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Audi Technical Updates, ATU

June, 2013

Important Reminder

This information is supplemental only.

- There may be information in this presentation that is not necessarily relevant to the North American market.
- Always refer to ELSA for the latest repair information
- Check for any Knowledge Articles in A.U.D.I. Search
- Check for any open campaigns or RVU's
- Check for the latest TSB's
- Always check ETKA for the correct part numbers

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Audi Technical Updates
Contents

- Electrical
  - Infotainment update
  - Audi side assist (lane change assistant) update
  - Battery testing as part of delivery inspection
  - Bus monitoring and DTC diagnosis

- Powertrain
  - Mixing coolant types
  - Checking oil level, dry-sump lubrication

- Body
  - Cabriolet-specific issues
  - Analyzing squeaking windows on frameless doors (A5/A7)

- Chassis
  - Audi braking guard

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Infotainment update

Contents: Infotainment update
General

No.	Event	Topic	Type/model
1		Locking/unlocking the CD/DVD drive	All
2		Supported functions for new Apple devices	All
3		MIB "Screenshot" function	A3 (8V)

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Infotainment update
Locking/unlocking the CD/DVD drive

For these systems, the navigation database is **stored on the hard drive and the CD/DVD drive is enabled**

Complaint: A CD/DVD cannot be ejected

Cause: When transport mode is deactivated, the CD/DVD drive is inadvertently locked

Measure: Check whether the drive is locked and if so, unlock the drive using the test program entitled "Eject Button, lock/unlock" in Guided Functions.

➔ The values in the table below corresponds to "drive unlocked".

Note: Optimization in the ODIS program with brand CD 19.49
➔ The "locking/unlocking CD/DVD" test program has been removed from the transport mode program

Infotainment system	Diagnosis address	Value	Adaption channel	TSB
MMI 3G+	5F	0	18	2013790
MMI 3G	5F	0	18	2013790
RMC	5F/56	0	10	2027367
MIB	5F	0	Drive status	-

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Infotainment update
Locking/unlocking the CD/DVD drive

For these systems, the navigation database is **stored on a CD/DVD used in the internal CD/DVD drive and the drive is locked from the factory (for theft protection)**.

Complaint: A CD/DVD cannot be ejected

Cause: The CD/DVD drive is enabled in transport mode during the delivery inspection and locked again during Guided Fault Finding -> The drive remains locked

Measure: Check whether the drive is locked and if so, unlock the drive using the test program entitled "Eject Button, lock/unlock" in Guided Functions.

➔ The values in the table below corresponds to "drive unlocked".

Note: Optimization in the ODIS program with brand CD 19.49
➔ The "locking/unlocking CD/DVD" test program has been removed from the transport mode program

Infotainment system	Diagnosis address	Value	Adaption channel	TSB
MMI 2G	37	0	68	2013790
RNS-E	37/56	0	67	2013790

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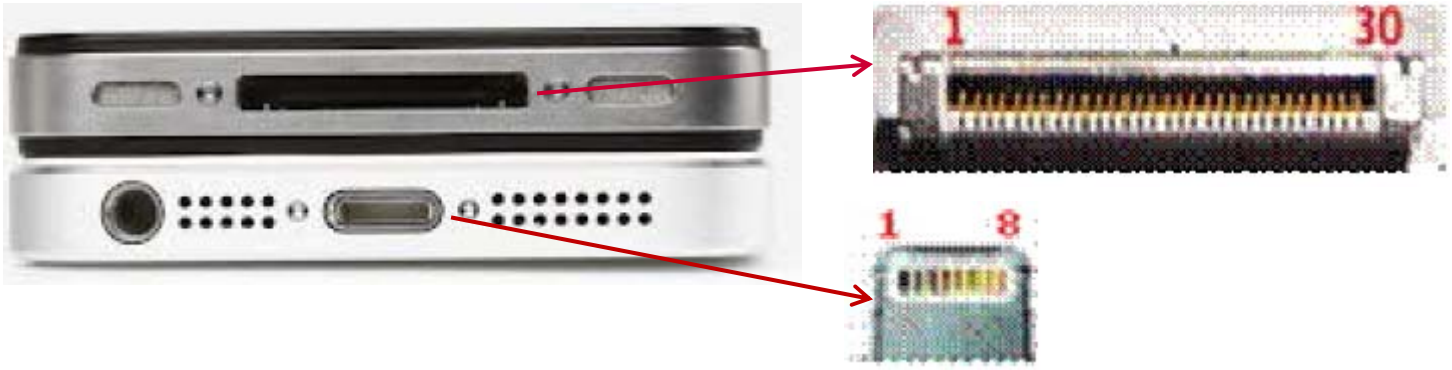
Infotainment update
Supported functions for new Apple devices

- **Complaint:** Current Apple devices cannot play videos when connected with an adapter cable
- **Systems affected:** MMI3G+/RMC/MIB
- **Background:**
  - On its new devices, Apple has removed the "Video via the interface" function
  - The new Apple devices have a new PIN configuration
  - 22 pins have been removed (old total: 30 -> new total: 8; see image below)
  - The pins that have been removed were responsible for various functions including analog video transfer
  - The Cover art function is still available



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Infotainment update
MIB "Screenshot" function A3(8V)

- Screenshot function in MIB High system available in series from SOP



- New storage concept for screenshots in MIB High system
  - Screenshots are saved via the same key combinations as before
  - No SD card is required in the SD slot 1 in order to save screenshots
  - The image is stored to the internal memory
  - Internal ring buffer can store up to 50 screenshots (image 51 overwrites image 1)

- Instructions for reading out screenshots in the workshop
  1. Copy the script (two files: *"autorun"* and *"autorun.sig"*) onto an empty SD card.
  2. Insert the SD card with the script into SD slot 1 and wait.
  3. "Completed successfully!" will be displayed in green.
  4. Remove the SD card. The screenshots will now be saved on the SD card.

  Note: The screenshot memory in the control unit is not erased as a result of the read-out process.

- There are no changes to the screenshot function for the MIB Standard systems (screenshot stored to SD card)

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Audi side assist update

Contents: Technical actions

No.	Event	Topic	Type/model
1		Latest information about Audi side assist	All

=> Several TSBs have been released recently addressing potential customer concerns – it is imperative to follow the TSB related to the specific customer concern!

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Audi side assist
System sporadically inoperative

- Side assist deactivates itself after the engine starts (*A4 PI, A5 PI, Q5 PI*)
  - DTC for "Lane change assistance control module 2 Function limitation due to insufficient voltage" stored in the side assist control unit (diagnosis address 3C)
  - Update software as per TSB **2031095**

- Side assist inoperative (*A6, A7, A8*)
  - DTC for "Lane Change Assistance Warning Lamp -K233- / -K234- Open/Short Circuit to B+" stored in the side assist control unit (diagnosis address 3C)
  - Update software as per TSB **2034000**

Audi side assist
System sporadically inoperative

- Side assist inoperative with “Sensors blocked” warning (*A4 PI, A5 PI*)
  - DTC for “Lane change assistance control module Restricted view” stored in the side assist control unit (diagnosis address 3C)
  - Follow instructions in PSS TSB **2033943**

- Side assist inoperative (*A4 PI, A5 PI, Q5 PI, A6, A7*)
  - DTC for “Lane Change Assistant Control Module -J769 No signal/communication” or “Data-Bus distance regulation No signal/communication” stored in the gateway (diagnosis address 19) and/or DTC for “Local data bus Faulty„stored in the lane change assist (diagnosis address 3C)
  - Replace control unit(s) as per TSB **2032225**

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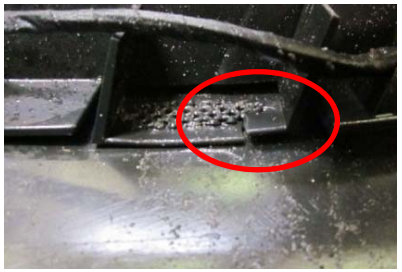
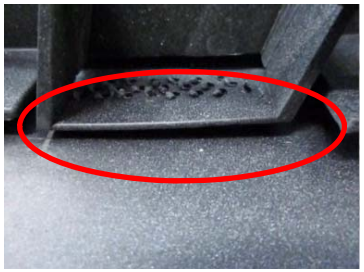
Audi side assist
False warnings

- False warnings from Audi side assist (*A6, A7*)
  - Update software as per TSB **2028809**

- False warnings from Audi side assist (*A4 PI, A5 PI*)
  - Cause:
    - Vibrations as a result of broken/loose parts inside the bumper (A4 PI, A5 PI)

    - Faulty radar reflections caused by wheels/tires (allroad only)
  - Follow instructions in TSB **2030583** (A4, A5) or TSB **2033782** (allroad)

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Battery testing as part of delivery inspection

Contents: Battery testing

No.	Event	Topic	Type/model
1		Testing the battery as part of the delivery inspection	All

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Overview

- Battery audit report 2012
- Delivery inspection
- Three types of battery test procedures using the tester
- Testing the battery as part of the delivery inspection
- Reasons why batteries may be faulty
- Identifying causes using history data
- Summary

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Battery audit report 2012

- The aim of the report was to observe two variables:
  - Proportion of tester logs from delivery inspections NOT sent to Audi (standard process since 2011)
  - Number of faulty batteries discovered during delivery inspections
- These two variables are used to determine the quality of the battery when handing over the vehicle

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Delivery inspection

- The relevant maintenance table for the vehicle is used as part of delivery inspections

- For all vehicles fitted with a BDM (**B**attery **D**iagnosis **M**odule), the battery is tested using GFF (**G**uided **F**ault **F**inding)
  - 95% of all AUDI vehicles from model year 2011 onwards are fitted with a BDM

- **Diagnostic logs must be sent online!**

		i.O./ durchgeführt	n.i.O.	behoben
	Bei Standfahrzeugen: Maßnahmen nach Wartungstabelle "Stand- und Lagerfahrzeuge" durchführen.	☐	☐	☐
→	Batteriezustand: Auslesen - Diagnoseprotokoll online versenden	☐	☐	☐
	Transportmodus deaktivieren	☐	☐	☐
	Verlademodus: Deaktivieren	☐	☐	☐
	Navigation MMI 3G High: Keine DVD im Navilaufwerk, Landessprache einstellen (MMI-Betriebsanleitung)	☐	☐	☐
	Serviceanzeige: Zurücksetzen	☐	☐	☐
	Zeituhr einstellen	☐	☐	☐
	Datenspeicher: Auslesen	☐	☐	☐

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Three types of battery test procedures using the tester

- **1. Testing batteries in the event of customer complaints**
  - Vehicle will not start
  - Ignition will not switch on
  - Central locking will not unlock
  - etc.

- **2. Testing the battery as part of the delivery inspection**
  - ***New vehicles*** prior to being delivered to the customer

- **3. Testing the battery as part of inspections**
  - Vehicles that come in for inspections
  - ***Used vehicles*** prior to being delivered to the customer

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Testing the battery as part of the delivery inspection

- Among the aspects assessed are:
  - Voltage shortfalls below 12.2 V
  - Voltage shortfalls below 11.6 V
  - Energy output must be less than 6x the nominal capacity

- Common reasons for faulty batteries are:
  - Battery maintenance program not observed
  - Issues with handling the battery
  - No-load current
  - CAN bus is active

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Reasons for a faulty battery
Maintenance program not being carried out

- Specification (HSO): The battery must be tested 90 days after production and must be fully charged
  - When solar panels are used, this period extends to 180 days

- ***Main cause:***
  Excessively long periods of immobilization below the critical voltage thresholds
  - *12.2 V (>175 hours)*
  - *11.6 V (>75 hours)*

- **90 days equate to 2160 hours!**

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Reasons for a faulty battery
Issues with handling the battery

- Showroom vehicles
  - No battery charger connected
  - Incorrect battery charger used (minimum 30 A charging current)
  - Battery charger is malfunctioning or is not switched on

- Moving the vehicle (e.g. to a different space)
  - Parking lights or side lights are on
  - Ignition is on
  - Radio is on
  - Selector lever not in "P" position (A3, and TT)

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Identifying causes using history data

- **Instances of no-load voltage shortfall:** **(LifeCycleData 1)**
- Instances of excessive no-load current (LifeCycleData 2)
- Switch-off levels log (LifeCycleData 3)
- Battery change log (LifeCycleData 4)
- Data regarding energy-critical vehicle status (LifeCycleData 5)
- **Energy balances for the last (20) journeys** **(LifeCycleData 6)**
- **Energy balances for the last (20) immobilizations** **(LifeCycleData 7)**
- Dynamic power management (LifeCycleData 10)
- Start/stop (LifeCycleData 12)
- Sporadic alternator faults (LifeCycleData 13)

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Identifying causes using history data
Maintenance program not being carried out

- **No-load voltage log** (LifeCycleData 1)

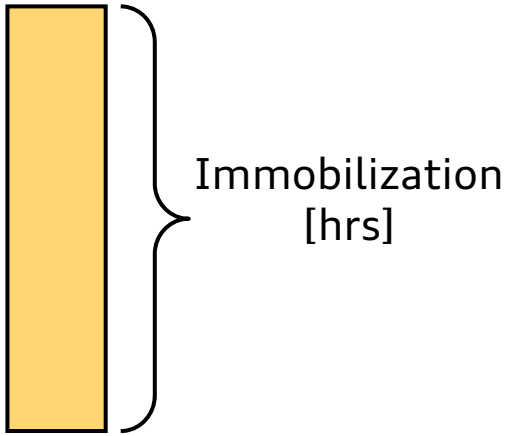
Instances of no-load voltage shortfall:

2012-11-26-07:32*21.2*01*03667***
2012-11-24-18:17*02.5*01**
2012-11-23-13:46*00.9*01**
2012-11-22-10:20*00.1*01**
2012-11-17-16:49*06.3*01**
2012-11-14-10:41*00.0*01**
2012-11-12-14:17*01.6*01**
2012-11-20-21:42*23.8*01***02258***
2012-11-19-21:42*24.0*01**
2012-11-18-21:42*24.0*01**
2012-11-17-21:42*24.0*01**
2012-11-16-21:42*24.0*01**
2012-11-15-21:42*24.0*01**
2012-11-14-21:42*24.0*01**
2012-11-18-10:01*00.2*01***00016***
2012-11-14-21:42*00.0*01**
2012-09-30-02:47*00.0*01**
2012-09-26-06:58*00.0*01**
2012-09-23-12:12*00.1*01**
2012-09-15-05:32*00.0*01**
2012-09-06-08:06*00.0*01**

Voltage below 12.5 V

Voltage below 12.2 V

Voltage below 11.6 V



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Identifying causes using history data
Maintenance program not being carried out

▸ **Journey energy balance** (LifeCycleData 6)

Date/time	Discharged charge	Temp.	Energy balance	Journey time
2013-01-25-12:15*	047*	-04*	+000.1*	00.05**
2013-01-24-13:36*	043*	-02*	+000.0*	00.01**
2013-01-23-12:22*	046*	+15*	-000.3*	00.03**
2012-05-10-09:33*	030*	+16*	+000.9*	00.07**
2012-05-07-07:58*	031*	+06*	+000.0*	00.01**
2012-05-04-08:04*	034*	+12*	+000.4*	00.05**
2012-03-01-09:44*	041*	+05*	+000.4*	00.06**
2012-02-23-14:15*	043*	+05*	+000.1*	00.03**
2012-02-09-12:47*	050*	+16*	+001.2*	00.06**
2012-02-08-13:55*	036*	-02*	+000.2*	00.03**
2012-02-08-13:37*	038*	-03*	+000.1*	00.02**

▸ **Immobilization energy balance** (LifeCycleData 7)

Date/time	Discharged charge	Energy balance	Immobilization	Duration CAN on	Duration terminal 15 on
2013-01-25-09:11*	042*	-000.2*	003.0*	00.0*	00.0**
2013-01-24-13:48*	045*	-000.2*	016.1*	00.0*	00.0**
2013-01-23-12:24*	036*	-000.1*	025.1*	00.0*	00.0**
2012-05-16-09:39*	052*	+005.6*	999.9*	00.0*	00.1**
2012-05-10-09:37*	021*	-008.3*	142.0*	00.0*	00.0**
2012-05-07-07:58*	033*	+000.0*	072.2*	00.0*	00.0**
2012-05-04-08:07*	026*	+000.0*	071.8*	00.0*	00.0**
2012-03-01-09:48*	027*	+001.9*	999.9*	00.0*	00.0**
2012-02-23-14:16*	040*	+000.1*	163.5*	00.0*	00.0**
2012-02-09-12:51*	044*	+000.1*	337.3*	00.0*	00.0**
2012-02-08-13:57*	043*	-001.4*	022.6*	00.3*	00.0**

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Summary

- If a maintenance program not being carried out correctly or handling issues are the cause, it is not possible to invoice these faults under warranty!

