002 Vehicle Identification and VIN Decoder

Vehicle Identification Number (VIN), decoding

Some of the information in this manual applies only to cars of a particular model year or range of years. For example, 1999 refers to the 1999 model year but does not necessarily match the calendar year in which the car was manufactured or sold. To be sure of the model year of a particular car, check the Vehicle Identification Number (VIN) on the car.

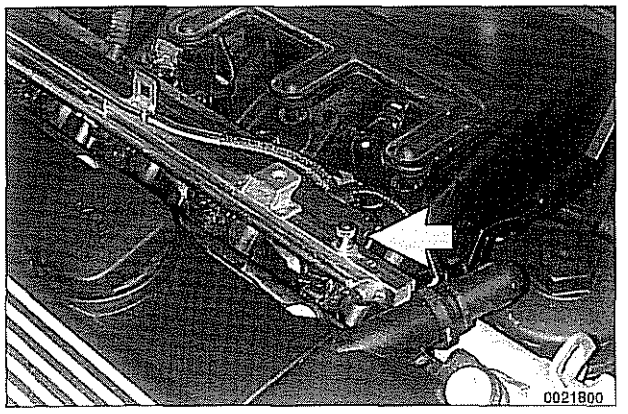
The VIN is a unique sequence of 17 characters assigned by BMW to identify each individual car. When decoded, the VIN tells the country and year of manufacture; make, model and serial number; assembly plant and some equipment specifications.

The BMW VIN is on a plate mounted on top of the dashboard, on the driver's side where the number can be seen through the windshield. The 10th character is the model year code. The letters I, O, Q and U are not used for model year designation. Examples: X for 1999, Y for 2000, 1 for 2001, 2 for 2002, etc. The table below explains some of the codes in the VIN for 1997 through 2002 BMW E39 5 Series BMWs covered by this manual.

Sample VIN:

WBA	DE63	2	0	WB	W61389
position 1 2 3	4 5 6 7	8	9	10 11	12-17

VIN position	Description	Decoding information	
1 - 3	Country of manufacture	WBA WBS	BMW, AG. Munich, Germany BMW Motorsport, GmbH, Munich, Germany
4	Line	D	525i (2001 - 2003) 528i (2000-2003), 530i, 540i
5	Series	D E J M N P R T	525i (2001 - 2002), 528i (1997 - 2000) M5, 530i, 540i (1997 - 1998) 525i Wagon 528i (1999 - 2000) 540i Sedan (1999 - 2003) 540i wagon (2001) 528i wagon (1999 - 2000) 540i wagon (2002 - 2003) 525i sedan (2002 - 2003), 530i (2001 - 2003)
6	Body type / engine type	6,4 5,3	Automatic Manual
7	Vehicle type	3, 4, 7	Passenger vehicle
8	Restraint system	0 1 2 3 4	Manual belts Manual belts with dual airbags Manual belts with advanced airbags Manual belts with driver & passenger airbags Manual belts with advanced passenger & driver airbags
9	Check digit		0 - 9 or X, calculated by NHTSA
10	Model year	V W X Y 1 2 3	1997 1998 1999 2000 2001 2002 2003
11	Assembly plant	A, F, K B, C, D, G E, J, P	Munich, Germany Dingolfing, Germany Regensburg, Germany
12-17	Serial number		Sequential production number for specific vehicle



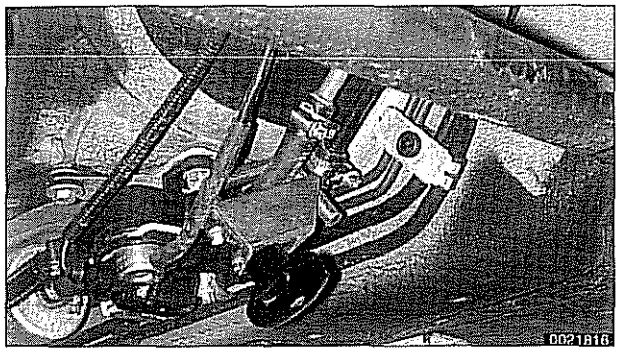
➢ Where applicable, remove schraeder valve cap (**arrow**) from air connection on fuel rail. Using a tire chuck, blow fuel back through feed line using a brief burst of compressed air (maximum of 3 bar or 43.5 psi).

> ***WARNING —***
> - *Fuel in fuel line is under pressure (approx. 3 - 5 bar or 45 - 75 psi) and may be expelled under pressure. Do not smoke or work near heaters or other fire hazards. Keep a fire extinguisher handy. Before disconnecting fuel hoses, wrap a cloth around fuel hoses to absorb any leaking fuel. Catch and dispose of escaped fuel. Plug all open fuel lines.*
> - *Always unscrew the fuel tank cap to release pressure in the tank before working on the tank or lines.*

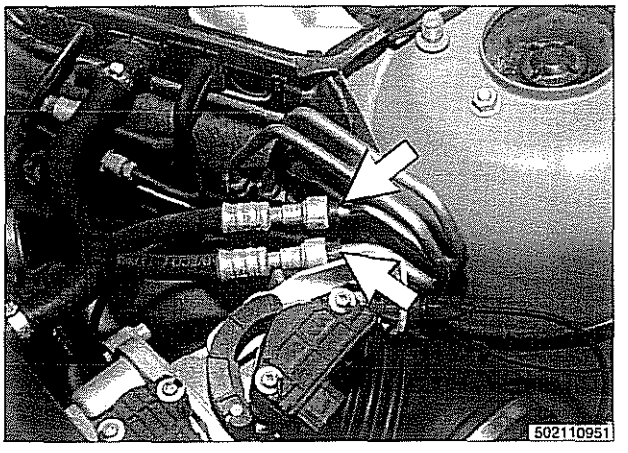
– Raise car and support in a safe manner.

