

2006 Audi TT

ELECTRICAL Electrical Equipment

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Electrical Equipment

01 ON BOARD DIAGNOSTIC (OBD)

GENERAL INFORMATION

OBD program text/data generated by control modules installed on vehicles from m.y. 2001 may not be recognized by VAG 1551/1552 Scan Tools (ST) with the latest program card. For example: scan tool display shows "text 799", "01529 /references" or similar.

In addition, OBD programs for vehicle electrical equipment updates implemented from m.y. 2001 may also not supported by VAG 1551/1552 Scan Tools (ST) with the latest program card. For example: Powertrain CAN-Bus function - adaptation and addition of Automatic Transmission coding/adaptation etc.).

Only the VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System is capable of processing all display text/data, as well as performing coding, adaptation and related OBD program functions on these vehicles.

OBD program functions on vehicles from m.y. 2001 must be performed using the VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System in mode "Guided Fault Finding".

INSTRUMENT CLUSTER THROUGH M.Y. 2000 - VIN 8N_Y040000 AND SOFTWARE VERSION D24, ON BOARD DIAGNOSTIC (OBD)

Application notes

The following OBD program information applies to instrument clusters on vehicles through m.y. 2000 only. OBD program information for instrument clusters from m.y. 2001. Refer to **General Information** .

Always confirm vehicle VIN and instrument cluster software version as per section title above. Confirm instrument cluster software version by initiating OBD program and reading information in display. Refer to **Instrument cluster On Board**

Diagnostic (OBD), initiating .

In the event an instrument cluster was previously replaced in a vehicle with VIN up to 8N_Y040000, the new/replacement cluster may contain software version D26 which contains certain Diagnostic Trouble Code (DTC), Read Measuring Value Block and Adaptation information that is not specifically covered in this section.

Information on replacement instrument clusters with software version D26 are contained in section "Interment cluster On Board Diagnostic (OBD) from VIN 8N_Y040001 and/or software versions from D26 &D03". Refer to **Application notes** .

General information

The instrument cluster contains an electronic speedometer, tachometer, liquid crystal (LCD) displays for odometer, trip odometer, digital clock with date, as well as analog coolant temperature and fuel level gauges. Control and warning lamps are situated within the speedometer and tachometer faces.

A "Driver's Information System " LCD is located between the tachometer and speedometer. Displayed information includes an auto check system, outside air temperature, radio frequency and selectable trip computer functions.

The auto check system integrated with the Driver's Information System monitors the brake system, coolant temperature, fuel level, engine oil pressure, and displays the ambient temperature as a default.

The optional Navigation system display is also included in the Driver's Information System (where applicable).

The instrument cluster is controlled by a microprocessor and has extensive On Board Diagnostic (OBD) capability. If malfunctions occur in any of the system components, corresponding DTCs are stored in the Diagnostic Trouble Code (DTC) memory of the instrument cluster. DTCs are read and identified using VAG 1551 Scan Tool (ST), VAG 1552.Mobile Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System in mode "Guided Fault Finding".

NOTE: The descriptions and displays in this section refer only to **VAG 1551**.

The following adaptation (adjustment) functions are also possible:

- Adapting fuel gauge sender resistance range
- Adapting fuel consumption display
- Coding of language versions for on-board computer and Auto Check system
- Resetting service interval display
- Setting distance/kilometer counter after replacing instrument cluster

Message "dEF" on trip recorder display

If the control module in the instrument cluster detects a malfunction in its permanent memory, the letters "dEF" will appear on the trip recorder display.

- If "dEF" appears on the display, replace the instrument cluster. Refer to **Instrument cluster, removing and installing** .

Notes on replacing instrument cluster

- The instrument cluster must not be disassembled.
- If necessary, the instrument cluster can be replaced with an exchange unit (where applicable).
- Complete the damage report form and return it together with the malfunctioning instrument cluster.
- Malfunctioning units must always be returned in their original packing.
- Various input values must be adapted to replacement speedometer. Refer to **Replacement instrument cluster input values, adapting** .

Instrument cluster On Board Diagnostic (OBD), initiating

Additional information

- Wiring Diagrams

- Technical Bulletins

Scan Tool (ST) and test equipment safety precautions

WARNING:

- Due to weight, size and need for manual operation of test instruments while vehicle is driven on public roads, instrument must be used only with a Driver operating the vehicle and an Instrument Operator operating the test equipment.
- Do not use Instrument with Driver only. Always use two persons to conduct test.
- Do not place Instrument on lap of Driver or front seat passenger because emergency stop may dislodge Instrument and cause airbag deployment with risk of injury to Instrument Operator.

WARNING: Use of Instrument in Audi TT Coup:

- Place Instrument in rear seating area and secure by available safety belt.
- Instrument Operator must be seated in the other rear seating position, after sliding front passenger seat and moving the seat back as far forward as possible. Do not activate the seat back release lever.
- Instrument Operator must wear safety belt.

Use of Instrument in Audi TT Roadster:

- Use only Instrument VAG 1551 Scan Tool (ST) or VAS 5052 Vehicle Diagnostic and Service System. DO NOT USE VAS 5051.
- Before test, deactivate passenger's airbag using

- key operated switch in glove compartment.
- Instrument Operator must be seated on passenger seat with safety belt worn.
 - Place Instrument in foot well in front of passenger seat in a manner allowing the Operator to use the Instrument in a safe manner.
 - After completion of test, re-activate front passenger airbag.

CAUTION: To prevent damage to electronic and electrical components, note the following:

- Always switch off the ignition before connecting or disconnecting test instruments.
- During some of the tests the control module may identify and record DTCs. The Diagnostic Trouble Code (DTC) memory should therefore be checked and (if necessary) erased after completing the tests and any repair work that may be required.

Test requirements

- Check fuses using wiring diagram
- Always check coding of instrument cluster according to coding table. Refer to **Code Control Module (function 07)**
- Connect VAG 1551/1552 Scan Tool, VAS 5051 Vehicle Diagnostic, Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions**
- Ignition switched on

NOTE: • If the display remains blank, check voltage supply of VAG 1551 according to wiring diagram.

- **Additional operating instructions can be called up with the scan tool HELP button.**
 - **The --> button serves to advance the program sequence.**
 - **If an incorrect entry is made, press button C to escape.**
 - **In the operating mode 1 "Rapid data transfer" the function 00 can be used to perform an "Automatic test sequence." This will check all control modules in the vehicle automatically.**
- Switch on printer with the Print button (indicator lamp lights up).
 - Press button -1- for "Rapid data transfer" mode.

Rapid data transfer HELP
Input address word XX

Indicated on display:

Address word for instrument cluster: 17

- Press buttons -1- and -7- to select "Instrument Cluster" address word 17.

Rapid data transfer Q
17 - Instrument cluster

Indicated on display:

- Press -Q- button to confirm input

8N1919930 KOMBIINSTR.+IMM. M73 D15 -->
Coding 06244 WSC XXXXX

After about 5 seconds this display will appear (example only):

- 8N1919930: Part Number of instrument cluster
- KOMBIINSTR.+IMM (instrument cluster + immobilizer): component

designation

- M73: manufacturer's code (Magneti Marelli)
- D15: software version installed in instrument cluster
- Coding 06244: coding of instrument cluster
- WSC XXXXX: Workshop Code

NOTE: Check coding according to coding table. Refer to Code Control Module (function 07) .

- Press --> button.

Rapid data transfer HELP
Control module does not answer

If the display shows one of the messages reproduced here, run through the troubleshooting procedure as described in the wiring diagram.

Refer to Wiring Diagrams, Troubleshooting & Component Locations binder

Rapid data transfer HELP
Error in communication link

Rapid data transfer HELP
K wire not switching to Ground

Rapid data transfer HELP
K wire not switching to B+

Rapid data transfer HELP
Select function XX

Indicated on display:

- After the HELP button is pressed, a list of the possible functions is printed out.
- Press --> button to advance the program sequence.

NOTE: The following OBD program information applies to instrument clusters on vehicles through m.y. 2000 only. OBD program information for instrument clusters from m.y. 2001. Refer to General Information .

On Board Diagnostic (OBD) functions

The following functions are possible:

- 02 - Check DTC Memory. Refer to Diagnostic Trouble Code (DTC) memory, checking (function 02) .
- 03 - Output DTM. Refer to Output Diagnostic Test Mode (DTM) (function 03) .
- 05 - Erase DTC Memory. Refer to Diagnostic Trouble Code (DTC) memory, erasing (function 05) .
- 06 - End Output. Refer to End Output (function 06) .
- 07 - Code Control Module. Refer to Code Control Module (function 07) .
- 08 - Read Measuring Value Block. Refer to Read Measuring Value Block (function 08) .
- 10 - Adaptation. Refer to Adaptation (function 10) .
- 11 - Log-in Procedure. Refer to Adaptation (function 10) .

Diagnostic Trouble Code (DTC) Memory, checking (function 02)

NOTE: The displayed diagnostic information is not constantly updated, but only when starting the On Board Diagnostic (OBD) or with the function 05 "Erase DTC Memory."

- Switch on printer with the Print button (indicator lamp in button lights up).

Rapid data transfer HELP
Select function XX

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Indicated on display:

- Press buttons -0- and -2- to select "Check DTC Memory" function 02.

Rapid data transfer Q
02 - Check DTC Memory

Indicated on display:

- Press -Q- button to confirm input

X DTCs recognized!

The number of stored DTCs appears in the display.

The stored DTCs are displayed and printed out one after the other.

- Check printout against DTC table and repair all malfunctions as necessary.
Refer to **Diagnostic Trouble Code (DTC) table** .

No DTC recognized! -->

If "No DTC recognized" is displayed the program will return to the start point after pressing --> button.

Rapid data transfer HELP
Select function XX

Indicated on display:

If something else is displayed:

Refer to Scan tool operating instructions

- End Output (function 06). Refer to **End Output (function 06)** .
- Switch off ignition and disconnect data link connector.

Diagnostic Trouble Code (DTC) table

NOTE:

- The following table lists all the malfunctions that can be recognized by the instrument cluster and printed out by the VAG 1551. The DTCs are listed in order according to their 5-figure code numbers.
- DTCs appear only on print-out.
- Before replacing a component shown as malfunctioning, check wiring and connections to the component as well as Ground connections according to the wiring diagram.
- After completing a repair and checking the function of the system, always check the Diagnostic Trouble Code (DTC) memory once again with the VAG 1551 scan tool and erase the memory.
- The Diagnostic Trouble Code (DTC) memory records all static and sporadic malfunctions. If a malfunction occurs and persists for at least 2 seconds, it is identified as a static malfunction. (In the case of the ambient temperature display, a malfunction must persist for at least 60 seconds before it is classified as a static malfunction; in the case of the coolant temperature sender, static malfunctions are those which persist for at least 30 minutes with the engine running). If the malfunction does not occur again it is registered as a sporadic malfunction and the letters "/SP" will appear at the right of the display.
- When the ignition is switched on, all existing malfunctions are automatically re-classified as sporadic malfunctions and will only register as static malfunctions if they still occur after testing.
- Sporadic malfunctions which no longer occur after 50 driving cycles (ignition on for at least 5 minutes, road speed of more than 30 km/h) are erased automatically.

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tool display		
00667		
Ambient-temperature signal		
<ul style="list-style-type: none"> • Open/short circuit to B+ • Short circuit to Ground 	<ul style="list-style-type: none"> • Open circuit or short circuit between instrument cluster and A/C control head -E87 • A/C control head -E87 malfunctioning • Outside Air Temperature Sensor -G17 malfunctioning 	<ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Perform OBD program. Refer to 87 AIR CONDITIONING <ul style="list-style-type: none"> ○ Replace -G17
00771		
Fuel level Sensor -G		
<ul style="list-style-type: none"> • Open/short circuit to B+ • Short circuit to Ground 	<ul style="list-style-type: none"> • Open circuit or short circuit between fuel level sensor -G- and instrument cluster • Fuel level sensor -G- (front-wheel drive/quattro) or -G169 (quattro) malfunctioning 	<ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Replace -G- (front-wheel drive/quattro) or -G169 (quattro)

VAG 1551 scan tool display	Possible causes	Corrective action
00779		
Outside Air Temperature		

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Sensor -G17		
<ul style="list-style-type: none"> • Open/short circuit to B+ • Short circuit to Ground 	Vehicles without air conditioner: <ul style="list-style-type: none"> • Open circuit or short circuit between -G17- and instrument cluster • -G17- malfunctioning 	Vehicles without air conditioner: <ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Replace -G17-
01039		
ECT Sensor -G2		
<ul style="list-style-type: none"> • Open/short circuit to B+ • Short circuit to Ground 	<ul style="list-style-type: none"> • Open circuit or short circuit between -G2 and instrument cluster • -G2 malfunctioning 	<ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Replace -G2
65535		
Control Module Malfunctioning	Instrument cluster malfunctioning	<ul style="list-style-type: none"> • Replace instrument cluster. Refer to <u>Instrument cluster, removing and installing</u>

Output Diagnostic Test Mode (DTM) (function 03)

NOTE:

- Output DTM may only be performed with the vehicle stationary and the engine not running.
- If any malfunctions are identified by the output DTM, trace the cause of the malfunction and if necessary replace the instrument cluster.

With output DTM, all "control elements" in the instrument cluster (if installed and coded) are activated in sequence.

- Simultaneous activation of all analog instruments (coolant temperature gauge, tachometer, speedometer, fuel gauge)

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- Activation of auto-check system indicator symbols
- Activation of seat belt warning lamp
- Activation of gong (chime)
- Segment test of multi-function display and/or LCD odometer
- Test of instrument lighting in instrument cluster, including dimmer function

NOTE: The lights must be switched on for this test.

- Overheating test: Activation of safety shut-off of air conditioner compressor

Output Diagnostic Test Mode (DTM), initiating

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -3- to select "output DTM" function 03.

Rapid data transfer Q
03 - Output Diagnostic Test Mode

Indicated on display:

- Press -Q- button to confirm input This will start the output DTM for the analog instruments (displays).

Output Diagnostic Test Mode -->
Analog displays

Indicated on display:

The following tests are carried out simultaneously when the -Q- button is pressed:

- Coolant temperature gauge needle moves across the full range of the scale

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- Tachometer needle moves across the full range of the scale
- Speedometer needle moves across the full range of the scale
- Fuel gauge needle moves across the full range of the scale

When the gauge needles have finished moving across the scales the following fixed values will be displayed:

Coolant temperature gauge:	90 ° C (194 ° F)
Tachometer:	3000 RPM
Speedometer:	100 km/h (62 mph)
Fuel gauge:	1/2

NOTE: If the ignition is switched on and then off again while the gauge needles are moving, the needles will return to their starting positions.

- Press --> button.

Output Diagnostic Test Mode -->
Seat Belt Warning Light -K19

Indicated on display:

Seat belt warning light will be activated.

NOTE: Depending on version / equipment, the seat belt warning light is activated via control module coding, i.e. if this actuator test is not performed, warning light is not active.

- Press " button.

Output Diagnostic Test Mode -->
Gong

Indicated on display:

The gong (chime) will be activated and will sound continuously.

- Press --> button.

Output Diagnostic Test Mode -->
Segment test

Indicated on display:

NOTE:

- All the display points on the multi-function display, the LCD display for the odometer and the clock display will be activated.
- All the display segments on the Driver's Information Display will light up and one line will remain dark.

- Press " button.

Output Diagnostic Test Mode -->
Lighting/switch and instruments

Indicated on display:

The dimmer function for the instrument cluster lighting will be activated.

- Press " button.

Output Diagnostic Test Mode -->
END

Indicated on display:

- Press --> button to terminate the output DTM.

This returns the tester to the basic function mode

Rapid data transfer HELP
Select function XX

Indicated on display:

Diagnostic Trouble Code (DTC) Memory, erasing

NOTE: If it is not possible to erase the DTC memory, check the DTC memory once again and repair malfunctions.

Requirements

- DTC memory checked. Refer to **Diagnostic Trouble Code (DTC) memory, checking (function 02)**
- All malfunctions repaired

After DTC memory has been successfully checked:

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -5- to select "Erase DTC Memory" function 05.

Rapid data transfer Q
05 Erase DTC Memory

Indicated on display:

- Press -Q- button to confirm input

Rapid data transfer -->
DTC memory is erased!

Indicated on display:

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The DTC memory is now erased.

- Press --> button.

Rapid data transfer HELP
Select function XX

Indicated on display:

NOTE:

- This message indicates an error in the test sequence:
- This message indicates an error in the test sequence:

Adhere exactly to test sequence: First check DTC memory, if necessary repair malfunctions, then erase.

End Output (function 06)

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -6- to select "End Output" function 06.

Rapid data transfer Q
06 End Output

Indicated on display:

- Press -Q- button to confirm input

Rapid data transfer HELP
Input address word XX

Indicated on display:

- Switch off ignition.

- Disconnect VAG 1551 scan tool.

Code Control Module (function 07)

This function can be used to code the instrument cluster for the following features:

- Optional equipment
- Export version
- Number of cylinders
- Engine type

- NOTE:**
- The coding procedure is used to set the appropriate configuration for the on-board computer and check the system according to the equipment installed, the export version, the number of cylinders and the engine type.
 - The coding table only gives the coding combinations that are possible for the Audi TT.

Coding procedure

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -7- to select "Code Control Module" function 07.
- Press -Q- button to confirm input

Code Control Module
Enter code number XXXXX (0-32000)

Indicated on display:

- NOTE:**
- Coding is entered for various combinations of optional equipment, according to equipment level.

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- If the vehicle is equipped with more than one item of optional equipment which needs to be coded, enter the sum total of the respective coding numbers.

- Enter code number according to coding table. Refer to Code Control Module (function 07) . Example: 06244

06			Seatbelt warning (02) plus washer fluid warning active (04) equals 06
	2		USA
		4	4 cylinders
		4	Turbo engine

Coding table

XX			Optional equipment
00			No optional equipment
01			Larger fuel tank capacity (quattro)
02			Seat belt warning system active
04			Washer fluid warning system active
	X		Country (export version)
	2		USA (US)
	3		Canada (CDN)
		X	Number of cylinders
		4	4 cylinders
		X	Type of engine
		4	Turbo engine

Code Control Module Q
Enter code number 06244 (0-32000)

Indicated on display (example only):

- Press -Q- button to confirm input

8N1919930 KOMBIINSTR.+IMM M73 D15 -->

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Coding 06244 WSC 06812

After about 5 seconds this display will appear:

- Press " button.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -6- to select "End Output" function 06.

Read Measuring Value Block (function 08)

Use this function to observe various instrument cluster inputs and stored data.

The measuring value block is divided into 4 display groups, each containing 4 display fields.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -8- to select "Read Measuring Value Block"function 08.

Rapid data transfer Q
08 Read Measuring Value Block

Indicated on display:

- Press -Q- button to confirm input

Read Measuring Value Block HELP
Enter display group number XXX

Indicated on display:

- Enter desired Display Group number from table. Refer to **Read Measuring Value Block (function 08)**
- Press -Q- button to confirm input.

The Read Measuring Value block selected will appear in standard format.

Interpreting displayed information. Refer to **Read Measuring Value Block (function 08)**

NOTE:

- The display on the scan tool will always show the actual values obtained from the senders and sensors. The values which appear on the instrument cluster are filtered and may not be the same.
- If the actual coolant temperature is between about 80 °C and 100 °C, the instrument cluster will always show 90 °C.
- The display groups shown here are the only ones which can be called up for the instrument cluster.

Display groups, summary

Display Group No.	Indicated on display:
001	1 = road speed 2 = engine speed (RPM) 3 = oil pressure switch 2 (< min) 4 = time (h)
002	1 = odometer reading 2 = fuel gauge 3 = fuel gauge sender (Ohm) 4 = ambient temperature
003	1 = coolant temperature
050	1 = odometer reading 2 = engine speed (RPM) 3 = oil temperature 4 = coolant temperature

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Read Measuring Value Blocks, interpreting

Read Measuring Value Block 1				-->	<-- Indicated on display (example only):
50 km/h	2400 RPM	Oil p2<min	12:20 h		
				Time	
			Oil pressure switch 2		
			<ul style="list-style-type: none"> • Oil p2< min (= less than minimum) • Oil p2OK (= okay) 		
		Engine speed			
		<ul style="list-style-type: none"> • 0 - 9990 RPM 			
	Road speed				
	<ul style="list-style-type: none"> • 0 - 300 km/h 				

Read Measuring Value Block 2				-->	<-- Indicated on display (example only):
2390 km	43 ltr.	219 Ohm	23.0 ° C		
				Ambient temperature	
			<ul style="list-style-type: none"> • -40 - +70 ° C 		
		Fuel gauge sender			
		<ul style="list-style-type: none"> • front wheel drive = 54Ohm (empty) - 290 Ohm (full) • all wheel drive = 59 Ohm (empty) - 282 Ohm (full) 			
	Fuel gauge				

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		• 0 - 100 ltr.	
	Odometer reading		

Read Measuring Value Block 3 --> <-- Indicated on display (example only):			
85.0 ° C			
	Engine Coolant Temperature (ECT)		
	• 50 - 130 ° C		

Read Measuring Value Block 50 --> <-- Indicated on display (example only):			
2390 km	2400 RPM	99 ° C	85.0 ° C
			Engine Coolant Temperature (ECT)
			• 50 - 130 ° C
		Oil temperature	
		Engine speed	
		• 0 - 9990 RPM	
	Odometer reading		

Adaptation (function 10)

The adaptation function is used to carry out and store the following adjustments:

- Adapting fuel consumption display

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- Coding language version for Auto Check system
- Resetting service interval display (SID)
- Adapting odometer reading when instrument cluster is replaced
- Adapting fuel gauge sender resistance range

The individual functions are selected by entering the appropriate adaptation channel number from adaptation table. Refer to **Adaptation (function 10)** .

Adaptation, initiating

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- to select "Adaptation" function 10.

Rapid data transfer Q
Adaptation

Indicated on display:

- Press -Q- button to confirm input

Adaptation
Enter channel number XX

Indicated on display:

- Enter desired channel number from adaptation table. Refer to **Adaptation (function 10)** .
- Press -Q- button to confirm input

NOTE: After adapting one of the displays or exiting a particular channel, the adaptation function (function 10) must be selected again before the next adaptation channel can be

entered.

Adaptation table

Adaptation channels	Adaptation functions
02	Service Interval Display (SID), resetting after a service. Refer to Adaptation (function 10)
03	Fuel consumption display. Refer to Adaptation (function 10)
04	Language versions for multi-function display. Refer to Adaptation (function 10)
09	Odometer. Refer to Adaptation (function 10)
40	SID: distance remaining until next Inspection Service (adaptation after replacing instrument cluster). Refer to Adaptation (function 10)
41	SID: time remaining until next Inspection Service (adaptation after replacing instrument cluster). Refer to Adaptation (function 10)
30	Fuel level sender. Refer to Adaptation (function 10)

Service Interval Display (SID), resetting after service

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -0- and -2- to access "channel 02"
- Press -Q- button to confirm input

NOTE:

- The service interval display serves to remind the driver that the vehicle is due for servicing. Messages appear in the Driver's Information Display.
- The service reminder will first appear 2000 km (1200 mi) before the next service is due. The display message comes up for 5 seconds every time terminal 15 is activated, and changes in steps of 100 km (62 mi.). Example of service interval display message: "SERVICE IN 1300 KM" will appear after the vehicle has been driven 13,700 km.

NOTE:

- When the service actually becomes due the message "SERVICE" will appear in the central display window for 5 seconds each time the ignition is switched on.
- A service is required after an elapsed period of 12 months, even if the distance covered in this time is less than 15,000 km (10,000 mi.).
- Servicing will always be required every 15000 km (10,000 mi.) in other words the Oil Change and the Inspection Service will be performed together at the end of the 15,000 km (10,000 mi.) interval.
- The service interval display can also be reset without using VAG 1551 scan tool/1552. Refer to Service interval display, resetting after a service without using VAG 1551/1552 .
- Software version of instrument cluster. Refer to Instrument cluster On Board Diagnostic (OBD), initiating .

Channel 2 Adaptation 1 -->

< - 1 3- >

Indicated on display:: the display will indicate the service interval function:

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1 - = set service interval: instrument cluster display will then show:

"SERVICE"

NOTE: The service interval display can only be reset via direct input.

- Press " button.

Channel 2 Adaptation 1
Enter adaptation value XXXXX

Indicated on display:

The service interval is reset (adapted) by entering the following values:

Adaptation value	Set / reset service interval
00000	Reset

- Enter the appropriate adaptation value (00000) via the button pad to reset the service interval.
- Press button -0- five times.

Channel 2 Adaptation 1 Q
Enter adaptation value 00000

Indicated on display:

- Press -Q- button to confirm input

Channel 2 Adaptation 0 -->
< - 1 3- >

Indicated on display:

0 - means service is reset,

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i.e. "SERVICE IN 15000 km" will be indicated in the instrument cluster after confirming input using the Q-button.

- Press -Q- button to confirm input

Channel 2 Adaptation 0 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 2 Adaptation 0 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate resetting of service interval display.

Fuel consumption display, adapting

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -0- and -3- to access "channel 03".
- Press -Q- button to confirm input

NOTE: • Adaptation is only possible on vehicles with on-board

computer.

- **The value entered must be between 85% and 115%.**
- **The value must be entered in steps of 5%.**
- **If the value "100" was changed due to a customer complaint, the changed value must be entered into a new instrument cluster.**

Channel 3 Adaptation 100 -->
< - 1 3- >

Indicated on display:

- Press --> button.

NOTE: The fuel consumption display can only be adapted via direct input.

Channel 3 Adaptation 100
Enter adaptation value XXXXX

Indicated on display:

- Enter required adaptation value via button pad on scan tool, filling in the initial spaces with "0."

Example:

- Required value: 90%
- Entry via button pad: 00090

Channel 3 Adaptation 100 Q
Enter adaptation value 00090

Indicated on display (example only):

- Press -Q- button to confirm input

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Channel 3 Adaptation 90 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 3 Adaptation 90 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of fuel consumption display.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

NOTE: If an incorrect entry is made the testing unit will switch to function mode.

Function is unknown or -->
cannot be carried out at the moment

Indicated on display:

- Press " button.
- Select adaptation function (function 10) and adaptation channel 03 again.
- Repeat adaptation of fuel consumption display and confirm entry with -Q- button.

Language versions for multi-function display, adapting

NOTE: Adaptation is only possible on vehicles with on-board

computer.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -0- and -4- to access "channel 04".
- Press -Q- button to confirm input

Channel 4 Adaptation 1 -->
< - 1 3- >

Indicated on display:

NOTE:

- The display will show only the last digit of the 5-figure language version code (e.g. 1 for German).
- If an incorrect value is entered the adaptation function will be terminated and must be re-started by selecting function 10 (Adaptation) again.
- The code can now be entered either directly or in stages via the button pad on the scan tool.

Coding table

Code	Language version
00001	German
00002	English
00003	French

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00004	Italian
00005	Spanish
00006	Portuguese

Entering code in stages:

- Key 1 can be used to change down to a lower code value, and button 3 can be used to change up to a higher code value (for example, to change to "2" for English).

Channel 4 Adaptation 2 Q

< - 1 3- >

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 4 Adaptation 2 Q

Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 4 Adaptation 2 -->

Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of language version.

Direct input:

Channel 4 Adaptation 1 -->

< - 1 3- >

Indicated on display:

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- Press " button.

Channel 4 Adaptation 1
Enter adaptation value XXXXX

Indicated on display:

- Enter the required 5-figure code (Refer to **Adaptation (function 10)**) via button pad.

Example:

- Code: 2 (English)
- Input: 00002
- Press -Q- button to confirm input

Channel 4 Adaptation 1 Q
Enter adaptation value 00002

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 4 Adaptation 2 Q
< - 1 3- >

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 4 Adaptation 2 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 4 Adaptation 2 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of language version.

Odometer, adaptation

This function is used to set the correct odometer reading after replacing the instrument cluster.

Preparation

NOTE:

- The adaptation function can only be performed on instrument clusters with a maximum of 100 kilometers or 63 miles indicated on counter.
 - The adaptation procedure can only be performed once on any one instrument cluster.
 - The adaptation value entered must be higher than the existing value (over 100 kilometers or 63 miles).
 - If an incorrect value is entered and confirmed, it cannot be changed. In this case the instrument cluster must be replaced.
-
- Record instrument cluster input values and proceed with initial adaptations (code instrument cluster, etc.). Refer to **Replacement instrument cluster input values, adapting**

Adaptation

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -1- to select "Login procedure" function 11.

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Rapid data transfer Q
11 - Login procedure

Indicated on display:

- Press -Q- button to confirm input

Login procedure
Enter code number XXXXX

Indicated on display:

- Enter code number 13861.

Login procedure Q
Enter code number 13861

Indicated on display:

- Press -Q- button to confirm input

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- to select "Adaptation" function 10.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press -Q- button to confirm input

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -0- and -9- to access "channel 09".
- Press -Q- button to confirm input

Channel 9 Adaptation 0 -->
<-1 3->

Indicated on display:

NOTE: The number can only be entered directly via VAG 1551 scan tool button pad.

- Press --> button to advance the program sequence.

Channel 9 Adaptation 0 Q
Enter adaptation value XXXXX

Indicated on display:

CAUTION:

- Replacement instrument clusters calibrated in miles require input of odometer reading in miles during adaptation (DO NOT convert to kilometers).
- Replacement instrument clusters calibrated in kilometers require input of odometer reading in kilometers during adaptation.
- If an incorrect odometer display value is entered and confirmed, it cannot be changed. In this case the instrument cluster must be replaced.

- Enter adaptation value (odometer reading) via scan tool button pad.

Example: 89627

0 8 9 6 3

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0	8	9	6	3	
X					Hundred thousands: 100000 - 655350
	X				Ten thousands: 10000 - 90000
		X			Thousands: 1000 - 9000
			X		Hundreds: 100 - 900
				X	Tens: 10 - 90
					Units: round up to the nearest 10

Channel 9 Adaptation 0 Q
Enter adaptation value 08963

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 9 Adaptation 8963 Q
<-1 3->

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 9 Adaptation 8963 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 9 Adaptation 8963 -->
Changed value is stored

Indicated on display:

- Press --> to terminate adaptation of odometer.

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This function is used after replacing the instrument cluster to enter the distance remaining before the next Inspection Service is due.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -4- and -0- to access "channel 40".
- Press -Q- button to confirm input

Channel 40 Adaptation 0 -->
< - 1 3- >

Indicated on display: for new instrument cluster:

The distance remaining before the next Inspection Service is due must be transferred from the old instrument cluster (e.g. 5000 km = adaptation value 50).

NOTE:

- **The distance can only be entered in steps of 100 km (62 mi.). Accordingly, the readout on the display will also be in steps of 100 km (62 mi.).**
- **The entered value is counted upward from 0 to 15000.**
- **When replacing the instrument cluster, see notes. Refer to Replacement instrument cluster input values, adapting .**
- **The number can only be entered directly via the button pad on the scan tool.**

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- **If an incorrect value is entered the adaptation function will be terminated and must be re-started.**

- Press --> button.

Channel 40 Adaptation 0
Enter adaptation value XXXXX

Indicated on display:

- Enter required value (noted from old unit) via button pad on scan tool, filling in the initial spaces with "0."

Example:

Distance remaining: 5000 km

Input value: 00050

Channel 40 Adaptation 0 Q
Enter adaptation value 00050

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 40 Adaptation 50 Q
< - 1 3- >

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 40 Adaptation 50 Q
Store changed value?

Indicated on display:

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- Press -Q- button to confirm input

Channel 40 Adaptation 50 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of service interval display.

SID: time remaining until next Inspection Service (after replacing instrument cluster)

This function is used after replacing the instrument cluster to enter the time remaining (in days) before the next Inspection Service is due.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons 1 and 0 and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons 4 and 1.
- Press -Q- button to confirm input
- Indicated on display: for new instrument cluster:

The time (in days) remaining before the next Inspection Service is due must be transferred from the old instrument cluster (e.g. 110 days = adaptation value 110).

NOTE:

- **The number can be entered in steps of 1 day; the readout on the display will also be in steps of 1 day.**
- **The entered value is counted upward from 0 to 365**

days.

- When replacing the instrument cluster, see notes. Refer to Replacement instrument cluster input values, adapting .
- When using the button pad on the scan tool, the number must be entered directly.
- If an incorrect value is entered the adaptation function will be terminated and must be re-started.

- Press " " button.

Channel 41 Adaptation 0
Enter adaptation value XXXXX

Indicated on display:

- Enter required value (noted from old unit) via button pad on scan tool, filling in the initial spaces with "0."

Example:

- Remaining time: 110 days
- Input value: 00110

Channel 41 Adaptation 0 Q
Enter adaptation value 00110

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 41 Adaptation 110 Q
< - 1 3- >

Indicated on display:

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- Press -Q- button to confirm input

Channel 41 Adaptation 110 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 41 Adaptation 110 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of service interval display.

Fuel level sender, adaptation

This function is used to adjust the resistance range of the fuel gauge sender signal to compensate for any discrepancies in the "empty" and "full" values.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -3- and -0-.
- Press -Q- button to confirm input

Channel 30 Adaptation 128 -->

< - 1 3- >

Indicated on display (example only): the display will show the adaptation value, e.g. 128.

NOTE:

- **The adaptation value displayed represents the standard resistance range for the fuel gauge sender as set by the factory.**
- **The adaptation value for the fuel gauge sender resistance range can be adjusted from the pre-set value by ± 8 .**
- **For software levels up to and including D17, the average value is 0 and the range is -8 to 8.**
- **From software levels D18, the average value is 128 and the range is 120 to 136.**

- Press " button.

Channel 30 Adaptation 128
Enter adaptation value XXXXX

Indicated on display:

- Enter adaptation value (e.g. 132) via button pad on scan tool, filling in the initial spaces with "0."

Channel 30 Adaptation 128 Q
Enter adaptation value 00132

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 30 Adaptation 132 Q
< - 1 3- >

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 30 Adaptation 132 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 30 Adaptation 132 -->
Changed value is stored

Indicated on display:

- Press --> to terminate adaptation of fuel gauge sender resistance range.

Replacement instrument cluster input values, adapting

It is important to note the following points when replacing the instrument cluster:

NOTE:

- **The instrument cluster must always be coded.**
- **Before replacing the existing instrument cluster, record odometer reading and values appearing in all service interval display adaptation channels.**
- **Recorded values must be adapted to new instrument cluster so it can count down to the next service due.**
- **The immobilizer control module is integrated in the instrument cluster. Immobilizer function adaptation is also necessary after replacing instrument cluster.**

The following steps must be carried out after replacing the instrument cluster:

- Code instrument cluster. Refer to **Code Control Module (function 07)** .
- Service Interval Display (SID): entering distance remaining until next

Inspection Service. Refer to **Adaptation (function 10)** .

- SID: entering time remaining until next Inspection Service. Refer to **Adaptation (function 10)** .
- Adapt odometer reading. Refer to **Adaptation (function 10)** .
- Adapt Immobilizer function. Refer to **Adaptation after replacing instrument cluster**
- Adapt vehicle keys. Refer to **Adaptation of vehicle keys**

Service interval display, resetting after a service without using VAG 1551/1552

After a service has been carried out (Oil Change + Inspection Service), the service interval display must be reset accordingly.

The service interval display can be reset using the adaptation function on VAG 1551 scan tool. Refer to **Adaptation (function 10)** .

The service interval display can also be reset using the following procedure:

- Switch off ignition.
- Press the trip recorder reset button on the instrument cluster and at the same time switch on the ignition.

When the trip recorder reset button is released, the display will show "SERVICE IN ???? km" or "SERVICE."

- Within a period of 5 seconds, turn the clock adjuster knob on the instrument cluster counter-clockwise until the message is reset to "SERVICE IN 15000 KM."

The trip recorder display will now read "SERVICE IN 15000 KM."

- Switch off ignition.

INSTRUMENT CLUSTER THROUGH M.Y. 2000 - VIN 8N_Y040001 AND/OR SOFTWARE VERSIONS FROM D26 & D03, ON BOARD DIAGNOSTIC (OBD)

The following OBD program information applies to instrument clusters on vehicles through m.y. 2000 only. OBD program information for instrument clusters from m.y. 2001. Refer to **General Information** .

Always confirm vehicle VIN and instrument cluster software version as per section title above. Confirm instrument cluster software version by initiating OBD program and reading information in display. Refer to **Instrument cluster On Board Diagnostic (OBD), initiating** .

Information in this section also applies to replacement instrument clusters with software version D26 installed in vehicles through VIN 8N_Y040000.

Vehicles from start of production through VIN 8N_Y040000 contain instrument clusters with software versions through D24 that have limited Diagnostic Trouble Code (DTC), Read Measuring Value Block and Adaptation information not specifically covered in this section.

Information on clusters on vehicles up to VIN 8N_Y040000 with software versions through D24 are contained in section "Instrument cluster On Board Diagnostic (OBD) through VIN 8N_Y040000 and software versions D24". Refer to **Application notes** .

General information

The instrument cluster contains an electronic speedometer, tachometer, liquid crystal (LCD) displays for odometer, trip odometer, digital clock with date, as well as analog coolant temperature and fuel level gauges. Control and warning lamps are situated within the speedometer and tachometer faces.

A "Driver's Information System" LCD is located between the tachometer and speedometer. Displayed information includes an auto check system, outside air temperature, radio frequency and selectable trip computer functions.

The auto check system integrated with the Driver's Information System monitors the brake system, coolant temperature, fuel level, engine oil pressure, and displays the ambient temperature as a default.

The optional Navigation system display is also included in the Driver's Information

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System (where applicable).

The instrument cluster is controlled by a microprocessor and has extensive On Board Diagnostic (OBD) capability. If malfunctions occur in any of the system components, corresponding DTCs are stored in the Diagnostic Trouble Code (DTC) memory of the instrument cluster. These can then be identified using VAG 1551 Scan Tool (ST), VAG 1552 Mobile Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System.

Instrument clusters installed from VIN 8N_Y040001 have expanded Diagnostic Trouble Code (DTC), Read Measuring Value Block and Adaptation information over previous models.

For example: Service Interval Display (SID) adaptation values for USA/CDN models with fixed service intervals:

Fixed service interval values, SID adaptation values

Channel 42 (minimum distance)	15000km or 10000 mi
Channel 43 (maximum distance)	15000 km or 10000 mi
Channel 44 (maximum time interval until service)	365 days
Channel 45 (oil grade, where applicable)	1

NOTE: The descriptions and displays in this section refer only to VAG 1551.

The following adaptation (adjustment) functions are also possible:

- Adapting fuel gauge sender resistance range
- Adapting fuel consumption display
- Coding of language versions for on-board computer and Auto Check system
- Resetting service interval display

- Setting distance/kilometer counter after replacing instrument cluster

Message "dEF" on trip recorder display

If the control module in the instrument cluster detects a malfunction in its permanent memory, the letters "dEF" will appear on the trip recorder display.

- If "dEF" appears on the display, replace the instrument cluster. Refer to **Instrument cluster, removing and installing** .

Notes on replacing instrument cluster

- The instrument cluster must not be disassembled.
- If necessary, the instrument cluster can be replaced with an exchange unit.
- Complete the damage report form and return it together with the malfunctioning instrument cluster.
- Malfunctioning units must always be returned in their original packing.
- Various input values must be adapted to replacement speedometer. Refer to **Replacement instrument cluster input values, adapting** .

Instrument cluster On Board Diagnostic (OBD), initiating

Additional information

- Wiring Diagrams
- Technical Bulletins

Scan Tool (ST) and test equipment safety precautions

WARNING:

- **Due to weight, size and need for manual operation of test instruments while vehicle is driven on public roads, instrument must be used only with a Driver operating the vehicle and an Instrument Operator operating the test equipment.**
- **Do not use Instrument with Driver only. Always**

use two persons to conduct test.

- **Do not place Instrument on lap of Driver or front seat passenger because emergency stop may dislodge Instrument and cause airbag deployment with risk of injury to Instrument Operator.**

WARNING: Use of Instrument in Audi TT Coup:

- **Place Instrument in rear seating area and secure by available safety belt.**
- **Instrument Operator must be seated in the other rear seating position, after sliding front passenger seat and moving the seat back as far forward as possible. Do not activate the seat back release lever.**
- **Instrument Operator must wear safety belt.**

Use of Instrument in Audi TT Roadster:

- **Use only Instrument VAG 1551 Scan Tool (ST) or VAS 5052 Vehicle Diagnostic and Service System. DO NOT USE VAS 5051.**
- **Before test, deactivate passenger's airbag using key operated switch in glove compartment.**
- **Instrument Operator must be seated on passenger seat with safety belt worn.**
- **Place Instrument in foot well in front of passenger seat in a manner allowing the Operator to use the Instrument in a safe manner.**
- **After completion of test, re-activate front passenger airbag.**

CAUTION: To prevent damage to electronic and electrical

components, note the following:

- Always switch off the ignition before connecting or disconnecting test instruments.
- During some of the tests the control module may identify and record DTCs. The Diagnostic Trouble Code (DTC) memory should therefore be checked and (if necessary) erased after completing the tests and any repair work that may be required.

Test requirements

- Check fuses using wiring diagram
- Always check coding of instrument cluster according to coding table. Refer to **Code Control Module (function 07)**
- Connect VAG 1551/1552 Scan Tool, VAS 5051 Vehicle Diagnostic, Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions**
- Ignition switched on

NOTE:

- If the display remains blank, check voltage supply of VAG 1551 according to wiring diagram.
- Additional operating instructions can be called up with the scan tool HELP button.
- The --> button serves to advance the program sequence.
- If an incorrect entry is made, press button C to escape.
- In the operating mode 1 "Rapid data transfer" the function 00 can be used to perform an "Automatic test sequence." This will check all control modules in the vehicle automatically.

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- Switch on printer with the Print button (indicator lamp lights up).
- Press button -1- for "Rapid data transfer" mode.

Rapid data transfer HELP
Input address word XX

Indicated on display:

Address word for instrument cluster: 17

- Press buttons -1- and -7- to select "Instrument Cluster" address word 17.

