

2002 BMW X5 30i

2000-06 STARTING & CHARGING SYSTEMS Generators & Regulators - X5 (E53)

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Generators & Regulators - X5 (E53)

IDENTIFICATION

CHASSIS & ENGINE IDENTIFICATION

Model (Chassis Code)	Engine Size (Code)
2001-03	
X5 (E53)	4.4L (M62)
2001-04	
X5 (E53)	3.0L (M54)
2002-03	
X5 (E53)	4.6L (M62)
2004	
X5 (E53)	4.4L (N62)

DESCRIPTION

Bosch or Valeo generators are installed in X5 vehicles. They are fitted depending on type of engine and equipment configuration. They differ with regard to their rating of 140 A and 170 A and are air cooled. X5 vehicles with 4.4L and 4.6L engines have generators which are cooled by coolant jackets.

TESTING

GENERATOR & REGULATOR SWITCH

Check for correct connections on fully charged battery, generator and starter motor. Check for good ground connection between engine and body. Check for properly tightened drive belt. Connect DIS tester. Search down through the following:

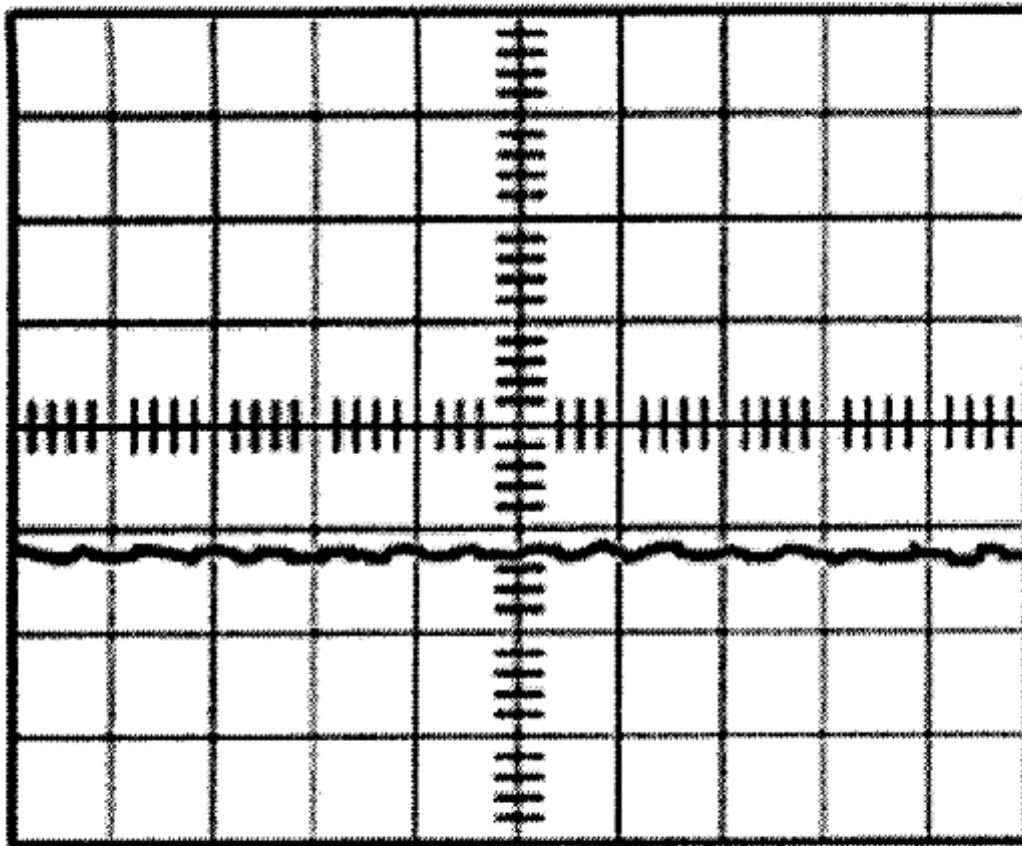
- FUNCTION SELECTION
- COMPLETE VEHICLE
- DRIVE
- VOLTAGE AND CURRENT REGULATION
- VOLTAGE AND CURRENT GENERATION

Work through test modules. To diagnose oscillograms for each fault, see **GENERATOR OSCILLOGRAMS**. If generator is faulty, repair or replace it. To replace generator on 3.0L (M54), see **GENERATOR 3.0L (M54)** under REMOVAL & INSTALLATION. To replace generator on 4.4L & 4.6L (M62), see **GENERATOR 4.4L & 4.6L (M62)** under REMOVAL & INSTALLATION. To replace generator on 4.4L (N62), see **GENERATOR 4.4L (N62)** under REMOVAL & INSTALLATION.

If regulator is faulty, replace it. To replace Bosch regulator, see **VOLTAGE REGULATOR (BOSCH)**. To replace Valeo regulator, see **VOLTAGE REGULATOR (VALEO)**. To replace regulator on 4.4L (N62) see **VOLTAGE REGULATOR 4.4L (N62)**.

GENERATOR OSCILLOGRAMS

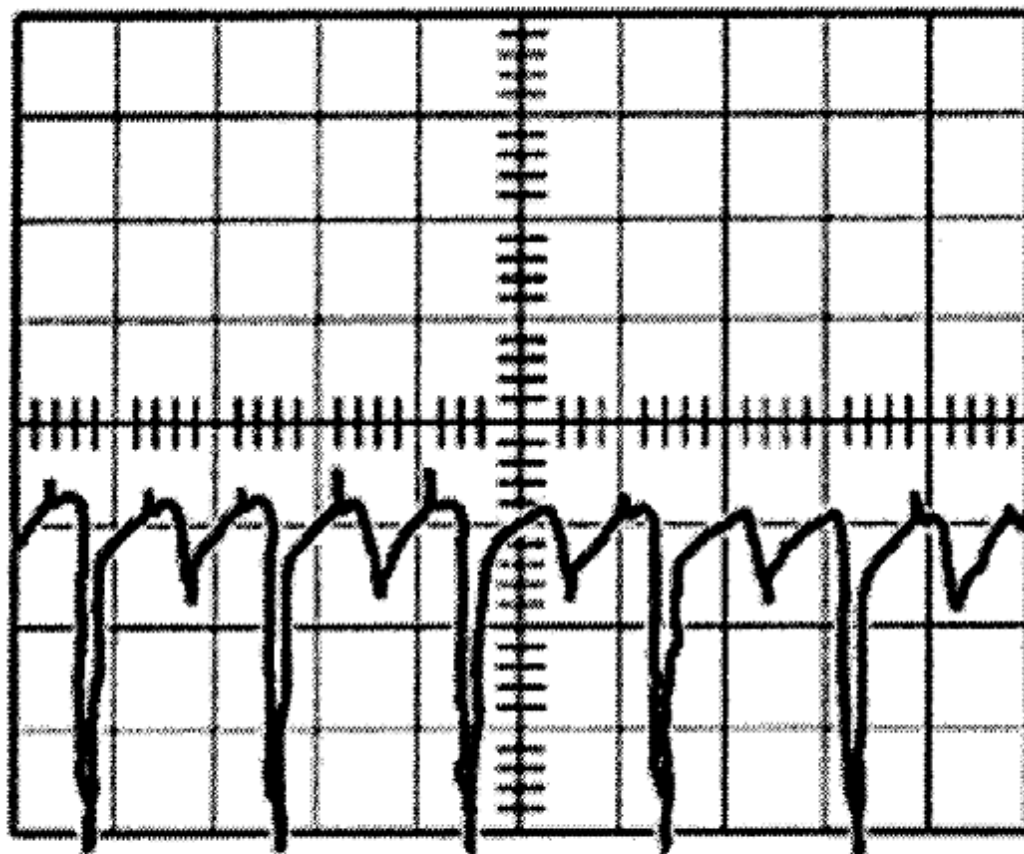
Fault	Oscillogram
Fault-Free	See <u>Fig. 1</u>
One Phase Interrupted	See <u>Fig. 2</u>
Internal Fault	See <u>Fig. 3</u>
Open Circuit In Negative Diode	See <u>Fig. 4</u>
Short Circuit In Positive Diode	See <u>Fig. 5</u>
Open Circuit In Positive Diode	See <u>Fig. 6</u>
Open Circuit In Exciter Diode	See <u>Fig. 7</u>



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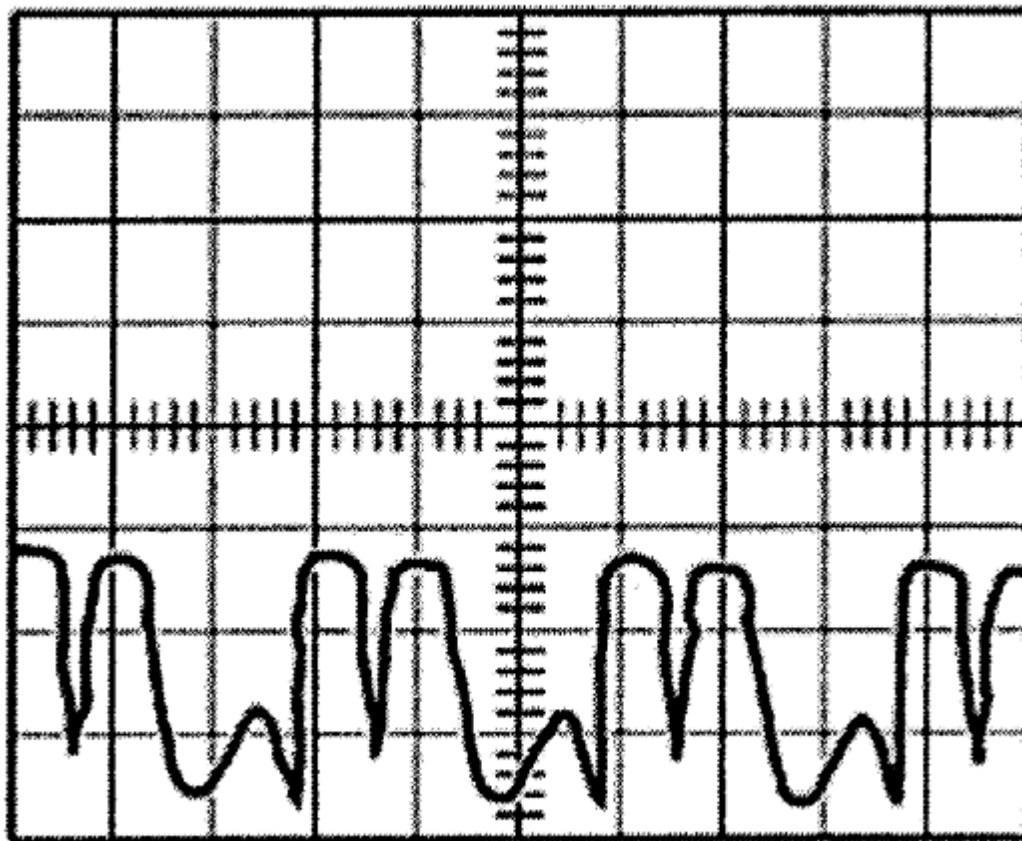
Fig. 1: Identifying Oscillogram For A Fault-Free Generator

Courtesy of BMW OF NORTH AMERICA, INC.



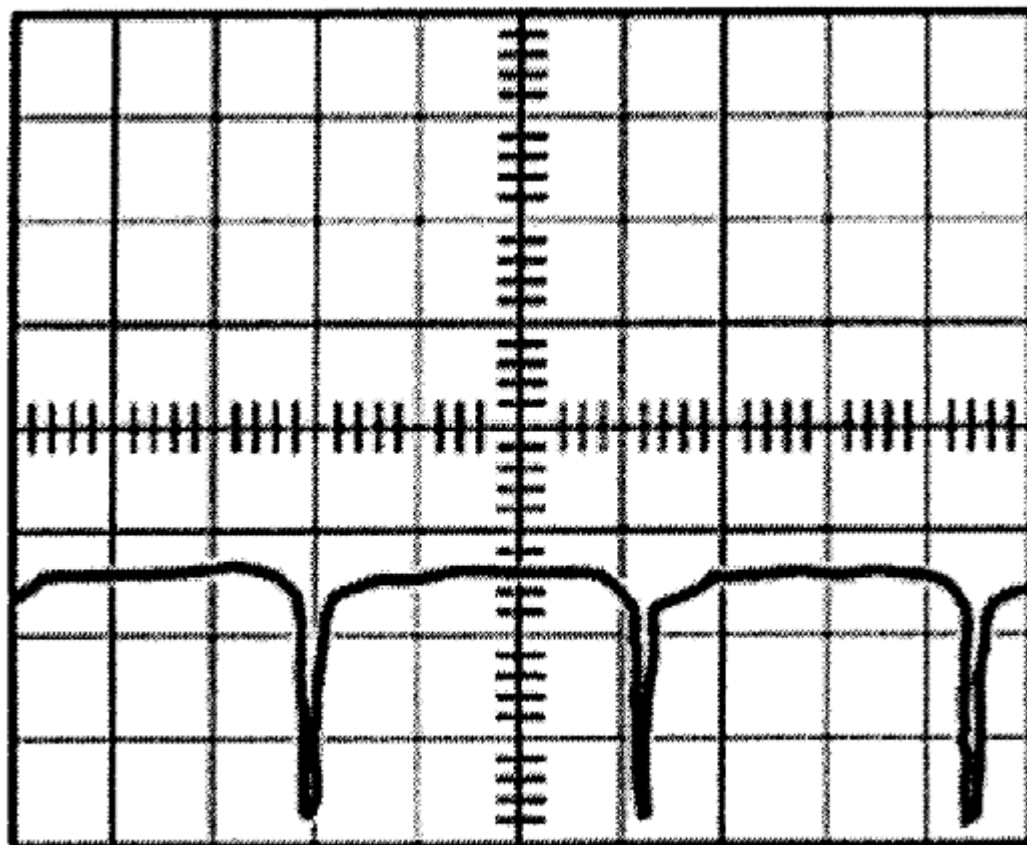
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Fig. 2: Identifying Oscilloscope For One Phase Interrupted
Courtesy of BMW OF NORTH AMERICA, INC.



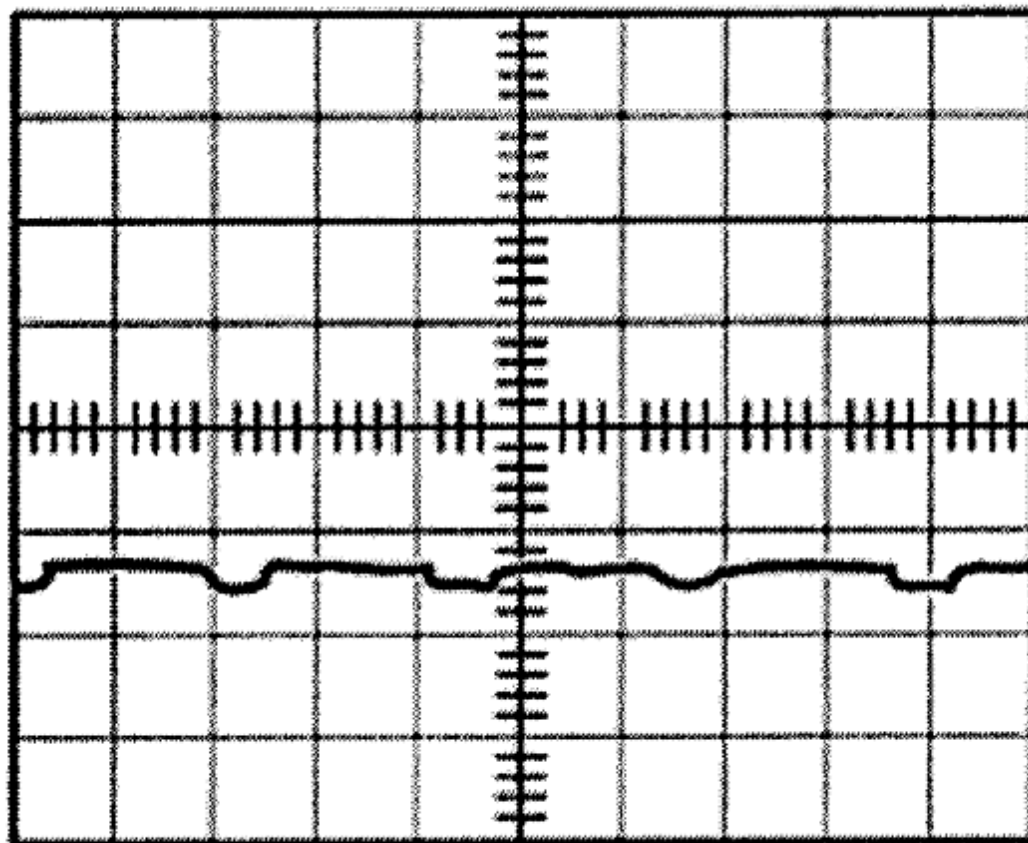
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Fig. 3: Identifying Oscillogram For Internal Fault
Courtesy of BMW OF NORTH AMERICA, INC.



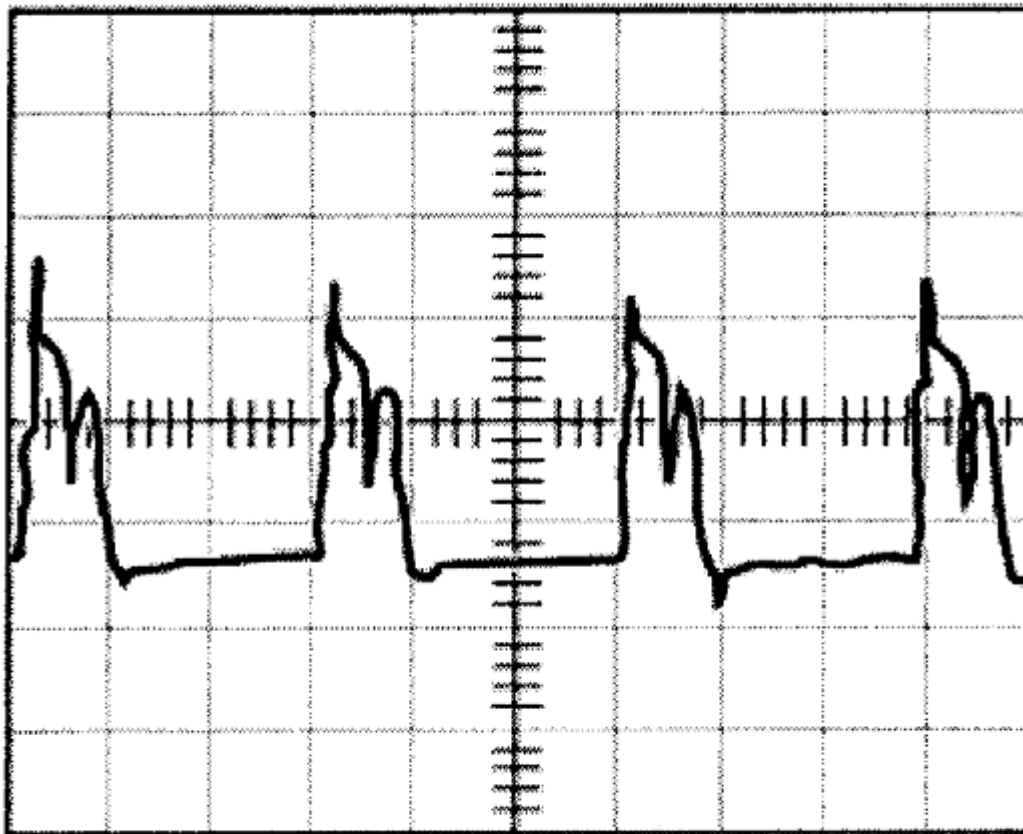
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Fig. 4: Identifying Oscilloscope For Open Circuit In Negative Diode
Courtesy of BMW OF NORTH AMERICA, INC.