- Batteries that are discharged/faulty as a result of no-load current and CAN bus faults must be reported prior to repair work being carried out (reporting obligation only affects the German market)

"Lack of battery maintenance is not a fault covered by the warranty"

Maik Heinrich, Product Support, 2012

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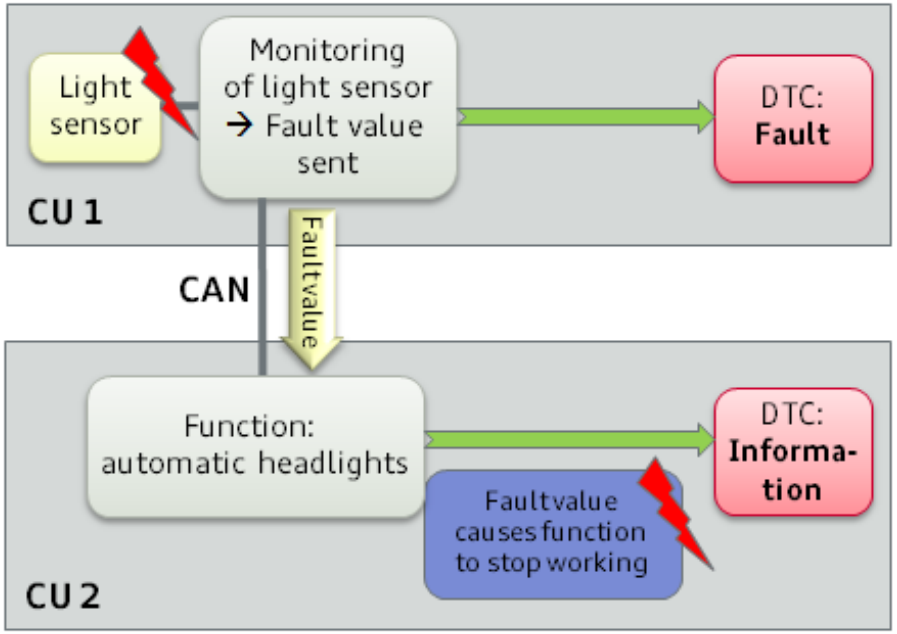
Bus monitoring and DTC diagnosis

Information

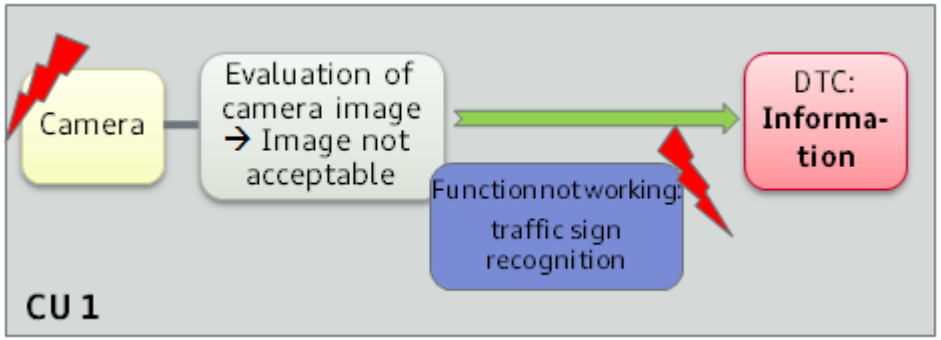
- Concept: fault memory entries used as information
- Information is stored in a control unit (CU) whenever a fault outside of the CU means that a function can no longer be performed by the customer.

  => This process prevents the CU from being repaired/replaced!

- Example 1: Light sensor failure



Example 2: Camera becomes dirty



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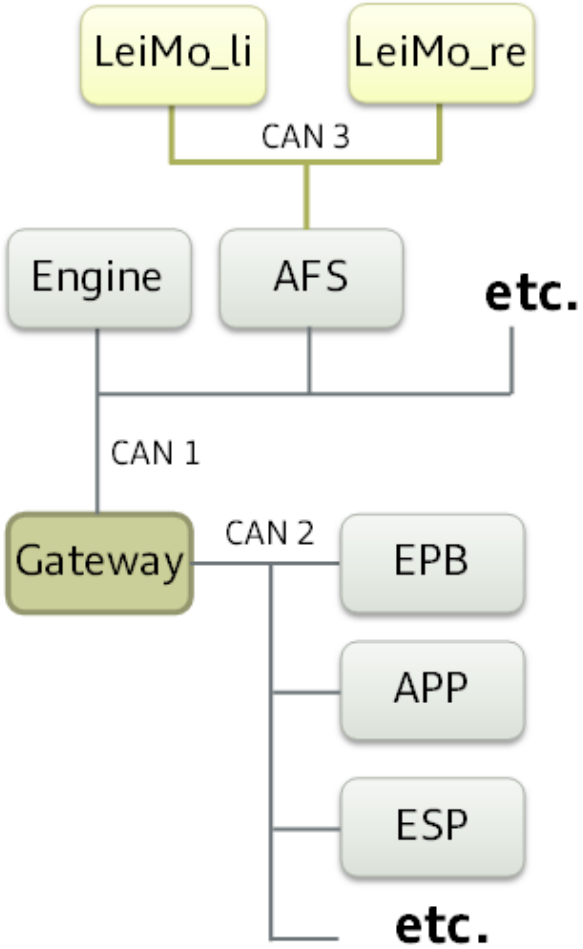
Bus monitoring
Overview

- Each bus segment has a bus master
  → central role for bus diagnosis
  - Installation monitoring and communication monitoring for the main bus segments (powertrain CAN bus, convenience CAN bus, FlexRay etc.) via the Gateway
  - Monitoring of sub-busses via the corresponding sub-bus master (e.g. BCM1 for rain-light sensor and headlight switch)
- Bus master enables message routing (transferring a message from one bus segment to another)
- Depending on the fault scenario, either **faults** (priority 4) or **information** (priority 6) will be recorded in the control unit fault memories



Main bus segments: CAN 1 and CAN 2
Sub-bus segment: CAN3

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Electrical faults on the data bus (e.g. CAN)

Single-wire faults

- Short circuit CAN_Low to ground or CAN_High to plus
- Only monitored by the bus master
- Fault output (only in bus master):
  - Data bus XY in single-wire operation, priority 4 (fault)
    (e.g. *U001800 Convenience CAN bus in single-wire operation*)

Defective data bus faults

- Control unit unable to send any messages (bus in "off" status)
- Monitored by all CUs; once a fault is recognized, no more messages are sent
  → This process prevents a faulty CU from disrupting other lines of communication
- Fault output (bus master and emission-related control units):
  - Data bus XY defective, priority 2–4 (fault)
    (e.g. *U001000 Convenience CAN bus defective*)
- Fault output (other control units)
  - U120000 Data bus defective, priority 6 (information)
  - Data bus XY defective, priority 6 (information) if the CU has several bus connections

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Fault monitoring at message level
Message timeout

- Monitoring of at least one pre-defined message from a control unit
- Monitoring via bus master (for each bus segment connected to the CU)
- One control unit monitors all other control units from which at least one message is received

- Fault output (bus master and emission-related control units):
  - [CU] no signal/communication, priority 2–6
    (e.g. *U013000* No communication to control unit for active steering)
- Fault output (other control units)
  - U112100 Data bus did not receive message, priority 6 (information)

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Fault monitoring at message level
Range value monitoring

- Messages are monitored to ensure they are in the correct format, for example a range value fault (e.g. specified value[0–9], received value: 12)
- Monitoring is only performed for customer relevant functions

- Fault output (emission-related control units):
  - CU XY implausible signal, priority 2–4 (fault)
    (e.g. U040200 CU for gearbox sending an implausible signal)
- Fault output (other control units)
  - U112200 Data bus receives implausible message, priority 4 (fault)

- These faults are normally due to incorrect/incongruous control unit data entry or incorrect installation
  - Check by performing an SVM Spec/Actual comparison or by creating a request to the Audi Technical Assistance Center (TAC)

    * Spec/actual result may show OK if the reference in the database is incorrect, once the reference is corrected the fault does not re-occur.

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Fault monitoring at message level
Fault values

- If a control unit recognizes that it cannot provide a value in a message due to a fault, a fault value (e.g. 0xFF) is sent

- Fault value for the transmitting CU
  - Sensor xy defective, priority 4 (fault)
- Fault value for the receiver (only for customer relevant functions):
  - U112300 Data bus received fault value, priority 6 (information)
- Fault value for the receiver (emission-related control units)
  - CU XY implausible signal, priority 2–6 (fault)
    (e.g. U040200 CU for gearbox sending an implausible signal)

- The entry *Data bus received fault value* only indicates that the actual fault is to be found in another control unit.

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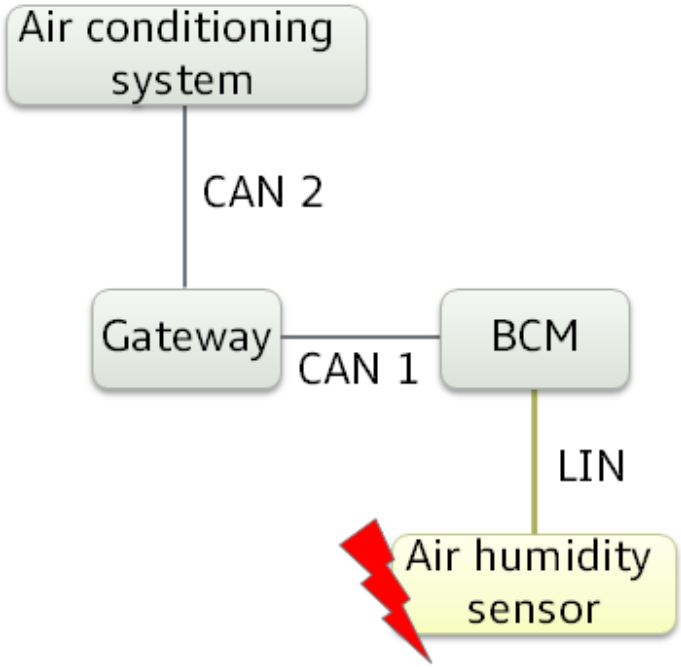
Example 1
Sensor signal failure (LIN message)

- Air humidity sensor does not have its own fault memory
  → Monitored by BCM
- Air humidity sensor message routed to CAN 1 and CAN 2
- Air humidity sensor message used by the air conditioning system

- If the **sensor fails**, the following fault memory entries are stored:

Control unit	DTC	Priority
BCM	No signal/communication to air humidity sensor	4 (fault)
Gateway	*- No entry -*	-
Air conditioning system	Data bus did not receive message	6 (information)



Air humidity sensor

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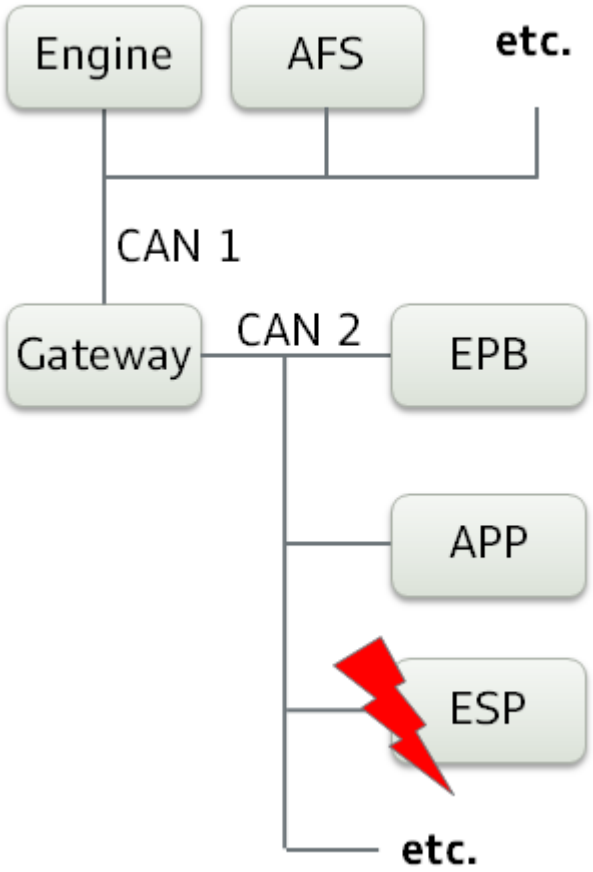
Example 2
Control unit communication failure

- ESP has a faulty bus connection → no messages received
- Installation monitoring in Gateway recognizes a timeout in the ESP control unit
- All control units using ESP signals (e.g. speed signals) record faults or information (for customer relevant functions)



Control unit	DTC	Priority
Gateway	No communication with ESP	4 (fault)
AFS	Data bus did not receive message	6 (information)
Engine (emission-related)	No communication with CU for ABS brake	2 (OBD fault)
etc.	etc.	etc.