Rapid data transfer Q
17 - Instrument cluster

Indicated on display:

- Press -Q- button to confirm input

8N1920880... INSTR+IMMOB. M73 D03 -->
Code 06244 WSC XXXXX

After about 5 seconds, the following appears on the display (example only):

- 8N1920880: Part no. of instrument cluster
- INSTR+IMMOB.: Instrument cluster plus anti-theft immobilizer component designation
- M73: Manufacturer code for Magneti Marelli
- D03: Software version of instrument cluster
- Coding 06244: Coding of instrument cluster
- WSC XXXXX: Workshop code

NOTE: Check coding according to coding table. Refer to Code Control Module (function 07) .

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- Press --> button.

Ident-no. Immob.: AUZ5Z0W1000071 -->

Indicated on display: (example only):

- AUZ5Z0W1000071: 14-digit ident. no. for immobilizer control module
- Press --> button.

Rapid data transfer HELP
Control module does not answer

If the display shows one of the messages reproduced here, run through the troubleshooting procedure as described in the wiring diagram.

Refer to Wiring Diagrams, Troubleshooting & Component Locations binder

Rapid data transfer HELP
Error in communication link

Rapid data transfer HELP
K wire not switching to Ground

Rapid data transfer HELP
K wire not switching to B+

Rapid data transfer HELP
Select function XX

Indicated on display:

- After the HELP button is pressed, a list of the possible functions is printed out.
- Press --> button to advance the program sequence.

NOTE: The following OBD program information applies to

instrument clusters on vehicles through m.y. 2000 only. OBD program information for instrument clusters from m.y. 2001. Refer to General Information .

On Board Diagnostic (OBD) functions

The following functions are possible:

- 02 - Check DTC Memory. Refer to Diagnostic Trouble Code (DTC) Memory, checking (function 02) .
- 03 - Output DTM. Refer to Output Diagnostic Test Mode (DTM) (function 03) .
- 05 - Erase DTC Memory. Refer to Diagnostic Trouble Code (DTC) Memory, erasing .
- 06 - End Output. Refer to End Output (function 06) .
- 07 - Code Control Module. Refer to Code Control Module (function 07) .
- 08 - Read Measuring Value Block. Refer to Read Measuring Value Block (function 08) .
- 10 - Adaptation. Refer to Adaptation (function 10) .
- 11 - Log-in Procedure. Refer to Adaptation (function 10) .

Diagnostic Trouble Code (DTC) Memory, checking (function 02)

NOTE: The displayed diagnostic information is not constantly updated, but only when starting the On Board Diagnostic (OBD) or with the function 05 "Erase DTC Memory."

- Switch on printer with the Print button (indicator lamp in button lights up).

Rapid data transfer HELP
Select function XX

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Indicated on display:

- Press buttons -0- and -2- to select "Check DTC Memory" function 02.

Rapid data transfer Q
02 - Check DTC Memory

Indicated on display:

- Press -Q- button to confirm input

X DTCs recognized!

The number of stored DTCs appears in the display.

The stored DTCs are displayed and printed out one after the other.

- Check printout against DTC table and repair all malfunctions as necessary.
Refer to **Diagnostic Trouble Code (DTC) table** .

No DTC recognized! -->

If "No DTC recognized" is displayed the program will return to the start point after pressing --> button.

Rapid data transfer HELP
Select function XX

Indicated on display:

If something else is displayed:

Refer to Scan tool operating instructions

- End Output (function 06). Refer to **End Output (function 06)** .
- Switch off ignition and disconnect data link connector.

Diagnostic Trouble Code (DTC) table

NOTE:

- The following table lists all the malfunctions that can be recognized by the instrument cluster and printed out by the VAG 1551. The DTCs are listed in order according to their 5-figure code numbers.
- DTCs appear only on print-out.
- Before replacing a component shown as malfunctioning, check wiring and connections to the component as well as Ground connections according to the wiring diagram.
- After completing a repair and checking the function of the system, always check the Diagnostic Trouble Code (DTC) memory once again with the VAG 1551 scan tool and erase the memory.
- The Diagnostic Trouble Code (DTC) memory records all static and sporadic malfunctions. If a malfunction occurs and persists for at least 2 seconds, it is identified as a static malfunction. (In the case of the ambient temperature display, a malfunction must persist for at least 60 seconds before it is classified as a static malfunction; in the case of the coolant temperature sender, static malfunctions are those which persist for at least 30 minutes with the engine running). If the malfunction does not occur again it is registered as a sporadic malfunction and the letters "/SP" will appear at the right of the display.
- When the ignition is switched on, all existing malfunctions are automatically re-classified as sporadic malfunctions and will only register as static malfunctions if they still occur after testing.
- Sporadic malfunctions which no longer occur after 50 driving cycles (ignition on for at least 5 minutes, road speed of more than 30 km/h) are erased automatically.

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tool display		
005621)		
Oil Level Thermo Sensor -G2661)		
<ul style="list-style-type: none"> • Open/short circuit to B+ • Short circuit to Ground • Implausible signal 	<ul style="list-style-type: none"> • Open circuit in wiring or short between oil level/temperature sender -G266 and instrument cluster • -G266- malfunctioning • Sender electronics malfunctioning 	<ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Replace -G266-
00667		
Ambient-temperature signal		
<ul style="list-style-type: none"> • Open/short circuit to B+ • Short circuit to Ground 	<ul style="list-style-type: none"> • Open circuit or short circuit between instrument cluster and A/C control head -E87 • -E87 malfunctioning • Outside Air Temperature Sensor -G17 malfunctioning 	<ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Perform OBD program. Refer to <u>87 AIR CONDITIONING</u> <ul style="list-style-type: none"> ○ Replace -G17
00668		
Battery Positive Voltage (B+) Term. 30		
<ul style="list-style-type: none"> • Voltage supply too low 	<ul style="list-style-type: none"> • Battery disconnected or totally discharged • Open circuit in wiring or short circuit at control 	<ul style="list-style-type: none"> • Perform automatic test sequence (function 00) to identify affected control module

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	module or sender	<ul style="list-style-type: none"> ● Repair open or short circuit in wiring using wiring diagram ● Erase DTC memory and road test
--	------------------	---

1) Where applicable. Component function may not be coded for US/CDN market.

VAG 1551 scan tool display	Possible causes	Corrective action
00771		
Fuel level Sensor - G		
<ul style="list-style-type: none"> ● Open/short circuit to B+ ● Short circuit to Ground 	<ul style="list-style-type: none"> ● Open circuit or short circuit between fuel level sensor -G- and instrument cluster ● Fuel level sensor -G- (front-wheel drive/quattro) or -G169 (quattro) malfunctioning 	<ul style="list-style-type: none"> ● Repair open or short circuit in wiring using wiring diagram ● Replace -G- (front-wheel drive/quattro) or -G169 (quattro)
00779		
Outside Air Temperature Sensor -G17		
<ul style="list-style-type: none"> ● Open/short circuit to B+ ● Short circuit to Ground 	Vehicles without air conditioner: <ul style="list-style-type: none"> ● Open circuit or short circuit between -G17- and instrument cluster ● -G17- malfunctioning 	Vehicles without air conditioner: <ul style="list-style-type: none"> ● Repair open or short circuit in wiring using wiring diagram ● Replace -G17-
01039		

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ECT Sensor -G2		
<ul style="list-style-type: none"> • Open/short circuit to B+ • Short circuit to Ground 	<ul style="list-style-type: none"> • Open circuit or short circuit between -G2 and instrument cluster • -G2 malfunctioning 	<ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Replace -G2

VAG 1551 scan tool display	Possible causes	Corrective action
013002)		
Control Module for Nav. w/CD) -J401-2)		
<ul style="list-style-type: none"> • No communication 	<ul style="list-style-type: none"> • Open/short circuit between -J401- and instrument cluster • -J401 without CAN-Bus capability installed • Instrument cluster adaptation not performed properly 	<ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Check CAN-Bus capability of control module by confirming that value "1" appears in Read Measuring Value Block 140. Refer to <u>Read Measuring Value Block (function 08)</u> • Check data exchange between control modules. Refer to <u>Data exchange between control modules, checking</u> • Install proper control module if necessary. • Perform Adaptation (function 10), select channel 62 and enter correct adaptation value. Refer to <u>Adaptation (function 10)</u>

2) Where applicable.

VAG 1551 scan tool display	Possible causes	Corrective action
01311		
Data Bus Information		
<ul style="list-style-type: none"> • Faulty • In 1-wire operation 	<ul style="list-style-type: none"> • Open/short circuit between control module and Information CAN-Bus network • Control module without CAN-Bus capability installed • Control module with CAN-Bus capability and instrument cluster not adapted • CAN-Bus in one wire operation (possibility of electro-magnetic compatibility problems) 	<ul style="list-style-type: none"> • Repair open or short circuit in wiring using wiring diagram • Check CAN-Bus capability of control module by confirming that value "1" appears in Read Measuring Value Block 140. Refer to <u>Read Measuring Value Block (function 08)</u> • Check data exchange between control modules. Refer to <u>Data exchange between control modules, checking</u> • Install proper control module if necessary. • Perform Adaptation (function 10), select channel 62 and enter correct adaptation value. Refer to <u>Adaptation (function 10)</u>
65535		
Control Module Malfunctioning	Instrument cluster malfunctioning	<ul style="list-style-type: none"> • Replace instrument cluster. Refer to <u>Instrument cluster, removing and installing</u>

Output Diagnostic Test Mode (DTM) (function 03)

NOTE: • Output DTM may only be performed with the vehicle

stationary and the engine not running.

- **If any malfunctions are identified by the output DTM, trace the cause of the malfunction and if necessary replace the instrument cluster.**

With output DTM, all "control elements" in the instrument cluster (if installed and coded) are activated in sequence.

- Simultaneous activation of all analog instruments (coolant temperature gauge, tachometer, speedometer, fuel gauge)
- Activation of auto-check system indicator symbols
- Activation of seat belt warning lamp
- Activation of gong (chime)

- Segment test of multi-function display and/or LCD odometer
- Test of instrument lighting in instrument cluster, including dimmer function

NOTE: The lights must be switched on for this test.

- Overheating test: Activation of safety shut-off of air conditioner compressor

Output Diagnostic Test Mode (DTM), initiating

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -3- to select "output DTM" function 03.

Rapid data transfer Q
03 - Output Diagnostic Test Mode

Indicated on display:

- Press -Q- button to confirm input This will start the output DTM for the analog

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instruments (displays).

Output Diagnostic Test Mode -->
Analog displays

Indicated on display:

The following tests are carried out simultaneously when the -Q- button is pressed:

- Coolant temperature gauge needle moves across the full range of the scale
- Tachometer needle moves across the full range of the scale
- Speedometer needle moves across the full range of the scale
- Fuel gauge needle moves across the full range of the scale

When the gauge needles have finished moving across the scales the following fixed values will be displayed:

Coolant temperature gauge:	90 ° C (194 ° F)
Tachometer:	3000 RPM
Speedometer:	100 km/h (62 mph)
Fuel gauge:	1/2

NOTE: If the ignition is switched on and then off again while the gauge needles are moving, the needles will return to their starting positions.

- Press --> button.

Output Diagnostic Test Mode -->
Seat Belt Warning Light -K19

Indicated on display:

Seat belt warning light will be activated.

NOTE: Depending on version / equipment, the seat belt warning light is activated via control module coding, i.e. if this actuator test is not performed, warning light is not active.

- Press " button.

Output Diagnostic Test Mode -->
Gong

Indicated on display:

The gong (chime) will be activated and will sound continuously.

- Press --> button.

Output Diagnostic Test Mode -->
Segment test

Indicated on display:

NOTE:

- All the display points on the multi-function display, the LCD display for the odometer and the clock display will be activated.
- All the display segments on the Driver's Information Display will light up and one line will remain dark.

- Press " button.

Output Diagnostic Test Mode -->
Lighting/switch and instruments

Indicated on display:

The dimmer function for the instrument cluster lighting will be activated.

- Press " button.

Output Diagnostic Test Mode -->
END

Indicated on display:

- Press --> button to terminate the output DTM.

This returns the tester to the basic function mode

Rapid data transfer HELP
Select function XX

Indicated on display:

Diagnostic Trouble Code (DTC) Memory, erasing

NOTE: If it is not possible to erase the DTC memory, check the DTC memory once again and repair malfunctions.

Requirements

- DTC memory checked. Refer to **Diagnostic Trouble Code (DTC) Memory, checking (function 02)**
- All malfunctions repaired

After DTC memory has been successfully checked:

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -5- to select "Erase DTC Memory" function 05.

Rapid data transfer Q
05 Erase DTC Memory

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Indicated on display:

- Press -Q- button to confirm input

Rapid data transfer -->
DTC memory is erased!

Indicated on display:

The DTC memory is now erased.

- Press --> button.

Rapid data transfer HELP
Select function XX

Indicated on display:

NOTE:

- This message indicates an error in the test sequence:
- This message indicates an error in the test sequence:

Adhere exactly to test sequence: First check DTC memory, if necessary repair malfunctions, then erase.

End Output (function 06)

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -6- to select "End Output" function 06.

Rapid data transfer Q
06 End Output

Indicated on display:

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- Press -Q- button to confirm input

Rapid data transfer HELP
Input address word XX

Indicated on display:

- Switch off ignition.
- Disconnect VAG 1551 scan tool.

Code Control Module (function 07)

This function can be used to code the instrument cluster for the following features:

- Optional equipment
- Export version
- Number of cylinders
- Engine type

NOTE:

- **The coding procedure is used to set the appropriate configuration for the on-board computer and check the system according to the equipment installed, the export version, the number of cylinders and the engine type.**
- **The coding table only gives the coding combinations that are possible for the Audi TT.**

Coding procedure

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -7- to select "Code Control Module" function 07.
- Press -Q- button to confirm input

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Code Control Module

Enter code number XXXXX (0-32000)

Indicated on display:

- Enter code number according to coding table. Refer to **Code Control Module (function 07)** . Example: 06244

NOTE:

- **Coding is entered for various combinations of optional equipment, according to equipment level.**
- **If the vehicle is equipped with more than one item of optional equipment which needs to be coded, enter the sum total of the respective coding numbers.**

07			Seatbelt warning (02) plus larger fuel tank (01) and 02M transmission for quattro (04) equals 07
	2		USA
		4	4 cylinders
		4	Turbo engine

Coding table

XX				Optional equipment
00				No optional equipment
01				Larger fuel tank capacity (quattro)
02				Seat belt warning system active
04				02M transmission (quattro)
	X			Country (export version)
	2			USA (US)
	3			Canada (CDN)
		X		Number of cylinders
		4		4 cylinders
			X	Type of engine
			4	Turbo engine

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Code Control Module Q
Enter code number 07244 (0-32000)

Indicated on display (example only):

- Press -Q- button to confirm input

8N1920880 INSTR.+IMM M73 D03 -->
Coding 07244 WSC 06812

After about 5 seconds this display will appear

- Press " button.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -6- to select "End Output" function 06.

Read Measuring Value Block (function 08)

Use this function to observe various instrument cluster inputs and stored data.

The measuring value block is divided into 12 display groups, each containing 4 display fields.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -8- to select "Read Measuring Value Block"function 08.

Rapid data transfer Q
08 Read Measuring Value Block

Indicated on display:

- Press -Q- button to confirm input

Read Measuring Value Block HELP Enter display group number XXX

Indicated on display:

- Enter desired Display Group number. Refer to table beginning from **Read Measuring Value Block (function 08)** .
- Press -Q- button to confirm input.

The Read Measuring Value Block selected appears in the standard format.

Interpreting displayed information. Refer to from **Read Measuring Value Block (function 08)** .

NOTE:

- **The display on the scan tool will always show the actual values obtained from the senders and sensors. The values which appear on the instrument cluster are filtered and may not be the same.**
- **If the actual coolant temperature is between about 80 °C and 100 °C, the instrument cluster will always show 90 °C.**
- **Data from display groups 10 to 15 must be recorded prior to instrument cluster replacement.**
- **Read Measuring Value Block 140 indicates all Control Modules that are active on part of the Information CAN-Bus network.**
- **The display groups shown here are the only ones which can be called up for the instrument cluster.**

Display groups, summary

Display Group Number	Indicated on display
----------------------	----------------------

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001	1 = road speed 2 = engine speed (RPM) 3 = oil pressure switch 2 (< min) 4 = time (h)
002	1 = odometer reading 2 = fuel gauge 3 = fuel gauge sender (Ohm) 4 = ambient temperature

Display Group Number	Indicated on display
003	1 = coolant temperature 2 = standing time, terminal 15 3 = dimmer signal 58d 4 = dimmer signal 58s
004	1 = distance driven since reaching service interval 2 = vacant 3 = vacant 4 = vacant
010	1 = channel 30 2 = adaptation fuel level sender 3 = channel 9 4 = input value for odometer
011	1 = channel 4 2 = language version 3 = channel 3 4 = fuel consumption indicator
012	1 = channel 40 2 = distance driven since service performed 3 = channel 41 4 = time since service

Display Group Number	Indicated on display
013	1 = channel 42 2 = min. value km

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	3 = channel 43 4 = max. value km
014	1 = channel 44 2 = max. time interval 3 = vacant 4 = vacant
015	1 = channel 45 2 = oil grade 3 = channel 46 4 = total consumption
050	1 = odometer reading 2 = engine speed 3 = oil temperature 4 = coolant temperature
140	1 = radio 2 = telephone 3 = navigation system 4 = telematics

Read Measuring Value Blocks, interpreting

Read Measuring Value Block 1				-->	<-- Indicated on display (example only)
50 km/h	2400 rpm	Oil p2 <min	12:20:00 h		
					Time
			Oil pressure switch 2 (1.2 bar)		
			<ul style="list-style-type: none"> • Oil p2 < min • Oil p2 OK 		
		Engine speed			
		<ul style="list-style-type: none"> • 0... 9990 rpm 			
	Vehicle speed				

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- 0... 300 km/h

Read Measuring Value				-->	<-- Indicated on display (example only)
Block 2					
2390 km	43 l	82 Ohm	23.0 ° C		
				Ambient temperature	
				<ul style="list-style-type: none"> • -40... +70 ° C 	
				Fuel gauge sender	
				<ul style="list-style-type: none"> • Approx. 54 Ohm (empty)... approx. 290 Ohm (full) 	
		Fuel gauge			
		<ul style="list-style-type: none"> • 0... 100 l 			
	Odometer reading				

Read Measuring Value				-->	<-- Indicated on display (example only)
Block 3					
85.0 ° C	12:01:00 h	24 %	80 %		
				Dimmer signal 58s	
				Illumination conditions of controls (e.g. switches)	
				Dimmer signal 58d	
				Illumination conditions of displays (e.g. radio display)	
		Terminal 15 standing time			
	Engine Coolant Temperature (ECT)				

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• 50... 130 ° C

Read Measuring Value Block 4 --> <-- Indicated on display (example only)			
100 km			
	Distance driven after reaching service		

Read Measuring Value Block 10 --> <-- Indicated on display (example only)			
Channel 30	1281)	Channel 9	239
			Input value for odometer adaptation (e.g. 239 = display value of odometer divided by 10)
			Adaptation channel for odometer
			Adaptation value1)
			Adaptation channel for fuel level sender

1) Default value set by Factory is 128. If value has been changed due to customer complaint of inaccurate fuel level readings, the changed value must also be applied to the replacement instrument cluster.

Read Measuring Value Block 11 --> <-- Indicated on display (example only)			
Channel 4	2	Channel 3	1002)
			Adaptation value2)

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		Adaptation channel for fuel consumption display
		Language selected <ul style="list-style-type: none"> • 1 = German • 2 = English
		Adaptation channel for multi-function display language versions

2) Default value set by Factory is 100. If value has been changed due to customer complaint of inaccurate fuel consumption indicator readings, the changed value must also be applied to the replacement instrument cluster.

Read Measuring Value Block 12			-->	<-- Indicated on display (example only)
Channel 40	8	Channel 41	10	
				Elapsed time <ul style="list-style-type: none"> • e.g. 10 = 10 days
				Adaptation channel for time following service
				Distance driven <ul style="list-style-type: none"> • 8 = 800 km
				Adaptation channel for distance driven after service

Read Measuring Value Block 13			-->	<-- Indicated on display (example only)
Channel 42	153)	Channel 43	303)	
				Maximum. distance

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				• 30 = 30,00 km3)
			Adaptation channel for max. distance	
		Minimum. distance		
				• 15 = 15,000 km3)
	Adaptation channel for min. distance			

3) Confirm maintenance intervals applicable to vehicle. Refer to Service Circulars, Maintenance

Read Measuring Value Block 14		-->	<-- Indicated on display (example only)	
Channel 44	7304)			
			Max. time interval	
				• 730 means 730 days/2 years
	Adaptation channel for max. time interval			

4) Confirm maintenance intervals applicable to vehicle. Refer to Service Circulars, Maintenance

Read Measuring Value Block 15		-->	<-- Indicated on display (example only)	
Channel 45	14)	Channel 46	300	
				Total consumption
				• 300 = 300 liters
		Adaptation channel for the total consumption quantity (petrol engine only)		

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	Oil grade
	<ul style="list-style-type: none"> • Input is possible from 1 to 44)
	Adaptation channel for oil grade

4) Where applicable. Confirm maintenance intervals applicable to vehicle. Refer to Service Circulars, Maintenance. Where applicable, oil grade must be adapted after service.

Read Measuring Value Block 50					-->	<-- Indicated on display (example only)
2390 km	2400 rpm	99 ° C	85.0 °			
			C			
						Coolant temperature
						<ul style="list-style-type: none"> • 50... 130 ° C
						Oil temperature
						Engine speed
						<ul style="list-style-type: none"> • 0... 9990 rpm
						Odometer reading

Read Measuring Value Block 140					-->	<-- Indicated on display (example only)
						Information CAN-Bus connection - Telematics
						<ul style="list-style-type: none"> • 1 = Telematic control module on Information CAN-Bus network • Empty = Telematic control module not on Information CAN-Bus network

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		<p>Information CAN-Bus connection - Navigation</p> <ul style="list-style-type: none">• 1 = Navigation control module on Information CAN-Bus network• Empty = Navigation control module not on Information CAN-Bus network
		<p>Information CAN-Bus connection - Telephone</p> <ul style="list-style-type: none">• 1 = telephone control module on Information CAN-Bus network• Empty = Telephone control module not on Information CAN-Bus network
		<p>Information CAN-Bus connection - Radio</p> <ul style="list-style-type: none">• 1 = Radio on Information CAN-Bus network• Empty = Radio not on Information CAN-Bus network

Adaptation (function 10)

The adaptation function is used to carry out and store the following adjustments:

- Adapting fuel consumption display
- Coding language version for Auto Check system
- Resetting service interval display (SID)
- Adapting odometer reading when instrument cluster is replaced
- Adapting fuel gauge sender resistance range

The individual functions are selected by entering the appropriate adaptation channel number from adaptation table. Refer to **Adaptation (function 10)** .

Adaptation, initiating

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- to select "Adaptation" function 10.

Rapid data transfer Q
Adaptation

Indicated on display:

- Press -Q- button to confirm input

Adaptation
Enter channel number XX

Indicated on display:

- Enter desired channel number from adaptation table. Refer to **Adaptation (function 10)** .
- Press -Q- button to confirm input

NOTE: After adapting one of the displays or exiting a particular channel, the adaptation function (function 10) must be selected again before the next adaptation channel can be entered.

Adaptation table

Adaptation channels	Adaptation functions
02	Service Interval Display (SID), resetting after service. Refer to <u>Adaptation (function 10)</u>
03	Fuel consumption display. Refer to <u>Adaptation (function 10)</u>
04	Language versions for multi-function display. Refer to <u>Adaptation (function 10)</u>
09	Odometer. Refer to <u>Adaptation (function 10)</u>
30	Fuel level sender. Refer to <u>Adaptation (function 10)</u>

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35	Engine speed threshold. Refer to <u>Adaptation (function 10)</u>
40	SID: Distance remaining until next Inspection Service (adaptation after replacing instrument cluster). Refer to <u>Adaptation (function 10)</u>
41	SID: Time remaining until next Inspection Service (adaptation after replacing instrument cluster). Refer to <u>Adaptation (function 10)</u>
42	SID: Minimum distance. Refer to <u>Adaptation (function 10)</u>
43	SID: Maximum distance. Refer to <u>Adaptation (function 10)</u>
44	SID: Maximum time interval. Refer to <u>Adaptation (function 10)</u>
45	Oil grade (where applicable). Refer to <u>Adaptation (function 10)</u>
46	Total consumption quantity. Refer to <u>Adaptation (function 10)</u>
60	Powertrain CAN-Bus. Refer to <u>Adaptation (function 10)</u>
62	Information CAN-Bus. Refer to <u>Adaptation (function 10)</u>

Service Interval Display (SID), resetting after service

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -0- and -2- to access "channel 02"
- Press -Q- button to confirm input

NOTE:

- The service interval display serves to remind the driver that the vehicle is due for servicing. Messages appear in the Driver's Information Display.
- The service reminder will first appear 2000 km (1200 mi) before the next service is due. The display message comes up for 5 seconds every time terminal 15 is activated, and changes in steps of 100 km (62 mi.). Example of service interval display message: "SERVICE IN 1300 KM" will appear after the vehicle has been driven 13,700 km.

NOTE:

- When the service actually becomes due the message "SERVICE" will appear in the central display window for 5 seconds each time the ignition is switched on.
- A service is required after an elapsed period of 12 months, even if the distance covered in this time is less than 15,000 km (10,000 mi.).
- Servicing will always be required every 15000 km (10,000 mi.) in other words the Oil Change and the Inspection Service will be performed together at the end of the 15,000 km (10,000 mi.) interval.
- The service interval display can also be reset without using VAG 1551 scan tool/1552. Refer to Service interval display, resetting after a service without using VAG 1551/1552 .
- Software version of instrument cluster. Refer to Instrument cluster On Board Diagnostic (OBD), initiating .

Channel 2 Adaptation 1 -->

< - 1 3- >

Indicated on display:: the display will indicate the service interval function:

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1 - = set service interval: instrument cluster display will then show:

"SERVICE"

NOTE: The service interval display can only be reset via direct input.

- Press " button.

Channel 2 Adaptation 1
Enter adaptation value XXXXX

Indicated on display:

The service interval is reset (adapted) by entering the following values:

Adaptation value	Set / reset service interval
00000	Reset

- Enter the appropriate adaptation value (00000) via the button pad to reset the service interval.
- Press button -0- five times.

Channel 2 Adaptation 1 Q
Enter adaptation value 00000

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 2 Adaptation 0 -->
< - 1 3- >

Indicated on display:

0 - means service is reset,

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i.e. "SERVICE IN 15000 km" will be indicated in the instrument cluster after confirming input using the Q-button.

- Press -Q- button to confirm input

Channel 2 Adaptation 0 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 2 Adaptation 0 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate resetting of service interval display.

Fuel consumption display, adapting

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -0- and -3- to access "channel 03".
- Press -Q- button to confirm input

NOTE: • Adaptation is only possible on vehicles with on-board

computer.

- **The value entered must be between 85% and 115%.**
- **The value must be entered in steps of 5%.**
- **If the value "100" was changed due to a customer complaint, the changed value must be entered into a new instrument cluster.**

Channel 3 Adaptation 100 -->
< - 1 3- >

Indicated on display:

- Press --> button.

NOTE: The fuel consumption display can only be adapted via direct input.

Channel 3 Adaptation 100
Enter adaptation value XXXXX

Indicated on display:

- Enter required adaptation value via button pad on scan tool, filling in the initial spaces with "0."

Example:

- Required value: 90%
- Entry via button pad: 00090

Channel 3 Adaptation 100 Q
Enter adaptation value 00090

Indicated on display (example only):

- Press -Q- button to confirm input

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Channel 3 Adaptation 90 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 3 Adaptation 90 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of fuel consumption display.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

NOTE: If an incorrect entry is made the testing unit will switch to function mode.

Function is unknown or -->
cannot be carried out at the moment

Indicated on display:

- Press " button.
- Select adaptation function (function 10) and adaptation channel 03 again.
- Repeat adaptation of fuel consumption display and confirm entry with -Q- button.

Language versions for multi-function display, adapting

NOTE: Adaptation is only possible on vehicles with on-board

computer.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -0- and -4- to access "channel 04".
- Press -Q- button to confirm input

Channel 4 Adaptation 1 -->
< - 1 3- >

Indicated on display:

NOTE:

- The display will show only the last digit of the 5-figure language version code (e.g. 1 for German).
- If an incorrect value is entered the adaptation function will be terminated and must be re-started by selecting function 10 (Adaptation) again.
- The code can now be entered either directly or in stages via the button pad on the scan tool.

Coding table

Code	Language version
00001	German
00002	English

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00003	French
00004	Italian
00005	Spanish
00006	Portuguese

Entering code in stages:

- Key 1 can be used to change down to a lower code value, and button 3 can be used to change up to a higher code value (for example, to change to "2" for English).

Channel 4 Adaptation 2 Q

< - 1 3- >

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 4 Adaptation 2 Q

Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 4 Adaptation 2 -->

Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of language version.

Direct input:

Channel 4 Adaptation 1 -->

< - 1 3- >

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Indicated on display:

- Press " button.

Channel 4 Adaptation 1
Enter adaptation value XXXXX

Indicated on display:

- Enter the required 5-figure code (Refer to **Adaptation (function 10)**) via button pad.

Example:

- Code: 2 (English)
- Input: 00002
- Press -Q- button to confirm input

Channel 4 Adaptation 1 Q
Enter adaptation value 00002

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 4 Adaptation 2 Q
< - 1 3- >

Indicated on display:

- Press -Q- button to confirm input

Channel 4 Adaptation 2 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 4 Adaptation 2 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of language version.

Odometer, adaptation

This function is used to set the correct odometer reading after replacing the instrument cluster.

Preparation

NOTE:

- The adaptation function can only be performed on instrument clusters with a maximum of 100 kilometers or 63 miles indicated on counter.
 - The adaptation procedure can only be performed once on any one instrument cluster.
 - The adaptation value entered must be higher than the existing value (over 100 kilometers or 63 miles).
 - If an incorrect value is entered and confirmed, it cannot be changed. In this case the instrument cluster must be replaced.
-
- Record instrument cluster input values and proceed with initial adaptations (code instrument cluster, etc.). Refer to **Replacement instrument cluster input values, adapting**

Adaptation

Rapid data transfer HELP
Select function XX

Indicated on display:

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- Press buttons -1- and -1- to select "Login procedure" function 11.

Rapid data transfer Q
11 - Login procedure

Indicated on display:

- Press -Q- button to confirm input

Login procedure
Enter code number XXXXX

Indicated on display:

- Enter code number 13861.

Login procedure Q
Enter code number 13861

Indicated on display:

- Press -Q- button to confirm input

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- to select "Adaptation" function 10.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press -Q- button to confirm input

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Adaptation

Enter channel number XX

Indicated on display:

- Press buttons -0- and -9- to access "channel 09".
- Press -Q- button to confirm input

Channel 9 Adaptation 0 -->

<-1 3->

Indicated on display:

NOTE: The number can only be entered directly via VAG 1551 scan tool button pad.

- Press --> button to advance the program sequence.

Channel 9 Adaptation 0 Q

Enter adaptation value XXXXX

Indicated on display:

CAUTION:

- Replacement instrument clusters calibrated in miles require input of odometer reading in miles during adaptation (DO NOT convert to kilometers).
- Replacement instrument clusters calibrated in kilometers require input of odometer reading in kilometers during adaptation.
- If an incorrect odometer display value is entered and confirmed during adaptation, it cannot be changed. In this case the instrument cluster must be replaced.

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- Enter adaptation value (odometer reading) via button pad.

Example: 89627

0 8 9 6 3

0	8	9	6	3	
X					Hundred thousands: 100000 - 655350
	X				Ten thousands: 10000 - 90000
		X			Thousands: 1000 - 9000
			X		Hundreds: 100 - 900
				X	Tens: 10 - 90
					Units: round up to the nearest 10

Channel 9 Adaptation 0 Q
Enter adaptation value 08963

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 9 Adaptation 8963 Q
<-1 3->

Indicated on display:

- Press -Q- button to confirm input

Channel 9 Adaptation 8963 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 9 Adaptation 8963 -->

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Changed value is stored

Indicated on display:

- Press --> to terminate adaptation of odometer.

Fuel level sender, adaptation

This function is used to adjust the resistance range of the fuel level sender signal to compensate for any discrepancies in the "empty" and "full" values.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -3- and -0- to access "channel 30"
- Press -Q- button to confirm input

Channel 30 Adaptation 128 -->
< - 1 3- >

Indicated on display (example only): the display will show the adaptation value, e.g. 128.

NOTE:

- The adaptation value displayed represents the standard resistance range for the fuel gauge sender as set by the factory (default value = 128).
- The adaptation value for the fuel gauge sender resistance range can be adjusted from the pre-set value

by ± 8 (range = 120... 136).

- If default value value "128" has been changed due to customer complaint of inaccurate fuel level readings, the changed value must also be applied to the replacement instrument cluster.

- Press " button.

Channel 30 Adaptation 128
Enter adaptation value XXXXX

Indicated on display:

- Enter adaptation value (e.g. 132) via button pad on scan tool, filling in the initial spaces with "0."

Channel 30 Adaptation 128 Q
Enter adaptation value 00132

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 30 Adaptation 132 Q
< - 1 3- >

Indicated on display:

- Press -Q- button to confirm input

Channel 30 Adaptation 132 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

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Channel 30 Adaptation 132 -->
Changed value is stored

Indicated on display:

- Press --> to terminate adaptation of fuel gauge sender resistance range.

Engine speed threshold, adaptation

This function permits influencing of the offset value for the engine speed threshold of the dynamic oil pressure warning function.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press -Q- button to confirm input

Adaptation
Enter channel no. XX

Indicated on display:

- Press buttons -3- and -5- to access "channel 35".
- Press -Q- button to confirm input
- Indicated on display: Display shows adaptation value, e.g. 0.

NOTE:

- **Adaptation value 0 corresponds to a factory set oil pressure warning if oil pressure drops below 1.2 bar at**

an engine speed of 1500 rpm.

- **Adaptation can be performed in four increments (0-1000).**
- **Adaptation value "250" changes engine speed threshold to 1750 rpm.**
- **If value "0" has been altered on account of a customer complaint modified value must be entered in new instrument cluster.**

- Press --> button.
- Indicated on display:
- Enter required adaptation value (e.g. 00250) via scan tool button pad, filling in the initial spaces with "0", e.g. 00250.
- Indicated on display (example only):
- Press -Q- button to confirm input
- Indicated on display:
- Press-Q- button to confirm input.
- Indicated on display:
- Press-Q- button to confirm input.
- Indicated on display:
- Press --> button to terminate adaptation of engine speed threshold.

SID: Distance remaining until next Inspection Service (adaptation after replacing instrument cluster)

This function is used after replacing the instrument cluster to enter the distance remaining before the next Inspection Service is due.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

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Adaptation

Enter channel number XX

Indicated on display:

- Press buttons -4- and -0- to access "channel 40".
- Press -Q- button to confirm input

Channel 40 Adaptation 0 -->

< - 1 3- >

Indicated on display: for new instrument cluster:

The distance remaining before the next Inspection Service is due must be transferred from the old instrument cluster (e.g. 5000 km = adaptation value 50).

NOTE:

- **The distance can only be entered in steps of 100 km (62 mi.). Accordingly, the readout on the display will also be in steps of 100 km (62 mi.).**
- **The entered value is counted upward from 0 to 15000.**
- **Input values when replacing instrument cluster. Refer to Replacement instrument cluster input values, adapting .**
- **The number can only be entered directly via the button pad on the scan tool.**
- **If an incorrect value is entered the adaptation function will be terminated and must be re-started.**

- Press --> button.

Channel 40 Adaptation 0

Enter adaptation value XXXXX

Indicated on display:

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- Enter required value (noted from old unit) via button pad on scan tool, filling in the initial spaces with "0."

Example:

Distance remaining: 5000 km

Input value: 00050

Channel 40 Adaptation 0 Q
Enter adaptation value 00050

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 40 Adaptation 50 Q
< - 1 3- >

Indicated on display:

- Press -Q- button to confirm input

Channel 40 Adaptation 50 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 40 Adaptation 50 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of service interval display.

SID: time remaining until next Inspection Service (adaptation after replacing instrument cluster)

This function is used after replacing the instrument cluster to enter the time remaining (in days) before the next Inspection Service is due.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Adaptation
Enter channel number XX

Indicated on display:

- Press buttons -4- and -1- to access "channel 41".
- Press -Q- button to confirm input
- Indicated on display: for new instrument cluster:

The time (in days) remaining before the next Inspection Service is due must be transferred from the old instrument cluster (e.g. 110 days = adaptation value 110).

NOTE:

- **The number can be entered in steps of 1 day; the readout on the display will also be in steps of 1 day.**
- **The entered value is counted upward from 0 to 365 days.**
- **Input values when replacing instrument cluster. Refer to Replacement instrument cluster input values, adapting .**
- **When using the button pad on the scan tool, the number must be entered directly.**
- **If an incorrect value is entered the adaptation function will be terminated and must be re-started.**

- Press " button.

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Channel 41 Adaptation 0
Enter adaptation value XXXXX

Indicated on display:

- Enter required value (noted from old unit) via button pad on scan tool, filling in the initial spaces with "0."

Example:

- Remaining time: 110 days
- Input value: 00110

Channel 41 Adaptation 0 Q
Enter adaptation value 00110

Indicated on display (example only):

- Press -Q- button to confirm input

Channel 41 Adaptation 110 Q
< - 1 3- >

Indicated on display:

- Press -Q- button to confirm input

Channel 41 Adaptation 110 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input

Channel 41 Adaptation 110 -->
Changed value is stored

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Indicated on display:

- Press --> button to terminate adaptation of service interval display.

SID: Minimum distance, adaptation

This function stipulates a minimum distance for the SID.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with -Q- button.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press-Q- button to confirm input.

Adaptation
Enter channel no. XX

Indicated on display:

- Press buttons -4- and -2- to access "channel 42".
- Press-Q- button to confirm input.

Channel 42 Adaptation 15 -->
min-value, oil in 1000 km < -1 3- >

Indicated on display: Display shows minimum distance until next service (here, e.g. 15 = 15000 km).

NOTE: • **Confirm maintenance intervals applicable to vehicle.**

Refer to Service Circulars, Maintenance.

- **Distance must be entered in steps of 1000 km. Accordingly, readout on the display will also be in steps of 1000 km.**
- **When using the button pad on the scan tool, the number must be entered directly.**
- **If an incorrect value is entered adaptation function will be terminated and must be restarted.**

CAUTION:

- **Replacement instrument clusters calibrated in miles require input of distance reading in miles during adaptation (DO NOT convert to kilometers).**
- **Replacement instrument clusters calibrated in kilometers require input of distance reading in kilometers during adaptation.**

- Press --> button.

Channel 42 Adaptation 15
Enter adaptation value XXXXX

Indicated on display:

- Enter required value via scan tool button pad, filling in initial spaces with "0".

Specification: 15000 km

Entry via keypad: 00015

Channel 42 Adaptation 15 Q
Enter adaptation value 00015

Indicated on display (example only):

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- Press-Q- button to confirm input.

Channel 42 Adaptation 15 Q
min-value, oil in 1000 km < -1 3- >

Indicated on display:

- Press-Q- button to confirm input.

Channel 42 Adaptation 15 Q
Store changed value?

Indicated on display:

- Press-Q- button to confirm input.

Channel 42 Adaptation 15 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of minimum distance.

SID: Maximum distance, adaptation

This function stipulates a minimum distance for the SID.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons 1 and 0 and confirm input with Q button.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

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- Press-Q- button to confirm input.

Adaptation

Enter channel no. XX

Indicated on display:

- Press buttons 4 and 3.
- Press-Q- button to confirm input.

Channel 43 Adaptation 30 -->
max-value, oil in 1000 km < -1 3- >

Indicated on display: Display shows maximum distance until the next service (here, e.g. 30 = 30,000 km).

NOTE:

- **The value entered for the corresponding engine variation must correspond to value of table. Refer to General information .**
- **Confirm maintenance intervals applicable to vehicle. Refer to Service Circulars, Maintenance.**
- **The distance must be entered in steps of 1000 km. Accordingly, readout on the display will also be in steps of 1000 km.**
- **When using the button pad on the scan tool, the number must be entered directly.**
- **If an incorrect value is entered adaptation function will be terminated and must be restarted.**

CAUTION:

- **Replacement instrument clusters calibrated in miles require input of distance reading in miles during adaptation (DO NOT convert to kilometers).**
- **Replacement instrument clusters calibrated in**

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kilometers require input of distance reading in kilometers during adaptation.

- Press --> button.

Channel 2 Adaptation 1
Enter adaptation value XXXXX

Indicated on display:

- Enter required value via scan tool button pad, filling in initial spaces with "0".

Input value: e.g. 30000 km

Entry via keypad: 00030

Channel 43 Adaptation 30 Q
Enter adaptation value 00030

Indicated on display (example only):

- Press-Q- button to confirm input.

Channel 43 Adaptation 30 Q
max-value, oil in 1000 km < -1 3- >

Indicated on display:

- Press-Q- button to confirm input.

Channel 43 Adaptation 30 Q
Store changed value?

Indicated on display:

- Press-Q- button to confirm input.

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Channel 43 Adaptation 30 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of maximum distance.

SID: Maximum time interval, adaptation

This function stipulates a max. time interval in days for the SID.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press-Q- button to confirm input.

Adaptation
Enter channel no. XX

Indicated on display:

- Press buttons -4- and -4- to access "channel 44".
- Press-Q- button to confirm input.
- Indicated on display: Display shows maximum time interval in days until the next service (here, e.g. 730 = 730 days).

NOTE:

- **The value entered for the corresponding engine variation must correspond to value of table. Refer to**

General information .

