Tightening torques	
Sensor bracket to body	8 Nm (6 ft-lb)

DSC steering angle sensor

Vehicles equipped with DSC have a steering angle sensor (**arrow**) mounted to the steering column right above the pedal cluster. Replacement of this component requires special tools to properly align the steering column and sensor.

After removal or replacement the steering angle sensor requires calibration using BMW scan tools DIS or MoDiC. Once calibrated, the sensor sends a confirmation ID code to the DSC control module to indicate proper calibration.

For steering column removal see ⇒ 320 Steering and Wheel Alignment.

DSC pressure sensor

Rear wheel drive cars: Two DSC pressure sensors are used, mounted in the brake master cylinder.

All wheel drive cars: One DSC pressure sensor is used, mounted on the hydraulic unit.

Tightening torques	
Pressure sensor to hydraulic unit	19 Nm (14 ft-lb)
Pressure sensor to master cylinder	15 + 4 Nm (11 + 3 ft-lb)

Hydraulic unit/control module,

removing and installing

CAUTION!

E46 cars require special BMW service equipment to properly bleed the brakes. Removal of the hydraulic unit is not recommended unless this equipment is available. For safety reasons, the brake system on cars with ABS must be bled using the procedures described in this repair group.

Note:

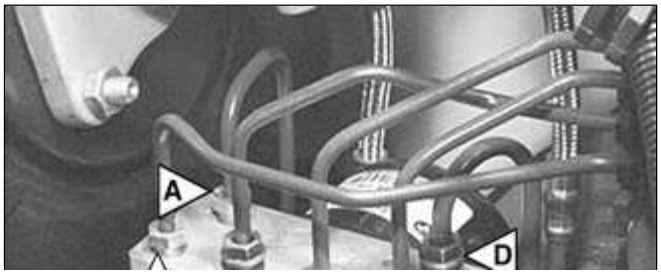
- *Before starting this procedure, read any fault codes from control module memory and print out diagnostic record.*

- *After completing work, perform the function test on control module using either DIS or MoDiC.*

The procedure for removing the ABS/ASC or ABS/DSC hydraulic unit/control module is similar for all models. The location of the units varies.

- On vehicles with hydraulic unit mounted beneath master cylinder, remove master cylinder as described earlier.

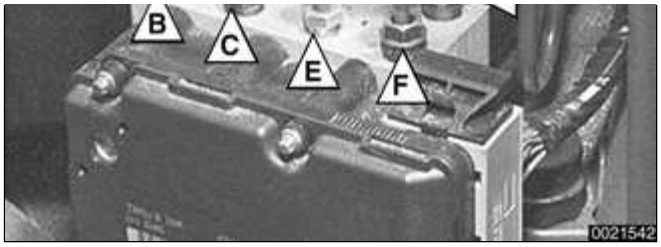
- Disconnect electrical harness connector at hydraulic unit/control module.



Mark brake lines in relation to their placement on hydraulic unit. (Teves MK 20 ASC hydraulic unit shown.)

A - Front from master cylinder

B - Left front



C - Right front

D - Rear from master cylinder

E - Right rear

F - Left rear

- Remove brake fluid input and output lines.

- Seal open brake fluid lines and bores with suitable plugs to prevent contamination.

- Carefully remove brake lines from any retainers or grommets that may be in the way of hydraulic unit/control module removal.

CAUTION!

Make sure not to bend or kink brake lines while separating rubber grommet from retainer.

- Remove mounting screws of hydraulic unit housing and remove hydraulic unit/control module from engine bay.

- If necessary, separate hydraulic unit from control module.

- Installation is reverse of removal, noting the following:

- Check rubber mount for hydraulic unit/control module. Replace if damaged.

- Make sure all nuts, fluid couplings, thread bores and mating surfaces are clean.

- Make sure brake lines are securely seated in grommets before installing brake lines in hydraulic unit bores.

- Bleed brakes as described earlier.

Tightening torques	
Brake lines to hydraulic unit	18 Nm (13 ft-lb)
Brake master cylinder to brake booster	26 Nm (19 ft-lb)
Hydraulic unit to body	8 Nm (6 ft-lb)
Mounting bracket to hydraulic unit	8 Nm (6 ft-lb)

DSC precharge pump, removing and installing

CAUTION!

E46 cars require special BMW service equipment to properly bleed the brakes. Removal of hydraulic components is not recommended unless this equipment is available. For safety reasons, the brake system on cars with ABS must be bled using the procedures described in this repair group.

Note:

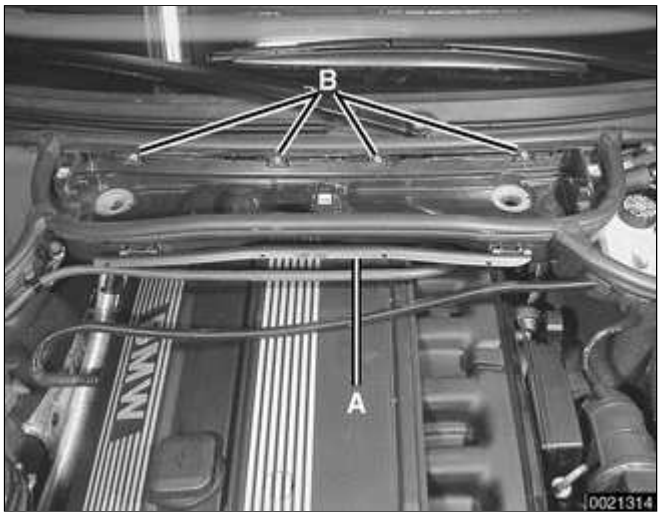
Before starting this procedure, read any fault codes from control module memory and print out the diagnostic record.

The precharge pump is mounted below the brake master cylinder on the left side of the engine compartment.

- Using a clean syringe, empty brake fluid reservoir.

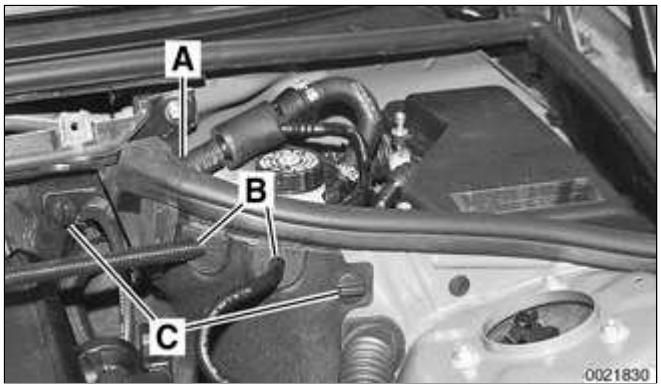
WARNING!

Brake fluid is highly corrosive and dangerous to the environment. Dispose of it properly.



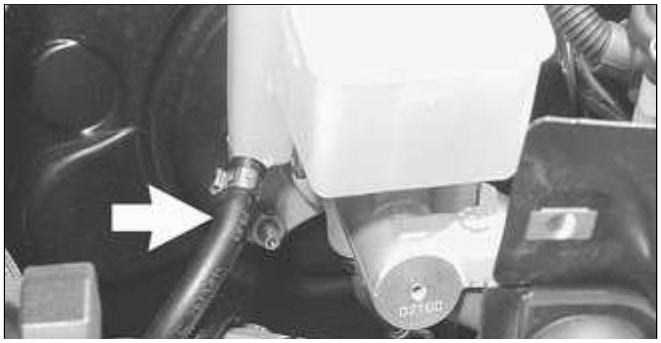
➢ Remove interior ventilation microfilter housing.

- ♦ Remove upper cover and microfilter.
- ♦ Open wiring harness loom (**A**) and remove wires.
- ♦ Unfasten screws (**B**) and remove lower microfilter housing.



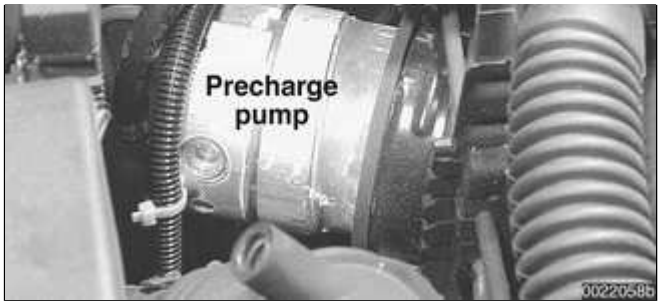
➢ Remove side trim panel from left rear of engine compartment:

- ♦ Remove rubber strip (**A**) from top of trim panel at brake booster.
- ♦ Remove vacuum line and positive battery cable with grommets (**B**) from trim panel.
- ♦ Release locking clips (**C**) on edges of trim panel and remove panel by pulling upwards.



➢ Working at precharge pump beneath brake master cylinder:

- ♦ Remove brake fluid feed line (**arrow**) from brake fluid reservoir.
- ♦ Remove brake fluid intake and



output lines from pump.

- Remove electrical harness connector.
- Lift pump to release from lower mounting pad.
- Slide pump out of retaining ring.

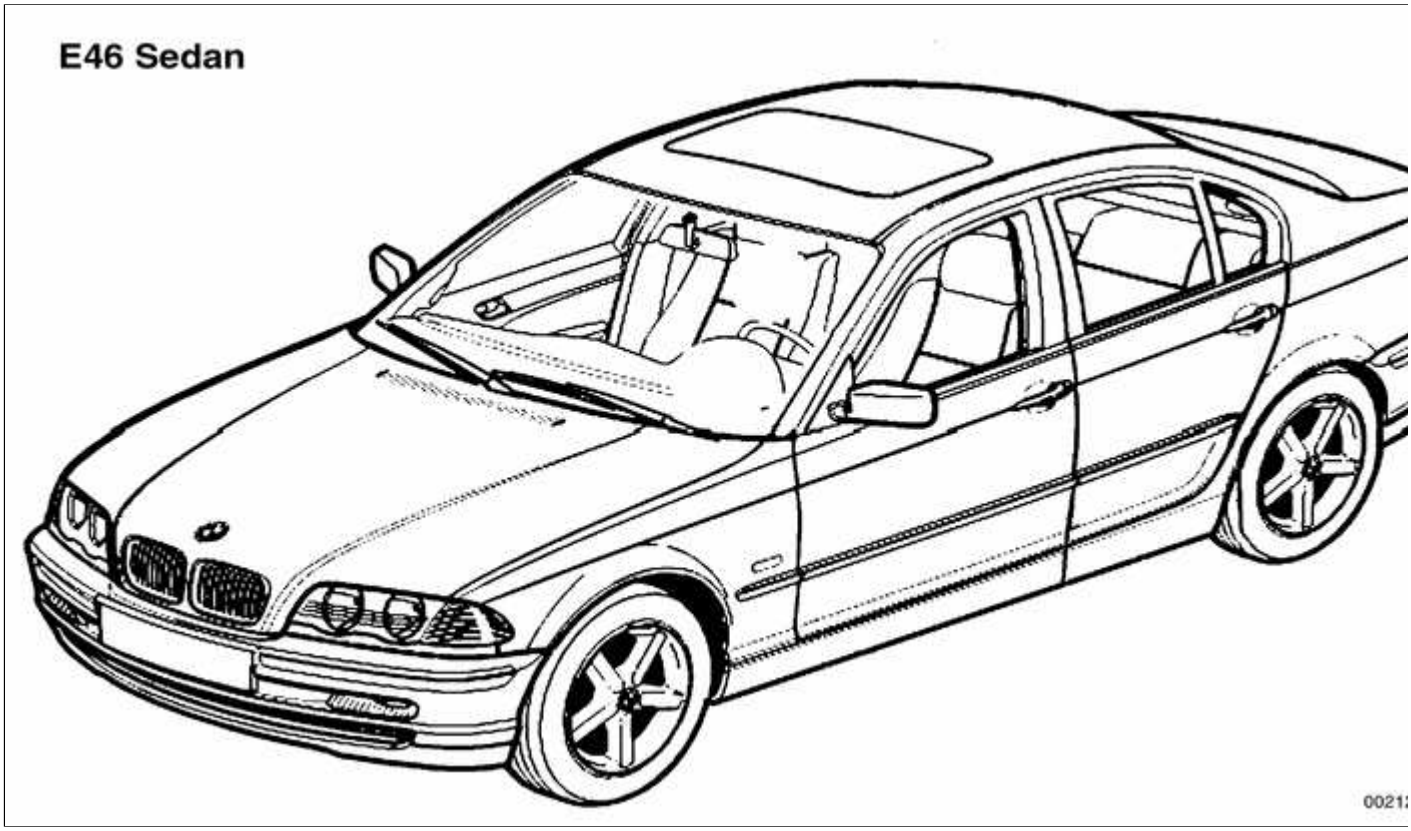
- Installation is reverse of removal, noting the following:

- Be sure to replace rubber pump mounts if damaged or worn.
- When installing vacuum hose and battery cable at trim panel, make sure isolating grommets are securely seated.
- Bleed brakes as described earlier.

