

720 Seat Belts

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GENERAL

This section covers repairs to the following seat belts systems. See the table below.

Multiple Restraint Systems	
Years	Restraint system
3/1996 - 8/1997	MRS
9/1997 - 3/1999	MRS II
3/1999 - on	MRS III

Multiple Restraint System electronics integrate seat belt operations and airbag deployment. Airbag repair information is covered in **721 Airbag System (SRS)**.

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 the table below.

Troubleshooting procedures		
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, seat belt mounting on car body and seat belt mounting on seat runner.
Belt creased, unraveled, pinched, cut or melted. Belt buckle or belt lock plastic casing worn, damaged or missing.	Seat belts aged or worn.	Replace complete automatic seat belt.
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. Return spring broken inside reel.	Tighten reel mounting bolt. Replace reel assembly.
Seat belt does not retract automatically (see note below).	Automatic reel loose. Return spring broken inside reel.	Tighten reel mounting bolt. Replace reel assembly.
Automatic belt squeaks when fastened or unfastened.	Excessive friction in belt guides. Automatic reel loose. Return spring broken inside reel.	Replace reel assembly. Tighten reel mounting bolt. 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.

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 redyed 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.*

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—

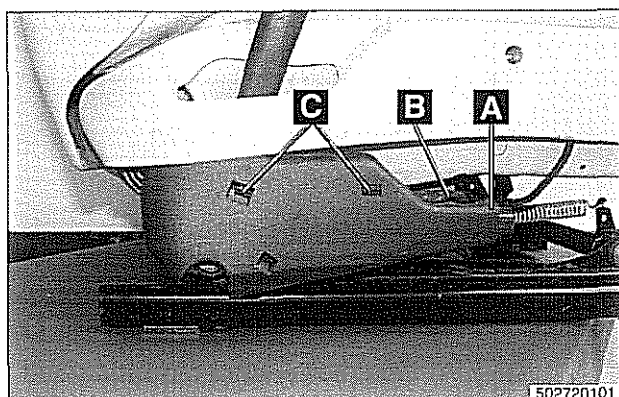
- *Pyrotechnic seat belt tensioners are powerful devices and should be handled with extreme care. Incorrect handling can trigger the tensioner and cause injury.*
- *BMW recommends that all repair or replacement work on pyrotechnic devices must be carried out by a qualified BMW technician.*
- *Be sure 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 the BMW Service Tester (DISplus, GT1, or MoDiC).*
- *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 component.*
- *During body straightening and welding with an electric arc welder, always disconnect the battery and the connection to the pyrotechnic gas generators.*

- Disconnect battery negative (–) cable in trunk.

CAUTION—

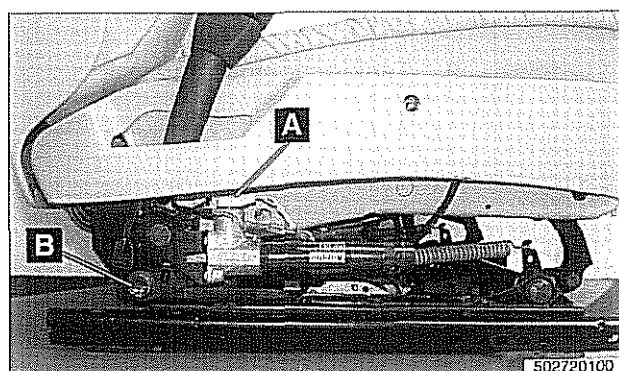
Prior to disconnecting the battery, read the battery disconnection cautions given in 001 General Warnings and Cautions.

- Remove front seat as described in 520 Seats.



➤ Remove tensioner cover:

- Cut wire ties (A).
- Release wiring harness from tensioner cover clip (B).
- Release tensioner cover locks (C) and slide cover down to remove.



➤ Remove pyrotechnic tensioner:

- Detach tensioner harness connector from seat rail by cutting wire tie (A).
 - Remove tensioner mounting bolt (B).
- Check tensioner mounting bracket for damage or bending. Replace if necessary.