- **Confirm maintenance intervals applicable to vehicle. Refer to Service Circulars, Maintenance.**
- **The respective specified value can only be entered in steps of single days and the display is therefore also in days.**
- **When using the button pad on the scan tool, the number must be entered directly.**
- **If an incorrect value is entered adaptation function will be terminated and must be restarted.**

- Press --> button.
- Indicated on display:
- Required value via scan tool button pad, filling in the initial spaces with "0".

Input value: e.g. 730 days

Entry via keypad: 00730

- Indicated on display:
- Press-Q- button to confirm input.
- Indicated on display:
- Press-Q- button to confirm input.
- Indicated on display:
- Press-Q- button to confirm input.
- Indicated on display:
- Press --> button to terminate adaptation of maximum time interval.

Oil grade, adaptation (where applicable)

Rapid data transfer HELP
Select function XX

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Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press-Q- button to confirm input.

Adaptation
Enter channel no. XX

Indicated on display:

- Press buttons -4- and -5- to access "channel 45".
- Press-Q- button to confirm input.

NOTE:

- **Oil used must be re-adapted after each service.**
- **The adaptation value can be set from 1-4. Attached to each value from 1-4 is a max distance (channel 43) and a maximum time (channel 44).**
- **The value entered for the corresponding engine variation must correspond to value of table. Refer to General information .**
- **Confirm maintenance intervals applicable to vehicle. Refer to Service Circulars, Maintenance.**

Channel 45 Adaptation 1 -->
Oil grade < -1 3- >

Indicated on display:

- Press --> button.

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Channel 2 Adaptation 1
Enter adaptation value XXXXX

Indicated on display:

- Required value via scan tool button pad, filling in the initial spaces with "0".

Input value: e.g. 2

Entry via keypad: 00002

Channel 45 Adaptation 1 Q
Enter adaptation value 00002

Indicated on display (example only):

- Press-Q- button to confirm input.

Channel 45 Adaptation 2 Q
Oil quality < -1 3- >

Indicated on display:

- Press-Q- button to confirm input.

Channel 45 Adaptation 2 Q
Store changed value?

Indicated on display:

- Press-Q- button to confirm input.

Channel 45 Adaptation 2 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation of oil grade.

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Total consumption, adaptation

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -1- and -0- and confirm input with Q button.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press-Q- button to confirm input.

Adaptation
Enter channel no. XX

Indicated on display:

- Press buttons -4- and -6- to access "channel 46".
- Press-Q- button to confirm input.

NOTE:

- **Displayed value must be adopted on instrument cluster replacement.**
- **The value indicated does not correspond to the actual consumption but rather to a calculated, averaged value for the service interval indicator based on various distance and engine data.**

Channel 46 Adaptation 300 -->
Consumption quantity in 1 liter < -1 3- >

Indicated on display:

- Press --> button.

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Channel 46 Adaptation 300
Enter adaptation value XXXXX

Indicated on display:

- Enter displayed adaptation value via scan tool button pad, filling in initial spaces with "0".

Required value: 300 l

Entry via keypad: 00300

Channel 46 Adaptation 300 Q
Enter adaptation value 00300

Indicated on display (example only):

- Press-Q- button to confirm input.

Channel 46 Adaptation 300 Q
Consumption quantity in 1 liter < -1 3- >

Indicated on display:

- Press-Q- button to confirm input.

Channel 46 Adaptation 300 Q
Store changed value?

Indicated on display:

- Press-Q- button to confirm input.

Channel 46 Adaptation 300 -->
Changed value is stored

Indicated on display:

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- Press --> button to terminate adaptation of total consumption.

Powertrain CAN-Bus, adaptation

NOTE:

- **The instrument cluster does not support Powertrain CAN-Bus functions. Therefore, "0" must be confirmed as the adaptation value.**
- **Input values when replacing instrument cluster. Refer to Replacement instrument cluster input values, adapting .**

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press keys -1- and -0- and confirm input with Q button.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press -Q- button to confirm input.

Adaptation
Enter channel no. XX

Indicated on display:

- Press keys -6- and -0- to access "channel 60".
- Press -Q- button to confirm input.

Channel 60 Adaptation 0 -->
< -1 3- >

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Indicated on display:

- Press --> button.

Channel 60 Adaptation 0
Enter adaptation value XXXXX

Indicated on display:

Entry via keypad: 00000

Channel 60 Adaptation 0 Q
Enter adaptation value 00000

Indicated on display:

- Press -Q- button to confirm input.

Channel 60 Adaptation 0 Q
< -1 3- >

Indicated on display:

- Press -Q- button to confirm input.

Channel 60 Adaptation 0 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input.

Channel 60 Adaptation 0 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation for Powertrain CAN-Bus.

Information CAN-Bus, adaptation

- NOTE:**
- The adaptation values of the table. Refer to Adaptation (function 10) are input.
 - Input values when replacing instrument cluster. Refer to Replacement instrument cluster input values, adapting .

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press -1- and -0- and confirm by pressing the -Q- button.

Rapid data transfer Q
10 - Adaptation

Indicated on display:

- Press -Q- button to confirm input.

Adaptation
Insert channel number XX

Indicated on display:

- Press buttons -6- and -2- to access "channel 62".
- Press -Q- button to confirm input.

Channel 62 Adaptation 0 -->
< - 1 3- >

Indicated on display:

- Press --> button.

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Channel 62 Adaptation 0
Input adaptation value XXXXX

Indicated on display:

- Using table. Refer to **Adaptation (function 10)** , input desired value using scan tool button pad, filling initial positions with "0".

Example input value: 5 (Navigation and Symphony radio)

Keypad input: 00005

Channel 62 Adaptation 0 Q
Input adaptation value 00005

Indicated on display (example only):

- Press -Q- button to confirm input.

Channel 62 Adaptation 5 Q
< - 1 3- >

Indicated on display:

- Press -Q- button to confirm input.

Channel 62 Adaptation 5 Q
Store changed value?

Indicated on display:

- Press -Q- button to confirm input.

Channel 62 Adaptation 5 -->
Changed value is stored

Indicated on display:

- Press --> button to terminate adaptation for Information CAN-Bus.

Table:

Equipment	Adaptation value
Radio (Symphony only)	1
Telephone	2
Navigation system	4
Telematics	8

Control modules which communicate over the Information CAN-Bus network have individual adaptation values. These values must be added together.

Example: Vehicle with Radio (Symphony) and Navigation System III (NS low)

- Adaptation value: Symphony Radio + Nav. = 1 + 4 = 5

Replacement instrument cluster input values, adapting

It is important to note the following points when replacing the instrument cluster:

NOTE:

- **The instrument cluster must always be coded..**
- **Before replacing the existing instrument cluster, record odometer reading and all values appearing in Read Measuring Value Blocks 10 to 15.**
- **Recorded values must be transferred/programmed into the new instrument cluster so it can count down to the next service due.**
- **The immobilizer control module is integrated in the instrument cluster. Immobilizer function adaptation is also necessary after replacing instrument cluster.**

The following steps must be carried out after replacing the instrument cluster:

- Code instrument cluster. Refer to Code Control Module (function 07) .

- Adapt fuel consumption display (only when default value in original instrument cluster was changed). Refer to **Adaptation (function 10)**
- Adapt language version for multi-function display. Refer to **Adaptation (function 10)**
- Adapt fuel level sender (only when default value in original instrument cluster was changed). Refer to **Adaptation (function 10)**
- Service Interval Display (SID): Enter distance remaining until next Inspection Service. Refer to **Adaptation (function 10)**
- SID: Enter time remaining until next Inspection Service. Refer to **Adaptation (function 10)**
- SID: Adapt maximum distance. Refer to **Adaptation (function 10)**
- SID: Adapt maximum time. Refer to **Adaptation (function 10)**
- Adapt oil grade (where applicable). Refer to **Adaptation (function 10)**
- Adapt total consumption quantity. Refer to **Adaptation (function 10)** .
- Adapt Powertrain CAN-Bus. Refer to **Adaptation (function 10)**
- Adapt Information CAN-Bus. Refer to **Adaptation (function 10)**
- Adapt odometer reading. Refer to **Adaptation (function 10)**
- Adapt Immobilizer function. Refer to **Adaptation after replacing instrument cluster**
- Adapt vehicle keys. Refer to **Adaptation of vehicle keys**

Service interval display, resetting after a service without using VAG 1551/1552

After a service has been carried out (Oil Change + Inspection Service), the service interval display must be reset accordingly.

The service interval display can be reset using the adaptation function on VAG 1551 scan tool. Refer to **Adaptation (function 10)** .

The service interval display can also be reset using the following procedure:

- Switch off ignition.

- Press the trip recorder reset button on the instrument cluster and at the same time switch on the ignition.

When the trip recorder reset button is released, the display will show "SERVICE IN ??? km" or "SERVICE."

- Within a period of 5 seconds, turn the clock adjuster knob on the instrument cluster counter-clockwise until the message is reset to "SERVICE IN 15000 KM."

The trip recorder display will now read "SERVICE IN 15000 KM."

- Switch off ignition.

Data exchange between control modules, checking

NOTE:

- **Data exchange between individual control modules occurs via a bus system.**
- **The term "CAN-bus" refers to a system that transports and distributes data.**
- **The wire connections between the control modules, via which data is transferred, are referred to as data wires.**
- **Data is transferred to the connected control modules serially (one after the other) via these data wires.**

Bus system, checking

The DTC table indicated that data exchange via the bus should be checked:

- Check to be sure the multi-pin connectors of the control modules are securely connected.

Requirements

- VAS 5051/5052 tester connected and vehicle On Board Diagnostic (OBD) selected. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle**

Diagnostic and Service System, connecting and selecting functions .

- Ignition switched on.

Procedure



Fig. 1: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- In selection -1-, press "00 - Check DTC Memory - complete system".

NOTE: The address word 00 initiates the automatic test sequence, i.e. it results in a DTC check on all OBD capable systems in the vehicle via rapid data transfer.

- Wait until the next indication appears on display.

When a control module responds with its identification, the display indicates the number of stored errors or indicates "no malfunctions recognized".

- If necessary, print out Screen content or On Board Diagnostic (OBD) protocol:

Refer to Operating instructions for VAS 5051/5052 tester

If a malfunction involving "... databus" or "... no communication" is indicated:

- Check whether the correct control module for this vehicle is installed (part

number and coding).

If the correct control modules are installed, check the CAN bus system.

Checking a "two-line bus system"

Three or more control modules are communicating across a "two-line bus system".

- Analyze the DTCs stored in the memories of the control modules.

NOTE: This analysis will help you locate the cause of the line malfunction.

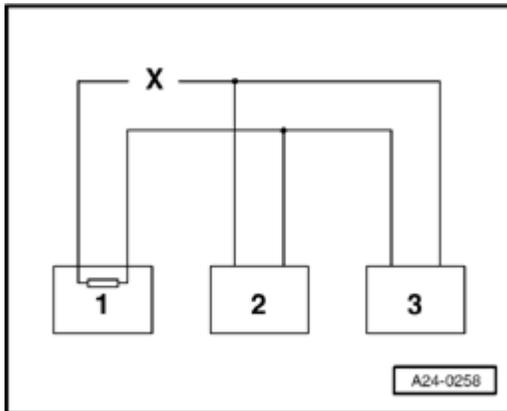


Fig. 2: Control Module 1 Not Communicating With Control Modules 2 And 3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Example 1:

From the DTCs stored in the memories, you have determined that control module 1 is not communicating with control modules 2 and 3.

Control module	DTCs stored in DTC memories:
1	<ul style="list-style-type: none"> Missing signal from control module 2 Missing signal from control module 3
2	<ul style="list-style-type: none"> Missing signal from control module 1
3	<ul style="list-style-type: none"> Missing signal from control module 1

- Switch ignition off.
- Disconnect the control modules connected across the bus wires and check the bus wires for an open circuit.

Refer to Wiring Diagrams, Troubleshooting & Component Locations

- Replace control module 1 if no malfunctions can be found in the bus wires.

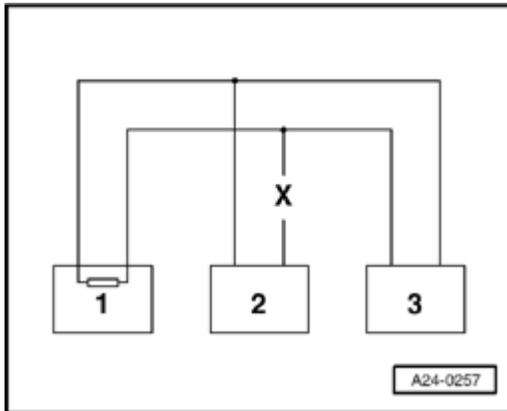


Fig. 3: Control Module 2 Not Communicating With Control Modules 1 And 3
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Example 2:

From the DTCs stored in the memories, you have determined that control module 2 is not communicating with control modules 1 and 3.

Control module	DTCs stored in DTC memories:
1	<ul style="list-style-type: none"> • Missing signal from control module 2
2	<ul style="list-style-type: none"> • Missing signal from control module 1 • Missing signal from control module 3
3	<ul style="list-style-type: none"> • Missing signal from control module 2

- Switch ignition off.
- Disconnect the control modules connected across the bus wires and check the bus wires for an open circuit.

Refer to Wiring Diagrams, Troubleshooting & Component Locations

- Replace control module 2 if no malfunctions can be found in the bus wires.

Example 3:

Using the DTCs stored in the memories, you have determined that none of the control modules are sending or receiving signals.

Control module	DTCs stored in DTC memories:
1	<ul style="list-style-type: none"> • e.g. powertrain data-BUS malfunctioning
2	<ul style="list-style-type: none"> • e.g. powertrain data-BUS malfunctioning
3	<ul style="list-style-type: none"> • e.g. powertrain data-BUS malfunctioning

- Switch ignition off.

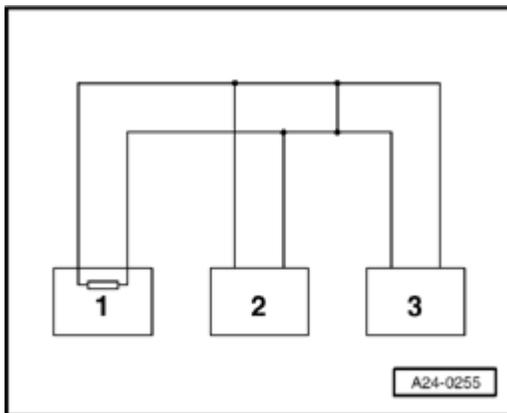


Fig. 4: Control Modules Connected Across Bus Wires
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect the control modules connected across the bus wires and check for short circuits between the bus wires.

Refer to Wiring Diagrams, Troubleshooting & Component Locations

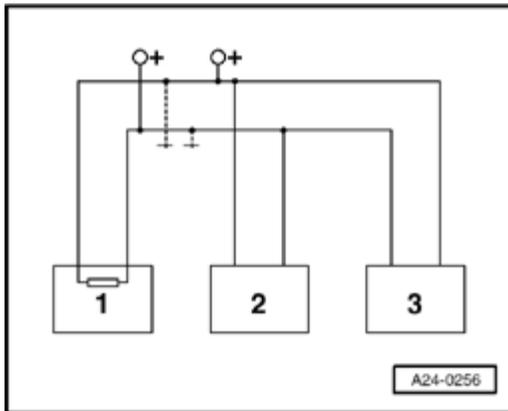


Fig. 5: Checking Bus Wires For Short Circuit To B+ Or Ground
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check the bus wires for short circuit to B+ or Ground (GND).

If a cause for the malfunction can not be determined, e.g. "powertrain data-BUS malfunctioning", check whether one of the control modules may be responsible for the DTC.

All control modules that use the CAN-bus are still disconnected. Ignition is switched off.

- Connect one of the control modules.
- Connect VAS 5051/5052 tester. Switch ignition on, and erase the DTC memory of the control module you just connected. End scan tool output using the "End Output" function 06.
- Switch ignition off and then on.
- Leave ignition on for 10 seconds. Then, read the DTC memory of the control module just connected.
- If the DTC "powertrain data-BUS malfunctioning" is displayed, replace the control module just connected.
- If the DTC "powertrain data-BUS malfunctioning" is not displayed, connect the next control module and repeat the procedure.

ANTI-THEFT IMMOBILIZER FROM 09.00, ON BOARD DIAGNOSTIC (OBD)

TT models from 09.00 production are equipped with Immobilizer Generation III.

Generation III has the same functionality as the previous version. However, in addition to the normal data exchange between the immobilizer control module and ignition key, Gen. III includes data exchange between the immobilizer control module and Engine Control Module (ECM).

Data exchange between the Immobilizer control module and ECM takes place over the vehicle CAN-Bus network.

- NOTE:**
- For Immobilizer III, the Engine Control Module (ECM) is actively incorporated into the evaluation and monitoring. The control module for immobilizer is integrated into the instrument cluster.

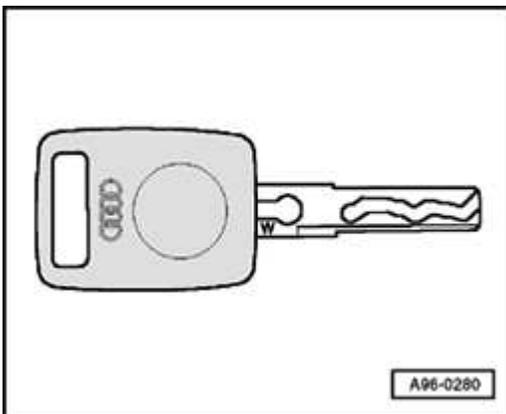


Fig. 6: Identifying Key

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- For immobilizer III, the keys are marked with an inscribed "W". The code consists of a fixed code and a variable code portion.

Function

Immobilizer III consists of:

- an adapted control module for anti-theft immobilizer (integrated in instrument cluster)
- a warning light in instrument cluster

- an induction coil at ignition lock
- an adapted Engine Control Module (ECM)
- and adapted ignition keys with electronics (transponder).

The control module for anti-theft immobilizer is integrated in the instrument cluster, e.g. if control module is malfunctioning, instrument cluster must be replaced. Refer to **Instrument cluster, removing and installing** .

The anti-theft immobilizer is a system for enabling/locking the Engine Control Module (ECM) via the CAN wire.

The transponder code consists of a fixed code and a variable code. This is different for every start procedure and therefore acts as a copy protection for the transponder.

Every immobilizer contains a different computational rule for the variable code that remains the same for its entire service life. During adaptation of the vehicle key, the immobilizer writes this computational rule into the transponder and simultaneously learns the fixed code of the current key.

The fixed code identifies each individual key so that a key that is lost can be blocked from usage. Each time the ignition is switched on, the induction coil for immobilizer reads the transponder's fixed code and then the variable code and determines whether this key is authorized for vehicle start.

The warning lamp lights up briefly (max. 3 seconds) and then goes out when an authorized vehicle key is used.

When an unauthorized vehicle key is used or when a system malfunction occurs, the warning lamp blinks constantly during ignition "on".

The electronic anti-theft immobilizer is capable of extensive On Board Diagnostic (OBD). If malfunctions occur in any of the system components, corresponding Diagnostic Trouble Codes (DTC) are stored in the DTC memory of the anti-theft immobilizer.

NOTE: All OBD program functions for anti-theft immobilizer must

only be performed using VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System.

WARNING: Anti-theft immobilizer OBD program functions described here must only be performed on a non-moving vehicle. DO NOT USE VAS 5051 during a road test.

Notes for use and adaptation of vehicle key

Engine will only start when an authorized vehicle key is used, i.e. one of the keys adapted to the immobilizer.

During adaptation of the vehicle keys (Refer to **Adaptation of vehicle keys**), all vehicle keys, including replacement and emergency keys, must always be adapted to the immobilizer.

If new or extra vehicle keys are required, adaptation of all vehicle keys must be performed.

If adaptation cannot be performed for all vehicle keys, e.g. key lost during a trip, the customer must be informed that adaptation must eventually be performed for any and all vehicle keys.

Especially when a key has been lost, all vehicle keys should be re-adapted, since this will render the lost key unauthorized for vehicle start.

Anti-theft immobilizer On Board Diagnostic (OBD), initiating

Additional information

- Wiring Diagrams
- Technical Bulletins

Scan Tool (ST) and test equipment safety precautions

- WARNING:**
- Due to weight, size and need for manual operation of test instruments while vehicle is driven on public roads, instrument must be used only with a Driver operating the vehicle and an Instrument Operator operating the test equipment.
 - Do not use Instrument with Driver only. Always use two persons to conduct test.
 - Do not place Instrument on lap of Driver or front seat passenger because emergency stop may dislodge Instrument and cause airbag deployment with risk of injury to Instrument Operator.

WARNING: Use of Instrument in Audi TT Coup:

- Place Instrument in rear seating area and secure by available safety belt.
- Instrument Operator must be seated in the other rear seating position, after sliding front passenger seat and moving the seat back as far forward as possible. Do not activate the seat back release lever.
- Instrument Operator must wear safety belt.

Use of Instrument in Audi TT Roadster:

- Use only Instrument VAG 1551 Scan Tool (ST) or VAS 5052 Vehicle Diagnostic and Service System. DO NOT USE VAS 5051.
- Before test, deactivate passenger's airbag using key operated switch in glove compartment.
- Instrument Operator must be seated on passenger seat with safety belt worn.

- **Place Instrument in foot well in front of passenger seat in a manner allowing the Operator to use the Instrument in a safe manner.**
- **After completion of test, re-activate front passenger airbag.**

CAUTION: To prevent damage to electronic and electrical components, note the following:

- **Always switch off the ignition before connecting or disconnecting test instruments.**
- **During some of the tests the control module may identify and record DTCs. The Diagnostic Trouble Code (DTC) memory should therefore be checked and (if necessary) erased after completing the tests and any repair work that may be required.**

Test requirements

- Check fuses using wiring diagram. Refer to Wiring Diagrams
- Connect VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions**
- Ignition switched on

NOTE:

- **If the display remains blank, check voltage supply of VAG 1551 according to wiring diagram.**
- **Additional operating instructions can be called up with the scan tool HELP button.**
- **The --> button serves to advance the program sequence.**

- If an incorrect entry is made, press button C to escape.
- In the operating mode 1 "Rapid data transfer" the function 00 can be used to perform an "Automatic test sequence." This will check all control modules in the vehicle automatically.

Procedure

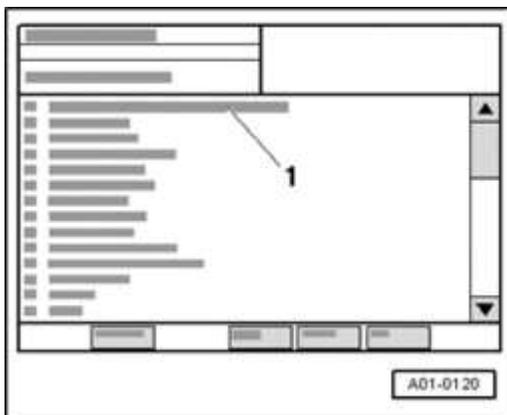


Fig. 7: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Press selection -1- of vehicle system "17 - instrument cluster" (instrument panel insert).

NOTE: Because the immobilizer is integrated in the instrument cluster, the same address word must be used as for the instrument cluster.

- Wait until the next indication appears on display.

NOTE: Confirm instrument cluster is coded according to market and equipment level. Refer to Code Control Module (function 07)

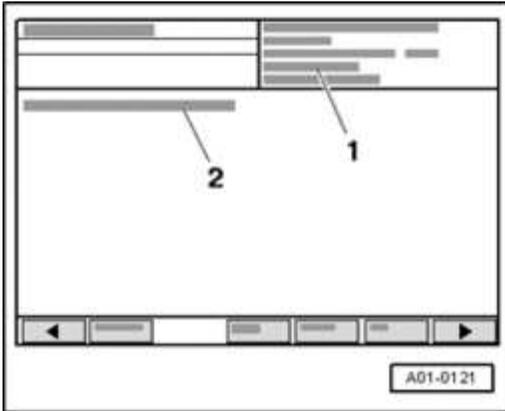


Fig. 8: VAS 5051 Tester Displaying Control Module Identification And Coding
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Control module identification of instrument cluster
- 2 - Control module identification of immobilizer

Immobilizer Control Module Identification, (examples only)	
TRUUT28NX111234561)	1) 17 digit VIN (Vehicle
AUZ5Z0W10000712)	2) Identification Number)
	14-digit identification number of immobilizer

- Press delta - button



Fig. 9: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Selection of diagnostic functions:

Diagnostic functions	Section
02 Check DTC Memory	<u>Check DTC memory</u>
05 Erase DTC Memory	<u>Diagnostic Trouble Code (DTC) Memory, erasing (function 05)</u>
06 End Output	<u>End Output (function 06)</u>
08 Read Measuring Value Block	<u>Read measuring value block</u>
10 Adaptation	<u>Adaptation</u>
11 Login Procedure	<u>Login Procedure (function 11)</u>

Diagnostic Trouble Code (DTC) Memory, checking (function 02)

NOTE: The displayed DTC information is updated only when initiating OBD or with "Erase DTC Memory" function 05.

- Initiate On Board Diagnostic (OBD) of immobilizer. Refer to Anti-theft immobilizer On Board Diagnostic (OBD), initiating .

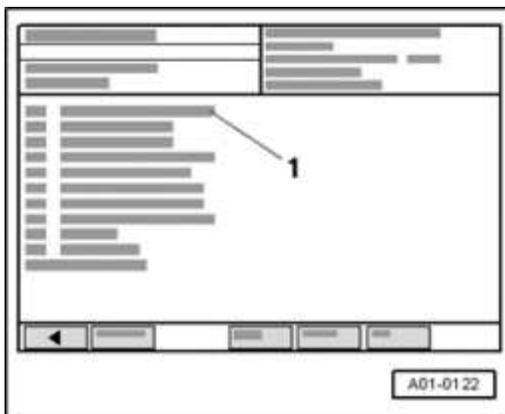


Fig. 10: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- In selection -1-, click on the diagnostic function "02 - Check DTC Memory".

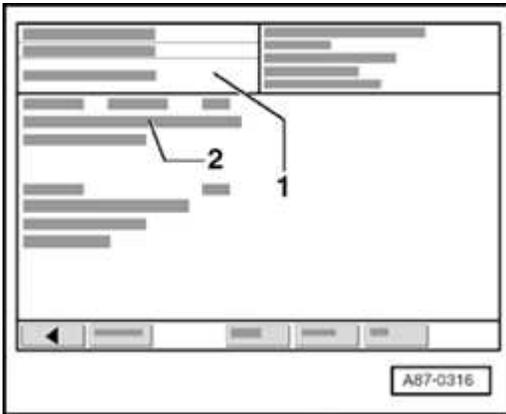


Fig. 11: Identifying Content Of DTC Memory & Identification Of Fault On Diagnostic System VAS 5051 Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - DTC memory content:

[small diamond] 0 malfunctions recognized

or

[small diamond] X malfunctions recognized

2 - Diagnostic Trouble Code (DTC)

[small diamond] DTC

[small diamond] malfunction location

[small diamond] malfunction type

If malfunctions were recognized:

- Print out Screen content or On Board Diagnostic (OBD) protocol:

Refer to Operating instructions for the VAS 5051/5052 tester

- Press <-- - button

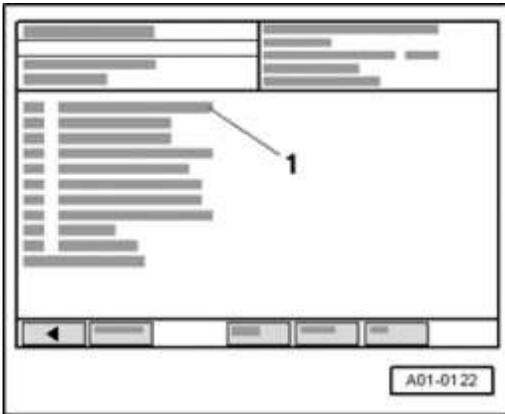


Fig. 12: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Repair malfunction(s) according to DTC table. Refer to **DTC table** .
- In selection -1-, press diagnostic function "02 - Check DTC Memory" again and Erase DTC Memory. Refer to **Diagnostic Trouble Code (DTC) Memory, erasing (function 05)**
- In selection, click on diagnostic function "06 - End Output". Refer to **End Output (function 06)** .

If no malfunction was recognized:

- In selection -1-, click on diagnostic function "06 - End Output". Refer to **End Output (function 06)** .

Diagnostic Trouble Code (DTC) table

NOTE:

- Next, all possible malfunctions that can be recognized by the immobilizer and printed out by the VAS 5051 tester are listed according to their 5-digit DTC.
- DTCs of the instrument cluster can also be indicated, since the immobilizer is integrated in the instrument cluster.

- **DTC memory stores all static and sporadic malfunctions:** If a malfunction occurs and persists for at least 2 seconds, it is identified as a static malfunction. If a malfunction does not occur again, it is registered as sporadic. In addition, "sporadic" is indicated on display.
- **When the ignition is switched on, all existing malfunctions are automatically re-classified as sporadic malfunctions and will only register as static malfunctions if they still occur after testing.**
- **Sporadic malfunctions which no longer occur during 50 driving cycles (ignition on at least 5 minutes, vehicle speed greater than 30 km/h) are erased automatically.**
- **Do not immediately replace components that the VAS 5051 suggests are malfunctioning, instead: Check wire connections and harness connectors to these components according to wiring diagram. Also check Ground (GND) connections according to wiring diagram. This is particularly valid when malfunctions are displayed as "sporadic".**
- **When repairing an open circuit for a CAN-bus malfunction, always be sure to prevent electromagnetic interference by twisting both data wires of the respective BUS system together.**
- **After repair, DTC memory must be checked again and erased.**

CAUTION: In addition, only DTC memory of the Engine Control Module (ECM) must be checked and DTC memory content "Engine Control Module deactivated" must be erased. Check and repair other stored malfunctions.

Display on	Possible cause	Corrective action
------------	----------------	-------------------

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VAS 5051/5052		
01128		
Immobilizer reader coil - D2-	<ul style="list-style-type: none"> • Harness connector not connected or induction coil with wire malfunctioning 	<ul style="list-style-type: none"> • Check harness connector and induction coil with wire (visual check) • Replace induction coil if necessary. Refer to Reader coil, replacing
	<ul style="list-style-type: none"> • Control module for immobilizer (integrated in instrument cluster) malfunctioning. 	<ul style="list-style-type: none"> • Erase DTC Memory. Refer to Diagnostic Trouble Code (DTC) Memory, erasing (function 05) • Recheck DTC Memory. Refer to Check DTC memory • Replace instrument cluster if necessary. Refer to Instrument cluster, removing and installing

Display on VAS 5051/5052	Possible cause	Corrective action
01176		
Key		
Signal too small	<ul style="list-style-type: none"> • Induction coil or wire malfunctioning (contact resistance/loose contact). 	<ul style="list-style-type: none"> • Check induction coil with wire and harness connector (visual check), replace induction coil if necessary. Refer to Reader coil, replacing

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	<ul style="list-style-type: none"> • Electronics in ignition key (transponder) missing or malfunctioning. 	<ul style="list-style-type: none"> • Replace ignition key, re-adapt all ignition keys and check for function. Refer to <u>Adaptation of vehicle keys</u> .
not authorized	<ul style="list-style-type: none"> • Mechanically appropriate ignition key is not adapted. 	<ul style="list-style-type: none"> • Re-adapt all ignition keys and check for function. Refer to <u>Adaptation of vehicle keys</u> .

Display on VAS 5051/5052	Possible cause	Corrective action
01177		
Engine control unit		
not authorized	<ul style="list-style-type: none"> • Engine Control Module (ECM) not adapted. 	<ul style="list-style-type: none"> • Adapt Engine Control Module (ECM): Refer to <u>Adaptation after replacing Engine Control Module (ECM)</u>
01179		
Incorrect key programming	<ul style="list-style-type: none"> • Adaptation of ignition key is incorrect 	<ul style="list-style-type: none"> • Re-adapt all ignition keys. Refer to <u>Adaptation of vehicle keys</u>
65535		
Internal Control Module Memory Check Sum Error	<ul style="list-style-type: none"> • Instrument cluster (with integrated anti-theft immobilizer) malfunctioning 	<ul style="list-style-type: none"> • Replace instrument cluster. Refer to <u>Instrument cluster, removing and installing</u>

Diagnostic Trouble Code (DTC) Memory, erasing (function 05)

NOTE:

- If DTC memory cannot be erased, Check DTC Memory again and repair malfunction.
- DTCs are not updated after erasing DTC memory until

after ignition has been switched on and off.

Requirements

- DTC memory checked. Refer to **Check DTC memory** .
- All malfunctions repaired.

Procedure

After successful DTC memory check:

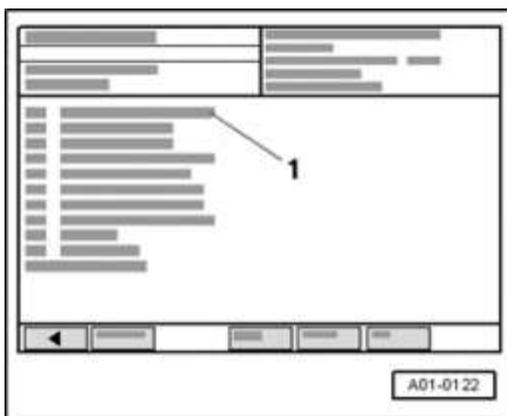


Fig. 13: Diagnostic System VAS 5051: Display -- Basic Setting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- In selection -1-, click on the diagnostic function "05 - Check DTC Memory".



Fig. 14: Diagnostic System VAS 5051: Display

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - [small diamond] no indication (before erasing)

or

[small diamond] DTC memory erased

NOTE: If indication -1- appears in display field: "DTC memory has not yet been checked", the work sequence was not adhered to correctly. DTC memory can only be erased if DTC memory was checked before.

2 - function? is being erased !

- Press on "OK"-button in display -2-.
- End function "05 - Erase DTC Memory" by pressing on <-- -button.

End Output (function 06)

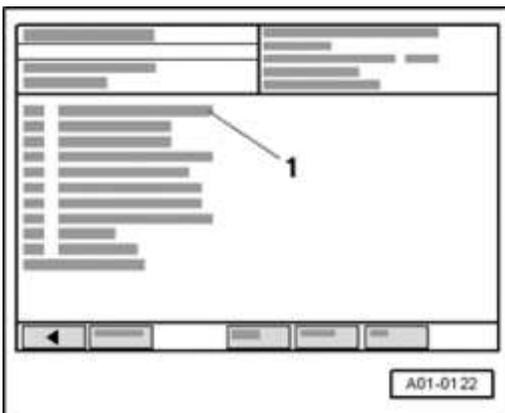


Fig. 15: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Select diagnostic function "06 - End Output" in selection -1-.



Fig. 16: Diagnostic System VAS 5051: Display
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Switch off ignition and disconnect diagnostic connector after this indication is displayed.

Read Measuring Value Block (function 08)

- Initiate On Board Diagnostic (OBD) of immobilizer. Refer to **Anti-theft immobilizer On Board Diagnostic (OBD), initiating** .

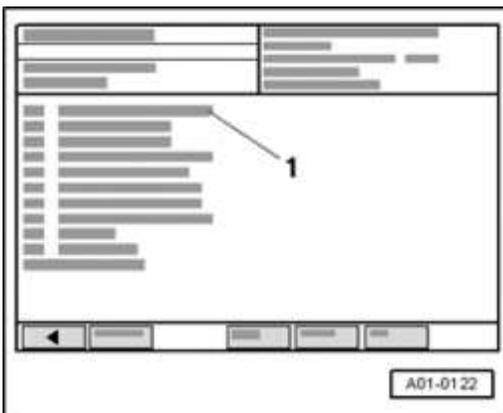


Fig. 17: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Select diagnostic function "08 - read measured value block" in selection -1-.

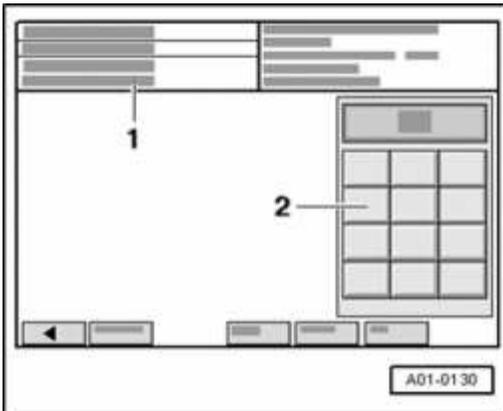


Fig. 18: Diagnostic System VAS 5051: Display - Display Group And Key Pad
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Enter display group Max. input value = 255

- Enter desired display group number in button field -2-. Refer to table --> **Read Measuring Value Block (function 08)** .

Interpreting displayed information. Refer to **Read Measuring Value Block (function 08)** .

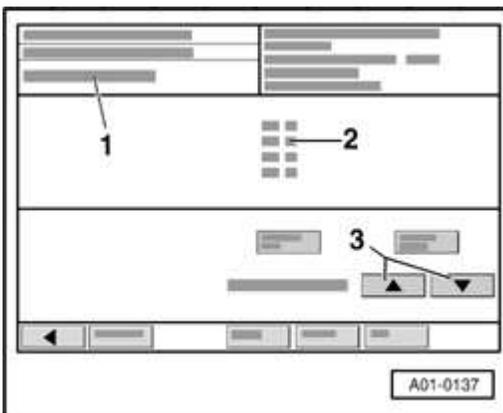


Fig. 19: Identifying VAS5051 Tester Display
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Display group X

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2 - Display field 1

Display field 2

Display field 3

Display field 4

NOTE:

- If no display follows, a display field is not assigned.
- To switch to a different display group, proceed as follows:

Display group	VAS 5051/5052 tester
higher	Press s button.
Lower	Press t button.

- Press "08 - Erase DTC Memory" to end function <-- -button.

Display group overview

Display group number	Indicated on display
0201)	Immobilizer Identification Number1) 1 = 1st & 2nd character 2 = 3rd & 4th character 3 = 5th & 6th character 4 = 7th & 8th character
0201)	Immobilizer Identification Number1) 1 = 9th & 10th character 2 = 11th & 12th character 3 = 13th & 14th character 4 = vacant
022	1 = Start procedure permitted 2 = Engine Control Module (ECM) responding 3 = Key condition OK 4 = Number of adapted keys
023	1 = Variable code authorized

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2 = Key status (transponder)
 3 = Fixed code authorized
 4 = Anti-theft immobilizer status

1) Read function where applicable

Display group number	Indicated on display
0241)	1 = Instrument cluster locking time1) 2 = Engine Control Module (ECM) locking time1) 3 = vacant 4 = Transponder recognition locking time1)
0251)	1 = CAN-communication1)

1) Where applicable

Read Measuring Value Blocks, interpreting

Read Measuring Value Block 20				<-- Indicated on display (example only)
AU	Z5	0W	10	
				Immobilizer Identification No.1) • 7th & 8th character
				Immobilizer Identification No.1) • 5th & 6th character
				Immobilizer Identification No.1) • 3rd & 4th character
				Immobilizer Identification No.1) • 1st & 2nd character

1) Read function where applicable

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Read Measuring Value Block 21 -->				<-- Indicated on display (example only)
00	00	71		
				vacant
			Immobilizer Identification No.1)	
			<ul style="list-style-type: none"> • 13th & 14th character 	
		Immobilizer Identification No.1)		
		<ul style="list-style-type: none"> • 11th & 12th character 		
	Immobilizer Identification No.1)			
	<ul style="list-style-type: none"> • 9th & 10th character 			
AUZ5Z0W1000071				

1) Read function where applicable

Read Measuring Value Block 22				-->	<-- Indicated on display
X	X	X	X		
					Number of adapted keys
					<ul style="list-style-type: none"> • up to a max. of 8 keys
			Key condition OK		
			<ul style="list-style-type: none"> • 1 = yes, i.e. a structurally legitimate fixed transponder code could be read (regardless of whether it was authorized or not) • 0 = no, i.e. no structurally legitimate fixed transponder code could be read 		
		Engine Control Module (ECM) responding			
		<ul style="list-style-type: none"> • 1 = yes (regardless of whether ECM is authorized or not) • 0 = no, i.e. Engine Control Module (ECM) is in after-run1) 			

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Start procedure permitted

- 1 = yes
- 0 = no, i.e. ignition key is not adapted or incorrectly adapted or the Engine Control Module (ECM) is incorrectly adapted or malfunctioning

1) Depending on the Engine Control Module (ECM), the measuring value block registers position "0 = Engine Control Module not responding" for 10 to 30 seconds after engine and ignition are switched off, i.e. ECM is switched clear and there is no malfunction. Initiate On Board Diagnostic (OBD) again to be sure. Refer to **Anti-theft immobilizer On Board Diagnostic (OBD), initiating** .

Read Measuring Value Block 23				-- <-- Indicated on display >
X	X	X	X	
				<p>Anti-theft immobilizer status</p> <ul style="list-style-type: none"> • 4: Customer service new; delivery condition of customer service (instrument cluster = replacement part) • 5: Customer service locked; adaptation data programmed in customer service • 6: Anti-theft immobilizer adapted, normal functioning condition • 7: Key adaptation active; key adaptation via tester
				<p>Fixed code authorized</p> <ul style="list-style-type: none"> • 1 = yes • 0 = no, i.e. fixed transponder code of key is not authorized
				Key status (transponder)

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	<ul style="list-style-type: none"> • 1 = Transponder in key is locked, i.e. computational rule in key can no longer be overwritten. Key can no longer be adapted to a different anti-theft immobilizer system. • 0 = Transponder in key is not locked, i.e. transponder has not yet been adapted to instrument cluster (new replacement part key).
Variable code authorized	<ul style="list-style-type: none"> • 1 = yes • 0 = no, i.e. variable code is not authorized (computational rule for variable code is not yet the same as that in the instrument cluster).