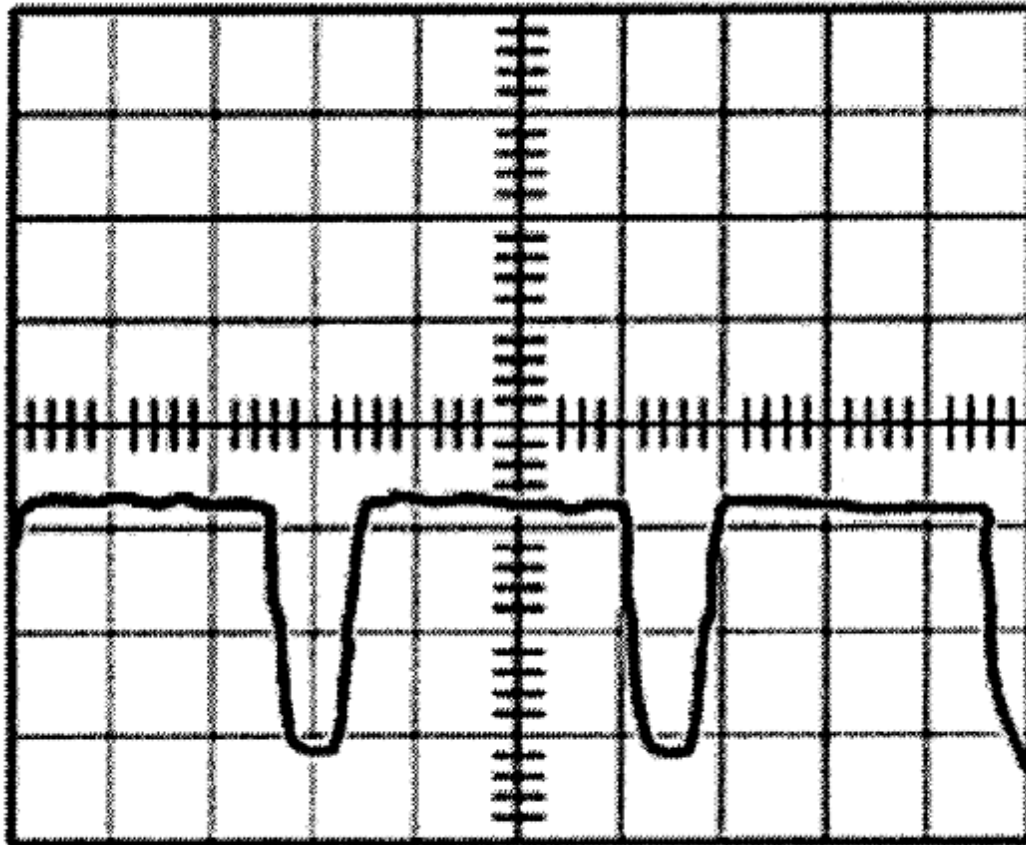
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Fig. 5: Identifying Oscilloscope For Short Circuit In Positive Diode
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 6: Identifying Oscillogram For Open Circuit In Positive Diode
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 7: Identifying Oscillogram For Open Circuit In Exciter Diode
Courtesy of BMW OF NORTH AMERICA, INC.

REMOVAL & INSTALLATION

CAUTION: Disconnecting vehicle battery will cancel fault codes of control units. On vehicles with radio codes, after disconnecting battery, radio codes must be re-entered. Obtain radio code card from customer. Note stored stations and restore them after connecting battery. Also, where applicable, initialize sunroof and set steering angle.

A/C COMPRESSOR DRIVE BELT 3.0L (M54)

NOTE: If drive belt is to be reused, mark direction of travel and reinstall drive belt in same direction.

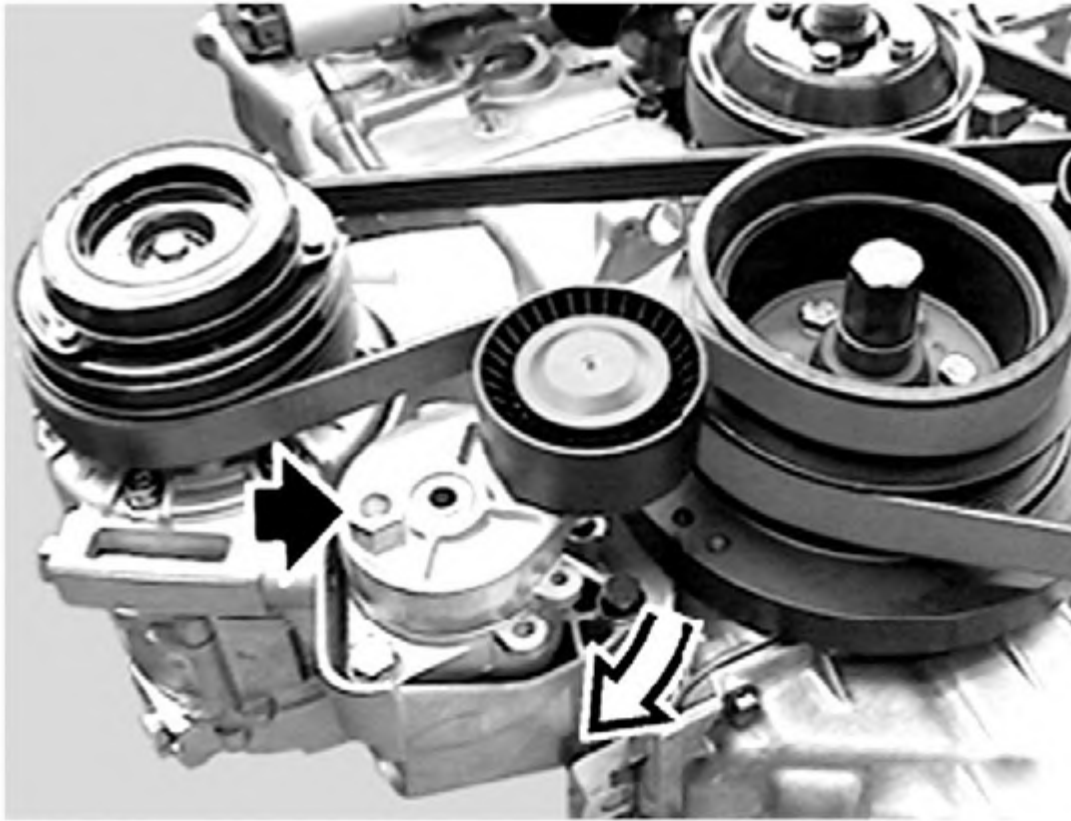
Removal & Installation

1. If necessary, remove splash guard. On models with hydraulic drive belt and tension jack, remove dust cap, push back belt tensioner at bolt connection of guide pulley and remove drive belt. See **Fig. 8**. On models with mechanical drive belt and tension jack, press back drive belt tensioner at hexagon head or Torx socket and remove drive belt. See **Fig. 9**.
2. Check drive belt for coolant and oil residues. To install, reverse removal procedure. Replace if necessary. Make sure belt is correctly positioned on belt pulleys.



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Fig. 8: Removing Hydraulic A/C Compressor Drive Belt - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 9: Removing Mechanical A/C Compressor Drive Belt - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

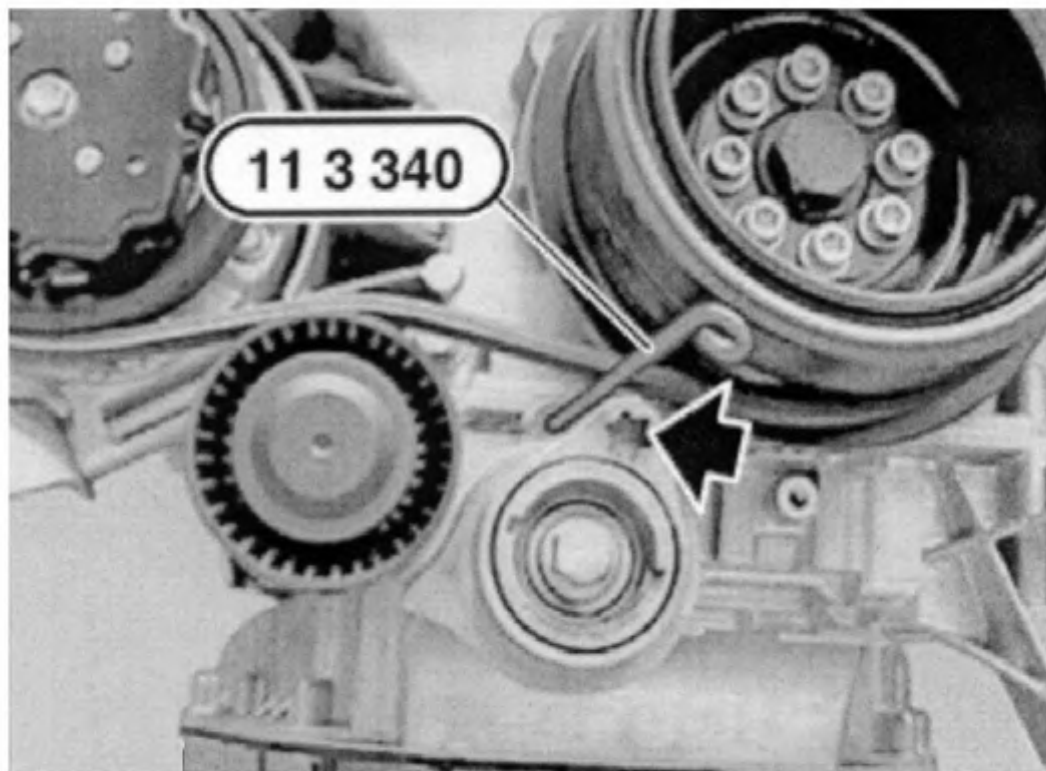
A/C COMPRESSOR DRIVE BELT 4.4L (N62)

NOTE: If drive belt is to be reused, mark direction of travel and reinstall drive belt in same direction.

NOTE: If drive belt is contaminated with hydraulic fluid, replace it.

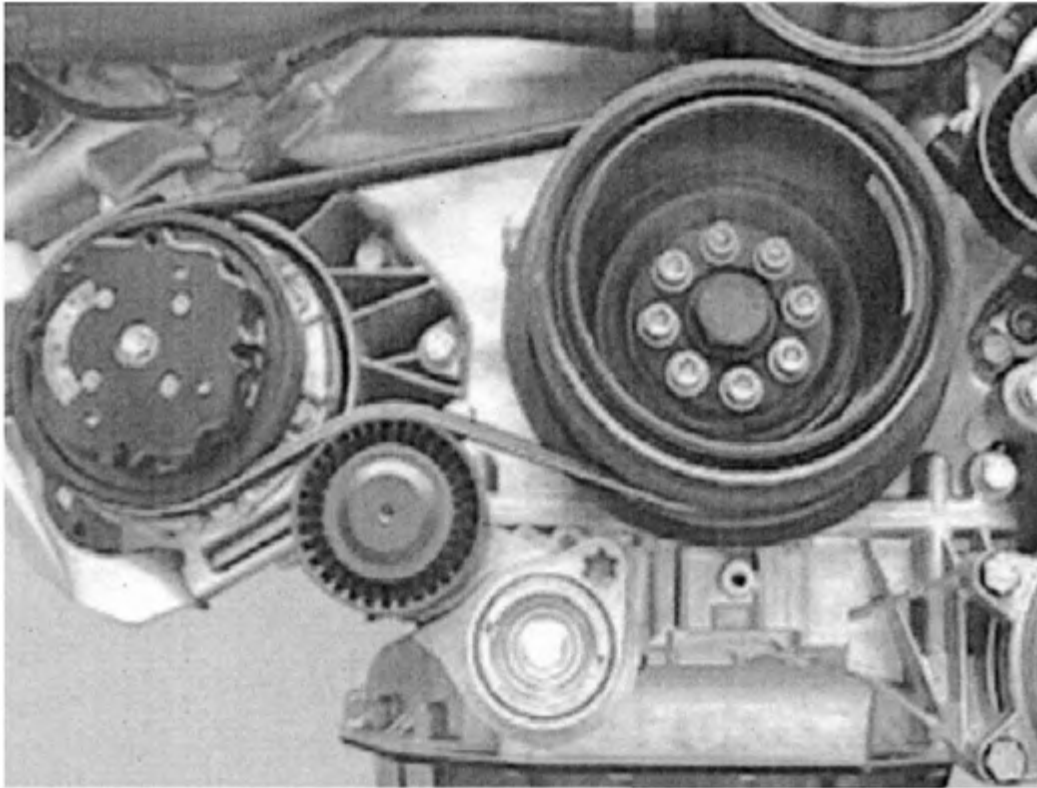
Removal & Installation

1. Remove generator drive belt. See **GENERATOR DRIVE BELT 4.4L (N62)**.
2. Remove engine splash guard.
3. Pretension belt tensioner slowly and carefully with a Torx socket as far as it will go and secure with Special Tool (11 3 340). See **Fig. 10**. Remove drive belt.
4. To install, reverse removal procedure. Check that drive belt is correctly positioned on pulleys. See **Fig. 11**.



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Fig. 10: Removing A/C Compressor Drive Belt - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.



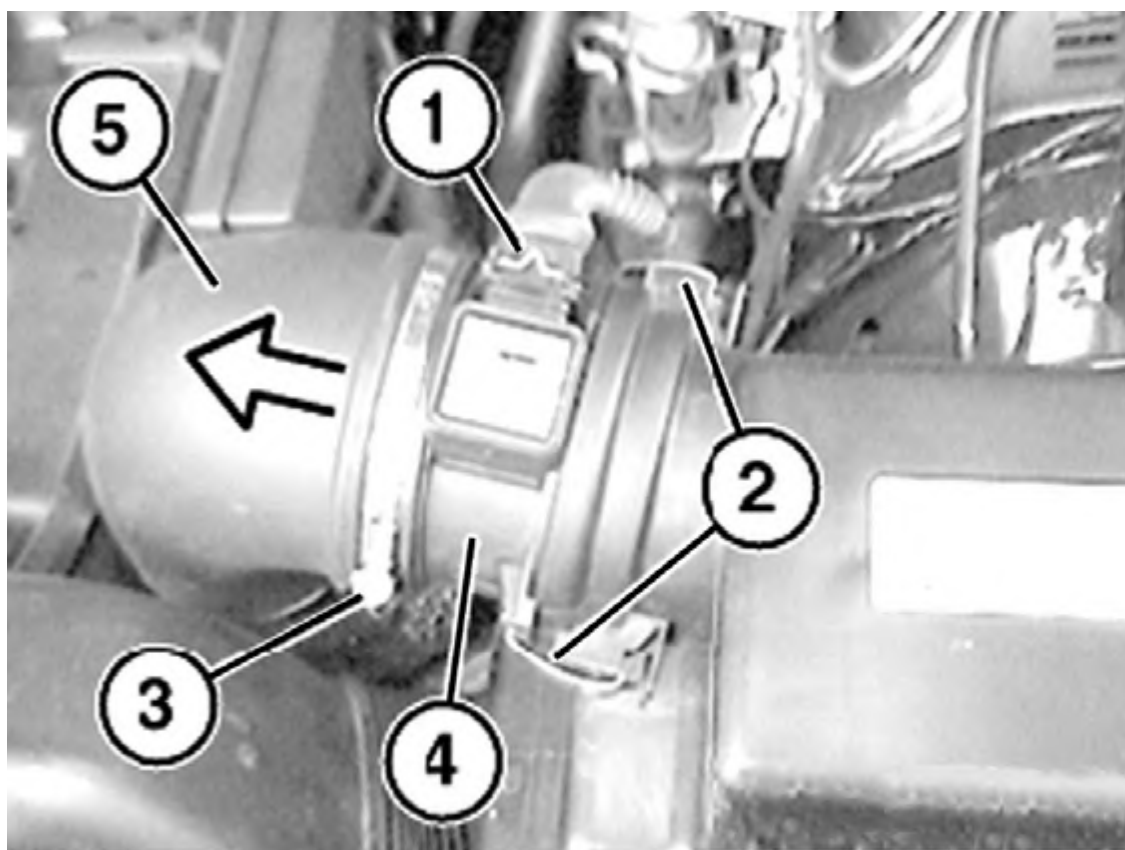
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Fig. 11: Checking A/C Compressor Drive Belt Position - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.

AIR-MASS SENSOR 3.0L (M54)

Removal & Installation

1. Retrieve fault codes of DME control unit. Switch off ignition.
2. Unlock plug (1) and detach. See **Fig. 12**. Open retainers (2). Release hose clamp (3) and detach intake hose (5) from air-mass flow sensor (4). Pull air-mass flow sensor out of intake filter housing.
3. To install, reverse removal procedure. Check sealing ring (1) between air-mass flow sensor and intake hose for damage. See **Fig. 13**. Replace, if necessary. Coat sealing ring (1) with acid-free grease.
4. Check sealing ring (1) between air-mass flow sensor and intake filter housing for damage. See **Fig. 14**. Replace, if necessary. Coat sealing ring (1) with acid-free grease.
5. Install air-mass flow sensor between intake filter housing and intake hose so that arrow points in direction of intake hose. See **Fig. 15**.
6. Retrieve and correct fault codes of DME control module. Clear fault memory.



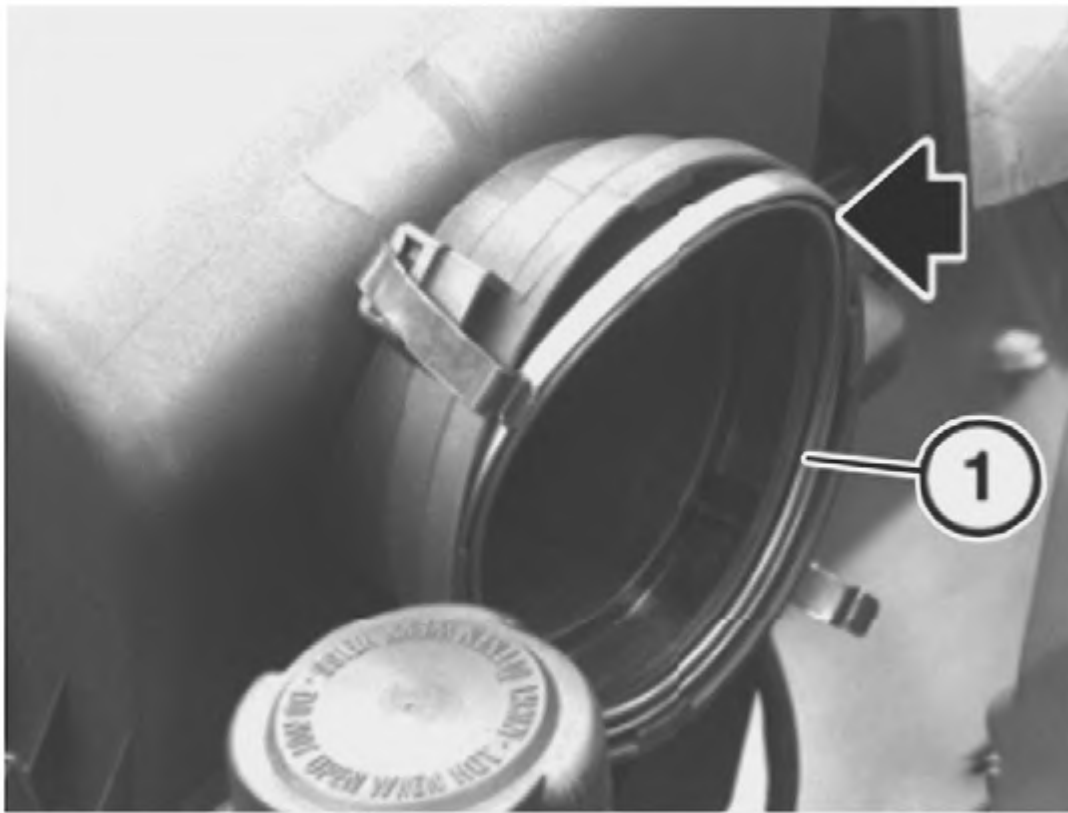
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Fig. 12: Removing Air-Mass Flow Sensor - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 13: Checking Sealing Ring - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 14: Locating Air-Mass Flow Sensor Seal - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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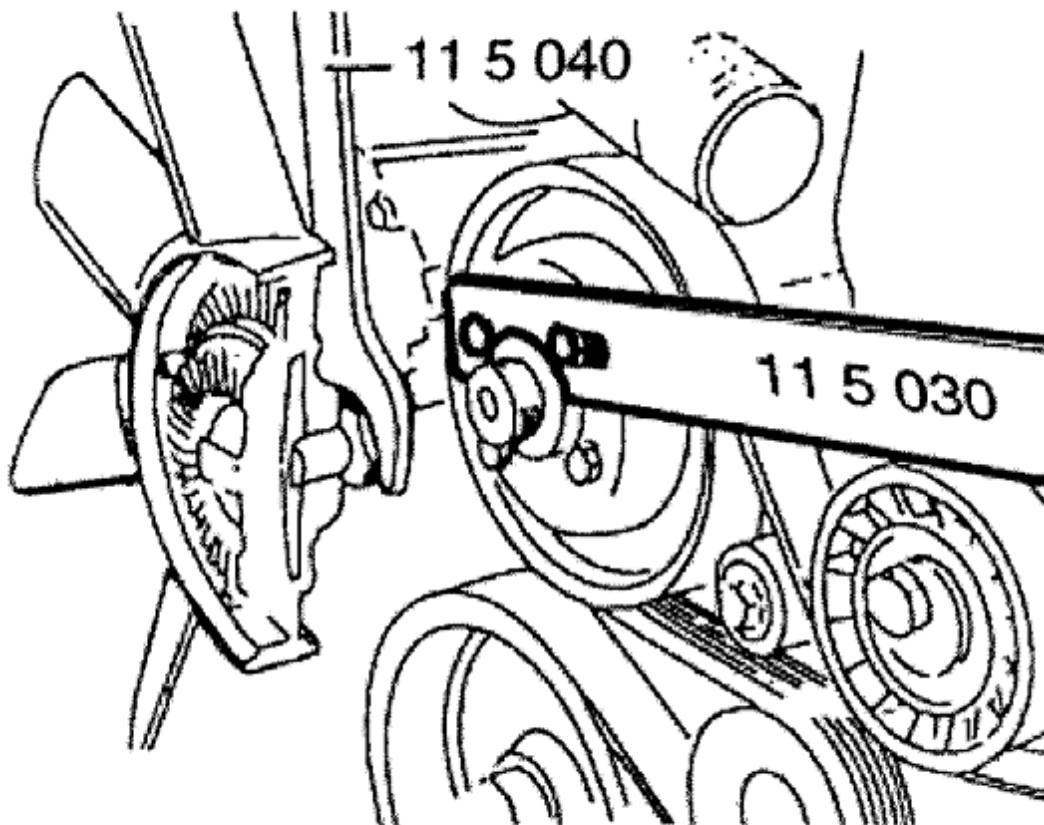
Fig. 15: Locating Arrow On Air-Mass Flow Sensor - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

FAN CLUTCH

NOTE: Fan clutch bolts have left-hand threads.

