-hand thread.

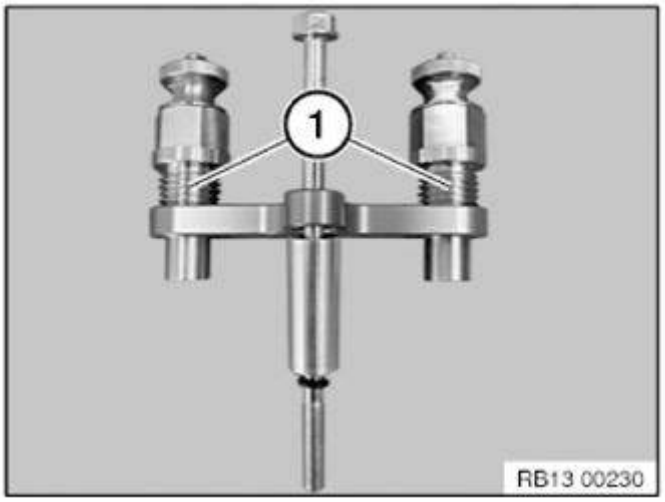


Fig. 81: Identifying Thread Of Stuck Injector
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool (1) **13 0 320** on injector slot. Join screws (2) to injector slot by a few threads. Screw in pull-out thread (4) until it is possible to screw the threaded sleeves (3) onto the injectors. Screw threaded sleeves (3) onto injectors and tighten down.

Tighten down screws (2).

Tightening torque: **13 53 8AZ** .

cardiagn.com

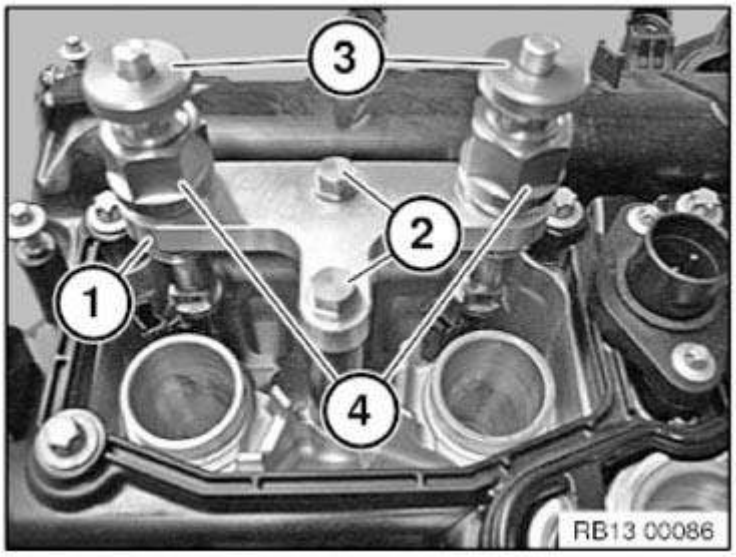


Fig. 82: Identifying Threaded Sleeves And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Set torque wrench (1) to **5 Nm** clockwise rotation. Together with special tool **13 0 320** this corresponds to a tensile force of max. 2000 N. The injector must be **replaced** if the torque wrench clicks when the injector is pulled out!

Fit torque wrench (1) and special tool (2) **00 9 170** on hexagon head (3) of special tool **13 0 320** .

Turn torque wrench (1) in clockwise direction until the injector is pulled out.

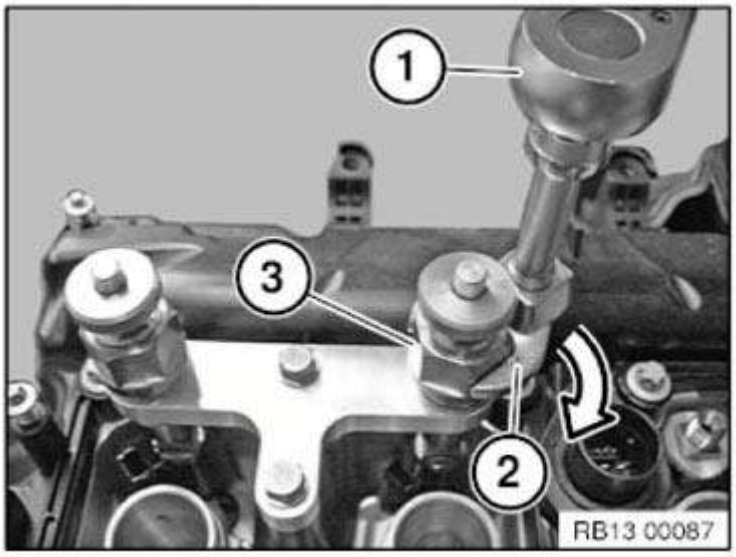


Fig. 83: Turning Torque Wrench In Clockwise Rotation
Courtesy of BMW OF NORTH AMERICA, INC.

After removing, fit protective caps (1 and 2) to injector tip and fuel line connection.

Installation note:

When installing a new injector:

- Replace decoupling element (3).

cardiagn.com

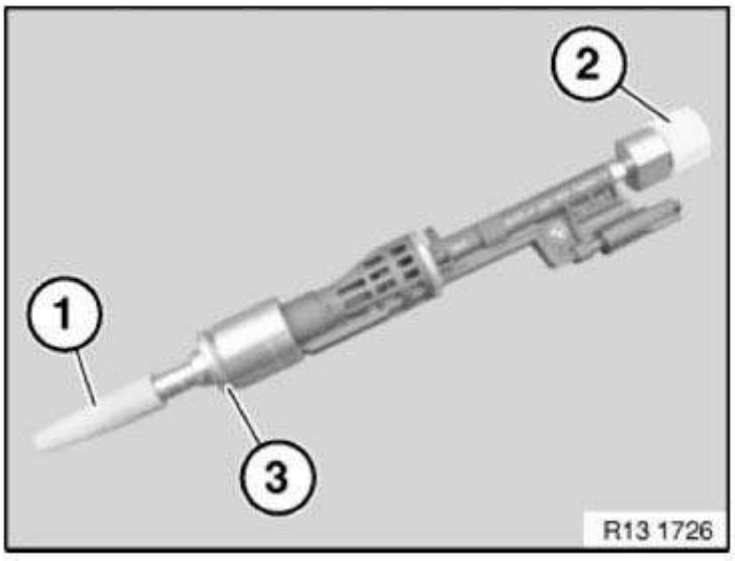


Fig. 84: Identifying Protective Caps And Decoupling Element
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

When reusing fuel injector:

- Replace decoupling element (1).
- Replace Teflon ring (2).

  A Teflon ring that has already been installed once in the cylinder head must be replaced before the injector is reinstalled.

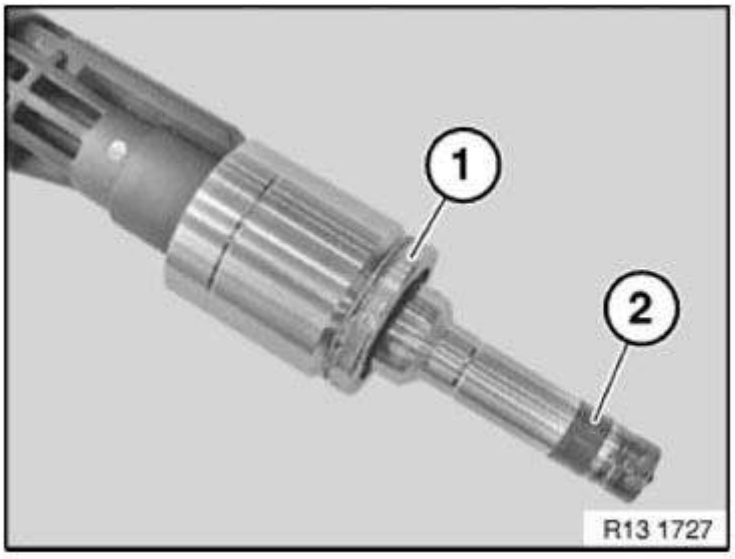


Fig. 85: Identifying Decoupling Element And Teflon Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Replace Teflon ring:

Before replacing the Teflon ring (1), make sure your hands and the work surface are clean and free of oil.

Avoid mechanical contact with injector tip (2).

cardiagn.com

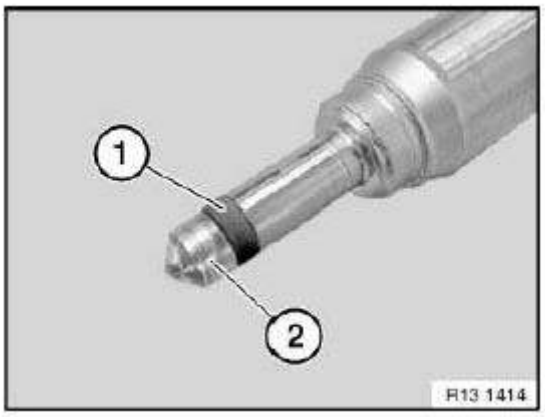


Fig. 86: Identifying Teflon Ring And Injector Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Remove Teflon ring (2) from injector (1) with special tool (3) 13 0 191 from set of special tools **13 0 190** .

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

Do not clean injector tip.

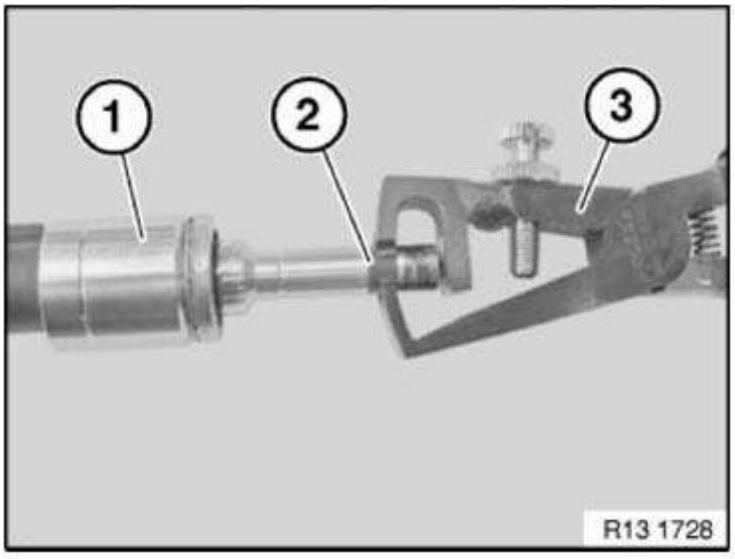


Fig. 87: Removing Teflon Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Slide new Teflon ring (1) onto installation cone (2) 13 0 283 from set of special tools **13 0 280** .

cardiagn.com

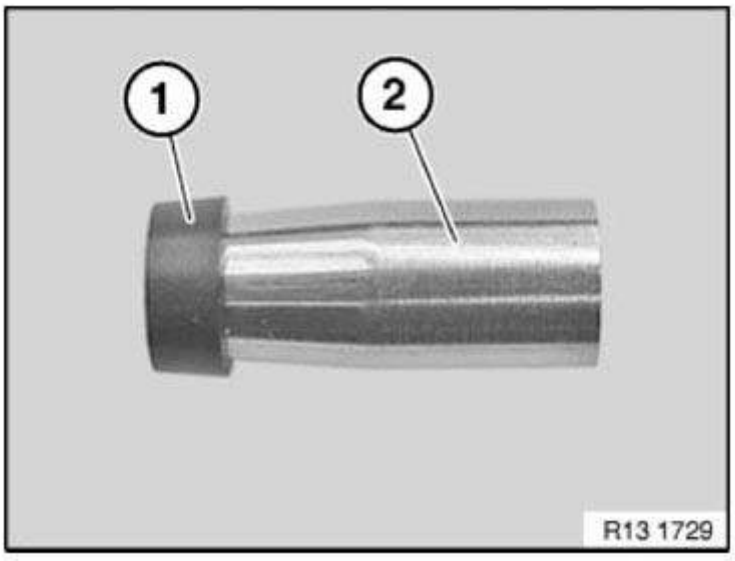


Fig. 88: Identifying Teflon Ring And Cone
Courtesy of BMW OF NORTH AMERICA, INC.

Fit Teflon ring (1) on injector tip (3) with installation cone (2) 13 0 283 from set of special tools **13 0 280** .

NOTE:

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

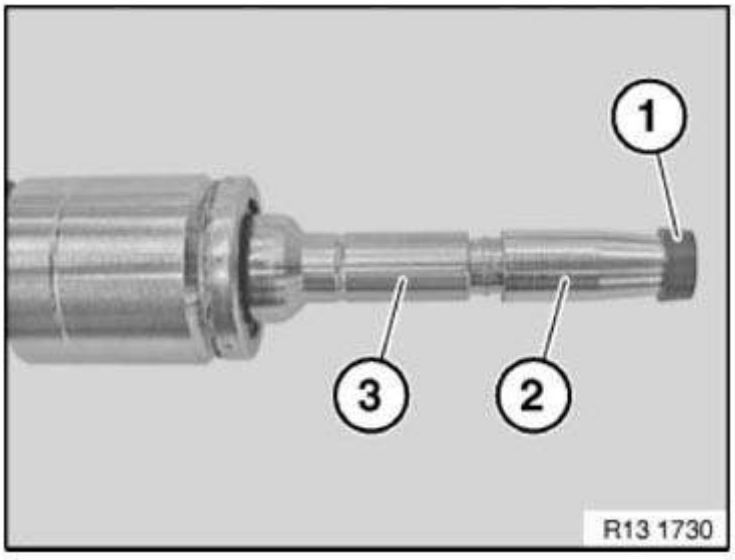


Fig. 89: Identifying Teflon Ring On Injector Tip And Cone
Courtesy of BMW OF NORTH AMERICA, INC.

Using special tool (1) 13 0 281 from set of special tools **13 0 280** , push Teflon ring (2) into groove (3) on injector.

cardiagn.com

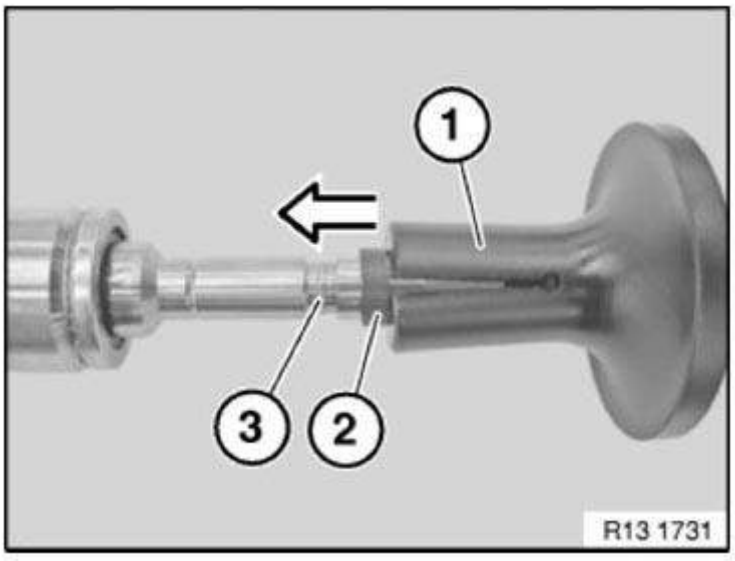


Fig. 90: Pushing Teflon Ring Into Groove
Courtesy of BMW OF NORTH AMERICA, INC.

To bring the widened Teflon ring to the installation dimension, special tool (1) 13 0 282 from set of special tools **13 0 280** must be slid up to limit position on injector (2).

Do not use any lubricating agents.

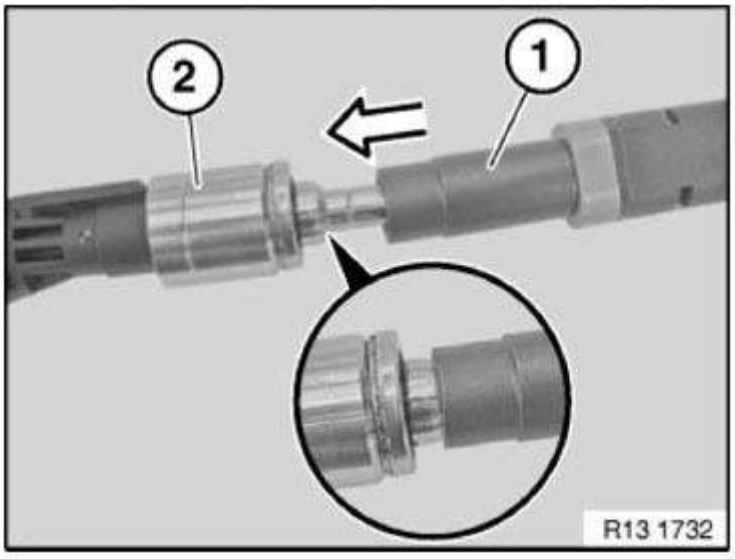


Fig. 91: Pushing Special Tool On Injector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Pull mounting tip (1) of special tool 13 0 282 towards rear to release installation cone (2) 13 0 281.**

cardiagn.com

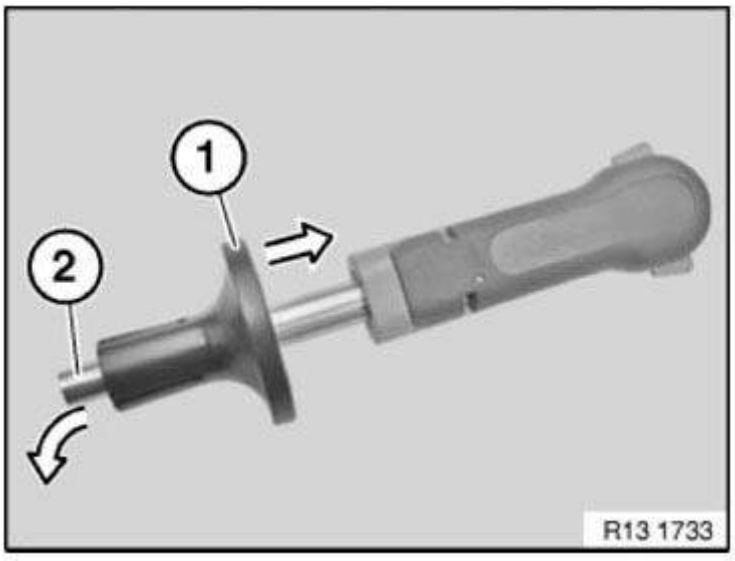


Fig. 92: Pulling Mounting Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Installing injector:

Before installing injector in engines that have been run:

IMPORTANT: Injectors must not be twisted to **6 Nm!**
The injector must be replaced if this value is exceeded!

- Check injector bore for dirt.

  Clean **only dirty** injector bores.

  Important - do not damage injector!

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

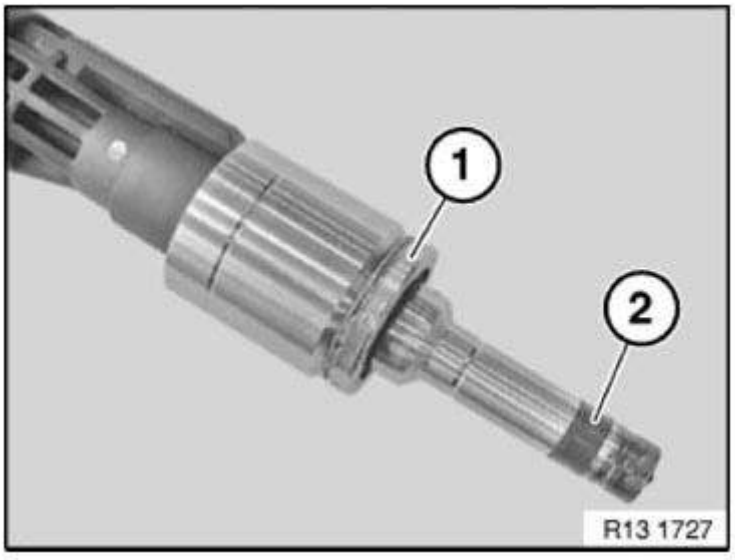


Fig. 93: Identifying Decoupling Element And Teflon Ring
Courtesy of BMW OF NORTH AMERICA, INC.

The Teflon ring must subsequently be replaced.

cardiagn.com

- Clean contact surfaces of decoupling elements (1) in cylinder head.
- Replace decoupling element (1).

IMPORTANT: Injection quantity compensation!

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

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

The adjustment value is printed in three digits on the injector body.

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



Fig. 94: Identifying Injector Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

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

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

Description of injector quantity compensation at end of instructions.

Insert injectors in injector bores.

Fit special tool (1) **13 0 320** on injector slot. Join screws (2) to injector slot by a few threads. Screw in pull-out thread (4) until it is possible to screw the threaded sleeves (3) onto the injectors. Screw threaded sleeves (3) onto injectors and tighten down.

Tighten down screws (2).

Tightening torque: **13 53 8AZ** .

cardiagn.com

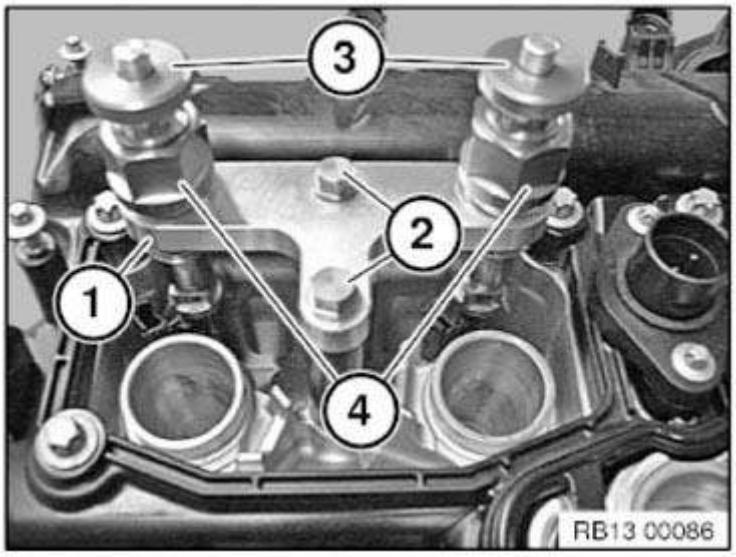


Fig. 95: Identifying Threaded Sleeves And Thread
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Set torque wrench (1) to **2 Nm** counterclockwise rotation.

Fit torque wrench (1) and special tool (2) **00 9 170** on hexagon head (3) of special tool **13 0 320** .

Turn torque wrench (1) in counterclockwise direction until 2 Nm are reached.

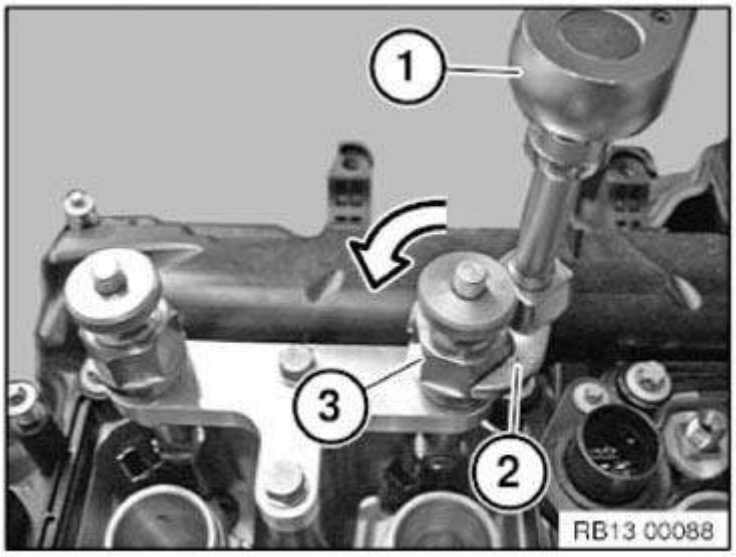


Fig. 96: Turning Torque Wrench Counterclockwise
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Install hold-down device (1) with curvatures (black arrows) downward.

cardiagn.com

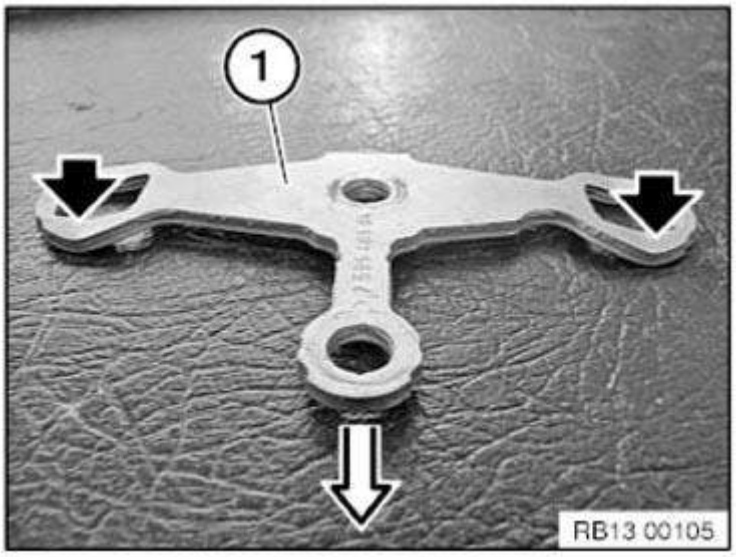


Fig. 97: Installing Hold Device With Curvatures
Courtesy of BMW OF NORTH AMERICA, INC.

Fit hold-down device (3) on injectors.

IMPORTANT: Only hand-tighten screw (1). Screw the screw (2) in by only a few threads. Otherwise, the hold-down device may tilt.

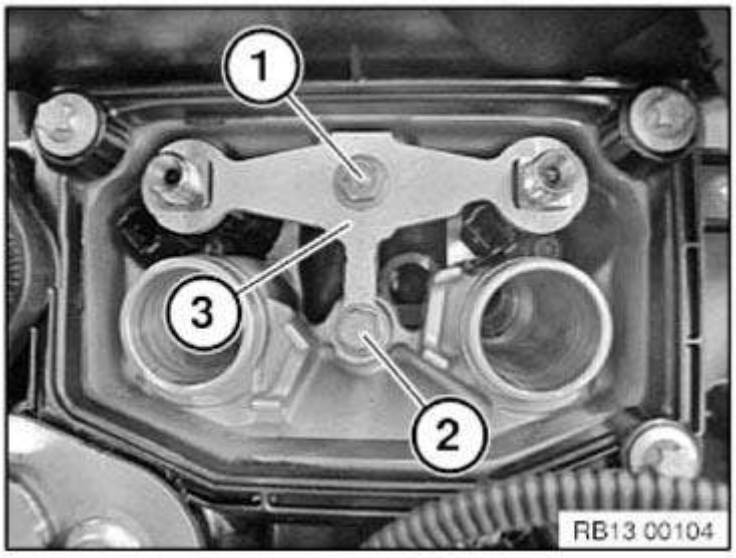


Fig. 98: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Install (4) rail, manually tightening nuts (3) and bolts (2) only.

NOTE:

- **Rail must still be displaceable on cylinder head.**
- **Nuts (2) must be able to be screwed on easily by hand.**

cardiagn.com

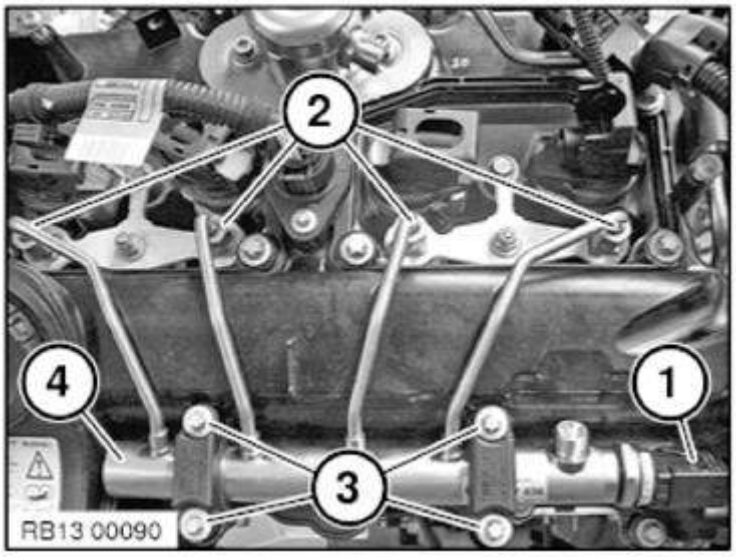


Fig. 99: Identifying Bolts And Nuts On Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Firstly tighten screw (1).

Tightening torque: **13 53 5AZ** .

Then tighten down screw (2).

Tightening torque: **13 53 5AZ** .

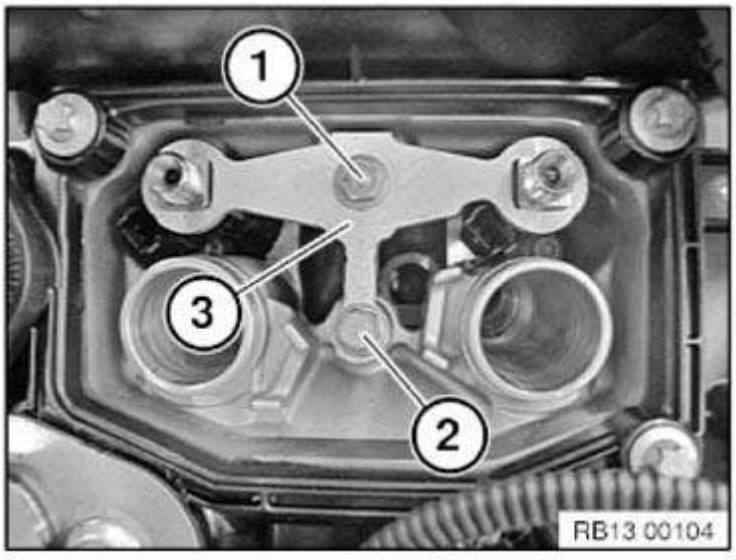


Fig. 100: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

First tighten screws (3).

Tightening torque: **13 53 4AZ** .

Then tighten nuts (2) on the injectors.

Tightening torque: **13 53 6AZ** .

Push on connector (1) for high pressure fuel sensor.

cardiagn.com

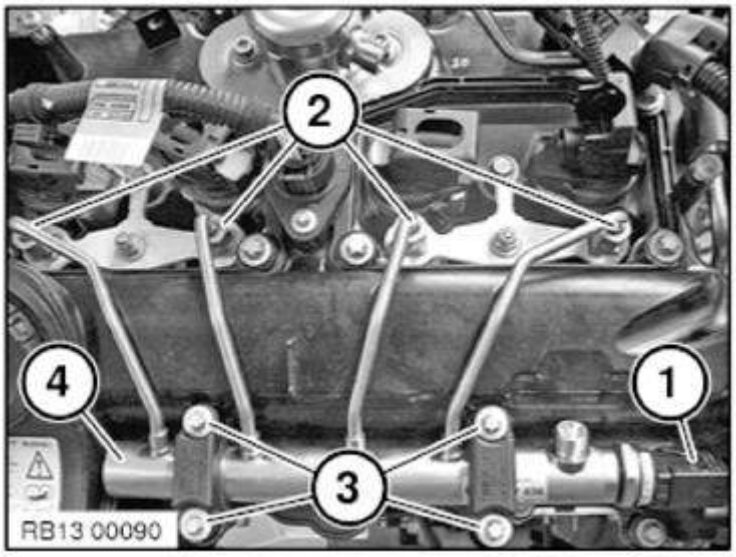


Fig. 101: Identifying Screws, Nuts And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Install pressure line (2).

Tighten nut (1) manually only.

IMPORTANT: Connect pressure line (2) without tension only. To ensure distortion-free installation of the pressure line and to avoid damaging the thread, it must be possible for both nuts (1) to be screwed on easily by hand!

Follow the correct screw connection sequence.

1. First tighten nut on high pressure pump.

   Tightening torque: **13 53 7AZ** .

2. Then tighten the nut on the rail.

   Tightening torque: **13 53 7AZ** .

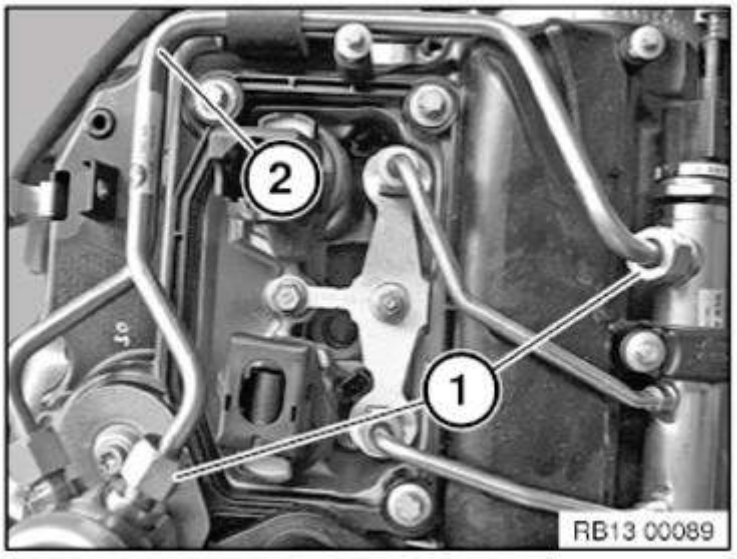


Fig. 102: Identifying Pressure Line And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Assemble engine.

Check fuel system for tightness.

Check function of DME.

Perform an injection quantity compensation:

The adjustment value is printed in three digits on the injector body.



Fig. 103: Identifying Injector Body Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

- Connect BMW diagnosis system
- Identify vehicle
- Select "Function selection"
- Select "Service functions"
- Select "Engine electronics"
- Select "Adjustment function"
- Select "Adjust injectors"
- Select "Test plan"
- For each replaced injector, the adjustment value must be entered according to the installation location (cylinder).

Clean spark plug slot.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 64 501 REMOVING AND INSTALLING/REPLACING A FUEL INJECTOR (N52T)

See **13 64 501 REMOVING AND INSTALLING/REPLACING A FUEL INJECTOR (N52T)**.

13 53 192 REMOVING AND INSTALLING/REPLACING A PRESSURE LINE (BOSCH HIGH-PRESSURE PUMP) (N55)

Special tools required:

cardiagn.com

- 32 1 270
- 13 0 160

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

WARNING: **Wear full face guard and protective gloves.**
Fuel can emerge spontaneously at high speed when the high pressure line is released!

IMPORTANT:

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

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

Necessary preliminary work:

- Remove IGNITION COIL of corresponding cylinder.

NOTE:

- **Ignition coils must not be fouled by fuel!**

  The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail! It is therefore essential to protect the spark plug slot against ingress of fuel with a cloth!

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

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

WARNING: **Wear full face guard and protective gloves.**
Fuel can emerge spontaneously at high velocity from the fuel injectors!
To reduce the fuel pressure, place rag over fuel injector and carefully tap against the fuel injector with a spanner.
There is a risk of injury if the fuel pressure is not reduced!

NOTE: **The following description applies to all pressure lines.**
Release the pressure line on the rail first. To reduce existing fuel pressure if

cardiagn.com

necessary. Fuel must not get into the spark plug slot. Then disconnect the pressure line from the injector.

Unscrew nuts (2).

Disconnect pressure line (1).

Installation note:

Reinstall rubber mount (3).

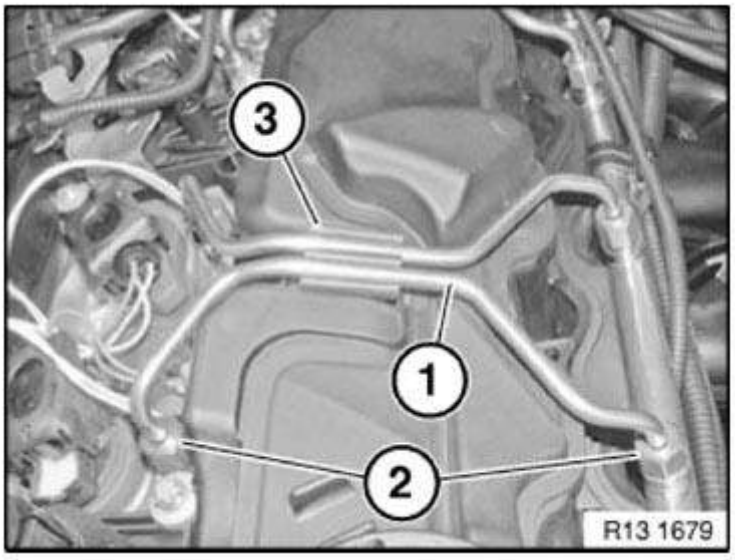


Fig. 104: Identifying Pressure Line, Rubber Mount And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

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

Seal rail and injector with a matching plug (1) from special tool kit 1 **32 1 270** .

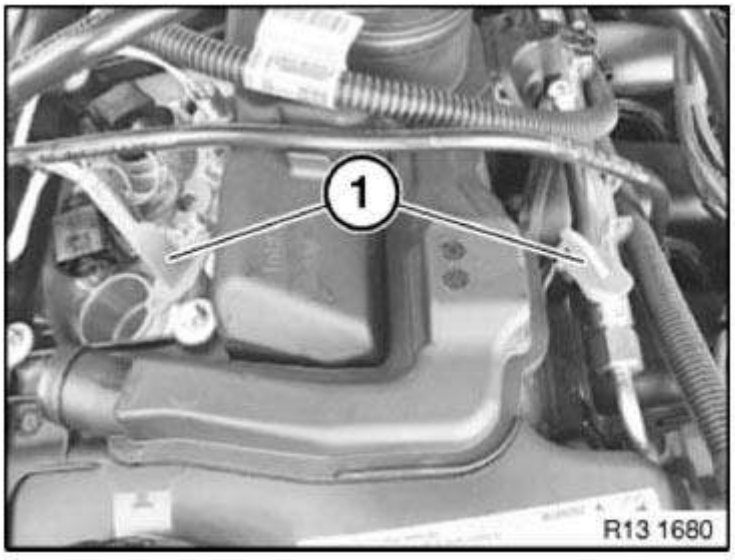


Fig. 105: Identifying Matching Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Seal pressure line (1) with a matching plug from special tool kit (2) **32 1 270** .

cardiagn.com

When reinstalling lines, lubricate the thread and bearing face of the ball with a little transmission oil or grease! When they are installed for the first time the nuts have a coating of lubricant (only effective once). Penetration of lubricant into the fuel-conducting area should be avoided.

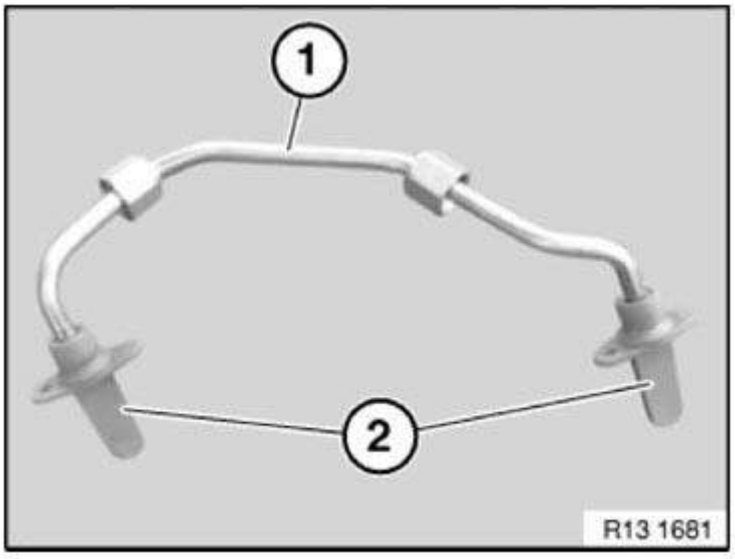


Fig. 106: Identifying Pressure Line And Matching Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Connect pressure line (1) without tension only.
To ensure distortion-free installation of the pressure line and to avoid damaging the thread, it must be possible for both nuts to be screwed on easily by hand!

IMPORTANT: If the ball bush is not in the center of the sealing cone of the rail and injector when the pressure line is attached, the pressure lines must be relieved of tension.
If pressure lines are tensioned, see further procedure in the section:
Relieving tension on pressure lines and fitting.

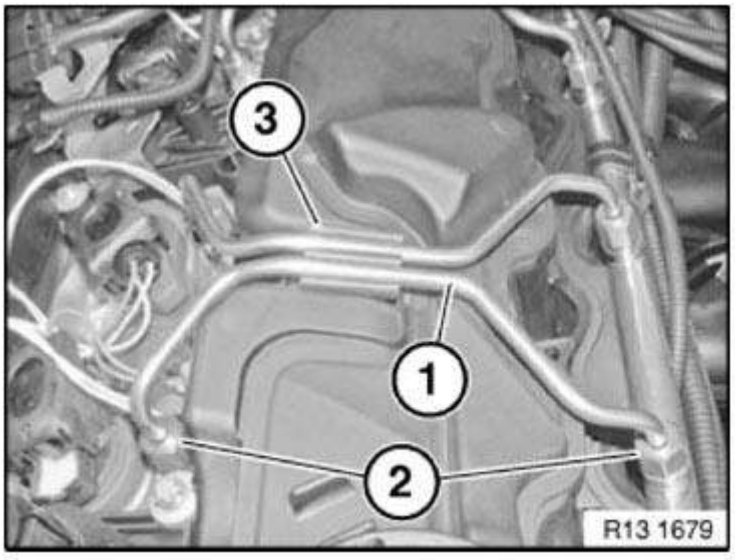


Fig. 107: Identifying Pressure Line And Sealing Cone
Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening sequence:

NOTE: Reset special tool in good time to prevent bending of pressure lines.

Insert pressure line (1), install together with rubber mount (3) and fit nuts (2) hand-tight only.

cardiagn.com

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

Tighten down nuts with special tool 3 **13 0 160** .

Tightening torque: **13 53 9AZ** .

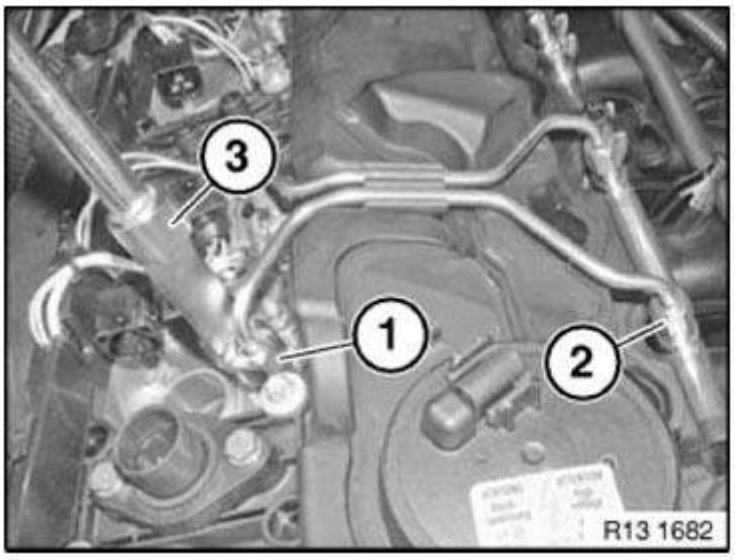


Fig. 108: Identifying Pressure Line And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Relieving tension on pressure lines and fitting:

If the ball bush is not in the center of the sealing cone of the rail and injector when the pressure line is attached, the pressure lines must be relieved of tension. To relieve tension on the pressure line, the pressure line of the adjacent injector on the same hold-down device must also be released and the hold-down device must be released.

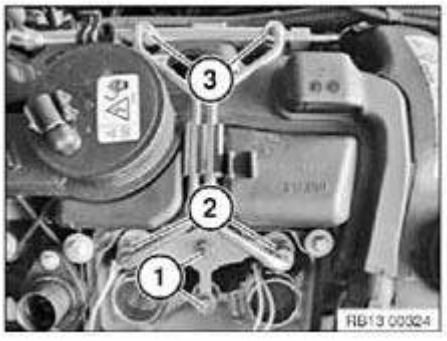


Fig. 109: Identifying Pressure Lines Screws And Union Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

1. Release union nuts (2) on injectors.
2. Release union nuts (3) on rail.
3. Release screws (1) on hold-down device.
4. Fit pressure lines hand-tight.
5. Tighten screws (1) on hold-down device

   Tightening torque: **13 53 6AZ** .

6. Tighten nuts (2) on injectors.

cardiagn.com

Tightening torque: **13 53 9AZ** .

7. Tighten nuts (3) on rail.

   Tightening torque: **13 53 9AZ** .

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 192 REMOVING AND INSTALLING/REPLACING A PRESSURE LINE (CONTINENTAL HIGH-PRESSURE PUMP) (N55)

Special tools required:

- **13 0 161**
- **32 1 270**

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

WARNING: **Wear full face guard and protective gloves.**
Fuel can emerge spontaneously at high speed when the high pressure line is released!

IMPORTANT:

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

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

Necessary preliminary work:

- Remove **IGNITION COIL** of corresponding cylinder.

NOTE:

- **Ignition coils must not be fouled by fuel!**

  The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail! It is therefore essential to protect the spark plug slot against ingress of fuel with a cloth!

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

cardiagn.com

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

WARNING: **Wear full face guard and protective gloves.**
Fuel can emerge spontaneously at high velocity from the fuel injectors!
To reduce the fuel pressure, place rag over fuel injector and carefully tap against the fuel injector with a spanner.
There is a risk of injury if the fuel pressure is not reduced!

NOTE: **The following description applies to all pressure lines.**
First disconnect the pressure lines from the rail. To reduce existing fuel pressure if necessary. Fuel must not get into the spark plug slot. Then disconnect the pressure line from the injector.

Unscrew nuts (1).

Disconnect pressure line (2).

Installation note:

Reinstall line damper (3).

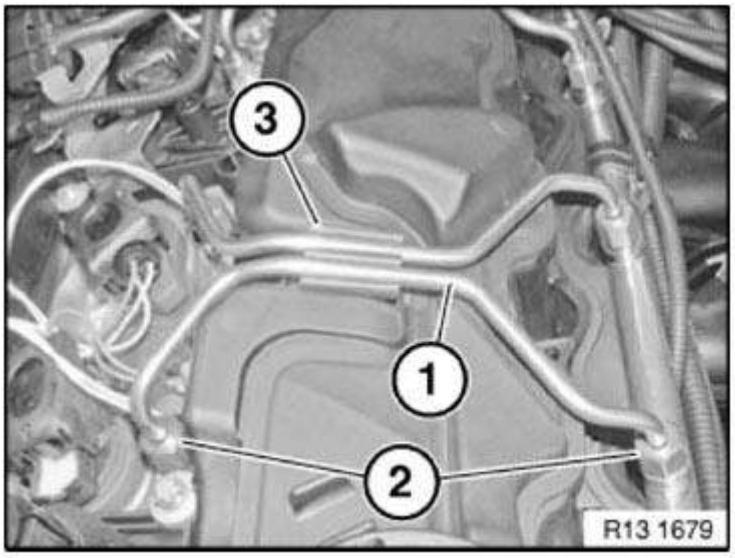


Fig. 110: Identifying Pressure Line, Nuts And Damper
Courtesy of BMW OF NORTH AMERICA, INC.

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

Seal rail and injector with a matching plug from special tool kit (1) **32 1 270** .

cardiagn.com

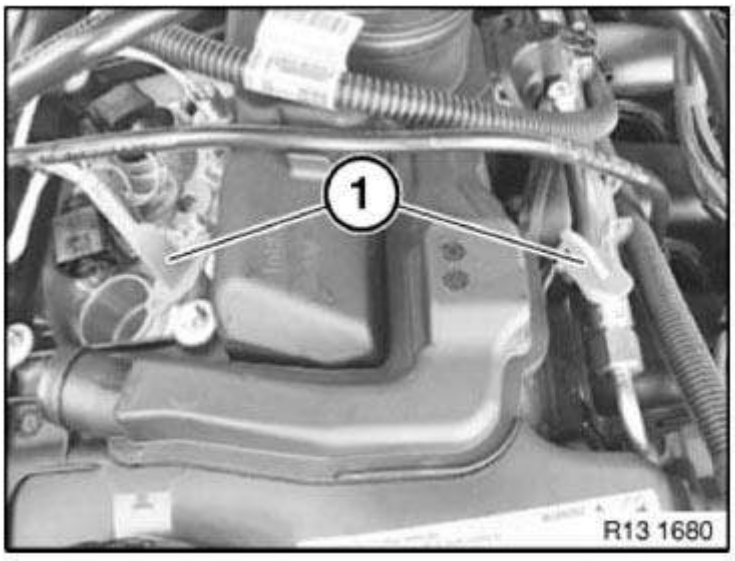


Fig. 111: Identifying Matching Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Seal pressure line (1) with a matching plug from special tool kit (2) **32 1 270** .

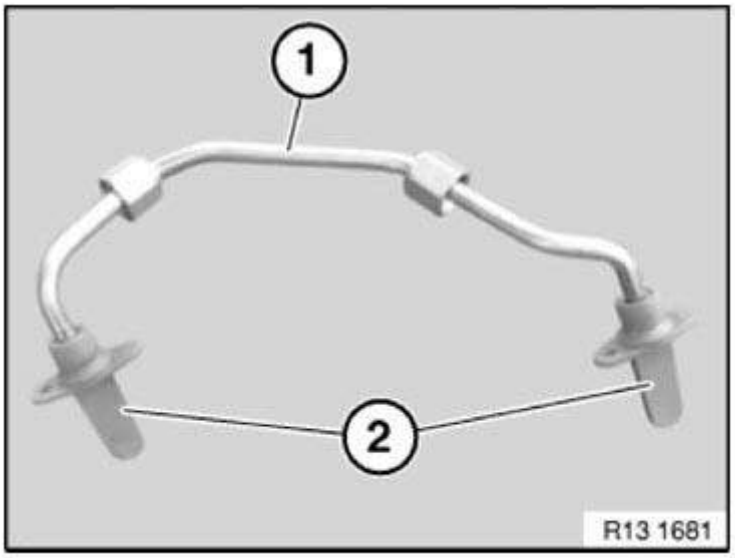


Fig. 112: Sealing Pressure Line
Courtesy of BMW OF NORTH AMERICA, INC.

Installing pressure line:

Installation of pressure line is described separately from removal.

Same procedure for all pressure lines.

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

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

cardiagn.com

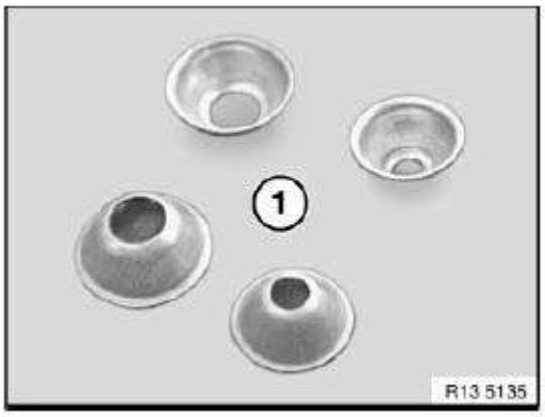


Fig. 113: Identifying Copper Seals
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Connect pressure line (1) without tension only.
To ensure distortion-free installation of the pressure line and to avoid damaging the thread, it must be possible for both nuts to be screwed on easily by hand!
Connect pressure line (1) and **hand-tighten** nuts (2) only.

Installation note:

Reinstall line damper (3).

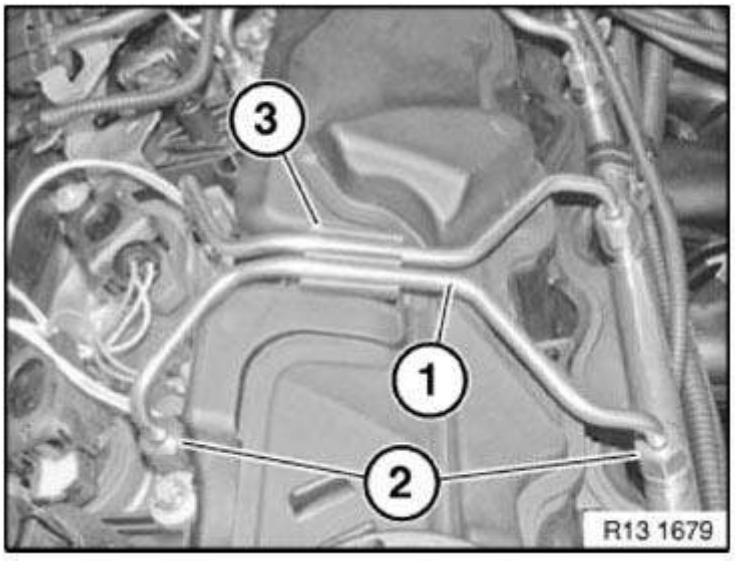


Fig. 114: Identifying Pressure Line, Damper And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening sequence:

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

Tighten down nuts with special tool 3 **13 0 161** .

Tightening torque: **13 53 9AZ** .

NOTE: **Reset special tool in good time to prevent bending of pressure lines.**

cardiagn.com

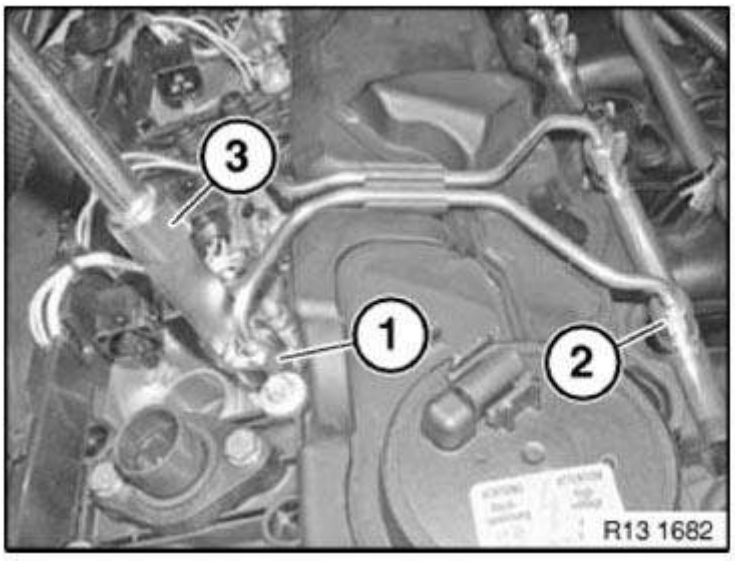


Fig. 115: Identifying Nut On Injector And Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 315 REMOVING AND INSTALLING/REPLACING ALL INJECTORS IN FUEL INJECTION SYSTEM (N47 D20 O1)

Special tools required:

- 13 5 210
- 13 5 214
- 13 5 215

IMPORTANT: When working on the oil, coolant or fuel circuit, you must protect the alternator against contamination.
Cover alternator with suitable materials.

- Use only fluff-free cloths
- Remove all traces of dirt contamination before dismantling lines or separate components

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Necessary preliminary tasks:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Detach ALL LEAKAGE OIL LINES from the injectors.
- Remove ALL PRESSURE LINES to injectors.
- Seal all fuel system openings with protective caps.

Release screw (1) of clamping claw.

cardiagn.com

Remove clamping claw, screw and centering ring.

Pull out injector with light rotational movements.

Copper sealing ring must be replaced after clamping jaw is released.

Installation note:

Retighten clamping claw rest (cylinder head cover mounting).

Tightening torque: **13 53 5AZ** .

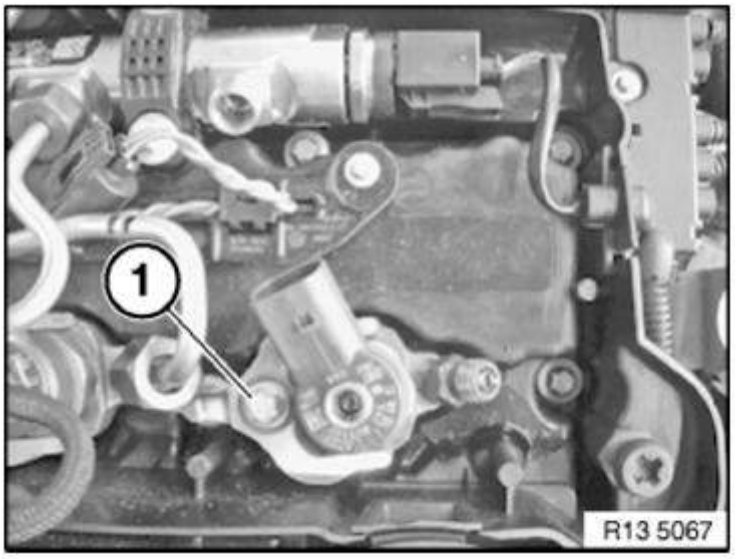


Fig. 116: Identifying Screw Of Clamping Claw
Courtesy of BMW OF NORTH AMERICA, INC.

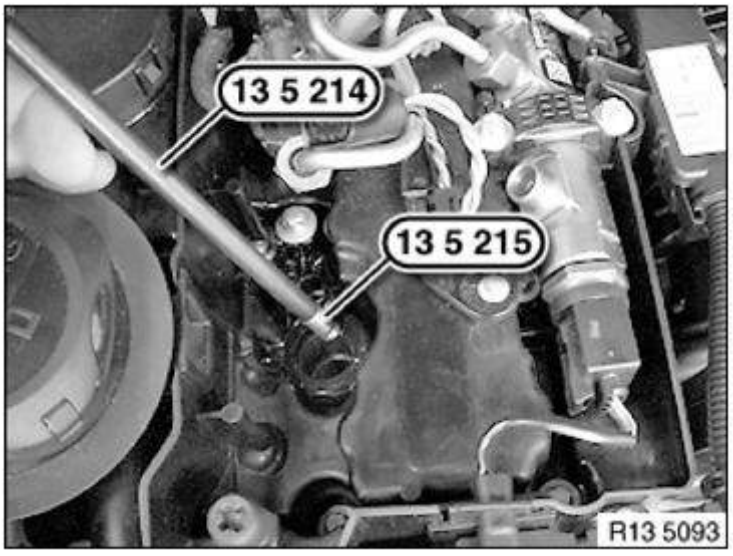
During assembly, make sure washer is correctly positioned in relation to screw centering in order to align clamping claw. Secure clamping claw in installation position to jointing torque.

Tightening torque: **13 53 1AZ** .

Cleaning injector slots:

Copper sealing ring must not remain in injector slot.

Place sealing cap **13 5 215** with mounting rod **13 5 214** into injector slot. Remove fitting rod.



cardiagn.com

Fig. 117: Placing Sealing Cap (13 5 215)
Courtesy of BMW OF NORTH AMERICA, INC.

Place the cleaning tool with brush head **13 5 210** into injector slot.

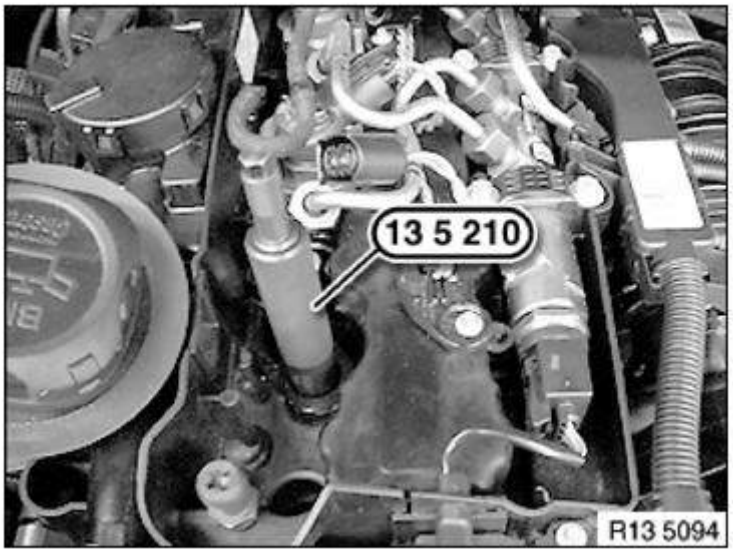


Fig. 118: Identifying Special Tool (13 5 210)
Courtesy of BMW OF NORTH AMERICA, INC.

Using a suitable tool (SW8) move brush head up and down in the injector slot in rotating movements. After removing the cleaning tool, blow out the injector slot with compressed air.

IMPORTANT: Wear safety goggles and cover injector slot with cleaning cloth or similar.

Remove seal plugs **13 5 215** again with mounting rod **13 5 214** .

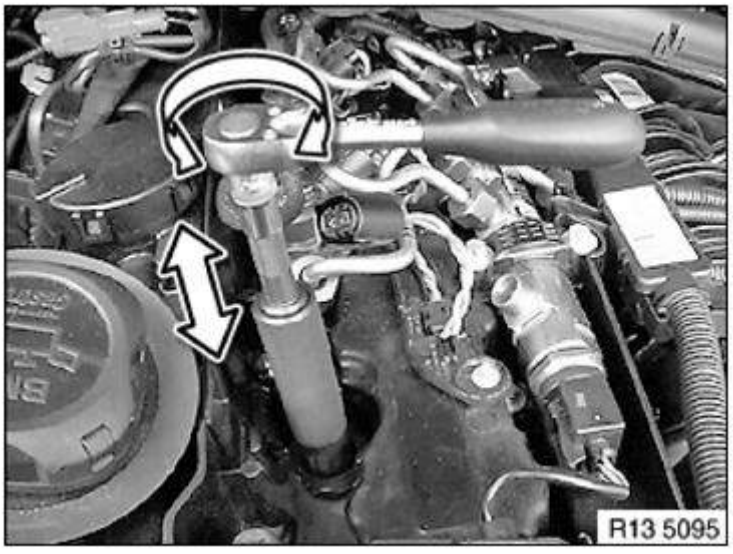


Fig. 119: Moving Brush Head
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Replace copper sealing ring (1) on injector (2) without fail.

Installation note:

Lightly lubricate injectors with highly heat-resistant grease before installing in injector slot (above copper sealing ring up to injector slot end (refer to **CONSUMABLES 4.5**).

cardiagn.com

Observe installation position of high-pressure connection.

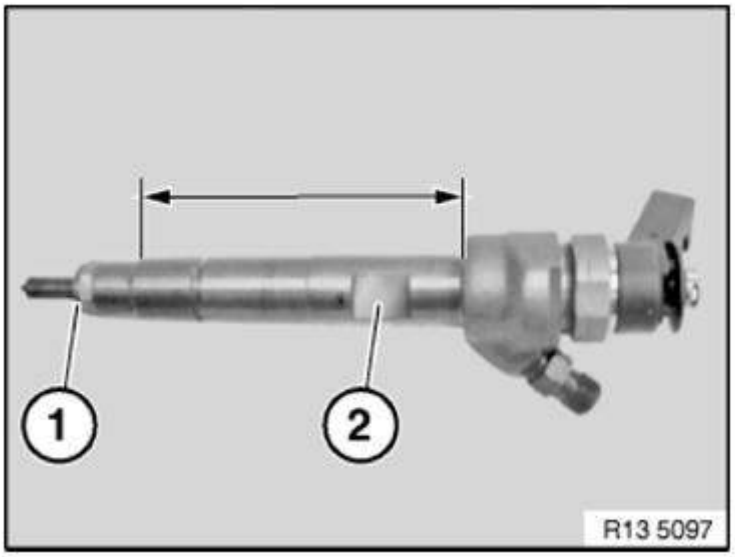


Fig. 120: Identifying Copper Sealing Ring On Injector
Courtesy of BMW OF NORTH AMERICA, INC.

The adjustment values must be read off in each case when new injectors are installed.

The adjustment value (7-position letter/number code) is engraved on each injector.

The digits/letters correspond to the installation location (cylinder) of the new injectors.

- Select "DDE".
- Select "Adjustment, injection quantity compensation"
- Select "Test schedule"

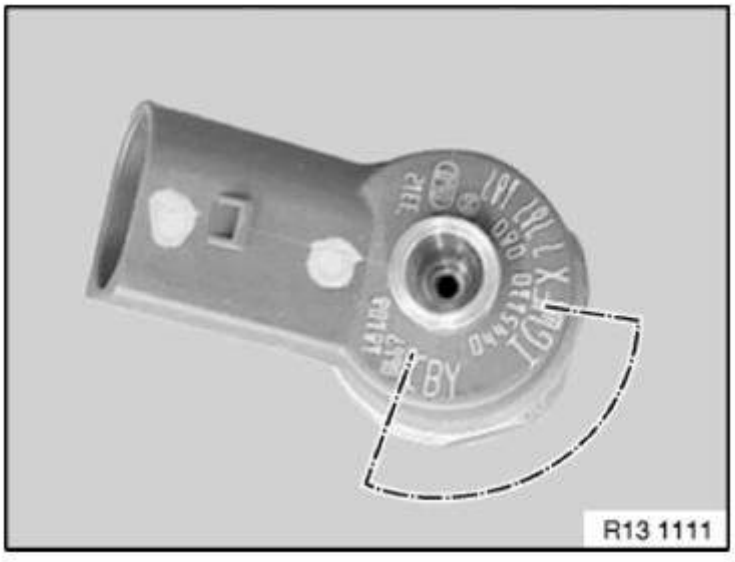


Fig. 121: Identifying Injectors Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

- The adjustment must be entered for each cylinder on which an injector has been replaced.

It is necessary to adjust the new injectors to ensure their full operability.

NOTE: **Assemble engine.**
Check stored fault messages.

cardiagn.com

Delete fault memory
Check fuel system for tightness.

13 53 310 REMOVING AND INSTALLING/REPLACING AN INJECTOR (N55)

Observe **WARNINGS ON REMOVAL OF THE INJECTORS** without fail!

IMPORTANT:
There are two different injector versions and hold-down device versions for the N55 engine.
A mixed installation of the components (hold-down device, spark plug shafts, injectors, cylinder heads and screws) between the two hold-down device versions is not possible/permitted!
Removal and installation of the various injectors are described separately according to the hold-down device version.
The hold-down device version must be identified beforehand in order to select the correct repair instructions.
Remove acoustic cover. See **12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55)** .

The bottom hold-down device version can be found on the electromagnetic compatibility panel (1) installed above the injectors.

- **REMOVING AND INSTALLING INJECTOR** up to engine number **14407684** .
- **Only E70, E71:**

  Removing and installing injector up to engine number **02167648** .

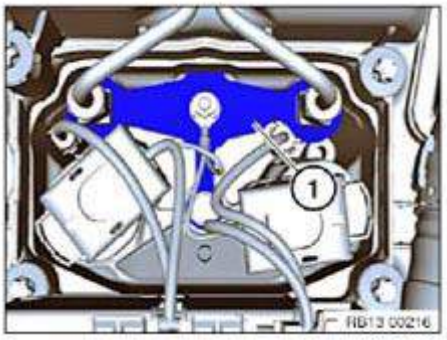


Fig. 122: Identifying Electromagnetic Compatibility Panel (Bottom)
Courtesy of BMW OF NORTH AMERICA, INC.

The top hold-down device version can be found on the hold-down device installed on top (1).

- **REMOVING AND INSTALLING INJECTOR** from engine number **14407685** .
- **Only E70, E71:**

  Removing and installing injector from engine number **02167649** .



cardiagn.com

Fig. 123: Identifying Electromagnetic Compatibility Panel (Top)
Courtesy of BMW OF NORTH AMERICA, INC.

13 53... REMOVING AND INSTALLING/REPLACING AN INJECTOR N55 UP TO ENGINE NUMBER 14407684 (BOTTOM HOLD-DOWN DEVICE VERSION)

Special tools required:

- 00 9 170
- 13 0 191
- 13 0 270
- 13 0 281
- 13 0 282
- 13 0 283

Make sure you strictly observe THE WARNINGS ON REMOVING THE INJECTORS!

Necessary preliminary tasks:

- Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on removal).
- Remove IGNITION COIL of corresponding cylinder.
- Disconnect PRESSURE LINES of corresponding cylinder.

NOTE: The following description applies to all injectors cylinder 1-6.

Slacken nut (1).

Tightening torque: 12 90 5AZ .

Remove earth cable.

Unlock connector (2) from injectors and detach.

Release screw plug (3) and remove.

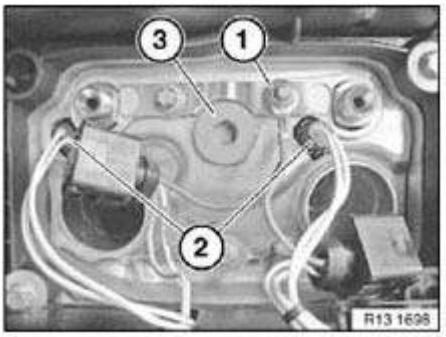


Fig. 124: Identifying Connector, Screw Plug And Slacken Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove clamping plate (2) and counter support bridge (3).

Clamping plate (2) is a disposable part and must be replaced following removal.

Remove EMC plate (4).

cardiagn.com

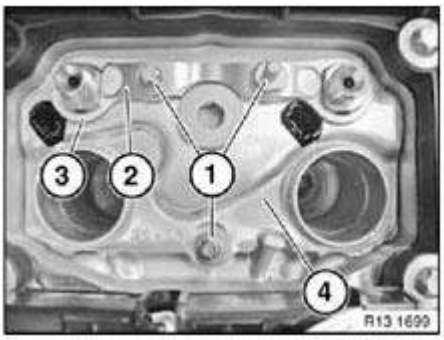


Fig. 125: Identifying Clamping, EMC Plate And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Feed out hold-down device (2) and remove.

Lift injectors (3) out of cylinder head and remove.

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

Mark injectors.

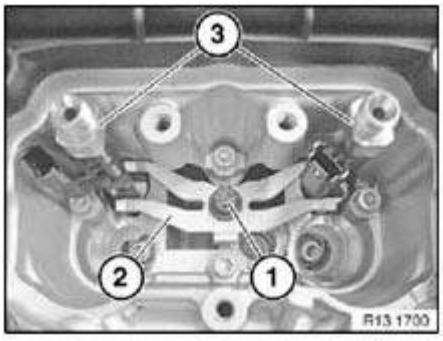


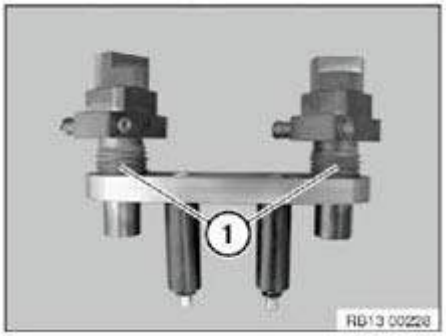
Fig. 126: Identifying Injectors, Hold-Down Device And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Procedure in event of stuck injector:

Use special tool **13 0 270** to remove injectors that are stuck.

Lightly oil pull-out thread (1) and unscrew completely (see **Fig. 127**) before using the special tool.

IMPORTANT: Pull-out thread (1) is a left-hand thread!



cardiagn.com

Fig. 127: Identifying Thread
Courtesy of BMW OF NORTH AMERICA, INC.

Fit special tool (1) **13 0 270** on injector slot. Join screws (2) to injector slot by a few threads. Screw in pull-out thread (4) until it is possible to screw the threaded sleeves (3) onto the injectors. Screw threaded sleeves (3) onto injectors and tighten down.

Tighten down screws (2).

Tightening torque: **13 53 13AZ** .

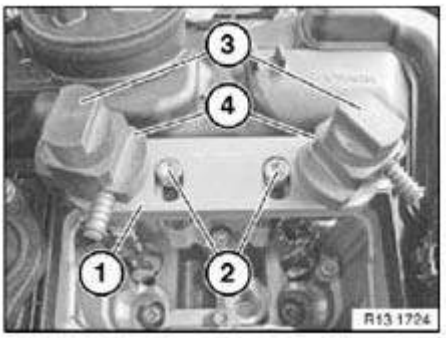


Fig. 128: Identifying Threaded Sleeves And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Set torque wrench (1) to **5 Nm** clockwise rotation. Together with special tool **13 0 270** this corresponds to a tensile force of max. 2000 N. The injector must be **replaced** if the torque wrench is activated when the injector is pulled out!

Fit torque wrench (1) and special tool (2) **00 9 170** on square head (3) of special tool **13 0 270** .

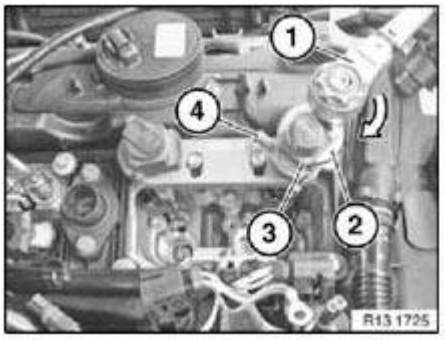


Fig. 129: Turning Torque Wrench Clockwise
Courtesy of BMW OF NORTH AMERICA, INC.

Turn torque wrench (1) in clockwise direction until the injector is pulled out.

Make sure that retaining pin (4) does not touch the cylinder head cover; if necessary, press the retaining pin back. **Risk of damage!**

After removing, fit protective caps (1 and 2) to injector tip and fuel line connection.

Installation note:

When installing a new injector:

- Replace decoupling element (3).

cardiagn.com

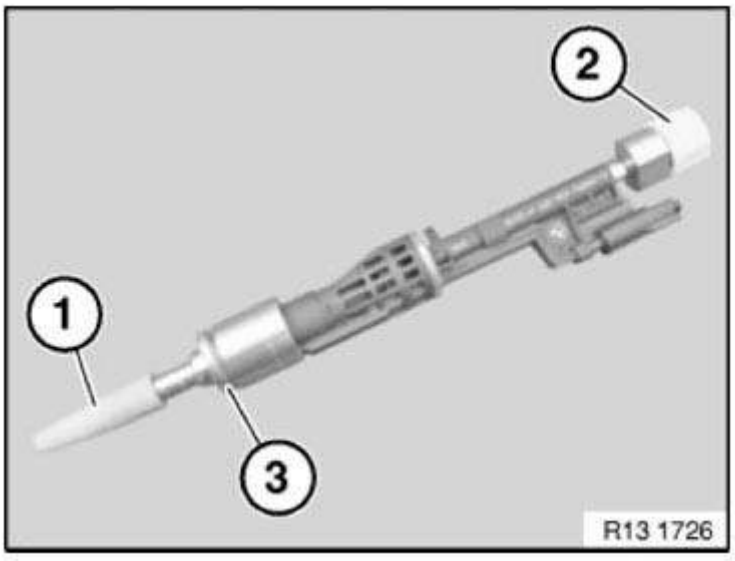


Fig. 130: Identifying Protective Caps And Decoupling Element
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

When reusing fuel injector:

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

  A PTFE sealing ring which has been installed in the cylinder head must be renewed before the injector is reinstalled.

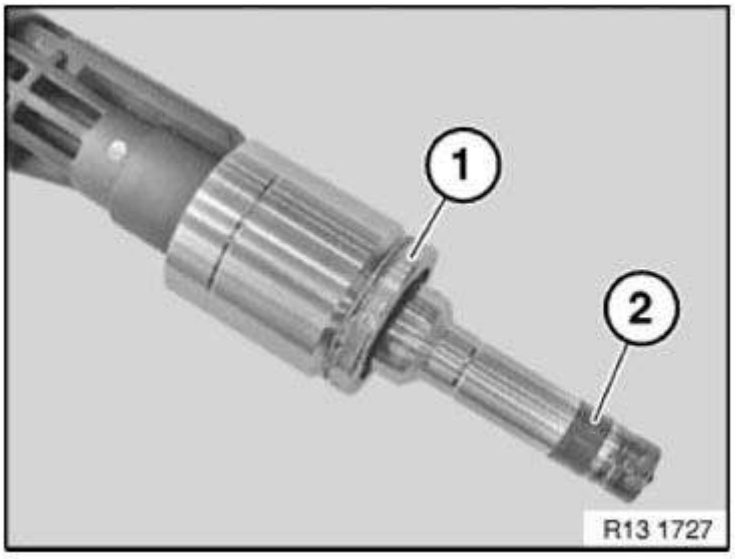


Fig. 131: Identifying Decoupling Element And PTFE Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Renew the PTFE sealing ring:

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

Avoid mechanical contact with injector tip (2).

cardiagn.com

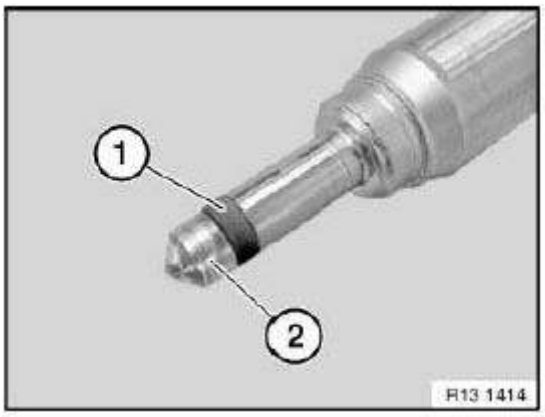


Fig. 132: Identifying PTFE Seal And Injector Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Remove PTFE sealing ring (2) with special tool (3) **13 0 191** from injector (1).

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

Do not clean injector tip.

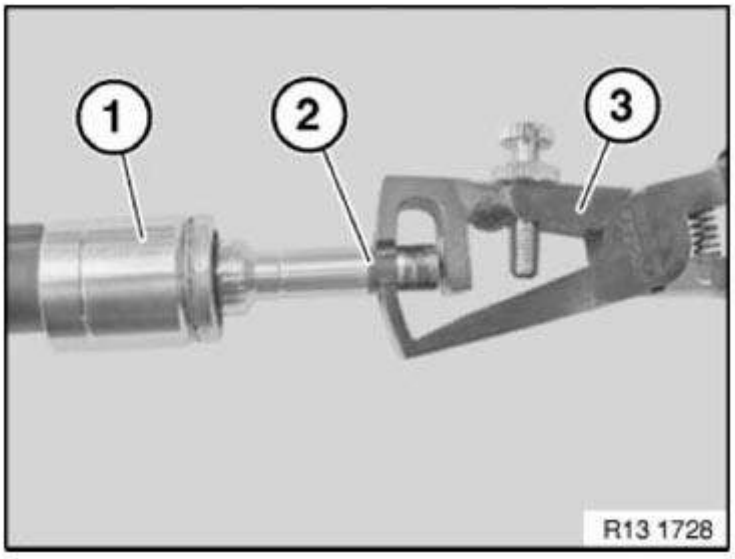


Fig. 133: Removing PTFE Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Slide new PTFE sealing ring (1) onto mounting taper (2) **13 0 283** .

cardiagn.com

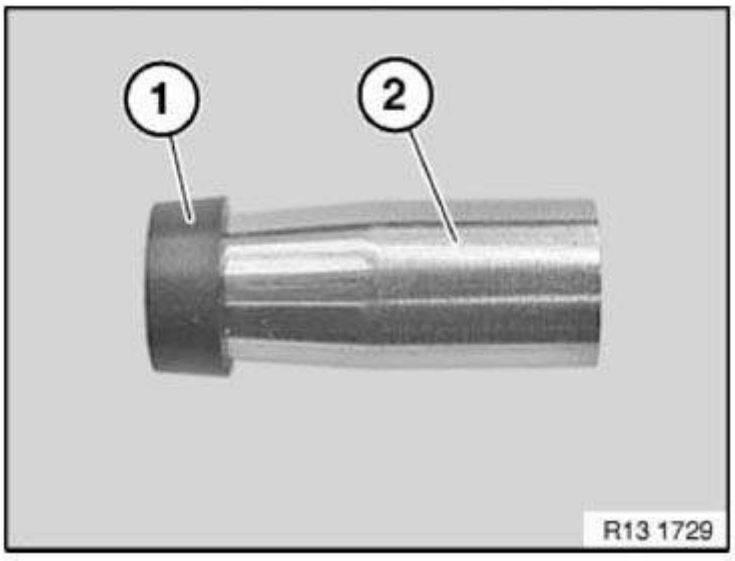


Fig. 134: Identifying PTFE Sealing Ring And Mounting Taper
Courtesy of BMW OF NORTH AMERICA, INC.

Mount PTFE sealing ring (1) with mounting taper (2) **13 0 283** onto injector tip (3).

NOTE:

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

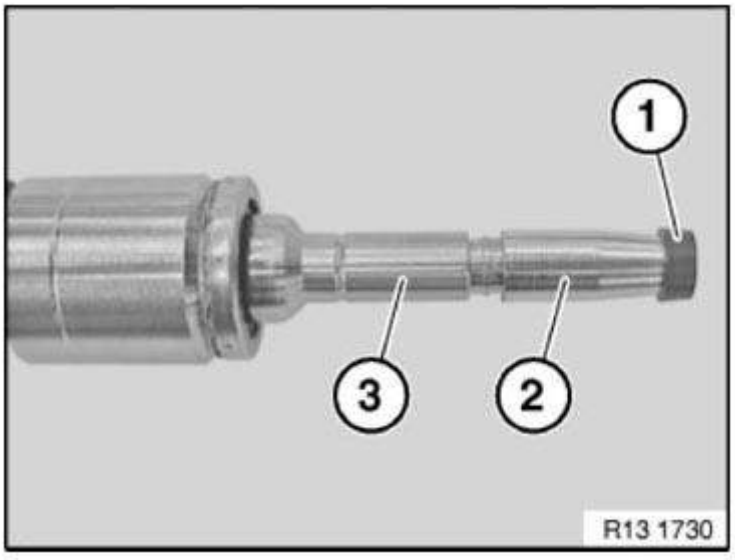


Fig. 135: Identifying PTFE Sealing Ring And Injector Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Using special tool (1) **13 0 281** push PTFE sealing ring into injector groove (3).

cardiagn.com

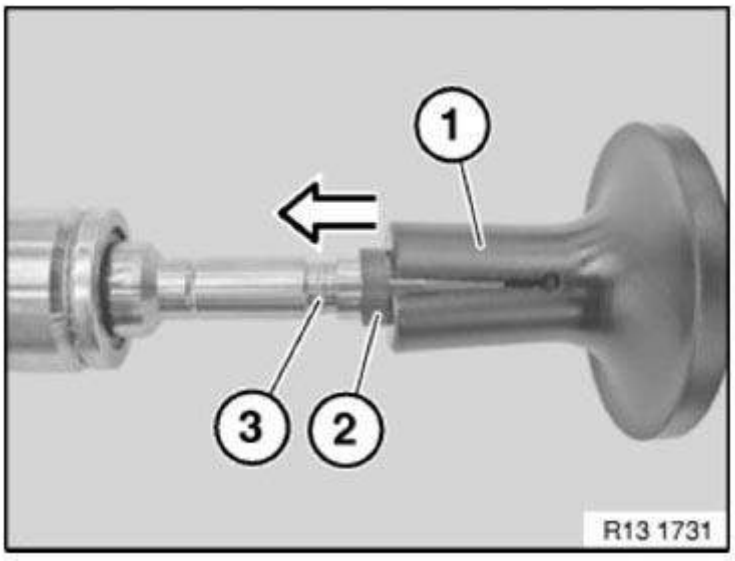


Fig. 136: Pushing PTFE Sealing Ring Into Injector Groove
Courtesy of BMW OF NORTH AMERICA, INC.

To bring the widened PTFE sealing ring to installation size, push special tool (1) 13 0 282 as far as it will go onto injector (2).

Do not use any lubricating agents.

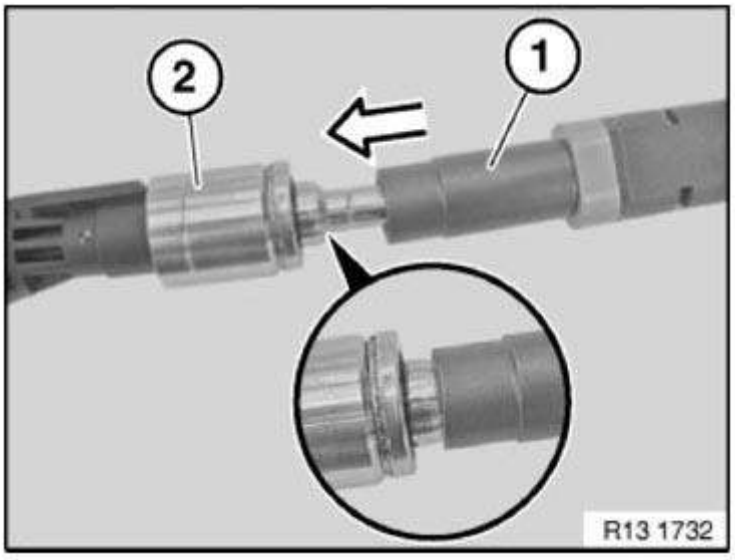


Fig. 137: Pushing Special Tool On Injector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Pull mounting tip (1) of special tool 13 0 282 towards rear to release mounting taper (2) 13 0 281 .**

cardiagn.com

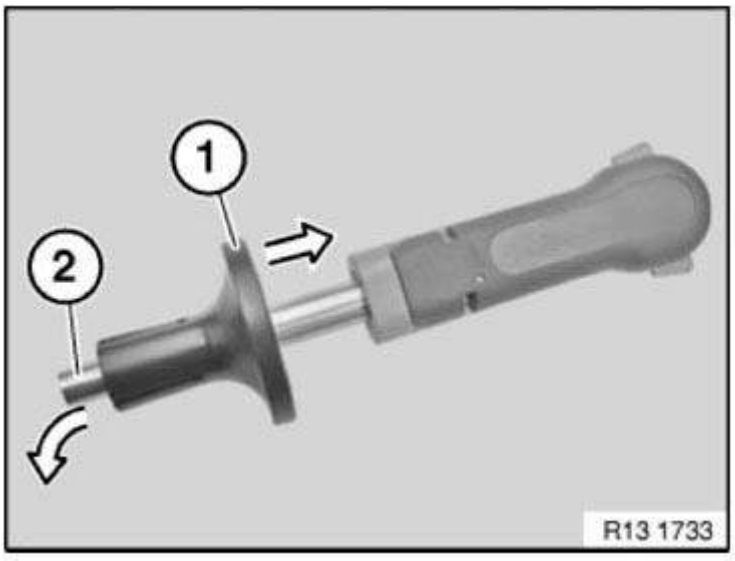


Fig. 138: Pulling Mounting Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Installing injector:

Installation of injector is described separately from removal.

Before installing injector in engines that have been run:

IMPORTANT: Injectors must not be twisted to **6 Nm!**
The injector must be replaced if this value is exceeded!

- Check injector bore for dirt.

  Clean **only dirty** injector bores.

  Important - do not damage injector!

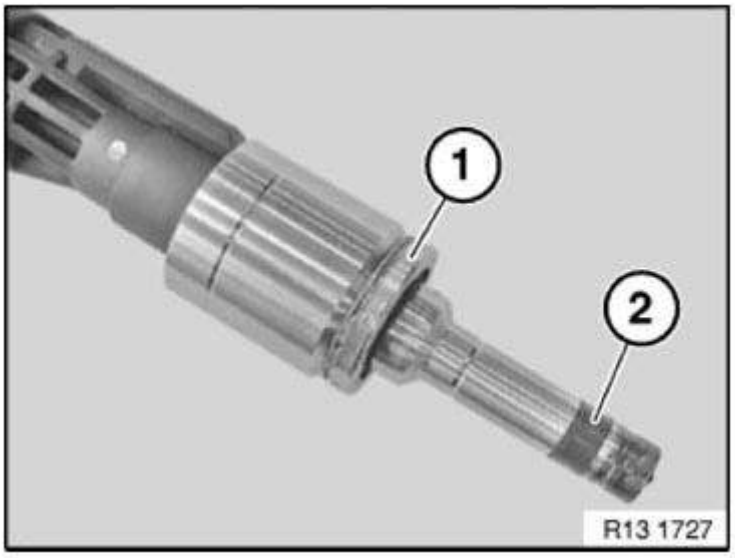


Fig. 139: Identifying PTFE Sealing Ring And Decoupling Element
Courtesy of BMW OF NORTH AMERICA, INC.

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

cardiagn.com

The PTFE sealing ring must then be replaced.

- Clean contact surfaces of decoupling elements (1) in cylinder head.
- Replace decoupling element (1).

IMPORTANT: Injection quantity compensation!

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

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

The adjustment value is printed with three digits - depending on the version - on the injector body.

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

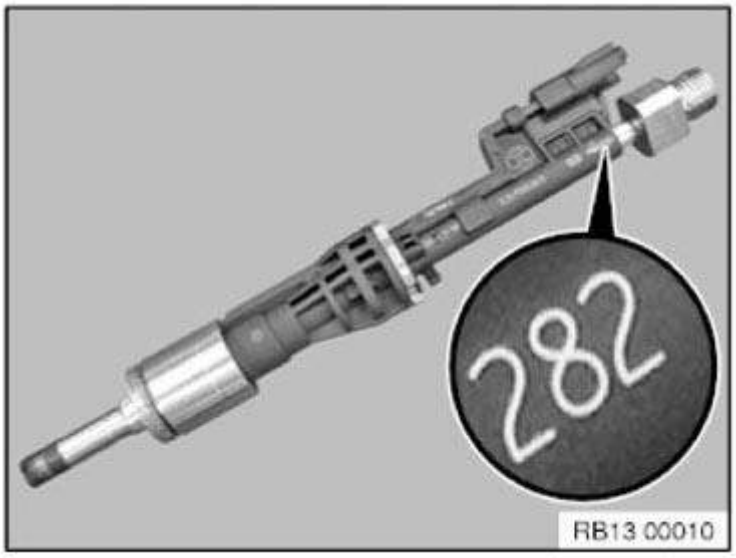


Fig. 140: Identifying Injector Adjustment Value (Cylinder Side)
Courtesy of BMW OF NORTH AMERICA, INC.

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

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

Injection quantity compensation is described at the end of these instructions.



cardiagn.com

Fig. 141: Identifying Injector Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

Installing injector:

Fit special tool (1) **13 0 270** on injector slot. Join screws (2) to injector slot by a few threads. Screw in pull-out thread (4) until it is possible to screw the threaded sleeves (3) onto the injectors. Screw threaded sleeves (3) onto injectors and tighten down.

Tighten down screws (2).

Tightening torque: **13 53 13AZ** .

