

540 Sunroof

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GENERAL

This repair group covers the slide-tilt sunroof assembly. There are two types of sunroofs available; one-piece standard sunroof and two-piece panorama sunroof. Service procedures are different for each type.

Replacement of the cable assembly or frame require that the headliner be removed. Removal and repair of the sunroof assembly and other components inside the roof cavity is beyond the scope of this manual.

Functional overview

Vent position: When the sunroof is set to the vent position (rear of panel up), the inside headliner panel automatically moves rearward. This provides cabin ventilation with less wind noise.

Anti-trap: This feature uses a Hall sensor to detect obstructions while the sunroof is closing in the automatic close function. The anti-trap feature is shut down prior to full closing (4 mm from full closed) to allow the sunroof to seat into the seal.

CAUTION—

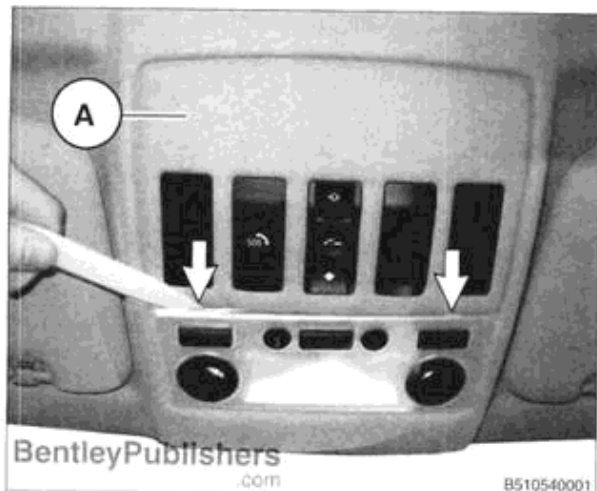
- The anti-trap feature is not functional when the switch is held in the manual close position.

Unloading: The sunroof is deactivated during engine start. This function is to provide maximum starting power to the engine starter motor. The sunroof control module receives the consumer cut off signal via K-CAN.

A **water channel** is incorporated into the sunroof assembly. It automatically rises when the sunroof panel is in the vent position and prevents water from entering the interior during braking.

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Sunroof, emergency closing



Sunroof, emergency closing

Standard sunroof shown in illustrations.

- Using a plastic prying tool, carefully pry interior light out of headliner at **arrows**, disconnect electrical connectors and remove.
- Using a plastic prying tool, carefully pry switch panel (**A**) out of headliner, disconnect electrical connectors and remove.



- Insert 4 mm Allen into drive in sunroof motor (**arrow**). Turn Allen to manually close sunroof.

Sunroof, emergency operation mode

When an electrical fault is detected the sunroof operates in emergency operation mode, moving for 750 milliseconds at a time. Emergency function is available when CAS sends an emergency mode enabled signal via K-CAN to sunroof control module.

SUNROOF ADJUSTMENTS

Sunroof, initializing

Initialization allows the sunroof control module to learn the end positions of the motor travel. Hall sensors send motor rotation pulses to the control module, which counts the pulses to determine panel position.

The sunroof initialization process consists of two steps:

- Normalization
 - Setting characteristic curve
- Initialize sunroof in the following situations:
- Malfunctions such as lack of one-touch function, lack of comfort opening / closing or lack of safety (anti-trapping) features.
 - If sunroof motor is removed and reinstalled.
 - If power supply to the sunroof is interrupted.
 - If repairs have been performed on the slide / tilt mechanism.