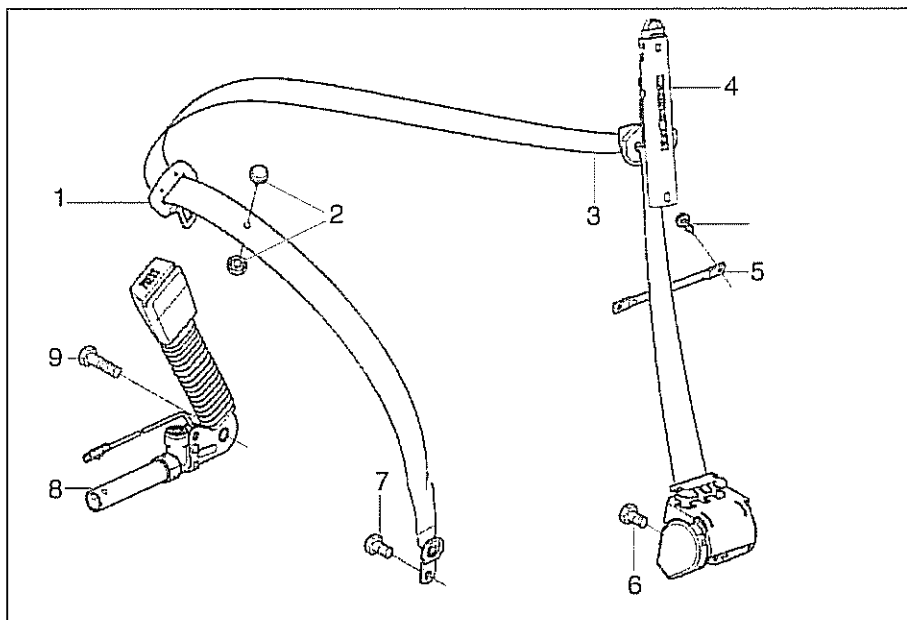
CAUTION—

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

- When reinstalling:
- Replace wire ties to relieve tension on pyrotechnic belt tensioner harness connector.

Tightening torques

Front seat to floor (M10)	42 Nm (31 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 assembly

1. Seat belt buckle
2. Seat belt stop button
3. Seat belt
4. Seat belt height adjuster
5. B-pillar cross brace
6. Seat belt reel mounting bolt
7. Seat belt anchor mounting bolt
8. Seat belt lock with pyrotechnic tensioner
9. Tensioner mounting bolt

Front seat belt reel, removing and installing (sedan and Sport Wagon models)

- Detach battery negative (–) cable in trunk.

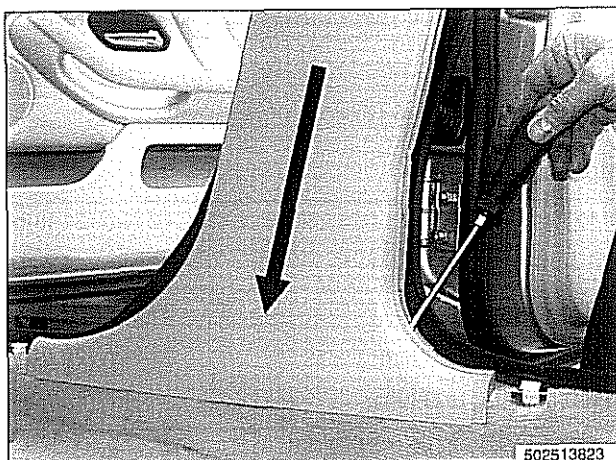
CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given in 001 General Warnings and Cautions.

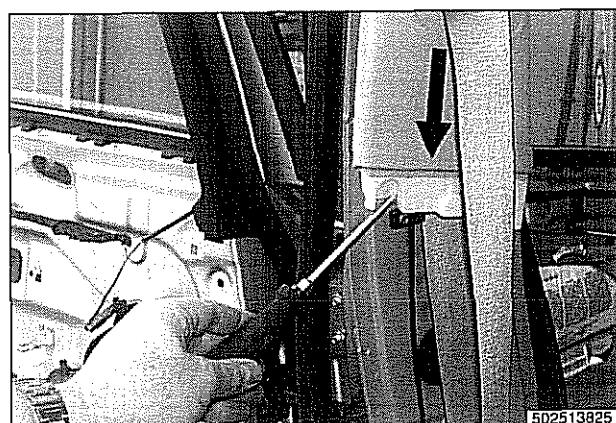
- Remove front seat as described in 520 Seats.

- Gently pry up front and rear plastic door sill protector strips to remove.





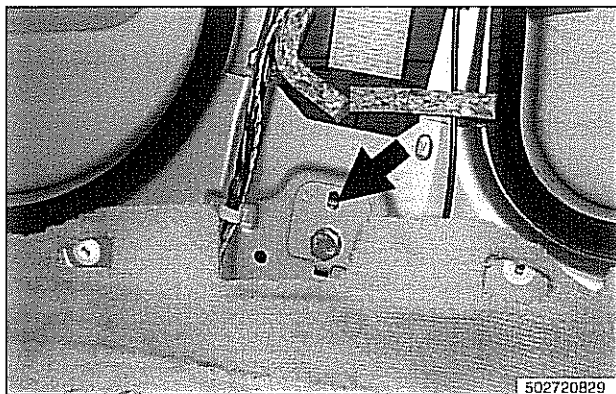
- Remove lower B-pillar (door pillar) plastic trim.
- Pry carefully along bottom of trim to disengage clips from pillar.
 - Slide trim down (**arrow**) and out to remove.



- Carefully pry bottom of upper door post trim away from post to release clips.
- Slide upper trim panel down (**arrow**) 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.