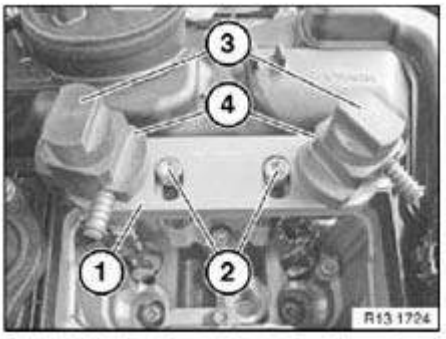


Fig. 142: Identifying Threaded Sleeves And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Set torque wrench (1) to **2 Nm** counterclockwise rotation.

Fit torque wrench (1) and special tool (2) **00 9 170** on square head (3) of special tool **13 0 270** .

Turn torque wrench (1) in counterclockwise direction until 2 Nm are reached.

Make sure that retaining pin (4) does not touch the cylinder head cover; if necessary, press the retaining pin back. **Risk of damage!**

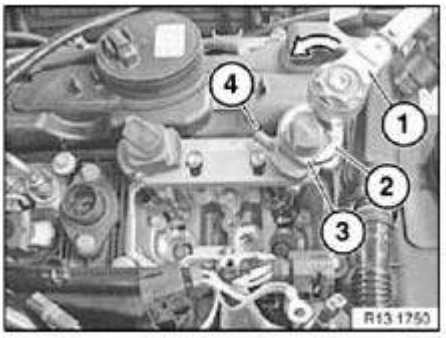


Fig. 143: Turning Torque Wrench Counterclockwise
Courtesy of BMW OF NORTH AMERICA, INC.

Install injectors (3).

Install hold-down device (2).

IMPORTANT: Tighten screw (1) hand-tight only so that hold-down device (2) is slack and if necessary injector can still be turned.

cardiagn.com

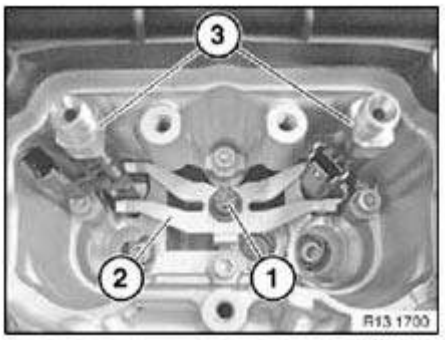


Fig. 144: Identifying Injectors, Hold-Down Device And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Align injectors.

IMPORTANT: Injectors must not be twisted to **6 Nm!**
The injector must be replaced if this value is exceeded!

Install EMC plate (1).

Insert counter support bridge (2).



Fig. 145: Identifying EMC Plate And Counter Support Bridge
Courtesy of BMW OF NORTH AMERICA, INC.

Insert clamping plate (1). Ensure correct installation position (see **Fig. 146**).

Insert screws (2) and tighten down hand-tight only.

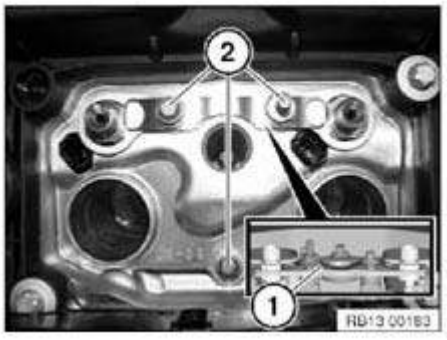


Fig. 146: Identifying Clamping Plate And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Install pressure lines on injectors and rail. Tighten nuts (1) and (2) manually only.

Installation note:

cardiagn.com

Reinstall line damper (3).

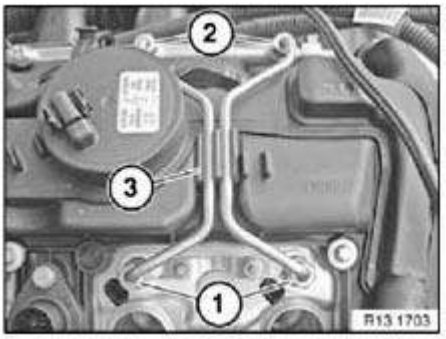


Fig. 147: Identifying Line Damper And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down hold-down screw (1) through EMC plate.

Tightening torque: **13 53 6AZ** .

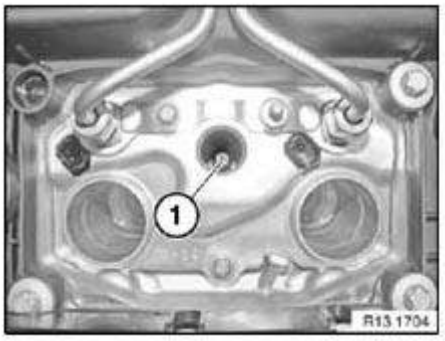


Fig. 148: Identifying Hold-Down Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down screws (1) of EMC plate uniformly.

Tightening torque: **13 53 11AZ** .

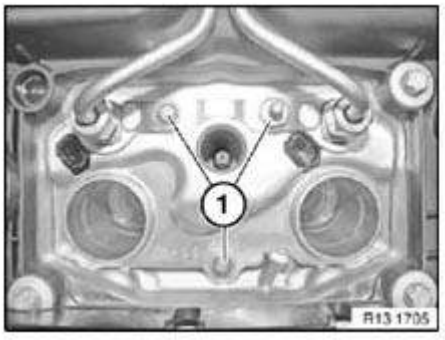


Fig. 149: Identifying Screws Of EMC Plate
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down screw plug (1) on EMC plate.

Tightening torque: **13 53 12AZ** .

cardiagn.com

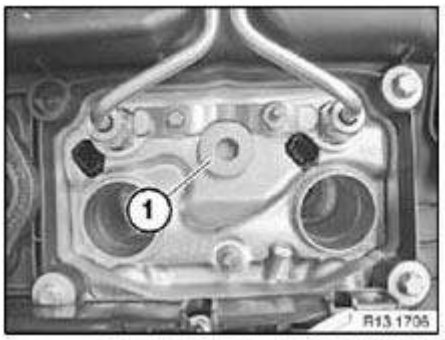


Fig. 150: Identifying Screw Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten down pressure lines on injectors (1).

Tightening torque: **13 53 9AZ** .

Then tighten down pressure lines (2) on the rail.

Tightening torque: **13 53 9AZ** .

Installation note:

Reinstall line damper (3).

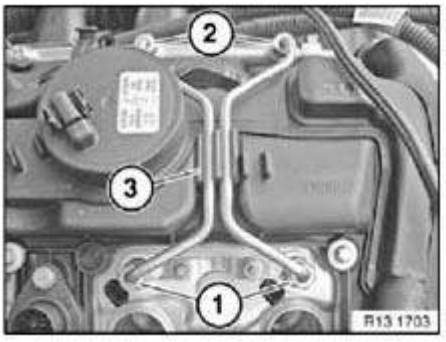


Fig. 151: Identifying Pressure Lines On Injectors And Line Damper
Courtesy of BMW OF NORTH AMERICA, INC.

Perform an injection quantity compensation:

The adjustment value is printed with three digits - depending on the version - on the injector body.

cardiagn.com

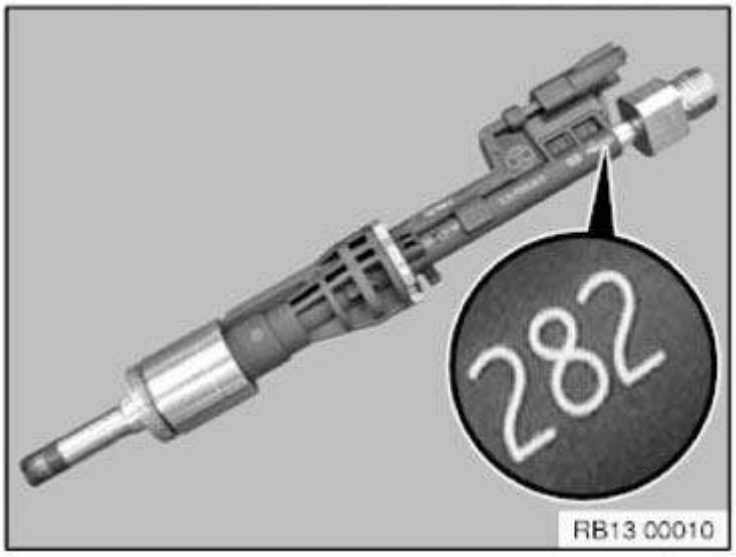


Fig. 152: Identifying Injector Body Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

- Connect BMW diagnosis system.
- Identify vehicle.
- Select "Function selection."
- Select "Service functions."
- Select "Engine electronics."
- Select "Adjustment functions."
- Select "Adjust injectors."
- Select "Test schedule"
- For each replaced injector, the adjustment value must be entered according to the installation location (cylinder).



Fig. 153: Identifying Injector Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

Clean spark plug slot.

Assemble engine.

Check fuel system for tightness.

cardiagn.com

Check function of DME.

13 53 332 REMOVING AND INSTALLING/REPLACING FEED LINE (BOSCH HIGH PRESSURE PUMP) (N55)

Special tools required:

- 13 5 020
- 32 1 270
- 13 5 160

WARNING: **Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on dismantling).**
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

Wear safety goggles.

IMPORTANT:

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

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

IMPORTANT:

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

Necessary preliminary tasks:

- Remove INTAKE PLENUM .

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

Unlock and detach vacuum line (1) from the vacuum pump.

Unlock and pull off connector (2) from the high pressure pump and connector (3) from the oil temperature sensor.

cardiagn.com

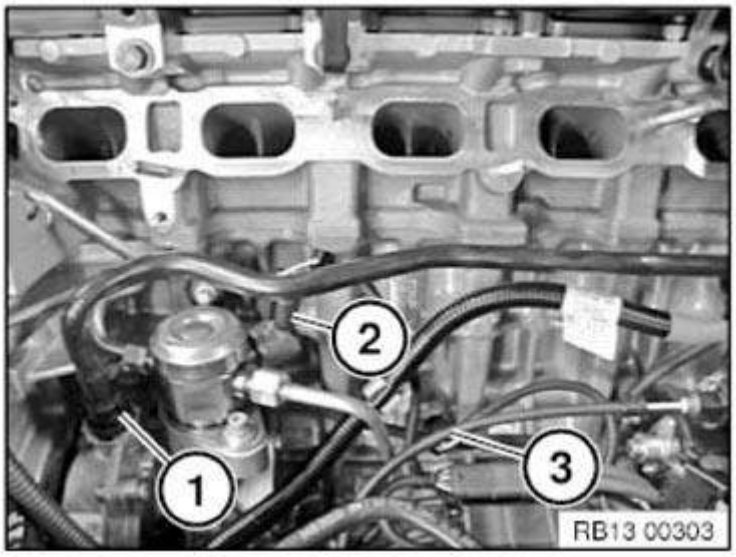


Fig. 154: Identifying Vacuum Line, High Pressure Pump And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) below cable channel (2).

Installation note:

Adhere to tightening/torque sequence.

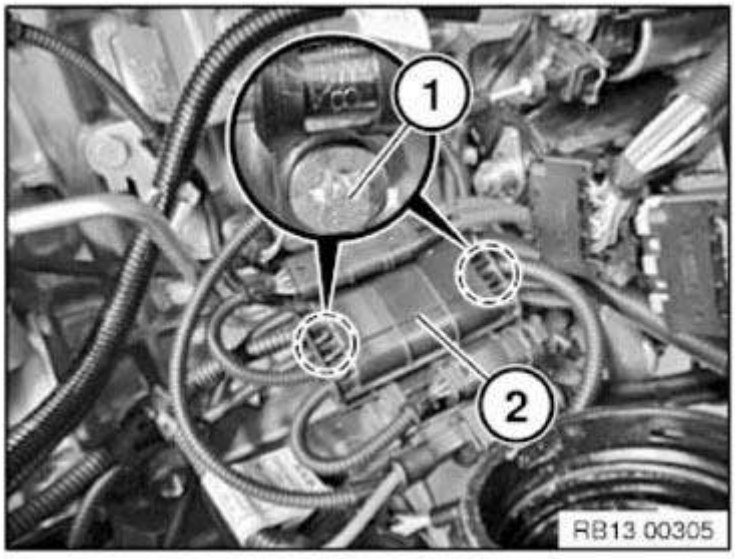


Fig. 155: Identifying Cable Channel And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release fuel hose (3) and seal with special tool (1) **13 5 160** .

Release nut (1) on high pressure pump.

Remove feed line (2).

Close off feed line and high pressure pump with a matching plug from set of special tools **32 1 270** .

cardiagn.com

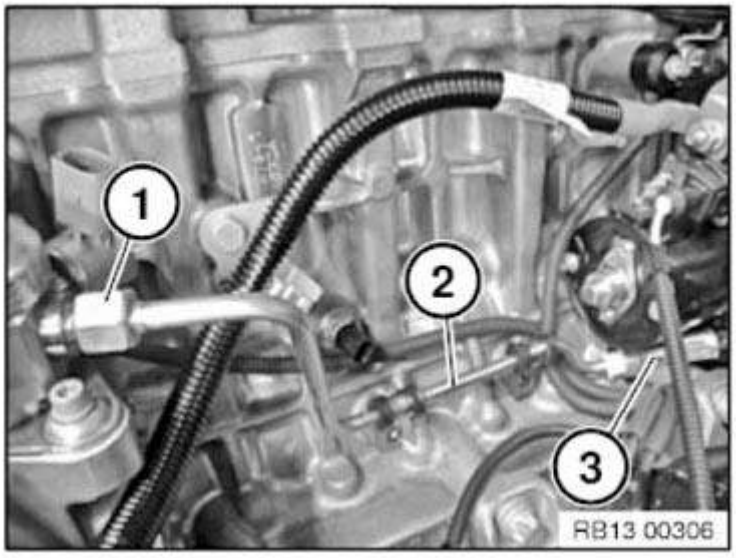


Fig. 156: Identifying Fuel Hose, Line And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Adhere to tightening/torque sequence.

First, fit feed line on high pressure pump and engine block only **hand-tight** . Do **not** connect fuel hose to the feed line yet.

Tighten screws (1) below the cable channel.

Tightening torque: **13 53 10AZ** .

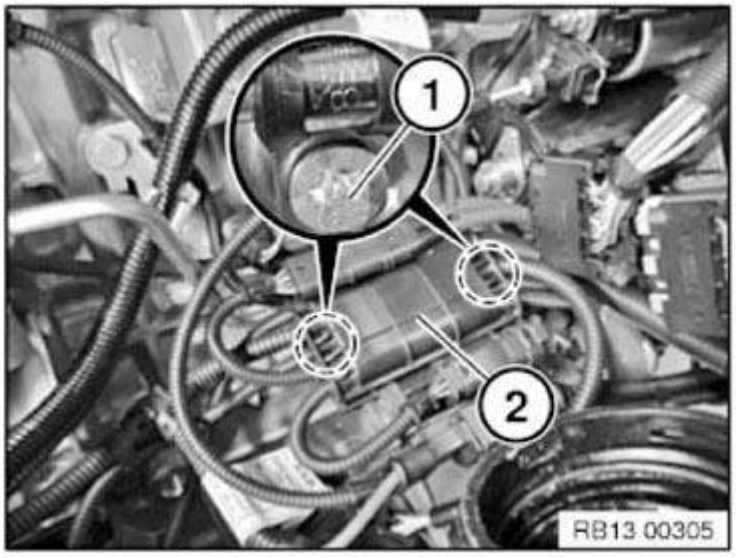


Fig. 157: Identifying Screws And Cable Channel
Courtesy of BMW OF NORTH AMERICA, INC.

Tighten union nut (1) with special tool **13 5 020** .

Tightening torque: **13 53 7AZ** .

Re-connect fuel hose (3) to feed line.

cardiagn.com

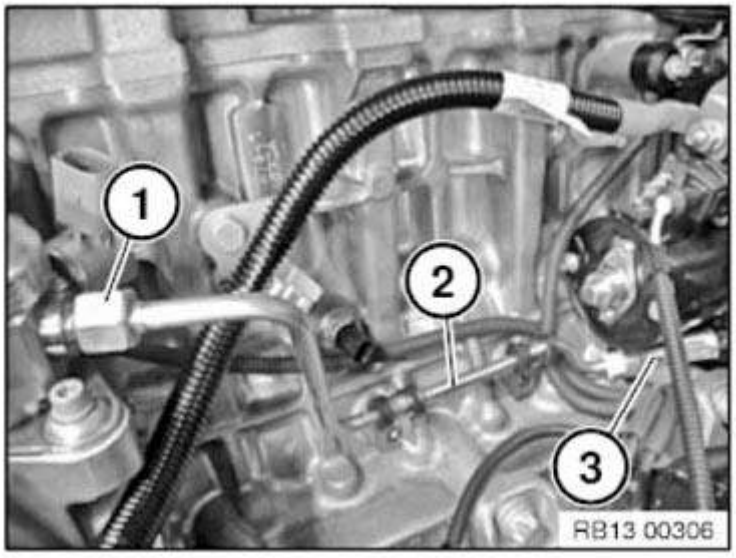


Fig. 158: Identifying Fuel Hose And Union Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 332 REMOVING AND INSTALLING/REPLACING FEED LINE (CONTINENTAL HIGH PRESSURE PUMP) (N55)

Special tools required:

- 13 5 020
- 13 5 161
- 13 5 162
- 32 1 270

WARNING: **Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on dismantling).**
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

Wear safety goggles.

IMPORTANT:

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

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

IMPORTANT:

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

cardiagn.com

Cover ignition coil with suitable means.

Necessary preliminary tasks:

- Remove **INTAKE PLENUM** .

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

Disengage connector (1) from the fuel low-pressure sensor, oil temperature sensor and the high pressure pump and remove.

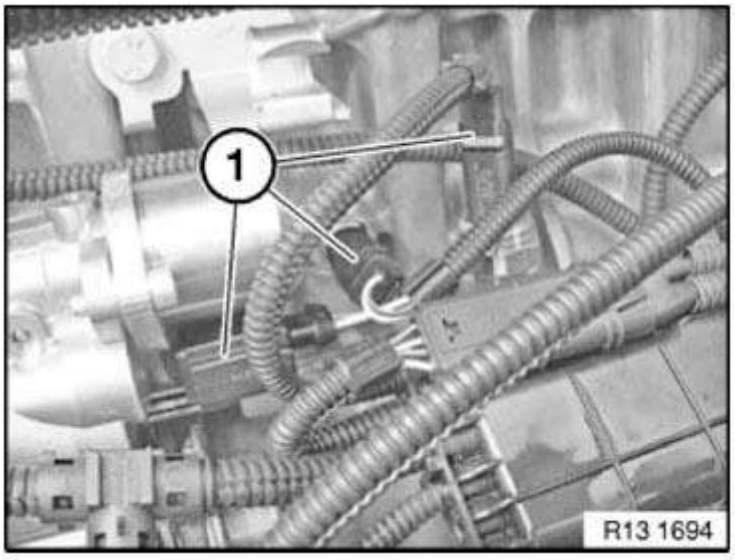


Fig. 159: Identifying Connector From Fuel Low Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Release fuel lines and seal off with special tools (1) **13 5 161** and (2) **13 5 162** .

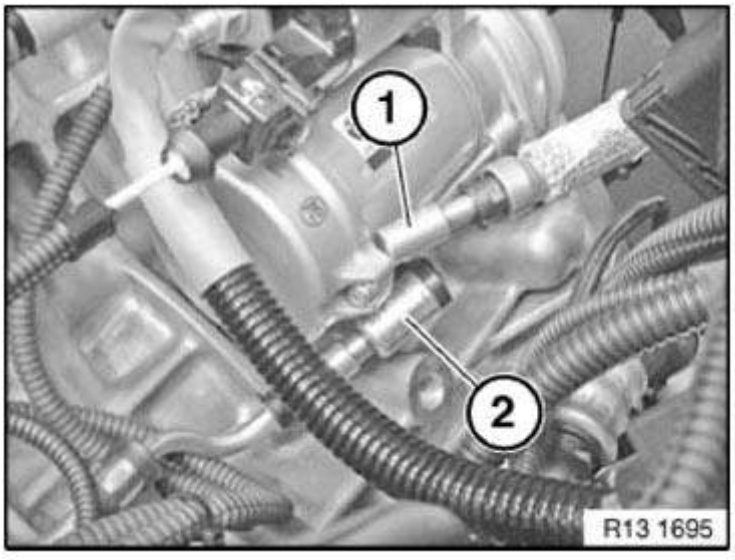


Fig. 160: Identifying Fuel Lines And Seal
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Release screws (1) below cable channel (2).

Installation note:

Adhere to tightening/torque sequence.

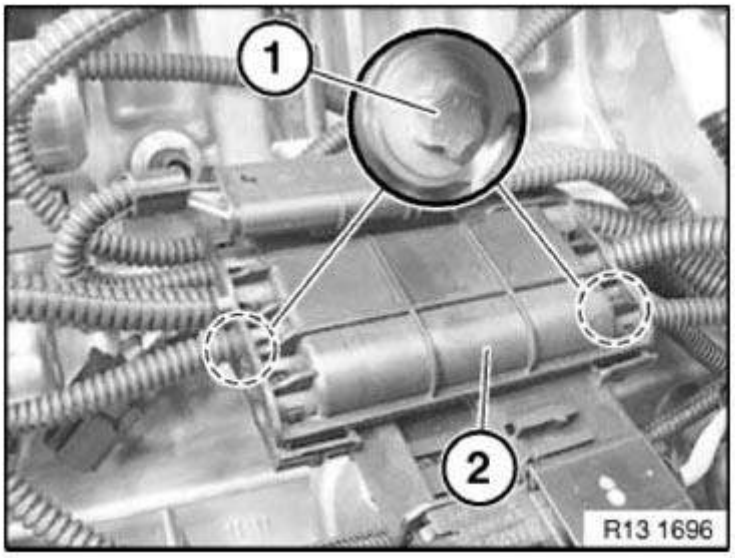


Fig. 161: Identifying Screws And Cable Channel
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) on high pressure pump.

Remove feed line (2).

Installation note:

Adhere to tightening/torque sequence.

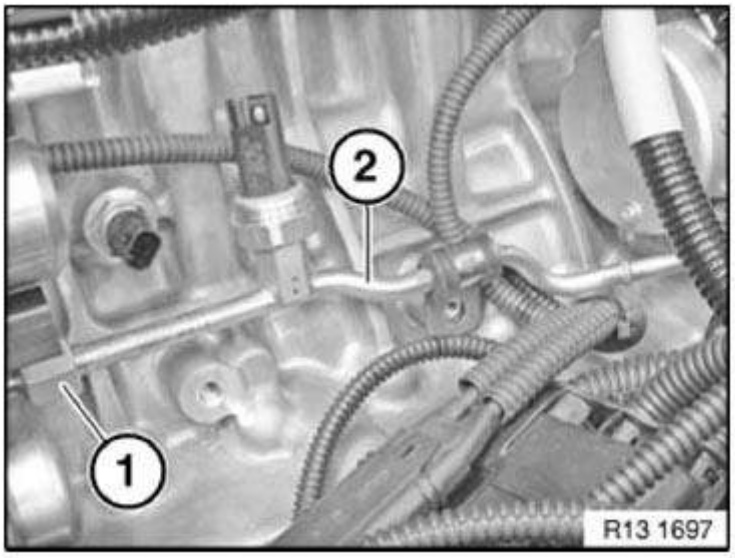


Fig. 162: Identifying Nut On High Pressure Pump And Feed Line
Courtesy of BMW OF NORTH AMERICA, INC.

Close off feed line and high pressure pump with a matching plug from set of special tools **32 1 270** .

cardiagn.com

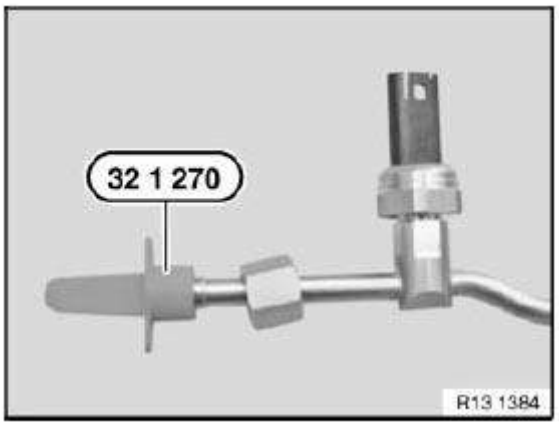


Fig. 163: Identifying Special Tools (32 1 270)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

First fit feed line (2) on high pressure pump and engine block only hand tight.

Adhere to tightening/torque sequence:

- 1. Tighten down nut (1) with special tool **13 5 020** . In doing so, hold against low-pressure sensor flange.

  Tightening torque: **13 53 7AZ** .

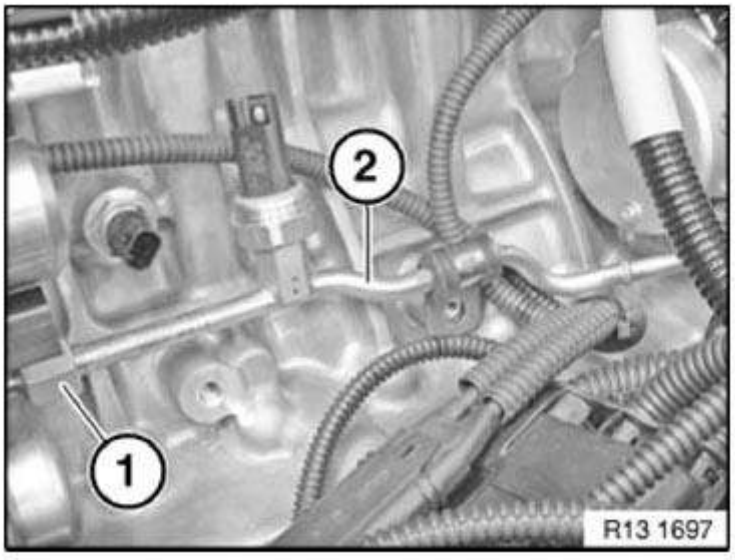


Fig. 164: Identifying Feed Line And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

- 2. Tighten bolts (1) below cable channel (2).

  Tightening torque: **13 53 10AZ** .

cardiagn.com

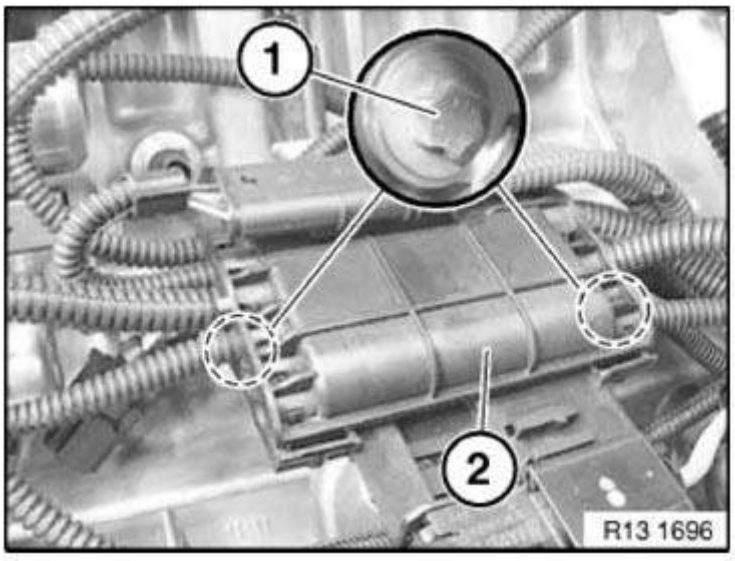


Fig. 165: Identifying Bolts And Cable Channel
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 332 REMOVING AND INSTALLING/REPLACING FEED LINE (N20)

Special tools required:

- 13 5 160

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

Wear safety goggles.

IMPORTANT:

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

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

IMPORTANT:

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

Necessary preliminary tasks:

- Remove ACOUSTIC COVER .

cardiagn.com

- Remove **COWL PANEL COVER** .

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

Release screw (1).

Lever out cable clip (2).

Remove cover (3).

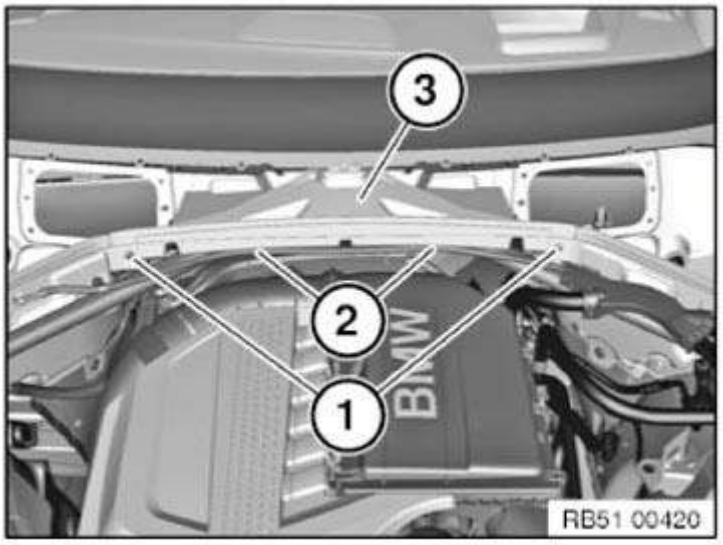
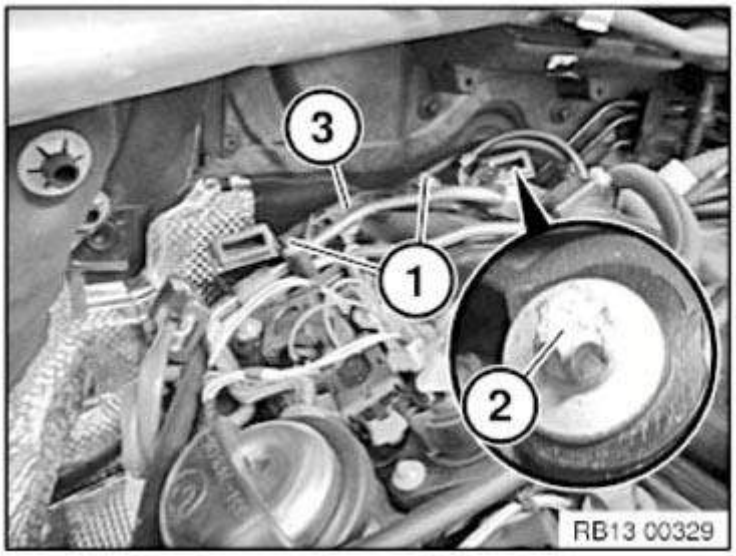


Fig. 166: Identifying Cable Clip, Screw And Cover
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Undo screw (2) from cable clip (3) at rear.

Lift out cable clip (3).



cardiagn.com

Fig. 167: Identifying Cable Clip And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Detach the fuel line at the snap fastener (1).

Release bolt (2) at rear of cylinder head.

Tightening torque: 13 53 3AZ .

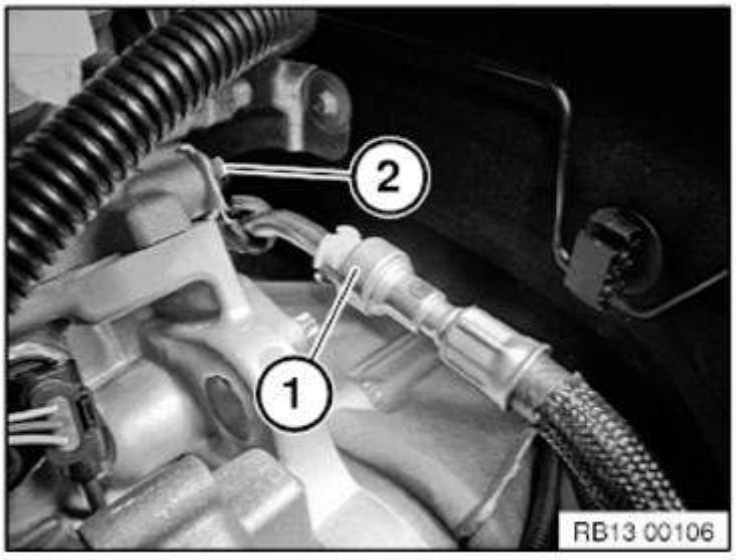


Fig. 168: Identifying Snap Fastener And Bolt
Courtesy of BMW OF NORTH AMERICA, INC.

Close fuel lines with special tools (1) 13 5 161 and (2) 13 5 162 from special tool set 13 5 160 .

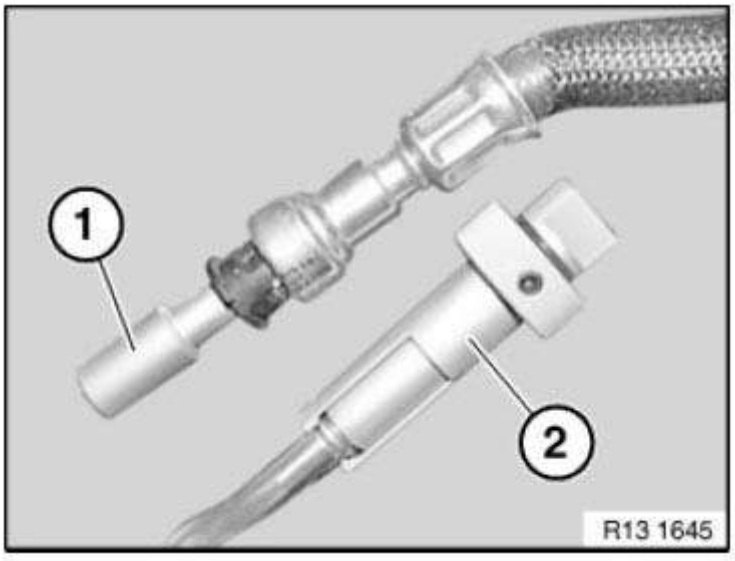


Fig. 169: Identifying Fuel Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Tightening torque: 13 53 2AZ .

Release the feed line from the clamp (2), thread out toward the top and remove.

cardiagn.com

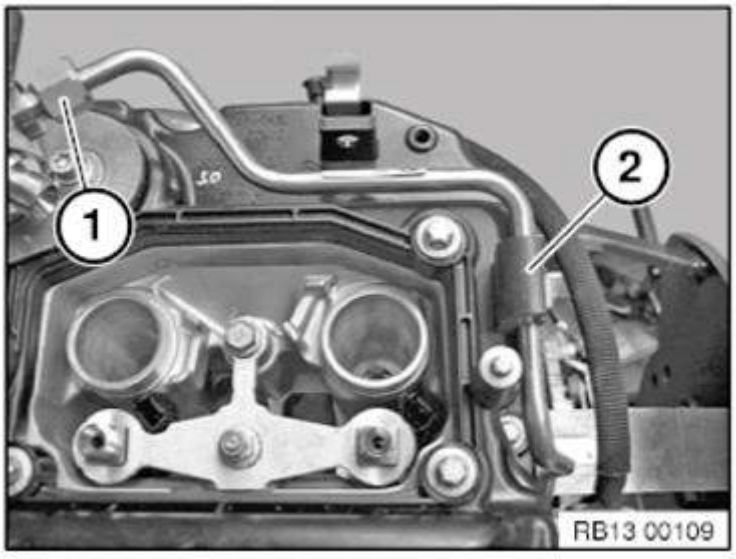


Fig. 170: Identifying Feed Line From Clamp And Slacken Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 158 REMOVING AND INSTALLING/REPLACING PRESSURE ACCUMULATOR OF FUEL INJECTION SYSTEM (N47 D20 O1)

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

Necessary preliminary work:

- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)**.
- Remove rear acoustic cover.
- Remove **PRESSURE LINES** to injectors.
- Remove **PRESSURE LINE** to high pressure pump.

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Unlock plug (1) from pressure control valve and detach.

Unlock return line (2) from pressure accumulator and disconnect.

Unlock plug from pressure sensor (3) and detach.

cardiagn.com

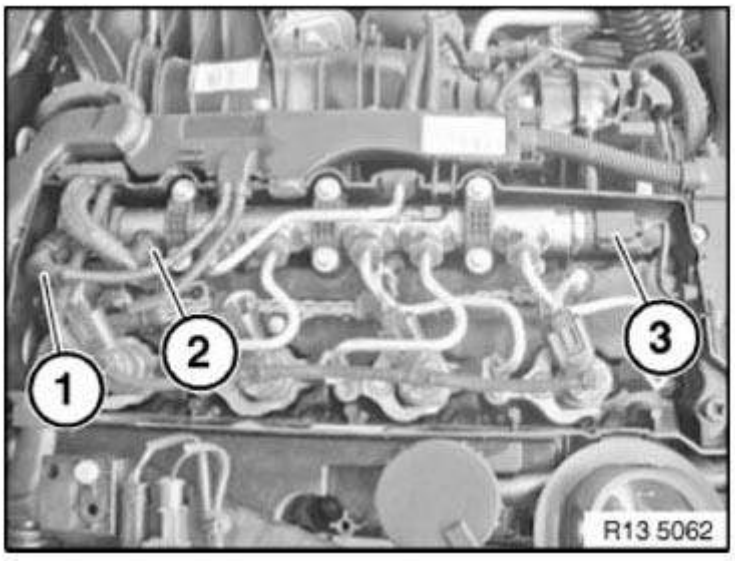


Fig. 171: Identifying Return Line, Pressure Sensor And Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Remove pressure accumulator.

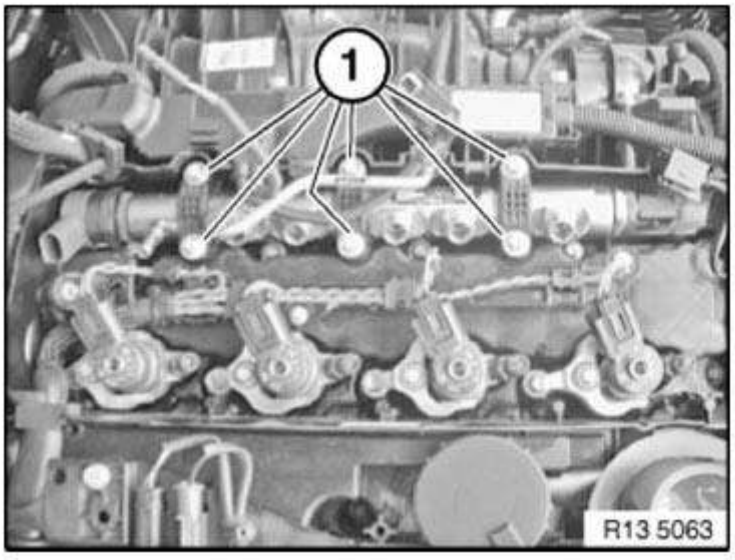


Fig. 172: Identifying Screws Of Pressure Accumulator
Courtesy of BMW OF NORTH AMERICA, INC.

Assembly sequence, high-pressure system:

1. Insert pressure accumulator.
2. Provisionally fasten all high pressure lines.
3. Clip pressure accumulator mountings and screw down.
4. Tighten down high pressure lines on injectors.

   Tightening torque: **13 53 2AZ** .

5. Tighten down high pressure lines on pressure accumulator.

   Tightening torque: **13 53 2AZ** .

6. Tighten down high pressure line on high pressure pump.

cardiagn.com

Tightening torque: **13 53 2AZ** .

Assemble engine.

Vent fuel system via BMW diagnosis system.

Check fuel system for leak tightness.

13 53 334 REMOVING AND INSTALLING/REPLACING PRESSURE LINE (BOSCH HIGH-PRESSURE PUMP) (N55)

Special tools required:

- **32 1 270**

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

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

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

IMPORTANT:

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

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

Necessary preliminary tasks:

- Remove **INTAKE PLENUM** .

Release nuts (1 and 2).

Remove H.P. line.

Seal connections of high pressure line and the high pressure pump with matching plugs from special tool set **32 1 270** .

cardiagn.com

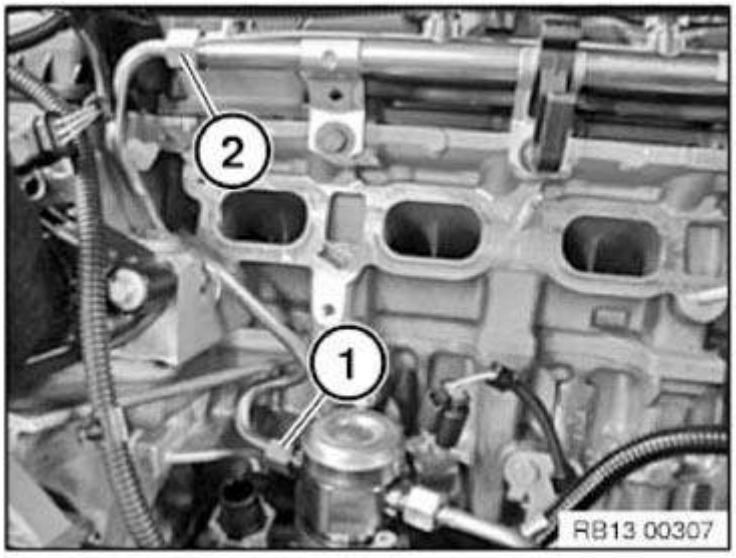


Fig. 173: Identifying Nuts Of High Pressure Line
Courtesy of BMW OF NORTH AMERICA, INC.

Fit high pressure line.

When reinstalling lines, lubricate the thread and bearing face of the ball with a little transmission oil or grease! When they are installed for the first time the nuts have a coating of lubricant (only effective once). Penetration of lubricant into the fuel-conducting area should be avoided.

IMPORTANT:

Adhere to the installation procedure!
Lay the high pressure line with the ball bush (1) to the high pressure pump. When doing so, the ball bush (2) of the high pressure line must lie in the center of the cone on the rail. If the ball bush (2) does not lie in the center of the cone, the installation position of the rail must be adjusted. To do this the following fuel system components must be released:

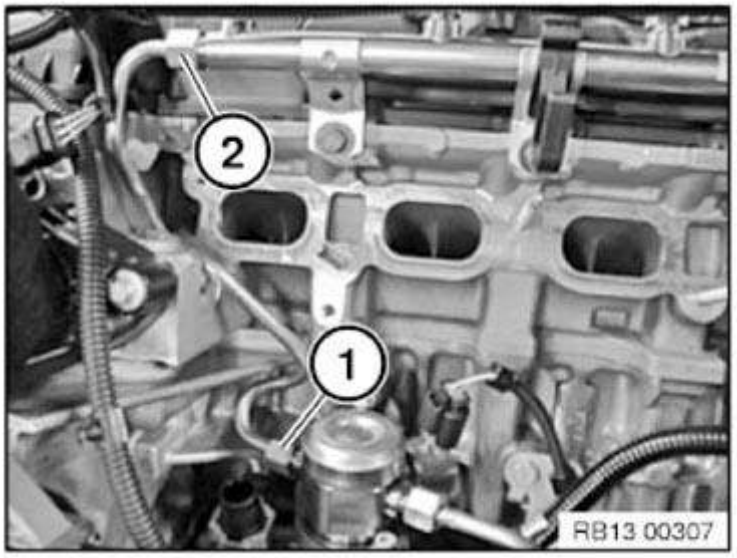


Fig. 174: Identifying Ball Bush And High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

- Release pressure lines on injectors and on rail.
- Release mounting bolts on rail.

Follow sequence of screw connections:

cardiagn.com

1. Fit high pressure line on high pressure pump and on rail hand-tight.
2. Fit high pressure lines between the injectors and the rail hand-tight.
3. Fit mounting bolts on the rail and cylinder head hand-tight.
4. Tighten mounting bolts on rail and cylinder head.

   Tightening torque: **13 53 2AZ** .

5. Tighten high pressure line on injectors.

   Tightening torque: **13 53 9AZ** .

6. Tighten high pressure line (injector line) on rail.

   Tightening torque: **13 53 9AZ** .

7. Tighten high pressure line (high pressure line between rail and high pressure pump) on rail.

   Tightening torque: **13 53 8AZ** .

8. Tighten high pressure line on high pressure pump.

   Tightening torque: **13 53 8AZ** .

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 334 REMOVING AND INSTALLING/REPLACING PRESSURE LINE (CONTINENTAL HIGH PRESSURE PUMP) (N55)

Special tools required:

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

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

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

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

IMPORTANT:

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

cardiagn.com

Necessary preliminary tasks:

- Remove **INTAKE PLENUM** .

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

Release nuts (1 and 2).

Release screw (3).

Disconnect high pressure line (4).

Seal connections of high pressure line (4) with matching plugs from set of special tools **32 1 270** .

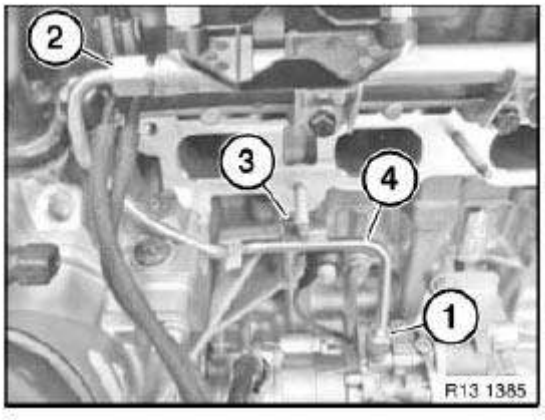


Fig. 175: Identifying High Pressure Line, Screw And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Seal fuel line connection of high pressure pump (1) and pressure accumulator with matching plugs from special tool set **32 1 270** .

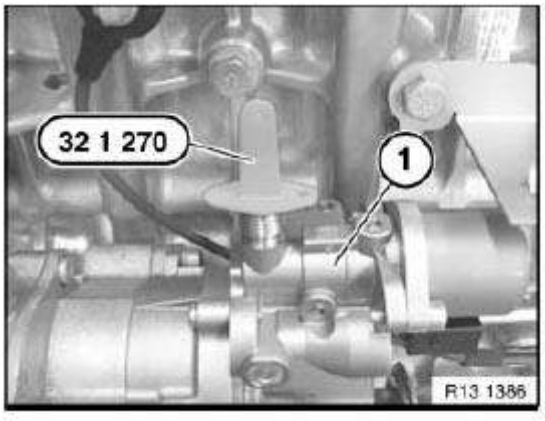


Fig. 176: Removing Seal Fuel Line Connection Of High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Install pressure line (4).

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

cardiagn.com

Install pressure line (4) without tension only.

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

If the nuts cannot be screwed on easily by hand, the high pressure pump must be slackened. This operation is described in the following section.

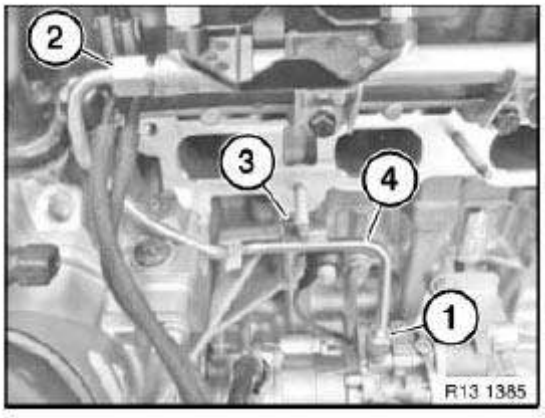


Fig. 177: Identifying Pressure Line, Screw Connections And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Only if high pressure pump has to be slackened:

Remove **OIL TEMPERATURE SENSOR**.

Slacken screws with special tool **11 8 610** .

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

Tighten down screws.

Tightening torque: **13 53 1AZ** .

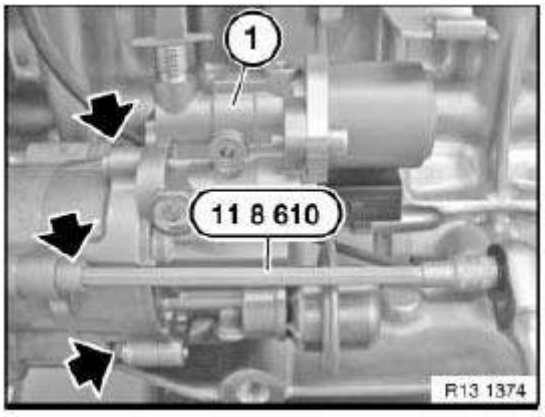


Fig. 178: Turning High Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Follow sequence of screw connections:

1. Tighten down nut (1) with special tool **13 5 020** .

   Tightening torque: **13 53 8AZ** .

2. Tighten nut (2).

cardiagn.com

Tightening torque: 13 53 8AZ .

3. Tighten down screw (3) for holder.

   Tightening torque: 13 53 3AZ .

IMPORTANT:

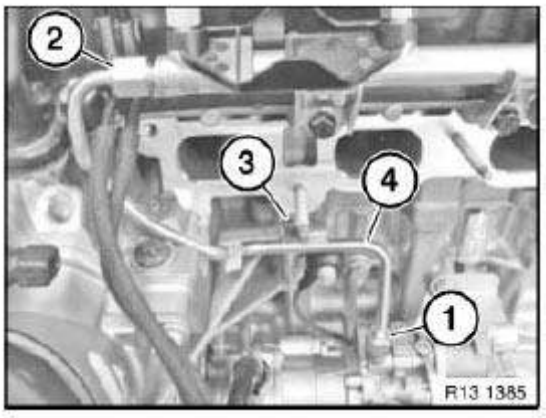


Fig. 179: Identifying Screw Connections And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 334 REMOVING AND INSTALLING/REPLACING PRESSURE LINE BETWEEN RAIL AND HIGH PRESSURE PUMP (N20)

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

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

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

IMPORTANT:

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

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

Necessary preliminary tasks:

cardiagn.com

- Remove **ACOUSTIC COVER** .
- Remove **COWL PANEL COVER** .

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

Release screw (1).

Lever out cable clip (2).

Remove cover (3).

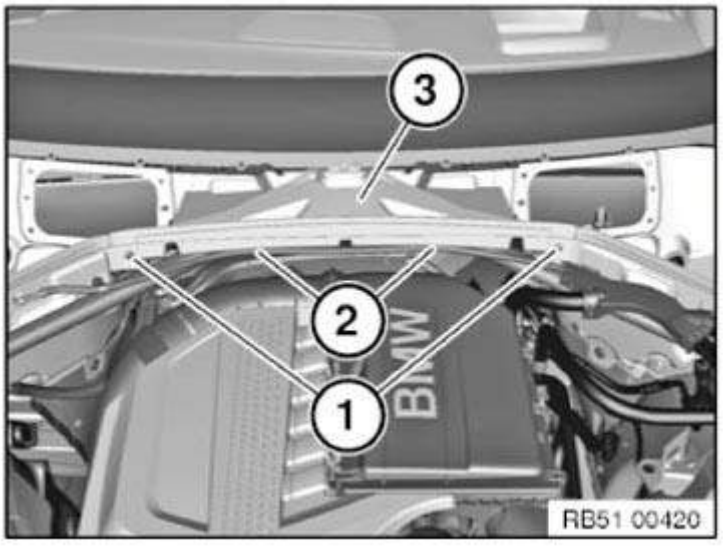
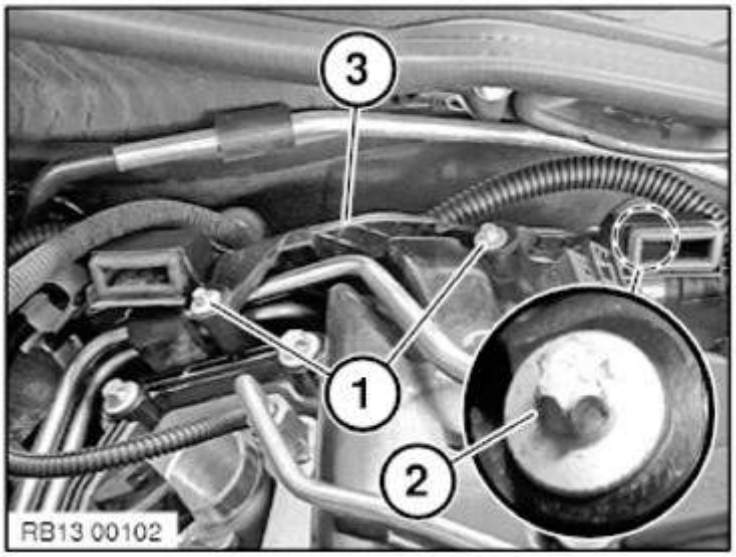


Fig. 180: Identifying Cable Clip, Cover And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Undo screw (2) from cable clip (3) at rear.

Lift out cable clip (3).



cardiagn.com

Fig. 181: Identifying Cable Clip And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unscrew nuts (1).

Unclamp pressure line (2) from bracket and remove.

Installation of pressure line is described separately from removal.

Renew pressure line (2).

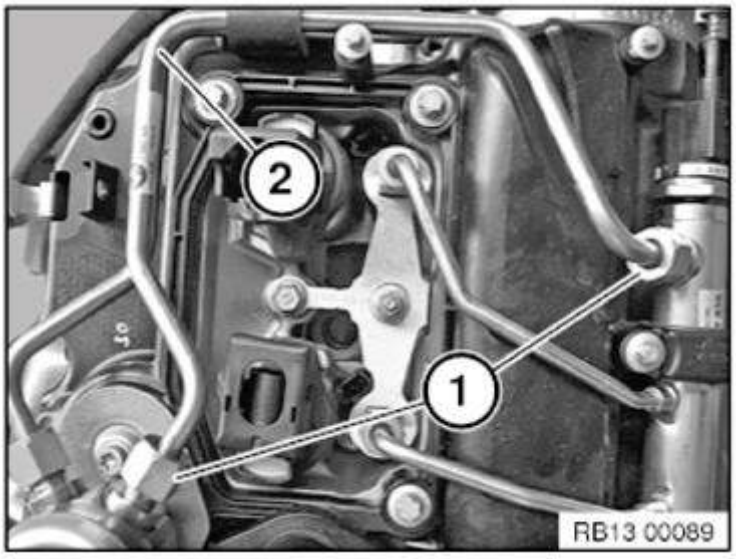


Fig. 182: Identifying Pressure Line And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Installing pressure line:

NOTE: The pressure line must be renewed in the course of every disassembly. Once the pressure line has been detached, it may not be used again.

Mount new pressure line (2).

Tighten nut (1) manually only.

Connect pressure line (2) without tension only.
IMPORTANT: To ensure distortion-free installation of the pressure line and to avoid damaging the thread, it must be possible for both nuts (1) to be screwed on easily by hand!

cardiagn.com

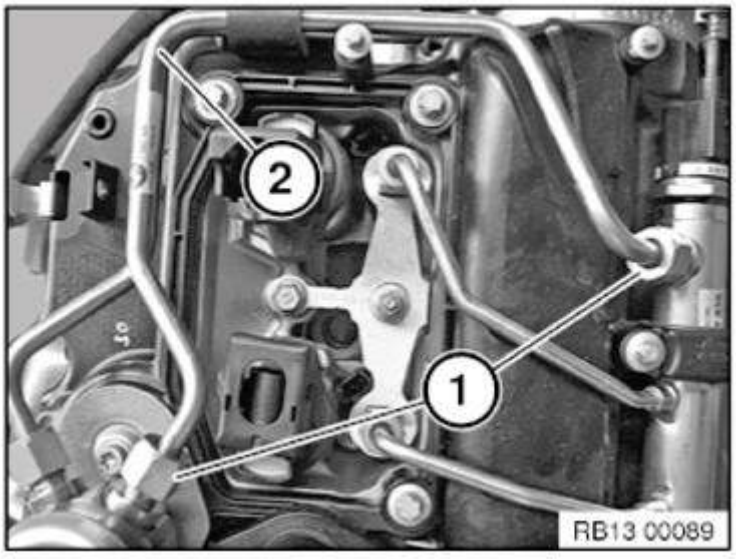


Fig. 183: Identifying Pressure Line And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Follow the correct screw connection sequence.

1. First tighten nut on high pressure pump.

   Tightening torque: **13 53 7AZ** .

2. Then tighten the nut on the rail.

   Tightening torque: **13 53 7AZ** .

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 170 REMOVING AND INSTALLING/REPLACING PRESSURE LINES TO THE INJECTORS (N47 D20 O1)

Special tools required:

- **37 1 152**

IMPORTANT:	When working on the oil, coolant or fuel circuit, you must protect the alternator against dirt contamination. Cover alternator with suitable materials. Failure to comply with this procedure may result in an alternator malfunction.
IMPORTANT:	After the engine has stopped, wait at least 1 minute before releasing the high pressure lines. After disconnecting the pressure lines, it is absolutely essential to seal the injectors and the high-pressure accumulator with protective caps. Do not mix up new pressure lines.

Necessary preliminary work:

- Read fault memory.
- Switch off ignition.
- Remove **INTAKE FILTER HOUSING**.

cardiagn.com

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Release all union nuts of the pressure lines with special tool **37 1 152** .

NOTE: **Reset special tool in good time to prevent bending of pressure lines.**

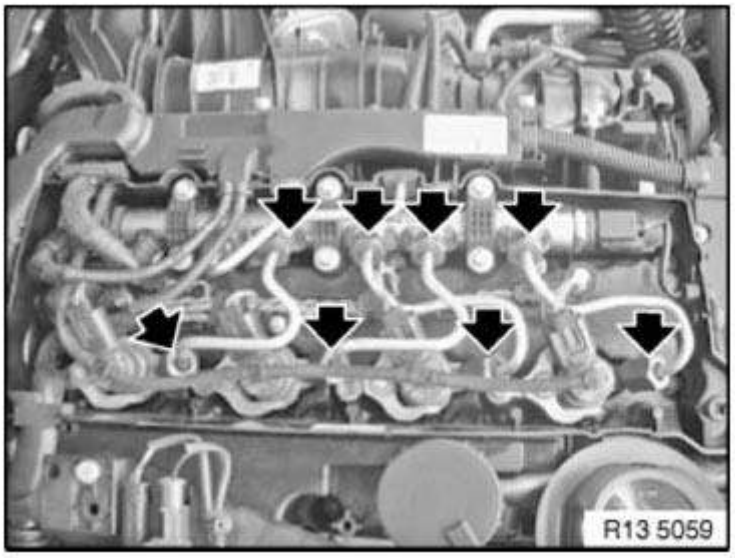


Fig. 184: Locating Union Nuts Of Pressure Lines
Courtesy of BMW OF NORTH AMERICA, INC.

Release all union nuts of the pressure lines with special tool **37 1 152** .

NOTE: **Reset special tool in good time to prevent bending of pressure lines.**

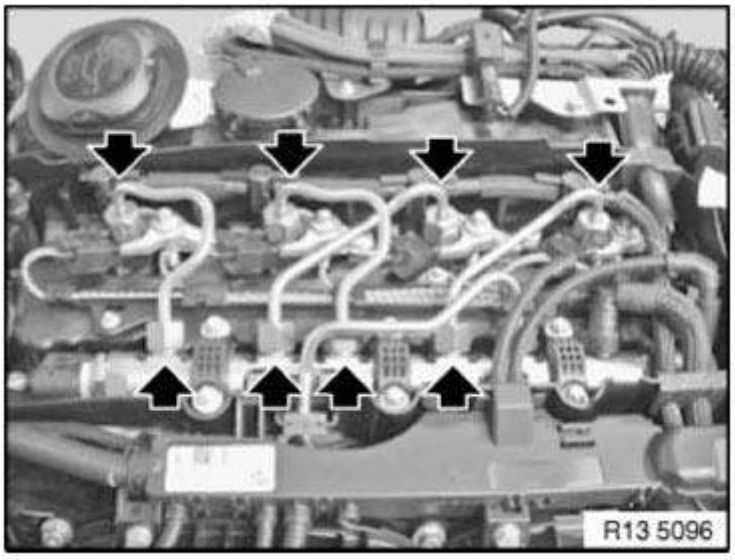


Fig. 185: Locating Union Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Risk of damage to injector and pressure accumulator!
Observe tightening torque: **13 53 2AZ** without fail If the pressure lines are leaking after installation, they must be replaced. Do not retighten pressure lines with a higher tightening torque!

cardiagn.com

Risk of damage to injector and pressure accumulator!

Installing pressure lines

Risk of injector breakage! Observe tightening torque: **13 53 2AZ** without fail.
All pressure lines may only be reused 3 times; after the 3rd time, they must be replaced.

1. Insert pressure lines.
2. Hand-tighten all union nuts on pressure lines.
3. Tighten down union nuts on injectors to specified torque.

IMPORTANT:

Tightening torque: **13 53 2AZ** .

4. Tighten down union nuts on pressure accumulator to specified torque.

   Tightening torque: **13 53 2AZ** .

5. Check all components of common rail system for tightness.

Reassemble the vehicle.

Vent fuel system via BMW diagnosis system.

Check fuel system for leak tightness.

13 53 560 REMOVING AND INSTALLING/REPLACING PRESSURE SENSOR ON PRESSURE ACCUMULATOR OF INJECTION SYSTEM (N47 D20 O1)

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

Necessary preliminary work:

- Read fault memory.
- Read out ignition.
- Remove **PRESSURE ACCUMULATOR**.

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Grip removed rail (2) at flattened area.

Cover plug-in contacts on pressure sensor and remove thread-locking sealant from thread with a suitable cleaning agent. Remove any adapters that may be connected to the pressure sensor. Clean threads and sealing surface on the pressure accumulator and seal with a protective cap.

NOTE: **Grip at pressure accumulator when removing pressure sensor (3).**

cardiagn.com

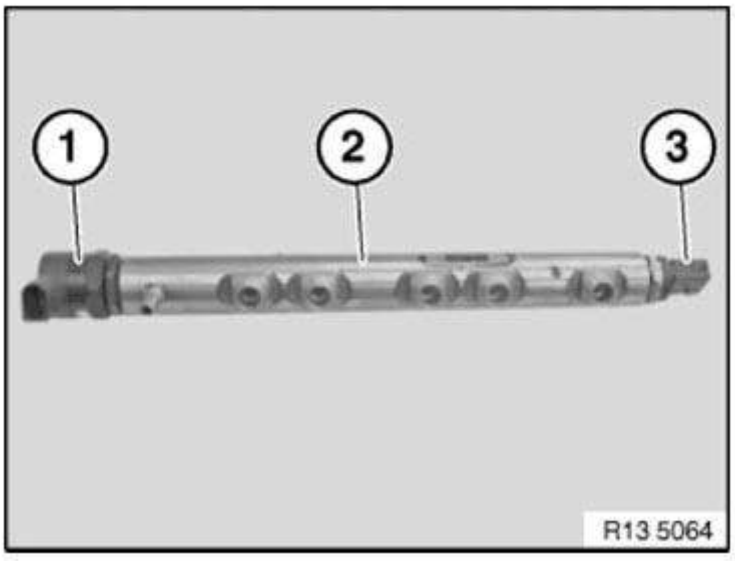


Fig. 186: Identifying Pressure Sensor And Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Check threads and sealing surfaces for damages prior to installing the pressure sensor. Ensure conditions of cleanliness when installing pressure sensor (1). Lightly grease thread on pressure sensor. Screw in pressure sensor by hand and then tighten.

Tightening torque: **13 53 3AZ** .

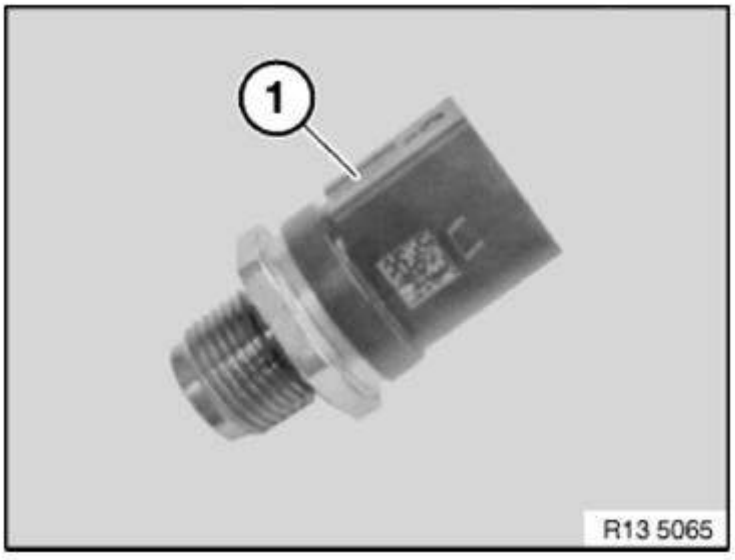


Fig. 187: Identifying Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for leak tightness.

Reset quantity mean value adaptation with BMW diagnosis system.

13 53 158 REMOVING AND INSTALLING/REPLACING RAIL (BOSCH HIGH PRESSURE PUMP) (N55)

Special tools required:

- **13 0 160**

cardiagn.com

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

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

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

IMPORTANT:

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

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

Necessary preliminary work:

- Disconnect **PRESSURE LINES**.
- Remove **INTAKE SILENCER HOUSING**.

Recycling:

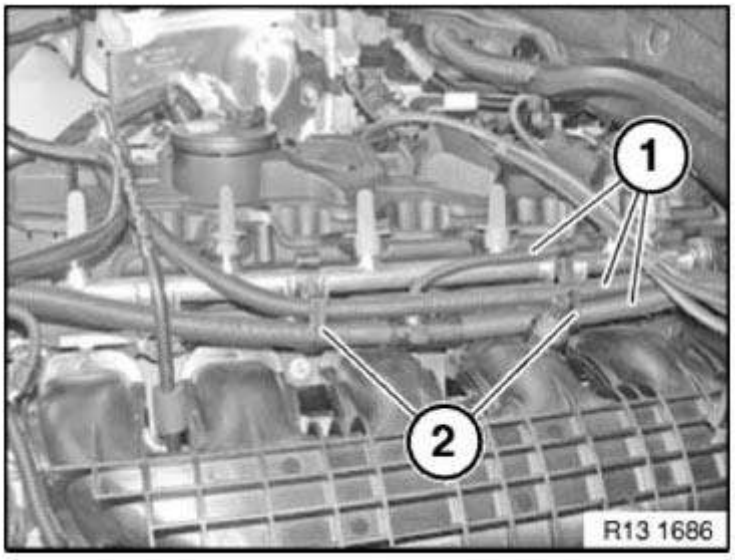
Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Release wiring harnesses (1) from rail and lay to one side.

Undo clamps (2) from rail.



cardiagn.com

Fig. 188: Identifying Wiring Harnesses And Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Unlock and disconnect plug (2) on high-pressure sensor.

Release screws (3).

Remove rail (4).

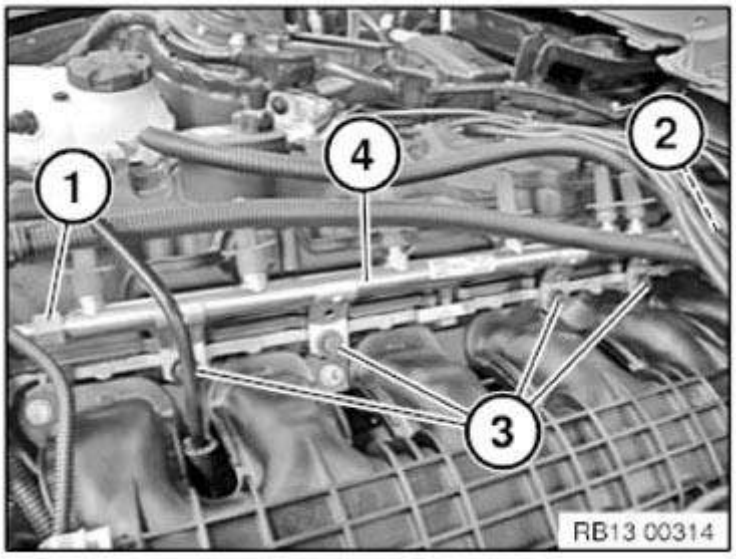


Fig. 189: Identifying Plug, Rail And Slacken Nut
Courtesy of BMW OF NORTH AMERICA, INC.

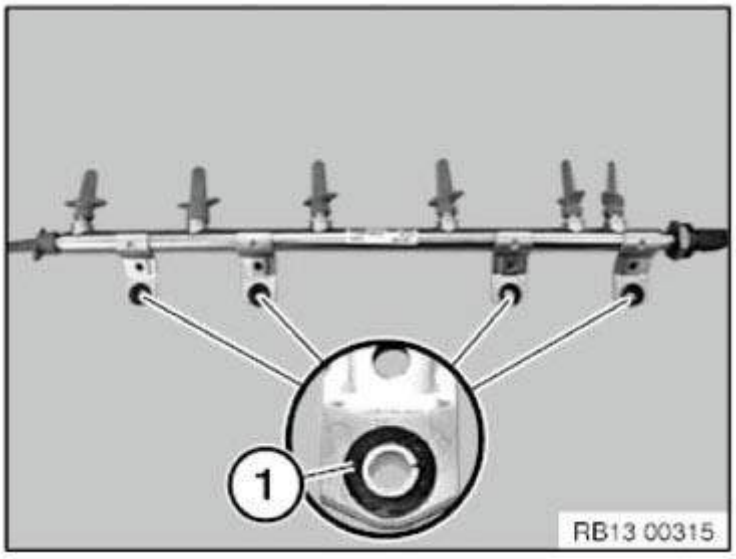
Installing the rail:

Rail installation is described separately from removal.

If an injector line is being replaced, the corresponding injector hold-down device must be released (see **13 53 310 REMOVING AND INSTALLING/REPLACING AN INJECTOR (N55)**).

Installation note:

Before reinstalling the rail, the decoupling element and sleeves (1) must be replaced.



cardiagn.com

Fig. 190: Identifying Decoupling Element And Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

Install rail (4) while tightening nuts (1) and bolts (3) hand-tight only.

NOTE:

- **Rail must still be displaceable on cylinder head.**
- **Nut (1) must be able to be screwed on easily by hand.**

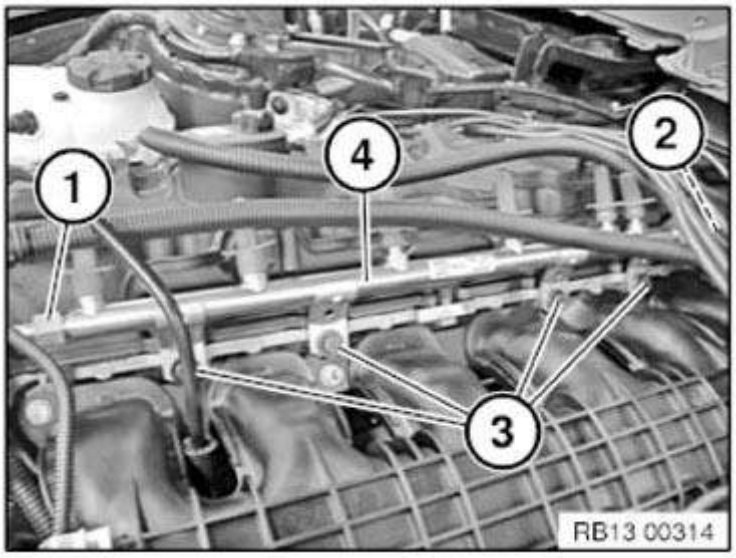


Fig. 191: Identifying Rail Bolts And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Fitting pressure lines:

(Same procedure for all pressure lines)

Install pressure line (1). Tighten nuts (2) hand-tight only.

When reinstalling lines, lubricate the thread and the nut facing of the ball! When they are installed for the first time the nuts have a coating of lubricant (only effective once). Penetration of lubricant into the fuel-conducting area should be avoided.

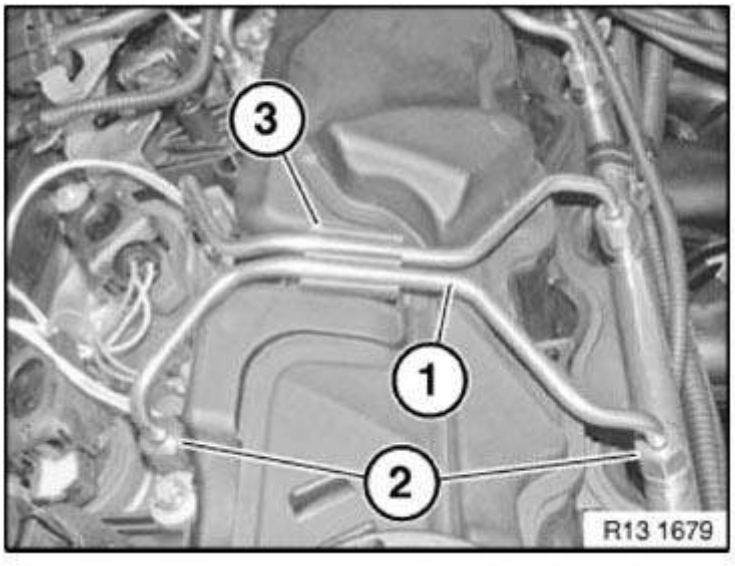


Fig. 192: Identifying Pressure Line And Nuts

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Connect pressure line (1) without tension only.

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

Reinstall rubber mount (3).

Procedure for loose injector hold-down device (this operation can be skipped if the injector hold-down device has not been loosened).

Firstly tighten screw (1).

Tightening torque: **13 53 6AZ** .

Then tighten down screw (2).

Tightening torque: **13 53 6AZ** .

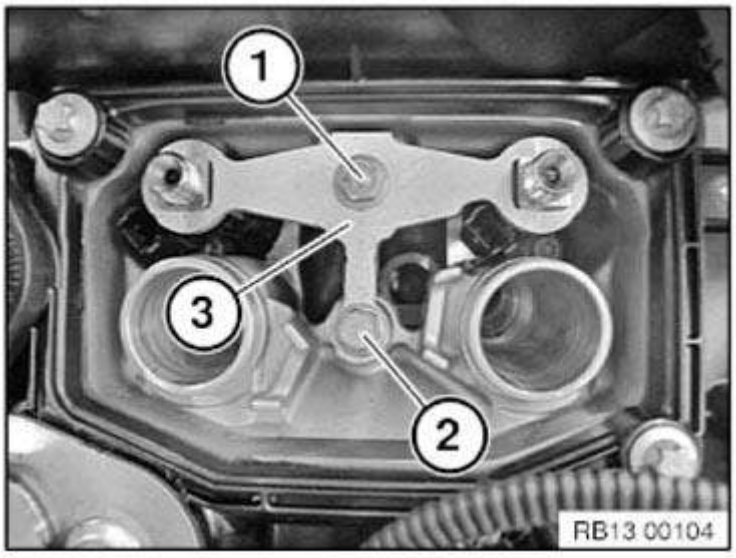


Fig. 193: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening sequence:

- **1.** Tighten screws (1).

  Tightening torque: **13 53 2AZ** .

- **3.** Tighten nuts (2).

  Tightening torque: **13 53 8AZ** .

cardiagn.com

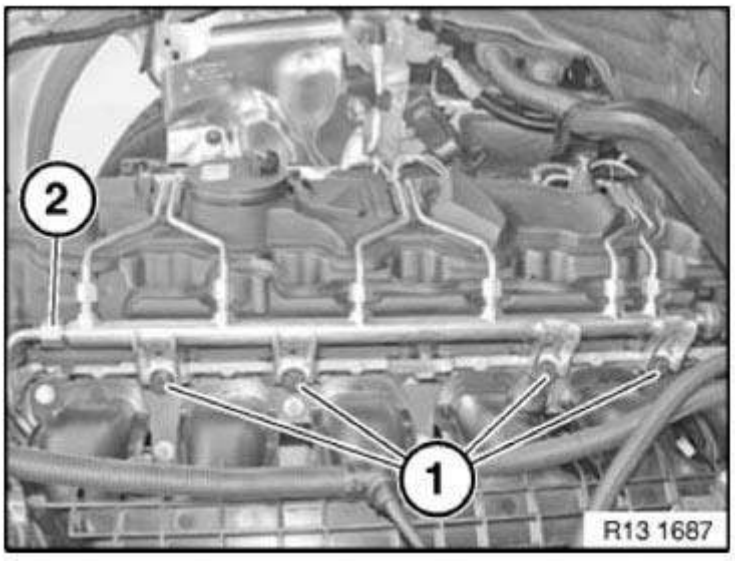


Fig. 194: Identifying Screws And Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Reset special tool in early to avoid bending pressure lines.
Tighten down nuts with special tool 3 **13 0 160** .

Adhere to tightening sequence:

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

Tightening torque: **13 53 9AZ** .

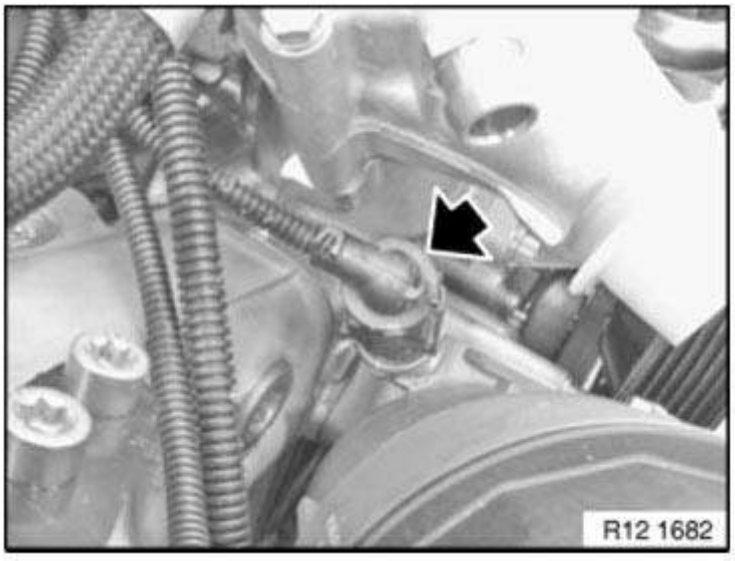


Fig. 195: Identifying Nut On Injector And Rail
Courtesy of BMW OF NORTH AMERICA, INC.

- **4.** Tighten nut (2).

5. Tighten nut (1).

Tightening torque: **13 53 8AZ** .

Push connector for high pressure sensor on.

cardiagn.com

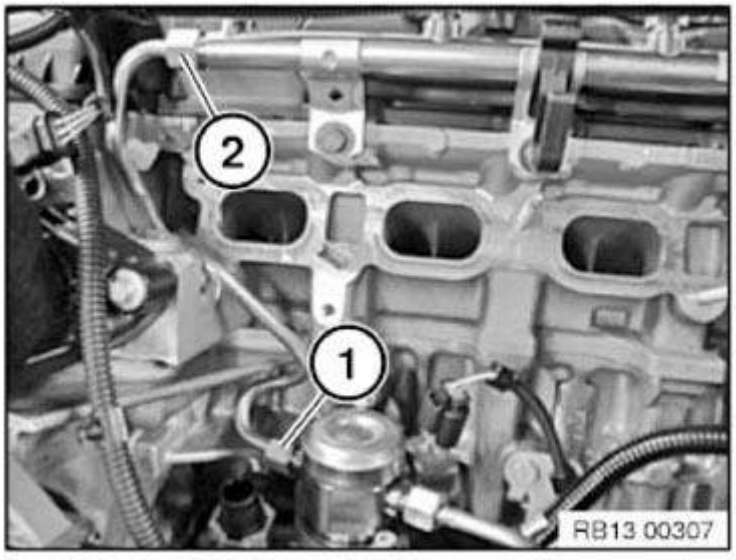


Fig. 196: Identifying Nut Of High Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 158 REMOVING AND INSTALLING/REPLACING RAIL (CONTINENTAL HIGH-PRESSURE PUMP) (N55)

Special tools required:

- 13 0 161
- 13 0 160

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

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

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

IMPORTANT:

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

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

cardiagn.com

Necessary preliminary tasks:

- Disconnect **PRESSURE LINES**.
- Remove **INTAKE SILENCER HOUSING**.

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Release wiring harnesses (1) from rail and lay to one side.

Undo clamps (2) from rail.

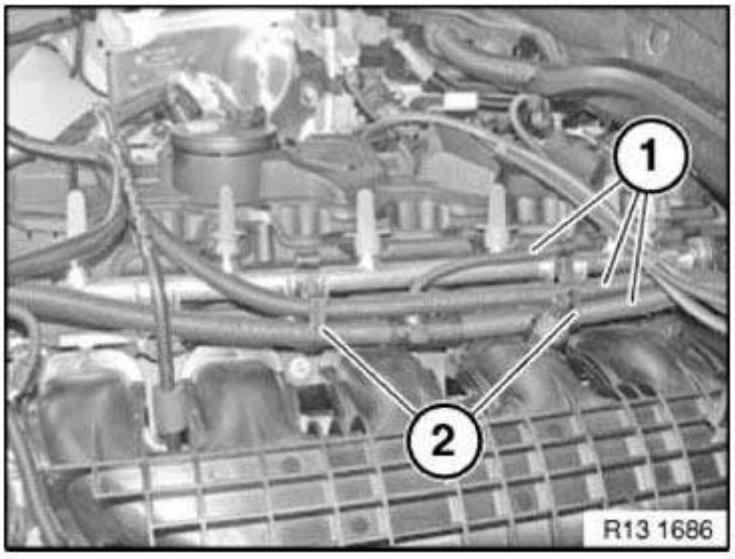


Fig. 197: Identifying Wiring Harnesses And Clamps From Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Slacken nut (1).

Unlock and disconnect plug (2) on high-pressure sensor.

Release screws (3).

Remove rail (4).

cardiagn.com

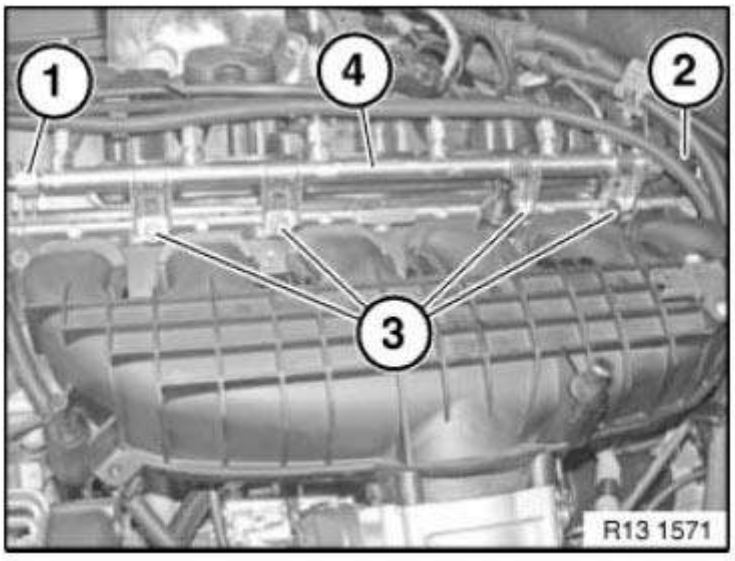


Fig. 198: Identifying Plug, Slacken Nut And Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Installing rail (without decoupling):

Rail installation is described separately from removal.

Install (4) rail while manually tightening nuts (3) and bolts (1).

NOTE:

- **Rail must still be displaceable on cylinder head.**
- **Nut (2) must be able to be screwed on easily by hand.**

Push on connector for high-pressure sensor (2).

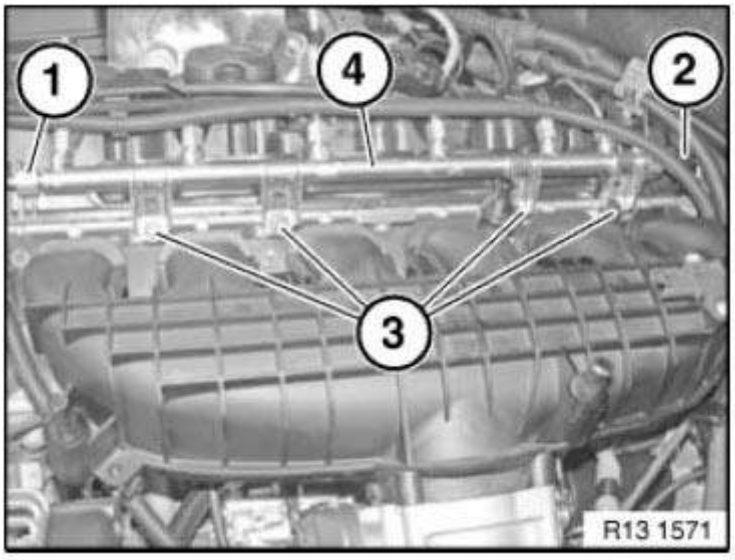


Fig. 199: Identifying Connector For High-Pressure Sensor And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Fitting pressure lines:

(Same procedure for all pressure lines)

Install pressure line (1). Tighten down nuts (2) hand-tight only.

cardiagn.com

Connect pressure line (1) without tension only.

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

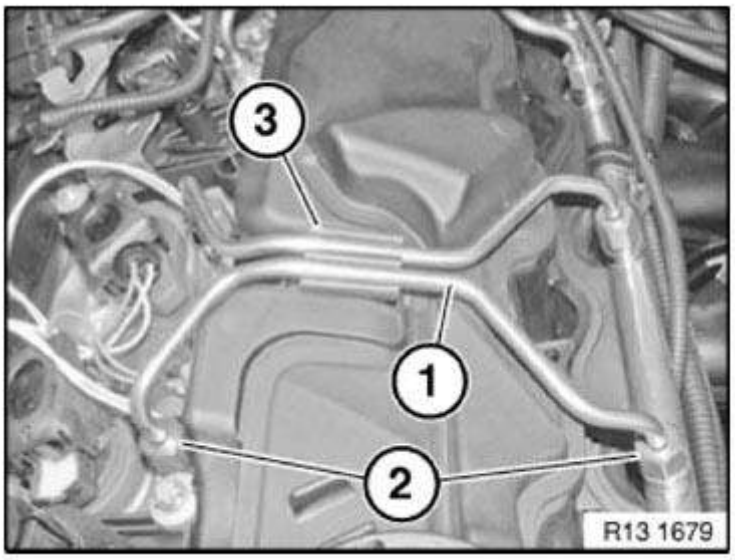


Fig. 200: Identifying Pressure Line And Damper
Courtesy of BMW OF NORTH AMERICA, INC.

Reinstall line damper (3).

Tighten down screws (1).

Tightening torque: **13 53 2AZ** .

Tighten nut (2).

Tightening torque: **13 53 8AZ** .

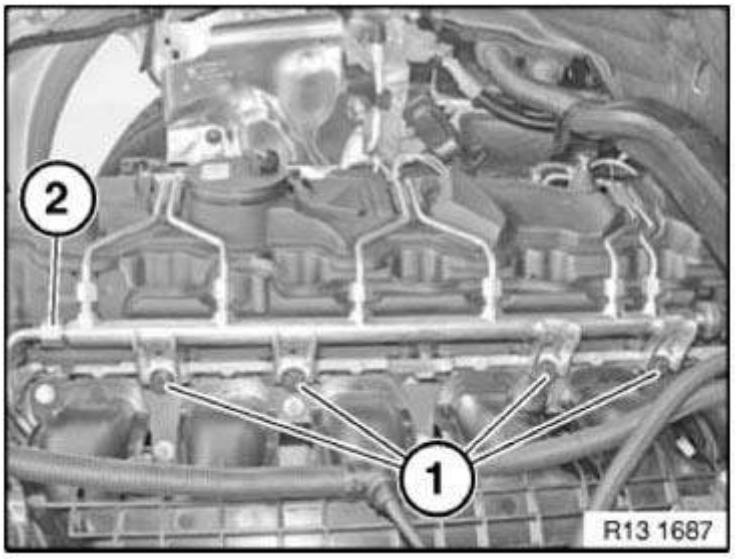


Fig. 201: Identifying Screws And Nut Of High-Pressure Pump
Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening sequence:

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

cardiagn.com

Tighten down nuts with special tool (3) **13 0 161** .

IMPORTANT: Reset special tool in early to avoid bending pressure lines.

Tightening torque: **13 53 9AZ** .

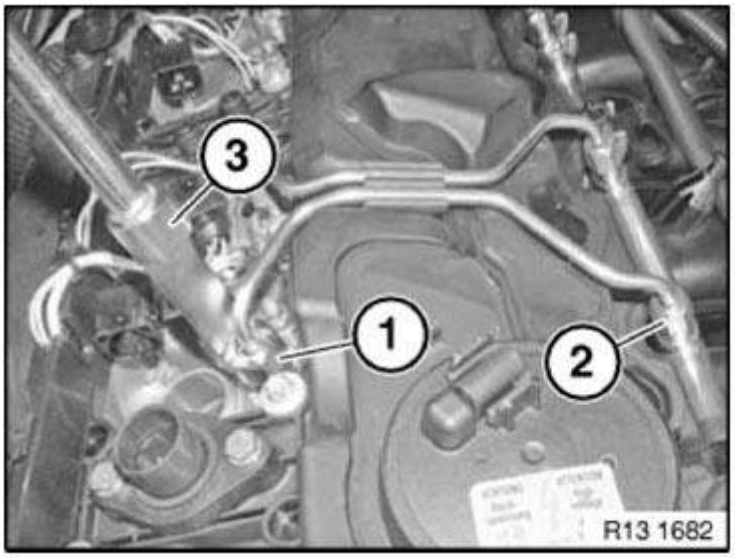


Fig. 202: Identifying Nut On Injector And Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Installing rail (with decoupling):

Rail installation is described separately from removal.

If an injector line is being replaced, the corresponding injector hold-down device must be released (see **13 53 310 REMOVING AND INSTALLING/REPLACING AN INJECTOR (N55)**).

Installation note:

Before reinstalling the rail, the decoupling element and sleeves (1) must be replaced.

