

**Audi Approved Collision Program  
2012**

# Audi Authorized Collision Repair Program

- ▶ Our Mission:

- ▶ We promote the proper quality of collision repairs for Audi vehicles through education, communication, use of factory standards, and the support of a highly trained and skilled network of Audi Authorized Collision Repair Facilities throughout the U.S.
  
- ▶ Our Customers deserve their car repaired to pre-loss crashworthiness and vehicle quality while receiving “Audi” level of service

# Two Levels of Audi Authorized Collision Programs

## ▶ Audi Authorized Collision Repair Facility Program

- Can repair all non-aluminum Audi vehicles including high-strength steel technology
- Meets Audi's yearly authorization standards
- Work in conjunction with a local dealership

## ▶ Audi Authorized Aluminum Collision Repair Facility Network

- Can perform all repairs for aluminum & non-aluminum Audi model vehicles
- Trained and tested in the skills required to repair and weld aluminum space frames and structural components
- Requires an additional investment in aluminum tools, specialized repair bay, equipment, and training on aluminum vehicles
- Meets Audi's yearly authorization standards for aluminum facilities

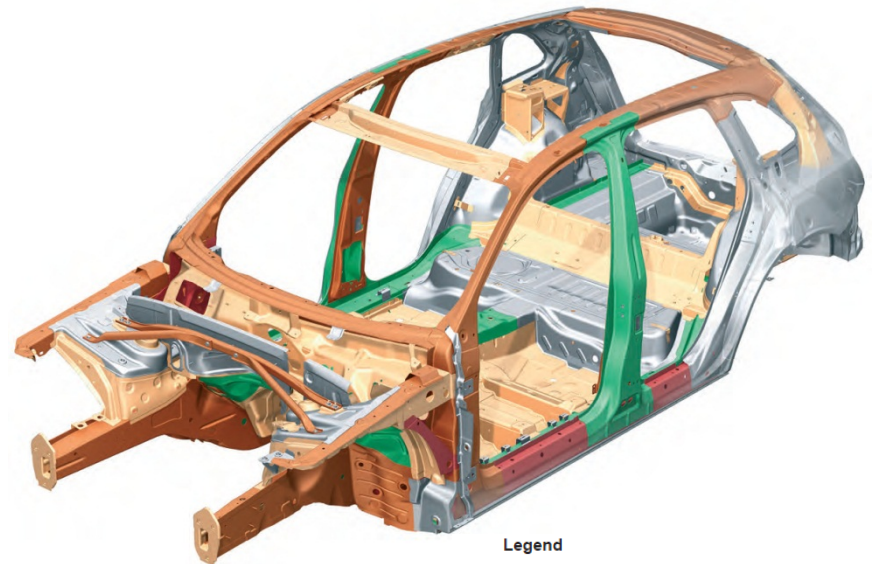
# Considerations for Estimating and Repair

- ▶ Materials used in the construction
- ▶ Specified Repair Procedures and Equipment
- ▶ Specialized Repair Techniques
- ▶ Material Limits
- ▶ Current and Upcoming Vehicle Technologies






# Vehicle Materials

► Today, modern bodies need to meet extensive and very complex requirements. They are modified according to the following main points:

- Passive safety
- Lightweight construction
- Stability and vibration resistance
- Pedestrian protection
- Corrosion protection



Legend

	Steel sheet up to 140MPa
	High-strength steel sheet from 180 to 240MPa
	Higher-strength steel sheet from 260 to 320MPa
	Ultra-high-strength steel sheet from 340 to 700MPa
	Ultra-high-strength, thermoformed steel sheet over 1,000MPa

# Specific Repair Procedures and Equipment

Drill the holes for the gas-shielded arc plug weld seam using a 7 mm diameter drill -VAS 5830- Ø.

Transfer separating cuts to the new part and cut with a body repair saw -V.A.G

1523A-.



## Note

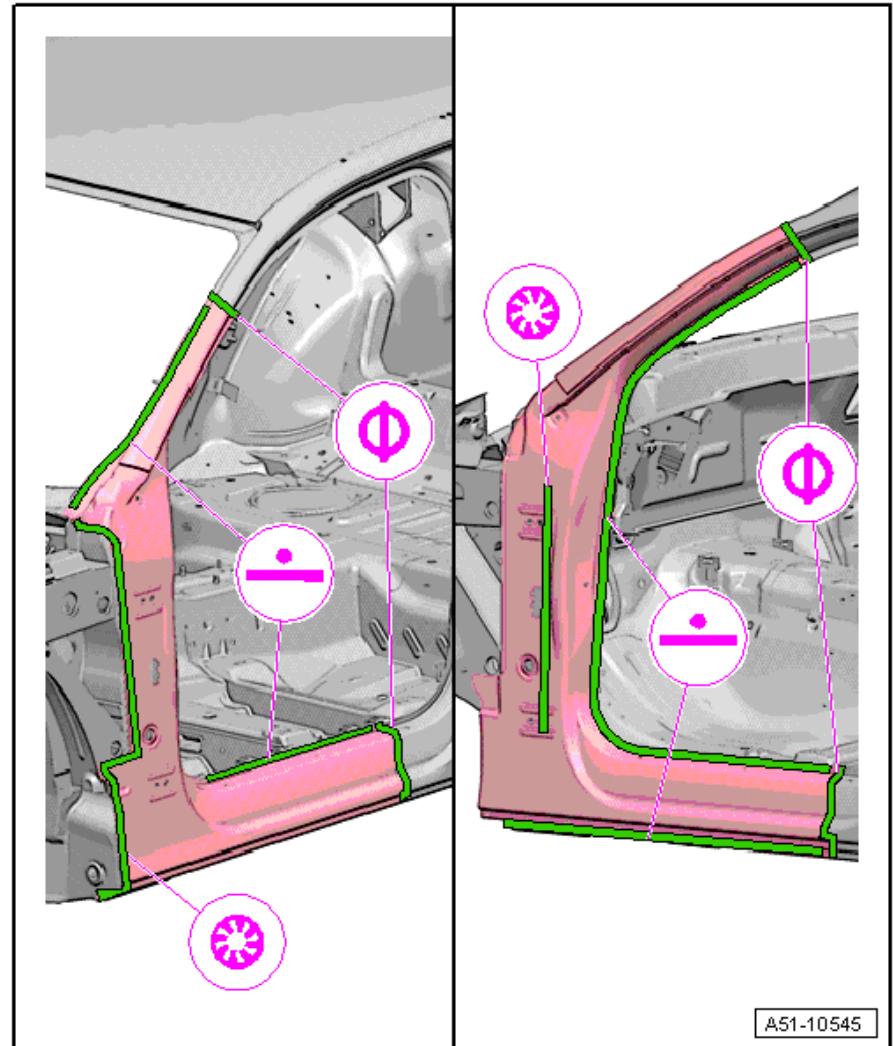
When using different types of steel and materials of different strengths, one of the resistance spot welders listed and approved by Audi is required to service correctly under

→ Chapter „Special Tools“.

The connection is made with a gas-shielded arc plug weld seam in place of the factory spot-welded bonded joints

Weld the A-pillar with a resistance spot welder, straight-line spot weld seam.