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Mixing coolant types

Contents: Technical actions
General

No.	Event	Topic	Type/model
1		Ability to mix coolant types	All

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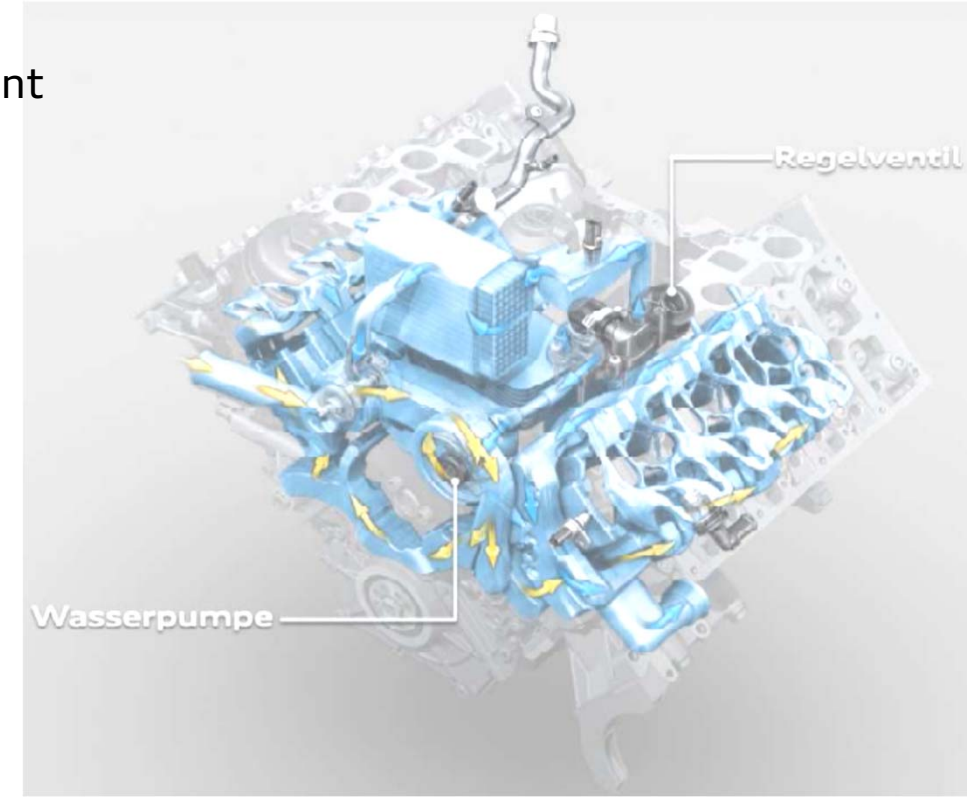
Overview

- Increasingly complex cooling systems
- Functions of the cooling system
- Current specifications relating to coolant additive, distilled water, etc.
- Damage profiles associated with non-compliance with specifications



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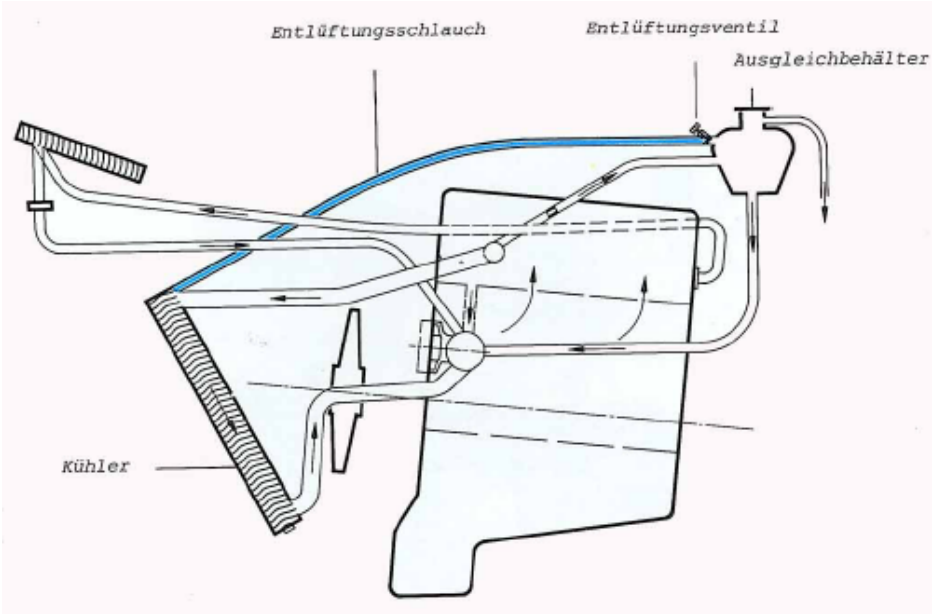
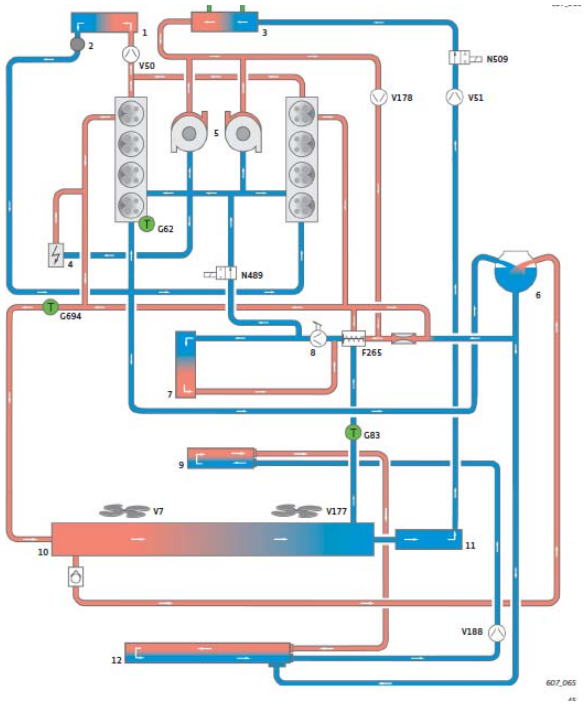
Increasingly complex cooling systems

Status in 1978



Current status



- Increasing complexity = increase in number of components + material diversity + temperature levels
- Today's cooling systems require a high quality of coolant. Malfunctions in the system can have serious consequences

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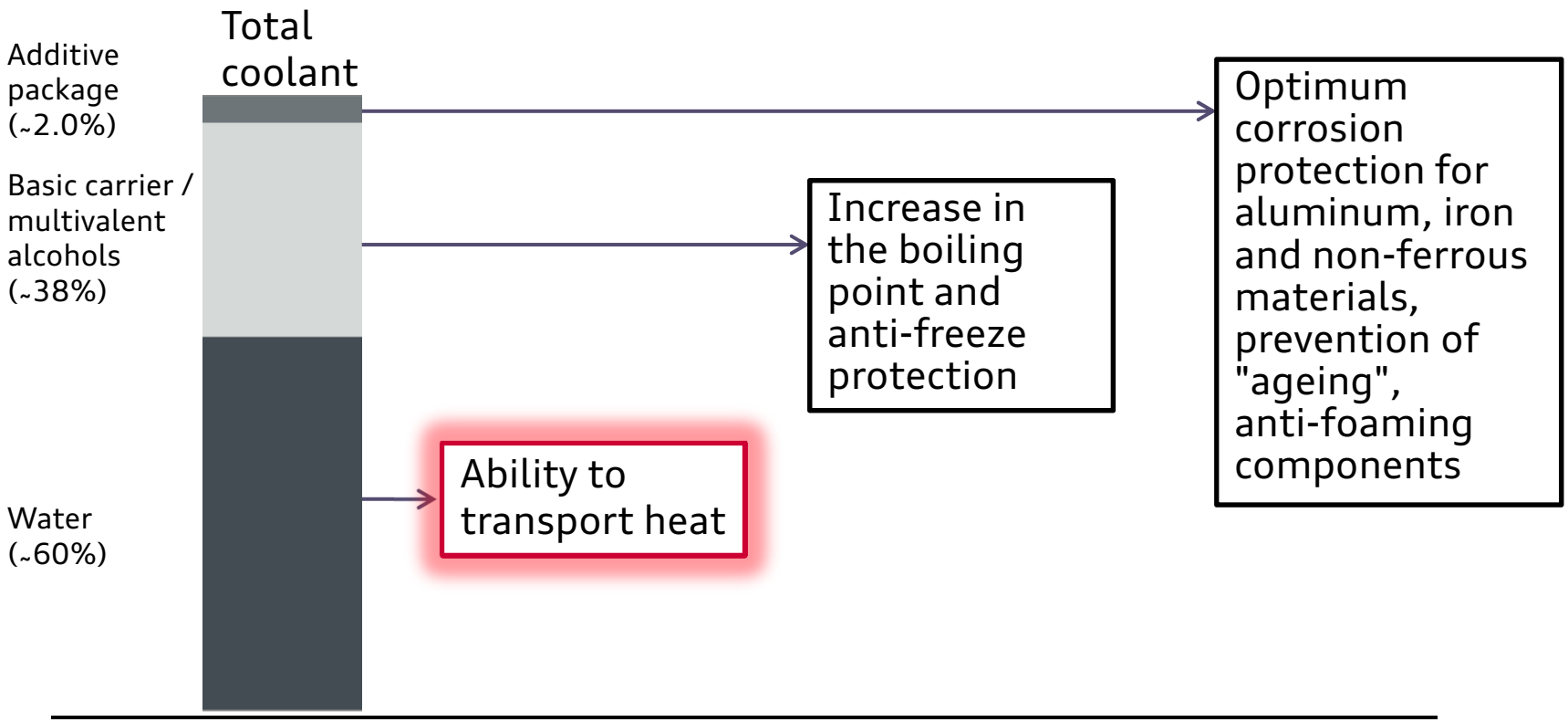
As such, significant demands are placed on the coolant

Example:



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Description in the Workshop Manual

Topping up

Note

- *The water used for the mix has a significant influence on the efficacy of a coolant. Requirements have been defined for the water quality to be used as a result of substances in water, which can vary by country or even region. Distilled water fulfills these requirements. For this reason, we recommend that the coolant in older models is also mixed with distilled water when it is topped up or replaced.*

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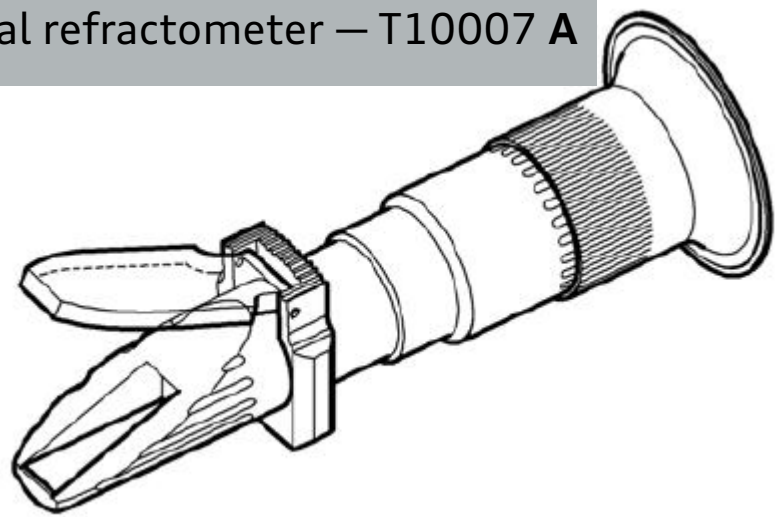
Finding the optimum mixing ratio

If the current coolant composition is not obvious (e.g. G12++ mixed with G13) always use the G13 scale to check the values to ensure that a sufficient level of anti-freeze protection and heat transport can be achieved

Manual refractometer – T10007 **A**



- **Please note: The efficacy of the coolant is adversely affected at a concentration of over 55%!**
- The manual refractometer **(T10007)** is **not suitable** for G13
- Example: warm country, 40 vol.% of coolant additive (approx. -25°C)
- Example: cold country, 50 vol.% of coolant additive (approx. -36°C)
- **Note the instructions in the Repair Manual**

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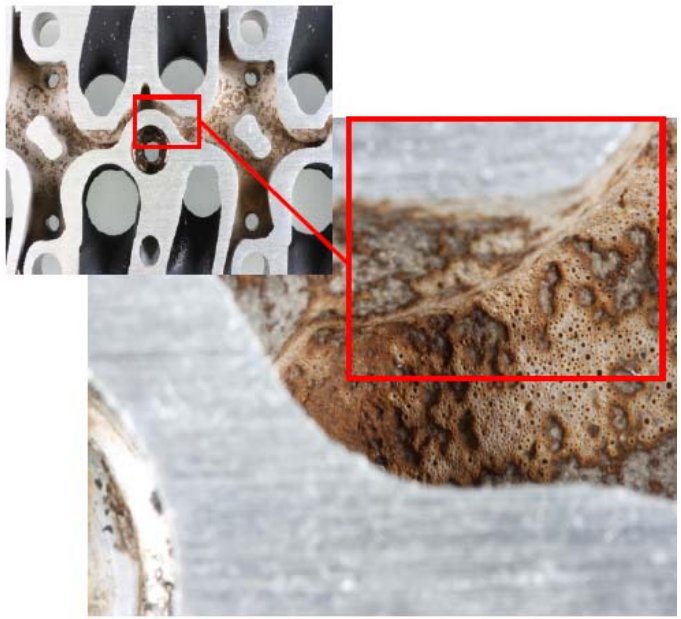
Damage profiles



Deposits resulting from an excessively high lime content (+ temperature)



Deposits + scoring on the water pump shaft causes leaks

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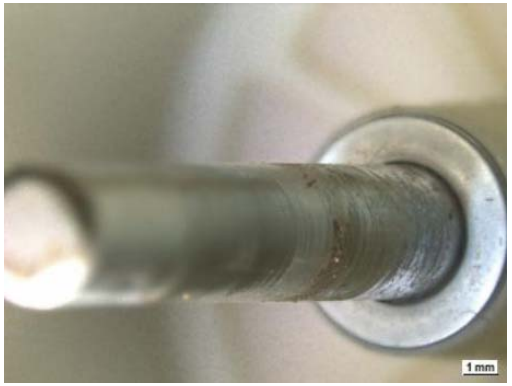
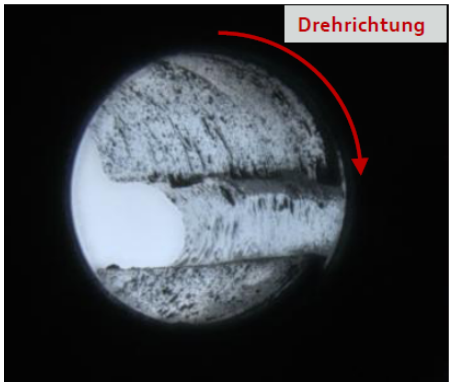
Damage profiles

Example of an additional coolant pump







- Deposits on the rotor and rotor shaft

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Checking oil level, dry-sump lubrication

Contents: Technical actions
General

No.	Event	Topic	Type/model
1		Oil level measurement Dry sump lubrication system	R8PI (V8&V10)