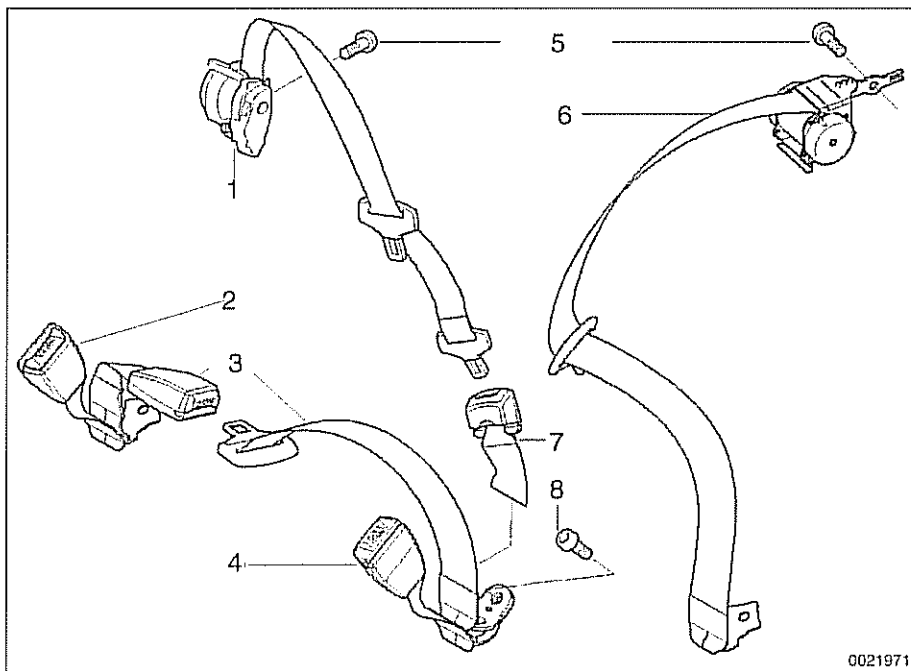
➤ When Installing automatic reel housing to B-pillar, slide tab into locating slot (**arrow**).

— Remainder of installation is reverse of removal.

Tightening torques

Front seat to floor (M10)	42 Nm (31 ft-lb)
Seat belt to seat	48 Nm (35 ft-lb)
Seat belt to height adjuster	31 Nm (23 ft-lb)
Seat belt reel to B-pillar bottom	31 Nm (23 ft-lb)
Sliding height adjuster to B-pillar	24 Nm (18 ft-lb)

REAR SEAT BELT ASSEMBLY

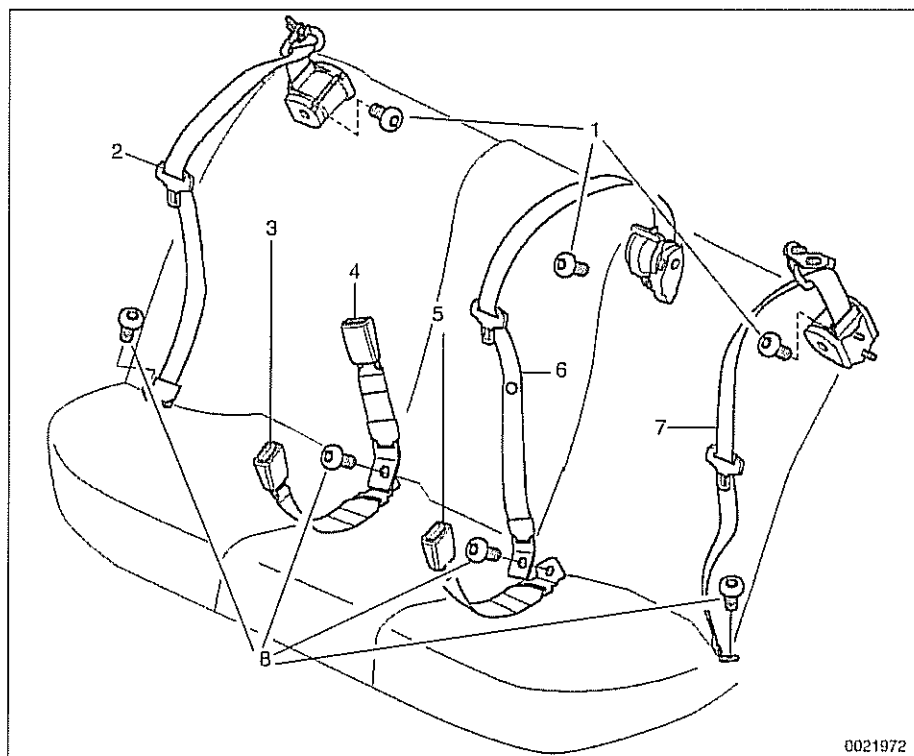


Rear seat belt assembly (sedan)

