

Vents and Ducts

The IHKA air distribution system includes 5 air distribution motors (stepper motors), right and left footwell ducts, dashboard mounted defroster vents, and three sets of face level vents.

Removal of at least one of the stepper motors (right footwell vent) involves removal of the passenger side airbag in the dashboard.

WARNING!

Airbags are inflated by an explosive device. Handled improperly or without adequate safeguards, the system can be very dangerous. Special precautions must be observed prior to any work at or near the airbags. See ⇒ [721 Airbag System \(SRS\)](#).

CAUTION!

When working on interior trim removal, work with plastic prying tools or wrap the tips of screwdrivers and pliers with tape.

Air distribution motors

The five air distribution motors are installed under the dashboard. They are made accessible by removing either the glove compartment and right footwell trim panel or the left footwell (pedal cluster) trim panel as described below.



Each motor can be removed after its electrical wiring harness connector has been removed.





- ◆ Squeeze plastic clip (**arrow**) to release motor.
- ◆ Tilt motor out of housing.
- During installation, be sure to align air distribution flap and motor drive (**A**).

Right side air distribution motors, accessing

Four of the air distribution motors are under the right side of the dashboard:

- ◆ Right side fresh air/recirculation
- ◆ Defroster
- ◆ Ventilation flaps
- ◆ Right footwell vent
- Remove glove compartment and right footwell trim panel for access. See ⇒ [513 Interior Trim](#).

CAUTION!

Disassemble interior trim carefully to avoid damage.

- Disconnect negative (-) battery cable in trunk.

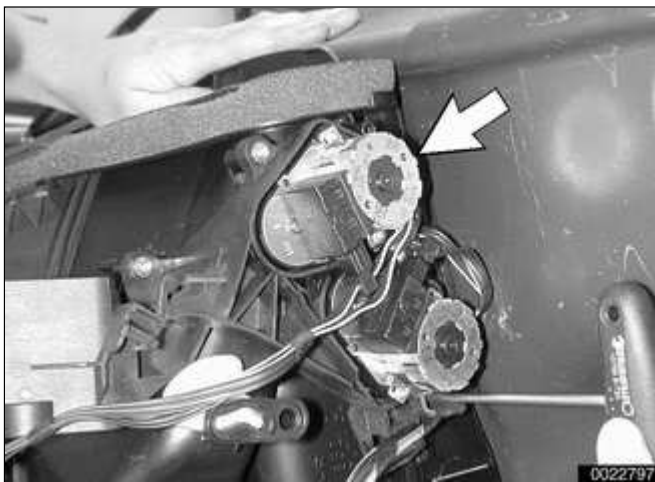
CAUTION!

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

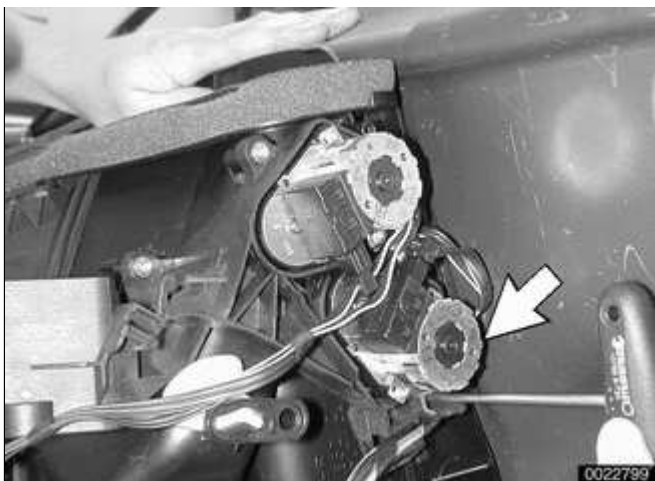


➤ Right side fresh air/recirculation motor (**arrow**):

- ◆ For access, remove right footwell duct as described below.
- ◆ Unhook linkage, then remove motor.

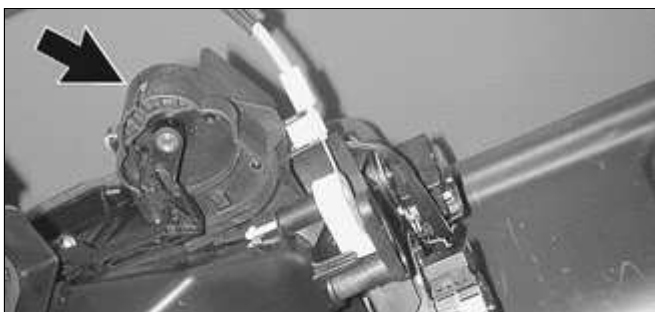


➤ Defroster air distribution motor (**arrow**)



➤ Ventilation distribution motor (**arrow**)

- ◆ For access, remove defroster air distribution motor.



➤ Right footwell vent air distribution motor (**arrow**):

- ◆ For access, remove passenger side airbag as described in ⇒ [721 Airbag System \(SRS\)](#).



- ◆ Unhook linkage, then remove motor.

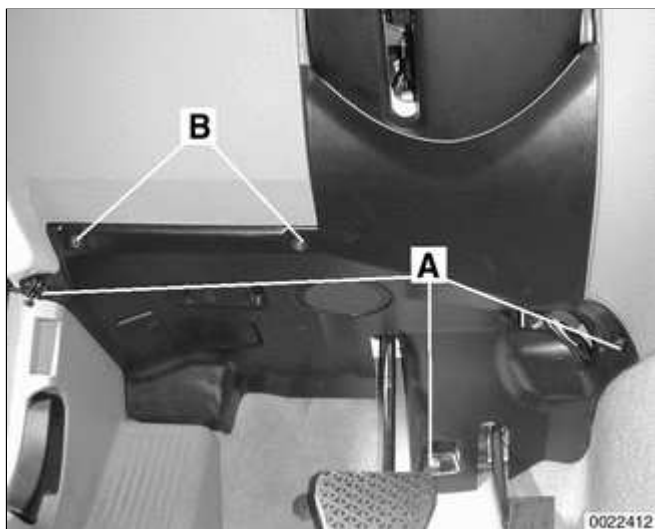
Left side air distribution motor, accessing

The fresh air distribution motor is under the left side of the dashboard. Remove the left footwell (pedal cluster) trim panel for access.

CAUTION!

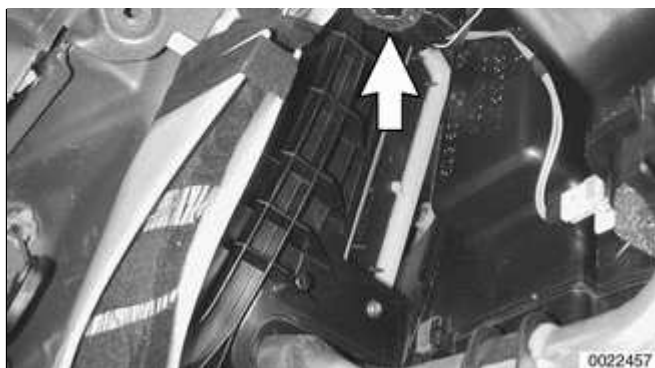
Disassemble interior trim carefully to avoid damage.

- Move steering column to maximum extended position.



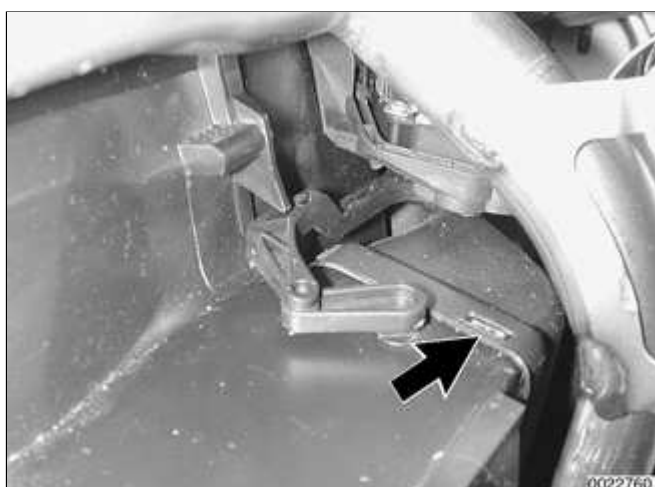
- ✦ Working at trim panel, remove fasteners.
 - ◆ Note locking clips (**A**) which must be rotated 90° to remove.
 - ◆ Remove mounting screws (**B**).
 - ◆ Unhook retaining clip from steering column lower trim.
 - ◆ Detach electrical harness connectors from footwell light and speaker (if equipped).
 - ◆ Release OBD II socket from panel and pull out.
- ✦ Reach up above accelerator pedal to gain access to fresh air distribution motor (**arrow**).





Right footwell duct, removing and installing

- Remove glove compartment as described in ⇒ [513 Interior Trim](#).
- Remove IHKA control panel or GPS On-Board Monitor, as applicable (described below).



- Reach through control panel opening to detach air duct locking clip (**arrow**) from heater/evaporator housing.
- Separate bottom of air duct from rear compartment duct.
- Pull forward and down to remove.
- Installation is reverse of removal.

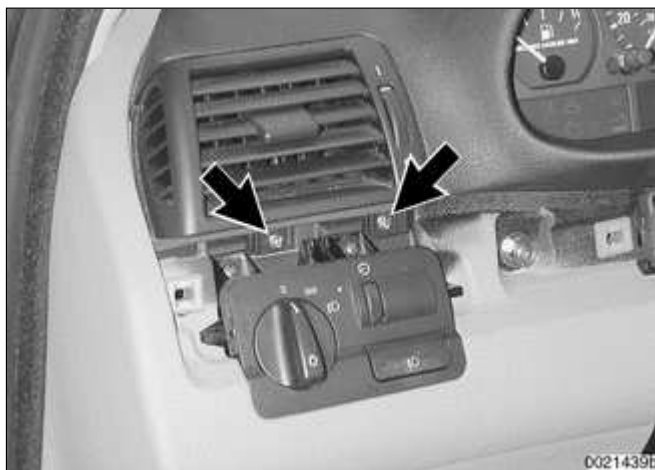
Dashboard vent, removing and installing



- Pry gently at dashboard trim to remove.

CAUTION!

To avoid marring interior trim, work with a plastic prying tool.



✦ Remove air vent mounting screws (**arrows**).

- Lift vent slightly and withdraw from dashboard.
- Installation is reverse of removal.

Note:

- ◆ *Removal of right or center dashboard vent is similar.*
- ◆ *To fully remove the center dashboard vent, use pliers to detach control cable housing and remove from control lever.*
- ◆ *Remove trim on right side prior to removing center trim.*

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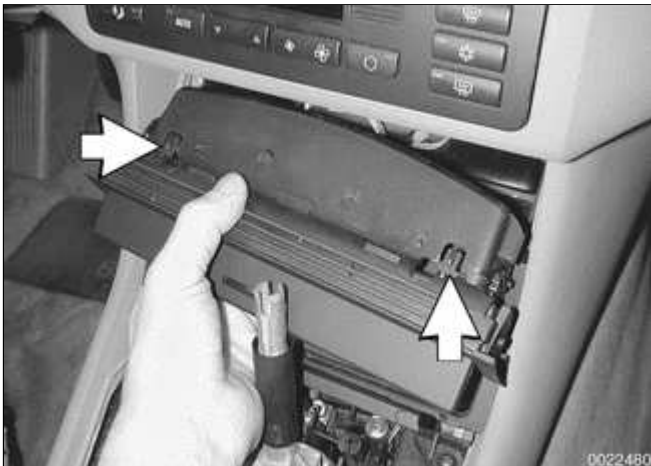
Heating and A/C Controls

The IHKA control module is integrated with the control panel in the center console below the radio. There is a built-in interior temperature sensor and fan.

Models with GPS navigation are equipped with a center console-mounted On-Board Monitor. This combines sound system control functions, GPS monitoring and heating/A/C control functions.

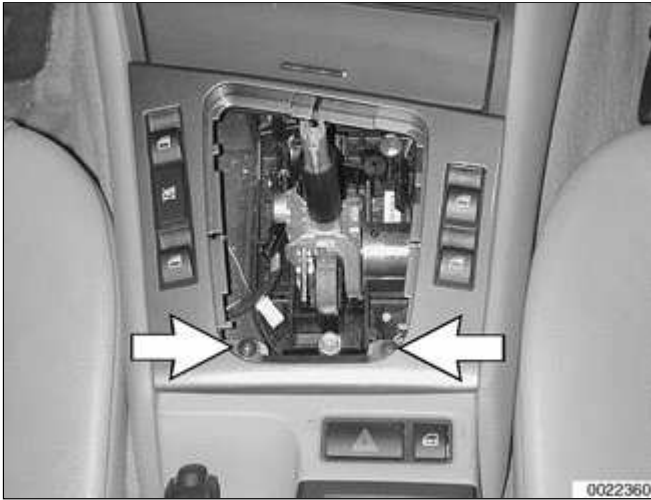
IHKA control panel, removing

If BMW special tools 64 1 010 are available, slide them between IHKA control panel front bezel and dashboard, then pull panel out. Otherwise, use the following procedure.