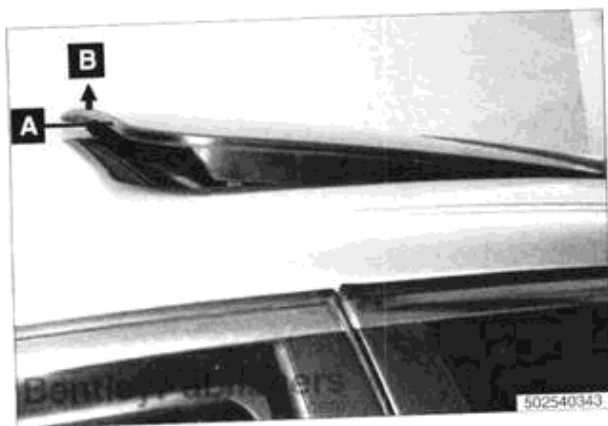
WARNING—

- There is no anti-trapping protection during initialization.

Sunroof normalization

During normalization the mechanical end positions of sunroof movement are detected and stored by the control module.

- Press and hold sunroof switch in raised (vent) position.
- After reaching end position (A), keep switch pressed for approximately 20 seconds longer.
- Normalization is complete when sunroof in raised position (A) moves briefly up (B).
- Release sunroof switch.



Setting characteristic curve

- Models with standard sunroof: Characteristic curve is learned manually in the following steps:
- Release switch within 5 seconds of normalization completion.
 - Press and hold switch in sunroof in raised (vent) position until sunroof has returned to closed position after a complete opening operation.
 - Characteristic curve learning is complete. Release sunroof switch.

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Sunroof, adjusting

- Models with panorama sunroof: Characteristic curve is learned manually in the following steps:
 - After completion of normalization process, press and hold switch in raised (vent) position. Hold during procedure described below.
 - The panorama glass roof stops for 5 seconds in the final raised position after normalization.
 - Sunroof headliner panel closes completely and then open completely.
 - The panorama glass then moves into closed position.
 - The panorama glass will then moves to open position and immediately back to the closed position.
 - Sunroof headliner panel closes completely.
 - Characteristic curve learning is complete. Release sunroof switch.
- All models: Check sunroof operation, including anti-trap protection.

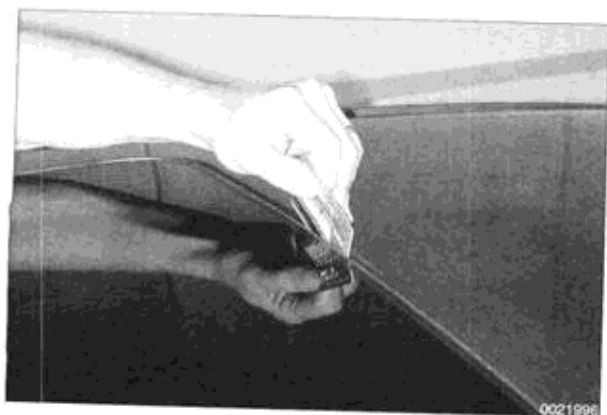
Sunroof, adjusting

The sunroof is controlled by a set of cables that move the sunroof panel along guide rails when the motor is operated. The sunroof can be adjusted without removing it from the car.

NOTE—

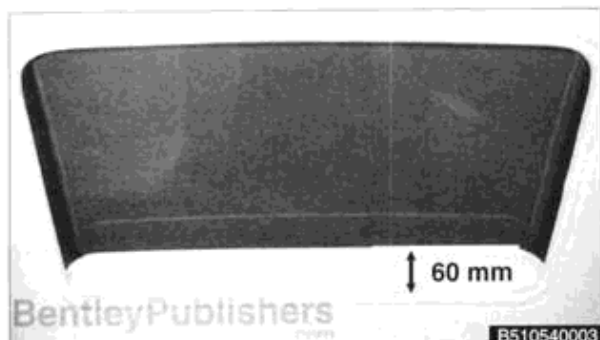
- Be sure to check drains in front corners of sunroof carrier if water is entering car through headliner.