General

This section covers system descriptions and general information for the repair groups found in 4 Body and 5 Body Equipment.

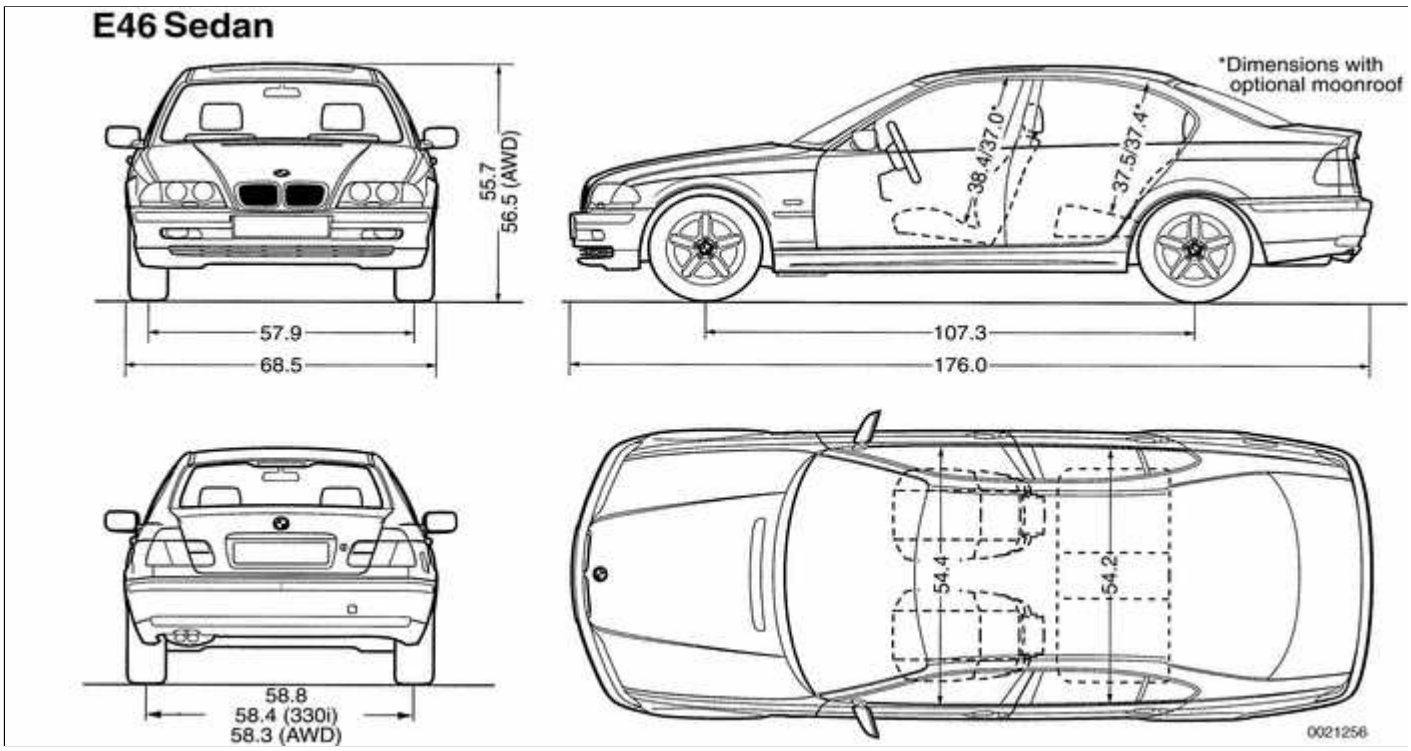
E46 Sedan



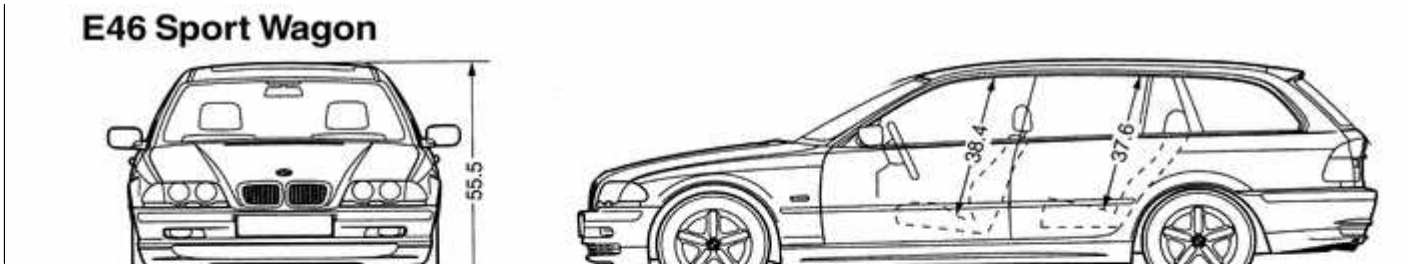
Body Assembly

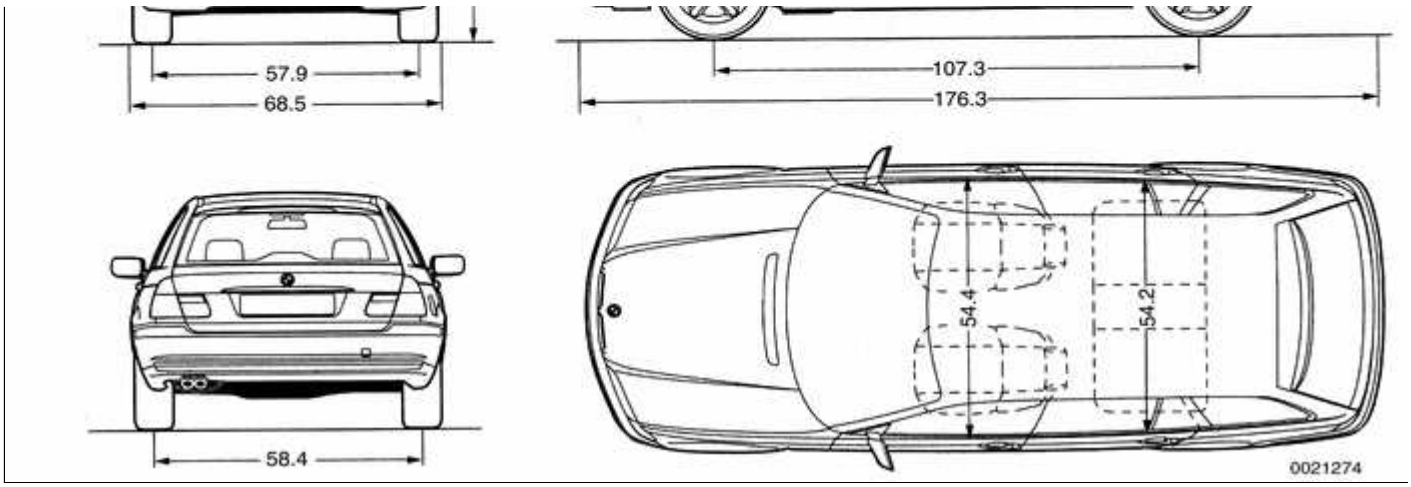
The body styles of E46 cars covered by this manual are the 4-door Sedan, 4-door Sport Wagon, 2-door Coupe and 2-door Convertible. Body dimensions vary slightly among models. Dimensions are given in inches.