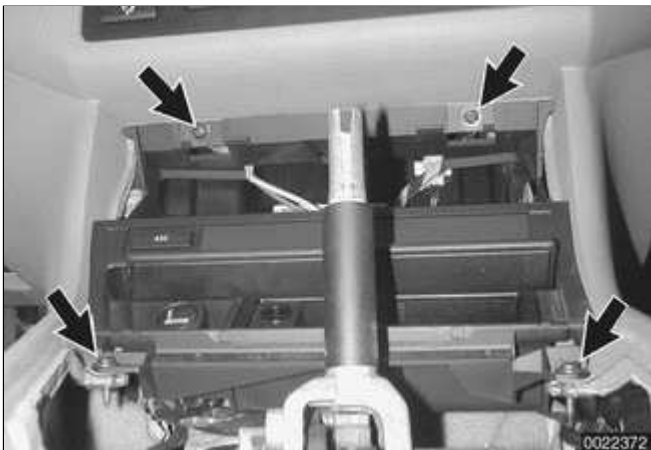


- Remove utility compartment below IHKA control panel:
 - ◆ Open compartment door.
 - ◆ Push upward in center of compartment to release locking tabs (**arrows**).
 - ◆ Pull out compartment.
- Shifter bezel: Lift up by prying gently.
- Shifter boot: Unclip bottom of boot from shifter trim (window switch carrier) by pushing forward. Pull boot up around shifter, but do not

remove.



- ✦ Remove screws (**arrows**) at rear of shifter trim (window switch carrier). Lift trim at back to unhook from front.



- ✦ Remove screws (**arrows**) at front and rear of ashtray carrier. Lift up ashtray carrier.

- Reach up through opening and push IHKA control module and panel out.
- Detach electrical harness connectors.
- Disassemble panel from module using an anti-static mat as a working surface.

CAUTION!

Do not touch circuit boards with bare fingers.

- Installation is reverse of removal.

On-Board Monitor, removing

- Remove dashboard center vent as described earlier.

- Pull off menu button on face of monitor. Reach through apertures with screwdriver to twist catches. This releases monitor from console.
- Pull out monitor and detach electrical harness connectors in back.

Heater core temperature sensor, removing and installing

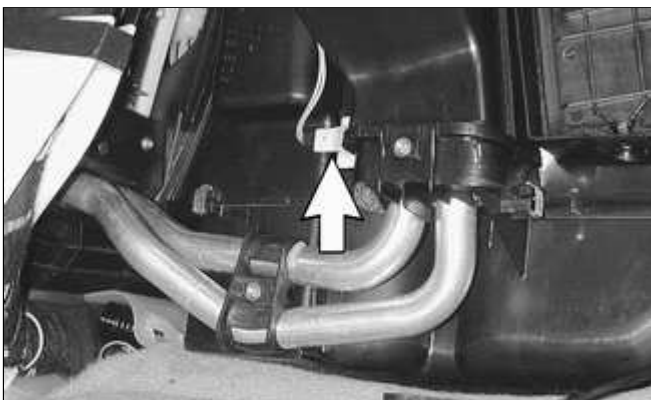
- Remove IHKA control panel or On-Board Monitor as described earlier.



- Reach through dashboard opening and detach heater core temperature sensor electrical harness connector (**arrow**).
- Pull sensor out of IHKA housing.
- Installation is reverse of removal.

Evaporator temperature sensor

- To gain access to evaporator temperature sensor (**arrow**):
 - ◆ Remove left footwell trim panel (above pedals). See ⇒ [513 Interior Trim](#).
 - ◆ Sensor is installed in left side of IHKA housing above coolant



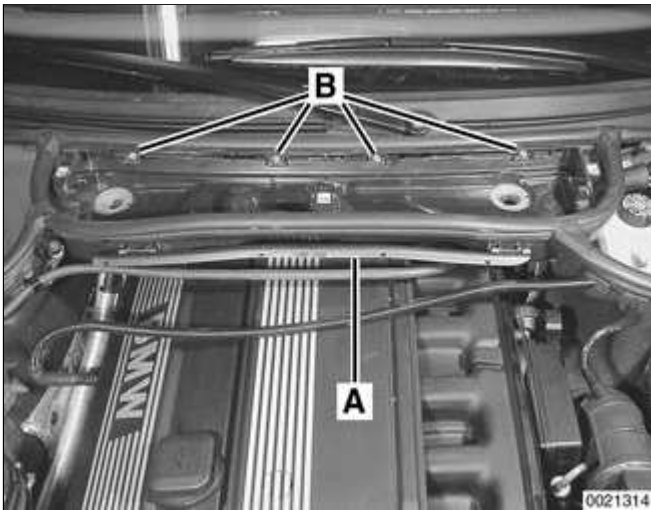


pipes.

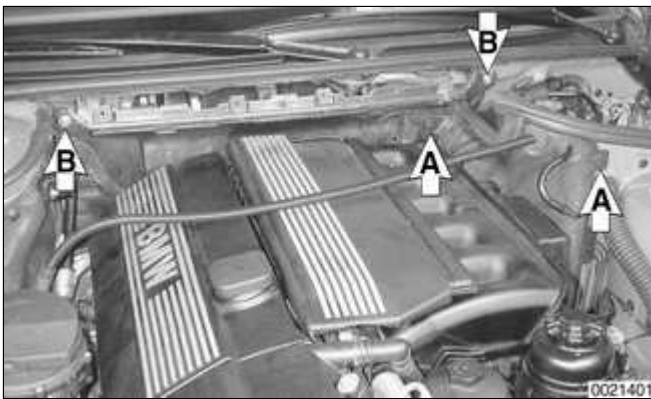
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Blower Components

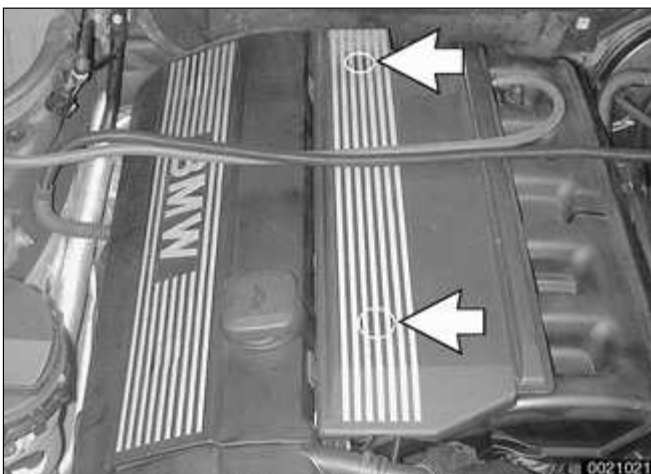
Blower motor, removing and installing



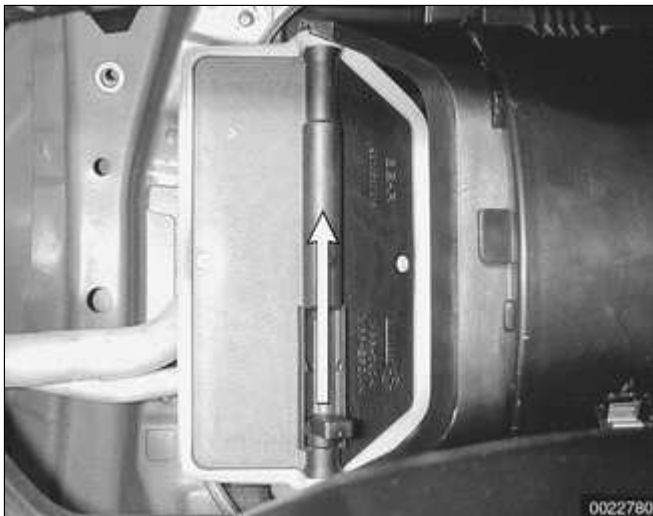
- ✦ Remove housing for interior ventilation microfilter.
 - ◆ Remove upper cover and microfilter.
 - ◆ Open wiring harness loom (A) and remove wires.
 - ◆ Unfasten screws (B) and remove lower housing.



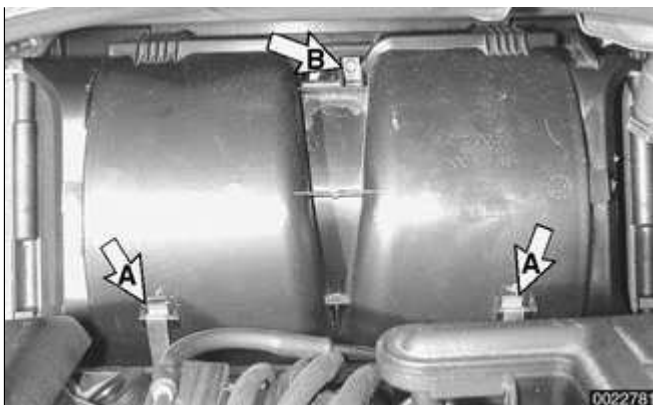
- ✦ Remove heater bulkhead cover:
 - ◆ Remove engine compartment side trim panel. Turn locking clips (A) and slide trim panel up.
 - ◆ Remove heater bulkhead cover mounting screws (B) and lift cover off bulkhead.



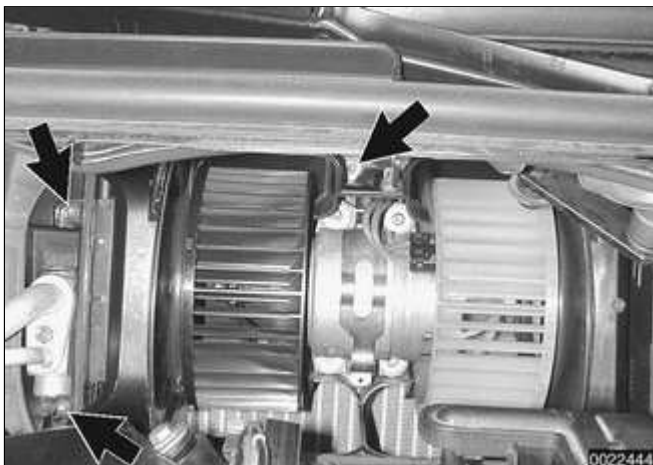
- ✦ Remove intake manifold cover:
 - ◆ Remove plastic trim covers (arrows).
 - ◆ Remove cover hold down bolts and lift off cover.



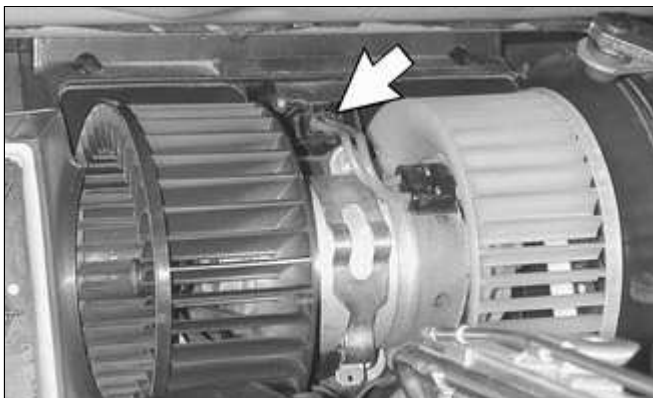
- Working inside right side of cowl, pull up on lever (**arrow**) and detach right air intake flap from blower housing.



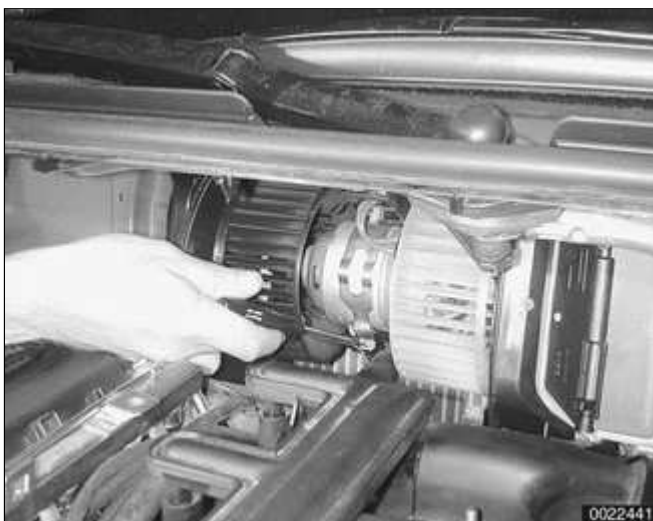
- Pry off blower cover retaining clips (**A**). Remove screw (**B**) and lift off outer blower housing cover.