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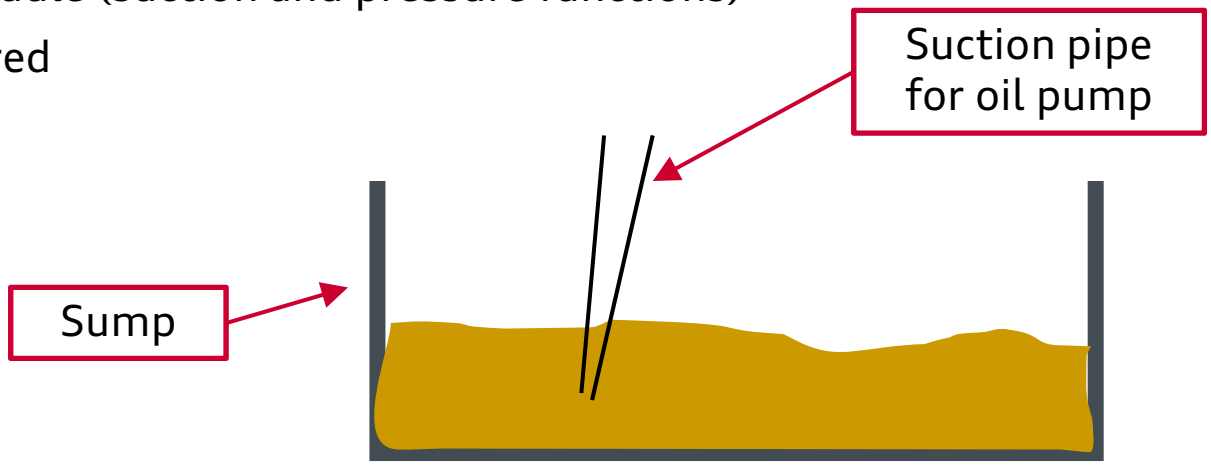
Oil level measurement — dry sump lubrication system
Principles of the dry sump lubrication system

- Application area:
  - Engines that are subjected to high longitudinal and lateral acceleration forces
  - Motorbikes plus sports vehicles, racing vehicles and off-road vehicles

- Technical observations:
  - Oil supply is saved in a separate oil reservoir
  - Very flat sump
  - Complex oil pump module (suction and pressure functions)
  - Several oil lines required



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Oil level measurement — dry sump lubrication system
Principles of the dry sump lubrication system

- **Advantages:**
  - A constant oil supply is even guaranteed during extreme acceleration
  - Very flat sump, providing:
    1. An increased clearance height or
    2. A lower installation position for the engine → reduction in the total center of gravity of the vehicle
  - Allows higher oil fill volumes without the size of the sump being increased, leading to:
    1. Enhanced cooling output
    2. Longer oil change intervals
- **Disadvantages:**
  - Additional parts required → additional costs and installation space
  - More complex process required to determine the current oil level

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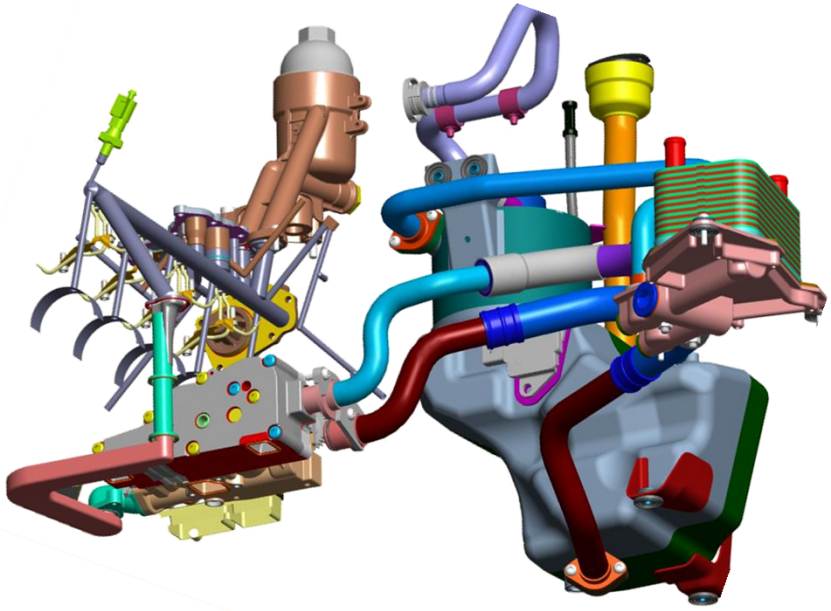
Oil level measurement — dry sump lubrication system

Design of the dry sump lubrication system in the Audi R8

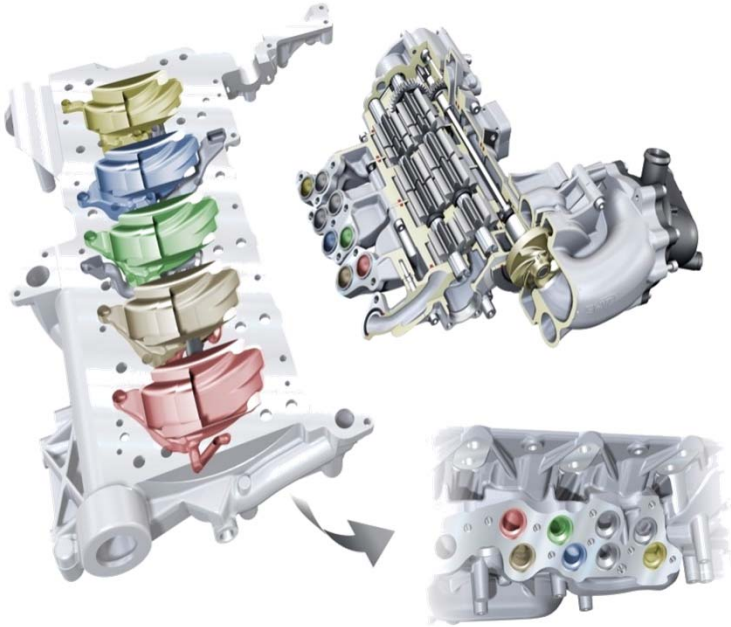
R8 V8

- The oil pump sits within the engine and is not sealed to the outside
- Two suction levels (two combined for the crank chambers, chain cases and both cylinder heads)



R8 V10

- The oil pump module sits on the engine and is sealed to the outside
- Four suction levels (one for each of the five crank chambers, chain cases and both cylinder heads)



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Oil level measurement — dry sump lubrication system
Differing oil systems: manual gearbox vs. S tronic (DSG)

Manual gearbox

- Oil dipstick with integrated guide tube



Dual clutch gearbox

- Oil dipstick integrated in the filler cap of the oil filler neck



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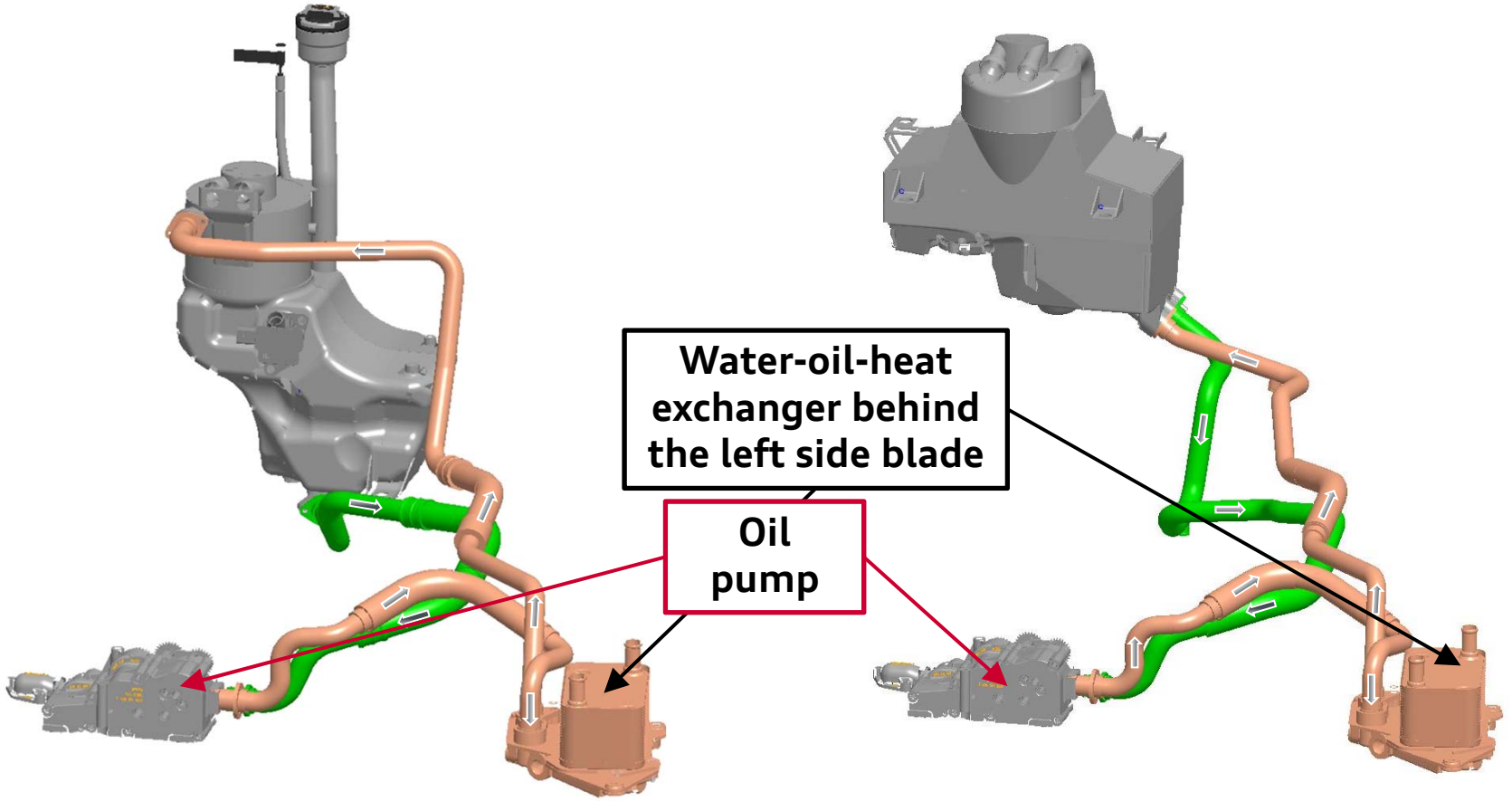
Oil level measurement — dry sump lubrication system
Variants of the R8 V8 oil system

Manual gearbox

Dual clutch gearbox



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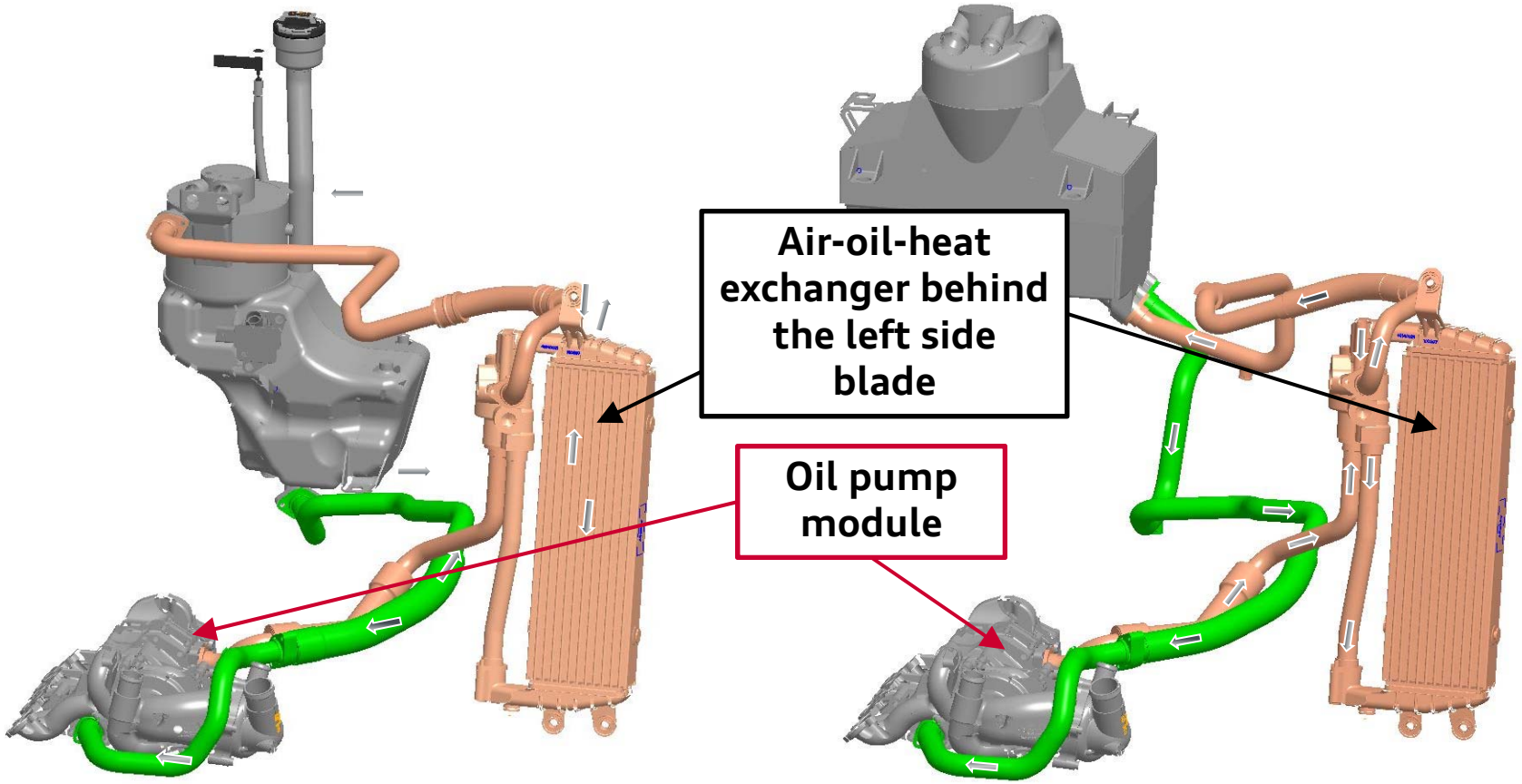
Oil level measurement — dry sump lubrication system
Variants of the R8 V10 oil system

Manual gearbox

Dual clutch gearbox



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Oil level measurement — dry sump lubrication system
Checking the oil level

1. Warm up the engine until an engine oil temperature of 100–110°C is displayed in the instrument cluster.

2. Run the engine at operating temperature at idling speed for two minutes (make sure that the vehicle is on a level surface!).

3. Switch off the engine and after two minutes check the oil level using the oil dipstick:
   a. If the oil level is in the "Do not fill" range → do not add any new engine oil

   b. If the oil level is in the "Fill" range → top up the oil
   Add new engine oil until the oil level reaches the center point in the "Do not fill" range.