- Adjust sunroof panel under the following circumstances:
 - Sunroof misaligned with roof.
 - Sunroof does not close squarely.
 - Wind noise at high speeds (sunroof closed).
 - Sunroof has been removed and installed.
 - For correct sunroof alignment:
 - Sunroof must be fully closed.
 - Gap must be even all around edges of sunroof.
 - Front of sunroof must be flush to 1 mm (0.04 in) below surface of roof.
 - Rear of sunroof must be flush to 1 mm (0.04 in) above surface of roof.
- ◀ Use credit card to measure gap. Card should insert through gap with equal resistance all around perimeter.

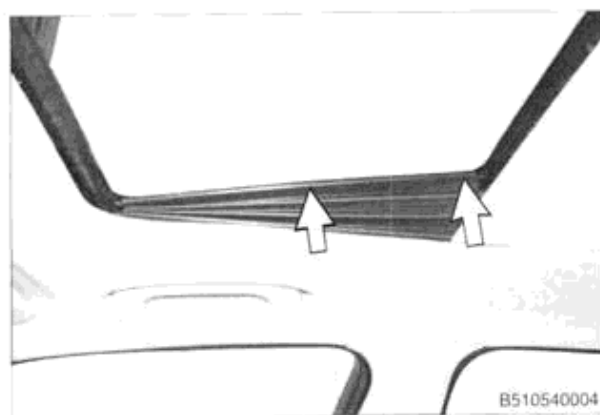


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Standard sunroof



- Slide sunroof headliner panel back into roof cavity until approx. 60 mm (2.36 in) is exposed.



- Raise glass sunroof panel to vent position to expose pleated rubber panel (**arrow**).

- Starting at rear section of pleated rubber panel, carefully pull pleated rubber panel off slotted mount on sunroof glass panel. Unclip pleated rubber panel at front and slide forward to remove.

CAUTION—

- The pleated rubber panels tear easily.



- Sunroof panel is retained by three fasteners (**arrows**) on each side. To adjust sunroof height:

- Loosen fasteners until sunroof can be moved.
- Push sunroof panel up or down until correct height is achieved.
- Reinstall sunroof pleated rubber panels.

Sunroof height adjustment specifications

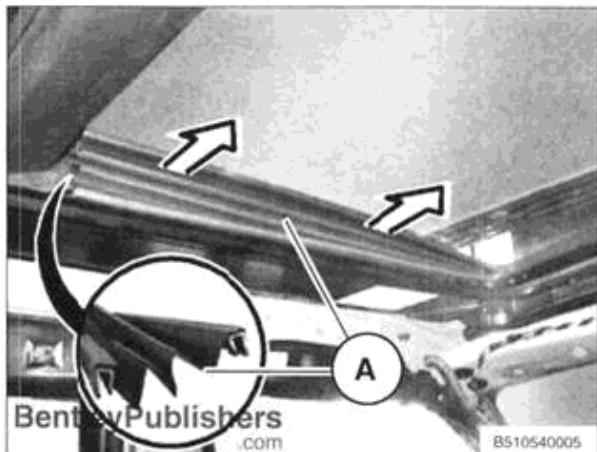
Rear	Flush / 1 mm (0.04 in) higher than roof top
Front	Flush / 1 mm (0.04 in) lower than roof top

Tightening torque

Glass panel to sunroof frame	4 Nm (35 in-lb)
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Sunroof, adjusting