E46 Sedan

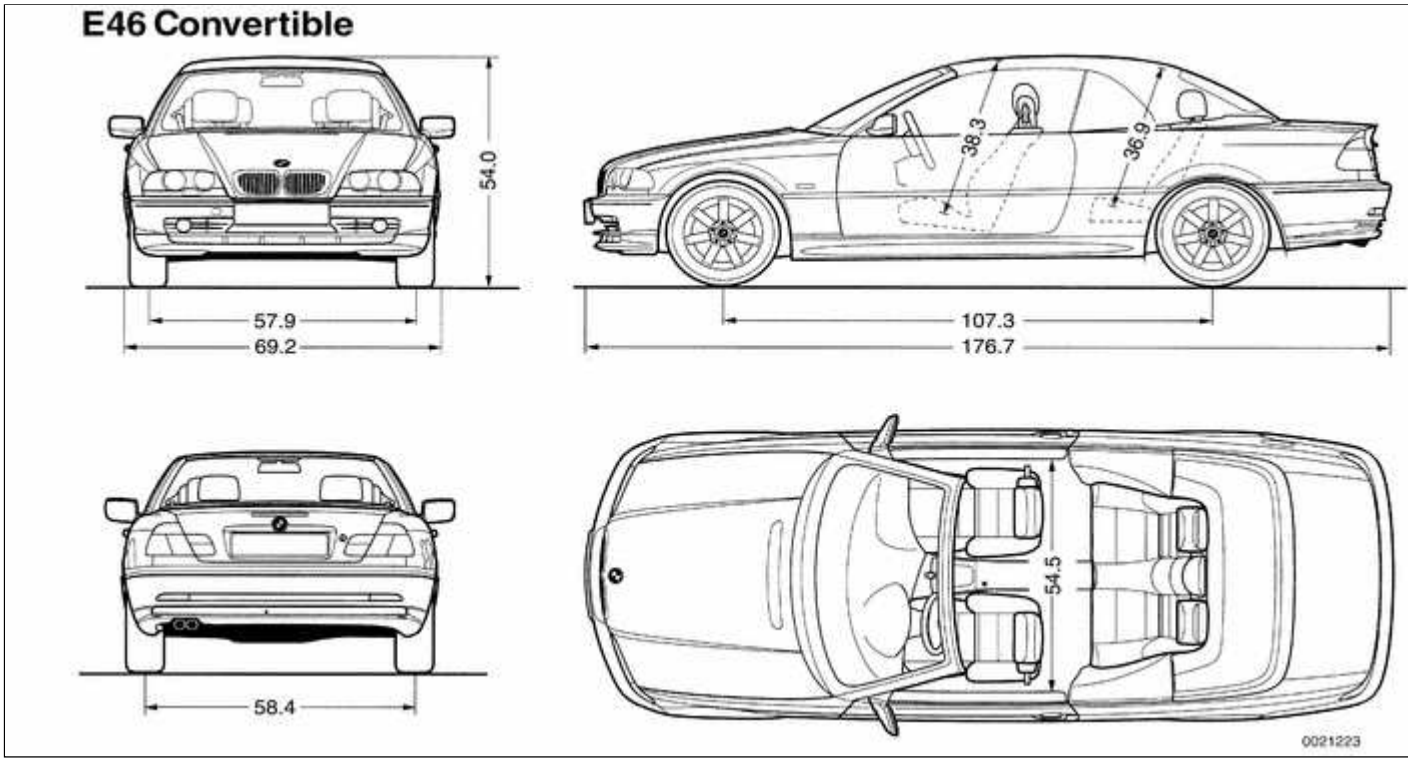


E46 Sport Wagon

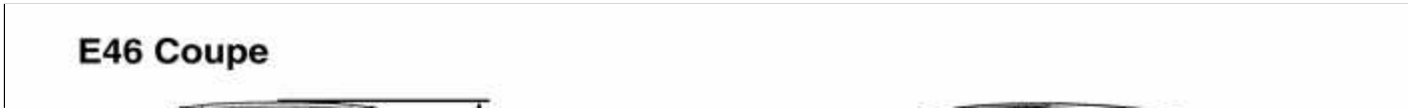


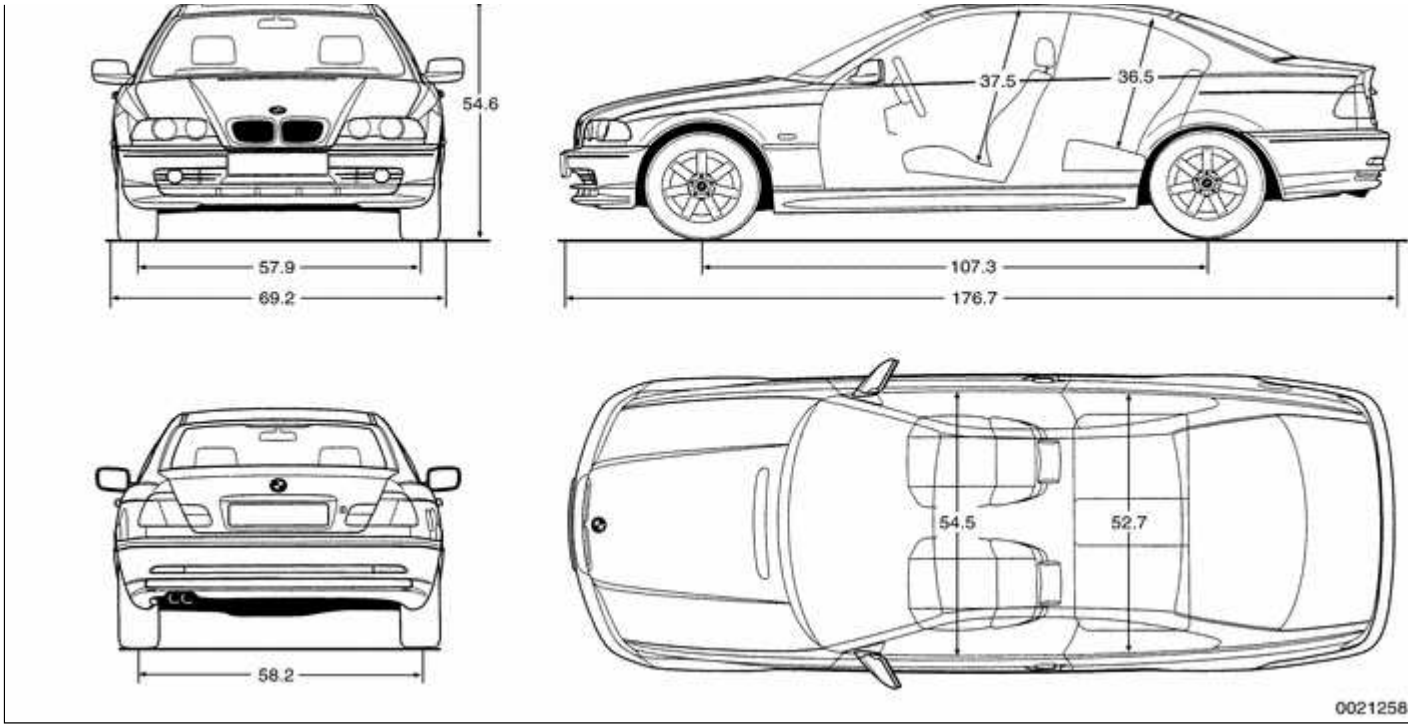


E46 convertible



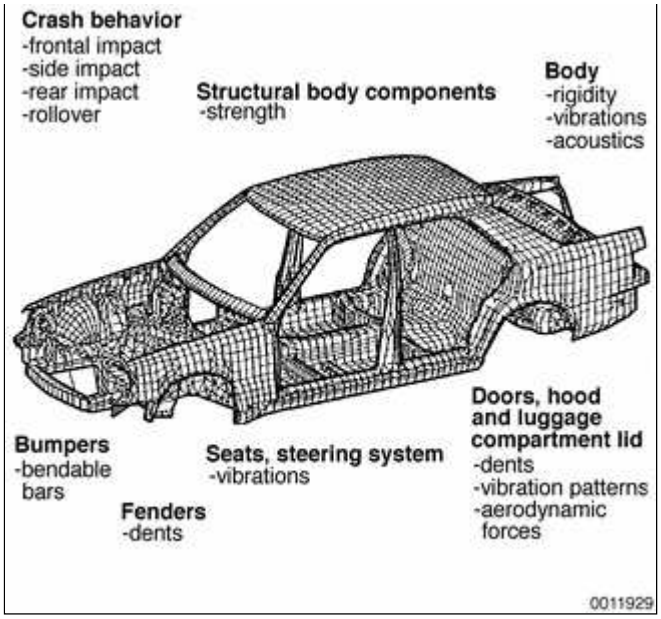
E46 Coupe





Body shell

The BMW 3 Series chassis is a unibody design constructed of high strength steel. Attaching parts, such as the front fenders, rear quarter panels, doors, trunk lid and hood are also constructed of steel.



Computer aided design (CAD) techniques have been used in refining E46 body models to reduce vehicle weight while retaining strength and increasing torsional rigidity. For good handling purposes, the more rigid the structure the more precisely the suspension can operate. High strength steels now account for 50% of the body shell weight. The body shell's resistance to twisting forces has been almost doubled over the previous 3 series models. To help insure long-lasting strength, 85% of the body (in surface area) is made of galvanized steel. This resists corrosion and maintains body strength over time.

The E46 body shell was designed so that the vibrations of torsional twisting and bending are separated into discrete components and in the inaudible range. The current Sedan design ensures that the body twists at 29 hertz and bends at 26 hertz.

Exterior and aerodynamics

With its traditional styling features, such as the kidney grille, circular headlights behind a glass cover (for reasons of streamlining), and the "kick" in the rearmost roof pillar (C-pillar), the E46 can be immediately recognized as a BMW.

Wind resistance. Windows bonded flush to the body and the guided flow of cooling air into the engine compartment provide a good coefficient of drag (C_d).

E46 cars have been designed for balanced aerodynamics but not necessarily an extremely low C_d.

- A low coefficient of lift (C_l) promotes stability at high speeds. The current design has a front C_l of 0.08 and a rear C_l of 0.10.
- Windshield wipers are designed for effectiveness at speeds up to and beyond 200 kph (124 mph).
- Body, window and exterior mirror shapes have been refined for lower wind noise and reduced soiling of mirrors and windows. The Coupe's side mirrors are specially shaped and include five ribs (**arrows**) on the top edge for further wind noise reduction.

All this has resulted in a C_d of

approximately 0.31 for the Sedan and 0.32 for the Coupe models.

Fenders. The exterior panels are corrosion-resistant zinc coated (galvanized) steel. The front fenders are bolted on. For front fender replacement information, see ⇒ 410 Fenders, Engine Hood.

Bumpers. The front and rear bumpers are clad in high quality deformable plastic and provide protection with virtually no damage to the bumper or the vehicle at solid barrier impact speeds of 4 kph (2.5 mph). In addition to hydraulic dampeners, which absorb the initial impact energy, these bumpers are backed by compressible tubes. These deform in a controlled manner at impact speeds greater than that for which bumpers and hydraulic dampeners are designed. This helps avoid expensive damage to the body at impact speeds up to 14 kph (9 mph).

Coupe models

The E46 Coupe is similar to the 4-door Sedan, but has a more stretched and sleeker appearance. Thus, with the same wheelbase and identical length, it looks different but still familiar.

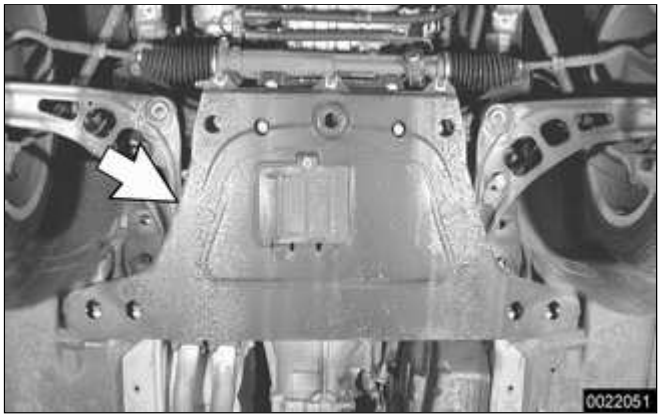
The 2-door Coupe differs from the 4-door (2-wheel drive) Sedan by a longer front end, a flatter hood line with air slits, and a roof 2.7 cm (1.1 in.) lower. Additional differences include wider doors with frameless windows, glass-covered door-posts (B pillars) and a shorter and lower trunk lid in the Coupe.

Convertible models

The E46 Convertible is an all-season vehicle with a high level of functionality, excellent interior comfort and acoustic

refinement. Interior materials and colors, the soft top and the light-alloy wheels have been carefully matched.

Although the automatic Convertible roof is standard, a hard-top in body color with heated rear window is available as an option for the cold season.



The Convertible body structure includes many passive safety refinements over its fixed-top counterparts.

- To achieve a more rigid underbody, an aluminum reinforcement plate (**arrow**) is bolted to the front undercarriage and reinforcing struts are bolted to the rear undercarriage.

Note:

The aluminum reinforcement plate is used in all rear wheel drive E46 models produced from December 2000.

- Transverse seat support reinforcements in the floor pan accommodates the new seat-integrated seat belts (SGS).

- The windshield frame is reinforced with stepped reinforcing tubes which allow it to act as roll-over protection.

- The windshield is bonded into its frame.

- There are tubular door reinforcements.

- The rollover protection system is tripped into position in a fraction of second. With this feature, two bars fully independent of each other come up behind each rear-seat

backrest when the vehicle is in danger of turning over.

A Convertible body normally flexes and vibrates, transferring oscillations to the passenger compartment. In the E46 Convertible, BMW utilizes a unique battery tray in the trunk as a vibration dampening system to counteract this oscillation.

CAUTION!

The E46 Convertible requires a special battery which is designed for constant vibration.

Information for the Convertible top and its related mechanisms can be found ⇒ 541 Convertible Top .

Sport Wagon

Introduced in 2000, the E46 Sport Wagon is identical to the E46 Sedan from the front bumper to the B pillar (middle door-post). From the B pillar back the Sport Wagon features:

- Remodelled rear doors
- Tail gate and hinge mechanism
- Rear (tail gate) window that flips up to open, independent from the tailgate, held open by compact torsional coil springs
- New rear bumper
- Roof rails (optional equipment)

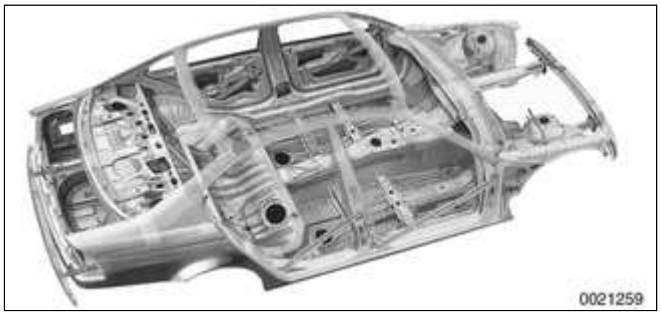
Structural, safety and comfort features in the Sport Wagon are comparable to the E46 Sedan and Coupe.

Sport Wagon capacities	
Cargo capacity:	
Rear seat backrest up	435 liters (15.4 cu. ft.)
Rear seat backrest folded down	1345 liters (47.5 cu. ft.)
Load capacity:	
In cargo compartment	540 Kg (1191 lb.)
On roof	75 Kg (165 lb.)

Safety and Security Features

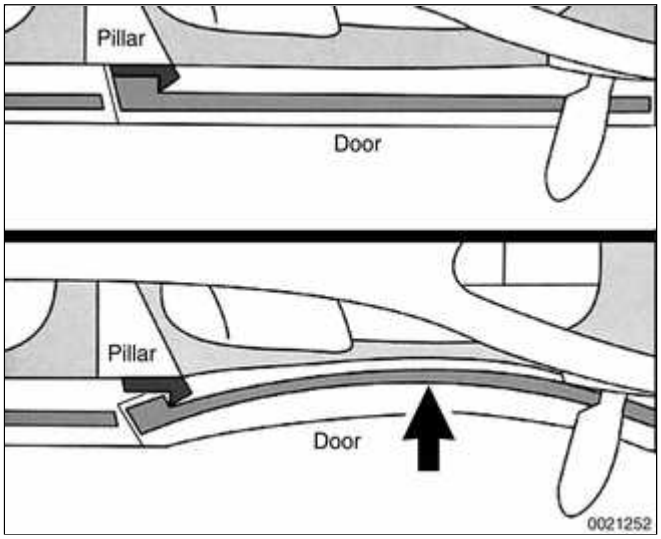
A large number of new or improved safety and security features are incorporated in E46 cars.

Safety cage



- The body safety cage is a continuation of an established BMW concept for passenger protection. Tubular impact structures built into the body provide protection against passenger injury during front or rear impacts.

Door anchoring system



- Each door is reinforced with a diagonal aluminum bar with a metal hook at the rear edge.

  Upon severe side impact, the hook locks into a recessed notch in the B or C pillar, thus providing unitized protection against buckling of the door. The body side holds together as a unit, offering significantly greater strength.

  After most impacts, the door springs back and unhooks from the notch. It can then be opened again.

Door locks and door handles

- The bow type door handles allow easy door opening, but are secure in accidents.

Electrical components in the locks are fully encapsulated and cannot be picked easily. The new door handles, latches and lock assemblies offer improved reliability and security against theft.

Door position and lock condition are detected by hall sensors.