> ***WARNING —***
> *Make sure the car is stable and well supported at all times. Use a professional automotive lift or jack stands designed for the purpose. A floor jack is not adequate support.*

– Working underneath car, remove protective engine splash guard.

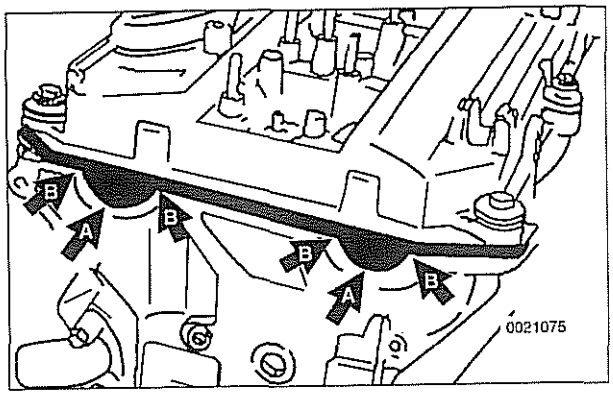


➢ Working beneath car (on left side under driver seat), remove fuel filter cover and clamp fuel hose(s).



➢ Disconnect fuel lines by sliding locking collar in (**arrows**) and pulling line apart.

Cylinder Head Removal and Installation



➢ Reinstall cylinder head covers to right and left cylinder heads using new gaskets.

- Check for correct seating of half-moon seals (**A**) in back of cylinder head cover.
- Use a small amount of Three Bond 1209 ® or equivalent sealer at corners (**B**) of half-moon cutouts.

– Install cylinder head cover fasteners and tighten uniformly in $^1/_2$ turn steps.

Tightening torque

Cylinder head cover fasteners	10 Nm (7.5 ft-lb)

– Install exhaust manifolds using new gaskets and fasteners. See **180 Exhaust System**.

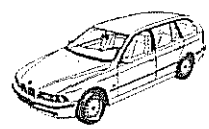
– Refill and bleed cooling system as described in **170 Radiator and Cooling System**.

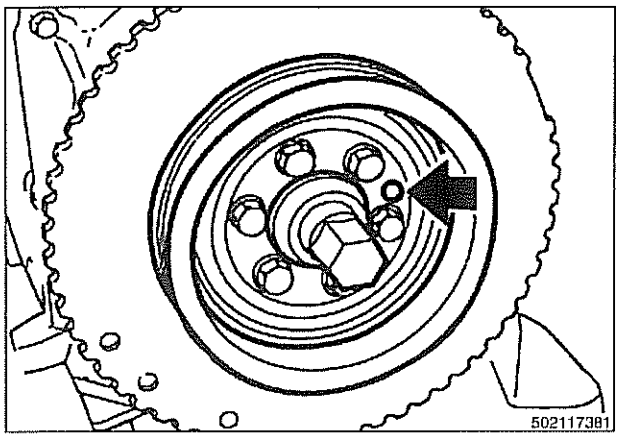
– Change engine oil and filter as described in ***020 Maintenance***.

> ***CAUTION—***
> *To prevent damaging engine electrical systems, be sure to install all ground wires previously removed.*

Tightening torques

Camshaft sprocket to camshaft	15 Nm (11 ft-lb)
Coolant manifold to cylinder head	10 Nm (7.5 ft-lb)
Cylinder head cover nuts	10 Nm (7.5 ft-lb)
Exhaust manifold to head	22 Nm (17 ft-lb)
Engine mount to subframe	42 Nm (30 ft-lb)
Spark plugs to cylinder head	22 Nm (17 ft-lb)





Tightening torque	
Vibration damper hub to crankshaft	410 Nm (300 ft-lb)

Install crankshaft hub and vibration damper while aligning locating hole (**arrow**) in damper with dowel pin in hub.

Tightening torque	
Vibration damper and pulley to crankshaft hub	22 Nm (17 ft-lb)

– Turn engine over by hand in direction of rotation at least two full rotations. Reinstall camshaft and crankshaft locking tools to recheck engine timing. Remove locking tools if no faults are found.

– Remove BMW special tool 11 3 390 (dummy tensioner) from side of cylinder head.

– Install primary chain tensioner so that cutout in tensioner piston engages chain rail.

Tightening torque	
Timing chain tensioner to tensioner sleeve	70 Nm (52 ft-lb)

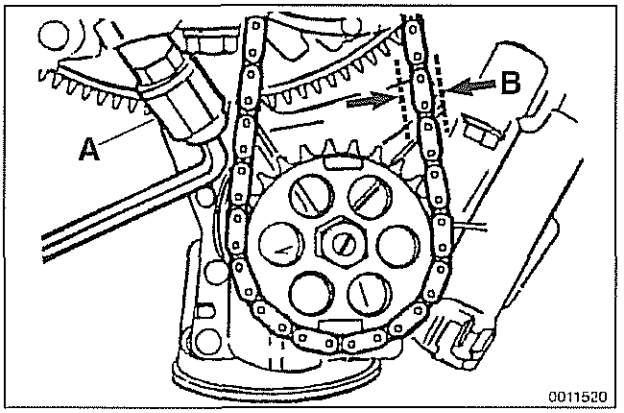
– Install cylinder head cover mounting studs, camshaft cover, and cylinder head cover.

Tightening torque	
Cylinder head cover to cylinder head	
M6 nut	10 Nm (89 in-lb)
M8 bolt	22 Nm (17 ft-lb)

– Installation of remaining parts is reverse of removal, noting the following:

- When installing thermostat, make sure arrow or vent hole faces up, if applicable.
- Refill cooling system as described in **170 Radiator and Cooling System**.
- Fill engine with oil and install new oil filter as described in **020 Maintenance**.