1. Center shoulder belt reel assembly (if equipped)
2. Right shoulder belt lock
3. Lap-belt assembly
4. Left shoulder belt lock
5. Bolt M10
(tighten to 31 Nm, 23 ft-lb)
6. Left shoulder belt reel assembly
7. Center shoulder belt lock (if equipped)
8. Bolt M12
(tighten to 48 Nm, 35 ft-lb)

Rear seat belts (sedan)

- Remove rear parcel shelf to access shoulder belt assembly mounting bolts. See **513 Interior Trim**.
- Remove rear seat cushion to access rear seat belt lock mounting bolts. See **520 Seats**.
- When installing seat belt lock straps:
 - Install right lock strap (which is shorter) underneath middle lock strap.
 - Install left lock strap underneath middle lap belt strap.
 - Metal strap ends must rest against stop on floor underneath seat.



Rear seat belt assembly (Sport Wagon)

1. Bolt M10
(tighten to 31 Nm, 23 ft-lb)
2. Right shoulder belt reel assembly
3. Center belt lock
4. Right belt lock
5. Left belt lock
6. Center shoulder belt reel assembly
7. Left shoulder belt reel assembly
8. Bolt M12
(tighten to 48 Nm, 35 ft-lb)

Rear seat belts (Sport Wagon)

- Center shoulder belt:
 - Remove shoulder belt guide trim at top of seat backrest.
 - Feed belt out through slot in trim. Working in cargo compartment, partially remove backrest cover to access shoulder belt reel.
 - Remove shoulder belt reel mounting bolt inside backrest.
- Outboard shoulder belt:
 - Remove roof-pillar (C-pillar) trim.
 - Remove center shoulder belt.
- Lift up rear seat cushion(s) to access rear seat belt lock mounting bolt(s).
- When installing seat belt lock straps:
 - Install right belt lock strap (which is shorter) underneath center belt lock strap.
 - Install left belt lock strap underneath center lap belt strap.
- Metal strap ends must rest against stop on floor underneath seat.



721 Airbag System (SRS)

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GENERAL

This repair group covers airbag components and replacement. Airbag system repair and fault diagnosis is not covered. Diagnostics, component testing, and airbag system repair should be carried out by trained BMW service technicians.

Individual airbag system components can only be tested electronically when installed in the car. BMW service testers DIS or MoDiC or equivalent must be used for diagnostic work.

WARNING —

Special test equipment is required to retrieve airbag fault codes, diagnose system faults, and reset/turn off the airbag indicator light. The indicator light will remain on until any problem has been corrected and the fault memory has been cleared.

Airbags are part of the BMW Multiple Restraint System (MRS). Three versions of MRS are available in E39 models.

Multiple Restraint Systems

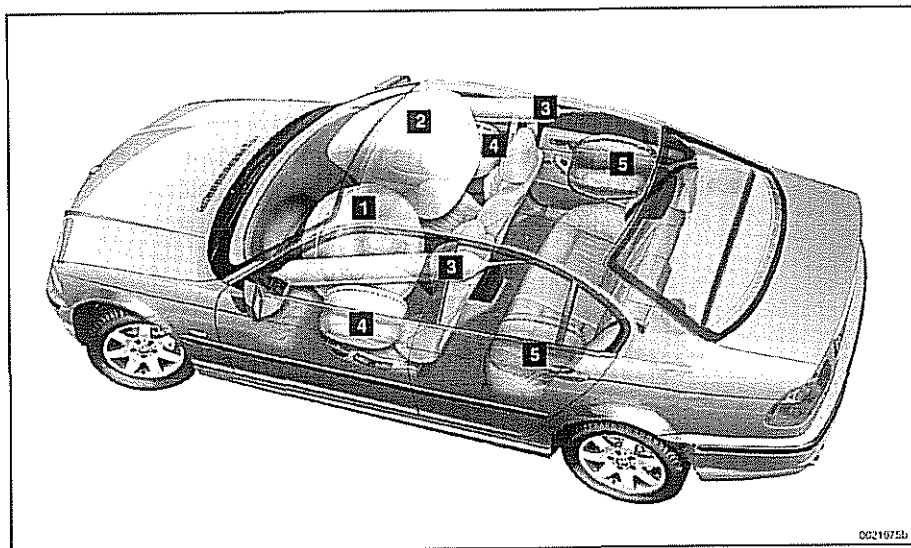
Date of manufacture	Restraint system
3/1996–8/1997	MRS
9/1997–3/1999	MRS II
3/1999–2002	MRS III

MRS and MRS II include the following restraint components:

- Driver and passenger front airbags (MRS/MRS II)
- Passenger front two-stage airbag (cars manufactured from 9/1998).
- The seat occupancy sensor (SBE) is used for detection of a passenger in the right front seat. MRS uses the SBE input to determine seat belt tensioner and/or front airbag deployment thresholds.
- Side impact airbag for driver and front passenger (MRS/MRS II)
- Left/right side impact crash sensors (MRS/MRS II)
- Side impact airbag for rear passenger (MRS II) (optional)
- Head Protection System (HPS) for driver and front passenger (MRS II)
- Battery Safety Terminal — BST (MRS II)
- Hall Sensor seat belt switches (MRS II)
- Front pyrotechnic seat belt tensioners
- Fuel pump cut off message