- Remove blower cover retaining screws (**arrows**). Lift off cover.



- Detach electrical harness connector (**arrow**).



- ✦ Pry off blower motor retaining strap.
 - Pull blower motor forward to remove.
 - Installation is reverse of removal:
 - ◆ Align slot in blower motor with mounting tab in blower motor housing.

Blower motor resistor pack, replacing

Note:

The blower motor resistor pack is also referred to as the final stage unit.

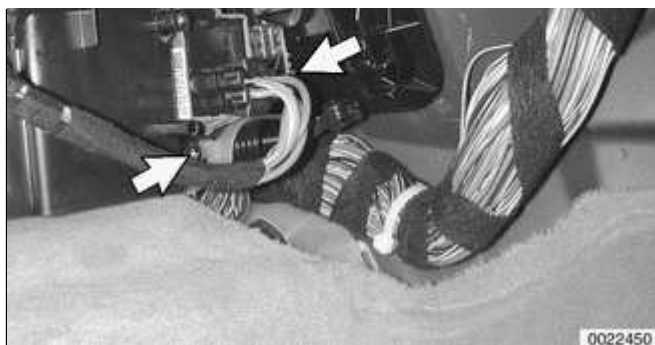
- Remove right footwell air duct as described earlier.



- ✦ Working under right side of dashboard at side of IHKA housing, unhook linkage, then remove air distribution motor (**arrow**).



- ✦ To remove blower resistor pack from IHKA housing:
 - ◆ Remove mounting screws



(arrows).

- ◆ Detach electrical harness connector.
- ◆ Press retaining clip away from switch to release switch.
- Installation is reverse of removal.
- ◆ Make sure electrical harness is routed as before.
- ◆ Align guides and clips correctly.

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Heater Components

The heater valve is located in the left side of the engine compartment, attached to the left strut tower. The solenoid operated valve controls coolant flow through the heater core.

The IHKA housing, located underneath the center of the dashboard, houses the heater core, the A/C evaporator, the heating and A/C blower and associated sensors and air distribution motors.

CAUTION!

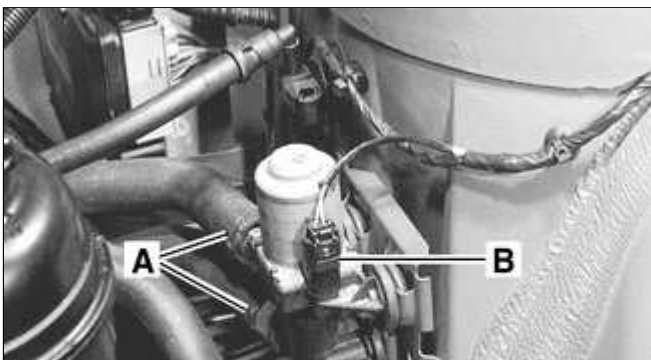
Removal of either the heater core or the IHKA housing involves dashboard removal. Before starting work, disconnect the battery negative (-) cable in the trunk. Be sure to read the battery disconnection cautions on page viii and the airbag warnings in ⇒ [721 Airbag System \(SRS\)](#).

Heater valve, replacing

- Drain engine coolant. See ⇒ [170 Radiator and Cooling System](#).

WARNING!

Allow the cooling system to cool before opening or draining the cooling system.



Disconnect hoses (A) and electrical harness connector (B) at heater valve on left inner fender.

- Carefully pull heater valve out of rubber mounting and pull up and out of engine compartment.

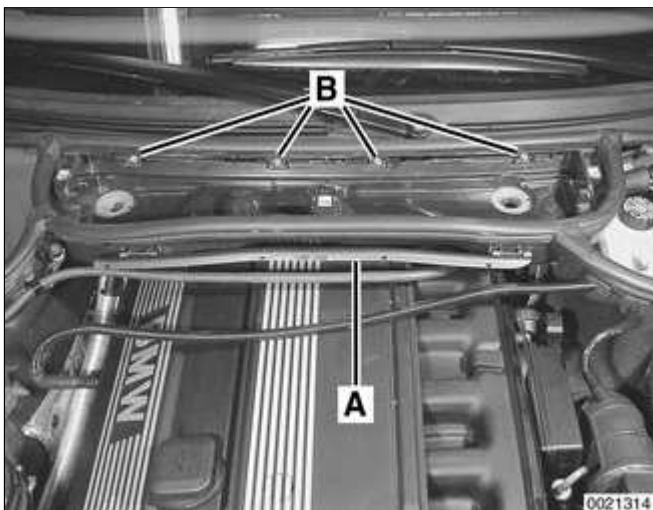


- Installation is reverse of removal.
- ◆ Inspect hoses and rubber mounts. Replace as necessary.
- ◆ Use new hose clamps.

Tightening torque

Coolant hose clamp 32 - 48 mm (2 1/4 - 4 in.)	2.5 Nm (22 in-lb)
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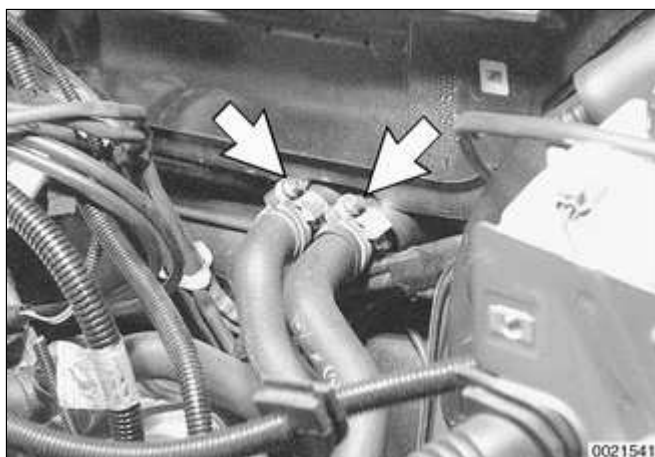
Heater core, replacing



- Remove housing for interior ventilation microfilter.
 - ◆ Remove upper cover and microfilter.
 - ◆ Open wiring harness loom (A) and remove wires.
 - ◆ Unfasten screws (B) and remove lower housing.
- Remove center console and dashboard. See ⇒ [513 Interior Trim](#).
- Drain engine coolant. See ⇒ [170 Radiator and Cooling System](#).

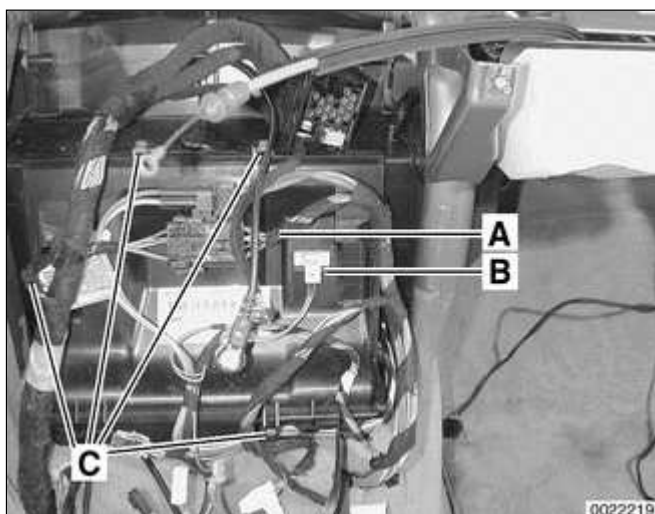
WARNING!

Allow the cooling system to cool before opening or draining the cooling system.



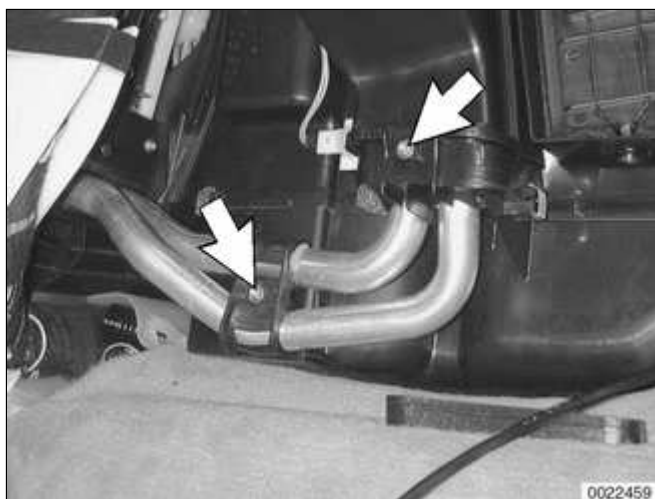
Working at rear engine compartment bulkhead, loosen hose clamps (**arrows**) and detach heater hoses.

- Blow out excess coolant from heater core using compressed air at coolant lines.
- Release right air duct from IHKA housing.



Working inside passenger compartment at IHKA housing:

- ◆ Detach wiring harness (**A**) from housing.
- ◆ Remove heater core temperature sensor (**B**) by pulling straight out.
- ◆ Remove retaining clips (**C**) from housing cover.
- ◆ Lift off front of cover, then unhook tabs from housing at rear.



Remove coolant pipe retaining clamps mounting screws (**arrows**).



To remove heater core from IHKA housing:

- ◆ Remove coolant pipe retainers



(**arrows**) to detach pipes.

- ◆ Tilt heater core to remove from housing.
- Installation is reverse of removal.
- ◆ Fit lugs in back of housing cover in heater housing slots.
- ◆ Use new sealing O-rings and coat with anti-seize agent.
- ◆ Fill and bleed cooling system.
See ⇒ [170 Radiator and Cooling System](#).

CAUTION!

Replace coolant flange O-rings and tighten fasteners to specified torques.

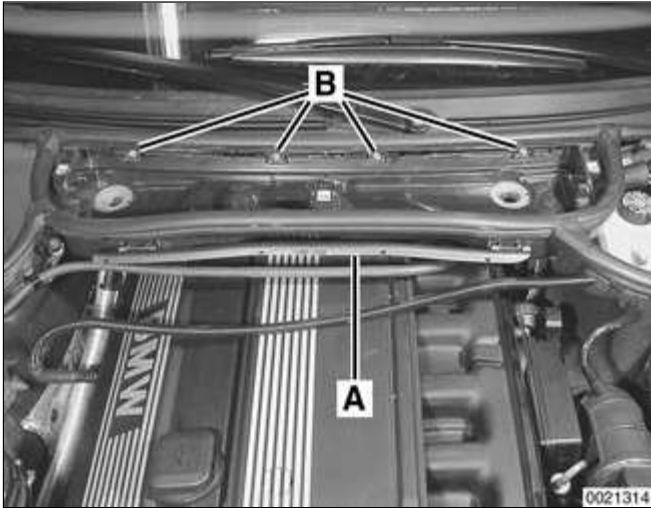
Tightening torque	
Coolant hose clamp 32 - 48 mm (2 1/4- 4 in.)	2.5 Nm (22 in-lb)

IHKA housing, removing and installing

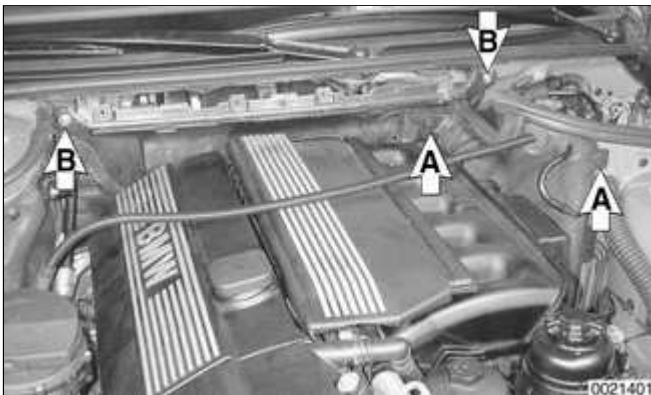
CAUTION!

- ◆ ***Removing the IHKA housing requires evacuating the A/C system. DO NOT attempt this procedure without proper tools and training.***
- ◆ ***Any person who services a***

motor vehicle air conditioner must, by law, be properly trained and certified, and use approved refrigerant recycling equipment. Technicians must complete an EPA-approved recycling course to be certified



- Remove housing for interior ventilation microfilter.
 - ◆ Remove upper cover and microfilter.
 - ◆ Open wiring harness loom (A) and remove wires.
 - ◆ Unfasten screws (B) and remove lower housing.