Butt weld the separating cuts with a gas-shielded arc continuous weld seam using the gas-shielded welder 250A -VAS 6045A



# Special Procedures - Joining Techniques

The screenshot displays the ElsaWeb software interface for Audi R8 body collision repair. The left sidebar shows a navigation tree with the following structure:

- Body Collision Repair
  - 00 General, Technical data
    - General Information
      - General Information
      - Vehicle Data
      - Safety Precautions
      - Contact Corrosion
      - Molded Foam Part
      - Laser Welds
      - Aluminum Repair Information
      - Body Construction
      - Materials for Joining Techniques
      - Removing Dents
      - Surface Treatment
      - Rivets Difficult to Access**
      - Contoured Surface
      - Corrosion Protection
      - Bonded Joints
      - Straightening Rack
    - Specifications
    - Special Tools
  - 50 Body Front
  - 51 Body Center, Chassis, Roof
  - 53 Body Rear
  - AH General Information

The main content area contains the following text:

— Remove the bolts with the pop rivet pliers (pneumatic) -V.A.G 2003- and mouthpiece pneumatic pop rivet pliers extension -V.A.G 2003/1-.

On the right side, there are three technical diagrams illustrating the repair process. The top diagram shows a hand using pop rivet pliers on a bolt, with a label 'A51-0466'. The middle diagram shows a close-up of the bolt being removed. The bottom diagram shows the use of a pneumatic pop rivet pliers extension, with a label 'A51-0467'.

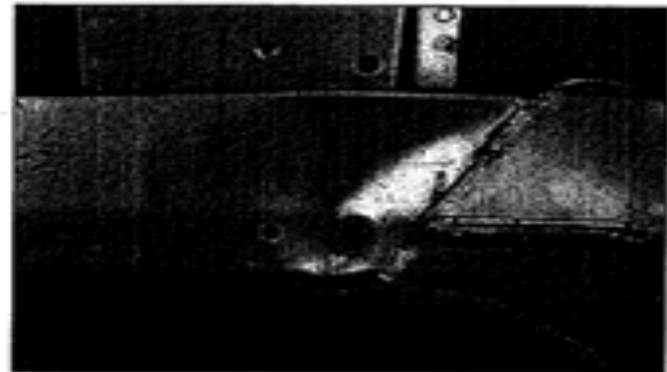
# Understanding the Materials and Their Limits

Audi Aluminum Repair



## Repair Guidelines

- Damaged castings must be replaced
- Damaged extrusions must be replaced
  - may have sectioning procedures
  - may have to be replaced at factory seams
- Damaged stampings have repair options
  - may have sectioning procedures
  - may have to be replaced at factory seams
  - straightening may be an option



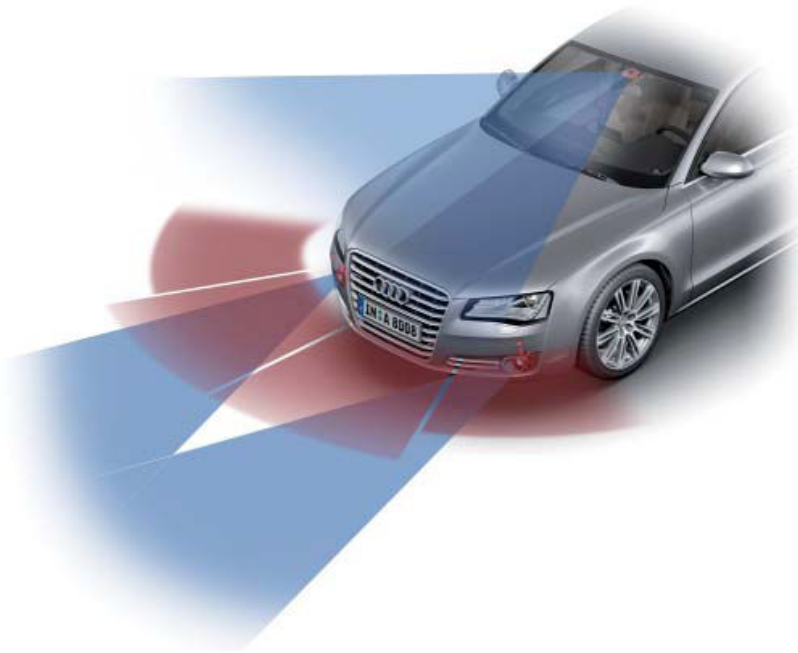


# Current/ Upcoming Technologies to Consider

- ▶ **Adaptive Cruise Control**
- ▶ **Adaptive Cruise Control with Stop and Go**
- ▶ **Night vision assist**
- ▶ **Audi active lane assist**
- ▶ **Audi Side Assist**
- ▶ **Heads-up Display**
- ▶ **Audi Parking Aids**