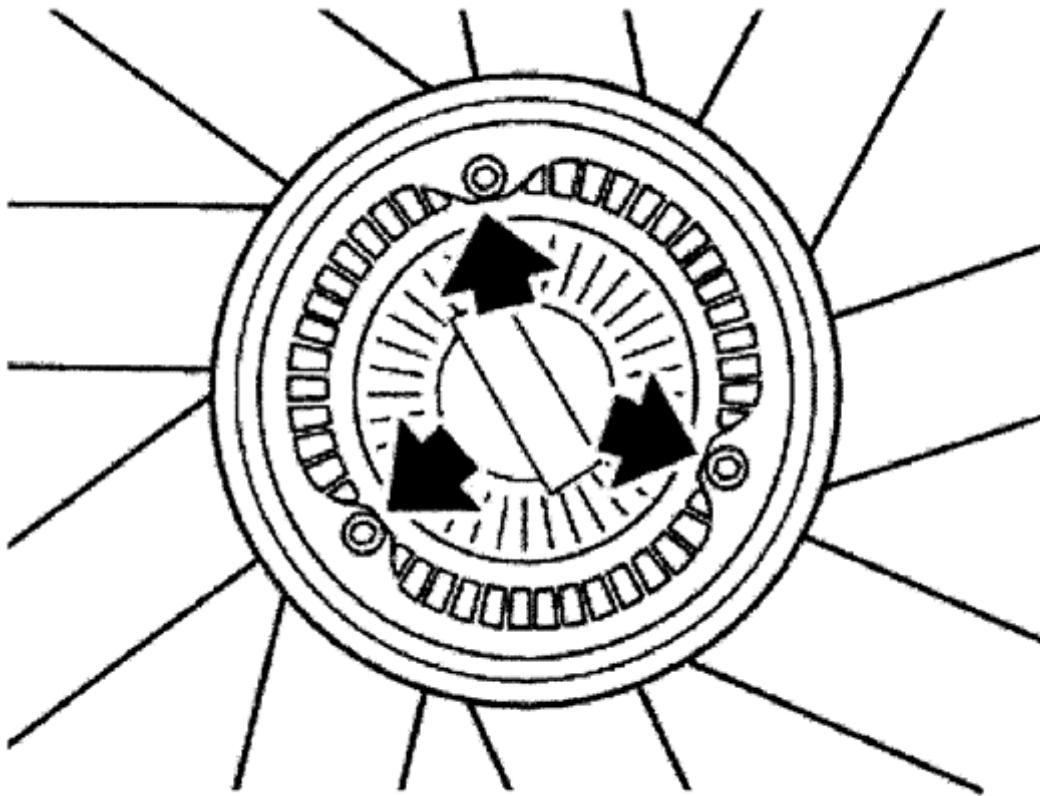
Removal & Installation

1. If necessary, remove air duct.
2. On 3.0L (M54), use Special Tool (11 5 030). Grip pulley and unfasten cap nut from water pump using Special Tool (11 5 040). See **Fig. 16**. On 4.4L and 4.6L (M62), use Special Tool (11 5 050). If necessary, unfasten fan cowl. Take fan wheel with fan coupling off water pump and remove. Unfasten screws and remove fan from fan coupling. See **Fig. 17**.
3. To install, reverse removal procedure. Tighten fan impeller using Special Tool (11 5 040). When using special tool, 22 ft. lbs. (30 Nm) on torque wrench scale is equal to a tightening torque of 30 ft. lbs. (40 N.m). Tighten to specification. See **TORQUE SPECIFICATIONS**.



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Fig. 16: Removing Cap Nut From Water Pump
Courtesy of BMW OF NORTH AMERICA, INC.



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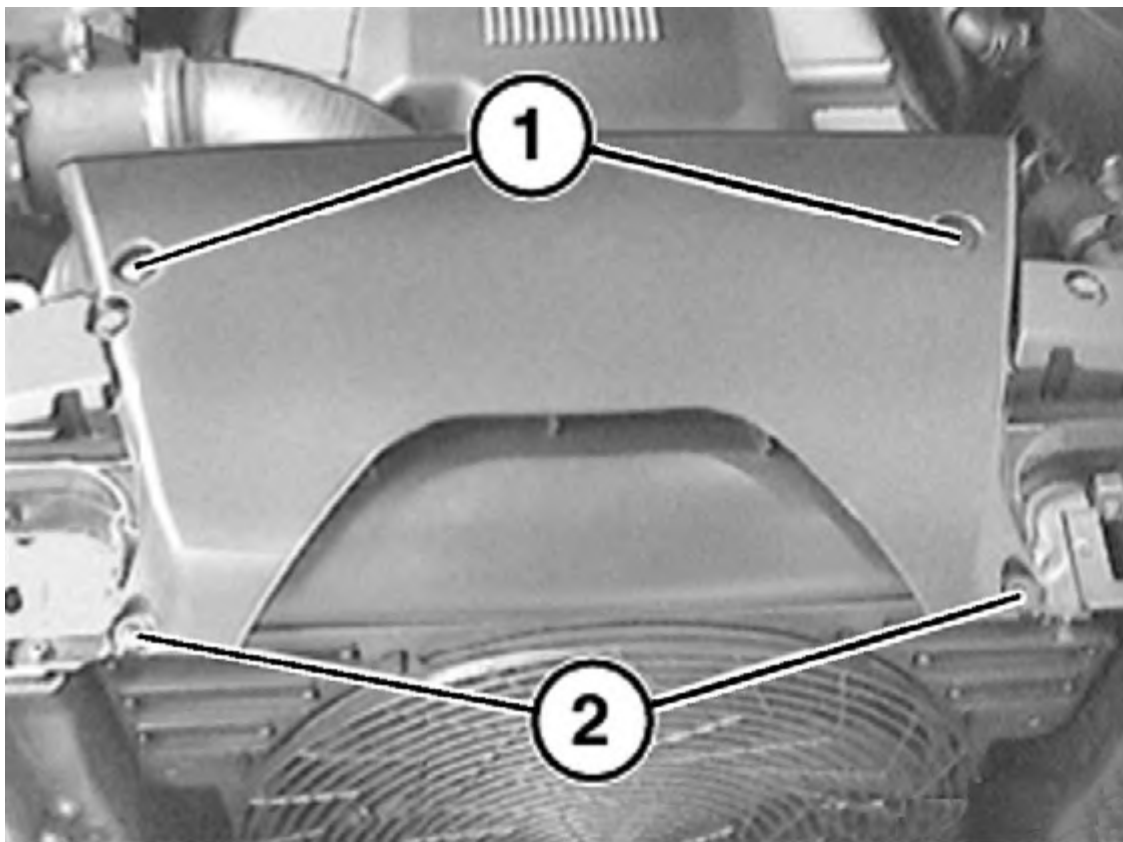
Fig. 17: Removing Fan From Fan Coupling
Courtesy of BMW OF NORTH AMERICA, INC.

FAN COWL 4.4L & 4.6L (M62)

Removal & Installation

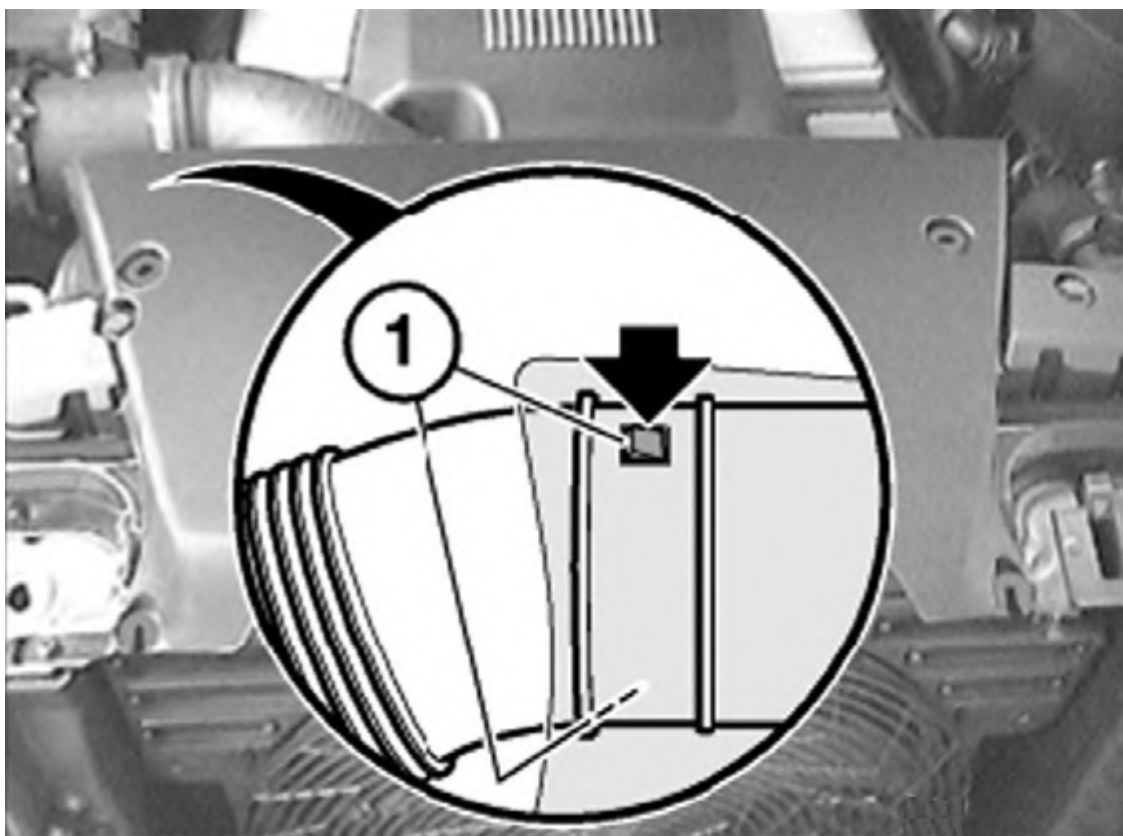
1. Lever out fan cowl cover expansion rivets. (1). See **Fig. 18**. Remove screws (2).
2. Intake pipe is secured in intake hood by 2 retaining lugs (1). See **Fig. 19**. Retaining lugs are located under intake hood. Press in retaining lugs (1) and remove intake hood.
3. Unclip water hose (1) from holder on fan cowl. For purposes of clarity, figure is shown from below. Underbody paneling does not have to be removed. Water hose (1) can be pulled out of holder from above. See **Fig. 20**.
4. Remove fan impeller with fan clutch. See **FAN CLUTCH**.
5. Detach plug (1) from Automatic Recirculated Air Control (AUC) sensor. See **Fig. 21**. Unlock plug connection (2) and unclip cable.
6. Lever out expansion rivets (1). See **Fig. 22**. Remove fan cowl towards top.
7. To install, reverse removal procedure. Attach lugs (1) to holders on radiator. See **Fig. 23**. Tighten intake

hood screws (2) to specification. See **TORQUE SPECIFICATIONS.**



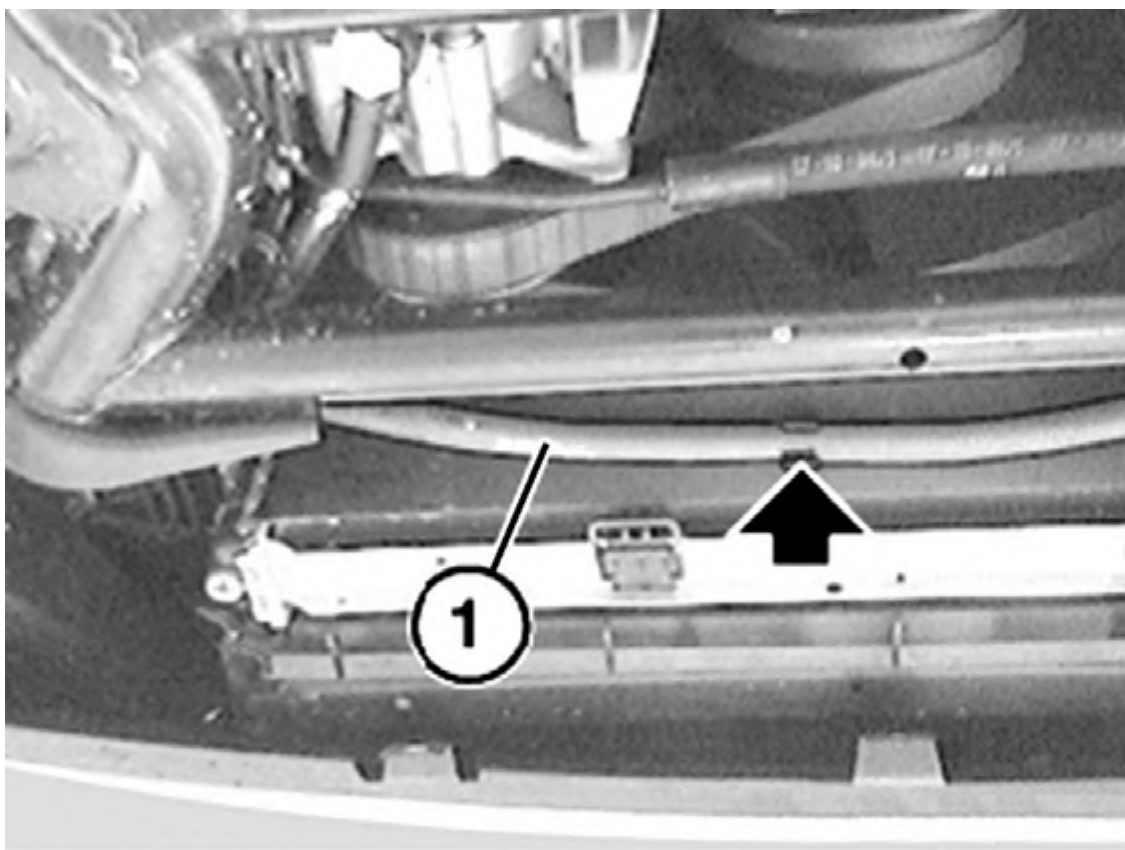
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Fig. 18: Locating Fan Cowl Cover Expansion Rivets - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



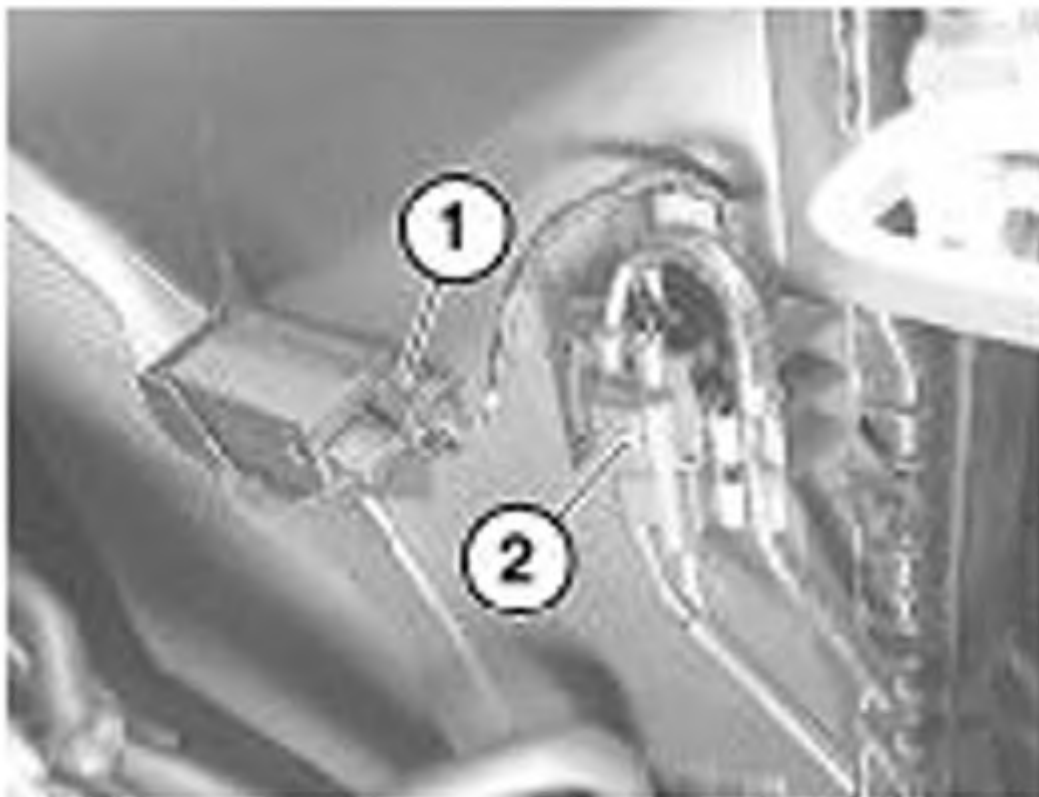
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Fig. 19: Locating Intake Hood Retaining Lugs - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



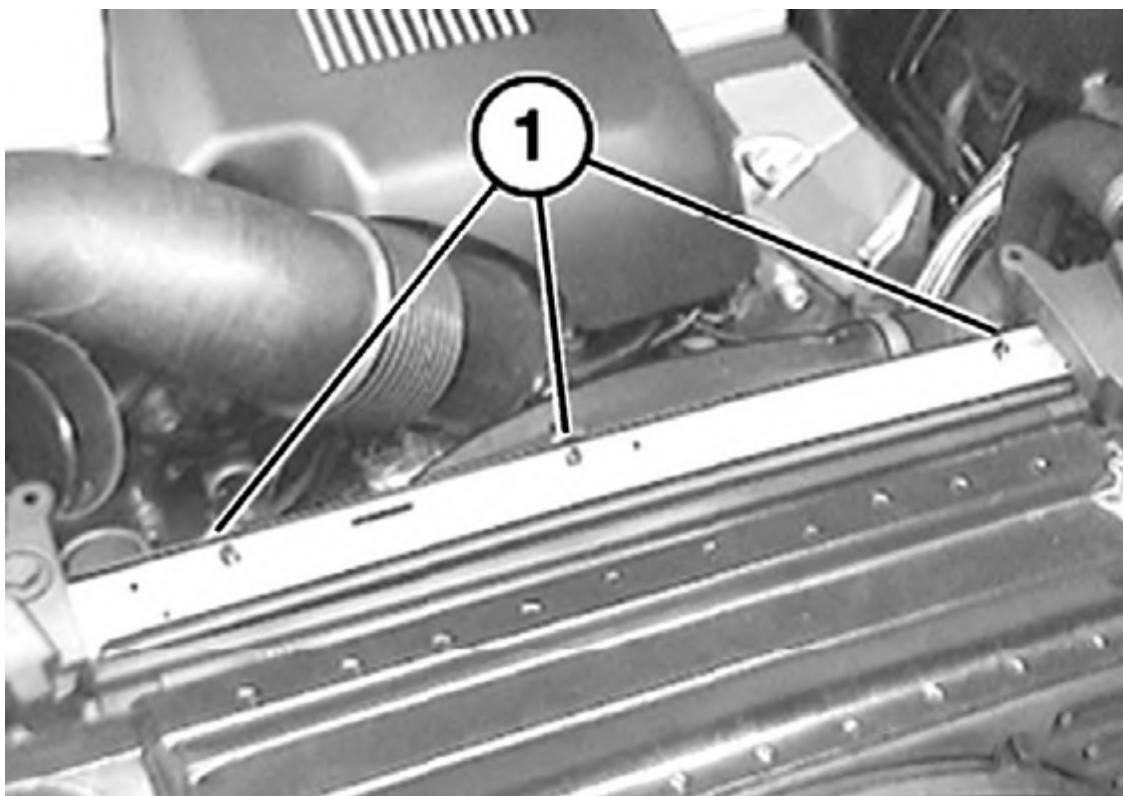
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Fig. 20: Removing Water Hose - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