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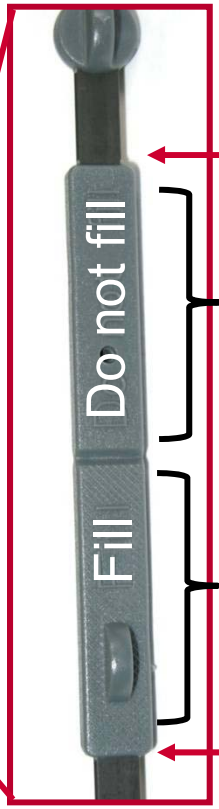
Oil level measurement — dry sump lubrication system

Checking the oil level

Manual gearbox





1 = The vehicle must not be driven if the oil level is above this marking → risk of combustion misfires, blue smoke and damage to the catalytic converter

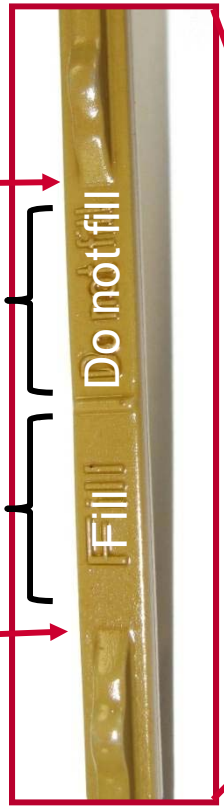
2 = Do not top up engine oil

3 = Top up engine oil

4 = The vehicle must not be driven if the oil level is below this marking → risk of inadequate lubrication → may result in engine damage

- 1 mm on the oil dipstick corresponds to an oil volume of approx. 0.04 liters
- Or: 0.5 liters = 12.5 mm (of the 24 mm per range 2 or 3)

Dual clutch gearbox





- 1 mm on the oil dipstick corresponds to an oil volume of approx. 0.06 liters
- Or: 0.5 liters = 8.3 mm (of the 15 mm per range 2 or 3)

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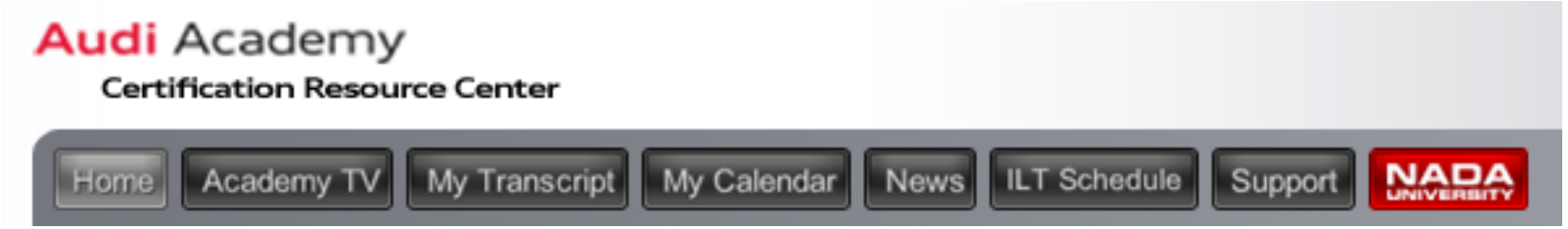
Oil level measurement — dry sump lubrication system
Checking the oil level

- The Audi Service TV program entitled “Audi R8 - Checking engine oil" will be available on the Audi Academy CRC site





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Cabriolet-specific issues

Cabriolet-specific issues

No.	Event	Topic	Type/model
1.		Rear lid does not open => convertible roof not in end position	A5 Cabriolet 8F
2.		Overview of switch positions => diagnostic aid	A5 Cabriolet 8F
3.		Influence of the convertible roof compartment lid position	A5 Cabriolet 8F
4.		Environmental data for controlling the convertible roof	A5 Cabriolet 8F

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Cabriolet-specific issues — A5 Cabriolet

1.) Luggage compartment lid does not open — convertible roof not in end position



<u>Complaint</u>:
The luggage compartment lid cannot be opened using the grip (soft touch function).

<u>Additional customer comment</u>:
After briefly actuating the convertible roof switch, the luggage compartment lid can now be opened using the grip.

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Truth in Engineering

Cabriolet-specific issues — A5 Cabriolet

1.) Luggage compartment lid does not open — convertible roof not in end position

General note on how the luggage compartment lid influences control of the convertible roof:

The convertible roof can only be moved if the luggage compartment lid is closed.
=> Prevents the convertible roof compartment lid from colliding with the luggage compartment lid.
While the convertible roof is in motion, a CAN bus signal from convenience system central control unit J393 prevents the luggage compartment lid from being opened using the grip (soft touch function).
=> Convenience CAN bus (communication with convertible roof control unit J285)
The luggage compartment lid can only be opened using the grip (soft touch function) again once the convertible roof has moved to the end position.
=> Prerequisites: No malfunction of the grip and/or locking mechanism for the luggage compartment lid occurs.
This data can be retrieved using Guided Fault Finding (GFF) via the following address word
=> 26 — electronic roof actuation J 256/MVB.

Important note:
Check whether or not the valet parking function is activated!!! ***(Luggage compartment lid can be locked separately)***

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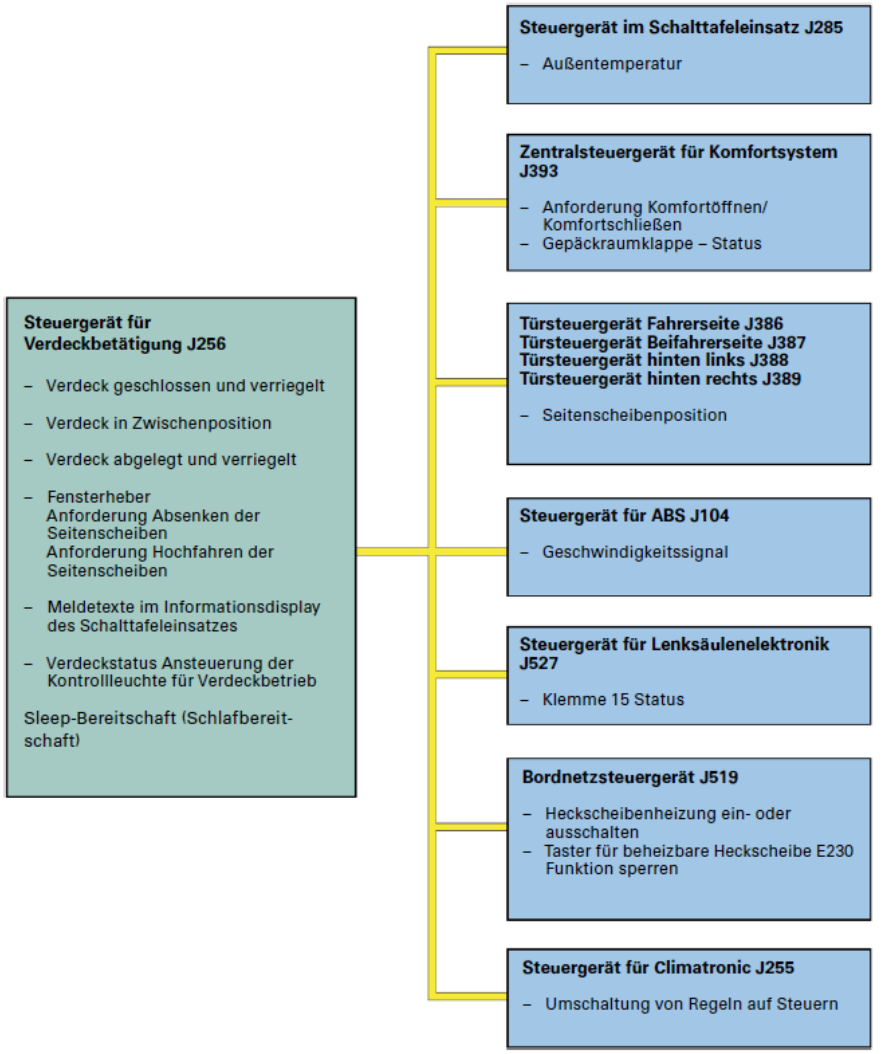
Cabriolet-specific issues — A5 Cabriolet

1.) Luggage compartment lid does not open — convertible roof not in end position



<u>Factor influencing the luggage compartment lid</u>:
In the event of a mechanical and/or electrical fault => it is not possible to move the convertible roof!

<u>In the event that switch E 137 is actuated</u>:
Display in the dash panel insert:
=> Convertible roof — actuation not possible
Warning lamp for convertible roof operation K215:
=> flashes *)

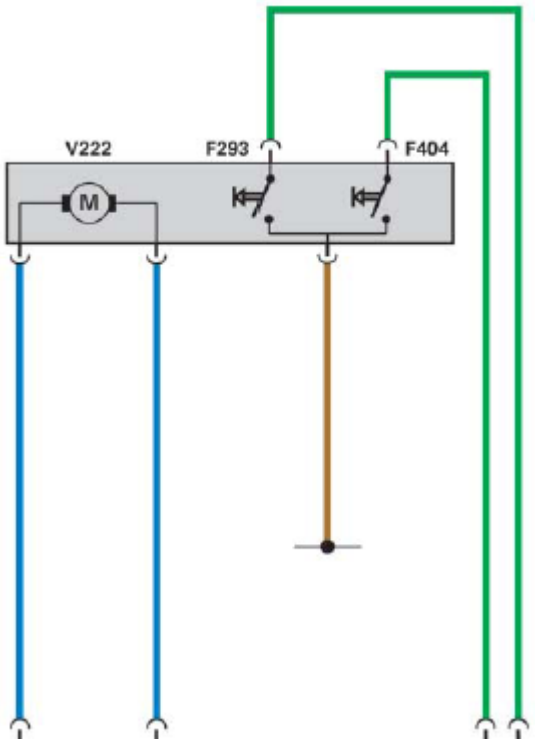


*) <u>Note</u>:
⇒Lights up in the event that switch E 137 is actuated:
- While convertible roof is moving
- Convertible roof not in end position (...terminal 15 on with ...)

Audi Truth in Engineering

Cabriolet-specific issues — A5 Cabriolet

1.) Luggage compartment lid does not open — convertible roof not in end position



<u>Workshop findings</u>:
If the problem persists, the following entries are/may be stored in the data memory for 26 — electronic roof operation:

- F404
B118629_9537065_Switch for convertible roof compartment lid lock, locked
(Switch F 404 for complaint => absolutely critical)

- F293
B119629_9541161_Switch for convertible roof compartment lid lock, unlocked
(Switch F 293 for problem => less critical)

Both switches are integrated in motor unit V222 (motor for convertible roof compartment lid).

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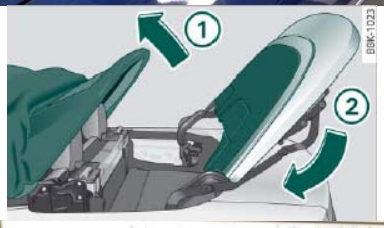
Cabriolet-specific issues — A5 Cabriolet

1.) Luggage compartment lid does not open — convertible roof not in end position







<u>Cause</u>:
The gear wheel with cams in the motor for the convertible roof compartment lid lock V222 is <u>not positioned centrally</u>.
The cams within the gear wheel actuate microswitches F293 and F404 to varying extents.
The tappet of the cam for microswitch F404 (switch for convertible roof compartment lid locking mechanism, locked) is sometimes not actuated far enough to trigger the switch point.
=> The convertible roof compartment lid is <u>not</u> recognized as being locked even though it is physically closed.
=> e.g. convertible roof <u>not</u> in end position!

=> Convertible top operation is not possible!!!
=> The luggage compartment lid cannot be opened!!!

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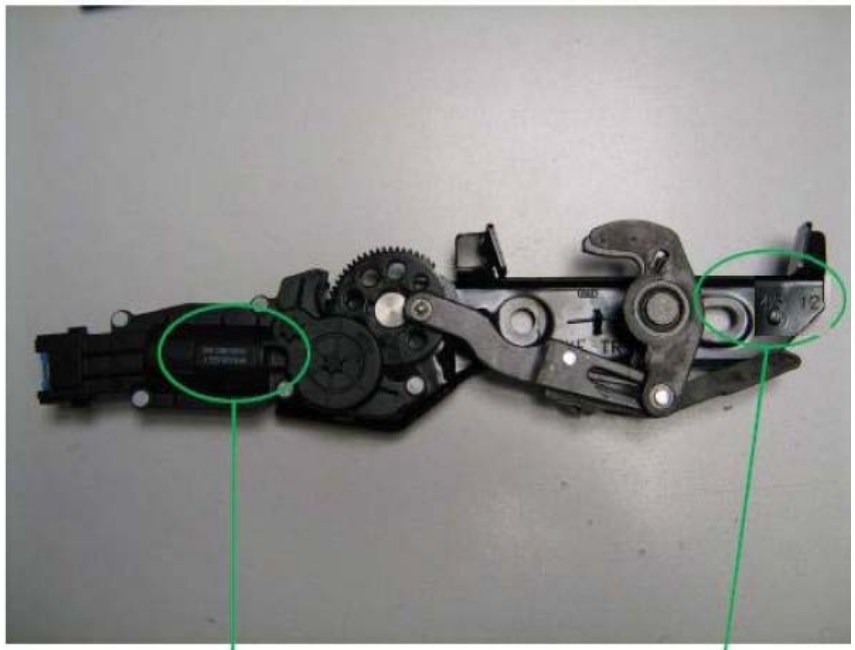
Cabriolet-specific issues — A5 Cabriolet

1.) Luggage compartment lid does not open — convertible roof not in end position





Ab Produktionsdatum 12.11.12 sind korrigierte Grundplatten verbaut worden



Prägung des Herstelldatums der Grundplatte --> KW45/ 2012

Action:

Series production:
From VIN number **FH DN007680** an optimized locking mechanism for the convertible roof compartment lid.