Read Measuring Value Block 24	-->	<-- Indicated on display
XX	X	XX
		<p>The transponder recognition locking time indicates how much time must pass before a transponder recognition is possible again. This lock is activated after an unauthorized key is detected 20 times in a row.</p> <ul style="list-style-type: none"> • 0 to 10 min1)
		vacant
		<p>The Engine Control Module (ECM) locking time indicates how much time must pass before an adaptation can be performed by the Engine Control Module again. If the 7-digit PIN is entered incorrectly three times while adapting channel 50, the control module is locked for 10 minutes 2).</p> <ul style="list-style-type: none"> • 0 to 255 min1)
		The instrument cluster locking time indicates how much time must

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pass before a login procedure can be performed again. If the 7-digit PIN is entered incorrectly three times during the login procedure (adaptation of vehicle key or used instrument cluster), the control module is locked for 10 minutes 1).

- 0 to 255 min1)

1) Read function where applicable.

2) This time is doubled after every third consecutive incorrect attempt, up to a maximum of 255 minutes.

Read Measuring Value Block 25		-->	<-- Indicated on display	
X				
	CAN-communication to Engine Control Module (ECM)1)			
	<ul style="list-style-type: none"> • 1 = yes • 0 = no, i.e. no CAN-communication between control module for anti-theft immobilizer and Engine Control Module (ECM) - Key adaptation not possible 			

1) Read function where applicable

Adaptation (function 10)

Using the adaptation function, the following changes can be made and saved.

- Perform adaptation of vehicle keys. Refer to **Adaptation of vehicle keys**
- Adaptation after replacing Engine Control Module (ECM). Refer to **Adaptation after replacing Engine Control Module (ECM)** .

- Adaptation after replacing instrument cluster. Refer to **Adaptation after replacing instrument cluster** .

Adaptation of vehicle keys

NOTE:

- If new or additional ignition keys are required, they must be adapted to the anti-theft immobilizer.
- All ignition keys, including those that were previously authorized, must be re-adapted.
- Especially when a key has been lost, all vehicle keys should be re-adapted, since this will render the lost key unauthorized for vehicle start.
- If it is not possible to adapt all keys for some reason, i.e. during a trip, the customer must have this done later at his/her local Audi dealership.
- The number of adapted keys is indicated after selecting the adaptation function (channel 21) and also in measuring value block 022.
- Adaptation can be interrupted using the "C" button.
- Once a key is adapted, it is locked and cannot be adapted to another immobilizer system.

Requirement:

- All keys available. If an old ignition key is not available, see "Lost key procedure". Refer to **Lost key procedure** .

Procedure

- Insert first key in ignition lock and switch on ignition.
- Initiate On Board Diagnostic (OBD) of immobilizer. Refer to **Anti-theft immobilizer On Board Diagnostic (OBD), initiating** .
- Perform login procedure for instrument cluster. Refer to **Login Procedure (function 11)** .

NOTE: Once the login procedure has been successfully completed, the warning lamp will light constantly and the immobilizer will be switched free for a specific time:

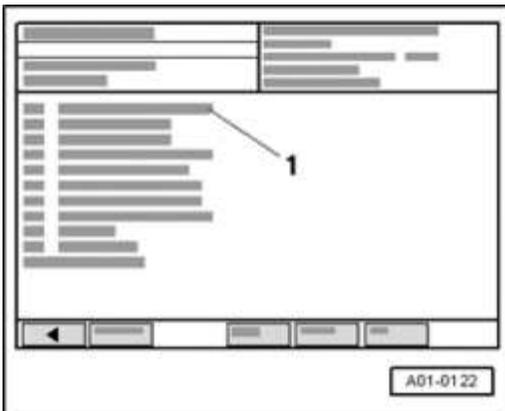


Fig. 20: Diagnostic System VAS 5051: Display - Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- In selection -1-, select the diagnostic function "10 - Adaptation".



Fig. 21: Diagnostic System VAS 5051: Display - Display Group And Key Pad
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Enter channel number Max. input value = 99

- Select function "21" in button field -2- for "Adaptation channel 21" and press

Q button to confirm input.

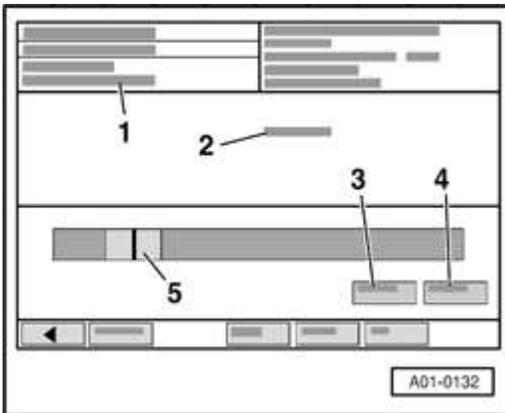


Fig. 22: Diagnostic System VAS 5051: Display - Channel 21 Read And Test, 17-Digit VIN, Old Number Of Keys, Sliding Bar
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Channel 21 read and test

2 - old number of keys

5 - The sliding bar is positioned on the current adaptation value, e.g. 2 The number of ignition keys which are adapted to the system will be displayed (e.g. 2)

NOTE: If indication -1- appears in display field: "Function unknown or cannot be performed at the moment", repeat login-procedure and the adaptation.

- Enter 5-digit adaptation value. Insert zeros in front.

Example:

Desired input value: 4 keys (including the key which is inserted in the ignition switch; max. 8 are possible)

Keypad input: 00004

- Press -Q- button to confirm input.

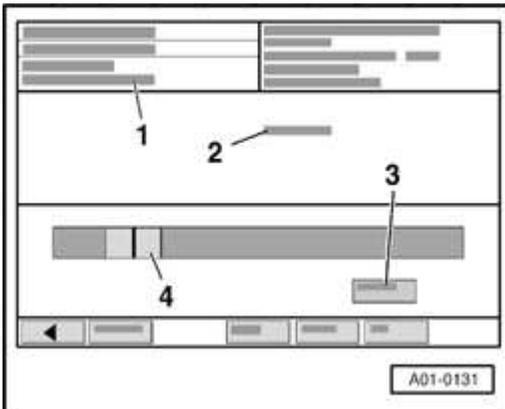


Fig. 23: Diagnostic System VAS 5051: Display - Channel 21Save, Old Number Of Keys And Original Value

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Channel 21save

2 - old number of keys

4 - original value 2, new value 4

- Confirm new adaptation value by pressing the "take over" button -3-.

NOTE: No single key must require more than 30 seconds during adaptation, otherwise the warning lamp will blink with a frequency of 2 Hz and adaptation must be performed again in its entirety (login procedure and adaptation).

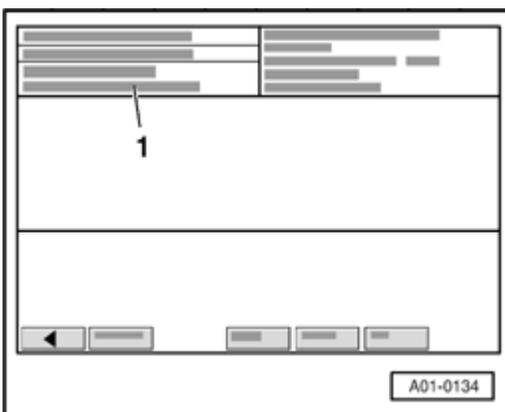


Fig. 24: Diagnostic System VAS 5051: Display - Channel 21
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Channel 21 Value 4 stored

Warning lamp in instrument cluster goes out and key in ignition is now adapted.

- End function "10 - Adaptation" by pressing <-- -button.

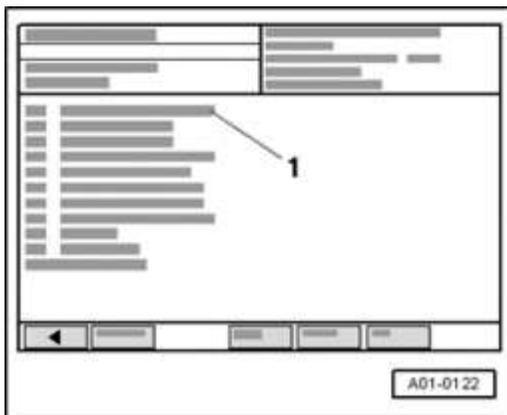


Fig. 25: Diagnostic System VAS 5051: Display -- Basic Setting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Select diagnostic function "06 - End Output" in selection -1-.
- Switch ignition off.
- Insert next key in ignition lock and switch on ignition. Warning lamp lights up when ignition is switched on and goes out after approx. one second. This key is also adapted now.
- Repeat procedure until all keys have been adapted. After the last key, the warning light will go out approx. 2 seconds after successful adaptation and a short confirmation signal will be given (0.5 seconds light off, 0.5 seconds light on, light off).
- During adaptation of vehicle keys, the fixed code of each key (transponder) is adapted to the immobilizer. Furthermore, the computational rule for the

variable code is written into each key and locked. After that, keys can only be adapted for immobilizer III if they have the correct computational rule for the variable code (key had already been adapted to the system) or if they have not yet been locked (replacement part key). Adapted vehicle keys can not be used in conjunction with a different immobilizer system.

- Select "Check DTC Memory", function 02. If there are no DTCs stored, then the function "Adapting keys" has been completed successfully.

Adaptation of ignition keys is automatically terminated if:

- The number of keys to be adapted has been reached.
- The ignition is switched on using a key that is already adapted and remains switched on for more than one second (DTC stored).
- The allotted adaptation time of 30 seconds per key, after ignition is switched on, is exceeded (DTC stored).
- A DTC is stored during key adaptation.

Lost key procedure

- Produce or order a replacement ignition key according to the lock number.
- Adapt all vehicle keys. Refer to **Adaptation of vehicle keys** .
- For vehicles with remote controlled central locking, all remote keys must be adapted to the control module for central locking.

Refer to **01 ON BOARD DIAGNOSTIC (OBD)** .

Determining the secret number (7-digit PIN)

The secret number is determined in conjunction with the 14 digit identification number of the Engine Control Module (ECM) or anti-theft immobilizer, and is read upon initiation of On Board Diagnostic (OBD).

Effective calendar date 03.11.2002, the immobilizer secret number is encoded for increased security. The encoded number is now 7-digits and is referred to as a "PIN" ("Personal Identification Number").

All models with anti-theft immobilizer are affected, regardless of generation.

The process to obtain the 7-digit PIN remains the same as with the 4-digit "secret number" previously used - that is: request via the "Warranty Information Network" (WIN). However, WIN Administration now requires additional information from both the vehicle and Dealer in order to generate the 7-digit PIN.

The PIN is only valid on the day it is requested. Thereafter, a new PIN is required.

The 7-digit PIN can only be processed and input using either the VAS 5051 or VAS 5052 with basis CD version 3.10 and higher. VAG 1551/1552 Scan Tools are unable to process or input this number.

A correct Importer/Dealer number must reside in the VAS 5051/5052 in order to request a PIN.

The requested PIN is intended for internal use only, is worthless to other Dealers and must not be shared with the customer.

- CAUTION:**
- **All Dealership VAS 5051 and VAS 5052 testers in service MUST be programmed with the correct Importer/Dealer number, as well as correct date and time.**
 - **Adaptation functions of the anti-theft immobilizer are not possible with incorrect data!**

Adaptation after replacing instrument cluster

- NOTE:**
- **The instrument cluster (with integrated anti-theft immobilizer) is adapted to the Engine Control Module (ECM). If the instrument cluster is replaced, the new instrument cluster must be re-adapted to the Engine Control Module (ECM).**
 - **After adapting the instrument cluster to the Engine Control Module (ECM), vehicle key adaptation must be performed. Refer to Adaptation of vehicle keys .**
 - **If no authorized ignition key is available, but the 7-digit PIN is available, new ignition keys must be made and**

adapted to "Adaptation after replacing instrument cluster".

- Adaptation can be interrupted using the "C" button.

Requirements

- VAS 5051/5052 tester connected and vehicle On Board Diagnostic (OBD) selected. Refer to VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions .
- Ignition switched on.

Procedure

- Insert old (authorized) ignition key into ignition lock and switch on ignition.



Fig. 26: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Press selection -1- of vehicle system "01 - Engine electronics".
- Wait until the next indication appears on display.

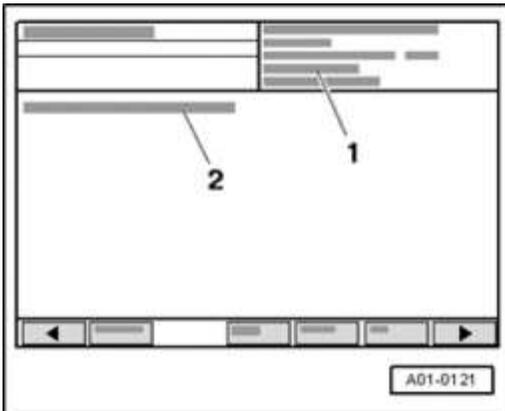


Fig. 27: VAS 5051 Tester Displaying Control Module Identification And Coding

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Control module identification of Engine Control Module (ECM).
- 2 - Control module identification of immobilizer

Immobilizer Control Module Identification, (examples only)

TRUUT28NX111234561)	1)	17 digit VIN (Vehicle
AUZ5Z0W10000712)	2)	Identification Number)
		14-digit identification number of immobilizer

Use the 14 digit identification number of the ECM to determine the 7-digit PIN. Refer to **Lost key procedure** .

- Press delta - button



Fig. 28: Diagnostic System VAS 5051: Display -- Basic Setting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Select diagnostic function "06 - End Output" in selection -1-.



Fig. 29: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Press selection -1- of vehicle system "17 - instrument cluster"
- Wait until the next indication appears on display.

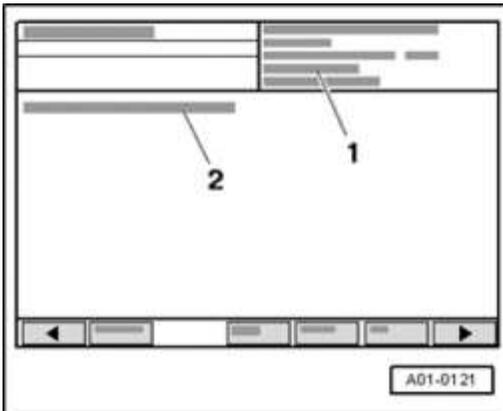


Fig. 30: VAS 5051 Tester Displaying Control Module Identification And Coding

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Control module identification of the instrument cluster
- 2 - Control module identification of immobilizer

Control module identification, immobilizer (example)

XXXXXXXXXXXXXXXXXXXX	1)	14-digit identification number of immobilizer
AUZ5Z0W1000071 1)		

Replacement part instrument clusters already have a 14 digit identification number (this is necessary if instrument cluster and Engine Control Module (ECM) are being replaced simultaneously). During adaptation of the instrument cluster to the ECM, this number is transferred to the ECM.

NOTE: If a used or remanufactured instrument cluster is being installed, it must first be switched free via a login procedure. Refer to Login Procedure (function 11) . The 7-digit PIN for this must be determined via the 14-digit identification number of the used instrument cluster. Continue as follows after successful login procedure:

- Press delta - button

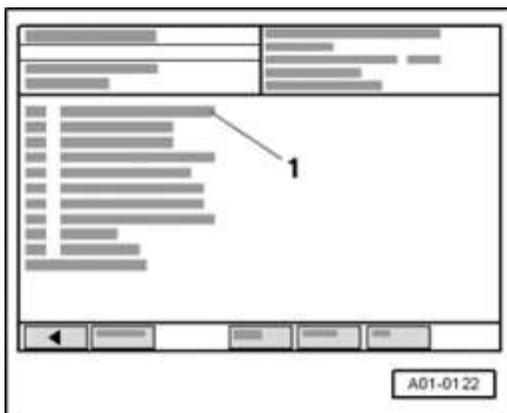


Fig. 31: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- In selection -1-, select the diagnostic function "10 - Adaptation".

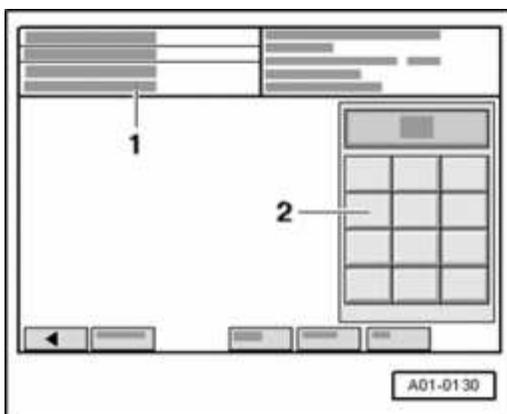


Fig. 32: Diagnostic System VAS 5051: Display - Display Group And Key Pad
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Enter channel number Max. input value = 99

- Select function "50" in button field -2- for "Adaptation channel 50" and press Q button to confirm input.

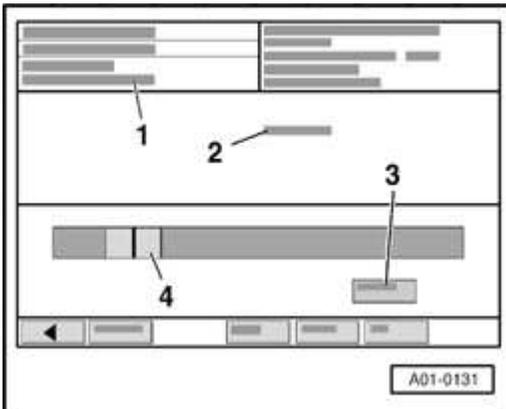


Fig. 33: Diagnostic System VAS 5051: Display - Channel 21 Save, Old Number Of Keys And Original Value

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Channel 50 read and test
- 2 - PIN ?
- 3 - Keypad - only direct input via the keypad is possible
- 4 - Sliding bar is positioned on 32000
 - Press "Keypad" button -3-



Fig. 34: Diagnostic System VAS 5051: Display - Display Group And Key Pad

Display on VAS 5051/5052:

1 - Enter adaptation value Input value: 0 to 65535

- Enter previously determined 7-digit PIN (of Engine Control Module (ECM)) in button field -2-.
- Press -Q- button to confirm input.

NOTE: If the 7-digit PIN is entered incorrectly three times, tester display will indicate "locked 10". This locking time can also be indicated in measuring value block 024 (display field 2). Adaptation is now locked for 10 minutes. This time is doubled after every third consecutive incorrect attempt, up to a maximum of 255 minutes.

- Wait until the next indication appears on display.

NOTE: If a malfunction occurs during adaptation, the following DTCs can be displayed:

- "Interference": CAN-bus not available or engine speed recognized (adaptation only with the engine standing still)

NOTE:

- "Adaptation not OK": Engine Control Module (ECM) cannot give out data (17-digit VIN, 14-digit identification number), since the control module is still new (factory condition) or the data is faulty.
- "System not OK": Engine Control Module (ECM) does not give out data, since it was previously used with a control module (instrument cluster) in another performance class (tuning-protection)
- "Key not OK": Data cannot be given out or accepted, because no key or no matching key is available.

If no malfunction is present, this display appears:

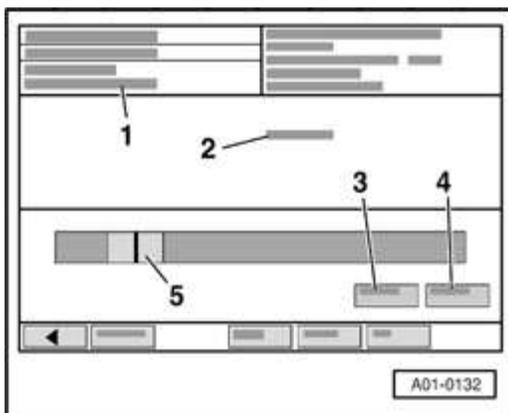


Fig. 35: Diagnostic System VAS 5051: Display - Channel 21 Read And Test, 17-Digit VIN, Old Number Of Keys, Sliding Bar
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Channel 50 read and test
- 2 - 17-digit VIN (Vehicle Identification Number)
- 5 - Sliding bar is positioned on 32000

In addition, the warning lamp in instrument cluster lights up.

- Press "Save" button -4-.

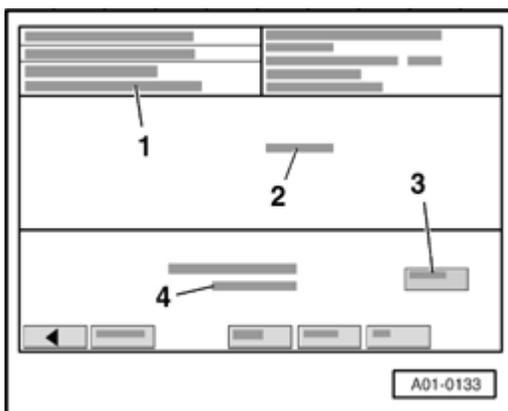


Fig. 36: Diagnostic System VAS 5051: Display - Channel 50 Save, 17-Digit VIN And Original Value
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Channel 50 save
- 2 - 17-digit VIN (Vehicle Identification Number)
- 4 - original value 32000, new value 32000

- Confirm new adaptation value by pressing the "take over" button -3-.

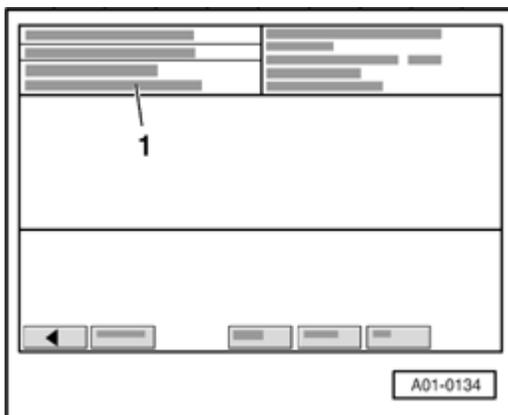


Fig. 37: Diagnostic System VAS 5051: Display - Channel 21
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Channel 50 Value 32000 stored

The warning light will go out approx. 2 seconds after successful adaptation and a short confirmation signal will be given (0.5 seconds light off, 0.5 seconds light on, light off).

- End function "10 - Adaptation" by pressing <-- -button.

Adaptation of the immobilizer to the Engine Control Module (ECM) has been completed.

- Perform adaptation of vehicle keys. Refer to **Adaptation of vehicle keys**

Adaptation after replacing Engine Control Module (ECM)

NOTE:

- The Engine Control Module (ECM) is adapted to the instrument cluster (with integrated anti-theft immobilizer). When the Engine Control Module (ECM) is replaced, the new ECM must be re-adapted to the immobilizer.
- If no authorized ignition key is available, but the 7-digit PIN is available, new ignition keys must be manufactured and adapted to the "Adaptation after replacing instrument cluster".
- Adaptation can be interrupted using the "C" button.

Procedure

- Initiate On Board Diagnostic (OBD) of immobilizer. Refer to **Anti-theft immobilizer On Board Diagnostic (OBD), initiating** .

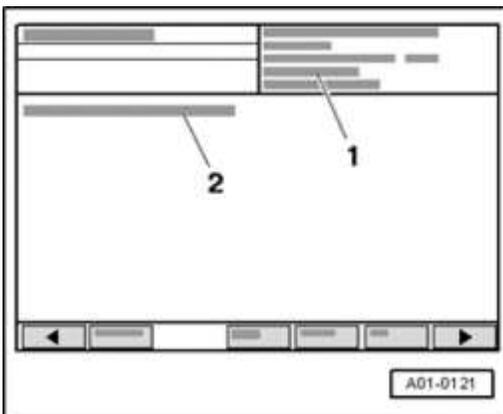


Fig. 38: VAS 5051 Tester Displaying Control Module Identification And Coding

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Control module identification of the instrument cluster
- 2 - Control module identification of immobilizer

Control module identification, immobilizer (example)

2006 Audi TT

ELECTRICAL Electrical Equipment

TRUUT28NX111234561)
AUZ5Z0W10000712)

1) 17 digit VIN (Vehicle
2) Identification Number)
14-digit identification number of
immobilizer

Using the 14 digit identification number of the ECM, determine the 7-digit PIN.
Refer to **Lost key procedure** .

- Press delta - button



Fig. 39: Diagnostic System VAS 5051: Display -- Basic Setting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Select diagnostic function "06 - End Output" in selection -1-.

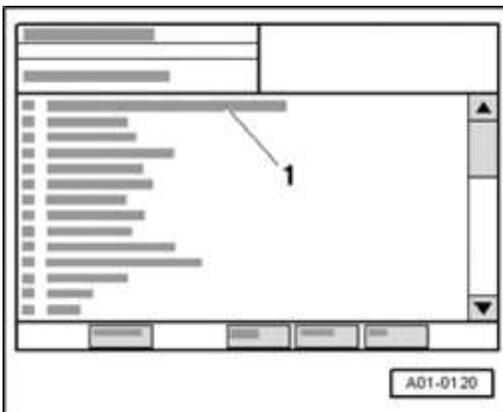


Fig. 40: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Press selection -1- of vehicle system "01 - Engine electronics".
- Wait until the next indication appears on display.

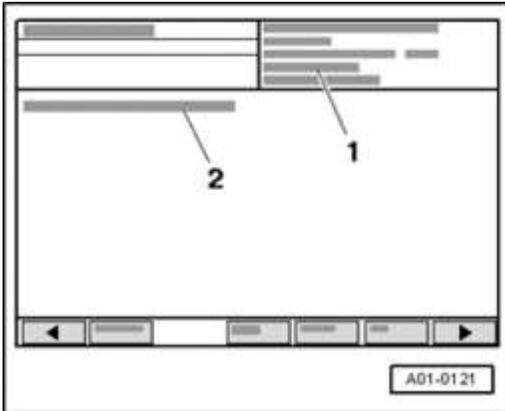


Fig. 41: VAS 5051 Tester Displaying Control Module Identification And Coding

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Control module identification of Engine Control Module (ECM).
- 2 - Control module identification of immobilizer

Control module identification anti-theft immobilizer
XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX

NOTE: If a used Engine Control Module (ECM) is being installed, it must first be switched free via a login procedure. Refer to Login Procedure (function 11) . The 7-digit PIN must be determined via the 14-digit identification number of the used Engine Control Module (ECM). Continue as follows after successful login procedure:

- Press delta - button

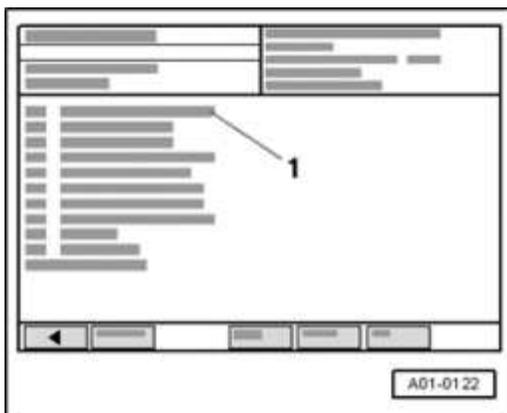


Fig. 42: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- In selection -1-, select the diagnostic function "10 - Adaptation".

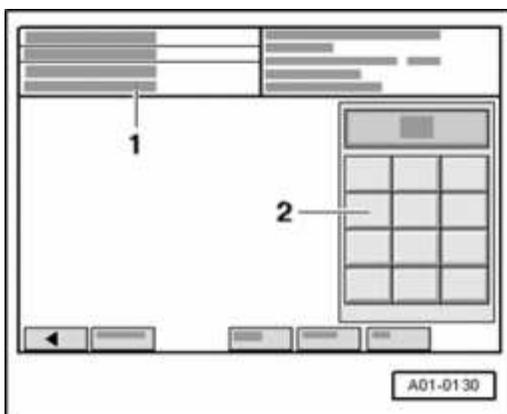


Fig. 43: Diagnostic System VAS 5051: Display - Display Group And Key Pad
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Enter channel number Max. input value = 99

- Select function "50" in button field -2- for "Adaptation channel 50" and press Q button to confirm input.

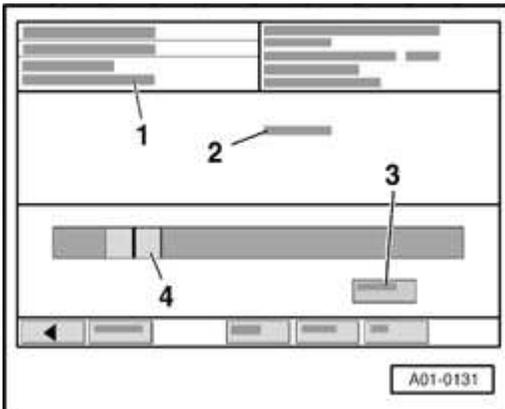


Fig. 44: Diagnostic System VAS 5051: Display - Channel 21 Save, Old Number Of Keys And Original Value
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Channel 50 read and test
- 2 - PIN ?
- 3 - Keypad - only direct input via the keypad is possible
- 4 - Sliding bar is positioned on 32000
 - Press "Keypad" button -3-.

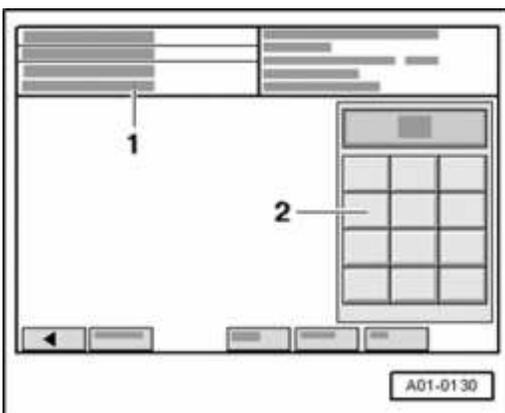


Fig. 45: Diagnostic System VAS 5051: Display - Display Group And Key Pad
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Enter adaptation value Input value: 0 to 65535

- Enter previously determined 7-digit PIN (of instrument cluster) in button field - 2-.
- Press -Q- button to confirm input.

NOTE: If the 7-digit PIN is entered incorrectly three times, tester display will indicate "locked 10". This locking time can also be indicated in measuring value block 024 (display field 1). Adaptation is now locked for 10 minutes. This time is doubled after every third consecutive incorrect attempt, up to a maximum of 255 minutes.

- Wait until the next indication appears on display.

NOTE: If a malfunction occurs during adaptation, the following DTCs can be displayed:

- "Interference": CAN-bus not available or engine speed recognized (adaptation only with the engine standing still)
- "Adaptation not OK": Instrument cluster cannot give out data (17-digit VIN, 14-digit identification number), since the control module is still new (factory condition) or the data is faulty.
- "System not OK": Instrument cluster does not give out data, since it was previously used with a control module (Engine Control Module) with another performance class (tuning-protection)
- "Key not OK": Data cannot be given out or accepted, because no key or no matching key is available.

If no malfunction is present, this display appears:

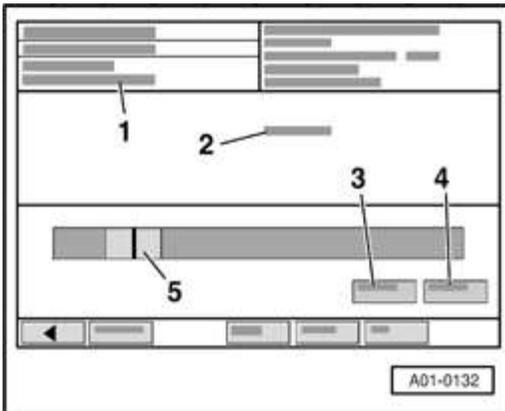


Fig. 46: Diagnostic System VAS 5051: Display - Channel 21 Read And Test, 17-Digit VIN, Old Number Of Keys, Sliding Bar
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Channel 50 read and test
- 2 - 17-digit VIN (Vehicle Identification Number)
- 5 - Sliding bar is positioned on 32000
- Press "Save" button -4-

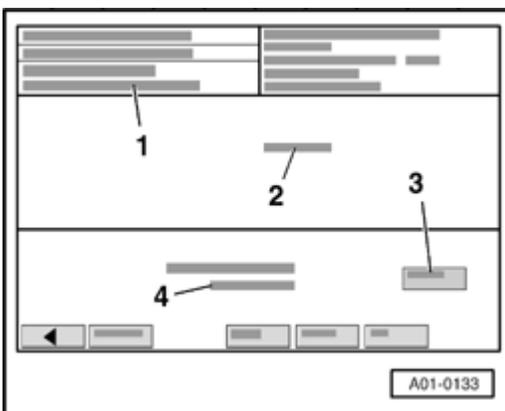


Fig. 47: Diagnostic System VAS 5051: Display - Channel 50 Save, 17-Digit VIN And Original Value
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Channel 50 save

2 - 17-digit VIN (Vehicle Identification Number)

4 - original value 32000, new value 32000

- Confirm new adaptation value by pressing the "take over" button -3-.

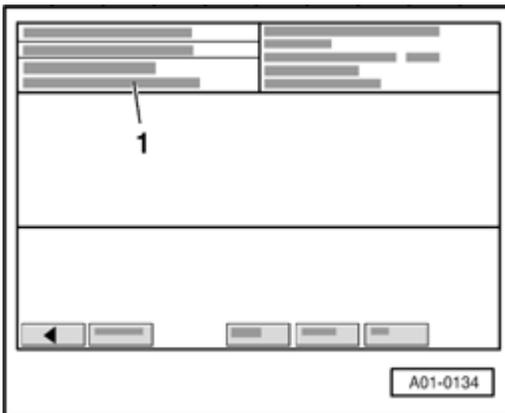


Fig. 48: Diagnostic System VAS 5051: Display - Channel 21
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Channel 50 Value 32000 stored

- End function "10 - Adaptation" by pressing <-- -button.

Adaptation of the Engine Control Module (ECM) to the immobilizer has been completed and the vehicle can be started.

Login Procedure (function 11)

In order to perform the Login procedure, a coded "secret number" must first be determined in conjunction with the 14 digit identification number of the Engine Control Module (ECM) or anti-theft immobilizer.

ECM and immobilizer identification numbers are read upon initiation of On Board Diagnostic (OBD).

Effective calendar date 03.11.2002, the immobilizer secret number is encoded for increased security. The encoded number is now 7-digits and is referred to as a "PIN" ("Personal Identification Number").

All models with anti-theft immobilizer are affected, regardless of generation.

The process to obtain the 7-digit PIN remains the same as with the 4-digit "secret number" previously used - that is: request via the "Warranty Information Network" (WIN). However, WIN Administration now requires additional information from both the vehicle and Dealer in order to generate the 7-digit PIN.

The PIN is only valid on the day it is requested. Thereafter, a new PIN is required.

The 7-digit PIN can only be processed and input using either the VAS 5051 or VAS 5052 with basis CD version 3.10 and higher. VAG 1551/1552 Scan Tools are unable to process or input this number.

A correct Importer/Dealer number must reside in the VAS 5051/5052 in order to request a PIN.

The requested PIN is intended for internal use only, is worthless to other Dealers and must not be shared with the customer.

CAUTION:

- **All Dealership VAS 5051 and VAS 5052 testers in service MUST be programmed with the correct Importer/Dealer number, as well as correct date and time.**
- **Adaptation functions of the anti-theft immobilizer are not possible with incorrect data!**



Fig. 49: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Press selection -1- of vehicle system "17 - instrument cluster"
- Wait until the next indication appears on display.

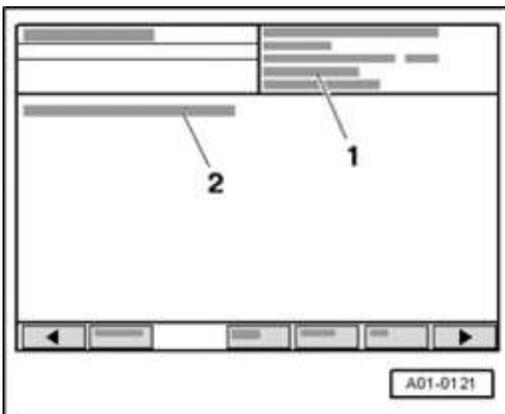


Fig. 50: VAS 5051 Tester Displaying Control Module Identification And Coding
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Control module identification of the instrument cluster
- 2 - Control module identification of immobilizer
- Press delta - button



Fig. 51: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- In selection -1-, select the diagnostic function "11 - Login-procedure".



Fig. 52: Diagnostic System VAS 5051: Display - Display Group And Key Pad
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Enter code word Max. input value = 65535

- Enter previously determined 7-digit PIN (of instrument cluster) in button field - 2-.
- Press -Q- button to confirm input.

NOTE: • After the third incorrect input of the 7-digit PIN, the

control module for anti-theft immobilizer or Engine Control Module (ECM) will be locked.

- It is not possible to make another attempt for 10 minutes. During this time, the ignition must remain constantly switched on. On Board Diagnostic (OBD) must be exited using the "End Output" function 06. This time is doubled after every third consecutive incorrect attempt, up to a maximum of 255 minutes.



Fig. 53: Diagnostic System VAS 5051: Display -- Basic Setting
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

NOTE: Once the login procedure has been successfully completed, the warning lamp will light constantly and the immobilizer will be switched free:

- as long as the engine is running and the ignition key remains inserted,
- for 45 minutes, as long as the ignition key remains inserted (engine not running),
- for 5 minutes, if ignition key is removed.

NOTE:

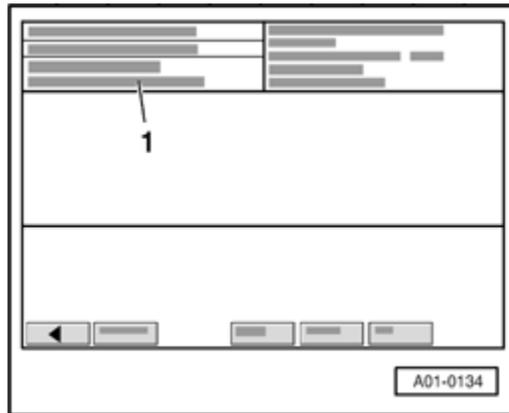


Fig. 54: Diagnostic System VAS 5051: Display - Channel 21
Courtesy of VOLKSWAGEN UNITED STATES, INC.

If indication -1- appears in display field: "Function unknown or cannot be performed at this moment", the 7-digit PIN was entered incorrectly (e.g. incorrect secret code)

Login Procedure, Engine Control Module (ECM)

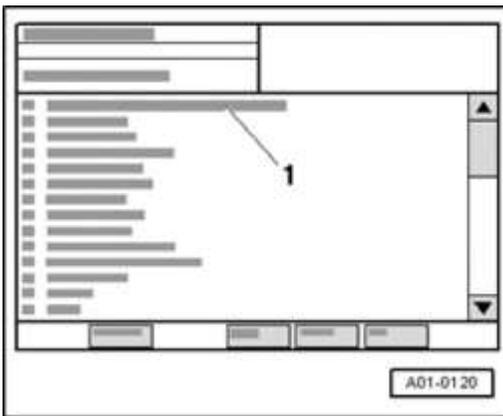


Fig. 55: Diagnostic System VAS 5051: Display
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- Press selection -1- of vehicle system "01 - Engine electronics".
- Wait until the next indication appears on display.

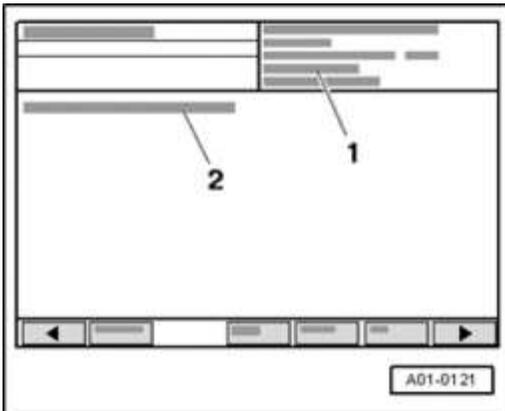


Fig. 56: VAS 5051 Tester Displaying Control Module Identification And Coding

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- 1 - Control module identification of Engine Control Module (ECM).
- 2 - Control module identification of immobilizer

- Press delta - button



Fig. 57: Diagnostic System VAS 5051: Display -- Basic Setting

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

- In selection -1-, select the diagnostic function "11 - Login-procedure".

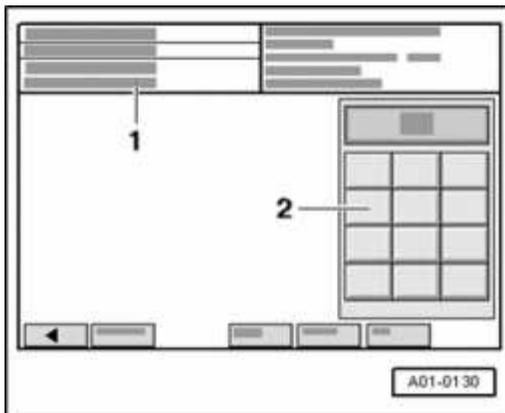


Fig. 58: Diagnostic System VAS 5051: Display - Display Group And Key Pad
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

1 - Enter code word Max. input value = 65535

- Enter 7-digit PIN (of Engine Control Module (ECM)) in button field -2-.
- Press -Q- button to confirm input.

NOTE:

- After the third incorrect input of the 7-digit PIN, the control module for anti-theft immobilizer or Engine Control Module (ECM) will be locked.
- It is not possible to make another attempt for 10 minutes. During this time, the ignition must remain constantly switched on. On Board Diagnostic (OBD) must be exited using the "End Output" function 06. This time is doubled after every third consecutive incorrect attempt, up to a maximum of 255 minutes.



Fig. 59: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Display on VAS 5051/5052:

The Engine Control Module (ECM) is now switched free.

NOTE:

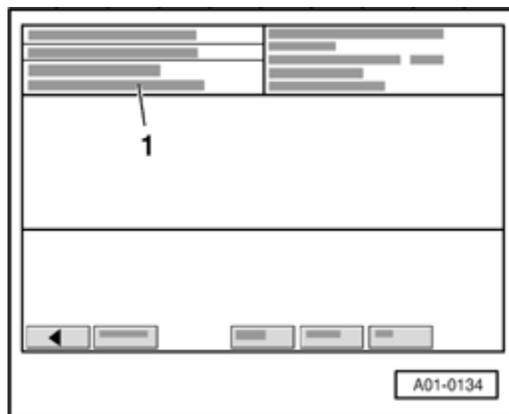


Fig. 60: Diagnostic System VAS 5051: Display - Channel 21
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

If indication -1- appears in display field: "Function unknown or cannot be performed at this moment", the 7-digit PIN was entered incorrectly (e.g. incorrect secret code)

NOTE:

- Data is exchanged between individual control modules by means of a "bus" system.
- "CAN-Bus" is used to describe a system that transports and distributes data.