Tightening torque	
Upper timing chain cover to cylinder head	
M6 nut	10 Nm (89 in-lb)
M8 bolt	22 Nm (17 ft-lb)
VANOS oil supply pipe to VANOS control unit banjo bolt	32 Nm (24 ft-lb)



➢ Use Allen wrench to adjust chain slack (**B**) by turning threaded spacer (**A**).

Oil pump chain adjustment	
Slack **B**	10 ±2 mm (0.394 ±0.079 in)

– Coat remaining oil pump mounting fastener with Loctite ®. Install and tighten.

– Remainder of assembly is reverse of disassembly.

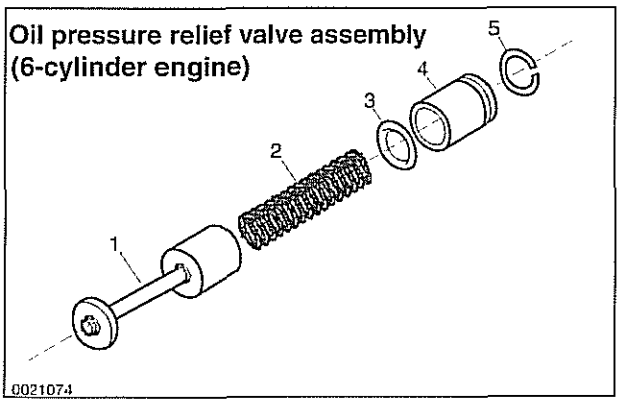
– After adding engine oil, start and run engine. Raise engine speed to 2,500 rpm until oil pressure warning light goes out (about 5 seconds).

Tightening torques	
Lower oil pan to upper oil pan	
M6 (8.8 grade)	10 Nm (89 in-lb)
M6 (10.9 grade)	12 Nm (9 ft-lb)
M8 (8.8 grade)	22 Nm (16 ft-lb)
Oil drain plug to oil pan (M12)	25 Nm (18 ft-lb)
Oil pump cover to oil pump (M6)	10 Nm (89 in-lb)
Oil pump sprocket to shaft (M10)	45 Nm (33 ft-lb)
Oil pump to engine block M8 (8.8 grade)	22 Nm (16 ft-lb)

Oil pressure relief valve (6-cylinder)

Remove oil pump as described earlier. The oil pump pressure relief valve is held in the side of the oil pump with a circlip.

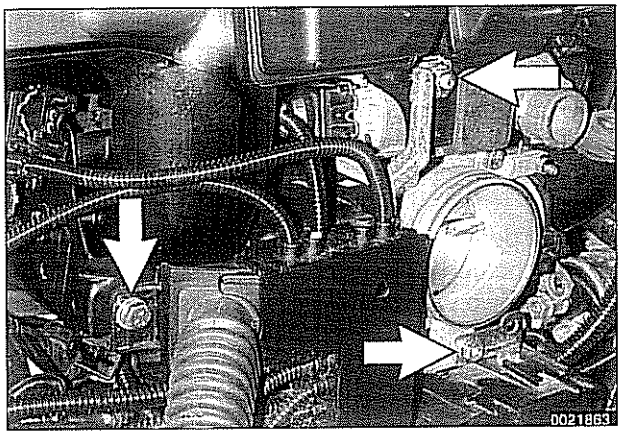
Oil pressure relief valve assembly (6-cylinder engine)



➢ Inspect oil pump relief valve components and bore for scoring or other damage.

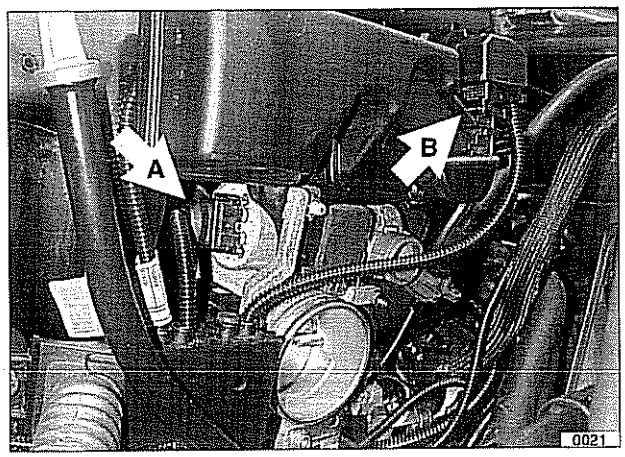
1. Control plunger
2. Spring
3. Sealing O-ring
4. Sleeve
5. Circlip

– Install using a new circlip.



➢ Remove nuts and bolts (**arrows**) retaining wiring harness to throttle housing.

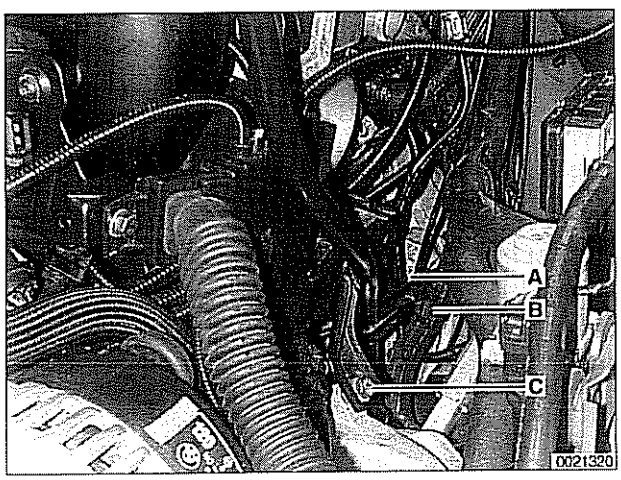
– Working at throttle housing, turn harness plug counterclockwise and remove.