Customer service:
In the event of a complaint where the cause has been verified as being the relevant component affected, this component must be replaced. Only optimized components with the following data specifications can be obtained via the genuine parts service:

Part number:	8F0 825 823F
Production date:	January 2013
Baseplate date:	CW 45/2012

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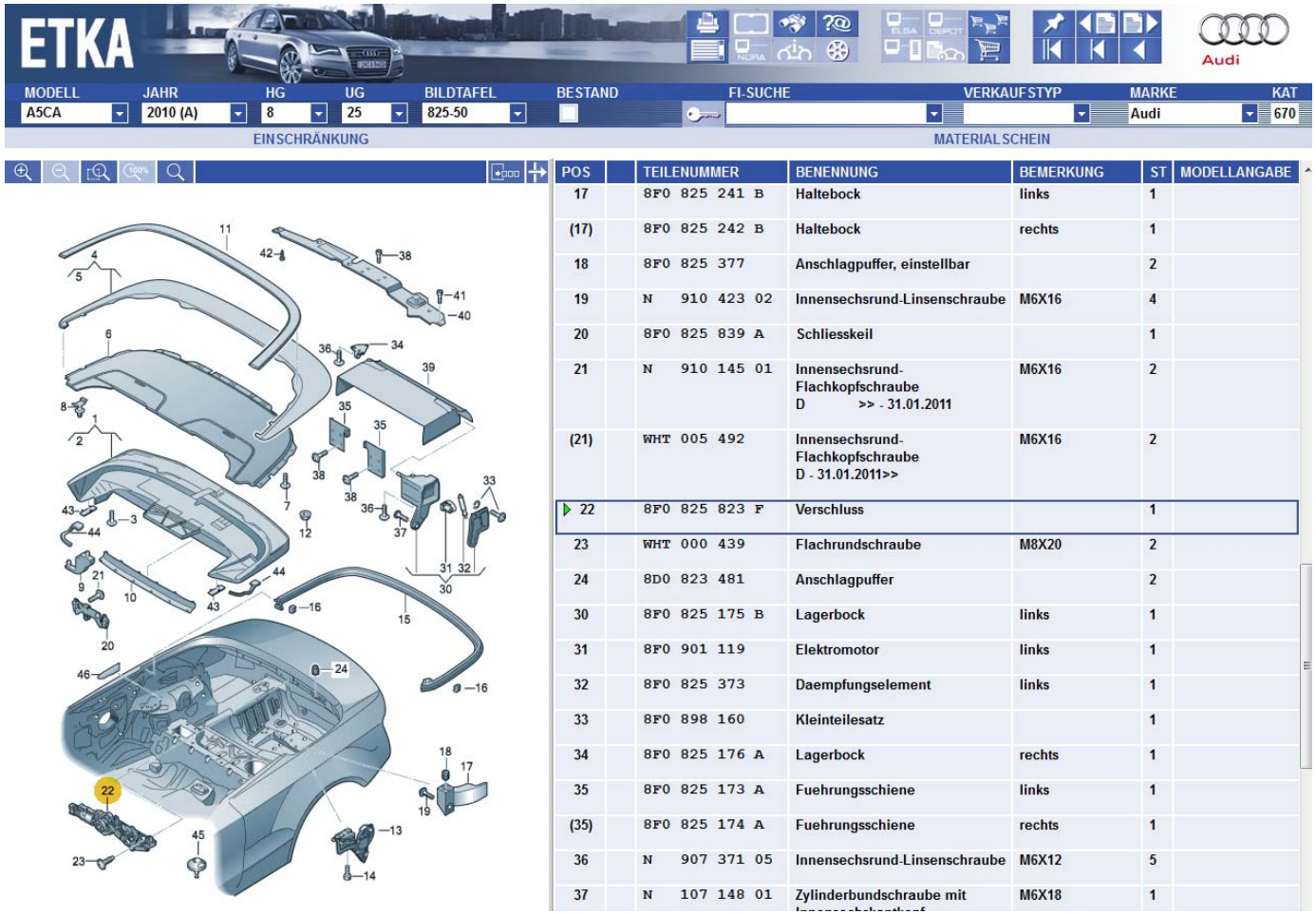
Cabriolet-specific issues — A5 Cabriolet

1.) Luggage compartment lid does not open — convertible roof not in end position



POS		TEILENUMMER	BENENNUNG	BEMERKUNG	ST	MODELLANGABE
17		8F0 825 241 B	Haltebock	links	1	
(17)		8F0 825 242 B	Haltebock	rechts	1	
18		8F0 825 377	Anschlagpuffer, einstellbar		2	
19		N 910 423 02	Innensechsrund-Linsenschraube	M6X16	4	
20		8F0 825 839 A	Schliesskeil		1	
21		N 910 145 01	Innensechsrund-Flachkopfschraube D >> - 31.01.2011	M6X16	2	
(21)		WHT 005 492	Innensechsrund-Flachkopfschraube D - 31.01.2011>>	M6X16	2	
22		8F0 825 823 F	Verschluss		1	
23		WHT 000 439	Flachrundschraube	M8X20	2	
24		8D0 823 481	Anschlagpuffer		2	
30		8F0 825 175 B	Lagerbock	links	1	
31		8F0 901 119	Elektromotor	links	1	
32		8F0 825 373	Daempfungselement	links	1	
33		8F0 898 160	Kleinteilesatz		1	
34		8F0 825 176 A	Lagerbock	rechts	1	
35		8F0 825 173 A	Fuehrungsschiene	links	1	
(35)		8F0 825 174 A	Fuehrungsschiene	rechts	1	
36		N 907 371 05	Innensechsrund-Linsenschraube	M6X12	5	
37		N 107 148 01	Zylinderbundschraube mit	M6X18	1	

Genuine part via ETKA (item 22 as assembly unit, illustration 825-50)

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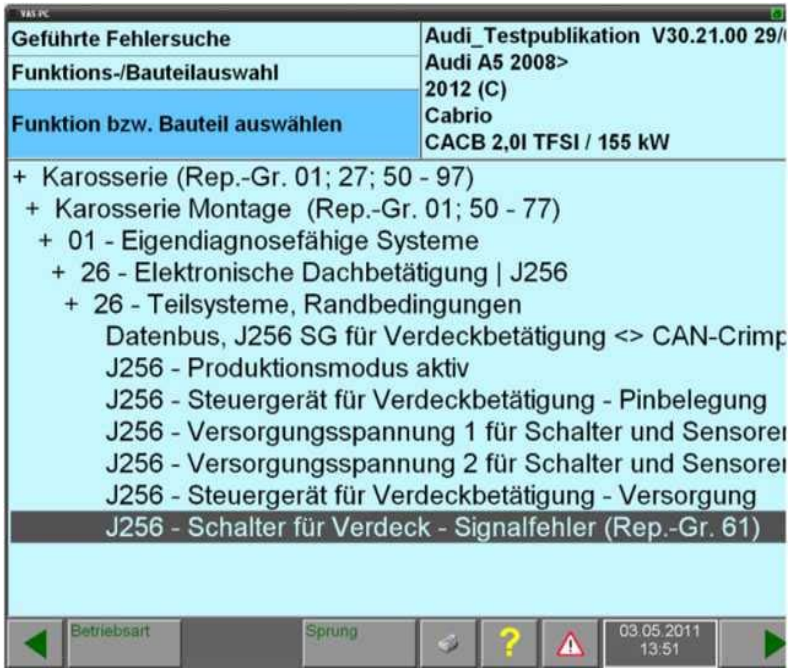
Cabriolet-specific issues — A5 Cabriolet

1.) Luggage compartment lid does not open — convertible roof not in end position



<u>Inspection</u>:

<u>2.) Electrical inspection</u>:

The switch positions of switch F404 and F293 can be checked in the relevant position by connecting the VAS tester to the vehicle.

Checking the switch position helps to ensure that the electrical switch contact is reliable after replacing locking mechanism 8F0 825 823F, and allows the contact to be read in convertible roof control unit J256.

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Cabriolet-specific issues — A5 Cabriolet

2.) Overview of switch positions (diagnosis) , 26 — electronic roof operation J256

The overview shows **14 switch positions**.

14.	13.	12.	11.	10.	9.	8.	7.	6.	5.	4.	3.	2.	1.	
1	0	0	1	0	0	X	X	X	0	1	1	0	1	Position 190
1	0	0	1	0	0	X	X	X	0	1	1	0	0	Position 180
1	0	0	1	0	0	X	X	X	0	1	1	1	0	Position 170
1	0	0	1	0	0	X	X	X	0	X	X	1	0	Position 160
1	0	X	X	0	0	X	X	X	0	X	X	1	0	Position 150
1	0	X	X	0	0	X	X	X	1	0	0	1	0	Position 130
0	0	X	X	0	0	X	X	X	1	0	0	1	0	Position 120
0	0	1	0	0	0	X	X	X	1	0	0	1	0	Position 110
0	0	1	0	0	0	X	X	X	1	0	0	1	0	Position 100
0	1	0	X	X	X	X	X	X	1	0	0	1	0	Position 90
0	1	0	1	1	1	0	X	X	1	0	0	1	0	Position 80
0	1	0	1	1	1	1	0	0	1	0	0	1	0	Position 70
0	1	0	1	1	1	1	0	0	0	X	X	1	0	Position 60
0	1	0	1	1	1	1	0	0	0	1	1	1	0	Position 50
0	1	0	1	1	1	0	X	X	0	1	1	1	0	Position 40
0	1	0	1	1	1	X	X	X	0	1	1	0	0	Position 30
0	1	0	1	1	1	0	X	X	0	1	1	0	1	Position 20
0	1	0	1	1	1	0	1	1	0	1	1	0	1	Position 10
0	1	0	1	1	1	0	1	1	0	1	1	0	1	Position 0

1: Switch for convertible roof compartment lid lock, locked — F404!!!!
2: Switch for convertible roof compartment lid lock, unlocked — F293
3: Switch for right side of convertible roof compartment lid — F291
4: Switch for left side of convertible roof compartment lid — F290
5: Switch for convertible roof compartment lid up — F407
6: Switch for rear right-hand section of convertible roof frame — F410
7: Switch for rear left-hand section of convertible roof frame — F409
8: Switch for top rear section of convertible roof frame — F408
9: Switch for convertible roof closed, on right — F412
10: Switch for convertible roof closed, on left — F411
11: Switch for left convertible roof locking mechanism — F169
12: Switch for convertible roof locking mechanism, open — F294
13: Switch for convertible roof, at front — F202 *)
14: Switch for convertible roof, stowed — F171

1 — Switch is actuated
0 — Switch is not actuated
X — Switching state not relevant in this position

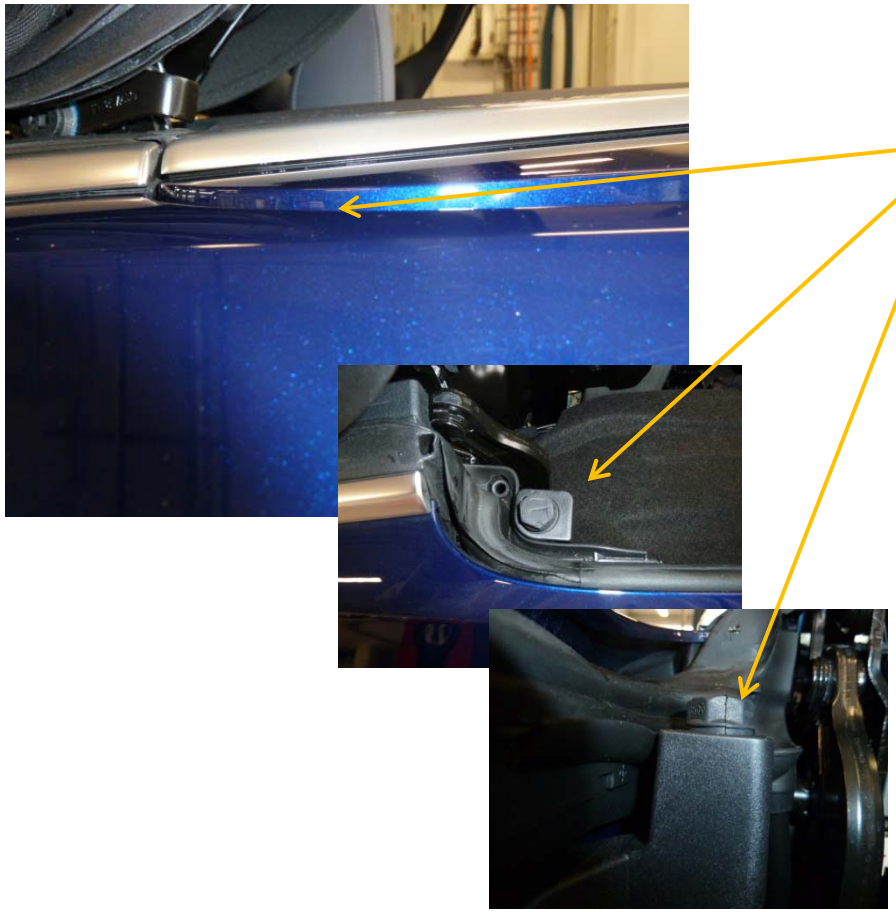
Position 0 – Convertible roof is closed all the way and locked

Position 190 – Convertible roof is open all the way and locked

Audi Truth in Engineering

Cabriolet-specific issues — A5 Cabriolet

3.) Ways in which the position of the convertible roof compartment lid has an impact on function and air-tightness



Possible complaints caused by convertible roof compartment lid:
In some circumstances, the position of the support cushions in the convertible roof compartment lid can prevent the convertible roof compartment lid from being physically shut.

Result:
- In terms of function => convertible roof not in end position
- In terms of air-tightness => water will penetrate through the convertible roof compartment lid

Ensure the convertible roof compartment lid is positioned correctly in the closed position.

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Cabriolet-specific issues — A5 Cabriolet

3.) Ways in which the position of the convertible roof compartment lid has an impact on function and air-tightness

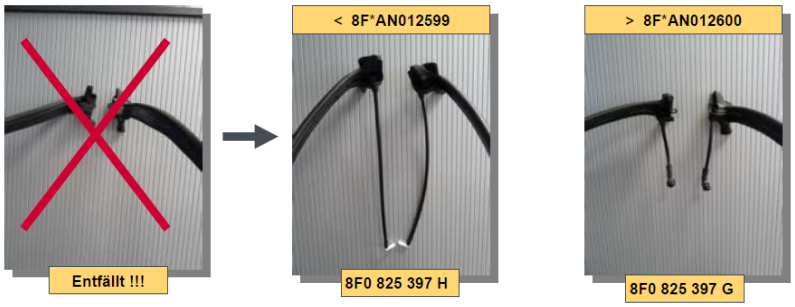
2. Wassereintritt über Verdeckkastendeckel (VDKD)

KD-Maßnahme: Gültig für Fzg. < **8F*AN012599** mit Dichtung **8F0 825 397 H**

Serienmaßnahme: Neues Dichtungskonzept > **8F*N012600** mit Dichtung **8F0 825 397 G**

Arbeitsschritte:

Alte VDKD-Dichtung entfernen => Neue KD VDKD-Dichtung 8F0 825 397 H verbauen!



Hinweise bzgl. der Arbeitsschritte finden Sie auch im Rep.-leitfaden (61)

12 Koppold, Klaus I/GS-4 06.04.2011

Audi Vorsprung durch Technik

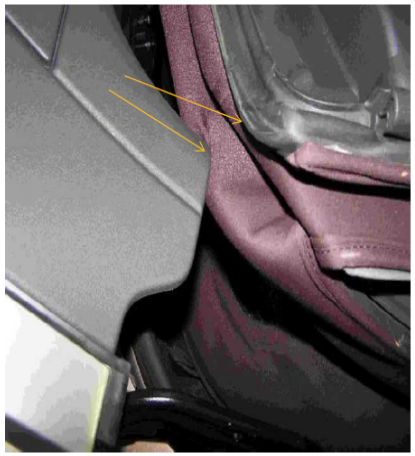
Possible complaint caused by the convertible roof compartment lid:
Air-tightness:

- Water will penetrate through the convertible roof compartment lid

Cabriolet-specific issues — A5 Cabriolet

3.) Ways in which the position of the convertible roof compartment lid has an impact on function and air-tightness

1.) Kollision: Verdeck – Verdeckkastendeckel (VDKD) beim Öffnungsvorgang



Beanstandung:

Beim Öffnungsvorgang streift die Verdeckspitze und/oder auch folgende Stofffalten am aufgestellten Verdeckkastendeckel (VDKD).

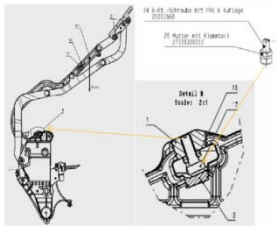
Dies kann bis zum Abbruch des Verdecklaufes bzw. zu starken Beschädigungen führen.