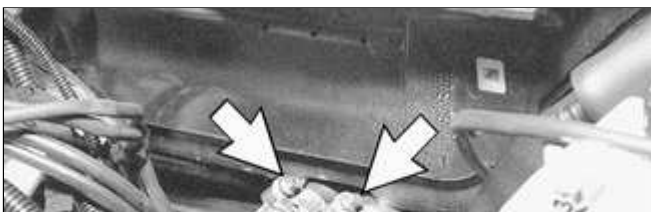


- Remove heater bulkhead cover:
 - ◆ Remove engine compartment side trim panel. Turn locking clips (A) and slide trim panel up.
 - ◆ Remove heater bulkhead cover mounting screws (B) and lift cover off bulkhead.

- Drain engine coolant. See ⇒ [170 Radiator and Cooling System](#).

WARNING!

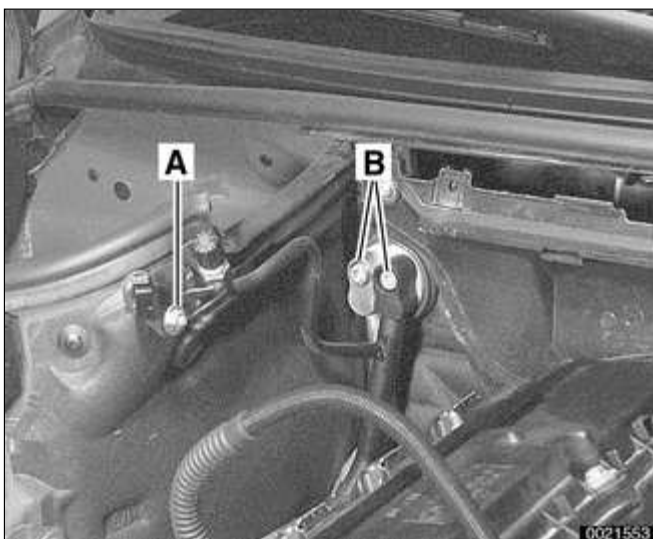
Allow the cooling system to cool before opening or draining the cooling system.



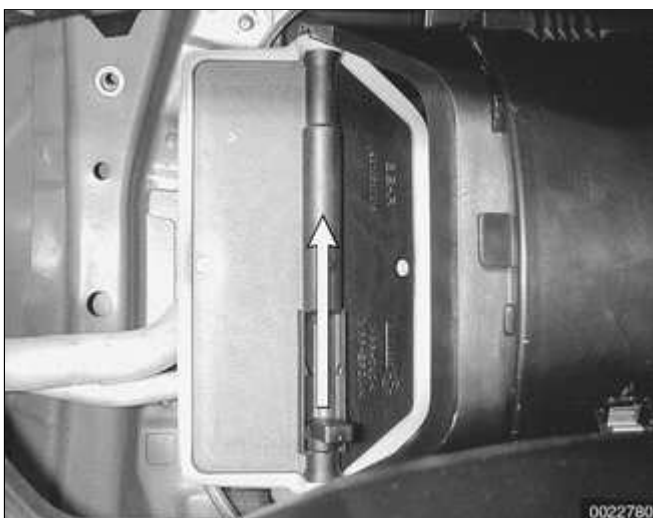
- Working at rear engine compartment bulkhead, loosen hose clamps (arrows) and detach heater hoses.



- Blow out excess coolant from heater core using compressed air at coolant lines.
- Following manufacturer's instructions, connect approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.



- ✦ Working in right rear of engine compartment, detach A/C lines:
 - ◆ Remove A/C recharging port bracket mounting nut (A).
 - ◆ Remove allen bolts (B) at bulkhead.
 - ◆ Using BMW special tool 64 5 102 or equivalent, detach and plug A/C lines.



- ✦ Working inside right side of cowl, pull up on lever (**arrow**) and detach right air intake flap from blower housing.
- Working in right front of IHKA housing, detach double pipe (A/C line) from expansion valve.
- ◆ Lay double pipe aside.
- ◆ Plug up open A/C ports.



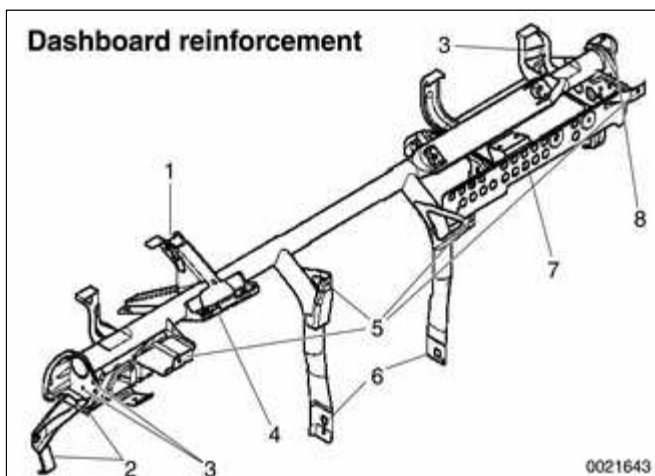
- ✦ Remove IHKA housing mounting nuts (**arrows**) at bulkhead.
- Remove center console and dashboard. See ⇒ [513 Interior Trim](#).



- Working inside passenger compartment below steering column, drill out steering column shear bolt. See ⇒ [320 Steering and Wheel Alignment](#).

◆ Remove steering column mounting bolts.

◆ Lower column.

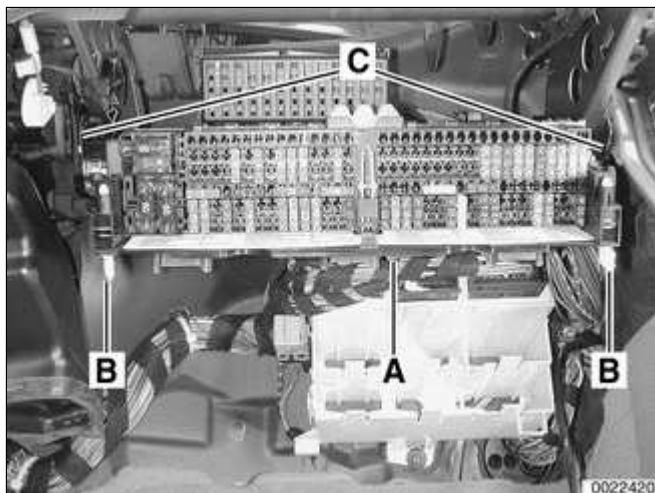


✦ Under dash attachments

- 1 - Bulkhead
- 2 - Left A-pillar
- 3 - Head protection airbag
- 4 - Steering column
- 5 - Dashboard mounts
- 6 - Center tunnel
- 7 - Relay panel
- 8 - Right A-pillar

Remove dashboard reinforcement fasteners:

- ◆ Detach bulkhead brace (1).
- ◆ Detach left and right A-pillar braces (2 and 8).
- ◆ Detach head protection airbag (3).
- ◆ Remove center tunnel mounting bolts (6).
- Detach heater housing electrical harness connectors.



✦ Working at right side of dash:

- ◆ Cut wire tie (**A**) at dashboard reinforcement support for relay panel.
- ◆ Turn fuse panel lock tabs (**B**) 90° and swing fuse panel down.
- ◆ Detach fuse panel pivots (**C**) from dashboard reinforcement.
- Lift off dashboard reinforcement, making sure all electrical harnesses and hoses are free.
- Remove IHKA housing, making sure all electrical harnesses and hoses are free.
- Installation is reverse of removal. Note the following:
 - ◆ Make sure A/C condensate drain is routed correctly.
 - ◆ Replace wire ties, sealing O-rings and hose clamps.
 - ◆ Use new shear bolt at steering column mounting. Tighten bolt until head shears off.
 - ◆ Evacuate and recharge A/C system using specialized equipment.
 - ◆ Fill and bleed cooling system. See ⇒ [170 Radiator and Cooling System](#).

CAUTION!

***Replace heater and A/C flange
O-rings and tighten fasteners to
specified torques.***

Tightening torques	
Coolant hose clamp 32 - 48 mm (2 1/4 - 4 in.)	2.5 Nm (22 in-lb)
Steering column to dashboard reinforcement	22 Nm (16 ft-lb)

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Air Conditioning Components

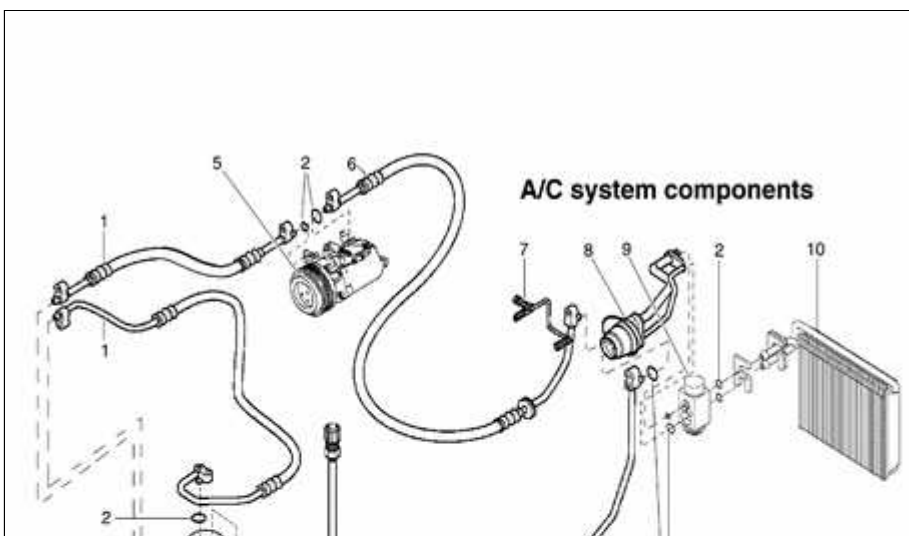
This section covers removal and installation of air conditioning refrigerant components. A/C testing and diagnosis, refrigerant discharge, evacuation and recharge are not covered here.

The A/C condenser, compressor, receiver dryer, pressure sensor, refrigerant lines and expansion valve are either installed in the engine compartment or accessible from the engine compartment.

The A/C evaporator is located in the IHKA housing. Removal of the IHKA housing involves dashboard removal. Before starting work, disconnect the battery negative (-) cable in the trunk. Be sure to read the battery disconnection cautions on page viii and the airbag warnings in ⇒ [721 Airbag System \(SRS\)](#).

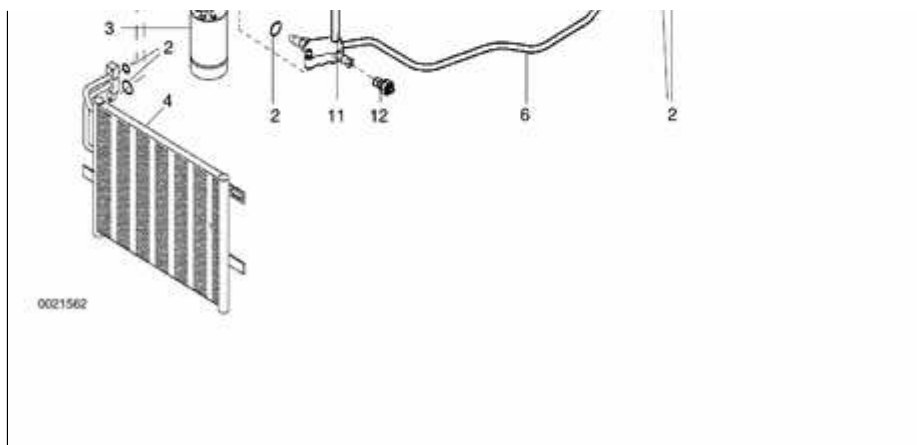
Note:

The air conditioning system is filled with R-134a refrigerant.



A/C system components

- 1 - High pressure line
- 2 - Sealing O-ring (always replace)
- 3 - Receiver-dryer
- 4 - Condenser



- 5 - Compressor
- 6 - Low pressure line
- 7 - Access port
- 8 - Double pipe
- 9 - Expansion valve
- 10 - Evaporator
- 11 - Access port
- 12 - Pressure sensor

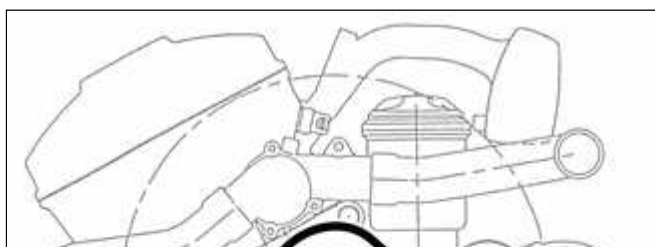
A/C compressor, replacing

- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.

WARNING!