➢ Working at side of intake manifold, disconnect electrical harness connectors:

- Idle control valve (**A**)
- Intake manifold resonance valve (**B**)

– Disconnect electrical harness connectors at oil pressure sender and oil temperature sender at base of oil filter housing.



➢ Remove dipstick guide tube:

- Disconnect wiring harness brackets from tube (**A**).
- Unclip fuel lines from tube (**B**).
- Remove lower guide tube mounting bolt (**C**).
- Pull out dipstick guide tube.

Fuel pump

The electric fuel pump is mounted in the fuel tank in tandem with the right side fuel level sender. The fuel pump delivers pressurized fuel to the fuel injection system. A pressure regulator maintains system pressure. The quantity of fuel supplied exceeds demand, so excess fuel returns to the fuel tank via a return line. See **130 Fuel Injection** for more information.

NOTE—
*Fuel pump removal procedures are given under **Fuel level sender (right side) and fuel pump, removing and installing.***

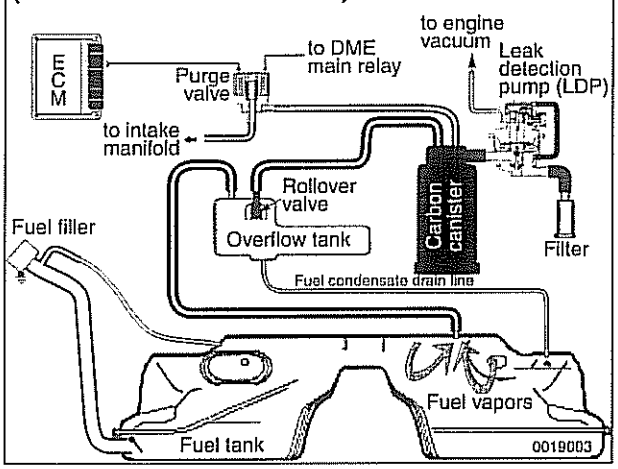
Fuel tank evaporative control system

Evaporative control, also referred to as running losses control, is designed to prevent fuel system evaporative losses from venting into the atmosphere.

The components of this system allow control and monitoring of evaporative losses by the on-board diagnostic (OBD II) software incorporated into the engine control module (ECM).

NOTE—
1997 V-8 models (540i) with Bosch DME M5.2 are not equipped with an OBD II running losses monitoring system.

Fuel tank evaporative control system (models with DME MS42.0)

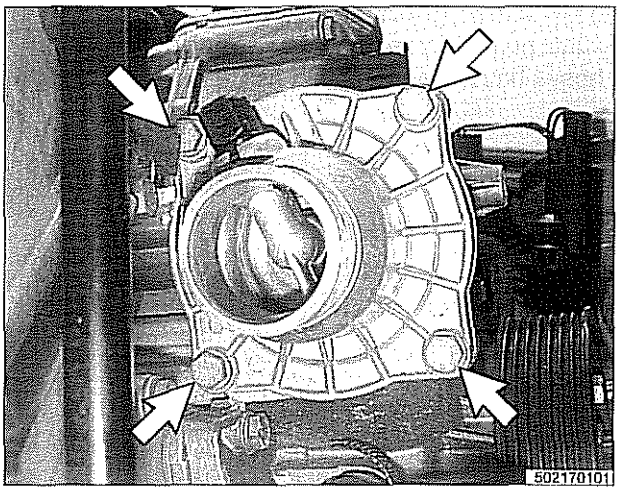


The main components of the evaporative control system and their functions:

- Fuel overflow tank acts as a liquid/vapor separator.
- Carbon canister stores evaporated fuel.
- Plumbing ducts vapors from fuel tank to canister and from canister to intake manifold.
- Carbon canister purge valve is controlled by engine control module (ECM).
- Running losses or 3/2-way valve (not shown) shunts excess fuel volume directly back to fuel tank before it circulates through injector fuel rail (models with Siemens MS42 or Bosch M5.2.1 engine management only).
- Leak detection unit (LDP or DMTL) pressurizes fuel tank and evaporative system to monitor system leaks (models with Siemens MS42 or Bosch M5.2.1 and later).

Leak detection systems vary among models and years, and are further described in **130 Fuel Injection**.

NOTE—
"3/2-way valve", "running losses valve" and "fuel changeover valve" are used interchangeably in BMW technical literature.



➢ Remove thermostat housing fasteners (**arrows**) and remove thermostat housing.

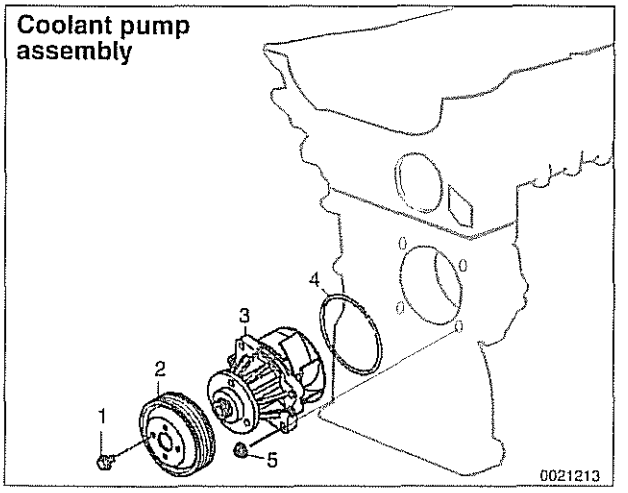
– Installation is reverse of removal, noting the following:
  - Keep sealing faces clean and free of oil.
  - Use new sealing gasket.
  - Fill system with coolant. See **Coolant, draining and filling (V-8 models)**.