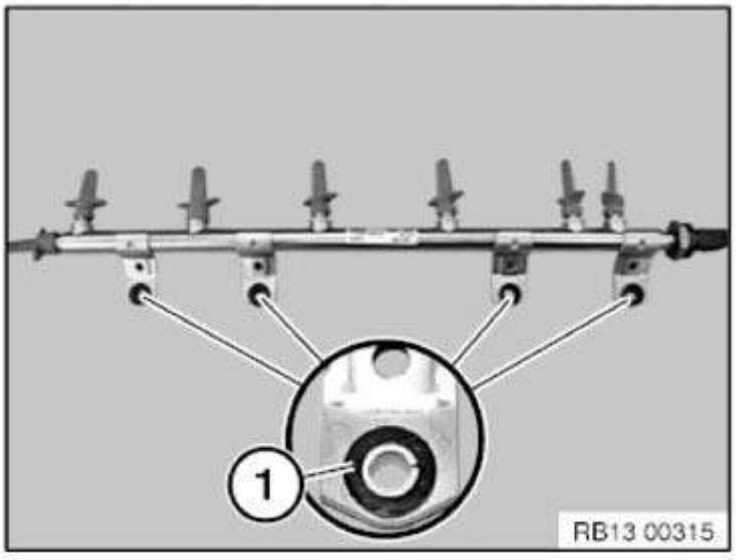


Fig. 203: Identifying Decoupling Element And Sleeves
Courtesy of BMW OF NORTH AMERICA, INC.

Install rail (4) while tightening nuts (1) and bolts (3) hand-tight only.

cardiagn.com

NOTE:

- **Rail must still be displaceable on cylinder head.**
- **Nut (1) must be able to be screwed on easily by hand.**

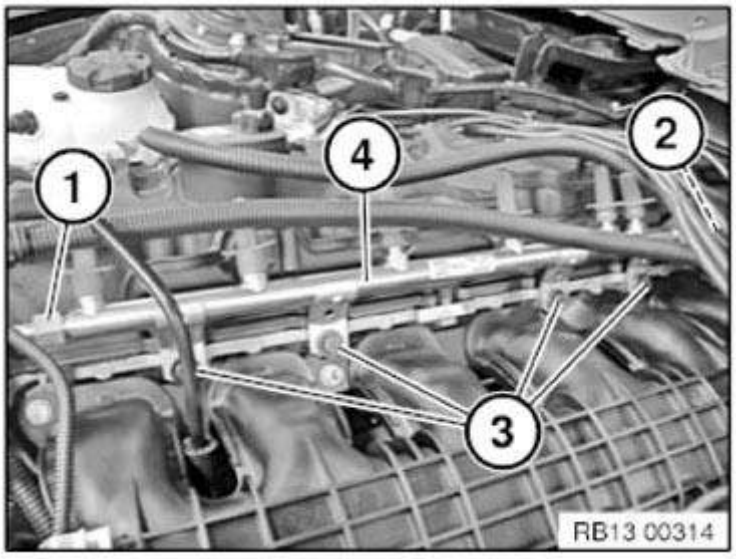


Fig. 204: Identifying Rail Nuts And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Fitting pressure lines:

(Same procedure for all pressure lines)

Install pressure line (1). Tighten nuts (2) hand-tight only.

When reinstalling lines, lubricate the thread and the nut facing of the ball! When they are installed for the first time the nuts have a coating of lubricant (only effective once). Penetration of lubricant into the fuel-conducting area should be avoided.

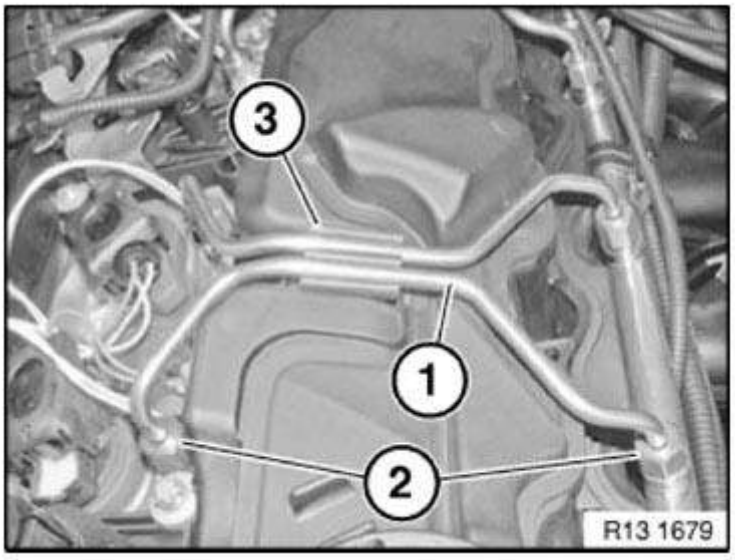


Fig. 205: Identifying Pressure Lines Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Connect pressure line (1) without tension only.

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

cardiagn.com

Reinstall rubber mount (3).

Procedure for loose injector hold-down device (this operation can be skipped if the injector hold-down device has not been loosened).

Firstly tighten screw (1).

Tightening torque: **13 53 6AZ** .

Then tighten down screw (2).

Tightening torque: **13 53 6AZ** .

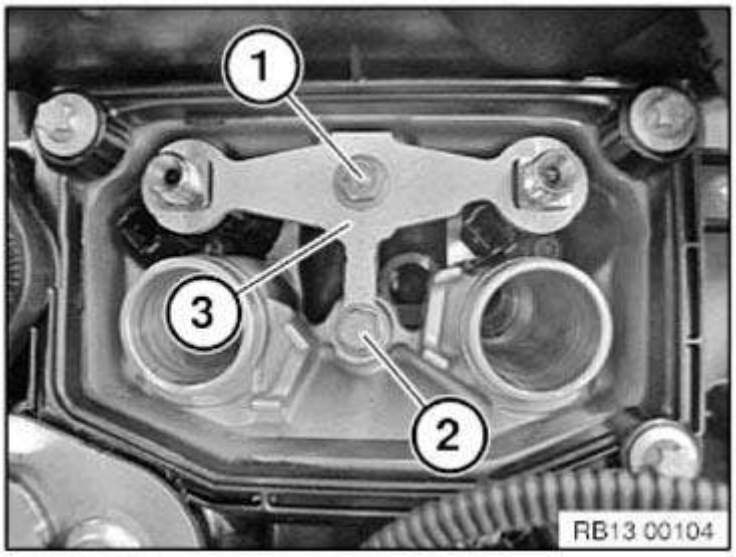


Fig. 206: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Adhere to tightening sequence:

- 1. Tighten screws (1).

  Tightening torque: **13 53 2AZ** .

- 2. Tighten nut (2).

  Tightening torque: **13 53 8AZ** .

cardiagn.com

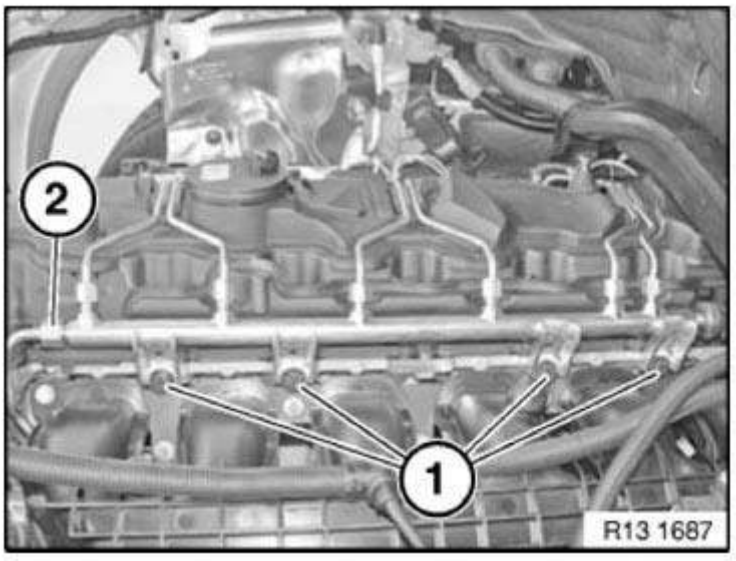


Fig. 207: Identifying Screws And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Reset special tool in early to avoid bending pressure lines.
Tighten down nuts with special tool 3 **13 0 160** .

Adhere to tightening sequence:

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

  Tightening torque: **13 53 9AZ** .

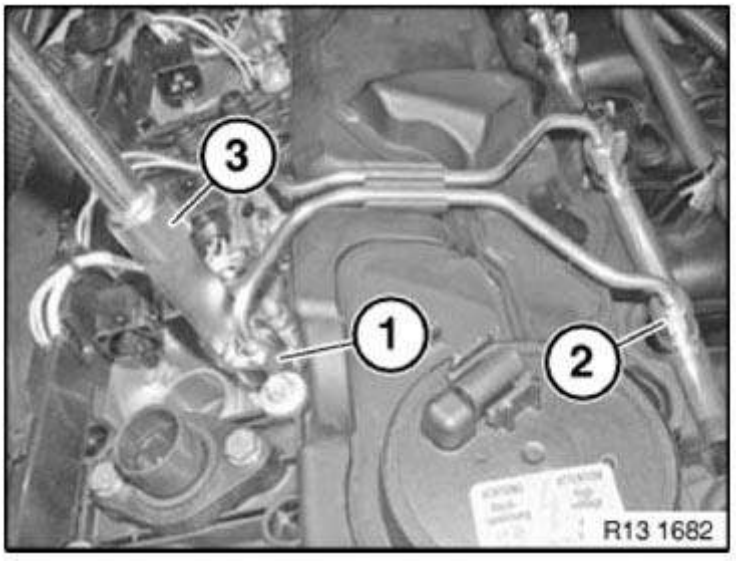


Fig. 208: Identifying Nut On Injector And Rail
Courtesy of BMW OF NORTH AMERICA, INC.

- 5. Tighten nut (1).

  Tightening torque: **13 53 8AZ** .

- 6. Tighten nut (2).

  Tightening torque: **13 53 8AZ** .

cardiagn.com

- 7. Tighten screw (3).

  Tightening torque: **13 53 10AZ** .

Push connector for high pressure sensor on.

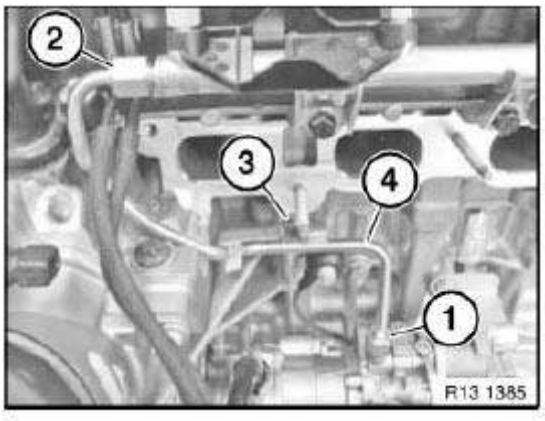


Fig. 209: Identifying Screw And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 158 REMOVING AND INSTALLING/REPLACING RAIL (N20, N26)

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

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

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

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

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

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

cardiagn.com

Necessary preliminary tasks:

- Remove **IGNITION COILS** .
- Remove and renew the **PRESSURE LINE** between rail and high pressure pump.

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Unlock connector (1) and remove.

Unscrew nuts (2).

Release screws (3).

Remove rail (4).

Rail installation is described separately from removal.

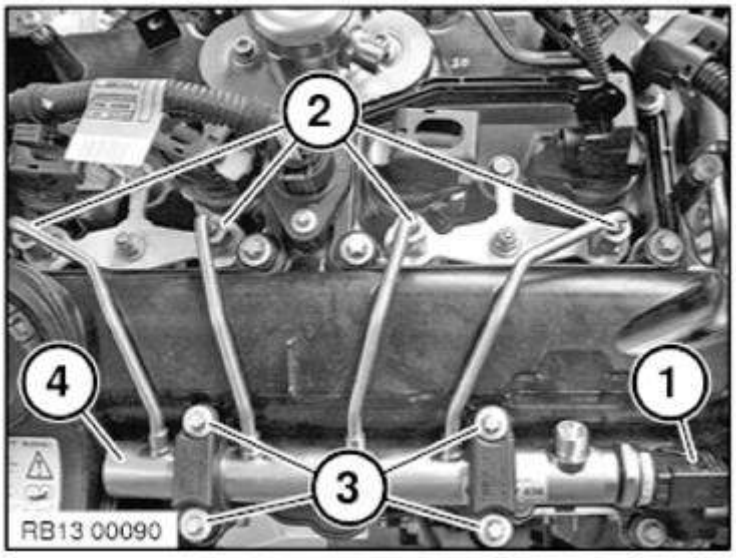


Fig. 210: Identifying Connector, Screws And Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Installing the rail:

NOTE: **Reconnecting:**
When reconnecting the fuel line, lubricate the outer thread. Penetration of lubricant into the fuel-conducting area should be avoided.

NOTE: **To relax the fuel system the hold-down devices must be slackened at the injectors before the rail is installed.**
Release screws (1) and (2) and slacken hold-down device (3).

cardiagn.com

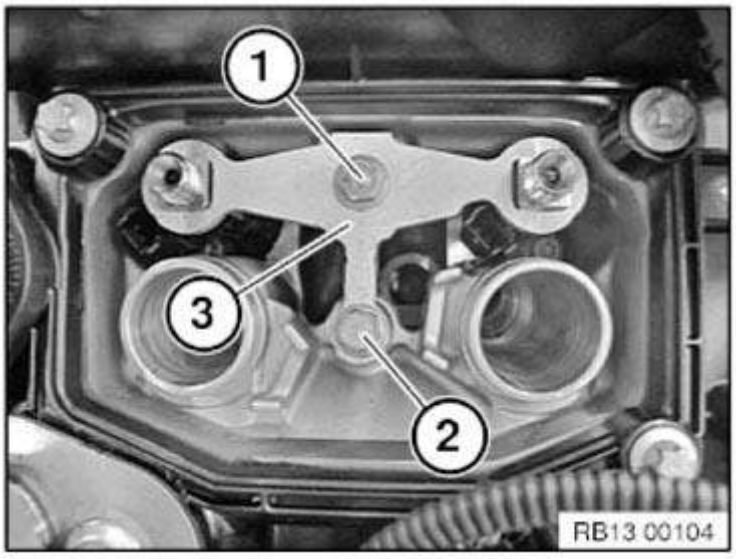


Fig. 211: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Install (4) rail, manually tightening nuts (3) and bolts (2) only.

NOTE:

- **Rail must still be displaceable on cylinder head.**
- **Nuts (2) must be able to be screwed on easily by hand.**
- **Push on connector (1) for high pressure fuel sensor.**

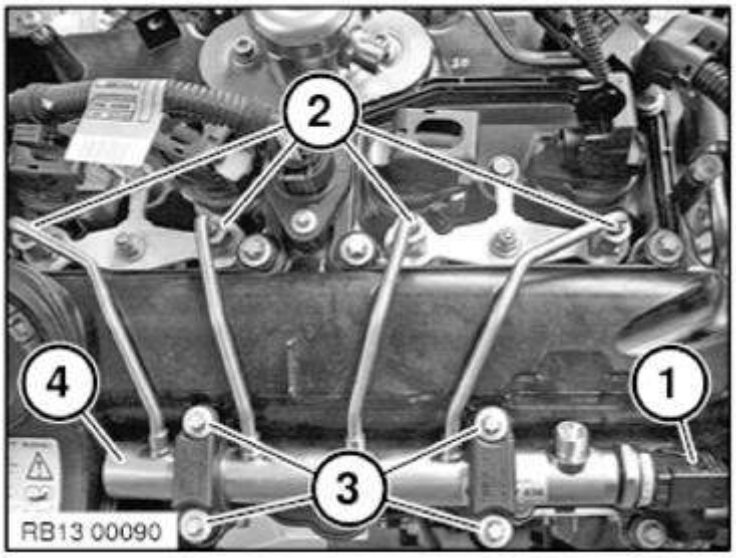


Fig. 212: Identifying Connector, Nuts And Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

Follow the correct screw connection sequence.

1. First tighten screw (1).

   Tightening torque: **13 53 5AZ** .

2. Then tighten screw (2).

   Tightening torque: **13 53 5AZ** .

cardiagn.com

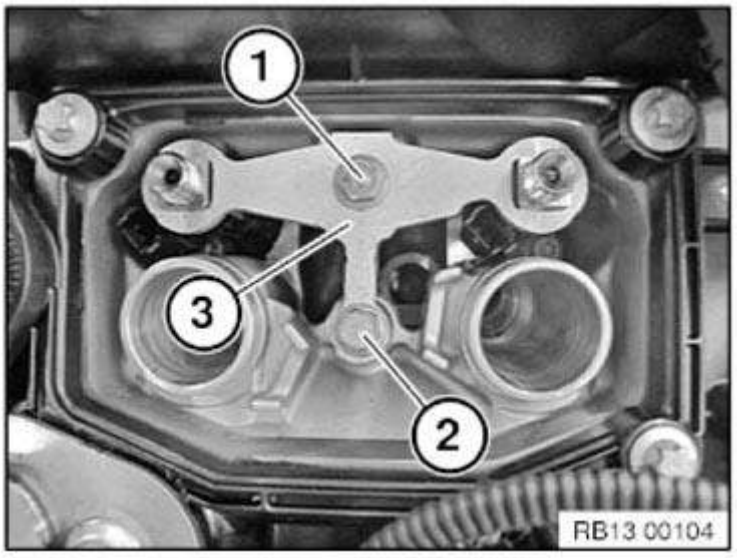


Fig. 213: Identifying Hold-Down Device And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Follow the correct screw connection sequence.

3. First tighten screws (3).

   Tightening torque: **13 53 4AZ** .

4. Then tighten nuts (2) at the injectors.

   Tightening torque: **13 53 6AZ** .

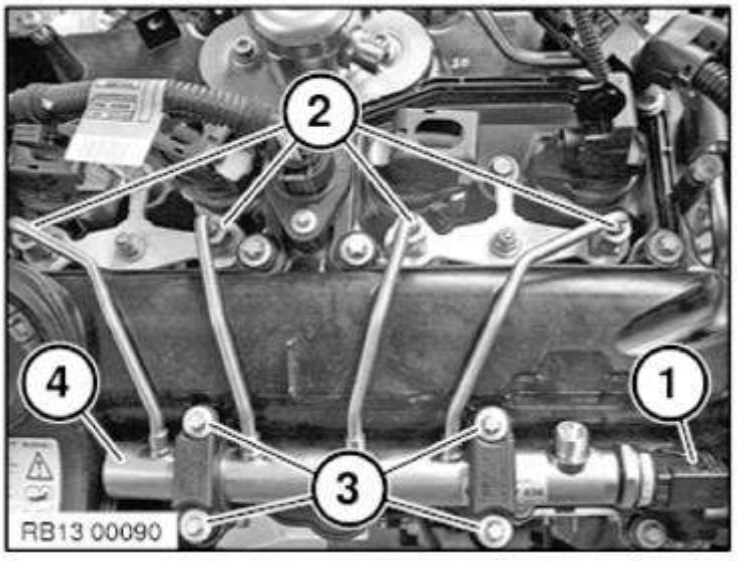


Fig. 214: Identifying Screws And Nuts Of Injectors
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 240 REPLACING COMPLETE FUEL INJECTION PIPE (N52T)

Special tools required:

cardiagn.com

- 13 5 161

IMPORTANT: Wear safety goggles and protective gloves when releasing the fuel line.

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Disconnect **BATTERY EARTH LEAD** .
- Remove **ACOUSTIC COVER** .

Recycling

Fuel escapes when fuel line is detached. Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Unlock and detach plug connections (1) on control unit.

Unclip wiring harness (2) from connector strip for fuel injectors.

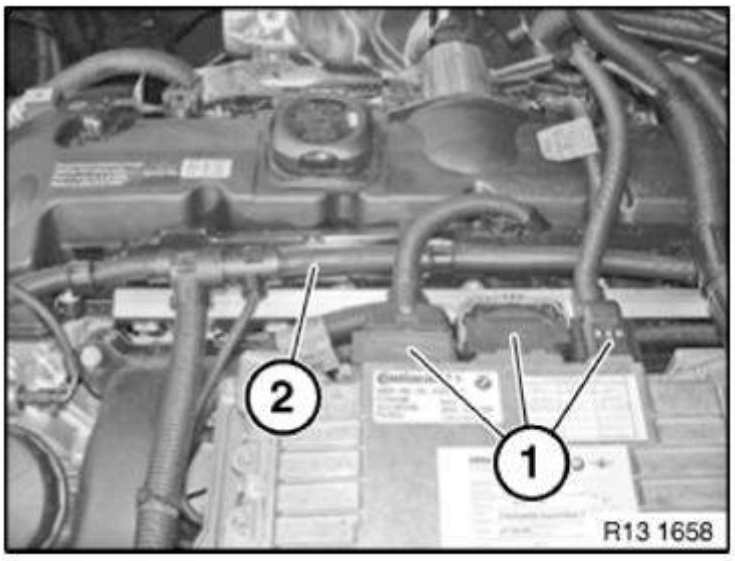
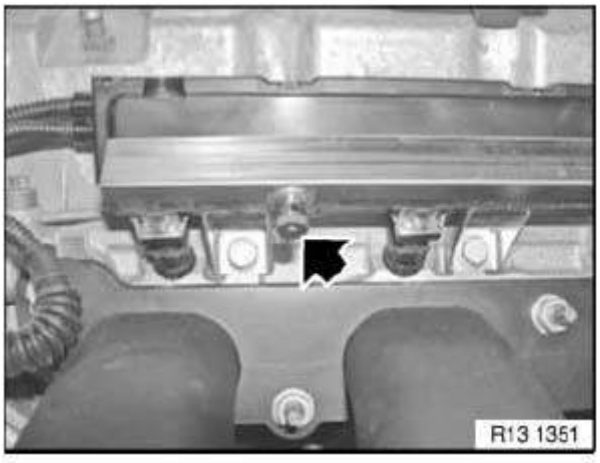


Fig. 215: Identifying Plug Connections And Wiring Harness
Courtesy of BMW OF NORTH AMERICA, INC.

Remove protective cap from compressed air valve.



cardiagn.com

Fig. 216: Locating Protective Cap From Compressed Air Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Connect compressed air line (1) to compressed air valve.

Blow fuel back into fuel tank with a short blast of compressed air (max. 3 bar).

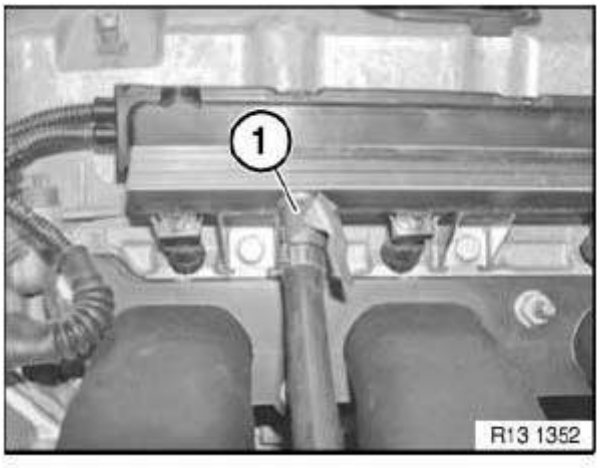


Fig. 217: Identifying Compressed Air Line
Courtesy of BMW OF NORTH AMERICA, INC.

Detach connector strip (1) in upward direction from fuel rail.

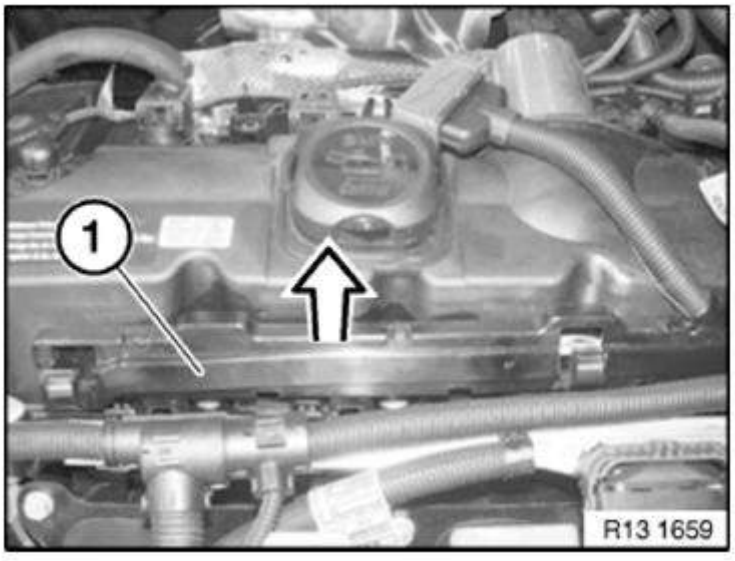


Fig. 218: Detaching Connector Strip
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock and detach fuel line (1).

Unfasten screws (2).

Tightening torque: **13 53 1AZ** .

Remove fuel injection pipe (3).

Replace sealing rings on fuel injectors.

NOTE: Modify FUEL INJECTORS only when replacing fuel injection pipe.

cardiagn.com

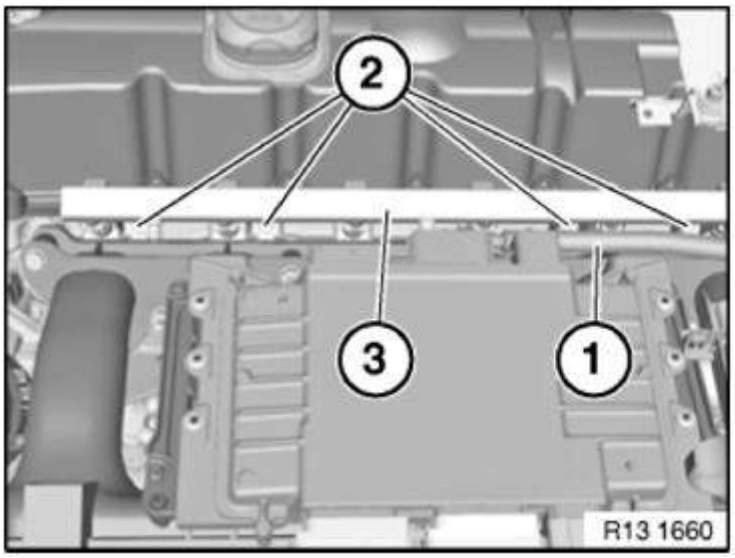


Fig. 219: Identifying Fuel Line And Fuel Injection Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Close off fuel hose with special tool (1) **13 5 161** .

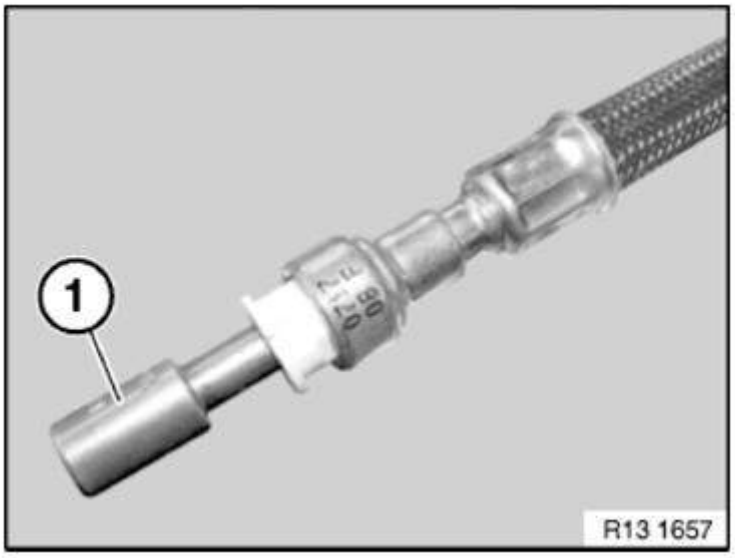


Fig. 220: Identifying Fuel Hose
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.
Check injection system for leak tightness.

13 53 596 REPLACING HIGH PRESSURE FUEL SENSOR (N20)

Special tools required:

- **32 2 100**

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on dismantling).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

cardiagn.com

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

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

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

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

Necessary preliminary tasks:

- Remove the **ACOUSTIC COVER** .

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

Unlock and pull off connector from high-pressure sensor.

Release high pressure sensor with ratchet, extension and special tool **32 2 100** and remove.

Tightening torque: **13 53 1AZ** .

Close the rail with fitting plugs if necessary.

Installation note:

Oil the thread and cone on the high pressure sensor.

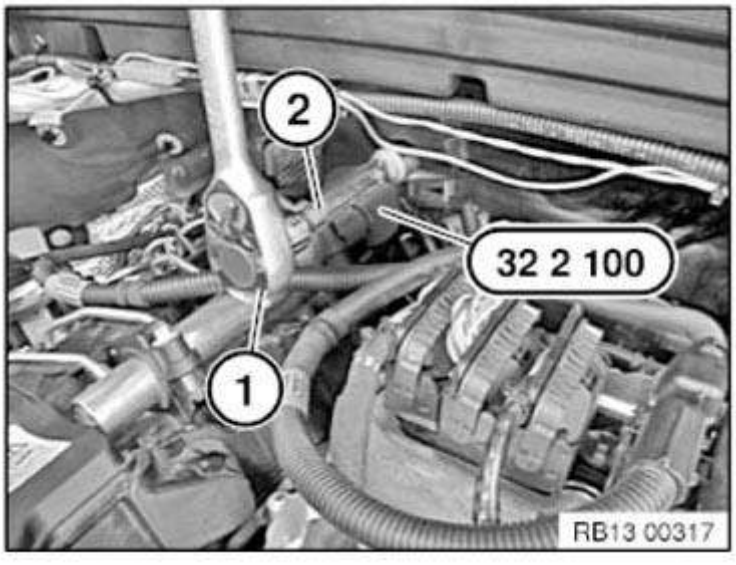


Fig. 221: Pulling Off Connector From High Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 596 REPLACING HIGH-PRESSURE FUEL SENSOR (N55)

Special tools required:

- 32 1 270
- 32 2 100

WARNING: **Observe warning on cylinder head cover.**
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on removal).
Electric fuel pump starts up automatically when door is opened!
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.

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

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

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

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

Necessary preliminary work:

- Remove ignition coil cover. See 12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55) .
- Remove CLEAN AIR PIPE.

Recycling:

Fuel escapes when fuel lines are detached.

Catch and dispose of escaping fuel in a suitable container.

Observe country-specific waste disposal regulations.

Release screws (1).

Slide cable channel (2) to one side.

cardiagn.com

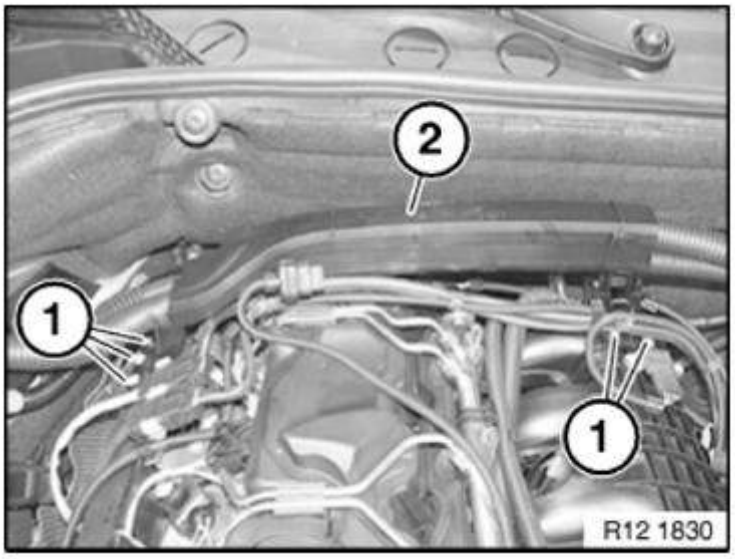


Fig. 222: Identifying Cable Channel And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Release connector (1) and remove.

Release high pressure sensor (2) and remove.

Tightening torque: **13 53 4AZ** with special tool. **32 2 100**

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

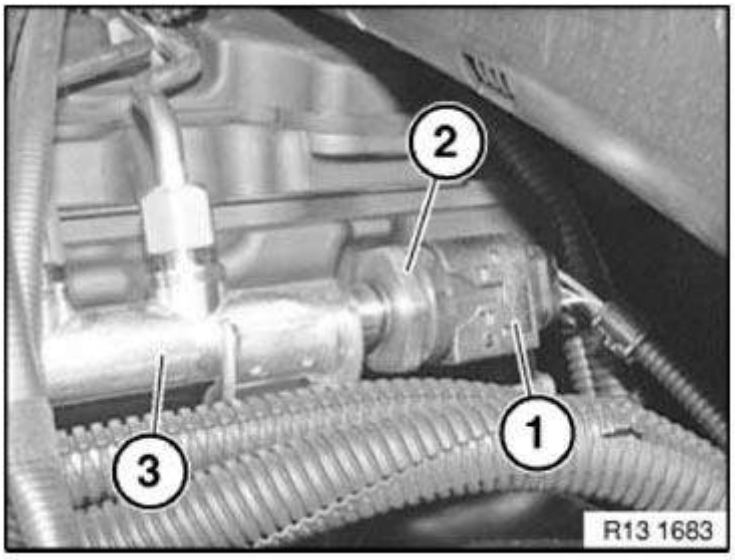


Fig. 223: Identifying Connector And High Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for tightness.

Check function of DME.

13 53 330 REPLACING LEAKAGE OIL LINES (N47 D20 O1)

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.

cardiagn.com

- Switch off ignition.
- Remove **INTAKE FILTER HOUSING**.
- Remove rear acoustic cover.
- Remove sound insulation on injectors.

It is essential to adhere to conditions of absolute cleanliness when carrying out repair work on the fuel system.

IMPORTANT:
- Do not allow any dirt particles or foreign bodies to get into the system.
- Use only fluff-free cloths.
- Remove all traces of dirt contamination before removing lines or individual components.

IMPORTANT: You must protect the alternator against dirt contamination before carrying out any repair work on the fuel circuit.
Cover alternator with suitable materials.
Failure to comply with this procedure may result in an alternator malfunction.

Pull out retainer (1) upwards.

Detach connection of leakage oil line (2) upwards.

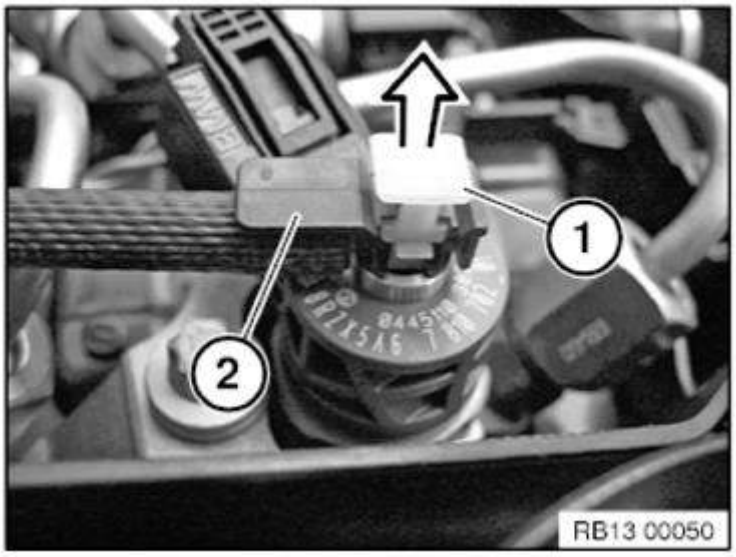


Fig. 224: Pulling Out Retainer
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

The entire leakage oil line must be replaced if seal (1) is damaged.

cardiagn.com

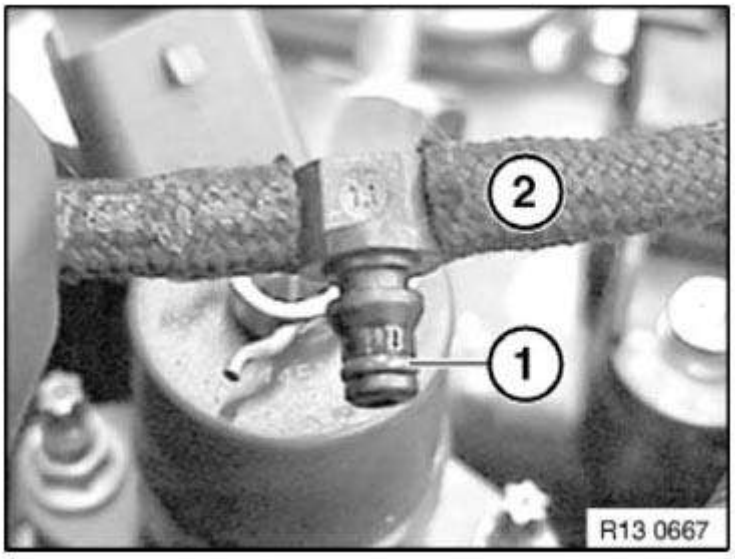


Fig. 225: Identifying Seal And Oil Line
Courtesy of BMW OF NORTH AMERICA, INC.

Detach leakage oil lines from the injectors. Release leakage oil line from rubber grommet (1).

Detach leakage oil line from T-piece (2) of fuel line (close to high pressure pump).

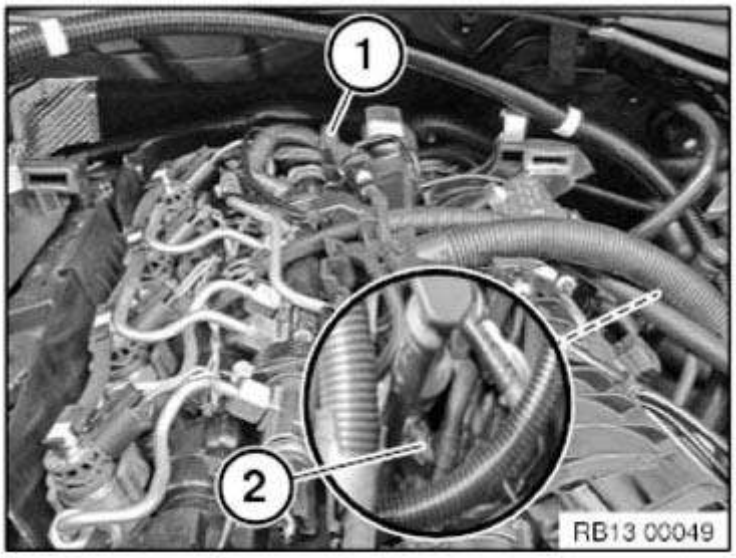


Fig. 226: Identifying Rubber Grommet And Oil Line From T-Piece
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Check fuel system for leak tightness.

13 53 180 REPLACING PRESSURE LINE BETWEEN HIGH PRESSURE PUMP AND PRESSURE ACCUMULATOR (N47 D20 O1)

Special tools required:

- 37 1 152

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.

cardiagn.com

- Switch off ignition.
- Disconnect and connect **INTAKE AIR MANIFOLD** .

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

IMPORTANT: After the engine has stopped, wait at least 1 minute before releasing the high pressure lines. After disconnecting the pressure line, it is absolutely essential to seal the openings in the high pressure pump and the high pressure accumulator with protective caps.

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Release union nuts (1) and (2) on pressure line with special tool **37 1 152**

Reset special tool in good time in order to avoid bending high pressure line.

Feed out pressure lines and remove.

Installation note:

Pay attention to installation position of rubber mounts (3) and rubber grommets (4).

Observe tightening sequence.

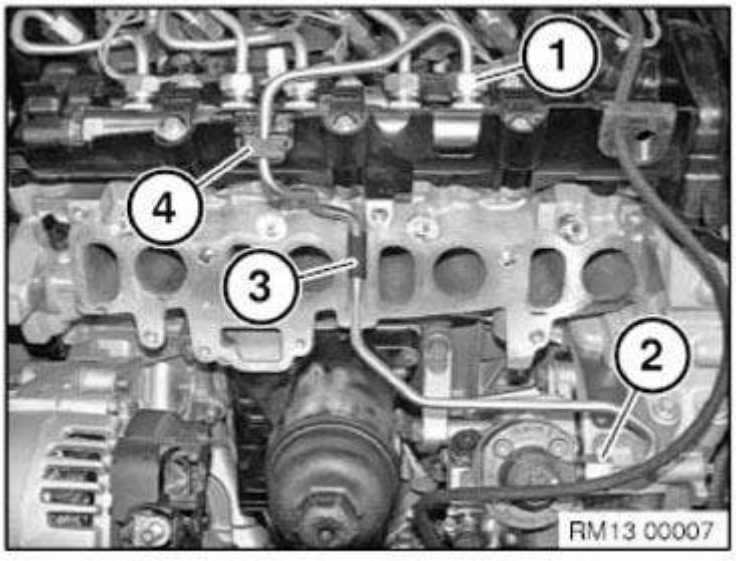


Fig. 227: Identifying Union Nuts, Rubber Mounts And Rubber Grommets
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

- Install pressure lines and tighten hand-tight on both sides.
- First tighten pressure line at rail (1).

  Tightening torque: **13 53 2AZ** .

- Then apply pressure line to high pressure pump (2).

cardiagn.com

Tightening torque: **13 53 2AZ** .

Installation note:

Pay attention to installation position of rubber mount (4) and abrasion protection (3) on pressure line.

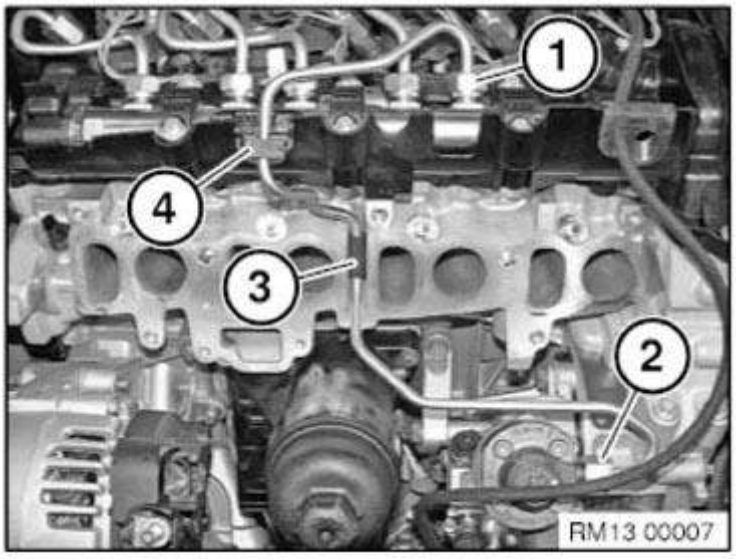


Fig. 228: Identifying Rubber Mount, Pressure Pump And Rail
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

Check fuel system for leak tightness.

13 53 570 REPLACING PRESSURE REGULATOR ON PRESSURE ACCUMULATOR OF FUEL INJECTION SYSTEM (N47 D20 O1)

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Remove **PRESSURE ACCUMULATOR**.

Recycling:

Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

Installation note:

Pressure regulator may only be used once!

Pressure regulator must be replaced (seat seal) after screw connection has been released.

Positioning before final tightening!

Grip at hexagon head (1) when removing pressure regulator.

Release hexagon screw connection on pressure accumulator.

Installation note:

cardiagn.com

Secure position of pressure regulator and grip at hexagon head (2).

Tightening torque: 13 53 4AZ .

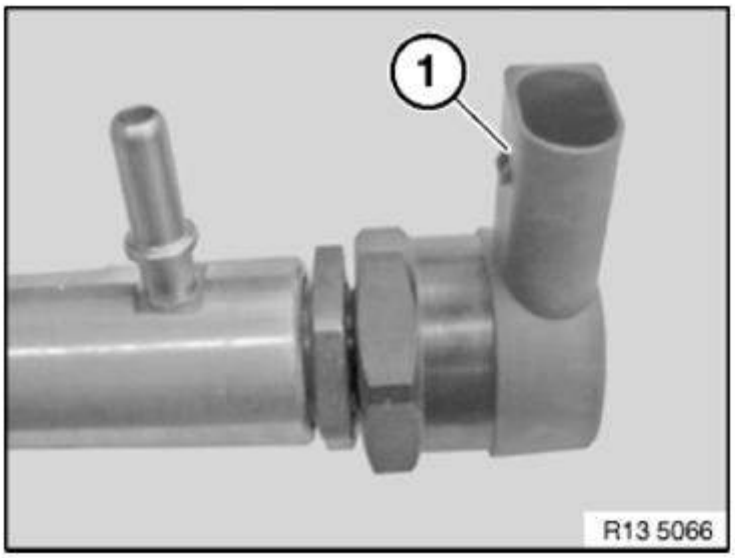


Fig. 229: Identifying Pressure Regulator And Grip Hexagon Head
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Assemble engine.**
Check fuel system for tightness.
Reset adaptation of pressure regulator with BMW diagnosis system.
Check stored fault message.
Delete fault memory.

13 53... WARNINGS FOR THE REMOVAL OF INJECTORS (N55)

WARNING: **Fuel, oil and dirt particles may get into your eyes!**
Wear full face guard and protective gloves.
Observe warning on cylinder head cover.
Disconnect NEGATIVE BATTERY TERMINAL (risk of fire due to short circuit on removal).
Carry out installation work on fuel system only with coolant temperature below 40 Â°C.
Electric fuel pump starts up automatically when door is opened!
Fuel can emerge spontaneously at high velocity from the fuel injectors!
To reduce the fuel pressure, place rag over fuel injector and carefully tap against the fuel injector with a spanner.
There is a danger of injury if the fuel pressure is not reduced!
Before removing the injectors, clean or vacuum off injector slots.

There are two different injector versions for the N55 engine.
A mixed installation of the components (hold-down device, spark plug shafts, injectors, cylinder heads, and screws) between the two hold-down device versions is not possible/permitted!
Compliance with the following notes regarding the removal of the injectors is absolutely mandatory:

- Injectors may be pulled out with a maximum tensile force of **2000 N** and twisted only to **6 Nm** (torsion movement). If these values are exceeded, the injectors must be **replaced!**
- When assembling, it is essential to adhere to screwing sequences and tightening torques!

cardiagn.com

Failure to comply with this regulation may result in leaks!

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

  Introduced dirt contamination can cause malfunctions in the system!

IMPORTANT:

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

  No water may penetrate into injector slots and corrosion between injectors and cylinder head must be prevented.

- Prior to removing injectors, remove the **IGNITION COIL** of the corresponding cylinder.
  - Ignition coils must not become coated with fuel!
  - The resistance of the silicone material is reduced significantly by contact with fuel, which may cause the ignition coil to fail! It is therefore essential to protect the spark plug slot against ingress of fuel with a cloth!
  - Clean spark plug slots before installing ignition coils.
  - Make sure the spark plug slot is absolutely clean.

THROTTLE AND OPERATION

13 54 250 REMOVING AND INSTALLING/REPLACING AIR INTAKE HOSE ON AIR FILTER HOUSING (N52T)

Necessary preliminary work:

- Switch off ignition.
- Remove **INTAKE SILENCER HOUSING**.

Release clamp (1).

Tightening torque: **13 71 1AZ** .

Feed out air intake hose (2) and remove.

cardiagn.com

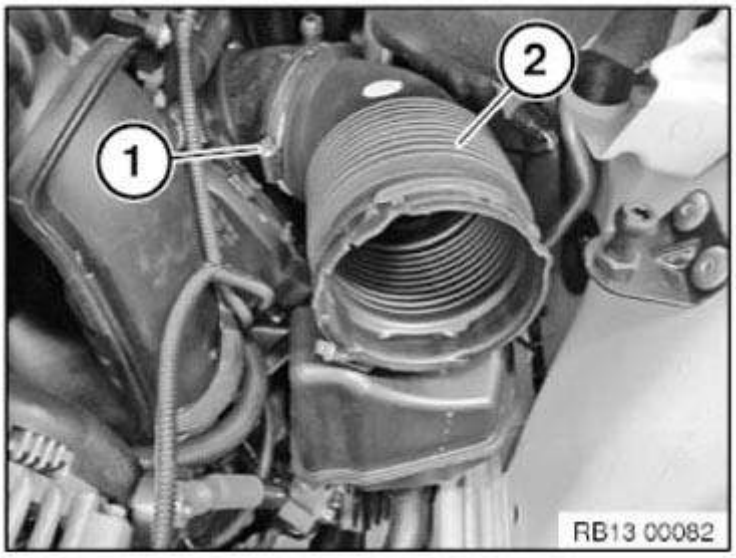


Fig. 230: Identifying Clamp And Air Intake Hose
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

13 54 251 REMOVING AND INSTALLING/REPLACING AIR INTAKE HOSE ON THROTTLE BODY (N52T)

Necessary preliminary work:

- Remove **AIR INTAKE HOSE** from air filter housing.

Unfasten clamp.

Tightening torque: **13 71 1AZ** .

Detach air intake hose (1) from throttle body and remove.

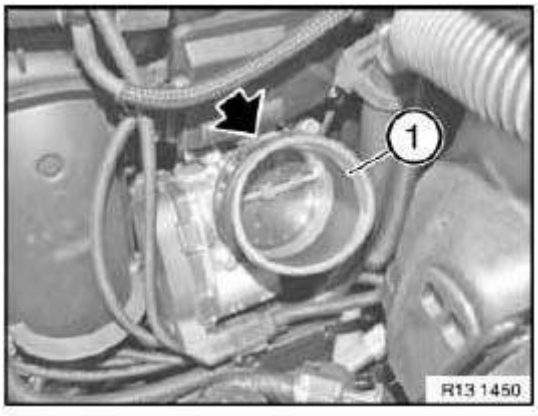


Fig. 231: Locating Air Intake Hose From Throttle Body
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

13 54 030 REMOVING AND INSTALLING/SEALING THROTTLE BODY (N47 D20 O1)

IMPORTANT: Read and comply with notes on protection against damage from electrostatic damage (ESD protection).

cardiagn.com

Necessary preliminary work:

- Switch off ignition.
- Remove intake port. See **13..... REMOVING INTAKE PORT (N47 D20 O1)**.

Release and detach plug connections (1) at throttle body and intake temperature sensor.

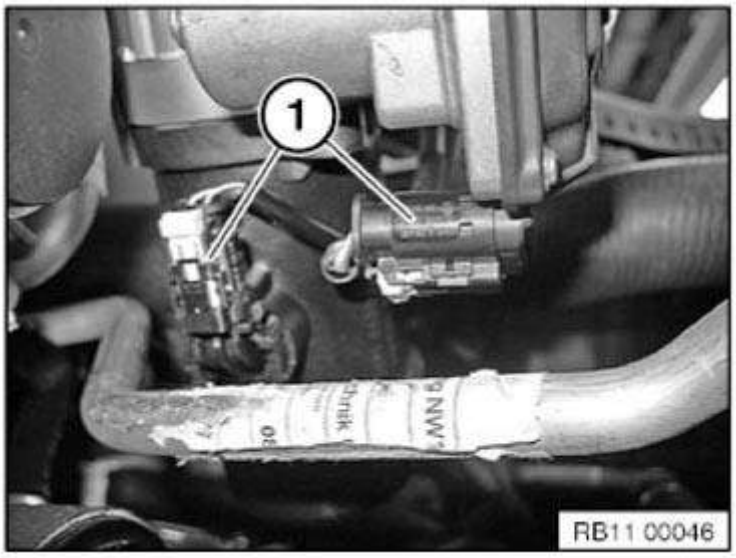


Fig. 232: Identifying Plug Connections
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1) on throttle body.

Tightening torque: **13 54 1AZ** .

Loosen clamps (2).

Feed out and remove throttle body (3).

Installation note:

Replace seals on throttle body and intake air mixer pipe.

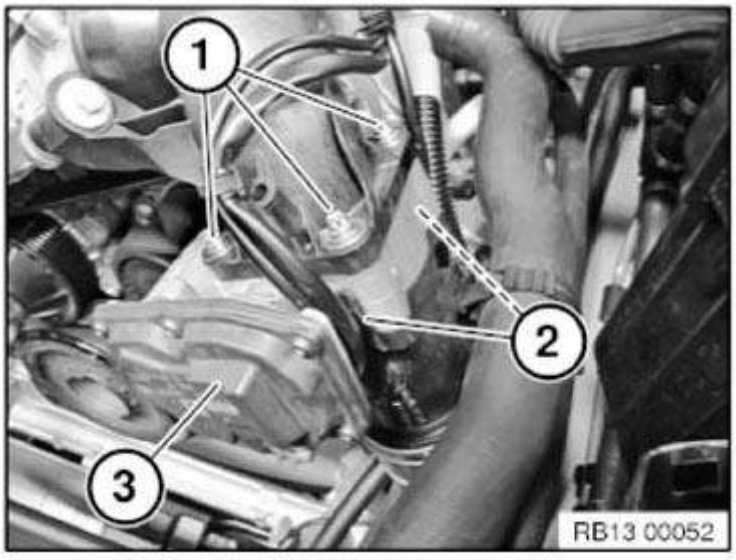


Fig. 233: Identifying Throttle Body, Clamps And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

Installation note:

Check stored fault message.

Delete fault memory.

13 54 030 REMOVING AND INSTALLING/SEALING THROTTLE BODY (N52T)

Read and comply with notes on **PROTECTION AGAINST ELECTROSTATIC DISCHARGE** (ESD protection).

Necessary preliminary work:

- Switch off ignition.
- Remove intake silencer housing. See **13 71 000 REMOVING AND INSTALLING/REPLACING INTAKE SILENCER HOUSING (N52T)**.
- Remove **AIR INTAKE HOSE** from throttle body.

Release connector (1) and remove.

Release screws.

Tightening torque: **13 54 1AZ** .

Remove throttle body (2).

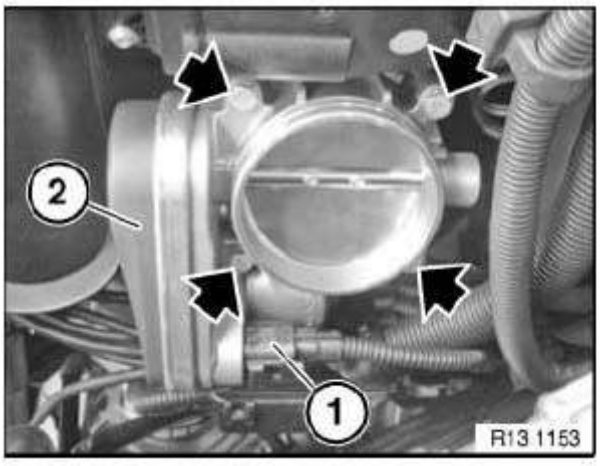


Fig. 234: Locating Screws Of Throttle Body
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

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

cardiagn.com

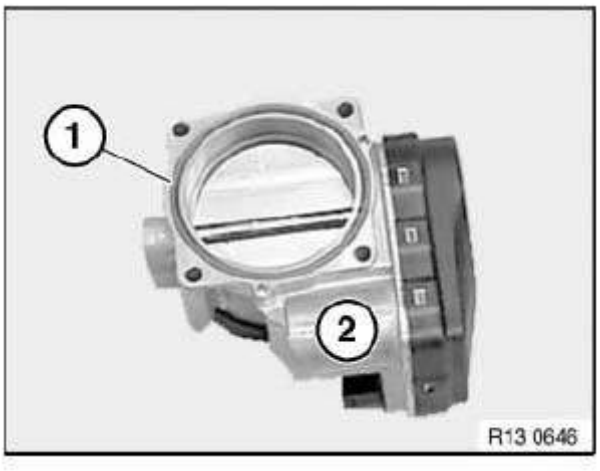


Fig. 235: Identifying Sealing Ring Of Throttle Body
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check stored fault messages.

Delete fault memory.

13 54 030 REMOVING AND INSTALLING/SEALING THROTTLE BODY (N55)

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

Necessary preliminary work:

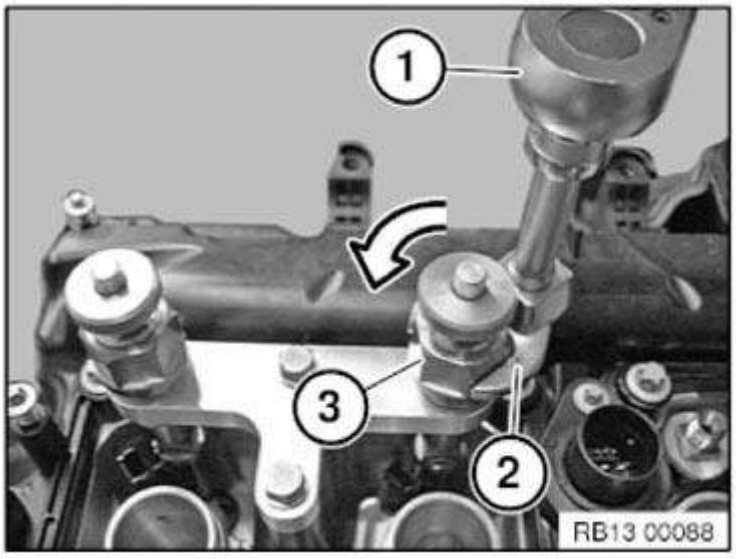
- Switch off ignition.
- **REMOVE LEFT CHARGE AIR DUCT** .

Version 1:

Release connector (1) and remove.

Unlock hose (2) and detach.

Release fastener (3) and detach fuel tank vent line from fuel tank vent valve and place to one side.



cardiagn.com

Fig. 236: Identifying Connector, Hose And Fastener
Courtesy of BMW OF NORTH AMERICA, INC.

Type 2:

Release connector (1) and remove.

Unlock and disconnect hoses (2) and (3).

Remove tank vent valve (4) from holder in the direction of arrow and place aside.

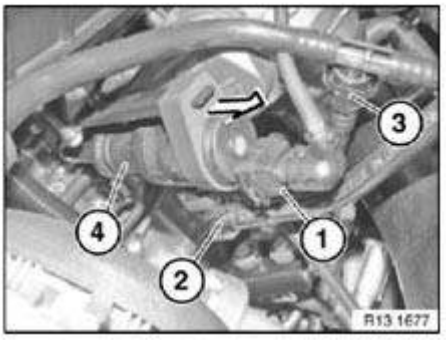


Fig. 237: Disconnecting Hoses
Courtesy of BMW OF NORTH AMERICA, INC.

Release connector (1) and remove.

Release screws (3).

Partially remove throttle body (4) and unlock tank ventilation line (2) and remove.

Tightening torque: **13 54 1AZ** .

Remove throttle body (4).

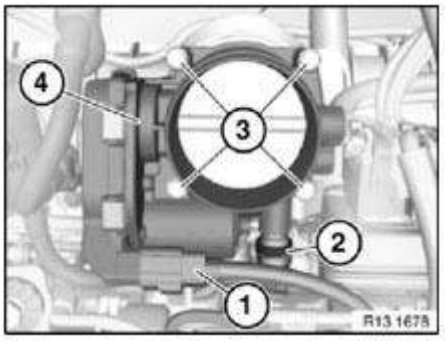


Fig. 238: Identifying Connector, Screws And Throttle Body
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

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

cardiagn.com

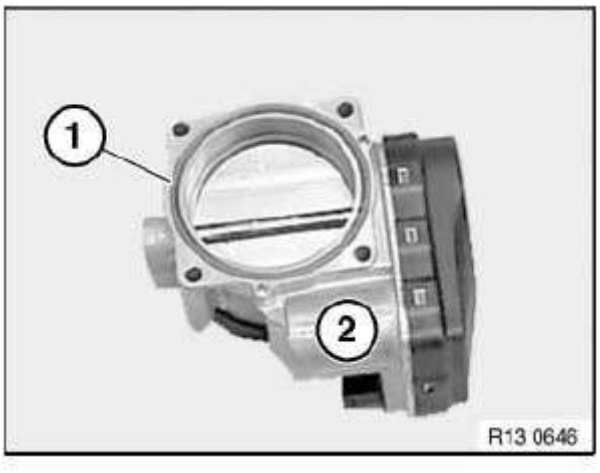


Fig. 239: Identifying Sealing Ring Of Throttle Body
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check stored fault message.

Delete fault memory.

13 54 030 REMOVING AND INSTALLING/SEALING THROTTLE VALVE ASSEMBLY (N20, N26)

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

Necessary preliminary tasks:

- Switch off ignition.
- Release **CHARGE AIR DUCT** on throttle body and lay it on its side.

Unlock tank ventilation line (1) and disconnect.

Unlock connector (2) and remove.

Release screws (3).

Tightening torque: **13 54 1AZ** .

Remove throttle body (4).

cardiagn.com

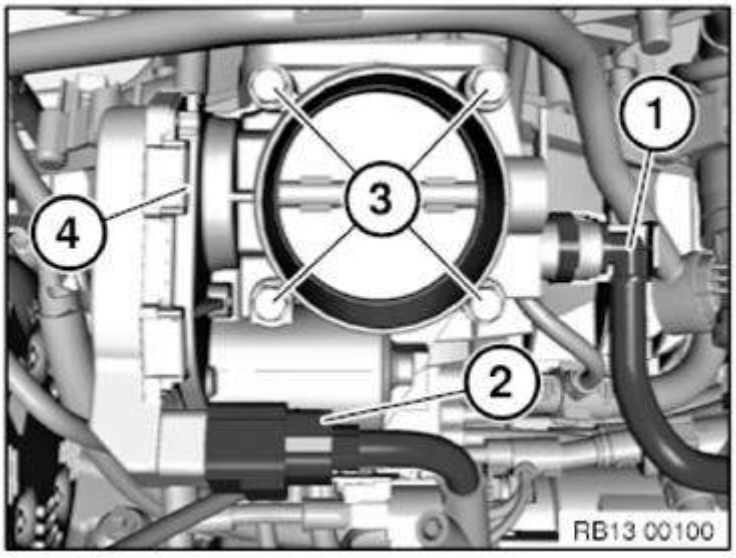


Fig. 240: Identifying Tank Ventilation Line And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

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

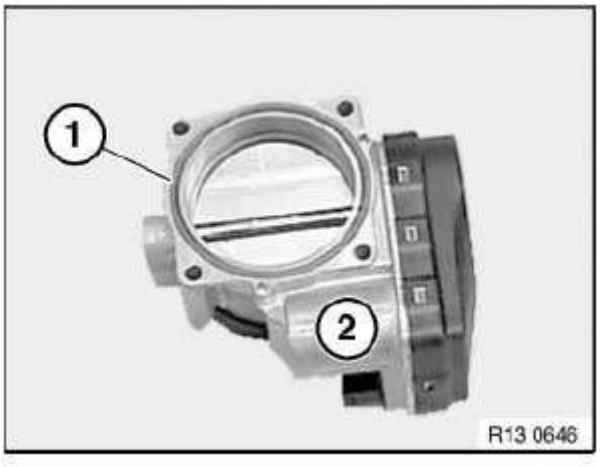


Fig. 241: Identifying Sealing Ring Of Throttle Body
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check stored fault message.

Delete fault memory.

11 61 365 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N20)

See **11 61 365 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N20)** .

11 61 368 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N55)

See **11 61 368 REMOVING AND INSTALLING/REPLACING LEFT-HAND CHARGE AIR DUCT (N55)** .

11 61 362 REMOVING AND INSTALLING/REPLACING RIGHT CHARGE AIR LINE (N20, N26)

cardiagn.com

See 11 61 362 REMOVING AND INSTALLING/REPLACING RIGHT CHARGE AIR LINE (N20, N26)
.

ELECTRONIC CONTROL UNIT

13 61 501 REPLACING (DDE) CONTROL UNIT (N47 D20 O1)

IMPORTANT: Read and comply with NOTES on protection against electrostatic damage (ESD protection).

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Disconnect BATTERY EARTH LEAD .
- FOLLOW INSTRUCTIONS FOR REMOVING AND INSTALLING CONTROL UNITS .

Replacement:

- Carry out programming/encoding.
- If no data can be read out from the previous control unit, carry out injection quantity compensation (description at end of instructions).

IMPORTANT: It is absolutely essential to read out the fault memory with the BMW diagnosis system and to create a fault memory printout.
Switch off ignition.

Release screws (1).

Detach coolant hose from cover of electronics box.

Remove electronics box cover (3).

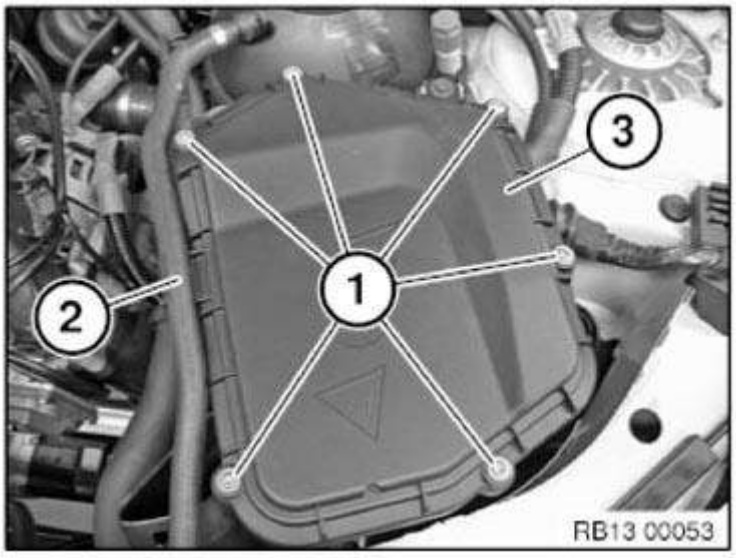


Fig. 242: Identifying Electronics Box Cover And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock all connectors (1) from control unit and disconnect.

Detach rubber grommets (2) from electronics box. Place wiring harnesses to the side.

Installation note:

cardiagn.com

Make sure grommets are correctly fitted (watertightness).

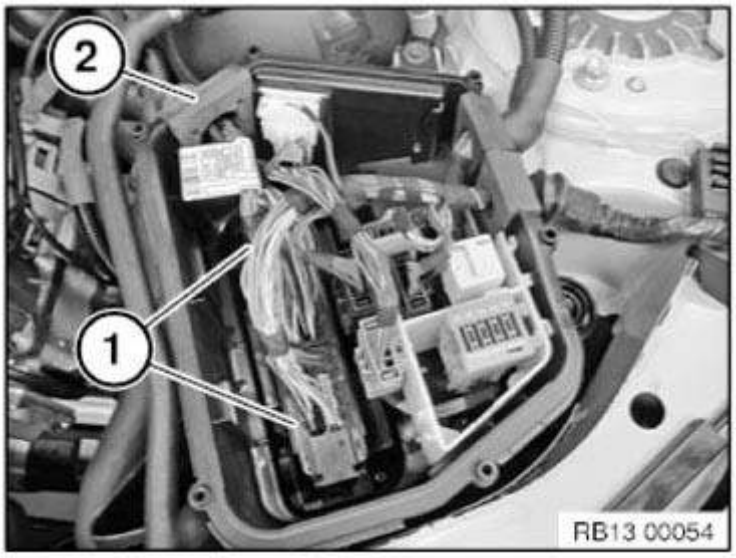


Fig. 243: Identifying Connectors And Rubber Grommets
Courtesy of BMW OF NORTH AMERICA, INC.

Release retainers (1) on control unit.

Pull out control unit (2) towards top.

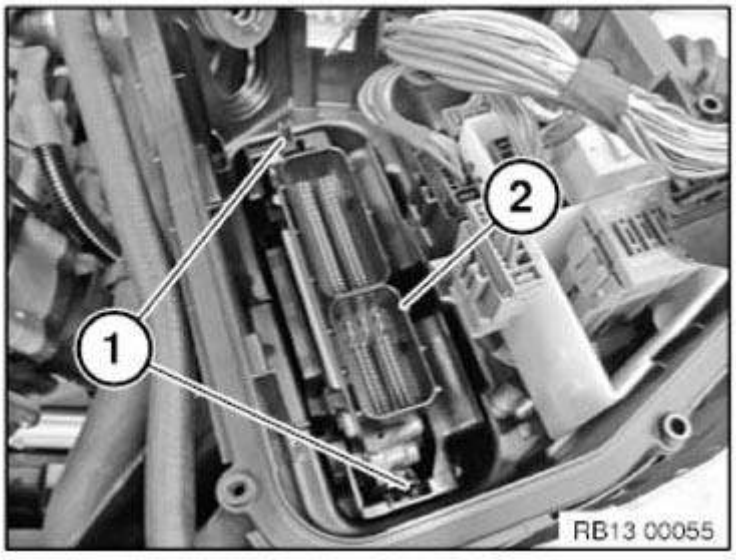


Fig. 244: Identifying Retainers And Control Unit
Courtesy of BMW OF NORTH AMERICA, INC.

Injector adjustment:

If the DDE control unit has been replaced, it will also be necessary to carry out injection quantity compensation!

The adjustment value (7-position letter/number code) is engraved on each injector.

Enter the numbers/letters according to the installation position (cylinder) of the injectors.

cardiagn.com

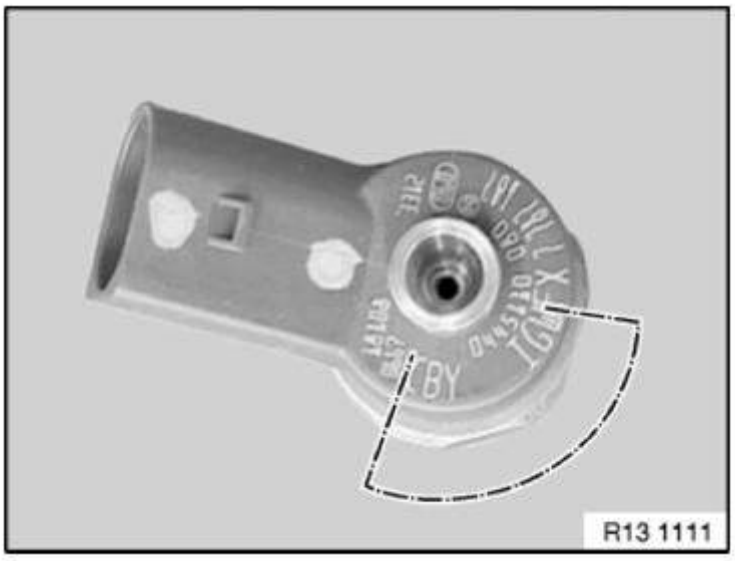


Fig. 245: Identifying DDE Control Unit Adjustment Value
Courtesy of BMW OF NORTH AMERICA, INC.

- Select "DDE".
- Select "Adjustment, injection quantity compensation"
- Select "Test plan"

The adjustment must be entered for each injector.

It is necessary to adjust the injectors to ensure their full operability.

NOTE: **Check stored fault messages.**
Delete fault memory.

SENSOR FOR CONTROL UNIT

13 62 511 REMOVING AND INSTALLING/REPLACING CHARGE-AIR TEMPERATURE SENSOR (N47 D20 O 1)

Necessary preliminary tasks:

- Read out fault memory of the DME control unit, work through test plans if necessary.
- Switch off ignition.
- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)**.

Unlock connector (1) from charge-air temperature sensor (2) and pull off.

cardiagn.com

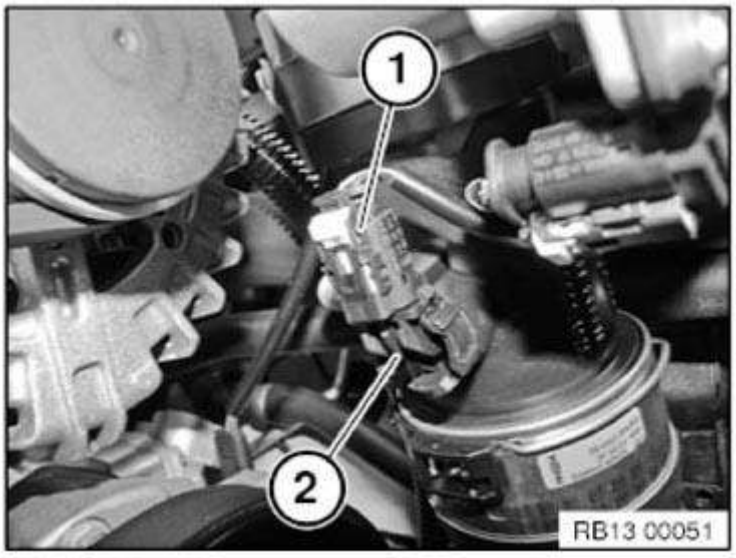


Fig. 246: Identifying Connector From Charge-Air Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: The lock must be unlocked for removal of charge-air temperature sensor!
If the lock is not unlocked, the retaining lug on charge-air temperature sensor wears.
If the retaining lug is damaged, the charge-air temperature sensor can fall out of the pressure pipe.

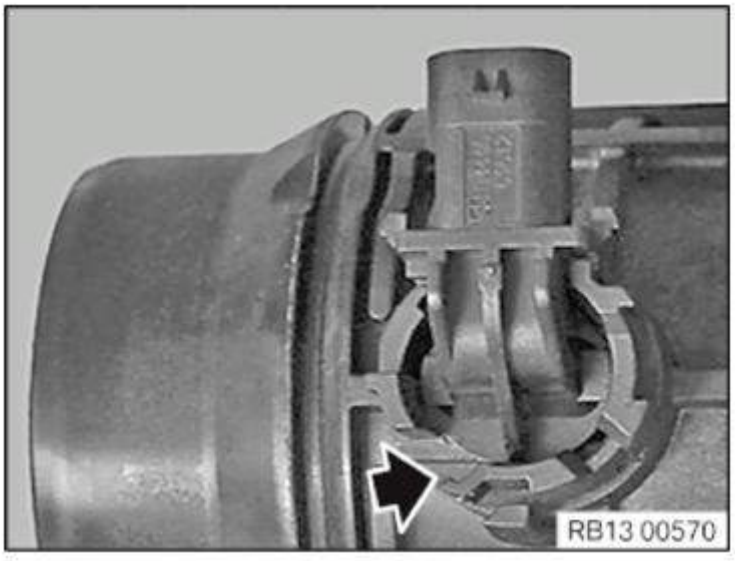


Fig. 247: Locating Retaining Lug
Courtesy of BMW OF NORTH AMERICA, INC.

Open the lock with a suitable tool (1).

Rotate charge-air temperature sensor (2) anticlockwise by 90Â° and pull out sensor straight.

Installation note:

Check sealing ring.

Replace damaged sealing ring.

cardiagn.com

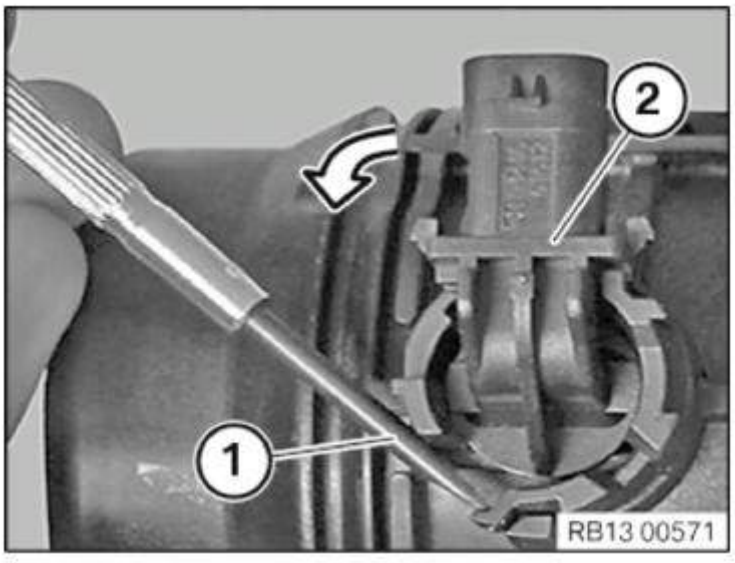


Fig. 248: Rotating Charge-Air Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Clear diagnostic fault entries from fault memory.**
Reassemble the vehicle.

13 62 010 REMOVING AND INSTALLING/REPLACING DIFFERENTIAL PRESSURE SENSOR (N52T)

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

Necessary preliminary work:

- Remove **ACOUSTIC COVER** .

Unclip wiring harness (1) and lay to one side.

Unlock connector (2) and remove.

Release screws (3).

Tightening torque: **13 62 4AZ** .

Pull differential pressure sensor (4) out of intake plenum.

cardiagn.com

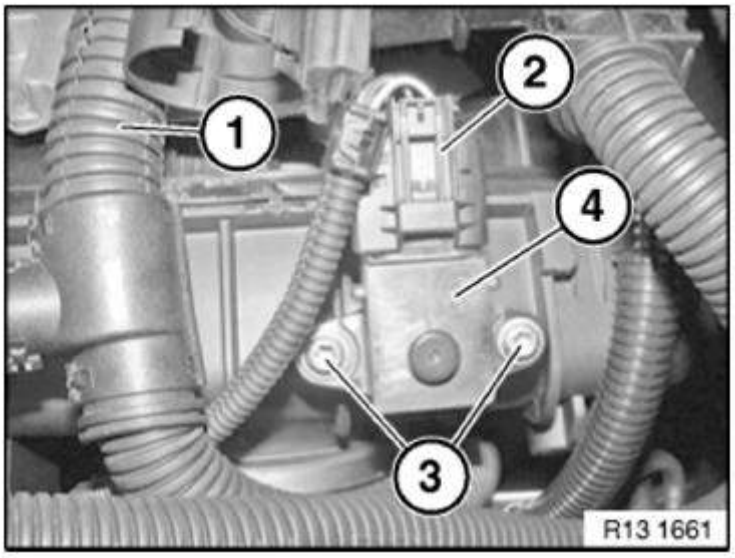


Fig. 249: Identifying Wiring Harness, Connector And Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Read out fault memory of control unit of Digital Motor Electronics (DME).

Check stored fault message.

Delete fault memory.

13 62 560 REMOVING AND INSTALLING/REPLACING HOT FILM AIR MASS METER (N20)

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.

Release connector (1) on hot film air mass meter and disconnect.

Unfasten screws (2).

Tightening torque: **13 71 4AZ** .

Remove the hot film air mass meter (3).

cardiagn.com

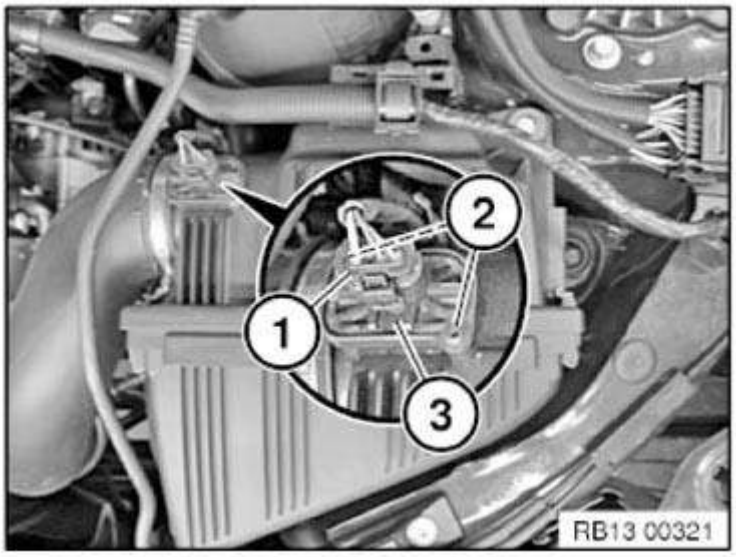


Fig. 250: Identifying Connector, Air Mass Meter And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

13 62 560 REMOVING AND INSTALLING/REPLACING HOT FILM AIR MASS METER (N47 D20 O1)

Necessary preliminary tasks:

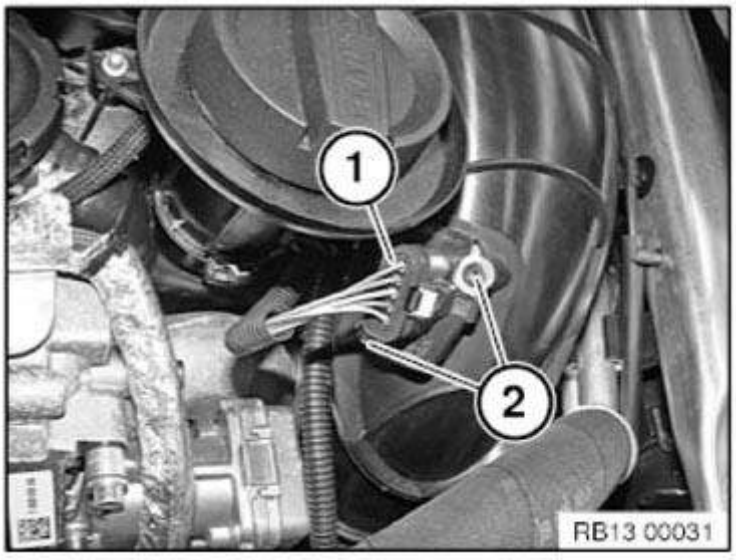
- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)**.

Unlock connector (1) and remove.

Unfasten screws (2).

Tightening torque: **13 71 1AZ** .

Remove the hot film air mass meter.



cardiagn.com

Fig. 251: Identifying Connector And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

Replacement only:

Reset the adaptation values for the air mass system via the BMW diagnosis system.

NOTE: Check stored fault messages.
Delete fault memory.

13 62 560 REMOVING AND INSTALLING/REPLACING HOT FILM AIR MASS METER (N52T)

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.

Release connector (1) and remove.

Unfasten screws (2).

Tightening torque: 13 62 8AZ .

Pull hot film air mass meter (3) out of upper section of intake silencer housing.

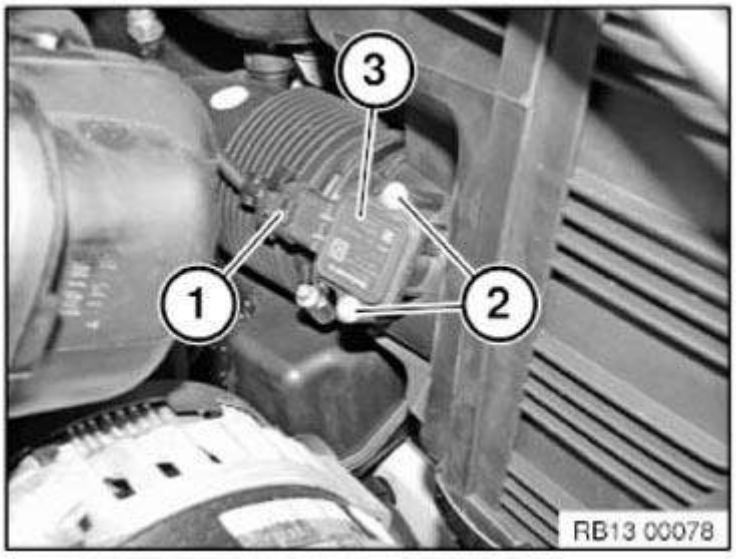


Fig. 252: Identifying Connector, Screws And Hot Film Air Mass Meter
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Check stored fault message.
Delete fault memory.

13 62 560 REMOVING AND INSTALLING/REPLACING HOT FILM AIR MASS METER (N55)

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.
- Remove ignition coil cover. See 12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55) .

Release clamps (1).

cardiagn.com

Tightening torque: **13 71 2AZ** .

Release connector (2) on hot film air mass meter and disconnect.

Disconnect clean air pipe (3) from rubber mount at top and remove.

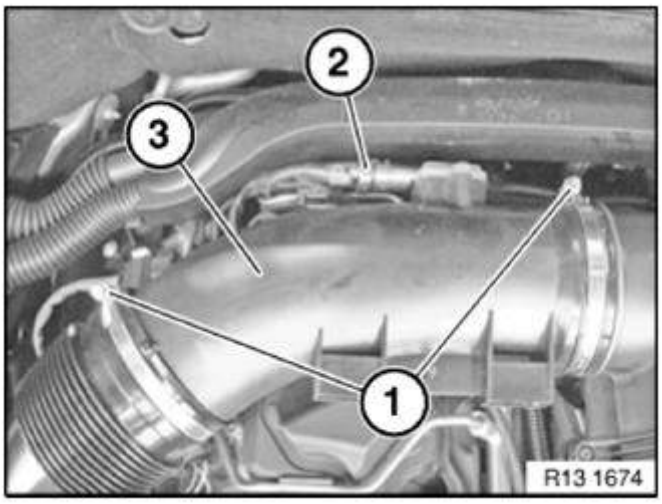


Fig. 253: Identifying Connector, Air Pipe And Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Release screws (1).

Tightening torque: **13 71 3AZ** .

Pull hot-film air mass meter (2) out of upper section of clean air pipe.

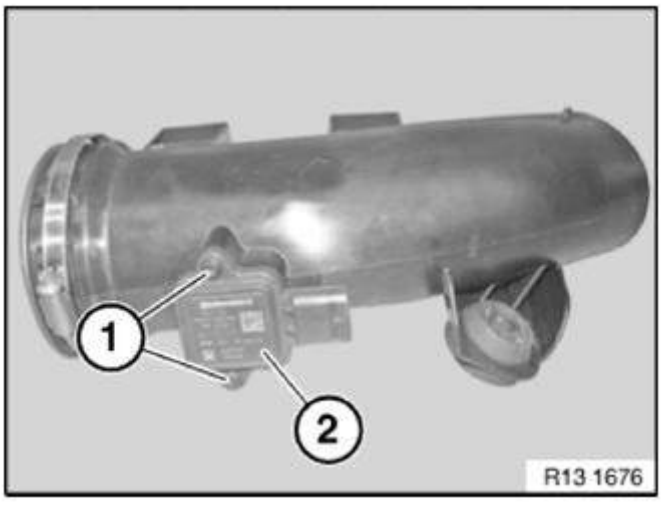


Fig. 254: Identifying Air Mass Meter And Screws
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

13 62 582 REMOVING AND INSTALLING/REPLACING OIL TEMPERATURE SENSOR (N55)

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Necessary preliminary work:

cardiagn.com

- Switch off ignition.
- Remove **THROTTLE VALVE ASSEMBLY**.

Recycling:

Catch and dispose of emerging engine oil.

Observe country-specific waste disposal regulations.

Release connector (1) and remove.

Release oil temperature sensor (2).

Tightening torque: **13 62 7AZ** .

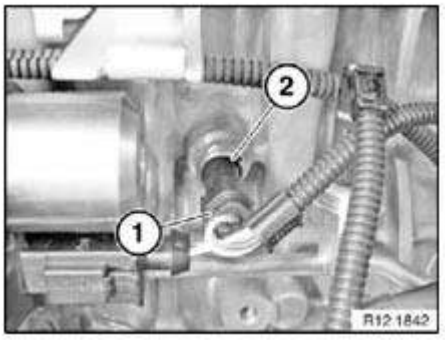


Fig. 255: Identifying Connector And Oil Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Add final details to vehicle**
Check engine oil level. Top up engine oil if necessary.

13 62 651 REMOVING/REPLACING OXYGEN SENSOR (N47 D20 O1)

Special tools required:

- **11 7 020**

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Remove **INTAKE FILTER HOUSING**.

Disconnect connector (1) and release from bracket.

Release oxygen sensor cable from clamp (2).

Remove oxygen sensor (3) with special tool **11 7 020** .

Tightening torque: **13 62 3AZ** .

cardiagn.com

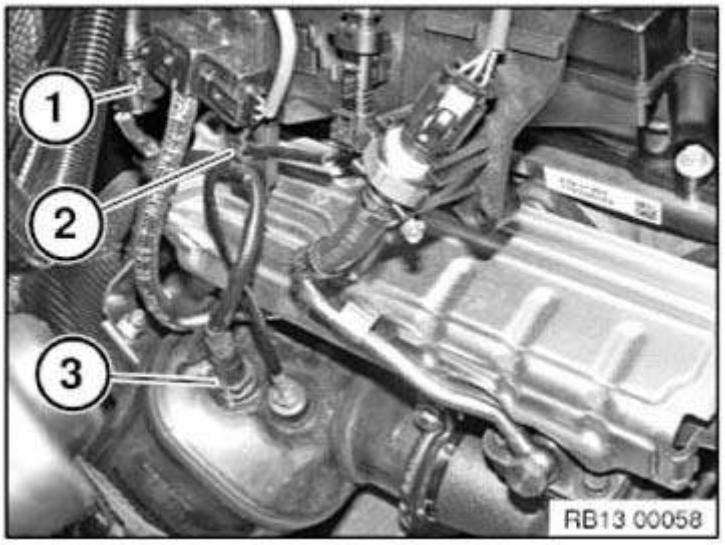


Fig. 256: Identifying Connector, Oxygen Sensor And Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Threads of new oxygen sensors are already coated with NEVER-SEEZ compound.

If an oxygen sensor is reused, only apply a thin and uniform coat of NEVER-SEEZ compound to thread.

Oxygen sensor section projecting into exhaust branch must not be cleaned or come into contact with lubricant.

Pay attention to cable routing of oxygen sensors.

11 7 020 Use special tool to tighten down oxygen sensor.

Tightening torque: **13 62 3AZ** .

Cover oxygen sensors when applying underbody protection.

Installation note:

Check stored error/fault messages.

Delete fault memory.

13 62 585 REPLACE THE EXHAUST PRESSURE SENSOR ON THE EXHAUST TURBOCHARGER (N47 D20 O1)

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Necessary preliminary tasks:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Remove **INTAKE SILENCER HOUSING**.

Unlock connector (1) and remove.

Release clamp (2).

Unclip the exhaust-gas temperature sensor (3) and remove from the pressure hose.

cardiagn.com

Installation note:

Immediately secure pressure hose back to the hose clamp on the exhaust back pressure sensor.

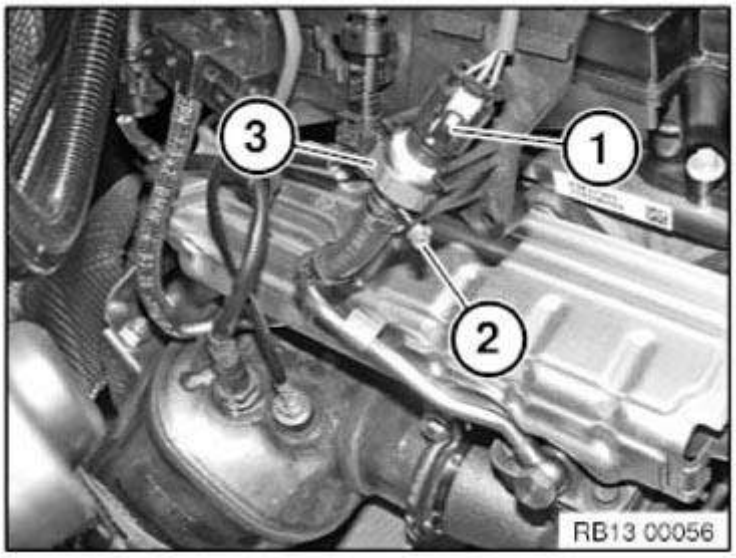


Fig. 257: Identifying Connector, Clamp And Exhaust-Gas Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

After replacing the exhaust back pressure sensor, carry out an adaptation using the, Exhaust back pressure sensor upstream of "exhaust turbocharger" diagnosis system.