# Adaptive Cruise Control

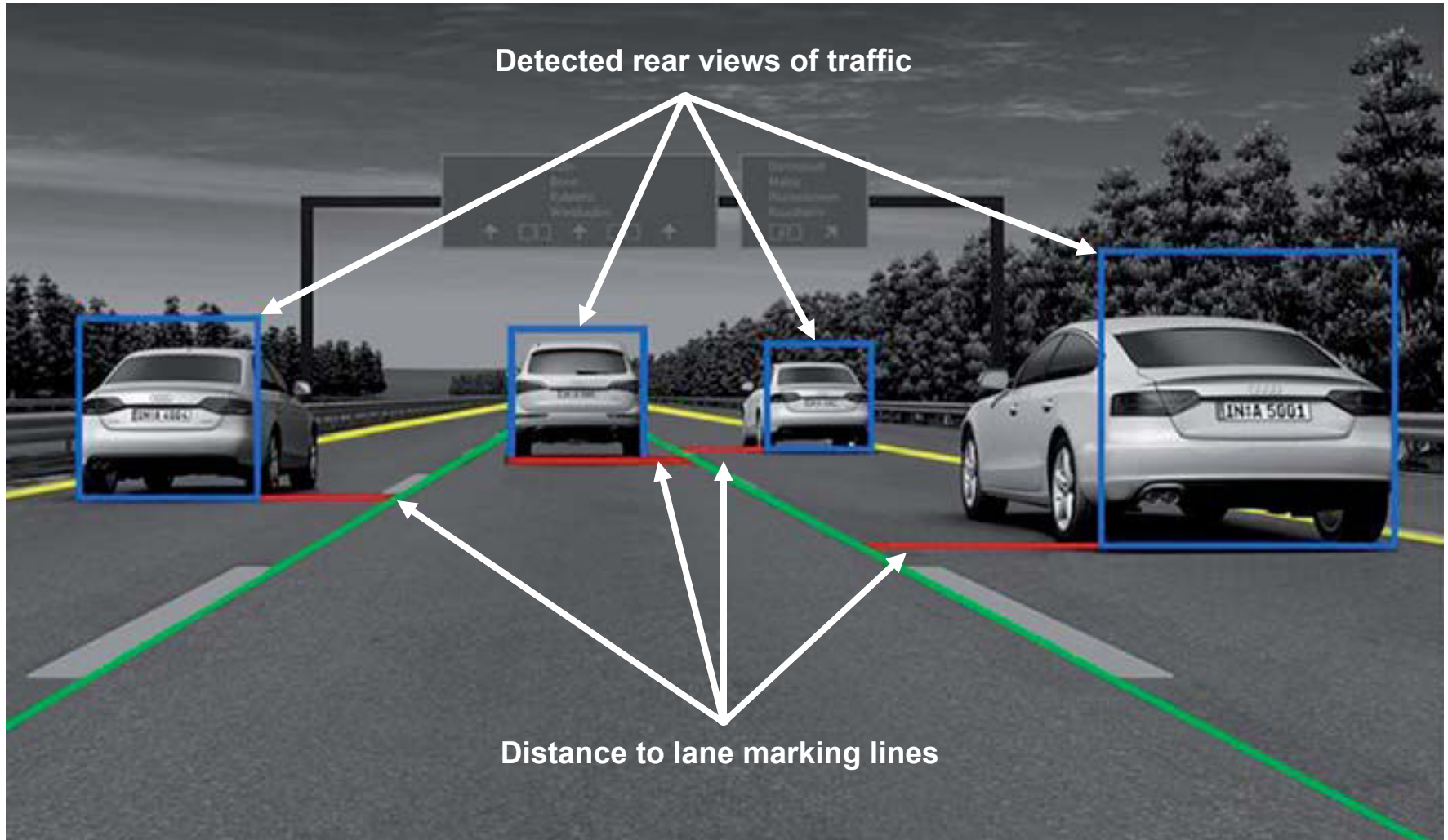
## New functions



- ▶ **Two Distance Regulation Control Modules. (J438-master, J850-slave.)**
- ▶ **Measuring range of 1.6 ft – 820 ft (0.5m – 250 m).**
- ▶ **Stop and Go.**
- ▶ **Start-off monitoring.**
- ▶ **Audi braking guard.**
- ▶ **Manual acceleration with operating stalk. (RESUME).**
- ▶ **Enhanced functions with Audi side assist.**
- ▶ **Component removal and installation procedures have changed.**

# Functions for Adaptive Cruise Control with Stop and Go

## Simulated image of traffic recognition



# Night vision assist

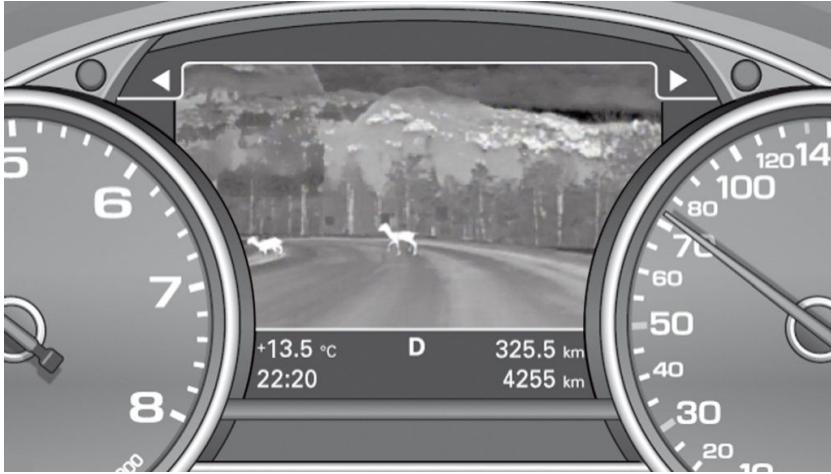
## Highlighting detected pedestrians

- ▶ Identification done through infrared camera technology.
- ▶ Classification of persons based on a list of categories.
- ▶ Detected persons highlighted by a yellow rectangle with brackets.
- ▶ No classification of persons who are partially concealed.
- ▶ Classification of persons only within a distance of approximately 50 ft to 295 ft ( 15m to 90m) of camera.



# Night vision assist

## Detection of animals and cyclists



- ▶ Larger animals are identified because of their body heat.
- ▶ Smaller animals are not identified.



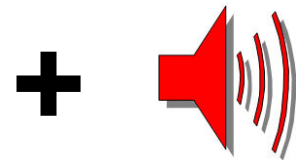
- ▶ Cyclists are clearly visible but at times are not fully highlighted.
- ▶ Motorcyclists are not highlighted by system.

# Night vision assist

## Driver warnings

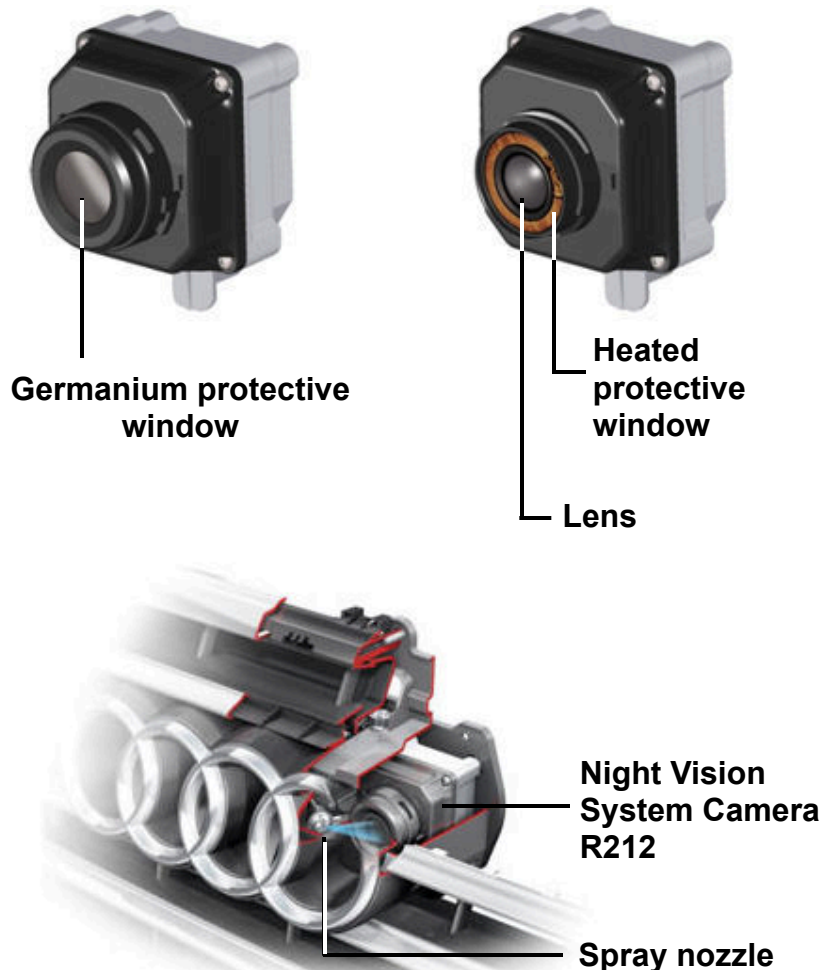
When the system calculates/detects the risk of collision with a pedestrian:

- ▶ Driver is alerted by a warning gong from the instrument cluster. (This warning can be deactivated through the MMI).
- ▶ The yellow pedestrian highlighting changes from yellow to red.