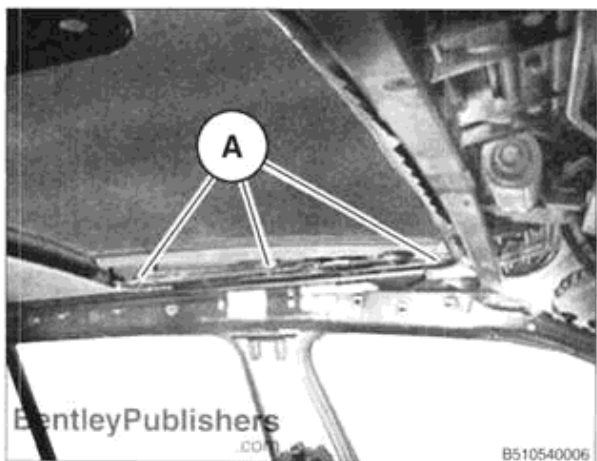


Panorama sunroof

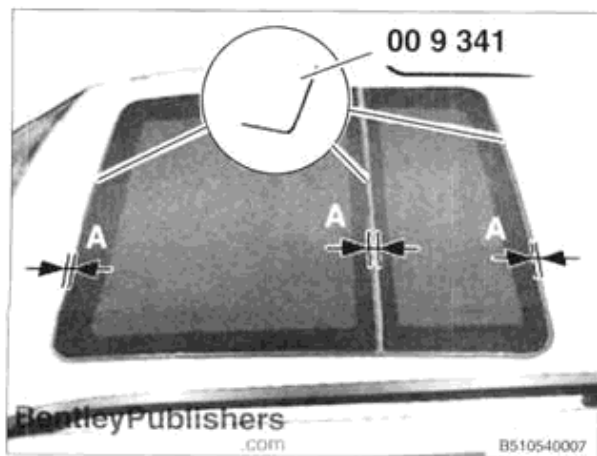
- Close glass sunroof panel to expose rubber pleated panel.

➤ Grasp and remove pleated rubber panel from guide in directions of arrows.

Pleated rubber panels cannot be removed without damaging them. Replace with new every time removed.



➤ Loosen mounting fasteners (A) on left and right sides until sunroof can be moved.



➤ Adjust panorama sunroof glass panels for consistent front and rear gaps (A).

- Special tool 00 9 341 is used to check gap spacing.
- A = 5.8 ± 0.3 mm (0.23 ± 0.012 in)

- Tighten mounting screws for glass panels.

Tightening torque

Glass panel to sunroof frame (replace fasteners)	4 Nm (35 in-lb)
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- Install new rubber pleated rubber panels.

SUNROOF MOTOR

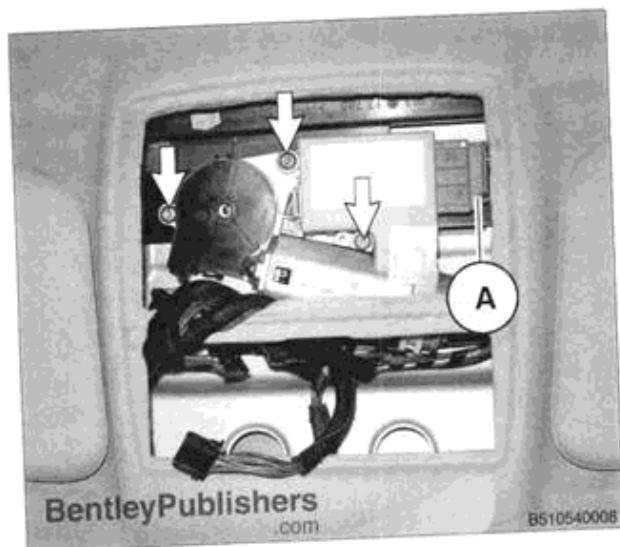
Sunroof motor, replacing

The procedure shown below applies to models with standard sunroof. It also applies to the front sunroof motor for models with panorama sunroof.



Using a plastic prying tool, carefully pry interior light out of headliner at **arrows**, disconnect electrical connectors and remove.

Using a plastic prying tool, carefully pry switch panel (**A**) out of headliner, disconnect electrical connectors and remove.



Remove sunroof motor mounting fasteners (**arrows**) and disconnect electrical connector (**A**). Remove motor.

Installation is reverse of removal.

- Be sure to properly engage sunroof motor drive gear sprocket into sunroof drive gear.
- Perform coding and programming if motor was replaced. See **600 Electrical System General**.
- Perform initialization procedure. See **Sunroof, initializing** in this repair group.

Tightening torque

Sunroof motor to sunroof carrier	3.5 Nm (30 in-lb)
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