Check stored error/fault messages.

Delete fault memory.

13 62 650 REPLACING CAMSHAFT PULSE GENERATOR (N47 D20 O1)

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Remove **INTAKE FILTER HOUSING**.
- Remove rear acoustic cover.
- Remove sound insulation on injectors.

If necessary, detach connector from pressure regulator (1).

If necessary, unplug connector (2), injector, cyl. 4.

Unlock connector (3) from pulse generator and detach.

cardiagn.com

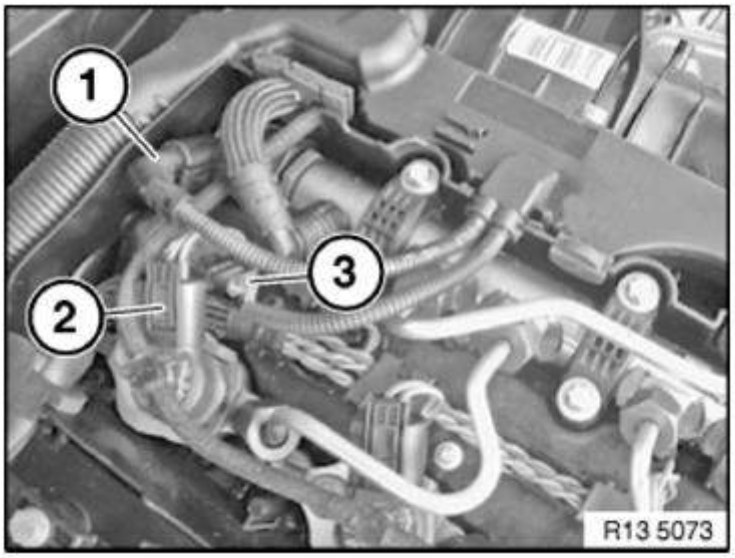


Fig. 258: Identifying Connector And Pressure Regulator
Courtesy of BMW OF NORTH AMERICA, INC.

Release screw (1).

Tightening torque: **13 62 1AZ** .

Remove pulse generator.

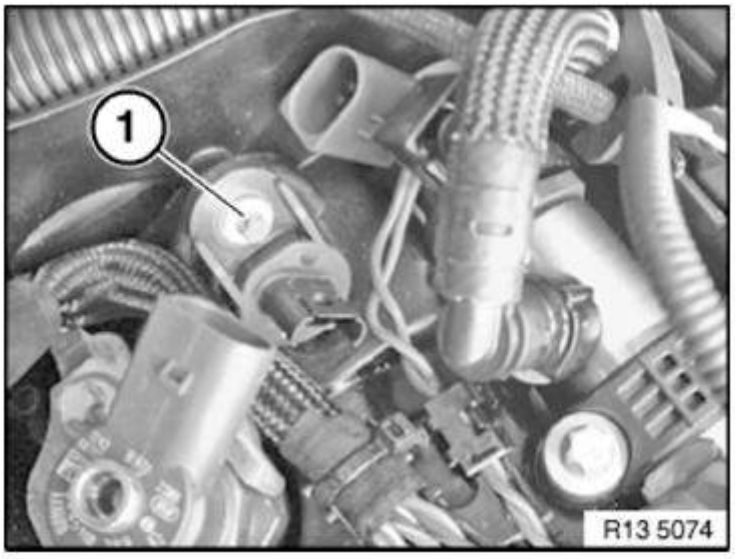


Fig. 259: Identifying Screw Of Pulse Generator
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Replace sealing ring (1). Apply a thin coat of lubricant to sealing ring for installation.

cardiagn.com

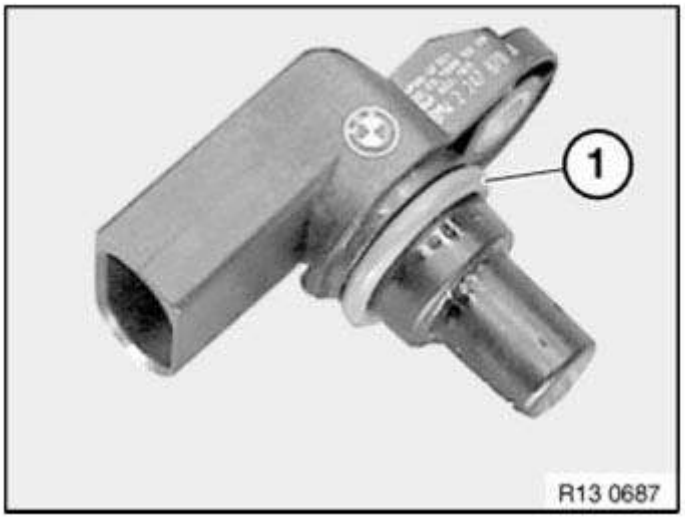


Fig. 260: Identifying Sealing Ring
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Reassemble the vehicle.

Delete fault memory.

Check function of DDE.

13 62 535 REPLACING CHARGING PRESSURE SENSOR (N47 D20 O1)

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Remove **INTAKE FILTER HOUSING**.

Release connector (1) and remove.

Release screw (2).

Tightening torque: **13 62 5AZ** .

Remove charging pressure sensor (3).

Installation note:

Check sealing ring of charging pressure sensor and replace if damaged.

Prior to installation, apply a thin coat of lubricant to sealing ring of charging pressure sensor.

cardiagn.com

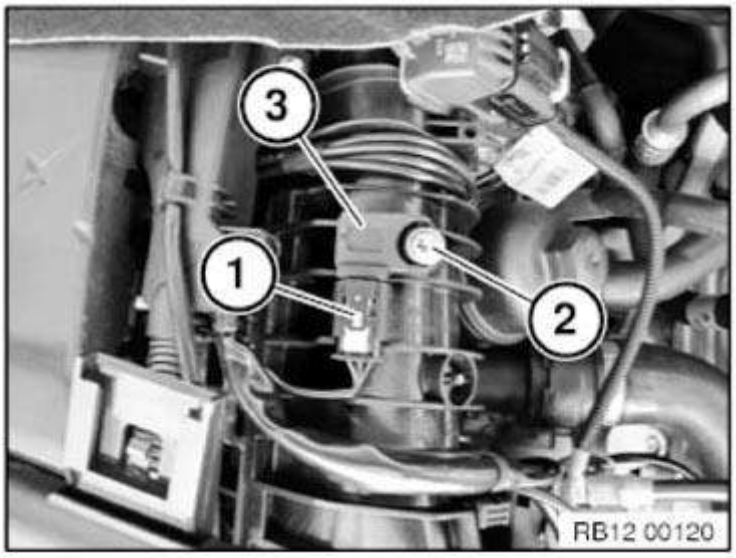


Fig. 261: Identifying Connector, Screw And Charging Pressure Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

13 62 531 REPLACE COOLANT TEMPERATURE SENSOR (N20, N26)

WARNING: **Risk of scalding!**
Only perform this repair work on an engine that has cooled down.

Recycling

Catch and dispose of escaping coolant.

Observe country-specific waste disposal regulations.

Necessary preliminary tasks:

- Read out the fault memory of the DME control unit.
- Switch off ignition.

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

Unlock connector (1) and remove.

Unfasten coolant temperature sensor (2).

Tightening torque: **13 62 6AZ** .

Installation note:

If necessary, top up coolant.

Check **COOLING SYSTEM** for leaks.

cardiagn.com

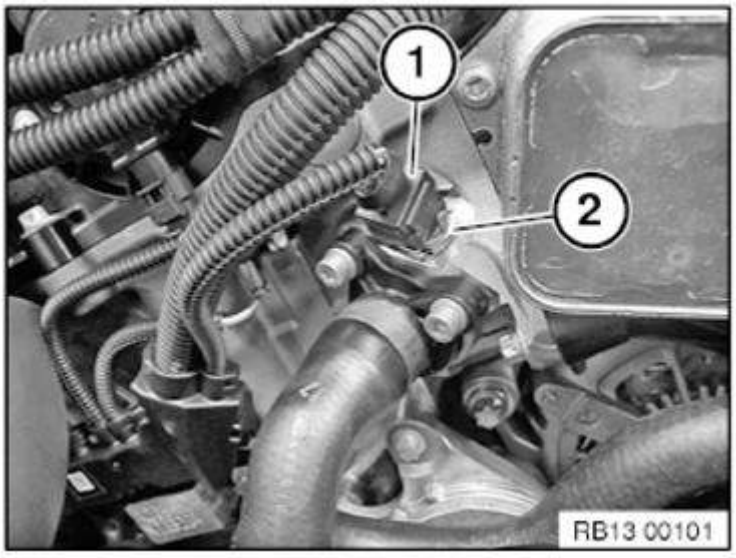


Fig. 262: Identifying Connector And Coolant Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Delete fault memory.

13 62 531 REPLACING COOLANT TEMPERATURE SENSOR (N47 D20 O1)

Special tools required:

- **11 8 850**

Necessary preliminary work:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- **REMOVE** upper section of clean air pipe

Recycling:

Catch and dispose of escaping coolant.

Observe country-specific waste disposal regulations.

Release lock (1) with hook (2) and detach connector (3).

cardiagn.com

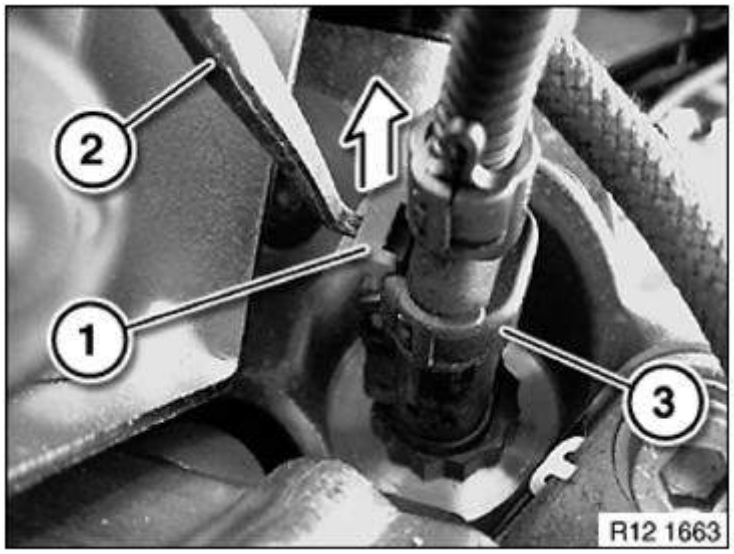


Fig. 263: Detaching Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Remove coolant temperature sensor (3) with special tool **11 8 850** .

Tightening torque: **13 62 2AZ** .

Check O-rings. Replace faulty O-rings.

If necessary, top up coolant.

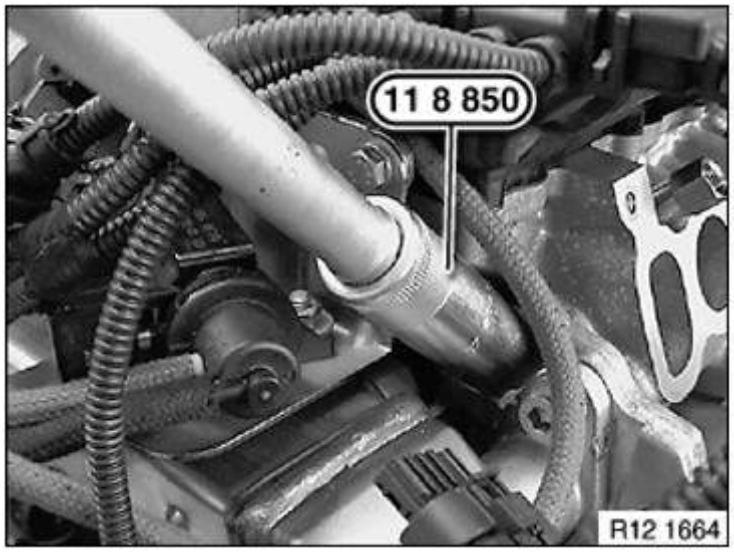


Fig. 264: Removing Coolant Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault message.**
Delete fault memory.

13 62 531 REPLACING COOLANT TEMPERATURE SENSOR (N52T)

WARNING: **Risk of scalding!**
Only perform this repair work on an engine that has cooled down.

Recycling

cardiagn.com

Catch and dispose of escaping coolant.

Observe country-specific waste disposal regulations.

Necessary preliminary work:

- Read out fault code memory of the DME control unit.
- Switch off ignition

Coolant temperature sensor is mounted on cylinder head at front.

Release connector (1) and remove.

Unfasten coolant temperature sensor (2).

Installation note:

Tightening torque: **13 62 5AZ** .

If necessary, top up coolant. See **17 00 008 DRAINING AND TOPPING UP COOLANT (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)** .

Check **COOLING SYSTEM** for leaks.

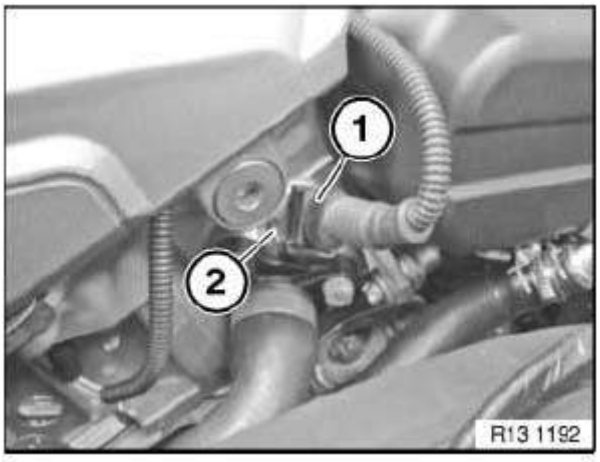


Fig. 265: Identifying Coolant Temperature Sensor And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Delete fault memory.**

13 62 531 REPLACING COOLANT TEMPERATURE SENSOR (N55)

WARNING: **Risk of scalding!**
Only perform this repair work on an engine that has cooled down.

Recycling

Catch and dispose of escaping coolant.

Observe country-specific waste disposal regulations.

Necessary preliminary work:

- Read out the fault memory of the DME control unit.
- Switch off ignition.

cardiagn.com

- Remove ignition coil cover. See **12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55)** .

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

Release connector (1) and remove.

Unfasten coolant temperature sensor (2).

Installation note:

Tightening torque: **13 62 5AZ** .

If necessary, top up coolant. See **17 00 008 DRAINING AND TOPPING UP COOLANT (N20, N55, N52T, N47 D20 O 1, N57 D30 O/T 1, B47)** .

Check **COOLING SYSTEM** for leaks.

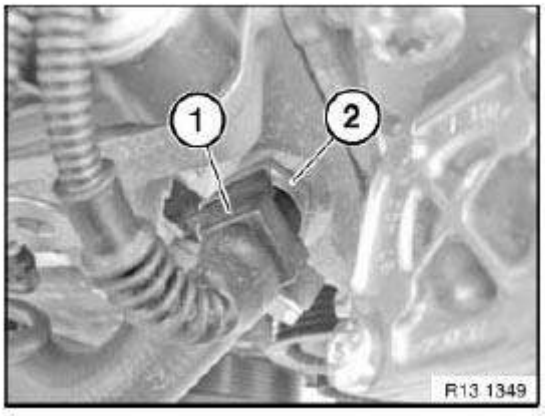


Fig. 266: Identifying Connector And Coolant Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Delete fault memory.

13 62 610 REPLACING CRANKSHAFT PULSE GENERATOR (N47 D20 O1)

Necessary preliminary work:

- Remove front **UNDERBODY PROTECTION** .

Pull connector (1) off pulse generator.

Release screw (2).

Tightening torque: **13 62 10AZ** .

Remove pulse generator.

cardiagn.com

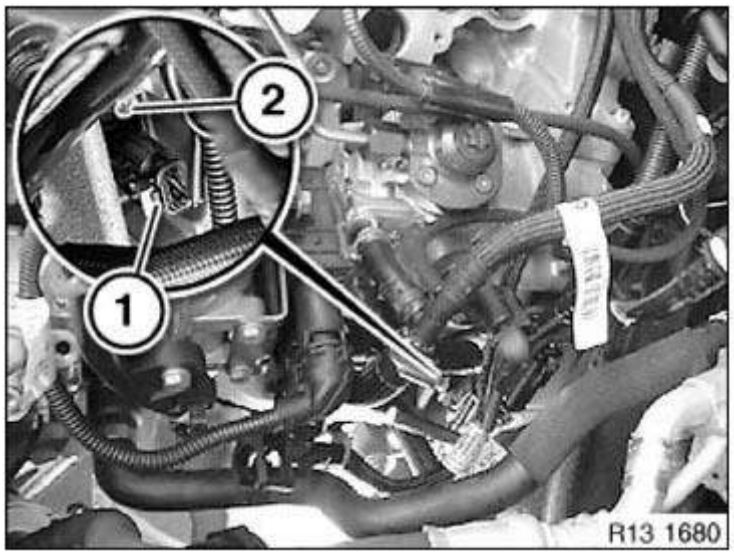


Fig. 267: Identifying Connector And Screw
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

Read out the fault memory of the DDE control unit.

Clear DDE fault memory.

13 62 651 REPLACING EXHAUST BACKPRESSURE SENSOR (N47 D20 O1)

Necessary preliminary tasks:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Remove **INTAKE SILENCER HOUSING**.

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Unlock connector (1) and remove.

Unlock exhaust backpressure sensor (2) at holder.

Remove exhaust backpressure sensor (2).

Detach pressure hose (3). Renew pressure hose.

cardiagn.com

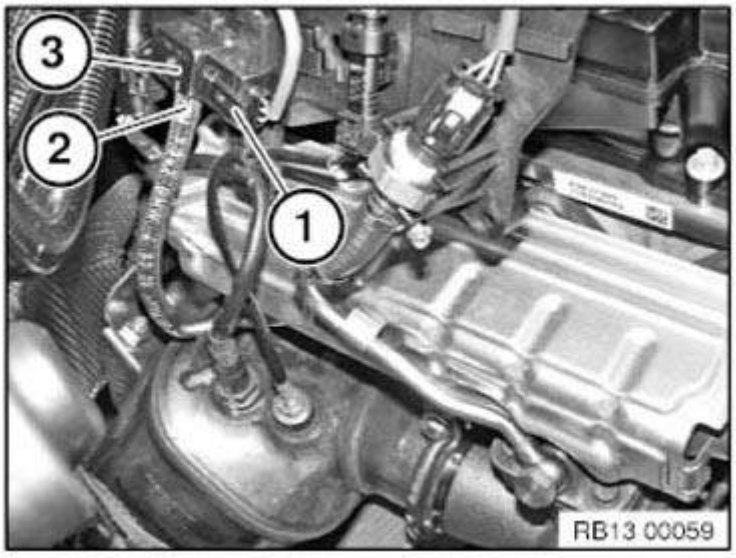


Fig. 268: Identifying Exhaust Back Pressure Sensor And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check stored error/fault messages.

Clear diagnostic fault entries from fault memory.

13 62 534 REPLACING EXHAUST-GAS TEMPERATURE SENSOR (N47 D20 O1)

WARNING: **Risk of burning!**
Only perform this repair work on an engine that has cooled down.

Necessary preliminary tasks:

- Read out the fault memory of the DDE control unit.
- Switch off ignition.
- Remove **INTAKE SILENCER HOUSING**.

Unlock connector (1) and remove.

Detach cable from clamp (2).

Release exhaust-gas temperature sensor (3) and remove.

Tightening torque: **13 62 4AZ** .

cardiagn.com

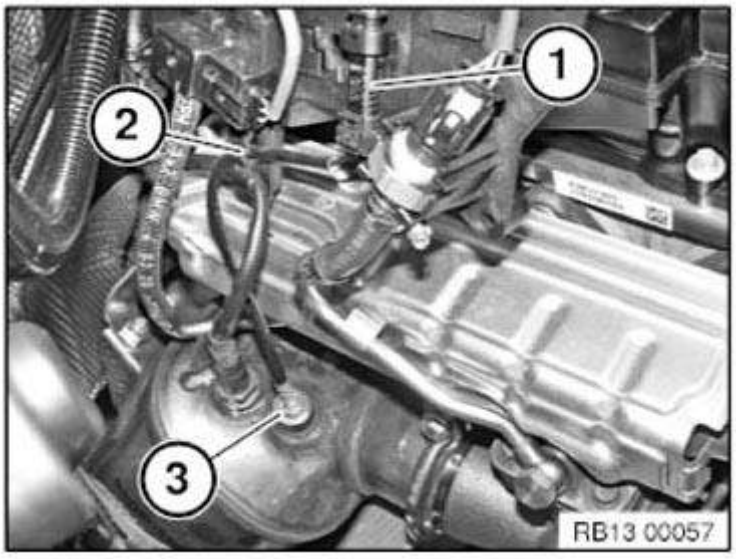


Fig. 269: Identifying Connector, Cable From Clamp And Exhaust-Gas Temperature Sensor
Courtesy of BMW OF NORTH AMERICA, INC.

IMPORTANT: Make sure when installing the exhaust-gas temperature sensor that the gauge tip (1) is not damaged.

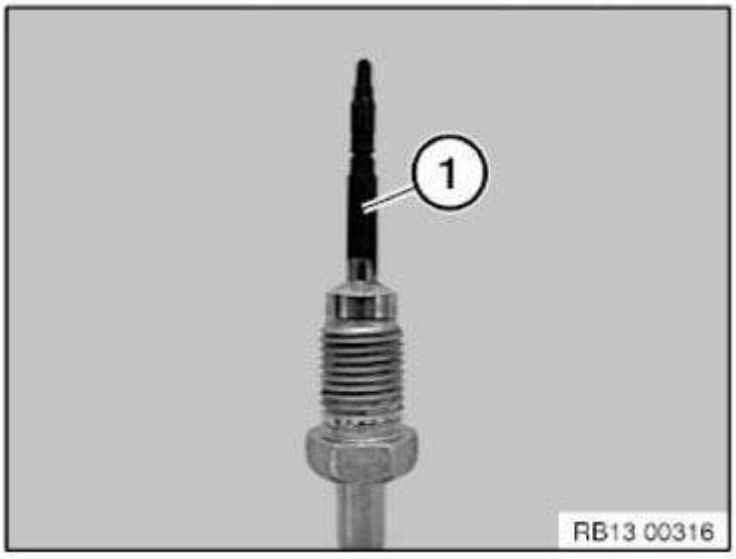


Fig. 270: Identifying Gauge Tip
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Check stored error/fault messages.

Delete fault memory.

START VALVES

13 64 501 REMOVING AND INSTALLING/REPLACING A FUEL INJECTOR (N52T)

Necessary preliminary work:

- Remove **FUEL INJECTION PIPE**.

Recycling

cardiagn.com

Fuel escapes when fuel line is detached. Catch and dispose of escaping fuel.

Observe country-specific waste disposal regulations.

NOTE: This procedure is applicable to all fuel injectors.

Lever out fuses (1).

Pull fuel injectors out of fuel rail.

Installation note:

Replace sealing rings on fuel injectors and coat with rubber care product.

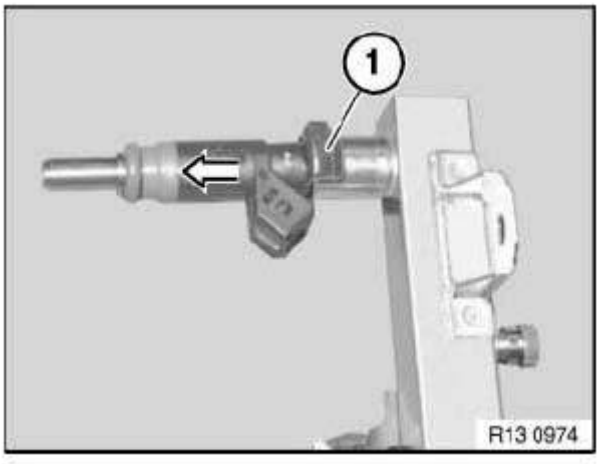


Fig. 271: Removing Fuses
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: Check stored fault message.
Delete fault memory.
Check injection system for leak tightness.

13 53... REMOVE, INSTALL REPLACE ONE INJECTOR N55 AS FROM ENGINE NUMBER 14407685 (HOLD-DOWN DEVICE CONCEPT AT THE TOP)

See 13 53... REMOVE, INSTALL REPLACE ONE INJECTOR N55 AS FROM ENGINE NUMBER 14407685 (HOLD-DOWN DEVICE CONCEPT AT THE TOP).

13 53 310 REMOVING AND INSTALLING/REPLACING AN INJECTOR (N55)

See 13 53 310 REMOVING AND INSTALLING/REPLACING AN INJECTOR (N55).

13 53... REMOVING AND INSTALLING/REPLACING AN INJECTOR N55 UP TO ENGINE NUMBER 14407684 (BOTTOM HOLD-DOWN DEVICE VERSION)

See 13 53... REMOVING AND INSTALLING/REPLACING AN INJECTOR N55 UP TO ENGINE NUMBER 14407684 (BOTTOM HOLD-DOWN DEVICE VERSION).

13 53... WARNINGS FOR THE REMOVAL OF INJECTORS (N55)

See 13 53... WARNINGS FOR THE REMOVAL OF INJECTORS (N55).

INTAKE SILENCER

13 71 155 REMOVE CLEAN AIR PIPE (N20)

cardiagn.com

Release clamp (1).

Tightening torque: **13 71 2AZ** .

Release clamp (2) on intake silencer housing.

Tightening torque: **13 71 1AZ** .

Feed out clean air pipe (3) and remove.

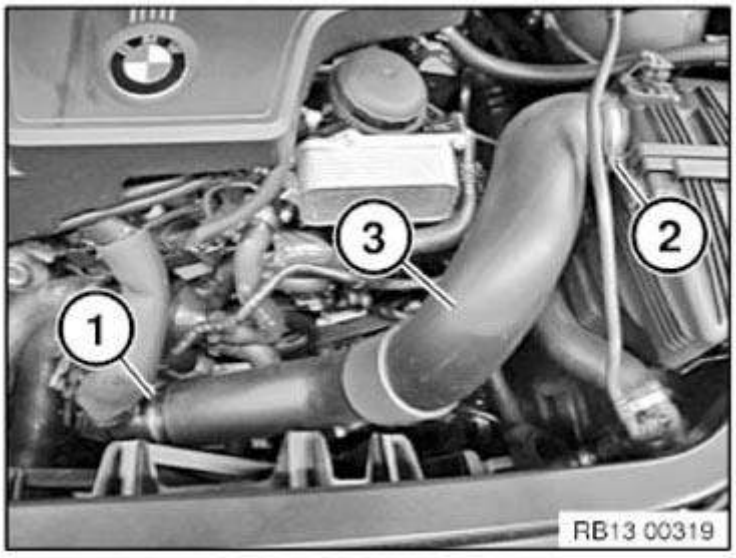


Fig. 272: Identifying Clamp And Air Pipe
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

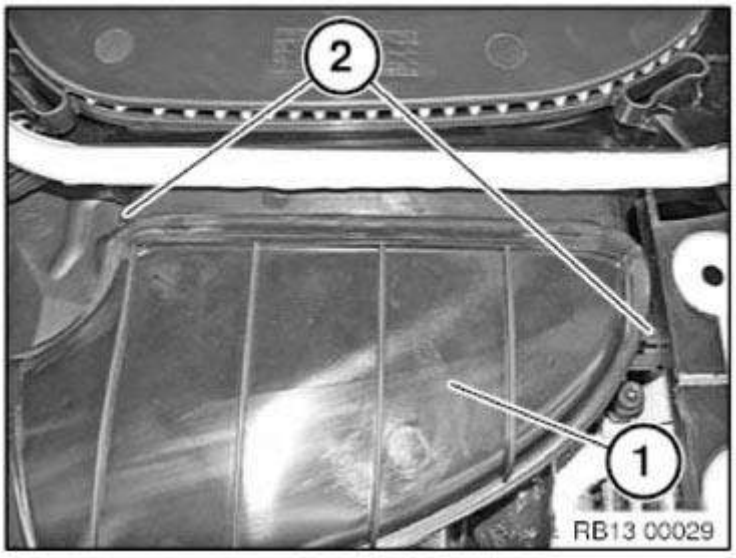
13 71 150 REMOVING CLEAN AIR PIPE (N47 D20 O1)

Necessary preliminary work:

- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)**.

At the clean air pipe (1), undo the clamps (2).

Pull the clean air pipe (1) off the intake filter housing.



cardiagn.com

Fig. 273: Identifying Air Pipe And Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock connector on hot film air mass meter and pull off.

Release clamp (2).

Tightening torque: **13 71 3AZ** .

Feed out upper part of clean air pipe towards top and remove.

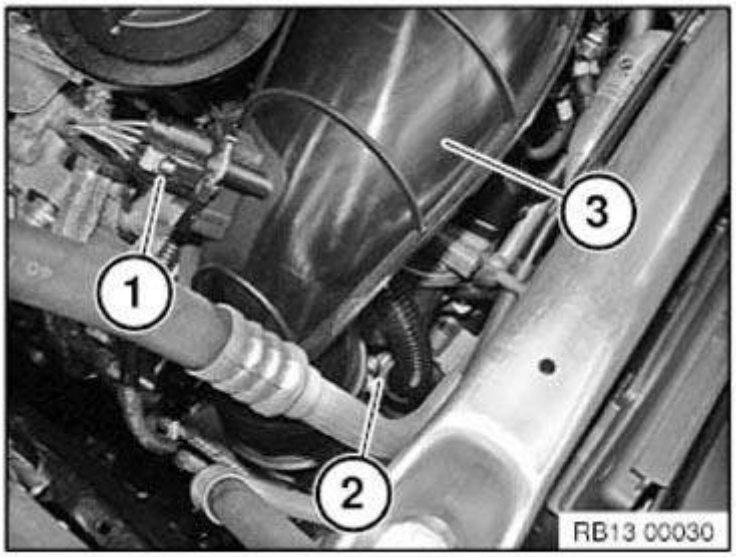


Fig. 274: Identifying Clamp And Connector
Courtesy of BMW OF NORTH AMERICA, INC.

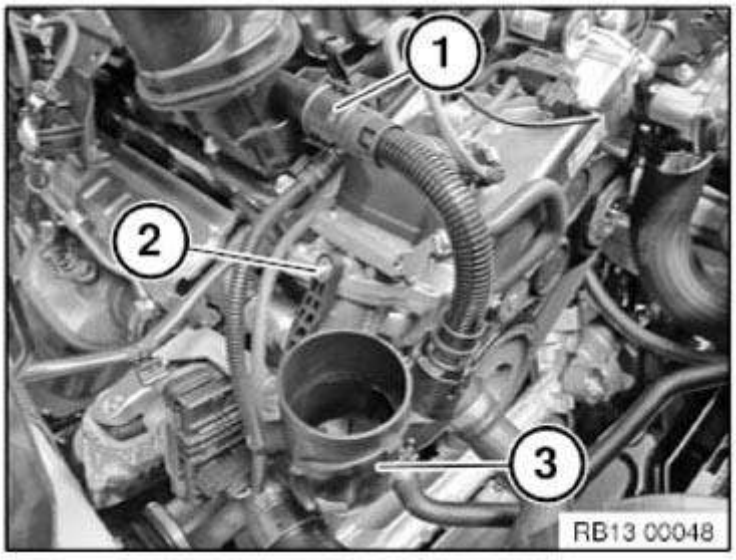
Press down locking hook and detach hose (2) for engine ventilation.

With the heating element installed, unlock connector from heating element and pull off.

Release screw (2).

Tightening torque: **13 71 4AZ** .

Release clip (3) on exhaust turbocharger and detach bottom section of clean air pipe, feed out and remove upwards.



cardiagn.com

Fig. 275: Identifying Hose, Screw And Clip
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

13 71 150 REMOVING CLEAN AIR PIPE (N55)

Necessary preliminary work:

- Remove ignition coil cover. See **12 00..... REMOVING AND INSTALLING/REPLACING IGNITION COIL COVER (N55)** .

Release clamps (1).

Tightening torque: **13 71 2AZ** .

Release connector (2) on hot film air mass meter and disconnect.

Disconnect clean air pipe (3) from rubber mount at top and remove.

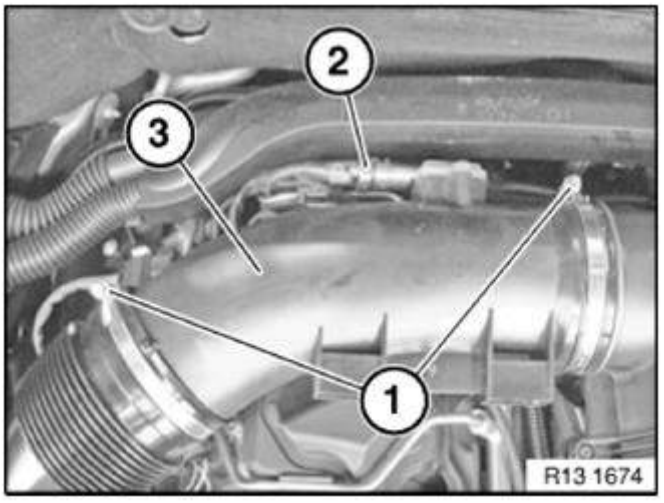


Fig. 276: Identifying Air Pipe, Connector And Clamps
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock tank ventilation line (1) and disconnect.

Release screw (2).

Tightening torque: **13 71 4AZ** .

Unlock plug (3) from heating element and disconnect.

Do **not** release vent hose at the cylinder head cover (4). Risk of damage to cylinder head cover!

Release screws at clean air pipe and disconnect vent hose from clean air pipe.

cardiagn.com

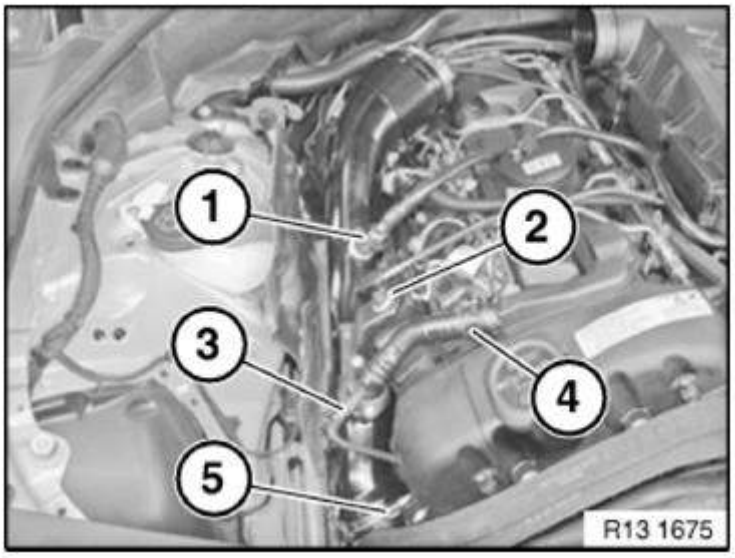


Fig. 277: Identifying Tank Ventilation Line, Screw And Plug
Courtesy of BMW OF NORTH AMERICA, INC.

Release clamp (5).

Tightening torque: **13 71 6AZ** .

Remove clean air pipe.

Assemble engine.

13 71 170 REMOVING AIR DUCT (N55)

Necessary preliminary tasks:

- Remove **CLEAN AIR PIPE**.
- Remove **COOLANT PUMP** .
- Remove **COOLANT THERMOSTAT** .

Release screw (1).

Tightening torque: **13 71 7AZ** .

Release screw (2) on exhaust turbocharger.

Tightening torque: **13 71 8AZ** .

Pull off air duct (3) from exhaust turbocharger, feed out and remove.

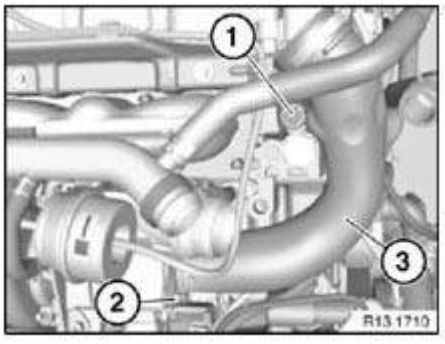


Fig. 278: Identifying Air Duct And Screw

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

13 71 000 REMOVING AND INSTALLING/REPLACING INTAKE SILENCER HOUSING (N20)

Necessary preliminary tasks:

Switch off ignition.

Release connector (1) on hot film air mass meter and disconnect.

Release clamp (2).

Tightening torque: **13 71 1AZ** .

Release clean air pipe from intake silencer housing.

Release screw (3).

Tightening torque: **13 71 3AZ** .

Pull the intake silencer housing (4) up and out of the rubber mounts and remove.

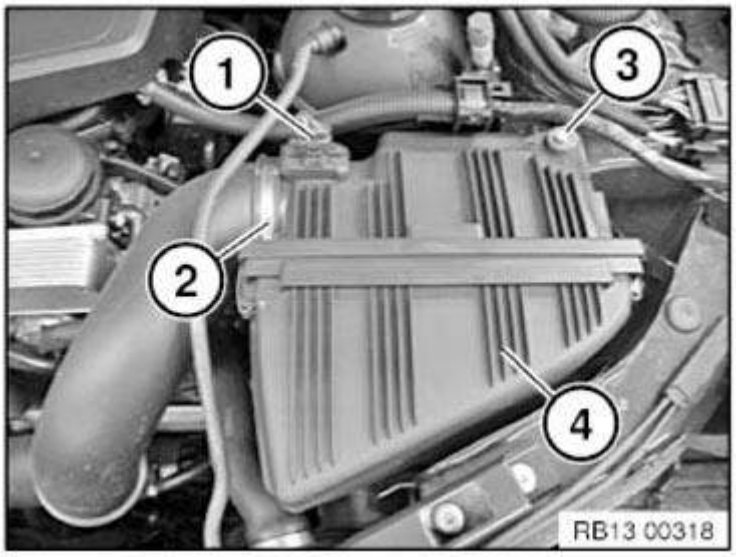


Fig. 279: Identifying Connector, Clamp And Intake Silencer Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

13 71 000 REMOVING AND INSTALLING/REPLACING INTAKE SILENCER HOUSING (N52T)

Necessary preliminary work:

- Switch off ignition.

Release clamp (1).

Tightening torque: **13 71 2AZ** .

Release connector (2) on hot film air mass meter and disconnect.

cardiagn.com

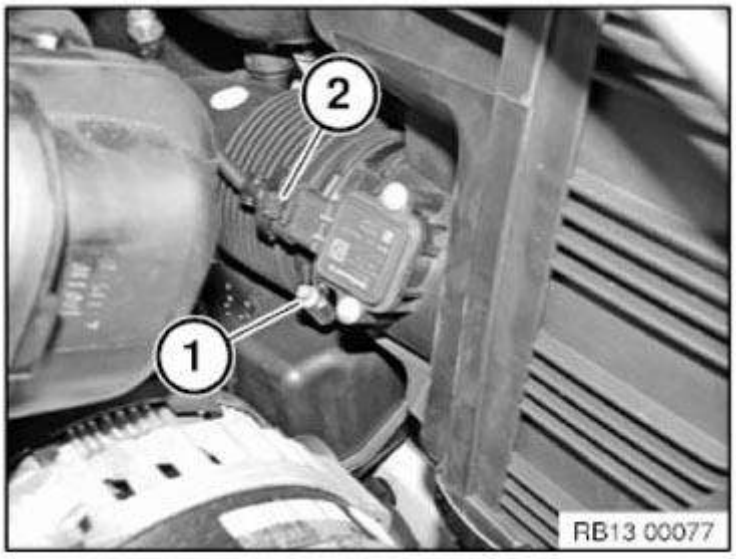


Fig. 280: Identifying Connector And Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Pull intake silencer housing upward out of rubber mounts and remove.

Installation note:

Make sure intake silencer housing is correctly seated on stop buffer at bottom.

Ensure that the intake silencer housing is installed correctly relative to the intake port.

Only if intake silencer housing is being replaced, modify **HOT FILM AIR MASS METER** and **AIR FILTER ELEMENT**.

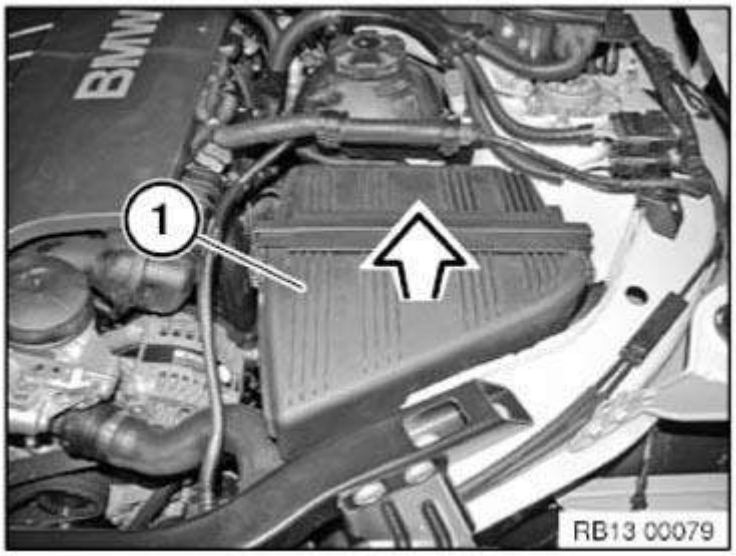


Fig. 281: Pulling Intake Silencer Housing
Courtesy of BMW OF NORTH AMERICA, INC.

NOTE: **Check stored fault messages.**
Delete fault memory.

13 71 000 REMOVING AND INSTALLING/REPLACING INTAKE SILENCER HOUSING (N55)

Necessary preliminary work:

cardiagn.com

- Remove intake port. See **13..... REMOVING INTAKE PORT (N55)**.

Detach line clip (1) from intake silencer housing in upward direction.

NOTE: **For clarification purposes, the drawing does not show upper part of intake silencer housing installed.**

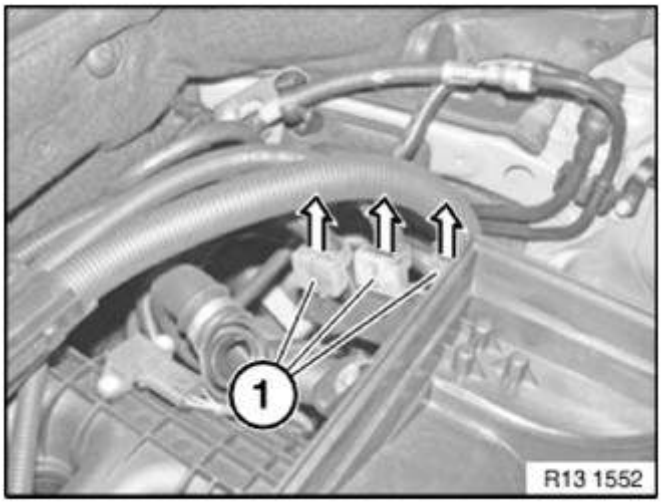


Fig. 282: Detaching Line Clip From Intake Silencer Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Release clamp (1).

Tightening torque: **13 71 3AZ** .

Pull intake silencer housing (2) off rubber mounts in an upward direction and remove.

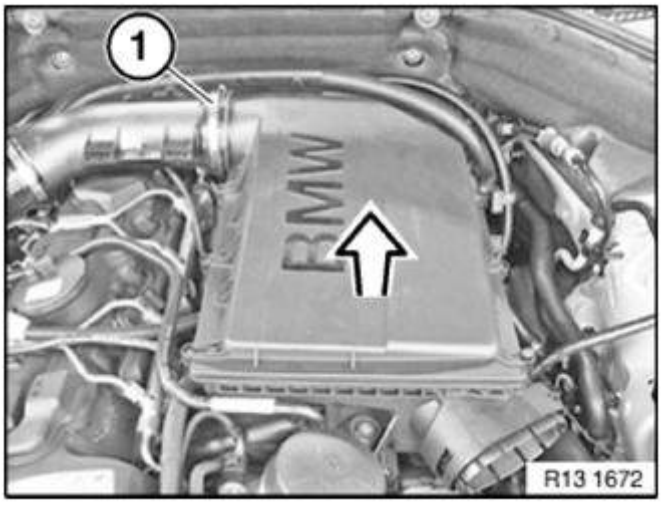


Fig. 283: Pulling Intake Silencer Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

13 71 000 REMOVING/REPLACING INTAKE SILENCER HOUSING (N47 D20 O1)

Necessary preliminary work:

- Switch off ignition.
- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)**.

cardiagn.com

- Remove intake port. See **13..... REMOVING INTAKE PORT (N47 D20 O1)**.

Unlock clean air pipe (1) and detach.

Pull off intake filter housing together with air filter element (2) upwards out of rubber retainer.

Remove intake filter housing in direction of travel.

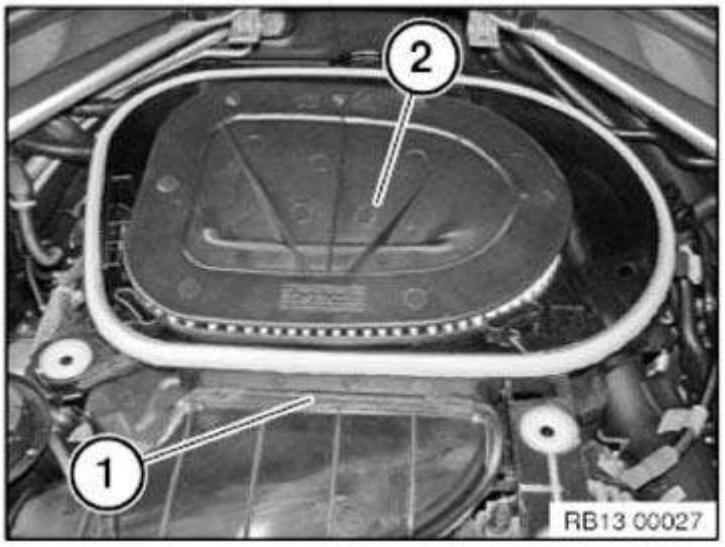


Fig. 284: Identifying Air Pipe And Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Assemble engine.

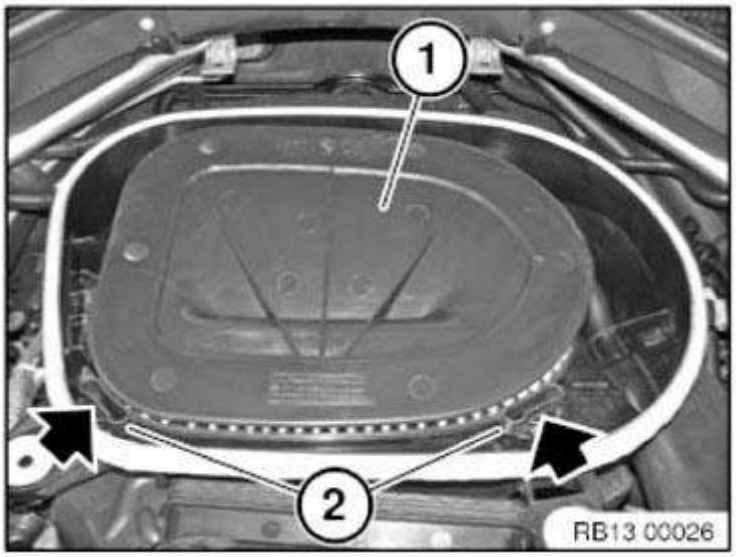
13 71 000 REPLACING AIR FILTER ELEMENT (N47 D20 O1)

Necessary preliminary work:

- Remove acoustic cover. See **13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)**.

Press tabs (2) in direction of arrow.

Remove air filter element (1) upwards.



cardiagn.com

Fig. 285: Locating Air Filter Element And Tabs
Courtesy of BMW OF NORTH AMERICA, INC.

Installation note:

Clean inside of intake filter housing.

Assemble engine.

13 71 165 REMOVING BOTTOM CLEAN AIR PIPE (N20)

Necessary preliminary tasks:

- Remove top **CLEAN AIR PIPE**.
- Remove **ENGINE VENTILATION LINE** .
- Remove front **UNDERBODY PROTECTION** .

Unlock tank ventilation line (1) and disconnect.

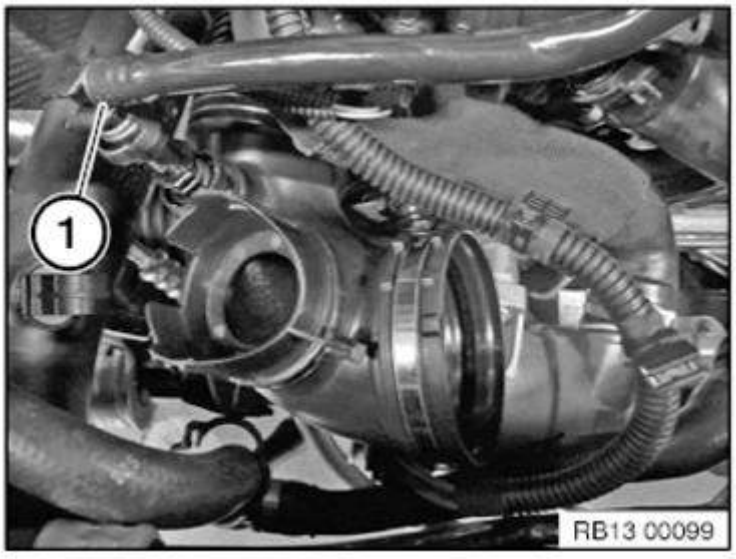


Fig. 286: Identifying Tank Ventilation Line
Courtesy of BMW OF NORTH AMERICA, INC.

Release nut (1) below bottom clean air pipe (2).

Tightening torque: **13 71 3AZ** .

Pull off, thread out and remove bottom clean air pipe (2) from exhaust turbocharger.

Check gasket, renew damaged gasket.

cardiagn.com

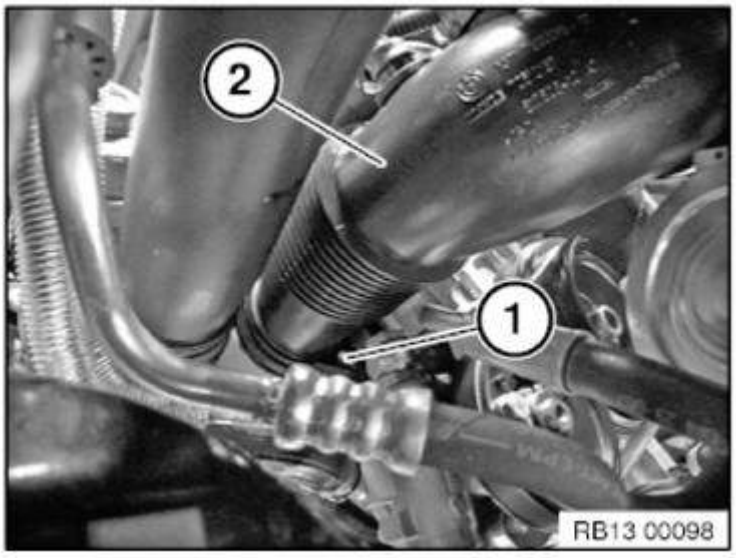


Fig. 287: Identifying Air Pipe And Nut
Courtesy of BMW OF NORTH AMERICA, INC.

Assemble engine.

13..... REMOVING INTAKE PORT (N47 D20 O1)

Necessary preliminary work:

- Remove acoustic cover

Release retainers (1) in intake silencer housing and air duct at front.

Feed out intake port (2) and remove.

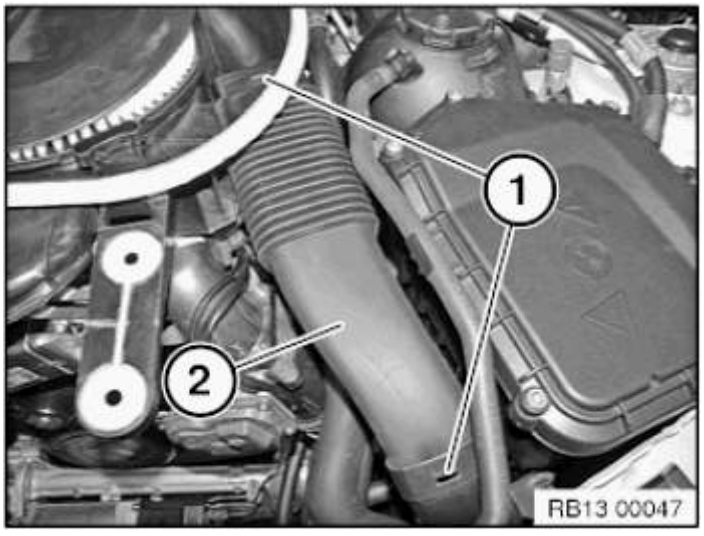


Fig. 288: Identifying Retainers And Intake Port
Courtesy of BMW OF NORTH AMERICA, INC.

AIR CLEANER

13..... REMOVE ACOUSTIC COVER (N47 D20 O/T1)

Raise acoustic cover (1) and remove in direction of travel.

cardiagn.com

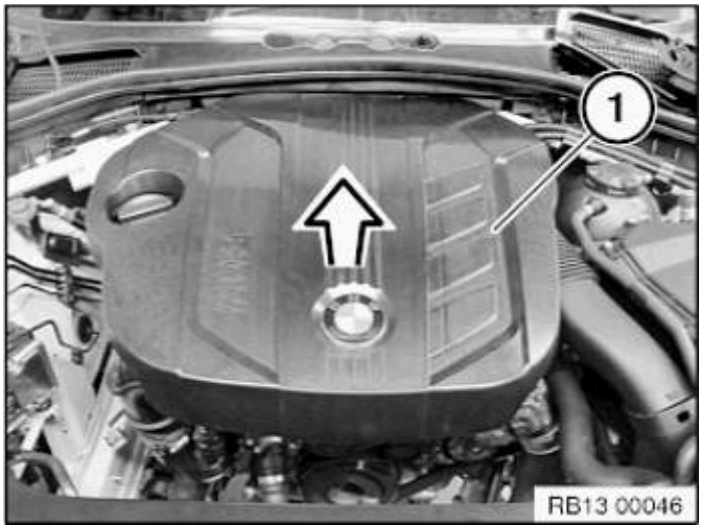


Fig. 289: Removing Acoustic Cover
Courtesy of BMW OF NORTH AMERICA, INC.

13 71 000 REMOVING/REPLACING INTAKE SILENCER HOUSING (N47 D20 O1)

See **13 71 000 REMOVING/REPLACING INTAKE SILENCER HOUSING (N47 D20 O1)**.

13 71 000 REPLACING AIR FILTER ELEMENT (N47 D20 O1)

See **13 71 000 REPLACING AIR FILTER ELEMENT (N47 D20 O1)**.

13 72 001 REPLACING AIR FILTER ELEMENT (N20)

Necessary preliminary tasks:

- Remove **INTAKE SILENCER HOUSING**.

Loosen retainers.

Remove front section of intake silencer housing (1).

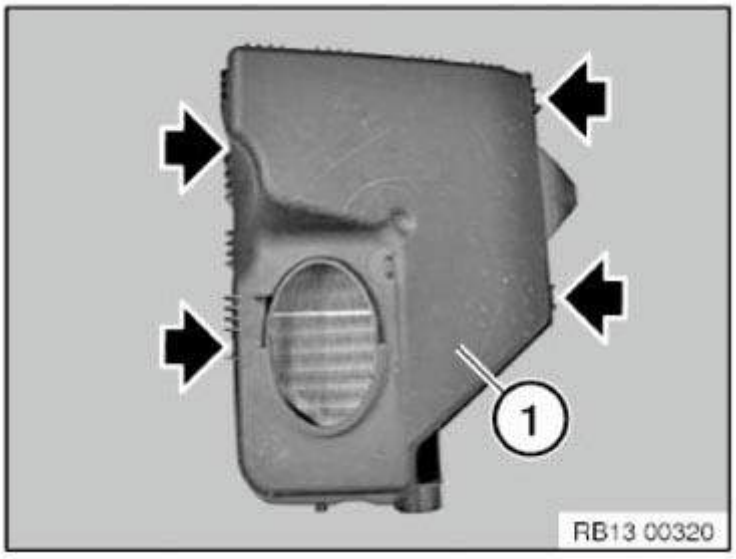


Fig. 290: Removing Front Section Of Intake Silencer Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Replace air filter element (1).

cardiagn.com

Installation note:

Clean intake filter housing from inside.

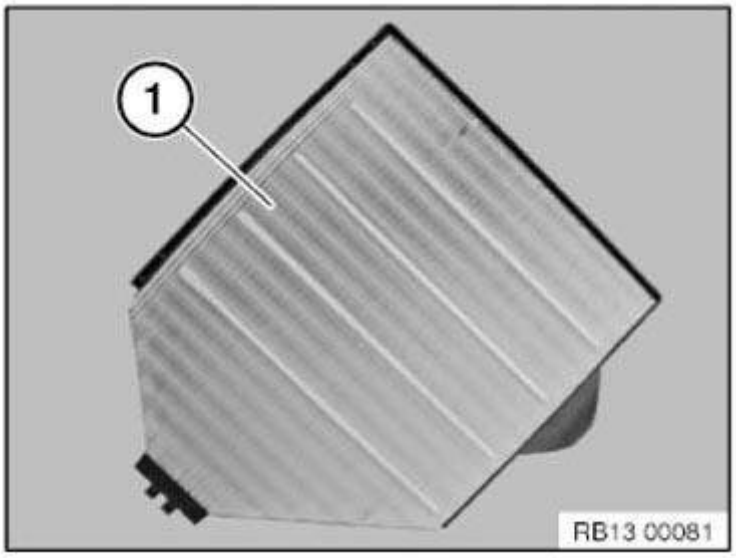


Fig. 291: Identifying Air Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

13 72 001 REPLACING AIR FILTER ELEMENT (N52T)

Necessary preliminary work:

- Remove **INTAKE SILENCER HOUSING**.

Loosen retainers.

Remove front section of intake silencer housing (1).

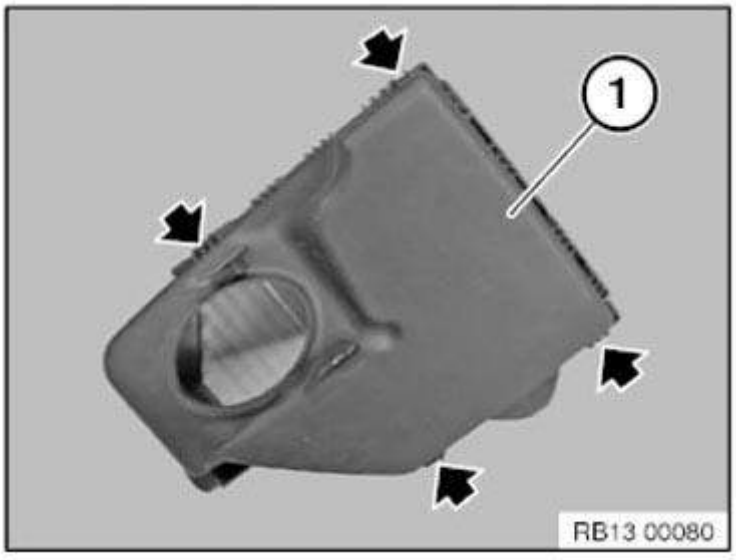


Fig. 292: Removing Intake Silencer Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Replace air filter element (1).

Installation note:

cardiagn.com

Clean intake filter housing from inside.

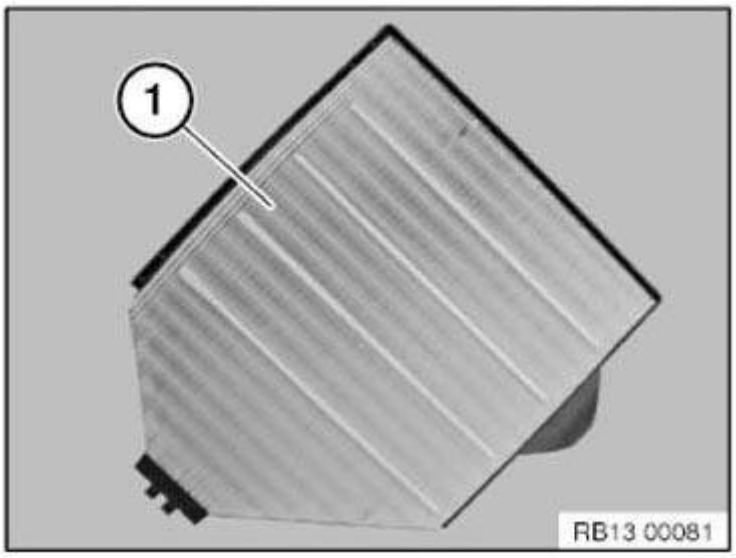


Fig. 293: Identifying Air Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

13 72 001 REPLACING AIR FILTER ELEMENT (N55)

Release clamp (1).

Tightening torque: **13 71 2AZ** .

Unfasten screws (2).

Tightening torque: **13 71 1AZ** .

Remove upper section of intake silencer housing

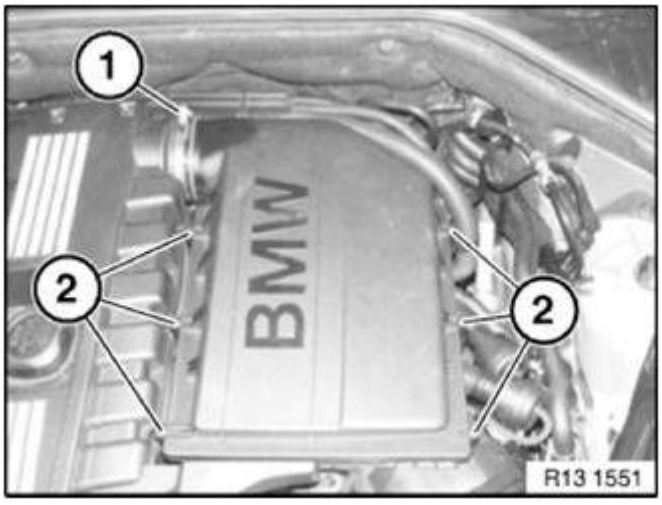


Fig. 294: Identifying Clamp And Screws Of Intake Silencer Housing
Courtesy of BMW OF NORTH AMERICA, INC.

Remove air filter element (1) and replace.

Installation note:

cardiagn.com

Clean upper part and lower section of intake silencer housing from inside.

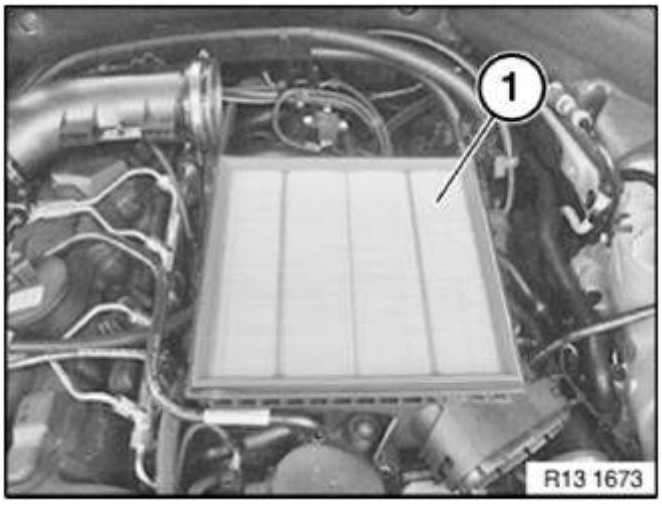


Fig. 295: Identifying Air Filter Element
Courtesy of BMW OF NORTH AMERICA, INC.

Reassemble the vehicle.

CARBON CANISTER VENTILATION

13 90 500 REPLACE THE TANK VENT VALVE (N20, N26)

Necessary preliminary tasks:

- Check stored fault message.
- Switch off ignition.
- Remove **ACOUSTIC COVER**

Unlock tank ventilation line (1) at T-piece, pull off and unclip from the clamp (2).

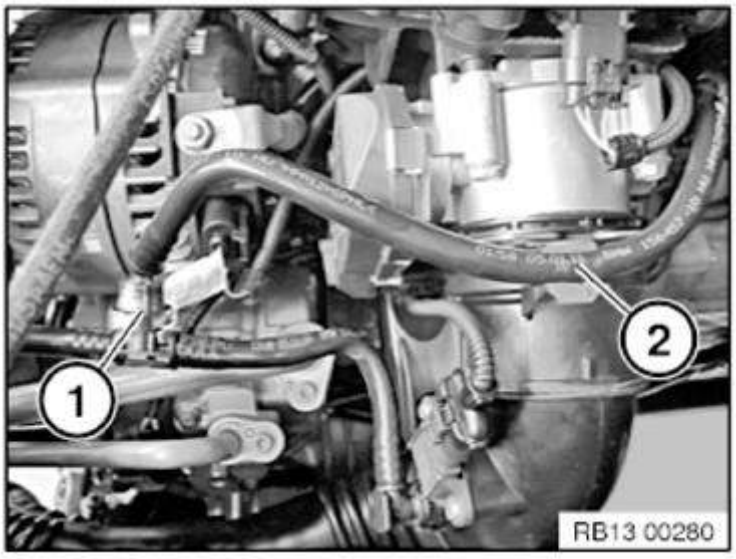


Fig. 296: Identifying Tank Ventilation Line And Clamp
Courtesy of BMW OF NORTH AMERICA, INC.

Unlock connector (1) and remove.

Unlock tank ventilation line (2) and disconnect.

cardiagn.com

Unlock tank ventilation line (3) on throttle body and disconnect.

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

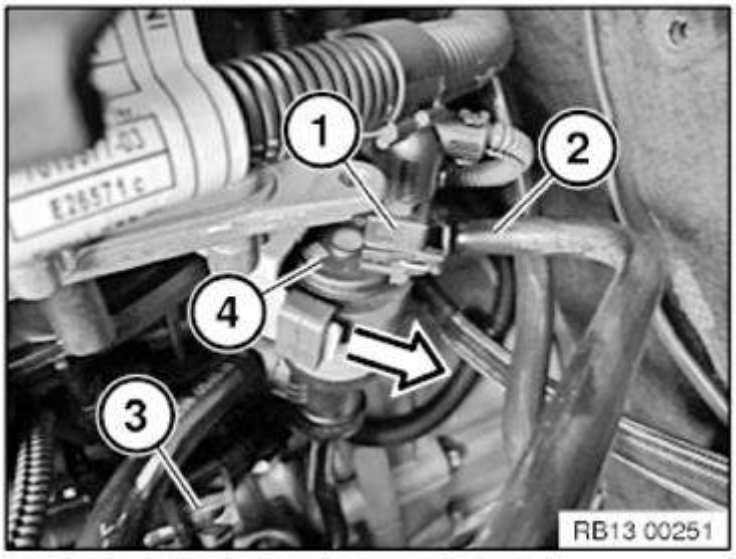


Fig. 297: Detaching Tank Vent Valve
Courtesy of BMW OF NORTH AMERICA, INC.

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

13 90 500 REPLACING TANK VENT VALVE (N52T)

Necessary preliminary work:

- Check stored fault messages.
- Switch off ignition.
- Remove **THROTTLE BODY**.

Installation location:

Tank vent valve is fitted at bottom on intake plenum.

Release connector (1) and remove.

Unlock hose (2) and detach.

Unlock hose (3) on intake plenum and detach.

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

cardiagn.com

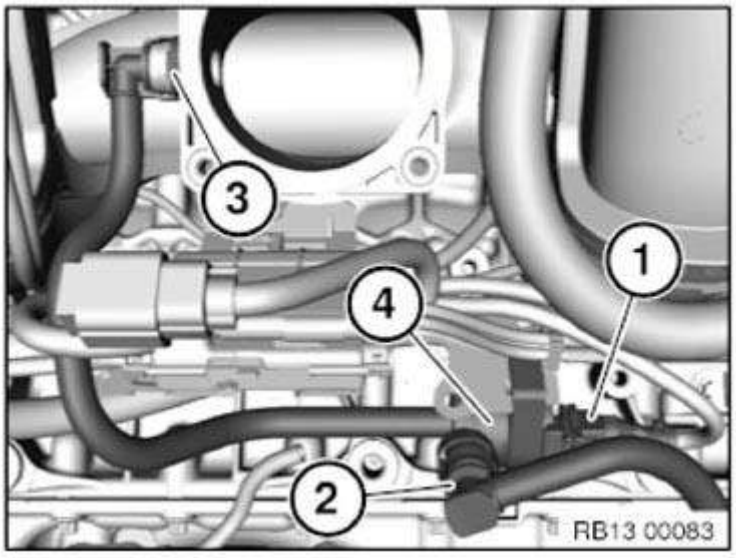


Fig. 298: Identifying Connector, Hose And Tank Vent Valve
Courtesy of BMW OF NORTH AMERICA, INC.

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

13 90 500 REPLACING TANK VENT VALVE (N55)

Necessary preliminary work:

- Check stored fault message.
- Switch off ignition.
- **REMOVE LEFT CHARGE AIR DUCT** .

Version 1:

Release connector (1) and remove.

Unlock hose (2) and detach.

Release fastener (3) and detach fuel tank vent valve from bracket and remove.

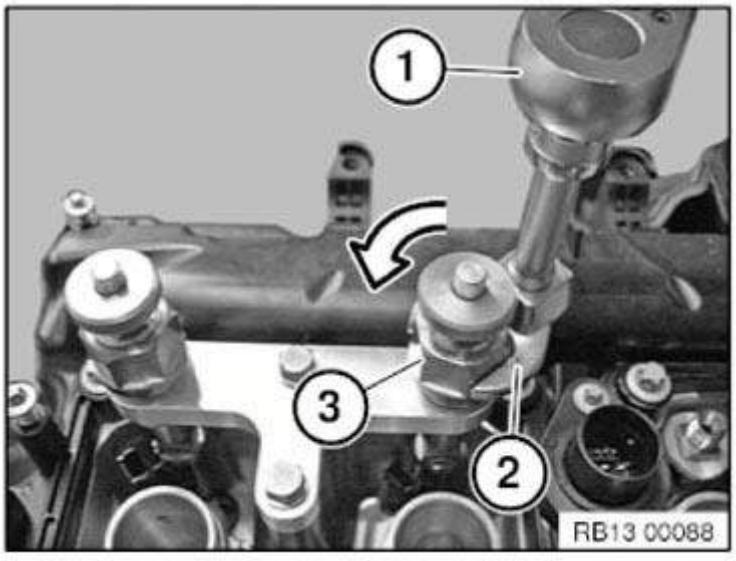


Fig. 299: Turning Torque Wrench Counterclockwise

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

Type 2:

Release connector (1) and remove.

Release screws (3).

Tightening torque: **13 54 1AZ** .

Remove throttle body part way and then unlock tank ventilation line (2) and pull off.

Remove throttle body (4).

Installation note:

Replace gasket on throttle body.

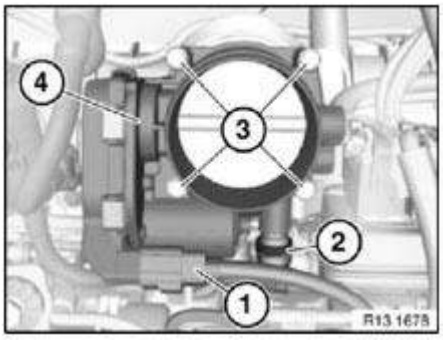


Fig. 300: Identifying Tank Ventilation Line, Screws And Throttle Body
Courtesy of BMW OF NORTH AMERICA, INC.

Release connector (1) and remove.

Unlock and disconnect hoses (2) and (3).

Detach and remove tank vent valve (4) from holder in direction of arrow.

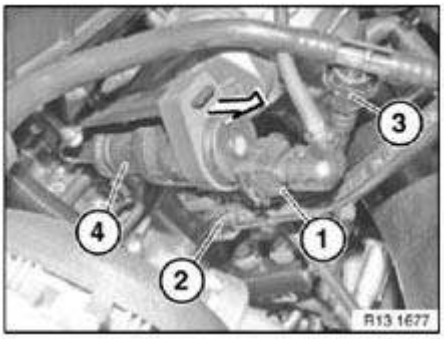


Fig. 301: Removing Tank Vent Valve
Courtesy of BMW OF NORTH AMERICA, INC.

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

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

cardiagn.com

FUEL SYSTEM

0491363 ADAPTER

0491363 138022 Adapter AM

NOTE: (adapter hose (2 pieces)) With M6 connecting nipple and quick-release coupling

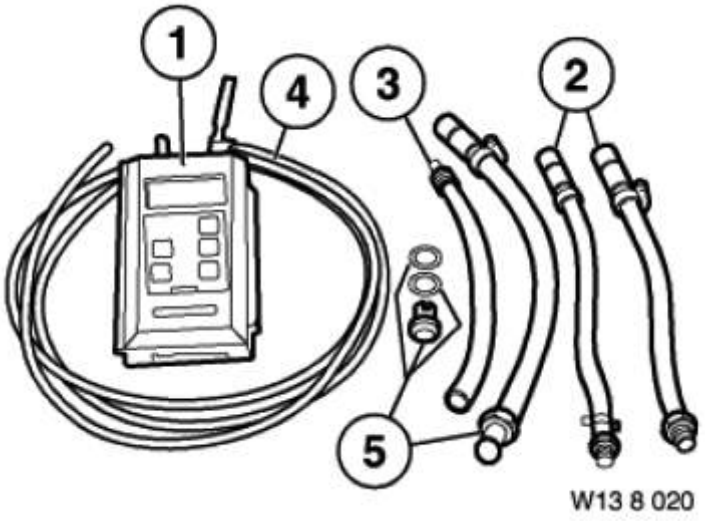


Fig. 1: Identifying Adapter (0491363)
Courtesy of BMW OF NORTH AMERICA, INC.

0491359 ADAPTER

0491359 136450 Adapter Mechanical tool

NOTE: For Motronic control unit (US) on BMW SERVICE TEST with 35-pin plug connection

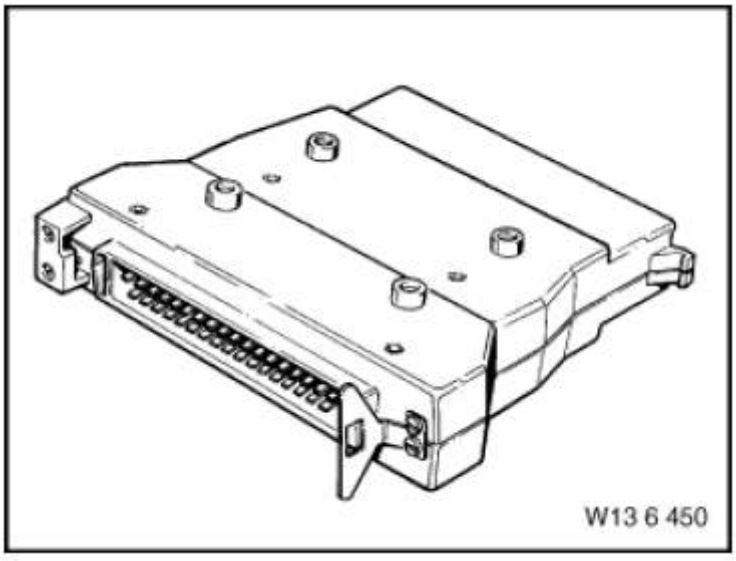


Fig. 2: Identifying Adapter (0491359)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0491297 ADAPTER

0491297 135130 Adapter Minimum set: Mechanical tools AM

NOTE: **For pressure gauge 13 3 061 or BMW DIS for measuring the internal pressure of the injection pump**

Storage Location

A3

A4

SI number

01 13 93 (713)

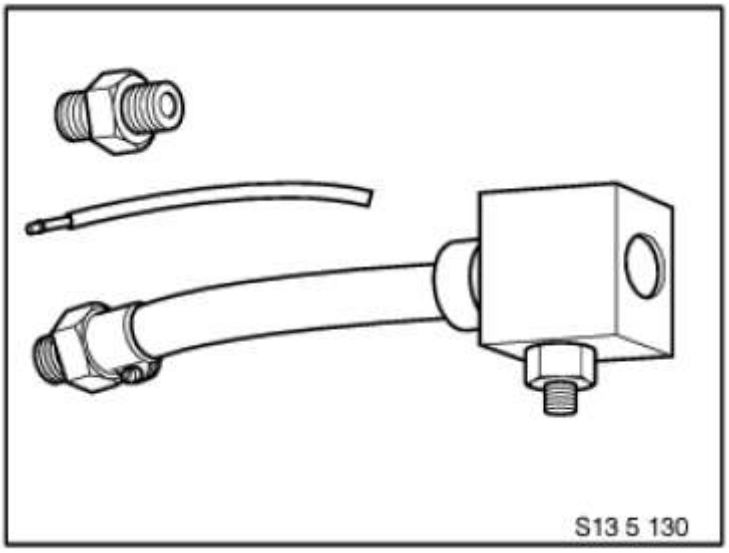


Fig. 3: Identifying Adapter (0491297)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0491298 Adapter

   NOTE: **Only available as part of complete set**

2. 0491299 Adapter

   NOTE: **(Adapter) connection to the pressure sensor BMW SERVICE-TEST Available as part of complete set only**

3. 0491300 Hose

   NOTE: **(Extension hose) available as part of set of special tools only**

0491366 ADAPTER

0491366 138025 Adapter AM

NOTE: **(adapter hose) With quick-release coupling and ring connection with banjo bolt for testing the output pressure at the metering unit**

cardiagn.com

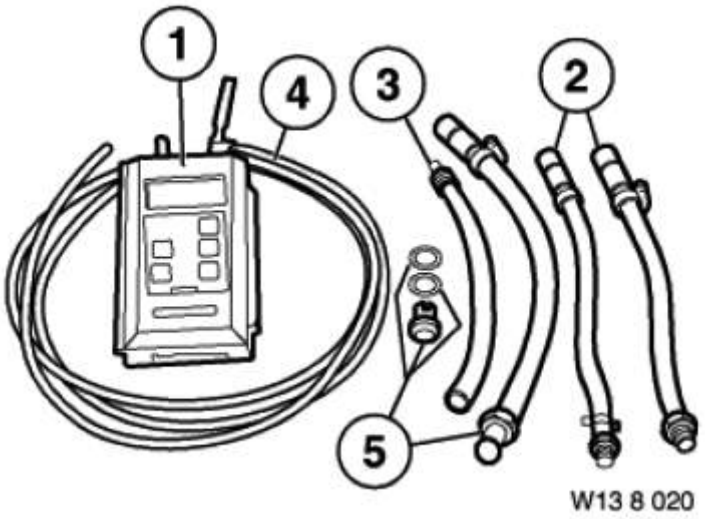


Fig. 4: Identifying Adapter (0491366)
Courtesy of BMW OF NORTH AMERICA, INC.

0491312 ADAPTER

0491312 135272 Adapter Minimum set: Mechanical tools AM

NOTE: (Adapter) For connecting the DIS pressure sensor

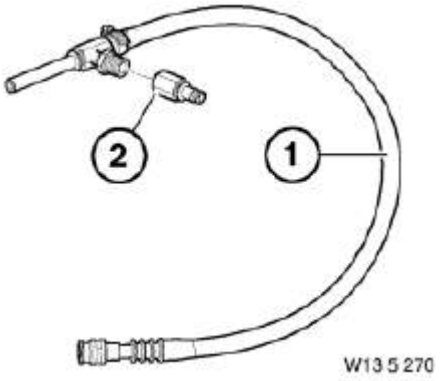


Fig. 5: Identifying Adapter (0491312)
Courtesy of BMW OF NORTH AMERICA, INC.

0491343 ADAPTER

0491343 136053 Adapter Minimum set: Mechanical tools AM

NOTE: Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12

Storage Location

A3

0491324 ADAPTER

0491324 135362 Adapter AM

NOTE: (Adapter)

cardiagn.com

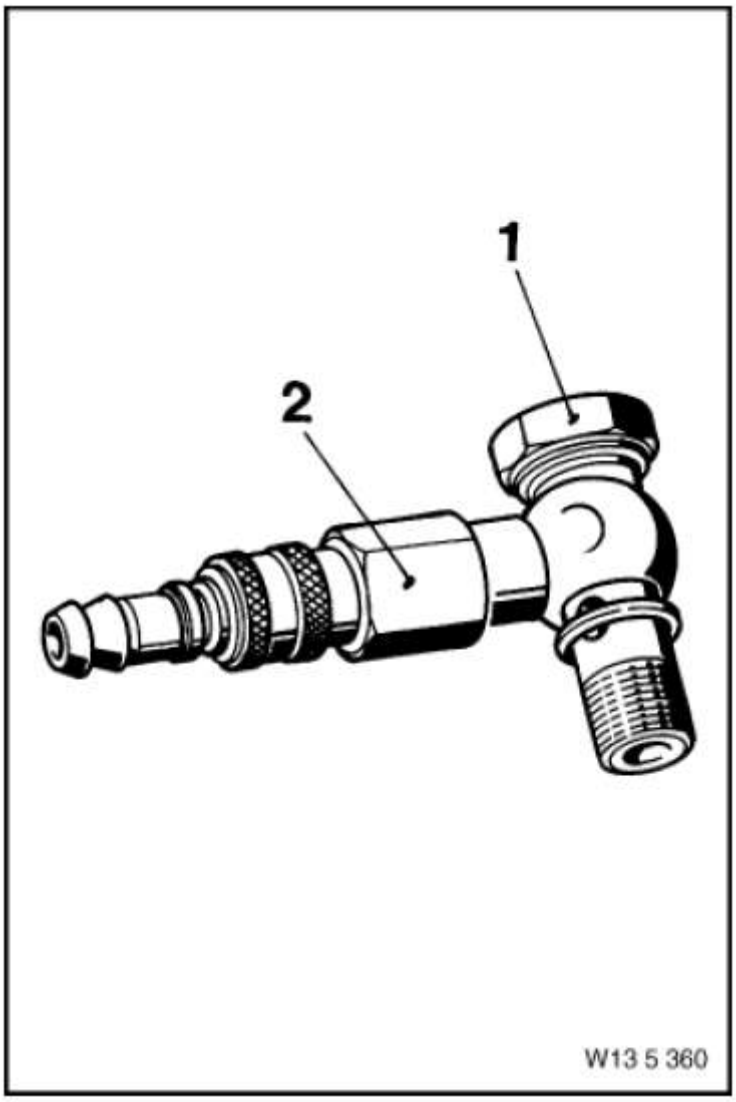


Fig. 6: Identifying Adapter (0491324)
Courtesy of BMW OF NORTH AMERICA, INC.

0495436 ADAPTER

0495436 130404 Adapter AM

NOTE: **(Adapter 04 (2 units))**

0491298 ADAPTER

0491298 135131 Adapter Minimum set: Mechanical tools AM

NOTE: **Only available as part of complete set**

Storage Location

A3

A4

cardiagn.com

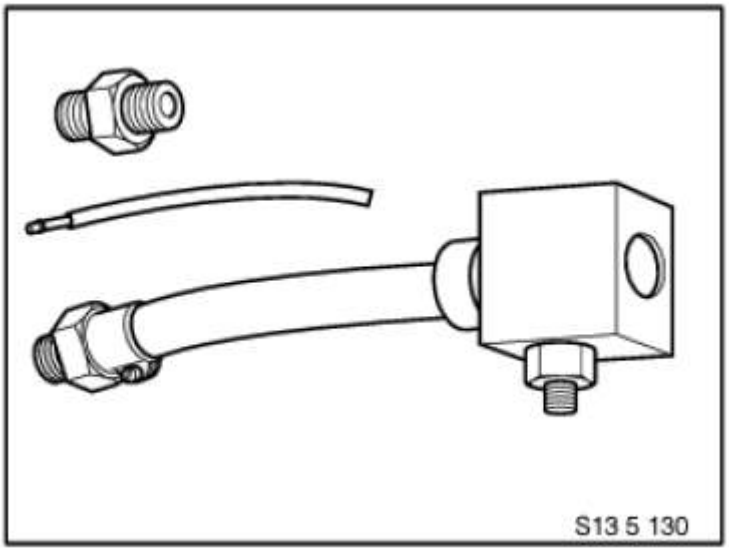


Fig. 7: Identifying Adapter (0491298)
Courtesy of BMW OF NORTH AMERICA, INC.

0491299 ADAPTER

0491299 135132 Adapter Minimum set: Mechanical tools AM

NOTE: **(Adapter) connection to the pressure sensor BMW SERVICE-TEST Available as part of complete set only**

Storage Location

A3

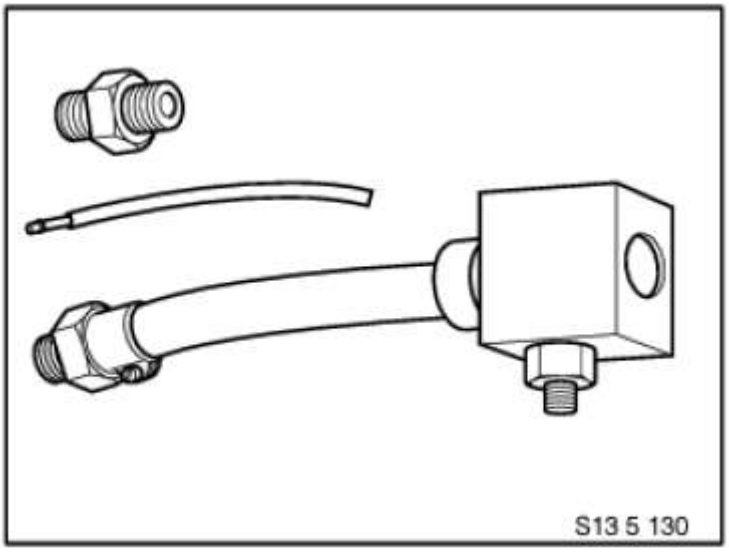


Fig. 8: Identifying Adapter (0491299)
Courtesy of BMW OF NORTH AMERICA, INC.

0491305 ADAPTER

0491305 135220 Adapter Minimum set: Mechanical tools AM

NOTE: **For pressure gauge 13 3 061 or BMW DIS for measuring fuel pressure at fuel injection pipe**

Storage Location

cardiagn.com

B4

SI number

01 06 95 (963)

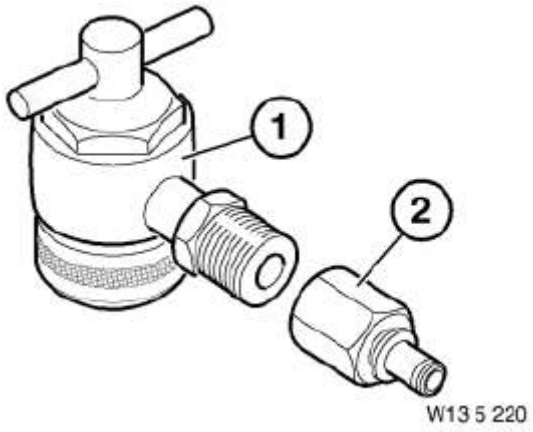


Fig. 9: Identifying Adapter (0491305)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

3 = **0495445** Gasket

NOTE: **(sealing kit for adapter 13 5 221)**

1 = **0491306** Adapter

NOTE: **Engine: M43, M44, M52, M62 Liquidation of existing inventory and then available only via complete tool set 13 5 220 = 83 30 0 491 305 - status 09.12.2011**

2 = **0491307** Adapter

NOTE: **(Adapter) For connecting the DIS pressure sensor Liquidation of existing inventory and then available only via complete tool set 13 5 220 = 83 30 0 491 305 - status 09.12.2011**

0491364 ADAPTER

0491364 138023 Adapter AM

NOTE: **(adapter hose) With counterpiece for quick-release coupling**

cardiagn.com

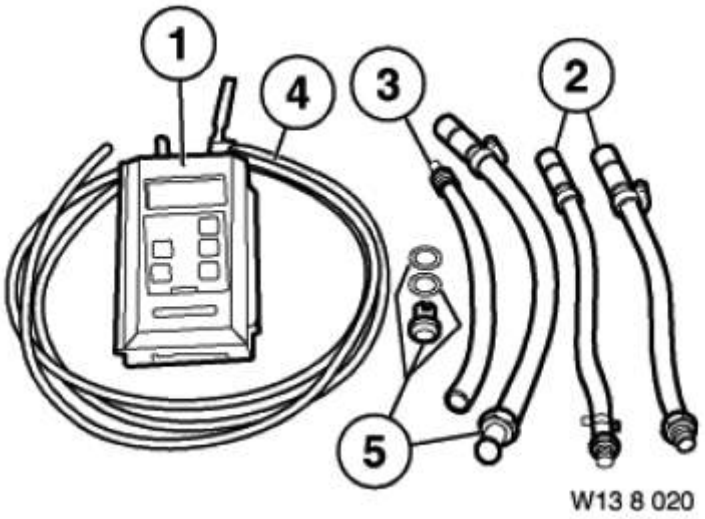


Fig. 10: Identifying Adapter (0491364)
Courtesy of BMW OF NORTH AMERICA, INC.

0491365 ADAPTER

0491365 138024 Adapter AM

NOTE: (adapter hoses) With T-piece for intake pressure connection

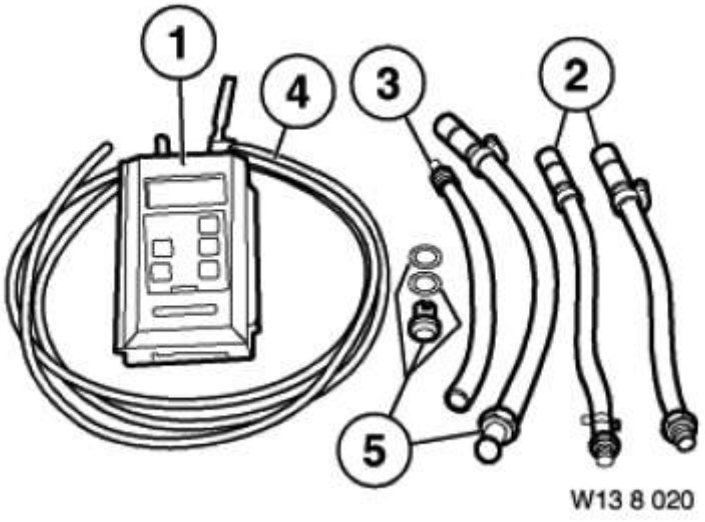


Fig. 11: Identifying Adapter (0491365)
Courtesy of BMW OF NORTH AMERICA, INC.