# Night vision assist

## Night Vision System Camera R212

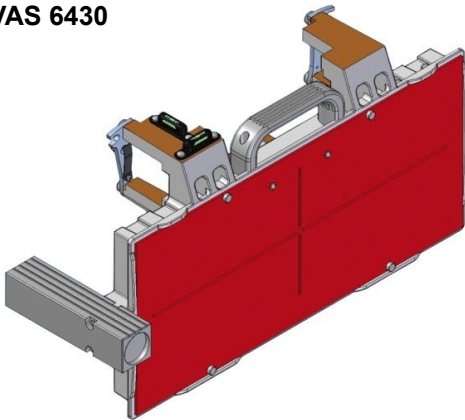


- ▶ Infrared thermal imaging camera.
- ▶ 320 X 240 pixel resolution.
- ▶ 30 frames per second.
- ▶ Stores last calibration results.
- ▶ Germanium protective window.
- ▶ Window heated at temps < 43°F (6°C.)
- ▶ Cleaned by washer jet.
- ▶ Protective window and seal replaceable.

# Night vision assist Calibration



VAS 6430



VAS 6430/6

## What special tools are needed?

- ▶ VAS Scan Tool.
- ▶ VAS 6141.
- ▶ VAS 6430 or VAS 6430/1.
- ▶ Calibration plate VAS 6430/6.
- ▶ Laser measuring device VAS 6350/3.

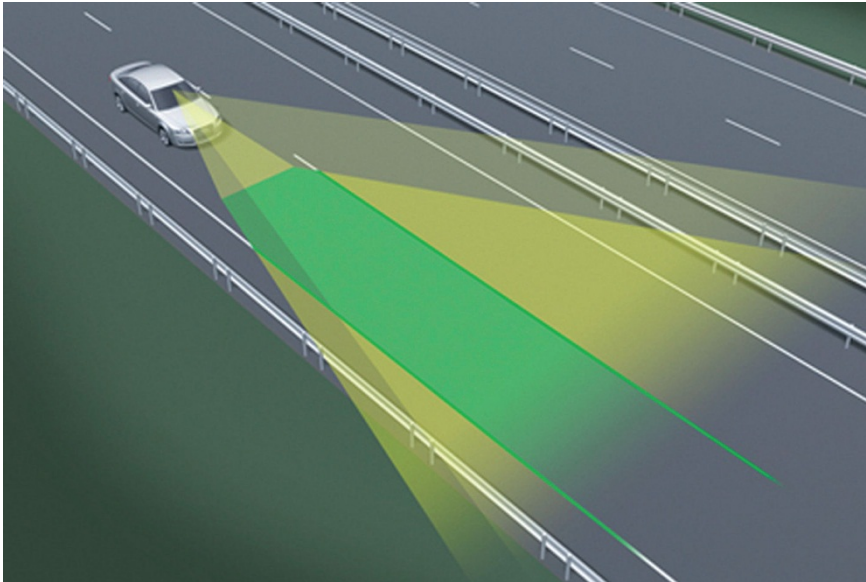
## When do you re-calibrate system?

- ▶ Replacement of camera.
- ▶ Replacement of camera housing mounting bracket.
- ▶ Replacement/removal of front bumper.
- ▶ DTC: No or incorrect Basic Setting in control module.
- ▶ After vehicle alignment.



# Audi active lane assist > MY2013

## Feature overview

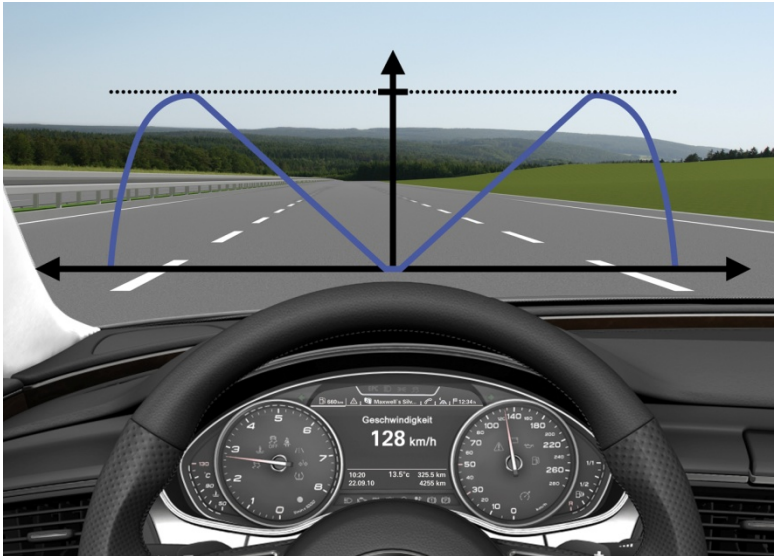


- ▶ **Steering intervention through the electro-mechanical power steering system.**
- ▶ **Continuous steering intervention mode to assist the driver in keeping the vehicle in the center of the lane.**
- ▶ **A system mode that aids in preventing inadvertent lane departures when approaching a lane marker.**
- ▶ **Driver can adjust sensitivity.**
- ▶ **Warning vibrations no longer produced by an “imbalance” motor.**
- ▶ **Steering wheel vibration warning can be enabled/disabled through MMI.**
- ▶ **Master control function through Image Processing Control Module J851.**

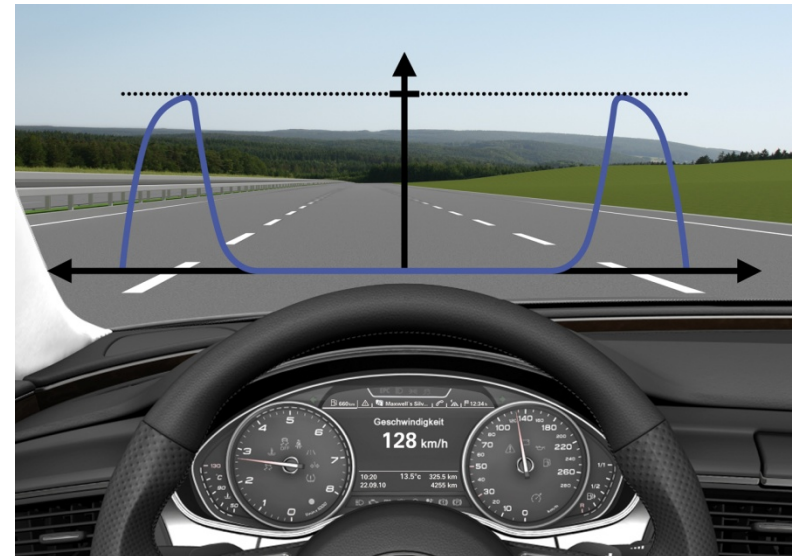
# Audi active lane assist

## System modes

System response to system setting:  
steering input "early"



