515-1

General

This section covers repair information for door, trunk and cargo compartment locks and central locking. Also covered are Electronic Immobilization System (EWS) and anti-theft alarm (DWA).

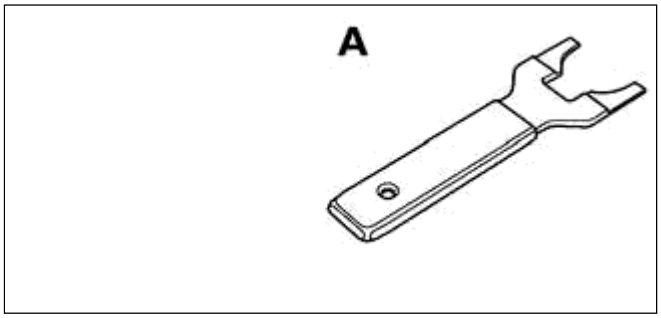
Keep in mind that E46 cars are equipped with sophisticated and self-diagnostic electrical systems. When experiencing malfunctions relating to central locking or anti-theft systems, it is recommended that the system be diagnosed using the BMW service tester DIS or MoDiC or equivalent. An advanced diagnostic scan tool can usually pinpoint electrical faults quickly and safely. Consult an authorized BMW dealer.

Note:

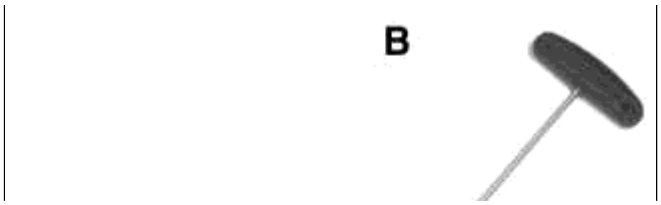
Additional general electrical information can be found in ⇒ 610 Electrical Component Locations and Electrical Wiring Diagrams.

Special tools

A few special tools may be necessary for repairs in this section.



- Ring antenna removal tool BMW 61 3 300



- Front door lock adjustment tool 4 mm Allen wrench

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Central Locking

Note:

There is a door lock key cylinder on the driver's door only

Central locking in E46 vehicles controls the door locks, trunk or cargo compartment lock and fuel filler flap lock. The Central Body Electronics (ZKE V) control module, known as the General Module (GM V), controls central locking.

The door lock actuators are sealed, self contained units with no replaceable parts. The actuators use Hall effect sensors in place of pin contacts and microswitches to provide door OPEN/CLOSED status signal. Each door lock-button only affects the actuator it controls. There is no effect on the central lock control of other doors.

The automatic locking feature can activates the door lock actuators when a road speed signal of 2.5 MPH is detected via the K-Bus. The factory default coding for this feature is OFF, but can be coded ON for individual users with the Key Memory function. See ⇒ Car Memory/Key Memory later in this section.

The driver's door lock location is the only point outside of the vehicle where the key can mechanically control all of the central locking system functions. The outside locks (driver's door and trunk) incorporate an overrunning lock cylinder that breaks away and freewheels if an attempt is made to destroy either with a screwdriver or dent puller.

The rear doors are equipped with the child lock-out lever preventing the door

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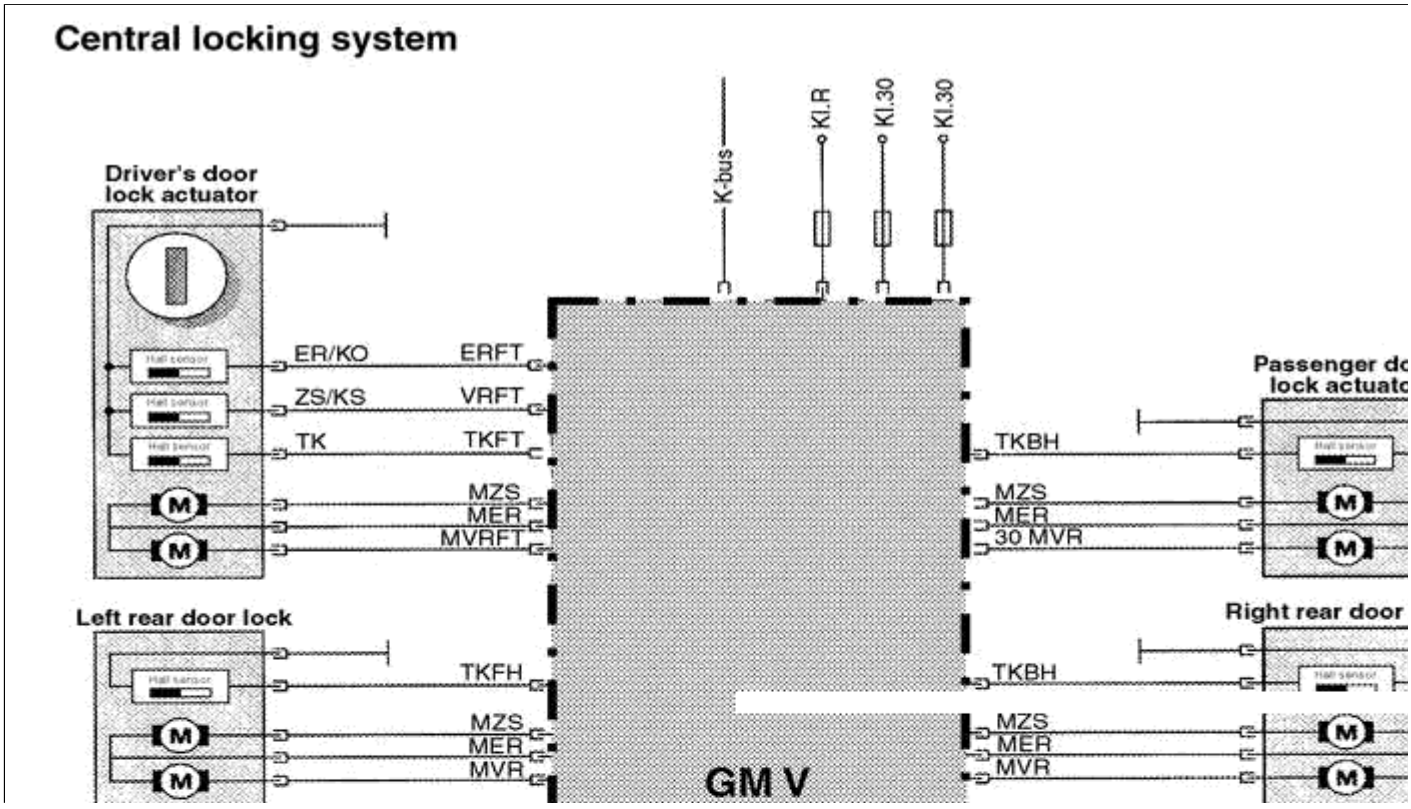
from being opened from the inside regardless of lock-button position.

The General Module (GM V) and Electronic Immobilization (EWS 3.3) interface via the K-bus to monitor double lock status and to initiate double lock override. This feature allows the doors to be opened from the inside if a key accepted by EWS is switched on in the ignition when the doors are double locked.

Continuous locking/unlocking will initiate a timed arrest of the locking system. The GM V counts each time the locks are actuated. After approximately 12 cycles, the timed arrest is active. The timed arrest is deactivated one actuator cycle for every 8 seconds until the counter is reset to 0. The timed arrest is overridden if a crash signal is received from the multiple restraint system (MRS).

Central locking system



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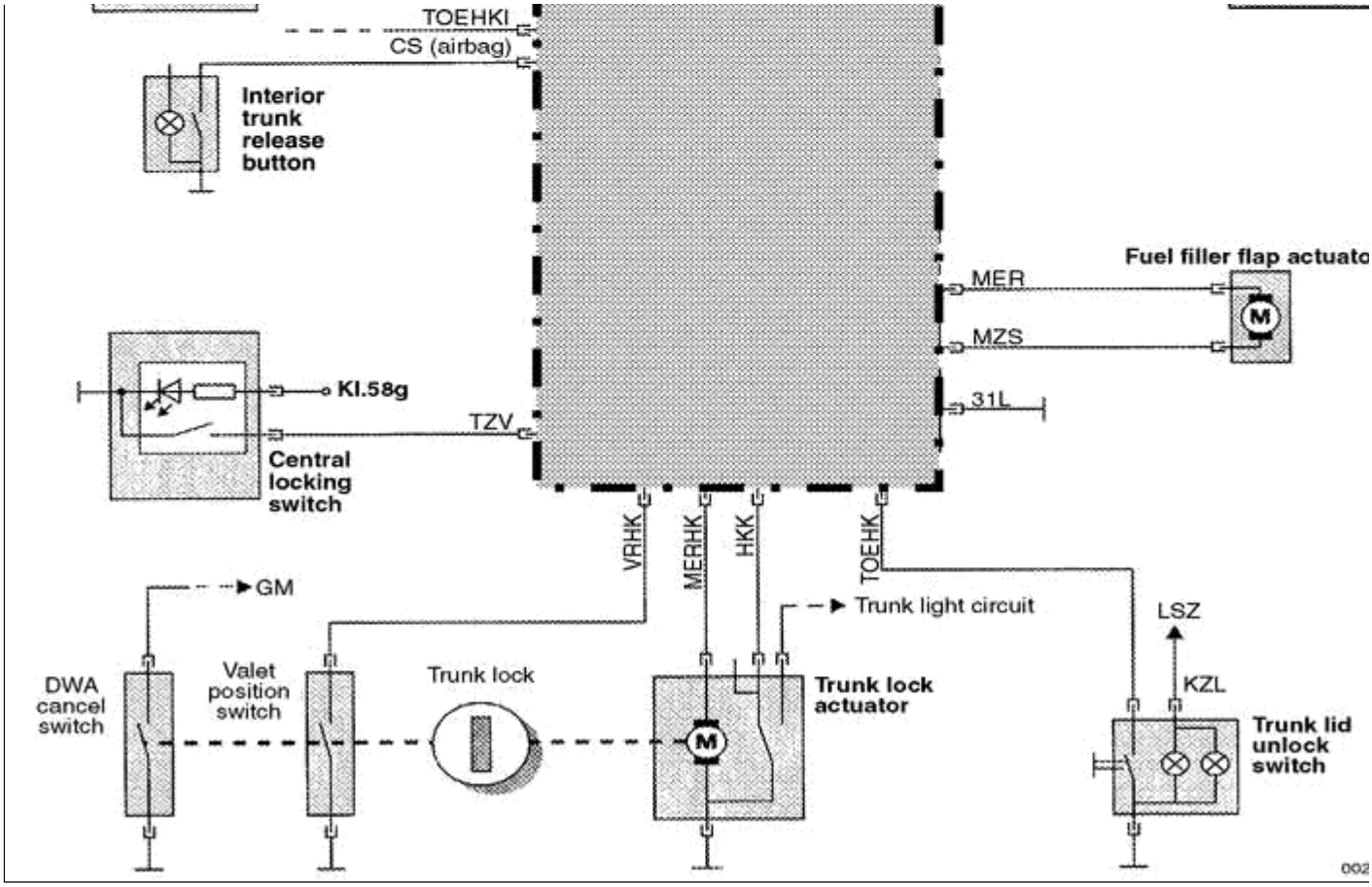

Central locking switch

The central locking switch is housed in a combined housing with the hazard flasher switch. The central switch locks all vehicle locks except for the fuel filler flap.

The switch provides a momentary ground input signal to the GM V. This input single locks each door and the trunk. The fuel filler flap remains unlocked for refueling purposes. If a door is manually unlocked and opened while centrally locked, the remaining doors stay locked. The opened door can be re-locked when closed by manually locking or pushing the central switch twice. This allows the locks of the remaining doors to be resynchronized.

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Single lock and double lock function

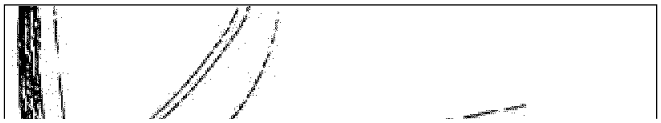
Each door lock actuator incorporates two motors:

Single lock motor controls the mechanical lock mechanism when the central lock switch is pressed to single lock the vehicle. The lock mechanism is fully locked at this point but can still be opened from the interior by pulling the appropriate interior door handle twice or by pressing the central lock switch again. When single lock function is activated, the fuel filler flap actuator is not locked.

Double lock motor, also known as central arrest, is activated only when the vehicle is locked from the outside at the driver's door lock with a key or when the General Module (GM V) receives a lock request from the remote entry (FZV) system. In this case the double lock motor is activated simultaneously with the single lock motor. The function of the double lock motor is to mechanically offset an internal rod in the lock actuator, disabling it from unlocking the vehicle from the interior. This prevents the doors from being unlocked by any means except from an unlock request at the driver's door or via the FZV remote key.

Trunk lock

The trunk lock can be operated with the key but does not lock or unlock the entire vehicle. When unlocked, the trunk can be opened by pressing the trunk release switch pad located above the license plate or from the remote trunk button in the left kick panel.