0495579 ADAPTER

0495579 135255 Adapter Minimum set: Mechanical tools AM

NOTE: For removing steering shaft on E85.

SI number

01 11 06 (265)

cardiagn.com



Fig. 12: Identifying Adapter (0495579)
Courtesy of BMW OF NORTH AMERICA, INC.

0494464 ADAPTER

0494464 136030 Adapter Minimum set: Mechanical tools Mechanical tool

NOTE: **For measuring fuel pressure in return line**

Storage Location

C46

SI number

01 11 02 (908)

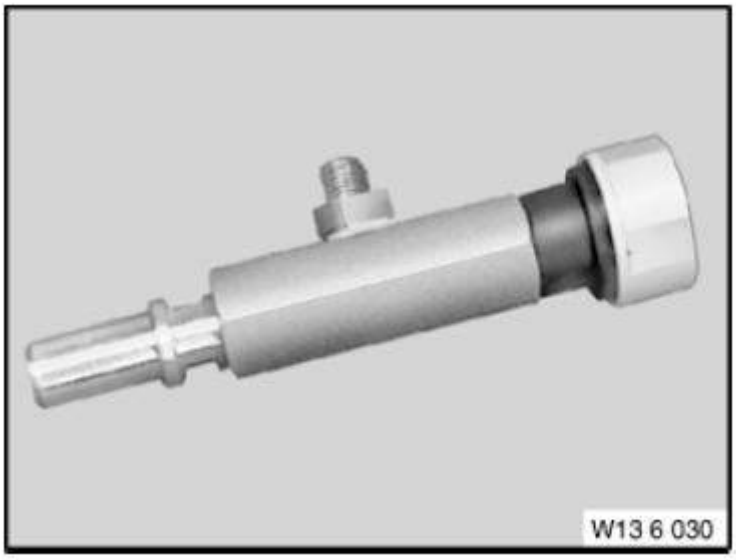


Fig. 13: Identifying Adapter (0494464)
Courtesy of BMW OF NORTH AMERICA, INC.

0491307 ADAPTER

0491307 135222 Adapter Minimum set: Mechanical tools AM

NOTE: **(Adapter) For connecting the DIS pressure sensor Liquidation of existing inventory and then available only via complete tool set 13 5 220 = 83 30 0 491**

cardiagn.com

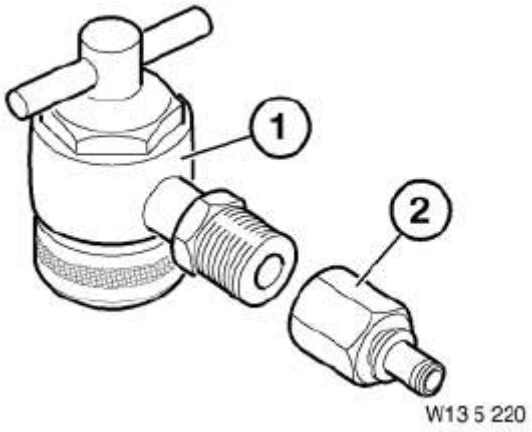


Fig. 14: Identifying Adapter (0491307)
Courtesy of BMW OF NORTH AMERICA, INC.

0495435 ADAPTER

0495435 130403 Adapter AM

NOTE: (Adapter 02 (2 units))

0491360 ADAPTER

0491360 138010 Adapter Mechanical tool

NOTE: For activating the diagnostic functions of the CNG control unit (indicator light in the instrument cluster) and for activating the high-pressure shutoff valve

Storage Location

W 2..

SI number

01 14 95 (014)

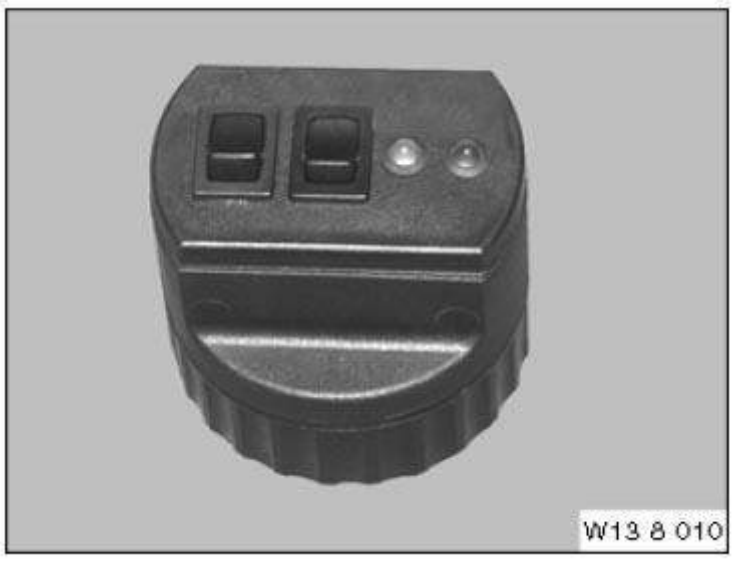


Fig. 15: Identifying Adapter (0491360)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0491311 ADAPTER

0491311 135271 Adapter Minimum set: Mechanical tools AM

NOTE: **(Adapter hose) Liquidation of existing inventory and then available only as a complete tool set 13 5 270 (83 30 0 491 310) - as of 22.05.12.**

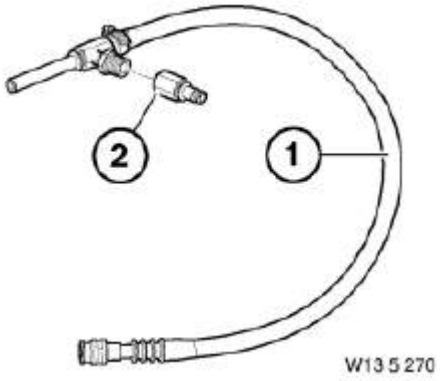


Fig. 16: Identifying Adapter (0491311)
Courtesy of BMW OF NORTH AMERICA, INC.

0491306 ADAPTER

0491306 135221 Adapter Minimum set: Mechanical tools AM

NOTE: **Engine: M43, M44, M52, M62 Liquidation of existing inventory and then available only via complete tool set 13 5 220 = 83 30 0 491 305 - status 09.12.2011**

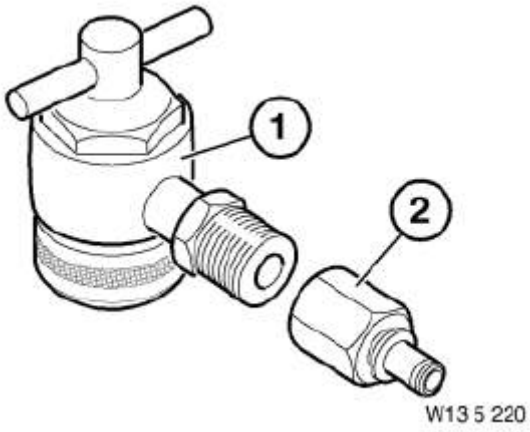


Fig. 17: Identifying Adapter (0491306)
Courtesy of BMW OF NORTH AMERICA, INC.

0495434 ADAPTER

0495434 130402 Adapter AM

NOTE: **(Adapter 01 (2 units))**

0491357 ADAPTER

0491357 136400 Adapter Mechanical tool

NOTE: **For control unit with 25-pin plug connection (L-Jetronic/3rd generation)**

cardiagn.com

Storage Location

W 2..

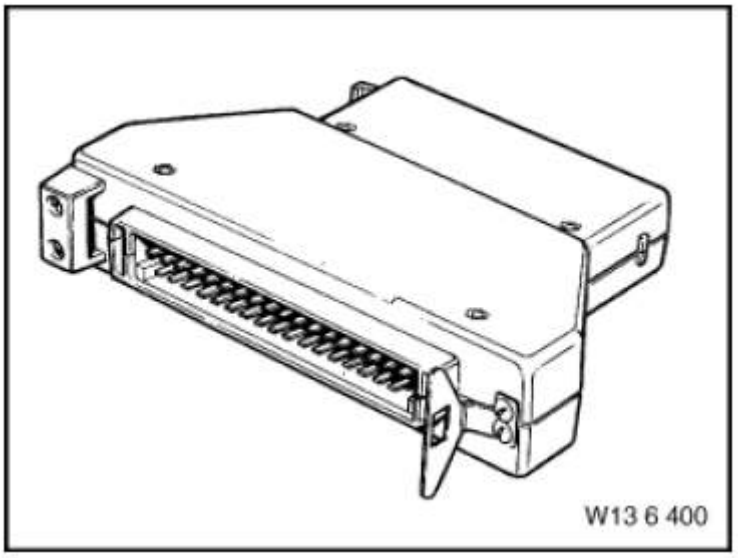


Fig. 18: Identifying Adapter (0491357)
Courtesy of BMW OF NORTH AMERICA, INC.

0491358 ADAPTER

0491358 136410 Adapter Mechanical tool

NOTE: **For wiring harness with 25-pin plug connection (L-Jetronic/3rd generation)**

Storage Location

W 2..

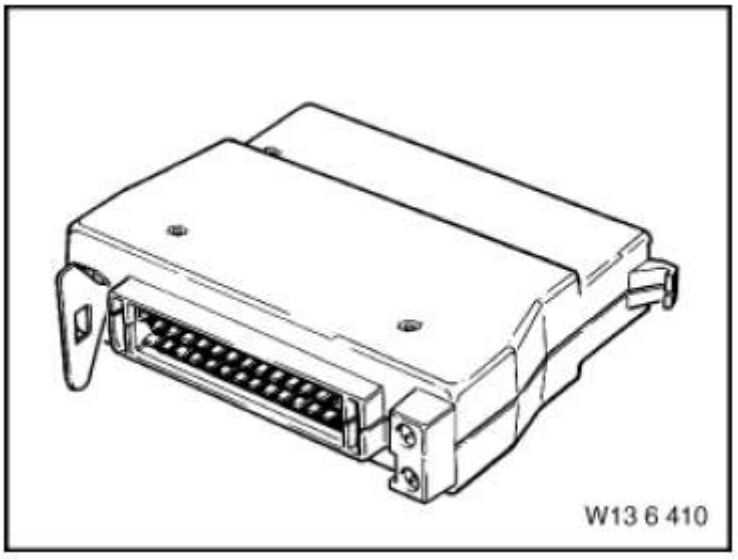


Fig. 19: Identifying Adapter (0491358)
Courtesy of BMW OF NORTH AMERICA, INC.

0491340 ADAPTER

0491340 136050 Adapter Minimum set: Mechanical tools AM

NOTE: **(adapter set for BMW DIS) For measuring oil and fuel pressures**

cardiagn.com

Storage Location

A3

B3

SI number

01 12 94 (859)

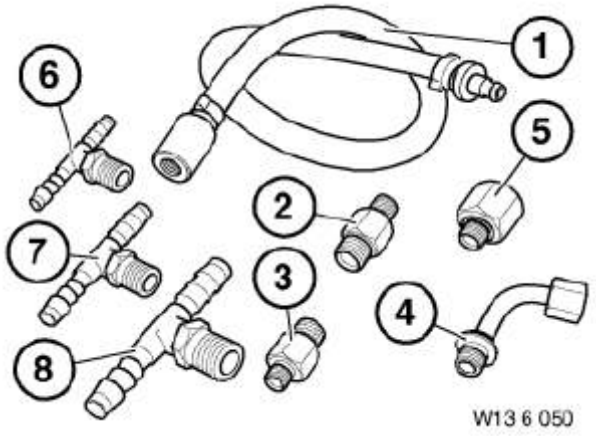


Fig. 20: Identifying Adapter (0491340)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

4 = **0495067** T-piece

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

1 = **0491341** Hose

NOTE: **(Connecting hose) For connecting reducers 13 6 052, 13 6 053, 13 6 55 and adapters 11 4 050, 11 4 160, 11 4 170, 13 5 131 to BMW DIS**

2 = **0491342** Adapter

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

3 = **0491343** Adapter

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

4 = **0491344** Adapter

NOTE: **(Adapter)**

5 = **0491345** T-piece

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

cardiagn.com

6 = 0491346 T-piece

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

7 = 0491347 T-piece

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

0491282 ADAPTER

0491282 135034 Adapter AM

NOTE: **(Adapter) 6 pieces For connecting the fuel injection lines**

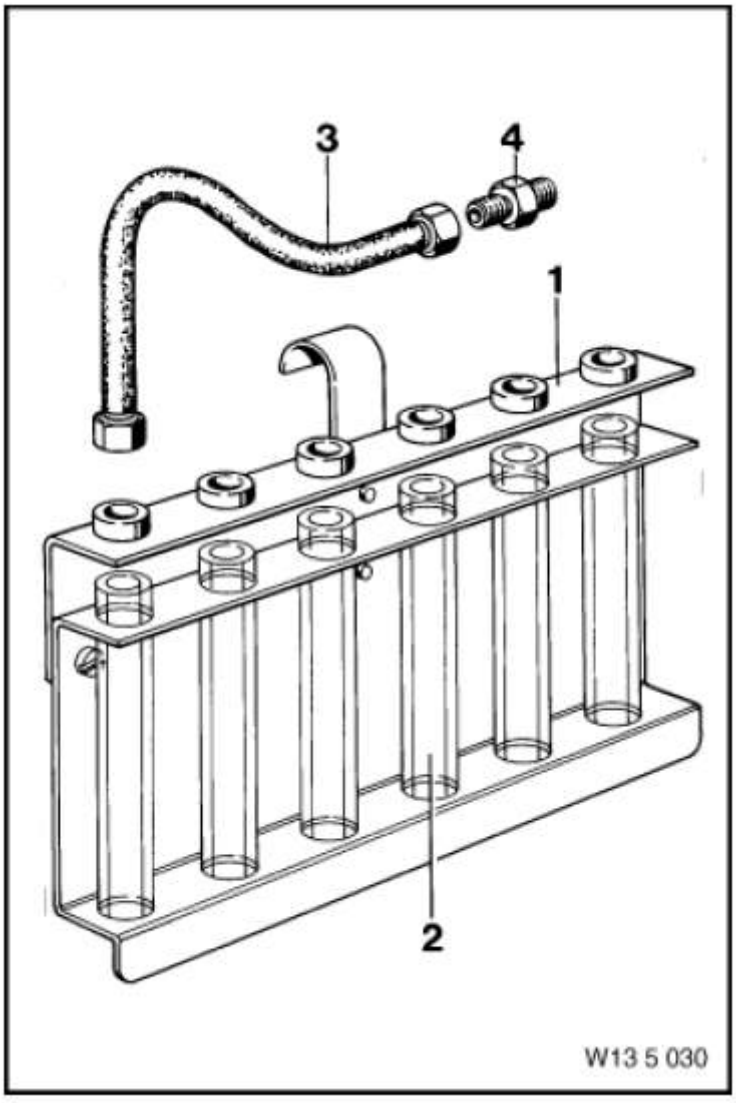


Fig. 21: Identifying Adapter (0491282)
Courtesy of BMW OF NORTH AMERICA, INC.

0491222 ADAPTER

0491222 130100 Adapter Mechanical tool

Replaced by: 83300491221

NOTE: **Replaced by 13 0 094 (0 491 221)**

cardiagn.com

Storage Location

B15

0491342 ADAPTER

0491342 136052 Adapter Minimum set: Mechanical tools AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

Storage Location

A3

0491327 ADAPTER

0491327 135381 Adapter AM

Replaced by: 83300491297

NOTE: **Replaced by 13 5 130 (0 941 297)**

0491221 ADAPTER

0491221 130094 Adapter AM

NOTE: **Between exhaust probe and exhaust manifold Can be ordered as part of complete special tool 13 0 090 = 0491217.**

cardiagn.com

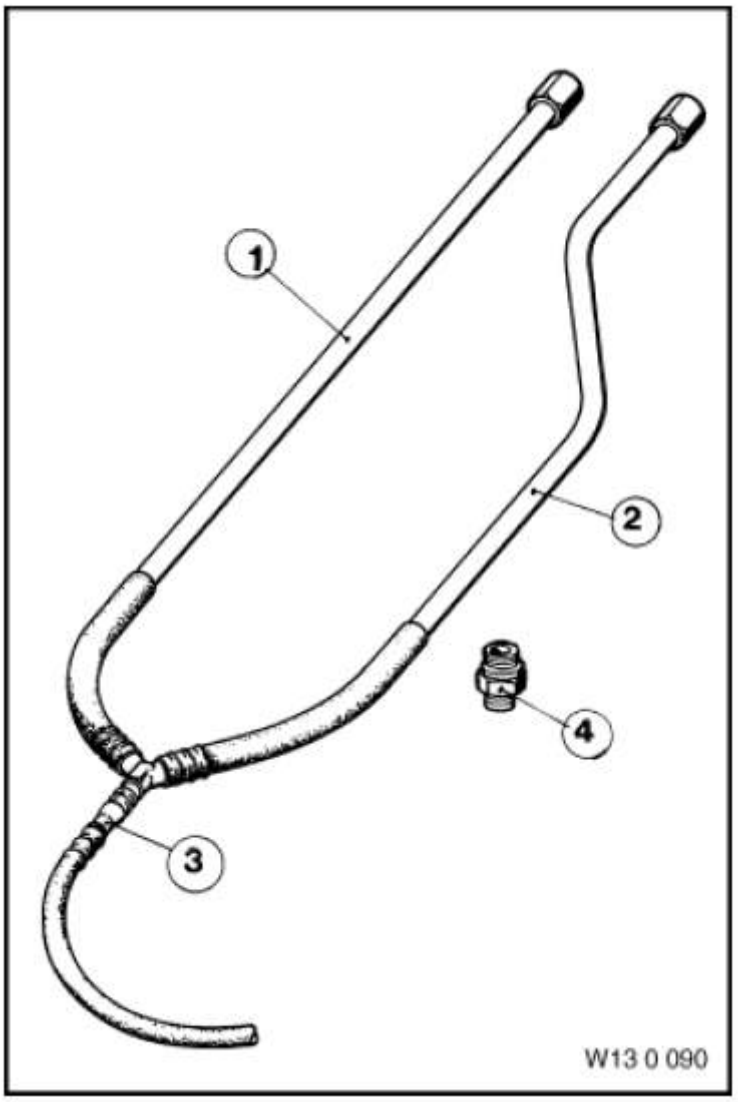


Fig. 22: Identifying Adapter (0491221)
Courtesy of BMW OF NORTH AMERICA, INC.

0491326 ADAPTER

0491326 135380 Adapter AM

Replaced by: 83300491297

NOTE: **With connecting hose for checking the injection pump internal pressure - July 93 Replaced by 13 5 130 (0 941 297)**

Storage Location

C16

Consisting of:

1. 0491327 Adapter

   NOTE: **Replaced by 13 5 130 (0 941 297)**

2. 0491328 Hose

   NOTE: **(Connecting hose) Replaced by 13 5 130 (0 941 297)**

cardiagn.com

0495437 ADAPTER

0495437 130405 Adapter AM

NOTE: **(Adapter 26 (2 units))**

0491310 ADAPTER

0491310 135270 Adapter Minimum set: Mechanical tools AM

NOTE: **(Adapter hose with coupling connector) For the DIS pressure sensor or pressure gauge 13 3 061 for measuring the fuel feed pressure**

Storage Location

A3

B3

C3

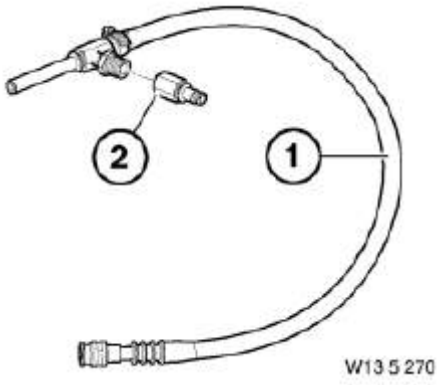


Fig. 23: Identifying Adapter (0491310)
Courtesy of BMW OF NORTH AMERICA, INC.

SI number

01 18 96 (163)

Consisting of:

1. **0491311** Adapter

   NOTE: **(Adapter hose) Liquidation of existing inventory and then available only as a complete tool set 13 5 270 (83 30 0 491 310) - as of 22.05.12.**

2. **0491312** Adapter

   NOTE: **(Adapter) For connecting the DIS pressure sensor**

0491316 ADAPTER

0491316 135300 Adapter Mechanical tool

NOTE: **For BMW SERVICE TEST with CO and HC measuring system**

cardiagn.com

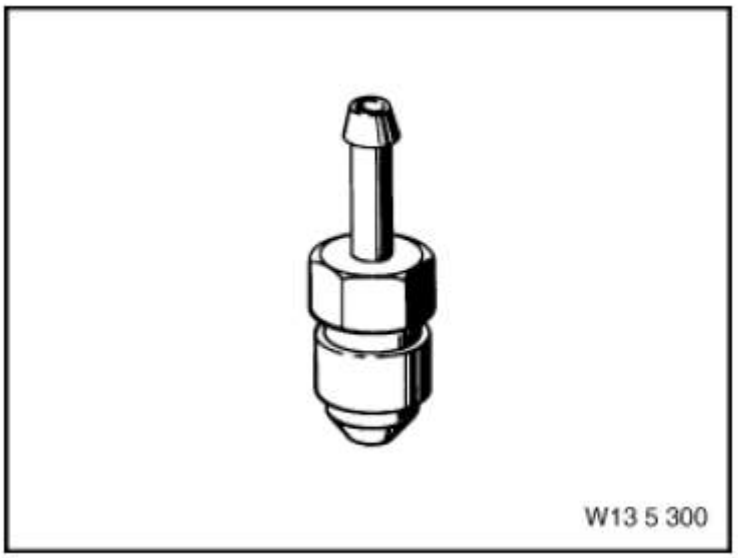


Fig. 24: Identifying Adapter (0491316)
Courtesy of BMW OF NORTH AMERICA, INC.

13-5272 ADAPTER

0491312 135272 Adapter Minimum set: Mechanical tools Mechanical tool

NOTE: **(Adapter) For connecting the DIS pressure sensor**

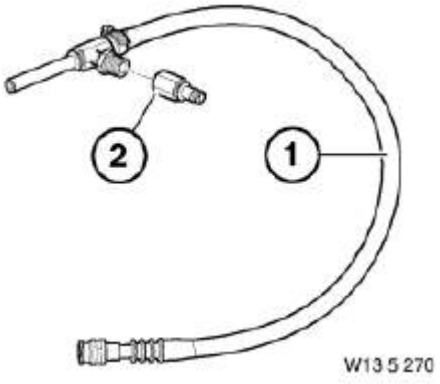


Fig. 25: Identifying Adapter (0491312)
Courtesy of BMW OF NORTH AMERICA, INC.

0491344 ADAPTER

0491344 136054 Adapter Minimum set: Mechanical tools AM

NOTE: **(Adapter)**

Storage Location

A3

cardiagn.com

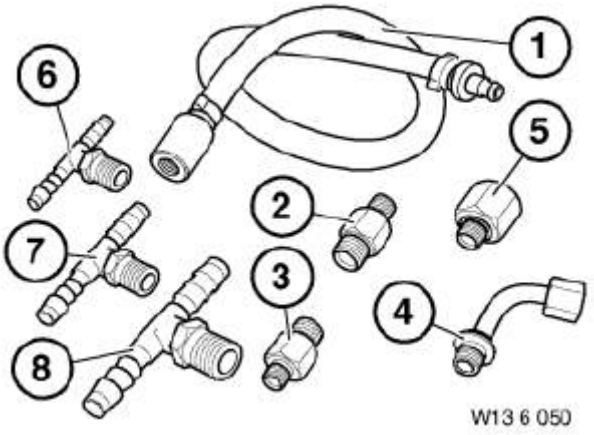


Fig. 26: Identifying Adapter (0491344)
Courtesy of BMW OF NORTH AMERICA, INC.

0496766 ADAPTER

0496766 130310 Adapter AM

In conjunction with: 13 0 200 = 0495325

NOTE: **In conjunction with return flow rate gauge 13 0 200. Engine N47TU**

Storage Location

B29

SI number

01 06 10 (633)

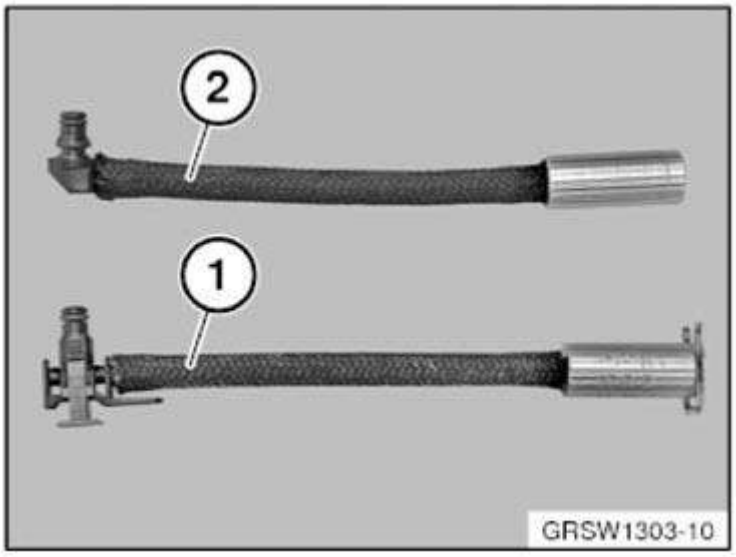


Fig. 27: Identifying Adapter (0496766)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0496863 Line

NOTE: **Only available as part of complete tool set 13 0 310 (83 30 0 496 766).**

cardiagn.com

2. 0496864 Line

NOTE: **Only available as part of complete tool set 13 0 310 (83 30 0 496 766).**

0496480 ADAPTER

0496480 130162 Adapter Minimum set: Mechanical tools AM

NOTE: **(Adapter SW15) --> only available in set under 13 0 160 (0496371).**

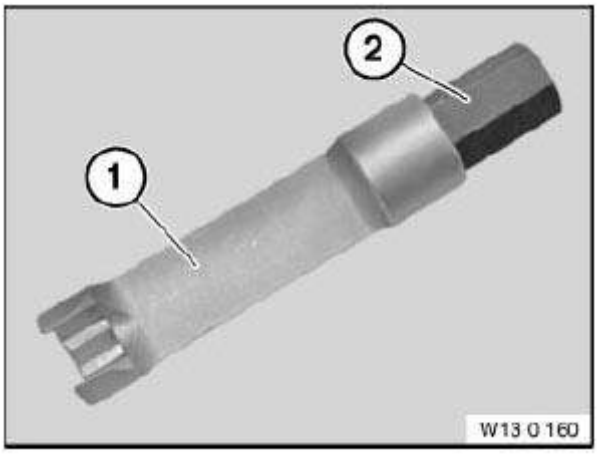


Fig. 28: Identifying Adapter (0496480)
Courtesy of BMW OF NORTH AMERICA, INC.

0494148 ADAPTER CABLE

0494148 136470 Adapter cable Minimum set: Measuring and testing equipment MP

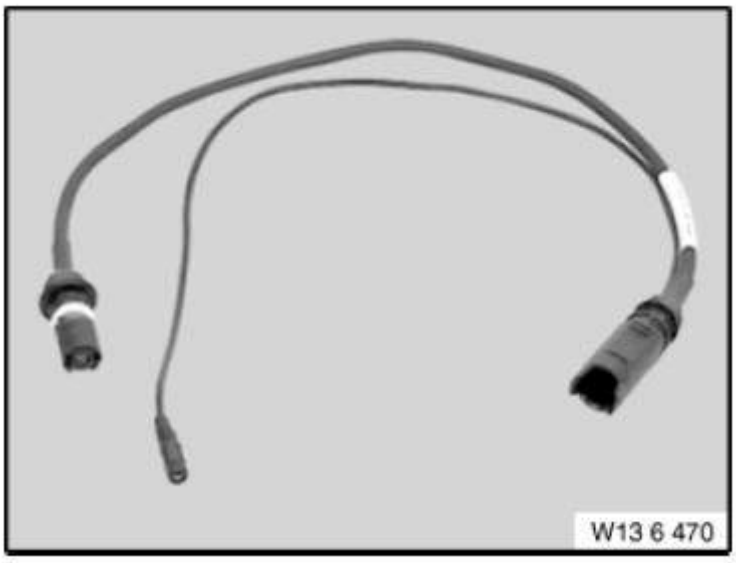
NOTE: **(Adapter cable) V adapter cable 1-pin For diagnosis and troubleshooting of preheating system**

Storage Location

Q208

SI number

02 05 01 (479)



cardiagn.com

Fig. 29: Identifying Adapter Cable (0494148)
Courtesy of BMW OF NORTH AMERICA, INC.

0494463 ADAPTER CABLE

0494463 135457 Adapter cable AM

NOTE: (Pressure control valve adapter cable (700 mm)) From 09/2011 remaining inventories will be sold off and can only be ordered as part of the complete special tool 0494456 (13 5 450).

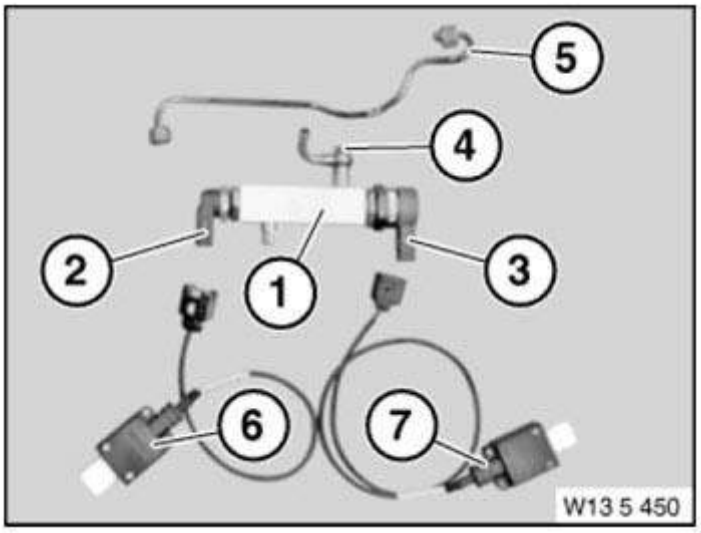


Fig. 30: Identifying Adapter Cable (0494463)
Courtesy of BMW OF NORTH AMERICA, INC.

0494462 ADAPTER CABLE

0494462 135456 Adapter cable AM

NOTE: (Rail pressure sensor adapter cable (400 mm)) From 09/2011 remaining inventories will be sold off and can only be ordered as part of the complete special tool 0494456 (13 5 450).

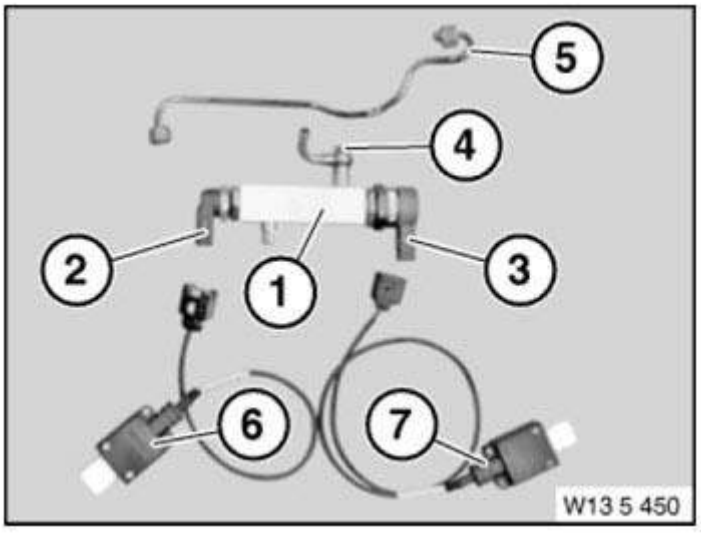


Fig. 31: Identifying Adapter Cable (0494462)
Courtesy of BMW OF NORTH AMERICA, INC.

0409689 ADAPTER CABLE

cardiagn.com

0409689 Adapter cable MP

NOTE: **(V adapter, 6-pin) For diagnosis and troubleshooting at E-gas actuator, exhaust-gas recirculation valve DISA, HFM and SWIRL flap (only E43) This adapter cable is replaced from February 2011 by cable 13 8 030 (0493837).**

Storage Location

N206

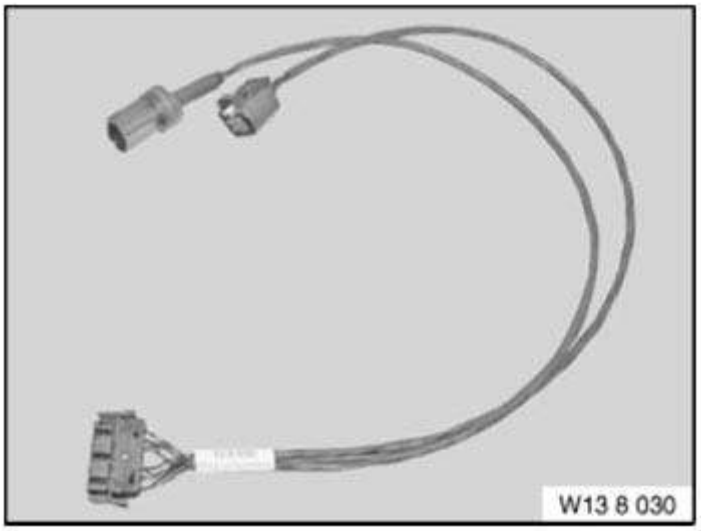


Fig. 32: Identifying Adapter Cable (0409689)
Courtesy of BMW OF NORTH AMERICA, INC.

0493837 ADAPTER CABLE

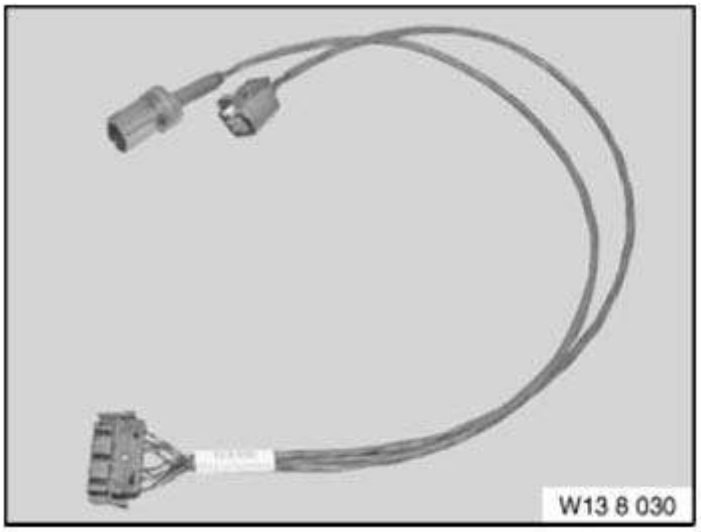
0493837 138030 Adapter cable AM

Replaced by: 83300409689

NOTE: **(V adapter, 6-pin) For diagnosis and troubleshooting at E-gas actuator, AGR valve DISA, HFM and SWIRL flap (only E43). Adapter cable is replaced by 0409689 cable.**

SI number

02 07 00 (647)



cardiagn.com

Fig. 33: Identifying Adapter Cable (0493837)
Courtesy of BMW OF NORTH AMERICA, INC.

0494457 BASIC BODY

0494457 135451 Basic body AM

NOTE: (Basic body) With rail pressure sensor and pressure control valve. From 09/2011 can only be ordered as part of the complete special tool 0494456 (13 5 450).

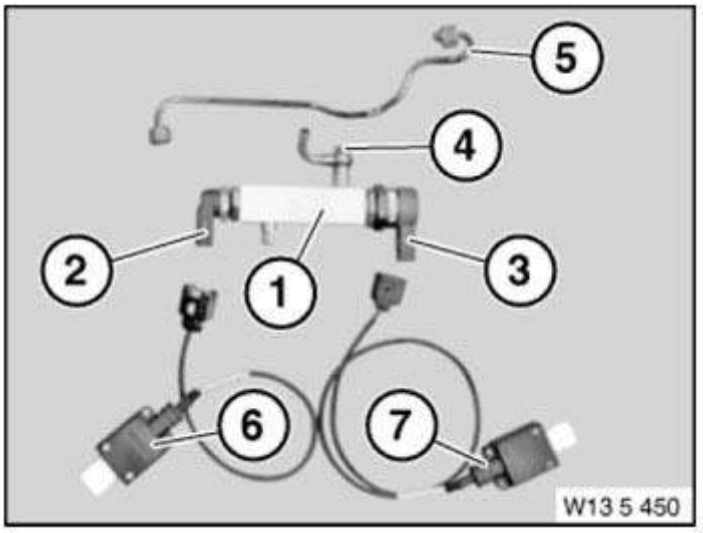


Fig. 34: Identifying Basic Body (0494457)
Courtesy of BMW OF NORTH AMERICA, INC.

0491258 BOX SPANNER

0491258 133030 Box spanner Mechanical tool

NOTE: For changing the non-return valve in the electric fuel pump/K-Jetronic

cardiagn.com

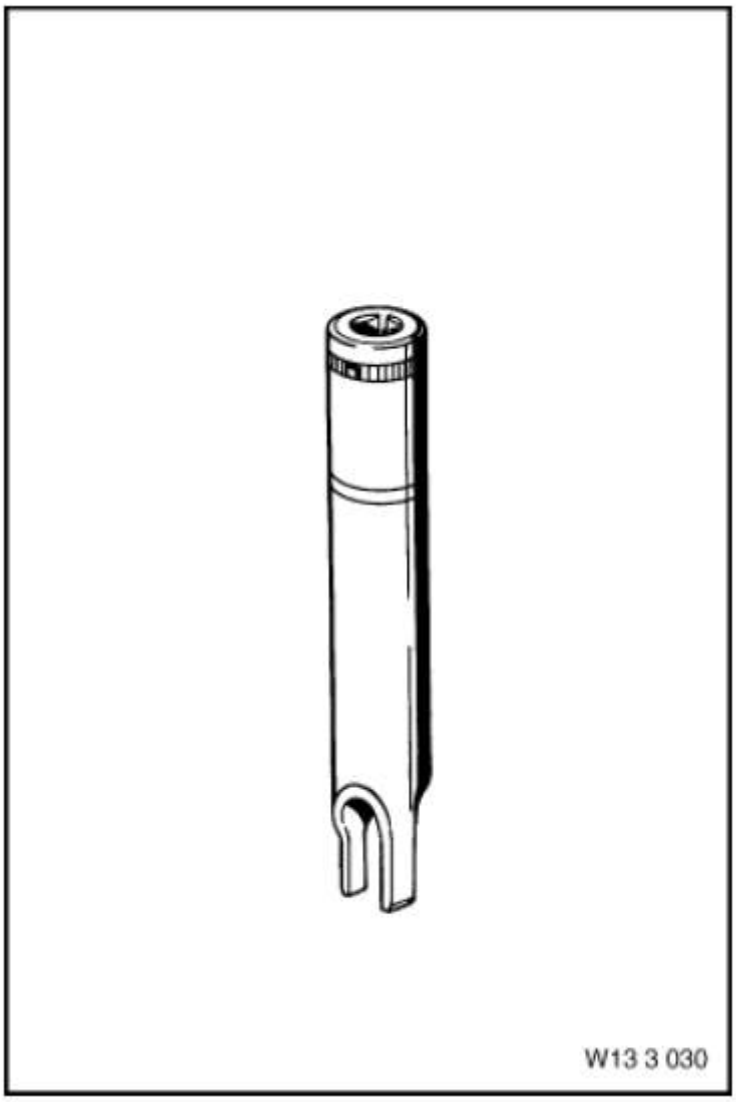


Fig. 35: Identifying Box Spanner (0491258)
Courtesy of BMW OF NORTH AMERICA, INC.

0493761 BRUSH HEAD

0493761 135213 Brush head Minimum set: Mechanical tools AM

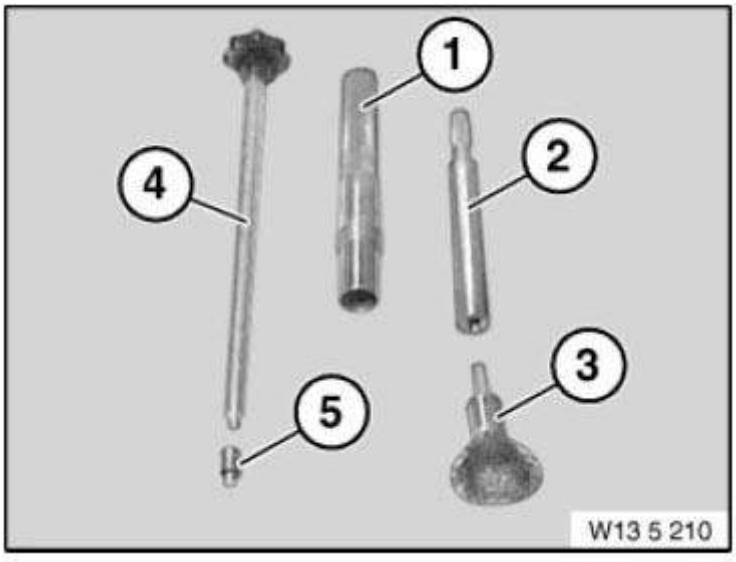


Fig. 36: Identifying Brush Head (0493761)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0493339 BUSH

0493339 135252 Bush Minimum set: Mechanical tools AM

NOTE: (Threaded bush)



Fig. 37: Identifying Bush (0493339)
Courtesy of BMW OF NORTH AMERICA, INC.

0491334 CABLE

0491334 136004 Cable AM

NOTE: (Cable) Power supply cable

cardiagn.com



Fig. 38: Identifying Cable (0491334)
Courtesy of BMW OF NORTH AMERICA, INC.

2361594 CAP

2361594 Cap Minimum set: Mechanical tools AM

NOTE: **To prevent contamination and damage of the rail, injectors and high pressure pump (M14) Contents per set = 10 pieces.**

SI number

01 46 14 (191)

cardiagn.com



Fig. 39: Identifying Cap (2361594)
Courtesy of BMW OF NORTH AMERICA, INC.

0491214 CAP

0491214 130060 Cap Mechanical tool

NOTE: **(Attachment caps (2 units)) for synchronization of carburetors**

Storage Location

B15

cardiagn.com

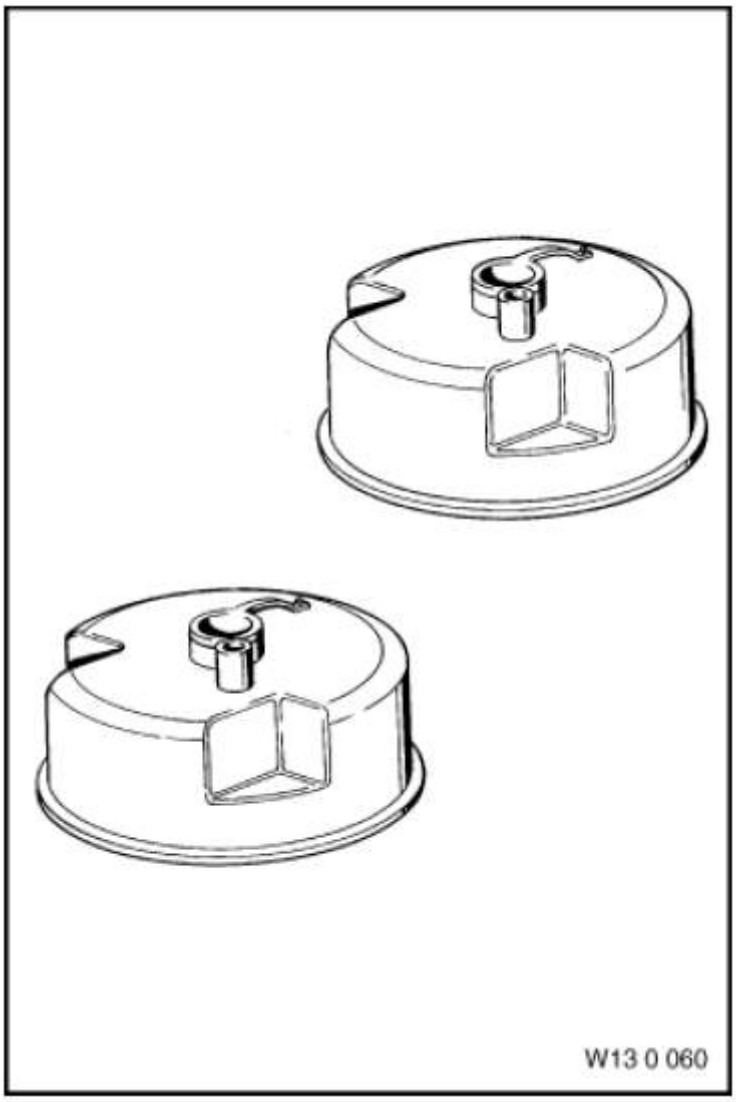
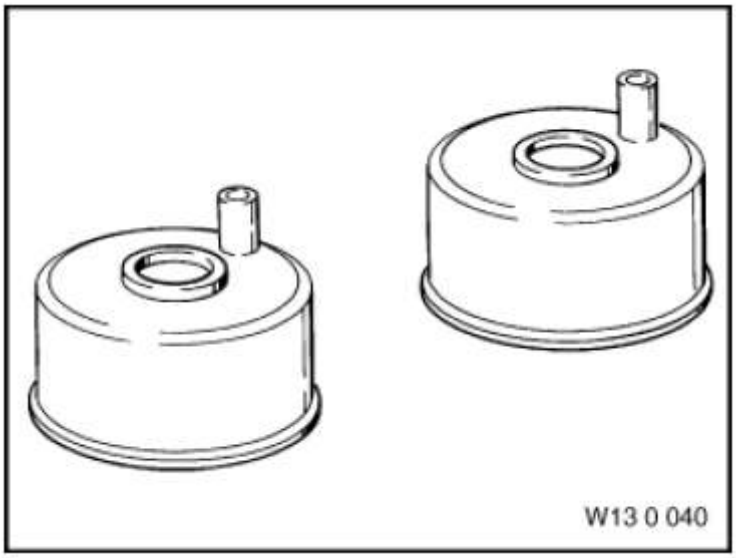


Fig. 40: Identifying Cap (0491214)
Courtesy of BMW OF NORTH AMERICA, INC.

0491212 CAP

0491212 130040 Cap Mechanical tool

NOTE: **(Attachment caps (2 pieces)) For synchronizing the carburetor - Solex 40 PHH**



cardiagn.com

Fig. 41: Identifying Cap (0491212)
Courtesy of BMW OF NORTH AMERICA, INC.

0491213 CAP

0491213 130050 Cap Mechanical tool

NOTE: (Fitting caps (2 x)) For synchronizing the carburetor - Stromberg 175 CDET

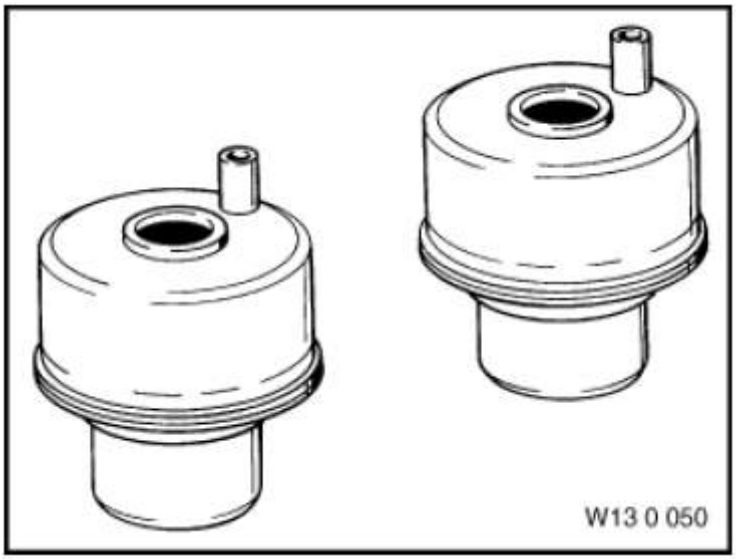


Fig. 42: Identifying Cap (0491213)
Courtesy of BMW OF NORTH AMERICA, INC.

0494491 CASE

0494491 135458 Case AM

NOTE: (Case) (not pictured) From 09/2011 can only be ordered as part of the complete special tool 0494456 (13 5 450).

0493379 CLAW

0493379 135254 Claw Minimum set: Mechanical tools AM

NOTE: (Clamping claw) For removal of injector nozzles/engine: M57

0491265 CONNECTOR

0491265 133066 Connector AM

NOTE: (Connector for warm-up sensor) All except N73 Only available as part of complete set

0491267 CONNECTOR

0491267 133068 Connector AM

NOTE: (Connection piece, distributor) All except N73

cardiagn.com

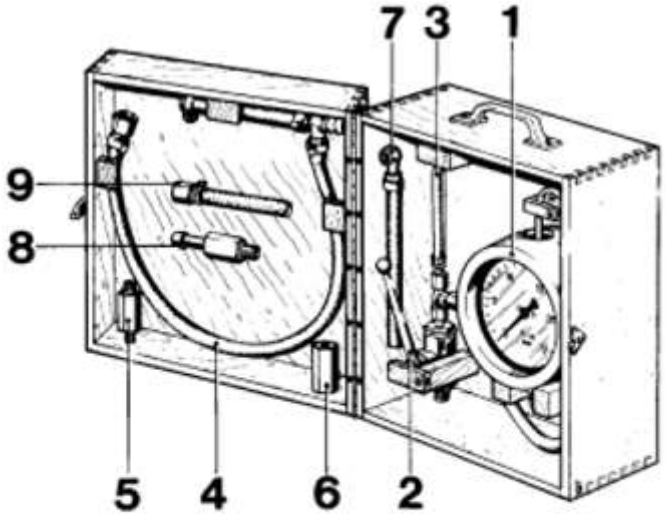


Fig. 43: Identifying Connector (0491267)
Courtesy of BMW OF NORTH AMERICA, INC.

0491264 CONNECTOR

0491264 133065 Connector AM

NOTE: (Connection piece, distributor) All except N73

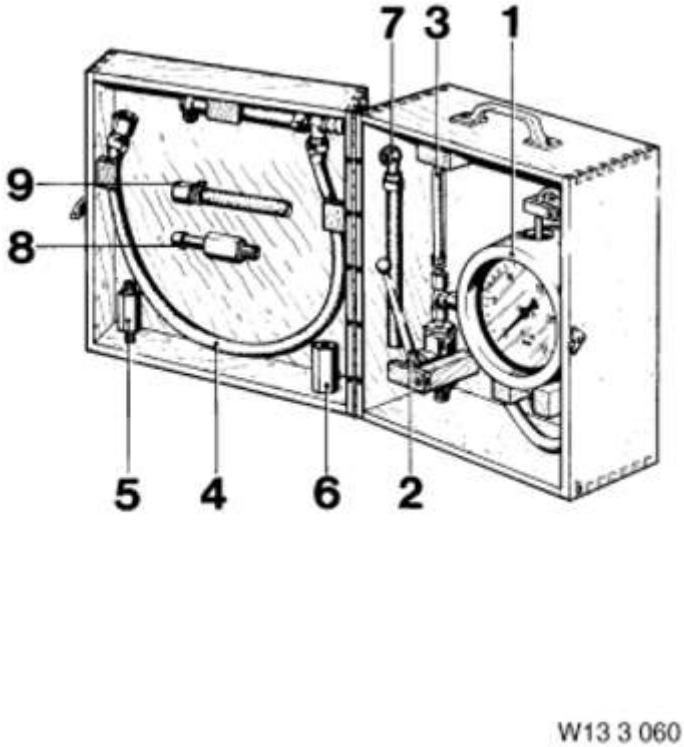


Fig. 44: Identifying Connector (0491264)
Courtesy of BMW OF NORTH AMERICA, INC.

0491268 CONNECTOR

cardiagn.com

0491268 133069 Connector AM

NOTE: For warm-up sensor with hose, all except N73

0491335 CONTAINER

0491335 136009 Container AM

NOTE: (Canister) With lid.



Fig. 45: Identifying Container (0491335)
Courtesy of BMW OF NORTH AMERICA, INC.

0491236 CONTAINER

0491236 131030 Container Mechanical tool

NOTE: (measuring container) For measuring the fuel injection rate - down-draught carburetor

cardiagn.com

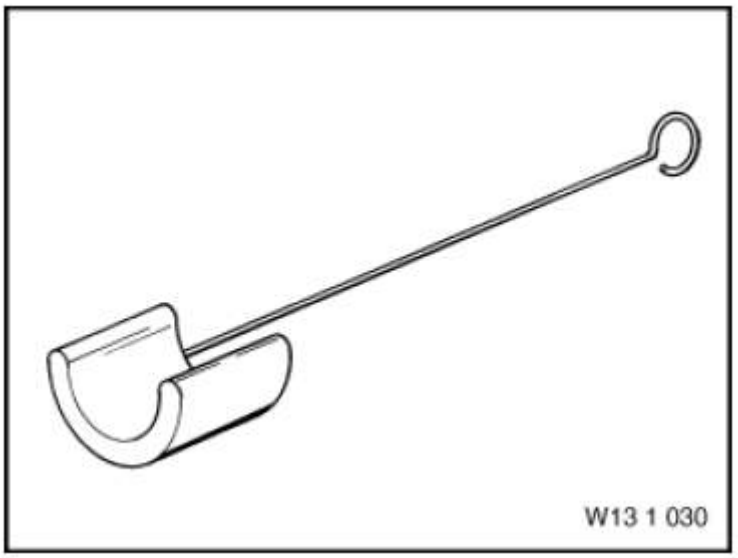


Fig. 46: Identifying Container (0491236)
Courtesy of BMW OF NORTH AMERICA, INC.

0491286 DEVICE

0491286 135061 Device AM

NOTE: **(Device) Liquidation of existing inventory and then available only via complete tool set 13 5 060 = 83 30 0 491 285 - status 29.11.2011**

0493453 DEVICE

0493453 130150 Device AM

NOTE: **(Mounting device) For mounting two dial gauges for synchronizing the throttle valves**

SI number

01 23 98 (390)

Consisting of:

4 = 0493458 Fixture

NOTE: **Only available as part of complete tool set 13 0 150 (83 30 0 493 453).**

4 = 0493459 Fixture

NOTE: **With mounting bolt for shims Only available as part of complete tool set 13 0 150 (83 30 0 493 453).**

cardiagn.com

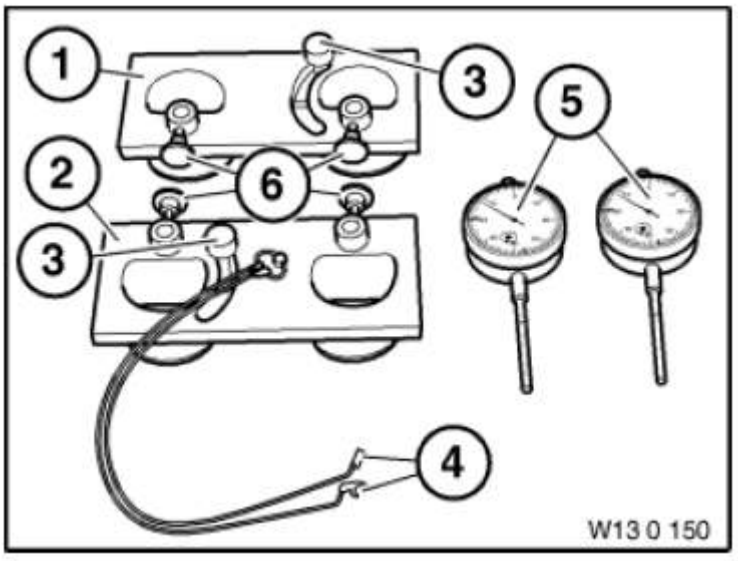


Fig. 47: Identifying Device (0493453)
Courtesy of BMW OF NORTH AMERICA, INC.

4 = **0493460** Screw

NOTE: **(Knurled screws (2 pieces)) Only available as part of complete tool set 13 0 150 (83 30 0 493 453).**

4 = **0493461** Washer

NOTE: **(Shims (2 pieces)) With nylon string Only available as part of complete tool set 13 0 150 (83 30 0 493 453).**

4 = **0493462** Dial gauge

NOTE: **(dial gauge) 2 pieces**

4 = **0493463** Screw

NOTE: **(knurled screws (4 x))**

0491296 DEVICE

0491296 135120 Device Mechanical tool

NOTE: **For pressing the injection pump off the sprocket during removal and for centering the sprocket**

Storage Location

B12

SI number

01 09 91 (416)

cardiagn.com

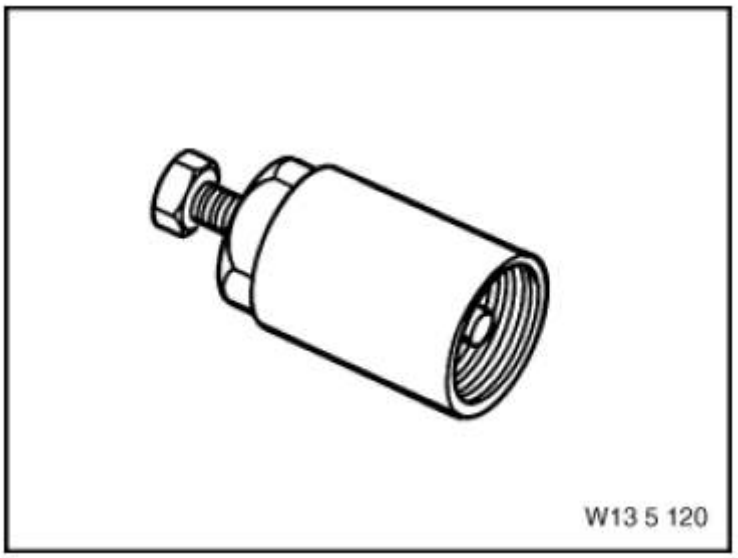


Fig. 48: Identifying Device (0491296)
Courtesy of BMW OF NORTH AMERICA, INC.

0496669 DEVICE

0496669 130270 Device Minimum set: Mechanical tools Mechanical tool

NOTE: **For removing and installing injectors.**

Storage Location

A27

SI number

01 18 09 (578)

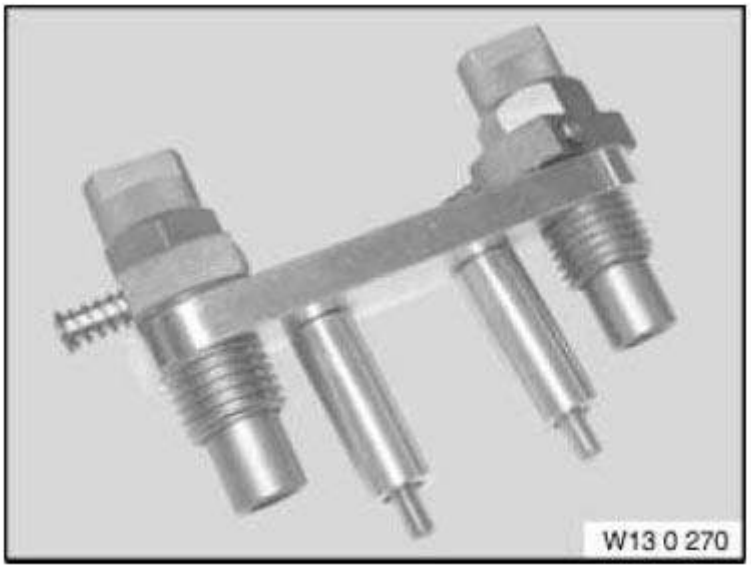


Fig. 49: Identifying Device (0496669)
Courtesy of BMW OF NORTH AMERICA, INC.

0491285 DEVICE

0491285 135060 Device AM

NOTE: **(Device with adjusting wrench) For removing the diesel injection pump and for**

cardiagn.com

turning the injection pump drive shaft e.g. to the TDC setting on installation - Without locking the camshaft Liquidation of existing inventory

Storage Location

A4

B4

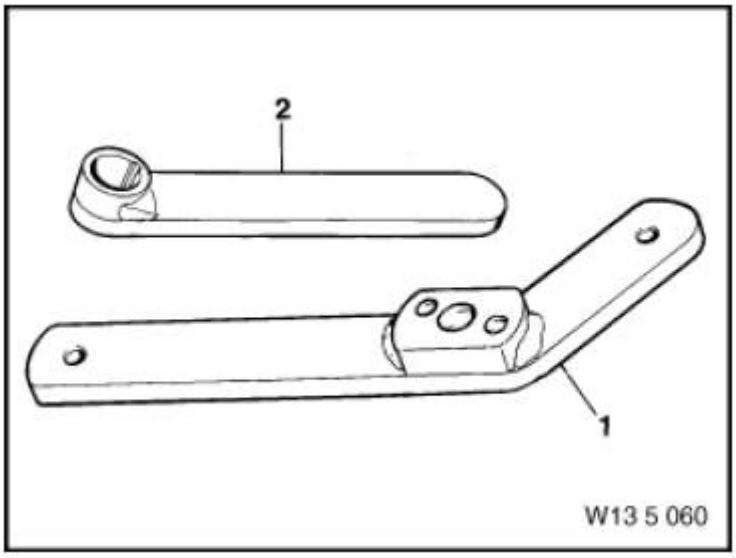


Fig. 50: Identifying Device (0491285)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. **0491286** Device

   NOTE: **(Device) Liquidation of existing inventory and then available only via complete tool set 13 5 060 = 83 30 0 491 285 - status 29.11.2011**

2. **0491287** Tool

   NOTE: **(wrench) Engine: M41, M51 sale of existing inventories and then available as part of set of special tools 13 5 060 = 83 30 0 491 285 only-as of 29.11.2011**

0491321 DEVICE

0491321 135350 Device Mechanical tool

NOTE: **For dynamic setting of diesel fuel injection pump**

0491288 DEVICE

0491288 135070 Device Mechanical tool

NOTE: **For securing the injection pump control lever - up to January 84**

0496885 DEVICE

0496885 130320 Device Minimum set: Mechanical tools AM

In conjunction with: **13 0 270 = 0496669**

cardiagn.com

NOTE: **For removing and installing injectors.**

Storage Location

A30

B30

SI number

01 05 11 (692)



Fig. 51: Identifying Device (0496885)
Courtesy of BMW OF NORTH AMERICA, INC.

0491249 DEVICE

0491249 131095 Device AM

NOTE: **(mounting device (K-Jetronic))**

cardiagn.com

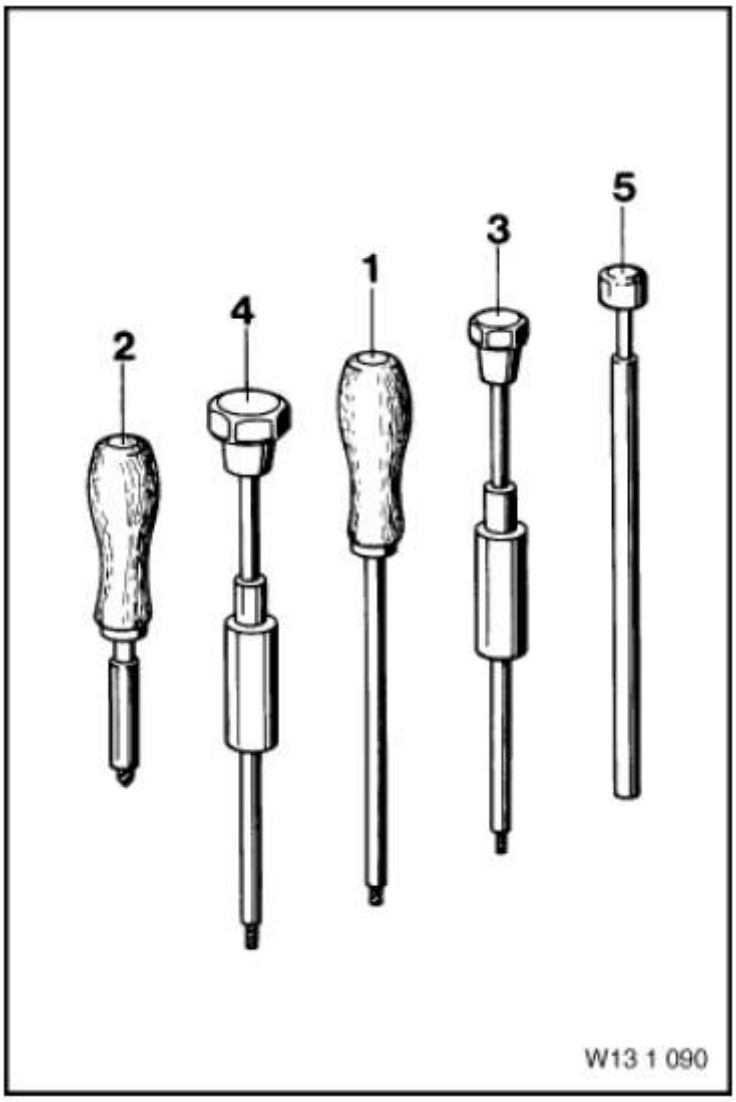


Fig. 52: Identifying Device (0491249)
Courtesy of BMW OF NORTH AMERICA, INC.

0494456 DEVICE

0494456 135450 Device AM

NOTE: **(Testing device) for checking the high pressure pump ATTENTION - sale of existing inventories and then discontinued as of 09/2011**

SI number

01 09 02 (906)

Consisting of:

1. 0494457 Basic body

NOTE: **(Basic body) With rail pressure sensor and pressure control valve. From 09/2011 can only be ordered as part of the complete special tool 0494456 (13 5 450).**

cardiagn.com

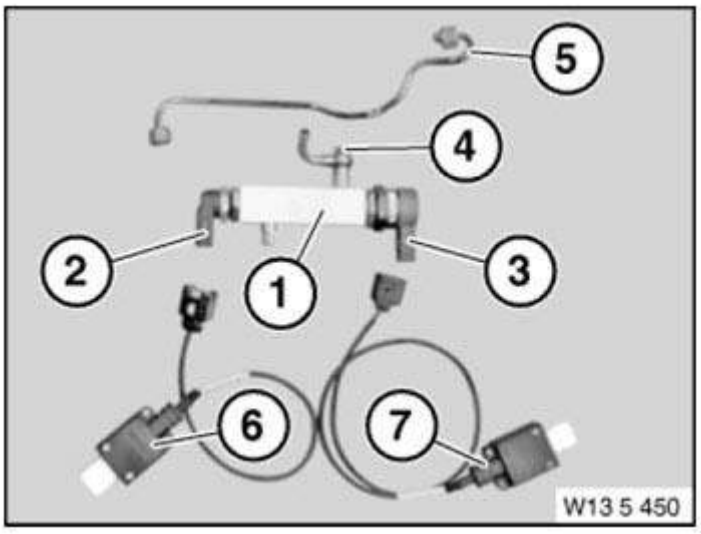


Fig. 53: Identifying Device (0494456)
Courtesy of BMW OF NORTH AMERICA, INC.

2. 0494458 Measuring device

NOTE: **(rail pressure sensor) Rail pressure sensor contained in 13 5 451.**

3. 0494459 Valve

NOTE: **(pressure control valve) Pressure control valve contained in 13 5 451.**

4. 0494460 Line

NOTE: **(Return line with banjo bolt) Separate components not available, only via set 0494456.**

5. 0494461 Line

NOTE: **(Fuel line/high pressure pump to testing device (basic body 13 5 451)) From 09/2011 can only be ordered as part of the complete special tool 0494456 (13 5 450).**

6. 0494462 Adapter cable

NOTE: **(Rail pressure sensor adapter cable (400 mm)) From 09/2011 remaining inventories will be sold off and can only be ordered as part of the complete special tool 0494456 (13 5 450).**

7. 0494463 Adapter cable

NOTE: **(Pressure control valve adapter cable (700 mm)) From 09/2011 remaining inventories will be sold off and can only be ordered as part of the complete special tool 0494456 (13 5 450).**

8. 0494491 Case

NOTE: **(Case) (not pictured) From 09/2011 can only be ordered as part of the complete special tool 0494456 (13 5 450).**

0491295 DEVICE

cardiagn.com

0491295 135110 Device Mechanical tool

Replaced by: 83300491020

NOTE: **(Centering device) For oil pump - Replaced by 11 4 100 (0 491 020)**

0493462 DIAL GAUGE

0493462 130155 Dial gauge AM

NOTE: **(dial gauge) 2 pieces**

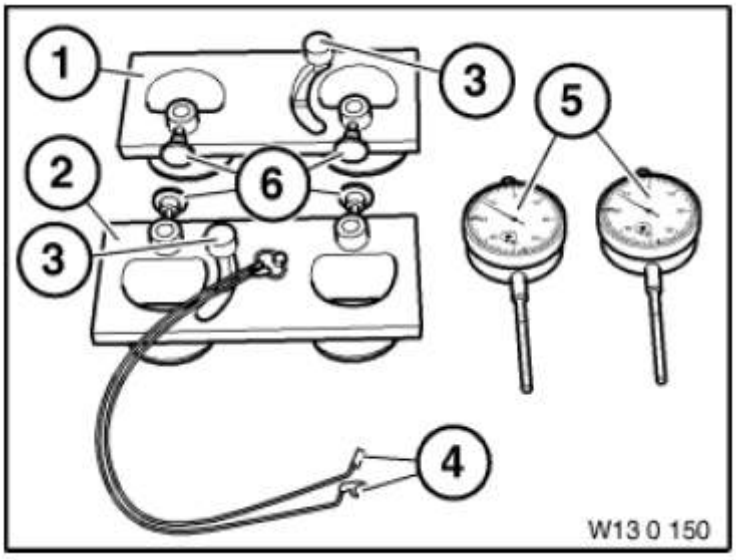


Fig. 54: Identifying Dial Gauge (0493462)
Courtesy of BMW OF NORTH AMERICA, INC.

0491292 DRILL BIT

0491292 135092 Drill bit AM

cardiagn.com

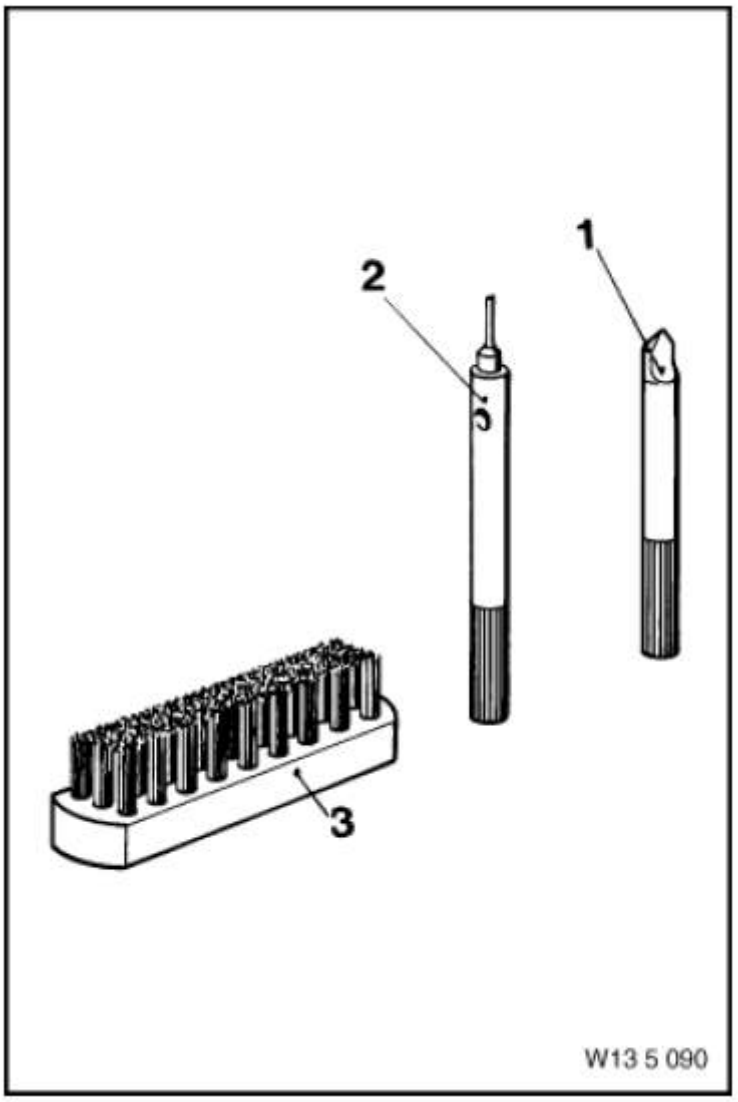


Fig. 55: Identifying Drill Bit (0491292)
Courtesy of BMW OF NORTH AMERICA, INC.

0491246 DRILL BIT

0491246 131092 Drill bit AM

NOTE: **(drill) drill, large (L-Jetronic)**

cardiagn.com

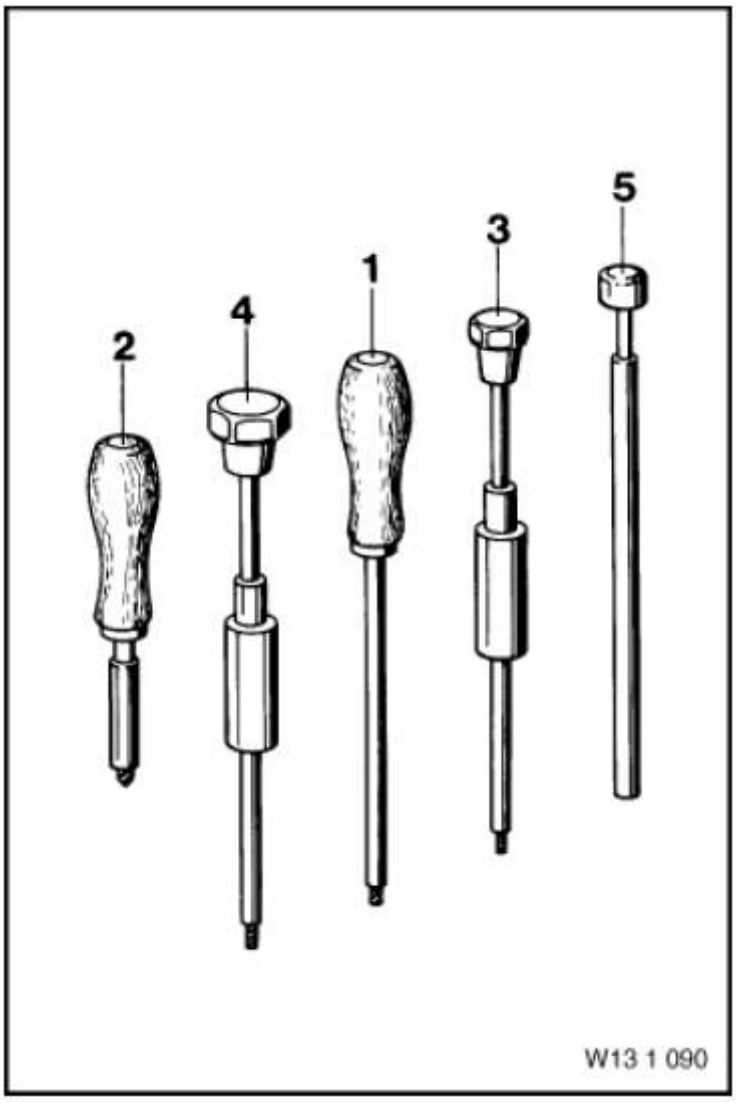


Fig. 56: Identifying Drill Bit (0491246)
Courtesy of BMW OF NORTH AMERICA, INC.

0491245 DRILL BIT

0491245 131091 Drill bit AM

NOTE: **(drill) drill, small (K-Jetronic)**

cardiagn.com

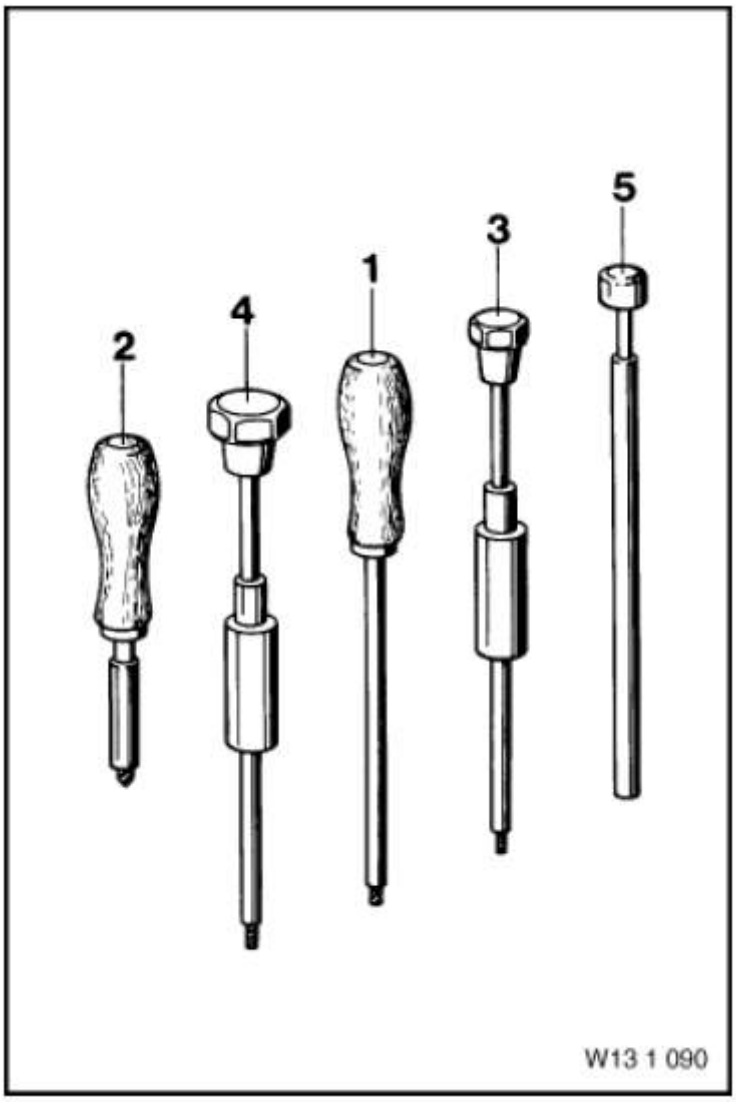
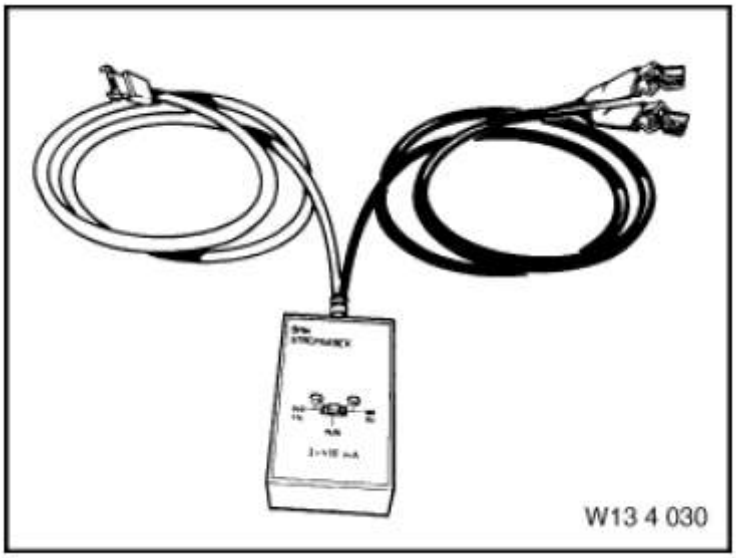


Fig. 57: Identifying Drill Bit (0491245)
Courtesy of BMW OF NORTH AMERICA, INC.

0491272 ELECTRONICS BOX

0491272 134030 Electronics box Mechanical tool

NOTE: (Constant current generator) For VDO idling control system - vehicles with catalytic converter or preparation



cardiagn.com

Fig. 58: Identifying Electronics Box (0491272)
Courtesy of BMW OF NORTH AMERICA, INC.

0491332 ELECTRONICS BOX

0491332 136002 Electronics box AM

NOTE: (Control module)



Fig. 59: Identifying Electronics Box (0491332)
Courtesy of BMW OF NORTH AMERICA, INC.

0495331 EXTRACTOR

0495331 130170 Extractor Mechanical tool

NOTE: For detaching leakage oil lines from injectors.

Storage Location

A19

SI number

01 14 05 (198)

cardiagn.com



Fig. 60: Identifying Extractor (0495331)
Courtesy of BMW OF NORTH AMERICA, INC.

0491276 EXTRACTOR

0491276 135010 Extractor Mechanical tool

NOTE: **For injection pump impeller**

Storage Location

B11

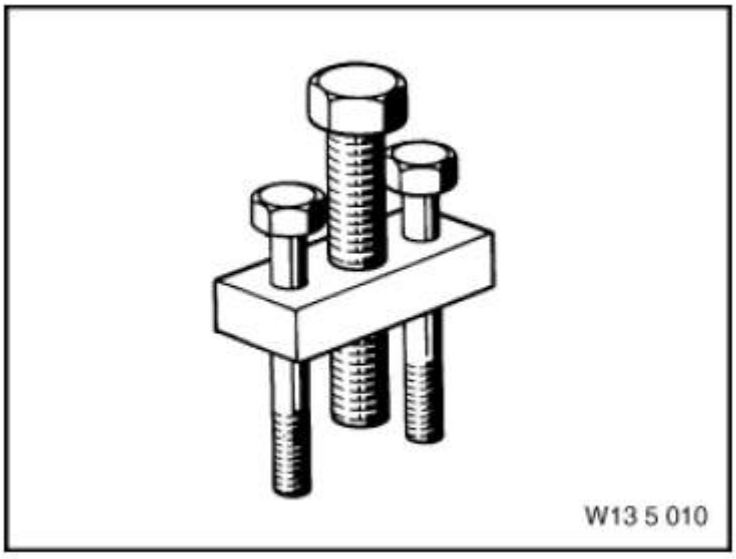


Fig. 61: Identifying Extractor (0491276)
Courtesy of BMW OF NORTH AMERICA, INC.

0491308 EXTRACTOR

0491308 135240 Extractor Mechanical tool

NOTE: **For injection pump sprocket - up to January 84**

0496826 FASTENER

0496826 130293 Fastener Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **Available as part of complete tool set 13 0 290 (0496707) only.**

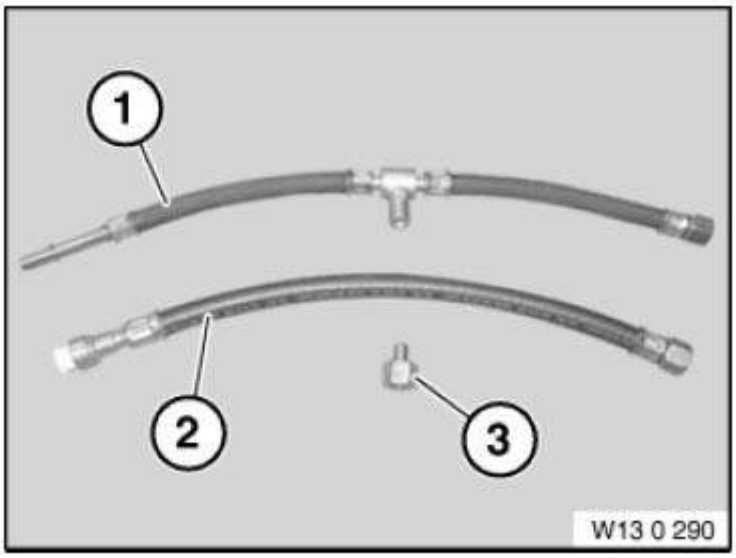


Fig. 62: Identifying Fastener (0496826)
Courtesy of BMW OF NORTH AMERICA, INC.

0496565 FASTENER

0496565 135160 Fastener Minimum set: Mechanical tools AM

NOTE: **(Caps (2x)) To close off the fuel lines when removing and installing the engine.**

Storage Location

A26

SI number

01 22 08 (498)

Consisting of:

1. 0496567 Fastener

NOTE: **(Cap (2 piece)) For sealing the quick connectors Deletion, only available via tool set**

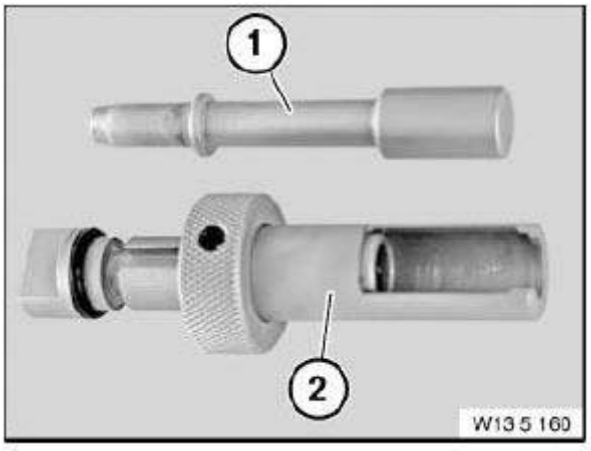


Fig. 63: Identifying Fastener (0496565)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

2. 0496568 Fastener

NOTE: **(Cap (2 x)) To close off the fuel lines. Discontinued, can only be ordered using complete tool**

0491314 FASTENER

0491314 135281 Fastener AM

NOTE: **(Cap) 2 pieces, for closing off the quick connectors**

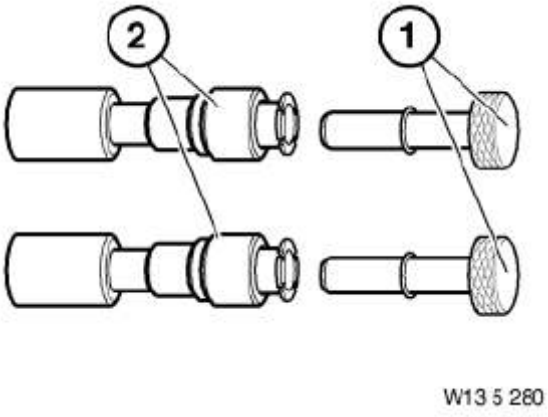


Fig. 64: Identifying Fastener (0491314)
Courtesy of BMW OF NORTH AMERICA, INC.

0496568 FASTENER

0496568 135162 Fastener Minimum set: Mechanical tools AM

NOTE: **(Cap (2 x)) To close off the fuel lines. Discontinued, can only be ordered using complete tool**

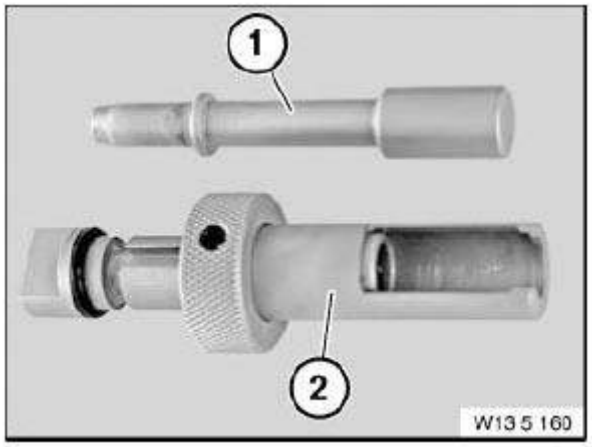


Fig. 65: Identifying Fastener (0496568)
Courtesy of BMW OF NORTH AMERICA, INC.

0496567 FASTENER

0496567 135161 Fastener Minimum set: Mechanical tools AM

NOTE: **(Cap (2 piece)) For sealing the quick connectors Deletion, only available via tool set**

cardiagn.com

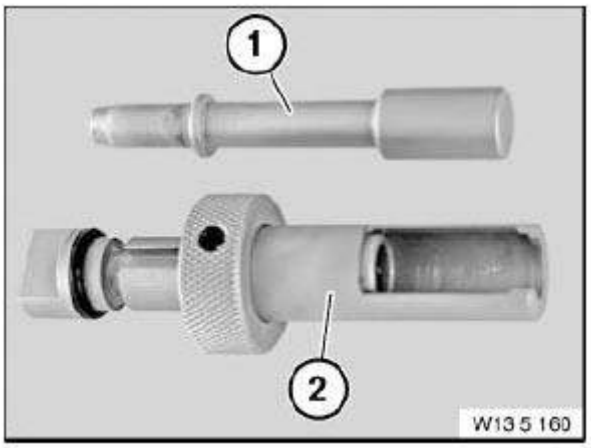


Fig. 66: Identifying Fastener (0496567)
Courtesy of BMW OF NORTH AMERICA, INC.

0491313 FASTENER

0491313 135280 Fastener AM

Replaced by: 83300496565

NOTE: **(Caps) To close off the fuel lines when removing and installing the engine. 13 5 280 discontinued from 10/2008. Replaced by 13 5 160 (0 496 565)**

Storage Location

B3

C3

SI number

01 18 96 (163)

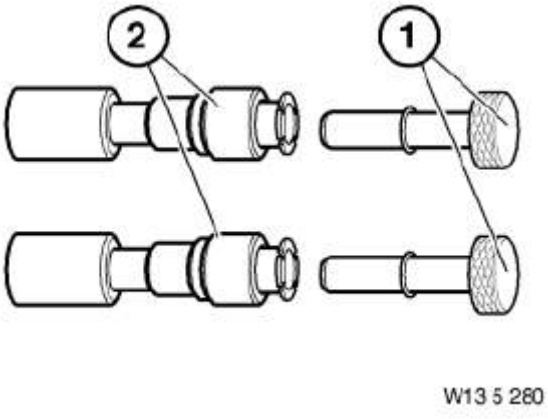


Fig. 67: Identifying Fastener (0491313)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0491314 Fastener

NOTE: **(Cap) 2 pieces, for closing off the quick connectors**

cardiagn.com

2. 0491315 Fastener

NOTE: **(Cap) 2 pieces, for closing off the fuel lines**

0491315 FASTENER

0491315 135282 Fastener AM

NOTE: **(Cap) 2 pieces, for closing off the fuel lines**

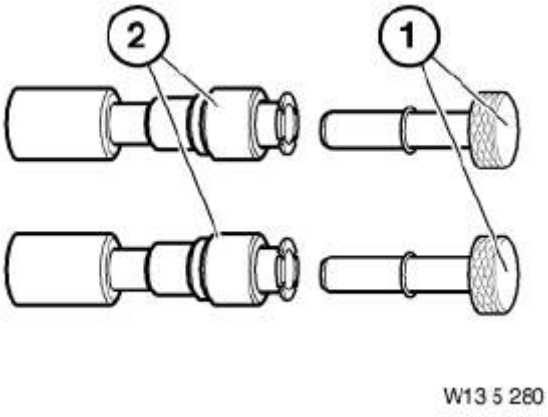


Fig. 68: Identifying Fastener (0491315)
Courtesy of BMW OF NORTH AMERICA, INC.