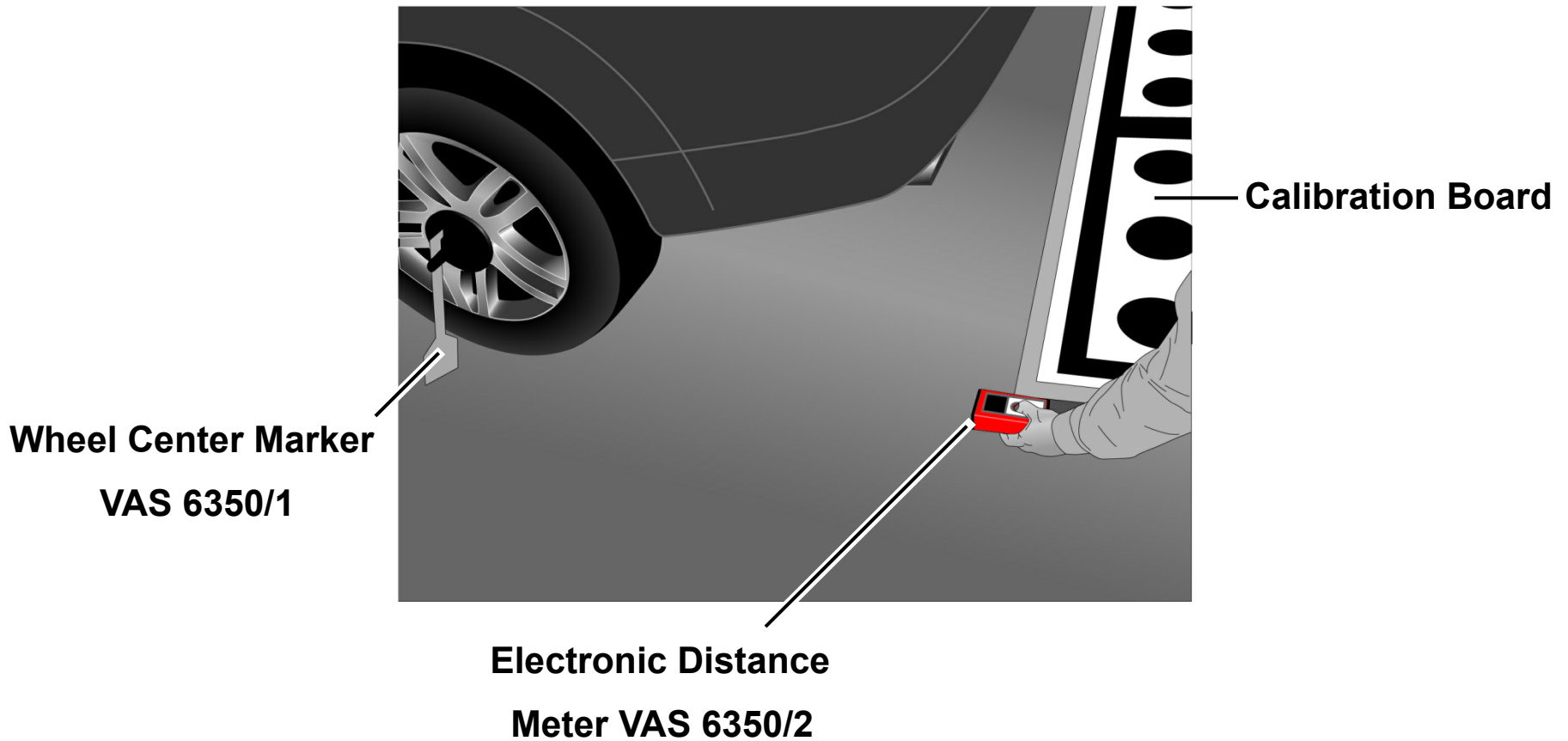
System response to system setting:  
steering input "late"



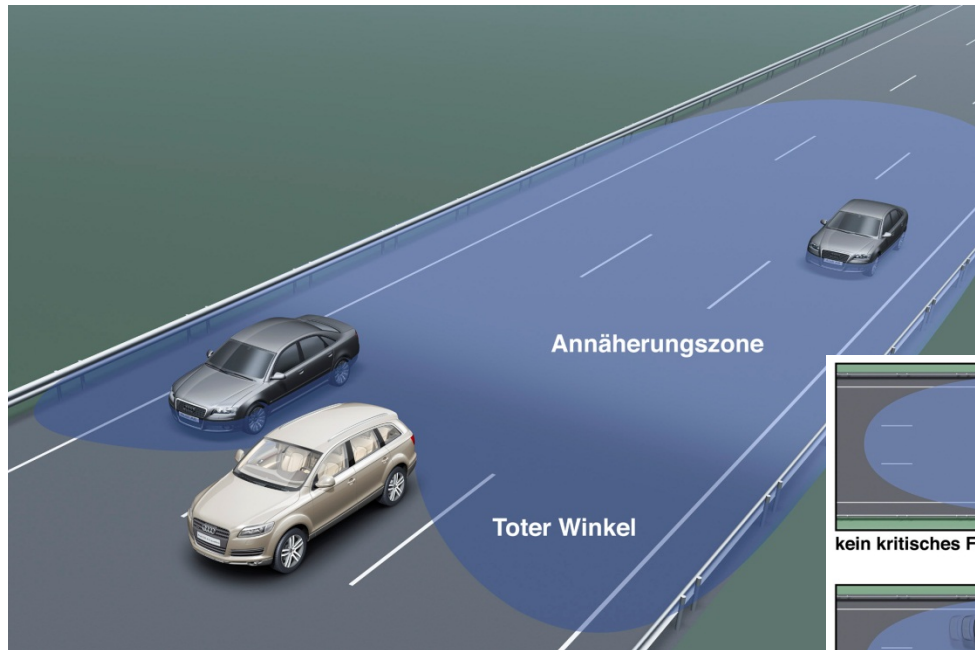
- ▶ Helps the driver to keep vehicle in center of lane through continuous corrective steering control.
- ▶ Driver is warned by steering vibrations if the function has been activated in the MMI.
- ▶ Can be set by the driver in the MMI menu.

- ▶ Helps the driver avoid unintentional lane departure by corrective steering control.
- ▶ Driver is warned by steering vibrations if the function has been activated in the MMI.
- ▶ This is the default setting on delivery of all new vehicles from the factory.

# Lane Change Assist Calibration with the VAS 6350

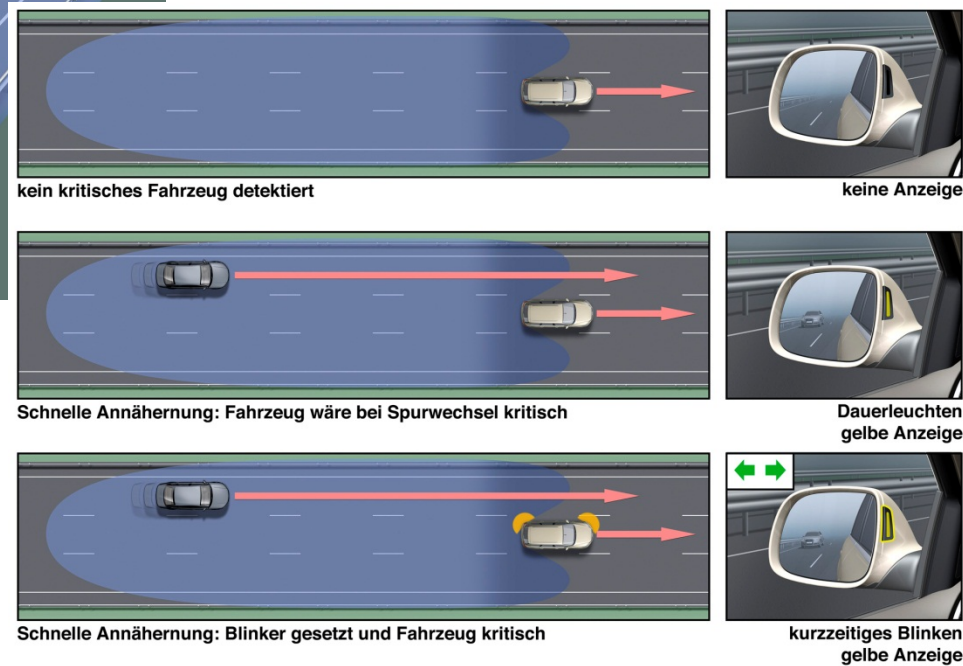


# Audi Side Assist



The areas to the side of and behind the vehicle are monitored using radar sensors.