Tightening torques

Block drain plug to block	25 Nm (18 ft-lb)
Coolant hose clamp (32 — 48 mm hose diameter)	2. 5 Nm (22 in-lb)
Radiator drain plug to radiator	2 - 3 Nm (18 - 27 in-lb)
Thermostat cover to coolant pump	10 Nm (89 in-lb)

Coolant pump, replacing (6–cylinder models)

Coolant pump assembly



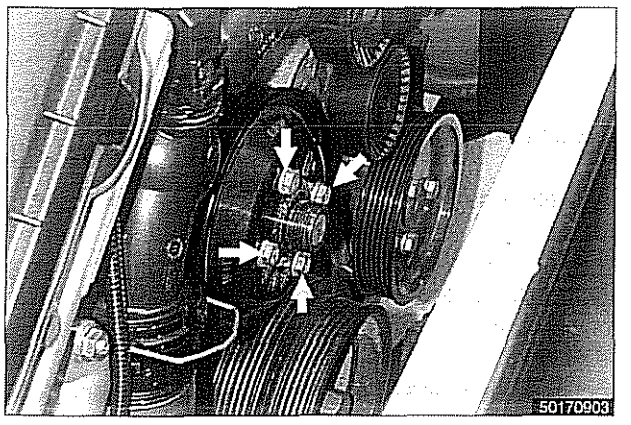
➢ The engine coolant pump is mounted in the front of the engine in the timing chain cover.

– Drain cooling system as described earlier. See **Coolant, draining and filling (6–cylinder models)**.

> ***WARNING —***
> *Allow cooling system to cool before opening or draining system.*

– Remove cooling fan and fan shroud. See **Mechanical (viscous clutch) cooling fan, removing and installing**.

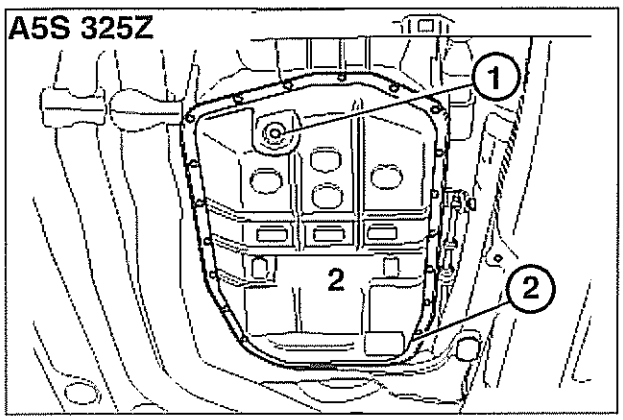
– Remove coolant pump drive belt. See **020 Maintenance**.

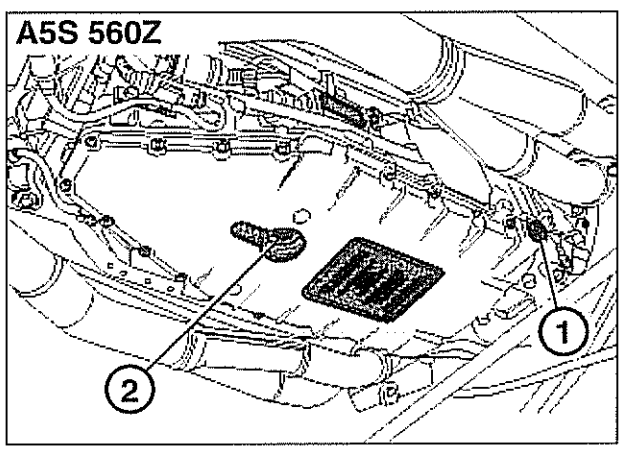


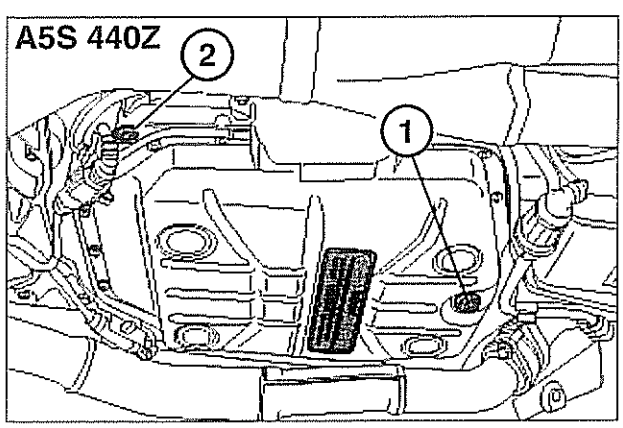
➢ Remove coolant pump pulley bolts (**arrows**) and remove pulley from pump.

– Remove nuts retaining pump to engine block.

NOTE —
The coolant pump is mounted on studs and retained by nuts.







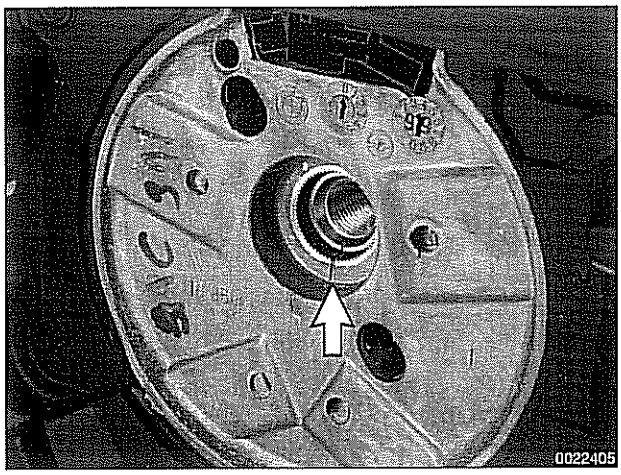
NOTE—
Use new ATF pan bolts purchased from BMW. Alternatively, clean old bolts and coat with Loctite® thread locking compound or equivalent.