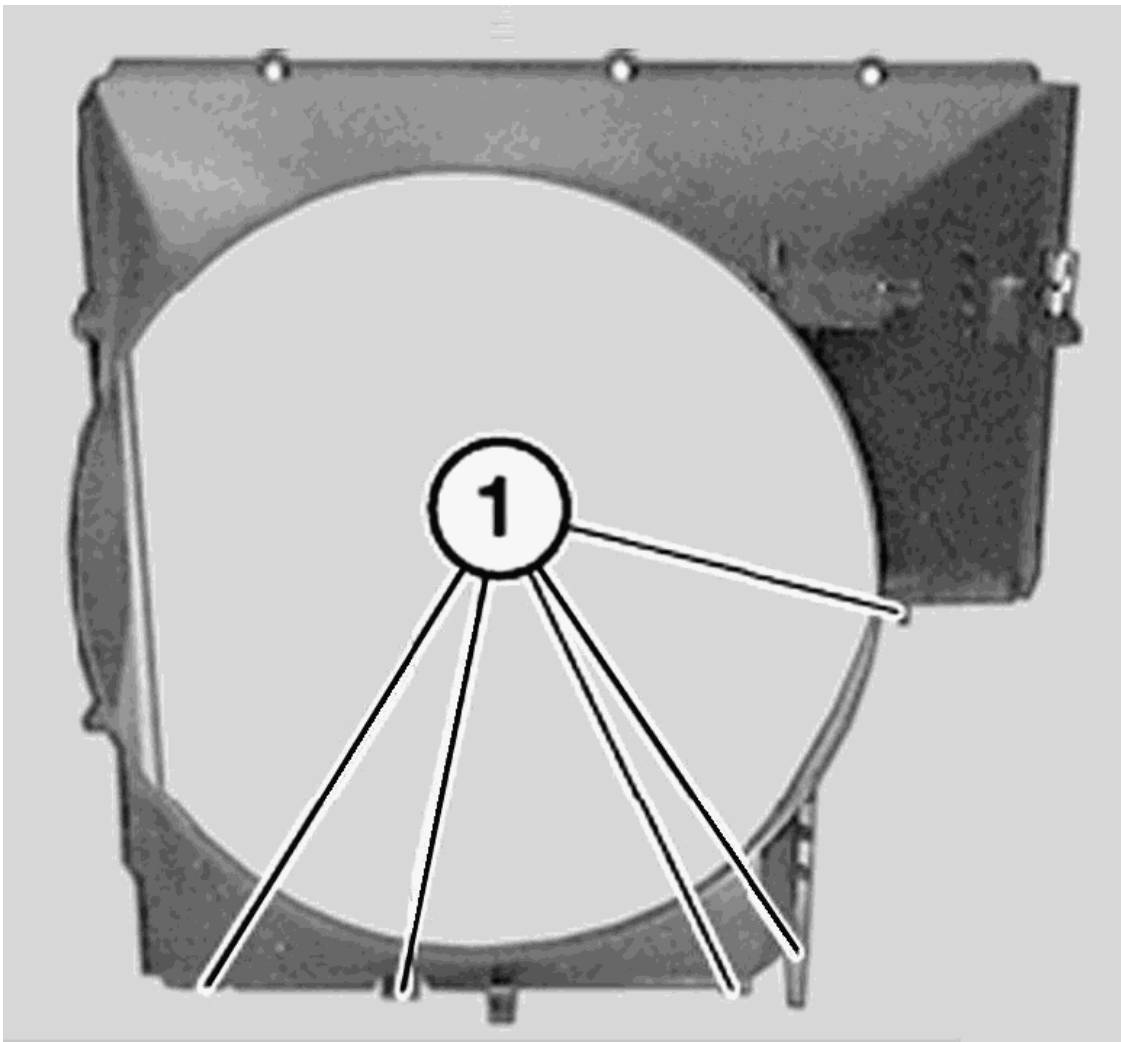
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Fig. 21: Locating Plug Connections - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 22: Locating Fan Cowl Expansion Rivets - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



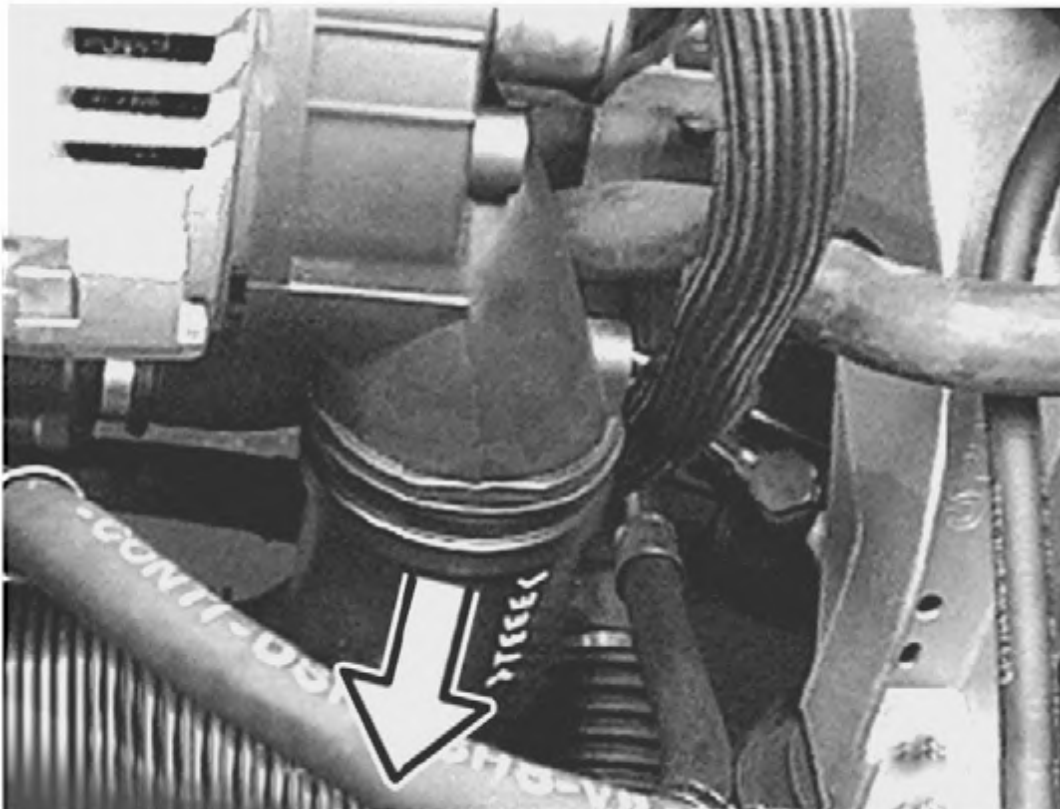
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Fig. 23: Attaching Lugs To Holders On Radiator - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.

GENERATOR 3.0L (M54)

CAUTION: Disconnecting vehicle battery will cancel fault codes of control units. On vehicles with radio codes, after disconnecting battery, radio codes must be re-entered. Obtain radio code card from customer. Note stored stations and restore them after connecting battery. Also, where applicable, initialize sunroof and set steering angle.

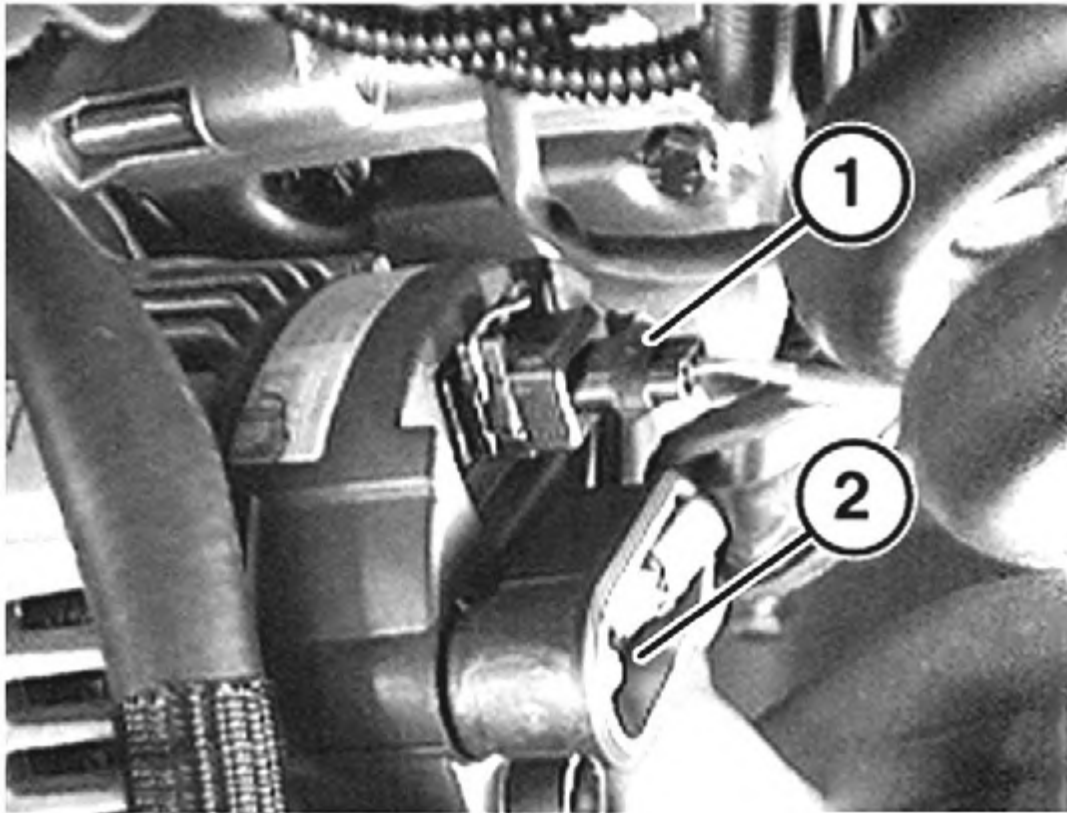
1. Retrieve fault codes. Turn off ignition. Disconnect and cover battery negative terminal.
2. Remove intake filter housing. See **INTAKE FILTER HOUSING**. Remove fan clutch. See **FAN CLUTCH**. Remove generator drive belt. See **GENERATOR DRIVE BELT 3.0L (M54)**.
3. If necessary, drain supply tank for power steering pump. Remove with holder and place to one side. Lines on supply tank for power steering pump remain connected.
4. If fitted, remove air hose. See **Fig. 24**.
5. For version 1, take off cap on connections. Disconnect plug connection (1). See **Fig. 25**. Remove nut (2) and disconnect wire from battery positive lead.
6. For version 2, disconnect plug connection (1). See **Fig. 26**. Remove nut (2) and disconnect wire from battery positive lead.
7. On version without idler pulley, remove generator screws in succession while gripping generator firmly. See **Fig. 27**. Remove generator.
8. On version with idler pulley, remove cover from idler pulley (1). See **Fig. 28**. Remove screw and remove idler pulley (1). Remove screw and remove generator (2).



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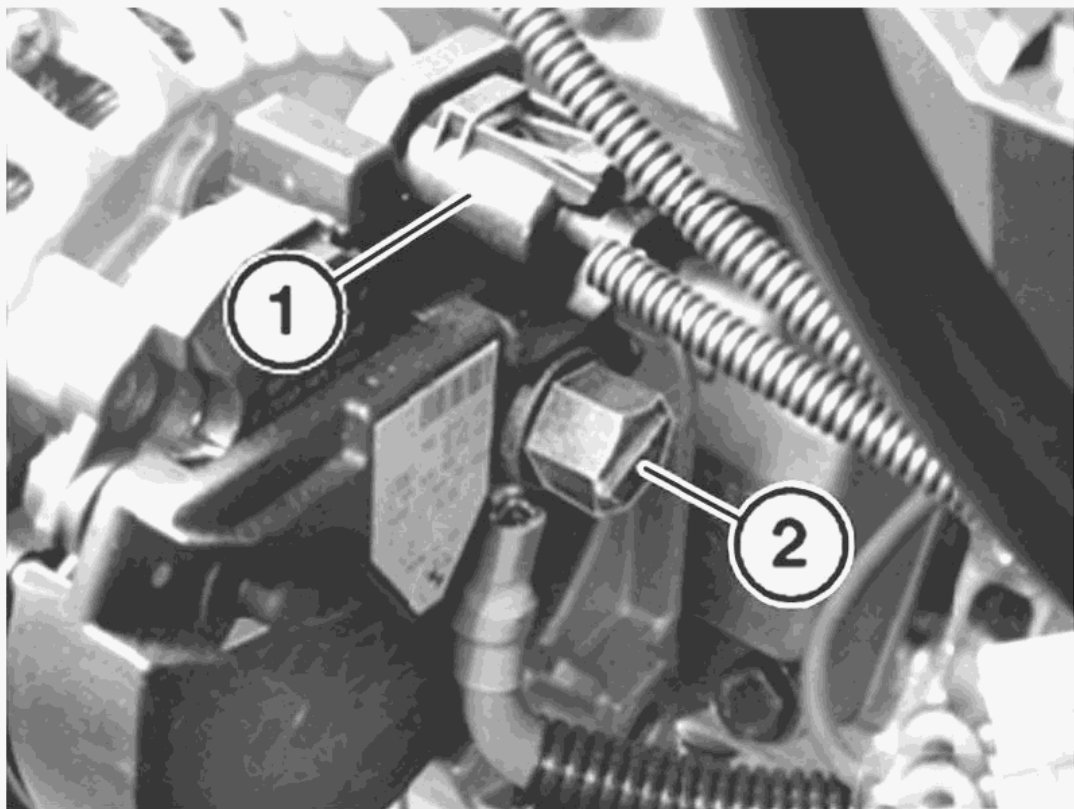
Fig. 24: Removing Air Hose - 3.0L (M54)

Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 25: Locating Version 1 Generator Connections - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 26: Locating Version 2 Generator Connections - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

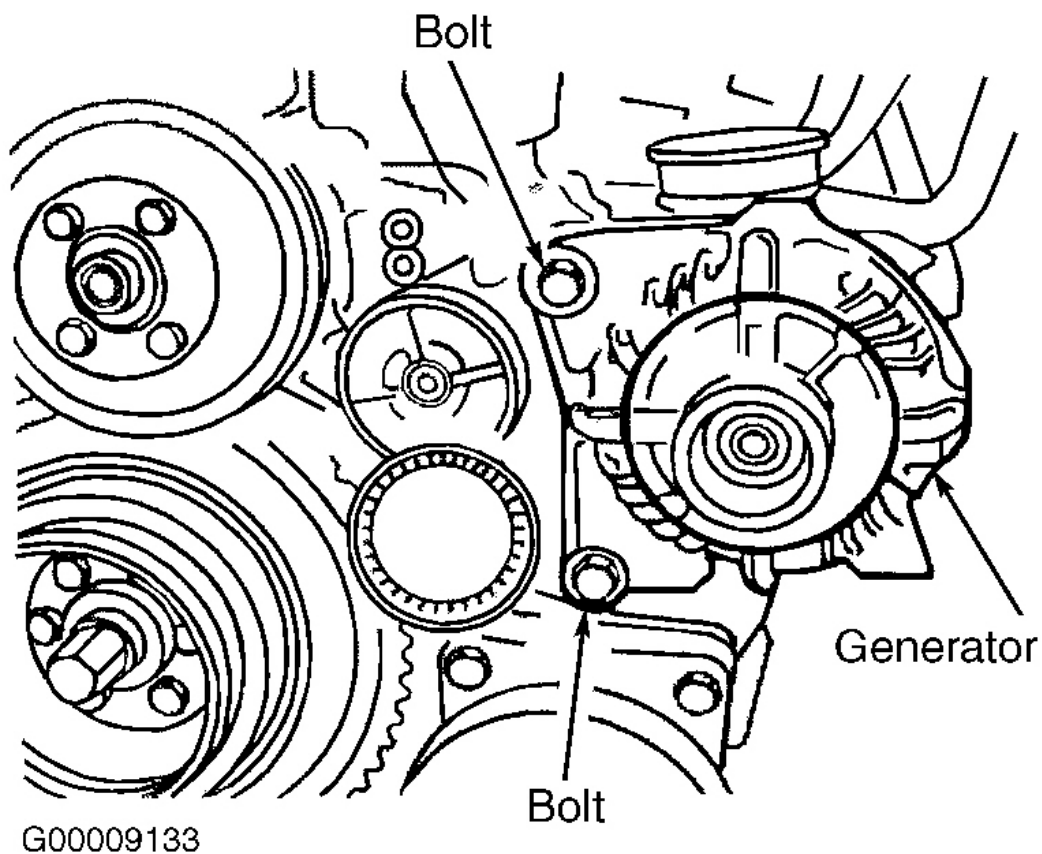
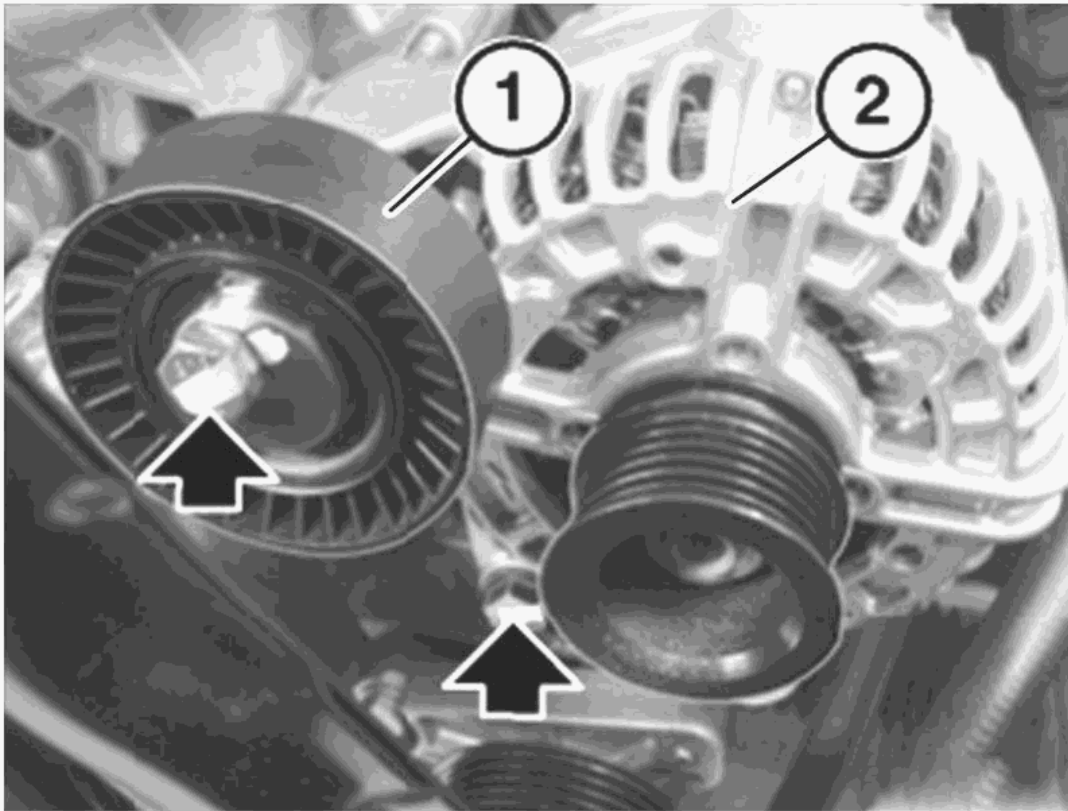


Fig. 27: Removing Generator (Without Idler Pulley) - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 28: Removing Cover From Idler Pulley - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation

1. To install, reverse removal procedure. Turning lock of tensioning roller on version with idler pulley must engage in generator groove. See **Fig. 29**.
2. Tighten wire from battery positive lead to specification. See **TORQUE SPECIFICATIONS**.
3. Interrogate fault memory of DME control unit. Clear fault memory.