The trunk can also be opened from inside the vehicle by pressing the remote trunk lid release button in driver's

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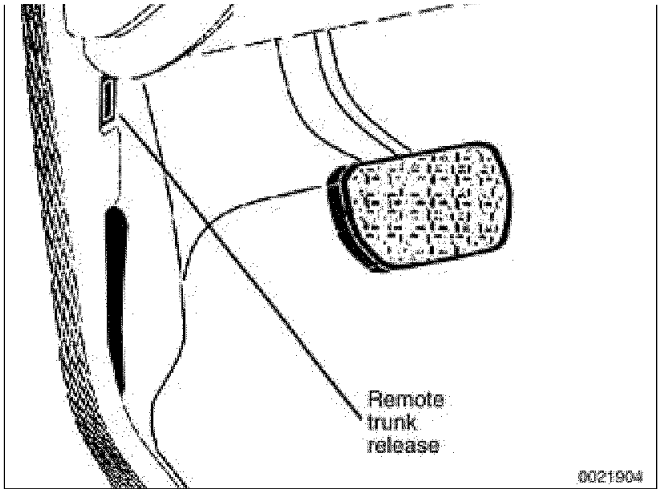

footwell area. The button provides the GM V with a ground signal when pressed.

The vehicle must be unlocked or single locked from the central lock switch for the remote unlock to work. The remote trunk release is locked out when the trunk is locked in the valet setting or when the GM V detects a vehicle speed over 4 mph via the K-bus.

Pressing the trunk release button on an FZV key also opens the trunk.

The trunk lid position (open/closed) and trunk lock key positions are input signals to the General Module (GM V). The trunk lid OPEN/CLOSED signals come from the trunk lid switch contact located in the trunk lock motor. When closed, the trunk contact provides a ground signal to the GM V signifying a CLOSED trunk. This contact also serves as the trunk light switch when the trunk is OPEN.

The actuator motor only operates in one direction to release the latch mechanism. The latch mechanism can also be manually unlocked with the key.

Located on the trunk lock are two additional microswitches for key position status signalling to the GM V.

- Valet position switch: With the key lock in the valet position, this switch provides a ground signal to the GM V. The GM V locks out the interior trunk release button preventing the trunk from being opened.

- DWA cancel switch: When the trunk is opened with the key, this switch provides a ground signal to the GM preventing the DWA alarm system from activating, if armed.

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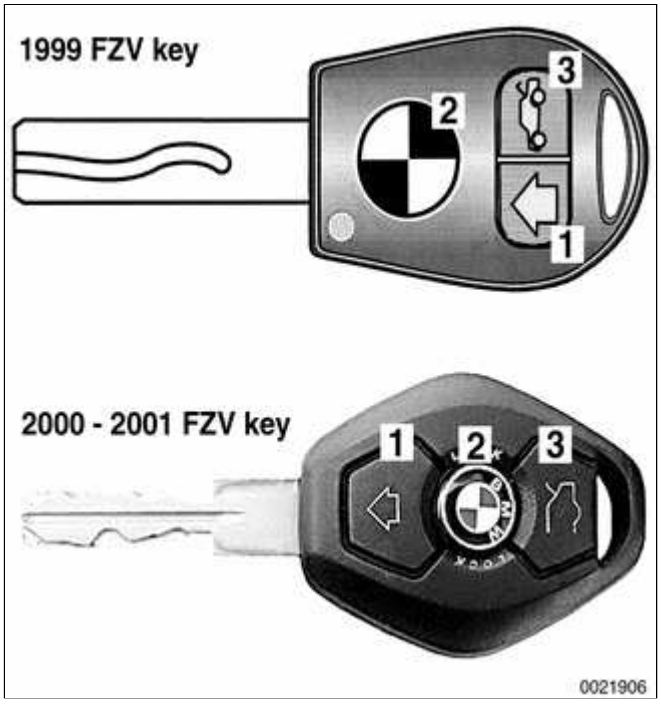
Remote entry (FZV)



The E46 remote (keyless) entry system (usually called FZV) uses a tiny radio transmitter in the vehicle key to lock and unlock the doors and the trunk by remote control.

1	Press once: ♦ unlock driver's door ♦ DWA disarmed ♦ interior lights on Press twice: ♦ total unlocking Hold ♦ convenience opening
2	Press once: ♦ lock ♦ DWA armed ♦ interior lights ON when vehicle is locked Press twice within 10 seconds ♦ deactivate interior and tilt monitoring
3	Press momentarily ♦ trunk lid opens Press and hold:

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	♦ panic mode (alarm if equipped)

There are a number of other features incorporated in FZV:

- Locking/unlocking of fuel filler lid
- Selective unlocking of driver's door (as with key in lock)
- Arming/disarming of DWA alarm system (if equipped)
- Remote unlocking of the trunk only
- Comfort opening of windows, sunroof, and convertible top.
- Interior lighting activation (search mode)
- Panic mode alarm activation (if equipped)
- Automatic correction for up to 1000 erroneous activation signals.
- Low transmitter battery fault code storage in the GM V
- 3 volt lithium battery (commercially available CR 2016) used as power supply for key transmitters
- An EEPROM to stores key data. Data is no longer lost when key battery is replaced; reinitialization is not required.

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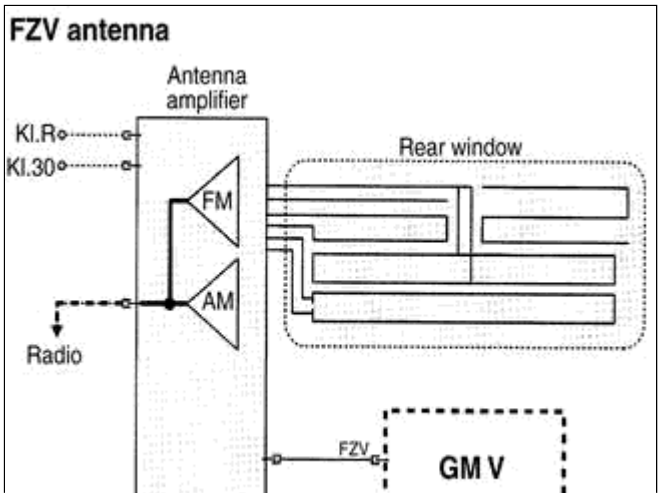
- Key incorporates an LED that signals operator of signal transmitting, key initialization status and key self-test indication

- Keys delivered with four different colored labels. This is helpful to differentiate FZV keys during initialization, preventing possibility of misassigning key ID which would change coded Key Memory functions.

Note:

- *A single unlock request from the driver's door with the FZV key unlocks the driver's door only. A second unlock request unlocks the remaining doors and trunk. This feature can be modified for individual users with the Key Memory capabilities to activate all lock actuators simultaneously. Car Memory/Key Memory is covered later in this section.*

- *Starting with 2000 models, the battery in the FZV ignition key is recharged while the key is in the ignition switch. Therefore there is no need to replace the key battery.*



The remote key receiver is part of the antenna amplifier and is installed in the left "C" pillar. The receiver produces a digital signal based on the transmitter command and sends it to the GM V for processing. The GM V then carries out all remote lock system, window/sunroof convenience closing features and DWA arming/disarming functions. The frequency of the FZV key radio signal to the antenna amplifier is 315 MHz. The system is also used to convey the key identification number being used to

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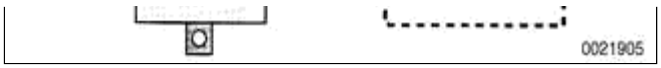

lock/unlock the vehicle. This is a requirement of the Key Memory feature, covered below.

Car Memory/Key Memory

A number of features and functions can be customized to the driver(s) preference. The identity of the vehicle user is provided by a signal from the keyless entry system (FZV).

Car Memory and Key Memory are actually two separate functions, although they are marketed as a combined feature.

Car Memory

The owner is provided with a list of systems that can be customized. Prior to vehicle delivery, the BMW scan tool DIS or MoDiC is used to code the driver preferences into the appropriate control modules. Thereafter these choices cannot be changed without recoding with a BMW scan tool.

The functions that can be set using Car Memory include:

- Alarm system (DWA) features such as arming/disarming with keyless entry (FZV), activation of tilt sensor or interior sensor
- Interior light activation when central locking is used
- Convenience opening of windows/sunroof
- Interior and external lighting preferences

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- Heating/A/C preferences (IHKA)
- Seat and mirror preferences (triggered by Key Memory)
- Instrument cluster display units (for example: km vs. miles)

Key Memory

Whenever one of the FZV keys is used to lock or unlock the car, the user is identified by the GM V. A maximum of four keys can be programmed with the Key Memory feature. The use of the personalized key then triggers Car Memory functions such as heating/A/C (IHKA) settings or memory seat position adjustment.

Most programming of Key Memory requires the use of BMW scan tools DIS or MoDiC. However, features such as IHKA blower speed and temperature store automatically without the use of scan tools.

Available Key Memory functions vary based on vehicle equipment. The functions that can be set include:

- Automatic locking after start off
- Selective locking
- Heating/A/C blower speed, heated or cooled air distribution, automatic blower setting.

Note:

Key Memory is only activated when using keyless entry. If the driver's door is unlocked manually, no electronic input is

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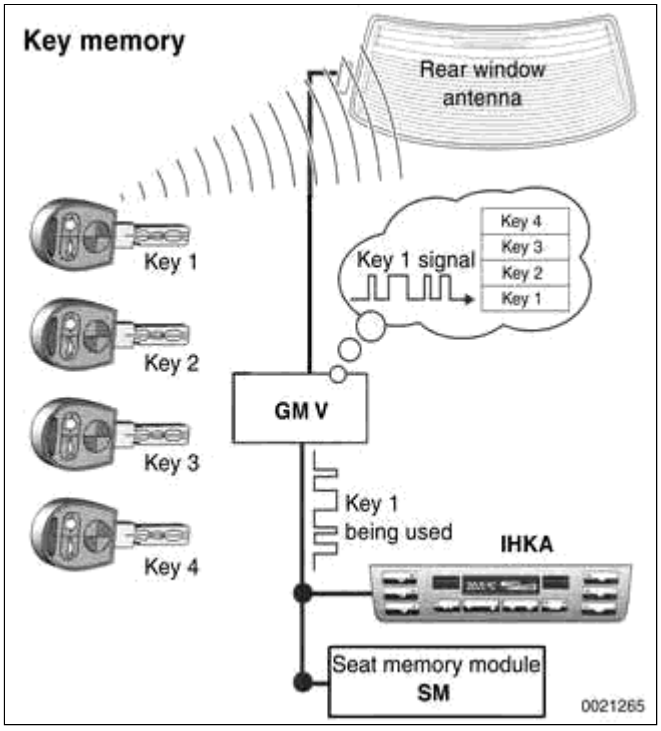
received at the GM V. Therefore Car Memory/Key Memory features will not be activated.

Remote key initialization



Initialization of FZV keys is required to establish lock/unlock signal synchronization with the GM V. The initialization procedure provides the GM V with a key identification number and a "rolling code" for each key. If initialization is not performed, the GM V will not respond to the key signals.

Up to 4 remote keys can be initialized. They must be initialized at the same time. Key initialization is only possible with the vehicle unlocked.

- Close all doors and have all keys available.
- Using key number 1, turn the ignition switch to KL R (accessory position), then switch off within 5 seconds and remove the first key.
- Within 30 seconds of turning the ignition switch to OFF Press and hold button #2
- While holding button #2, press and release ("tap") button #1 three times within 10 seconds.
- Release both buttons.

Note:

The Key Memory function of the GM responds to the key identification number of each key. If the keys are not initialized in the same order prior to initialization,

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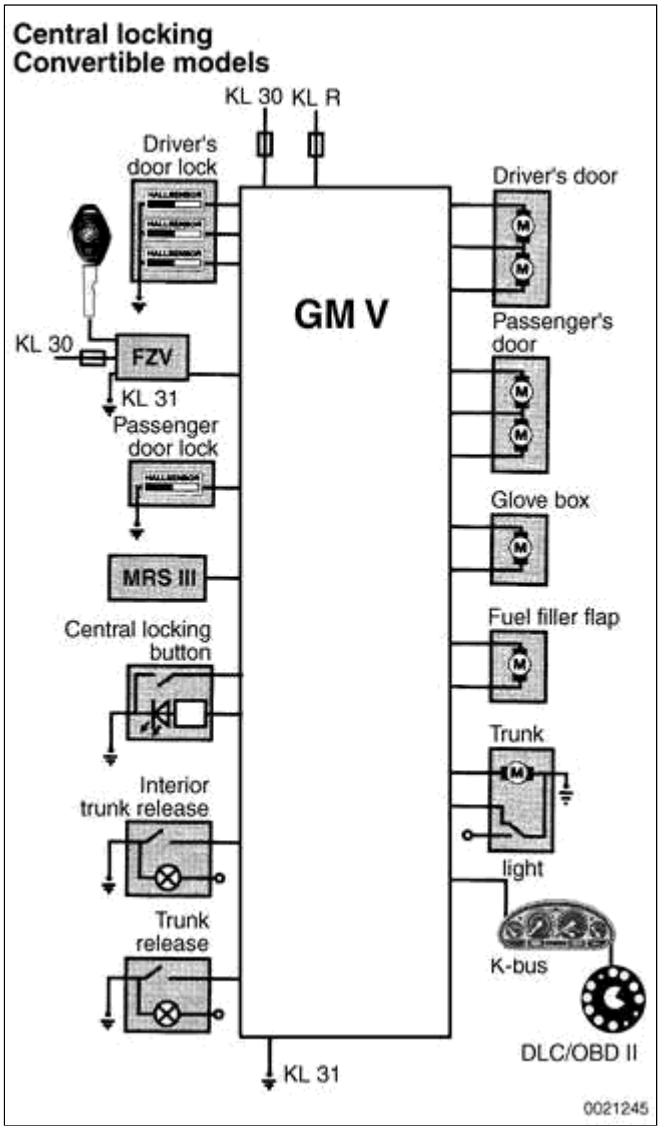
the key memory functions activated by the keys will not be assigned correctly. Always initialize the keys in the same order.