MRS III adds the following features:

- MRS III employs "smart" technology. Smart technology refers to the control module's programming for the deployment of the airbags, in stages depending on the severity of the impact.
- Two-stage airbag for both driver and passenger. Allows for a softer cushioning effect when the airbags are triggered at lighter impact.
- MRS III satellite sensors use 2 wire connectors.
- Rear side airbags arrive de-activated from the factory and can only be activated upon written request from the customer.
- Rear seat head protection is available when ordered with optional rear seat side airbags.



E39 Airbags

1. Driver airbag
2. Passenger airbag
3. Head Protection System (HPS) Inflatable Tubular Structure (ITS) (MRS II and MRS III)
4. Front side impact airbag
5. Rear door side impact airbag (optional) (MRS II and MRS III)

Two-stage airbag (MRS III)

Beginning with 2000 model year (9/1999 production) the front airbags were changed to a two-stage style airbag. This ensures that the force of airbag inflation is not greater than necessary to provide protection. The airbags are designed to provide "soft" deployment if the acceleration sensor detects a low-speed impact, and "hard" deployment in higher speed impacts.

NOTE—

A two-stage passenger airbag was used on cars built between 9/1998 and 3/1999. This pre-smart technology airbag used two ignition stages. Stage one is designed to ignite first during an impact. Stage two ignites after a timed period, as programmed in the MRS II control module.

Airbag indicator light

The MRS control module detects and stores system status.

The airbag indicator light in the instrument cluster displays the status of the airbag system when the ignition key is in "accessory" or ON positions.

- System normal: Indicator light comes on briefly, then goes out.
- System malfunction: Indicator light fails to come on.
- System malfunction: Indicator light comes on briefly, goes out and lights up again.

The airbag indicator light also comes on if the seat belt pyrotechnic tensioners have been triggered.

Warnings

When servicing airbag equipped cars, the following precautions must be observed to prevent personal injury.