Automatic transmission fluid capacity

A4S 310R	
with torque converter	7.8 liters (8.3 US qt)
without torque converter	3.3 liters (3.5 US qt)
A5S 360R / A5S 390R	
with torque converter	9 liters (9.5 US qt)
without torque converter	4 liters (4.2 US qt)
A5S 325Z (2.5 liter engine)	
with torque converter	8.9 liters (9.4 US qt)
without torque converter	6.2 liters (6.5 US qt)
A5S 325Z (3.0 liter engine)	
with torque converter	8.7 liters (9.3 US qt)
without torque converter	6.1 liters (6.4 US qt)
A5S 560Z	
with torque converter	13.1 liters (13.8 US qt)
without torque converter	5.5 liters (5.8 US qt)
A5S 440Z	
with torque converter	9.7 liters (10.2 US qt)
without torque converter	4.0 liters (4.2 US qt)

Tightening torques

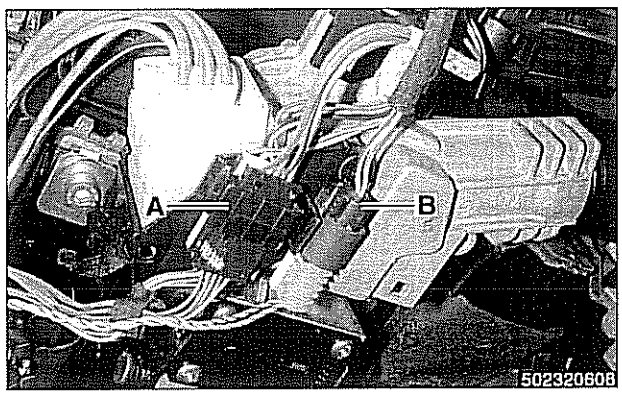
ATF drain plug to ATF pan	
A4S 310R	33 Nm (24 ft-lb)
A5S 360R / A5S 390R (M14)	20 Nm (15 ft-lb)
A5S 325Z	35 Nm (26 ft-lb)
A5S 560Z	50 Nm (37 ft-lb)
A5S 440Z (M16)	30 Nm (23 ft-lb)
ATF fill plug to transmission housing	
A4S 310R	25 Nm (18 ft-lb)
A5S 360R / A5S 390R (M14)	20 Nm (15 ft-lb)
A5S 325Z	30 Nm (23 ft-lb)
A5S 560Z	100 Nm (74 ft-lb)
A5S 440Z (M18)	35 Nm (26 ft-lb)
ATF pan to transmission (M6)	
A4S 310R	12 Nm (9 ft-lb)
A5S 360R / A5S 390R	10 Nm (7 ft-lb)
A5S 325Z	6 Nm (4 ft-lb)
A5S 560Z	10 Nm (7 ft-lb)
A5S 440Z	10 Nm (7 ft-lb)



➢ Check for proper alignment of steering column marks (**arrow**) before removing steering wheel.

NOTE—
The steering column and steering wheel are match marked at the factory.

– Remove lower steering column trim panel. See **Steering column trim, removing and replacing**.



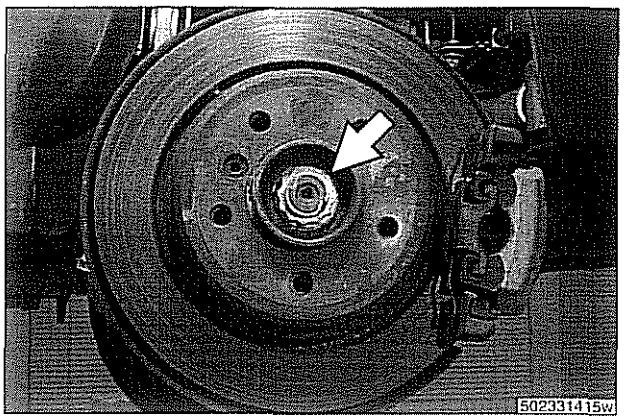
➢ Working underneath steering column, disconnect electrical harnesses (**A**) and (**B**).

– Remove steering wheel.

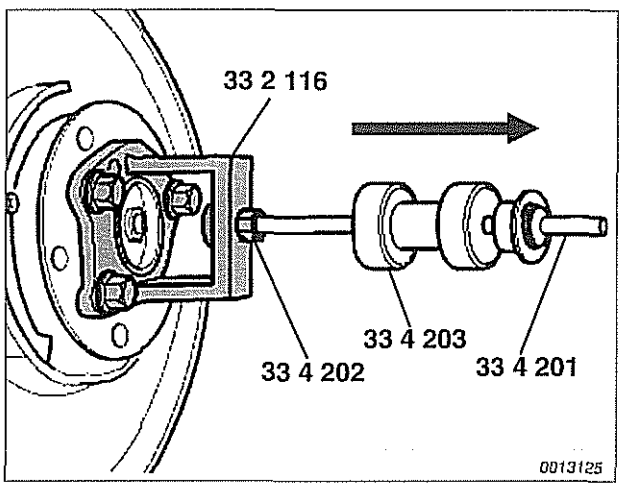
– When reinstalling steering wheel:
  - Align steering wheel and column match marks.
  - Align steering wheel to alignment pins located on steering column switch block.
  - Install steering column center bolt. Do not over-torque.

– Carefully install airbag. See **721 Airbag System (SRS)**.