Convertible central locking



In Convertible models, the glove compartment lock is integrated into central locking functions. An additional lock actuator is positioned above the glove compartment lock, locking it whenever central locking is activated.

A microswitch on the glove compartment lock cylinder signals the GM V to lock the trunk electrically. This is the equivalent of valet key position. The trunk can only be opened with either the remote (FZV) key or the wallet key.

Also, the trunk is locked whenever the top storage compartment is unlocked while the top is raised or lowered. The top storage cover motor Hall sensor signals the GM V whenever the cover is unlocked.

The Convertible Top Module (CVM II) receives a signal from the GM V over the K-bus to lock out convertible top operation whenever the trunk is OPEN.

The FZV antenna for the Convertible is incorporated into the rear view mirror.

Tailgate and rear window locking

The Sport Wagon tailgate can be opened from:

- Remote key (FZV)

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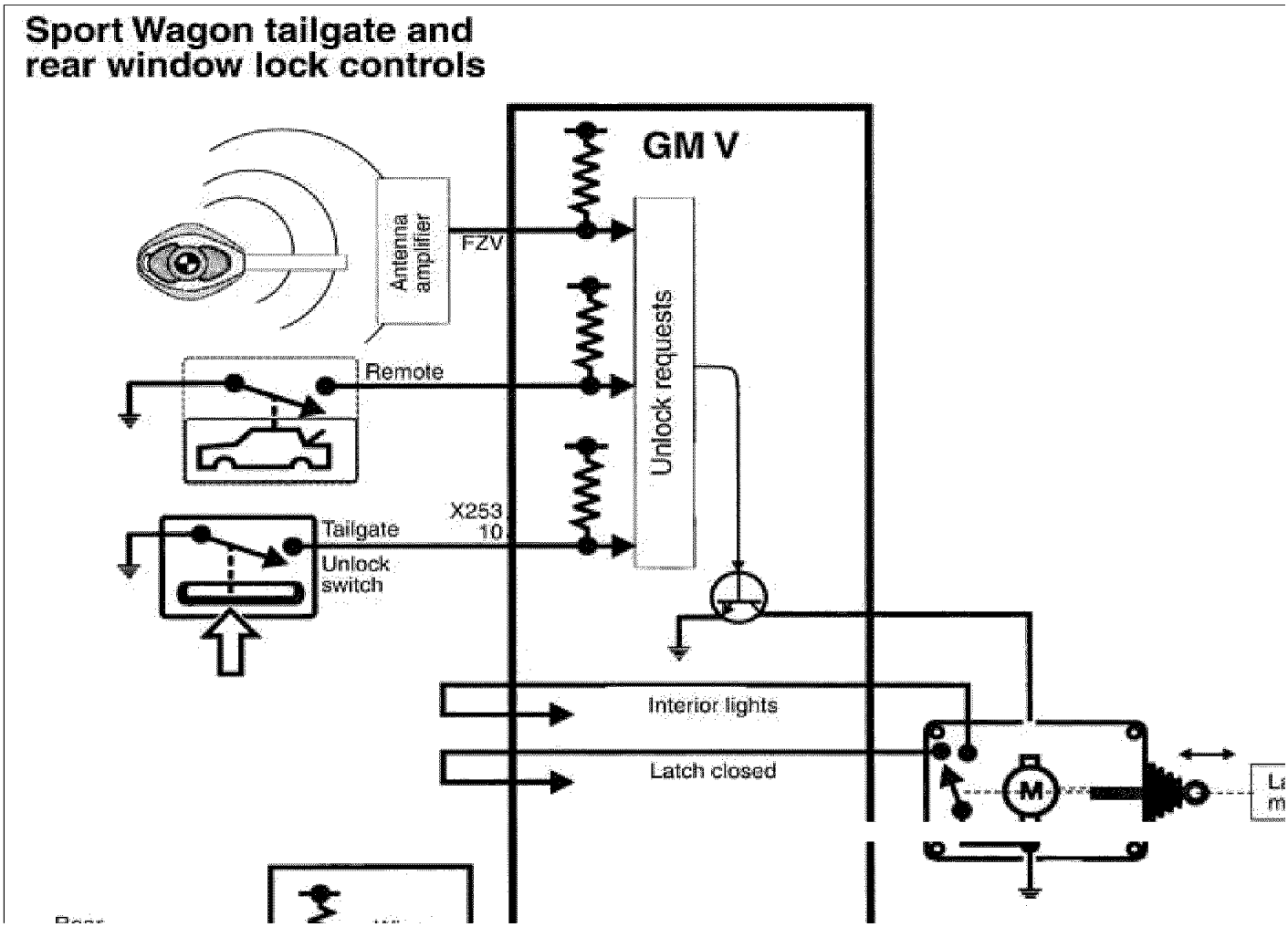
- Interior tailgate release button at driver's kickpanel
- Unlock microswitch above rear license plate

Any of these input requests to the GM V activate the tailgate latch motor. The GM V will also switch on the interior lights with a tailgate unlock request.

The rear window is opened with the release switch on the rear wiper arm cover. Pressing the switch signals the GM V to activate the rear window release relay.

Sport Wagon tailgate and rear window lock controls



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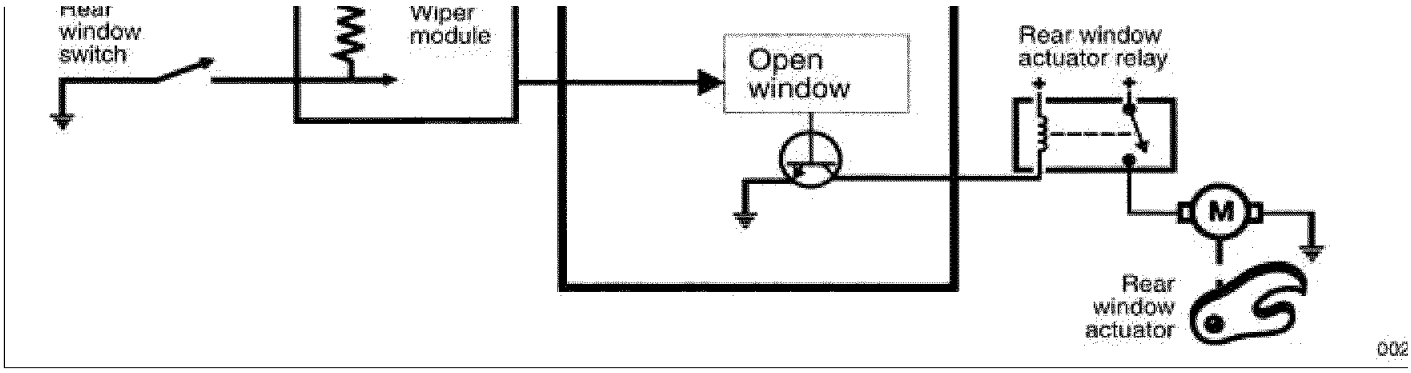

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Door Handles and Locks

Any time a door lock is removed and reinstalled, be sure to check and reset:

- Unlocking of rotary latch
- Outside door handle overtravel

These adjustments and measurements must be made by closing the door lock rotary latch with a screwdriver, then attempting to open it with the outside door handle. Both adjustment procedures are described below, under ⇒ Rotary latch adjustments.

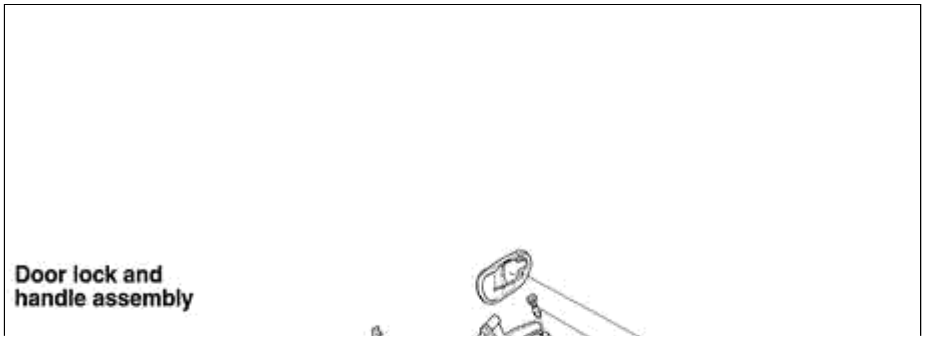
CAUTION!

Do not close the door before resetting rotary latch adjustment. The door may lock and be unopenable from outside.

Rotary latch adjustments

CAUTION!

Carry out rotary latch checks and adjustments with the door open. If the door is closed with the incorrect latch setting, it may not be possible to open the door without destroying the inner door panel.



Door lock and handle assembly

1 - Inside door lock release

2 - Inside door

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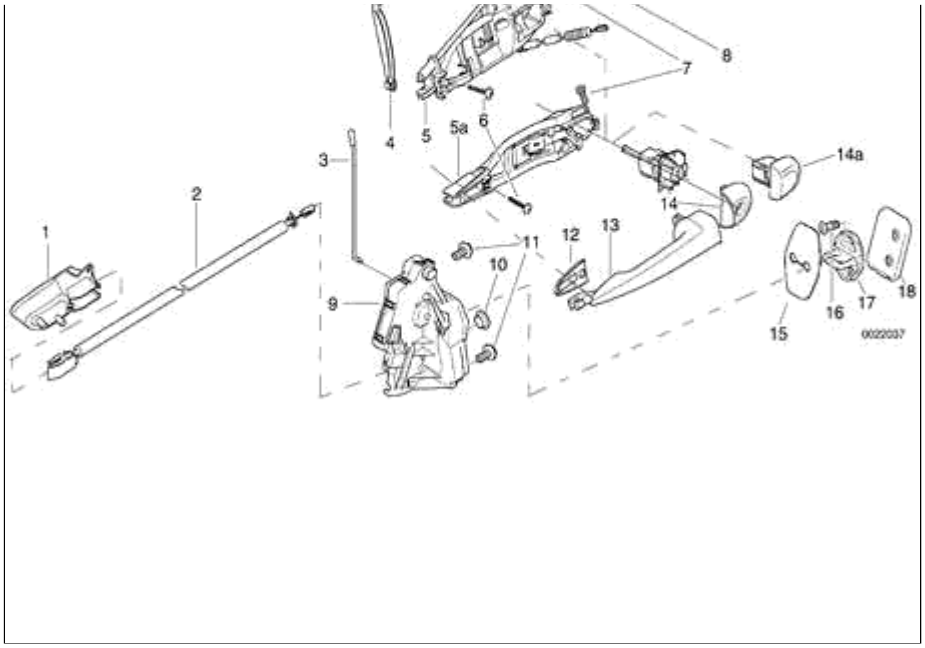

release Bowden cable

3 - **Lock button and rod**

4 - **9/2000 and later models: Bowden cable bracket**

5 - **9/2000 and later models: Door handle inner mechanism**

5a - **Models to 9/2000: Door handle inner mechanism**

6 - **Inner handle mounting bolt**

7 - **Key cylinder mounting bolt (Torx)**

8 - **Gasket**

9 - **Door lock with rotary latch**

10 - **Plug**

11 - **Bolt M6 (always replace)**

- tighten to 9 Nm (80 in-lb)

12 - **Gasket**

13 - **Outer door handle**

14 - **Driver's door: Door lock**

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cylinder and cover

14a - **Rear or right door: Outer handle rear anchor**

15 - **Door striker cover**

16 - **Torx bolt M8**

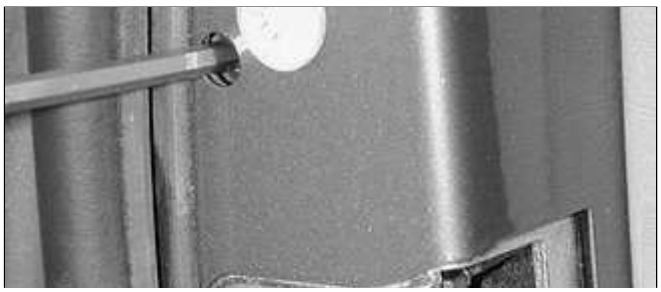
- tighten to 24 Nm (18 ft-lb)

17 - **Door lock striker**

18 - **Lock plate**

Rotary latch unlocking, resetting

- With door open, close rotary latch.
  - Lock car with key or lock button.
  - Unlock car.
  - Open rotary latch using outside handle.
  - If latch unlocks, adjustment is correct.