Roof padding

In addition to the side and head protection airbags, there is supplementary padding at the roof pillars and along the roof above the doors. This is positioned to present energy absorbing surfaces to passengers thrown around by side impact forces.

Seat belts

In the Sedan, Coupe and Sport Wagon models, each front seat belt assembly has a height-adjustable anchor at the B pillar.

An automatic pyrotechnic (explosive charge) tensioner tightens the front belt at the buckle upon impact, snugging up lap and shoulder segments of the belt. The tensioners are designed to automatically tension the belts by about 2 inches (55 mm) in the event of a collision.

A force limiter puts an upper limit on the amount of force each belt can exert on the passenger.

The Convertible seat belts are integrated into the seat, but otherwise have features similar to the other models.

Airbags

As many as 8 airbags are installed in E46 cars, depending on model.

The front airbags operate without sodium azide propellant, widely considered an irritant when an airbag is deployed.

Starting with 2000 models, "smart" front passenger and driver airbags were installed. These are of the dual-threshold, dual stage design, including a sensor to help prevent the unnecessary deployment of the passenger side airbag if the seat is unoccupied.

Depending on options chosen, one airbag may be installed in each door of the Sedan and Sport Wagon models, protecting passengers against side impacts. Coupe and Convertible models are equipped with door-installed airbags as well.

Head Protection System (HPS) airbags stretch diagonally across the tops of the front doors.

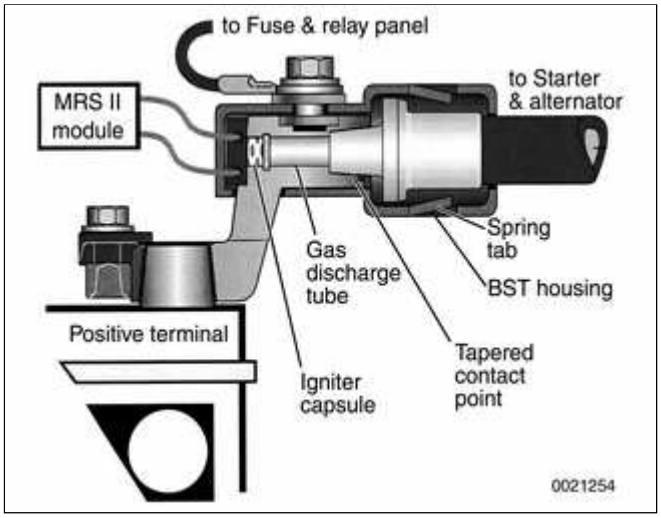
Airbag deployment automatically triggers fuel shut-off, turns on the hazard and interior lights, and unlocks the doors.

WARNING!

- ***Airbags are inflated by an explosive device. Handled improperly or without adequate safeguards, airbag units can be very dangerous. Special precautions must be observed prior to any work at or near any of the airbags. See ⇒ 721 Airbag System (SRS).***

- ***Always disconnect the battery and cover the negative (-) battery terminal with an insulator before starting diagnostic, troubleshooting or service work on cars fitted with SRS, and before doing any welding on the car.***

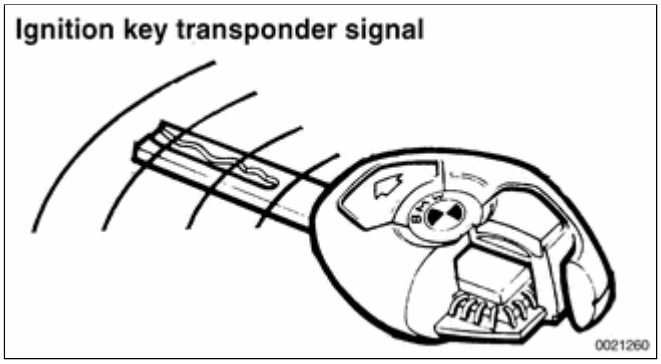
Battery safety terminal (BST)



- A pyrotechnic (explosive charge) device automatically disconnects the battery positive terminal during impacts or collisions.

The seatbelt system, airbag system and battery safety terminal are controlled by the Multiple Restraint System (MRS II) control module.

Security



- Electronic immobilization (EWS 3.3). All E46 vehicles incorporate an electronic immobilization system known as EWS 3.3. This system uses a wireless communication link between a transponder chip in the ignition key and the ring antenna surrounding the ignition switch. The EWS control module blocks the starting of the vehicle unless the correct coded ignition key is used.

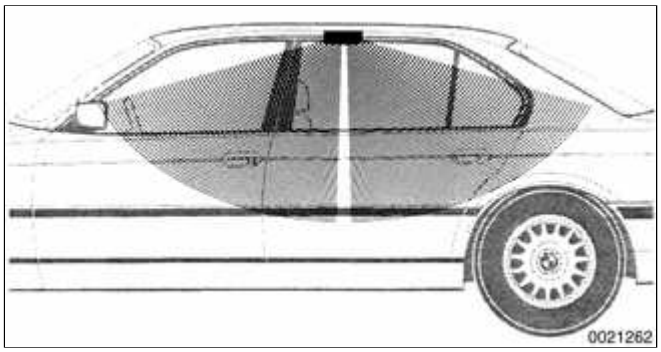
Note:

Electronic immobilization is sometimes referred to as the driveaway protection

system.

Anti-theft alarm (DWA). This is a dealer-installed option for which the E46 vehicles are factory-wired. When armed, the system monitors door lock contacts and trunk and engine hood locks and sounds a siren if it detects tampering.

Tilt sensor. Located in the right side of the trunk above the battery, the tilt sensor monitors the vehicle parked angle when DWA is armed. The siren is activated if the vehicle angle is changed. This helps prevent theft of the car using a ramp truck.



Ultrasonic interior protection (UIS). An interior ultrasonic emitter/detector is installed in the center of the headliner of Sedan, Coupe and Sport Wagon models. The DWA alarm is triggered if motion is detected inside the car.

Short distance radar (SDR) is the interior motion detector system used in Convertible models. The SDR emitter is located on the driveshaft tunnel under the center console next to the parking brake.

For further information about anti-theft systems, see ⇒ 515 Central Locking and Anti-theft.

Emergency location

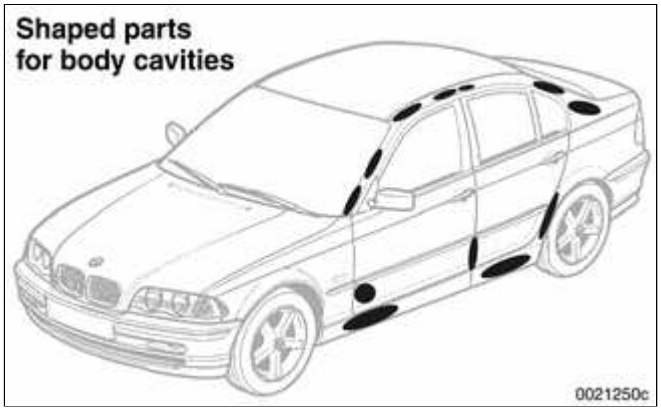
If emergency assistance is needed, the on-board navigation system (if equipped) uses GPS technology to pinpoint the location of the vehicle.

Interior Features

E46 interiors have a unique character, with a combination of sporty features and innovative design. All body versions were made in a wide choice of interior and exterior colors. New colors with matching leather or leatherette upholstery were introduced for each model year, including light-alloy wheels in new designs.

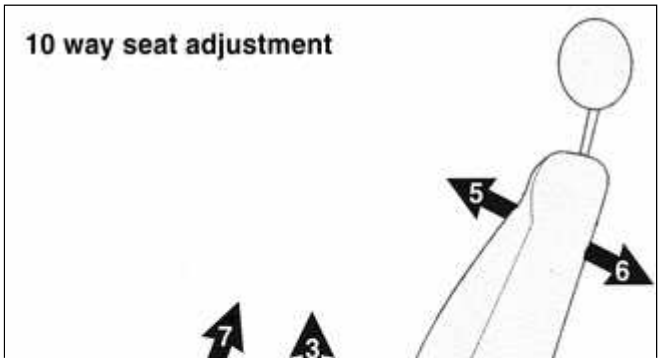
Driving comfort is enhanced by power steering, tilt steering wheel, height-adjustable front seats, and electrically adjustable and heated rear-view mirrors. Inside the car there are reading lights at four seating positions.

Noise reduction



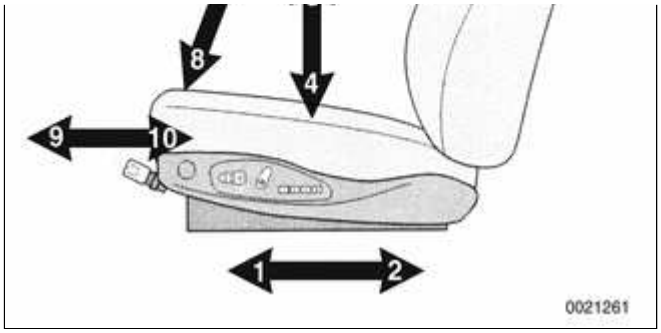
To reduce interior noise, certain body cavities are sealed with shaped parts installed during the manufacturing process. The body is heated to approx 180°C (356°F) and kept at that temperature for approx. 20 minutes, during which interval the shaped parts expand to fit the shapes of the cavities.

Seats



Anatomically correct seats are constructed from polyurethane foam containing areas or "zones" of different firmness. They offer good lateral support without constricting the occupant.

Driving comfort is enhanced by power steering, tilt steering wheel, height-



adjustable front seats, and electrically adjustable and heated rear-view mirrors. Inside the car there are reading lights at four seating positions.

The seats have a passive internal ventilation system: Cylindrical cavities within the cushions and backrests generate a pumping effect as the car's ride motions cause occupant motion. This helps remove moisture and feeds fresh air into the seats.

Other features of the seating system:

- The seat bases have steel springs for added support and strength.
- The seat control switches are along the outside edge of the seat.
- Heated seats are an option in all models.
- In cars equipped with seat position memory, three different seat configurations can be memorized by the seat control module(s).
- Seat memory coordinates with outside mirror memory.
- In Convertible models: When a rear passenger presses the seat back switch forward, the comfort entry aid system moves the seat forward and lowers the headrest to prevent it from contacting the sun visor. The seat and headrest are then returned to memorized positions. These functions are controlled by the seat memory module(s).

- For security reasons, the release lever to fold the rear seat backrest forward is installed in the trunk.

- In Sport Wagon models: Rear seat backs are split 60/40 with the center arm rest on the left seat back. The center arm rest incorporates a non adjustable headrest. When folded down, the arm rest opens out with cup-holders and a storage compartment.

- See ⇒ 520 Seats for more details.

Instruments and controls

Everything in the interior passenger compartment essential to the driver is logically grouped and easy to reach. All instruments and controls have been arranged ergonomically and are fully integrated into the overall design of the vehicle. The following features are optional in some models.

Tilt-telescopic steering wheel has 30 mm (1.2 in.) of vertical and longitudinal adjustment.

Multi-function steering wheel contains two key pads containing controls for the sound system, telephone and cruise control.

Padded dashboard houses the instrument cluster and the ventilation and heating system.

Instrument cluster uses large easy-to-read analog instruments and is removable as a unit without removing the dashboard. On-board computer and Check Control functions are integrated into the instrument cluster

displays.

Service Interval Display calculates vehicle service needs, based on current driving patterns, and indicates to the driver when the car requires service.

Integrated on-board navigation system, based on Global Positioning System (GPS) technology, is optionally available on E46 cars. When installed, a multi-function monitor is included in the center of the dash above the radio. In addition to displaying navigation system information, this monitor accesses to On-Board Computer functions, audio system controls, mobile phone dialling and memory, and automatic ventilation.

Park Distance Control (PDC) is an optional system which uses ultra-sonic sensors in the rear bumper trim to warn the driver of approaching too close to obstacles when parking.

Central Body Electronics (ZKE V)

E46 cars are equipped with a sophisticated centralized body electric/electronics plan. Central Body Electronics (ZKE V) is self-diagnostic and incorporates many functions into a single control module. The consolidation of several systems into a single control module minimizes power requirements and the incorporation of the diagnostic link results in more efficient and accurate troubleshooting.

ZKE V directly controls the following functions:

- Windshield wiper/washer system, with optional Rain Sensor Interface. See ⇒ 611 Wipers and

Washers.

- Central locking with power trunk release. See ⇒ 515 Central Locking and Anti-theft.
- Keyless entry (FZV)
- Power window control. See ⇒ 512 Door Windows.
- Car/key memory
- Interior lighting
- Alarm system (DWA)
- Electronic consumer sleep mode. See ⇒ 600 Electrical System–General.