If a vehicle is located in the blind spot or if it approaches quickly from behind, the driver is warned by a continuous lighting display in the exterior mirror. If, in this situation, the driver activates the turn signal, the system warns of a possible collision by flashing.



# Audi Side Assist

Instrument Cluster



Warning Light -- Left

Warning Light -- Right



Side Assist ON/OFF Button



MMI Display for Adjusting Brightness



Sensor 1 -- Left



Sensor 2 -- Right



Audi side assist is a passive driver assistance system.

Audi side assist does not intervene in the driving of the vehicle.

# Head-up Display

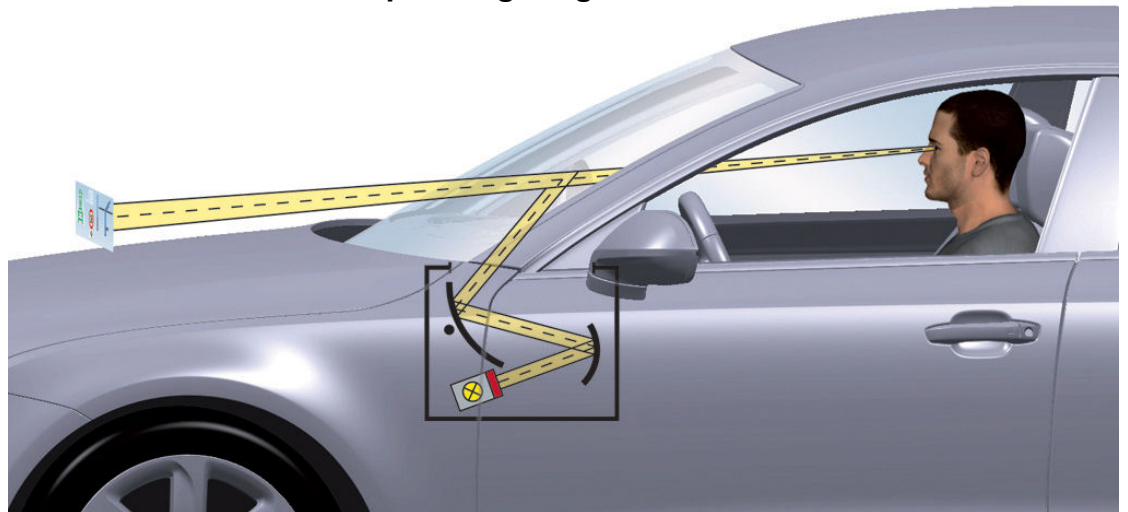
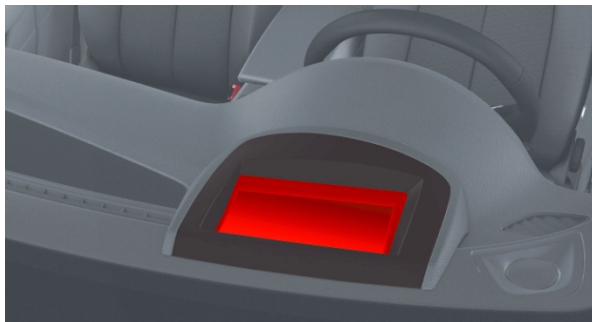


**Windshield Projection Head Up Display Control Module J898**

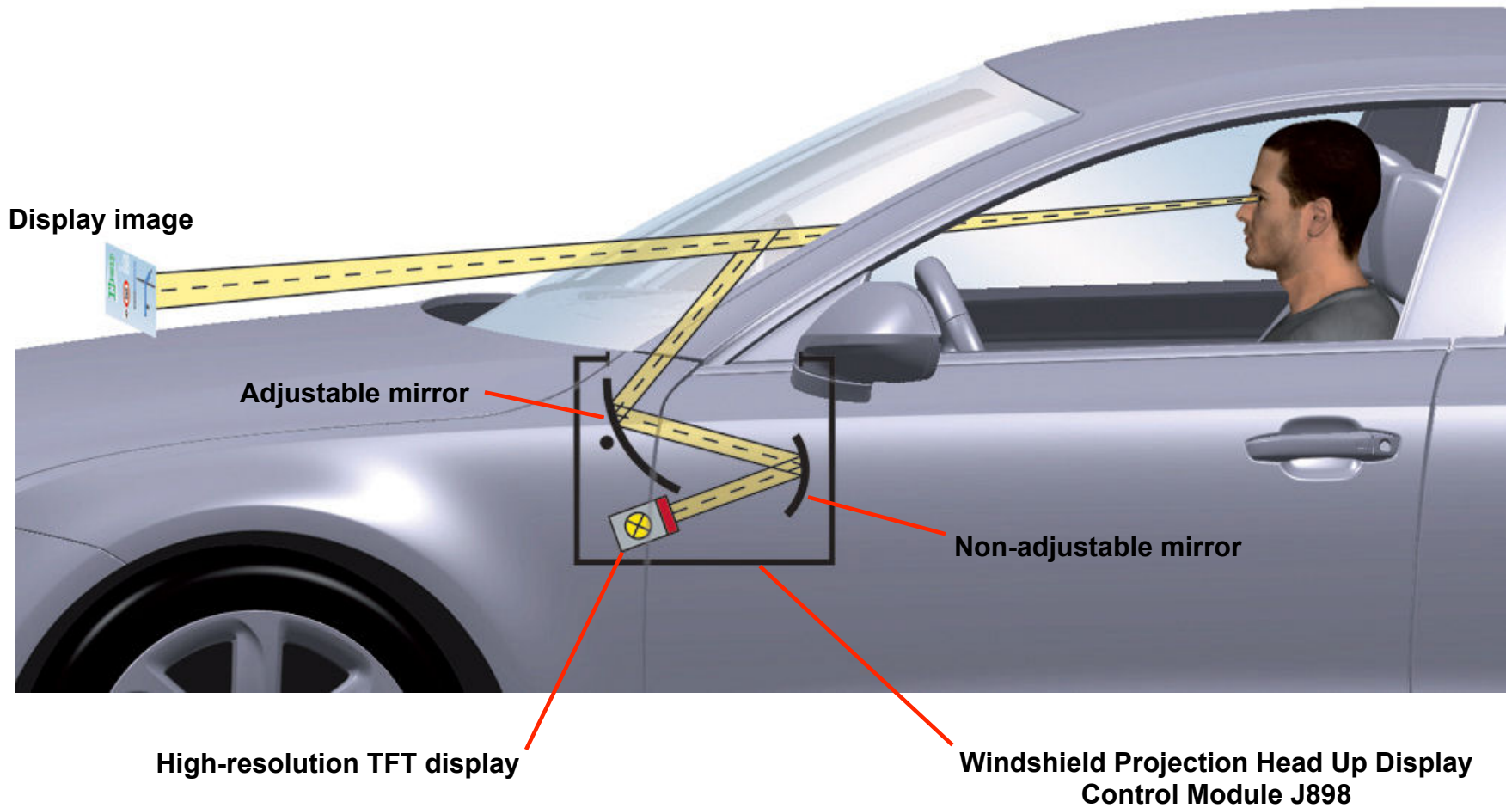
**Position controller for head-up display, Windshield Projection Head Up Display Button E736**