- If latch fails to unlock:
  - Remove latch adjuster access hole cover.
  - Use 4 mm Allen wrench to loosen

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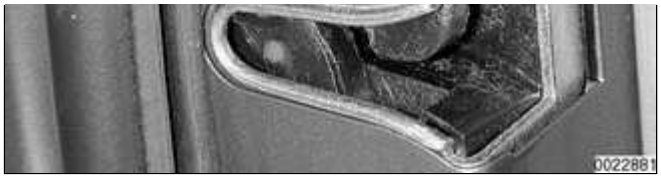


adjustment screw, then retighten.

- Carry out check again.

Note:

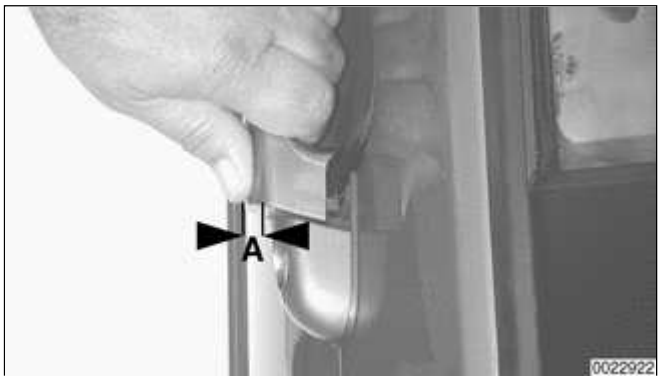
The right side latch adjusting screw is threaded left-handed.

Tightening torque	
Door lock adjustment screw	3 + 2 Nm (27 + 18 in-lb)

Outside handle overtravel, resetting

- With door open, close rotary latch with a screwdriver.

- Open rotary latch with outside door handle.



Measure additional distance (**A**) handle can travel once rotary latch releases.

- If measurement **A** is obtained, rotary latch adjustment is correct.

- If measurement **A** is not obtained, readjust rotary latch through access hole, as described above, and check handle overtravel again.

- If measurement **A** is still not obtained, replace door lock.

Outside door handle overtravel	
Measurement **A**	min. 2 mm (0.08 in.)

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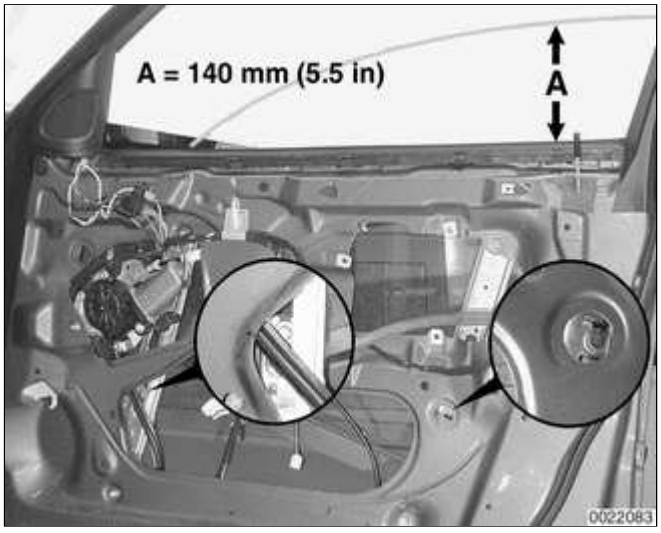
Door lock, removing and installing

The front and rear door locks for all E46 models are similar. Early production cars, up to 9/2000, use a lock actuator with an external lever which couples with the outside door handle mechanism. Cars produced from 9/2000 use a Bowden cable to attach the outside door handle to the lock release mechanism.

- Remove front door tim panel, air bag, and vapor barrier as described in ⇒ 411 Doors and ⇒ 721 Airbag System (SRS).



➢ Detach window from window regulator rails:

- Reattach battery. Move window to approx. 140 mm (5.5 in.) from bottom.

- Remove window retaining screws (**insets**) at window regulator rails.

WARNING!

Once the window is positioned correctly, disconnect harness connector from power window motor to prevent accidental operation of the window.

Note:

Be prepared to retrieve the captured nut corresponding to the retaining screw on the back side of the window rail. It may fall to the bottom of the door.

- Be sure to separate plastic lug at base of window from rail.

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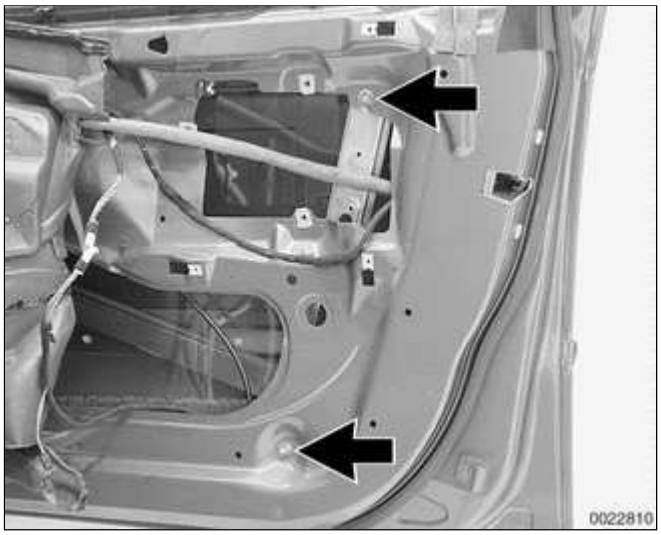
- Raise window to top.

CAUTION!

Guide the window up manually in order to avoid binding.



- Remove window regulator rear rail:

  - Remove top and bottom rail mounting fasteners (**arrows**).

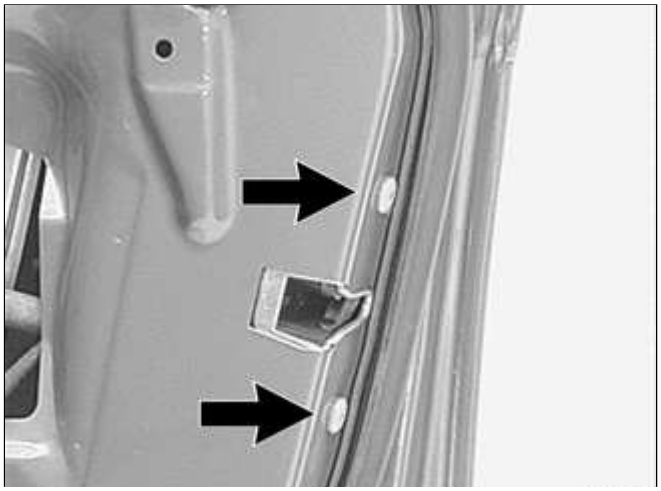
  - Slide rail down, allowing it to hang to the side out of the way.

WARNING!

E46 cars are fitted with side-impact airbags in the front doors. When servicing the door locks 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.

  - Driver's door: Remove door lock cylinder as described later.

  - Models produced from 9/2000: Carefully pry outside door handle Bowden cable off lock assembly.



- Remove lock mounting bolts (**arrows**) from rear edge of door. Support lock to prevent it from falling into bottom of door.

  - Disconnect harness connector from lock assembly.

  - Remove lock assembly, complete with lock-button linkage.

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- Installation is reverse of removal, noting the following:

- Insert lock button up through inner door plate, taking care to avoid bending linkage.

- On models produced to 9/2000: Tilt lock assembly outward while lifting it into position inside the door. This is done to make sure lock lever is inserted between outside door handle pawl and outer door skin.

- Use new door lock mounting bolts.

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

- Secure wire harnesses with wire ties, as applicable.

- Be sure to check unlocking of rotary latch and outside door handle overtravel as described above under ⇒ Rotary latch adjustments.

- Check function of window mechanism before reinstalling vapor barrier and inner door panel.

Tightening torques	
Airbag to door (replace screws)	8.5 Nm (75 in-lb)
Door lock to door M6 bolt (always replace)	9 Nm (80 in-lb)
Window guide to door	9 Nm (80 in-lb)

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Tightening torques	
Window to guide	8 Nm (71 in-lb)

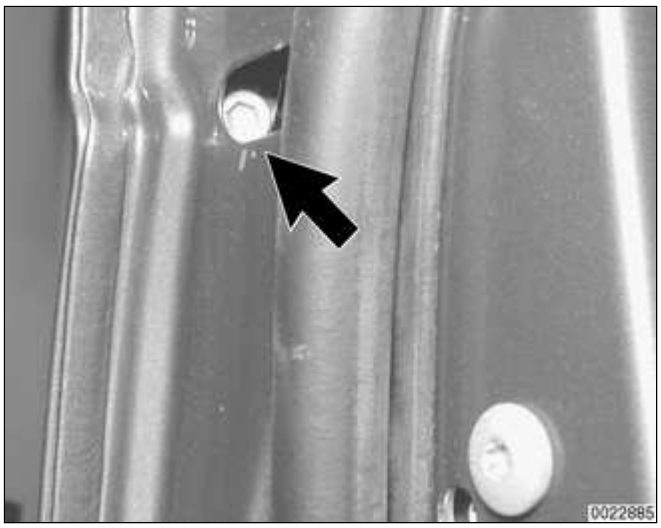
Driver's door lock cylinder, removing and installing

Only the driver's door is equipped with a lock cylinder. The procedure for removing the door handle rear anchor on the other three doors is similar to that for removing the driver's door lock cylinder.

- Open door and remove plastic plug (Sedan or Sport Wagon shown in illustration) or rubber covering (Coupe or Convertible) at lock cylinder mounting bolt access hole in upper rear door edge.

Note:

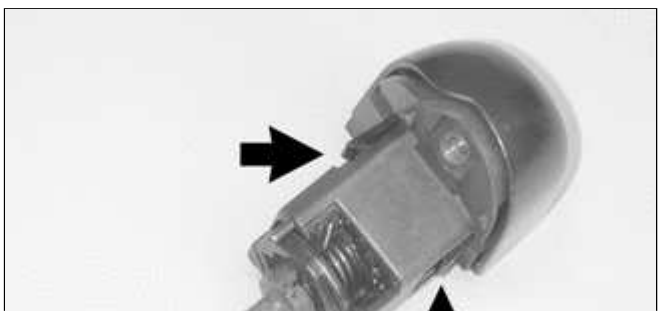
On Sedan or Sport Wagon: Remove inner plug by prying with screwdriver, then peel off outer (oval) plastic trim.



- Remove lock cylinder mounting screw (**arrow**).
  - Pull out lock cylinder.

Note:

Use key in cylinder to help pull cylinder out.



- Use a small screw driver to pry cylinder cover locking tabs (**arrows**). Slide cover off cylinder gently to avoid breaking tabs.
  - Installation is reverse of removal.

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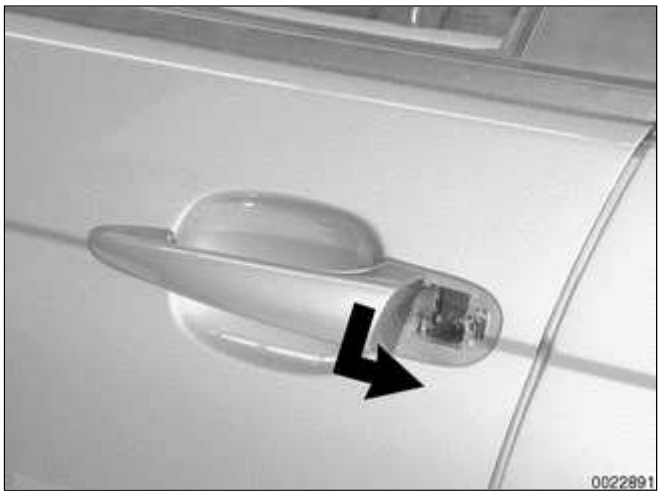
- On Sedan or Sport Wagon: Replace cylinder mounting bolt access hole trim cover if necessary.

Door handle, removing and installing (to production date 9/2000)

- On driver's door: Remove door lock cylinder as described earlier.

- Other doors: Remove door handle rear anchor. Procedure is similar to removing driver's door lock cylinder described earlier.