Beim Schließvorgang kann es ebenso zum Kontakt kommen, ist aber in der aktuellen Situation (Verdeckspitze und/oder folgende Stofffalten gleiten über den geneigten VDKD zurück) zuerst unkritisch bis es erneut zum Schließvorgang kommt.

Hinweis:

Achten Sie präventiv auf Beschädigungen an der Verdeckspitze sowie am VDKD.

3 Koppold, Klaus I/GS-4 02.10.2012



Audi Vorsprung durch Technik

Possible complaints caused by the convertible roof compartment lid:

Function:

- Collision between convertible roof and convertible roof compartment lid (seven-joint hinge)

Cabriolet-specific issues — A5 Cabriolet

4.) Environmental data for controlling the convertible roof

General information to aid analysis in the event of a complaint:
In the event of complaints concerning the convertible roof, remember that various faults in the environmental data can also lead to impairments with the function of the convertible roof (open/close function).
This applies to all Audi Cabriolet models (A4C, A5C, TT Roadster, R8 Spyder)

Check this data using Guided Fault Finding (GFF) via address word
=> 26 — electronic roof operations J256 (MVB)

Experience shows that the following points are often affected:

•Ambient temperature:	< -4°C => convertible roof does not operate (convertible roof can be closed once)
•Speed:	Up to max. 30/50 km/h (does not include A4 Cabriolet) depending on type (process to move the convertible roof [when closing] is interrupted if this speed is exceeded)
•Overheat protection:	Approx. 3 convertible roof cycles (opening/closing) possible, after that convertible top function is deactivated for max. 20-25 min
•Luggage compartment lid:	Position (closed)
•Side window:	Position (lowered)
•Battery voltage:	< 11.4 Volt normal convertible roof operation not possible!

Note:
Automatic closing of the side windows following movement of the convertible roof is no clear indication that the convertible roof has reached its defined end position (closed/open).
The convertible roof has only reached its end position (opened/closed) when warning lamp K215 (illuminated during operation) goes out.

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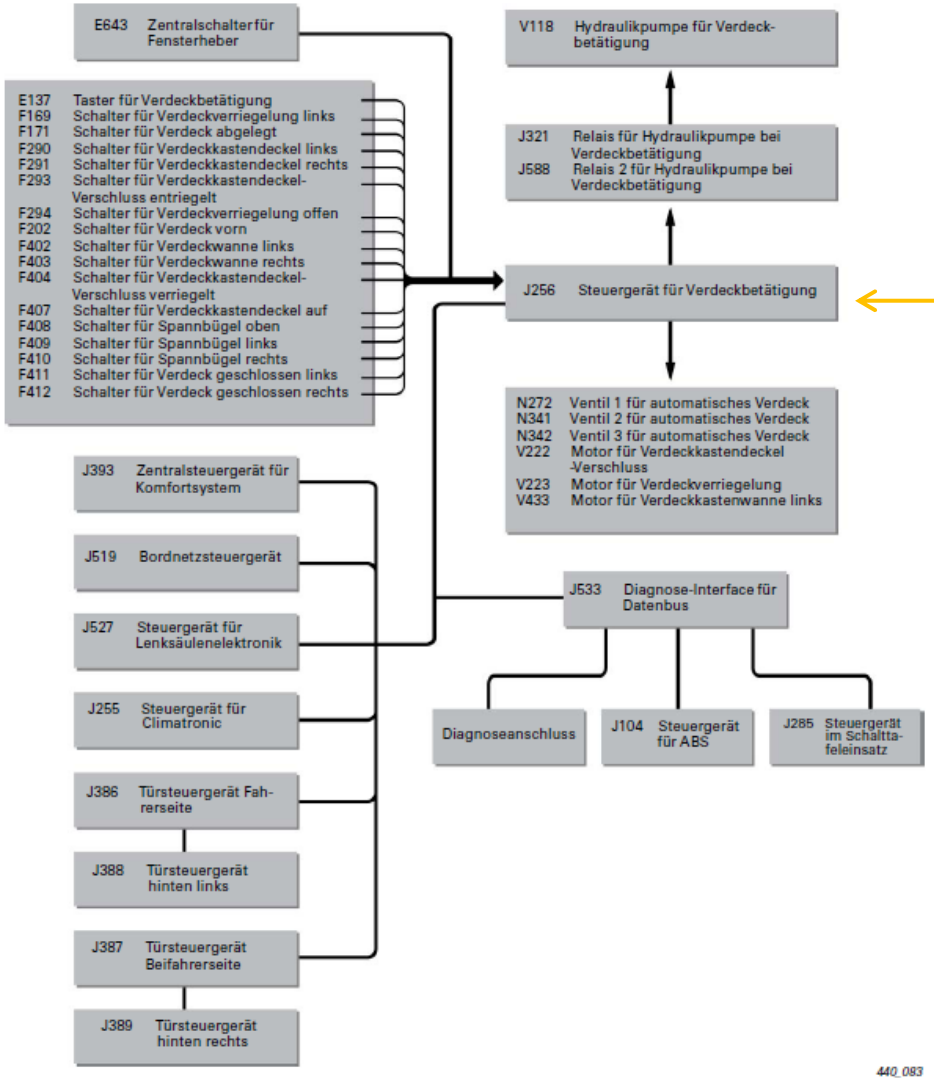
Cabriolet-specific issues — A5 Cabriolet

4.) Environmental data for controlling the convertible roof



System overview:
Elements networked with the convertible roof controller.

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Analyzing squeaking windows on frameless doors (A5/A7)

Analyzing squeaking windows on frameless doors (A5/A7)
Sample video



* View video titled “Window squeak” to hear noise sample

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Analyzing squeaking windows on frameless doors (A5/A7)

There are two different statements customers may make regarding squeaking noises on frameless doors.

- Window squeaks with short-stroke lowering
- Window squeaks when operating the window

Both points can often be reproduced both with the doors open and closed.

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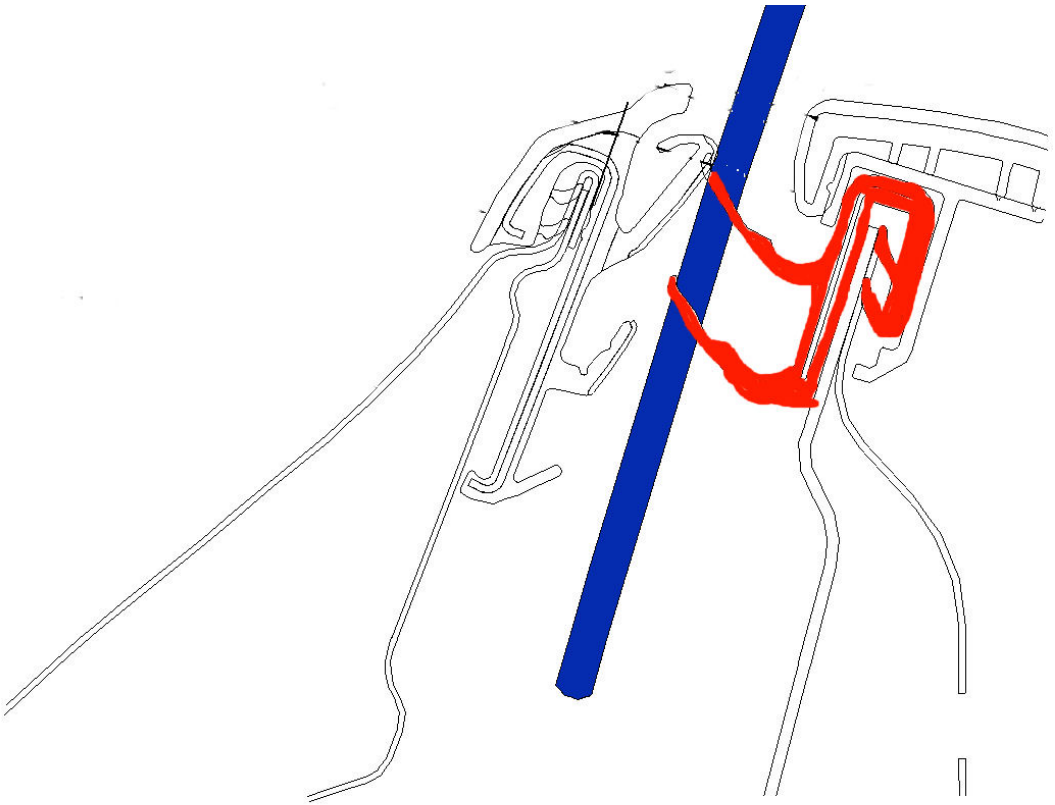
Analyzing squeaking windows on frameless doors (A5/A7)



Frequently, excessive contact pressure between the **door window pane** and the **inner window slot trim strip** is the cause of squeaking door windows.

Blue: **door window**
Red: **inner window slot trim strip**

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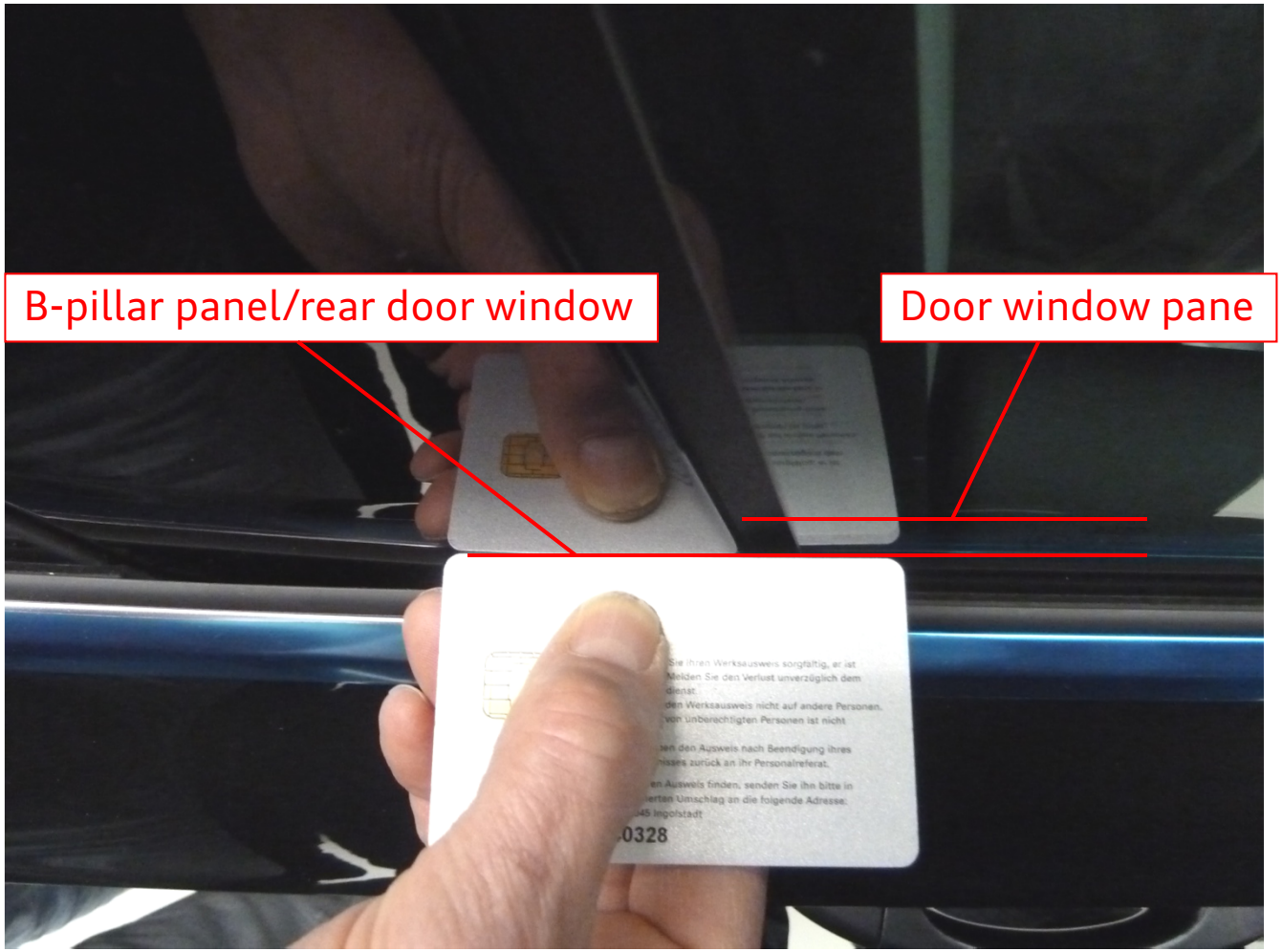
Analyzing squeaking windows on frameless doors (A5/A7)



The first step is to check the installation position of the door window in the vehicle.

If the window pane is too far in the center in relation to the vehicle, this is the first sign that a window may be squeaking.

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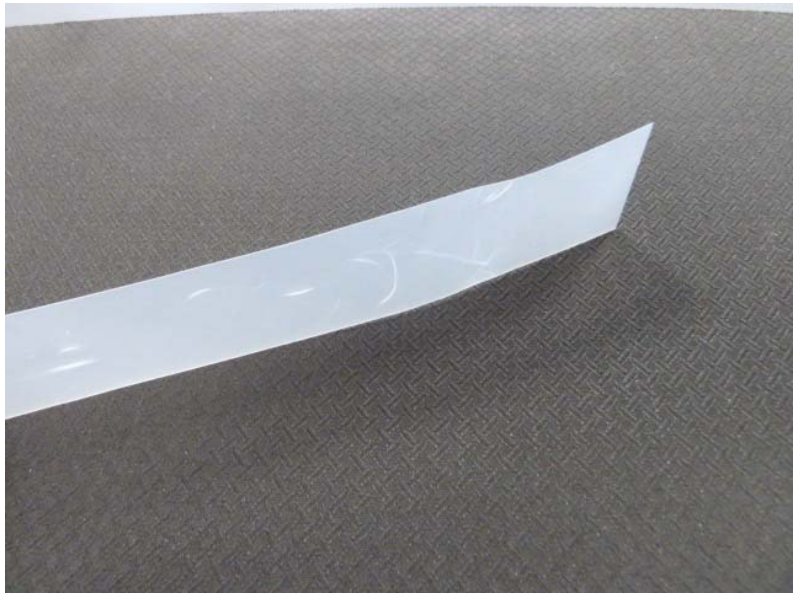
Analyzing squeaking windows on frameless doors (A5/A7)



It is very easy to analyze whether the contact pressure between the inner window slot trim strip and the door window pane is too great.

To do this, a film strip of around 20 x 4.5 cm in size is required. It is important to ensure that this film is approx. 0.3 mm thick.

Film strips can be made from folder film/label tabs, such as Avery no. 05113081.

You can then use this film to analyze the cause of the squeaking window.