- **The wires between the control modules that are used to transfer the data are known as signal wires.**
- **These signal wires are used for serial transmission of data, i.e. data is sent to each of the connected control modules in turn.**

CRUISE CONTROL SYSTEM (CCS) FROM M.Y. 2001, ON BOARD DIAGNOSTIC (OBD)

General Information

OBD program text/data generated by control modules installed on vehicles from m.y. 2001 may not be recognized by VAG 1551/1552 Scan Tools (ST) with the latest program card. For example: scan tool display shows "text 799", "01529 /references" or similar.

In addition, OBD programs for vehicle electrical equipment updates implemented from m.y. 2001 may also not supported by VAG 1551/1552 Scan Tools (ST) with the latest program card. For example: Powertrain CAN-Bus function - adaptation and addition of Automatic Transmission coding/adaptation etc.).

Only the VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System is capable of processing all display text/data, as well as performing coding, adaptation and related OBD program functions on these vehicles.

OBD program functions on vehicles from m.y. 2001 must be performed using the VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System in mode "Guided Fault Finding".

CRUISE CONTROL SYSTEM (CCS) THROUGH M.Y. 2000, ON BOARD DIAGNOSTIC (OBD)

General information

All cruise control system functions are controlled by the Engine Control Module (ECM). The processing of electronic engine controls and cruise control functions are integrated in the ECM. Other than the cruise control switches on the steering column, the clutch and brake pedal switches and related wiring, there are no separate cruise control components to be serviced.

As all electronic throttle control operations are monitored by On Board Diagnostic (OBD), Diagnostic Trouble Codes (DTC) pertaining to engine electronics that are stored in DTC memory may be relevant to cruise control function.

Always check DTC memory first before troubleshooting CCS (function 02). Refer to

- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMU
- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): ATC
- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AWP
- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): BEA

The operating status of the cruise control system, cruise control switches, brake and clutch switches (as inputs to the ECM) can be tested using the following procedure.

Cruise Control System (CCS), testing

Additional information

- Wiring Diagrams
- Technical Bulletins

Scan Tool (ST) and test equipment safety precautions

WARNING:

- **Due to weight, size and need for manual operation of test instruments while vehicle is driven on public roads, instrument must be used only with a Driver operating the vehicle and an Instrument Operator operating the test equipment.**
- **Do not use Instrument with Driver only. Always**

use two persons to conduct test.

- **Do not place Instrument on lap of Driver or front seat passenger because emergency stop may dislodge Instrument and cause airbag deployment with risk of injury to Instrument Operator.**

WARNING: Use of Instrument in Audi TT Coup:

- **Place Instrument in rear seating area and secure by available safety belt.**
- **Instrument Operator must be seated in the other rear seating position, after sliding front passenger seat and moving the seat back as far forward as possible. Do not activate the seat back release lever.**
- **Instrument Operator must wear safety belt.**

Use of Instrument in Audi TT Roadster:

- **Use only Instrument VAG 1551 Scan Tool (ST) or VAS 5052 Vehicle Diagnostic and Service System. DO NOT USE VAS 5051.**
- **Before test, deactivate passenger's airbag using key operated switch in glove compartment.**
- **Instrument Operator must be seated on passenger seat with safety belt worn.**
- **Place Instrument in foot well in front of passenger seat in a manner allowing the Operator to use the Instrument in a safe manner.**
- **After completion of test, re-activate front passenger airbag.**

CAUTION: To prevent damage to electronic and electrical

components, note the following:

- **Always switch off the ignition before connecting or disconnecting test instruments.**
- **During some of the tests the control module may identify and record DTCs. The Diagnostic Trouble Code (DTC) memory should therefore be checked and (if necessary) erased after completing the tests and any repair work that may be required.**

Test requirements

- Check fuses using wiring diagram
- Connect VAG 1551/1552 Scan Tool, VAS 5051 Vehicle Diagnostic, Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System. Refer to VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions
- Ignition switched on

NOTE:

- **If the display remains blank, check voltage supply of VAG 1551 according to wiring diagram.**
- **Additional operating instructions can be called up with the scan tool HELP button.**
- **The --> button serves to advance the program sequence.**
- **If an incorrect entry is made, press button C to escape.**
- **In the operating mode 1 "Rapid data transfer" the function 00 can be used to perform an "Automatic test sequence." This will check all control modules in the vehicle automatically.**

- Switch on ignition.
- Switch on printer with the Print button (indicator lamp lights up).

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- Press button -1- for "Rapid data transfer" mode.

Rapid data transfer HELP
Input address word XX

Indicated on display:

- Press buttons -0- and -1- to enter "Engine electronics" address word 01.
- Press --> button.

Rapid data transfer HELP
Select function XX

Indicated on display:

"Read Measuring Value Block", performing

- Press buttons -0- and -8- to select "Read Measuring Value Block" function 08.

Rapid data transfer Q
08 - Read Measuring Value Block

Indicated on display: :

- Press -Q- button to confirm input

Read Measuring Value Block HELP
Enter display group number XXX

Indicated on display:

- With engine running at idle speed, press buttons -0-, -0- and -6- to enter display group number 066.
- Press -Q- button to confirm input

The read measuring value block appears in the standard format.

Display group, summary

Display Group	Indicated on display:
066	1 = Actual road speed (km/h) 2 = Brake/clutch switch status 3 = Specified road speed (km/h) 4 = CCS switch status

Interpreting displayed information. Refer to **Cruise Control System (CCS), testing** .

Read Measuring Value Block 066, interpreting

Read Measuring Value Block 66		-->	<-- Indicated on display (example only):
km/h	X X X X	km/h	X X X X
			CCS Switch status (driver-operated control switch) 0 0 0 0 = cruise control switched off (switch engaged) 0 0 1 1 = cruise control switched on 0 0 0 1 = cruise control switched off (switch not engaged) 0 1 1 1 = "SET/FIX" button pressed in 1 0 1 1 = switch moved to "RES/AUFN" ("resume") position
			Specified road speed Display continues to show the speed that was last stored until: - the cruise control function is switched off via the operating switch (i.e. switch engaged in "OFF" position) - the engine is switched off
			Brake and clutch switch status, cruise control status (enabled or not enabled)

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1 0 0 0 = cruise control enabled
1 0 1 1 = brake depressed (brake pedal switch)
1 1 0 0 = clutch depressed

Actual road speed

Read Measuring Value Block 66 -->
0 km/h 1 0 0 0 0 km/h 0 0 0 0

Indicated on display (example only):

Check displays in display zones 2 and 4.

Read Measuring Value Block 66 -->
0 km/h 1 0 0 0 0 km/h 0 0 0 0

Checking display in display zone 2:

Test condition	Display zone 2
CCS enabled (activated)	1000
Brake depressed (brake pedal switch)	1011
Clutch depressed	1100

If display zone 2 does not read "1000" (CCS activated):

- Check identification of engine control module.

Refer to

- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMU
- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): ATC
- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AWP

- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): BEA
- If the letter "G" does not appear after component designation, cruise control must be activated to operate. Refer to **Cruise Control System (CCS), testing** .

Read Measuring Value Block 66 -->
0 km/h 1 0 0 0 0 km/h 0 0 0 0

Checking display in display zone 4:

Test condition	Display zone 4
Switch B engaged in "OFF/AUS" position	0000
Switch B at "ON/EIN"	0011
Memory set, switch B in "OFF/AUS" position but before engagement point	0001
Button A pressed in ("SET/FIX")	0111
Switch B held at "RES/AUFN"	1011

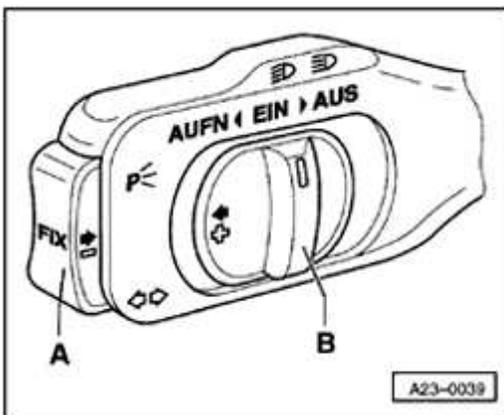


Fig. 61: Cruise Control Switch

Courtesy of VOLKSWAGEN UNITED STATES, INC.

If the specifications for display zone 4 are not obtained when switch B is in the "ON/EIN" position (0011):

- Connect test box VAG 1598/31 to wiring harness for engine control module.

Refer to **Electrical testing using VAG1598/31 test box** .

Cruise control system, activating/deactivating

- Connect Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System VAS 5051 or VAG 1551 Scan Tool (ST). Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions** .
- Press buttons -0- and -1- to enter "Engine electronics" address word 01.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press the "1" button twice to select "Log-in Procedure" function 11
- Press -Q- button to confirm input.

Log-in Procedure HELP
Enter code number XXXXX

Indicated on display:

Activating:

- Enter code number 11463
- Press -Q- button to confirm input.

Deactivating:

- Enter code number 16167
- Press -Q- button to confirm input.

Wiring and component check using test box VAG 1598/31

NOTE: • **Test box VAG 1598/31 is designed so that it can be**

connected to the wiring harness for the engine control module and to the engine control module itself at the same time.

- This has the advantage of enabling the engine management system to remain fully operational even with the test box connected (for example, when testing signals while the engine is running).
- The instructions for performing the individual tests indicate whether or not the engine control module itself also needs to be connected to the test box.
- Use the hand multimeter VAG 1526 or the multimeter VAG 1715 and the diode test lamp VAG 1527 for the checks.
- To connect the testers to test box 1598/31, always use the adapter leads from adapter set VAG 1594.
- After re-connecting the engine control module, perform adaptation of engine control module to throttle valve control module.

Refer to

- **24 MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMU
- **28 IGNITION/GLOW PLUG SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): ATC
- **24 MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AWP
- **24 MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): BEA
- **24 - MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO GENERIC SCAN TOOL ENGINE CODE(S): AMU, BEA, ATC, AWP
- **24 MULTIPORT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V FUEL INJECTION & IGNITION. ENGINE CODE(S): BHE

- **24 - MULTIPORT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V
GENERIC SCAN TOOL, ENGINE CODE: BHE

WARNING: To prevent damage to the electronic components, switch to the respective measuring range before connecting the test lead and observe the test requirements.

- Switch off ignition.
- Remove cover of protective housing for control modules.

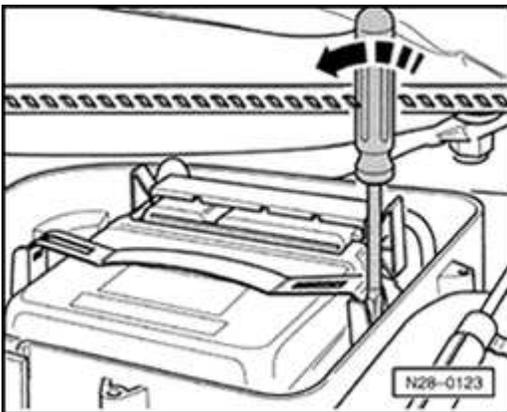


Fig. 62: Removing Engine Control Module
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully lever off the retainer bar with a screwdriver -arrow-.
- Then release connectors on control module and pull off.

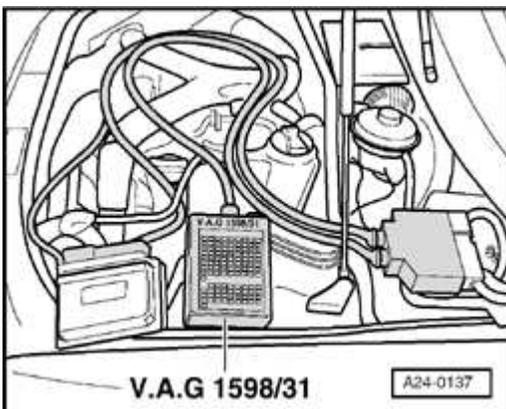


Fig. 63: Test Box Vag 1598/31 Connected To Wiring Harness Connector

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect test box VAG 1598/31 to wiring harness connector. Also connect the Ground clamp on the test box (not shown in the illustration) to the battery negative terminal. The instructions for performing the individual tests indicate whether or not the engine control module itself also needs to be connected to the test box.
- Carry out test as described in the repair instructions.
- Disconnect harness connector at cruise control switch. Refer to **Steering column switches, removing and installing** .

Wire connection should be checked for short circuit to B+, short circuit to Ground and open circuit.

- Check wire connection according to wiring diagram.

Refer to Wiring Diagrams

- Repair open circuit or short circuit if necessary.

If wire connection is OK, cruise control switch must be replaced.

AUTOMATIC VERTICAL HEADLIGHT AIM CONTROL SYSTEM, ON BOARD DIAGNOSTIC (OBD)

General information

Automatic headlight adjustment is required on vehicles with High Intensity Gas Discharge (HID) headlights.

Automatic vertical headlight aim control system keeps the low beams at a constant level even if the car is loaded, a situation which would normally change the headlight angle.

There are two vehicle level sensors, one on the front axle and one on the rear axle. These sensors register the vehicle's fore/aft angle of inclination. The Vehicle Speed Signal (VSS) is also processed.

The control module evaluates these signals and activates the headlight beam adjusting motors when low beams are on.

Function

The automatic vertical headlight aim control system consists of:

- Automatic vertical headlight aim control system control module -J431-
- Left rear level control system sensor -G76-
- Left front level control system sensor -G78-
- Right headlight beam adjusting motor -V48-
- Left headlight beam adjusting motor -V49-

When starting the engine, vehicle level is measured and compared to the set point. This signal is sent to the headlight beam adjusting motors which adjust headlight position to this value once, whether or not the low beams are on.

After this single correction, signals to change low beam position will only be sent to the headlight beam adjusting motors with the low beams on.

If a trip is interrupted (vehicle speed less than 1 km/h) and a vehicle position change is recognized due to additional weight (e.g. extra people in the car) the headlights will be automatically adjusted to the proper height.

All changes made by the automatic vertical headlight aim control system are due to static operating conditions.

NOTE: The following description is only relevant for the VAG1551 scan tool.

Automatic vertical headlight aim control On Board Diagnostic (OBD), initiating

Additional information

- Wiring Diagrams
- Technical Bulletins

Scan Tool (ST) and test equipment safety precautions

- WARNING:**
- Due to weight, size and need for manual operation of test instruments while vehicle is driven on public roads, instrument must be used only with a Driver operating the vehicle and an Instrument Operator operating the test equipment.
 - Do not use Instrument with Driver only. Always use two persons to conduct test.
 - Do not place Instrument on lap of Driver or front seat passenger because emergency stop may dislodge Instrument and cause airbag deployment with risk of injury to Instrument Operator.

WARNING: Use of Instrument in Audi TT Coup:

- Place Instrument in rear seating area and secure by available safety belt.
- Instrument Operator must be seated in the other rear seating position, after sliding front passenger seat and moving the seat back as far forward as possible. Do not activate the seat back release lever.
- Instrument Operator must wear safety belt.

Use of Instrument in Audi TT Roadster:

- Use only Instrument VAG 1551 Scan Tool (ST) or VAS 5052 Vehicle Diagnostic and Service System. DO NOT USE VAS 5051.
- Before test, deactivate passenger's airbag using key operated switch in glove compartment.

- **Instrument Operator must be seated on passenger seat with safety belt worn.**
- **Place Instrument in foot well in front of passenger seat in a manner allowing the Operator to use the Instrument in a safe manner.**
- **After completion of test, re-activate front passenger airbag.**

CAUTION: To prevent damage to electronic and electrical components, note the following:

- **Always switch off the ignition before connecting or disconnecting test instruments.**
- **During some of the tests the control module may identify and record DTCs. The Diagnostic Trouble Code (DTC) memory should therefore be checked and (if necessary) erased after completing the tests and any repair work that may be required.**

Test requirements

- Check fuses using wiring diagram
- Connect VAG 1551/1552 Scan Tool, VAS 5051 Vehicle Diagnostic, Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions**
- Ignition switched on

NOTE:

- **If the display remains blank, check voltage supply of VAG 1551 according to wiring diagram.**
- **Additional operating instructions can be called up with the scan tool HELP button.**

- **The --> button serves to advance the program sequence.**
 - **If an incorrect entry is made, press button C to escape.**
 - **In the operating mode 1 "Rapid data transfer" the function 00 can be used to perform an "Automatic test sequence." This will check all control modules in the vehicle automatically.**
- Switch on printer with the Print button (indicator lamp lights up).
 - Press button -1- for "Rapid data transfer" mode.

Rapid data transfer HELP
Input address word XX

Indicated on display:

Automatic vertical headlight aim control address word: 55

- Press buttons -5- and -5- to enter "Head lamp vertical aim control system" address word 55.

Rapid data transfer Q
55 - H. lamp. vert. aim ctrl.sys

Indicated on display:

- Press -Q- button to confirm input.

4B0907357 Vertical Aim Control D003 -->
Coding 00009 WSC 06812

Indicated on display (example only): (after about 5 seconds)

- Automatic vertical headlight aim control system control module identification:
4B0907357
- Software version: D003

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- Control module coding: 00009
- WSC 06812: dealer number
- Press --> button.
- If one of these four messages is displayed, carry out troubleshooting procedures. Refer to Wiring Diagrams, Troubleshooting & Component Locations binder.

Rapid data transfer HELP
Error in communication link

Rapid data transfer HELP
K-wire not switching to Ground

Rapid data transfer HELP
K-wire not switching to B+

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press HELP button to print list of possible functions.
- Press --> button to continue.

On Board Diagnostic (OBD) functions

The following functions are possible:

01 - Check control module version

02 - Check DTC Memory. Refer to **Diagnostic Trouble Code (DTC) Memory, checking (function 02)**

03 - Output Diagnostic Test Mode. Refer to **Output Diagnostic Test Mode (DTM) (function 03)**

04 - Basic Setting. Refer to **Basic Setting (function 04)**

05 - Erase DTC Memory. Refer to **Diagnostic Trouble Code (DTC) Memory, erasing (function 05)**

06 - End Output. Refer to **End Output (function 06)**

07 - Code Control Module. Refer to **Code Control Module (function 07)**

08 - Read Measuring Value Block. Refer to **Read Measuring Value Block (function 08)**

Control Module Versions, checking (function 01)

Rapid Data Transfer HELP
Select function XX

Indicated on display::

- Press buttons -0- and -1- to select "check control module versions" function 01.

Rapid Data Transfer Q
01 - Check control module version

Indicated on display::

- Press -Q- button to confirm input.

4B0907357 Vertical Aim Control D003 -->
Code 00009 WSC 06812

Indicated on display (example only): (after about 5 seconds):

- Automatic vertical headlight aim control system control module identification:
4B0907357
- Software version: D003
- Control module coding: 00009

- WSC 06812: Dealer number
- Press --> button.

Diagnostic Trouble Code (DTC) Memory, checking (function 02)

NOTE: The DTCs indicated are only updated when initiating On Board Diagnostic (OBD) or with "Erase DTC Memory" function 05.

- Switch printer on by pressing PRINT button (indicator light in button comes on).

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -2- to select "Check DTC Memory" function 05.

Rapid data transfer Q
02 - Check DTC Memory

Indicated on display:

- Press -Q- button to confirm input.

X DTC recognized -->

The number of stored Diagnostic Trouble Codes (DTCs) is shown on the display.

Stored DTCs are displayed in sequence and printed out one after another.

- Repair malfunctions printed out according to DTC Table. Refer to **Diagnostic Trouble Code (DTC) table**

No DTC recognized -->

If "No DTC recognized" is shown on display

- Press --> button to return VAG1551 scan tool to "Select function XX" mode.

Rapid data transfer HELP
Select function XX

Indicated on display:

If anything else is indicated on display. Refer to VAG1551 Scan Tool (ST) operating instructions.

- Press buttons -0- and -6- to select "End Output" function 06. Refer to **End Output (function 06)**.
- Switch ignition off.
- Disconnect VAG1551 scan tool from DLC.

Diagnostic Trouble Code (DTC) table

NOTE:

- **All possible malfunctions recognized by the automatic vertical headlight aim control system and printed out by the VAG1551 Scan Tool (ST) are listed on the following sections according to the 5-digit DTC.**
- **The 5-digit DTC numbers are only shown on the printout.**
- **Before replacing a component suspected of malfunctioning, check all related wiring connections, harness connections and Ground (GND) connections according to the appropriate wiring diagram. Refer to "Wiring Diagrams, Troubleshooting & Component Locations" binder.**
- **After completing necessary repairs, connect the VAG1551 scan tool, check DTC memory (scan tool function 02) and, if necessary, erase DTC memory (scan tool function 05).**

- **DTC memory contains all static and sporadic faults. A malfunction is recognized as static if it exists for at least 2 seconds. If a static malfunction is no longer present after 2 seconds it will be classified as a sporadic malfunction and identified by the letters "/SP" in the lower right of the VAG1551 scan tool display.**
- **When the ignition is switched on, all malfunctions present are identified as "sporadic" and are only stored as static malfunctions if they are detected in the next check routine.**
- **A sporadic malfunction will be erased if it no longer exists after 50 driving cycles (ignition on for at least 5 minutes, road speed above 30 km/h or 18 mph).**

DTC	Possible causes	Corrective action
VAG 1551 Scan Tool display		
00625		
Vehicle Speed Signal		
<ul style="list-style-type: none"> • Implausible signal 	<ul style="list-style-type: none"> • Open circuit or short circuit between instrument cluster and control module. 	<ul style="list-style-type: none"> • Check wiring for open circuit or short circuit according to wiring diagram.
00774		
Level Control System Sensor, LR-G76		
<ul style="list-style-type: none"> • Short circuit to B+ 	<ul style="list-style-type: none"> • Open circuit or short circuit between left rear level control system sensor -G76- and control module 	<ul style="list-style-type: none"> • Check wiring for open circuit or short circuit according to wiring diagram.

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<ul style="list-style-type: none"> • Open/short circuit to Ground 	<ul style="list-style-type: none"> • -G76- faulty 	<ul style="list-style-type: none"> • Replace -G76-.
00776		
Level Control System Sensor, LF-G78		
<ul style="list-style-type: none"> • Short circuit to B+ 	<ul style="list-style-type: none"> • Open circuit or short circuit between left front level control system sensor -G78- and control module 	<ul style="list-style-type: none"> • Check wiring for open, short circuit according to wiring diagram.
<ul style="list-style-type: none"> • Open/short circuit to Ground 	<ul style="list-style-type: none"> • -G78- faulty 	<ul style="list-style-type: none"> • Replace -G78-.

DTC	Possible causes	Corrective action
VAG 1551 Scan Tool display		
01537		
Sender for Veh. Level/Supp. Volt.		
<ul style="list-style-type: none"> • Short circuit to B+ 	<ul style="list-style-type: none"> • Open circuit or short circuit to B+/Ground between control module and vehicle level sensor 	<ul style="list-style-type: none"> • Check wiring for open circuit or short circuit according to wiring diagram.
<ul style="list-style-type: none"> • Open/short circuit to Ground 		
01538		
Motors for Beam Adjustment-		

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V48/V49		
<ul style="list-style-type: none"> • Short circuit to B+ 	<ul style="list-style-type: none"> • Short circuit to B+/Ground between left headlight beam adjusting motor -V48-, right headlight beam adjusting motor -V49- and control module 	<ul style="list-style-type: none"> • Check wiring for open circuit or, short circuit according to wiring diagram.
<ul style="list-style-type: none"> • Short circuit to Ground 	<ul style="list-style-type: none"> • -V48-, -V49- faulty 	<ul style="list-style-type: none"> • Replace -V48-, -V49-.
01539		
Headlights Not Set	<ul style="list-style-type: none"> • Basic setting 2 (in display group 002) not performed 	<ul style="list-style-type: none"> • Perform basic setting. Refer to <u>Basic Setting (function 04)</u> .
65535		
Control Module Malfunctioning	<ul style="list-style-type: none"> • Automatic vertical headlight aim control system control module -J431- faulty 	<ul style="list-style-type: none"> • Replace control module.

Output Diagnostic Test Mode (DTM) (function 03)

NOTE:

- **The output Diagnostic Test Mode (DTM) can only be carried out on a stationary vehicle.**
- **Switch ignition on.**
- **Switch low beam on.**
- **If a malfunction is found during the output DTM, trace the cause and replace the malfunctioning part.**

The following tests can be carried out by output DTM:

- Lowering headlights
- Raising headlights

Output DTM, initiating

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- Press buttons -0- and -3- to select "Output Diagnostic Test Mode" function 03.

Rapid data transfer Q
03 - Output Diagnostic Test Mode

Indicated on display:

- Press -Q- button to confirm input (output DTM for headlight vertical headlight aim control system is started).

Output Diagnostic Test Mode -->
Lower head lights

Indicated on display:

Headlights will be lowered until sequence is switched ahead or the lowest position is reached.

- Press --> button.

Output Diagnostic Test Mode -->
Raise head lights

Indicated on display:

Headlights will be raised until sequence is switched ahead or the highest position is reached.

- Press --> button.

Output Diagnostic Test Mode -->
END

Indicated on display:

- Press --> button.

The scan tool returns to the "Select function XX" mode.

Rapid data transfer HELP
Select function XX

Indicated on display:

Basic Setting (function 04)

After replacing a headlight, axle sensor or the control module basic settings must be initiated. The following must be observed for this:

Test Requirement

- Vehicle must be loaded to an exactly definable weight. Refer to **01 MAINTENANCE**
- Settle car (push down on car a few times so that shock absorbers and car bounce up and down).

Basic Setting, initiating

- Press buttons -0- and -4- to select "Basic Setting" function 04.

Rapid data transfer Q
04 - Basic Setting

Indicated on display:

- Press -Q- button to confirm input.

Basic Setting
Input display group number XXX

Indicated on display:

- Press buttons -0-, -0-, and -1- to input display group number 001.
- Press -Q- button to confirm input.

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System in Basic Setting 1 -->
Please Wait

Indicated on display:

Headlights are moved into adjustment position (about 15 seconds).

System in Basic Setting 1 -->
Adjust headlights

Indicated on display:

Headlights are now in adjustment position.

- Adjust headlights using a headlight adjustment tool (e.g. VAS5046).

Basic setting 1 turns regulation off and "Headlights not adjusted" will be stored in DTC memory.

- Press --> button.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -4- to select "Basic Setting" function 04.

Rapid data transfer Q
04 - Basic Setting

Indicated on display:

- Press -Q- button to confirm input.

Basic Setting
Input display group number XXX

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Indicated on display:

- Press buttons -0-, -0-, and -2- to input display group number 002.
- Press -Q- button to confirm input.

System in Basic Setting 2 -->
Normal position learned

Indicated on display:

The control module has stored this position as the normal position. "Headlights not adjusted" is erased from DTC memory and regulation is switched back on.

- Press --> button.

Rapid data transfer HELP
Select function XX

Indicated on display:

Diagnostic Trouble Code (DTC) Memory, erasing (function 05)

NOTE: If DTC memory cannot be erased, check DTC memory again and repair any malfunctions.

Test requirements

- DTC memory checked. Refer to **Diagnostic Trouble Code (DTC) Memory, checking (function 02)**
- All malfunctions repaired

After successfully checking DTC memory:

Rapid data transfer HELP
Select function XX

Indicated on display:

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- Press buttons -0- and -5- to select "Erase DTC Memory" function 05.

Rapid data transfer Q
05 - Erase DTC Memory

Indicated on display:

- Press -Q- button to confirm input.

Rapid data transfer "
DTC Memory is erased

Indicated on display:

DTC memory is erased.

- Press --> button.

Rapid data transfer HELP
Select function XX

Indicated on display:

NOTE:

- If this display appears as shown, the test sequence was incorrect.
- If this display appears as shown, the test sequence was incorrect.

Follow the sequence of operations precisely, first read DTC memory, repair any malfunctions (if necessary) then erase DTC memory.

End Output (function 06)

- Press buttons -0- and -6- to select "End Output" function 06.

Rapid data transfer Q
06 - End Output

Indicated on display:

- Press -Q- button to confirm input.

Rapid data transfer HELP
Insert address word XX

Indicated on display:

- Switch ignition off.
- Disconnect VAG1551 Scan Tool (ST) from DLC.

Code Control Module (function 07)

NOTE: "Code Control Module" function 07 is used to program the automatic vertical headlight aim control system control module for:

- Vehicle type
- Drive layout

During coding, option combination possibilities are set.

Coding, initiating

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -7- to select "Code Control Module" function 07.
- Press -Q- button to confirm input.

Code Control Module Q
Input code number XXXXX (0-32000)

Indicated on display:

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- Input code number as shown in code table. Refer to **Code Control Module (function 07)** .

Example: 00009

Coding table

Code	Vehicle type/drive layout
0009	TT front-wheel drive
0010	TT all-wheel drive

Code Control Module Q
Input code number 00009 (0-32000)

Indicated on display (example only):

- Press -Q- button to confirm input.

4B0907357Vertical Aim Control D003 -->
Coding 00009 WSC 06812

Indicated on display: (after about 5 seconds)

- Press --> button to complete coding.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -6- to select "End Output" function 06.

Rapid data transfer Q
06 - End Output

Indicated on display:

- Press -Q- button to confirm input.

Read Measuring Value Block (function 08)

Use this function to observe various automatic vertical headlight level inputs and stored data.

The measuring value block is divided into 2 display groups, each containing 3 display fields.

Rapid data transfer HELP
Select function XX

Indicated on display:

- Press buttons -0- and -8- to select "Read Measuring Value Block" function 08.

Rapid data transfer Q
08 - Read Measuring Value Block

Indicated on display:

- Press -Q- button to confirm input.

Read Measuring Value Block HELP
Input display group number XXX

Indicated on display:

- Input desired display group number from table. Refer to **Read Measuring Value Block (function 08)** .
- Press -Q- button to confirm input.

The Read Measuring Value Block selected appears in the standard format.

Interpreting displayed information. Refer to **Read Measuring Value Block (function 08)** .

Display groups, summary

--	--

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Display group number	Indicated on display:
001	1 = Voltage supply (terminal 15) 2 = Low beam voltage supply (terminal 56b) 3 = Vehicle speed in km/h
002	1 = Vehicle level sensor front (V) 2 = Vehicle level sensor rear (V) 3 = Position motor actuation

Read Measuring Value Blocks, interpreting

Read Measuring Value Block 1			-->	<-- Indicated on display (example only):
13.5 V	13.5 V	90 km/h		
		Vehicle speed • 0 - 300 km/h		
	Low beam voltage supply (terminal 56b) • 0 - 15 V			
Voltage supply (terminal 15) • 0 - 15 V				

Read Measuring Value Block 2			-->	<-- Indicated on display (example only):
3.0 V	2.8 V	ADP.i.O.		
		Position Motor actuation • ADP. running (position motors actuated to adjust headlight level to normal position) • ADP.i.O. (normal position set)		
	Voltage at left rear level control system sensor • 0.5 - 4.5 V			

Voltage at left front level control system sensor

- 0.5 - 4.5 V

VAG 1551/1552 SCAN TOOL (ST), VAS 5051 VEHICLE DIAGNOSTIC TESTING AND INFORMATION SYSTEM OR VAS 5052 VEHICLE DIAGNOSTIC AND SERVICE SYSTEM, CONNECTING AND SELECTING FUNCTIONS

VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions

Scan Tool (ST) and test equipment safety precautions

WARNING:

- **Due to weight, size and need for manual operation of test instruments while vehicle is driven on public roads, instrument must be used only with a Driver operating the vehicle and an Instrument Operator operating the test equipment.**
- **Do not use Instrument with Driver only. Always use two persons to conduct test.**
- **Do not place Instrument on lap of Driver or front seat passenger because emergency stop may dislodge Instrument and cause airbag deployment with risk of injury to Instrument Operator.**

WARNING: Use of Instrument in Audi TT Coup:

- **Place Instrument in rear seating area and secure by available safety belt.**
- **Instrument Operator must be seated in the other rear seating position, after sliding front passenger seat and moving the seat back as far forward as possible. Do not activate the seat back release lever.**

- **Instrument Operator must wear safety belt.**

Use of Instrument in Audi TT Roadster:

- **Use only Instrument VAG 1551 Scan Tool (ST) or VAS 5052 Vehicle Diagnostic and Service System. DO NOT USE VAS 5051.**
- **Before test, deactivate passenger's airbag using key operated switch in glove compartment.**
- **Instrument Operator must be seated on passenger seat with safety belt worn.**
- **Place Instrument in foot well in front of passenger seat in a manner allowing the Operator to use the Instrument in a safe manner.**
- **After completion of test, re-activate front passenger airbag.**

CAUTION: To prevent damage to electronic and electrical components, note the following:

- **Always switch off the ignition before connecting or disconnecting test instruments.**
- **During some of the tests the control module may identify and record DTCs. The Diagnostic Trouble Code (DTC) memory should therefore be checked and (if necessary) erased after completing the tests and any repair work that may be required.**

Test conditions

- **Battery voltage at least 11 V**
- **Ground connections on engine and transmission OK**
- **Fuses OK**

Refer to Wiring Diagrams

- Ground connections and Ground point for transmission OK

Refer to Wiring Diagrams

- Check battery Ground strap and Ground strap between battery and transmission.
- Switch off ignition.

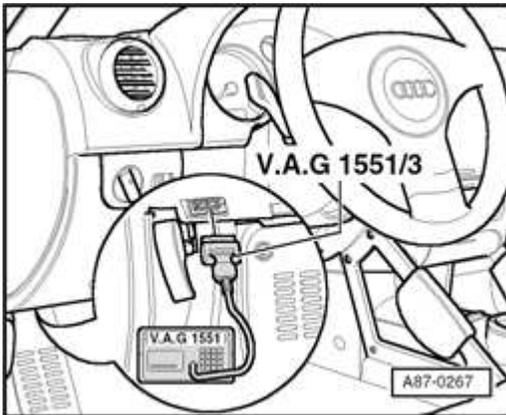


Fig. 64: Connecting Scan Tool To DLC
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect VAG 1551/1552 Scan Tool (ST) with lead VAG 1551/3 or connect VAS 5051/5052 with appropriate adapter.

NOTE: The Data Link Connector (DLC) is located under the instrument panel, left.

- WARNING:**
- When taking test readings while the vehicle is moving, VAG 1551/1552/VAS 5052 tester must always be secured to the rear seat and operated from this position.
 - **DO NOT USE VAS 5051 during a road test.**

VAG - ON BOARD DIAGNOSTIC HELP

1 - Rapid data transfer*

2 - Flash code output*

Indicated on display:

* Appears alternately

NOTE: If the display remains blank:

Refer to Scan tool operating instructions

- Switch on ignition
- Switch on printer with the Print button (Warning lamp in button lights up).
- Press button -1- for "Rapid data transfer."

Rapid data transfer HELP

Enter address word XX

Indicated on display:

NOTE: Address word 00 is used to carry out the automatic test sequence, i.e. checking the DTC memory via rapid data transfer for all vehicle systems with On Board Diagnostic (OBD) capability.

27 BATTERY, STARTER, GENERATOR, CRUISE CONTROL

BATTERY

General information

The battery is one of the most important electrical components in the modern automobile. A battery that provides trouble-free service has a great influence on customer satisfaction. To ensure trouble-free service and optimum service life, batteries must be checked, serviced and maintained as per the instructions in this article.

Apart from starting the engine, the battery has other tasks. It acts as a buffer and

also supplies electrical energy to the complete vehicle electrical system. In addition, the cyclical and capacity demands on the battery have increased due to additional safety and convenience features (electrical consumers) being installed.

The automobile battery has undergone many technical changes and improvements, and development of new battery technologies continues. However, due to physical and chemical limitations, it is not yet possible to consider traditional lead-acid automobile batteries as being totally maintenance free.

Audi TT equipped with the 3.2L V6 engine are equipped with an Absorbed Glass Mat (AGM) battery that requires specific servicing procedures. Refer to **Absorbed Glass Mat (AGM) Battery**, .

Warnings and safety measures for lead-acid batteries

When servicing batteries, Technicians must be aware of, and observe the warnings and safety measures specified in this article

Explanation of WARNING symbols on batteries

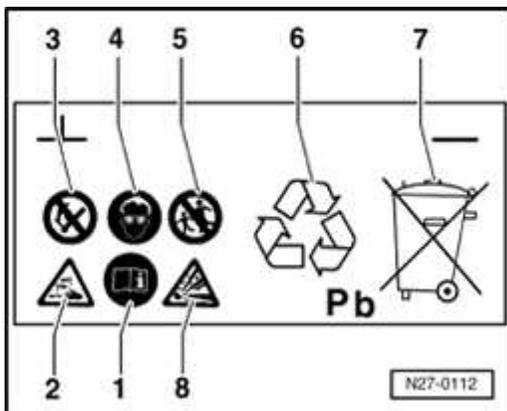


Fig. 65: Warning Symbols On Batteries
Courtesy of VOLKSWAGEN UNITED STATES, INC.

WARNING: 1 - Read and follow all instructions on battery, contained in this article, and in Owner's Manual!

2 - Battery acid (electrolyte) can cause severe burns!

• When working with electrolyte always wear eye

protection, rubber gloves and a suitable apron.

- **Unprotected contact with electrolyte will severely burn the skin, eyes and mucous membrane.**
- **Electrolyte gasses will burn breathing passages.**
- **Ingestion of electrolyte will burn digestive system.**

- **Never tip a battery on edge. Electrolyte can spill from the ventilation openings.**
- **FIRST AID: If electrolyte is spilled on eyes or skin, flush at once with large quantities of water. Remove any clothing affected and also flush with water.**
- **Should electrolyte be spilled on painted surfaces in vehicle or on floor, remove with absorbent material (dispose of absorbent material properly). Neutralize any remaining electrolyte with mixture of baking soda and water.**
- **Do not touch electrolyte with bare hands. Avoid skin contact.**

- **After servicing batteries, do not touch mouth, nose or eyes. Thoroughly wash hands prior to breaks and upon completion of battery servicing.**
- **Keep area were batteries are serviced free from food and drink.**

3 - Keep open flames and sparks away and DO NOT smoke near batteries!

- **Avoid sparks when working with wiring,**

connectors, electrical components, as well as tools and equipment used for servicing.

- **Always reinstall battery positive (B+) or negative (-) terminal covers if removed during servicing.**

4 - Always wear eye protection when working with electrolyte!

- **If electrolyte gets into eyes, flush with large quantities of water. Seek medical attention immediately!**

5 - Keep children away from batteries!

6 - Dispose of batteries properly!

- **Waste batteries must only be disposed of in appropriate waste disposal sites. Refer to local regulations pertaining to battery disposal.**

7 - Never dispose of batteries in household waste!

- **Electrolyte and internal battery materials are harmful to the environment.**

8 - Danger of explosion!

- **Batteries produce explosive gasses while being charged.**
- **Keep open flames and sparks away and DO NOT smoke near batteries.**
- **Spray battery with anti-static spray prior to handling.**
- **Materials capable of generating and conducting electrostatic charges must not be used in the area of the battery while being charged.**

- The battery charger **MUST** be turned off when connecting or disconnecting the cables at the battery.
- Battery cell caps must **NOT** be removed while charging.
- Ensure that battery is charged in a well ventilated area and, after charging is complete, is left to sit for a period of time in that area.
- Batteries should be transported only in conductive metal containers.
- Avoid short circuits. Always reinstall battery positive (B+) or negative (-) terminal covers if removed during servicing.

Battery handling instructions

NOTE:

- Battery terminals must no longer be greased.
- To avoid damaging the battery housing, do not use force when attaching the battery clamps; press them on by hand.

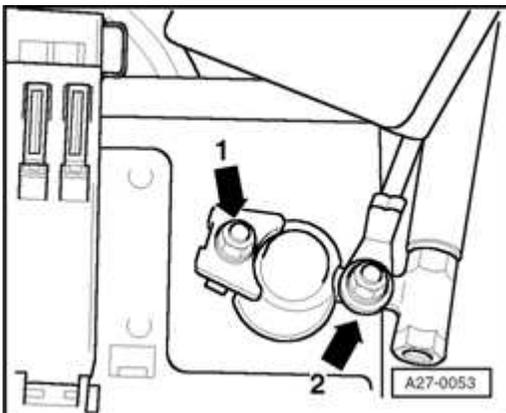


Fig. 66: Battery Terminal Nuts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tightening torque for battery clamps -arrow 1-: 6 Nm.

- Tightening torque for additional terminals -arrow 2-: 6 Nm.
- After reconnecting the battery, re-activate and check operation of vehicle electrical equipment (radio, clock and convenience functions etc.) as explained in this article and/or Owner's Manual.

Absorbed Glass Mat (AGM) Battery,

General information

Audi TT equipped with the 3.2L V6 engine are equipped with an Absorbed Glass Mat (AGM) battery located in the left rear luggage compartment in the spare tire/wheel well.

Servicing

Unlike conventional lead-acid batteries, AGM batteries are completely sealed and use a fiberglass mat construction which completely absorbs the electrolyte. As a result, no excess electrolyte is present and it is not possible to check the electrolyte level or otherwise service the electrolyte.

Specific removal/installation, testing and charging procedures are required for AGM batteries. Heed all notes pertaining to AGM batteries in the following procedures.

If it is determined that an AGM battery is malfunctioning, replacement is necessary.

WARNING: DO NOT attempt to open an AGM battery!

Battery, disconnecting and reconnecting

- WARNING:**
- **Observe Warning and safety measures for lead acid batteries. Refer to Warnings and safety measures for lead-acid batteries .**
 - **Always wear suitable protective clothing. Refer to Warnings and safety measures for lead-acid batteries .**

- CAUTION:**
- Always ensure the vehicle electrical system is protected by disconnecting the battery negative (-) terminal (interrupted current flow to ground) prior to servicing key areas of the electrical system as specified in this article.
 - Do not loosen or remove ground strap from body. Disconnect terminal from battery only.
 - Disconnecting the battery positive (B+) terminal must only be performed as required to remove battery from vehicle, and must only be carried out after the negative (-) terminal is disconnected.
 - When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article.