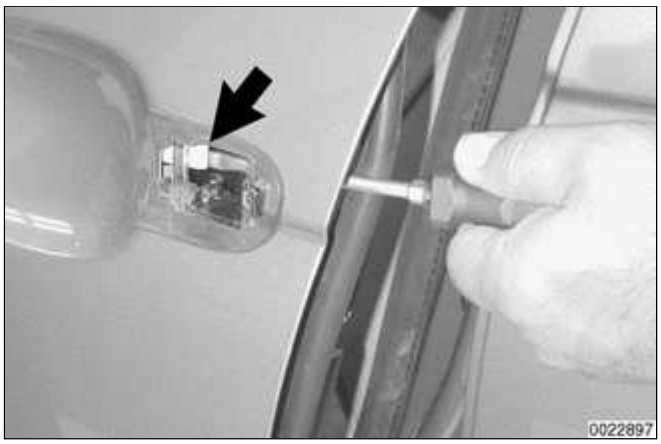
Pull handle out as far as it will go, then backward approx. 2 mm (0.08 in.).

- Push handle in slightly (approx. 4 mm/0.16 in.).

- Remove door handle from door by angling out of door cavity.

Note:

Make sure the lock release pawl at the rear of the handle and the mounting guide at the front of the handle are intact.



Before reinstalling, insert screwdriver through access hole in edge of door to push lock release lever (**arrow**) outward.

- Insert outside handle and snap forward until a click is heard.

- Be sure to check unlocking of rotary latch and outside door handle overtravel as described above under ⇒ Rotary latch adjustments.

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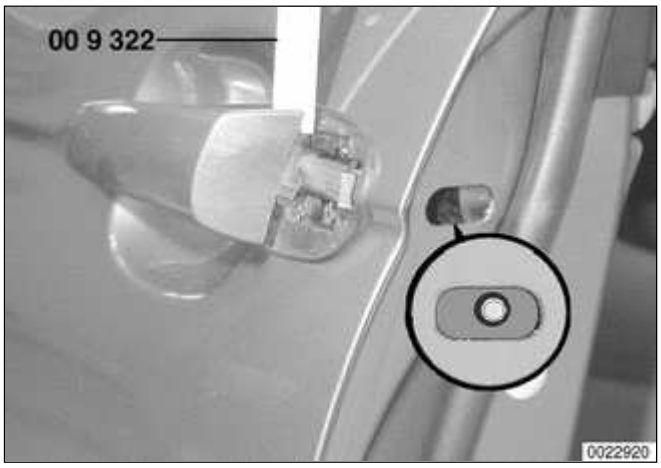
Door handle, removing and installing (from production date 9/2000)

- On driver's door: Remove door lock cylinder as described earlier.

- On other doors: Remove door handle rear anchor. Procedure is similar to removing driver's door lock cylinder described earlier.



➢ Pull outside door handle out and wedge BMW special tool 00 9 322 under handle.

- Working in lock cylinder mounting bolt access hole, tighten down screw (counterclockwise direction). Lock is now in "installation position". Remove special tool 00 9 322.

Tightening torque	
Outside handle to lock (left-hand thread)	2.0 ± 0.4 Nm (18 ± 3.5 lb-in)

- Pull outside door handle outward and unhook from front guide.

Note:

Make sure the lock release bore at the rear of the handle and the mounting guide at the front of the handle are intact.

- Before reinstalling handle, make sure lock mechanism is in "installation position" as described earlier:

♦ Distance between inner door handle lever and outer door skin must not

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exceed measurement **A**.

- If measurement exceeds specification, pull lever outward with fingers until measurement is correct.

Installation distance: inner door handle lever to door	
Measurement **A**	less than 8 mm (0.32 in.)

- Insert handle and snap into place.

Note:

Take care that the door handle base gasket is not deformed when the handle is installed.

- Be sure to check unlocking of rotary latch and outside door handle overtravel as described above under ⇒ Rotary latch adjustments.

Door handle inner mechanism, removing and installing (to production date 9/2000)

- Remove door lock and outside door handle as described earlier.

- Remove front door tim panel, air bag, and vapor barrier as described in ⇒ 411 Doors and ⇒ 721 Airbag System (SRS).

- Remove outside handle base seals.

Loosen inner handle mounting bolt (**arrow**).

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- Working inside door opening, slide inner handle toward front and remove.

- Installation is reverse of removal.

Note:

Inspect mounting bolt and replace if necessary.

Door handle inner mechanism, removing and installing (from production date 9/2000)

- Remove outside door handle as described earlier.

- Remove outside handle base seals.

- Remove front door tim panel, air bag, and vapor barrier as described in ⇒ 411 Doors and ⇒ 721 Airbag System (SRS).

- Lever out Bowden cable from door handle with screwdriver.

- On Sedan or Sport Wagon: Slide Bowden cable out of guide.

Note:

Foam insulation on bowden cable must be placed in original position during reinstallation.

- On Coupe or Convertible: Remove inner door guide (plastic) to gain access to Bowden cable.

Note:

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Take care to not damage inner door guide during removal and installation.

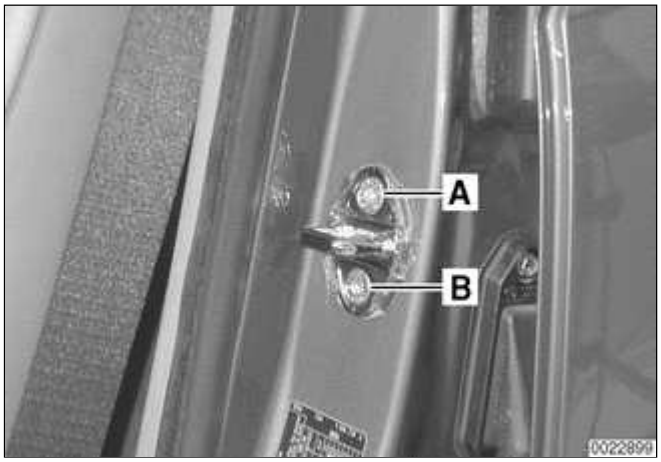
- Loosen handle mounting bolt.
- Working inside door opening, slide inner handle toward front and remove.
- Installation is reverse of removal.

Note:

- *Inspect handle mounting bolt and replace if necessary.*
- *Bowden cable end must be correctly fitted in lock actuator.*

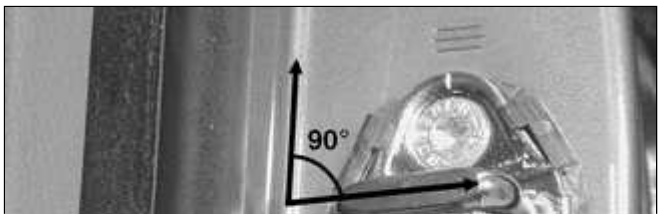
Door striker, replacing

- Remove striker plastic cover.



➢ Remove striker top mounting bolt (**A**).

- Screw M8 stud into top bolt hole to keep striker backing plate from falling down into B-pillar cavity.
- Remove lower bolt (**B**).
- Remove and reinstall striker and gasket while holding on to stud. Install striker mounting bolts finger-tight.



➢ Position striker bar approx. 90° to inside edge of door frame. Leave striker mounting bolts finger-tight.

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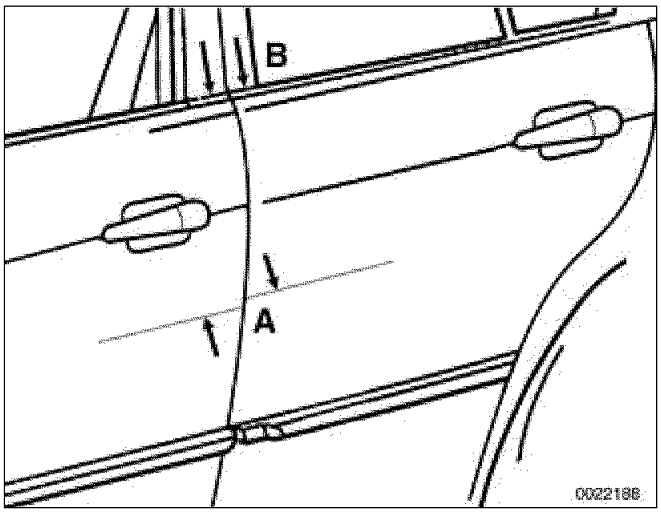

➢ Set position of striker:

- When closed, rear edge of front door must be even with front edge of rear door (Sedan or Sport Wagon) or with rear quarter panel (Coupe or Convertible). Maximum deviation allowed measured at **A**.
- When closed, shoulder of front door must be flush to shoulder of rear door (Sedan or Sport Wagon) or with top of rear quarter panel (Coupe or Convertible). No deviation is allowed at measurement **B**.
- When door is closed, striker must not contact lock housing.
- With door closed, there must be no in/out movement of door.

- Torque striker bolts. Recheck door alignment. Reinstall plastic cover.

Door striker position	
Deviation from parallelism of closed door (**A**)	max. 1 mm (0.04 in.)
Deviation from flush at door shoulder (**B**)	0

Tightening torque	
Striker plate to	24 Nm (18 ft-lb)

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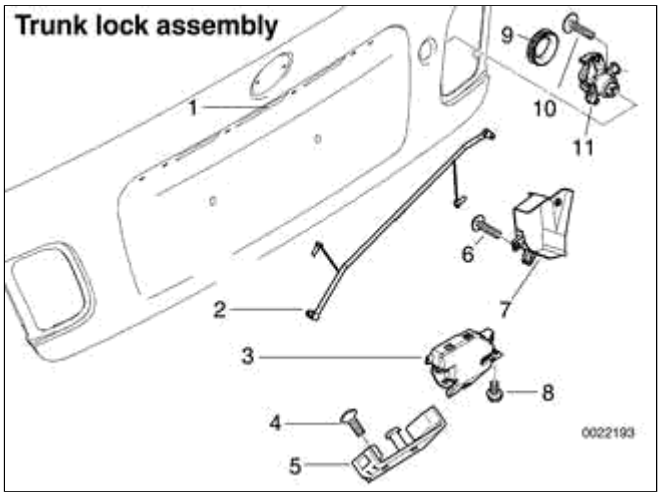
Tightening torque	
body pillar	

Trunk locking mechanism



Trunk lock assembly

1 - Trunk release microswitch

2 - Connecting rod

3 - Lock with microswitch

4 - Torx screw M6

5 - Striker plate

6 - Trim screw

7 - Lock cover

8 - Torx bolt M6

9 - Lock cylinder gasket

10 - Self-threading screw

11 - Lock cylinder

The trunk can be unlocked by using:

- Central locking button
- Left door key
- FZV remote entry system
- Trunk lock cylinder in the trunk lid right side taillight assembly
- Trunk release in the driver's footwell, if equipped
- Microswitch in the center of the

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license plate light strip

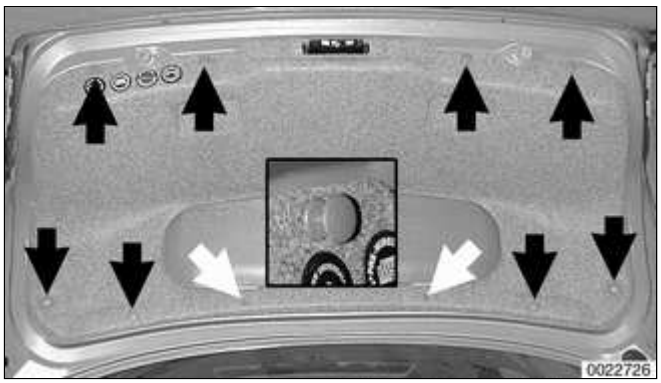
The trunk lock cylinder does not actuate central locking control.

- To remove the trunk lock microswitch:

♦ Remove licence plate light strip.

♦ Separate electrical harness connector from strip.

♦ Separate microswitch from strip.



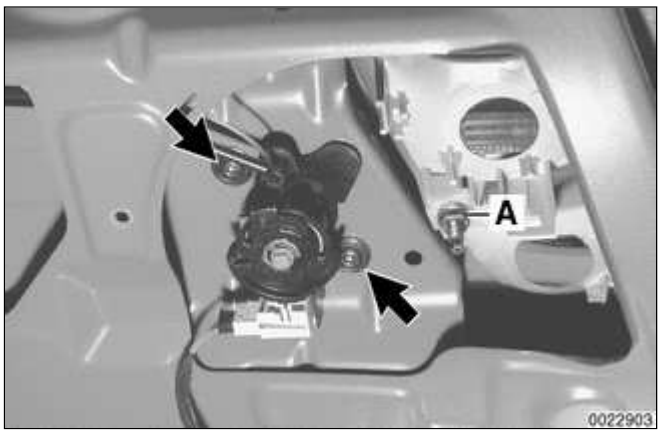
➢ To access trunk lock cylinder or lock:

♦ 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**). and remove trunk liner. Expansion rivets are released by pry upper portion out (**inset**).

♦ Lift off trim panel.



➢ To remove trunk lock cylinder:

♦ Remove right taillight socket from trunk lid. See ⇒ 630 Lights.

♦ Remove right tail lens mounting nut (**A**) and detach tail lens from trunk lid.