Other functions not directly controlled by ZKE V but interconnected:

- Rain sensor (AIC)
- Sunroof operation. See ⇒ 540 Sunroof.
- Seat memory. See ⇒ 520 Seats.
- Outside rear-view mirror control and heating
- Windshield washer jet heating

ZKE V Diagnostic Trouble Codes (DTCs) are accessible electronically through the data-link connector (DLC). See ⇒ 610 Electrical Component Locations.

Note:

- *All 1999 models and cars produced through June 2000 are equipped with the DLC socket in the rear right corner of the engine compartment.*

- *In cars produced after June 2000, the DLC socket in the engine compartment has been discontinued. All scan tool codes can now be accessed through the OBD II interface socket on the driver's side of the dashboard, left and below the instrument cluster, under a cover.*

Heating and air conditioning (IHKA)

The integrated heating and air conditioning (IHKA) system uses an extra large, infinitely variable radial blower motor for good distribution of air. Fresh air enters through the grille below the engine hood and into the passenger compartment via the dashboard and footwell vents.

Repair information for the heating and air conditioning system is covered in ⇒ 640 Heating and Air Conditioning.

Heating and air conditioning vent diagram

Sport Wagon interior features

Child seats. There are three child seat hold down anchors behind the rear seat back rest. Plastic trim covers are used to hide the anchors.

Cargo area. There is a spring-loaded blind and a cargo safety net installed behind the rear seat.

Storage. There are extra storage compartments on the left and right sides in the rear. These house the rear window washer fluid reservoir and sound system components.

Power socket. A 12 volt power socket is in the left side of the cargo area behind the rear seat backrest.

General

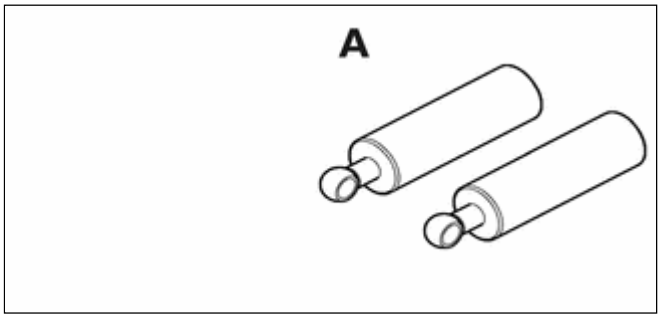
This repair group covers replacement of the front fenders and removal and installation of the engine hood.

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.

Special tools

Most body repairs can be performed using regular automotive service tools. Some BMW special tools are required to set body pieces into the service positions.



- Service position hood props BMW 51 2 160

Front Fenders

Front fender, removing and installing

- Raise hood. Raise and safely support front of vehicle.

WARNING!

- ***When raising the car using a floor jack or a hydraulic lift, carefully position the jack pad to prevent damaging the car body. A suitable liner (wood, rubber, etc.) should be placed between the jack and the car to prevent body damage.***

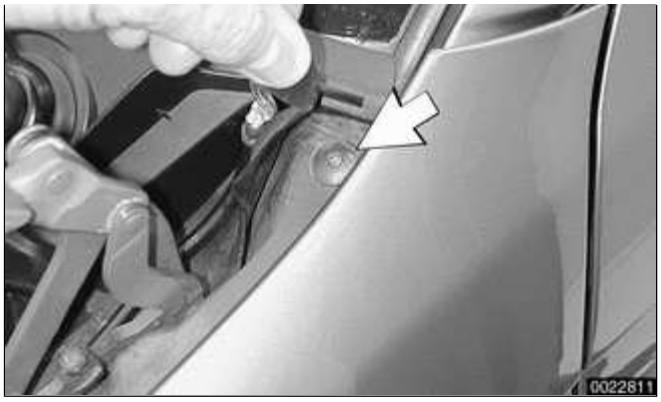
- ***Watch the jack closely. Make sure it stays stable and does not shift or tilt. As the car is raised, the car may roll slightly and the jack may shift.***

- Remove front wheel. Remove inner plastic liner from wheel housing.

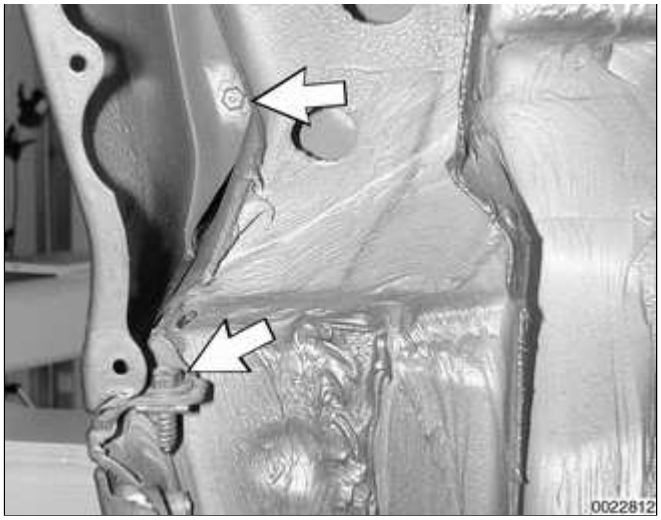
- Remove front turn signal/lens assembly from applicable front corner. Carefully pry out side directional from fender and disconnect. See ⇒ 630 Lights.

- Remove body colored trim panel underneath headlight assembly.

➢ Working at cowl, feed corner of side trim panel cover out from side of fender. Gently lift panel cover upwards

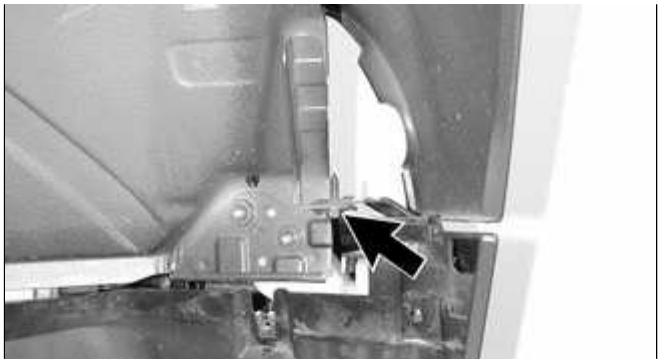


and remove retaining screw (**arrow**).

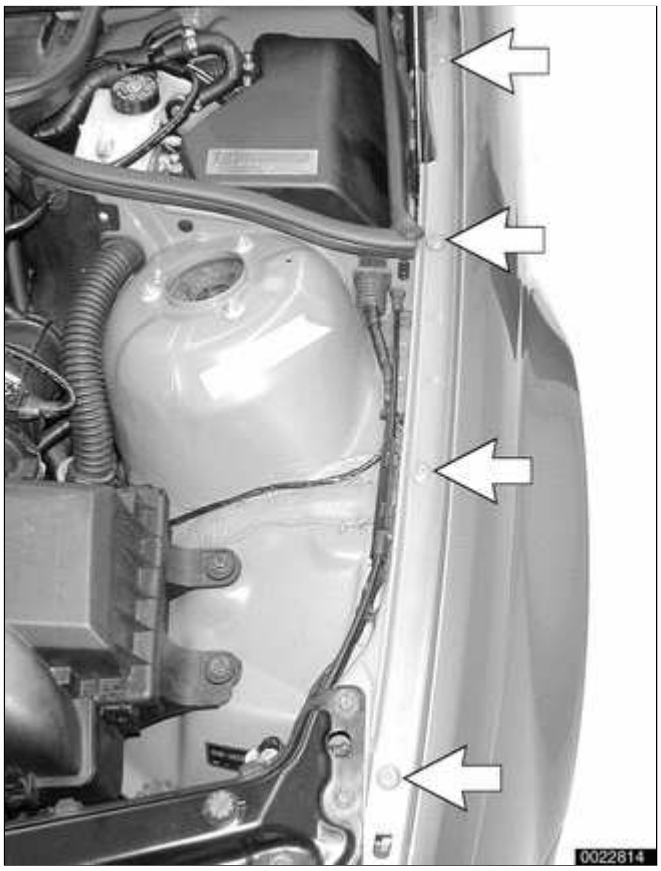


- Remove lower fender attaching bolts (**arrows**) at rear of wheel housing.

- With door open remove upper fender to door post attaching bolt (arrow).



- Remove screw (**arrow**) at front of fender.



- Remove bolts (**arrows**) along top edge of fender.
  - Carefully remove fender from body.
  - Installation is reverse of removal, noting the following:
    - Before installing new fender, clean old sealant and protective coating from mounting surfaces.
    - Position new fender and loosely install all mounting bolts. Align fender with door pillar and inner fender, then tighten bolts.
    - Repair any paint damage and paint any exposed metal.
    - Reseal and apply protective coating to mounting surfaces.

Clearance specification	
Fender to front hood or to door	4.25 ± 0.75 mm (0.167 ± 0.03 in.)

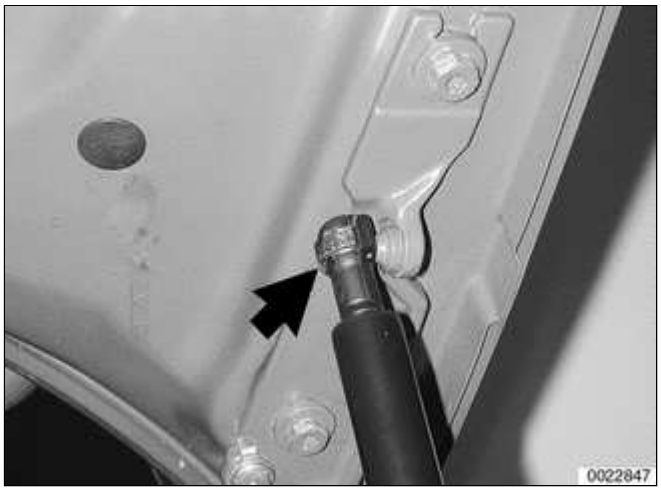
Engine Hood

Hood, raising to service position

CAUTION!

- ***Do not switch on the windshield wipers with the engine hood raised. As a precaution, remove the wiper motor fuse. See ⇒ 610 Electrical Component Locations.***

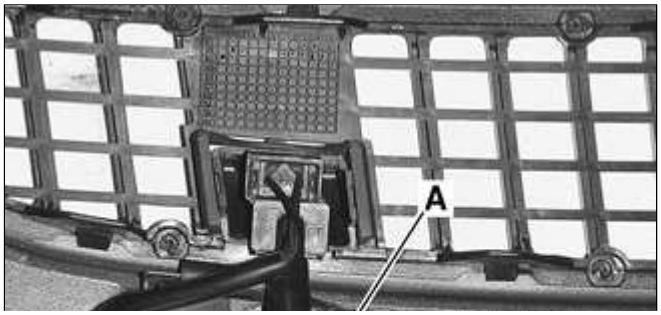
- ***The hood is heavy. Before removing the hood supports, be sure to have an assistant help support the hood.***



- Open hood fully. With the help of a partner, support hood and remove retaining clips (**arrow**) on upper end of pressurized lifting struts. Pull struts off hood.

  - Raise hood higher and install BMW special tool 51 2 160 in between hood lift struts and hood brackets to hold hood in service position.

Hood, removing and installing



- Raise hood:

  - Disconnect washer fluid hose (**A**) from washer nozzles.

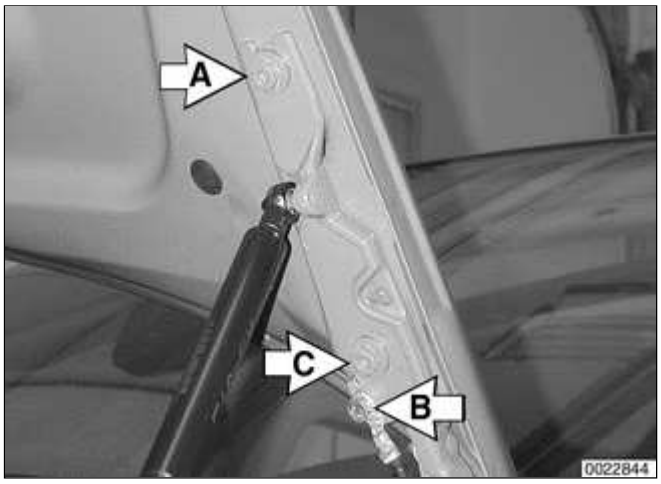
  - Where applicable, disconnect

electrical harness connector (**B**) from heated nozzles.

- Detach gas-charged hood supports from hood.

CAUTION!

The hood is heavy. Before removing the hood supports or hood retaining bolts, be sure to have an assistant help support the hood.