Tightening torques	
Steering wheel to steering shaft (M14)	63 Nm (47 ft-lb)
Airbag to steering wheel (MFL only)	8 Nm (6 ft-lb)

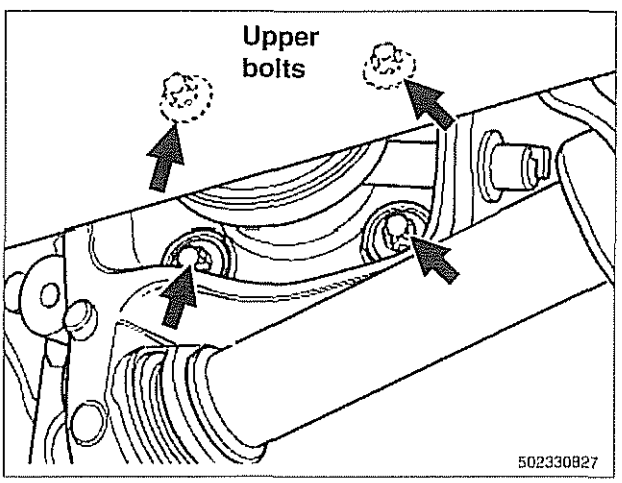


- With an assistant applying brakes, break free and remove staked collar nut (**arrow**).
- If equipped, disconnect brake pad sensor connector at brake caliper.
- Remove brake caliper assembly and rotor. See **340 Brakes**. Leave brake hose connected to caliper. Suspend caliper assembly from chassis using stiff wire.
- Remove ABS pulse sensor at wheel bearing carrier.



- Remove drive flange from bearing assembly using impact style puller (BMW special tools 33 2 116, 33 4 201/202/203 or equivalent).

> ***CAUTION—***
> *The wheel bearing is destroyed when the drive flange is removed. Do not attempt to reuse bearing.*



- Remove four wheel bearing flange (Torx) bolts (**arrows**).

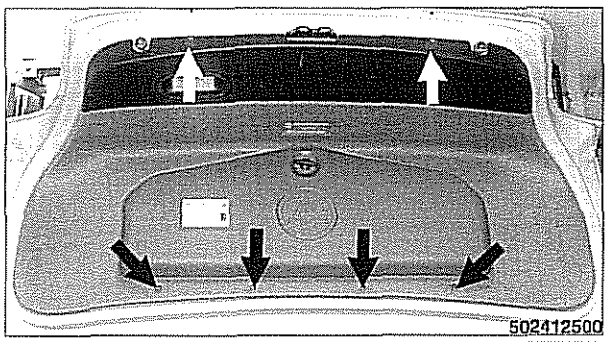
GENERAL

This repair group covers trunk lid and tailgate removal and installation. Also included here are replacement procedures for the gas-charged support struts that hold the trunk lid or tailgate in the open position.

NOTE—
The body is painted at the factory after assembly. Realignment of body panels may expose unpainted metal. Paint all exposed metal once the work is complete.

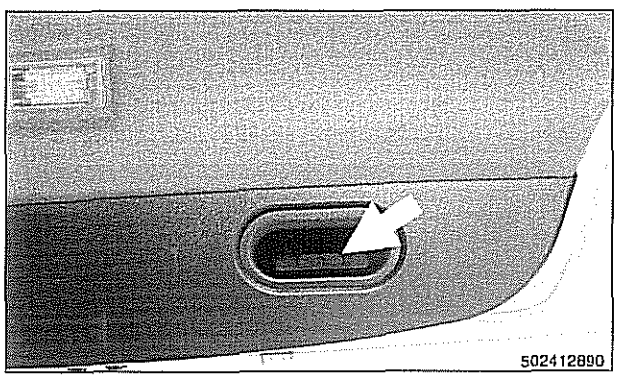
TRUNK LID

Trunk lid, removing and installing

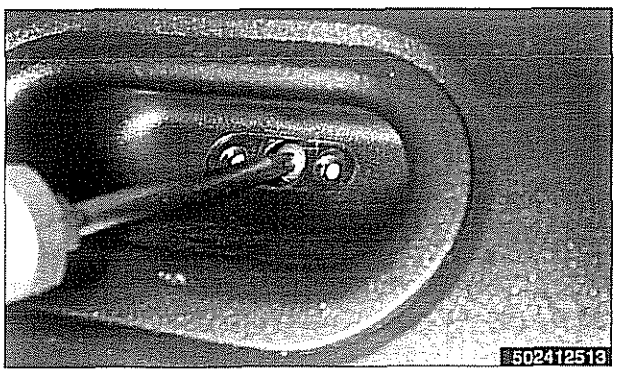


Raise trunk lid.

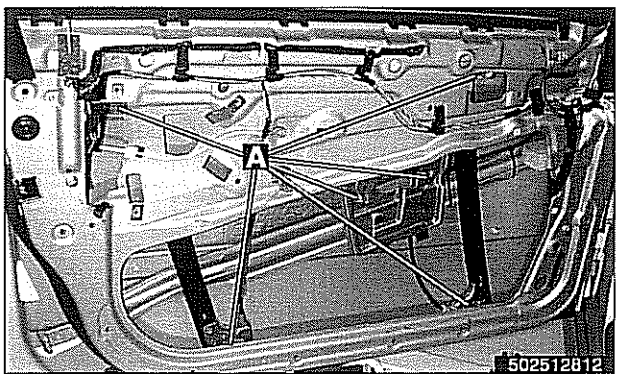
- Open tool kit cover and remove screws attaching tool kit to trunk lid (**black arrows**).
- Disconnect tool kit cover retaining strap from trunk lid and remove tool kit.
- Remove insulating liner expansion rivets (**white arrows**).



Pry out moulded trim cover (**arrow**).



Remove trim handle mounting screw.