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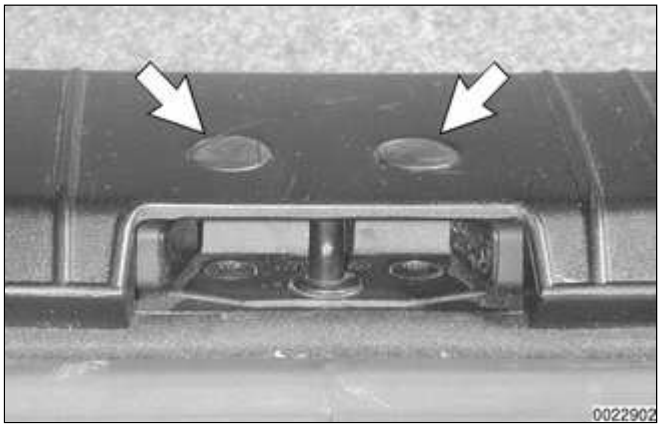
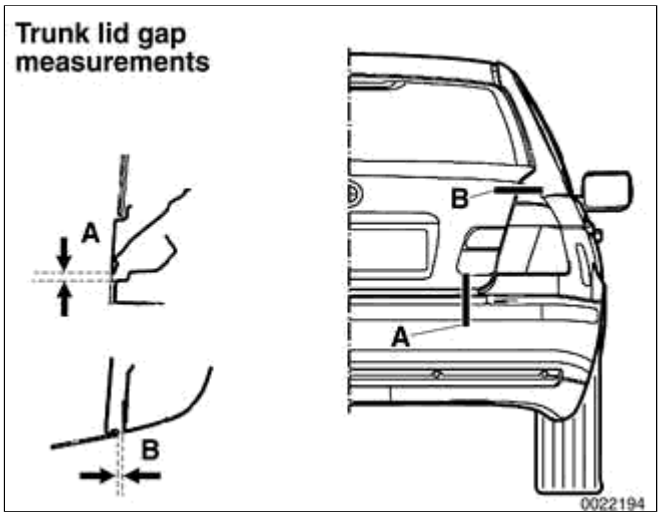
- Remove lock cylinder cover mounting screws (**arrows**). Slide cover to right to remove.

Note:

- *On Convertible models: Remove third brake light to access trunk lock mechanism.*
- *Use new self-tapping screws to reinstall trunk lock cylinder.*



➢ Pry out rear trunk edge trim caps (**arrows**) to access mounting screws to remove trunk lock striker.



➢ When reinstalling, or to adjust trunk lid alignment, adjust position of trunk lock striker with mounting bolts finger tight.

- Set gap measurements as listed below.
- Check trunk lid lock operation with lid open.
- Also see ⇒ 412 Trunk Lid, Tailgate.

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.)

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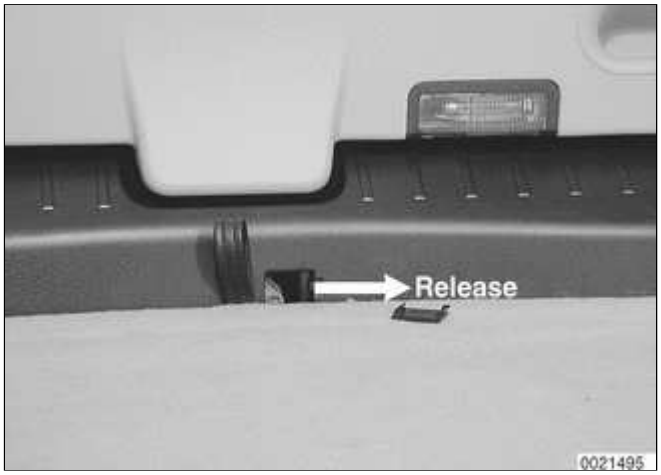
Note:

Do not lubricate lock or lock striker with grease.

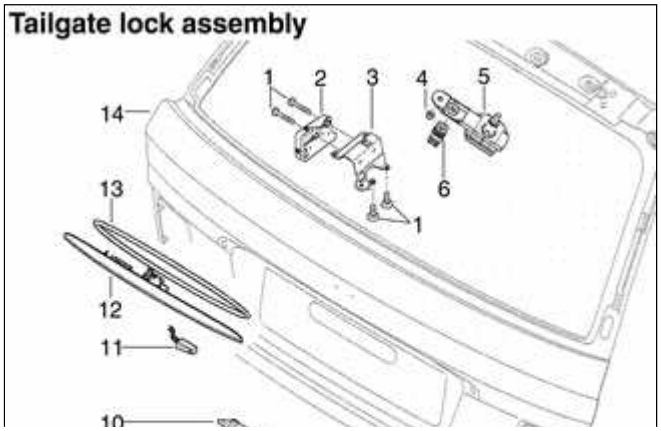
Tailgate lock, emergency release

The Sport Wagon tailgate can be unlocked using the central locking switch, the left door key or the FZV remote entry system. The tailgate can be opened by pushing the tailgate release button in the left front kickpanel or by pressing the microswitch in the center of the license plate light strip. There is no key lock cylinder in the tailgate.



- In case of electrical failure, there is an emergency tailgate lock release. The release is located in the rear cargo area, along the lower edge of the rear apron behind a small access cover. Remove access cover and push release in direction of arrow to open tailgate.

Tailgate and rear window locking mechanism



- Tailgate lock assembly
  - 1 - Torx bolt M6
  - 2 - Rear window lock
  - 3 - Rear window lock cover
  - 4 - Nut M6
  - 5 - Rear window striker mounting bracket and wiper pivot

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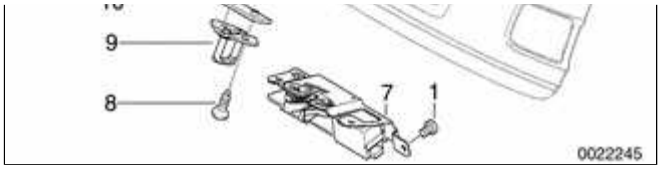


6 - Rear window lock striker

7 - Tailgate lock

8 - Torx bolt M8

9 - Tailgate lock striker

10 - Lock plate

11 - Tailgate release microswitch

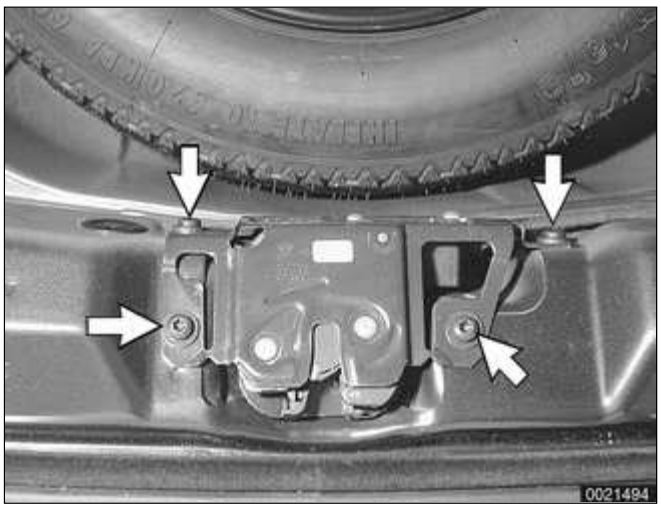
12 - Tailgate grip

13 - Tailgate grip gasket

14 - Tailgate

To remove tailgate lock microswitch:

- Remove license plate light strip.
- Separate electrical harness connector from strip.
- Separate microswitch from strip.



To remove tailgate lock:

- Open tailgate and remove tailgate rear panel trim.
- Mark position of lock on rear panel.
- Remove lock mounting bolts (**arrows**).
- Detach lock mechanism electrical harness contractor.
- Electric lock actuator and emergency release lever can now be separated from tailgate lock mechanism.

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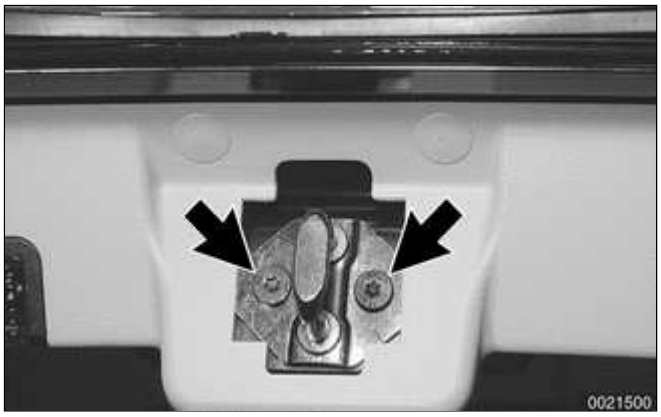


To remove tailgate lock striker:

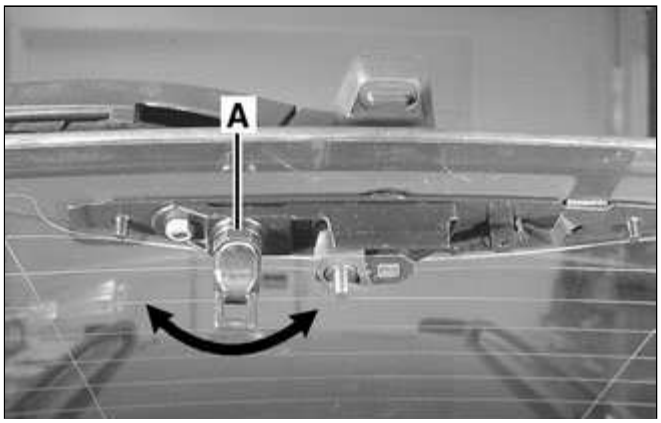
- Open tailgate and pry out lock striker trim from bottom of tailgate.
- Remove one striker mounting screw (**arrows**).
- Thread in M8 stud to keep striker lock plate from falling inside door.
- Remove second screw and striker.
- Reinstall striker bolts finger tight. Adjust striker position before tightening bolts.

- To adjust striker position:

- Close tailgate slowly, allowing striker to center itself on lock.
- Striker must not touch lock housing.
- Tighten striker mounting bolts, then check tailgate to body gaps as shown below.

Note:

Do not lubricate lock or lock striker with grease.



To remove rear window lock striker:

- Adjust striker height by loosening lock nut **A**, then turning striker in or out.
- Retighten lock nut.

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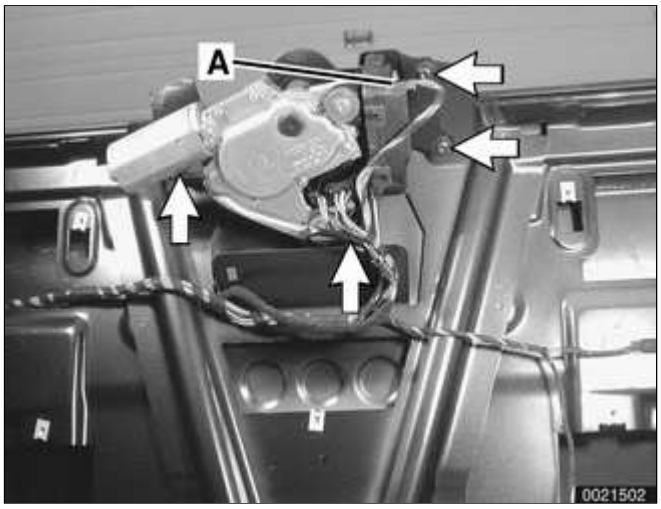
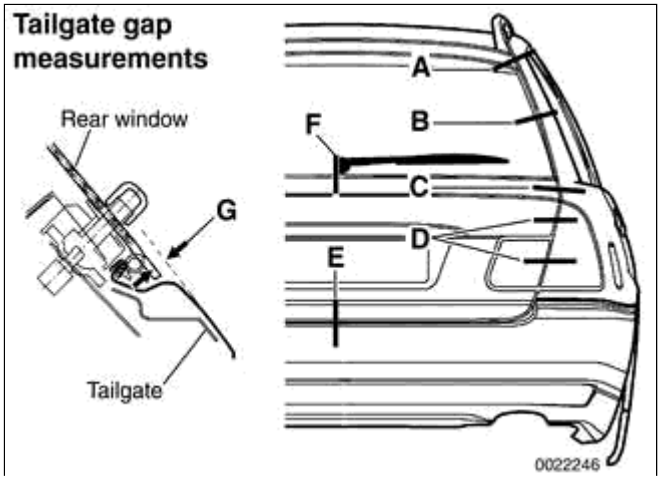


➢ To remove rear window lock:

- Open tailgate. Remove tailgate trim panel.
- Detach window lock electrical harness connector (**A**).
- Remove lock mounting screws (**arrows**).
- Slide lock out from under rear window wiper motor.
- Reinstall lock mounting bolts finger tight. Adjust lock position before tightening bolts.

- To adjust lock position:

- Close window slowly, allowing lock to center itself on striker.
- Tighten striker mounting bolts, then check rear window to body gaps as shown below.
- Tighten lock mounting bolts.