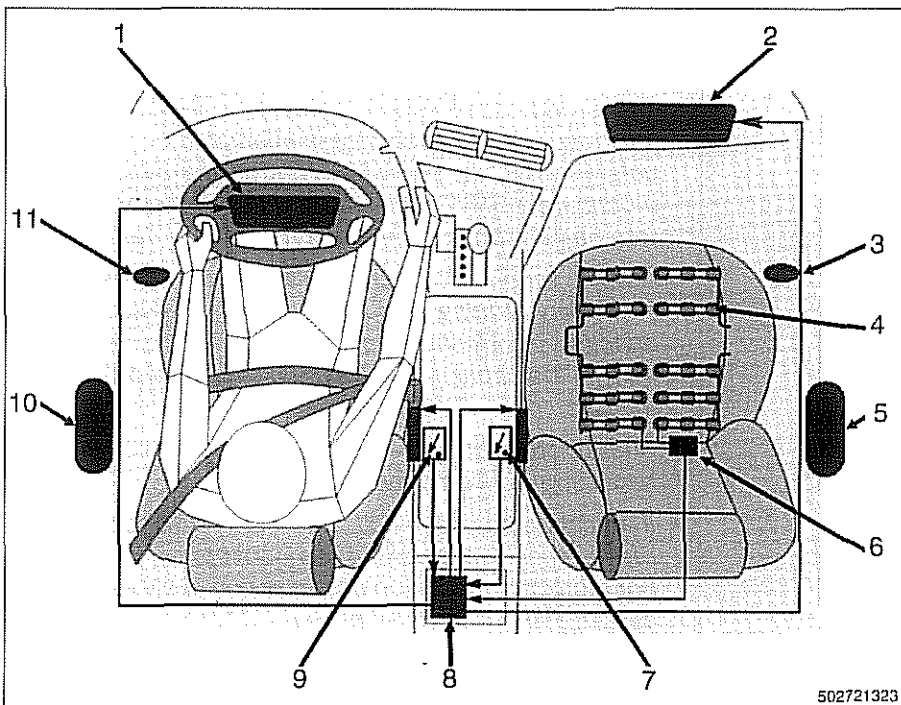
WARNING —

- *If the airbag indicator light is on, there is a risk that the airbags will not be triggered in case of an accident. Be sure to have the system inspected and repaired immediately.*
- *Airbag(s) 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.*
- *The airbag is a vehicle safety system. Serious injury may result if system service is attempted by persons unfamiliar with the BMW MRS and its approved service procedures. BMW advises that all inspection and service be performed by an authorized BMW dealer.*
- *Always disconnect the battery and cover the negative (–) battery terminal with an insulator before starting diagnostic, troubleshooting or service work not associated with the airbags, and before doing any welding on the car.*
- *After disconnecting the battery, wait 5 seconds before beginning work on airbag components.*
- *If an airbag has been activated due to an accident, BMW specifies that airbag components be replaced. For more information on post-collision airbag service, see an authorized BMW dealer.*
- *Do not fire an airbag unit prior to disposal. It must be fired by a special disposal company or shipped back to BMW in the packaging of the new components.*
- *When removing a fired airbag unit, avoid contact with the skin; wear gloves. In case of skin contact, wash with water.*
- *Do not allow airbag system components to come in contact with cleaning solutions or grease. Never subject airbag components to temperatures above 167°F (75°C). When reconnecting the battery, no person should be inside the vehicle.*
- *Always place an airbag unit that has been removed from its packaging with the padded side facing upward. Do not leave an airbag unit unattended.*
- *If the airbag unit or airbag control module has been dropped from a height of 1½ meter (1½ ft.) or more, the airbag unit should not be installed.*

AIRBAG ELECTRONICS

MRS

The MRS control module contains the electronic crash sensor for frontal impact. Sensors mounted on the driver and passenger floor are used for side impacts. The MRS control module is located between the front seat under the center console.



MRS airbag system diagram

1. Driver's side airbag
2. Passenger's side airbag
3. Right side impact sensor
4. Seat occupancy sensor pad
5. Right side impact airbag
6. SBE control module (analog to digital converter)
7. Passenger pyrotechnic seat belt tensioner and seat belt microswitch (Hall sensor MRS III)
8. MRS control module
9. Driver pyrotechnic seat belt tensioner and seat belt microswitch (Hall sensor MRS III)
10. Left side impact airbag
11. Left side impact sensor

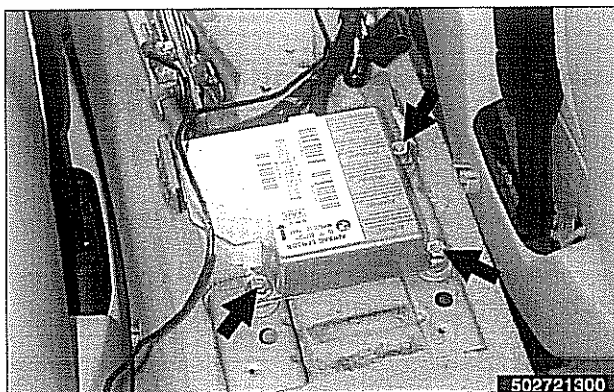
MRS control module, replacing

- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

CAUTION—

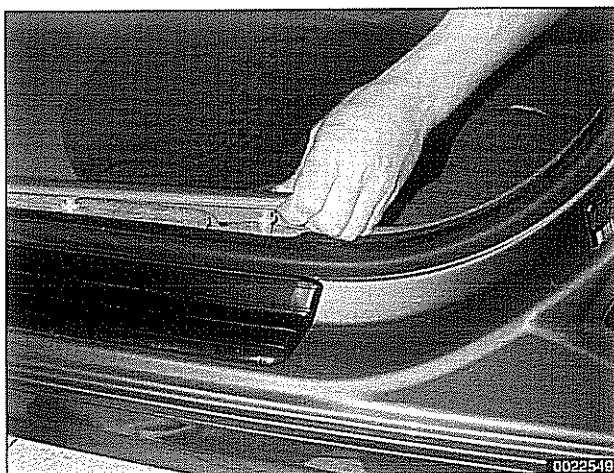
Prior to disconnecting the battery, read the battery disconnection cautions given in 001 General Warnings and Cautions.

- Remove center console between front seats. See 513 Interior Trim.
- Remove module mounting nuts (**arrows**) and lift up control module. Disconnect electrical harness connector.
- Installation is reverse of removal.
 - Be sure that MRS control module ground cable is attached to the module mounting stud.

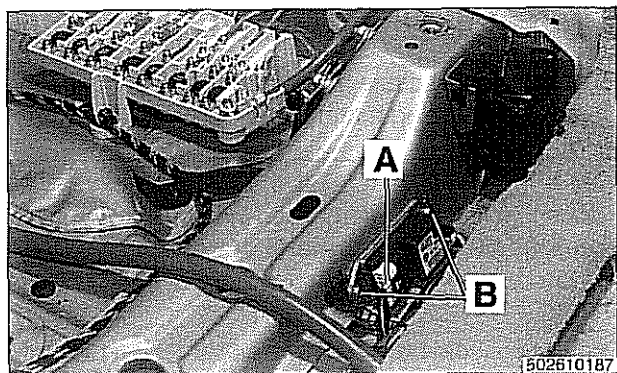


Side-impact crash sensor, removing and installing

- Make sure ignition key is OFF.
- Remove front seat. See 520 Seats.
- Remove plastic door sill trim by lifting to release clips at one end, then sliding off. Fold up carpet towards rear seat floor. If necessary, remove floor level heater duct.