0496769 FITTING AID

0496769 130281 Fitting aid Minimum set: Mechanical tools AM

NOTE: **Not available individually, but as part of set 0496668 (130280) only.**

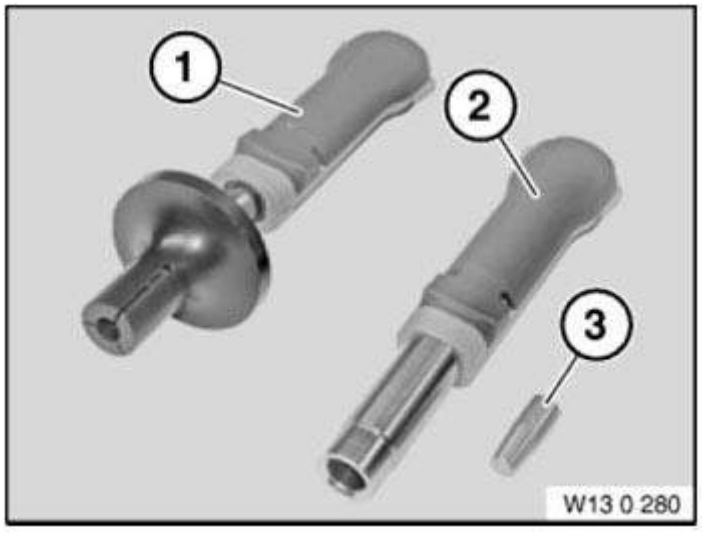


Fig. 69: Identifying Fitting Aid (0496769)
Courtesy of BMW OF NORTH AMERICA, INC.

0495761 FITTING AID

0495761 130195 Fitting aid Minimum set: Mechanical tools AM

NOTE: **(Mounting cone)**

Storage Location

cardiagn.com

C19

SI number

01 20 06 (299)



Fig. 70: Identifying Fitting Aid (0495761)
Courtesy of BMW OF NORTH AMERICA, INC.

0495756 FITTING AID

0495756 130190 Fitting aid Minimum set: Mechanical tools AM

NOTE: **(Installation set) For removing and installing the Teflon rings on the injector.**

Storage Location

C19

SI number

01 20 06 (299)

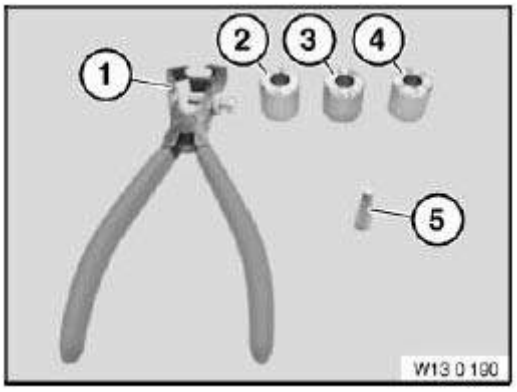


Fig. 71: Identifying Fitting Aid (0495756)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. **0495757** Pliers
2. **0495758** Holding sleeve

cardiagn.com

NOTE: **(Assembly sleeve 1)**

3. 0495759 Holding sleeve

NOTE: **(Assembly sleeve 2)**

4. 0495760 Holding sleeve

NOTE: **(Assembly sleeve 3)**

5. 0495761 Fitting aid

NOTE: **(Mounting cone)**

0496668 FITTING AID

0496668 130280 Fitting aid Minimum set: Mechanical tools AM

NOTE: **For installation of PTFE rings on injector.**

Storage Location

A28

SI number

01 18 09 (578)

Consisting of:

1. 0496769 Fitting aid

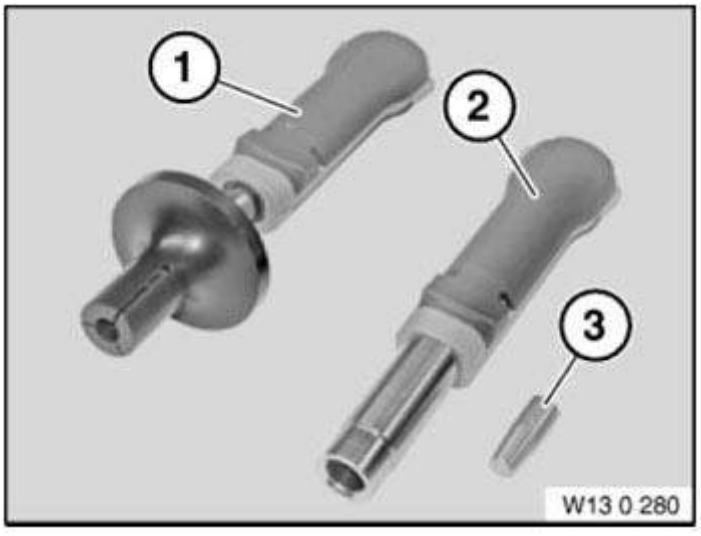
NOTE: **Not available individually, but as part of set 0496668 (130280) only.**

2. 0496770 Guide

NOTE: **Not available individually, but as part of set 0496668 (130280) only.**

3. 0496771 Holding sleeve

NOTE: **Not available individually, but as part of set 0496668 (130280) only.**



cardiagn.com

Fig. 72: Identifying Fitting Aid (0496668)
Courtesy of BMW OF NORTH AMERICA, INC.

0493459 FIXTURE

0493459 130152 Fixture AM

NOTE: With mounting bolt for shims Only available as part of complete tool set 13 0 150 (83 30 0 493 453).

0493458 FIXTURE

0493458 130151 Fixture AM

NOTE: Only available as part of complete tool set 13 0 150 (83 30 0 493 453).

0495445 GASKET

0495445 135223 Gasket Minimum set: Mechanical tools AM

NOTE: (sealing kit for adapter 13 5 221)

0491284 GAUGE

0491284 135050 Gauge Mechanical tool

NOTE: For adjusting the injection pump to the throttle valve idle position (synchronization) and for adjusting the full load stop (injection pump accelerator linkage)

0491251 GAUGE

0491251 131110 Gauge Mechanical tool

NOTE: For creating the basic setting on the throttle valve kickers of the 2BE carburetor

cardiagn.com

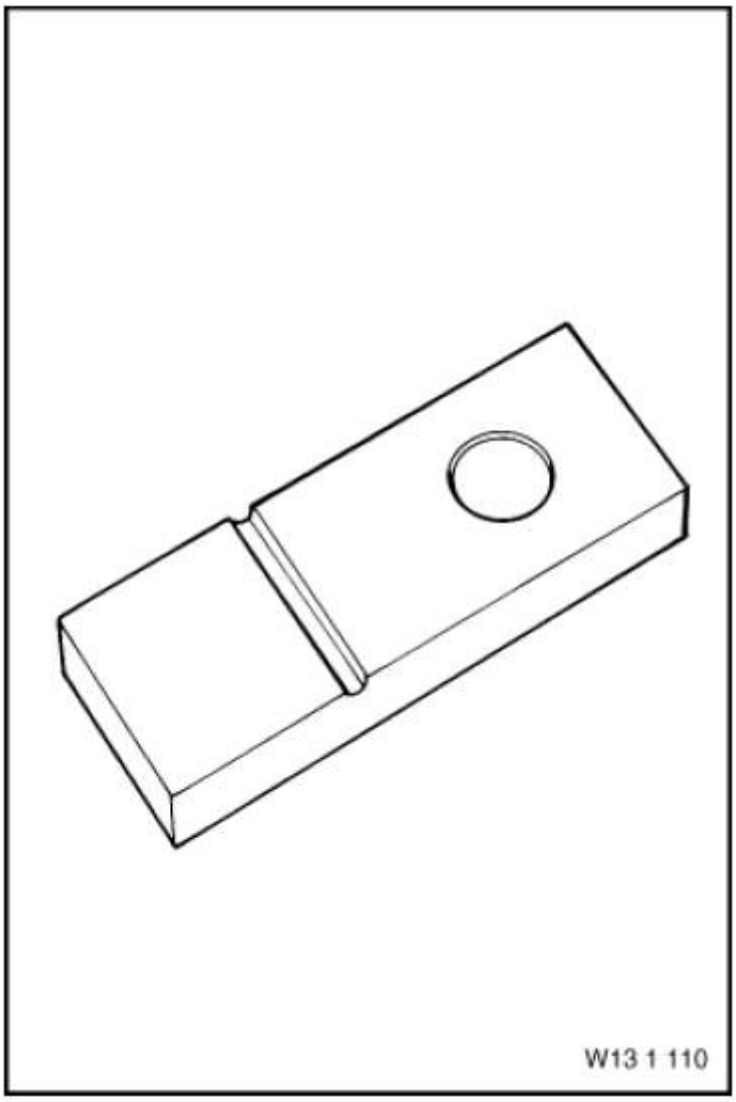


Fig. 73: Identifying Gauge (0491251)
Courtesy of BMW OF NORTH AMERICA, INC.

0494529 GAUGE

0494529 131140 Gauge AM

NOTE: **For fixing the fuel injectors in position during installation.**

SI number

01 15 02 (941)

Consisting of:

1. 0494582 Strip

   NOTE: **(Disconnection strip) Only available as part of complete tool set 13 1 140 (83 30 0 494 529).**

2. 0494583 Ring

   NOTE: **(Fixing rings (6 pieces)) Only available as part of complete tool set 13 1 140 (83 30 0 494 529).**

cardiagn.com

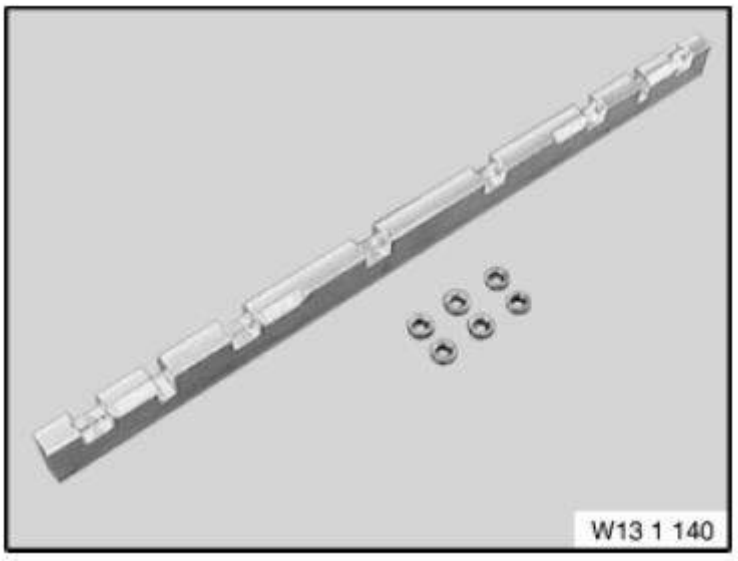


Fig. 74: Identifying Gauge (0494529)
Courtesy of BMW OF NORTH AMERICA, INC.

0491283 GAUGE

0491283 135040 Gauge Mechanical tool

NOTE: To adjust the connecting rod length from the intermediate shaft to the injection pump control lever

0491301 GAUGE

0491301 135140 Gauge Mechanical tool

NOTE: (Plug gauge) For warm-up sensor - up to January 84

0491253 GAUGE

0491253 132000 Gauge Mechanical tool

NOTE: For adjustment of pressure converter, miscellaneous: USA only

0491242 GAUGE

0491242 131070 Gauge Mechanical tool

NOTE: For setting the fuel-level sensor for all 4A1 carburetors

cardiagn.com

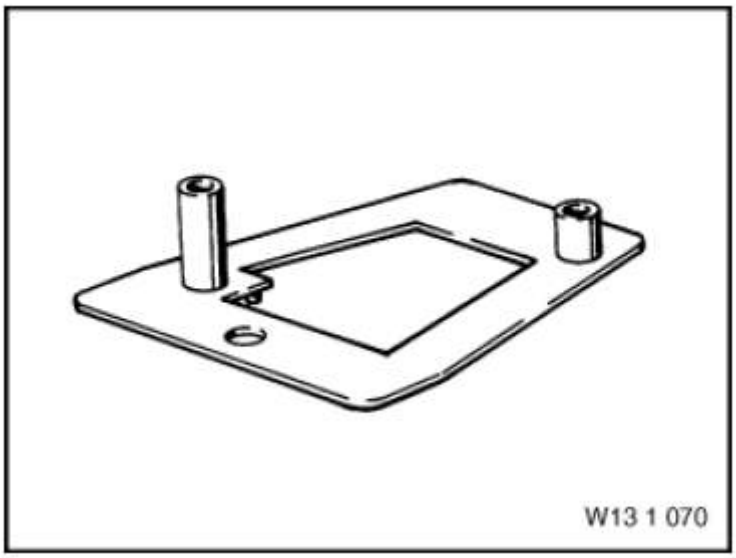


Fig. 75: Identifying Gauge (0491242)
Courtesy of BMW OF NORTH AMERICA, INC.

0491309 GAUGE

0491309 135260 Gauge Mechanical tool

NOTE: For adjusting the throttle valves

0491255 GAUGE

0491255 133000 Gauge Mechanical tool

NOTE: (Setting gauge) for pre-tensioning the electric fuel pump with interchangeable diaphragm - until January 84

0496770 GUIDE

0496770 130282 Guide Minimum set: Mechanical tools AM

NOTE: Not available individually, but as part of set 0496668 (130280) only.

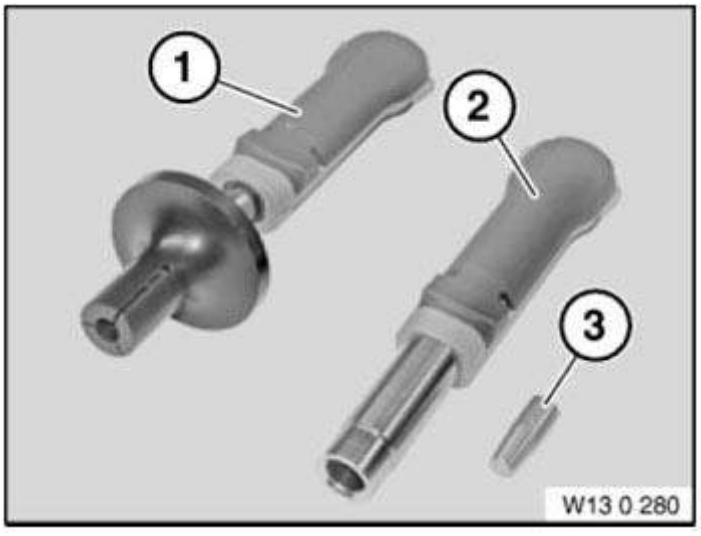


Fig. 76: Identifying Guide (0496770)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0491233 HANDLE

0491233 131017 Handle AM

NOTE: (Pressing-on tool handle) For CO tamper tell-tales - engine: M20

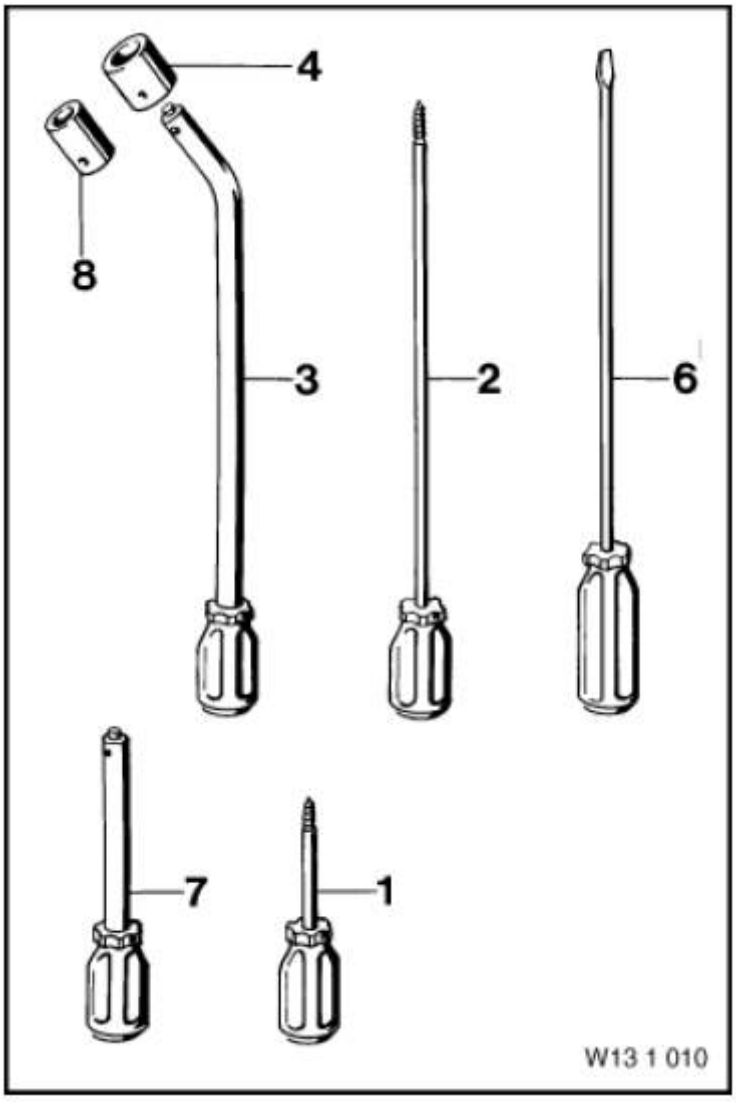


Fig. 77: Identifying Handle (0491233)
Courtesy of BMW OF NORTH AMERICA, INC.

0491230 HANDLE

0491230 131013 Handle AM

NOTE: (Pressing-on tool handle) For CO tamper tell-tales

cardiagn.com

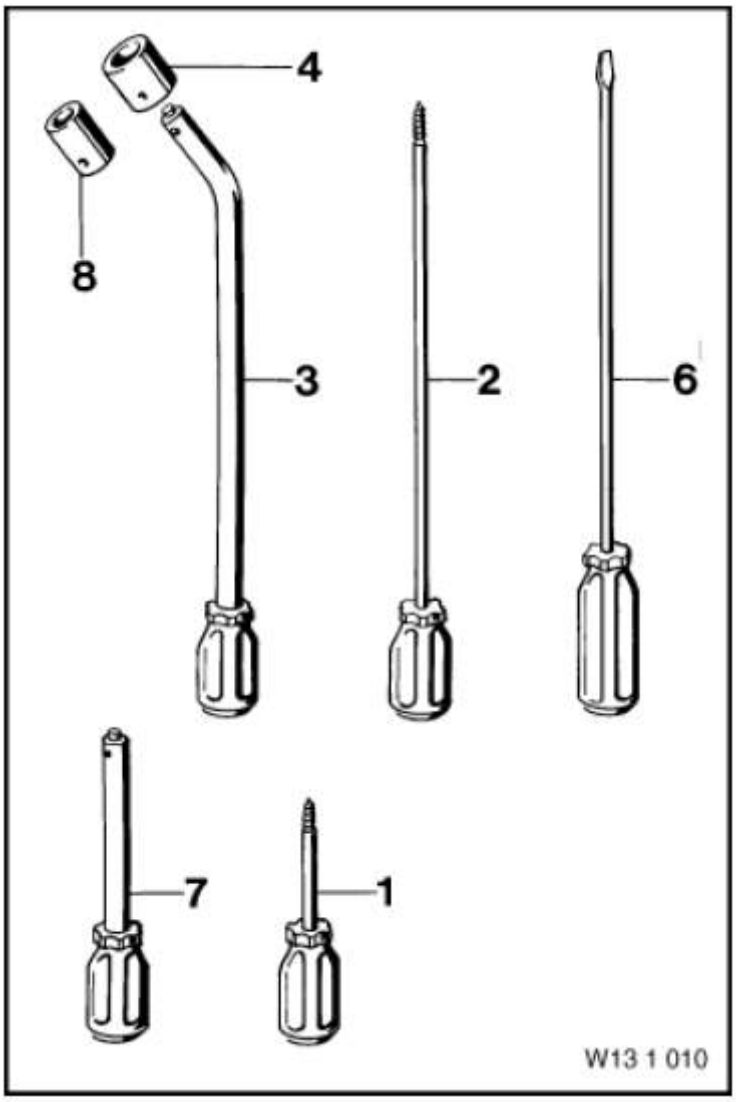


Fig. 78: Identifying Handle (0491230)
Courtesy of BMW OF NORTH AMERICA, INC.

0491235 HEXAGON SOCKET

0491235 131020 Hexagon socket AM

NOTE: **(Hexagon socket wrench) For CO value setting (K-Jetronic) - model year: starting at 81, no longer available from supplier.15.10.2000 miscellaneous: Sweden only**

Storage Location

A1

B1

cardiagn.com

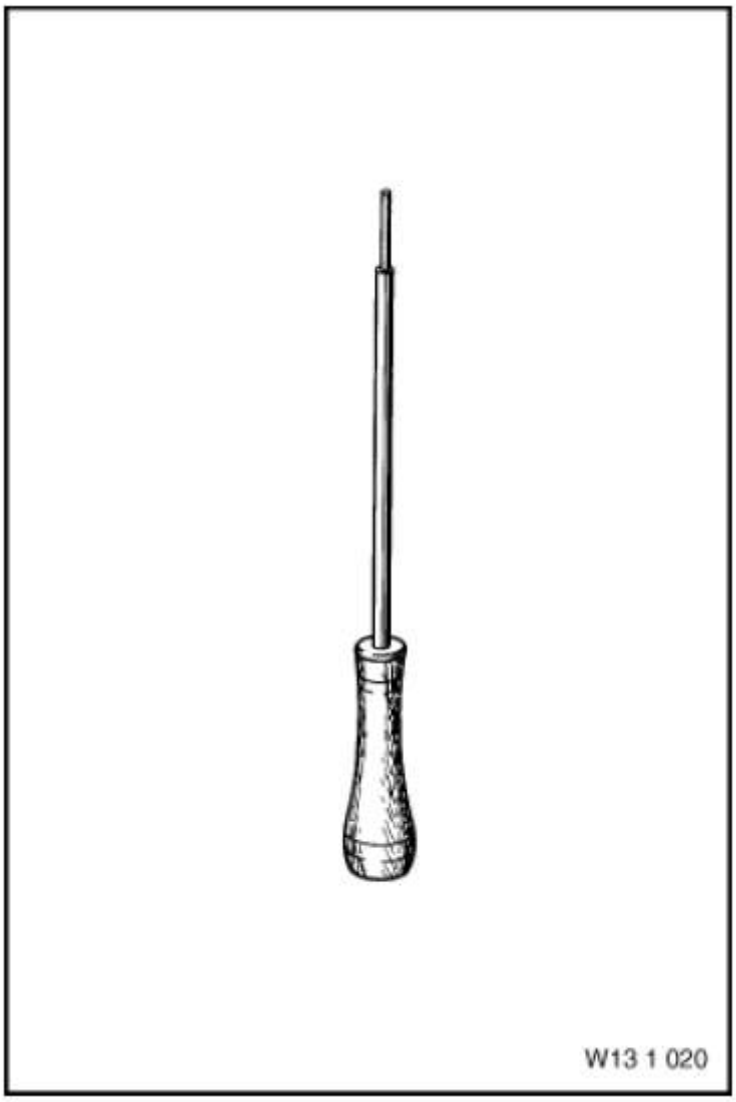


Fig. 79: Identifying Hexagon Socket (0491235)
Courtesy of BMW OF NORTH AMERICA, INC.

0491204 HEXAGON SOCKET

0491204 130010 Hexagon socket Mechanical tool

NOTE: **(Hexagon socket key) For setting the CO values K-Jetronic**

Storage Location

X4

cardiagn.com

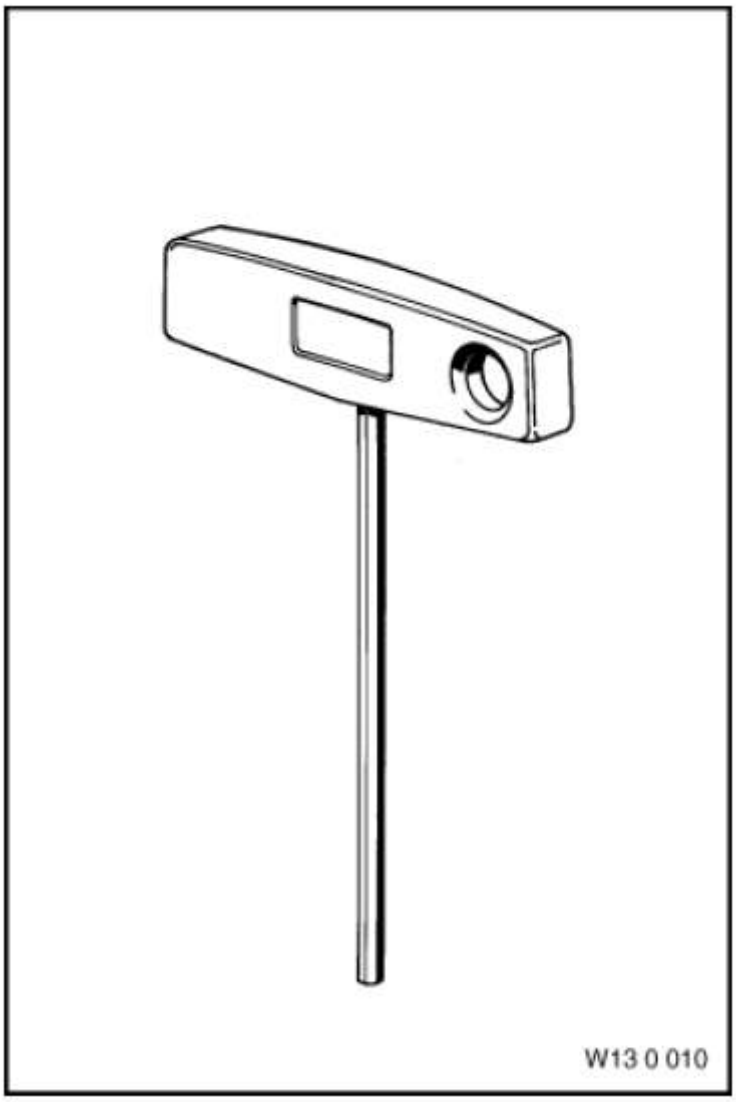


Fig. 80: Identifying Hexagon Socket (0491204)
Courtesy of BMW OF NORTH AMERICA, INC.

0491279 HOLDER

0491279 135031 Holder AM

NOTE: **(Holder) Discontinuation and replaced by 36 1 030. (0 493 829)**

cardiagn.com

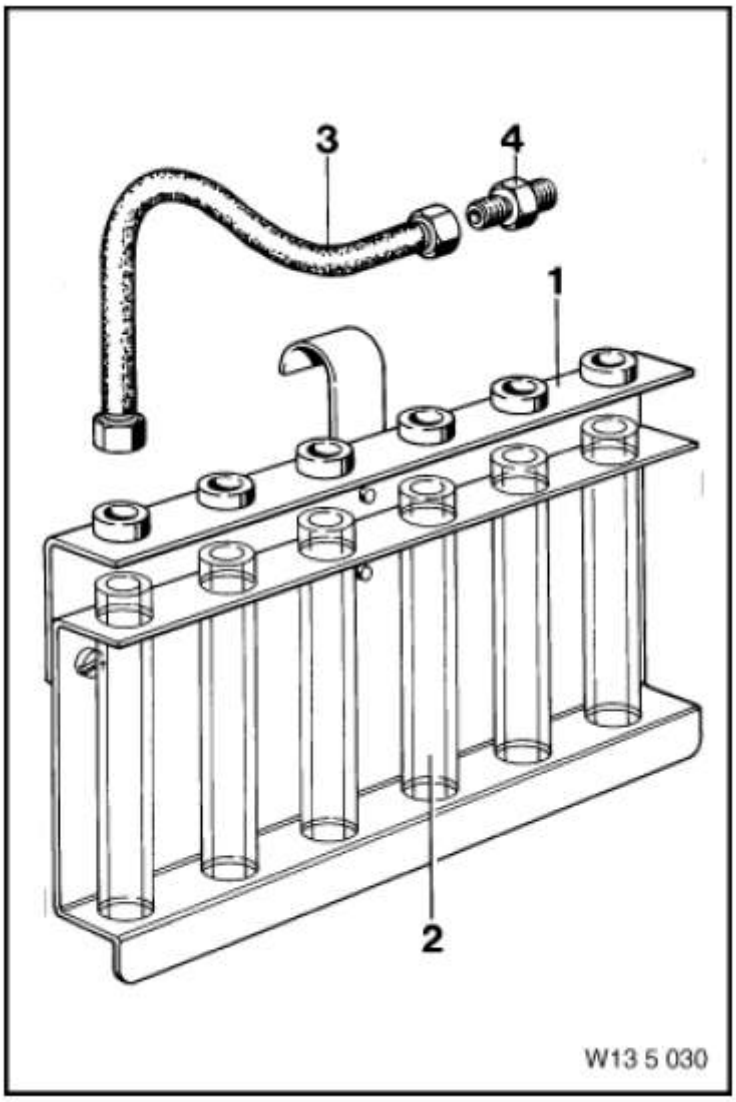
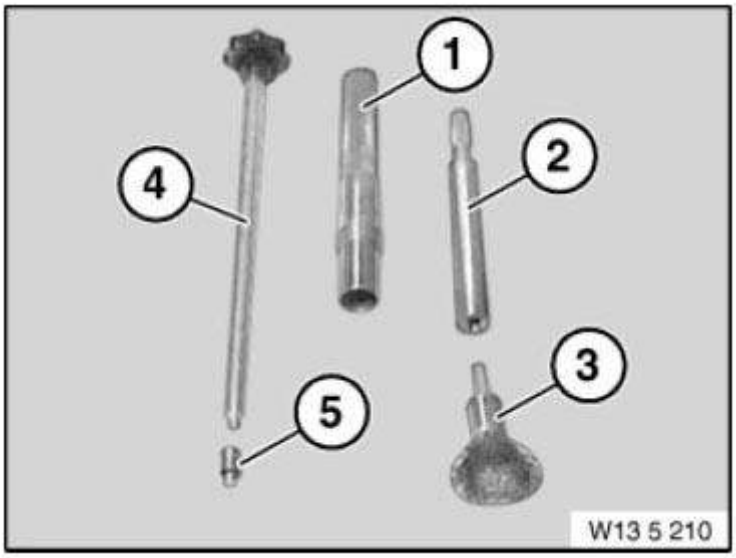


Fig. 81: Identifying Holder (0491279)
Courtesy of BMW OF NORTH AMERICA, INC.

0493760 HOLDER

0493760 135212 Holder Minimum set: Mechanical tools AM

NOTE: **(Brush holder)**



cardiagn.com

Fig. 82: Identifying Holder (0493760)
Courtesy of BMW OF NORTH AMERICA, INC.

0491319 HOLDER

0491319 135330 Holder Mechanical tool

NOTE: **(dial gauge holder) For screwing into the diesel injection pump during static adjustment**

Storage Location

A5

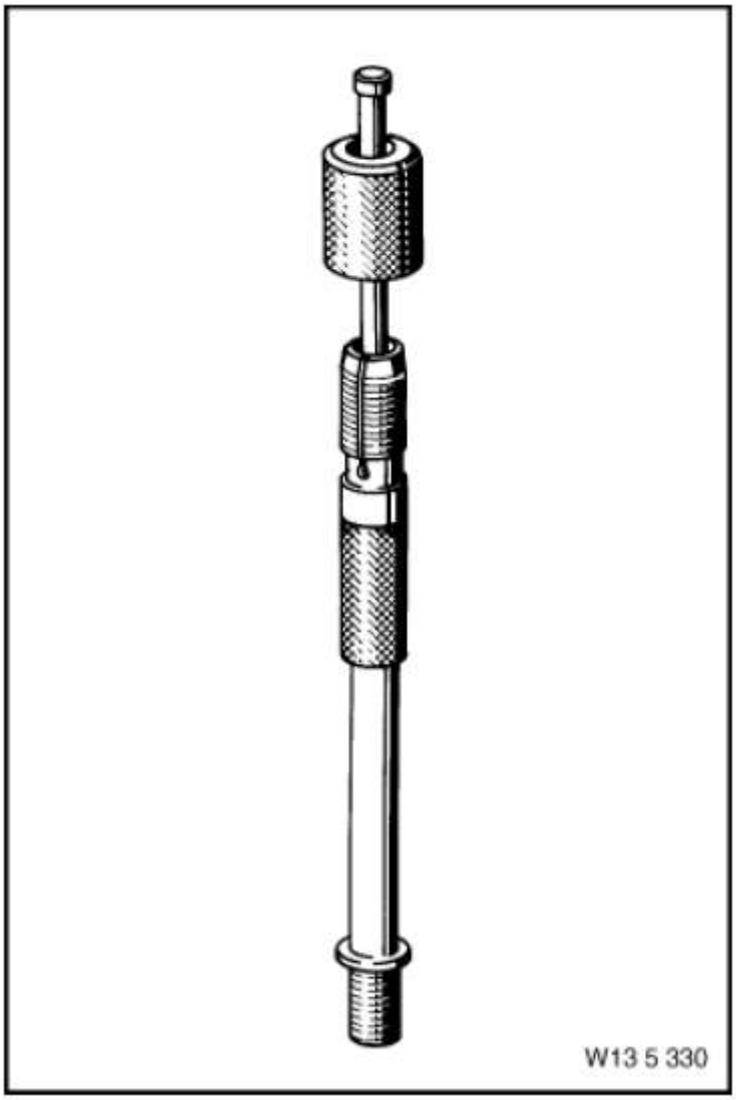


Fig. 83: Identifying Holder (0491319)
Courtesy of BMW OF NORTH AMERICA, INC.

0495759 HOLDING SLEEVE

0495759 130193 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **(Assembly sleeve 2)**

Storage Location

C19

cardiagn.com

SI number

01 20 06 (299)

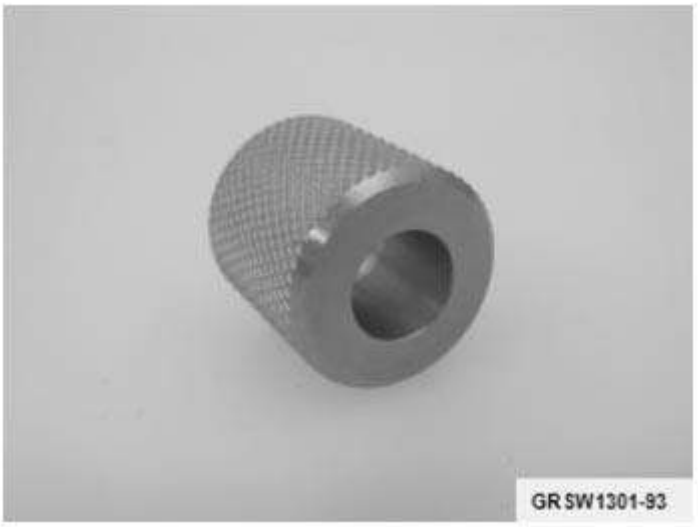


Fig. 84: Identifying Holding Sleeve (0495759)
Courtesy of BMW OF NORTH AMERICA, INC.

0495760 HOLDING SLEEVE

0495760 130194 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **(Assembly sleeve 3)**

Storage Location

C19

SI number

01 20 06 (299)

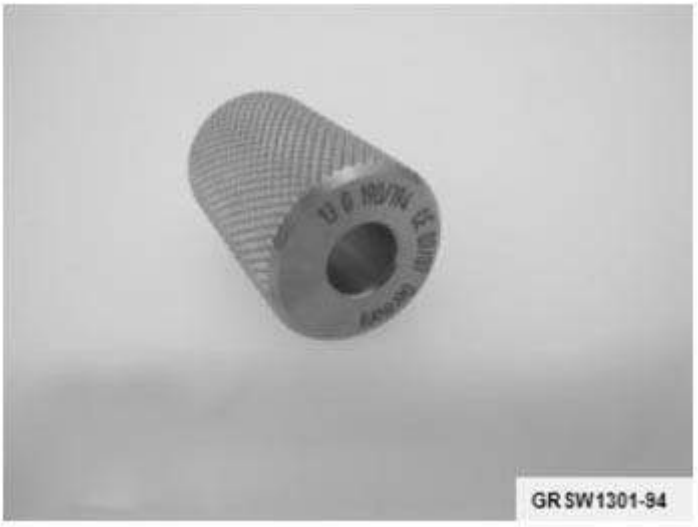


Fig. 85: Identifying Holding Sleeve (0495760)
Courtesy of BMW OF NORTH AMERICA, INC.

0493759 HOLDING SLEEVE

0493759 135211 Holding sleeve Minimum set: Mechanical tools AM

cardiagn.com

NOTE: **(Guide sleeve)**

0496771 HOLDING SLEEVE

0496771 130283 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **Not available individually, but as part of set 0496668 (130280) only.**

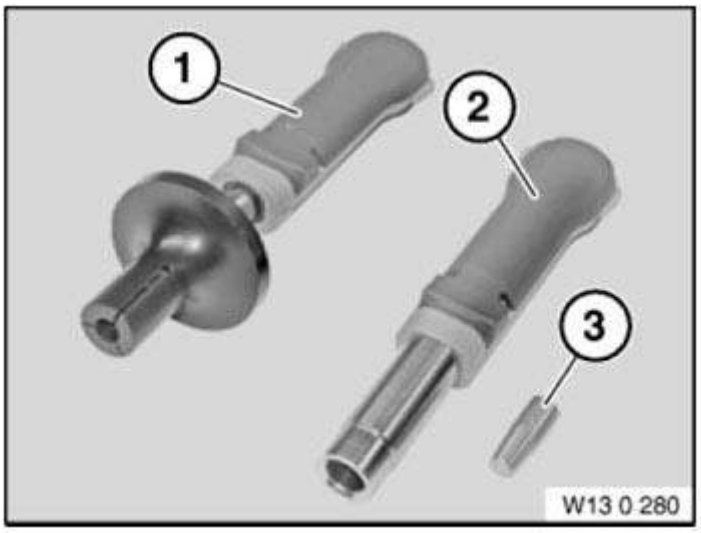


Fig. 86: Identifying Holding Sleeve (0496771)
Courtesy of BMW OF NORTH AMERICA, INC.

0495758 HOLDING SLEEVE

0495758 130192 Holding sleeve Minimum set: Mechanical tools AM

NOTE: **(Assembly sleeve 1)**

Storage Location

C19

SI number

01 20 06 (299)



Fig. 87: Identifying Holding Sleeve (0495758)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0491275 HOSE

0491275 135002 Hose AM

NOTE: (Connecting hose) Replaced by 13 5 130 (0 941 297)

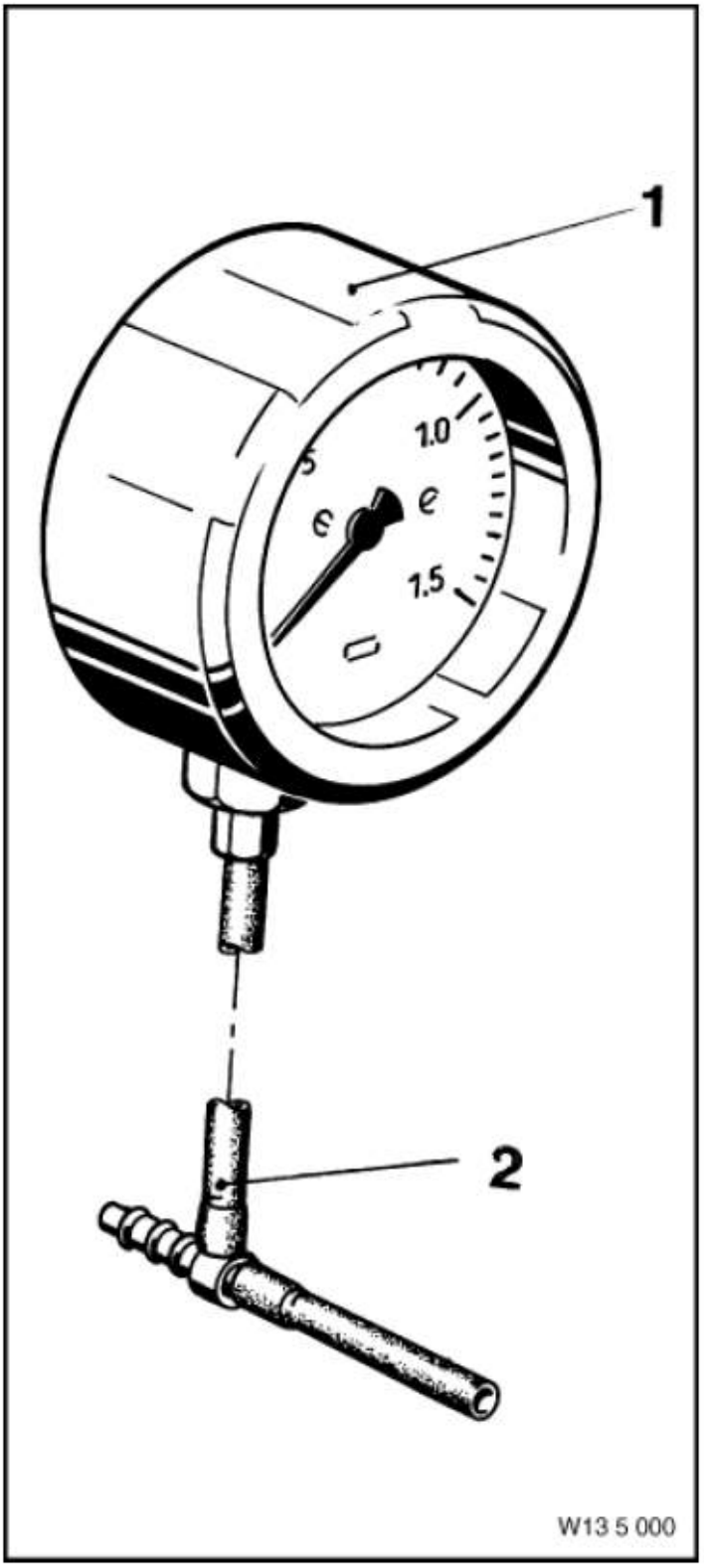


Fig. 88: Identifying Hose (0491275)
Courtesy of BMW OF NORTH AMERICA, INC.

0491239 HOSE

cardiagn.com

0491239 131042 Hose AM

NOTE: (Connecting hose with air vent)

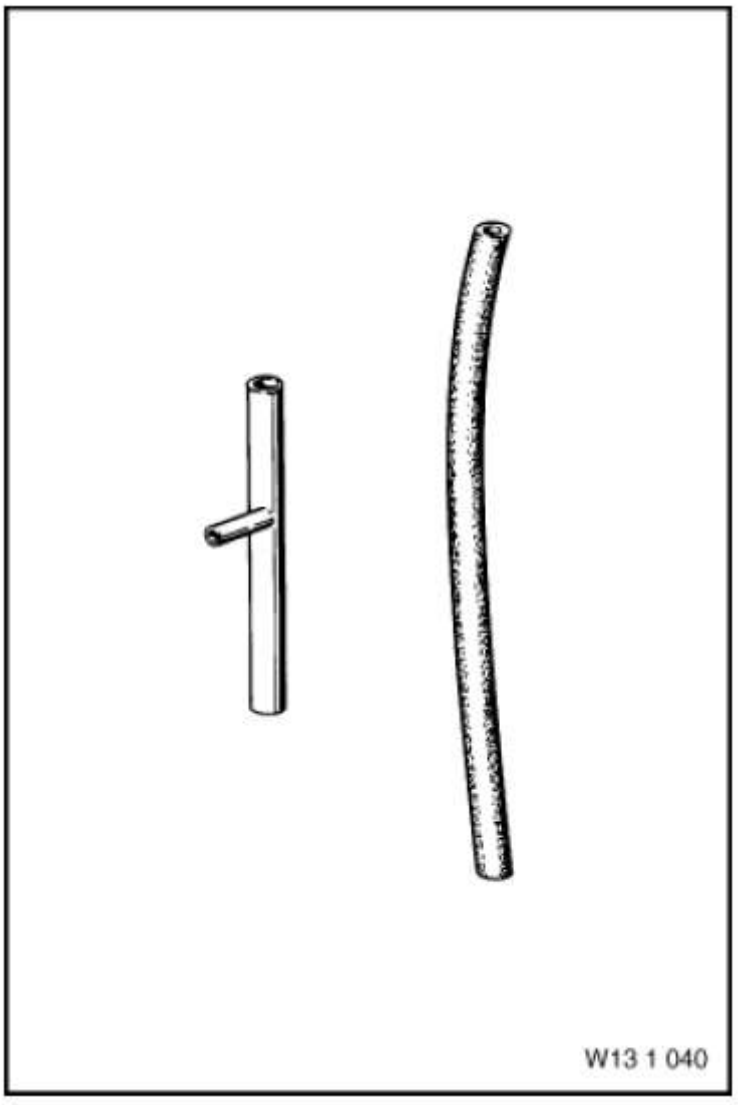


Fig. 89: Identifying Hose (0491239)
Courtesy of BMW OF NORTH AMERICA, INC.

0491220 HOSE

0491220 130093 Hose AM

NOTE: (Connecting hose with T-piece) Can be ordered as part of complete special tool 13 0 090 = 0491217.

cardiagn.com

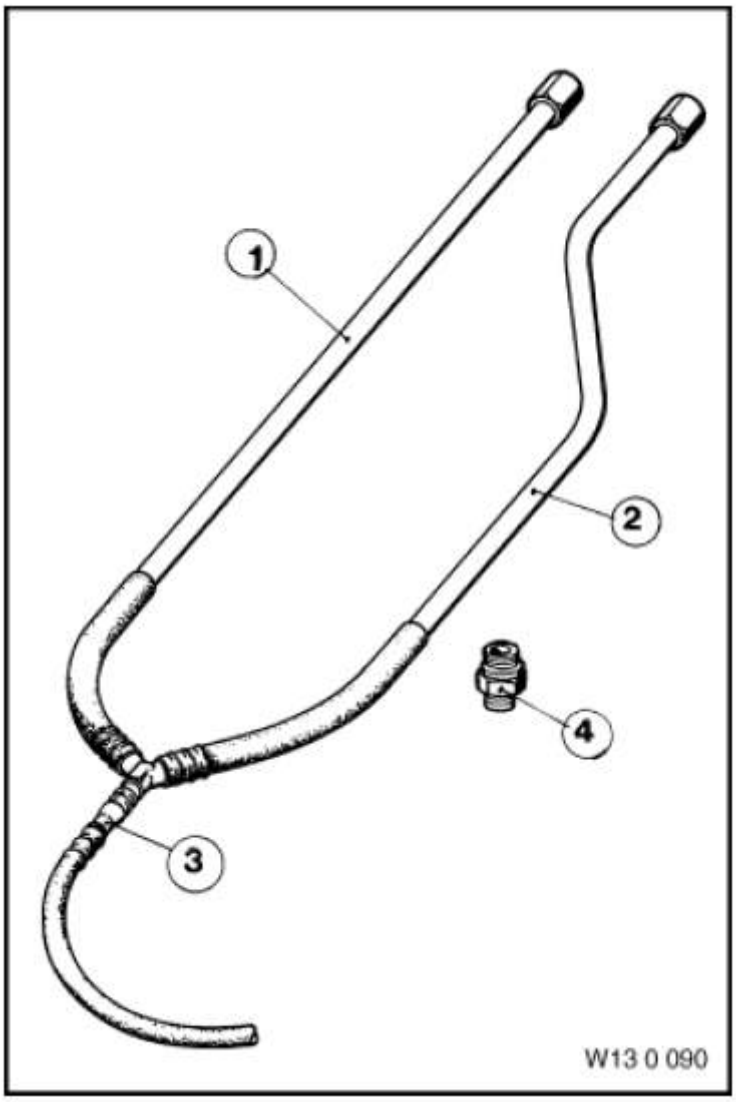
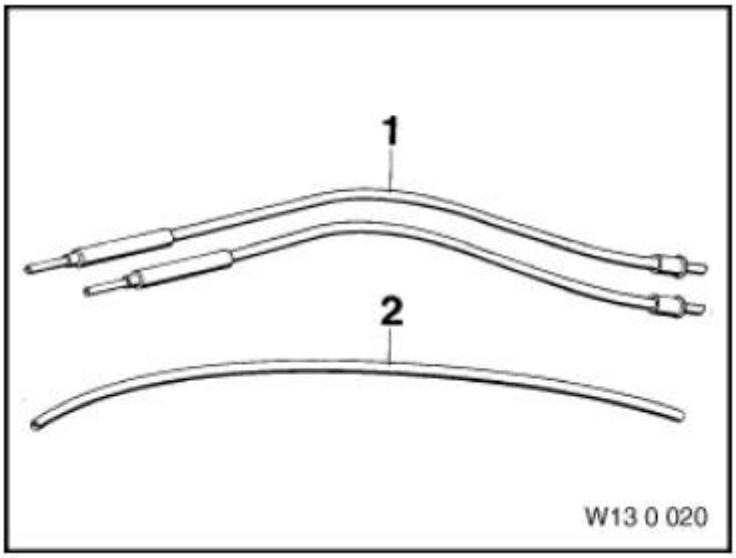


Fig. 90: Identifying Hose (0491220)
Courtesy of BMW OF NORTH AMERICA, INC.

0491207 HOSE

0491207 130022 Hose AM

NOTE: **(Connecting hose) Replaced by 13 5 130 (0 941 297)**



cardiagn.com

Fig. 91: Identifying Hose (0491207)
Courtesy of BMW OF NORTH AMERICA, INC.

0491266 HOSE

0491266 133067 Hose AM

NOTE: (Connecting hose) For checking the electric fuel pump delivery rate All except N73 Only available as part of complete set

0491300 HOSE

0491300 135133 Hose Minimum set: Mechanical tools AM

NOTE: (Extension hose) available as part of set of special tools only

Storage Location

A3

A4

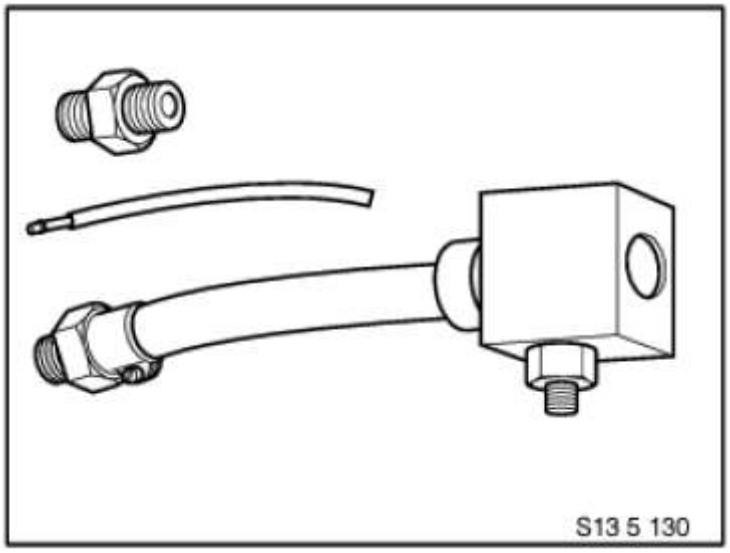


Fig. 92: Identifying Hose (0491300)
Courtesy of BMW OF NORTH AMERICA, INC.

0491328 HOSE

0491328 135382 Hose AM

Replaced by: 83300491297

NOTE: (Connecting hose) Replaced by 13 5 130 (0 941 297)

0491341 HOSE

0491341 136051 Hose Minimum set: Mechanical tools AM

NOTE: (Connecting hose) For connecting reducers 13 6 052, 13 6 053, 13 6 55 and adapters 11 4 050, 11 4 160, 11 4 170, 13 5 131 to BMW DIS

Storage Location

A3

cardiagn.com

B3

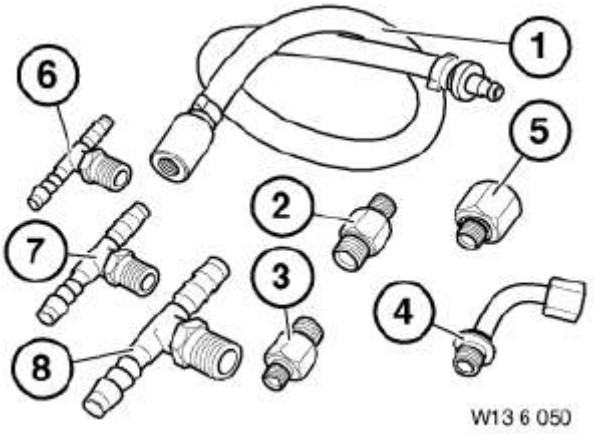


Fig. 93: Identifying Hose (0491341)
Courtesy of BMW OF NORTH AMERICA, INC.

0491211 HOSE

0491211 130033 Hose AM

NOTE: (Connecting hose) Replaced by 13 5 130 (0 941 297)

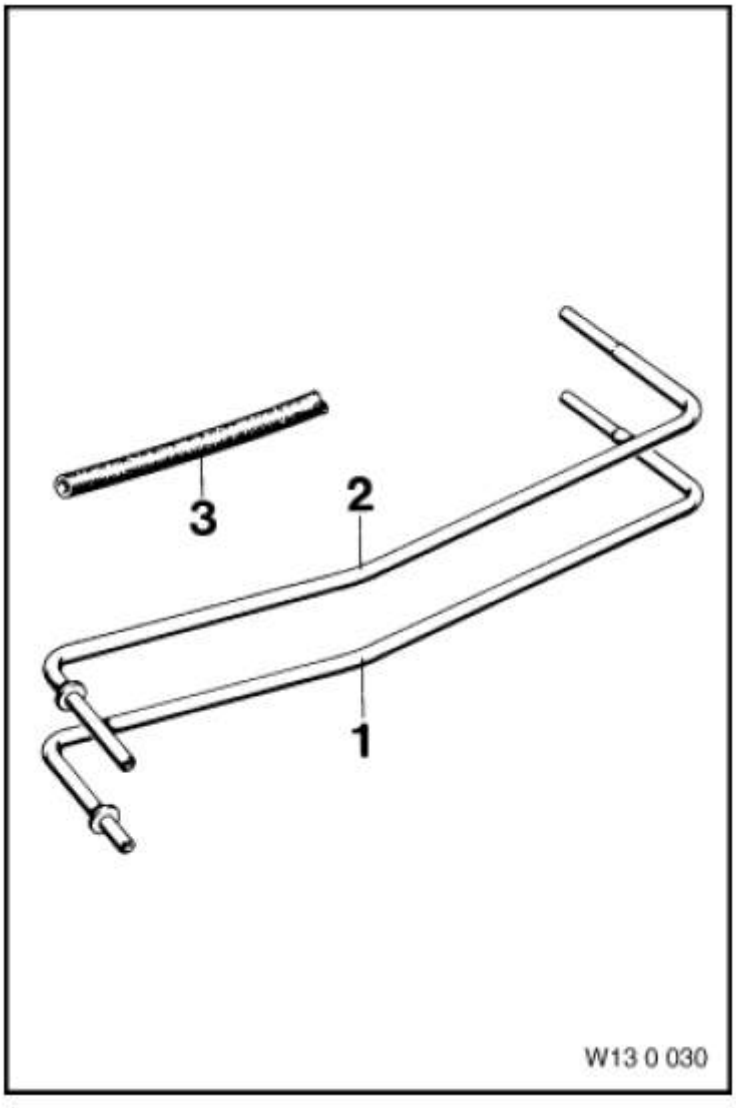


Fig. 94: Identifying Hose (0491211)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0491294 JOINT

0491294 135100 Joint Mechanical tool

NOTE: **For adjusting the full-load stop screw on suction diesel engines**

Storage Location

A12

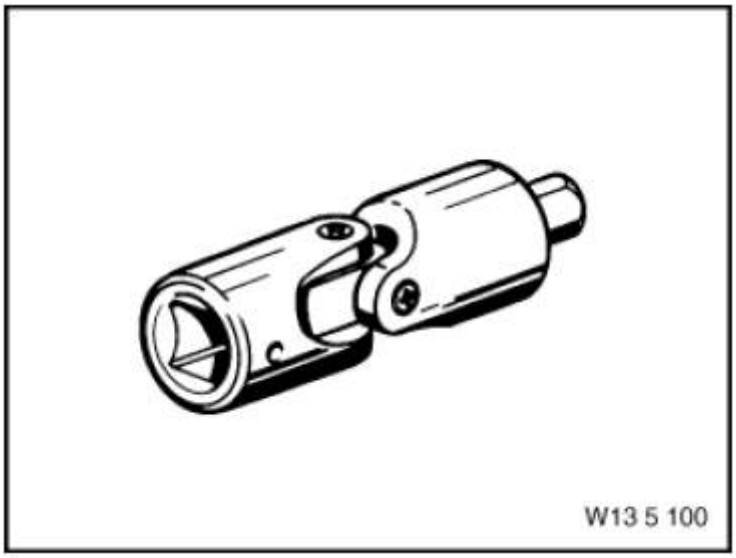


Fig. 95: Identifying Joint (0491294)
Courtesy of BMW OF NORTH AMERICA, INC.

2353954 LEAK DETECTOR

2353954 Leak detector MP

NOTE: **"BMW Smoke diagnosis tester" leak detector for the tightness diagnosis of closed systems such as fuel tanks, intake air passages, etc.. (1) "BMW Smoke diagnosis tester", (2) "UltraTracer", (3) cylinder with pressure reducer, (4) diverse adapter, (5) coupling kit for compressed air connection, (6) torch with white and UV light including special glasses, (7) power pack**

Storage Location

Alternatively

SI number

02 11 13 (958)

cardiagn.com



Fig. 96: Identifying Leak Detector (2353954)
Courtesy of BMW OF NORTH AMERICA, INC.

0494279 LEVER

0494279 136100 Lever Minimum set: Mechanical tools Mechanical tool

NOTE: **(Removal rod) For removing injectors**

Storage Location

C49

SI number

01 15 01 (790)

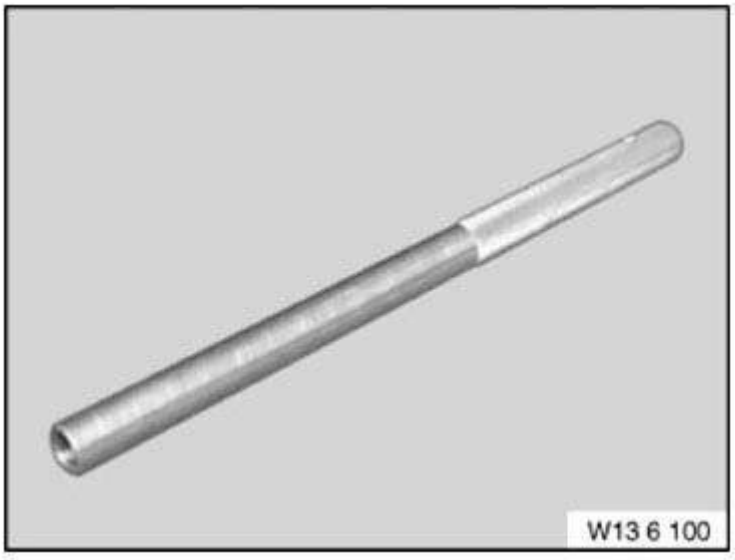


Fig. 97: Identifying Lever (0494279)
Courtesy of BMW OF NORTH AMERICA, INC.

0494461 LINE

0494461 135455 Line AM

NOTE: **(Fuel line/high pressure pump to testing device (basic body 13 5 451)) From**

cardiagn.com

09/2011 can only be ordered as part of the complete special tool 0494456 (13 5 450).

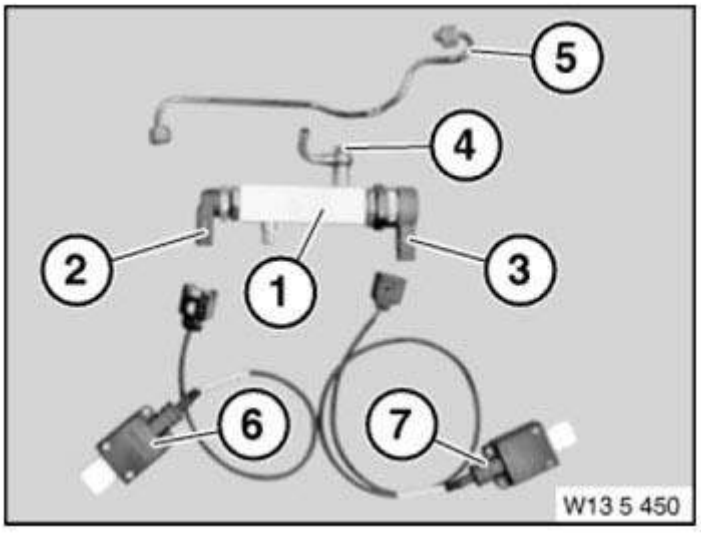


Fig. 98: Identifying Line (0494461)
Courtesy of BMW OF NORTH AMERICA, INC.

0496864 LINE

0496864 130312 Line AM

NOTE: **Only available as part of complete tool set 13 0 310 (83 30 0 496 766).**

Storage Location

B29

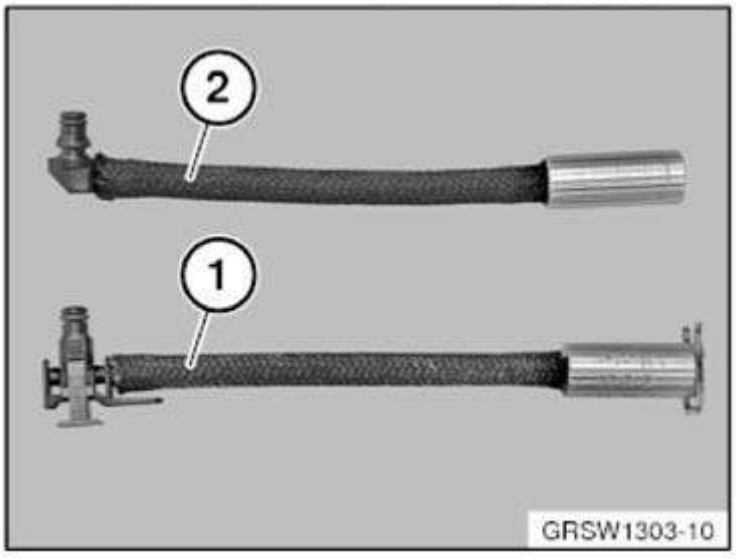


Fig. 99: Identifying Line (0496864)
Courtesy of BMW OF NORTH AMERICA, INC.

0496707 LINE

0496707 130290 Line Minimum set: Mechanical tools AM

In conjunction with: 13 3 060; 11 4 310 = 0496623

cardiagn.com

NOTE: **Two fuel lines. Auxiliary lines for 13 3 060. For fuel pressure check in all direct injectors in comb. with IMIB and 100 bar sensor.**

Storage Location

A29

A30

B29

SI number

01 27 09 (598)

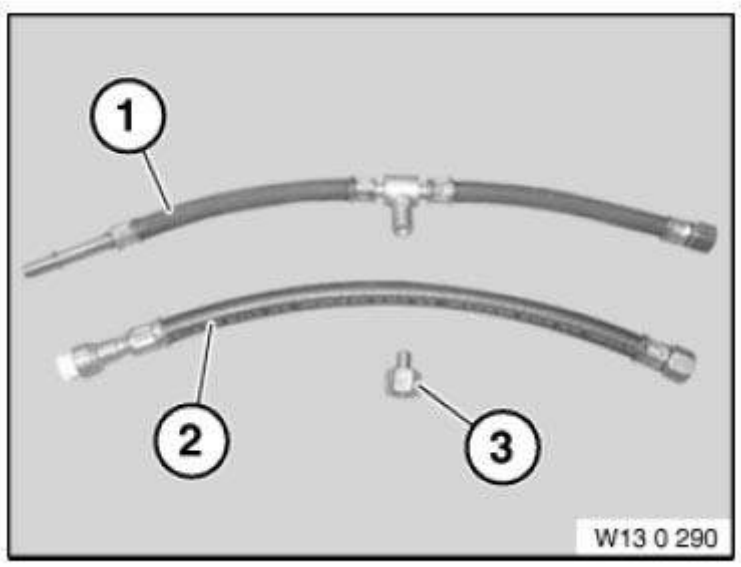


Fig. 100: Identifying Line (0496707)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

1. 0496824 Line

   NOTE: **With connection for 13 3 060 or 11 4 310. Available as part of complete tool set 13 0 290 (0496707) only.**

2. 0496825 Line

   NOTE: **Available as part of complete tool set 13 0 290 (0496707) only.**

3. 0496826 Fastener

   NOTE: **Available as part of complete tool set 13 0 290 (0496707) only.**

0491262 LINE

0491262 133063 Line AM

NOTE: **(Connection lines (2 x)) For check of fuel and oil pressure**

0494460 LINE

cardiagn.com

0494460 135454 Line AM

NOTE: **(Return line with banjo bolt) Separate components not available, only via set 0494456.**

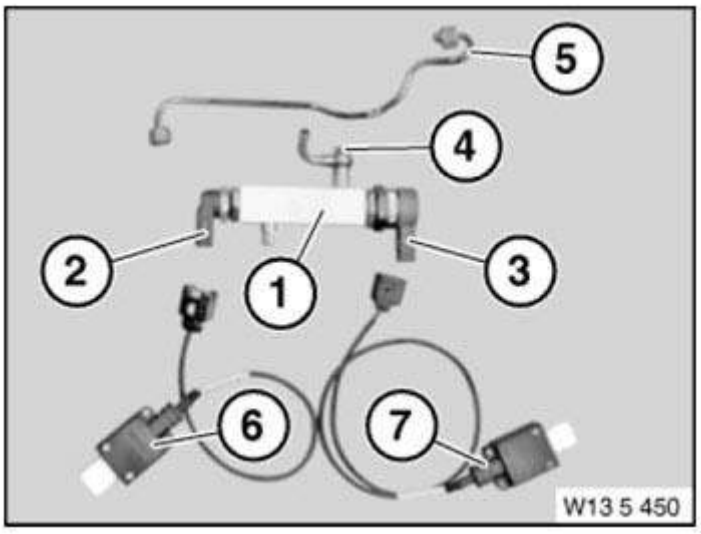


Fig. 101: Identifying Line (0494460)
Courtesy of BMW OF NORTH AMERICA, INC.

0491281 LINE

0491281 135033 Line AM

NOTE: **(Connecting lines (6 pieces))**

cardiagn.com

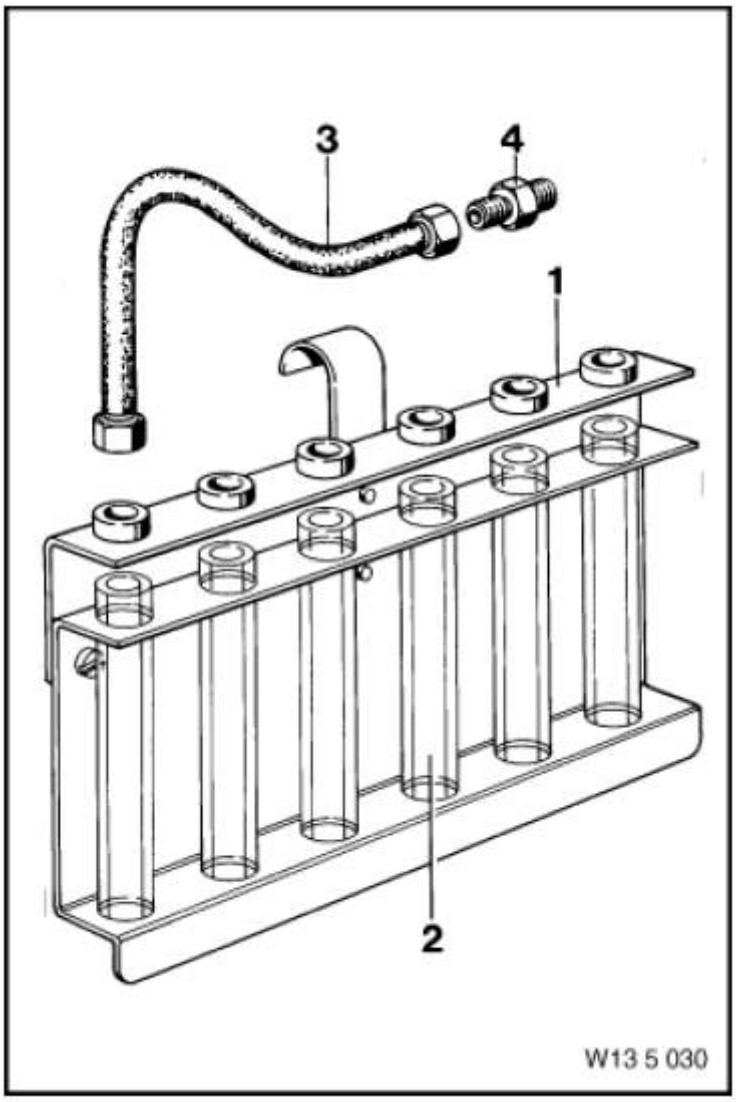


Fig. 102: Identifying Line (0491281)
Courtesy of BMW OF NORTH AMERICA, INC.

0496863 LINE

0496863 130311 Line AM

NOTE: **Only available as part of complete tool set 13 0 310 (83 30 0 496 766).**

Storage Location

B29

cardiagn.com

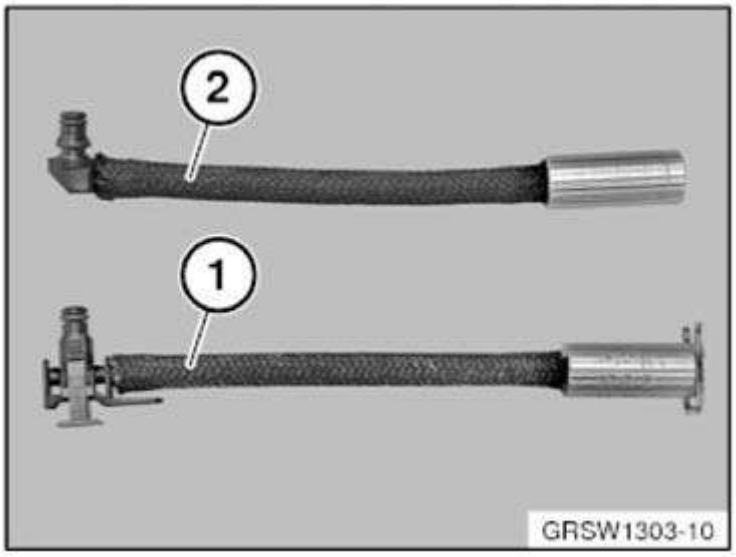


Fig. 103: Identifying Line (0496863)
Courtesy of BMW OF NORTH AMERICA, INC.

0496824 LINE

0496824 130291 Line Minimum set: Mechanical tools AM

NOTE: **With connection for 13 3 060 or 11 4 310. Available as part of complete tool set 13 0 290 (0496707) only.**

Storage Location

A29

A30

B29

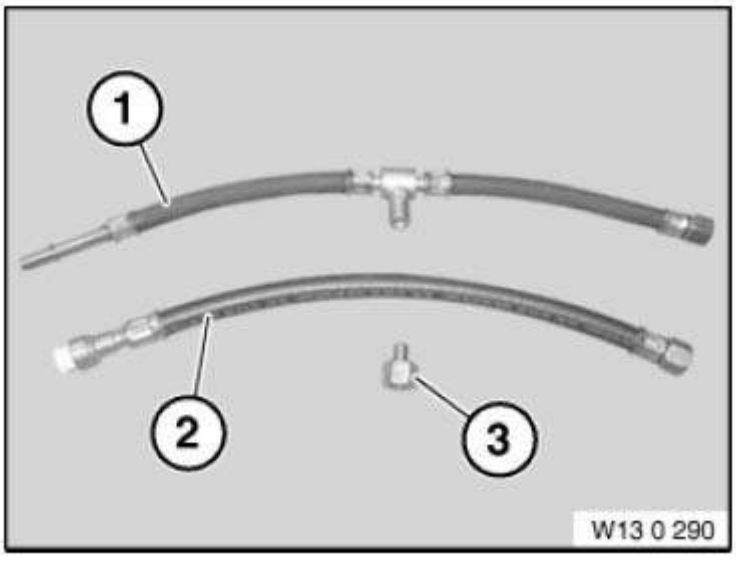


Fig. 104: Identifying Line (0496824)
Courtesy of BMW OF NORTH AMERICA, INC.

0491263 LINE

0491263 133064 Line AM

cardiagn.com

NOTE: **(Connection line) With T-piece for L-Jetronic, all except N73**

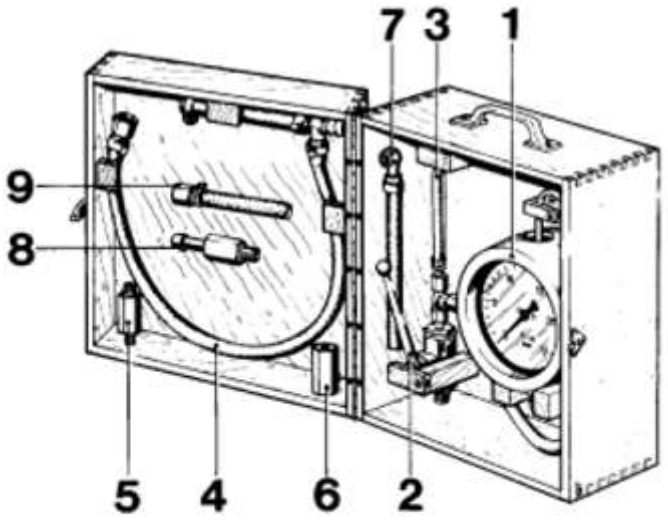


Fig. 105: Identifying Line (0491263)
Courtesy of BMW OF NORTH AMERICA, INC.

0496825 LINE

0496825 130292 Line Minimum set: Mechanical tools AM

NOTE: **Available as part of complete tool set 13 0 290 (0496707) only.**

Storage Location

B29

C29

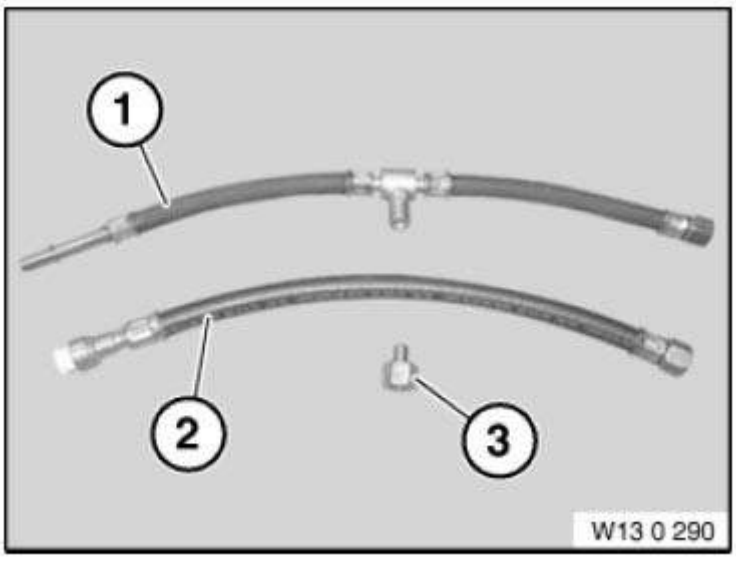


Fig. 106: Identifying Line (0496825)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0491320 MANDREL

0491320 135340 Mandrel Mechanical tool

NOTE: **(alignment pin) For injection pump wheel**

Storage Location

X4

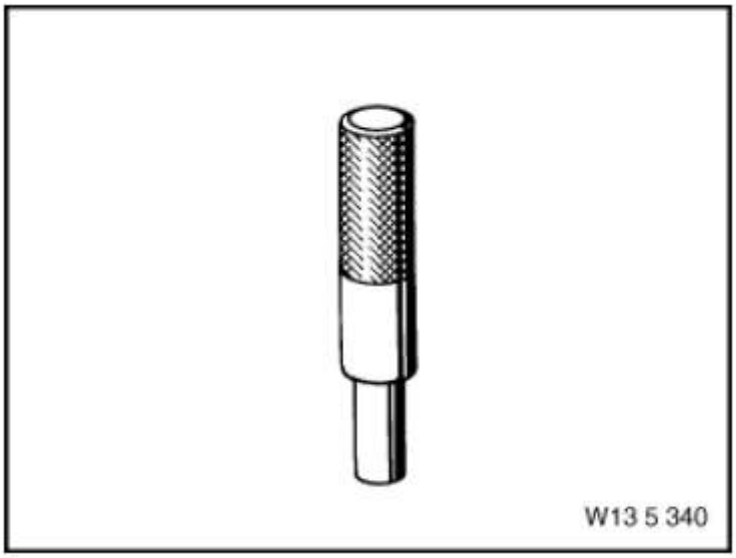


Fig. 107: Identifying Mandrel (0491320)
Courtesy of BMW OF NORTH AMERICA, INC.

0491252 MANDREL

0491252 131120 Mandrel Mechanical tool

NOTE: **(Drift) For driving in air correction needle on 2BE carburetor**

SI number

01 05 86 (604)

cardiagn.com

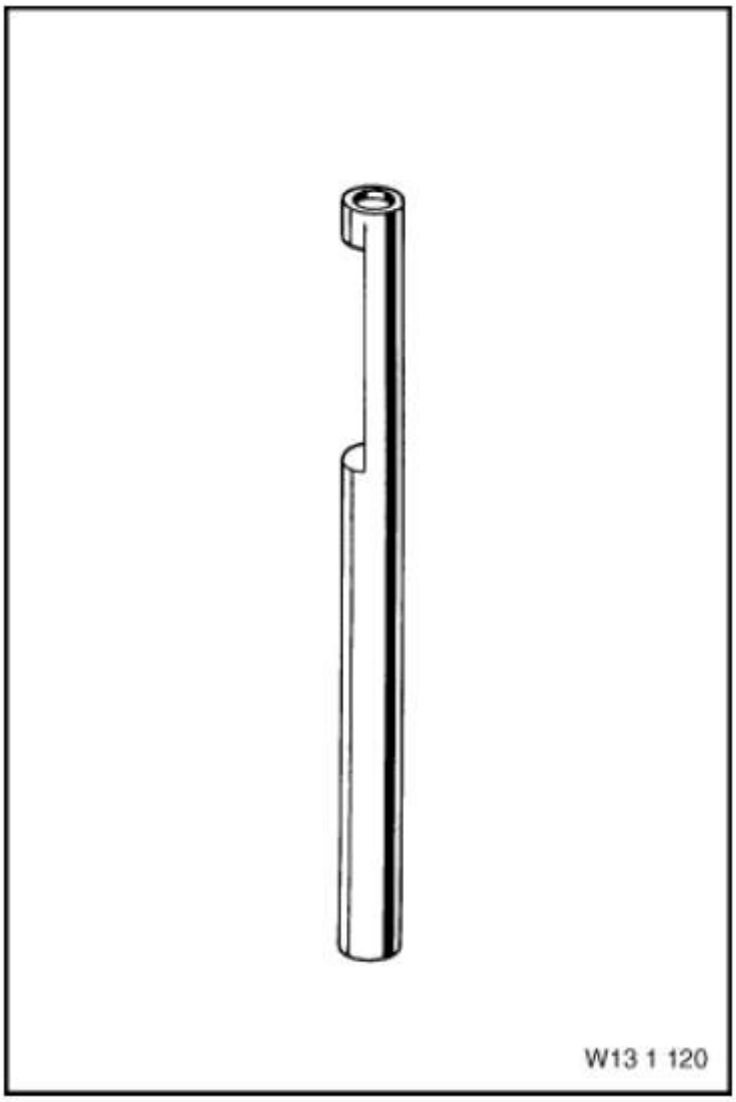


Fig. 108: Identifying Mandrel (0491252)
Courtesy of BMW OF NORTH AMERICA, INC.

0491337 MANDREL

0491337 136020 Mandrel Mechanical tool

Replaced by: 83300491339

NOTE: **(Test mandrel for adjusting the rpm sensor) Replaced by 13 6 040 (0 491 339)**

cardiagn.com

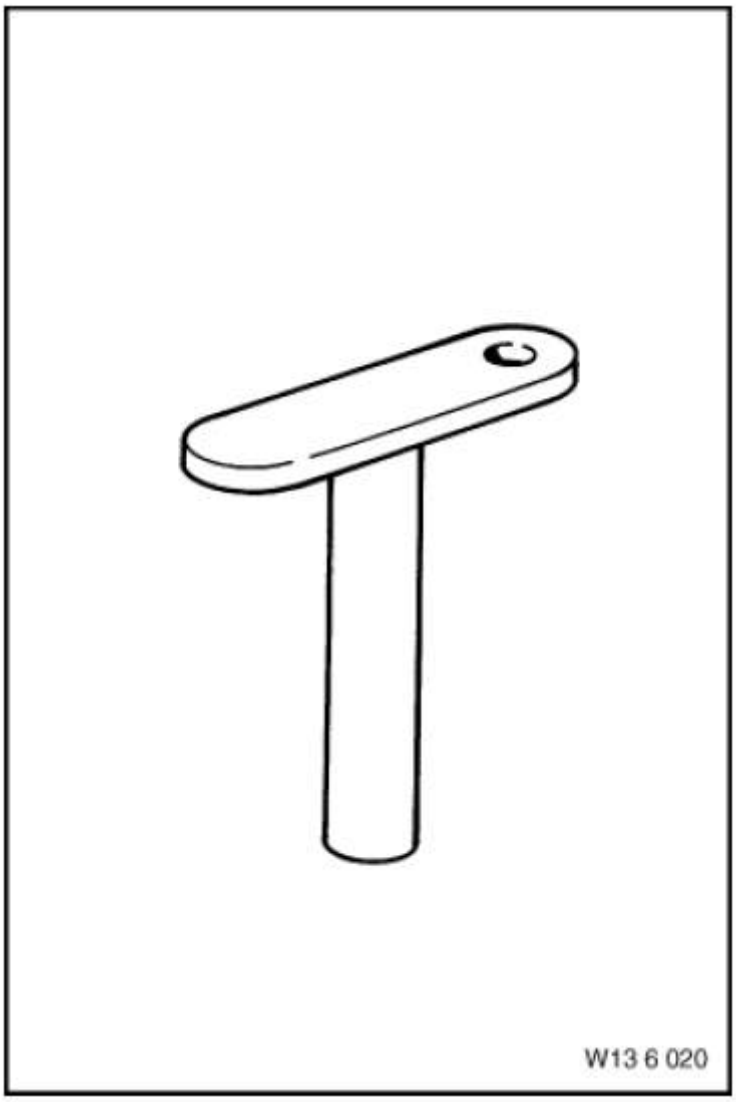


Fig. 109: Identifying Mandrel (0491337)
Courtesy of BMW OF NORTH AMERICA, INC.

0491226 MANDREL

0491226 131000 Mandrel Mechanical tool

NOTE: **(Assembly drift) for float needle/valve seat - 4A1 carburetor**

cardiagn.com

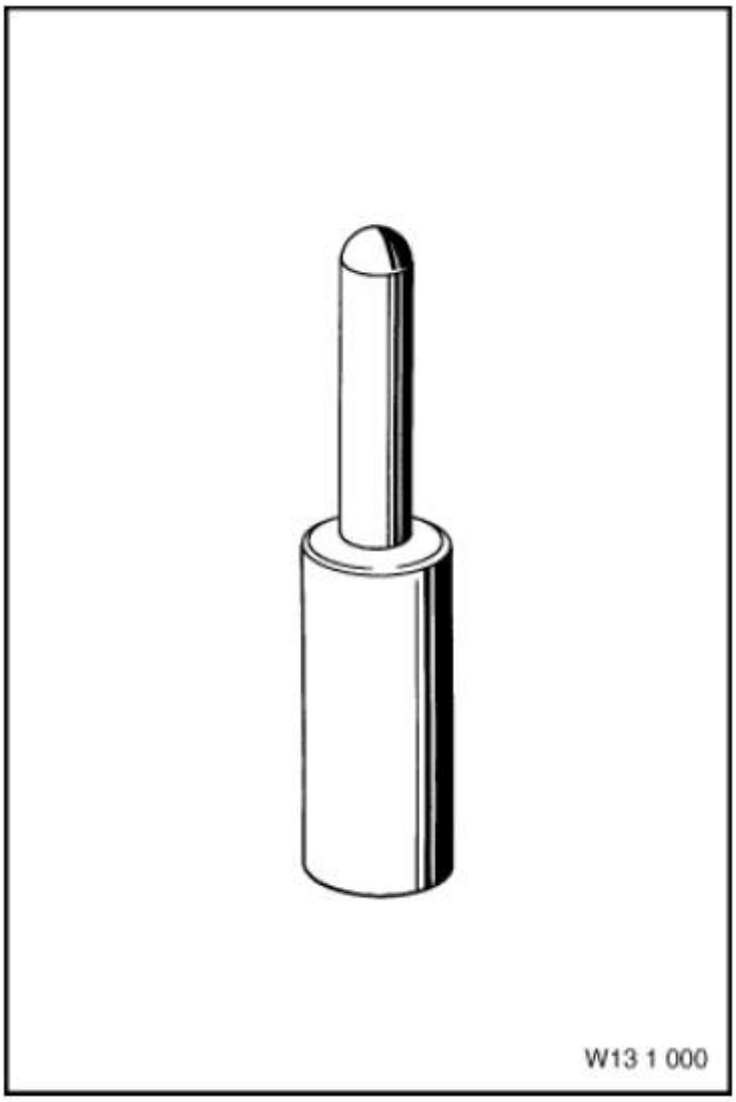


Fig. 110: Identifying Mandrel (0491226)
Courtesy of BMW OF NORTH AMERICA, INC.

0491339 MANDREL

0491339 136040 Mandrel Mechanical tool

NOTE: **(Test mandrel) For adjusting the holder for the rpm sensor**

Storage Location

C3

SI number

01 05 95 (932)

cardiagn.com

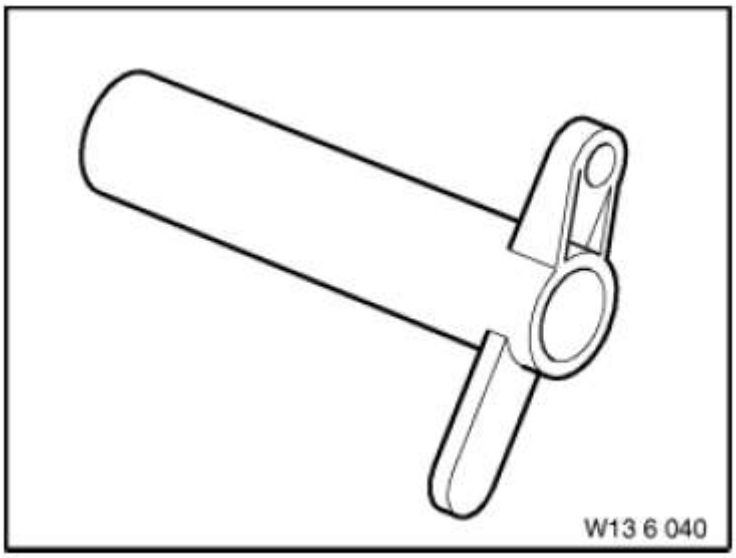


Fig. 111: Identifying Mandrel (0491339)
Courtesy of BMW OF NORTH AMERICA, INC.

0491336 MANDREL

0491336 136010 Mandrel Mechanical tool

NOTE: **(Test mandrel) For adjusting the speed sensor on vehicle with DDE**

Storage Location

X9

SI number

01 03 89 (037)

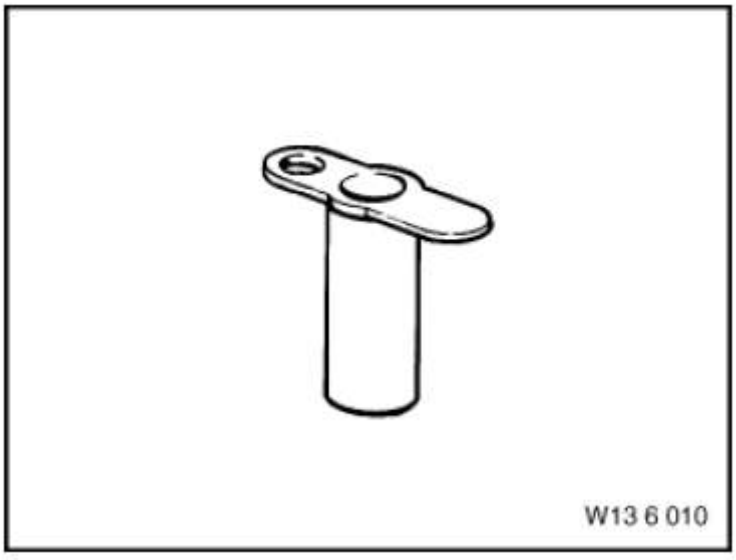


Fig. 112: Identifying Mandrel (0491336)
Courtesy of BMW OF NORTH AMERICA, INC.