➢ Loosen upper hood hinge bolts (**A**). Remove ground strap (**B**) and remove lower hinge bolts (**C**). Lift hood off carefully.

- Installation is reverse of removal.

♦ Repair any paint damage and paint any exposed metal.

♦ Check hood alignment as described next.

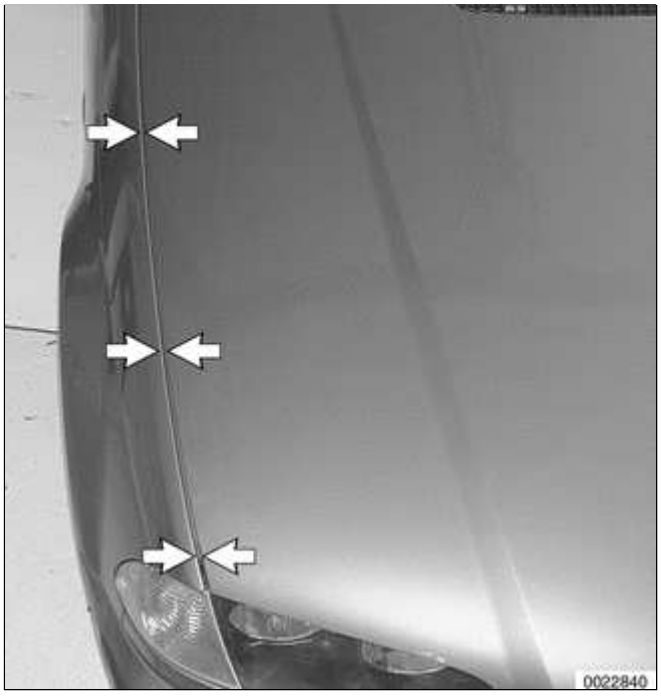
Note:

The hood was fitted and attached to an unfinished body at the factory. Unfinished surfaces exposed by this procedure must be touched up with paint.

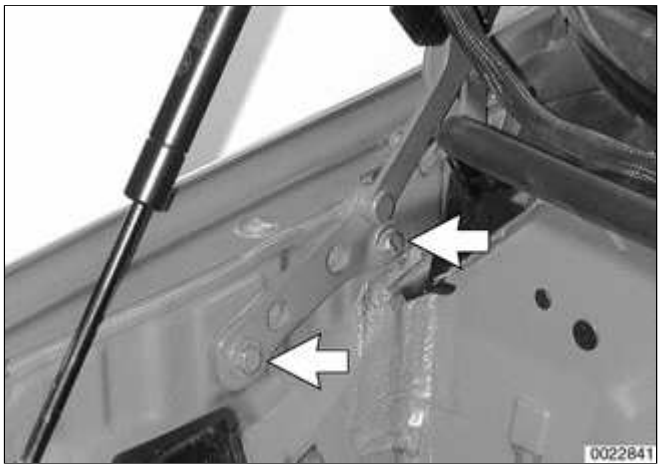
Hood, aligning

When installing the hood, align the hinges as close to the original painted surface as possible. Movement of the hood on its attaching hardware may require touch-up paint.

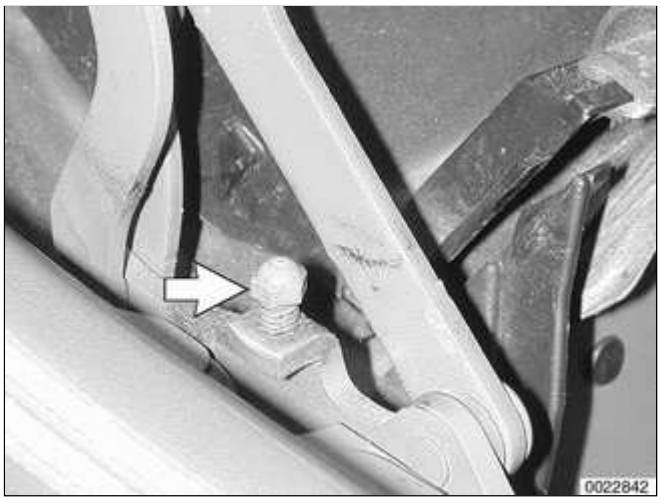
➢ The hood should be aligned so that gap (**arrows**) to fender is as even as possible.



Clearance specification	
Hood edges to adjoining body panel (gap)	5.5 mm (0.216 in.)

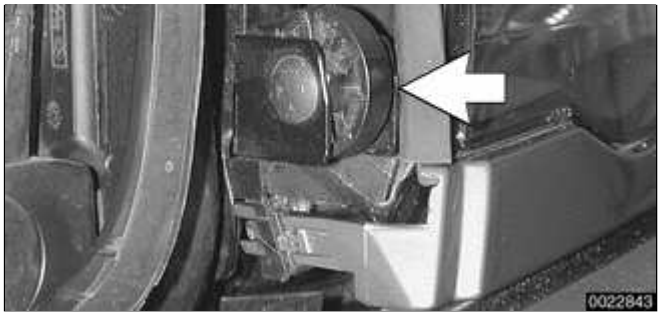


- If height adjustment at rear of hood cannot be completed using upper hinge, loosen lower hinge bolts (**arrows**) and reposition as necessary.



- Plastic coating on top of hinge stop screw must not be damaged or missing.

- Stop disk for front of hood (**arrow**) is eccentric, and is marked 0-10. Initial setting is with the 0 setting forward, for



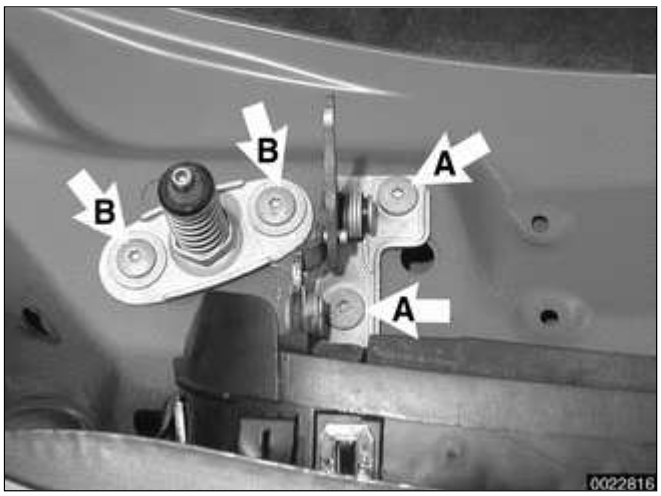
minimal clearance. Turn stop disk to move hood front stop further out.

- Height at front of hood is set using spring pins and rubber stop buffers.

Hood release cable and spring pins, adjusting

Before adjusting hood pins, be sure the hood is aligned evenly to fenders and front panel.

- Make sure bowden cable, which connects both hood locks together, is seated in lock guide on both left and right locks.



Loosen hood spring pin bolts (**A**) and retaining hook bolts (**B**) at hood on left and right sides only enough to allow movement.

- Turn rubber stop buffers over headlights inwards to provide clearance.

- Lower (but do not fully latch) hood several times so pins on hood center themselves in lower locks.

CAUTION!

Do not let hood lock with latch bolts loose.

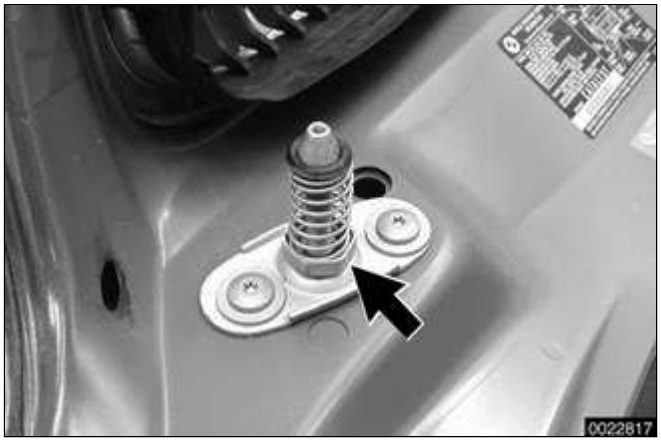
- Tighten hood spring pin bolts and latch bolts when alignment is correct.

- Remove one screw from each side, clean and coat with

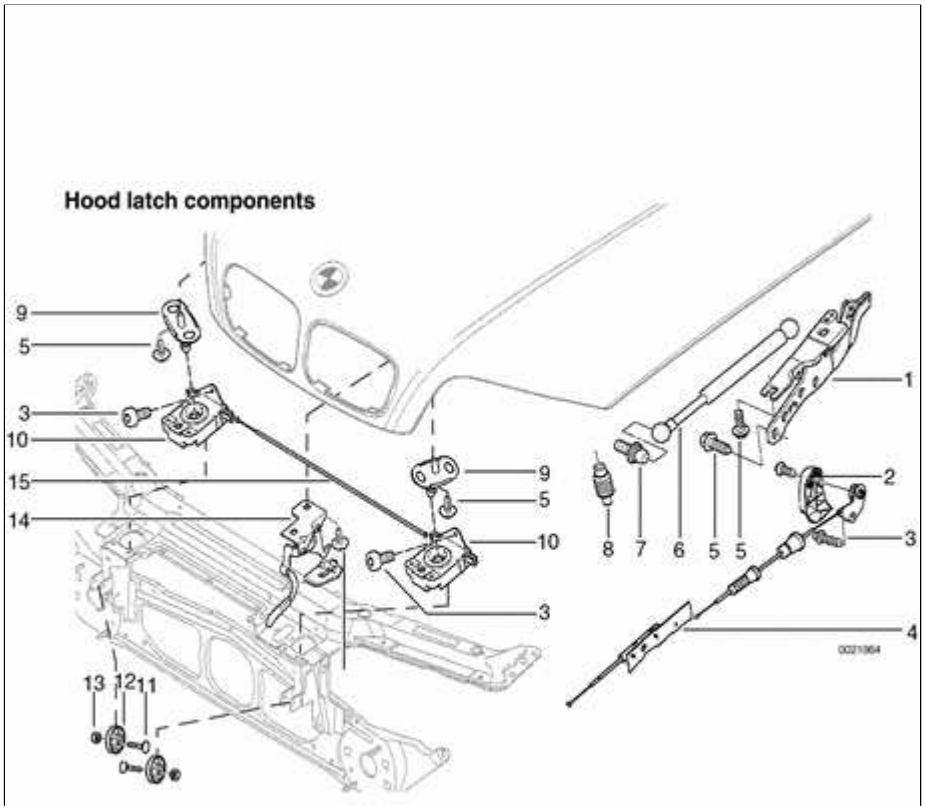
Loctite®270 or equivalent, and reinstall.

- Unscrew rubber stop buffers above headlight assemblies until they support hood when closed without movement.

- Test hood for correct closure and opening. If hood does not spring open, lengthen spring pins.



➢ To lengthen spring pin, loosen locknut (**arrow**) with wrench inserted through spring, then turn pin counterclockwise.



Hood latch components, assembly

1 - Hood hinge

2 - Hood release lever

3 - Torx bolt

4 - Bowden cable, main

5 - Hex bolt

6 - Gas pressurized strut

7 - Ball pin

8 - Stop buffer

9 - Spring pin

10 - Lower hood lock

11 - Saucer head screw

12 - Eccentric wheel

13 - Hex nut with plate

14 - Hood catch

15 - Bowden cable, center

BMW > 328 > 2000 > 2.5L L6 (M52)

411-1

General

This repair group covers front and rear door repair information. It includes removal and installation of interior front door trim panels, rear door trim panels of Sedans and Sport Wagons and rear trim panels of Coupes and Convertibles.

For information on the power door windows and door glass replacement, see ⇒ 512 Door Windows.

For information on the power door locking system, see ⇒ 515 Central Locking and Anti-theft.

Doors

WARNING!

E46 cars are fitted with side-impact airbags in the front doors. When servicing doors on cars with front side-impact airbags, always disconnect the negative (-) battery terminal. See ⇒ 721 Airbag System (SRS) for cautions and procedures relating to the airbag system.