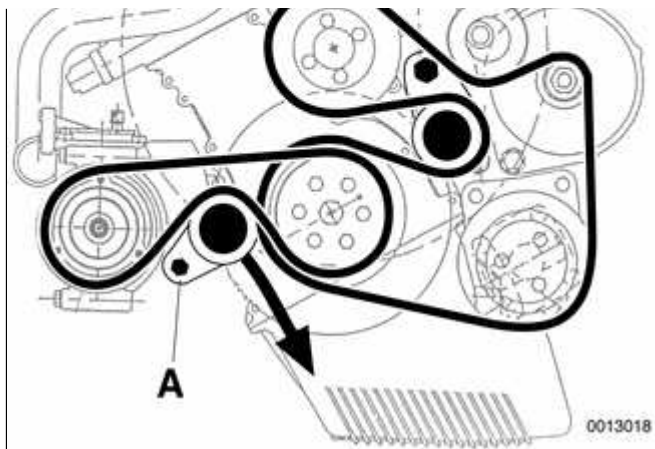
Do not discharge/charge the A/C system without proper equipment and training. Damage to the vehicle and personal injury may result.

- Remove splash shield from under engine.
- Mark A/C drive belt with direction of rotation.



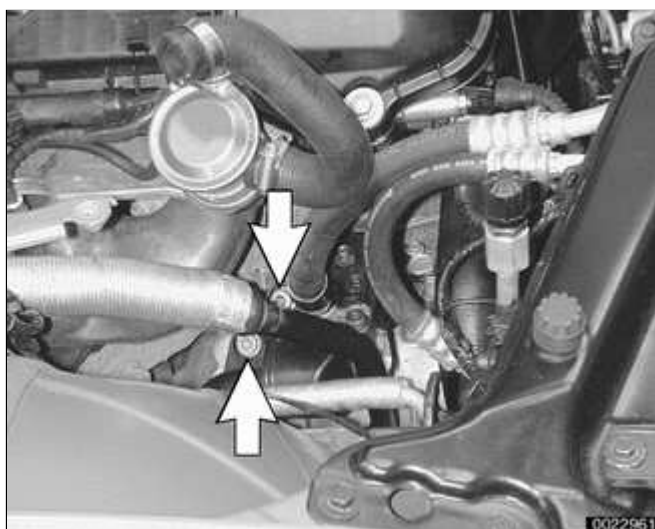
Release tension on A/C belt:

- ◆ Use long-handled wrench to turn tensioner pulley release lug (A) clockwise (against spring tension).



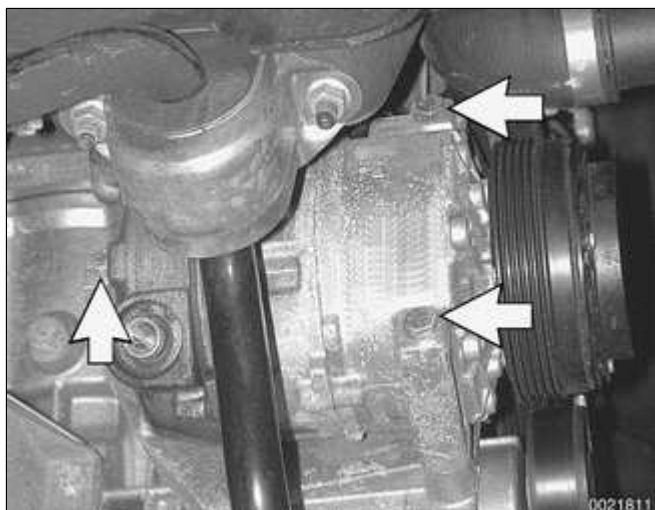
◆ Remove drive belt.

- Detach and set aside front washer fluid reservoir. See ⇒ [611 Wipers and Washers](#).
- Disconnect electrical harness connector from compressor.



✦ Remove A/C pressure hose and suction hose flange bolts (**arrows**) from compressor. Plug hoses immediately.

- All-wheel-drive model: Unbolt and lower front stabilizer bar. See ⇒ [310 Front Suspension](#).



✦ Support compressor while removing compressor mounting bolts (**arrows**). Remove compressor.

- Installation is reverse of removal.

CAUTION!

- ◆ **Always replace O-rings when reconnecting refrigerant lines.**
- ◆ **When installing a new compressor always replace receiver/drier unit.**

Tightening torque

A/C line to A/C compressor	20 Nm (15 ft-lb)
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- Recharge system following equipment manufacturer's instructions. See ⇒ [Table e](#) for A/C system fluid specifications.

Table e. A/C system fluid specifications

Fluid	Quantity
R-134a refrigerant	740 ± 25 g (2 lb ± 1 oz.)
Refrigerant oil	PAG oil

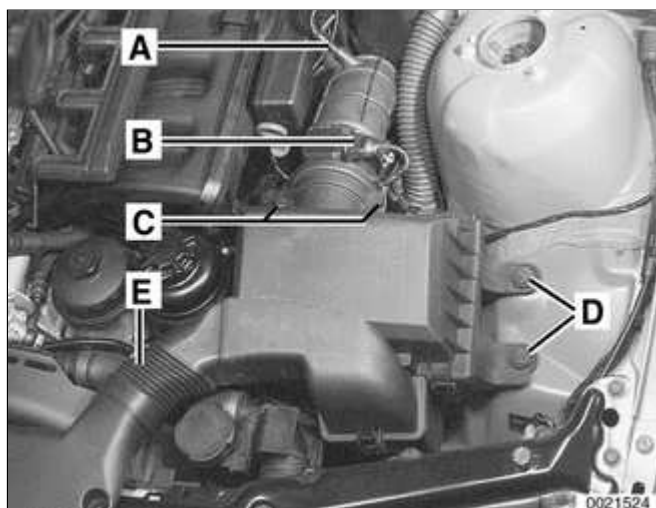
A/C condenser, replacing

The A/C condenser is located in front of the radiator.

- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling /recharging unit to A/C system and discharge system.

WARNING!

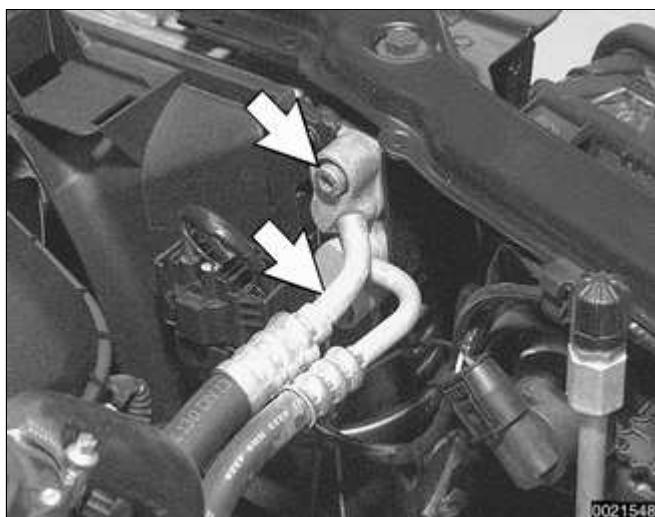
Do not discharge/charge the A/C system without proper equipment and training. Damage to the vehicle and personal injury may result.



➤ Remove complete air filter housing:

- ◆ Detach vacuum line at intake boot (A).
- ◆ Disconnect electrical harness connector on mass air flow sensor (B).
- ◆ Release mass air flow sensor clips (C).

- ◆ Remove filter housing mounting screws (D).
- ◆ Detach air duct connections (E) and lift complete air filter housing out of engine compartment, pulling it forward away from mass air flow sensor.
- Remove intake hood, cooling fan and shroud, and radiator, as described in ⇒ [170 Radiator and Cooling System](#).



- ◀ Detach A/C lines from upper right corner of condenser. Plug lines immediately.
- Remove fastener (expansion rivet) from top left corner of condenser.
- Remove Torx screw from top right corner of condenser, just below refrigerant line flange.
- Lift up condenser to disengage from plastic bracket and remove from above.
- Installation is reverse of removal.

CAUTION!

- ◆ ***Always replace O-rings when reconnecting refrigerant lines.***
- ◆ ***When installing a new condenser always replace receiver/drier unit.***
- Recharge system following equipment manufacturer's instructions.

A/C system fluid specifications	
Fluid	Quantity
R-134a refrigerant	740 ± 25 g (2 lb ± 1 oz.)
Refrigerant oil	PAG oil

A/C receiver/drier, replacing

The receiver/drier is mounted in the front right corner of the engine compartment behind and below the headlight assembly.

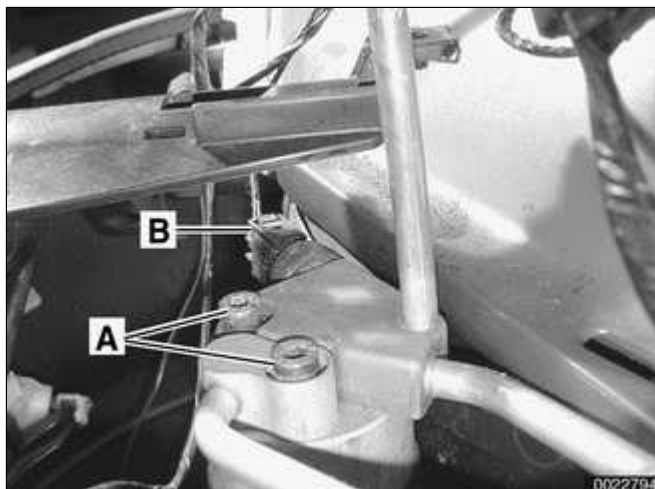
- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.

CAUTION!

The receiver/drier must be replaced when

- ♦ ***There is dirt in the A/C system***
- ♦ ***The compressor has seized or has been replaced for any reason***
- ♦ ***The condenser or evaporator are replaced for any reason***
- ♦ ***The A/C system is leaking and there is no more refrigerant***
- ♦ ***The A/C system was open for 24 hours or more.***

- Remove right headlight assembly.
See ⇒ [630 Lights](#).



◀ Remove refrigerant pressure line mounting bolts (A) from receiver/drier.

◆ Plug lines immediately.

◆ Disconnect high pressure switch harness connector (B).

- Working beneath right front of car, remove splash shield retaining screws. Remove splash shield.
- Loosen receiver/drier mounting strap bolts and slide receiver/drier down and out.
- Installation is reverse of removal.

CAUTION!

Always replace O-rings when reconnecting refrigerant lines.

- Recharge system following equipment manufacturer's instructions.

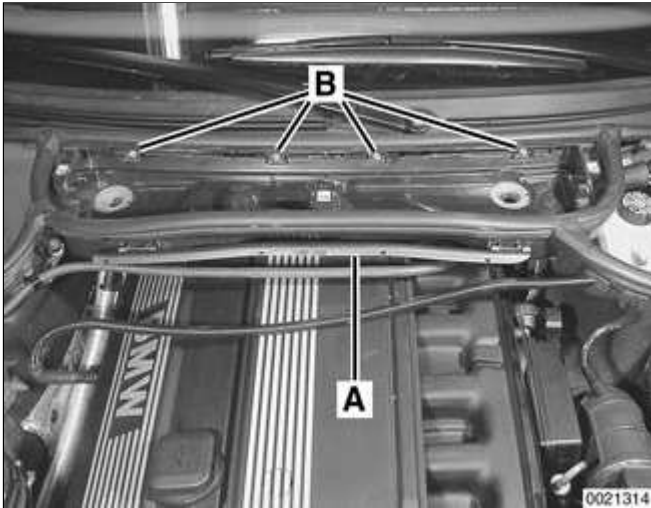
A/C system fluid specifications	
Fluid	Quantity
R-134a refrigerant	740 ± 25 g (2 lb ± 1 oz.)
Refrigerant oil	PAG oil

A/C expansion valve, removing and installing

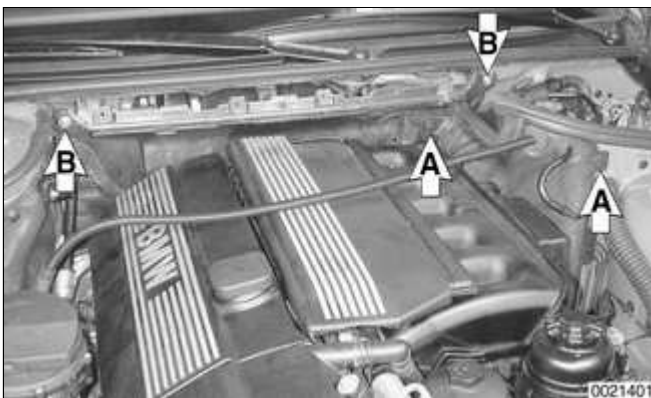
- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling /recharging unit to A/C system and discharge system.