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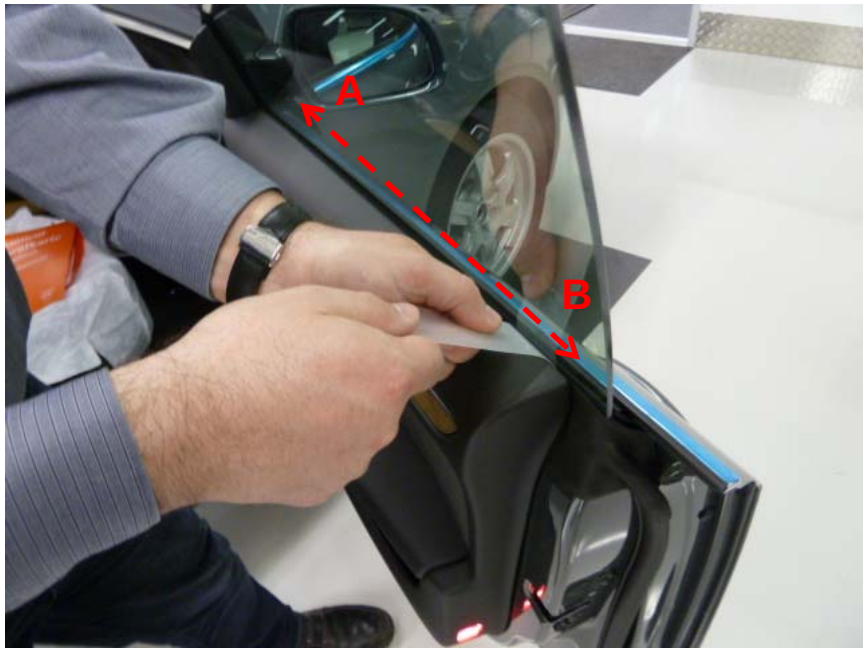
Analyzing squeaking windows on frameless doors (A5/A7)



Using this film, you can now analyze whether the pressure between the window trim slot strip and the door window panes is too great.

In order to insert the film between the inner window slot trim strip and the door window pane, the door window must be gently pushed outwards.

Now slide the inserted film from **A** to **B**; this will determine whether there is a specific area in which it is considerably harder to slide/pull the film.

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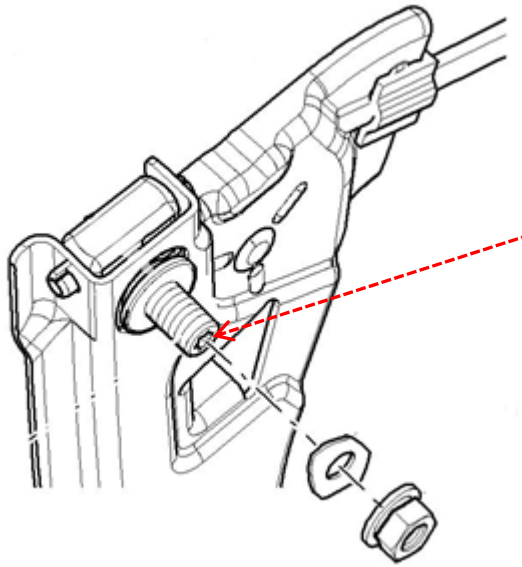
Analyzing squeaking windows on frameless doors (A5/A7)





If the door window is now too low in the area around the vehicle's B-pillar or the pressure between the door window pane and the window slot trim strip is determined to be too great, the following adjustment (to reduce the pressure) can be made.

The position of the door window can be changed using the top contact point on the B-pillar. To change the position, loosen the nut and rotate the inner torx to position the door window pane in relation to the B-pillar.

1 revolution = 1.25 mm

The door window must not protrude into the B-pillar panel/rear door window! The vehicle must continue to be wind and watertight.

Analyzing squeaking windows on frameless doors (A5/A7)

Note:

This analysis aid does not represent a general solution to be used for complaints about squeaking noises when operating the window!

Squeaking noises can be caused by a variety of issues.

- Incorrect installation
- Wear
- Environmental influences (tree resin, pollen dust, industry, sand)
- Incorrect car care products used
- Weather (temperature, different climate zones)
- etc.

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Audi braking guard

Audi braking guard

No.	Event	Topic	Type/model
1.		Audi braking guard	All

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Audi braking guard

- The braking guard is an additional function of the ACC, and works in conjunction with the radar sensor(s). The braking guard becomes active in situations where a vehicle in front brakes suddenly, or where the car approaches a slower-moving object at high speed.

- The braking guard is active when the ACC is switched off.
  - The function can be deactivated via the MMI; the message “braking guard: off” then appears in the instrument cluster

- There are different versions of braking guard. The function of braking guard 1, originally introduced with the A6 (4F), has been gradually enhanced with additional functions.

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Audi braking guard
Braking guard 1

- Used in: A6 (4F) from MY 06 (ACC 2)

- In the event of an impending collision, the ABS hydraulic unit is pre-filled to allow the brake to be actuated more quickly. In the ABS/ESP control unit, the hydraulic braking assistant is set to a higher sensitivity level

- No warning is issued, neither an audible warning nor a warning jolt or braking intervention

- The driver cannot directly feel the function of braking guard 1. The altered braking behaviour only becomes apparent in the event of an emergency braking manoeuvre.

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Audi braking guard
Braking guard 2

- Used in:

Q7 (4L)	from MY 07 (ACC 2)
A4 (8K)	from MY 09 (ACC 2)
A5 (8T, 8F)	from MY 08 (ACC 2)
Q5 (8R)	from MY 09 (ACC 2)

- In the event of an impending collision, the ABS hydraulic unit is pre-filled to allow the brake to be actuated more quickly. In the ABS/ESP control unit, the hydraulic braking assistant is set to a higher sensitivity level
- A warning is also issued to the driver:
  - A visual and audible warning is given in the form of a display and warning sound
  - A haptic warning is given in the form of a warning jolt (brakes are not applied)
- **Two types of warning are issued during this process:**
  - **Distance warning**

    If the driver drives too closely behind a vehicle in front for an extended period of time, the ACC display starts flashing red. This action is intended to alert the driver to the present danger

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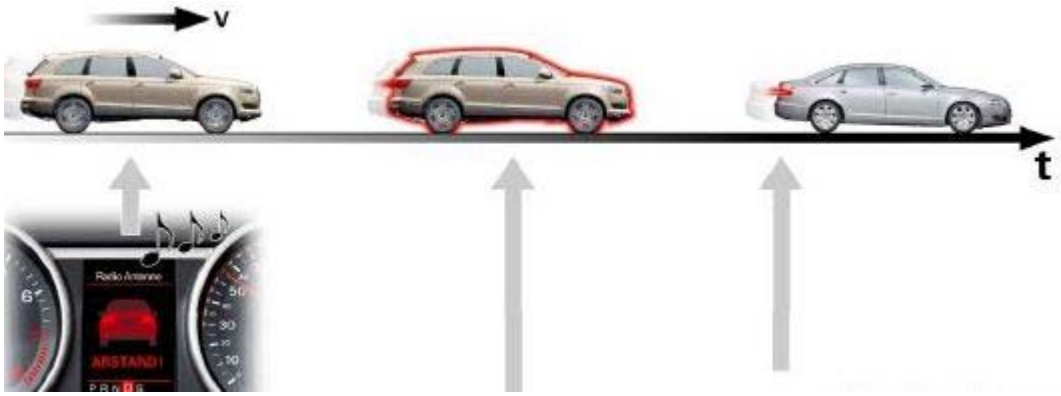
Audi braking guard
Braking guard 2

- **Rapid-approach warning:**

  If a clearly slower vehicle is travelling in front, or if a vehicle travelling in front brakes sharply, the car issues a rapid-approach warning. In this case, it may only be possible to avoid a collision if the driver is forced to respond out of his or her comfort zone — by braking or swerving.

  The warning is first issued as a display and an audible warning. If the driver still does not brake following these warnings, a brief warning jolt is initiated.

- Furthermore, there is no braking intervention



Initial warning

Braking jolt

Acute warning

Car in front brakes sharply

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Audi braking guard
Braking guard 2 plus pre sense front

- Used on: A6, A7 (4G) from MY 12 (ACC 3 with software up to 160)
  A8 (4H) from MY 11 (ACC 3 with software up to 160)

- Same functions as described for braking guard 2
- Additionally, if the driver does not respond following a rapid-approach warning, a braking intervention is initiated. Partial braking is introduced, initially at 3 m/s^2; if there is still no response from the driver, the car brakes with increased braking force in an attempt to reduce the speed of the vehicle. If the driver still does not respond, the car is fully braked shortly before impact to minimise the effects of the collision. This full-braking action is only active for a brief period, no longer than 500 ms (= ½ second).

  If the driver does not brake strongly enough during this sequence, the system supports him or her by supplying increased braking force in an attempt to avoid the collision

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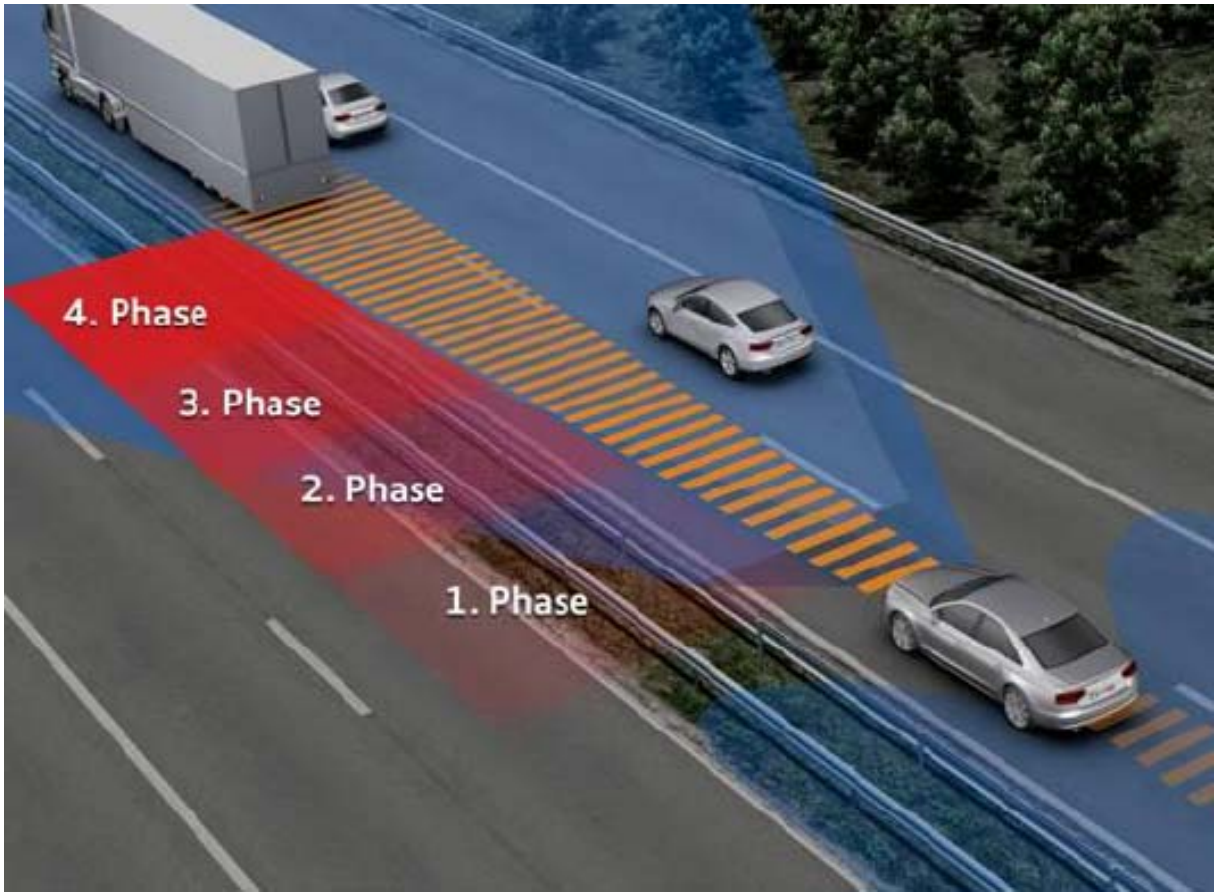
Audi braking guard

Braking guard 2 plus pre sense front, visual representation



1. Phase 1:
Visual and audible warning

2. Phase 2:
Warning jolt, followed by partial braking (3 m/s²)

3. Phase 3:
Stronger partial braking (up to 5 m/s²)

4. Phase 4:
Full braking (500 ms)

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Audi braking guard

Braking guard 2 plus pre sense front with full deceleration in the lower speed range

- Used on:

A4 PI (8K)	from MY 13 (ACC 3)
A5 PI (8T, 8F)	from MY 13 (ACC 3)
Q5 PI (8R)	from MY 13 (ACC 3)
A6, A7 (4G)	from MY 13 (ACC 3 with software from 400)
A8 (4H)	from MY 13 (ACC 3 with software from 400)

- Same functions as described for braking guard 2 plus pre-sense front
- Additionally, if the vehicle is travelling at a speed under 30 km/h and the driver does not respond following the rapid-approach warning, a braking intervention is initiated, as described previously for braking guard 2 plus pre sense front

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Audi braking guard

Braking guard 2 plus pre sense front with full deceleration in the lower speed range

- If the vehicle is travelling at a speed below 30 km/h and only a full-braking action can avoid the collision, the system deploys automatic emergency braking, decelerating the vehicle up to 8 m/s² (shortly before ABS control). The maximum deceleration is 20 km/h.
  At speeds below 20 km/h, braking is possible to bring the vehicle to a stop. The system responds to other vehicles which are moving, standing or have come to a stop.

- The braking guard is a support system, and cannot prevent an accident on its own. The driver remains solely responsible for ensuring a timely response and for keeping the vehicle under control.

- The braking guard can only function within the limits of the system. If it is not possible to detect hazards, the braking guard will not respond – see Owners manual for further information.

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Audi braking guard
Application matrix

	Braking guard 1	Braking guard 2	Braking guard 2 plus pre sense front	Braking guard 2 plus pre sense with full deceleration
Audi A6 (4F)	X			
Audi Q7 (4L)	X	X		
Audi A4 (8K), A5 (8T, 8F) ACC 2	X	X		
Audi Q5 (8R) ACC 2	X	X		
Audi A6, A7 (4G) ACC 3 software up to 160	X	X	X	
Audi A8 (4H) ACC 3 software up to 160	X	X	X	
Audi A4 PI (8K), A5 PI (8T, 8F) ACC 3	X	X	X	X
Audi Q5 PI (8R) ACC 3	X	X	X	X
Audi A6, A7 (4G) ACC 3 software > 400	X	X	X	X
Audi A8 (4H) ACC 3 software > 400	X	X	X	X

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Audi braking guard
Possible customer complaint “braking guard does not work”

- The braking guard is designed so that a rapid-approach warning is only issued where there is immediate risk of a collision. As such, this function is not noticeable in normal traffic conditions. Even if the customer subjectively believes he or she drives very close to the vehicle in front, this may not objectively constitute a critical situation that would require an intervention from the braking guard.
- There are no additional components for the braking guard function that would not also be required by the ACC. It is not possible for the braking guard to have a function restriction without adversely affecting the ACC function, in which case a warning would be displayed in the instrument cluster.
- It is not permitted to test the function of the braking guard during a test drive on public roads. To test this function, a traffic situation posing the risk of a collision would have to be deliberately set up. This would constitute a wilful posing of a risk to traffic safety and is strongly discouraged.

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Thank you.