Special tools, testers and auxiliary items needed

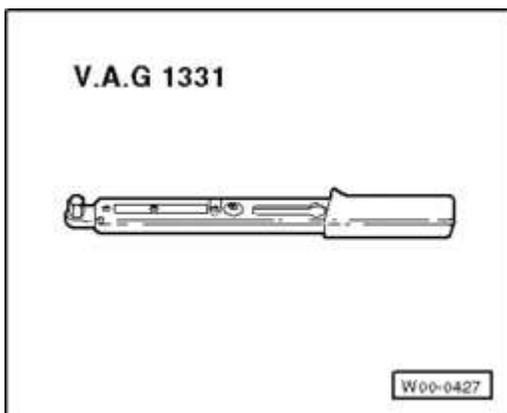


Fig. 67: Torque Wrench V.A.G 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)

Battery, disconnecting

- CAUTION:**
- Obtain anti-theft radio security code.
 - Switch off all electrical consumers.
 - Switch ignition off and remove ignition key.
 - Do not loosen or remove ground strap from body. Disconnect terminal from battery only.

4-cylinder engine

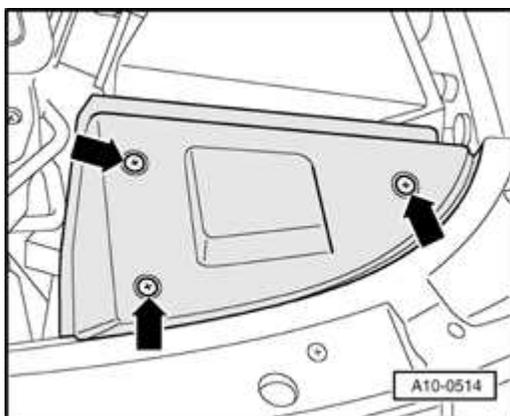


Fig. 68: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners -arrows-.
- Remove battery cover.

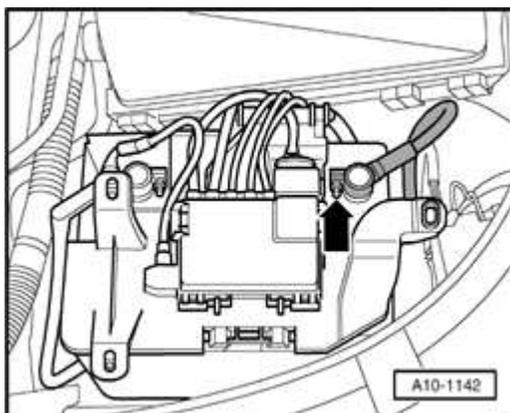


Fig. 69: Battery Ground Strap
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect negative (-) terminal -arrow- from battery.

6-cylinder engine

- Fold luggage compartment floor panel forward.

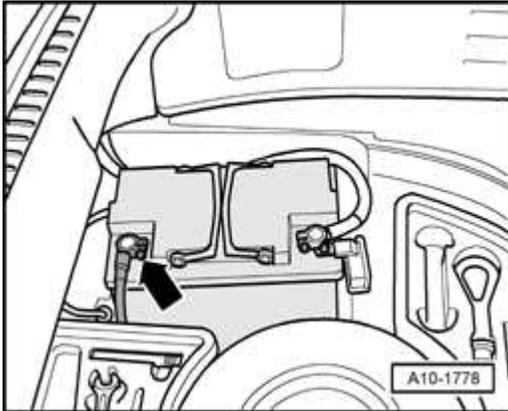


Fig. 70: Disconnecting Battery Ground (GND) Strap
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect negative (-) terminal -arrow- from battery.

Battery, reconnecting (all)

NOTE:

- In order to prevent damage to the battery housing, battery terminals must be placed on battery posts without using force (by hand only).
- Battery posts and terminals must no longer be greased.

- Reconnect negative (-) terminal -arrow- on battery.
- Torque negative (-) terminal clamp fastener to 6 Nm.
- Perform work steps specified in table. Refer to **Battery, disconnecting and reconnecting** .

Work steps required after reconnecting battery

Work steps	completed?
Diagnostic Trouble Code (DTC) Memory: Check using VAS 5051/5052 in mode "Guided Fault Finding".	
Power windows (where applicable): Completely open and close all power windows.	

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Radio: Input anti-theft radio code and check radio, CD & tape player functions as applicable.	
Clock: Check and reset to local time.	
All electrical consumers: Check function.	

NOTE: If desired, print this section and use the table above as a checklist.

Battery, removing and installing

- WARNING:**
- Observe Warning and safety measures for lead acid batteries. Refer to Warnings and safety measures for lead-acid batteries .
 - Always wear suitable protective clothing. Refer to Warnings and safety measures for lead-acid batteries .

Special tools, testers and auxiliary items needed



Fig. 71: Torque Wrench V.A.G 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)

Removing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article.

4-cylinder engine

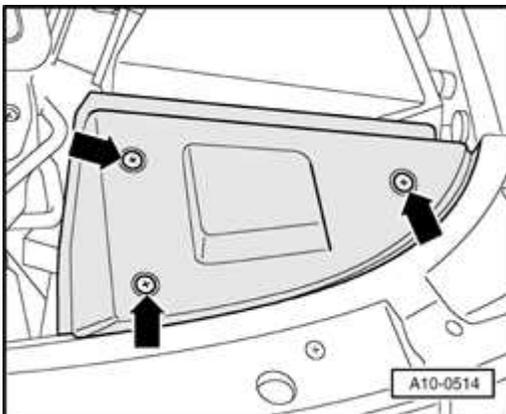


Fig. 72: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners -arrows-.
- Remove battery cover.

Fuse panel version I

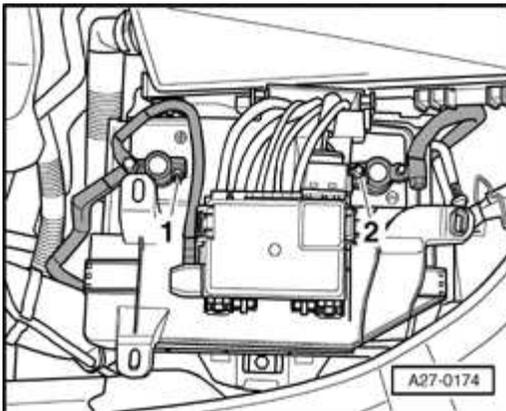


Fig. 73: Fuse Panel Version I

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- First disconnect negative (-) terminal -2- from battery.
- Then disconnect positive (B+) terminal -1-.

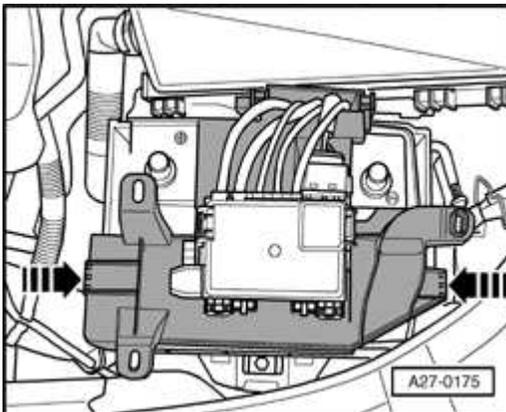


Fig. 74: Depressing Fuse Panel Retainers

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Depress fuse panel retainers -arrows- and fold fuse panel to rear.

Fuse panel version II

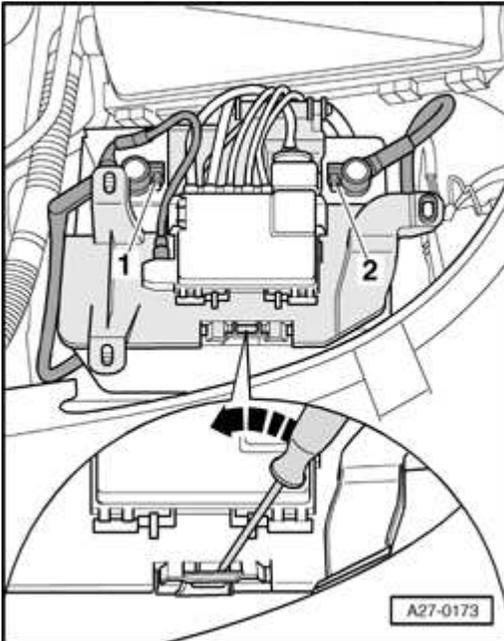


Fig. 75: Fuse Panel Version II

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- First disconnect negative (-) terminal -2- from battery.
- Then disconnect positive (B+) terminal -1-.
- Depress fuse panel retainer using screwdriver -arrows- and fold fuse panel to rear.

6-cylinder engine

- Fold luggage compartment floor panel forward.

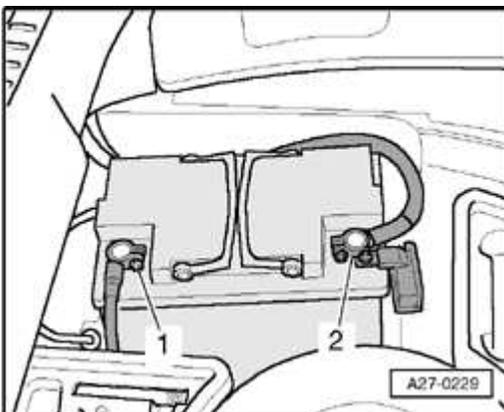


Fig. 76: Battery Terminals

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- First disconnect negative (-) terminal -1- from battery.
- Then disconnect positive (B+) terminal -2-.
- Remove central gas vent hose.

Continued for all

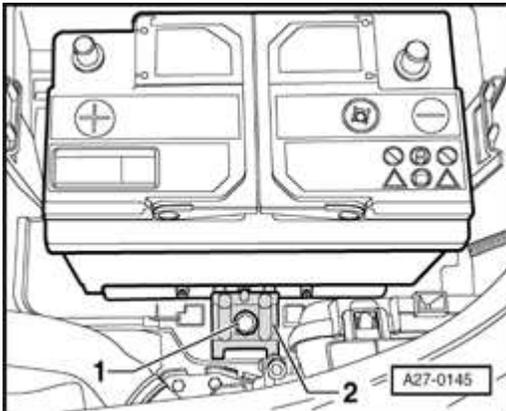


Fig. 77: Battery Hold-Down Bracket And Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove battery hold-down bracket bolt -1-
- Remove battery hold-down bracket -2-.
- Carefully lift battery from carrier.

Installing

- Carefully lift battery onto carrier.

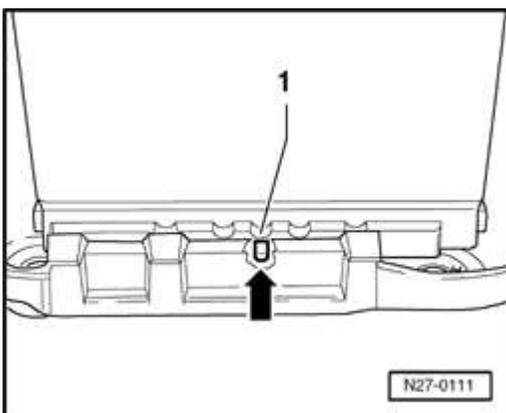
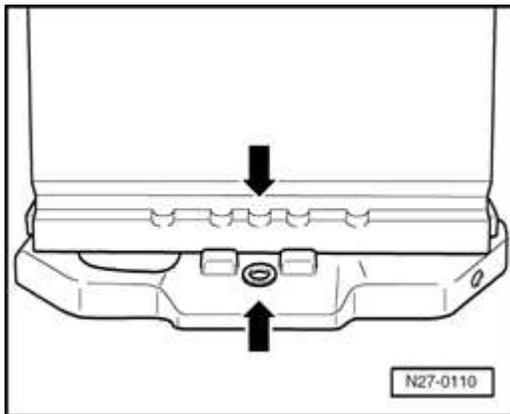


Fig. 78: Battery Foot Strip Cut-Out

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Install battery so battery carrier lug -arrow- engages in battery foot strip cut-out -1-.

It must not be possible to move battery to the left or right.

**Fig. 79: Aligning Center Groove In Battery Foot Strip With Threaded Hole in Battery Carrier**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Battery is inserted correctly when center cut-out in battery foot strip aligns with threaded hole in battery carrier -arrows-.

- Fit battery hold-down bracket.
- Install battery hold-down bracket bolt and torque to 20 Nm.

CAUTION: Results of inadequately secured battery:

- Shorter battery service life due to vibration damage.
- Battery cell and plate damage.
- Electrolyte leakage due to battery case damage.
- Poor collision safety.

Remaining installation is in reverse order of removal, noting the following:

- Observe WARNINGS! regarding central gas venting. Refer to **Battery with central gas venting** .

NOTE:

- **Battery for 4-cylinder engine illustrated here.**
- **Reconnecting sequence must be strictly adhered to.**

CAUTION: Ensure all electrical consumers are switched off and ignition key is removed.

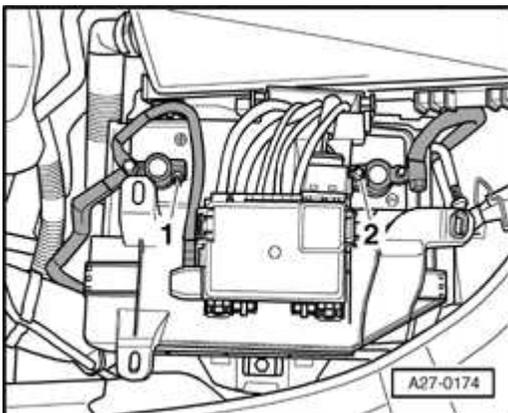


Fig. 80: Fuse Panel Version I

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- First reconnect positive (B+) terminal -1- at battery.
- Then reconnect negative (-) terminal -2-.

Battery terminal tightening torque: 6 Nm.

- Perform work steps specified in table. Refer to **Battery, disconnecting and reconnecting** .

Battery with central gas venting

Function

New generation batteries are equipped with a central gas venting system and integrated flame trap. Function: Gases produced during charging escape through a central opening on the side of the upper cover. The integrated flame trap prevents flammable gases in the battery from igniting. The flame trap is comprised of a small

round fiberglass mat with a diameter of 15 mm and a thickness of 2 mm. Working as a one-way-valve, it allows gases produced during charging to vent.

There are two different types of batteries with central gas venting:

- Batteries WITH external vent connection and hose for central gas venting.
- Batteries WITHOUT vent connection and hose for central gas venting.

WARNING:

- Only install batteries of the latest type with central gas venting.
- Where equipped, ensure vent hose and hose connection are always secured to the battery housing during servicing.
- Vent hose must not be kinked or pinched.
- Always use genuine battery cell caps. Plugs must be installed with an O-ring seal.

Battery with charge indicator (magic eye), checking

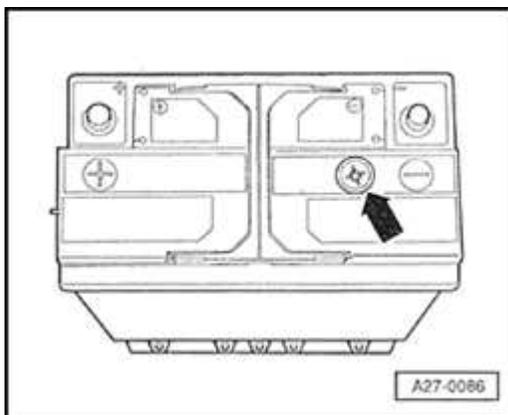


Fig. 81: Locating Magic Eye

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Charge indicator -arrow- displays electrolyte level and charge condition.

NOTE:

- As the charge indicator is located in a single cell, the indication is only valid for that cell. An exact assessment of battery condition should always be

confirmed by performing a load test

- **If the charge indicator on batteries in excess of 5 years old are colorless, DO NOT attempt to top and/or recharge battery. Battery must be replaced.**
- **Air bubbles that occur normally during battery charging (even during vehicle operation) may adversely affect charge indicator reading. To obtain an accurate reading, gently tap the charge indicator with a screwdriver handle or rock the vehicle in order to displace any possible air bubbles that have formed.**
- **Where equipped, battery cell caps may be covered with plastic foil**

Charge indicator readings

- Green = sufficient charge (and electrolyte level) OK
- Black = no charge or insufficient charge. Refer to **Battery, charging** .
- Colorless or yellow = critically low electrolyte level. Top up with distilled water immediately. Refer to **Electrolyte level - battery with cell caps, checking** .

Visual check

Always perform a visual check of the battery before checking no load voltage, electrolyte specific gravity and load test.

Check for:

- Cracked battery case and resulting corrosion damage to surrounding area.
- Loose, damaged or corroded battery posts and terminals.

WARNING:

- **Ensure that all battery post/terminal connections are securely installed and tightened according to the torque value specified in this article.**
- **Intermittent contact at battery terminals may**

spark or cause electrical system malfunctions.

- **Ensure original or approved battery cell caps and /or covers are securely installed. Battery cell caps must be equipped with an O-ring.**

No-load voltage, checking

WARNING:

- **Battery cell caps must be screwed in tightly when charging, measuring voltage or performing load tests.**
- **The following notes and procedures must be followed to ensure correct measurements.**

Special tools, testers and auxiliary items needed

- Multimeter, Fluke 83 (or equivalent).

Prerequisites

- If the no-load voltage measurement is carried out with the battery installed in the vehicle, the battery negative (-) terminal **MUST** be disconnected.
- Vehicle must not be started or driven (with battery to be tested) for at least 2 hours before taking measurements.
- During this time, no load or additional charge is to be applied to battery.

No load voltage, checking

- Disconnect battery. Refer to **Battery, disconnecting and reconnecting** .
- Measure voltage between battery posts.
- No load voltage 12.5 volts or above: battery OK

If no load voltage is OK

- Reconnect battery and perform work steps as specified. Refer to **Battery, disconnecting and reconnecting** .

If no load voltage is below 12.5 volts

- Recharge battery immediately. Refer to **Battery, charging** .
- After charging, test voltage between battery posts again.
- No-load voltage must not be below 12.5 volts

If no load voltage is below 12.5 volts

- Replace battery. Refer to **Battery, removing and installing** .

Electrolyte level - battery with charge indicator (magic eye), checking

NOTE:

- Audi TT equipped with the 3.2L V6 engine are equipped with an Absorbed Glass Mat (AGM) battery located in the left rear luggage compartment in the spare tire/wheel well.
- Unlike conventional lead-acid batteries, AGM batteries are completely sealed and use a fiberglass mat construction which completely absorbs the electrolyte. As a result, no excess electrolyte is present, and it is not possible to check the electrolyte level or otherwise service the electrolyte.
- If it is determined that an AGM battery is malfunctioning, replacement is necessary.
- The following procedures apply only to batteries with removable cell caps.

WARNING: DO NOT attempt to open an AGM battery!

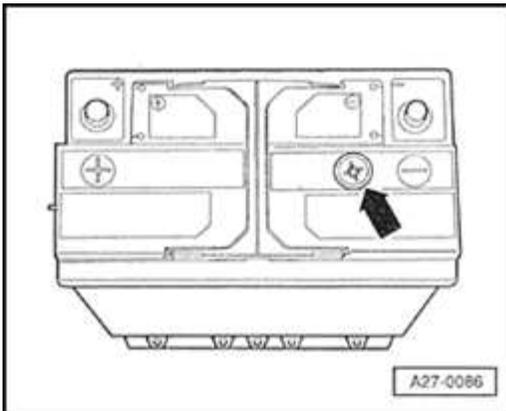


Fig. 82: Locating Magic Eye

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Charge indicator -arrow- displays electrolyte level and charge condition.

NOTE:

- As the charge indicator is located in a single cell, the electrolyte indication is only valid for that cell.
- If the charge indicator on batteries in excess of 5 years old are colorless, DO NOT attempt to top up electrolyte level. Battery must be replaced.
- Air bubbles that occur normally during battery charging (even during vehicle operation) may adversely affect charge indicator reading. To obtain an accurate reading, gently tap the charge indicator with a screwdriver handle or rock the vehicle in order to displace any possible air bubbles that have formed.

Charge indicator readings

- Green = sufficient charge (and electrolyte level) OK
- Black = no charge or insufficient charge. Refer to **Battery, charging** .
- Colorless or yellow = critically low electrolyte level. Top up with distilled water immediately. Refer to **Electrolyte level - battery with cell caps, checking** .

- WARNING:**
- **Observe Warning and safety measures for lead acid batteries. Refer to Warnings and safety measures for lead-acid batteries .**
 - **Always wear suitable protective clothing. Refer to Warnings and safety measures for lead-acid batteries .**

- NOTE:**
- **Audi TT equipped with the 3.2L V6 engine are equipped with an Absorbed Glass Mat (AGM) battery located in the left rear luggage compartment in the spare tire/wheel well.**
 - **Unlike conventional lead-acid batteries, AGM batteries are completely sealed and use a fiberglass mat construction which completely absorbs the electrolyte. As a result, no excess electrolyte is present, and it is not possible to check the electrolyte level or otherwise service the electrolyte.**
 - **If it is determined that an AGM battery is malfunctioning, replacement is necessary.**
 - **The following procedures apply only to batteries with removable cell caps.**

WARNING: DO NOT attempt to open an AGM battery!

Special tools, testers and auxiliary items

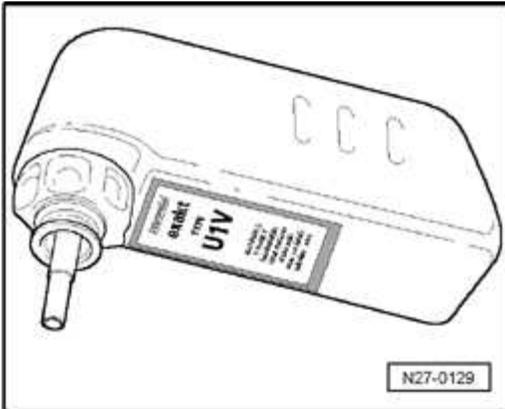


Fig. 83: VAS 5045 Battery Filling Bottle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Battery filler bottle VAG 5045 (or equivalent)

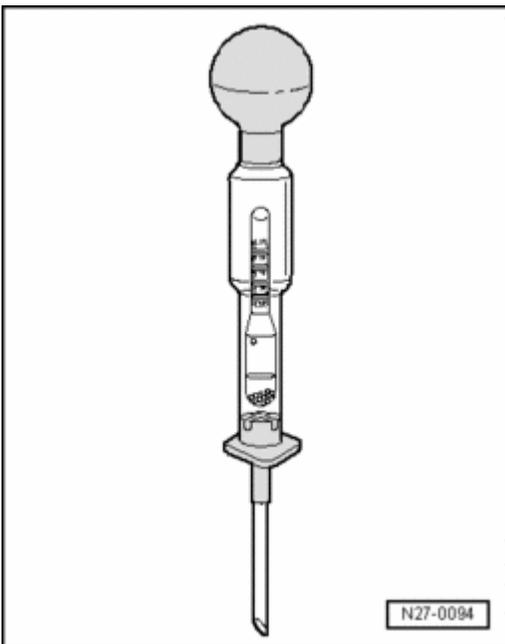


Fig. 84: Identifying Commercially Available Hydrometer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Commercially available hydrometer

CAUTION:

- **Dispose of electrolyte (sulfuric acid/water mixture) properly! Waste electrolyte must only be disposed of in appropriate waste disposal sites.**

Refer to local regulations pertaining to electrolyte disposal.

- **To ensure effective sealing of the various battery cover systems, it is important to use the correct type of battery cell caps. If caps are lost or damaged, always install new caps of the same type as originally installed.**
- **Each cell cap must be installed with an O-ring seal.**

NOTE:

- **The correct battery electrolyte level is an important factor in ensuring the long life of the battery.**
- **If the battery has visible "Min." and "Max." markings, the electrolyte level can be checked by a simple visual inspection from the outside.**
- **The electrolyte level must be above the "Min" marking and must only reach up to the "Max." marking.**
- **If the external "Min." and "Max." markings are not clearly visible, or if the electrolyte level is not visible through the battery housing, unscrew the cell caps to check the electrolyte level. The level will then be visible inside the battery.**
- **The electrolyte must be level with the plastic indicator web inside the battery. This corresponds to the "Max." marking on the outside.**

Electrolyte level too low

NOTE:

If the electrolyte level is too low, the cell plates will dry out and the battery will lose power. The cell plates must be fully covered by the electrolyte (sulfuric acid) in order to prevent corrosion of the plates, plate bridges and cell connectors. Corrosion of these parts will make the battery unreliable and ultimately unusable.

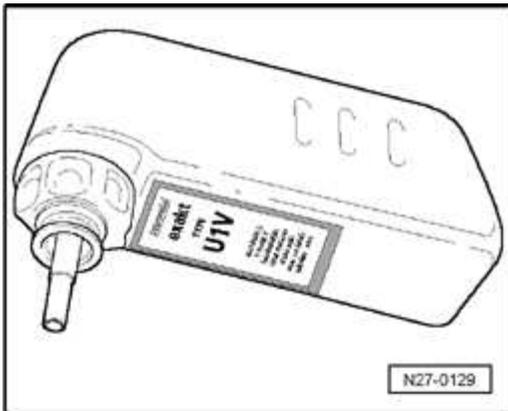


Fig. 85: VAS 5045 Battery Filling Bottle

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- If the electrolyte level is too low, top up with distilled water using battery filler bottle VAS 5045 until the "Max." marking is reached.

NOTE:

- The neck of filler bottle VAS 5045 is designed to prevent overfilling of the battery cells, which would cause the electrolyte to overflow. When the "Max." level is reached, the flow of distilled water into the battery cell is cut off.
 - Use distilled water only, this prevents electrolyte impurities, which result in increased self-discharge.
- Screw cell caps into battery cells. Refer to Battery with central gas venting , Batteries with central gas venting.

Electrolyte level too high

- NOTE:** If the electrolyte level is too high, the leaking electrolyte (sulfuric acid/water mixture) will cause damage outside the battery, i.e. to components in engine compartment.

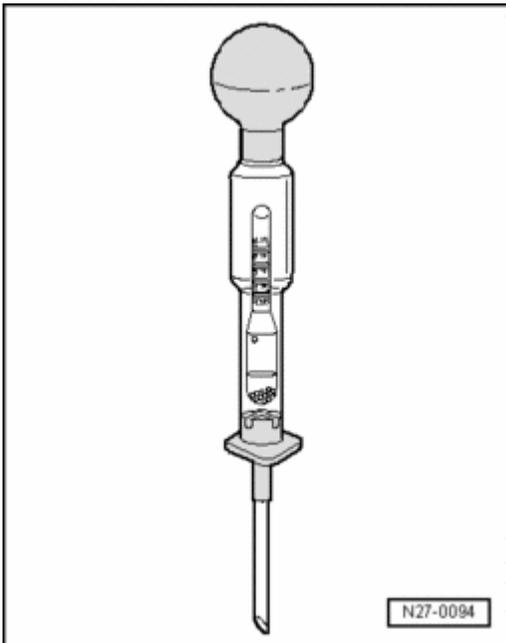


Fig. 86: Identifying Commercially Available Hydrometer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

If the electrolyte level is too high (i.e. above the plastic indicator web inside the battery or above the "Max." marking on the outside), the excess fluid must be extracted. This is done using a commercially available hydrometer.

- Extract electrolyte using the hydrometer until the remaining fluid is level with the plastic indicator web or the "Max." marking.
- Screw cell caps into battery cells. Refer to **Battery with central gas venting** , Batteries with central gas venting.

Specific gravity, checking

WARNING:

- **Observe Warning and safety measures for lead acid batteries. Refer to Warnings and safety measures for lead-acid batteries .**
- **Always wear suitable protective clothing. Refer to Warnings and safety measures for lead-acid batteries .**

NOTE:

- Audi TT equipped with the 3.2L V6 engine are equipped

with an Absorbed Glass Mat (AGM) battery located in the left rear luggage compartment in the spare tire/wheel well.

- Unlike conventional lead-acid batteries, AGM batteries are completely sealed and use a fiberglass mat construction which completely absorbs the electrolyte. As a result, no excess electrolyte is present, and it is not possible to check the electrolyte level or otherwise service the electrolyte.
- If it is determined that an AGM battery is malfunctioning, replacement is necessary.
- The following procedures apply only to batteries with removable cell caps.

WARNING: DO NOT attempt to open an AGM battery!

Special tools, testers and auxiliary items needed

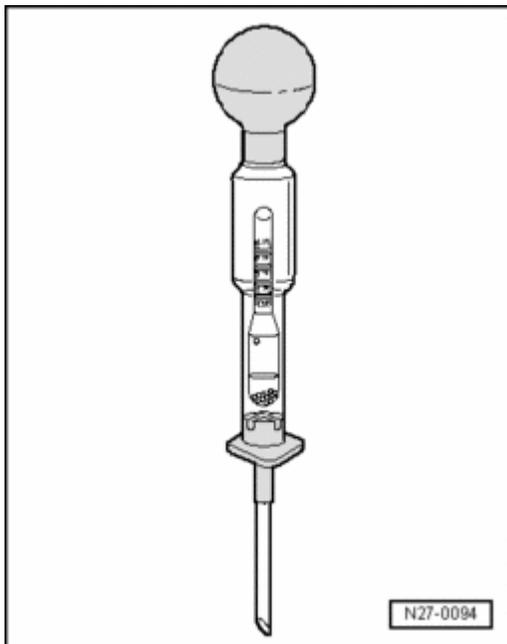


Fig. 87: Identifying Commercially Available Hydrometer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Commercially available hydrometer
- Cleaning cloths

NOTE:

- In conjunction with the "voltage under load" test, the specific gravity test gives a good indication of the battery condition.
- The temperature of the electrolyte in the battery must be at least 10 °C.
- The specific gravity can be checked immediately after charging battery.

CAUTION:

- Dispose of electrolyte (sulfuric acid/water mixture) properly! Waste electrolyte must only be disposed of in appropriate waste disposal sites. Refer to local regulations pertaining to electrolyte disposal.
- To ensure effective sealing of the various battery cover systems, it is important to use the correct type of battery cell caps. If caps are lost or damaged, always install new caps of the same type as originally installed.
- Each cell cap must be installed with an O-ring seal.

The specific gravity must be checked in all battery cells as follows:

CAUTION: Before beginning repairs on the electrical system

- Switch off all electrical consumers.
- Switch off ignition and remove ignition key.
- Remove all battery plugs (battery cell caps).

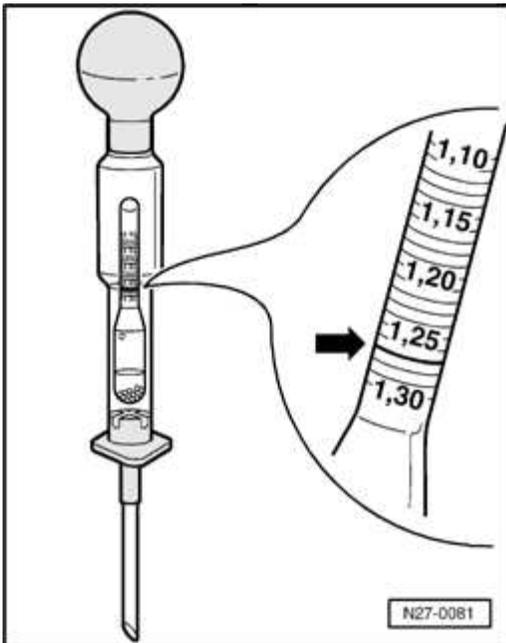


Fig. 88: Hydrometer Specific Gravity Reading
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Immerse end of hydrometer in a cell and extract sufficient electrolyte so that float swims free in the electrolyte.
- The greater the specific density of the extracted electrolyte, the higher the float rises
- The density in kg/dm³ can be read off the scale of the hydrometer (specific density of electrolyte)
- Read off measured value on hydrometer and compare with table:

Charge condition in normal climates	Specific gravity in kg/dm³
Discharged	1.12
Half charged	1.20
Well charged	1.28
Charge condition in tropical climates	Specific gravity in kg/dm³
Discharged	1.08
Half charged	1.16

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ELECTRICAL Electrical Equipment

Well charged

1.23

In countries with normal climates the specific gravity must be at least 1.24 kg/dm³.

- If the specific gravity is too low, charge the battery.
- After charging the battery, repeat the specific gravity test.

NOTE: The specific gravity readings for the individual battery cells must not differ by more than 0.03 kg/dm³.

Examples of non-acceptable differences between specific gravity levels

Battery cell:	1	2	3	4	5	6
	Specific gravity per cell in kg/dm ³					
Example 1:	1.24	1.25	1.25	1.10	1.24	1.25
Example 2:	1.26	1.26	1.25	1.14	1.18	1.24

Example 1:

- The specific gravity in cell 4 is too low.

Example 2:

- The specific gravity in cells 4 and 5 is too low. The specific gravity readings for the individual battery cells differ by more than 0.03 kg/dm³.
- If the specifications are not obtained, replace battery.
- If the specifications are obtained, screw plugs in again.

Always use the original cell caps and check they are fully screwed in to make sure that the battery is properly sealed.

Use genuine cell caps of the same type if the original plugs are lost or damaged.

Each sealing plug must be installed with an O-ring.

Battery, testing

WARNING:

- **Observe Warning and safety measures for lead acid batteries. Refer to Warnings and safety measures for lead-acid batteries .**
- **Dispose of electrolyte (sulfuric acid/water mixture) properly! Waste electrolyte must only be disposed of in appropriate waste disposal sites. Refer to local regulations pertaining to electrolyte disposal.**
- **DO NOT load test batteries which are gassing. Otherwise there is a risk of explosion.**
- **The following notes and procedures must be followed to ensure correct measurements.**

NOTE:

- **In order to better determine a battery's overall condition, it is recommended to always perform the test in conjunction with the electrolyte specific gravity test. Refer to Specific gravity, checking .**
- **Always follow the battery tester operating instructions.**
- **It is not necessary to remove battery from vehicle or disconnect battery terminals.**

Special tools and auxiliary items needed

- Battery Test Kit Midtronics MCR 340V

CAUTION: Before beginning repairs on the electrical system

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Connect tester cable clamps to battery terminal. Refer to MCR 340V Instruction Manual.**

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- Clamps must have a good contact with battery posts/terminals.
- Select test mode "IN-VEHICLE" or "OUT-OF-VEHICLE". Refer to MCR 340V Instruction Manual.
- Select battery type (AGR. or conventional). Refer to MCR 340V Instruction Manual.
- Select test type "Warranty Test". Refer to MCR 340V Instruction Manual.
- Perform battery load test by setting load current on tester according to battery (DIN) capacity. Refer to MCR 340V Instruction Manual.

NOTE: Use print function of MCR 340V where test results are required for warranty claims.

Load test results

Battery tester display / print-out	Required action
Good Battery	none
Good - Recharge	Charge battery where necessary1) Refer to <u>Battery, charging</u>
Use inCHARGE	Charge battery1) Refer to <u>Battery, charging</u>
Replace Battery	Replace battery Refer to <u>Battery, removing and installing</u>
Bad Cell - Replace	Replace battery Refer to <u>Battery, removing and installing</u>

1) Repeat battery load test after recharging battery.

A battery is in good condition if the voltage measured by the tester during the test drops gradually and does not fall below a specified value. The rate of decrease varies and depends on the battery capacity and cold cranking amp rating ("cold cranking amps" is the rated ability of the battery to perform at low temperatures and with high loads i.e.: high compression engines).

A battery is either faulty or in a low state of charge if the voltage measured during the test drops quickly and falls below the specified voltage.

After performing the load test, a faulty battery will remain below the specified voltage and may only recover very slowly over a long period of time. The no load voltage (Refer to **No-load voltage, checking**) is never reached.

Such batteries no longer have sufficient reserve and load capacity and must be replaced.

Battery, charging

WARNING: Danger of explosion!

- **Batteries produce explosive gasses while being charged.**
- **Keep open flames and sparks away and DO NOT smoke near batteries.**
- **The battery charger MUST be turned off when connecting or disconnecting the cables at the battery.**
- **Battery cell caps must NOT be removed while charging.**
- **"Boosting" a sulfated battery a high charging rate can cause an explosion.**
- **Ensure that battery is charged in a well ventilated area.**
- **Precision tools must not be kept in the same room where batteries are being charged. Tools may corrode due to chemical reaction.**

Special tools and auxiliary items needed

- **Battery Charging Station: Midtronics INC-940**

- CAUTION:**
- Audi TT equipped with the 3.2L V6 engine are equipped with an Absorbed Glass Mat (AGM) battery that must not be charged with a conventional battery charger. Only use Battery Charging Station INC 940!
 - Voltage and current limits associated with conventional chargers may cause overheating and subsequent damage to AGM battery.

Battery charger, connecting

- NOTE:**
- Before charging, battery must have a minimum temperature of 10 °C (50 °F)
 - It is not necessary to remove battery from vehicle or disconnect battery terminals.
 - Charging voltage must not exceed 14.4V.
 - Always follow the battery charger operating instructions
 - After charging, confirm battery no load voltage and electrolyte specific gravity (where applicable) before reuse in vehicle.

CAUTION: Before beginning repairs on the electrical system

- Switch off all electrical consumers.
 - Switch ignition off and remove ignition key.
- Connect battery charger to battery, positive to positive (+), negative to negative (-).

Vehicles with conventional lead acid battery:

- Adjust charging rate according to battery capacity. Refer to Midtronics INC-940 Instruction Manual.

WARNING: If battery begins gassing (boiling) violently when charging, REDUCE charging rate immediately.

Vehicles with AGM battery:

- Select AGM setting and adjust charging rate according to battery capacity. Refer to Midtronics INC-940 Instruction Manual.

Charging totally discharged batteries

Batteries that have not been used for long periods of time begin to self discharge (e.g. vehicles in storage). Under these conditions, the battery begins to sulfate and the surface area of the battery plates hardens. A battery is considered to be totally discharged if the no load voltage is below 11.6 volts. No load voltage, checking. Refer to **No-load voltage, checking** .

On totally discharged batteries, the electrolyte (sulfuric acid/water mixture) is almost all water. When these batteries are exposed to freezing temperatures, permanent damage to the battery plates (and housing) results.

If a totally discharged battery is charged quickly ("quick charged" or "boost charged"), only a surface charge is accepted (if at all). The battery may even test OK immediately after charging. However, in this case the sulfating process continues inside the battery. Once a battery begins to sulfate, it's ability to further accept a routine charge (from the Generator) and provide adequate load and reserve performance will diminish until the battery malfunctions.

Totally discharged batteries must only be slow charged and re-tested.

- Apply a maximum charge current that is no more than 10% of battery capacity, e.g.: for a 60Ah battery, max. charge current = 6 amps.
- Charge a totally discharged battery for a minimum of 24 hours.

CAUTION: Never "quick charge" a totally discharged battery. Effective charging will not take place, despite what appears to be a sufficient voltage applied. Batteries loaded in this manner may be incorrectly evaluated

as OK and battery damage may result.

Quick charging/boost starting

WARNING:

- Audi TT equipped with the 3.2L V6 engine are equipped with an Absorbed Glass Mat (AGM) battery that must not be quick charged under any circumstances
- Observe Warning and safety measures for lead acid batteries. Refer to Warnings and safety measures for lead-acid batteries .
- Always wear suitable protective clothing. Refer to Warnings and safety measures for lead-acid batteries .
- Conventional batteries should only be quick charged when absolutely necessary (to aid in starting), and the charge current must not exceed 20% of battery capacity (refer to charger instructions).
- Battery must not be connected to vehicle electrical system when quick charging. Disconnect negative (-) and positive (B+) battery terminals. Refer to Battery, disconnecting and reconnecting .

WARNING:

- The battery cell caps must always be firmly screwed on for charging, voltage measurement and load measurement.
- Ensure good ventilation.
- Avoid naked flames and never smoke in rooms used for charging batteries as the battery forms gas which is readily flammable during the charging process.

- **Observe safety regulations of charger and battery manufacturers.**
- **Never "quick charge" a totally discharged battery. Effective charging will not take place.**

GENERATOR (GEN)

Generator (GEN) - 4-cylinder 132kW (180 bhp) engine, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**
- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .**

Special tools, testers and auxiliary items needed



Fig. 89: Torque Wrench V.A.G 1331

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)

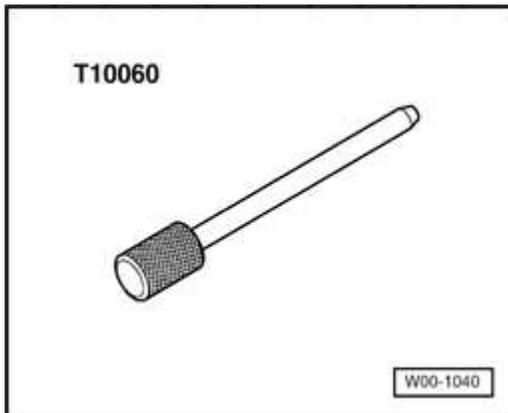


Fig. 90: Special Tool - T10060

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- T10060 Mandrel

Removing

- Disconnect battery. Refer to **Battery, disconnecting and reconnecting** .

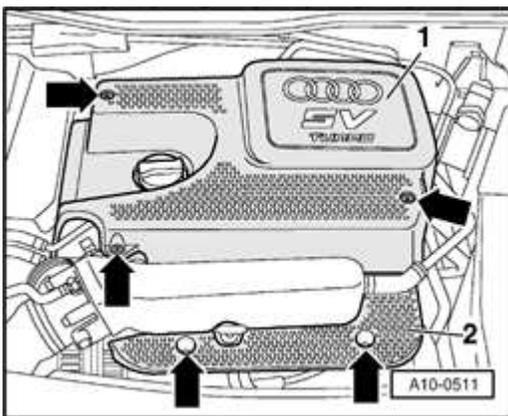


Fig. 91: Removing Engine Cover Panel

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove engine cover -1- and cover in front of intake manifold -2- -arrows-.