WARNING!

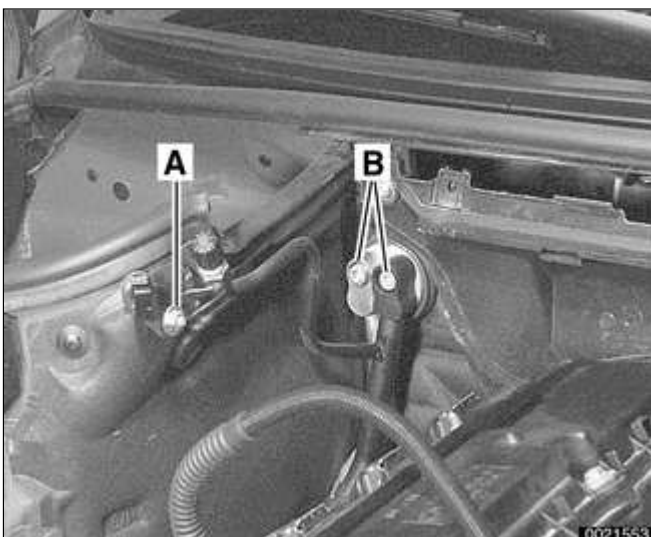
Do not discharge/charge the A/C system without proper equipment and training. Damage to the vehicle and personal injury may result.



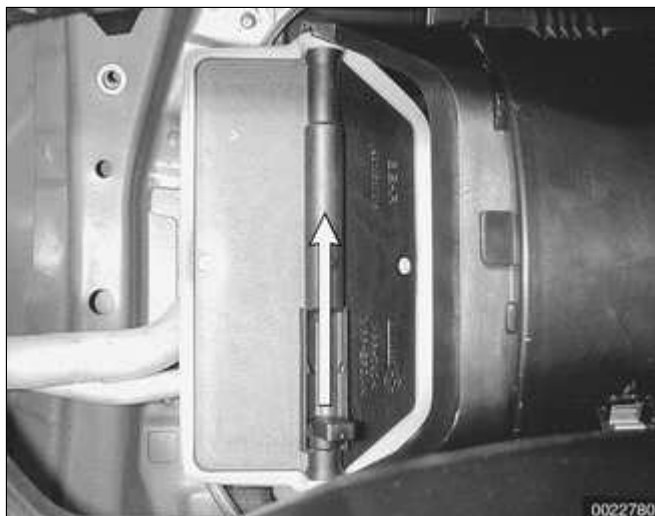
- ◀ Remove housing for interior ventilation microfilter.
 - ◆ Remove upper cover and microfilter.
 - ◆ Open wiring harness loom (A) and remove wires.
 - ◆ Unfasten screws (B) and remove lower housing.



- ◀ To remove heater bulkhead cover:
 - ◆ Remove engine compartment side trim panel. Turn locking clips (A) and slide trim panel up.
 - ◆ Remove heater bulkhead cover mounting screws (B) and lift cover off bulkhead.



- ◀ Working in right rear of engine compartment, detach A/C lines:
 - ◆ Remove A/C recharging port bracket mounting nut (A).
 - ◆ Remove allen bolts (B) at bulkhead. Release and plug open A/C lines.



◀ Working inside right side of cowl, pull up on lever (**arrow**) and detach right air intake flap from blower housing.

- Working in right front of IHKA housing, detach double pipe (A/C line) from expansion valve.
- ◆ Lay double pipe aside.
- ◆ Plug up open A/C ports.
- Remove expansion valve mounting bolts and remove valve.
- Installation is reverse of removal.

CAUTION!

Always replace O-rings when reconnecting refrigerant lines.

- Recharge system following equipment manufacturer's instructions.

A/C system fluid specifications	
Fluid	Quantity
R-134a refrigerant	740 ± 25 g (2 lb ± 1 oz.)
Refrigerant oil	PAG oil

A/C evaporator, removing and installing

- Following manufacturer's instructions, connect an approved refrigerant recovery/recycling/recharging unit to A/C system and discharge system.

- Drain engine coolant. See ⇒ [170 Radiator and Cooling System](#).
- Remove complete IHKA housing as described earlier.
- Remove heater core as described earlier.
- Working on left side of IHKA housing:
 - ◆ Detach evaporator temperature sensor electrical harness connector and pull out sensor.
 - ◆ Detach wiring harness from housing.
 - ◆ Detach linkage from fresh air distribution motor.
- Working on right side of IHKA housing:
 - ◆ Unclip and remove fresh air/recirculation motor.
 - ◆ Remove evaporator cover mounting screw and remove cover.
- Detach and remove microswitch at side of IHKA housing.
- Working in front of IHKA housing:
 - ◆ Remove blower housing mounting screws. Lift out blower housing.

- ◆ Remove double coolant pipe.
- Pry off evaporator housing retaining clips and remove cover. Pull evaporator and expansion valve out of bottom of housing.
- If installing new evaporator, switch over expansion valve. Use new sealing O-rings.

CAUTION!

Do not bend cooling fins on evaporator. If necessary, straighten with fin comb.

- Installation is reverse of removal.
- ◆ Make sure electrical harnesses are routed as before.
- ◆ Align guides and clips correctly.
- ◆ Recharge system following equipment manufacturer's instructions.

A/C system fluid specifications	
Fluid	Quantity
R-134a refrigerant	740 ± 25 g (2 lb ± 1 oz.)
Refrigerant oil	PAG oil

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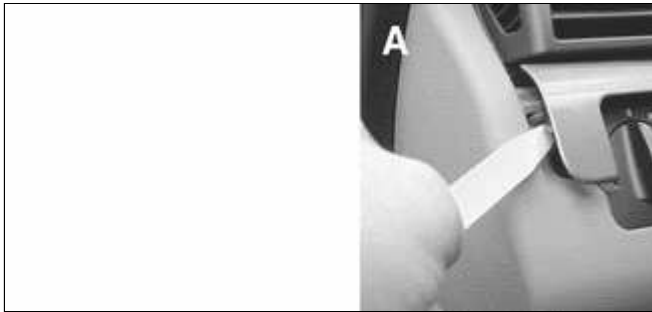
General

This section covers the BMW factory-installed sound system, including radio, amplifier and speaker removal. Radio antenna information is also included.

Special tools

Use BMW special tool 00 9 321 or equivalent plastic prying tool to pry out plastic interior parts without damage or marring.

- Plastic prying tool BMW 00 9 321

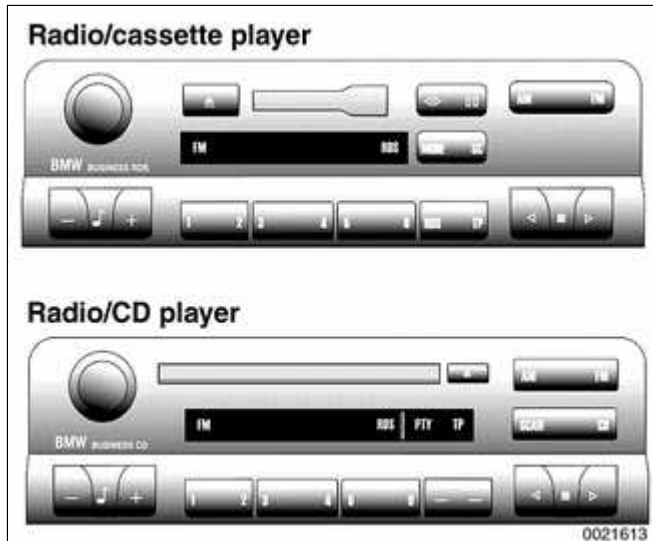


General

- A tag on the bottom of the radio contains the serial number (A) and model number (B).



Sound system



The standard E46 radio features a cassette player. The optional radio has a single in-dash CD player. Both radios are prewired for the optional CD changer that mounts in the trunk. Another option, the On-Board Monitor, integrates GPS navigation with radio and IHKA controls. Basic radio controls are also incorporated in the steering wheel.

Sound system components are interconnected via K-bus. Theft proofing of the radio by code is no longer required as the radio will not function without the K-bus connection and a valid signal from the instrument cluster.

Other features of the sound system include:

- ◆ Autostoring of stations
- ◆ Speed dependent volume
- ◆ Telephone muting

Diversity antenna, described later in this group, is optional on some models and standard on the Convertible and Sport Wagon.

RDS

Radio Data System (RDS) is a transmit and receive system operated in the FM band. It is a data service offered by radio stations in which the information is transmitted inaudibly with the audio programs. The name of the station is displayed in the radio when the RDS system is active. Program identification, program service name and RDS quality are also displayed.

Troubleshooting

Although electronic radio and sound system troubleshooting is beyond the scope of this manual, there are number of self-tests that are possible with the standard BMW radio installed in E46 cars.

Radio test functions are activated by pressing the M button within 8 seconds of switching the radio on. Hold it pressed in for 8 seconds to start the tests.

The test functions include:

- ◆ Radio serial number
- ◆ Software version display
- ◆ Speed dependent volume control adjustment
- ◆ Station signal strength, including FM frequency set, signal strength and quality of signal received
- ◆ AM frequency set and signal strength

The test also checks antenna functions:

- ◆ Antenna signal strength (F number) indicates the quality of the signal received by the antenna. The scale ranges from 0 to 15, with the optimum value being 15. If the value falls below 10, radio stations can not be listened to in stereo.

Radio and Audio Accessories

Radio, removing and installing

CAUTION!

- ♦ *Before beginning work on the radio or sound system, verify that the radio is an original equipment BMW radio and that the wiring harness has not been modified.*
- ♦ *Servicing of aftermarket sound equipment should be referred to an authorized agent of the equipment's manufacturer.*

Note:

On-Board Monitor removal is covered in ⇒ [640 Heating and Air Conditioning](#).

- Prying gently, remove right dashboard trim, then center dashboard trim.

CAUTION!

To avoid marring interior trim, work with a plastic prying tool.



Remove radio mounting screws (arrows).

- Pull radio out of instrument panel opening. Detach electrical harness connector and antenna lead.
- Installation is reverse of removal.

Amplifier

In all models the sound system amplifier is installed behind the trim on the left side of the car.

- Sedan or Coupe: To access amplifier, carefully remove trunk trim clips on left side and peel back trim.



- ✦ Sport Wagon: Remove left cargo compartment trim cover. Sound system amplifier (**arrow**) is behind sound insulation.

- Convertible:

- ◆ Disconnect battery negative terminal.
- ◆ Remove lower section of rear seat left side trim.
- ◆ If necessary, remove convertible top module. See ⇒ [541 Convertible Top](#).
- ◆ Amplifier is attached to side wall.

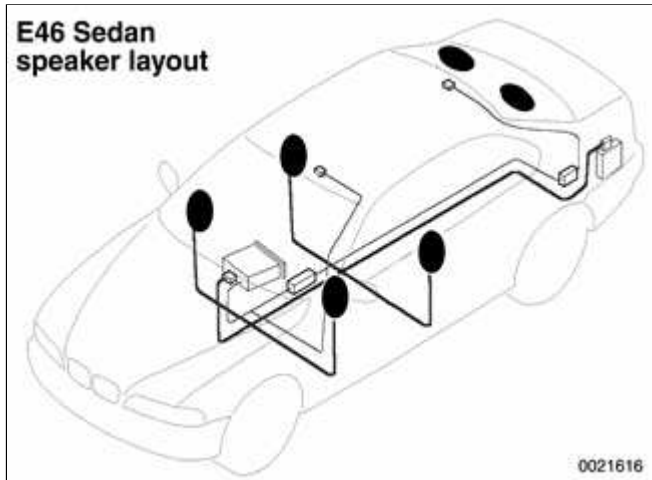
CD changer

The optional CD changer is located in the left side of the trunk behind the trim panel. An access door allows loading of up to 6 CDs.

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Speakers

Each model in the E46 model line-up features a slightly different speaker setup. Speaker and other component locations also vary depending on the type of sound system installed. Some of the common speaker installations are covered in this section.



Sedan and Sport Wagon: The standard installation is six speakers, one in each door and two in the rear. The rear speakers in the Sedan are in the parcel shelf. The rear speakers in the Sport Wagon are mounted on the left and right wheel housings behind trim covers.

Coupe: A tweeter and a mid-range speaker are installed in one housing unit in each front door panel. Another speaker pair is in the left and right rear side trim panels.

Convertible: The standard speaker set-up consists of four speakers mounted in the rear side trim panels, two on each side. One speaker on each side is a 130 mm wide band and the other is a tweeter.

The Harman/Kardon system incorporates an additional subwoofer installed in the trunk. The amplification for this subwoofer comes from the main sound system amplifier.