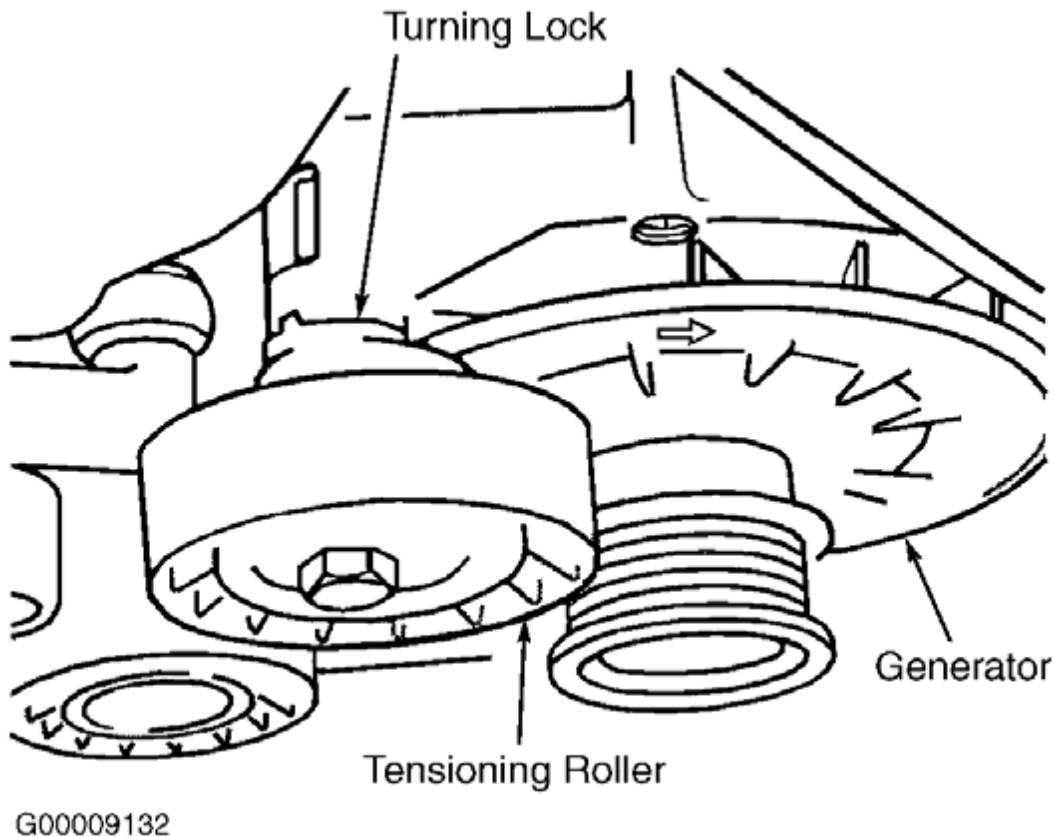


Fig. 29: Positioning Tensioning Roller Turning Lock - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

GENERATOR 4.4L & 4.6L (M62)

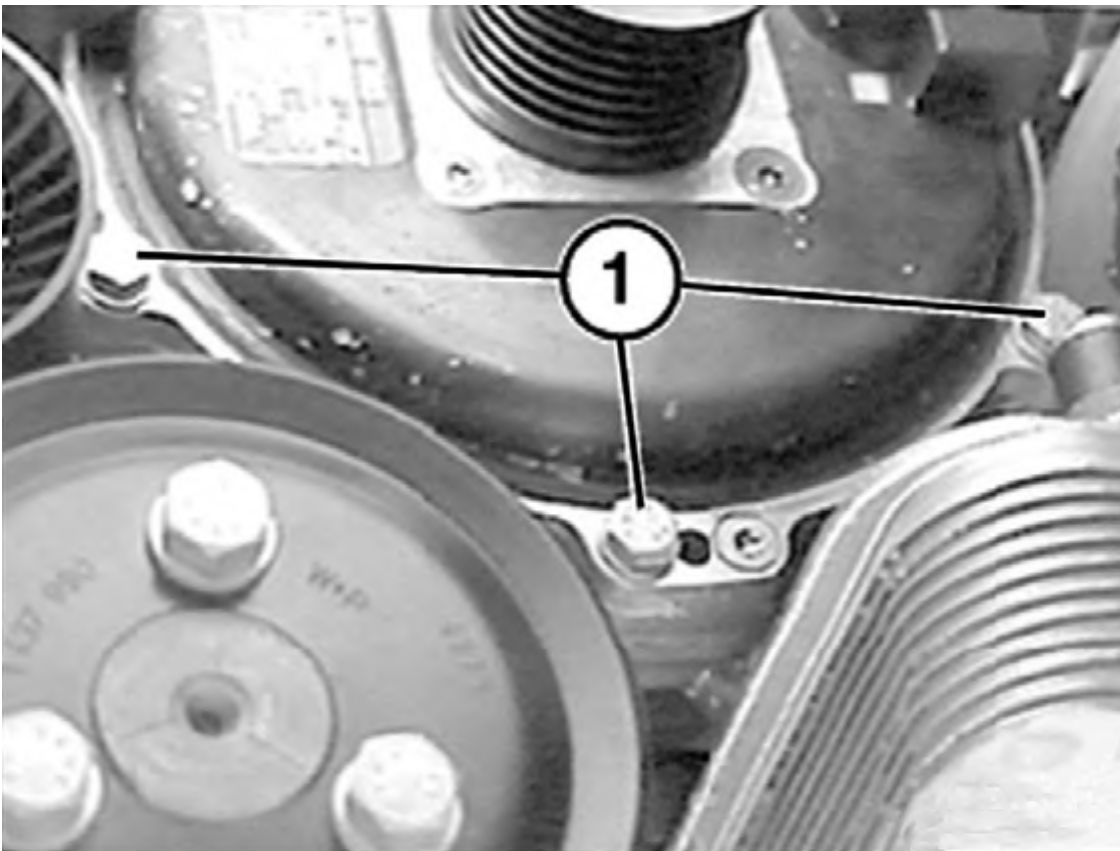
WARNING: Danger of scalding! Only perform procedures on engine that has cooled down.

CAUTION: Disconnecting vehicle battery will cancel fault codes of control units. On vehicles with radio codes, after disconnecting battery, radio codes must be re-entered. Obtain radio code card from customer. Note stored stations and restore them after connecting battery. Also, where applicable, initialize sunroof and set steering angle.

Removal

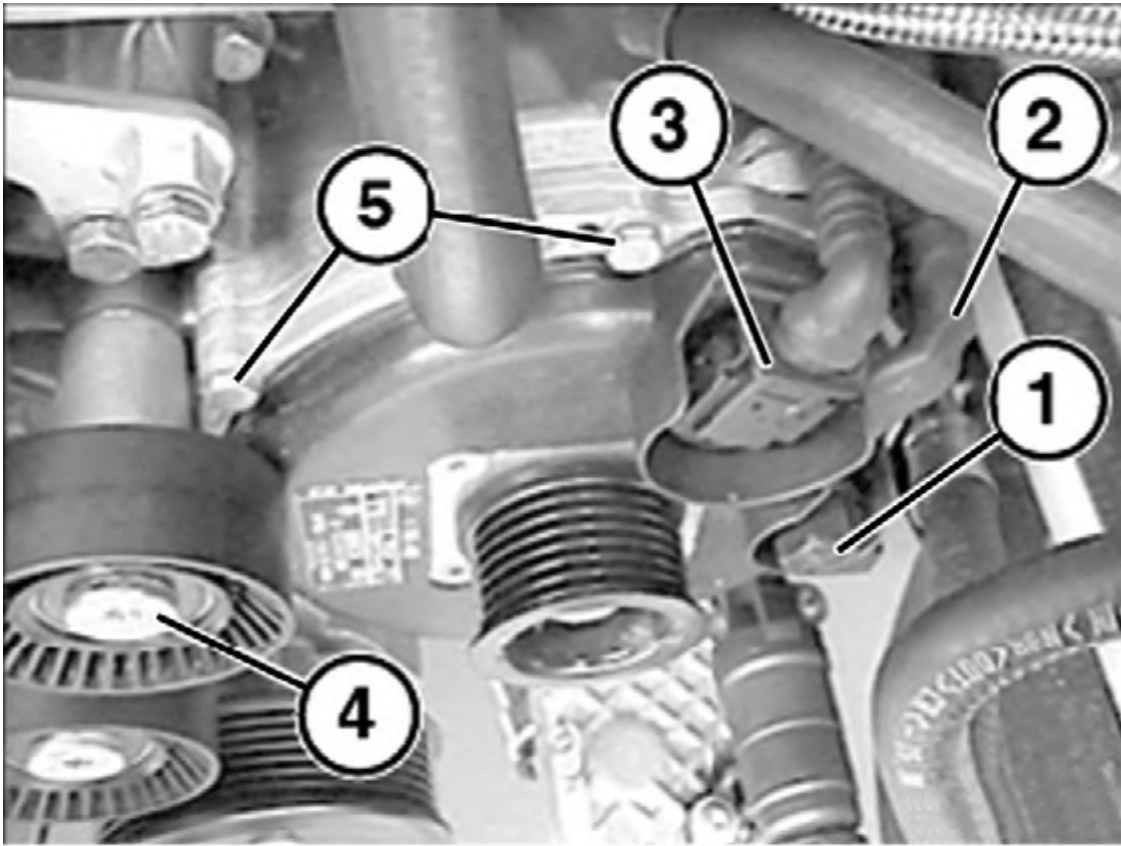
1. Disconnect and cover battery negative lead.
2. Remove generator drive belt. See **GENERATOR DRIVE BELT 4.4L & 4.6L (M62)**.

3. Remove fan cowl. See **FAN COWL 4.4L & 4.6L (M62)**.
4. Open cap on coolant expansion tank. Slacken vent plug on coolant expansion tank. Remove reinforcement plate. Remove underbody paneling. Open drain plug at bottom of radiator. Drain, catch and dispose of coolant observing all appropriate disposal regulations.
5. Remove bolts (1) on generator. See **Fig. 30**.
6. Remove nut (1). See **Fig. 31**. Disconnect battery positive wire (2) from generator. Disconnect plug (3). Remove screw (4) and remove roller. Remove screws (5) on generator.
7. Pull out generator towards front. A small amount of coolant will emerge when generator is removed from housing. Catch and dispose of coolant observing all appropriate disposal regulations.



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Fig. 30: Locating Generator Bolts - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 31: Removing Generator - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.

Installation

1. Replace sealing ring (1) on generator. See **Fig. 32**.
2. If necessary, replace generator belt pulley. See **GENERATOR BELT PULLEY**.
3. To install, reverse removal procedure. Tighten battery positive wire to specification. See **TORQUE SPECIFICATIONS**.
4. Open cap and vent plug on coolant expansion tank. See **Fig. 33**.
5. Turn on ignition. Set heating controller to maximum temperature. Set fan to low setting. This opens heating valves and starts auxiliary water pump.
6. Use only recommended BMW coolant (82 14 1 467 704) or equivalent. Very slowly pour coolant into coolant expansion tank up to full level. Close vent plug when bubble-free coolant emerges.
7. Close coolant expansion tank. Allow engine to warm up until thermostat opens.
8. Allow engine to cool down before checking level again. Coolant temperature must not exceed 86°F (30°C). If ambient temperature exceeds 86°F (30°C), allow engine to cool down at least to ambient temperature. Check coolant level. If necessary, top up coolant until liquid reaches marking on coolant

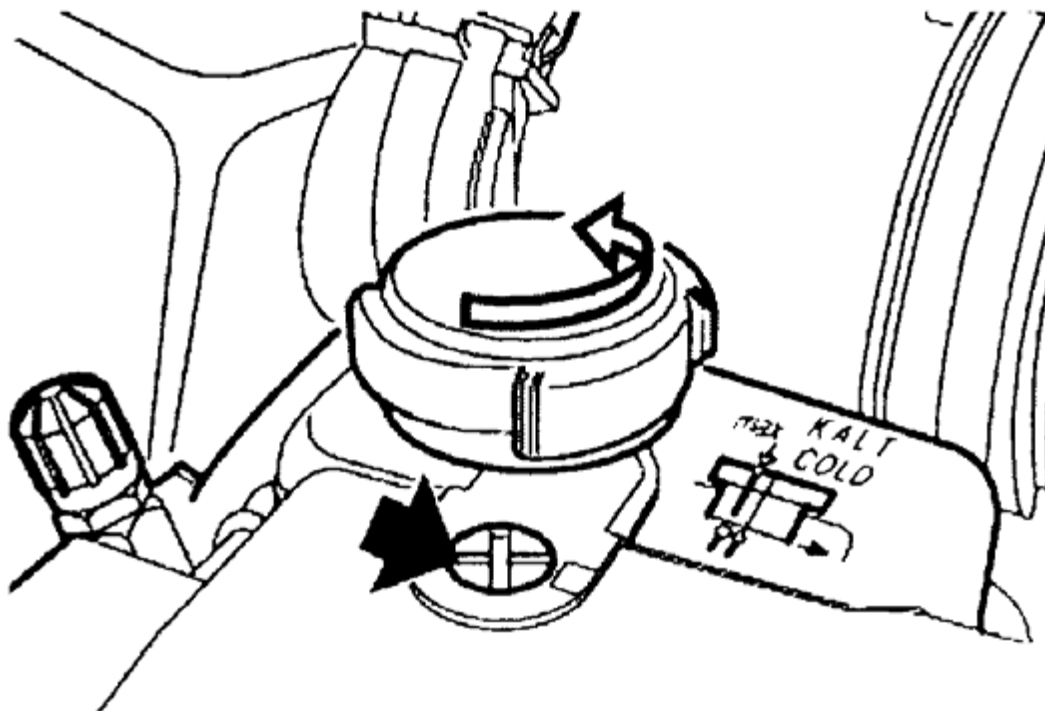
expansion tank.

9. Check cooling system for leaks.



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Fig. 32: Locating Sealing Ring - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 33: Locating Cap & Vent Plug - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.

GENERATOR 4.4L & 4.8L (N62)

WARNING: Danger of scalding! Only perform tasks on an engine that has cooled down.

CAUTION: Disconnecting vehicle battery will cancel fault codes of control units. On vehicles with radio codes, after disconnecting battery, radio codes must be re-entered. Obtain radio code card from customer. Note stored stations and restore them after connecting battery. Also, where applicable, initialize sunroof and set steering angle.

NOTE: A small amount of coolant emerges when generator is removed from housing. Catch and dispose of escaping coolant observing appropriate waste disposal regulations.

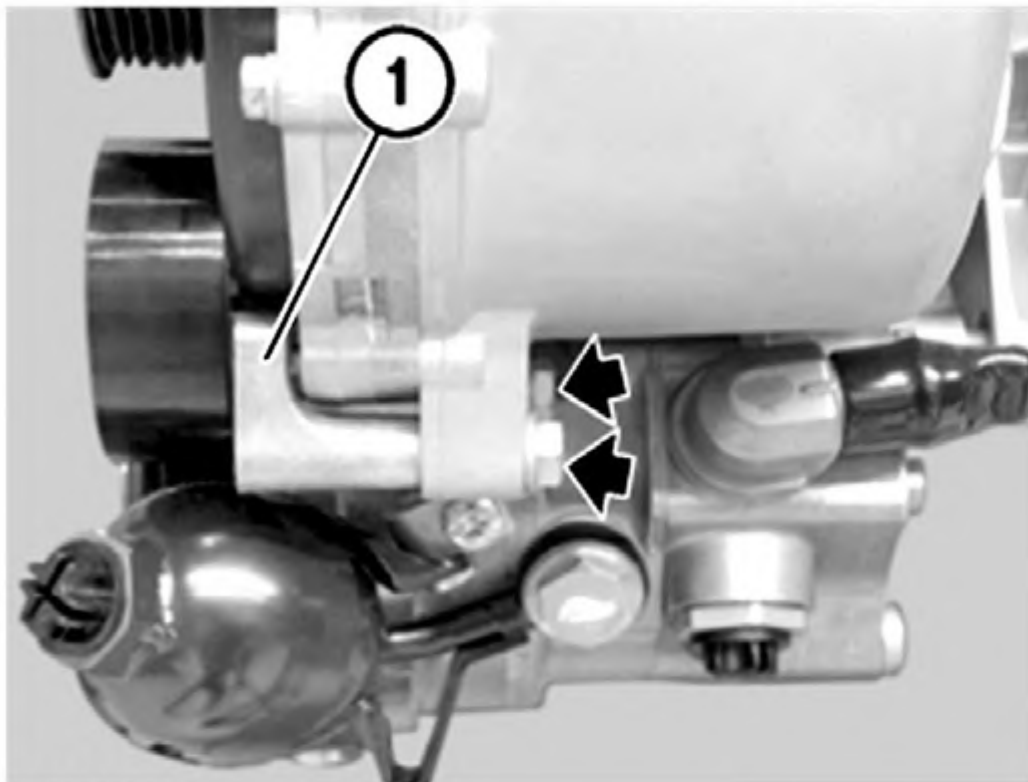
NOTE: There are no vent plugs on radiator or thermostat housing. Cooling system is

bled while filling and during subsequent idle operation.

NOTE: For purposes of clarity, some procedures are shown in figures after component has been removed.

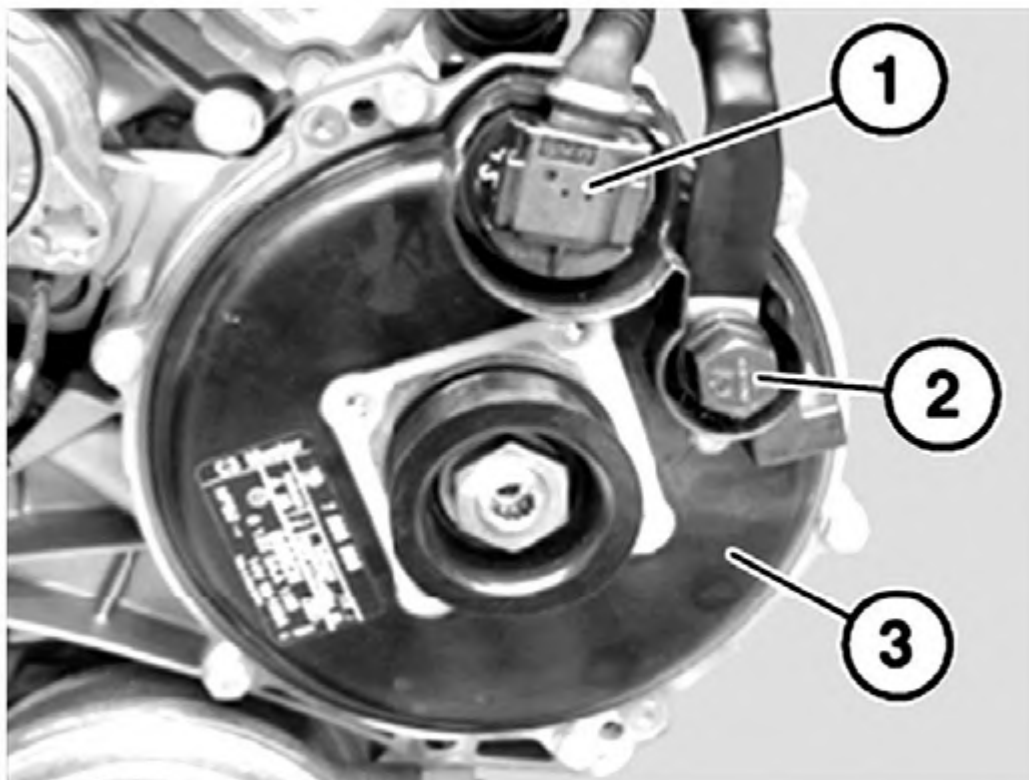
Removal

1. Retrieve fault codes. Turn off ignition. Disconnect and cover battery negative terminal.
2. Remove radiator.
3. Remove generator drive belt. See **GENERATOR DRIVE BELT 4.4L (N62)**.
4. Remove A/C compressor drive belt. See **A/C COMPRESSOR DRIVE BELT 4.4L (N62)**.
5. Remove screws on antifriction bearing on left and right of stabilizer bar. Hydraulic lines on oscillating motor remain connected. Do NOT release screws on stabilizer link. Remove stabilizer bar with antifriction bearing from threaded pins and secure from falling down.
6. Release holder from hydraulic lines for power steering. Hydraulic lines on power steering pump remain connected.
7. Remove screws and remove guide pulley (1). See **Fig. 34**.
8. Unlock plug (1) and remove. See **Fig. 35**. Unscrew nut (2). Remove battery positive lead from generator (3).
9. Remove screws on generator (3). See **Fig. 36**. Remove generator out towards front.