Front or rear door, removing and installing

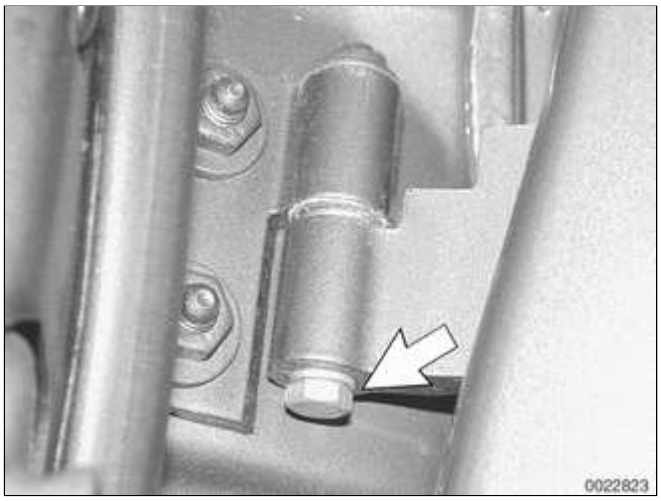
- If working on a door with side-impact airbag, disconnect negative (-) battery cable.

CAUTION!

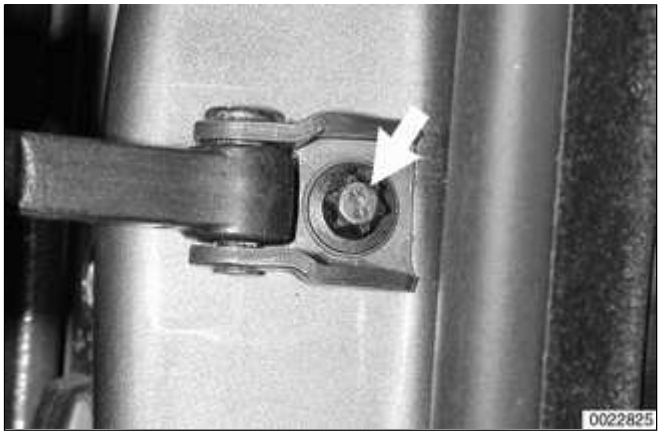
Prior to disconnecting the battery, read the battery disconnection cautions given at the front of this manual on page viii.

- Remove harness connector mounting bolt (arrow) at door pillar.

- Pull up on locking clip and separate connector.



- With door fully open, remove pin bolts (**arrow**) from top and bottom door hinges.



- Remove door check mounting bolt (**arrow**).
  - Remove door by lifting up off lower hinge halves.

CAUTION!

Be careful not to damage door or other painted body surfaces. Make sure no load is placed on wiring harness.

  - Installation is reverse of removal. Keep in mind the following:

- On 4-door models, mount and align rear doors first, followed by the front doors.

- Align door so that panel gaps are equal on either side, as described later. If necessary, adjust door hinges as described later.

- Adjust door striker so that trailing edge of front door is slightly higher (1 mm / 0.04 in.) than leading edge of rear door. See ⇒ 515 Central Locking and Anti-theft.

- Repair any paint damage and paint any exposed metal.

CAUTION!

In 2-door models, removing and installing the door may upset the adjustment and alignment of the window. Window adjustment, as described in ⇒ 512 Door Windows, must be carried out after installation to prevent damaging the glass.

Door adjustment	
Front fender to front door gap approx.	4.25 mm ± 0.25 mm (0.17 ± 0.01 in.)
Front door to rear door gap approx.	4.5 mm ± 0.25 mm (0.18 ± 0.01 in.)
Rear door to rear fender approx.	4.0 mm ± 0.25 mm (0.16 ± 0.01 in.)
Permissible deviation from parallel	1.0 mm (0.04 in.)

Tightening torque	
Door hinge to door	20 Nm (15 ft-lb)

Door check, replacing

WARNING!

E46 cars are fitted with side-impact

airbags in the front doors and as an option on 4-door models. When servicing doors on cars with front side-impact airbags, always disconnect the negative (-) battery terminal. See ⇒ 721 Airbag System (SRS) for cautions and procedures relating to the airbag system.

- Close door window completely.

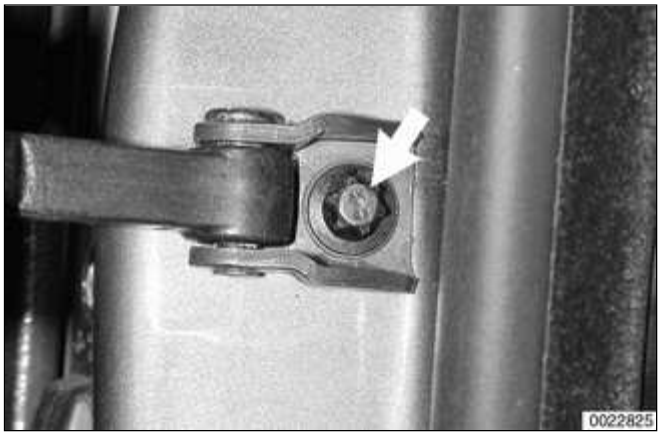
- Disconnect negative (-) battery cable.

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 later.

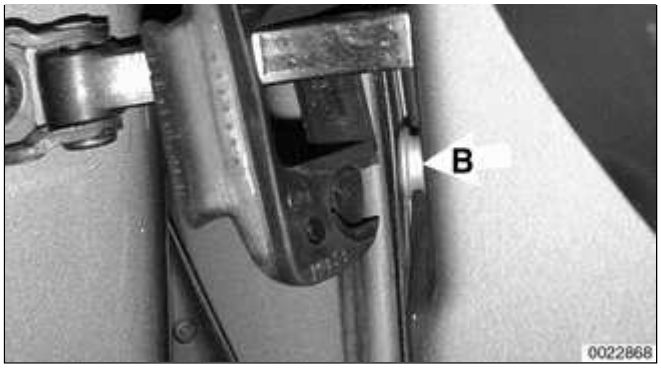
- Where applicable, remove side-impact airbag from door. See ⇒ 721 Airbag System (SRS) Remove door vapor barrier.



➢ Remove door check mounting bolt (**arrow**).

➢ Remove rubber cover (**A**) and bolts (**B**) from door check lockplate on door.

- Remove door check from inside door.



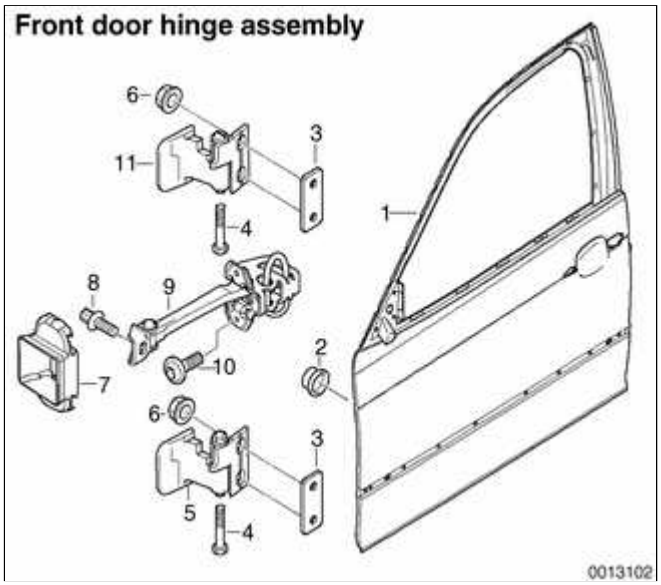
- Installation is reverse of removal.

- Lubricate door check before installing.

- Use new mounting bolts when reinstalling the side-impact airbag to the door (where applicable).

Tightening torque	
Door check to door	24 Nm (16 ft-lb)

Door hinge adjustment



If the installed door is uneven or out of parallel, shims can be used to correct its position. The shims are placed behind the hinge plate and are available in two different thicknesses (0.5 mm and 1.0 mm).

1 - Door

2 - Protective cap

3 - Spacer plate

4 - Hex bolt

5 - Lower door hinge

6 - Hex nut with plate

7 - Door check gasket

8 - Torx bolt with washer

9 - Door check

10 - Torx bolt

11 - Upper door hinge

Front and rear doors are similar.

Tightening torques	
Door hinge to door	20 Nm (15 ft-lb)

Door Panels

WARNING!

E46 cars are fitted with side-impact airbags in the front doors and as an option on 4-door models. When servicing doors on cars with front side-impact airbags, always disconnect the negative (-) battery terminal. See ⇒ 721 Airbag System (SRS) for cautions and procedures relating to the airbag system.

Door trim panel, removing and installing

- Disconnect negative (-) battery cable.

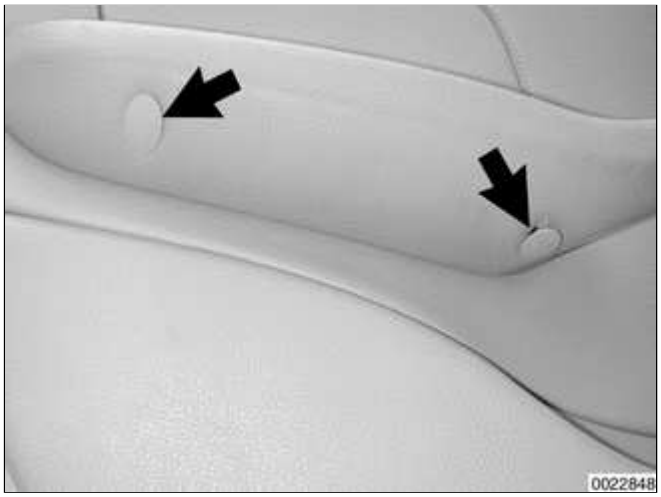
CAUTION!

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

➢ Gently pry off door panel trim strip.

➢ Carefully pry out mirror adjustment switch and disconnect harness connector from switch.

- For rear trim panel: Pry out window switch at top of armrest.



- Pry off concealing plugs (**arrows**) from under armrest.

- Remove door panel retaining screws (**arrows**).

- Unclip door panel from door perimeter using a trim panel tool. Pull panel retaining clips off one at a time.

- Pry off inside door release Bowden cable at end of clip (**arrow**).

- Pull off panel: Detach cable from interior door release lever.

  - Disconnect radio speaker harness connector.

  - Installation is reverse of removal, noting the following:

  - Replace any damaged plastic parts or clips.

  - Renew vapor barrier if it is damaged.

  - Use new mounting bolts when reinstalling side-impact airbag to door.

  - When installing door panel, align metal retainers on window sill with openings on top of door panel.

  - Check door-lock mechanism and window for ease of movement.

Rear side trim panel, removing and installing (Coupe model)

- Remove rear seat cushion. Remove rear backrest side section. See ⇒ 520 Seats.

Using a trim tool, gently pry up door threshold trim. Starting at A-pillar, press radius of trim downwards while sliding trim forward off trim clips. Remove clips from body using pliers. Save for installation.

- Remove trim plugs on armrest. Remove panel mounting screws.
- Gently pry off panel using trim tool.
- Disconnect electrical harness connectors as necessary. Remove side panel by lifting up and toward interior.
- Installation is reverse of removal. Replace any damaged plastic parts or clips.

Rear side trim panels, removing and installing (Convertible model)

- Remove rear seat cushion. Remove rear backrest side section. See ⇒ 520 Seats.
- Lower side windows; open convertible roof.
- Remove side panel insert:

- Remove trim plugs on side panel armrest.
- Remove insert panel retaining screws.
- Gently pry side panel insert from upper and lower side panels.
- Disconnect electrical harness connectors as necessary.

- Remove upper side trim panel:

- Remove trim retaining rivet from upper corner at door. Pull trim cap upwards from weather-stripping.
- Unhook spring from linkage at convertible top.
- Remove retaining screws from lower edge of upper panel.
- Gently pull weather-stripping from rear edge of upper panel as necessary.
- Pry up on upper panel and remove.

- Remove lower side trim panel:

- Gently pry lower side trim panel from body.
- Make sure to feed lower front corner of side trim panel out from door threshold trim.

- Installation is reverse of removal. Make sure to replace any broken trim clips.

General

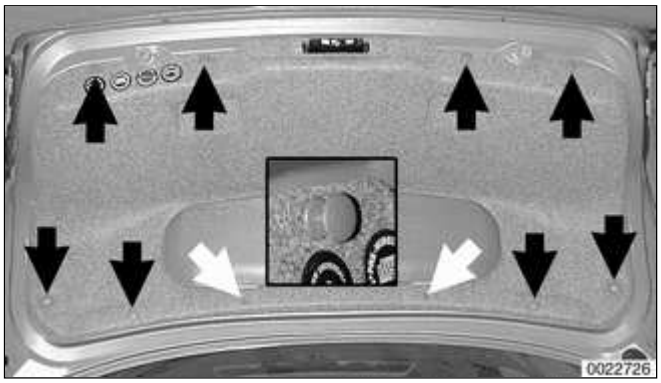
This repair group covers trunk lid and tailgate removal and installation. Also included here are replacement procedures for the gas-charged support struts that hold the trunk lid or tailgate in the open position.