0491225 MEASURING DEVICE

0491225 130500 Measuring device Mechanical tool

NOTE: **(Synchronization device) to synchronize carburetors**

cardiagn.com

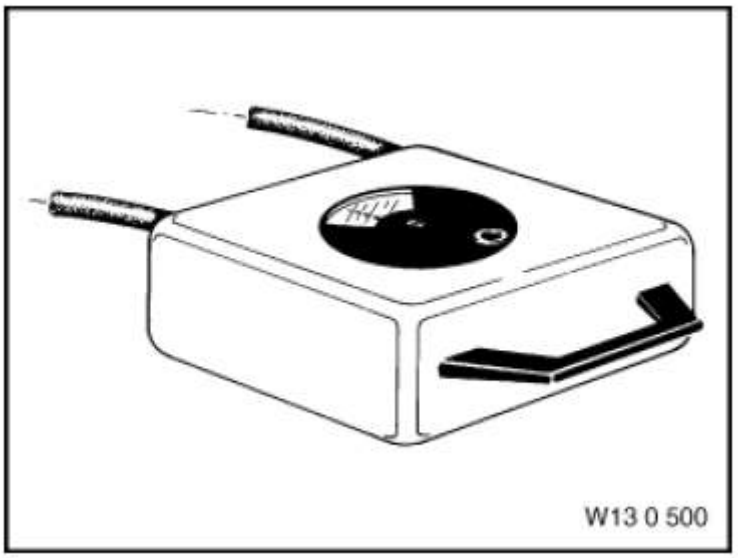


Fig. 113: Identifying Measuring Device (0491225)
Courtesy of BMW OF NORTH AMERICA, INC.

0491259 MEASURING DEVICE

0491259 133060 Measuring device AM

NOTE: For checking fuel and oil pressure

Consisting of:

1. **0491260** Pressure gauge

   NOTE: (Pressure gauge 0...25 bar)

2. **0491261** Valve

   NOTE: (Valve) 2-way valve, engine: all except S50, S54, N73

3. **0491262** Line

   NOTE: (Connection lines (2 x)) For check of fuel and oil pressure

4. **0491263** Line

   NOTE: (Connection line) With T-piece for L-Jetronic, all except N73

cardiagn.com

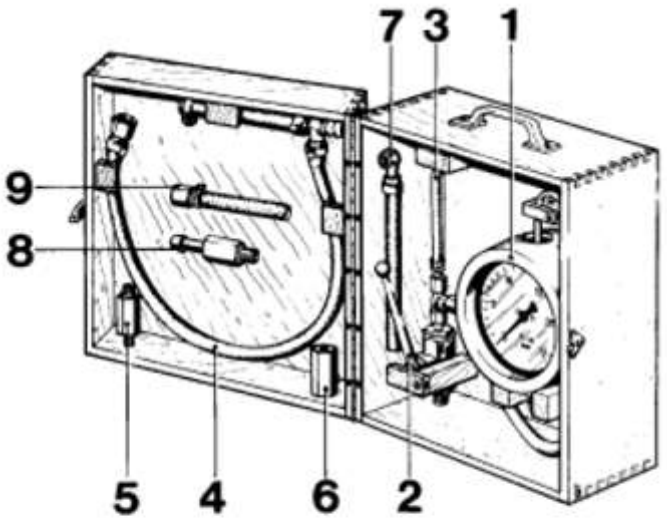


Fig. 114: Identifying Measuring Device (0491259)
Courtesy of BMW OF NORTH AMERICA, INC.

5. 0491264 Connector

NOTE: (Connection piece, distributor) All except N73

6. 0491265 Connector

NOTE: (Connector for warm-up sensor) All except N73 Only available as part of complete set

7. 0491266 Hose

NOTE: (Connecting hose) For checking the electric fuel pump delivery rate All except N73 Only available as part of complete set

8. 0491267 Connector

NOTE: (Connection piece, distributor) All except N73

9. 0491268 Connector

NOTE: For warm-up sensor with hose, all except N73

0491361 MEASURING DEVICE

0491361 138020 Measuring device AM

NOTE: (measuring device) With connection parts for checking and adjusting low pressure regulator

SI number

01 14 95 (014)

cardiagn.com

Consisting of:

1. **0491362** Measuring device

   NOTE: **(measuring device) Without adapter hoses**

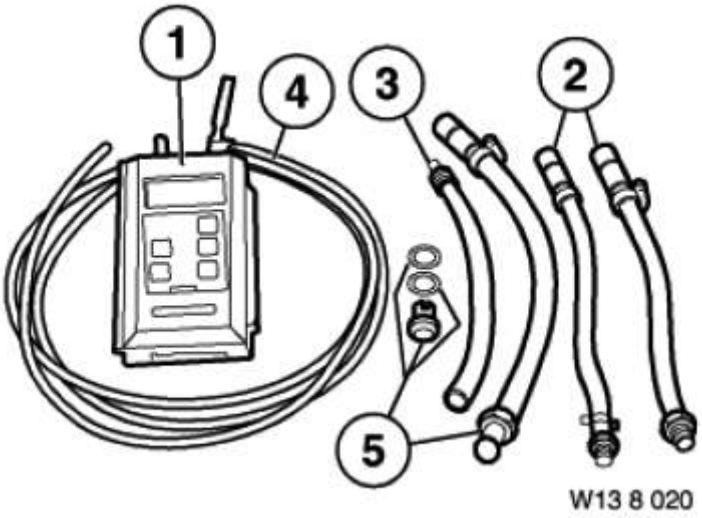


Fig. 115: Identifying Measuring Device (0491361)
Courtesy of BMW OF NORTH AMERICA, INC.

2. **0491363** Adapter

   NOTE: **(adapter hose (2 pieces)) With M6 connecting nipple and quick-release coupling**

3. **0491364** Adapter

   NOTE: **(adapter hose) With counterpiece for quick-release coupling**

4. **0491365** Adapter

   NOTE: **(adapter hoses) With T-piece for intake pressure connection**

5. **0491366** Adapter

   NOTE: **(adapter hose) With quick-release coupling and ring connection with banjo bolt for testing the output pressure at the metering unit**

0491362 MEASURING DEVICE

0491362 138021 Measuring device AM

NOTE: **(measuring device) Without adapter hoses**

cardiagn.com

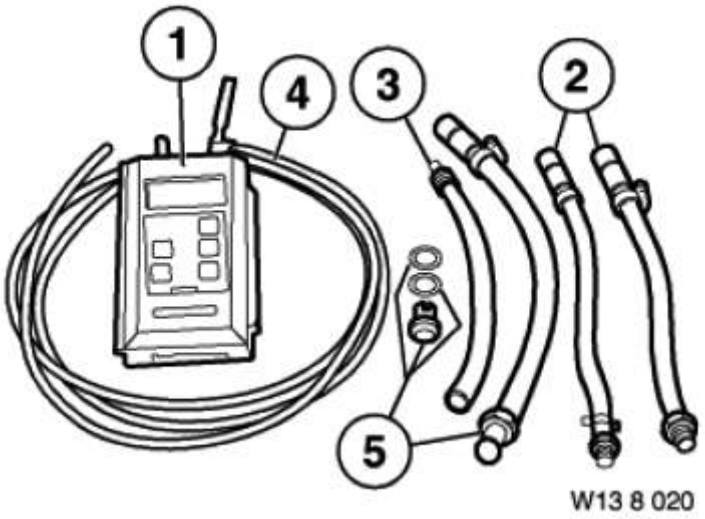


Fig. 116: Identifying Measuring Device (0491362)
Courtesy of BMW OF NORTH AMERICA, INC.

0494458 MEASURING DEVICE

0494458 135452 Measuring device AM

NOTE: (rail pressure sensor) Rail pressure sensor contained in 13 5 451.

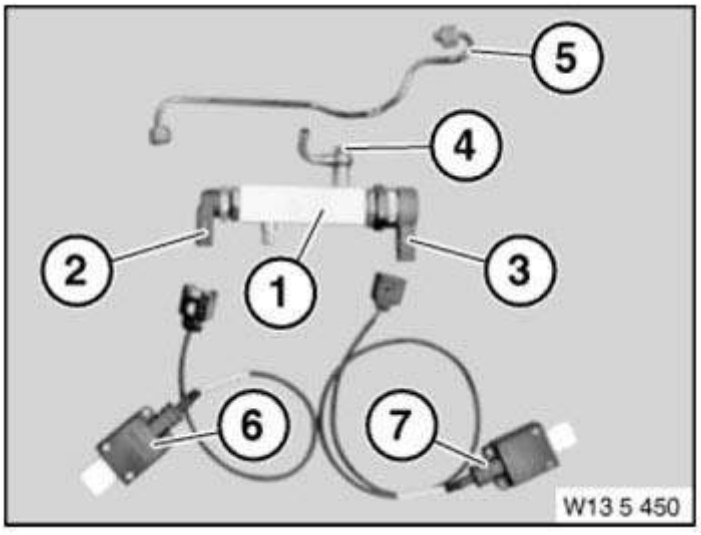


Fig. 117: Identifying Measuring Device (0494458)
Courtesy of BMW OF NORTH AMERICA, INC.

0491280 MEASURING GLASS

0491280 135032 Measuring glass AM

NOTE: (Measuring jug) 6 units

cardiagn.com

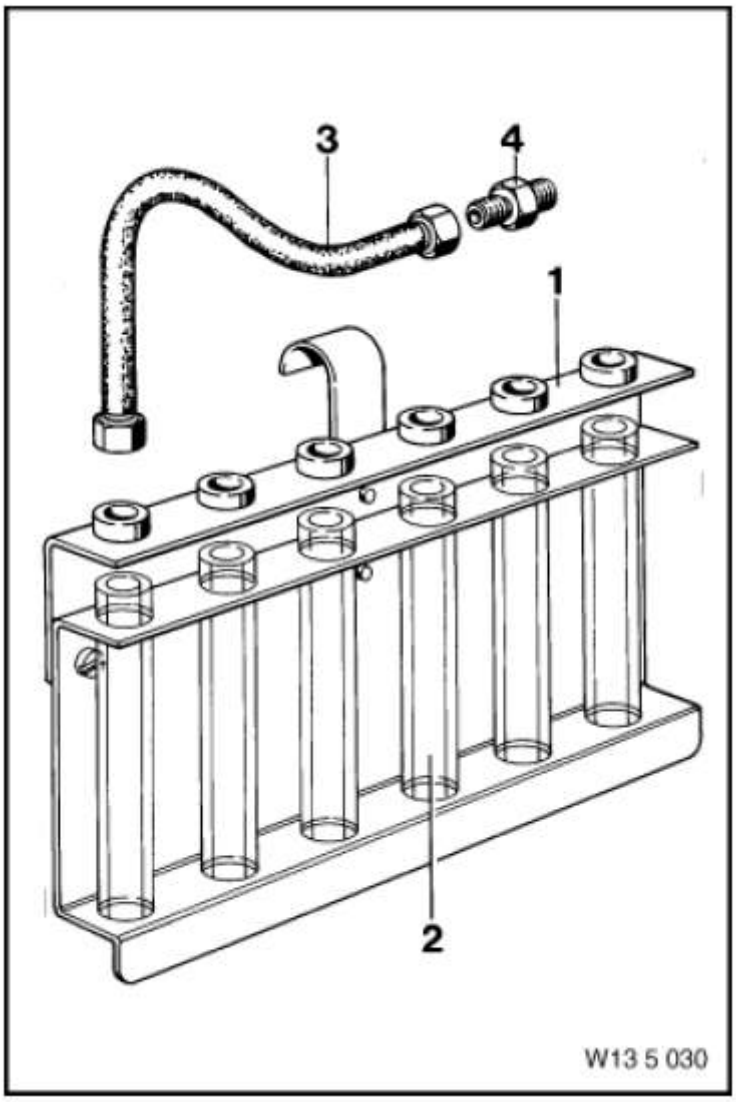


Fig. 118: Identifying Measuring Glass (0491280)
Courtesy of BMW OF NORTH AMERICA, INC.

0491257 MEASURING GLASS

0491257 133020 Measuring glass Mechanical tool

NOTE: **(Measuring glass) For checking electric fuel pumps - delivery rate**

cardiagn.com

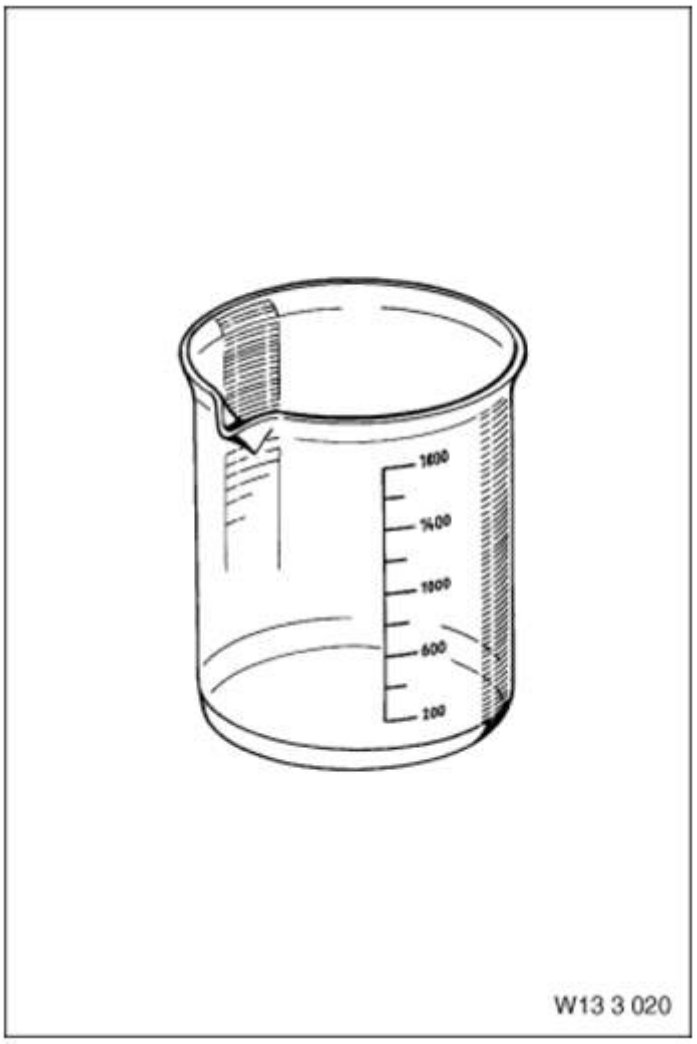


Fig. 119: Identifying Measuring Glass (0491257)
Courtesy of BMW OF NORTH AMERICA, INC.

0491291 MILLING CUTTER

0491291 135091 Milling cutter AM

cardiagn.com

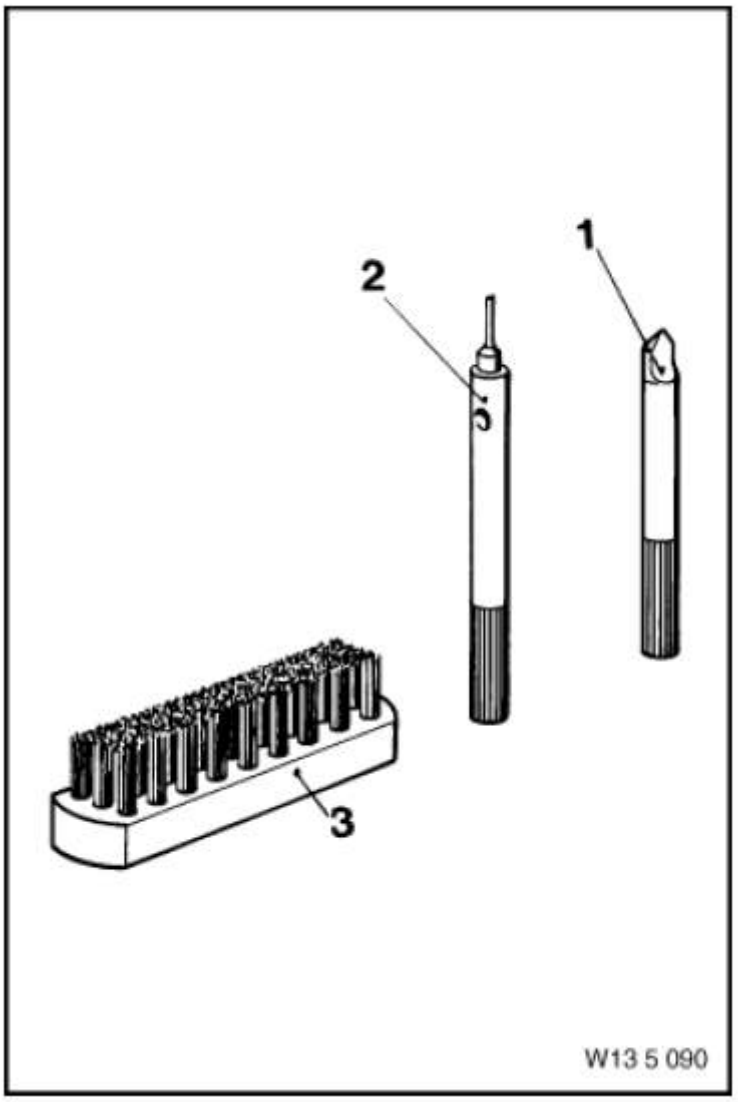


Fig. 120: Identifying Milling Cutter (0491291)
Courtesy of BMW OF NORTH AMERICA, INC.

0491289 PIN

0491289 135080 Pin Mechanical tool

NOTE: **(Dowel pin) to synchronize injection pump and throttle valve - until January 84**

0495757 PLIERS

0495757 130191 Pliers Minimum set: Mechanical tools AM

Storage Location

C19

SI number

01 20 06 (299)

cardiagn.com



Fig. 121: Identifying Pliers (0495757)
Courtesy of BMW OF NORTH AMERICA, INC.

0493763 PLUG

0493763 135215 Plug Minimum set: Mechanical tools AM

NOTE: **(Seal plug)**

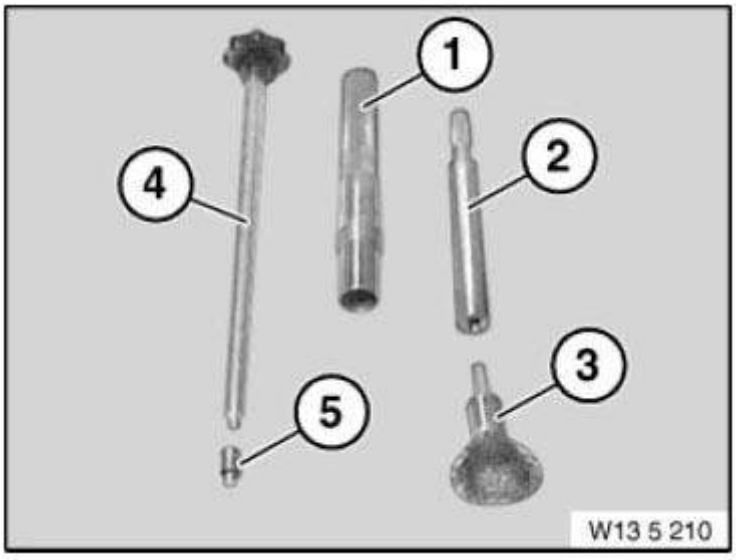


Fig. 122: Identifying Plug (0493763)
Courtesy of BMW OF NORTH AMERICA, INC.

0491231 PRESSING-ON TOOL

0491231 131014 Pressing-on tool AM

NOTE: **For CO tamper protections**

cardiagn.com

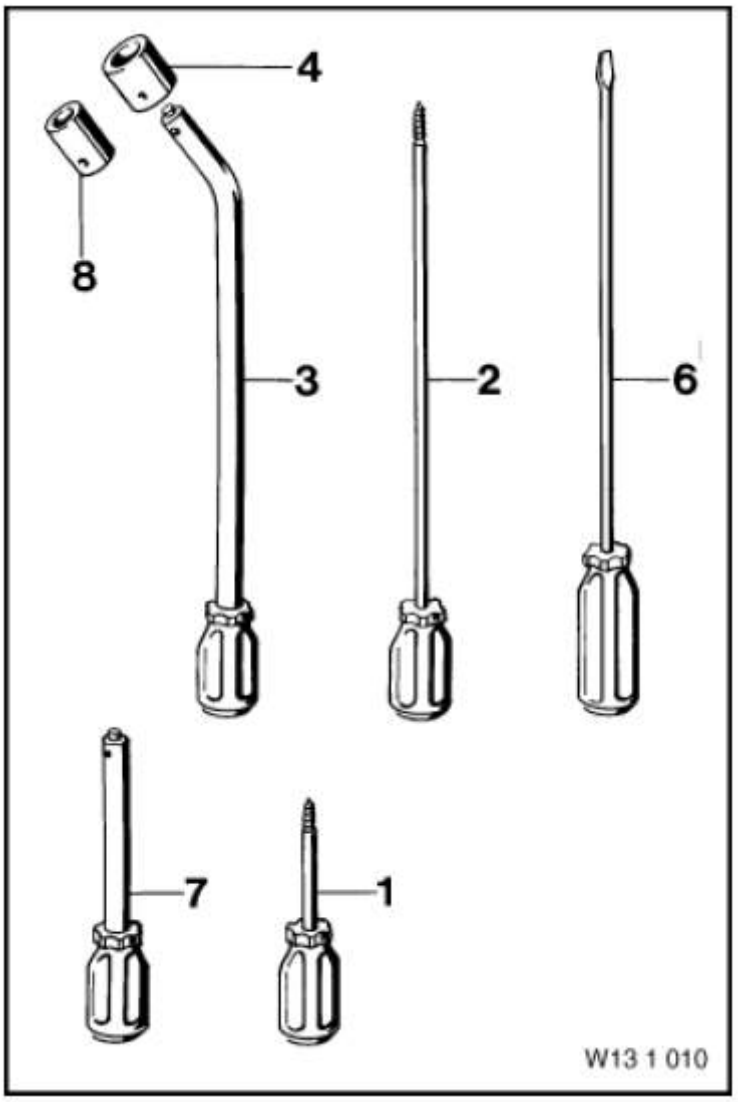


Fig. 123: Identifying Pressing-On Tool (0491231)
Courtesy of BMW OF NORTH AMERICA, INC.

0491234 PRESSING-ON TOOL

0491234 131018 Pressing-on tool AM

NOTE: **For CO tamper protections - engine: M20**

cardiagn.com

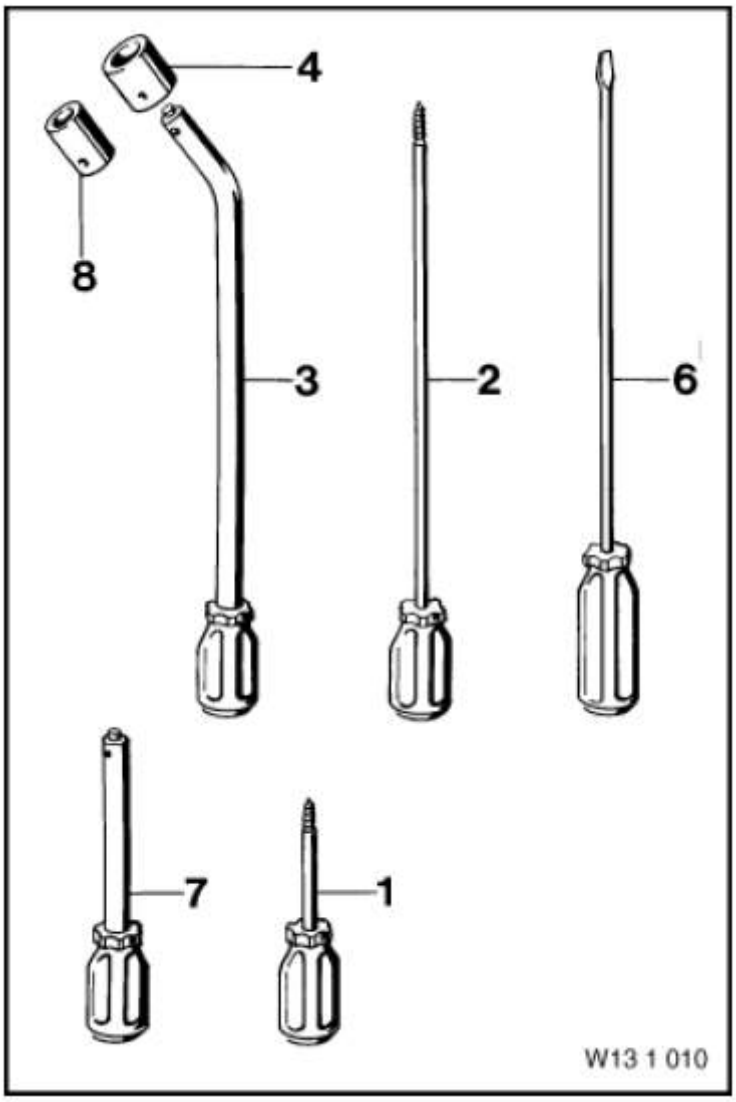


Fig. 124: Identifying Pressing-On Tool (0491234)
Courtesy of BMW OF NORTH AMERICA, INC.

0491260 PRESSURE GAUGE

0491260 133061 Pressure gauge AM

NOTE: (Pressure gauge 0...25 bar)

cardiagn.com

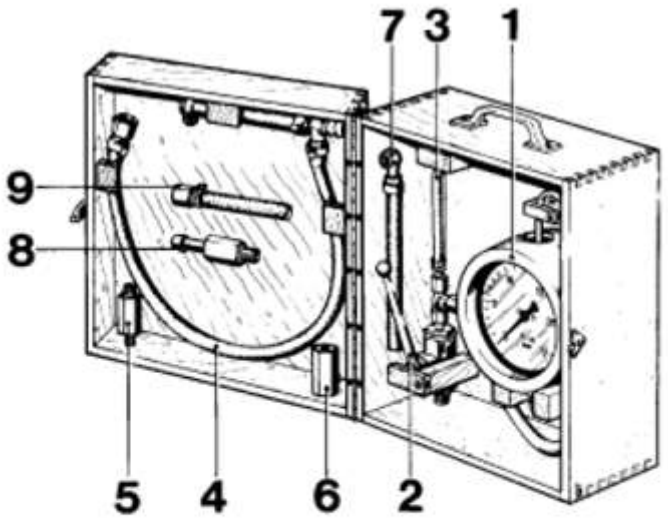


Fig. 125: Identifying Pressure Gauge (0491260)
Courtesy of BMW OF NORTH AMERICA, INC.

0491273 PRESSURE GAUGE

0491273 135000 Pressure gauge AM

NOTE: With connecting hose for checking the charging pressure

Consisting of:

1. **0491274** Pressure gauge
2. **0491275** Hose

NOTE: (Connecting hose) Replaced by 13 5 130 (0 941 297)

cardiagn.com

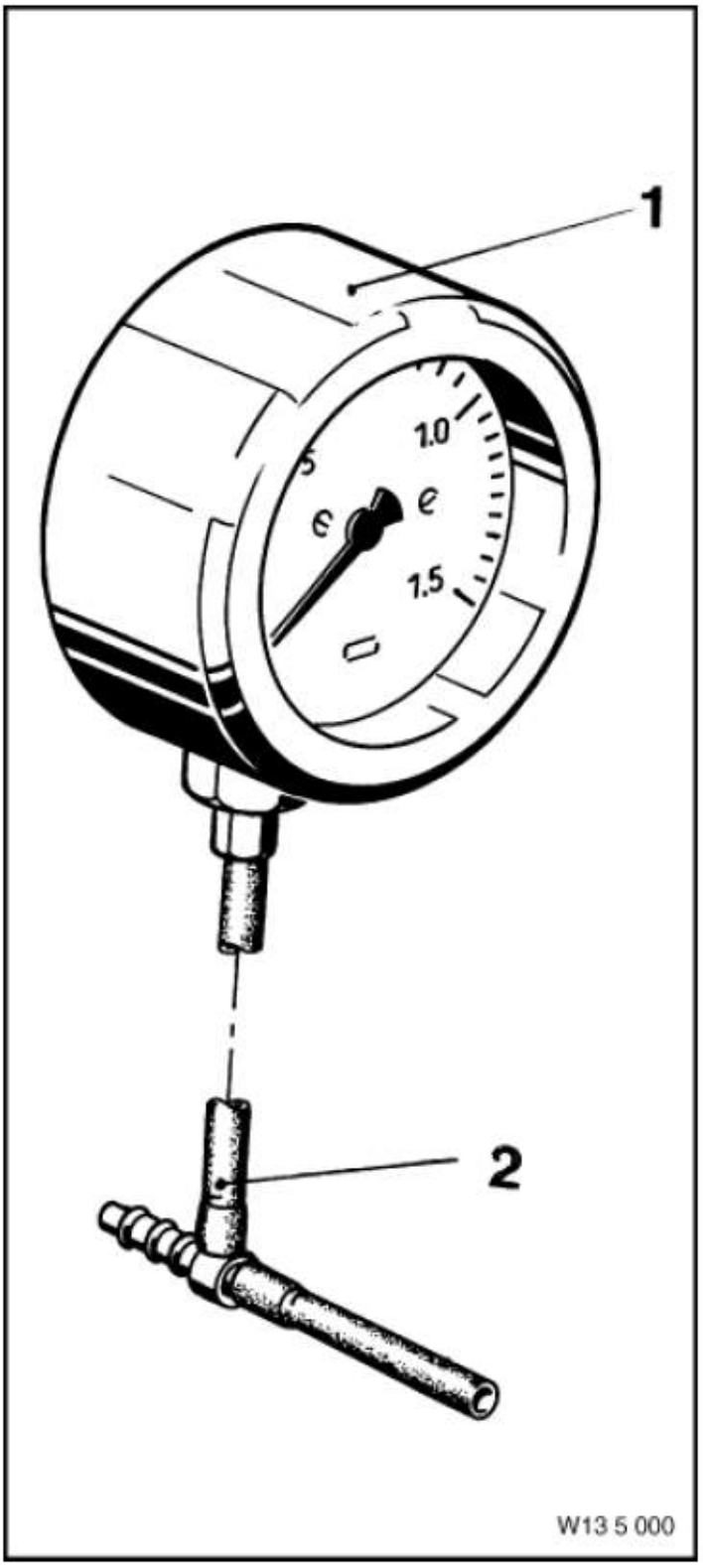


Fig. 126: Identifying Pressure Gauge (0491273)
Courtesy of BMW OF NORTH AMERICA, INC.

0491329 PRESSURE GAUGE

0491329 135390 Pressure gauge Mechanical tool

NOTE: **Measuring range -1... +1.5 bar - to check the fuel feed pressure**

0491274 PRESSURE GAUGE

0491274 135001 Pressure gauge AM

cardiagn.com

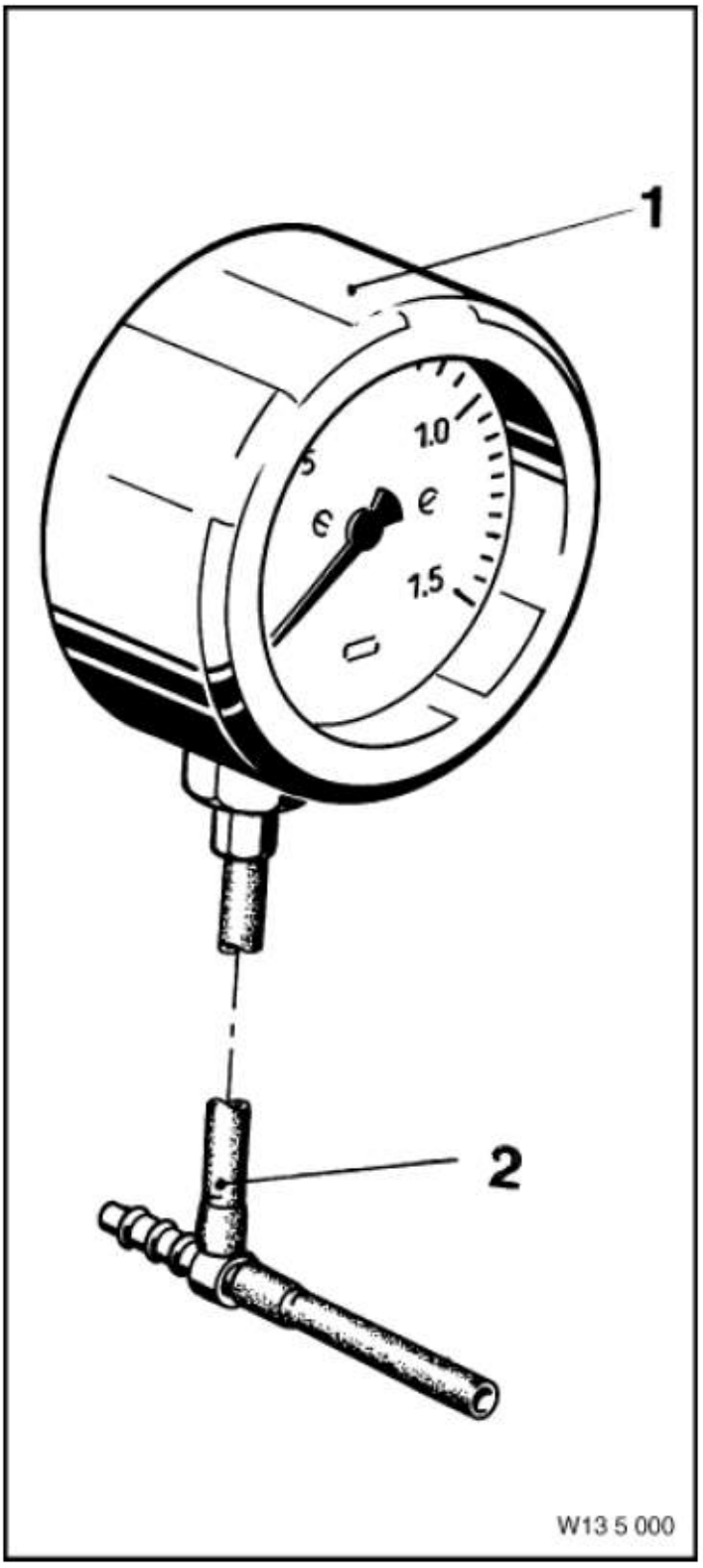


Fig. 127: Identifying Pressure Gauge (0491274)
Courtesy of BMW OF NORTH AMERICA, INC.

0491228 PULLER

0491228 131011 Puller AM

NOTE: (Puller, short)

cardiagn.com

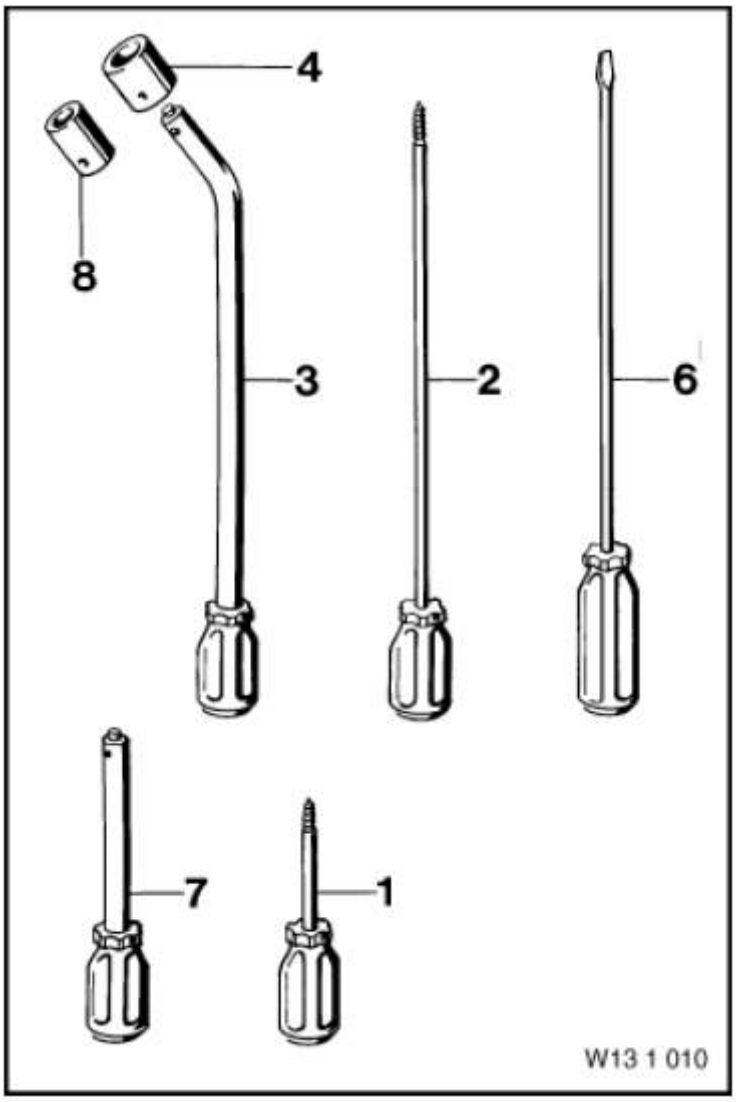


Fig. 128: Identifying Puller (0491228)
Courtesy of BMW OF NORTH AMERICA, INC.

0491247 PULLER

0491247 131093 Puller AM

NOTE: **(puller, small (K-Jetronic))**

cardiagn.com

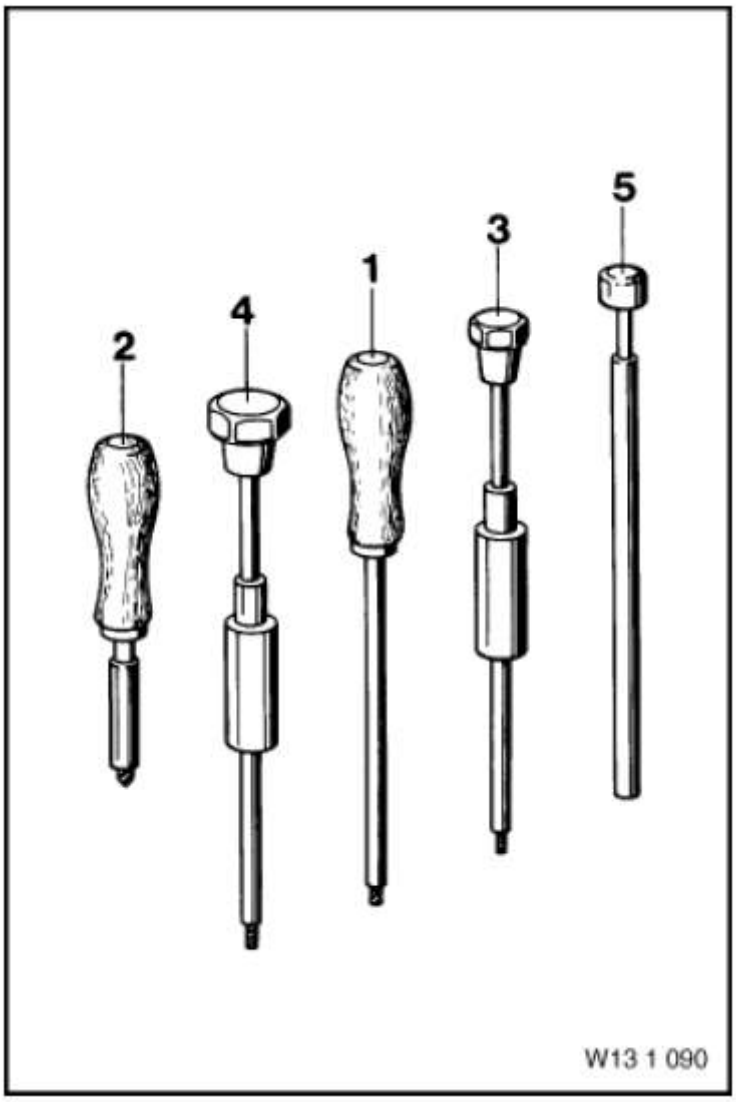


Fig. 129: Identifying Puller (0491247)
Courtesy of BMW OF NORTH AMERICA, INC.

0491229 PULLER

0491229 131012 Puller AM

NOTE: **(Puller, long)**

cardiagn.com

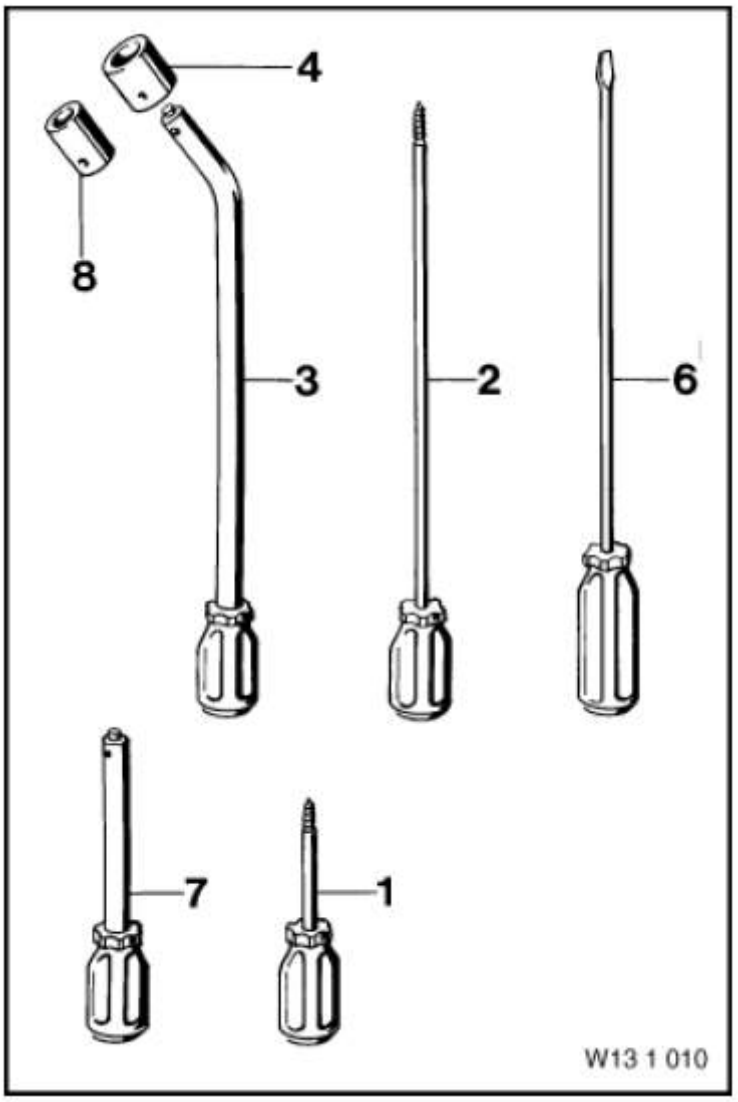


Fig. 130: Identifying Puller (0491229)
Courtesy of BMW OF NORTH AMERICA, INC.

0493321 PULLER

0493321 135250 Puller Minimum set: Mechanical tools AM

NOTE: **For removing injector nozzles or injectors from cylinder head**

Storage Location

A11

B11

SI number

01 06 98 (306)

cardiagn.com

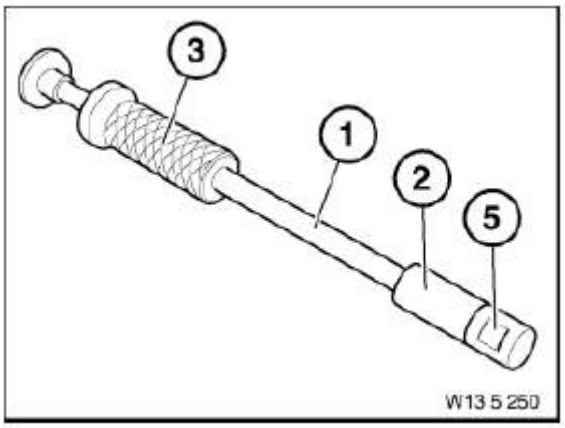


Fig. 131: Identifying Puller (0493321)
Courtesy of BMW OF NORTH AMERICA, INC.

Consisting of:

5 = **0495579** Adapter

NOTE: **For removing steering shaft on E85.**

1 = **0493338** Rod

NOTE: **(Guide rod)**

2 = **0493339** Bush

NOTE: **(Threaded bush)**

3 = **0493340** Weight

NOTE: **(Weight)**

4 = **0493379** Claw

NOTE: **(Clamping claw) For removal of injector nozzles/engine: M57**

0491248 PULLER

0491248 131094 Puller AM

NOTE: **(puller, large (L-Jetronic))**

cardiagn.com

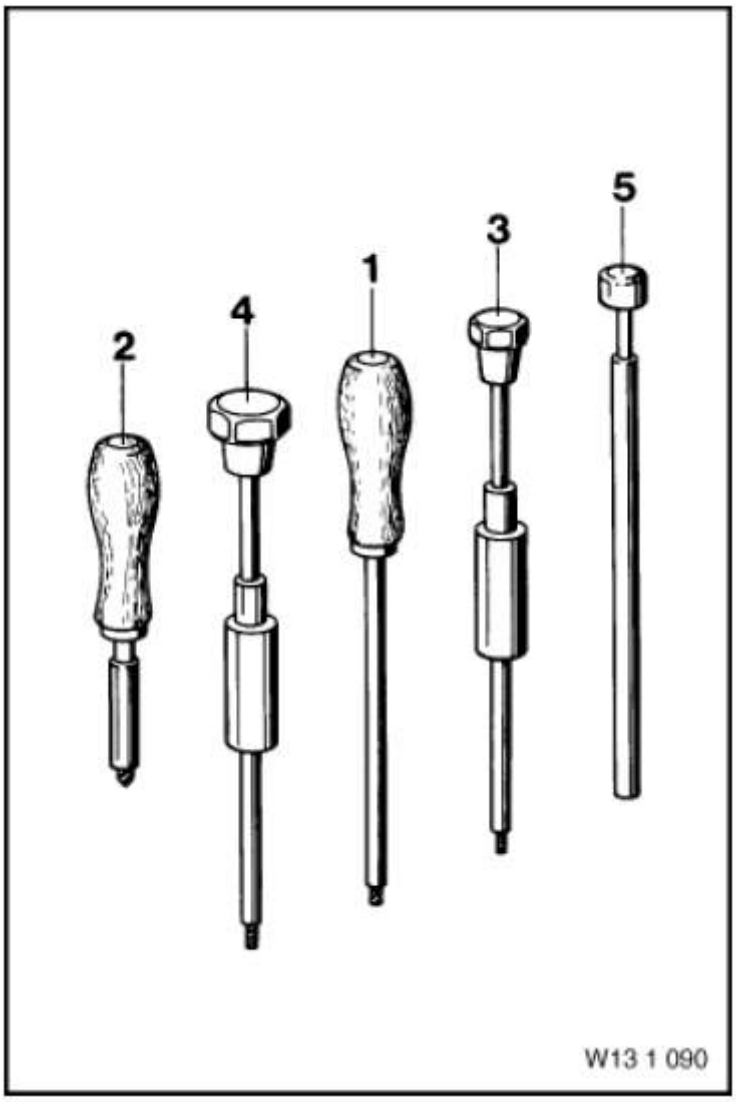


Fig. 132: Identifying Puller (0491248)
Courtesy of BMW OF NORTH AMERICA, INC.

0494583 RING

0494583 131142 Ring AM

NOTE: (Fixing rings (6 pieces)) Only available as part of complete tool set 13 1 140 (83 30 0 494 529).

0491240 RING SPANNER

0491240 131050 Ring spanner Mechanical tool

NOTE: For Didta carburetor

cardiagn.com

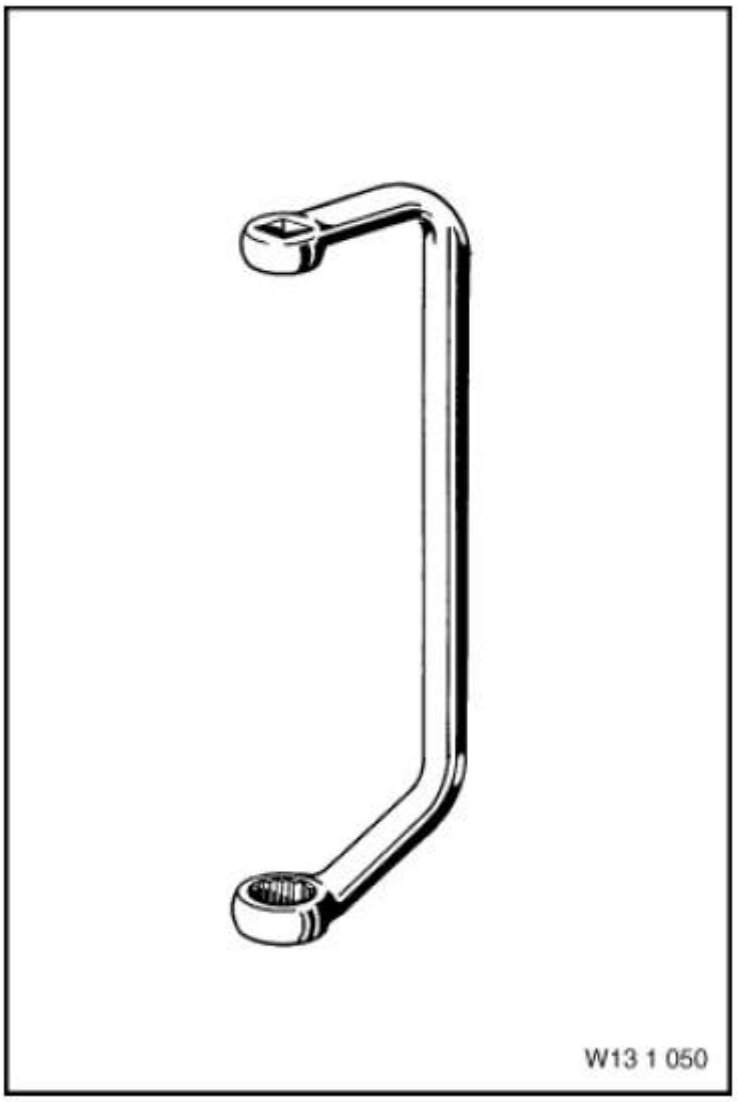


Fig. 133: Identifying Ring Spanner (0491240)
Courtesy of BMW OF NORTH AMERICA, INC.

0493338 ROD

0493338 135251 Rod Minimum set: Mechanical tools AM

NOTE: (Guide rod)



Fig. 134: Identifying Rod (0493338)

cardiagn.com

Courtesy of BMW OF NORTH AMERICA, INC.

0493762 ROD

0493762 135214 Rod Minimum set: Mechanical tools AM

NOTE: (Mounting rod) For the seal plug

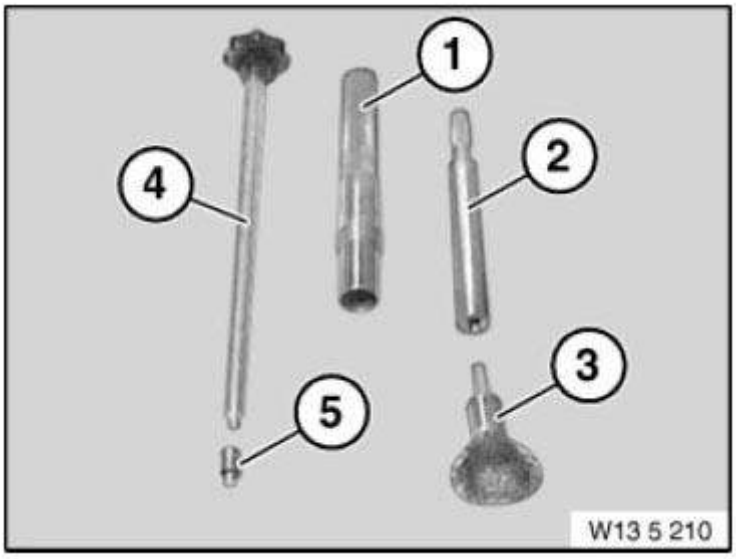


Fig. 135: Identifying Rod (0493762)
Courtesy of BMW OF NORTH AMERICA, INC.

0491323 SCREW

0491323 135361 Screw AM

NOTE: (Banjo bolt).

cardiagn.com

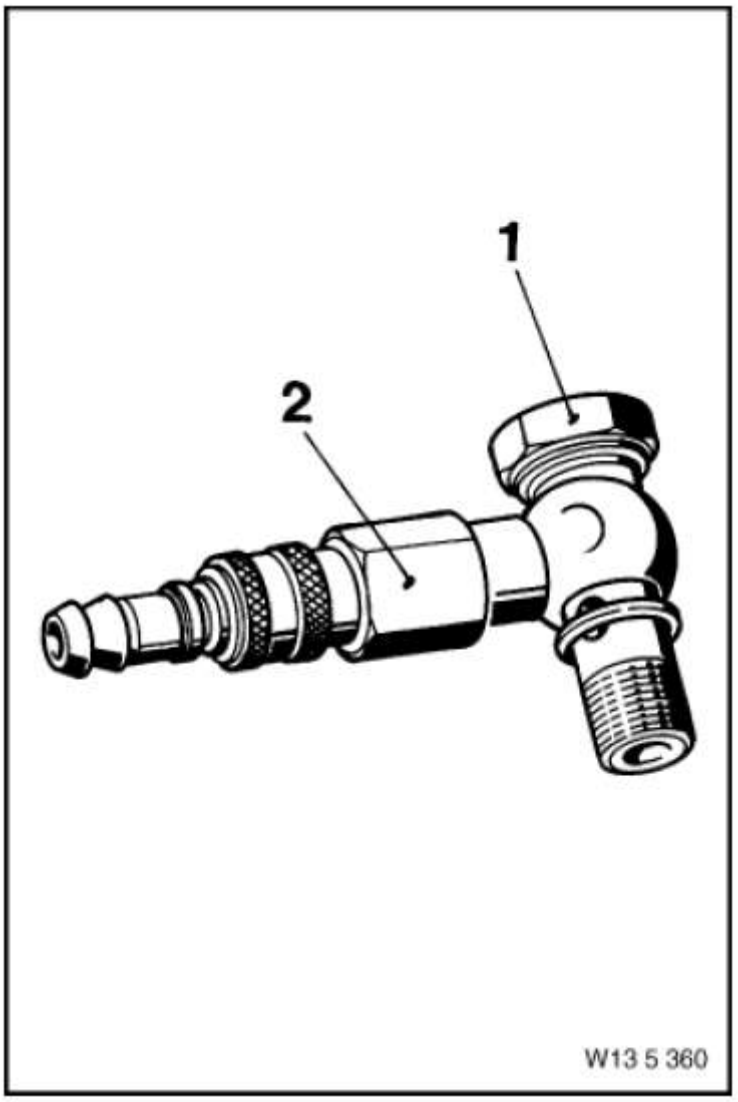


Fig. 136: Identifying Screw (0491323)
Courtesy of BMW OF NORTH AMERICA, INC.

0491232 SCREW

0491232 131016 Screw AM

NOTE: **(Screwdriver)**

cardiagn.com

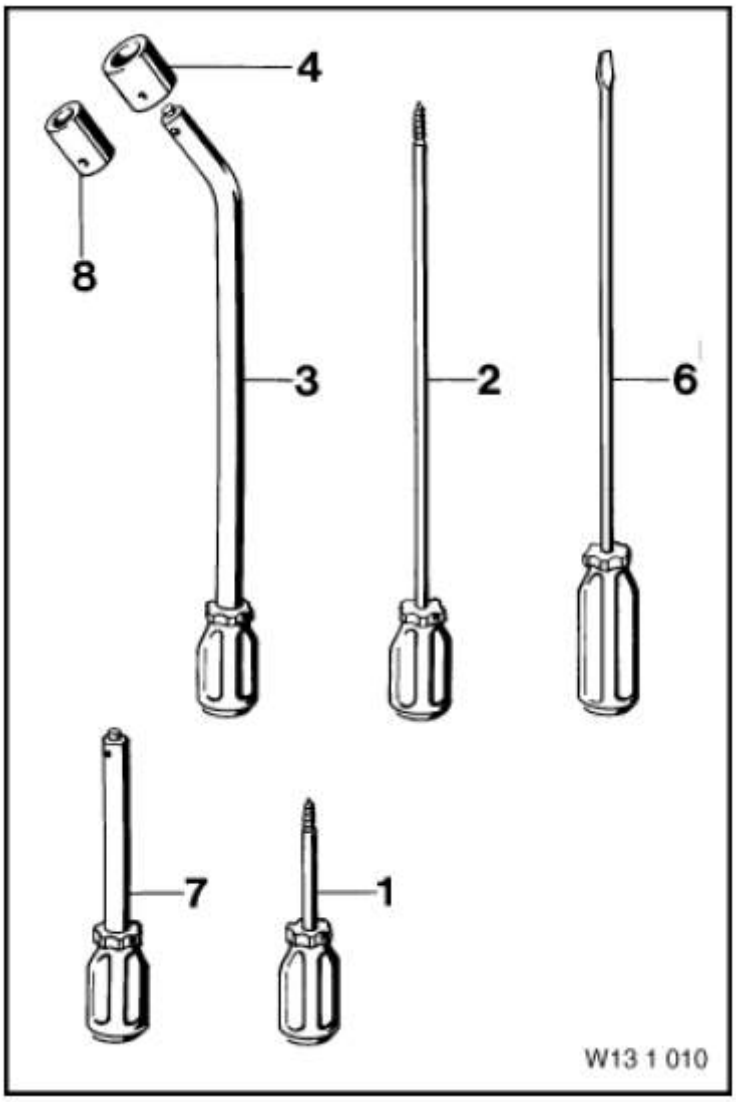


Fig. 137: Identifying Screw (0491232)
Courtesy of BMW OF NORTH AMERICA, INC.

0491250 SCREW

0491250 131100 Screw Mechanical tool

NOTE: **(screwdriver) For CO value adjustment (L-Jetronic) - From model year 83**

Storage Location

X4

cardiagn.com

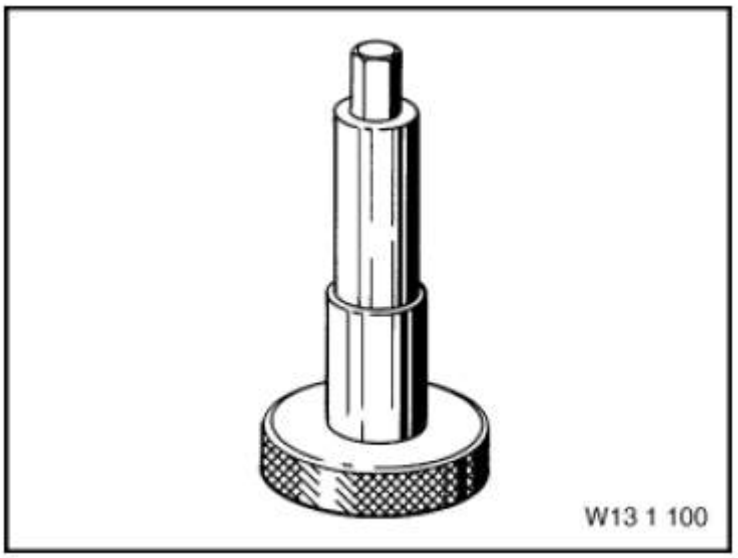


Fig. 138: Identifying Screw (0491250)
Courtesy of BMW OF NORTH AMERICA, INC.

0491241 SCREW

0491241 131060 Screw Mechanical tool

NOTE: **(Screwdriver) For CO value adjustment (L-Jetronic) - Up to model year 82**

Storage Location

X4

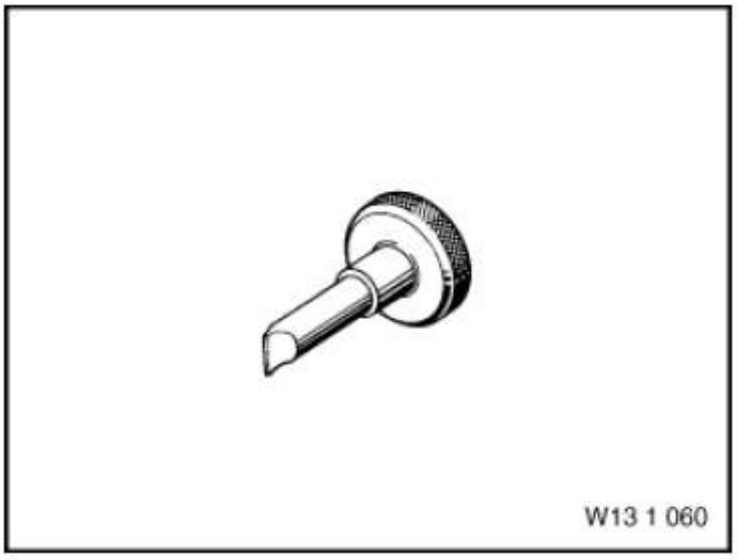


Fig. 139: Identifying Screw (0491241)
Courtesy of BMW OF NORTH AMERICA, INC.

0493460 SCREW

0493460 130153 Screw AM

NOTE: **(Knurled screws (2 pieces)) Only available as part of complete tool set 13 0 150 (83 30 0 493 453).**

0491322 SCREW

cardiagn.com

0491322 135360 Screw AM

NOTE: **(Banjo bolt) With ring element for checking the fuel intake pressure**

Storage Location

Y2

Consisting of:

1. 0491323 Screw

   NOTE: **(Banjo bolt).**

2. 0491324 Adapter

   NOTE: **(Adapter)**

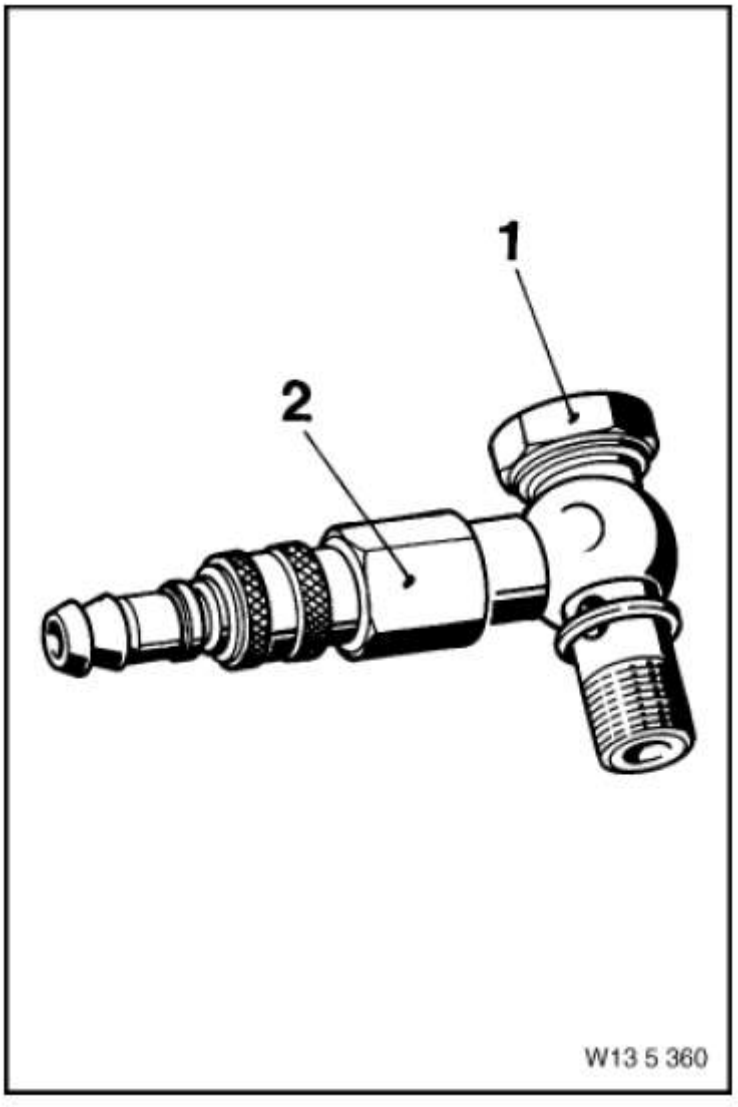


Fig. 140: Identifying Screw (0491322)
Courtesy of BMW OF NORTH AMERICA, INC.

0493463 SCREW

0493463 130156 Screw AM

NOTE: **(knurled screws (4 x))**

cardiagn.com

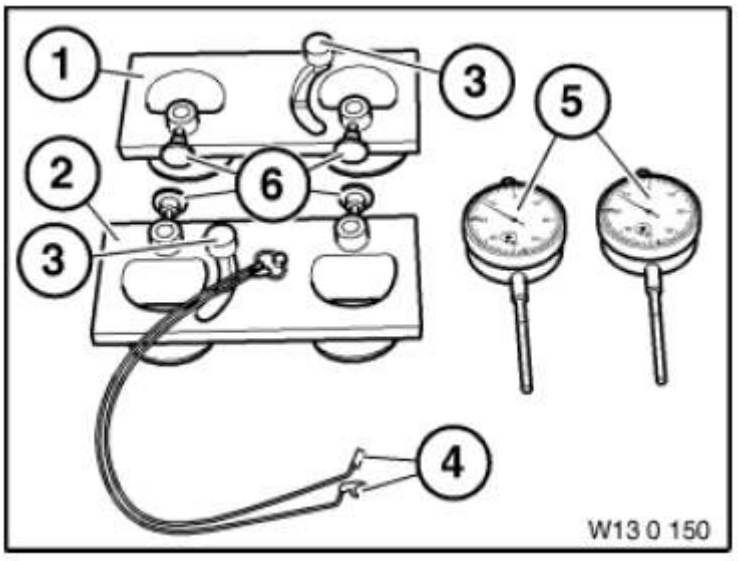


Fig. 141: Identifying Screw (0493463)
Courtesy of BMW OF NORTH AMERICA, INC.

0491224 SENSOR

0491224 130120 Sensor Mechanical tool

NOTE: **(exhaust gas probe) For sampling raw gas at the exhaust in order to check the engine idle speed and exhaust composition**

cardiagn.com

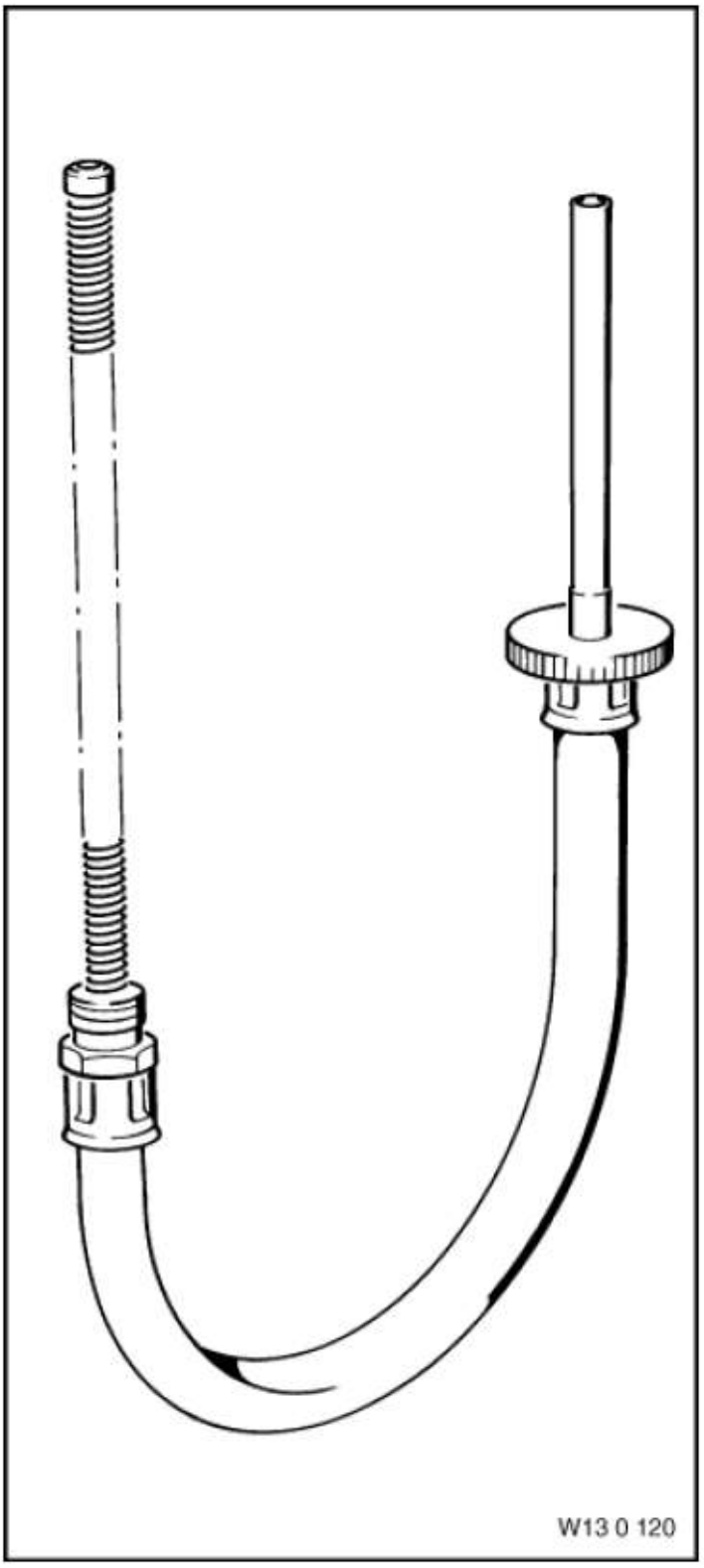


Fig. 142: Identifying Sensor (0491224)
Courtesy of BMW OF NORTH AMERICA, INC.

0491216 SENSOR

0491216 130080 Sensor Mechanical tool

Replaced by: 83300491224

NOTE: **(Exhaust gas probe) Replaced by 13 0 120 (0 491 224)**

0491218 SENSOR

cardiagn.com

0491218 130091 Sensor AM

NOTE: **(Exhaust probe, straight) Can be ordered as part of complete special tool 13 0 090 = 0491217.**

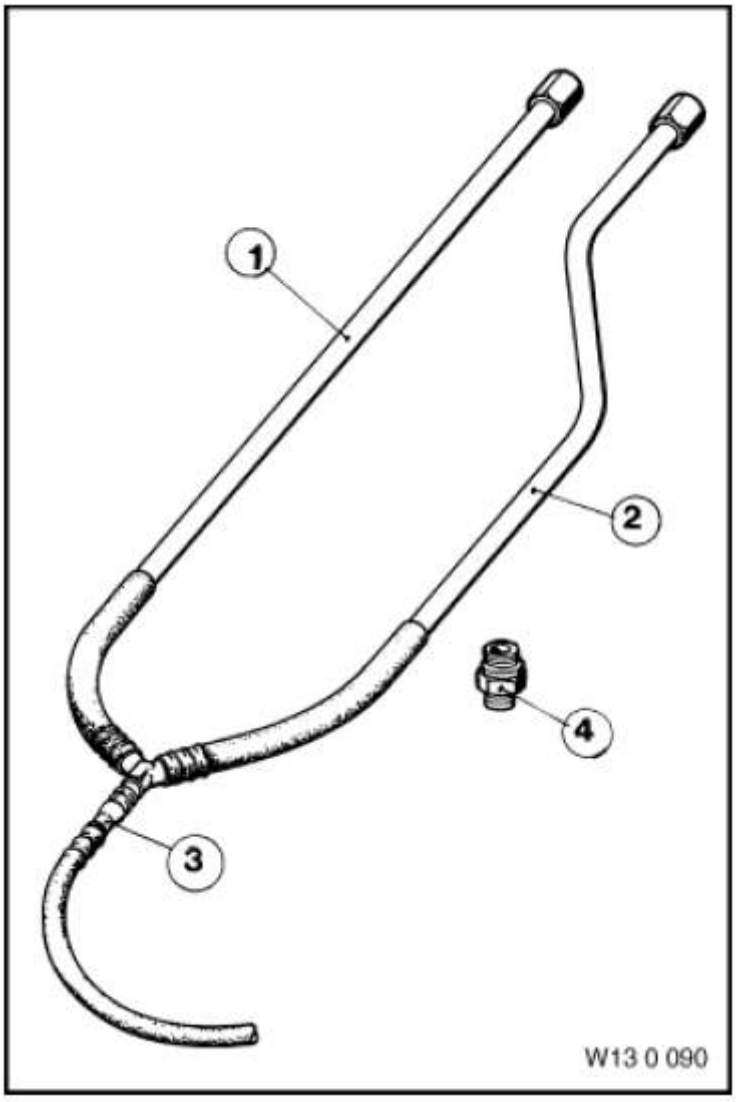


Fig. 143: Identifying Sensor (0491218)
Courtesy of BMW OF NORTH AMERICA, INC.

0491223 SENSOR

0491223 130110 Sensor Mechanical tool

NOTE: **(Exhaust sensors (6 pieces)) For raw gas removal at the exhaust manifold for checking the engine idle and exhaust content**

SI number

01 10 91 (443)

cardiagn.com

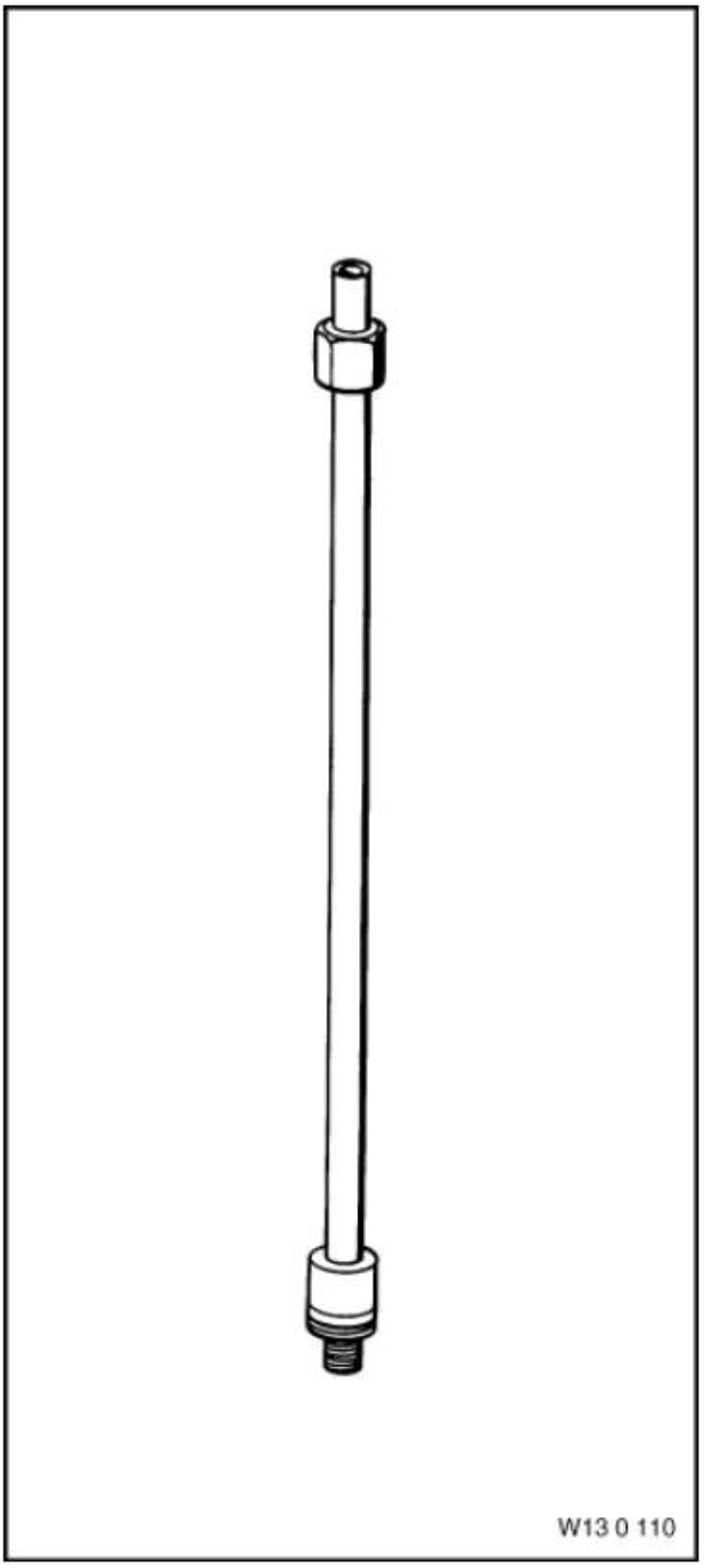


Fig. 144: Identifying Sensor (0491223)
Courtesy of BMW OF NORTH AMERICA, INC.

0491208 SENSOR

0491208 130030 Sensor AM

NOTE: **(Exhaust gas probes and connection hose) For checking the CO value - right-hand drive vehicles without catalytic converter**

Consisting of:

1. **0491209** Sensor

cardiagn.com

NOTE: **(Exhaust gas probe) With short insertion pipe for rear exhaust manifold - RHD**

2. 0491210 Sensor

NOTE: **(Exhaust gas probe) With long insertion pipe for front exhaust manifold - RHD**

3. 0491211 Hose

NOTE: **(Connecting hose) Replaced by 13 5 130 (0 941 297)**

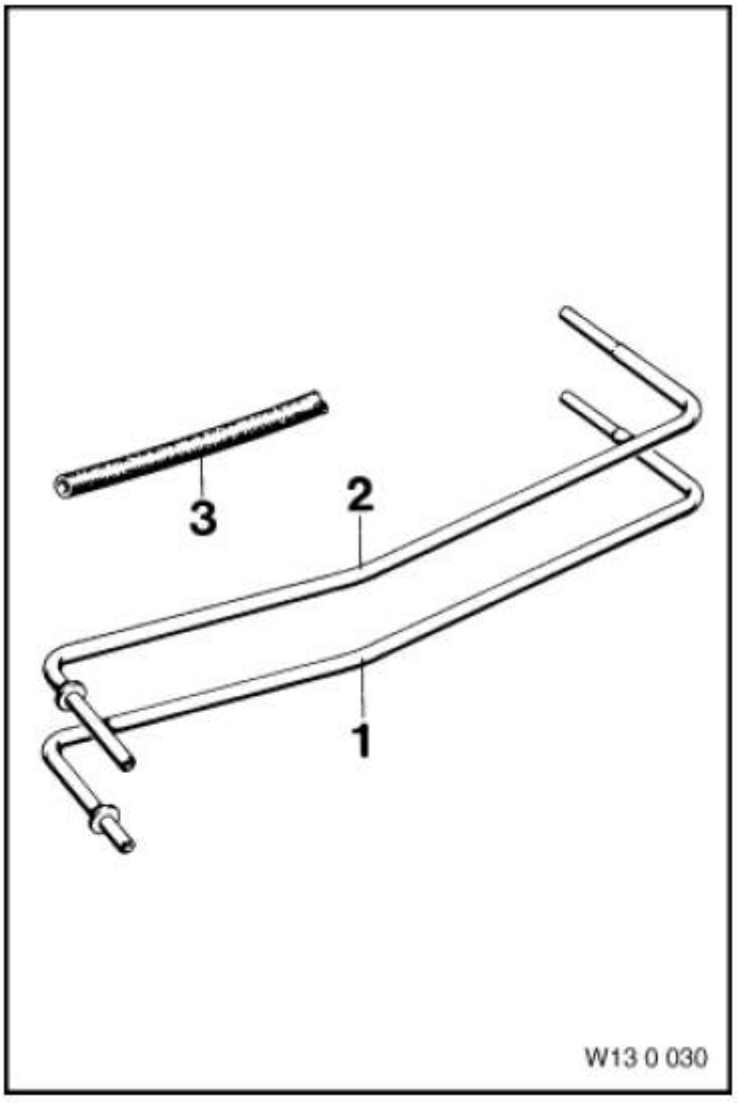


Fig. 145: Identifying Sensor (0491208)
Courtesy of BMW OF NORTH AMERICA, INC.

0491205 SENSOR

0491205 130020 Sensor AM

NOTE: **(exhaust sensor and connecting hose) for checking the CO value - without catalytic converter**

Storage Location

A1

cardiagn.com

B1

Consisting of:

1. 0491206 Sensor

   NOTE: (exhaust sensor (2 x))

2. 0491207 Hose

   NOTE: (Connecting hose) Replaced by 13 5 130 (0 941 297)

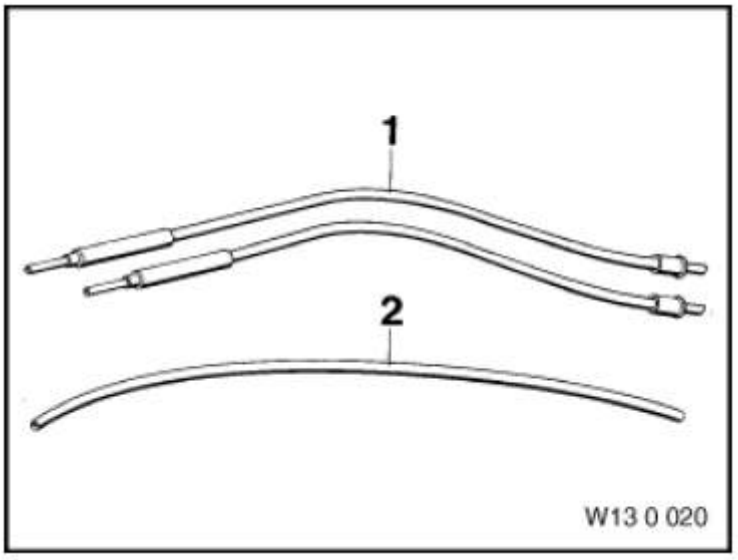


Fig. 146: Identifying Sensor (0491205)
Courtesy of BMW OF NORTH AMERICA, INC.

0491217 SENSOR

0491217 130090 Sensor AM

NOTE: (Exhaust sensors with connecting hose) For raw gas removal at the exhaust manifold for checking the engine idle and exhaust content

Consisting of:

1. 0491218 Sensor

   NOTE: (Exhaust probe, straight) Can be ordered as part of complete special tool 13 0 090 = 0491217.

2. 0491219 Sensor

   NOTE: (Exhaust probe, offset) Can be ordered as part of complete special tool 13 0 090 = 0491217.

3. 0491220 Hose

   NOTE: (Connecting hose with T-piece) Can be ordered as part of complete special tool 13 0 090 = 0491217.

cardiagn.com

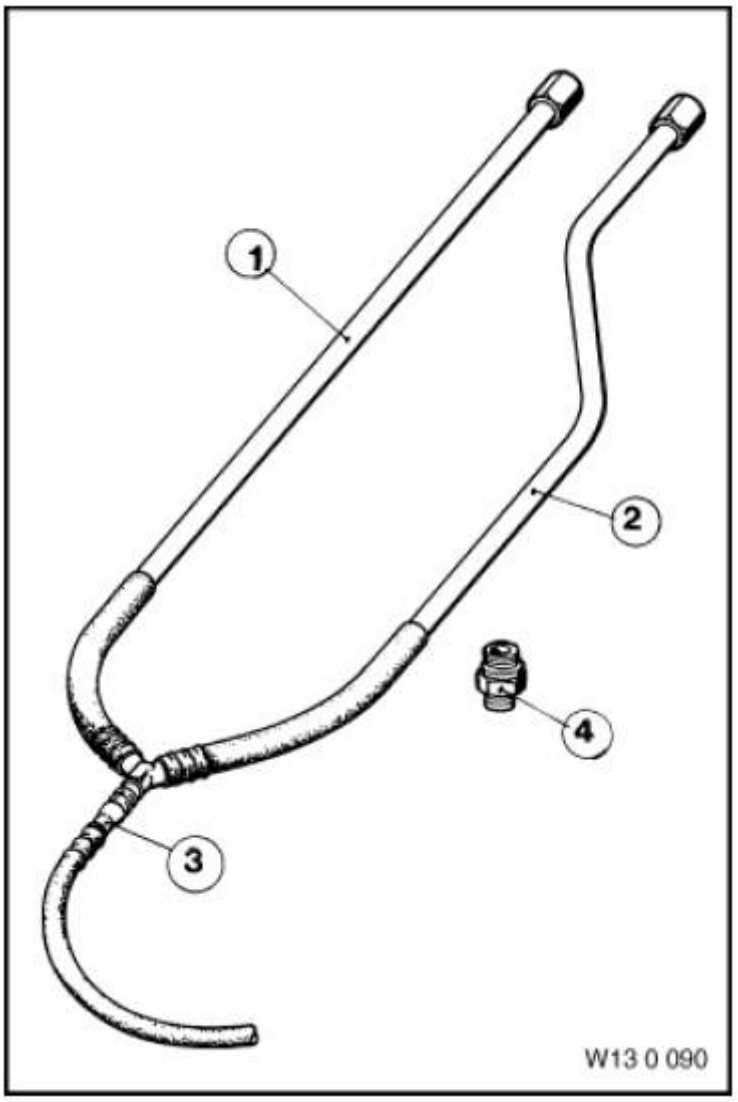


Fig. 147: Identifying Sensor (0491217)
Courtesy of BMW OF NORTH AMERICA, INC.

4. 0491221 Adapter

NOTE: **Between exhaust probe and exhaust manifold Can be ordered as part of complete special tool 13 0 090 = 0491217.**

0491210 SENSOR

0491210 130032 Sensor AM

NOTE: **(Exhaust gas probe) With long insertion pipe for front exhaust manifold - RHD**

cardiagn.com

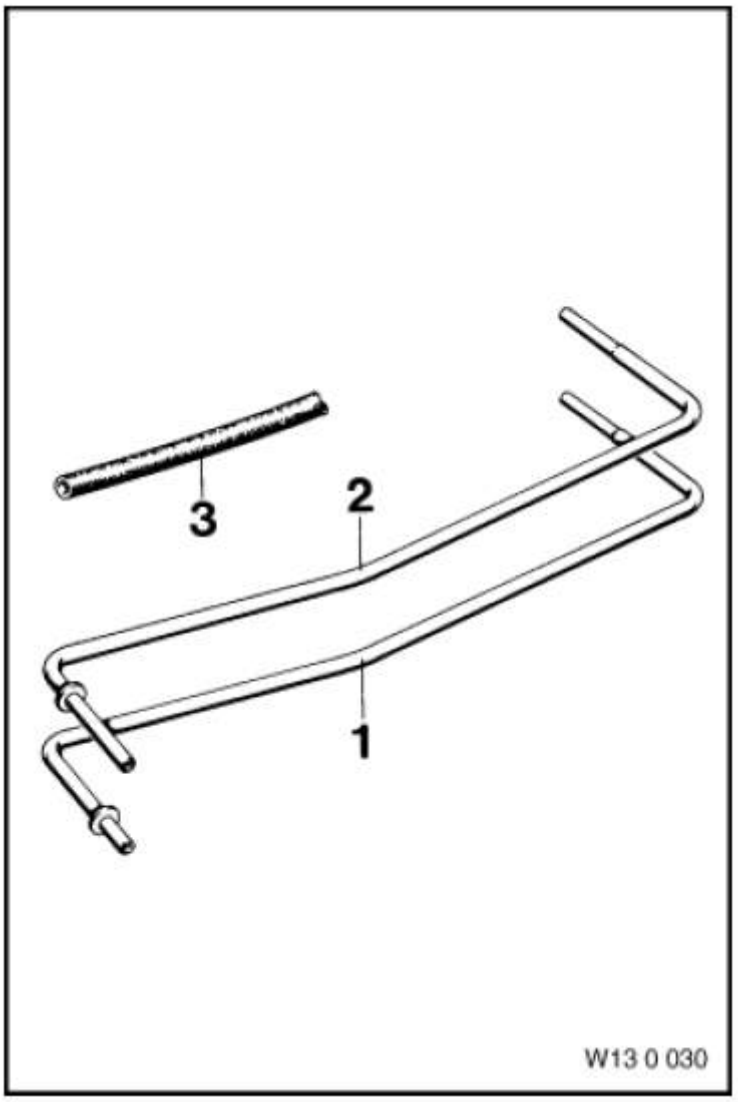


Fig. 148: Identifying Sensor (0491210)
Courtesy of BMW OF NORTH AMERICA, INC.