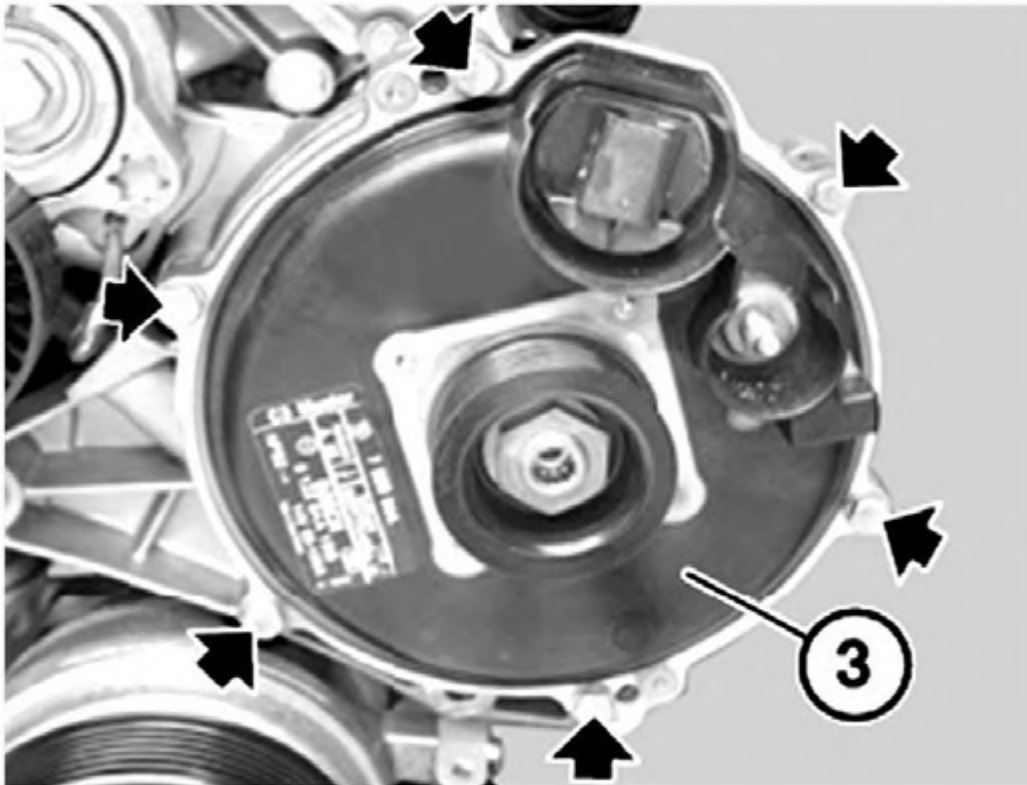
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Fig. 34: Removing Guide Pulley - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 35: Locating Generator Connections - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.



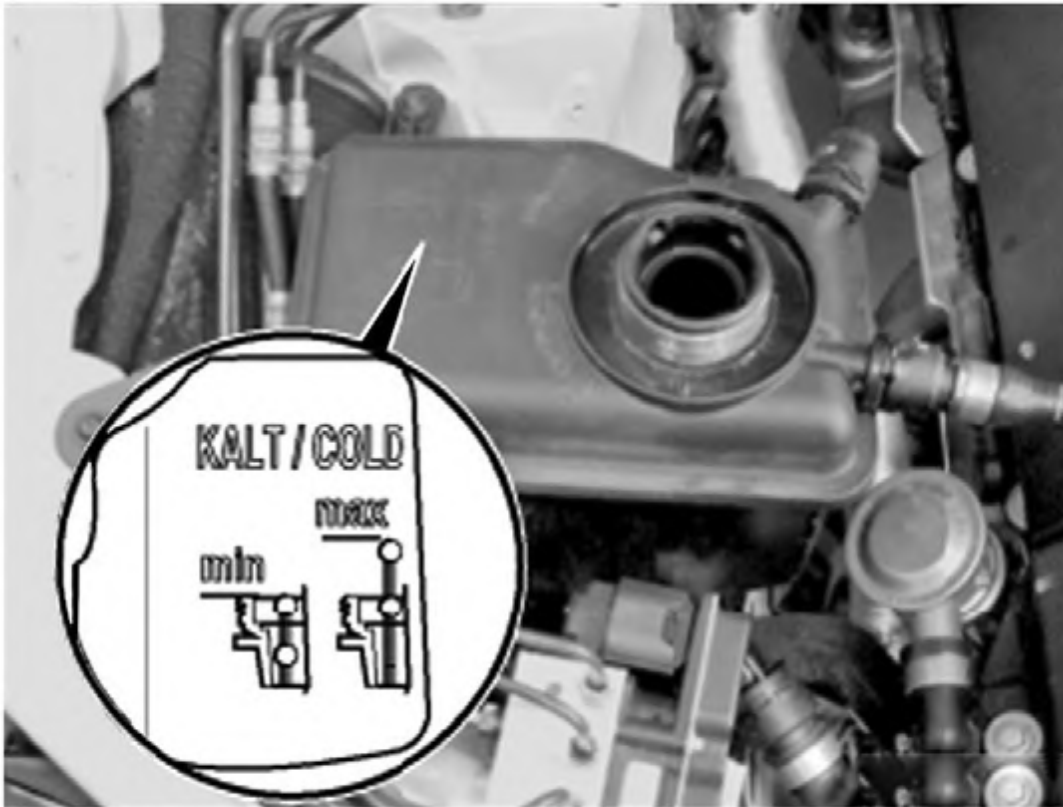
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Fig. 36: Removing Generator - 4.4L (N62)

Courtesy of BMW OF NORTH AMERICA, INC.

Installation

1. To install, reverse removal procedure. Replace sealing ring (1) on generator. See **Fig. 32**. Tighten screws to specification. See **TORQUE SPECIFICATIONS**.
2. If necessary, replace generator belt pulley. See **GENERATOR BELT PULLEY**.
3. Engine must be cooled down before coolant level is checked. Coolant temperature must not exceed 86°F (30°C). If ambient temperature is above 86°F (30°C), allow engine to cool down to ambient temperature.
4. Turn on ignition. Set blower to low level. Set heating controller to maximum temperature. This ensures that heater valves are fully opened and auxiliary water pump starts up. The auxiliary water pump must deliver coolant in order to ensure full bleeding.
5. Use only recommended BMW coolant (82 14 1 467 704) or equivalent. Perform filling operation slowly. Pour coolant into expansion tank up to MAX mark. See **Fig. 37**. Do NOT overfill. Start engine and run at idle speed for about one minute with cap open. Add coolant to MAX as necessary. Close cap and run engine up to operating temperature and main thermostat opens. Check cooling circuit and drain plug for leaks.



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Fig. 37: Filling Coolant Expansion Tank - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.

GENERATOR BELT PULLEY

Removal & Installation

1. Depending on generator type, grip shaft with one of the following:
 - Hexagon Socket
 - Multi-Tooth Socket
 - Torx Socket Wrench

Remove nut with Special Tool (12 7 110). See **Fig. 38**.

2. To install, reverse removal procedure. Tighten nut to specification. See **TORQUE SPECIFICATIONS**.

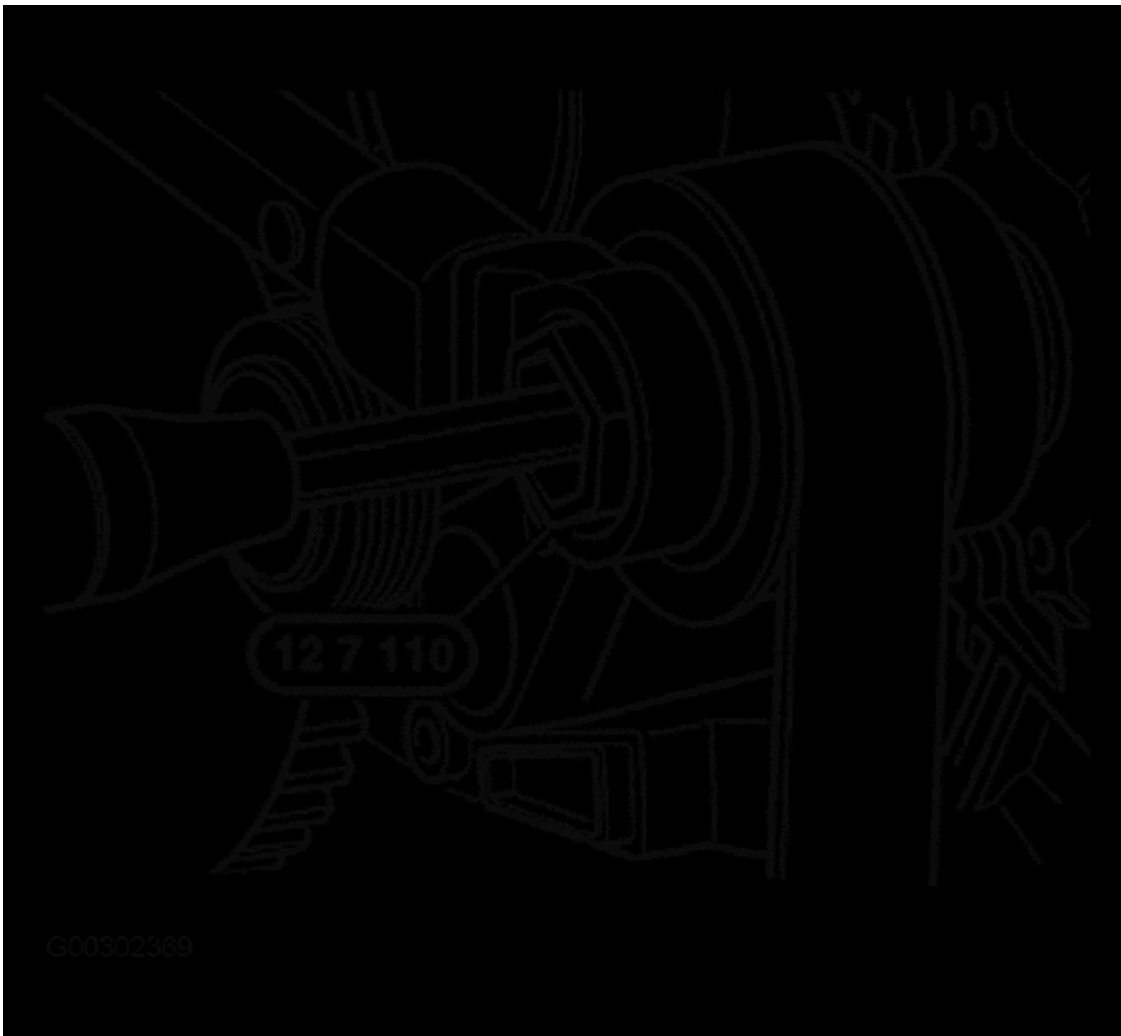


Fig. 38: Removing Generator Belt Pulley
Courtesy of BMW OF NORTH AMERICA, INC.

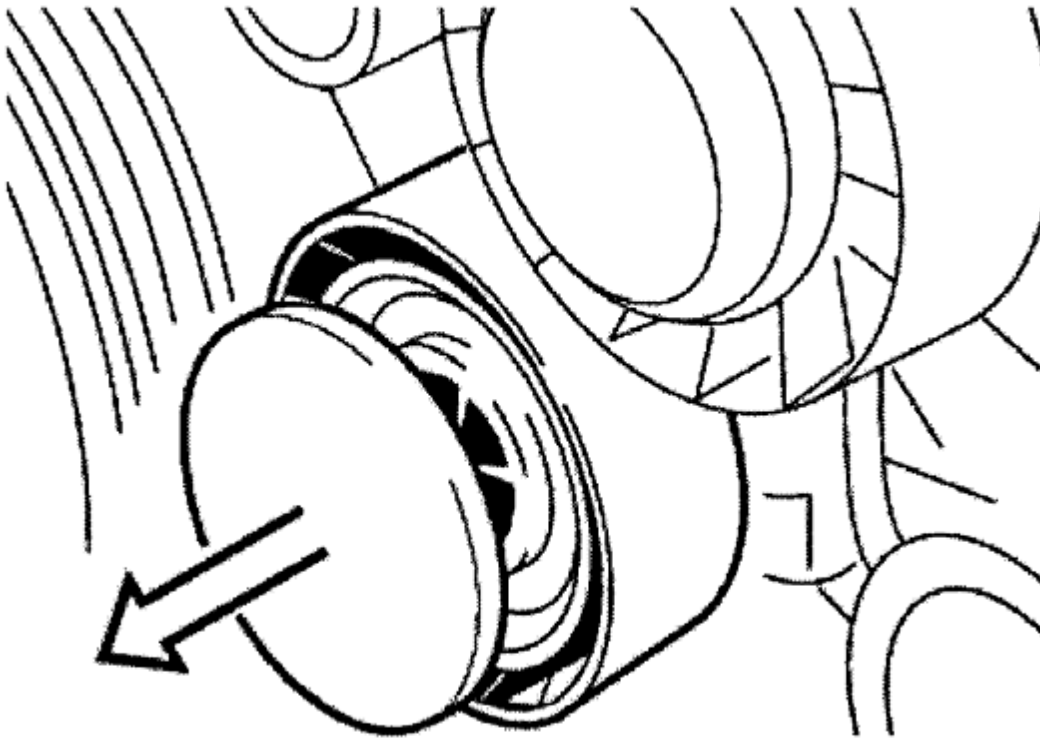
GENERATOR DRIVE BELT 3.0L (M54)

NOTE: If drive belt is to be reused, mark direction of travel and reinstall drive belt in same direction.

Removal & Installation

1. Remove fan clutch with fan impeller. See **FAN CLUTCH**.
2. Remove A/C compressor drive belt. See **A/C COMPRESSOR DRIVE BELT**.
3. Remove cap from tensioning roller. See **Fig. 39**.
4. Relieve tension on belt drive. See **Fig. 40**. Remove drive belt.
5. Check drive belt for coolant and oil residues. Replace if necessary.
6. To install, reverse removal procedure. Check that belt is correctly positioned on belt pulleys. see **Fig. 41**.

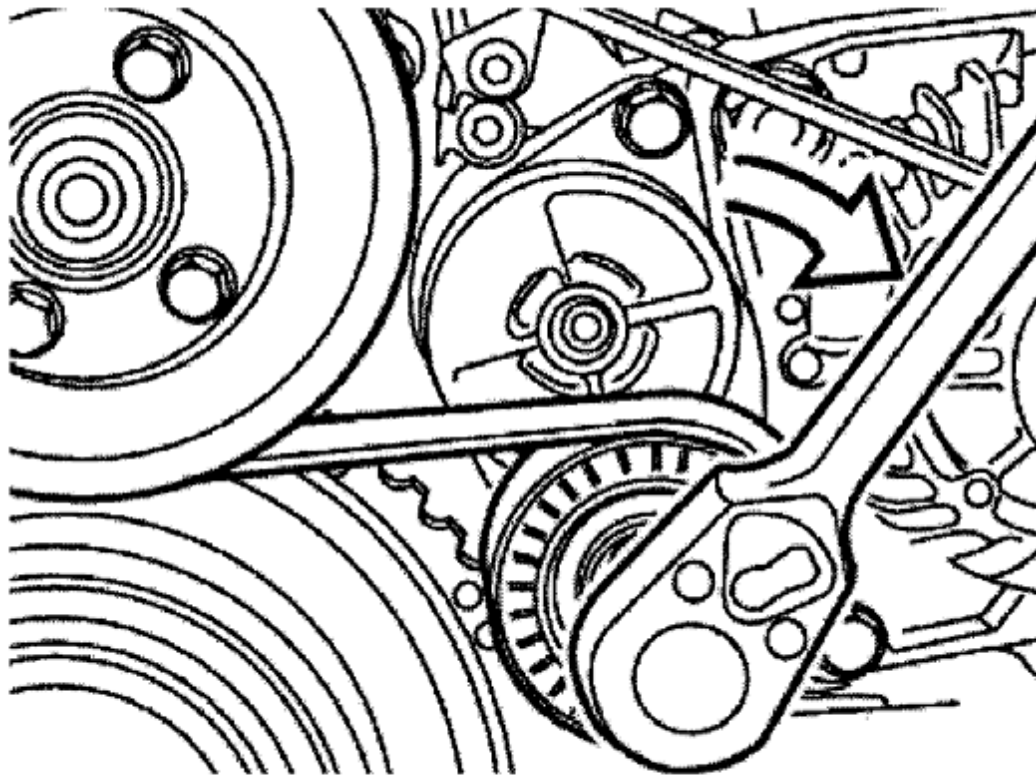
For version with auxiliary tensioning roller, see **Fig. 42**. Locking device of auxiliary tensioning roller must snap into groove on generator. See **Fig. 43**.



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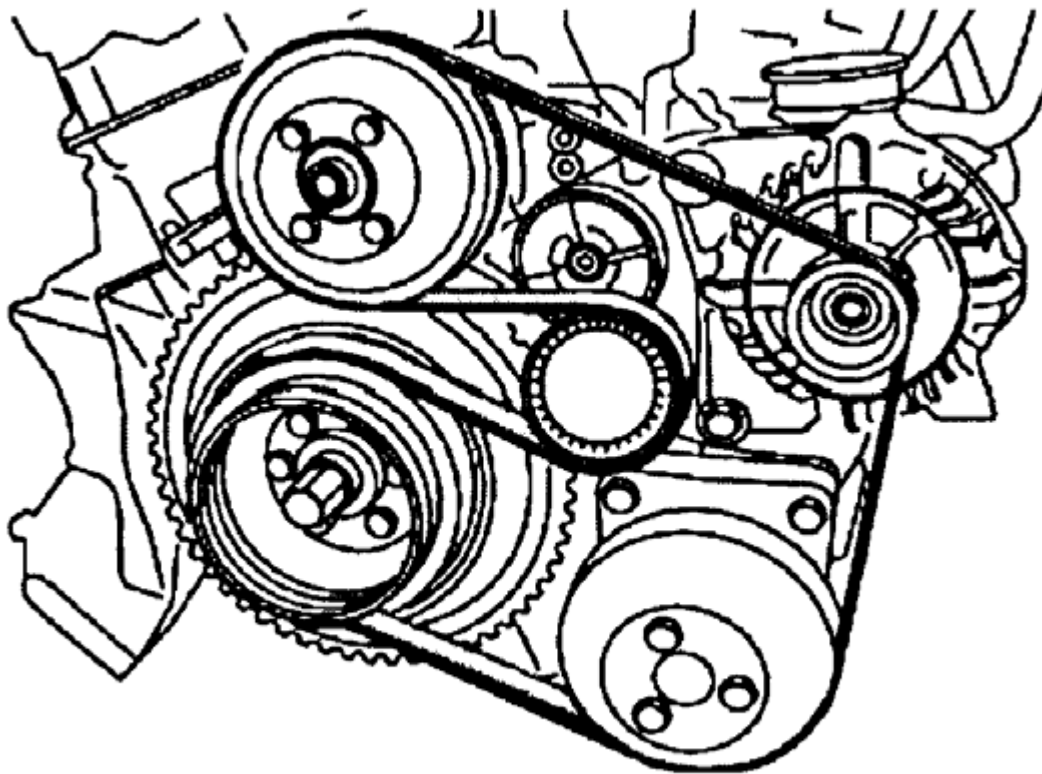
Fig. 39: Removing Cap From Tensioning Roller - 3.0L (M54)

Courtesy of BMW OF NORTH AMERICA, INC.



G00302353

Fig. 40: Relieving Tension On Belt Drive - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 41: Routing Alternator Drive Belt - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 42: Routing Alternator Drive Belt W/ Auxiliary Tension Roller - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.