Airbag System (SRS)



- Remove electrical harness connector from crash sensor (A). Remove sensor retaining screws (B) and remove sensor. Note direction of sensor before removing.

- Installation is reverse of removal.

NOTE —

Arrow on sensor must point to door sill.

AIRBAGS

Driver airbag, removing and installing

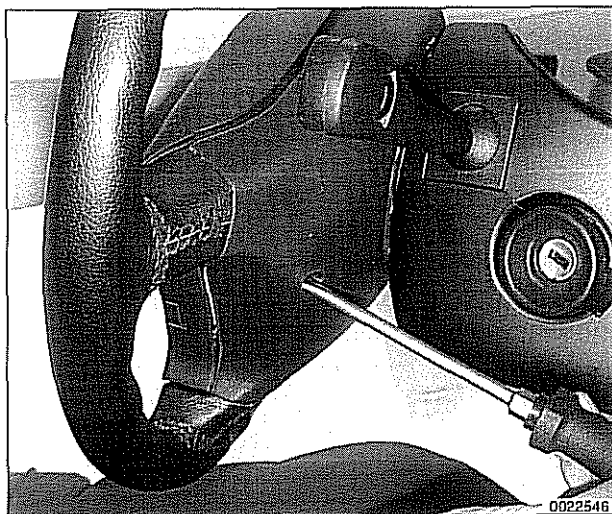
- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

WARNING —

After disconnecting the battery, wait 5 seconds before beginning work on airbag components.

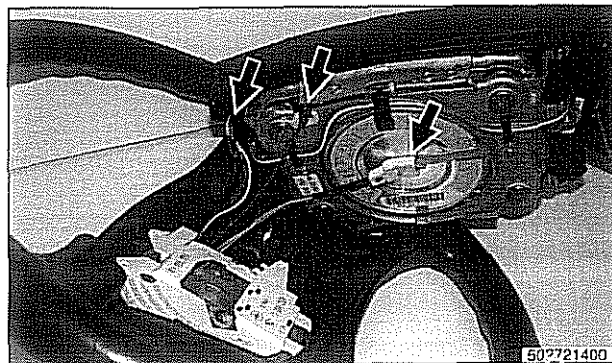
CAUTION —

Prior to disconnecting the battery, read the battery disconnection cautions given in 001 General Warnings and Cautions.

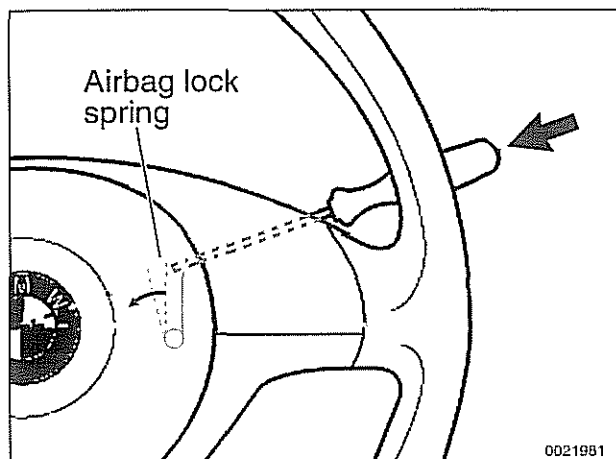


- Multifunction (MFL) steering wheel:

- Working behind steering wheel, completely loosen Torx screws (T30) while holding airbag in place.
- Support airbag unit to prevent it from falling out.



- Carefully lift airbag unit off steering wheel and disconnect harness connectors (arrows) from rear of airbag unit.



◀ Sport steering wheel:

- Insert screwdriver through opening in rear of steering wheel and push against spring tension to release airbag unit lock.
- Repeat procedure on other side of steering wheel.
- Lift off airbag unit and detach electrical harness connectors.

WARNING—

- Store the removed airbag unit with the horn pad facing up. If stored facing down, accidental deployment could propel it violently into the air, causing injury.
- Once an airbag is removed, the car must not be driven.
- Do not connect the battery with the airbag disconnected. A fault code will be stored, setting off the airbag indicator light. Special tools are needed to reset the fault memory.
- Once the airbag unit is installed and all other service procedures have been completed, start the engine and check that the airbag indicator light goes out. If the indicator light stays on, the airbag system will not function as designed. Have the system diagnosed and repaired by an authorized BMW dealer.

— Installation is reverse of removal.

- MFL steering wheel: Torque airbag using specification listed below.
- Sport steering wheel: Press airbag unit mounting pins into spring locks in steering wheel until they snap in firmly.

CAUTION—

Do not pinch airbag harness in center of steering wheel when installing airbag.

Tightening torque

Airbag to steering wheel (MFL)	8 Nm (71 in-lb)
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Passenger airbag, removing and installing

- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

WARNING—

After disconnecting the battery, wait 5 seconds before beginning work on airbag components.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given in 001 General Warnings and Cautions.