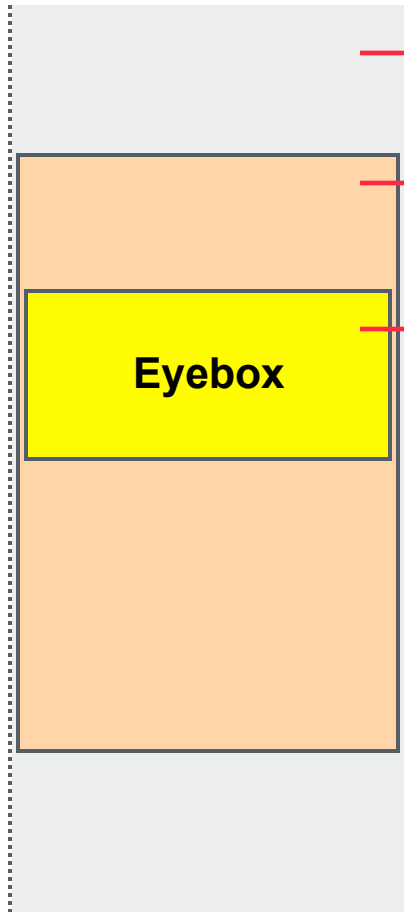
**Instrument panel lighting control**



# Heads-up Display Operation



# Heads-up Customer: accessible vertical calibration



- ▶ The adjustment range of the eyebox can be aligned vertically on the windshield by the customer.
- ▶ Adjustment range of the eyebox determined by the service vertical calibration.
- ▶ Visible area in which the driver sees the head-up display untruncated.

Position controller for head-up display,  
Windshield Projection Head Up Display Button E736





# Heads-Up: Service calibration with the VAS Scan Tool

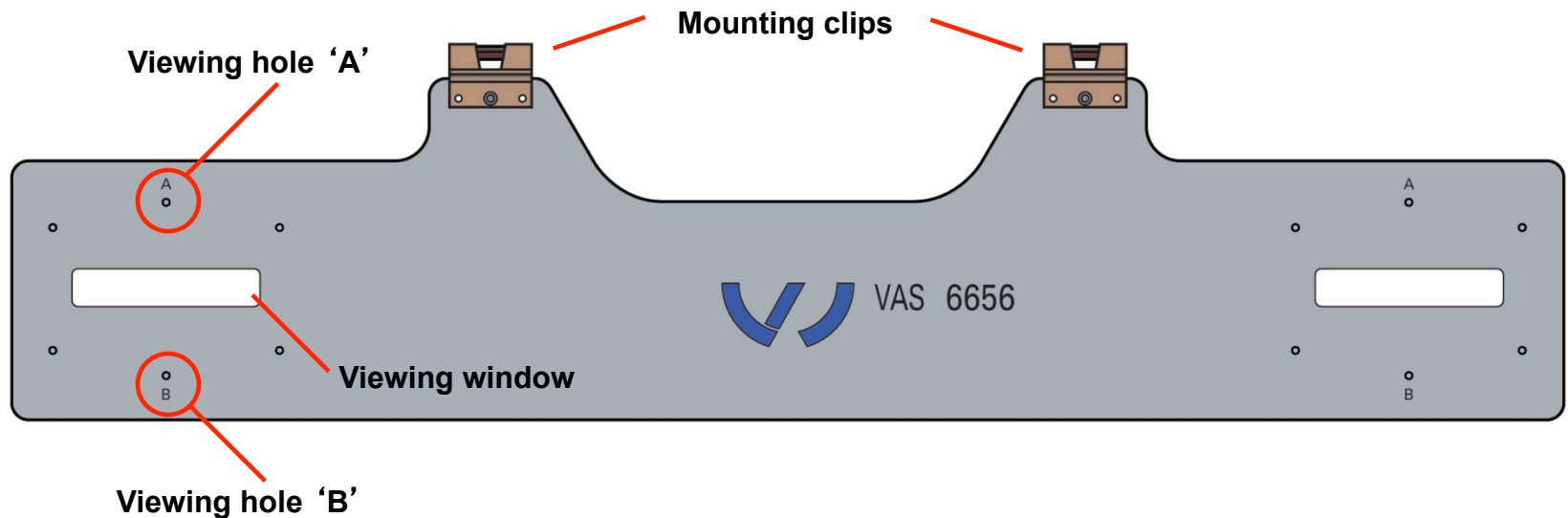


## Two-step calibration:

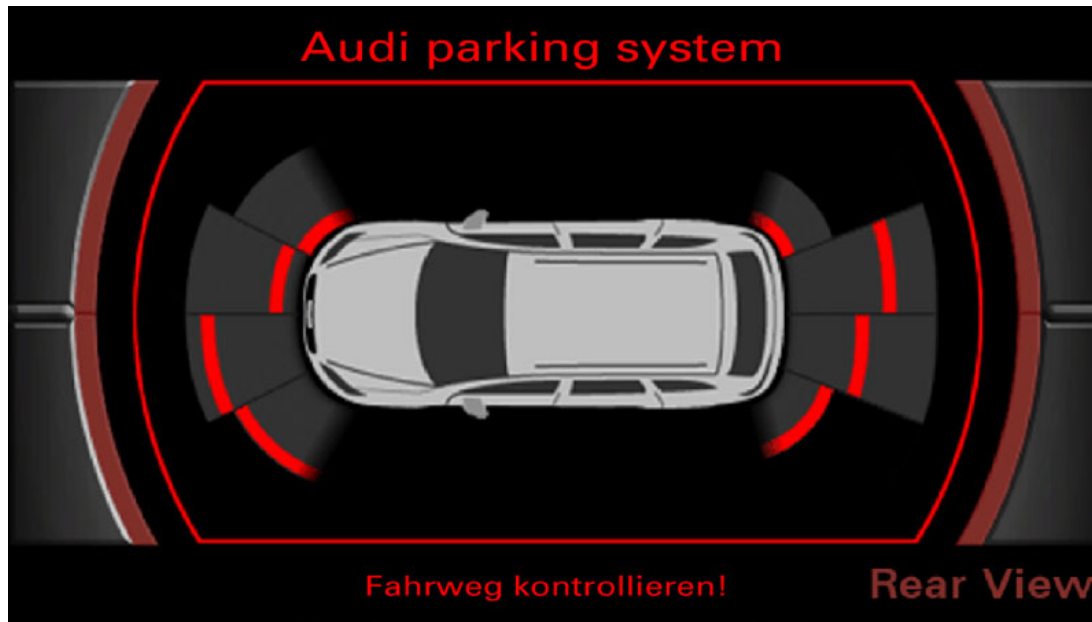
- ▶ Height adjustment.
- ▶ Distortion correction.