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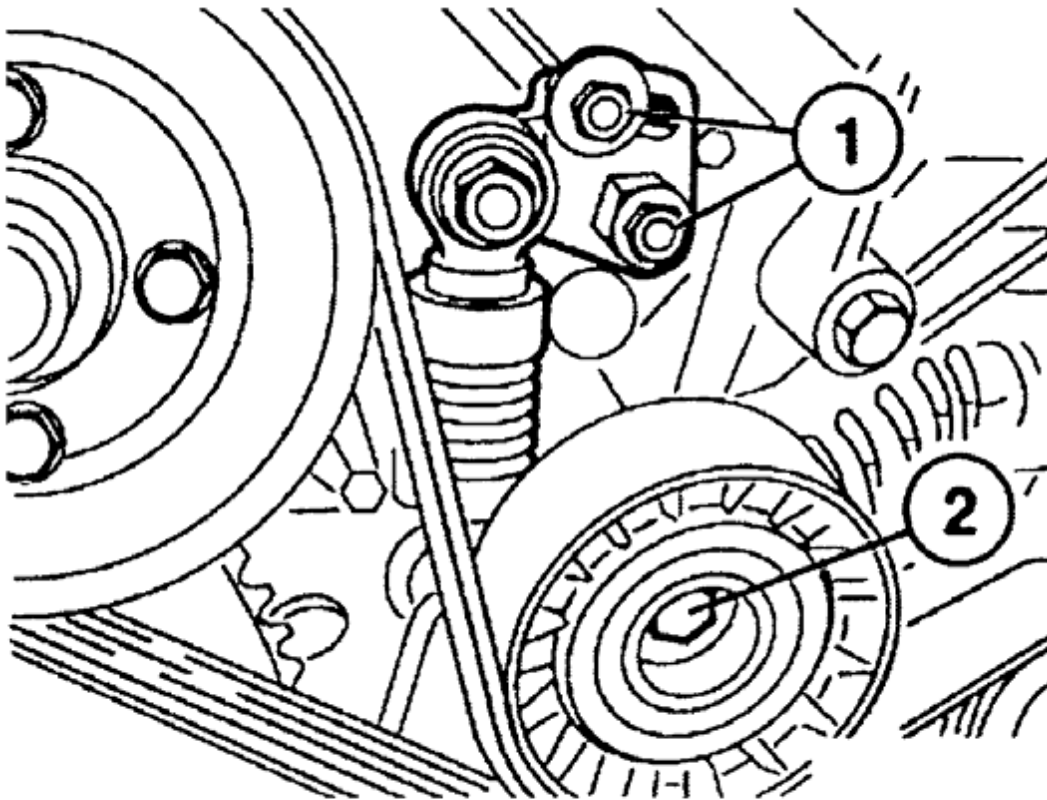
Fig. 43: Locating Locking Device Of Auxiliary Tensioning Roller - 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

GENERATOR DRIVE BELT 4.4L & 4.6L (M62)

NOTE: If drive belt is to be reused, mark direction of travel and reinstall drive belt in same direction.

Removal & Installation

1. Remove fan clutch with impeller. See **FAN CLUTCH**.
2. Slacken screws (1) and relieve tension on belt drive. See **Fig. 44**. Remove drive belt.
3. Check drive belt for coolant and oil residue. Replace, if necessary.
4. To install, mount drive belt and check that it is correctly positioned on belt pulleys. See **Fig. 45**.
5. Pretension adjustable plate at hexagon head (1) up to end of elongated hole (2) and tighten screws (3). See **Fig. 46**. Screws (3) with liquid cooled generator are M8 strength class 10.9 and tightening torque is 22 ft. lbs. (30 N.m).



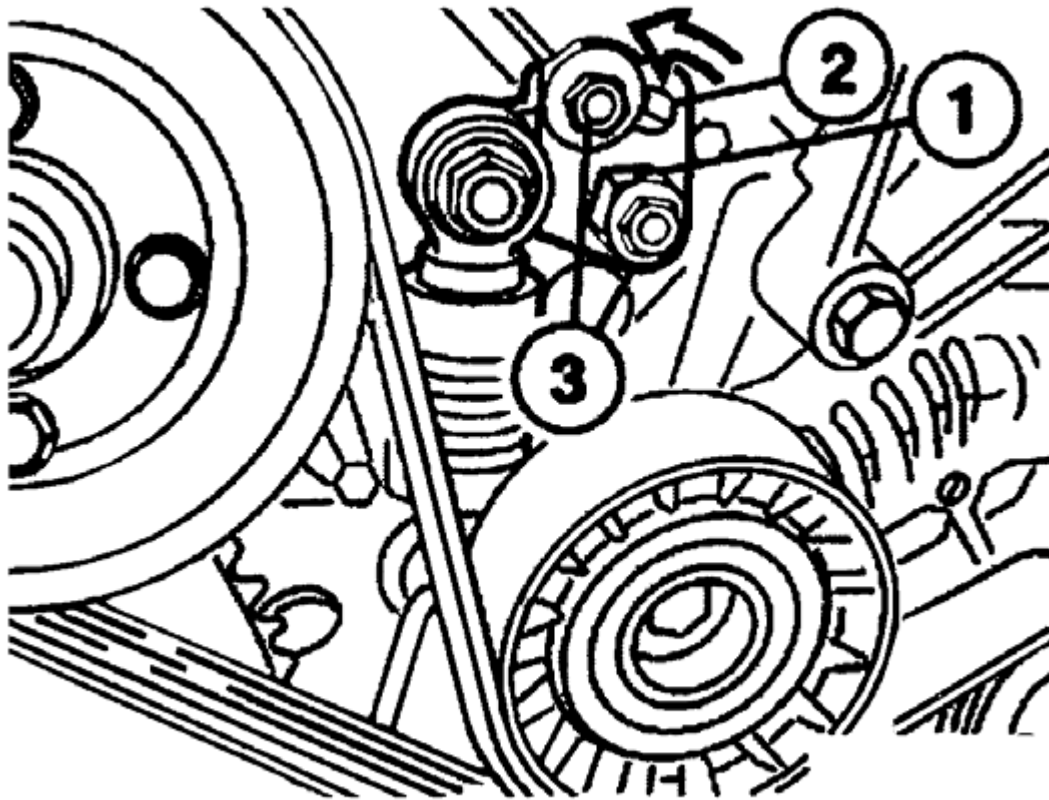
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Fig. 44: Removing Generator Drive Belt - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 45: Alternator Drive Belt Routing - 4.4L & 4.6L (M62)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 46: Installing Generator Drive Belt - 4.4L & 4.6L (M62)

Courtesy of BMW OF NORTH AMERICA, INC.

GENERATOR DRIVE BELT 4.4L & 4.8L (N62)

NOTE: If drive belt is to be reused, mark direction of travel and reinstall drive belt in same direction.

Removal & Installation

1. Pretension belt tensioner slowly and carefully with a Torx socket as far as it will go and secure with Special Tool (11 3 340). See **Fig. 47**. Remove generator drive belt.
2. Check drive belt for coolant and oil residue. Replace, if necessary.
3. To install, reverse removal procedure. Check that belt is correctly positioned on belt pulleys. See **Fig. 48**.



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Fig. 47: Removing Generator Drive Belt - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.



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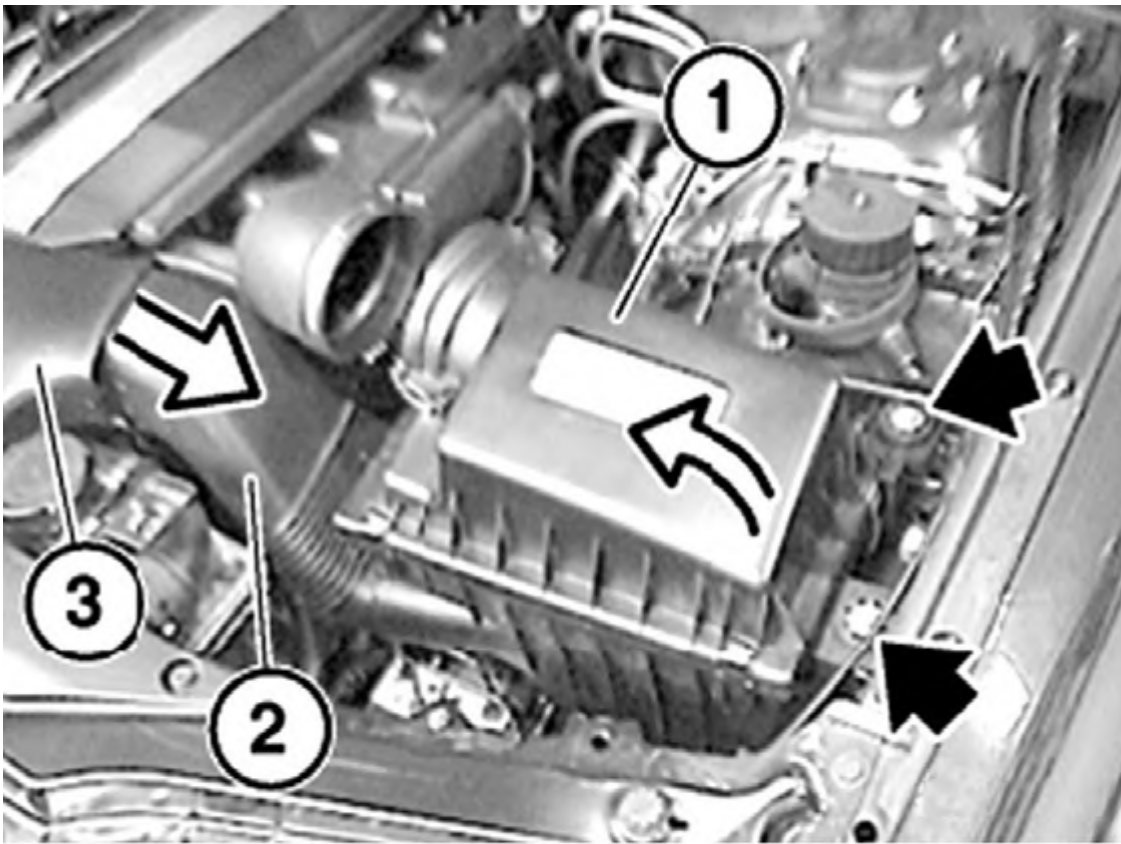
Fig. 48: Installing Generator Drive Belt - 4.4L (N62)

Courtesy of BMW OF NORTH AMERICA, INC.

INTAKE FILTER HOUSING

Removal & Installation

1. Turn off ignition. Remove air-mass sensor. See **AIR-MASS SENSOR 3.0L (M54)**.
2. Remove screws. Raise intake filter housing (1) a little. See **Fig. 49**. Pull intake pipe (2) out of intake hood (3).
3. To install, reverse removal procedure.



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Fig. 49: Removing Intake Filter Housing 3.0L (M54)
Courtesy of BMW OF NORTH AMERICA, INC.

VOLTAGE REGULATOR (BOSCH)

CAUTION: Disconnecting vehicle battery will cancel fault codes of control units. On vehicles with radio codes, after disconnecting battery, radio codes must be re-entered. Obtain radio code card from customer. Note stored stations and restore them after connecting battery. Also, where applicable, initialize sunroof and set steering angle.

Removal & Installation

1. Turn off ignition. Retrieve fault codes. Disconnect battery ground wire from generator. Remove generator. See **GENERATOR 3.0L (M54)**.
2. Release bolts on cover. See **Fig. 50**.
3. Remove regulator switch. Check contact surfaces of collector rings for wear and recondition if necessary.

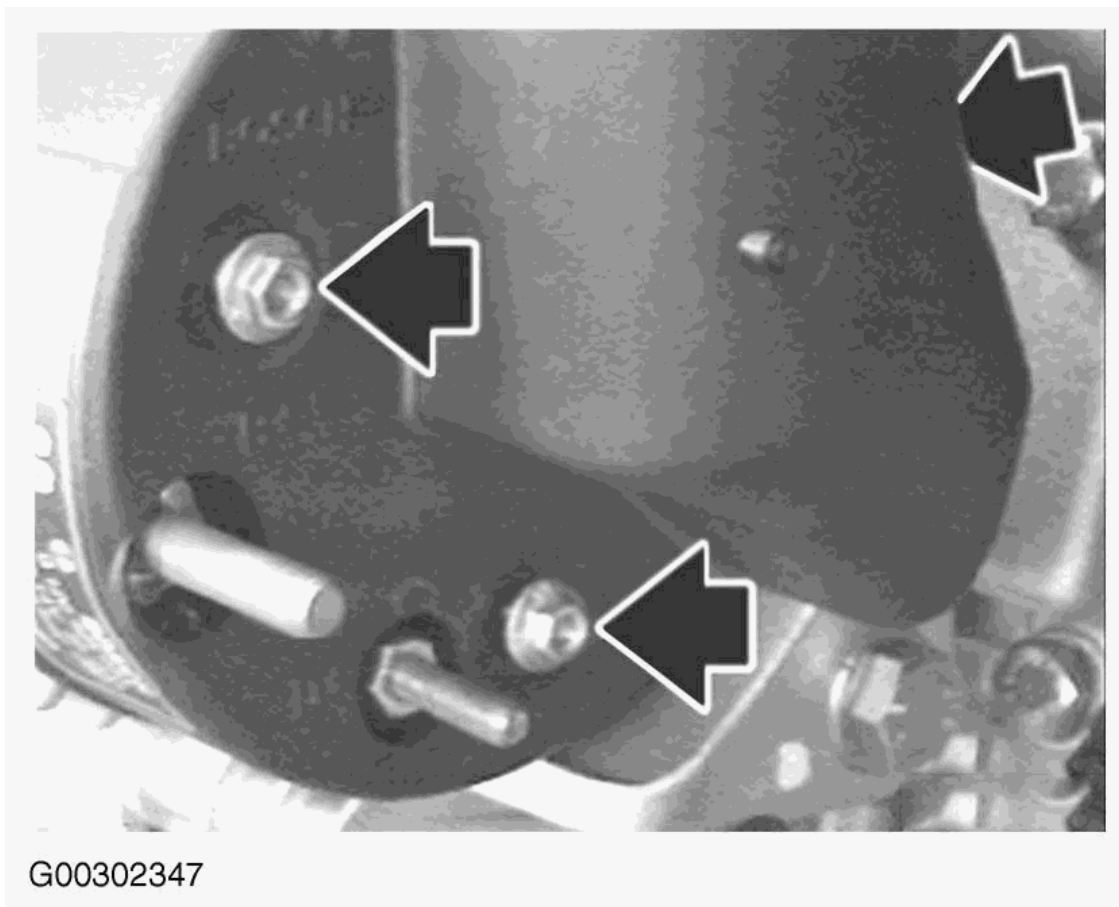


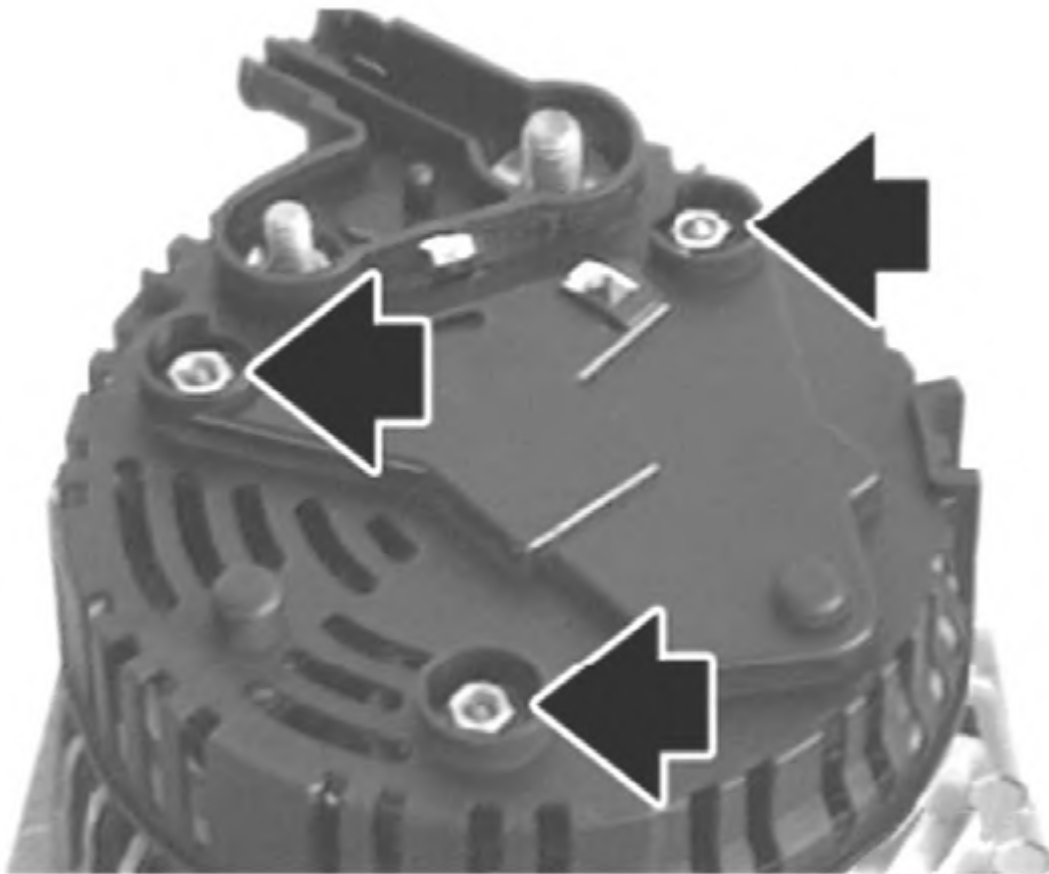
Fig. 50: Locating Bosch Regulator Switch Cover Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

VOLTAGE REGULATOR (VALEO)

CAUTION: Disconnecting vehicle battery will cancel fault codes of control units. On vehicles with radio codes, after disconnecting battery, radio codes must be re-entered. Obtain radio code card from customer. Note stored stations and restore them after connecting battery. Also, where applicable, initialize sunroof and set steering angle.

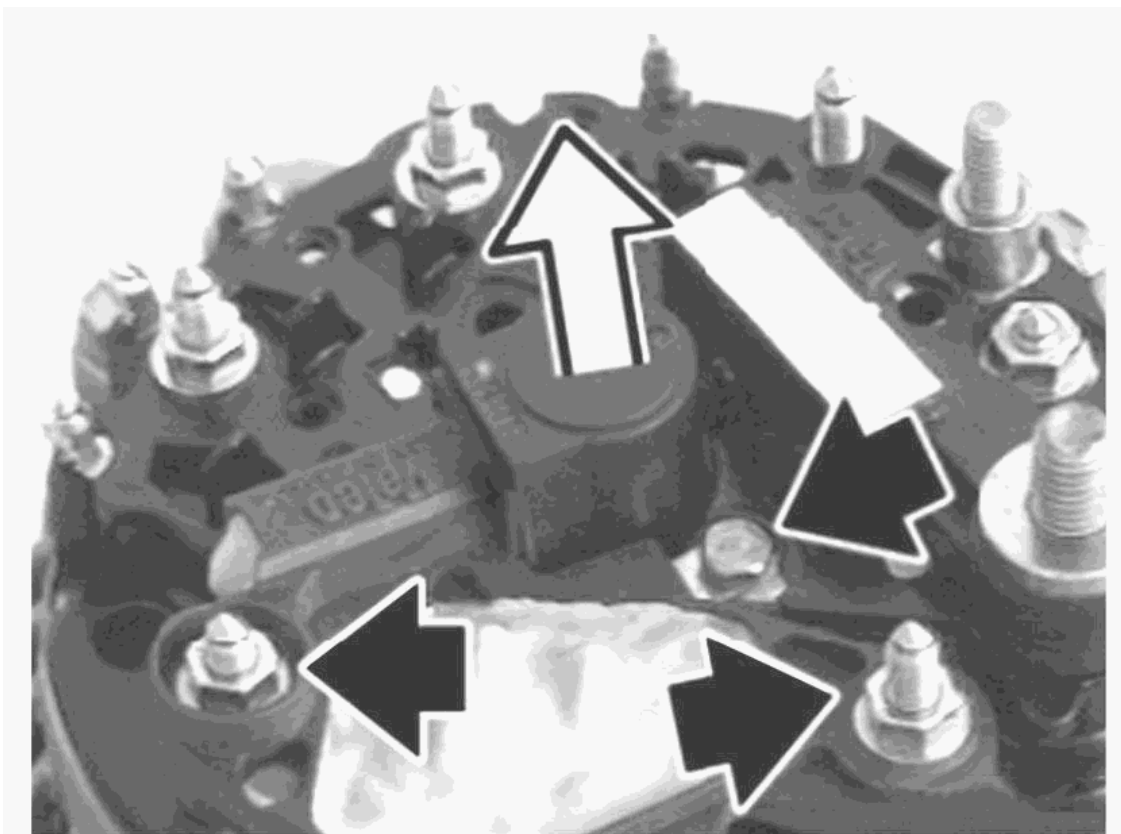
Removal

1. Turn off ignition. Retrieve fault codes. Disconnect battery ground wire. Remove generator. See **GENERATOR 3.0L (M54)**.
2. Remove nuts on cover. See **Fig. 51**.
3. Remove screws. Remove regulator switch. See **Fig. 52**.
4. Check contact surfaces (1) of collector rings for wear and recondition if necessary. See **Fig. 53**.