In the Convertible, the subwoofer is installed in the ski bag cover. It is hinged so that it can be swung aside when the ski bag is used. A magnet on the subwoofer cover holds it in place against the rear bulkhead while the ski bag is used. The subwoofer functions in either position.

Also in the Convertible, the sound system receives a signal from the rear

window defroster relay when the top is lowered. This switches off the stereophonic function.

Door mounted speaker, removing

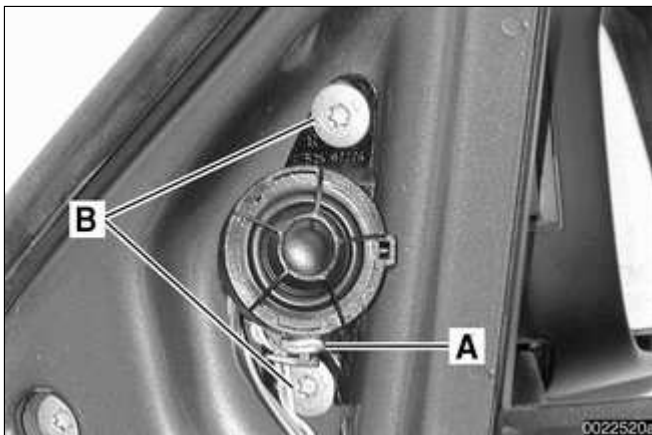
WARNING!

All E46 cars are equipped with front door airbags. Rear door airbags are optional. Before performing any work involving airbags, disconnect the negative (-) battery cable. See ⇒ [721 Airbag System \(SRS\)](#).

CAUTION!

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove interior door panel as described in ⇒ [411 Doors](#).



- ✦ Detach electrical harness connector (A) and remove speaker mounting screws (B).

- Remove speaker.

Rear side panel speaker, removing

- Disconnect battery negative terminal.

CAUTION!

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove lower section of rear seat side trim.
- If necessary, remove convertible top module. See ⇒ [541](#) [Convertible Top](#) (left side only).
- Speaker is attached to side wall.

Rear speaker, removing and installing



- ◀ Working at rear parcel shelf, pry speaker cover by inner edge and remove.

CAUTION!

To avoid marring interior trim, work with a plastic prying tool.

- Remove mounting screws, lift up speaker and detach electrical harness connector.
- When reinstalling, make sure speaker and harness are seated as before.

Subwoofer, removing

- Coupe:
- ◆ Working in trunk under parcel shelf, remove subwoofer mounting

screws.

- ◆ Unhook and pull subwoofer down.
Remove electrical harness
connector.
- Convertible:
 - ◆ Working in trunk, unhook and
swing out subwoofer.
 - ◆ Squeeze plastic harness cover
and remove.
 - ◆ Detach electrical harness
connector.
 - ◆ Using plastic pry tool, gently pry
subwoofer at bottom left and pull
out.

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Antenna

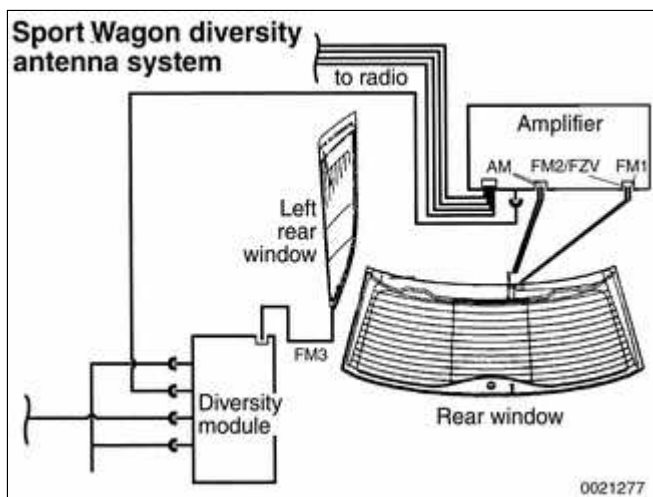
Antenna and diversity

The antenna used for the radio, telephone and FZV remote entry system is integrated with the rear window defogger in the Sedan and Coupe models.

Convertible and Sport Wagon models feature a diversity antenna system to provide the strongest possible radio station signal to the sound system.

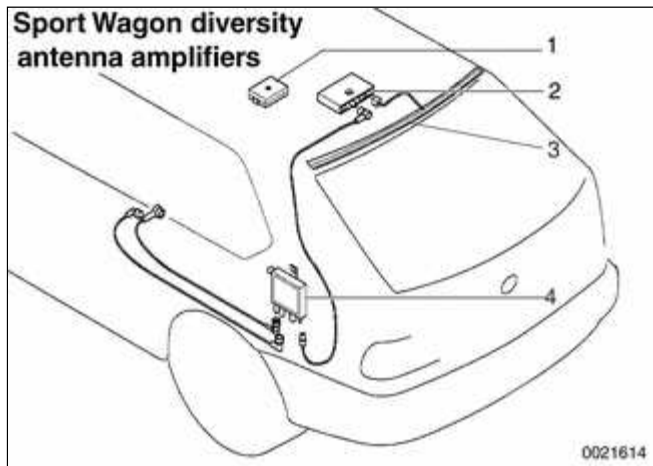
In this system there are two (or more) antennas. Both the main and the auxiliary antenna(s) receive radio signals and both signals are amplified in separate amplifiers. The signals are then transmitted to the diversity switching module, which locks onto the strongest signal and sends it to the radio receiver.

Sport Wagon antenna system



✦ The diversity antenna system on the E46 Sport Wagon consists of the following;

- ◆ FM1 antenna in rear window (right half)
- ◆ FM2 antenna in rear window (center)
- ◆ FM3 antenna in left rear side window
- ◆ AM antenna in rear spoiler



- ◆ FZV (keyless entry) antenna combined with FM2 antenna

✦ The FM1/FM2 antenna amplifier is located beneath the rear spoiler. The signal from this amplifier is transmitted to the diversity module in the cargo compartment behind the left trim panel.

- 1 - Suppression filter
- 2 - Antenna amplifier
- 3 - AM antenna
- 4 - Diversity module

The FM3 antenna has a separate amplifier integrated into the diversity module. The module will select the clearest signal from the three antennas and transmit that to the sound system.

The AM antenna is glued to the bottom of the rear spoiler.

Convertible antenna system

The diversity antenna system on the E46 Convertible consists of the following:

- ◆ Main antenna mast on left rear fender
- ◆ Auxiliary antenna in convertible top storage cover
- ◆ Main antenna amplifier, mounted directly below the antenna mast
- ◆ Auxiliary antenna amplifier, mounted on convertible top storage cover and powered through antenna lead

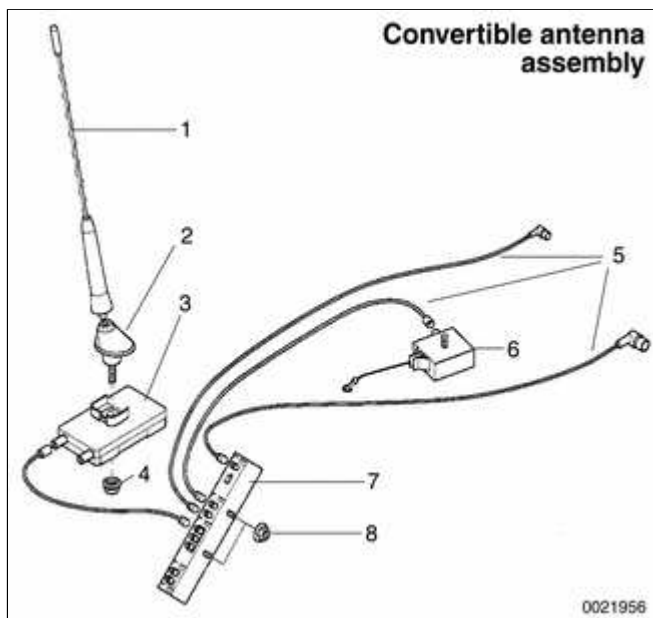
- ◆ Diversity switching module, mounted below antenna mast in trunk

More information on the rear window defogger/antenna system is in ⇒ [640 Heating and Air Conditioning](#).

Note:

The telephone antenna is wound around the main antenna mast.

Antenna, removing (Convertible models)



- ✦ Unscrew and remove antenna mast.

- 1 - Antenna mast
 - 2 - Antenna head
 - 3 - Antenna base
 - 4 - Nut (M5)
 - 5 - Antenna cable
 - 6 - Antenna FM amplifier
 - 7 - Antenna diversity amplifier
 - 8 - Nut (M6)
- Detach and remove wheel housing trim liner in left side of trunk.
 - Through elongated hole of antenna retaining bracket, unscrew M5 nut.
 - ◆ This releases antenna head from base.

- ◆ Place antenna base down on bracket.
- ◆ Remove antenna head from above fender.
- To remove base, slide toward rear of car, then detach cable connections.
- When installing, make sure the offset of antenna head points toward back of car.

Antenna amplifier, accessing

- Convertible main antenna amplifier:
- ◆ Detach and remove wheel housing trim liner in left side of trunk.
- ◆ Antenna amplifier is mounted below antenna bracket.
- Convertible auxiliary antenna amplifier:
- ◆ Open convertible top compartment lid.
- ◆ Auxiliary amplifier is attached to left rear corner of lid.



- ⚡ Sedan or Coupe antenna amplifier:
- ◆ Remove left roof pillar (C-pillar) trim panel as described in ⇒ [513 Interior Trim](#) to access amplifier.



- Sedan or Coupe antenna suppressor:

- ◆ Remove right roof pillar (C-pillar) trim panel to access suppressor.



- ◆ Sport Wagon FM3 antenna/diversity module:

- ◆ Remove left cargo compartment trim cover to gain access to module (**arrow**).

- Sport Wagon FM1/FM2 antenna amplifier:

- ◆ Remove rear spoiler. See ⇒ [412 Trunk Lid, Tailgate](#).

- ◆ Amplifier is in center of rear window beneath spoiler.

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General

This section covers repairs to the seat belts.

Multiple Restraint System (MRS II) electronics integrate seat belt operations and airbag deployment. Airbag repair information is covered in ⇒ [721 Airbag System \(SRS\)](#).

All E46 models are equipped with 3-point shoulder belts at four seating positions.

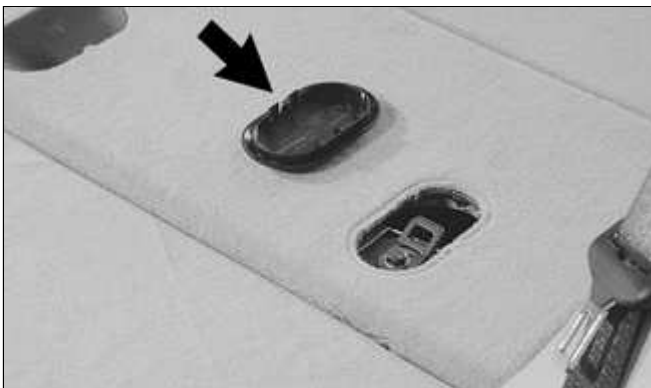
- ◆ Sport Wagon models are equipped with an additional 3-point shoulder belt in the center of the rear seat.
- ◆ Sedan and Coupe models are equipped with a lap belt in the center rear seat position.
- ◆ Convertible models are equipped with seat-integrated seat belt system (SGS) in the front seats.

Child safety anchors

Sport Wagon models are equipped with three child safety harness anchors behind the rear seat in the cargo compartment floor.



Remove plastic cover (**arrow**) to access safety anchor eye.





Troubleshooting

The seat belt reel should lock when driving quickly through curves, during severe braking or in case of a collision. The automatic reel does not require any servicing and should never be opened.

In case of an accident, follow the seat belt troubleshooting procedures presented in ⇒ [Table a. Troubleshooting the automatic seat belt system.](#)

Note:

The rear bench seat belt strap may not retract fully due to increased friction between strap and seat cover. A small remaining loop in belt strap when fully retracted is acceptable.

WARNING!

- ♦ ***For maximum protection from injury, seat belts should be replaced as a set (including all hardware), if they are subject to occupant loading in a collision.***
- ♦ ***Seat belts should not be modified or repaired. The seat belt mounting points should not be changed or modified.***
- ♦ ***Do not bleach or dye seat belt webbing. Webbing that is severely faded or re-dyed will not meet the strength requirements of a collision and must be replaced. Clean belts***

with a luke-warm soap solution only.