➢ When reinstalling, or to adjust tailgate or rear window alignment, adjust position of tailgate striker or window lock with mounting bolts finger tight.

- Set gap measurements as listed below.
- Also see ⇒ 412 Trunk Lid, Tailgate.

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Tailgate and rear window position gap adjustment	
Rear spoiler / side panel (**A**)	3.75 ± 1.3 mm (0.15 ± 0.05 in.)
Rear window / side panel (**B**)	3.5 ± 1.4 mm (0.14 ± 0.06 in.)
Tailgate / side panel (**C**)	3.6 mm ± 0.75 mm (0.14 ± 0.03 in.)
Tailgate / side panel (height)	flush to 2 mm (0.08 in.) lower
Tailgate light / corner light (**D**)	4.25 ± 0.75 mm (0.17 ± 0.03 in.)
Tailgate / rear bumper (**E**)	5 ± 1 mm (0.2 ± 0.04 in.)
Rear window / tailgate (**F**)	4 ± 1 mm (0.16 ± 0.04 in.)
Rear window / tailgate (**G**)	5.4 ± 1 mm (0.21 ± 0.04 in.)

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Electronic Immobilization (EWS)

E46 cars are equipped with a passive theft-prevention system. The Electronic Immobilization System (EWS 3.3) makes it impossible to start the engine using any means other than the special keys furnished with the vehicle.

Note:

- *EWS is sometimes also referred to as Driveaway Protection.*
- *If a vehicle key is lost or stolen, the electronic authorization for that key can be cancelled using the BMW scan and diagnostic tools DIS or MoDiC.*
- *Force applied to a key can damage the electronic circuitry. A damaged key will not start the engine.*

In the EWS system, the ignition key is embedded with a computer chip and permanently coded. The key communicates with the vehicle using a transponder in the key and a ring antenna surrounding the steering lock cylinder.

A primary code is programmed into the key and into the vehicle itself. A secondary code is changed every time the vehicle is started. If the key code and EWS control module code do not match, the engine management control module and the starter are disabled. EWS ignition keys cannot be duplicated.

The system is designed to have up to

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ten keys. Only an authorized BMW dealer can provide replacement keys.

Note:

- *It is possible to damage the electronic circuitry in the key, rendering it unusable. In that case, a new key should be purchased and initialized by an authorized BMW dealer.*

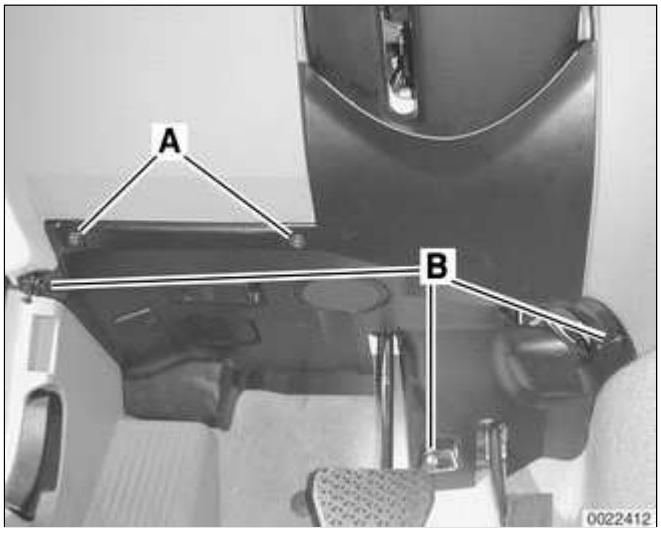
- *Starting with 2000 models, the battery in the FZV ignition key is recharged while the key is in the ignition switch. Therefore there is no need to replace the key battery.*

EWS control module, replacing

- Disconnect negative (-) cable from battery.

CAUTION!

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



➢ Lower left footwell (pedal cluster) trim panel.

- Remove screws (**A**).

- Remove fasteners (**B**).

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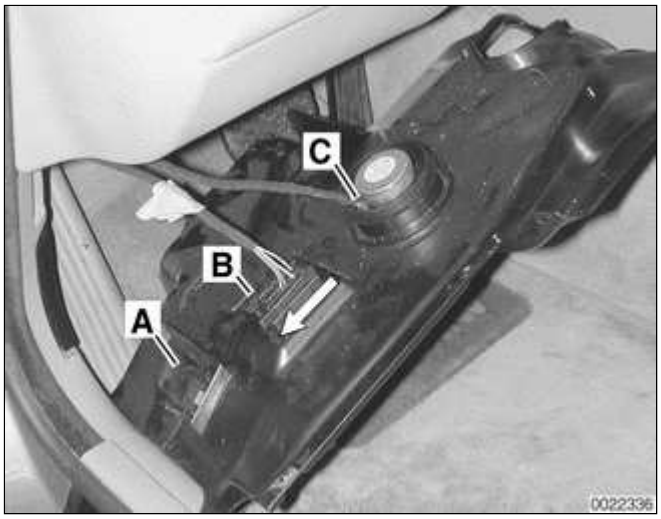

- Disconnect electrical harness connectors at left footwell trim panel and remove panel:
  - Unplug connector at footwell interior light (**A**), if equipped.
  - Slide lock at OBD II connector (**B**) in direction of **arrow**.
  - Unplug connector at speaker if equipped (**C**).

- Remove EWS control module harness connector (**arrow**).
  - Remove module mounting screws. Remove module.

Note:

The EWS module should be identified with EWS markings.

- Installation is reverse of removal.

Ring antenna

To remove the ring antenna using BMW special tool 61 3 300, it is necessary to remove the upper and lower steering column trim. Alternatively, remove the ignition switch key cylinder.

- With ignition key in "ON" position (60° from "LOCKED"), insert a thin piece of stiff wire into opening (**arrow**) in lock cylinder and pull lock cylinder out.
  - Detach ring antenna harness connector.

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- Gently work ring antenna off key cylinder.

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Anti-Theft Alarm (DWA)

The DWA anti-theft system is a dealer installed accessory option. All E46 vehicles are factory prepared to provide the DWA function. This means that the vehicle is prewired and the General Module (GM V) is preprogrammed for the system. However, once the DWA system components are installed the GM V must be coded, using the DIS or MoDiC, to recognize the installed components and carry out DWA functions.

The GM V utilizes existing components and/or circuits as part of the DWA system:

- Door lock hall effect sensor contacts
- Trunk lid switch contact
- Trunk lock key position switch
- Hood switch
- DWA status (LED)

The DWA accessory kit includes the following:

- Tilt sensor in right trunk area
- UIS (interior monitoring sensor) in center of headliner
- Siren in cowl area next to IHKA housing

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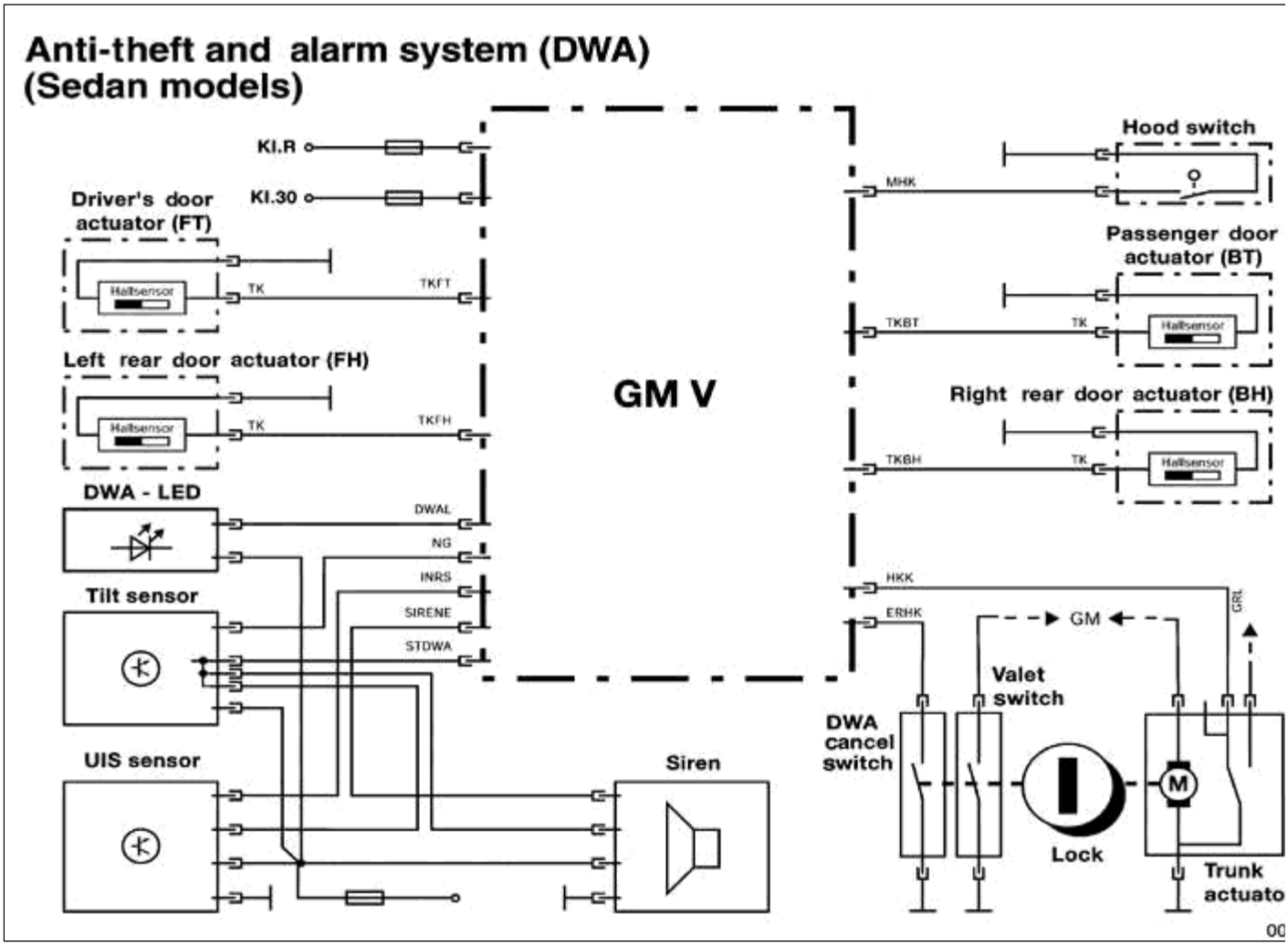
Anti-theft and alarm system (DWA) (Sedan models)



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DWA alarm arming/disarming

The DWA alarm is armed every time the vehicle is locked from the outside with the door lock cylinder or FZV key.

The LED in the rear view mirror flashes as an acknowledgment, along with flashing exterior lights and a momentary chirp from the siren.

The GM V monitors all required input signals for CLOSED status (door closed, trunk closed, etc.) The inputs must be in CLOSED status for a minimum of 3 seconds for the GM V to include them as

an activation component. If after 3 seconds any input signal not in CLOSED status is excluded (this is acknowledged by the DWA LED) preventing false alarm activation.

If the DWA is armed a second time within 10 seconds, the tilt sensor and interior protection sensor are also excluded as alarm activation components. This function is useful for preventing false alarm activation if the vehicle is transported on a train or flat bed truck.

While armed the trunk can be opened without the alarm being triggered as follows:

- If opened with the trunk remote button via the FZV, the GM V prevents the alarm from activating. (This feature is customizable under the Car Memory function.)

- If opened with the key at the trunk lock cylinder, the trunk key position switch signals the GM V and in the same manner prevents the alarm from activating.

- In either case, when the trunk is returned to the CLOSED position, it will no longer activate the alarm.

Alarm operation

When the alarm is triggered, the siren will sound for 30 seconds. At the same time the headlight low beams and hazard lights will flash for 5 minutes. The GM V signals the Light Center Switch (LSZ) via the K-bus to flash the lights. Following an alarm trigger, the system will reset and trigger again if further tampering is done to the vehicle.

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Door contacts

The door lock Hall effect sensors provide status of door OPEN/CLOSED:

- When the door latch is CLOSED, current flow through the sensor is <5 mA.
- When the door is OPEN, current flow through the sensor is >12 mA.

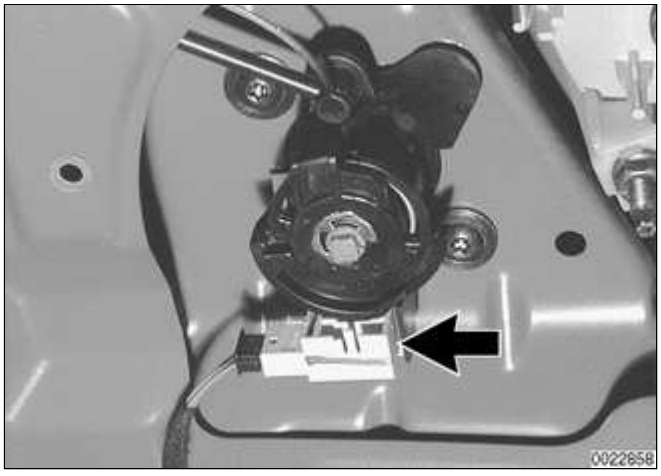
With the DWA armed, the GM V will activate the siren if it receives a door OPEN signal.