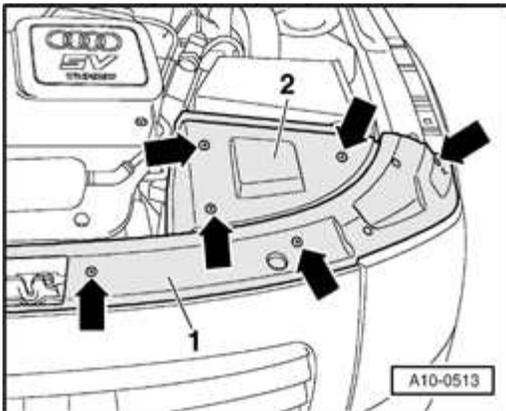


Fig. 92: Lock Carrier And Battery Covers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners -arrows- and remove left lock carrier cover -1-

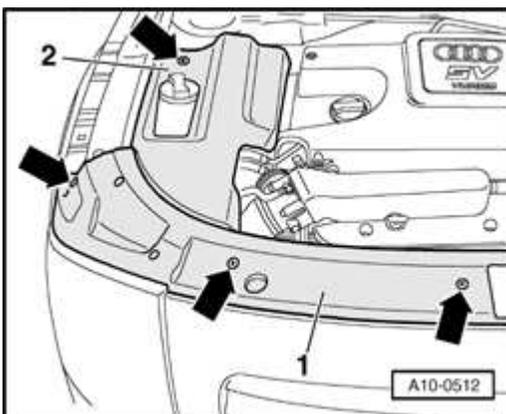


Fig. 93: Locating Fasteners, Right Lock Carrier Cover And Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners -arrows- and remove right lock carrier cover -1- and expansion tank cover -2-.

CAUTION: Before removing ribbed belt, mark direction of rotation. Belt damage will result if not reinstalled in proper direction.

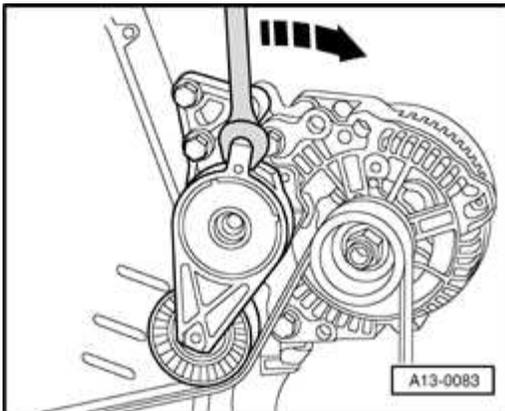


Fig. 94: Relieving Tension On Poly V-Belt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen ribbed belt by turning tensioner in direction of -arrow-.

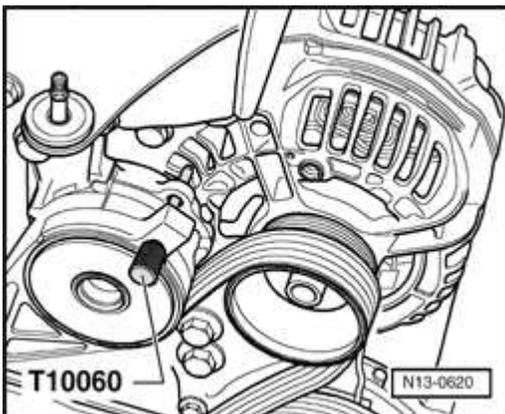


Fig. 95: Blocking Tensioner With Mandrel T10060
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Block tensioner with T10060.
- Remove ribbed belt.

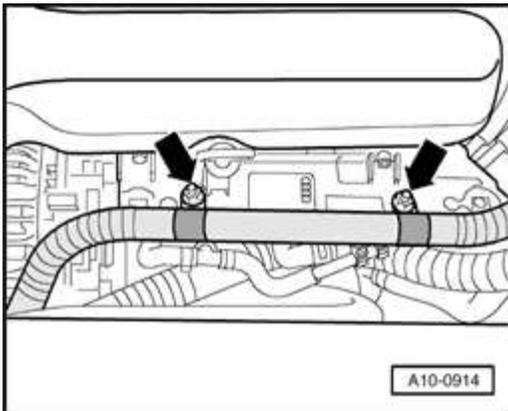


Fig. 96: Secondary Air System Pipe Brackets At Engine
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove secondary air system pipe from brackets at engine -arrows-.

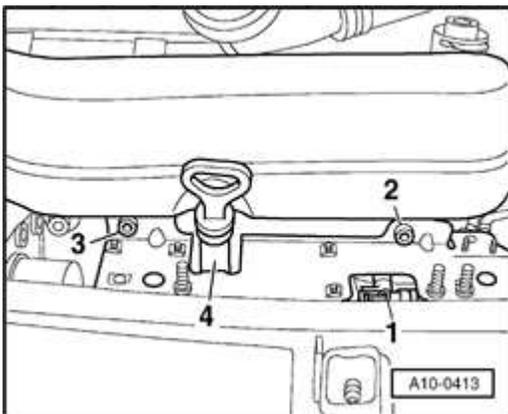


Fig. 97: Identifying Electrical Change-Over Valve Connector, Intake Manifold Brackets & Dipstick Tube
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -2- and -3-.
- Pull off holder from guide tube for dipstick -4-.
- On underside of holder, disconnect electrical connections -1-
- Disconnect vacuum hose to solenoid valves at intake manifold.
- Set aside holder with connected hoses.
- Pull air hoses off of secondary air pump.

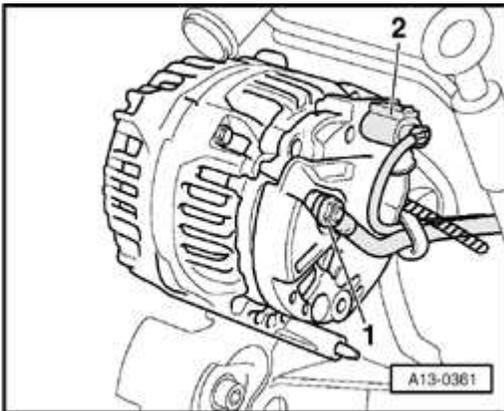


Fig. 98: Generator Electrical Connector And Terminal B+
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector -2-.
- Remove nut from generator terminal B+ and remove connector eyelet from terminal.
- Remove harness retainer at generator.

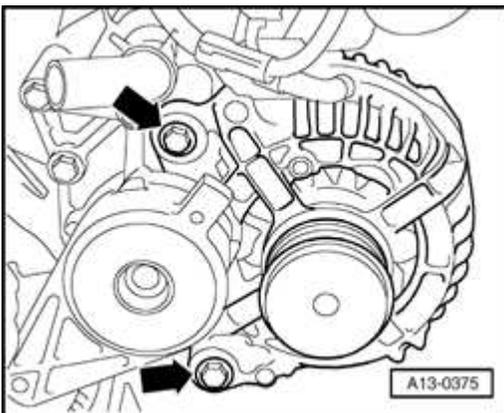


Fig. 99: Generator Mounting Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -arrows-.
- Lift generator from bracket and up to left of engine compartment.

Installing

Install in reverse order of removal, noting the following:

- Press sleeves into generator mounting to aid in installation.

- CAUTION:**
- Before installing the ribbed belt, make sure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.
 - When installing belt, ensure correct seating in the belt pulleys!

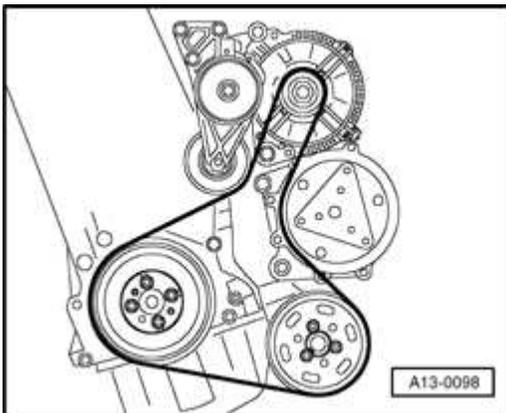


Fig. 100: Identifying Belt Drive For Vehicles With Air Conditioning
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.
- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .
- Perform work steps specified in table. Refer to **Battery, disconnecting and reconnecting** .
- Start engine and check belt running.

Tightening torques

Component	Nm
Generator to bracket - bolt	23
Terminal B+ to generator - nut	16
Secondary air pipe bracket to manifold - bolt	10
Secondary air pipe to bracket - bolt	10

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .

Special tools, testers and auxiliary items needed**Fig. 101: Torque Wrench V.A.G 1331**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)

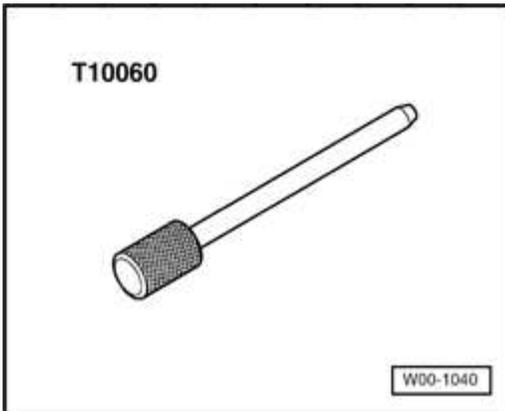


Fig. 102: Special Tool - T10060

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- T10060 Mandrel

Removing

- Disconnect battery. Refer to **Battery, disconnecting and reconnecting** .

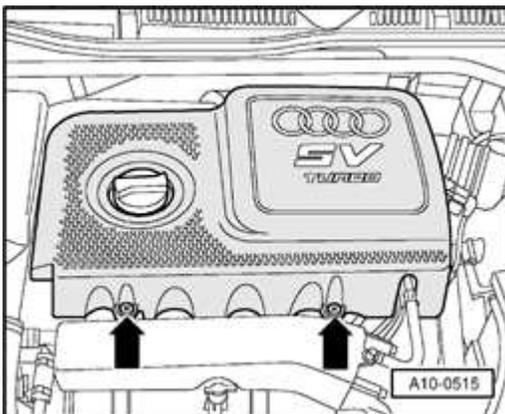


Fig. 103: Removing/Installing Engine Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners -arrows- and remove engine cover.

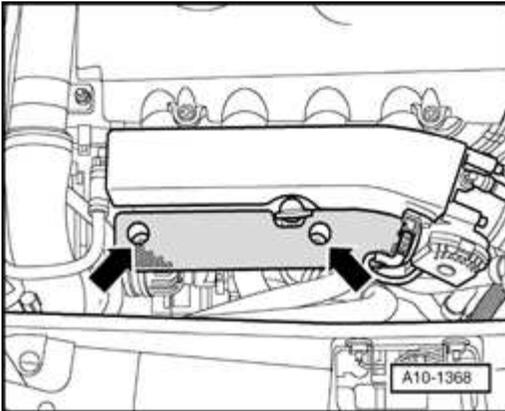


Fig. 104: Cover In Front Of Intake Manifold
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover in front of intake manifold -arrows-.

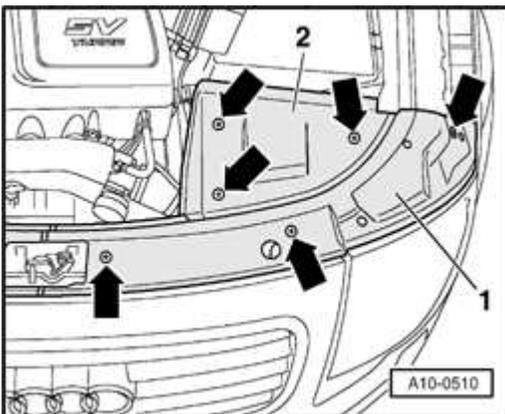


Fig. 105: Removing Left-Hand Cover Panels On Lock Carrier And Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners -arrows- and remove left lock carrier cover -1-.

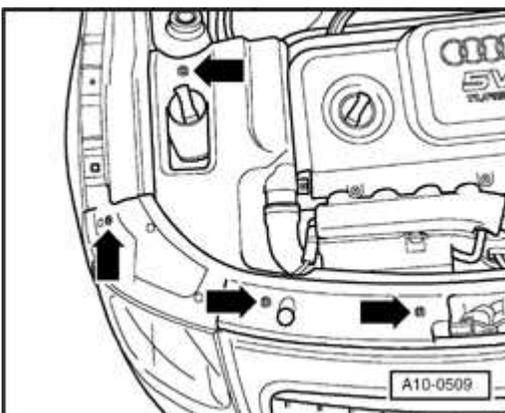
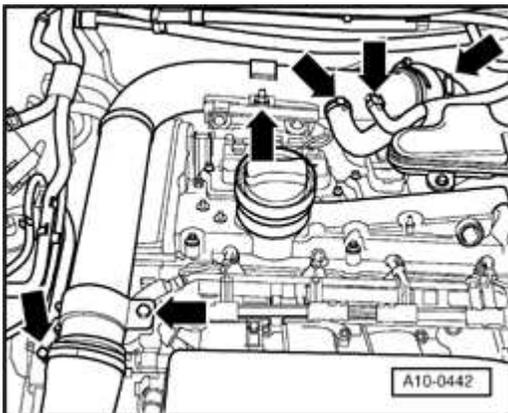


Fig. 106: Removing Covers At Lock Carrier And Above Coolant Expansion Tank

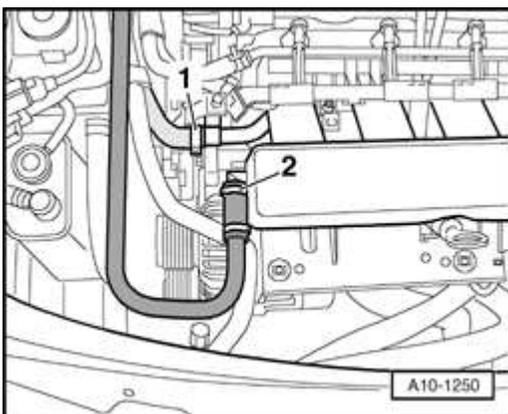
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fasteners -arrows- and remove right lock carrier cover -1- and expansion tank cover -2-.

**Fig. 107: Removing Intake Air Duct**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release hose clamps and fasteners -arrows- and remove air pipe.

**Fig. 108: Vacuum Pipe And Coolant Hose**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release hose clamps and remove vacuum pipe -2- from intake manifold.

NOTE: Disregard coolant hose -1-.

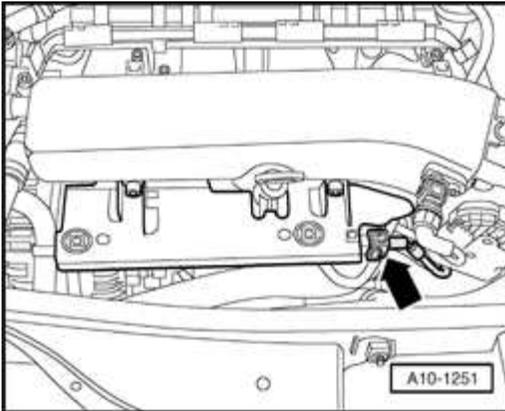


Fig. 109: Locating Electrical Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Where applicable, disconnect electrical connector -arrow-.

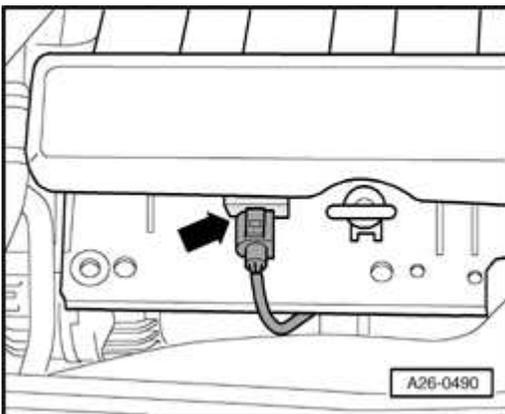


Fig. 110: Disconnecting Electric Harness Connector At Exhaust Gas Temperature (EGT) Sensor 1 -G235-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Where applicable, disconnect electrical connector -arrow-.

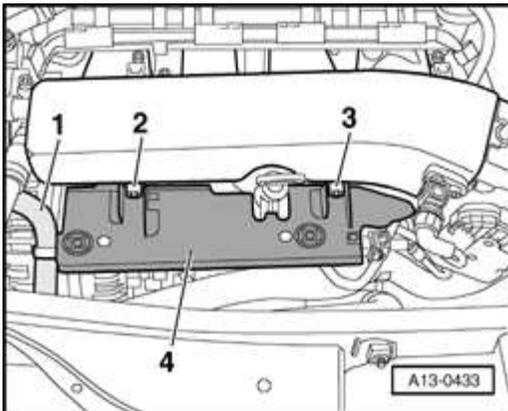


Fig. 111: Holder, Bolts And Coolant Hose
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -2- and -3-.
- Pull holder -4- off guide tube for dipstick.
- Disengage coolant hose -1- from holder.
- Set aside holder with hoses connected.

CAUTION: Before removing ribbed belt, mark direction of rotation. Belt damage will result if not reinstalled in proper direction.

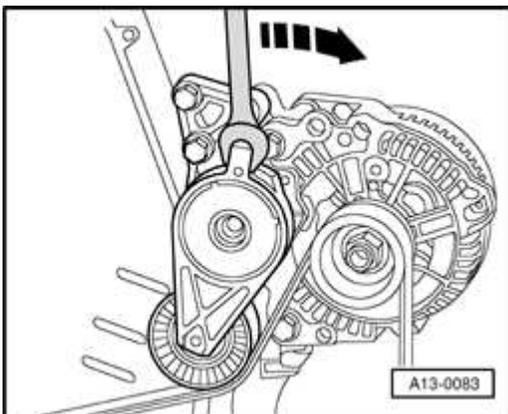


Fig. 112: Relieving Tension On Poly V-Belt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen ribbed belt by turning tensioner in direction of -arrow-.

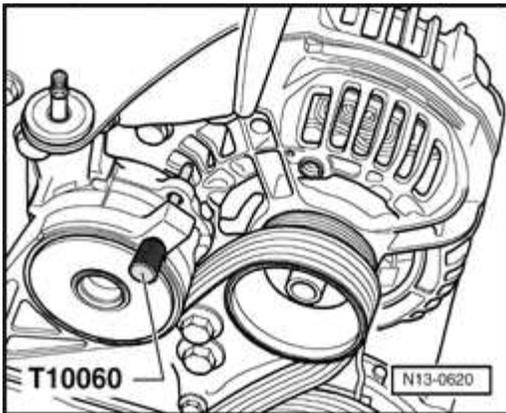


Fig. 113: Blocking Tensioner With Mandrel T10060
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Block tensioner with T10060.
- Remove ribbed belt.

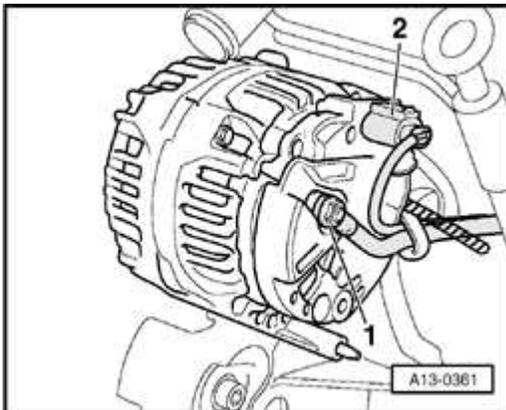


Fig. 114: Generator Electrical Connector And Terminal B+
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector -2-.
- Remove nut from generator terminal B+ and remove connector eyelet from terminal.
- Remove harness retainer at generator.

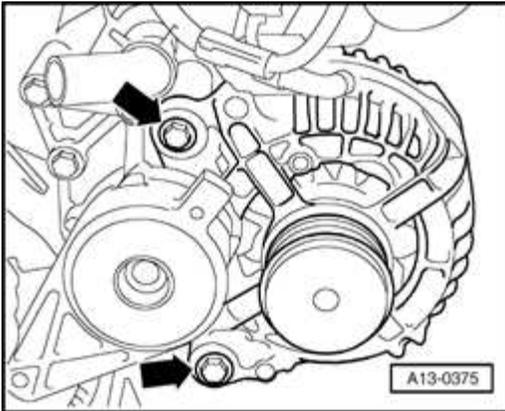


Fig. 115: Generator Mounting Bolts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -arrows-.
- Lift generator from bracket and up to left of engine compartment.

Installing

Install in reverse order of removal, noting the following:

- Press sleeves into generator mounting to aid in installation.

CAUTION:

- **Before installing the ribbed belt, make sure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.**
- **When installing belt, ensure correct seating in the belt pulleys!**

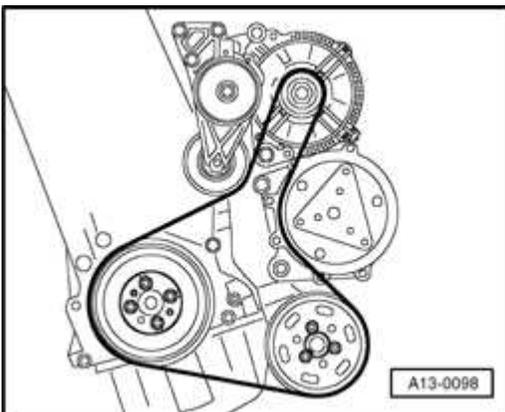


Fig. 116: Identifying Belt Drive For Vehicles With Air Conditioning
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.
- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .
- Perform work steps specified in table. Refer to **Battery, disconnecting and reconnecting** .
- Start engine and check belt running.

Tightening torques

Component	Nm
Generator to bracket - bolt	23
Terminal B+ to generator - nut	16
Secondary air pipe bracket to manifold - bolt	10
Secondary air pipe to bracket - bolt	10

Generator (GEN) - 6-cylinder 184kW (250 bhp) engine, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**
- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to **Battery, disconnecting and reconnecting** .**

Special tools, testers and auxiliary items needed



Fig. 117: Torque Wrench V.A.G 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)

Removing

- Disconnect battery. Refer to **Battery, disconnecting and reconnecting** .

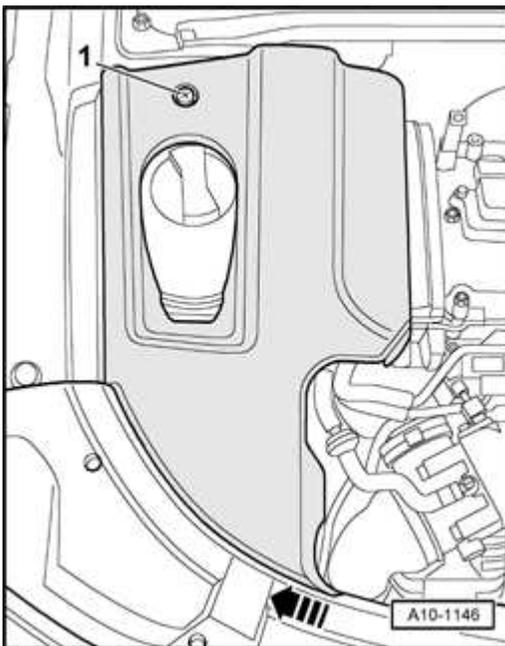


Fig. 118: Removing Screw And Coolant Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release fastener -1- and remove cover in direction of -arrow-.

CAUTION: Before removing ribbed belt, mark direction of rotation. Belt damage will result if not reinstalled in proper direction.

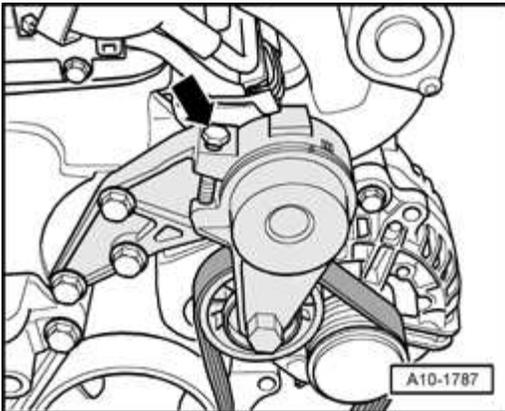


Fig. 119: Screwing Into Bore On Tensioning Element
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Thread M8 x 40 bolt -arrow- into tensioner enough to relieve ribbed belt tension.
- Remove ribbed belt.

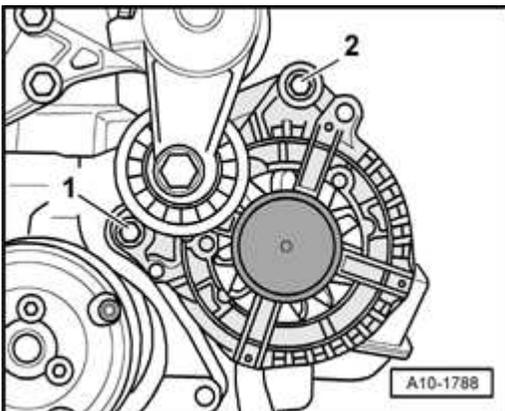


Fig. 120: Removing Upper/Lower Securing Bolt For Generator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove upper bolt -2-.
- Lift vehicle.

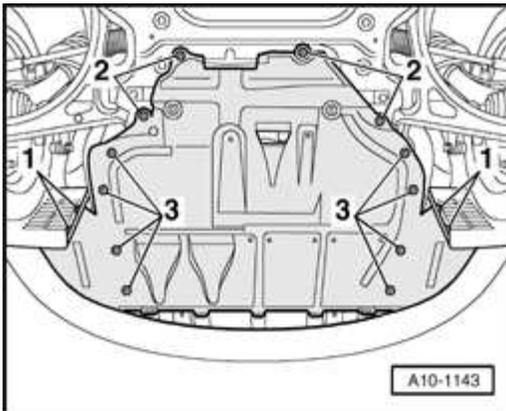


Fig. 121: Identifying Center Sound Insulation Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -1-, -2- and -3-.
- Remove center noise insulation panel.

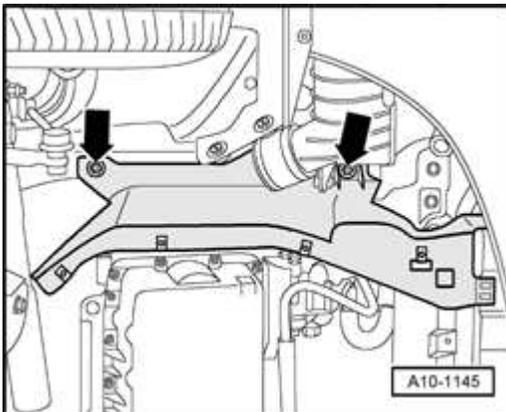


Fig. 122: Right Sound Insulation
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Remove right noise insulation.

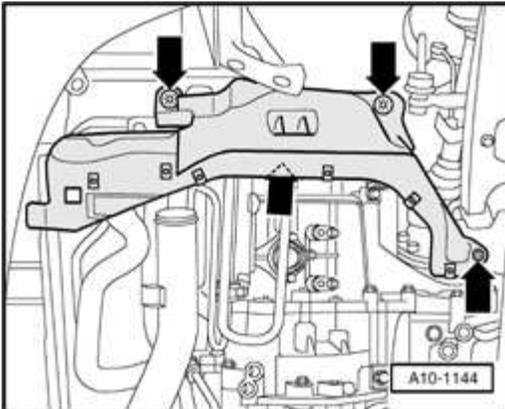


Fig. 123: Left Sound Insulation Panel
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Remove left noise insulation.

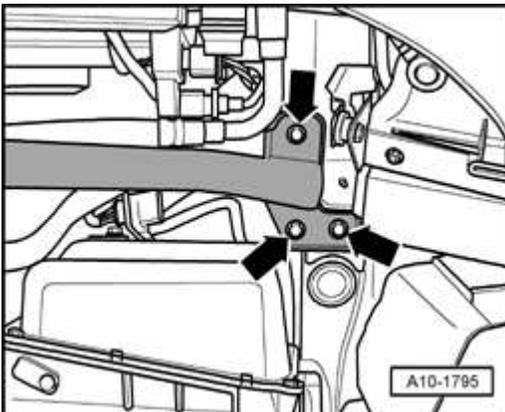


Fig. 124: Removing Cross Piece
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -arrows-.
- Remove cross brace.

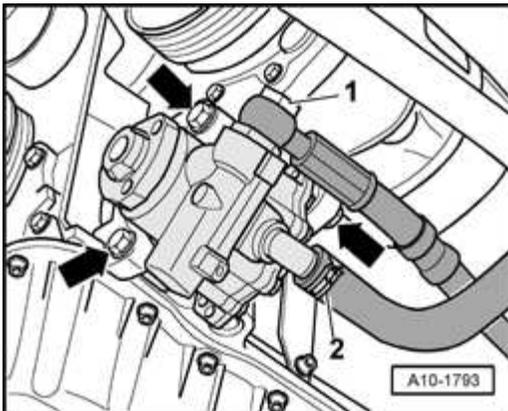


Fig. 125: Removing Bolts And Power Steering Pump From Bracket
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -arrows-.
- Suspend power steering pump from lock carrier (leave hydraulic hoses -1- and -2- connected).

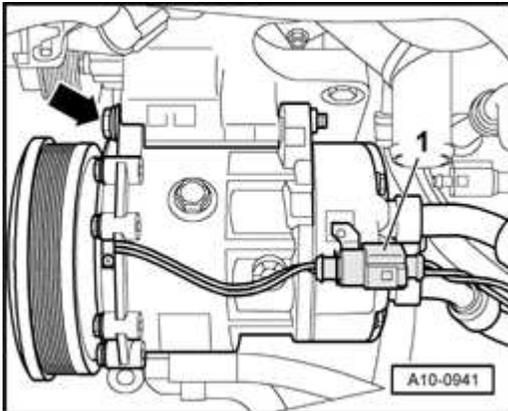


Fig. 126: Disconnecting Electrical Connector For Air Conditioning Compressor Clutch
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector -1-
- Remove bolts -arrow-.

CAUTION:

- Do not remove refrigerant hoses from a/c compressor.
- Have helper carefully lever engine to left when removing bolts. Loosen or remove

engine/transmission mountings if necessary.

- Suspend a/c compressor from long member (leave refrigerant hoses connected).

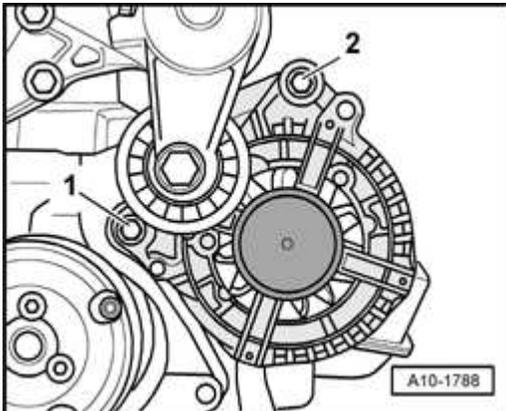


Fig. 127: Removing Upper/Lower Securing Bolt For Generator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove lower bolt -1-.
- Remove generator from bracket (leave wiring connected).

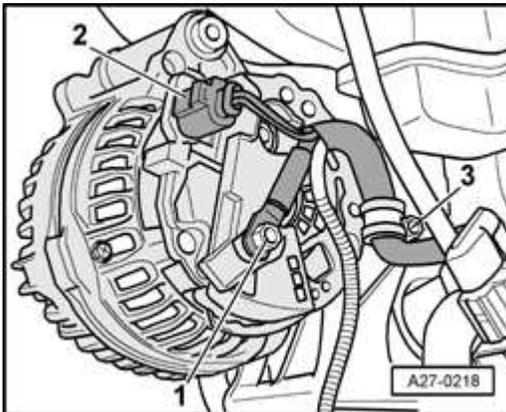


Fig. 128: Identifying Connector, Electrical Wire And Wiring Clamp On Generator
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove harness retainer -3- at generator.
- Remove nut -1- from generator terminal B+ and remove connector eyelet from terminal.

- Disconnect electrical connector -2-.
- Remove generator.

Installing

Install in reverse order of removal, noting the following:

- CAUTION:**
- Engine/transmission mountings that may have been loosened or removed must be adjusted. Refer to 10 ENGINE - ASSEMBLY
 - Before installing the ribbed belt, make sure that all subassemblies (generator, a/c compressor etc.) are securely mounted and turn freely.
 - When installing belt, ensure correct seating in the belt pulleys!

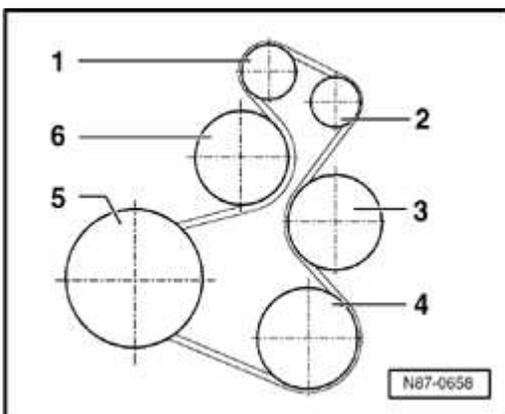


Fig. 129: Poly V-Belt Routing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Note running direction of ribbed belt as previously marked and route as illustrated.

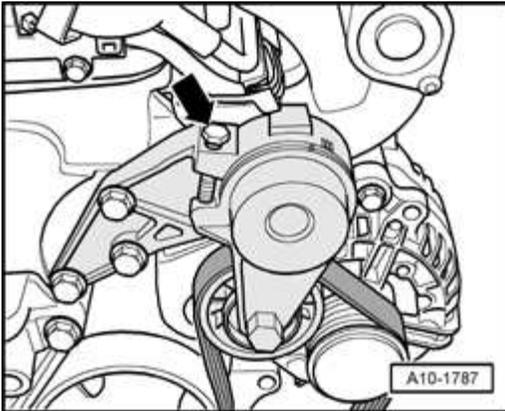


Fig. 130: Screwing Into Bore On Tensioning Element
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove M8 x 40 bolt -arrow- from tensioner.
- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .
- Perform work steps specified in table. Refer to **Battery, disconnecting and reconnecting** .
- Start engine and check belt running.

Tightening torques

Component	Nm
Generator to bracket - bolt	23
Terminal B+ to generator - nut	16
A/C compressor to bracket - bolt	45
Power steering pump to bracket - bolt	23

Voltage Regulator (VR) - Bosch, replacing

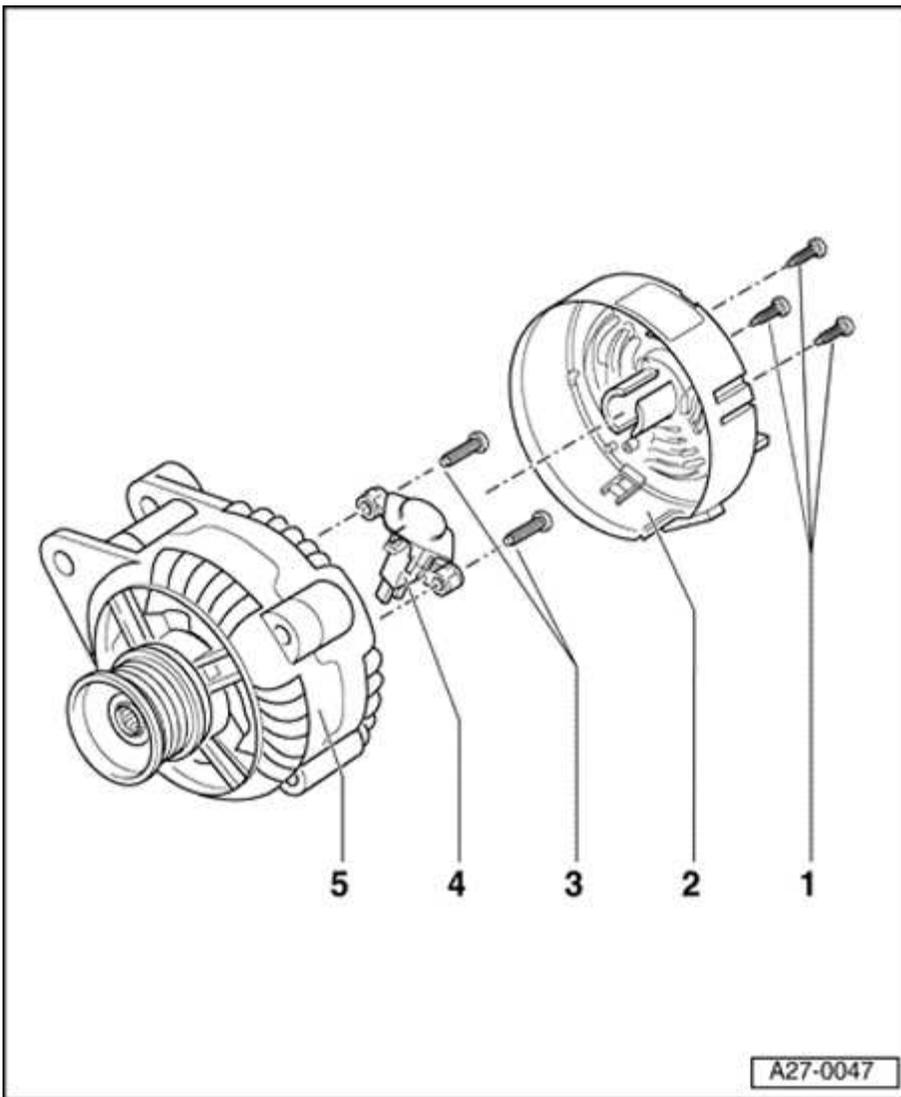


Fig. 131: Bosch Generator, Through MY 2000, Assembly Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Screws

- 1 Nm

2 - Protective cap

- 3 retainer lugs

3 - Screws

- M4 (2 Nm)

4 - Voltage Regulator (VR)

- **Removing:**
- Remove screws -1-
- Remove cap -2-
- Remove screws -3-
- Remove voltage regulator

- Carbon brushes - wear limit: 5 mm

5 - Generator (GEN)

Voltage Regulator (VR) - Valeo, replacing

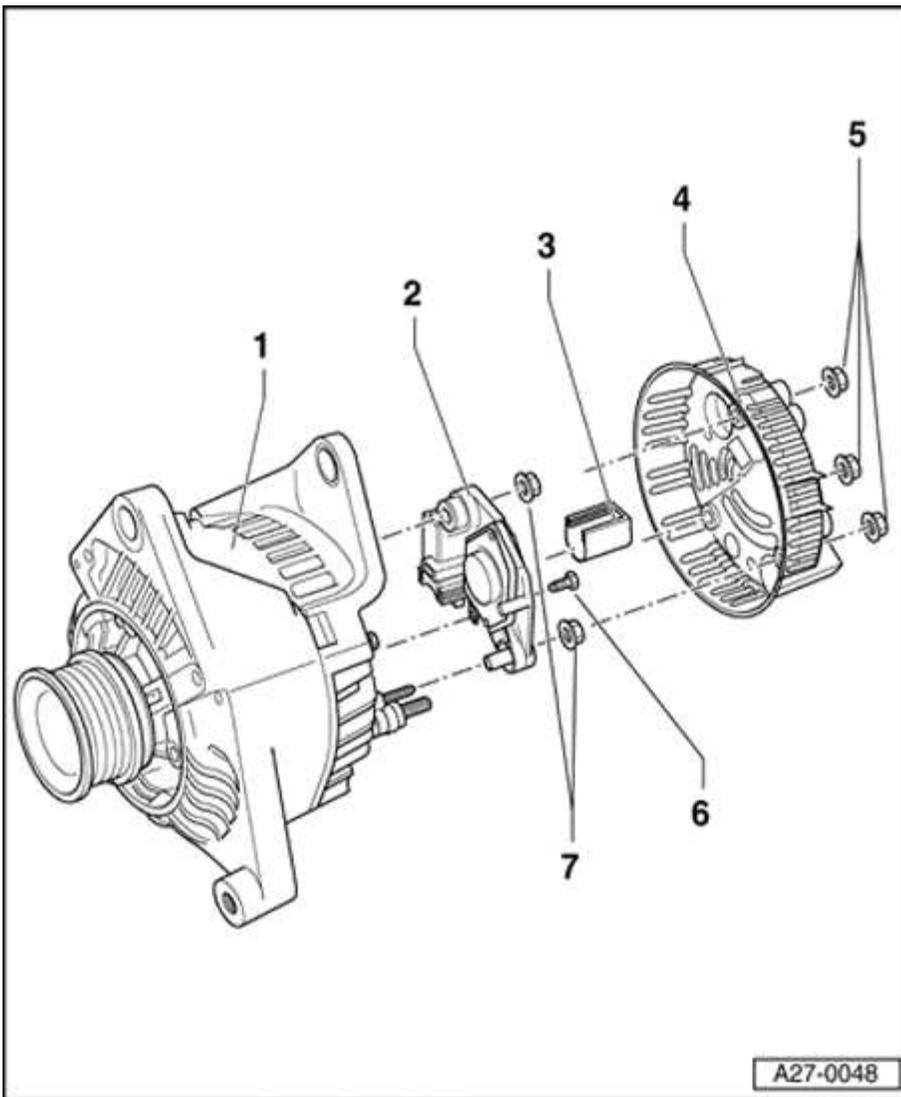


Fig. 132: Valeo Generator, Through MY 2000, Assembly Overview
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Generator (GEN)

2 - Voltage Regulator (VR)

• Removing:

- Remove nuts -1-
- Remove cover -4-
- Remove cover -3-
- Remove bolt -6-

- Remove nuts -7-
- Remove voltage regulator -2-
- Wear limit of carbon brushes: 5 mm

3 - Cover

- Press cover off before securing voltage regulator. Press cover on again after securing voltage regulator

4 - Protective cover

5 - Nuts

- 2 Nm

6 - Hex bolt

- 2 Nm

7 - Nuts

- 3.5 Nm

Ribbed belt pulley, removing and installing

Special tools, testers and auxiliary items needed

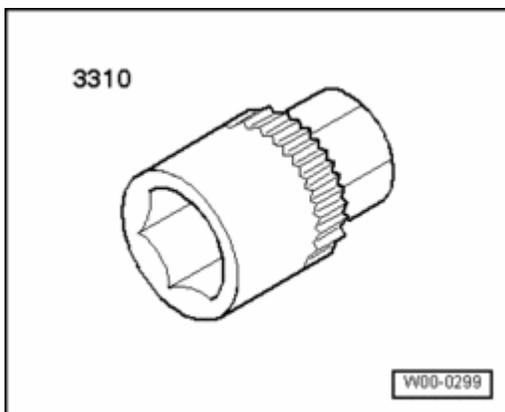


Fig. 133: 3310 Socket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Socket 3310

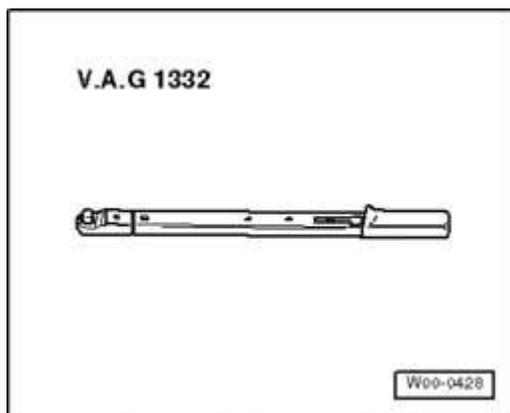


Fig. 134: Torque Wrench V.A.G. 1332

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or equivalent 40 - 200 Nm)

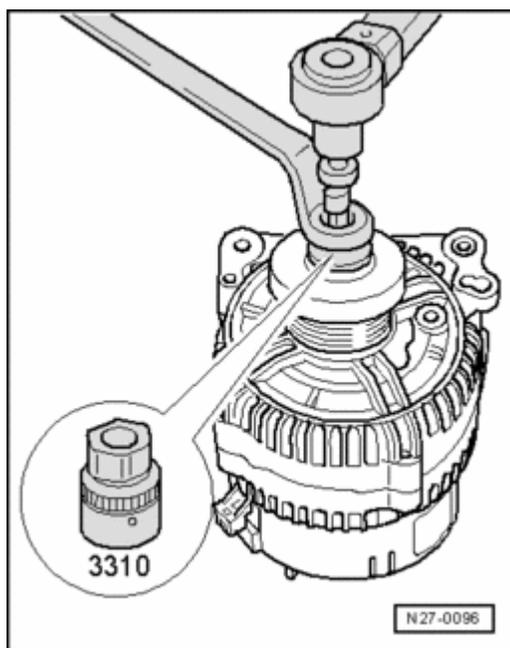


Fig. 135: Loosen/Tighten Nut At Pulley With Wrench And Adapter 3310

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Counter-hold securing nut using 3310.