- ♦ **Seat belts should be periodically inspected for webbing defects such as cuts or pulled threads.**
- ♦ **Immediately after replacing a damaged or worn seat belt, destroy the old belt to prevent it from being used again.**

Table a. Troubleshooting the automatic seat belt system

Problem	Probable cause	Repairs
Damage to seat belt:	Accident in which bumper impact absorbers were permanently deformed	Replace complete automatic seat belt. Also check and replace, if necessary: <ul style="list-style-type: none"> ♦ Seat belt mounting on car body ♦ Seat belt mounting on seat runner
Belt creased, unraveled, pinched, cut or melted	Seat belts aged or worn	Replace complete automatic seat belt.
Belt buckle or belt lock plastic casing worn, damaged or missing		
Seat belt buckle is not ejected with spring pressure when red button on seat belt lock is pressed	Seat belt lock mechanism worn or damaged	Replace seat belt lock.
Seat belt automatic reel does not lock when pulled out suddenly.	Automatic reel defective	Replace reel assembly.
Seat belt automatic reel jams when pulled out.	Automatic reel loose	Tighten reel mounting bolt.
	Return spring broken inside reel	Replace reel assembly.

Problem	Probable cause	Repairs
Seat belt does not retract automatically. (See note.)	Automatic reel loose	Tighten reel mounting bolt.
	Return spring broken inside reel	Replace reel assembly.
Automatic belt squeaks when belt fastened or unfastened.	Excessive friction in belt guides	Replace reel assembly.
	Automatic reel loose	Tighten reel mounting bolt.
	Return spring broken inside reel	Replace reel assembly.
Seat belt pyrotechnic tensioner triggered	Accident triggered pyrotechnic deployment	Replace complete automatic seat belt. Also check retaining bracket of belt tensioner for twist.
Convertible models only:		
Front seat back requires excessive force to lock or unlock	Accident damage to seat via seat belt	Replace front seat.
Seat back lock warning lamp on when seat back is locked; or warning lamp lights up when seat back is shaken	Seat back lock microswitch defective	Replace microswitch
	Microswitch electrical harness connectors loose or defective	Repair electrical leads.
	Seat back lock is damaged	If fault persists, replace front seat.
Contact surface of inertia reel warped	Accident damage	Replace front seat.
Seat back warped or deformed	Accident damage	
Head restraint carrier not parallel	Accident damage	
Seat movement sticky or sluggish at some point in its range; unusual noises	Accident damage (side)	
Front seat shows evidence of contact with body structural part (e.g., door)	Accident damage (side)	
Front seat shows evidence of contact with external objects	Accident damage (rollover)	

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Front Seat Belt Assembly

Front seat belt tensioner, removing and installing

The front seat belt locks are equipped with pyrotechnic (explosive charge) automatic tensioners. These tensioners are designed to automatically retract and tension the seat belt by 55 mm (approximately 2 inches) in the event of an accident.

WARNING!

- ♦ *Pyrotechnic seat belt tensioners are powerful devices and should be handled with extreme care. Incorrect handling can trigger the tensioner and cause injury.*
- ♦ *BMW recommends that all repair or replacement work on pyrotechnic devices must be carried out by a qualified BMW technician.*
- ♦ *Be sure to disconnect the battery and wait 5 seconds before attempting to work on pyrotechnic devices.*
- ♦ *Pyrotechnic devices cannot be repaired. Always replace them.*
- ♦ *Never treat pyrotechnic components with cleaning agents or grease.*

- ♦ **Do not expose pyrotechnic components to temperatures above 75°C (167°F).**
- ♦ **Pyrotechnic components can only be tested electrically when installed, using BMW service tester DIS, MoDiC or equivalent scan tool.**
- ♦ **Do not fire a pyrotechnic gas generator prior to disposal. It must be fired by a special disposal company or shipped back to BMW in the packaging of the new components.**
- ♦ **During body straightening and welding with an electric arc welder, always disconnect the battery and the connection to the pyrotechnic gas generators.**

- Detach battery negative (-) cable in luggage compartment.

CAUTION!

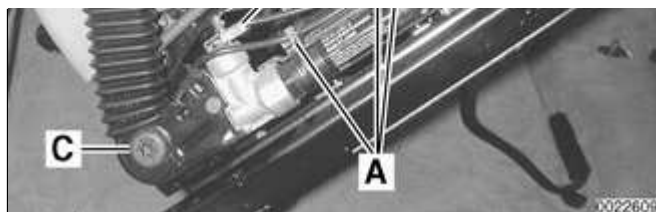
Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove front seat as described in ⇒ [520 Seats](#).

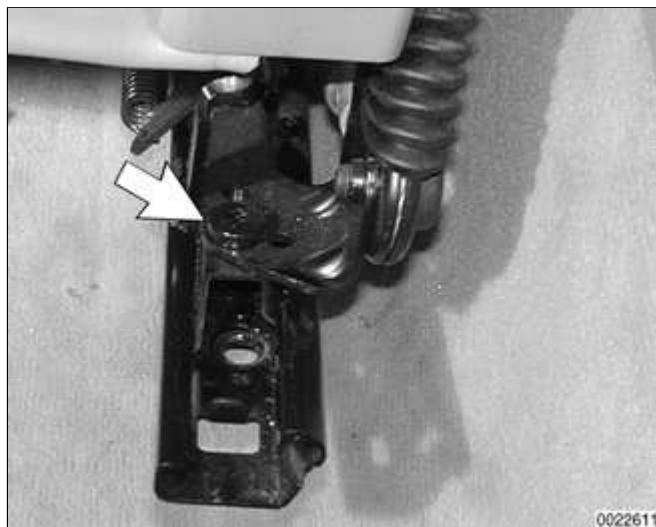


Remove pyrotechnic belt tensioner:

- ♦ Detach tensioner harness connector from seat rail by cutting wire tie (A).



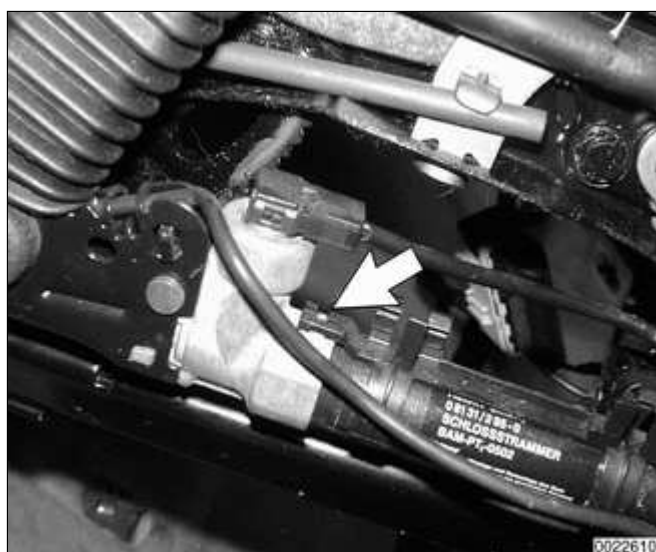
- ◆ Detach harness connection (**B**).
- ◆ Remove tensioner mounting bolt (**C**).



- ⚡ Check tensioner mounting bracket (**arrow**) for damage or bending. Replace if necessary.

CAUTION!

A bent tensioner mounting bracket may make it impossible to adjust seat height.



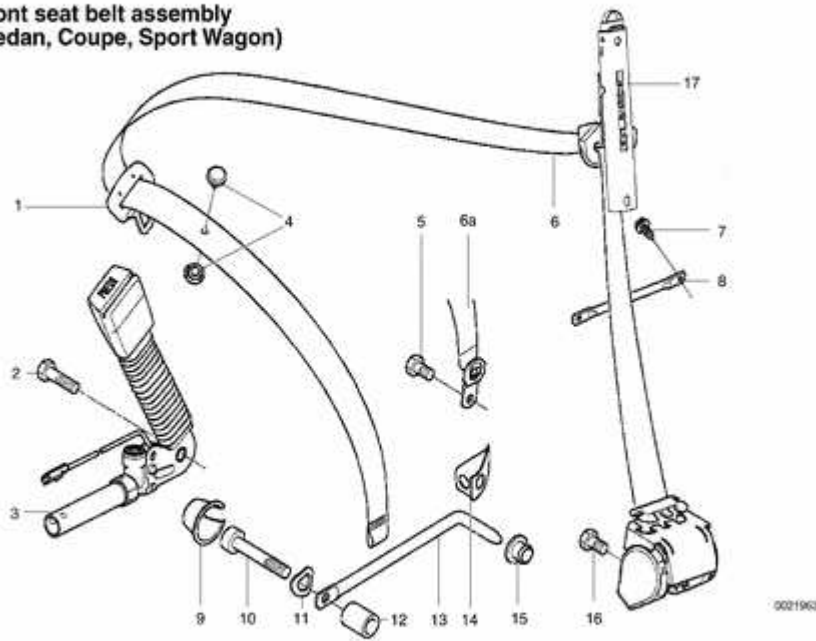
- ⚡ When reinstalling:
 - ◆ Replace wire ties to relieve tension on the pyrotechnic belt tensioner harness connector.
 - ◆ Make sure tensioner harness connector mounting bracket (**arrow**) is installed correctly.

Tightening torques

Front seat to floor (M10 fastener)	45 Nm (33 ft-lb)
Seat belt to seat	48 Nm (35 ft-lb)
Tensioner mounting bracket to seat rail	24 Nm (18 ft-lb)
Tensioner to mounting bracket	48 Nm (35 ft-lb)

Front seat belt

Front seat belt assembly
(Sedan, Coupe, Sport Wagon)



assembly (Sedan, Coupe, Sport Wagon)

- 1 - Seat belt buckle**
- 2 - Tensioner mounting bolt**

◆ tighten to 48 Nm (35 ft-lb)

- 3 - Seat belt lock with pyrotechnic tensioner**
- 4 - Seat belt stop button**
- 5 - Seat belt anchor bolt**

◆ tighten to 48 Nm (35 ft-lb)

- 6 - Seat belt reel assembly**
- 6a - Seat belt anchor end (Sedan/Sport Wagon models)**

- 7 - Bolt M8**
- 8 - B-pillar cross-brace**

- 9 - Plastic cap**

- 10 - Bolt M10**

◆ tighten to 31 Nm (23 ft-lb)

- 11 - Spring washer**

- 12 - Spacer
- 13 - Seat belt anchor bar (Coupe only)
- 14 - Cap
- 15 - Grommet
- 16 - Seat belt reel mounting bolt M10
- ◆ tighten to 31 Nm (23 ft-lb)
- 17 - Seat belt height adjuster

Front seat belt reel, removing and installing (Sedan, Coupe or Sport Wagon models)

- Detach battery negative (-) cable in luggage compartment.

CAUTION!

Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove front seat as described in ⇒ [520 Seats](#).
- Coupe models: Working just inside door sill.
- ◆ Pry off plastic protective cap over end of seat belt anchor bar.

- ◆ Remove anchor bar bolt and slip off end of seat belt from bar.

Note:

Replace anchor bar if it is bent.

- ⚡ Prying gently upward, remove plastic door sill protector strip.



- ⚡ Sedan or Sport Wagon models: Remove lower B-pillar (door pillar) plastic trim.

- ◆ Pry gently along bottom of trim to disengage clips from pillar.

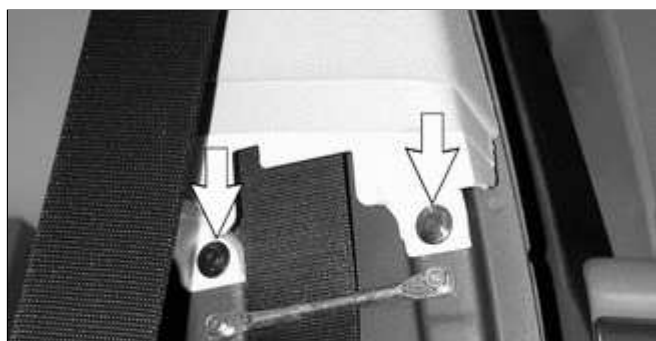
- ◆ Slide trim down and out.

- Coupe models: Remove rear side panel as described in ⇒ [411 Doors](#).

Note:

Partially peel rubber door seal(s) away from B-pillar.

- ⚡ Remove upper B-pillar (door pillar) plastic trim expansion rivets (**arrows**).





- ◀ Pull B-pillar upper trim down to remove.



- ◀ Remove automatic reel from B-pillar:
- ◆ Remove upper seat belt anchor bolt (A).
 - ◆ Remove cross-brace mounting bolts (B).
 - ◆ Remove sound insulation at base of B-pillar. Then remove automatic seat belt reel mounting bolt (C).
 - ◆ Lift out reel.
 - If it is necessary to remove sliding seat belt height adjuster, unscrew mounting bolts from B-pillar.
 - Installation is reverse of removal.
 - ◆ Install automatic reel housing to