Note:

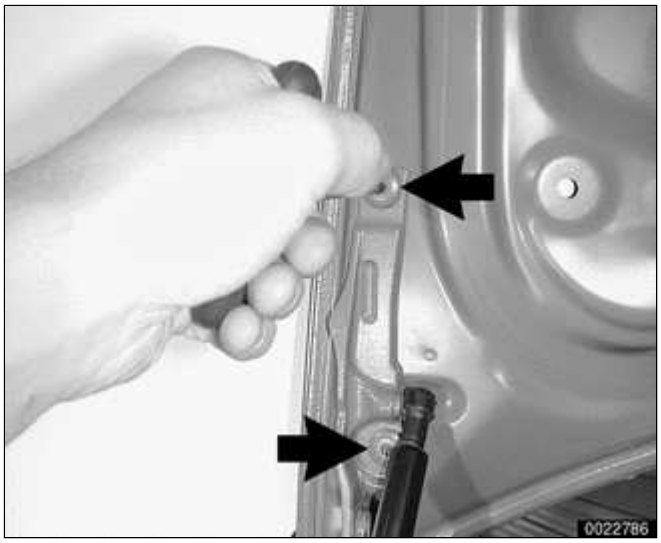
The body is painted at the factory after assembly. Realignment of body panels may expose unpainted metal. Paint all exposed metal once the work is complete.

Trunk Lid

Trunk lid, removing and installing



- Raise trunk lid.
  - Open tool kit and remove screws attaching tool kit to trunk lid (**white arrows**).
  - Unclip retaining strap at trunk lid and remove tool kit.
  - Remove insulating liner expansion rivets (**black arrows**), by prying upper portion out (**inset**).
  - Remove trunk liner.
  - Disconnect electrical harness connectors from components and remove wiring harness from trunk lid.



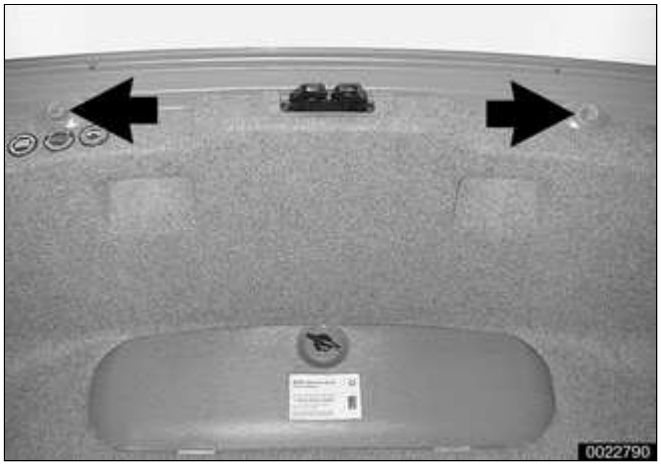
- While supporting trunk lid, loosen top hinge screws (**arrows**) and remove lower screws from left and right sides.

Note:

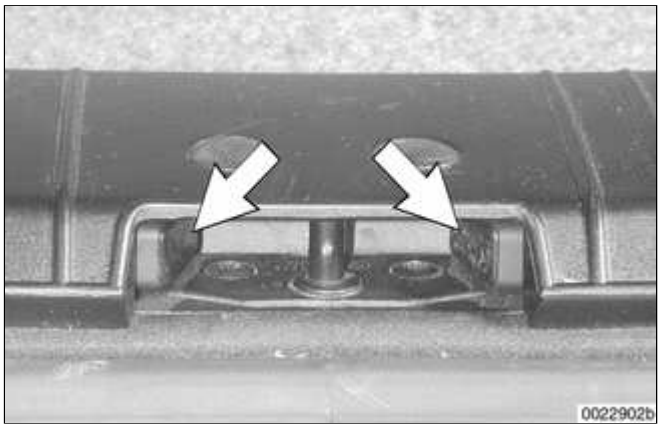
Before loosening hinge bolts, mark hinge and hinge bolt locations for reinstallation.

  - Installation is reverse of removal. If necessary, align trunk lid to body as described next.

Trunk lid, aligning



- Raise trunk lid. Working at lower corners of trunk lid, unscrew out rubber buffers (**arrows**) on left and right sides.



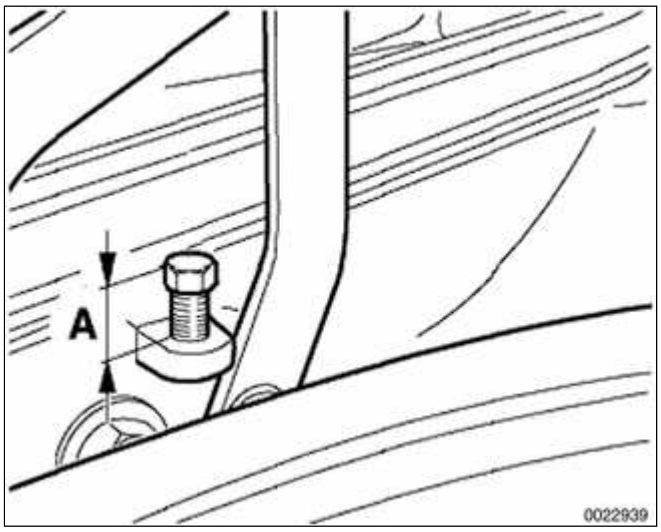
- Inspect pads (**arrows**) on each side of latch assembly for damage or wear and replace if necessary.

- Remove protective caps at trunk lower trim panel and loosen screws of trunk lock until it can be moved.

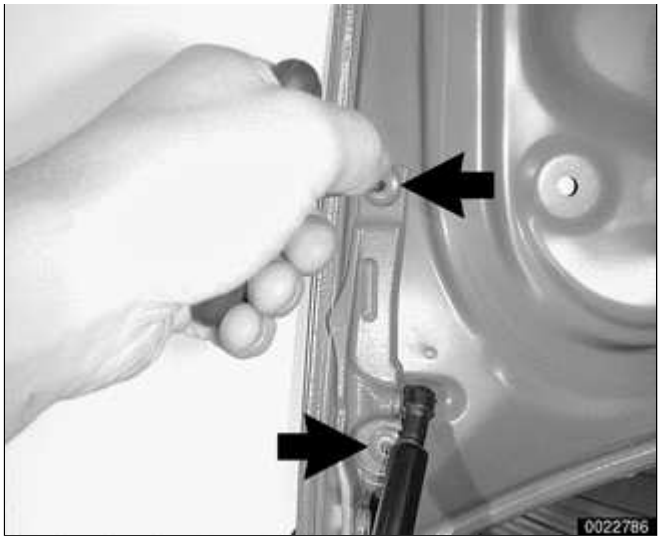
- Check stop screw at trunk lid hinge:
  - If stop screw has a round plastic head, cut or grind off bolt head. If head is removed, replace round headed stop screw with flat head

screw and protective cap.

- If stop screw has removable protective cap (**arrow**) remove protective cap from stop screw.



- Adjust stop screw so that head is set to (**A**) 10 mm (0.40 in.) above bore height.



- To adjust trunk lid gap at rear fender:

  - Loosen bolts retaining trunk hinge to trunk lid (**arrows**) until trunk lid is just able to move.

  - If range of adjustment is insufficient, loosen lower bolts on trunk hinge

  - Once trunk lid gap is within specification, tighten trunk hinge to lid bolts.

Trunk lid gap specification	
Trunk lid gap at rear fender	4.25 ± 0.75 mm (0.17 ± 0.03 in.)

CAUTION!

Before closing truck lid, be sure that trunk lid and body are not damaged.

➢ To adjust trunk lid at lock:

- Remove protective caps from trim panel and loosen screws retaining latch assembly until it can just be moved.
- Inspect pads (**arrows**) on each side of latch assembly for damage or wear and replace if necessary.
- Insert key in trunk lock, and hold key in unlock position to prevent lock from closing. Close trunk lid to center latch assembly.
- Open trunk lid and tighten screws retaining latch. Replace protective caps on trim panel.
- Check adjustment of trunk lid and lock, repeat adjustment process if necessary.

- Screw in trunk lid detent buffers until left and right sides of lid rest on buffers with trunk lid closed.

CAUTION!

Top surface of trunk lid must not protrude above top lip of fenders or height adjustment can be distorted.

- Gently twist detent buffer ejector clockwise with screwdriver to unlock buffer and release ejector.

- To adjust stop screw at trunk lid hinge:

- Working at trunk lid hinge, set stop screw to a height of 10 mm (0.40 in.). Place a strip of paper on

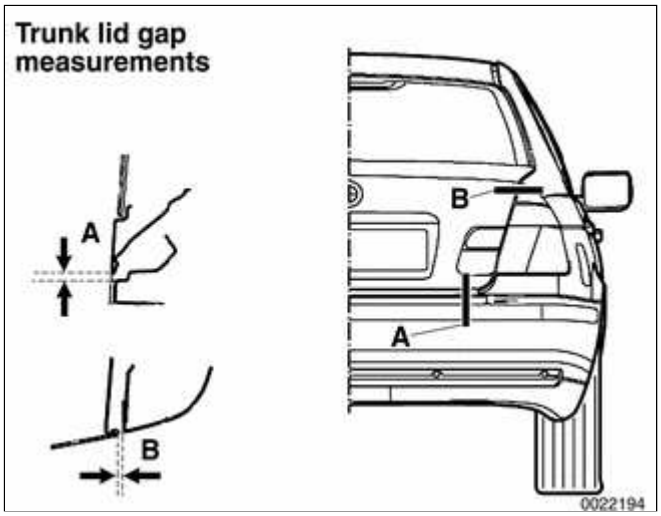
top of stop screw, and gently close trunk lid.

- Adjust height of stop screw until paper strip can be removed with slight resistance. Once stop screw height has been adjusted, lower adjusted height of stop screw 2.5 mm (0.1 in.) to accommodate for stop screw protective cap.

- Fit protective cap on stop screw. Check that trunk lid is in correct position, adjust if necessary.

CAUTION!

Excessive force should not be needed to close trunk lid.



➢ Set gap measurements as listed below.

Trunk position gap adjustment	
Trunk lid / trunk panel (**A**)	5 ± 1.5 mm (0.2 ± 0.06 in.)
Trunk lid / rear fender (**B**)	4.25 ± 0.75 mm (0.17 ± 0.03 in.)

Trunk lid support strut, removing and installing

WARNING!

Make sure to support trunk lid before removing strut.

➢ Open trunk lid and support in open position. Remove spring clips (**arrows**) from support strut ends.

- Remove strut from trunk lid.

- Installation is reverse of removal. Replace retaining clips damaged during removal.

Tailgate (Sport wagon models)

Tailgate, removing and installing

- Raise complete tailgate. Remove interior trim and disconnect wiring harnesses.

- Disconnect left and right support struts as detailed below.

- While supporting tailgate, remove hinge bolts for tailgate on left and right sides.

CAUTION!

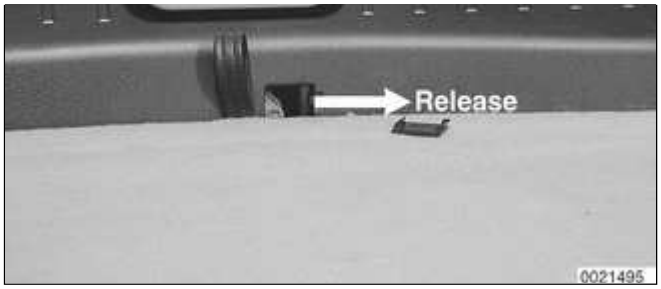
The tailgate is very heavy. Use assistance to properly support both sides prior to removal of the hinge bolts.

- Installation is the reverse of removal. Follow alignment procedures as shown below.

Tightening torques	
Tailgate to tailgate hinge (M8)	20 Nm (15 ft-lb)

Tailgate, emergency release

The tailgate of the E46 Sport Wagon has no key cylinder. An emergency release mechanism is incorporated into the tailgate latch. This allows mechanical opening of the latch in



case of an electrical failure. The release is located in the rear cargo area, along the lower edge of the rear apron behind a small access cover.

- Working inside car, at base of tailgate:

♦ Remove release cover.

♦ Push lever toward driver's side (**arrow**).

Tailgate support strut, removing and installing

➢ Open tailgate fully. Support tailgate and remove retaining clips (**arrow**) on upper end of pressurized lifting struts.

CAUTION!

The tailgate is very heavy, and will close without both pressurized lifting struts installed. Properly support tailgate prior to removal of the lifting struts.

- Pull struts off tailgate.

- Remove spring retainer from lower end of support strut and remove strut.

- Installation is reverse of removal. Replace retaining clips if damaged during removal.

Rear spoiler, removing and installing