## What special tools are needed?

- ▶ VAS Scan Tool.
- ▶ VAS 6656.

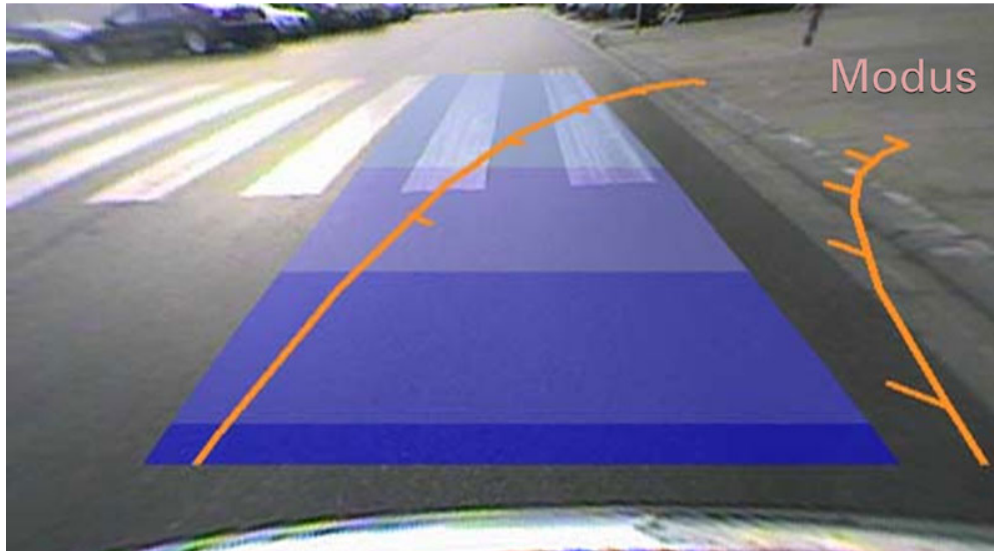


# Audi Parking Aid

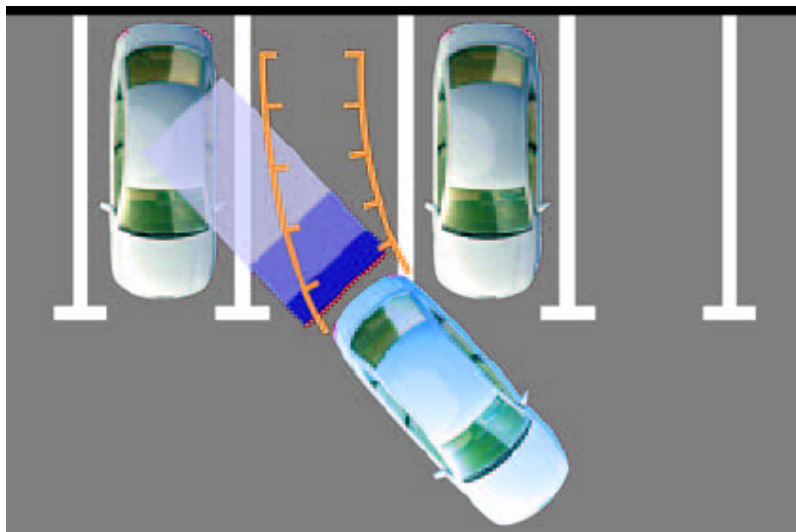


A purely acoustic solution can only use a different signal frequency to indicate if an obstacle was detected by the 4 front parking aid sensors or the 4 rear parking aid sensors.

# Audi Parking System Plus Advanced

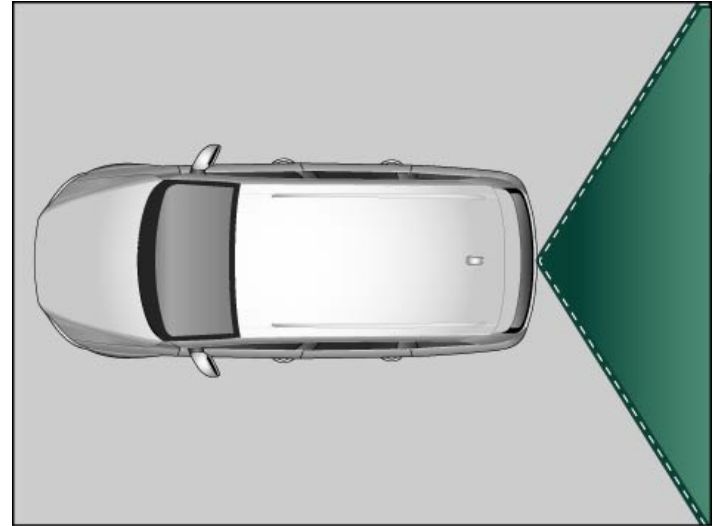
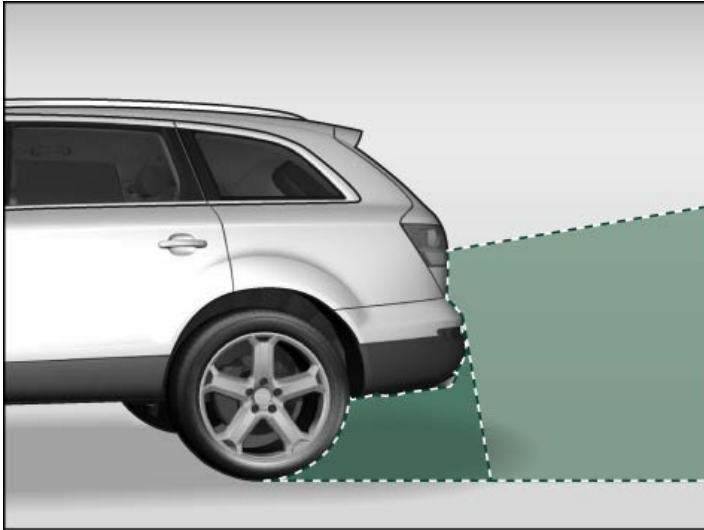


The reversing camera allows obstacles to be approached significantly closer while allowing the driver's view to remain mainly to the front.



Reverse parking is simplified by the static and dynamic reference lines of the video image.

# Reversing Camera Detection Angle



**Detection Angle:**

– Horizontal: 130

– Vertical: 95

# Conclusion

- ▶ **Estimating and Planning a repair needs to begin with the complete identification of the vehicle options, their component/controller locations, and materials that the vehicle body is constructed from**
- ▶ **There are specific tools and equipment required to do a repair that returns the vehicle to the crash standard it was designed to be. Start with a 5 star rated car return the vehicle back to the customer with a 5 star crash rating**
- ▶ **All of the technology based options need to be recalibrated even if there was a “simple repair”**
- ▶ **Planning the repair and knowing the requirements can:**
  - ▶ **Lower cycle time**
  - ▶ **Prevent large supplements**
  - ▶ **Prevent customer dissatisfaction**
  - ▶ **Limit future liability caused by improper repair**

# BACK-UP

## Back-up