Airbag System (SRS)



- Pry up cover from top of passenger side airbag on dashboard.



- Remove airbag mounting bolts (arrows).
- Lift airbag and disconnect electrical harness connector. Remove airbag.

WARNING—

Store the removed airbag unit with the soft pad facing up. If stored facing down, accidental deployment could propel it violently into the air, causing injury.

- Installation is reverse of removal. Make sure wiring harness is not pinched when installing airbag unit in dashboard.

Tightening torques

Passenger air bag to dashboard (M6)	10 NM (88 in-lb)
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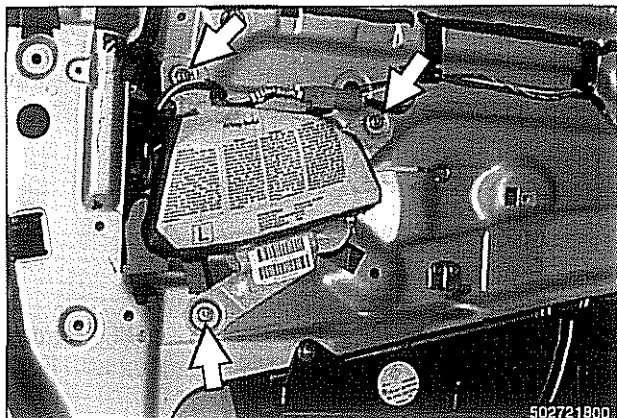
Door mounted side-impact airbag, removing and installing

- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given in 001 General Warnings and Cautions.

- Remove inside door panel as described in 411 Doors.



Front door airbag:

- Remove airbag mounting bolts (arrows).
- Disconnect electrical harness connector.

CAUTION—

When removing and installing the airbag unit, pay attention to the routing of the electrical harness to avoid kinks or breaks in the wire.

— Installation is reverse of removal.

Rear door airbag:

- Detach electrical harness connector.
- Remove mounting bolts and remove airbag from door.

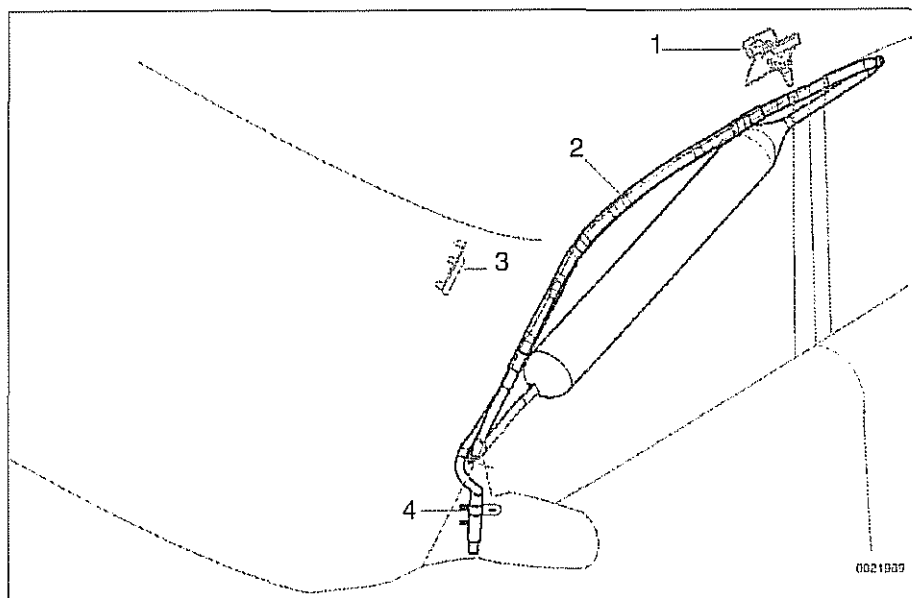
— Installation is reverse of removal.

- Route electrical harnesses as they were before.
- Use new wire ties as necessary.
- Use new self-locking mounting bolts.

Tightening torque

Side-impact airbag to door

8.5 Nm (75 in-lb)



Head protection airbag components

1. B-pillar deflection plate
2. Head protection airbag
3. Cable holder
4. Gas generator



Head protection airbag (HPS)

- ◀ Replacement of a head protection airbag (HPS) is an extensive operation, including removal of the following:
- Complete dashboard
 - Complete headliner
 - Windshield pillar (A-pillar) trim
 - Door pillar (B-pillar) trim
- Before starting work on the HPS airbag, disconnect negative (–) cable from battery and cover negative terminal with insulating material.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given in 001 General Warnings and Cautions.

Tightening torque

HPS airbag to body	11 Nm (8 ft-lb)
HPS airbag mounting bracket to A or B-pillar	2.5 Nm (22 in-lb)
HPS gas generator to dashboard reinforcement (M6 self-tapping screw)	4 Nm (35 in-lb)