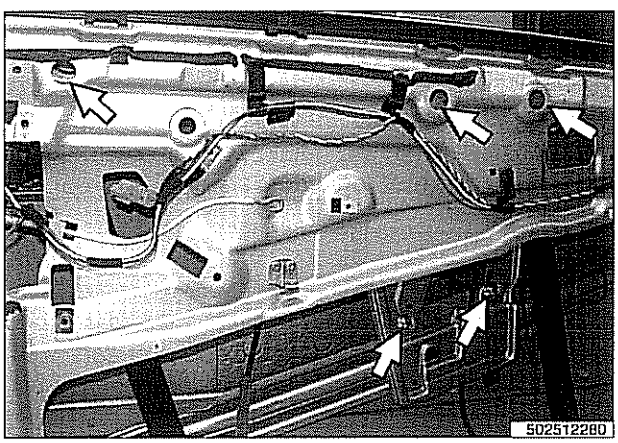


– Disconnect window from window guide rail as described in **Door window, removing and installing**. Do not remove window from door.
  - Push window up and use wedge to hold in position.

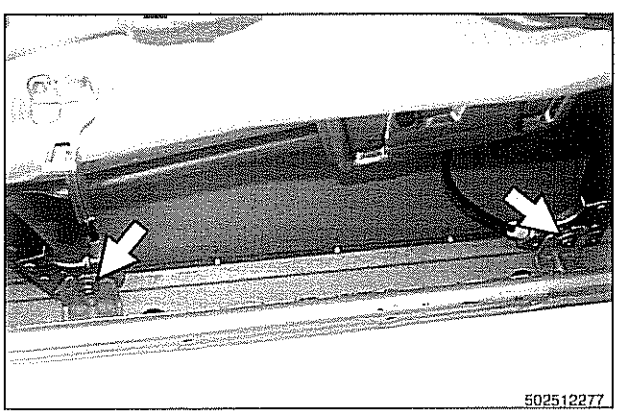
– If necessary, remove speaker unit from door.

– Removing window regulator from door:
  - Disconnect window motor electrical harness connector.

➢ Remove lower window regulator fasteners (**arrows**).



➢ Remove upper window regulator fasteners (**arrows**).



➢ Loosen fasteners (**arrows**) and slide regulator up to remove from mounts.

– Remove window regulator through opening in bottom of door, checking for any wiring that might become snagged during removal.

– Installation is reverse of removal.
  - Be sure to route wiring harnesses to keep them away from moving window mechanism. Use new wire ties as necessary.
  - Adjust window as described earlier.

Tightening torques

Window motor to regulator	5 Nm (44 in-lb)
Window regulator to door	8 Nm (71 in-lb)
Window to guide	8 Nm (71 in-lb)

Engine diagnostic trouble codes: M54 engine (continued)		
P-code	**BMW-FC**	**Explanation**
P1413	35	Secondary Air Injection Pump Relay Control Circuit Signal Low
P1414	35	Secondary Air Injection Pump Relay Control Circuit Signal High
P1444	142	Diagnostic Module Tank Leakage (DM-TL) Pump Control Open Circuit
P1445	140	Diagnostic Module Tank Leakage (DM-TL) Pump Control Circuit Signal Low
P1446	140	Diagnostic Module Tank Leakage (DM-TL) Pump Control Circuit Signal High
P1447	142	Diagnostic Module Tank Leakage (DM-TL) Pump Current Too High during Switching Solenoid Test
P1448	142	Diagnostic Module Tank Leakage (DM-TL) Pump Current Too Low
P1449	142	Diagnostic Module Tank Leakage (DM-TL) Pump Current Too High
P1451	126	Diagnostic Module Tank Leakage (DM-TL) Switching Solenoid Control Circuit Signal Low
P1452	126	Diagnostic Module Tank Leakage (DM-TL) Switching Solenoid Control Circuit Signal High
P1500	211	Idle-Speed Control Valve Stuck Open
P1501	211	Idle-Speed Control Valve Stuck Closed
P1502	27	Idle-Speed Control Valve Closing Solenoid Control Circuit Signal High
P1503	27	Idle-Speed Control Valve Closing Solenoid Control Circuit Signal Low
P1504	27	Idle-Speed Control Valve Closing Solenoid Control Open Circuit
P1506	53	Idle-Speed Control Valve Opening Solenoid Control Circuit Signal High
P1507	53	Idle-Speed Control Valve Opening Solenoid Control Circuit Signal Low
P1508	53	Idle-Speed Control Valve Opening Solenoid Control Open Circuit
P1512	124	DISA (Differentiated Intake Manifold) Control Circuit Signal Low
P1513	124	DISA (Differentiated Intake Manifold) Control Circuit Signal High
P1523	21	'A' Camshaft Position Actuator Signal Low (Bank 1) (M52: 'B' Camshaft Position Actuator Tight or Jammed)
P1524	21	'A' Camshaft Position Actuator Control Circuit Signal High (Bank 1)
P1525	21	'A' Camshaft Position Actuator Control Open Circuit (Bank 1)
P1529	19	'B' Camshaft Position Actuator Control Circuit Signal Low (Bank 1)
P1530	19	'B' Camshaft Position Actuator Control Circuit Signal High (Bank 1) (S54 to 09/00: Throttle Valve Position Control, Control Deviation)
P1531	19	'B' Camshaft Position Actuator Control Open Circuit (Bank 1)
P1602	48	Control Module Self-Test, Control Module Defective
P1602	58	Control Module Self-Test, Control Module Defective
P1602	63	Control Module Self-Test, Control Module Defective
P1602	66	Control Module Self-Test, Control Module Defective
P1602	67	Control Module Self-Test, Control Module Defective
P1602	70	Control Module Self-Test, Control Module Defective
P1602	71	Control Module Self-Test, Control Module Defective
P1602	72	Control Module Self-Test, Control Module Defective
P1603	49	Control Module Self-Test, Torque Monitoring