Trunk lid switch contact

The trunk switch contact is located in the trunk lock assembly. When closed, the trunk contact provides a ground signal to the GM V signifying a CLOSED trunk.

With the DWA armed, the GM V will activate the siren if it receives a trunk OPEN signal.

Trunk lock key position switches



There are two switches mounted in one block (**arrow**) on the trunk lock cylinder:

- Valet position switch. With the key lock in the valet position, this switch provides a ground signal to the GM V. The GM V locks out the interior trunk release button preventing the trunk from being opened.
- DWA deactivation switch. When the trunk is opened mechanically with

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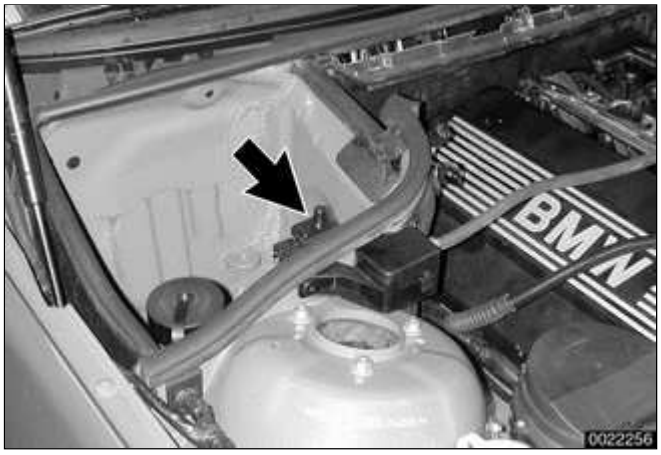
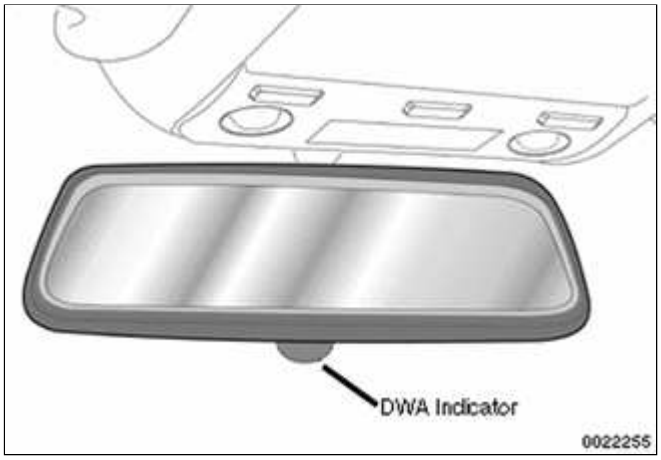
the key, this switch provides a ground signal to the GM V preventing the DWA from activating if armed.

Hood contact switch



- Located on the right side engine compartment, the hood contact switch (**arrow**) provides a ground signal to the GM V signifying an open hood. The plunger of this switch can be pulled up past a detent causing the switch contact to open. This feature can be used to simulate a CLOSED hood with the hood open when diagnosing the DWA system.

DWA LED



- The DWA indicator is located in the rear view mirror. All E46 vehicles are equipped with the LED. It is not part of the retailer installed accessory DWA system.

The LED is provided with constant battery voltage (KL 30). The GM V provides a switched ground signal providing the various blinking signals used to convey DWA status to the vehicle operator. DWA LED status is summarized in ⇒ Table a.

Table a. DWA LED status

DWA status	DWA LED condition
Disarmed	OFF
Armed	Continual slow flash

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Table a. DWA LED status	
DWA status	**DWA LED condition**
Armed with one or more monitored inputs not in CLOSED position (trunk not closed, etc.)	Rapid flash for 10 seconds, then continual slow flash
Alarm activated	Rapid flash for 5 minutes, then continual slow flash
Rearmed in less than 10 seconds	ON for 1 second
Disarmed after activated alarm	Rapid flash for 10 seconds, then OFF

Tilt sensor

Located in the right trunk area above the battery, the solid state tilt sensor monitors the vehicle parked angle when DWA is armed. The sensor requires three signal wires to perform its function:

- KL 30. Constant battery voltage
- STDWA signal. Switched ground input signal provided by the GM V indicating DWA armed/disarmed status. The tilt sensor is used as a splice location for the STDWA signal to the siren and interior protection sensor.
- NG signal. Switched ground output signal provided to the GM V. This signal is used for two purposes: a. As a momentary acknowledgment that the tilt sensor received STDWA

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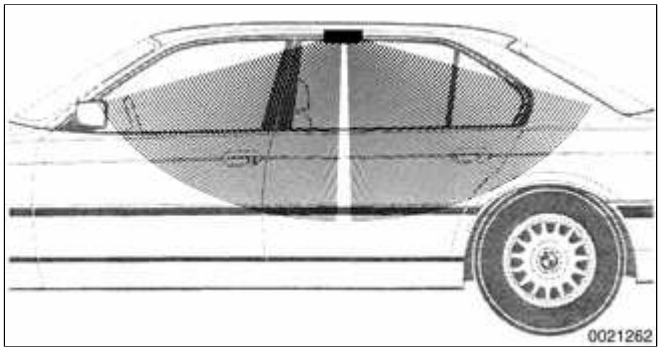
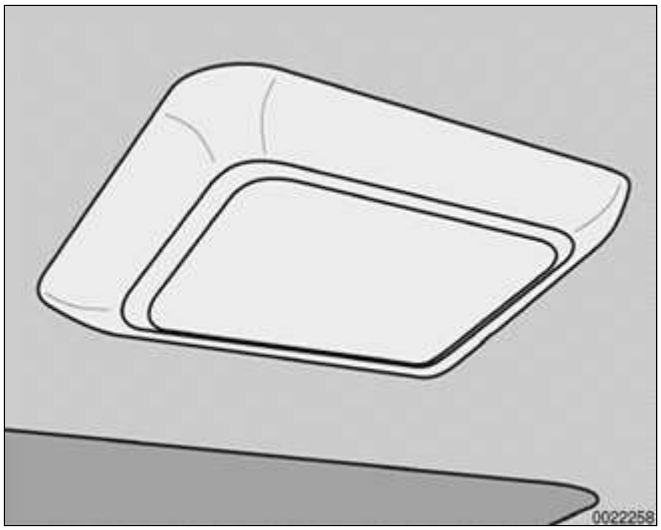
and is currently monitoring the vehicle angle. b. If the tilt sensor detects a change in the vehicle angle when DWA is armed, the NG signal is switched to inform the GM V to activate the siren.

When the tilt sensor receives the STDWA signal from the GM V, the angle of the vehicle is memorized and monitored by the solid state electronics. Once armed, if the angle changes, the tilt sensor provides a switched ground signal to the GM V to activate DWA.

Interior protection (UIS)



- The combined ultrasonic transmitter and receiver in UIS monitors the vehicle interior for motion.



- The UIS is mounted in the center of the headliner panel even with the door (B) pillar. Due to the design of the vehicles interior, the sensor is unidirectional and must be installed in the proper direction to ensure proper operation of the system (trim cover ensures directional installation).

Every time the DWA system is armed (STDWA signal), the sensor adapts to whatever objects are stationary in the interior. The sensor emits ultrasonic waves in a programmed timed cycle. It receives echoes of the emitted signals. The UIS amplifies the received sound wave signals and compares them with the transmitted waves. The UIS also checks the incoming echoes for background hiss (wind noise through a

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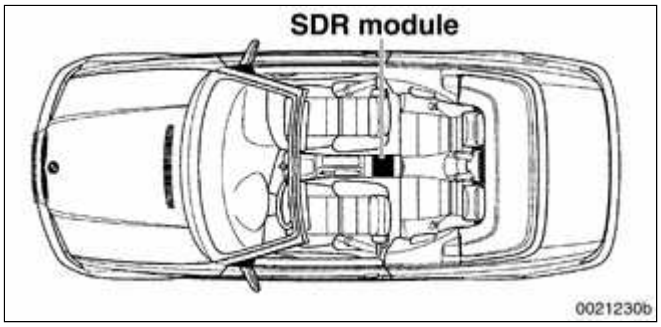
partially open window) and adapts for this.

If the echoes are consistently similar, no movement is detected. If the echoes are altered or inconsistent, the UIS changes to a constant cycle and the echo is compared again. If the inconsistency is still present the UIS sends the activate siren signal (INRS) to the GM V.

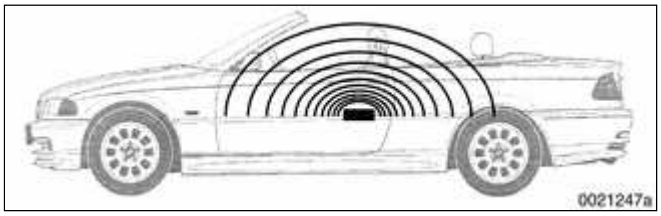
As with the tilt sensor, the UIS is also switched OFF when the vehicle is locked two times within ten seconds. This allows the sensor to be switched OFF for transportation purposes.

Convertible interior protection (SDR)



- In Convertible models, the interior motion detector for the alarm system is a short distance radar (SDR) detector located on the center tunnel, under the center console next to the parking brake handle. The central position allows the most effective monitoring of the vehicle interior.

The SDR detector consists of two printed circuit boards, one being the transmitter/receiver and the other the processing electronics. The module housing is highly conductive material for high frequency transmission.



- The SDR sensor transmits an electromagnetic field in a hemispherical pattern within the vehicle interior. The monitoring radius is preset in the module. The receiving antenna monitors reflected signals from the interior. The module evaluates these signals as a base line for vehicle security. Any objects that come into this monitoring radius will be detected and evaluated by the SDR module.

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The module operates in pulse mode. The radar unit transmits a signal, then pauses for the reflected signals to be received by the module.

The detection range of the radar is adjusted by rapid switching when the system is armed. This allows the sensor to adjust its range to either the windshield with the top lowered or to the soft top when it is raised.

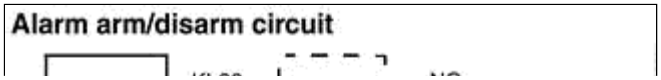
The module will signal the GM V to trigger the alarm if a new object is detected within its sensing hemisphere. However, false alarms may be triggered by objects falling into the interior when the system is armed with the top lowered. Also, large metal objects, such as the seat backrests, will shield the microwave pulse and create a sensor "shadow" effect in the interior.

As with the tilt sensor and the UIS, the SDR sensor can be switched OFF by activating the central locking system twice within 10 seconds.

Alarm siren

The DWA siren is installed in the right rear engine compartment. This location provides a secure position with loud acoustic output.

The siren contains electronic circuitry for producing the warning tone when the alarm is triggered. The siren also contains a rechargeable battery that is used to power the siren when the alarm is triggered. The rechargeable battery will allow the siren to sound if it or the vehicle battery is disconnected. The siren battery is recharged from the vehicle battery when DWA is not in the armed state.



The siren has four wires connecting it to

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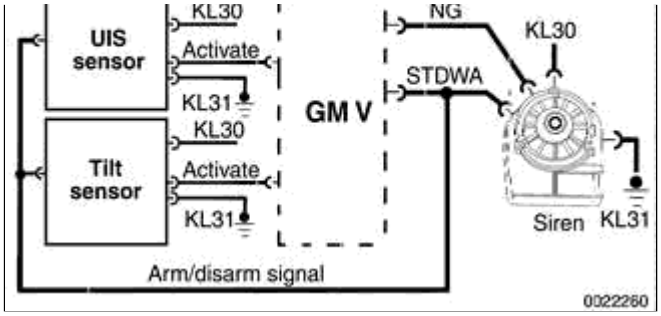

the alarm system:

- KL 30 (power)
- KL 31 (ground)
- STDWA signal (arm/disarm signal from GM V)
- NG signal (activate siren output signal to the GM V)

The arm/disarm output signal from the GM V (STDWA) is provided to the tilt sensor, UIS sensor and the siren simultaneously. The arm/disarm signal is a switched ground that signals the components of DWA armed/disarmed status.

The activate the siren, the NG signal is high whether DWA is armed or disarmed. If a monitored input activates the alarm, the high signal to the siren is switched to a 50% duty cycle at the GM V. The control circuitry in the siren activates the siren. If the DWA is armed and the battery is disconnected, the siren circuitry recognizes the normally high NG signal as suddenly going low. In this case the siren is also activated.

Panic mode operation

When the trunk button on an FZV key is pressed and held, the GM V activates the siren for the panic mode. The panic mode is functional with either an armed or disarmed DWA system.

Emergency disarming

Emergency disarming occurs automatically if a key is used to turn the ignition switch ON and EWS accepts it.

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The EWS signals the GM V to unlock the doors and to deactivate the DWA.

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