0491219 SENSOR

0491219 130092 Sensor AM

NOTE: **(Exhaust probe, offset) Can be ordered as part of complete special tool 13 0 090 = 0491217.**

cardiagn.com

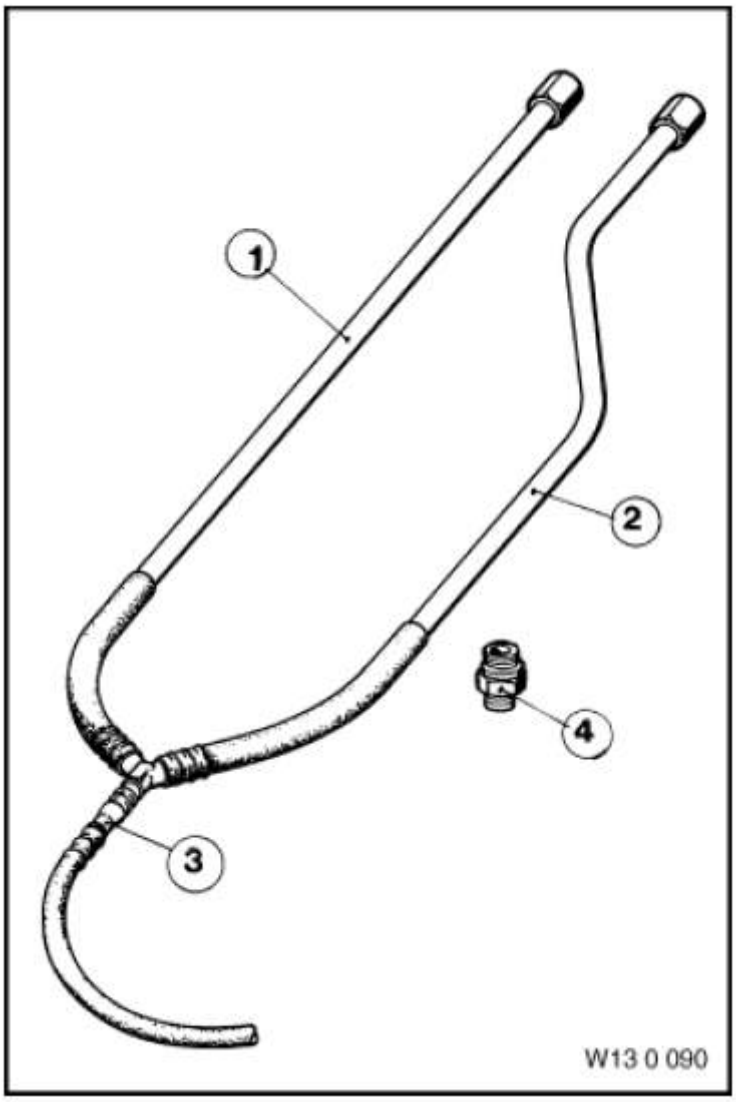
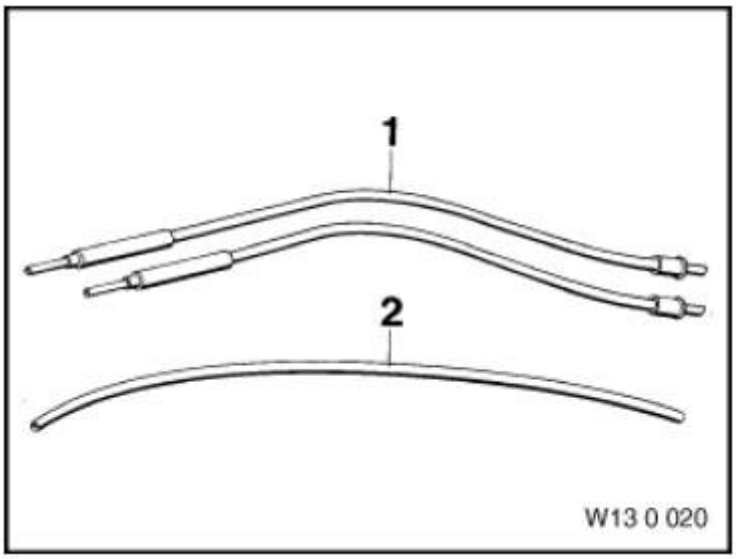


Fig. 149: Identifying Sensor (0491219)
Courtesy of BMW OF NORTH AMERICA, INC.

0491206 SENSOR

0491206 130021 Sensor AM

NOTE: (exhaust sensor (2 x))



cardiagn.com

Fig. 150: Identifying Sensor (0491206)
Courtesy of BMW OF NORTH AMERICA, INC.

0491215 SENSOR

0491215 130070 Sensor Mechanical tool

Replaced by: 83300491217

NOTE: **(Exhaust gas probe) For vehicles with catalytic converter - Other: only Japan and USA Replaced by 13 0 090 (0 491 217)**

0491209 SENSOR

0491209 130031 Sensor AM

NOTE: **(Exhaust gas probe) With short insertion pipe for rear exhaust manifold - RHD**

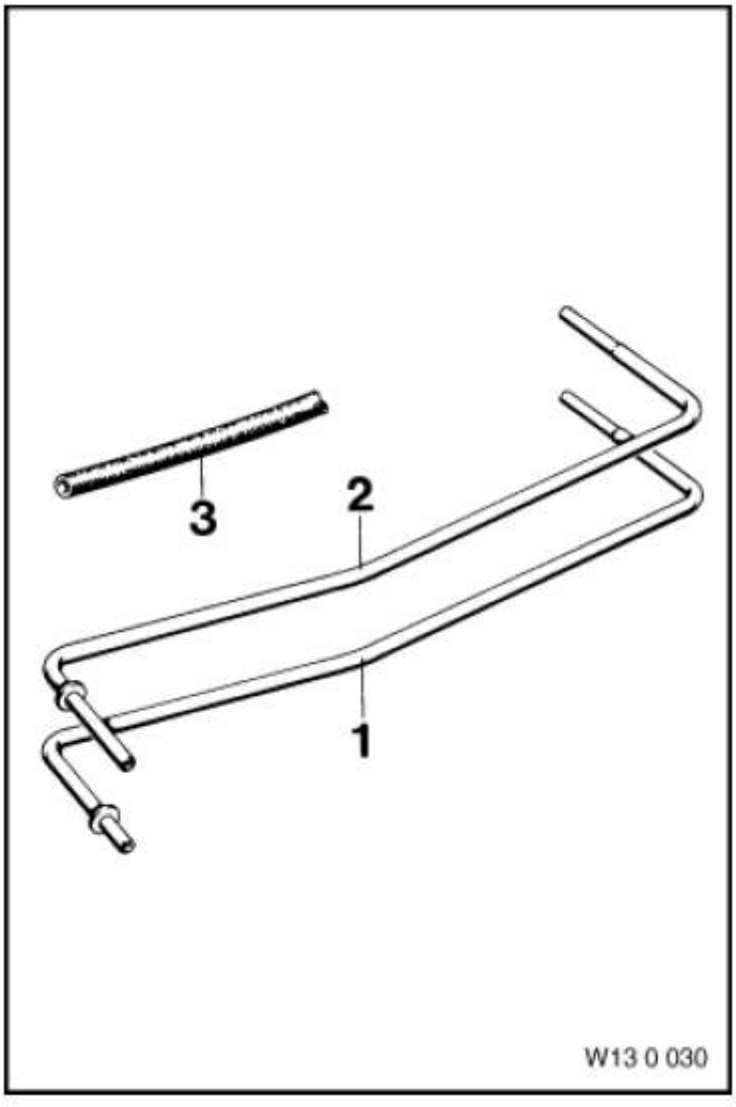


Fig. 151: Identifying Sensor (0491209)
Courtesy of BMW OF NORTH AMERICA, INC.

0491331 SIGHT GLASS

0491331 136001 Sight glass AM

cardiagn.com



Fig. 152: Identifying Sight Glass (0491331)
Courtesy of BMW OF NORTH AMERICA, INC.

0491237 SIMULATOR

0491237 131040 Simulator AM

NOTE: (Simulator) For 4A1 carburetor - model year: from 80

Consisting of:

1. **0491238** Simulator
2. **0491239** Hose

NOTE: (Connecting hose with air vent)

cardiagn.com

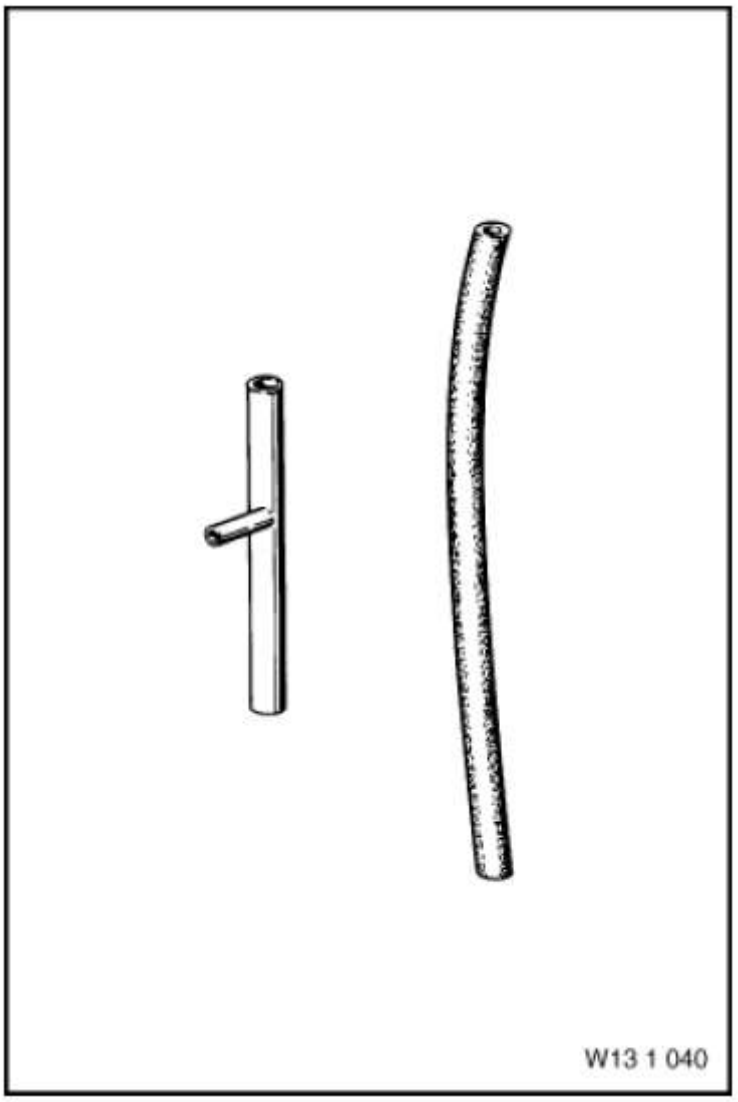


Fig. 153: Identifying Simulator (0491237)
Courtesy of BMW OF NORTH AMERICA, INC.

0491203 SIMULATOR

0491203 130000 Simulator Mechanical tool

Replaced by: 83300491237

NOTE: **(simulator) For synchronizing the carburetor - This eliminates the need to perform a correction of the idle speed after the intake silencer housing is installed Model year: until 80/from 80 Replaced by 13 1 040 (0 491 237)**

cardiagn.com

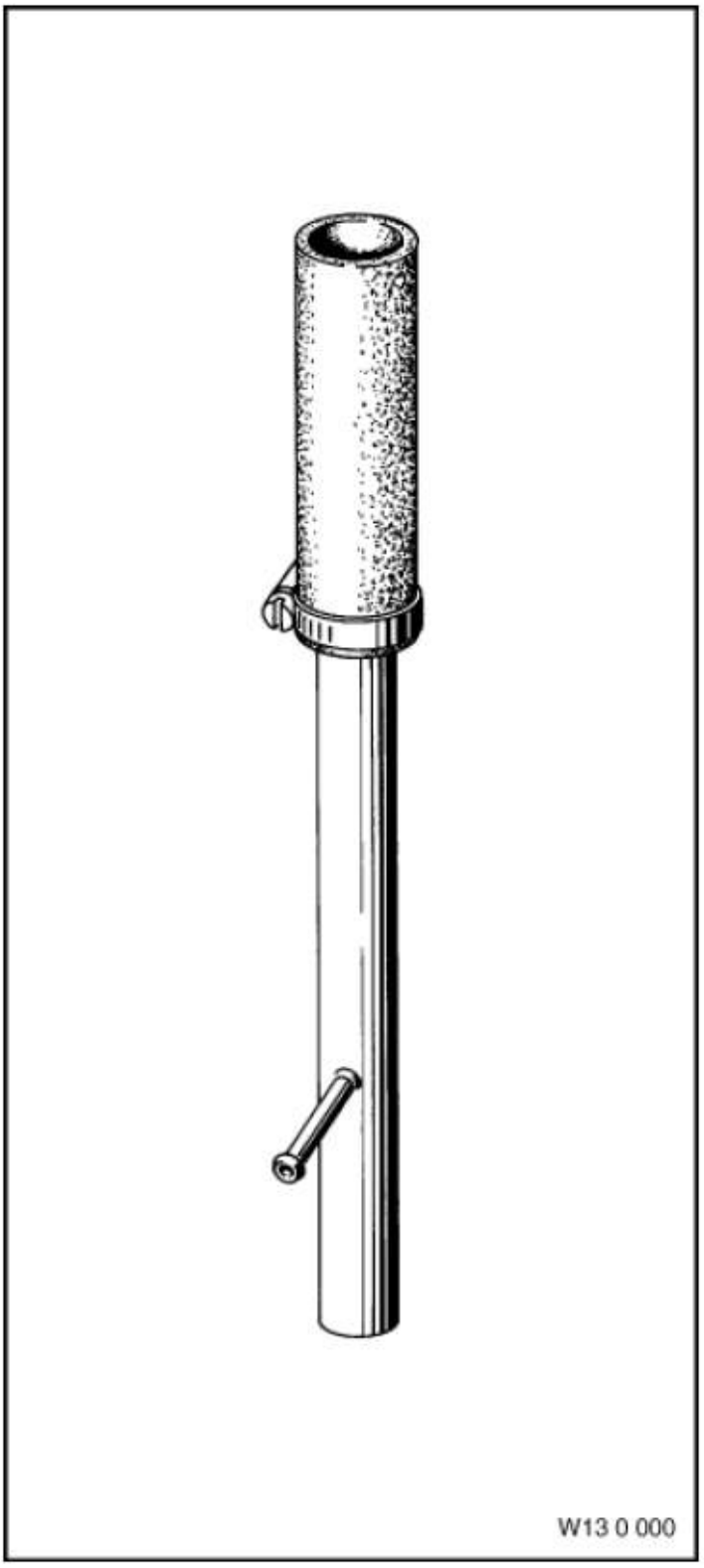


Fig. 154: Identifying Simulator (0491203)
Courtesy of BMW OF NORTH AMERICA, INC.

0491243 SIMULATOR

0491243 131080 Simulator Mechanical tool

NOTE: (Simulator) For 2B4 carburetor

cardiagn.com

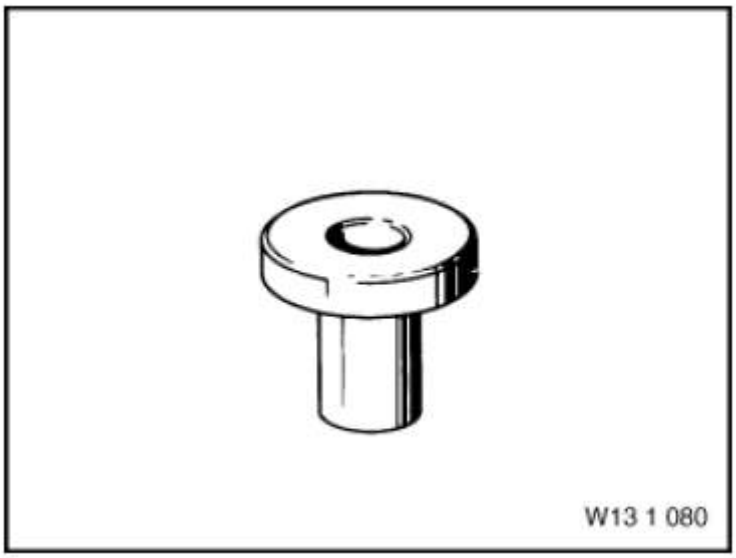


Fig. 155: Identifying Simulator (0491243)
Courtesy of BMW OF NORTH AMERICA, INC.

0491238 SIMULATOR

0491238 131041 Simulator AM

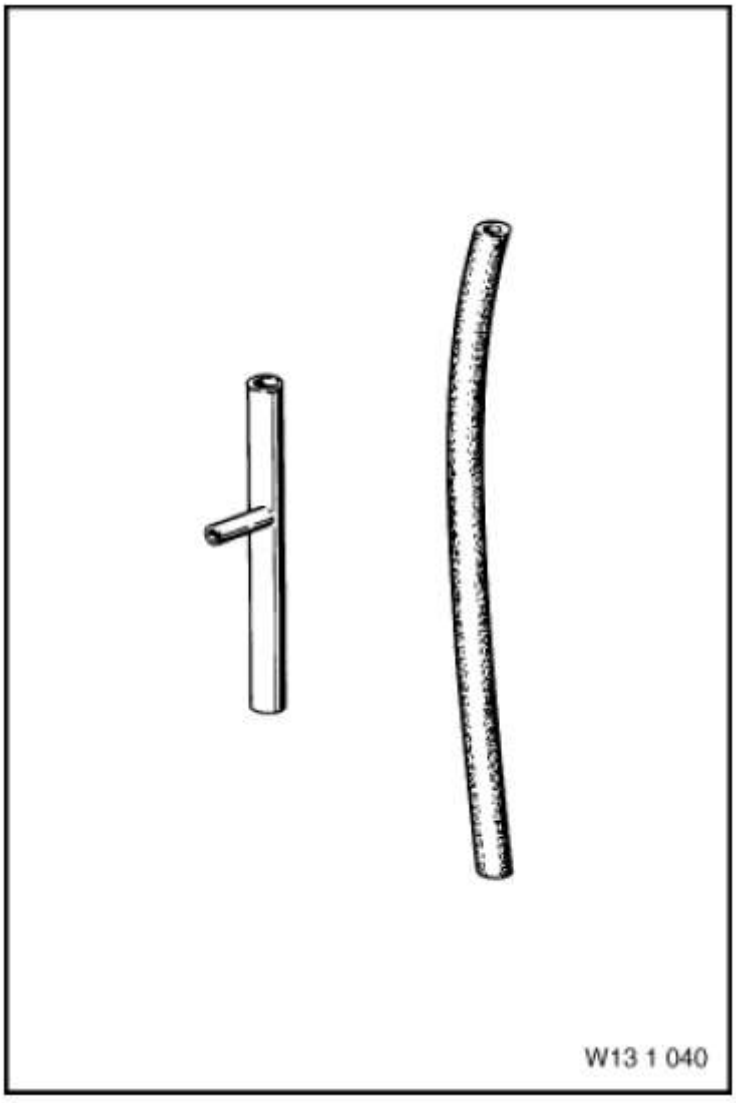


Fig. 156: Identifying Simulator (0491238)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0496479 SOCKET WRENCH

0496479 130161 Socket wrench Minimum set: Mechanical tools AM

NOTE: **(Socket wrench SW14 open) --> only available in set under 13 0 160 (0496371).**

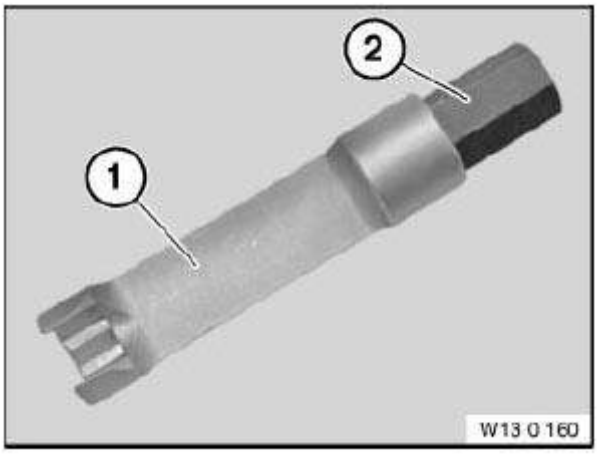


Fig. 157: Identifying Socket Wrench (0496479)
Courtesy of BMW OF NORTH AMERICA, INC.

0491318 SOCKET WRENCH INSERT

0491318 135320 Socket wrench insert Mechanical tool

NOTE: **For releasing and fixing the injector nozzles**

Storage Location

A9

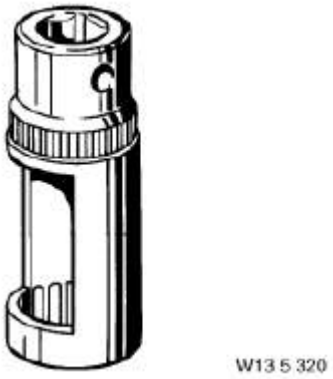


Fig. 158: Identifying Socket Wrench Insert (0491318)
Courtesy of BMW OF NORTH AMERICA, INC.

0496371 SOCKET WRENCH WITH ADAPTER

0496371 130160 Socket wrench with adapter Minimum set: Mechanical tools AM

NOTE: **For releasing and tightening down fuel line screw connection on injector.**

Storage Location

A25

SI number

cardiagn.com

01 20 08 (490)

Consisting of:

1. 0496479 Socket wrench

NOTE: **(Socket wrench SW14 open) --> only available in set under 13 0 160 (0496371).**

2. 0496480 Adapter

NOTE: **(Adapter SW15) --> only available in set under 13 0 160 (0496371).**

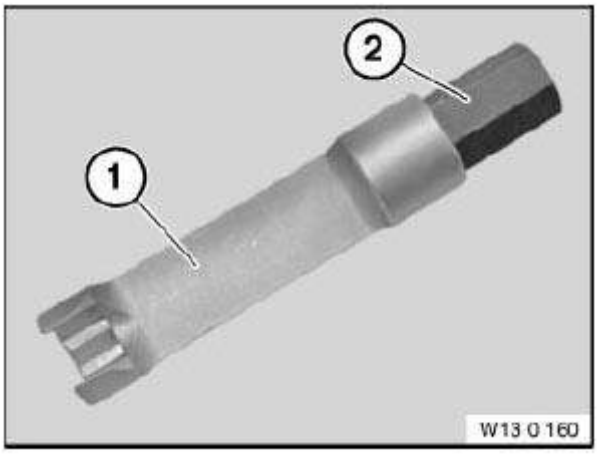


Fig. 159: Identifying Socket Wrench With Adapter (0496371)
Courtesy of BMW OF NORTH AMERICA, INC.

0494455 SOFTWARE

0494455 138200 Software Mechanical tool

NOTE: **For exhaust-gas test quality assurance system (fault statistics), responsible: Sales D, V1-A-S (Mr Stolze)**

0494582 STRIP

0494582 131141 Strip AM

NOTE: **(Disconnection strip) Only available as part of complete tool set 13 1 140 (83 30 0 494 529).**

0495432 SYNCHROMETER

0495432 130400 Synchrometer AM

NOTE: **(Synchrometer)**

Consisting of:

1. 0495433 Synchrometer
2. 0495434 Adapter

NOTE: **(Adapter 01 (2 units))**

3. 0495435 Adapter

cardiagn.com

NOTE: **(Adapter 02 (2 units))**

4. 0495436 Adapter

NOTE: **(Adapter 04 (2 units))**

5. 0495437 Adapter

NOTE: **(Adapter 26 (2 units))**

0495433 SYNCHROMETER

0495433 130401 Synchrometer AM

0495067 T-PIECE

0495067 136058 T-piece Minimum set: Mechanical tools AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

Storage Location

A3

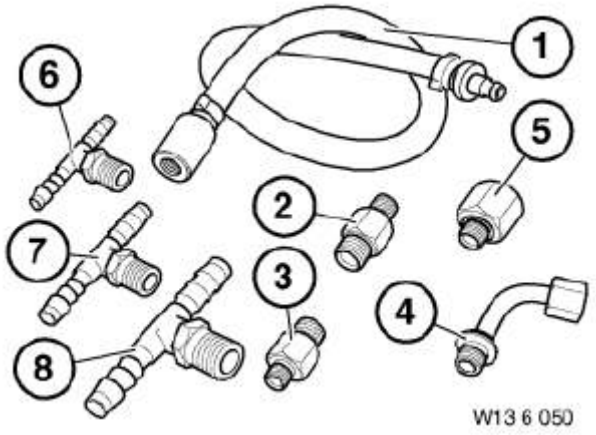


Fig. 160: Identifying T-Piece (0495067)
Courtesy of BMW OF NORTH AMERICA, INC.

0491347 T-PIECE

0491347 136057 T-piece Minimum set: Mechanical tools AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

Storage Location

A3

0491345 T-PIECE

0491345 136055 T-piece Minimum set: Mechanical tools AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

cardiagn.com

Storage Location

A3

0491346 T-PIECE

0491346 136056 T-piece Minimum set: Mechanical tools AM

NOTE: **Liquidation of existing inventory and then available only as a complete tool set 13 6 050 (83 30 0 491 340) - as of 19.01.12**

Storage Location

A3

0491269 TEMPLATE

0491269 134000 Template Mechanical tool

NOTE: **(Drilling template) For auxiliary air slide - catalytic converter**

0491256 TERMINAL

0491256 133010 Terminal Minimum set: Mechanical tools Mechanical tool

NOTE: **(Hose clip) For removing a hose during repair work**

Storage Location

C4



Fig. 161: Identifying Terminal (0491256)
Courtesy of BMW OF NORTH AMERICA, INC.

0491330 TESTER

0491330 136000 Tester AM

NOTE: **(Tester for fuel injectors) for functional check of injection jet and fuel injection rate as well as leakage test, discontinued since 15.05.97**

Consisting of:

1 = **0491331** Sight glass
2 = **0491332** Electronics box

NOTE: **(Control module)**

cardiagn.com

3 = 0491333 Wiring harness

4 = 0491334 Cable

NOTE: **(Cable) Power supply cable**

9 = 0491335 Container

NOTE: **(Canister) With lid.**



Fig. 162: Identifying Tester (0491330)
Courtesy of BMW OF NORTH AMERICA, INC.

0491278 TESTER

0491278 135030 Tester AM

NOTE: **For checking the fuel injection rate at the K-Jetronic**

Consisting of:

1. 0491279 Holder

NOTE: **(Holder) Discontinuation and replaced by 36 1 030. (0 493 829)**

2. 0491280 Measuring glass

cardiagn.com

NOTE: **(Measuring jug) 6 units**

3. 0491281 Line

NOTE: **(Connecting lines (6 pieces))**

4. 0491282 Adapter

NOTE: **(Adapter) 6 pieces For connecting the fuel injection lines**

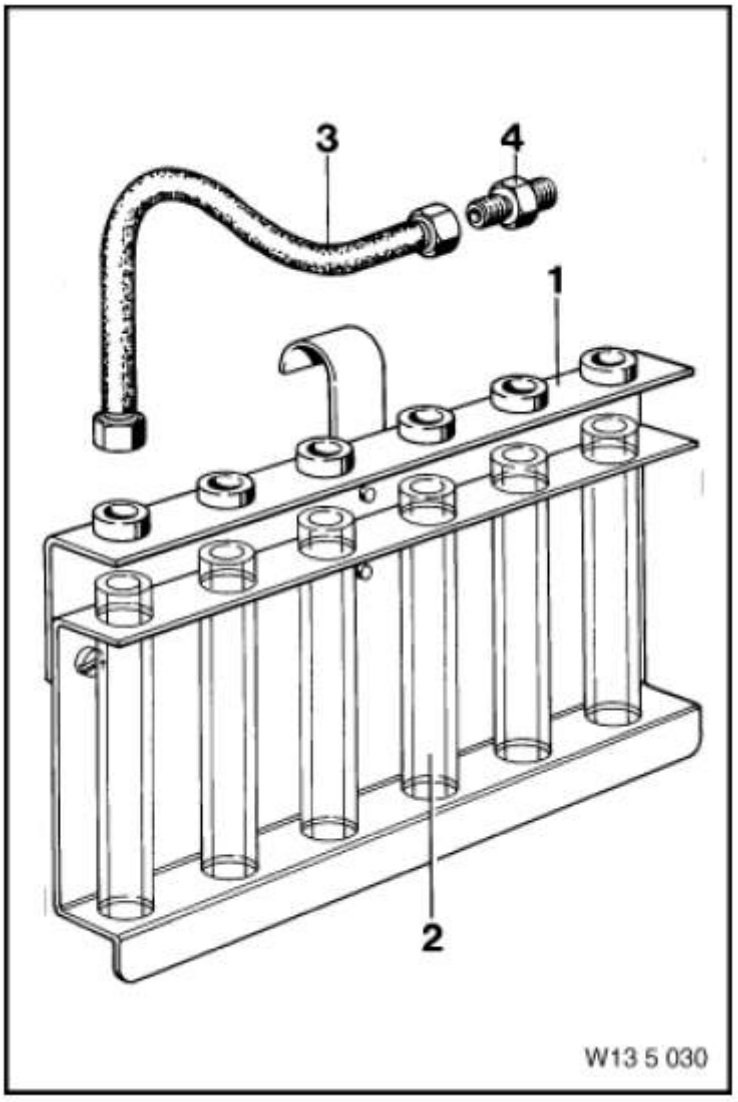


Fig. 163: Identifying Tester (0491278)
Courtesy of BMW OF NORTH AMERICA, INC.

0491244 TOOL

0491244 131090 Tool AM

NOTE: **(tool set) For fitting tamper protection, Miscellaneous: Japan and USA only**

Consisting of:

1. 0491245 Drill bit

NOTE: **(drill) drill, small (K-Jetronic)**

cardiagn.com

2. 0491246 Drill bit

NOTE: **(drill) drill, large (L-Jetronic)**

3. 0491247 Puller

NOTE: **(puller, small (K-Jetronic))**

4. 0491248 Puller

NOTE: **(puller, large (L-Jetronic))**

5. 0491249 Device

NOTE: **(mounting device (K-Jetronic))**

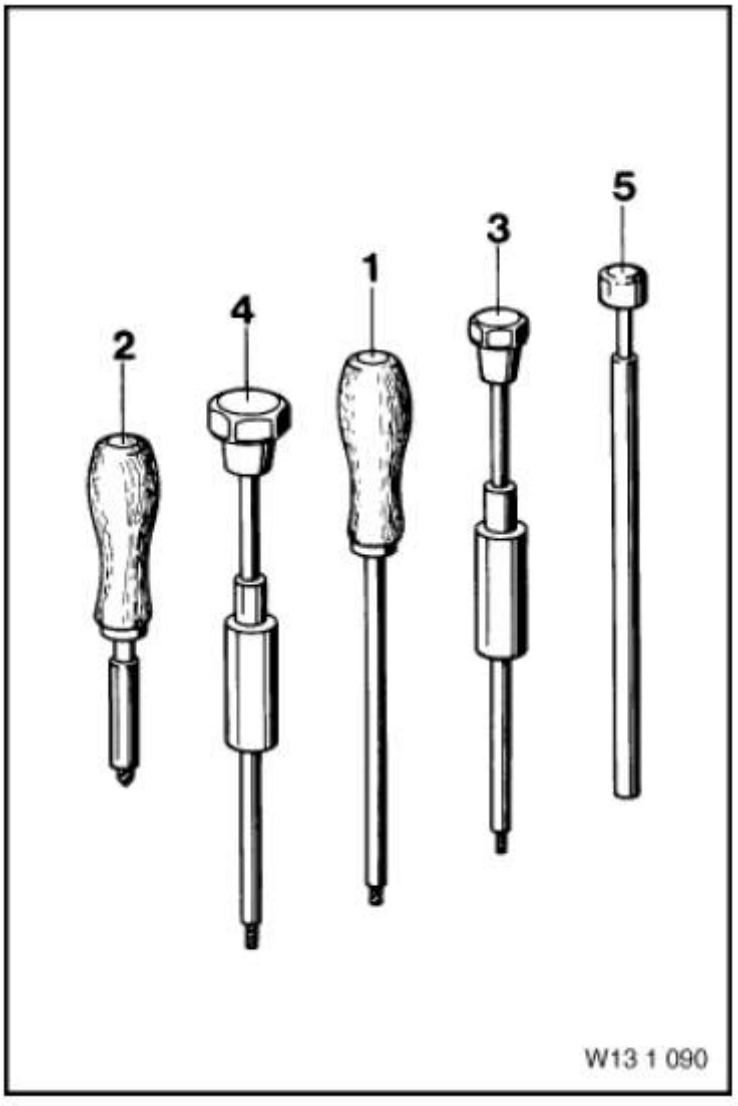


Fig. 164: Identifying Tool (0491244)
Courtesy of BMW OF NORTH AMERICA, INC.

0491290 TOOL

0491290 135090 Tool AM

NOTE: **(Cleaning tool) For injector nozzle**

cardiagn.com

Consisting of:

1. **0491291** Milling cutter
2. **0491292** Drill bit
3. **0491293** Tool

NOTE: **(Brass brush)**

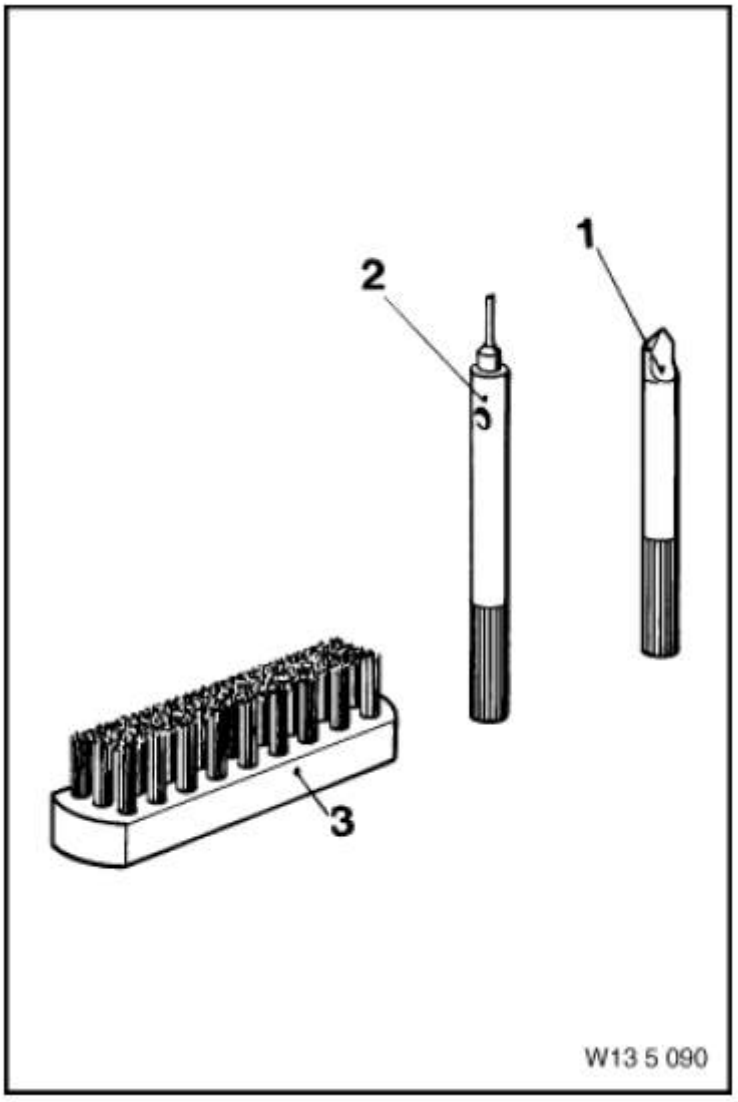


Fig. 165: Identifying Tool (0491290)
Courtesy of BMW OF NORTH AMERICA, INC.

0491302 TOOL

0491302 135150 Tool Mechanical tool

NOTE: **(Tool) For intake valves on the injection pump - up to January 84**

0493758 TOOL

0493758 135210 Tool Minimum set: Mechanical tools AM

NOTE: **(Cleaning set) For injector channels**

Storage Location

C4

cardiagn.com

SI number

01 05 00 (574)

Consisting of:

1. **0493759** Holding sleeve

   NOTE: **(Guide sleeve)**

2. **0493760** Holder

   NOTE: **(Brush holder)**

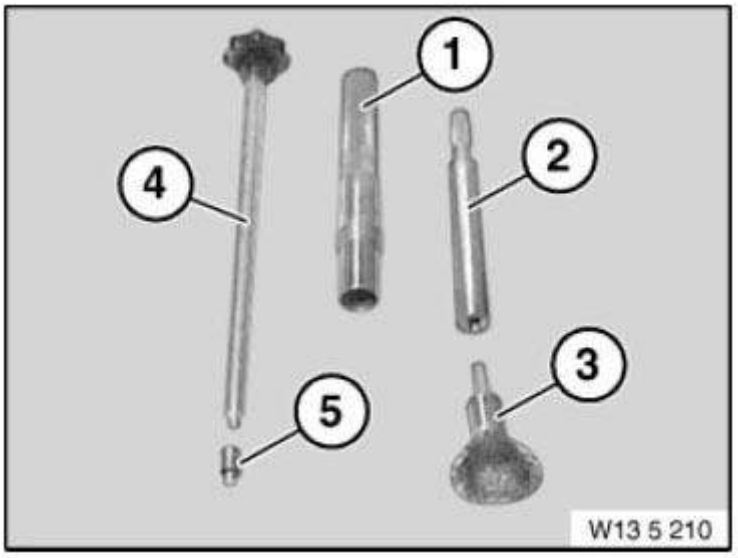


Fig. 166: Identifying Tool (0493758)
Courtesy of BMW OF NORTH AMERICA, INC.

3. **0493761** Brush head
4. **0493762** Rod

   NOTE: **(Mounting rod) For the seal plug**

5. **0493763** Plug

   NOTE: **(Seal plug)**

0491227 TOOL

0491227 131010 Tool AM

NOTE: **(Carburetor tool) For removing and installing the CO tamper protections - model series: all, except US and Japan**

Consisting of:

1 = **0491228** Puller

NOTE: **(Puller, short)**

2 = **0491229** Puller

cardiagn.com

NOTE: **(Puller, long)**

3 = **0491230** Handle

NOTE: **(Pressing-on tool handle) For CO tamper telltales**

4 = **0491231** Pressing-on tool

NOTE: **For CO tamper protections**

6 = **0491232** Screw

NOTE: **(Screwdriver)**

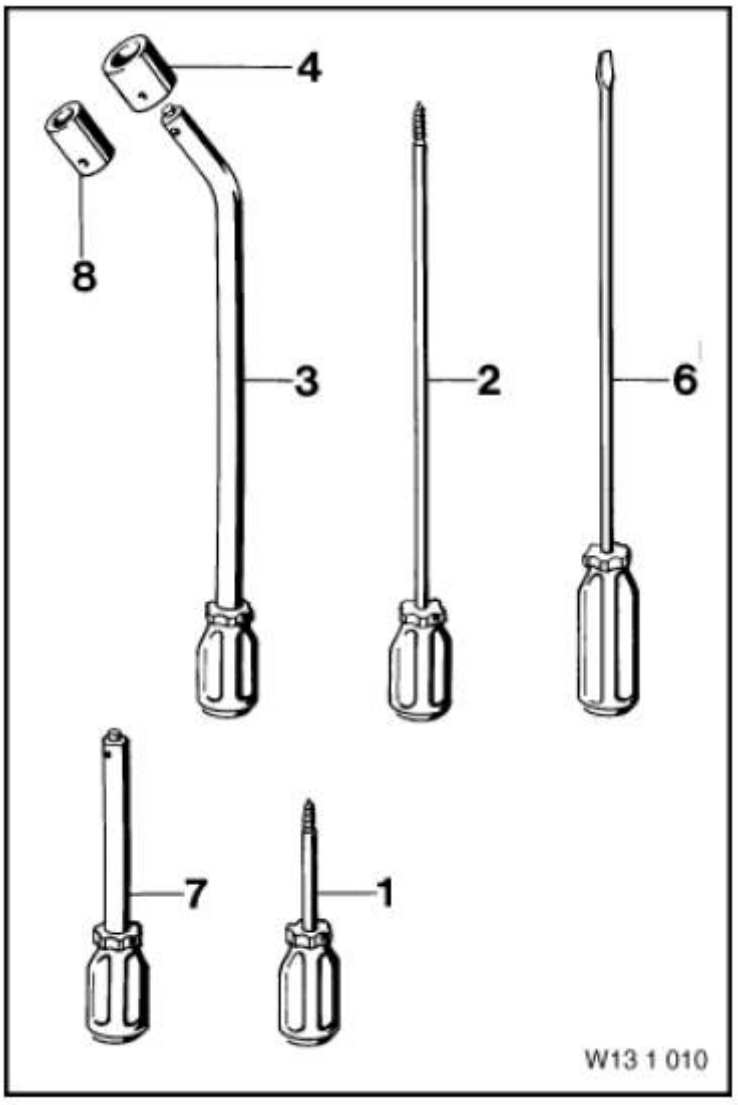


Fig. 167: Identifying Tool (0491227)
Courtesy of BMW OF NORTH AMERICA, INC.

7 = **0491233** Handle

NOTE: **(Pressing-on tool handle) For CO tamper telltales - engine: M20**

8 = **0491234** Pressing-on tool

NOTE: **For CO tamper protections - engine: M20**

cardiagn.com

0491287 TOOL

0491287 135062 Tool AM

NOTE: **(wrench) Engine: M41, M51 sale of existing inventories and then available as part of set of special tools 13 5 060 = 83 30 0 491 285 only-as of 29.11.2011**

0491293 TOOL

0491293 135093 Tool AM

NOTE: **(Brass brush)**

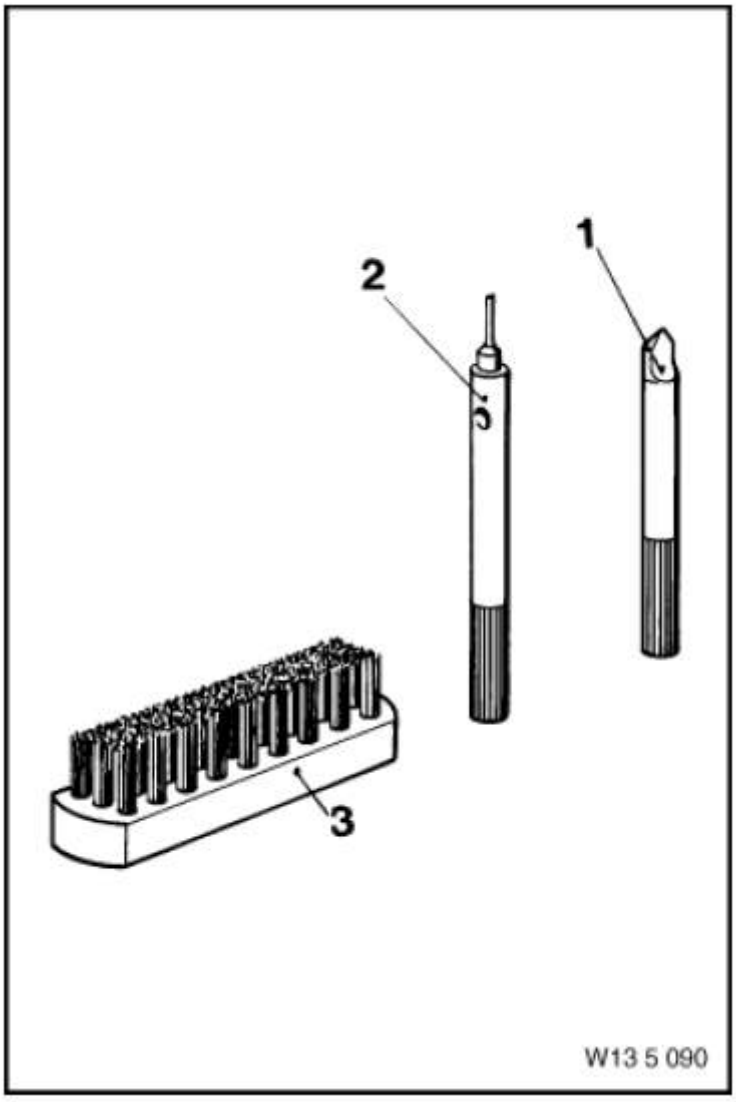


Fig. 168: Identifying Tool (0491293)
Courtesy of BMW OF NORTH AMERICA, INC.

2184117 TOOL SET

2184117 Tool set Mechanical tool

NOTE: **For disconnecting the coolant or fuel hoses.**

SI number

08 03 10 (651)

cardiagn.com

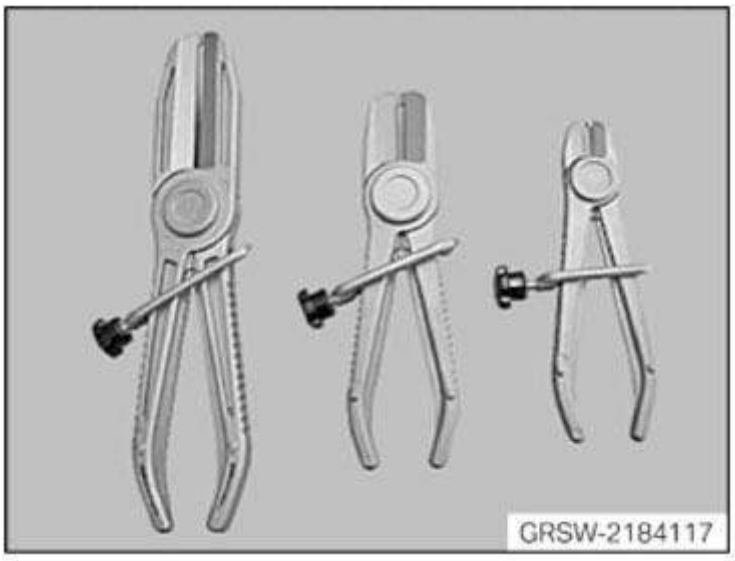


Fig. 169: Identifying Tool Set (2184117)
Courtesy of BMW OF NORTH AMERICA, INC.

0491261 VALVE

0491261 133062 Valve AM

NOTE: (Valve) 2-way valve, engine: all except S50, S54, N73

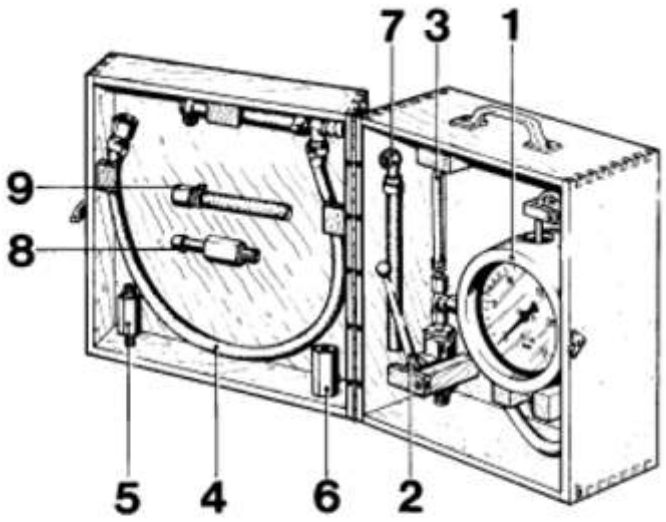


Fig. 170: Identifying Valve (0491261)
Courtesy of BMW OF NORTH AMERICA, INC.

0494459 VALVE

0494459 135453 Valve AM

NOTE: (pressure control valve) Pressure control valve contained in 13 5 451.

cardiagn.com

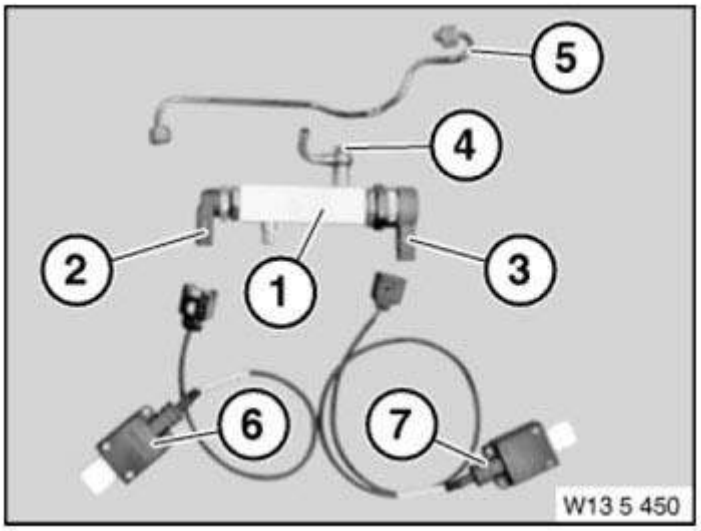


Fig. 171: Identifying Valve (0494459)
Courtesy of BMW OF NORTH AMERICA, INC.

0493461 WASHER

0493461 130154 Washer AM

NOTE: **(Shims (2 pieces)) With nylon string Only available as part of complete tool set 13 0 150 (83 30 0 493 453).**

0493340 WEIGHT

0493340 135253 Weight Minimum set: Mechanical tools AM

NOTE: **(Weight)**



Fig. 172: Identifying Weight (0493340)
Courtesy of BMW OF NORTH AMERICA, INC.

0491333 WIRING HARNESS

0491333 136003 Wiring harness AM

cardiagn.com



Fig. 173: Identifying Wiring Harness (0491333)
Courtesy of BMW OF NORTH AMERICA, INC.

0491317 WRENCH

0491317 135310 Wrench Mechanical tool

NOTE: For adjusting the fuel injection rate at full load

0491277 WRENCH

0491277 135020 Wrench Minimum set: Mechanical tools Mechanical tool

NOTE: (Ignition key) SW17 For releasing and tightening the fuel injection lines

Storage Location

A9

cardiagn.com



Fig. 174: Identifying Wrench (0491277)
Courtesy of BMW OF NORTH AMERICA, INC.

0491254 WRENCH

0491254 132010 Wrench Mechanical tool

NOTE: For tightening down the nut on the fuel filter heating element

Storage Location

X3

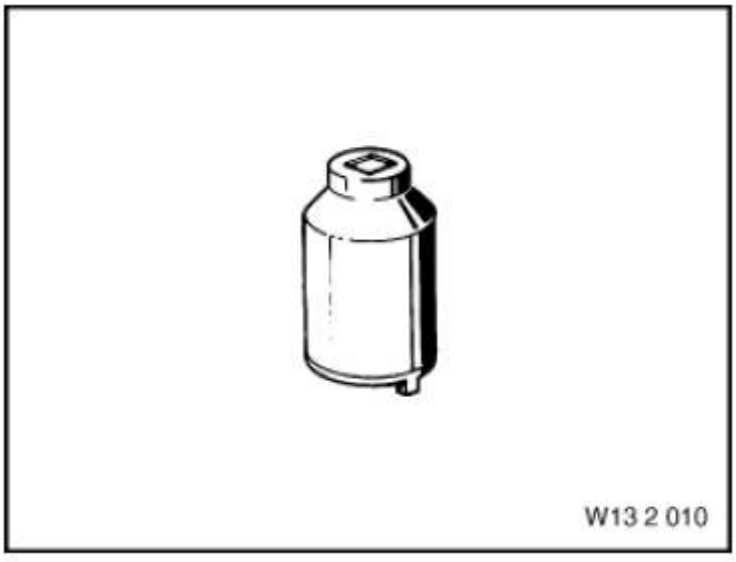


Fig. 175: Identifying Wrench (0491254)
Courtesy of BMW OF NORTH AMERICA, INC.

cardiagn.com

0491270 CONNECTOR

0491270 134010 connector Mechanical tool

NOTE: **(Connector) For adjusting the idle control system**

Storage Location

W 2..

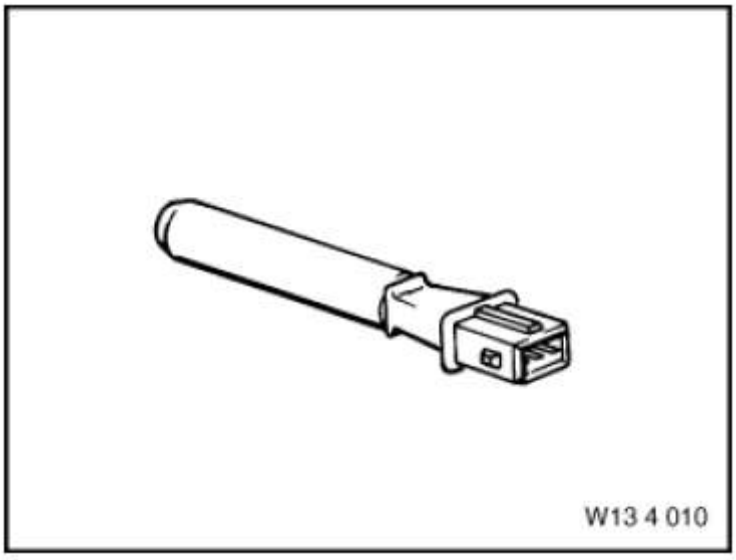


Fig. 176: Identifying Connector (0491270)
Courtesy of BMW OF NORTH AMERICA, INC.

0491304 CONNECTOR

0491304 135180 connector Mechanical tool

NOTE: **(Connector) For actuator sensor Digital Diesel Electronics 2.1 for troubleshooting on injection system**

Storage Location

I 103

SI number

02 02 95 (934)

cardiagn.com

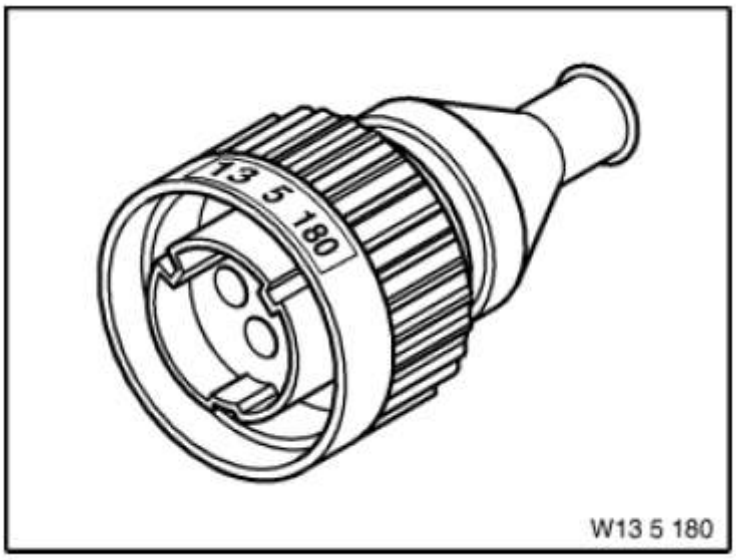


Fig. 177: Identifying Connector (0491304)
Courtesy of BMW OF NORTH AMERICA, INC.

0491303 CONNECTOR

0491303 135170 connector Mechanical tool

NOTE: **(Connector) For actuator sensor Digital Diesel Electronics 2.1 for troubleshooting on injection system**

Storage Location

I 103

SI number

02 08 93 (750)

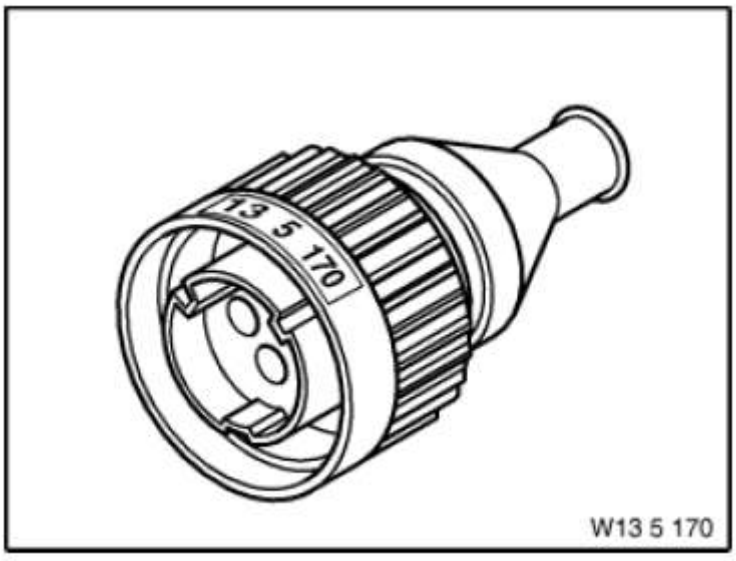


Fig. 178: Identifying Connector (0491303)
Courtesy of BMW OF NORTH AMERICA, INC.

0491271 CONNECTOR

0491271 134020 connector Mechanical tool

cardiagn.com

NOTE: **(connector) For adjusting the idle speed control system - From 1986**

Storage Location

W 2..

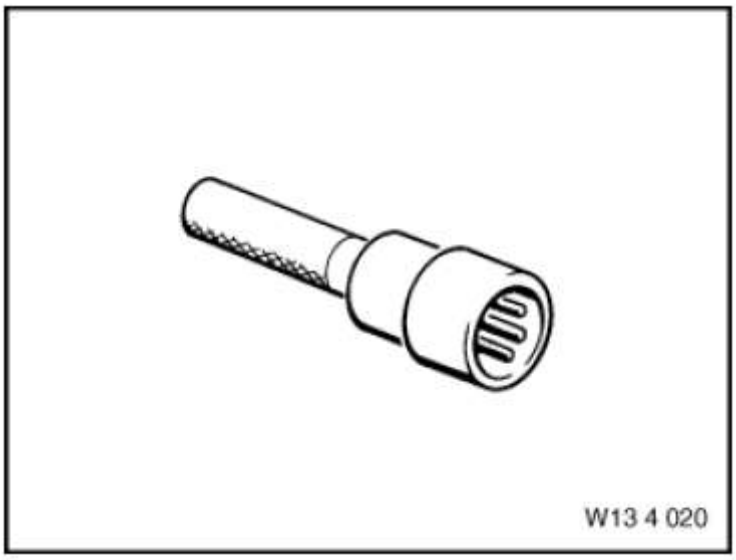


Fig. 179: Identifying Connector (0491271)
Courtesy of BMW OF NORTH AMERICA, INC.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702112

cardiagn.com

ENGINE PERFORMANCE

Fuel System - Tightening Torques - X3 Utility

FUEL INJECTION NOZZLES AND PIPES (N52T)

13 53 FUEL INJECTION NOZZLES AND PIPES

TIGHTENING TORQUE SPECIFICATION - FUEL INJECTION NOZZLES AND PIPES

Â	Type	Thread	Tightening specification	Measure
1AZ Fuel rail	N52T	M6	Â	9 Nm
2AZ Holder, fuel filter, to body	N52T	M6	Â	8 Nm

FUEL INJECTOR NOZZLES AND LINES (N55)

13 53 FUEL INJECTOR NOZZLES AND LINES

TIGHTENING TORQUE SPECIFICATION - FUEL INJECTOR NOZZLES AND LINES

Â	Type	Thread	Tightening specifications	Dimension
1AZ High pressure pump to vacuum pump	N55/N55 Hybrid	M6 x 25	Continental high pressure pump	9Â±1 Nm
		M6 x 25	Bosch high pressure pump	12Â±1 Nm
2AZ Rail to cylinder head	N55/N55 Hybrid	M7	Â	13Â±1 Nm
3AZ High-pressure line to cylinder head	N55/N55 Hybrid	M7	Â	13Â±2 Nm
4AZ Fuel high-pressure sensor	N55/N55 Hybrid	M10	Â	30-5 Nm
5AZ Fuel low-pressure sensor	N55/N55 Hybrid	M10	Sensata fuel low-pressure sensor	20-3 Nm
		M10	Bosch fuel low-pressure sensor	30-5 Nm
6AZ Hold-down device to cylinder head	N55/N55 Hybrid	M7	Â	13Â±1 Nm
7AZ Feed line to high pressure pump	N55/N55 Hybrid	M14	Coat screw connection with transmission oil.	30Â±3 Nm
8AZ High pressure line to rail and high pressure pump	N55/N55 Hybrid	M14	Coat screw connection with transmission oil.	30Â±3 Nm
9AZ High pressure lines to rail and injection system	N55/N55 Hybrid	M12	Coat screw connection with transmission oil.	23Â±3 Nm
10AZ Fuel delivery line	N55/N55 Hybrid	M8	Replace screw. 1. Jointing torque 2. Torsion angle adjustment	Â 5 Nm 90Â°Â ±15Â°
11AZ EMC plate to ignition coils and injector well	N55/N55 Hybrid	M6	Â	8, 5 Nm
12AZ Screw plug in the EMC plate	N55/N55 Hybrid	Â	Â	25 Nm
13AZ Special tool 13 0 270 or 0 496 885 on injector shaft	N55/N55 Hybrid	M6	Â	8, 5 Nm

FUEL INJECTOR NOZZLES AND LINES (N20)

cardiagn.com

13 53 FUEL INJECTOR NOZZLES AND LINES

TIGHTENING TORQUE SPECIFICATION - FUEL INJECTOR NOZZLES AND LINES

Â	Type	Thread	Tightening specifications	Dimension
1AZ Fuel high-pressure sensor	N20/N26	Â	Oil threads and pins	30-5 Nm
2AZ Feed line to high pressure pump	N20/N26	M14	Lubricate outer threads.	30Â±3 Nm
3AZ Feed line to cylinder head	N20/N26	M7 x 18	Â	13Â±3 Nm
4AZ Rail to cylinder head	N20/N26	K7 x 30	Â	7Â±1 Nm
5AZ Hold-down device to cylinder head	N20/N26	M7 x 90	Hexagon screw	13Â±2 Nm
		M7 x 90	Hexagon screw with ground connection	13Â±2 Nm
6AZ High pressure lines to injectors	N20/N26	M12	Lubricate outer threads.	23Â±3 Nm
7AZ High pressure line to rail and high pressure pump	N20/N26	M14	Lubricate outer threads.	30Â±3 Nm
8AZ Special tool 13 0 320 on injector shaft	N20/N26	M6	Â	8 Nm

FUEL INJECTOR NOZZLES AND LINES (N47T)

13 53 FUEL INJECTOR NOZZLES AND LINES

TIGHTENING TORQUE SPECIFICATION - FUEL INJECTOR NOZZLES AND LINES

Â	Type	Thread	Tightening specifications	Dimension
1AZ Injector to cylinder head	N47D20O1	M8x95	Joining Final torque	8 Nm 26 Nm
2AZ Fuel injection lines to injector, rail and high pressure pump	N47D20O1	Union nut	Â	24 Nm
3AZ Pressure sensor to rail	N47D20O1	Pressure sensor	Grease thread lightly.	70 Nm
4AZ Pressure control valve to rail	N47D20O1	Pressure control valve	1. Tightening 2. Opening 3. Final torque	60 Nm 90 degrees 85 Nm
5AZ Cylinder head cover mounting (clamping claw support)	N47D20O1	M6x35 with sleeve	Retightening	10 Nm

HIGH PRESSURE PUMP (N47T)

13 51 HIGH PRESSURE PUMP

TIGHTENING TORQUE SPECIFICATION - HIGH PRESSURE PUMP

Â	Type	Thread	Tightening specifications	Dimension
1AZ Metering unit to high pressure pump	N47 D20 O1	M5	Â	6.5 Nm
2AZ Holder to high pressure pump and cylinder head	N47 D20 O1	M8	Observe tightening specification and sequence!	19 Nm
3AZ Hose clamps	N47 D20 O1	SW5	Â	1.5 Nm
	Â	SW6	Â	3 Nm
4AZ High pressure pump to cylinder head	N47 D20 O1	M8	Â	19 Nm

cardiagn.com

HIGH PRESSURE PUMP (N20)

13 51 HIGH PRESSURE PUMP

TIGHTENING TORQUE SPECIFICATION - HIGH PRESSURE PUMP

Â		Type	Thread	Tightening specifications	Dimension
1AZ	High-pressure pump to cylinder head cover	N20/N26	M6	Tighten bolts to final torque either way in increments of 90Â°. FOLLOW REPAIR INSTRUCTIONS !	12 Nm

HIGH-PRESSURE PUMP DRIVE (N47T)

13 52 HIGH-PRESSURE PUMP DRIVE

TIGHTENING TORQUE SPECIFICATION - HIGH-PRESSURE PUMP DRIVE

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Tensioning rails Guide rails	N47 D20 U 1/N47 D20 O 1/N47 D20 K 1/N47 D20 T 1	M8	Â	20 Nm
2AZ	Sprocket wheel, high-pressure pump	N47 D20 U 1/N47 D20 O 1/N47 D20 K 1/N47 D20 T 1	M12x1	Â	65 Nm
3AZ	Chain tensioner, bottom	N47 D20 U 1/N47 D20 O 1/N47 D20 K 1/N47 D20 T 1	M6	Â	10 Nm
4AZ	Oil spray nozzle	N47 D20 U 1/N47 D20 O 1/N47 D20 K 1/N47 D20 T 1	M6	Â	10 Nm

INTAKE MUFFLER (N52T)

13 71 INTAKE MUFFLER

TIGHTENING TORQUE SPECIFICATION - INTAKE MUFFLER

Â		Type	Thread	Tightening specification	Measure
1AZ	Gaiter to throttle valve	N52T	Hose clamp	Â	3 Nm
2AZ	Gaiter to intake muffler	N52T	Hose clamp	Â	3 Nm
3AZ	Intake silencer to body	N52T	M6	Â	8 Nm
4AZ	Intake filter housing upper section to intake filter housing lower section	N52T	Â	Â	2 Nm

INTAKE SILENCER (N20)

13 71 INTAKE SILENCER

TIGHTENING TORQUE SPECIFICATION - INTAKE SILENCER

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Clean air pipe to intake silencer	N20/N26	Â	Clamp	3 Nm
2AZ	Upper clean air pipe to lower clean air pipe	N20/N26	Â	Clamp	3 Nm
3AZ	Intake silencer to body	N20/N26	M6	Â	8 Nm
4AZ	Hot film air mass meter to intake silencer	N20/N26	Â	Â	2 Nm
5AZ	Clean air pipe to exhaust turbocharger	N20/N26	Â	Â	8, 0 Nm

INTAKE SILENCER (N47T)

cardiagn.com

13 72 INTAKE SILENCER

TIGHTENING TORQUE SPECIFICATION - INTAKE SILENCER

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Outside air intake hood to vehicle front wall	N47 D20 O1	Â	Â	2 Nm
2AZ	Hot film air mass meter to clean air pipe	N47 D20 O1	Â	Â	2 Nm
3AZ	Clean air pipe, upper part to lower section	N47 D20 O1	Â	Â	3 Nm
4AZ	Clean air pipe	N47 D20 O1	Â	Â	8 Nm

INTAKE SILENCER (N55)

13 71 INTAKE SILENCER

TIGHTENING TORQUE SPECIFICATION - INTAKE SILENCER

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Intake silencer upper part to lower section	N55	Â	Â	2.5 Nm
2AZ	Clean air pipe to intake silencer	N55	Â	Clamp	3 Nm
3AZ	Hot film air mass meter to top clean air pipe	N55	Â	Â	2 Nm
4AZ	Clean-air duct to cylinder head cover	N55	Â	Â	3 Nm
5AZ	Upper clean air pipe to lower clean air pipe	N55	Â	Clamp	3 Nm
6AZ	Lower clean air pipe to air duct	N55	Â	Â	3 Nm
7AZ	Air duct to turbocharger	N55	Â	Â	8 Nm
8AZ	Lower air duct to cylinder head	N55	Â	Â	8 Nm
9AZ	Lower charge-air duct to upper charge-air duct	N55	Â	Â	3 Nm

SENSORS FOR CONTROL UNIT (N47T)

13 62 SENSORS FOR CONTROL UNIT

TIGHTENING TORQUE SPECIFICATION - SENSORS FOR CONTROL UNIT

Â		Type	Thread	Tightening specifications	Dimension
1AZ	Camshaft sensor to cylinder head cover	N47D20O1	Â	Â	3.6 Nm
2AZ	Coolant temperature sensor at cylinder head	N47D20O1	Â	Check O-rings.	3.5 Nm
3AZ	Oxygen sensor	N47D20O1	Â	Â	50 Nm
4AZ	Exhaust-gas temperature sensor to exhaust system	N47D20O1	Â	Â	30 Nm
5AZ	Charging pressure sensor to intake plenum	N47D20O1	Â	Â	4 Nm
6AZ	Exhaust backpressure sensor	N47D20O1	Â	Â	4 Nm
7AZ	Banjo bolt for exhaust backpressure sensor	N47D20O1	Â	Replace sealing rings. Use stainless steel sealing rings only	35 Nm
8AZ	NOX sensor	N47D20O1	Â	Â	50 Nm
9AZ	Carrier plate to cylinder head cover	N47D20O1	Â	Â	5 Nm
10AZ	Crankshaft sensor to gear case cover	N47D20O1	M5	Â	5 Nm

SENSORS FOR CONTROL UNIT (N52T)

cardiagn.com

13 62 SENSORS FOR CONTROL UNIT

TIGHTENING TORQUE SPECIFICATION - SENSORS FOR CONTROL UNIT

Â	Type	Thread	Tightening specifications	Dimension
1AZ Camshaft sensor to cylinder head	N52T	M6	Â	9 Nm
2AZ Crankshaft sensor to crankcase	N52T	M6	Replace aluminum screws. Jointing torque Angle of rotation	Â 3 Nm 45 Â°
3AZ Knock sensor to crankcase	N52T	M8	Replace aluminum screws. Jointing torque Angle of rotation	Â 10 Nm 45 Â°
4AZ Differential pressure sensor to air intake system	N52T	K50x20	Â	6 Nm
5AZ Coolant temperature sensor	N52T	M12x1.5	Â	13.5 Nm
6AZ Magnet wheel to eccentric shaft	N52T	M6x20	Â	8 Nm
7AZ VVT sensor to bearing bracket	N52T	M6x14	Â	8 Nm
8AZ Hot-film air mass meter	N52T	Â	Â	2 Nm

SENSORS FOR CONTROL UNIT (N55)

13 62 SENSORS FOR CONTROL UNIT

TIGHTENING TORQUE SPECIFICATION - SENSORS FOR CONTROL UNIT

Â	Type	Thread	Tightening specifications	Dimension
1AZ Camshaft sensor to cylinder head	N55/N55 Hybrid	M6x16	Â	8 Nm
2AZ Connector housing, crankshaft sensor, to crankcase	N55/N55 Hybrid	M6x16	Â	8 Nm
3AZ Knock sensor to crankcase	N55/N55 Hybrid	M8x30	Â	21, 5 Nm
4AZ Intake pressure sensor	N55/N55 Hybrid	Â	Â	4 Nm
5AZ Coolant temperature sensor	N55/N55 Hybrid	Â	Â	13, 5 Nm
6AZ Cable channel to engine block	N55/N55 Hybrid	M6	Â	8 Nm
7AZ Oil temperature sensor to engine block	N55/N55 Hybrid	Â	Â	15 Nm
8AZ Crankshaft sensor to crankcase	N55/N55 Hybrid	Â	Â	5 Nm

SENSORS FOR CONTROL UNIT (N20)

13 62 SENSORS FOR CONTROL UNIT

TIGHTENING TORQUE SPECIFICATION - SENSORS FOR CONTROL UNIT

Â	Type	Thread	Tightening specifications	Dimension
1AZ Camshaft sensor to cylinder head	N20/N26	M6x16	Â	8 Nm

cardiagn.com

2AZ Plug for crankshaft position sensor on engine block	N20/N26	M6x16	Â	8 Nm
3AZ Crankshaft sensor to crankcase	N20/N26	M6	Â	8 Nm
4AZ Knock sensor to crankcase	N20/N26	M8x30	Â	21, 5 Nm
5AZ Intake pressure sensor	N20/N26	K50x16	Â	3, 75 Nm
6AZ Coolant temperature sensor, coolant	N20/N26	M12x1.5	Â	13, 5 Nm

THROTTLE AND ACTUATOR (N52T)

13 54 THROTTLE AND ACTUATOR

TIGHTENING TORQUE SPECIFICATION - THROTTLE AND ACTUATOR

Â	Type	Thread	Tightening specification	Measure
1AZ Throttle-valve assembly to intake manifold	N52T	M6 x 50	Â	9 Nm

THROTTLE VALVE (N47T)

13 54 THROTTLE VALVE

TIGHTENING TORQUE SPECIFICATION - THROTTLE VALVE

Â	Type	Thread	Tightening specifications	Dimension
1AZ Throttle body to air intake system	N47 D20 O1	M6	Â	8 Nm

THROTTLE VALVE AND OPERATION (N20)

13 54 THROTTLE VALVE AND OPERATION

TIGHTENING TORQUE SPECIFICATION - THROTTLE VALVE AND OPERATION

Â	Type	Thread	Tightening specifications	Dimension
1AZ Throttle valve assembly to intake manifold	N20/N26	M6 x 50	Â	7 Nm

THROTTLE VALVE AND OPERATION (N55)

13 54 THROTTLE VALVE AND OPERATION

TIGHTENING TORQUE SPECIFICATION - THROTTLE VALVE AND OPERATION

Â	Type	Thread	Tightening specifications	Dimension
1AZ Throttle body to intake system	N55/N55 Hybrid	M6 x 50	Â	7 Nm

cardiagn.com

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00702160

FUEL SYSTEM

Operating Fluids

1.0 DIESEL EXHAUST FLUID OVERVIEW

E90 335D

Vehicles are factory-filled with DEF (diesel engine additive), also known as AdBluereg;. DEF is stored in two separate reservoirs within the vehicle. The "active" reservoir from which the DEF is injected into the exhaust system holds approx. 1.6 gallons. It is heated at low exterior temperatures to prevent the DEF from freezing. The second reservoir feeds the active tank via a transfer pump and is large enough to last between scheduled engine oil changes. It is referred to as the "passive" tank, with a capacity of approx 4.5 gallons, and is located in the "spare tire well" of the trunk. At every Engine Oil Service, all remaining DEF must be completely drained from both tanks, and then refilled with new DEF. It is not sufficient to "top up" the reservoir.

The filling location for both tanks is behind an access flap on the surface of the rear bumper's left side. Remove the plugs by inserting the front face of the screwdriver handle (from the vehicle's on-board tool kit) into the plug's recess.

If the supply of DEF runs low, the instrument cluster warning lamp will indicate the estimated remaining distance which the vehicle may be driven, starting at approx. 1000 more miles. At approx. 200 miles, the warning lamp will illuminate again, with the miles counting down to 0. Once the distance reaches 0 miles (shown by "- - -" with the warning lamp symbol), the car will not start up again until DEF is refilled. This is done so that the vehicle meets federal emissions regulations. However, the DEF system does allow one single "emergency" engine start at "0" miles, provided that you start the engine within 3 minutes of last shutting it off.

DEF will soon be available at BMW centers (part number, container size and other details to be provided). One pack of DEF will be sent to each BMW center prior to the first vehicle arrival.

X5 3.0D

Vehicles are factory-filled with DEF (diesel engine additive), also known as AdBluereg;. DEF is stored in two separate reservoirs within the vehicle. The "active" reservoir from which the DEF is injected into the exhaust system holds approx. 1.6 gallons. It is heated at low exterior temperatures to prevent the DEF from freezing. The second reservoir, known as the "passive tank", feeds the active tank via a transfer pump and is large enough to last between scheduled engine oil changes. The passive tank's capacity is approx 4.5 gallons, and is located underneath the driver's seat. At every Engine Oil Service, all remaining DEF must be completely drained from both tanks, and then refilled with new DEF. It is not sufficient to "top up" the reservoir.

The active tank can be filled from the passenger side engine compartment.

If the supply of DEF runs low, the instrument cluster warning lamp will indicate the estimated remaining distance which the vehicle may be driven, starting at approx. 1, 000 more miles. At approx. 200 miles, the warning lamp will illuminate again, with the miles counting down to 0. Once the distance reaches 0 miles (shown by "- - -" with the warning lamp symbol), the engine will not start up again until DEF is refilled. This is done so that the vehicle meets federal emissions regulations. However, the DEF system does allow one single "emergency" engine start at "0" miles, provided that you start the engine within 3 minutes of the last time that it was shut off.

DEF will soon be available at BMW SAV centers. One pack of DEF will be sent to each BMW center prior to the first vehicle arrival.

2.0 DEF EXTRACTION AND REFILL

E70 and E90 with M57Y from start of production.

Scheduled maintenance or warranty repairs which require the evacuation and the refilling of the SCR (Selective

cardiagn.com

Catalyst Reduction) emissions system.

OVERVIEW OF DEF (DIESEL EXHAUST FLUID) EXTRACTOR

Always refer to the latest Repair Instructions: RA16 19 006 (E70 Active), RA16 19 060 (E70 passive), or RA16 19 070 (E90) for important safety considerations when working with DEF.

The DEF Extractor/Filler unit removes DEF from the system, using compressed air to create a vacuum using the Venturi principle. The extractor can hold 11 liters of DEF fluid.

DEF Extractor (P/N 81 39 2 153 908):

1. Shop air connection
2. Venturi valve block
3. Exhaust hose for the valve block
4. Extraction line to service the port on the SCR system
5. DEF level indicator

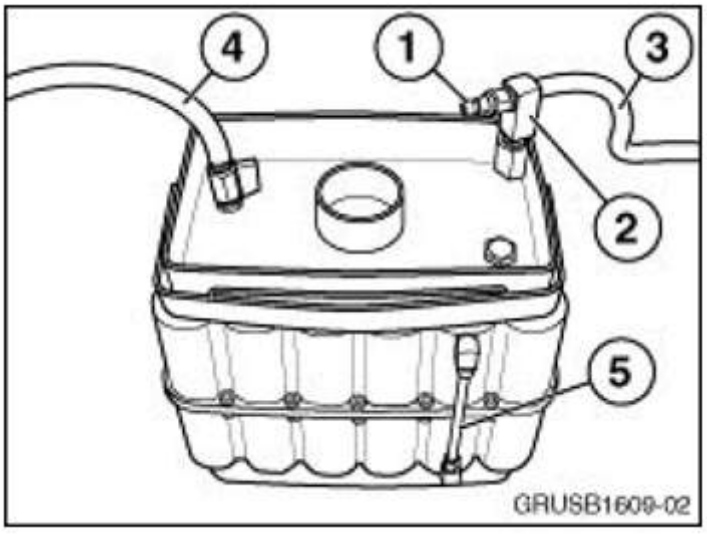


Fig. 1: Overview Of DEF Extractor
Courtesy of BMW OF NORTH AMERICA, INC.

DRAINING DEF E90

1. Remove the filler connection cap on the left rear bumper.
2. When draining the active tank, remove the filler cap (1); for the passive reservoir, remove the filler cap (2).
3. If necessary, use the screwdriver handle (3) from the onboard vehicle tool kit to open the filler caps.

cardiagn.com

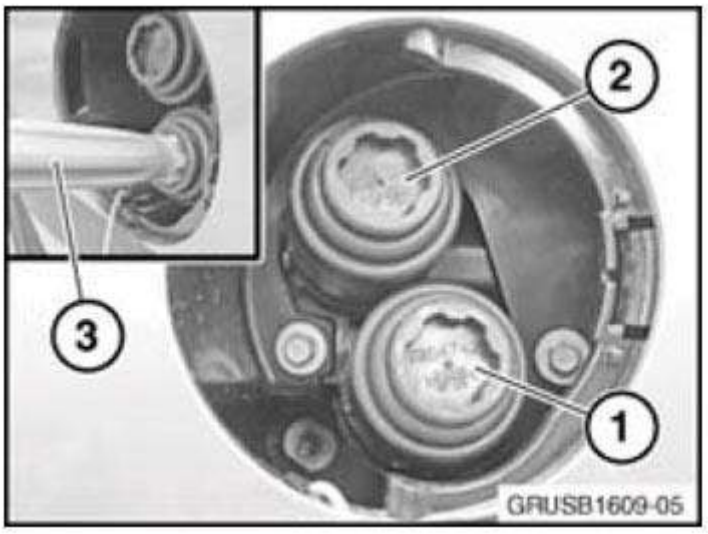


Fig. 2: Removing Filler Cap Using Screwdriver Handle
Courtesy of BMW OF NORTH AMERICA, INC.

4. Remove the cover under the left rear bumper to access the service ports for the active (1) and passive tanks (2).

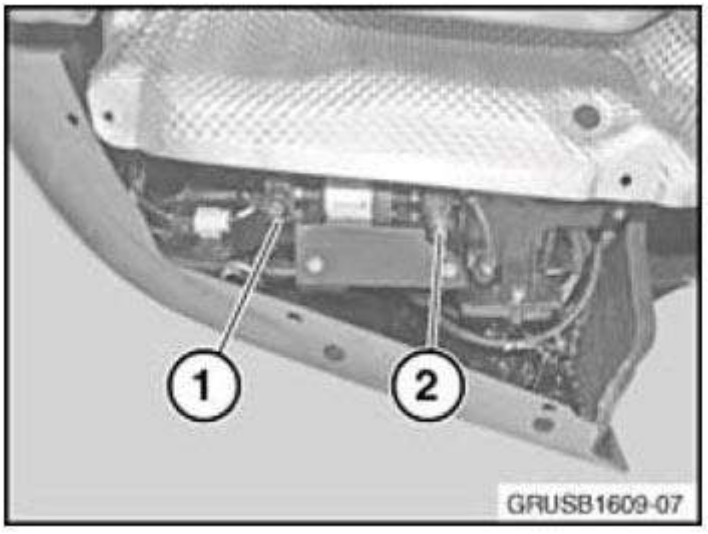


Fig. 3: Identifying Left Rear Bumper Service Ports For Active And Passive Tanks
Courtesy of BMW OF NORTH AMERICA, INC.

5. Connect the extraction line (1) from the tool (P/N 81 39 2 153 908) to the active (2) or the passive (3) service ports.

NOTE: **Clean the caps for the service ports with water before reinstalling. Make sure the caps lock back onto the service ports**

cardiagn.com

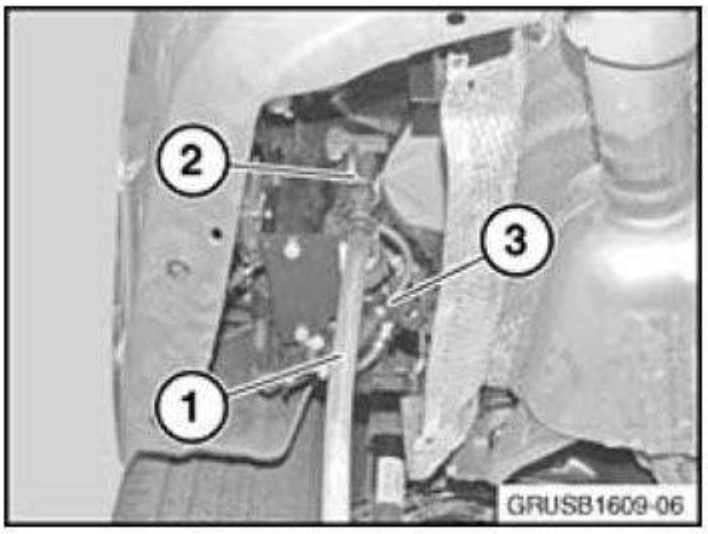


Fig. 4: Connecting Extraction Line To Active Or Passive Service Ports
Courtesy of BMW OF NORTH AMERICA, INC.

6. Connect the shop air to the vacuum block, and open the valve at the vacuum block on the canister for vacuum supply. Slowly open the valve of the suction line at the canister and draw off the DEF. Watch the level through the level tube. Make sure the exhaust hose off the vacuum block is situated so that it will drain into a suitable catch pan, in case the DEF extractor canister gets overfilled.

DRAINING DEF E70

1. Remove the filler cap of the active reservoir (1) or the passive reservoir (2).

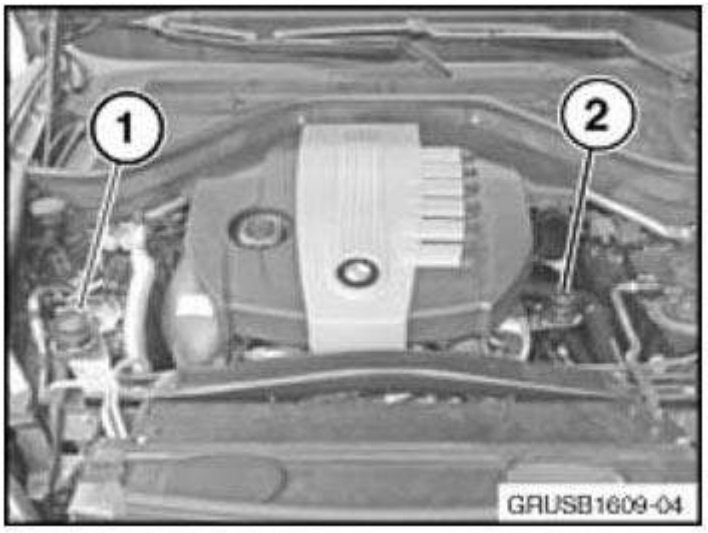


Fig. 5: Identifying Filler Cap Of Active Reservoir And Passive Reservoir
Courtesy of BMW OF NORTH AMERICA, INC.

2. Service ports for the active (1) or the passive reservoirs (2) are located under the right side of the vehicle.

cardiagn.com

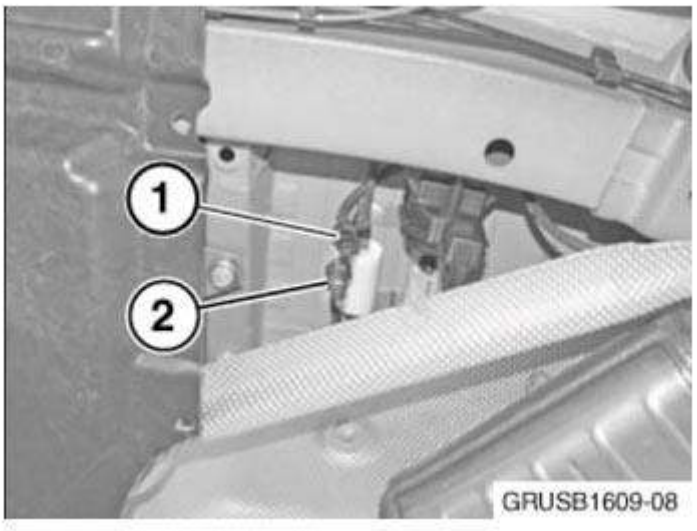


Fig. 6: Identifying Service Ports For Active And Passive Reservoirs
Courtesy of BMW OF NORTH AMERICA, INC.

3. Remove the cap from the service port being drained and attach the extractor hose (1) to the port.

NOTE: **Clean the caps for the service ports with water before reinstalling. Make sure the caps lock back onto the service ports.**

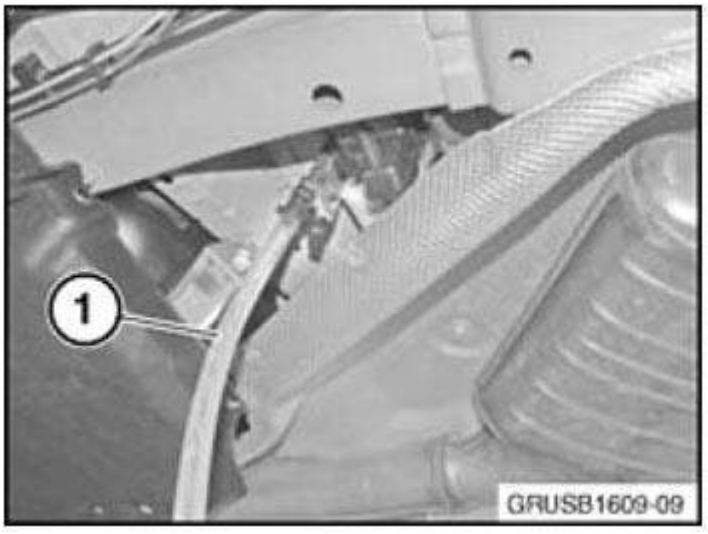


Fig. 7: Identifying Extractor Hose
Courtesy of BMW OF NORTH AMERICA, INC.

4. Connect the shop air to the vacuum block, and open the valve at the vacuum block on the canister for vacuum supply. Slowly open the valve of the suction line at the canister and draw off the DEF. Watch the level through the level tube. Make sure the exhaust hose off the vacuum block is situated so that it will drain into a suitable catch pan, in case the DEF extractor canister gets overfilled.

EMPTYING THE DEF EXTRACTOR

1. To empty the canister; open the drain valve (1) on the bottom of the canister.

NOTE: **The extractor will not function properly if the drain is opened while there is vacuum applied to the system.**

cardiagn.com

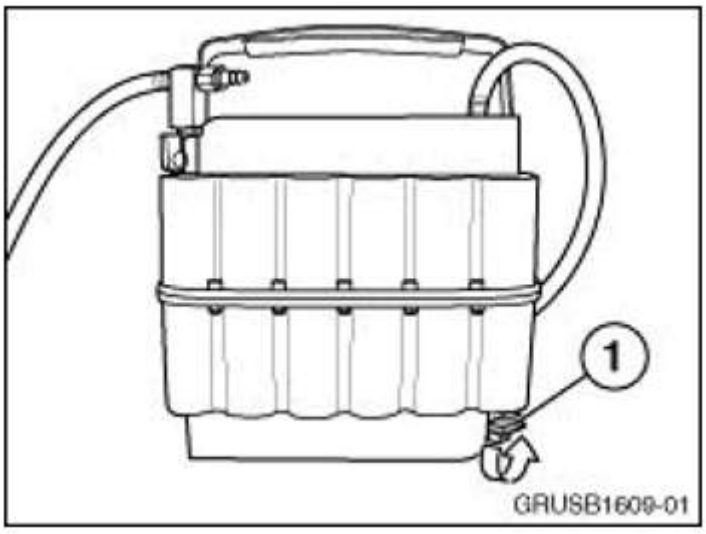


Fig. 8: Identifying Drain Valve
Courtesy of BMW OF NORTH AMERICA, INC.

Consult with your local municipality on proper disposal of used DEF. Never reuse the DEF that is evacuated from a vehicle. Always refill the SCR system with new DEF (2.5 gallon service bottles, P/N 83 19 0 440 158).

Filling the SCR system

Factory warranty will only reimburse the use of 2.5 gallon service bottles (P/N 83 19 0 440 158) when draining and refilling the SCR system.

NOTE: **The filling (1) and vent (2) lines at the filler adapter are switched, depending on the application.**

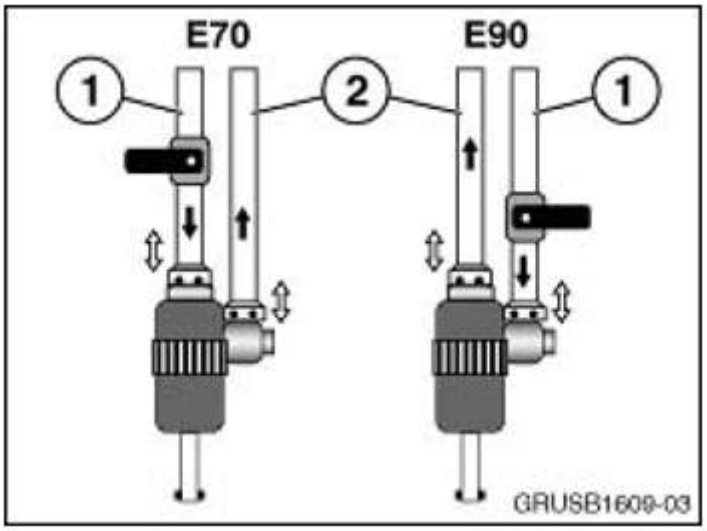


Fig. 9: [Draining And Refilling SCR System]
Courtesy of BMW OF NORTH AMERICA, INC.

Proper maintenance for DEF Extractor/Filler Tools (P/N 81 39 2 153 908/909)

Always rinse the tools, lines and fittings with water after each use.

Copyright 2016 Mitchell Repair Information Company, LLC. All Rights Reserved.

Article GUID: A00395990

cardiagn.com