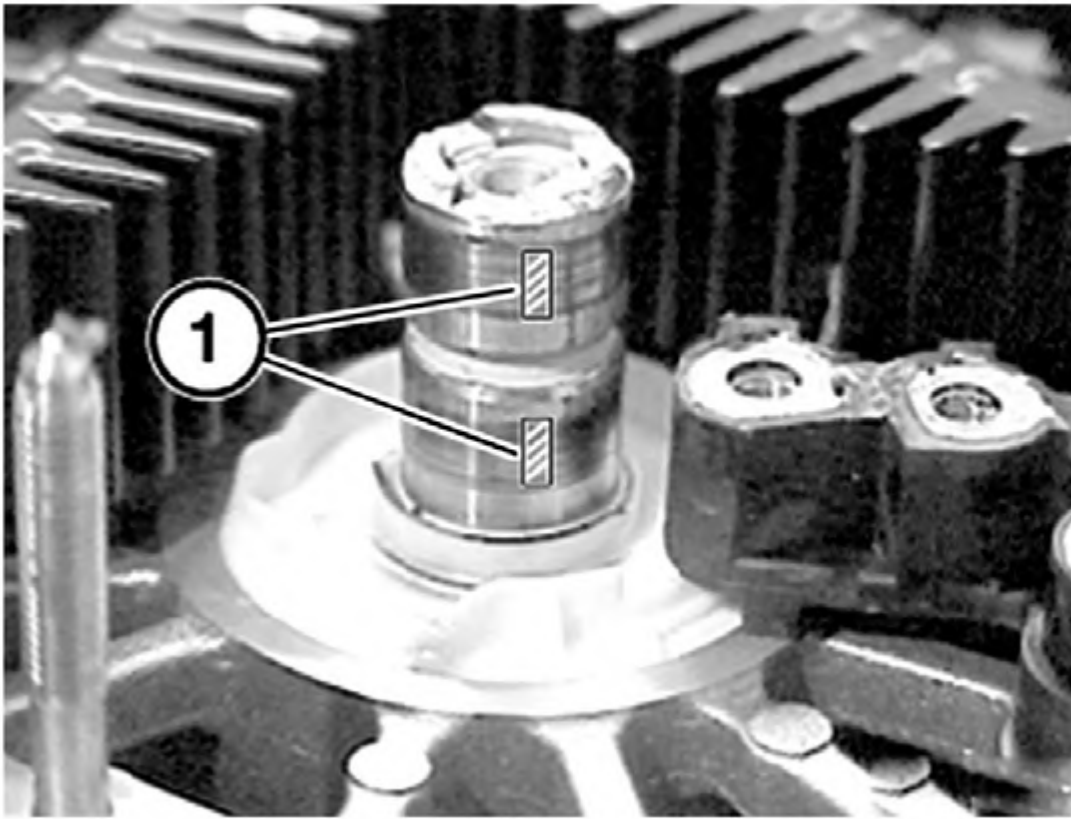
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Fig. 51: Removing Nuts On Regulator Cover (VALEO)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 52: Removing Regulator Switch (VALEO)
Courtesy of BMW OF NORTH AMERICA, INC.

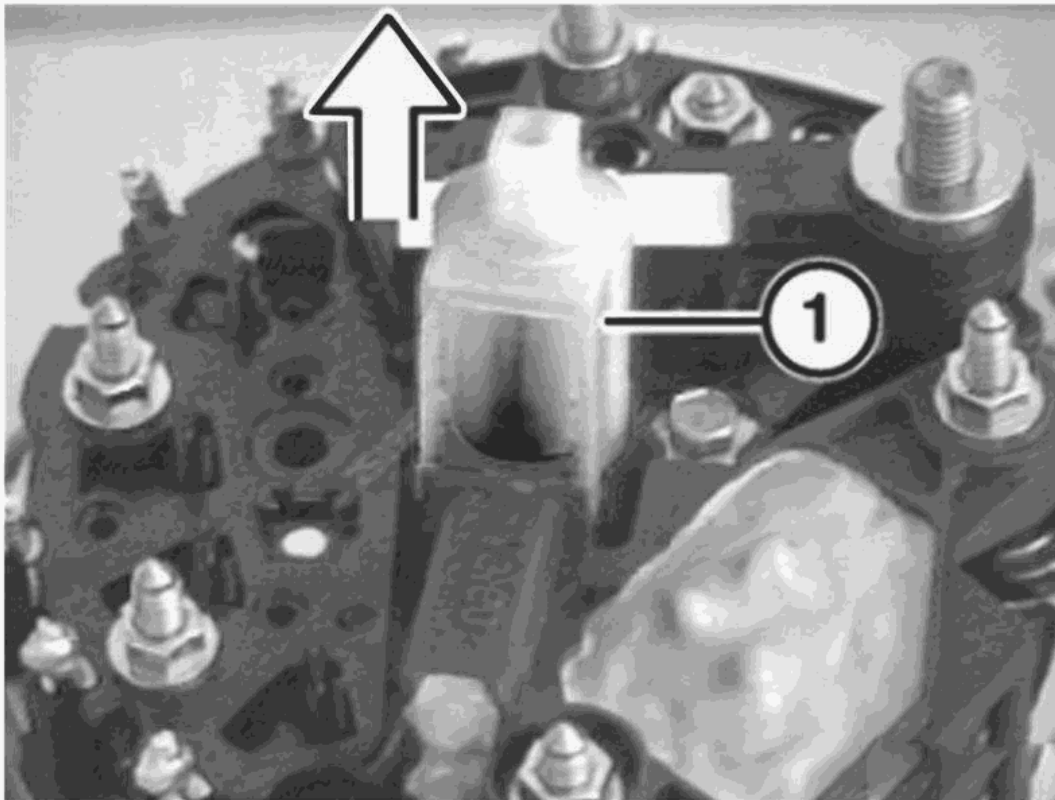


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Fig. 53: Locating Contact Surfaces Of Collector Rings (VALEO)
Courtesy of BMW OF NORTH AMERICA, INC.

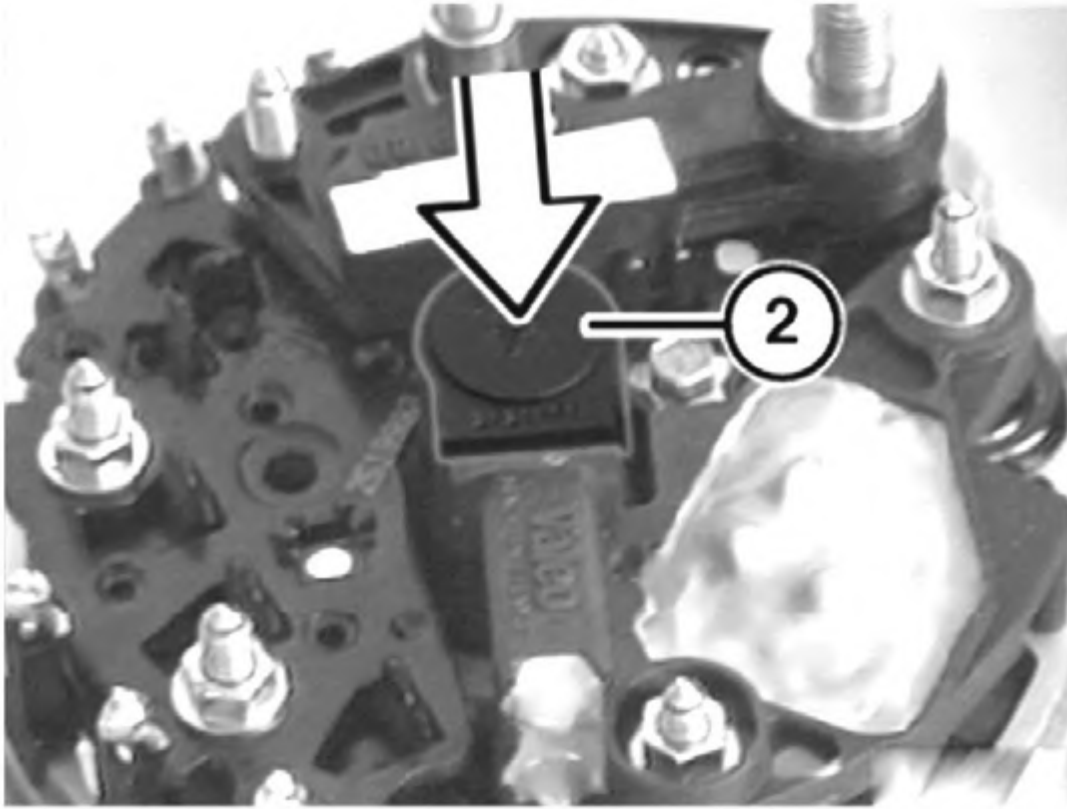
Installation

1. Install regulator switch with assembly cap. Hand tighten nuts of regulator switch. Remove assembly cap (1). See **Fig. 54**.
2. Fit supplied cover cap (2). See **Fig. 55**. Tighten nuts and ground screw of regulator switch to specification. See **TORQUE SPECIFICATIONS**.



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Fig. 54: Removing Assembly Cap (VALEO)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 55: Fitting New Cover Cap (VALEO)

Courtesy of BMW OF NORTH AMERICA, INC.

VOLTAGE REGULATOR 4.4L (N62)

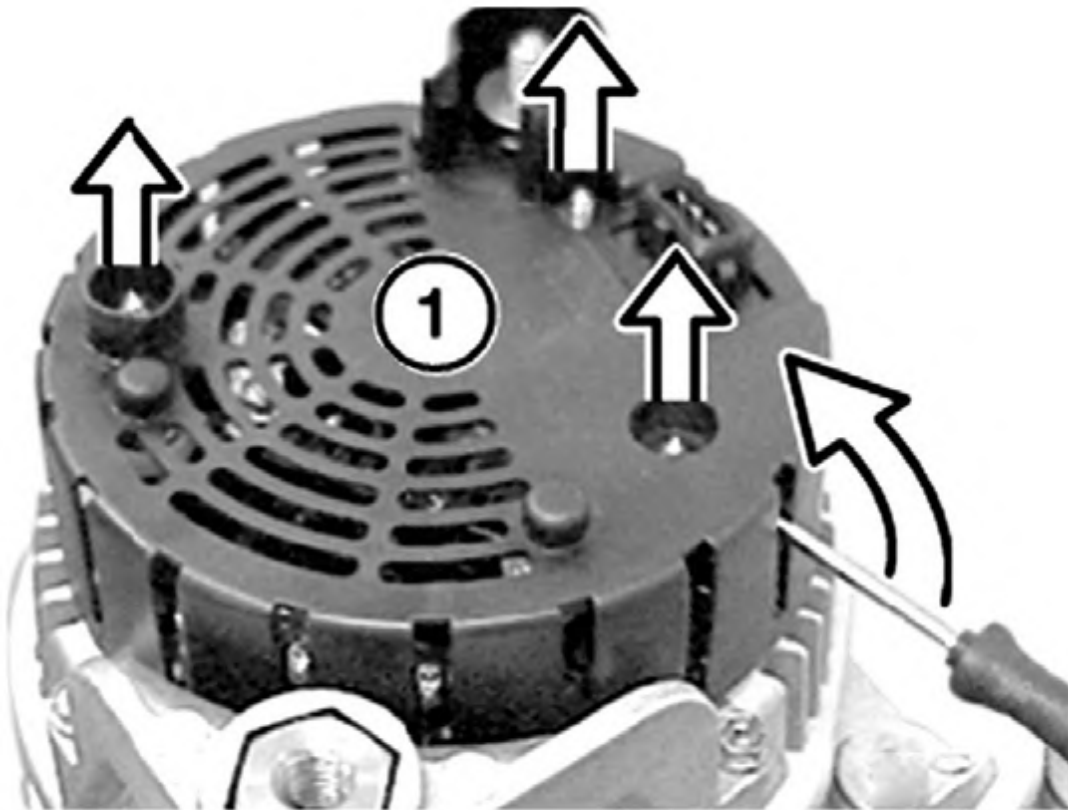
CAUTION: Disconnecting vehicle battery will cancel fault codes of control units. On vehicles with radio codes, after disconnecting battery, radio codes must be re-entered. Obtain radio code card from customer. Note stored stations and restore them after connecting battery. Also, where applicable, initialize sunroof and set steering angle.

NOTE: Manufacturer may refer to component as controller switch.

Removal & Installation

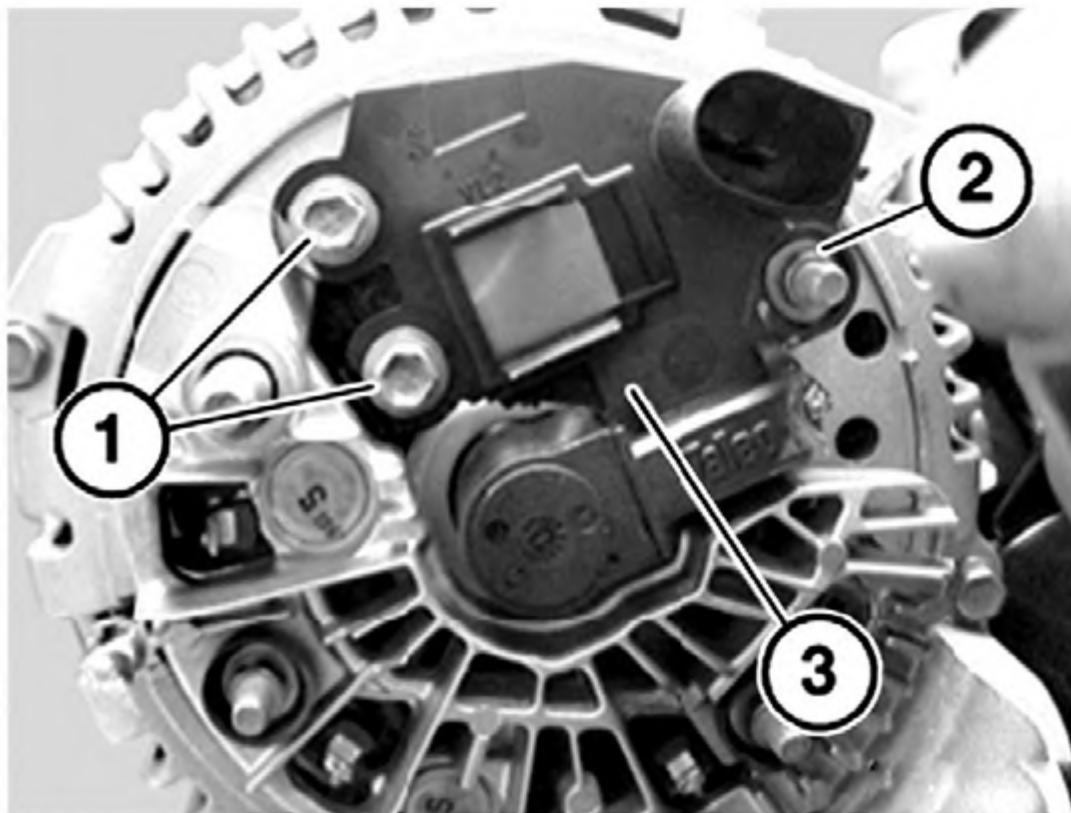
1. Disconnect battery negative lead. Remove generator. See **GENERATOR 4.4L (N62)**.
2. Carefully insert a screwdriver between cover (1) and threaded pin. See **Fig. 56**. Lever cover (1) off towards top.
3. Release contact screws (1). See **Fig. 57**. Unscrew nut (2). Remove regulator (3).
4. Check contact surfaces (1) of slip rings for wear and recondition, if necessary. See **Fig. 53**.

5. Press in carbon brushes (1) of regulator in direction of arrow. See **Fig. 58**. Install regulator (2).
6. Insert and tighten contact screws (1). See **Fig. 57**. Insert nut (2) and tighten.
7. Install generator. See **GENERATOR 4.4L (N62)**.
8. Perform generator test. See **GENERATOR & REGULATOR SWITCH** under TESTING.



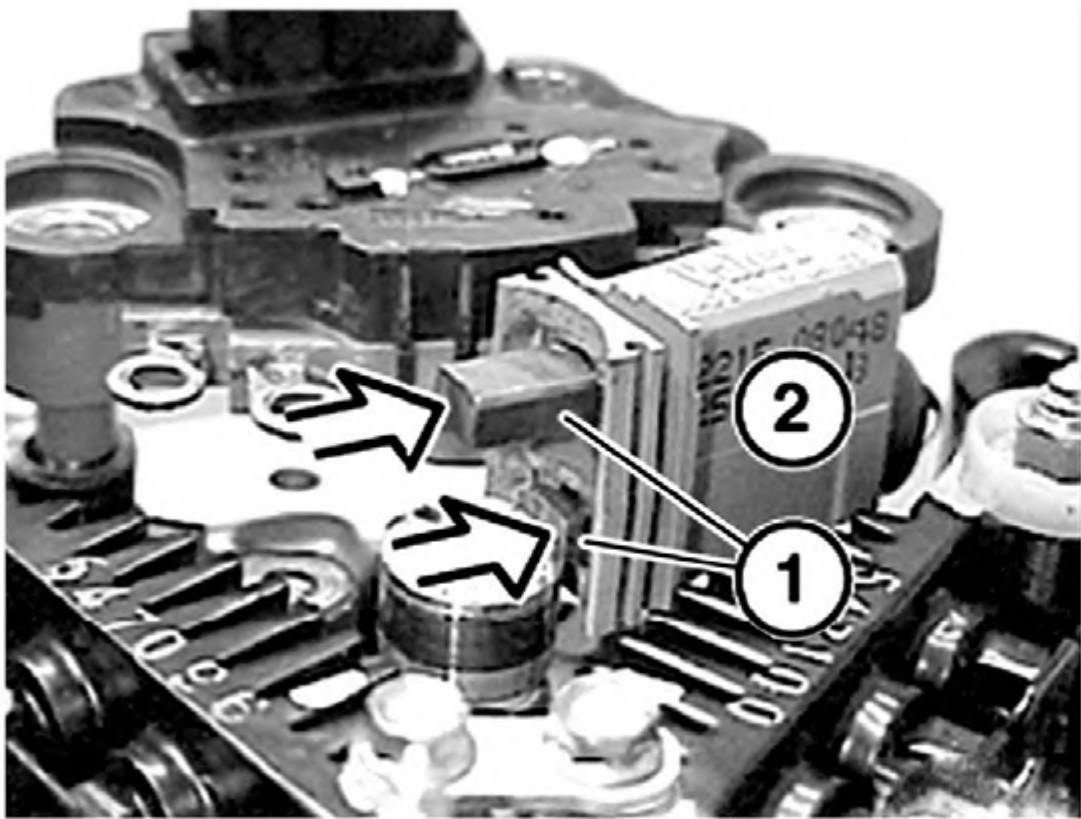
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Fig. 56: Removing Generator Regulator Switch Cover - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 57: Removing Generator Regulator - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 58: Installing Regulator - 4.4L (N62)
Courtesy of BMW OF NORTH AMERICA, INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m.)
Drain Plug For Coolant In Engine Block	18 (25)
Fan Clutch On Water Pump	30 (40)
Pulley	33 (45)
Pulley (Ribbed Drive Belt)	
With Cooling Jacket	59 (80)
Without Cooling Jacket	52 (70)
INCH Lbs. (N.m.)	
Bleeder Screw On Thermostat	71 (8)
Drain Plug-To-Radiator	22 (2.5)
Intake Hood-To-Front Wall	35 (4)
Wires-To-Generator Nuts	
Terminal D+	62 (7)

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Fig. 59: Charging System Wiring Diagram (X5)
Courtesy of BMW OF NORTH AMERICA, INC.