2006 Audi TT

ELECTRICAL Electrical Equipment

- To remove, turn generator shaft clockwise
- To install, turn generator shaft counter-clockwise

Tightening torques

Component	Nm
Generator pulley to generator - nut	65

Ribbed belt pulley with free-wheel, removing and installing

Special tools, testers and auxiliary items needed

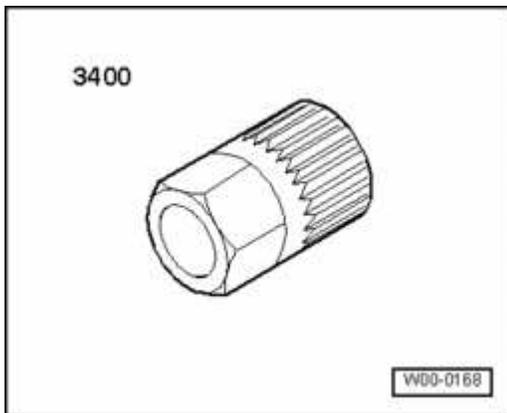


Fig. 136: 3400 Multi-Tooth Adapter

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Socket 3400



Fig. 137: Torque Wrench V.A.G. 1332

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or equivalent 40 - 200 Nm)

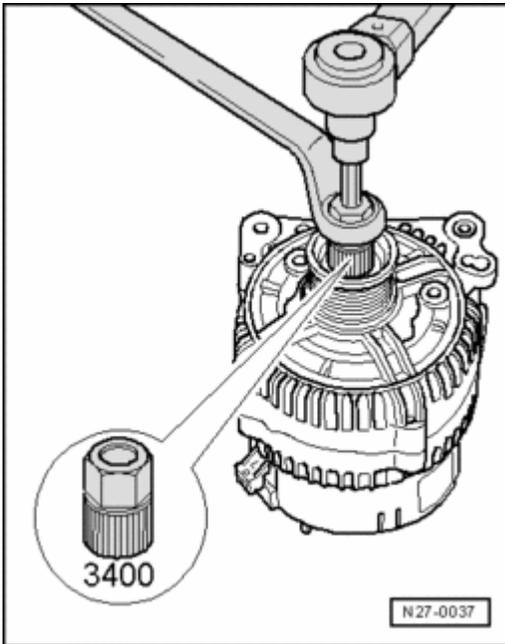


Fig. 138: Tightening/Loosening Nut At Pulley With Wrench And Adapter 3400
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Counter-hold securing nut using 3400.
- To remove, turn generator shaft clockwise
- To install, turn generator shaft counter-clockwise
- Clip protective cap onto free-wheel pulley.

Tightening torques

Component	Nm
Generator pulley to generator - nut	80

STARTER

Starter - 4-cylinder engine with manual transmission, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**

- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .**

Special tools, testers and auxiliary items needed



Fig. 139: Torque Wrench V.A.G 1331

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)



Fig. 140: Torque Wrench V.A.G. 1332
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or equivalent 40 - 200 Nm)

Removing

- CAUTION:**
- Switch off all electrical consumers.
 - Switch ignition off and remove ignition key.

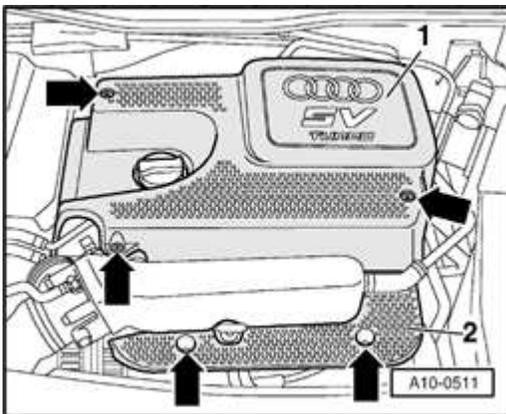


Fig. 141: Removing Engine Cover Panel
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Where applicable, remove cover -2- near intake manifold.

NOTE: Cover for 132kW (180 bhp) engine is illustrated here. Cover for 165kW (225 bhp) engine is similar.

- Remove battery. Refer to **Battery, removing and installing** .

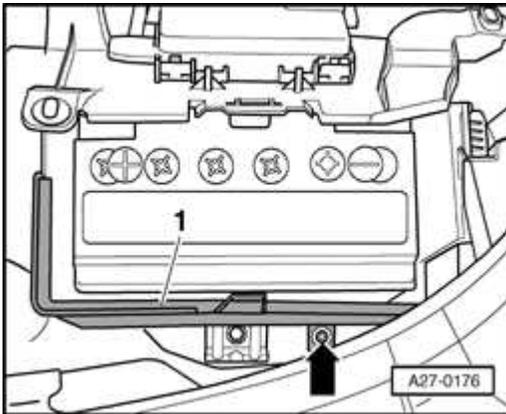


Fig. 142: Front Battery Cover And Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt -arrow-
- Remove front battery cover -1-.

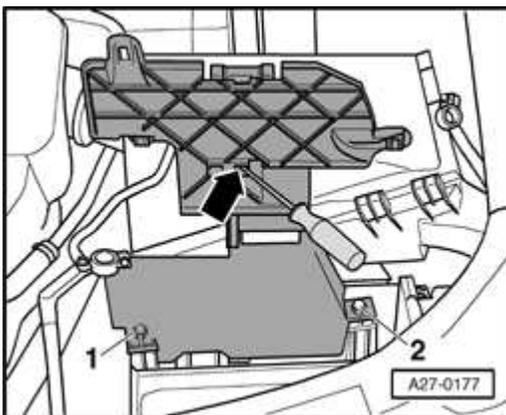


Fig. 143: Unclipping Main Fuse Box From Top Of Battery Mount And Locating Rear Battery Cover Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip main fuse box from top of battery mount -arrow-.
- Remove bolts -1- and -2- and detach rear battery cover from battery carrier.

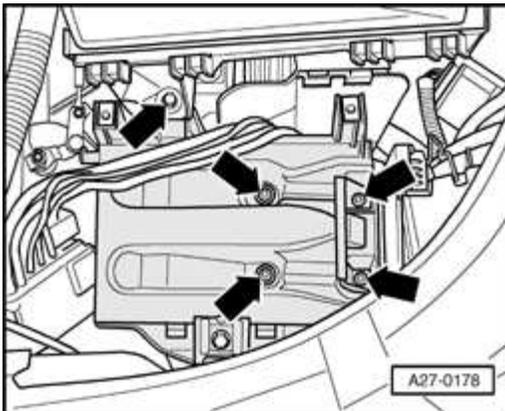


Fig. 144: Battery Carrier And Bolts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -arrows-.
- Remove battery carrier.

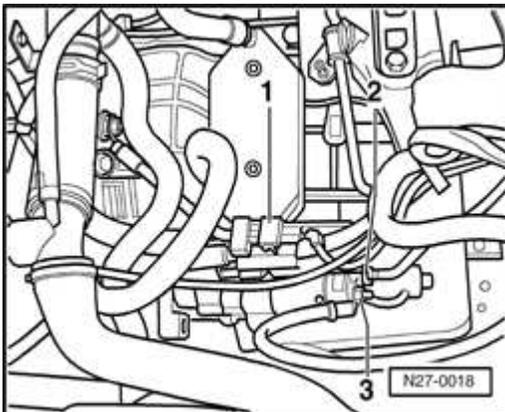


Fig. 145: Electrical Connection, Terminal Connector & Solenoid Terminal Wire

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector -1-.
- Unclip connector from wire guide.
- Remove nut at starter solenoid terminal B+ -3- and remove connector eyelet from terminal.
- Disconnect electrical connector -2-.
- Remove wiring from wire guide.

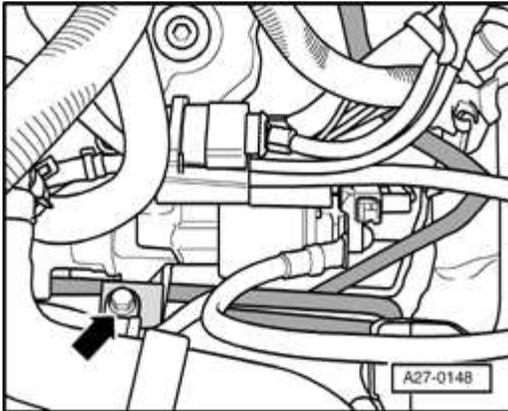


Fig. 146: Power Steering Pressure Pipe Retaining Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Where applicable, remove bolt -arrow- and move power steering pressure pipe to one side.
- Remove wire guide.

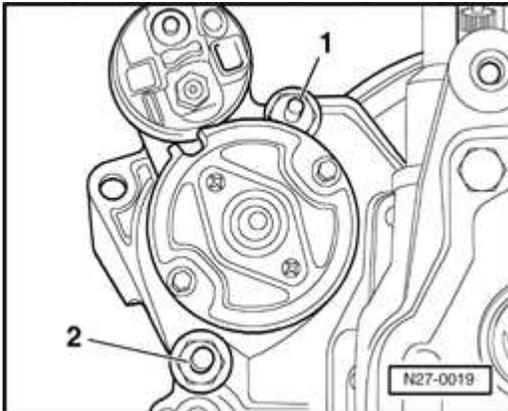


Fig. 147: Identifying Starter Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt -1-.
- Remove left front wheel/tire

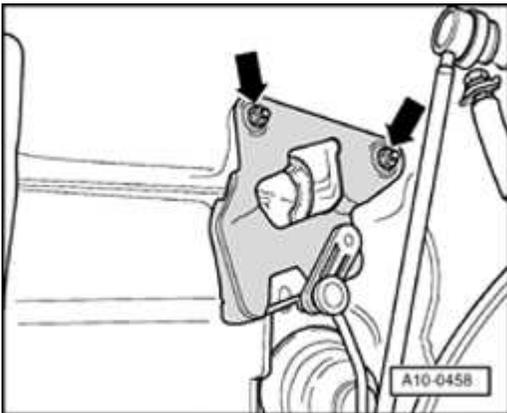


Fig. 148: Unbolting Bracket For Headlight Range Control In Left Wheelhousing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Where applicable, remove headlight range control bracket -arrows-.
- Lift vehicle.

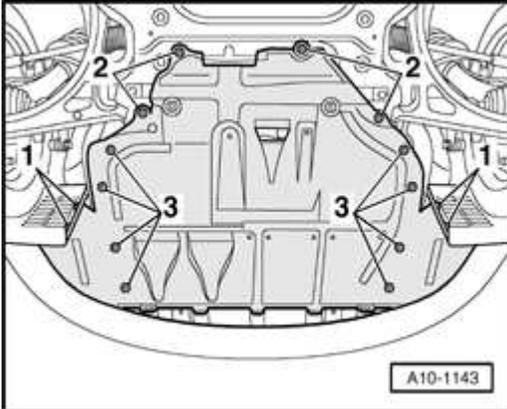


Fig. 149: Identifying Center Sound Insulation Fasteners

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -1-, -2- and -3-.
- Remove center noise insulation panel.

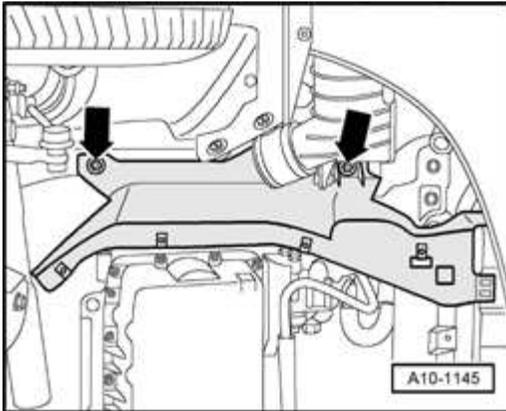


Fig. 150: Right Sound Insulation

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Remove right noise insulation panel.

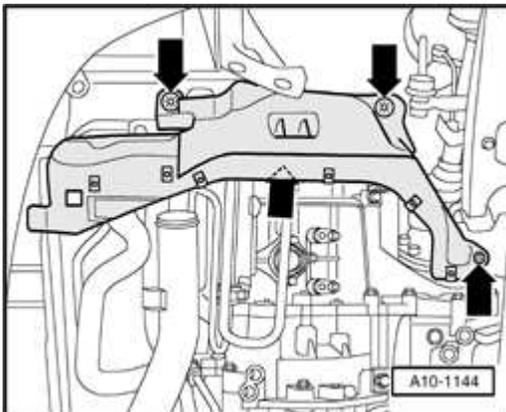


Fig. 151: Left Sound Insulation Panel

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Remove left noise insulation panel.

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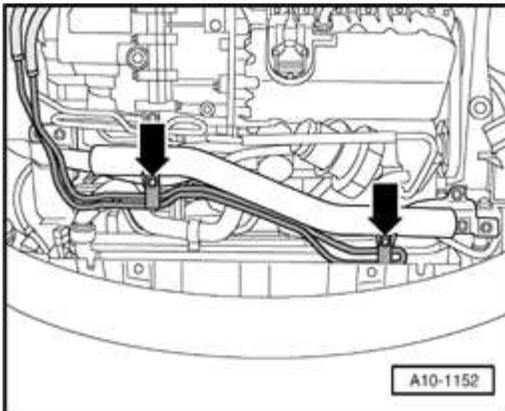


Fig. 152: Power Steering Lines At Cross-Piece Pipe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Where applicable, remove power steering pipe from connecting pipe -arrows-.

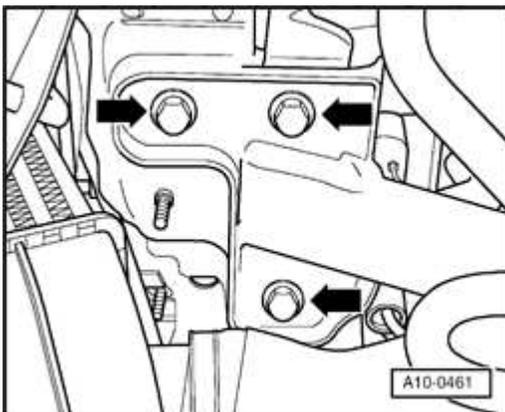


Fig. 153: Identifying Connecting Line Bolts (Left)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Where applicable, remove connecting pipe between charge-air coolers on left and right long members.

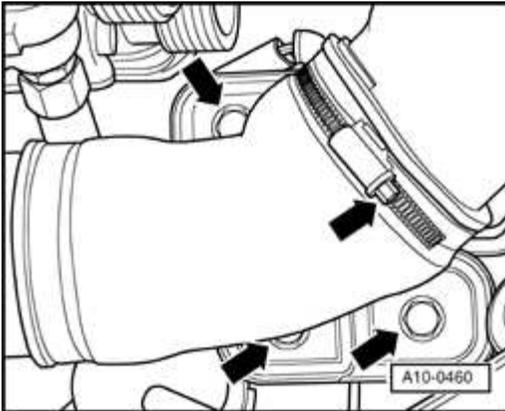


Fig. 154: Identifying Connecting Line Bolts & Right Charge Air Coolers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove both hoses to charge-air cooler.
- Remove connecting pipe.

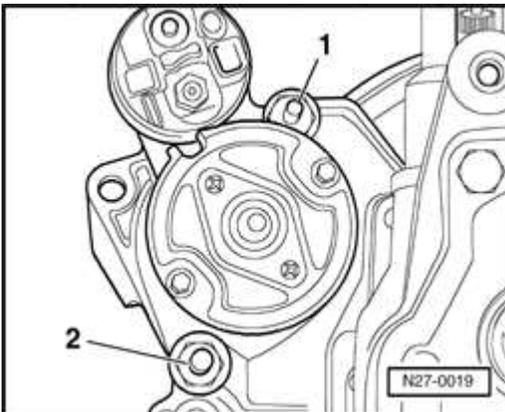


Fig. 155: Identifying Starter Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt -2-.
- Remove starter.

Installing

Install in reverse order of removal, noting the following:

- Install battery carrier.
- Install battery. Refer to **Battery, removing and installing** .

- Perform work steps specified in table. Refer to **Battery, disconnecting and reconnecting** .

Tightening torques

Component	Nm
Starter to transmission - bolt M10	45
Starter to transmission - bolt M12	65
Connecting pipe to long member - bolt	20
Power steering pressure pipe to starter - bolt	22
Wire guide to starter - bolt	22
Terminal B+ to solenoid - nut	16
Battery carrier to long member - bolt	10

Starter - 4-cylinder engine with automatic transmission, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**
- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .**

Special tools, testers and auxiliary items needed



Fig. 156: Torque Wrench V.A.G 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)



Fig. 157: Torque Wrench V.A.G. 1332
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1332 Torque wrench (or equivalent 40 - 200 Nm)

Removing

CAUTION:

- **Switch off all electrical consumers.**
 - **Move gear selector to "Park" position.**
 - **Switch ignition off and remove ignition key.**
-
- Lift vehicle.

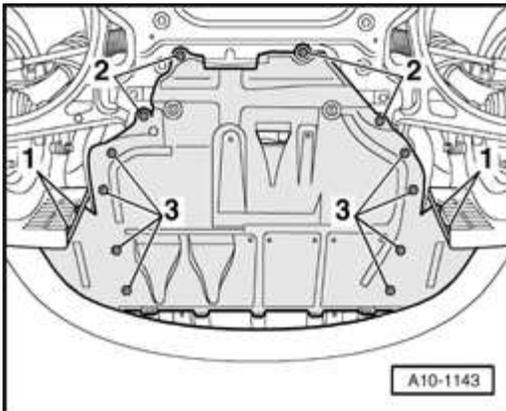


Fig. 158: Identifying Center Sound Insulation Fasteners
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -1-, -2- and -3-.
- Remove center noise insulation panel.

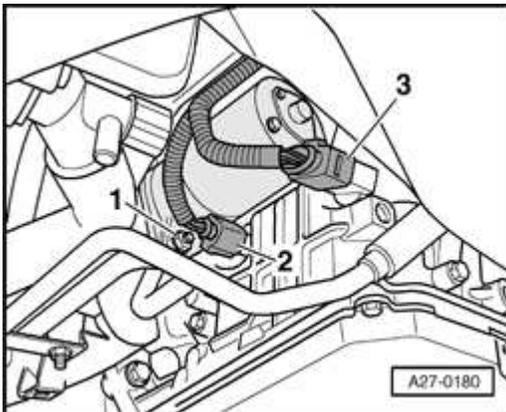


Fig. 159: Electrical Connectors And Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connectors -2- and -3-.
- Remove bolt -1-.

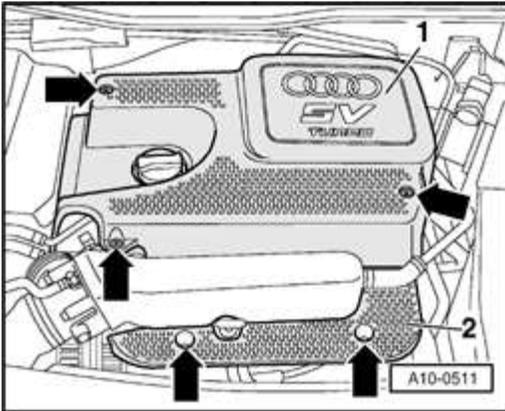


Fig. 160: Removing Engine Cover Panel
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -2- near intake manifold.
- Remove battery. Refer to **Battery, removing and installing** .

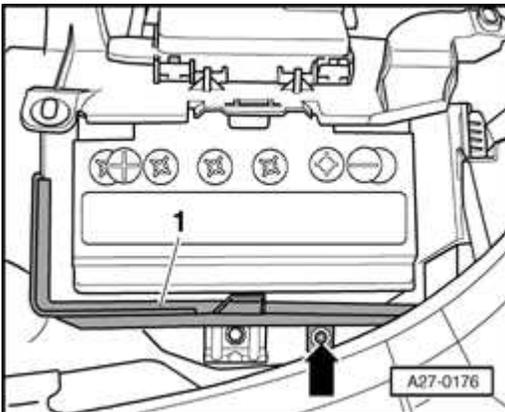


Fig. 161: Front Battery Cover And Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -arrow-
- Remove front battery cover -1-.

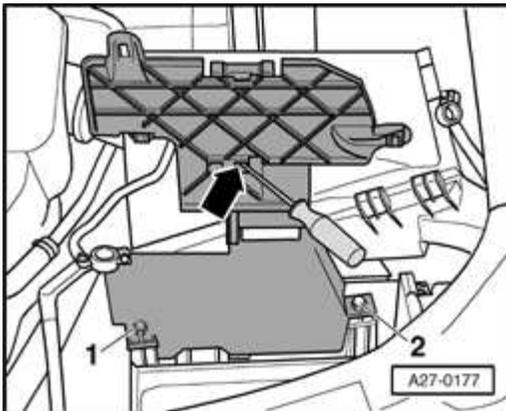


Fig. 162: Unclipping Main Fuse Box From Top Of Battery Mount And Locating Rear Battery Cover Bolts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip main fuse box from top of battery mount -arrow-.
- Remove bolts -1- and -2- and detach rear battery cover from battery carrier.

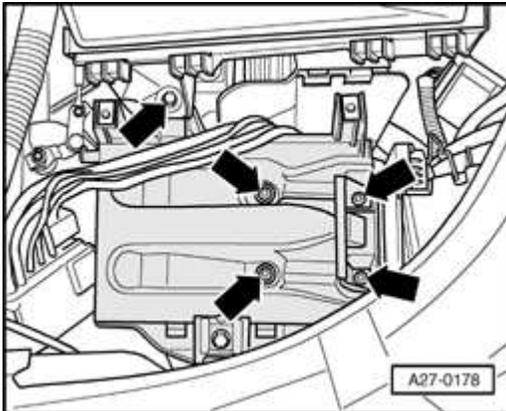


Fig. 163: Battery Carrier And Bolts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -arrows-.
- Remove battery carrier.

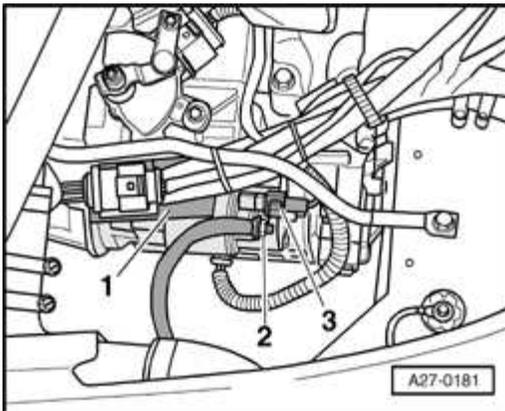


Fig. 164: Wire Guide, Electrical Connector And Starter Solenoid Terminal B+
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector -3-.
- Remove nut at starter solenoid terminal B+ -2- and remove connector eyelet from terminal.
- Remove wire guide -1-
- Remove wire guide from double bolt.

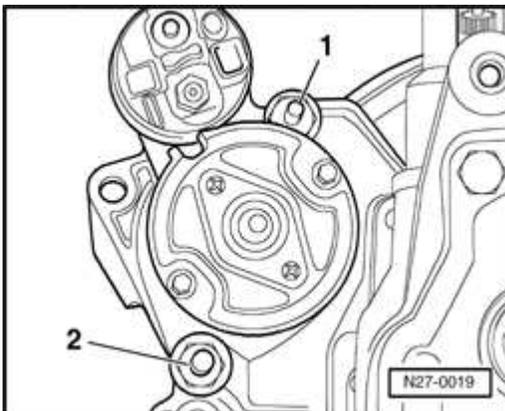


Fig. 165: Identifying Starter Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolt -1-.
- Remove starter.

Installing

Install in reverse order of removal, noting the following:

- Install battery carrier.
- Install battery. Refer to **Battery, removing and installing** .
- Perform work steps specified in table. Refer to **Battery, disconnecting and reconnecting** .

Tightening torques

Component	Nm
Starter to transmission - bolt	80
Wire guide to starter - bolt	22
Terminal B+ to solenoid - nut	16
Battery carrier to long member - bolt	10

Starter - 6-cylinder engine, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**
- **When disconnecting and reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .**

Special tools, testers and auxiliary items needed



Fig. 166: Torque Wrench V.A.G 1331

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)

Removing

- Disconnect battery. Refer to **Battery, disconnecting and reconnecting** .

WARNING:

- **The cooling system is under pressure when the engine is warm. If necessary reduce pressure before repair.**
- **Cover cap of expansion tank with rag and open carefully, as hot steam i.e. hot coolant may escape when opening.**
- Slowly remove cap from coolant expansion tank.

When removing engine compartment trim cover clips, note the following:

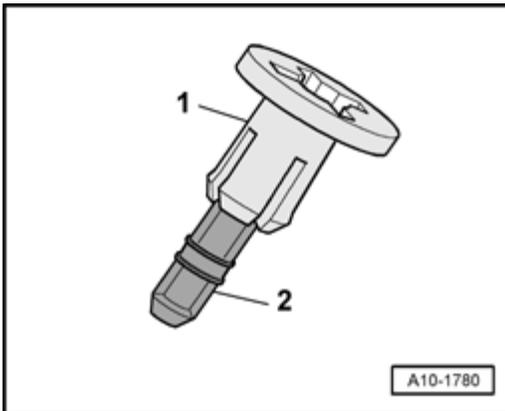


Fig. 167: Identifying Fasteners At Lock Carrier & Pin
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- To remove clips -1- at lock carrier, press pin -2- approx. 4 mm only (do not press right through). Then remove clip.

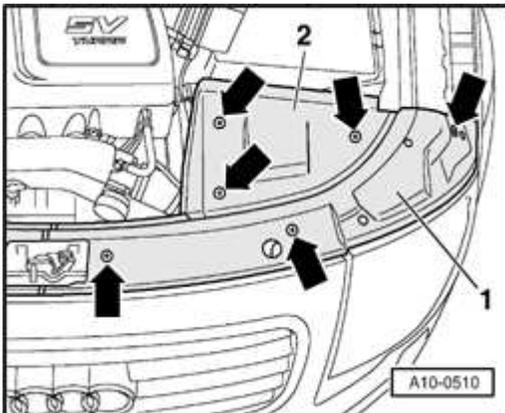


Fig. 168: Removing Left-Hand Cover Panels On Lock Carrier And Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove clips -arrows- from left lock carrier cover -1- and fuse box cover - 2-.

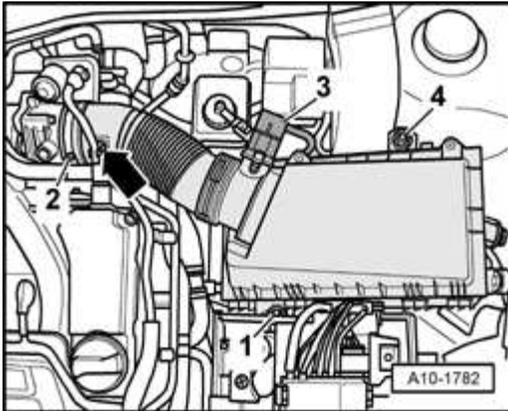


Fig. 169: MAF Sensor G70, Guide Hose At Throttle Valve Control Module And Bolts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen clamp -2- and remove air hose from throttle housing.
- Disconnect electrical connector -3- at Mass Airflow Meter (MAF)
- Remove bolts -1- and -4-.
- Set aside wiring harness -arrow-.
- Remove air cleaner housing with MAF and air hose.

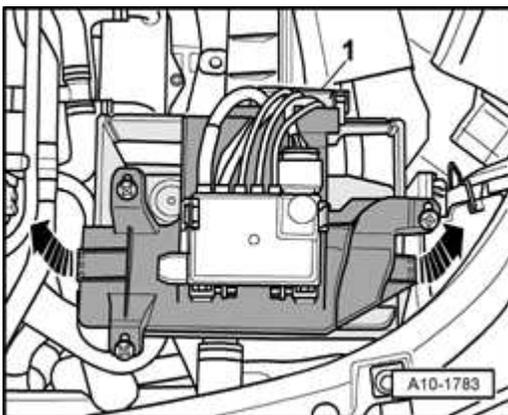


Fig. 170: Folding Up Fuse Box Bracket

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip protective cover -1- for wiring.
- Lift fuse box carrier lid -arrows-.

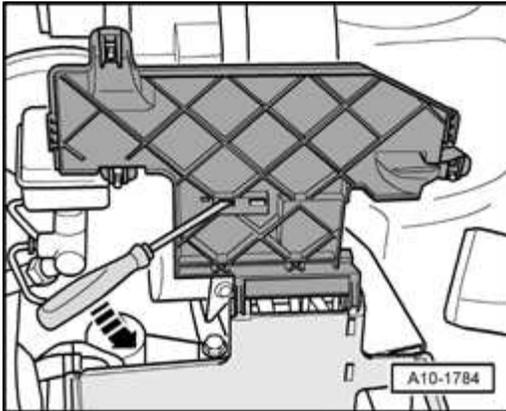


Fig. 171: Removing Fuse Box By Releasing Tabs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Depress retainers with screwdriver -arrow- and remove fuse box from carrier.

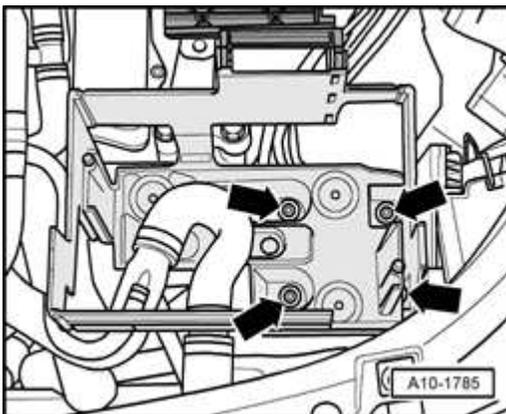


Fig. 172: Removing Carrier
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -arrows-.
- Remove fuse box carrier.

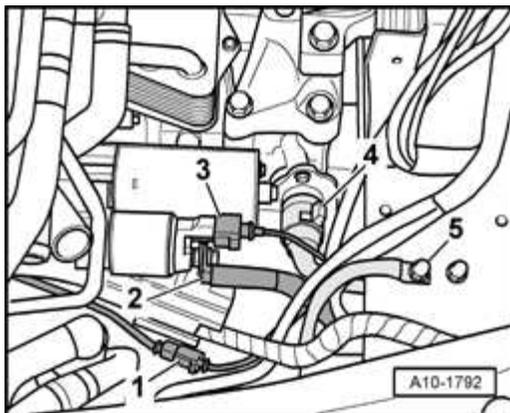


Fig. 173: Disconnect Electrical Connectors, Ground Cable & Unscrewing Wire At Solenoid Switch For Starter

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connectors -3- and -4-.
- Remove nut at starter solenoid terminal B+ -2- and remove connector eyelet from terminal.
- Remove connector -1- from wire guide.
- Unclip guide from wires.
- Remove wire guide.

CAUTION: DO NOT loosen or remove Ground (GND) connection -5-.

- Remove nut at power steering pressure pipe bracket.
- Swivel bracket upwards.

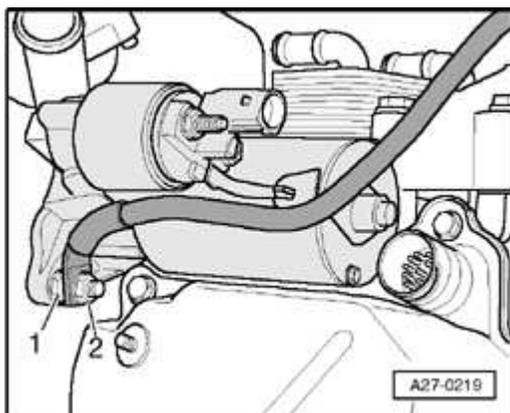


Fig. 174: Starter Nut And Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut -2- and remove ground connector eyelet from combi-bolt.
- Remove bolt -1-.
- Remove upper bolt.
- Remove starter upwards.

Installing

Install in reverse order of removal, noting the following:

NOTE: If difficulty is encountered when installing the starter Ground (GND) cable and nut, lift vehicle and remove center noise insulation panel for better access.

- Install fuse box carrier and lock carrier trim.
- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .
- Perform work steps specified in table. Refer to **Battery, disconnecting and reconnecting** .

Tightening torques

Component	Nm
Starter to transmission - bolt	40
Power steering pressure pipe to starter - bolt	22
Wire guide to starter - bolt	22
Terminal B+ to solenoid - nut	16
Battery carrier to long member - bolt	10

CRUISE CONTROL SYSTEM (CCS) FROM M.Y. 2001

General information

All cruise control system functions are controlled by the Engine Control Module (ECM). The processing of electronic engine controls and cruise control functions

are integrated in the ECM. Other than the cruise control switches on the steering column, the clutch and brake pedal switches (where applicable) and related wiring, there are no separate cruise control components to be serviced.

As all electronic throttle control operations are monitored by On Board Diagnostic (OBD), Diagnostic Trouble Codes (DTC) pertaining to engine electronics that are stored in DTC memory may be relevant to cruise control function.

Always check DTC memory first before troubleshooting CCS (function 02). Refer to VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System.

The operating status of the cruise control system, cruise control switches, brake and clutch switches (as inputs to the ECM) can be tested using an OBD program. Use VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System in operating mode "Guided Fault Finding".

CRUISE CONTROL SYSTEM (CCS) THROUGH M.Y. 2000

General information

All cruise control system functions are controlled by the Engine Control Module (ECM). The processing of electronic engine controls and cruise control functions are integrated in the ECM. Other than the cruise control switches on the steering column, the clutch and brake pedal switches (where applicable) and related wiring, there are no separate cruise control components to be serviced.

As all electronic throttle control operations are monitored by On Board Diagnostic (OBD), Diagnostic Trouble Codes (DTC) pertaining to engine electronics that are stored in DTC memory may be relevant to cruise control function.

Always check DTC memory first before troubleshooting CCS (function 02). Refer to

- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMU
- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): ATC

- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AWP
- **01 ON BOARD DIAGNOSTIC (OBD)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): BEA

The operating status of the cruise control system, cruise control switches, brake and clutch switches (as inputs to the ECM) can be tested using an OBD program procedure. Refer to **General information** .

90 INSTRUMENTS

INSTRUMENT CLUSTER THROUGH M.Y. 2000 - VIN 8N_Y040000 AND SOFTWARE VERSION D24

General information

The instrument cluster contains an electronic speedometer, tachometer, liquid crystal (LCD) displays for odometer, trip odometer, digital clock with date, as well as analog coolant temperature and fuel level gauges. Control and warning lamps are situated within the speedometer and tachometer faces.

A "Driver's Information System" LCD is located between the tachometer and speedometer. Displayed information includes an auto check system, outside air temperature, radio frequency and selectable trip computer functions.

The auto check system integrated with the Driver's Information System monitors the brake system, coolant temperature, fuel level, engine oil pressure, and displays the ambient temperature as a default.

The optional Navigation system display is also included in the Driver's Information System (where applicable).

On Board Diagnostic (OBD), function

The instrument cluster is controlled by a microprocessor and has extensive On Board Diagnostic (OBD) capability. If malfunctions occur in any of the system components, corresponding DTCs are stored in the Diagnostic Trouble Code (DTC) memory of the instrument cluster.

If OBD recognizes instrument cluster malfunctions related to the:

- odometer
- speedometer calibration

the trip odometer display will change to show "dEF."

In this case, replace speedometer. Refer to **Instrument cluster, removing and installing** .

Other malfunctions recognized by OBD will not cause the trip odometer display to change as described above.

Before performing any troubleshooting or inspection, always begin by checking for DTCs using the On Board Diagnostic (OBD) program. DTCs stored in memory are retrieved/checked with VAG 1551/1552 scan tool or VAS 5051/5052 tester in mode "Self Diagnosis". Refer to **Instrument cluster On Board Diagnostic (OBD), initiating** .

Where applicable, also use VAS 5051/5052 tester in mode "Guided Fault Finding"

OBD program application notes. Refer to **OBD program application notes** .

OBD program application notes

Always confirm vehicle VIN and instrument cluster software version as per section title above. Confirm instrument cluster software version by initiating OBD program and reading information in display. Refer to **Instrument cluster On Board Diagnostic (OBD), initiating** .

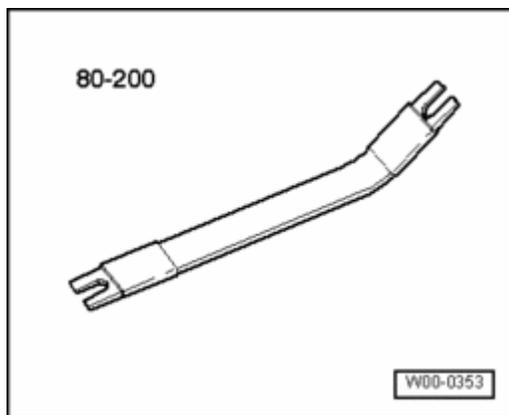
In the event an instrument cluster was previously replaced in a vehicle with VIN up to 8N_Y040000, the new/replacement cluster may contain software version D26 which contains certain Diagnostic Trouble Code (DTC), Read Measuring Value Block and Adaptation information that is not specifically covered in this section.

Information on replacement instrument clusters with software version D26 are contained in section "Interment cluster On Board Diagnostic (OBD) from VIN 8N_Y040001 and/or software versions from D26 &D03". Refer to **Application**

notes .**Message "dEF" on trip recorder display**

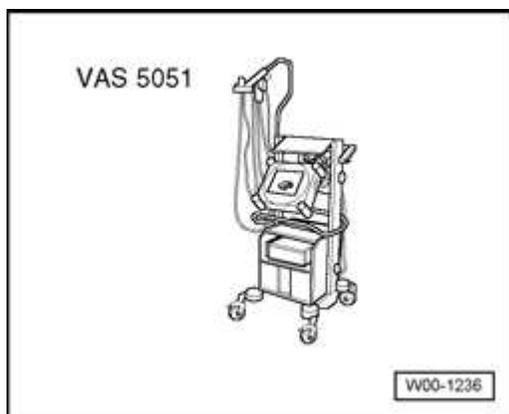
If the control module in the instrument cluster detects a malfunction in its permanent memory, the letters "dEF" will appear on the trip recorder display.

- If "dEF" appears on the display, replace the instrument cluster. Refer to **Instrument cluster, removing and installing** .

Instrument cluster, removing and installing**Special tools, testers and auxiliary items needed****Fig. 175: Pry Lever 80-200**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry lever 80-200

**Fig. 176: VAS 5051 Vehicle Diagnosis, Testing and Information System**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAS 5051 Vehicle Diagnostic Testing and Information System
- Optional: VAS 5052 Vehicle Diagnostic and Service System
- Optional: VAG 1551/1552 Scan Tool (ST)

Preparation

Should instrument cluster require replacement, input values for replacement instrument must first be determined by using either of the two methods that follow:

VAS 5051/5052

- Determine input values automatically by connecting VAS 5051/5052 and select operating mode "Guided Fault Finding"
- Enter appropriate model, equipment and model year information and press ">" to confirm.

After all Control Modules have been registered and DTC memories checked,

- Select "Go to"
- Select "Function / Component Selection"
- Select "Control Module functions"
- Select "+17 - Instrument Cluster"
- Select function "Instrument cluster replacing"
- Follow testers prompts

VAG 1551/1552

- Determine input values individually using VAG 1551/1552. Refer to **Replacement instrument cluster input values, adapting** .

Removing**NOTE:**

- **Instrument cluster must not be disassembled.**
- **It is not necessary to remove the steering wheel. For**

ease of illustration the steering wheel is not shown in the following illustrations.

- All removed cable ties are to be re-attached in same position on installation.

CAUTION: Before beginning repairs on the electrical system

- Switch off all electrical consumers.
- Switch off ignition and remove ignition key.
- Use adjuster to pull out and pivot steering wheel downwards as far as possible.
- Remove driver's storage compartment.

Refer to **68 - INTERIOR EQUIPMENT**

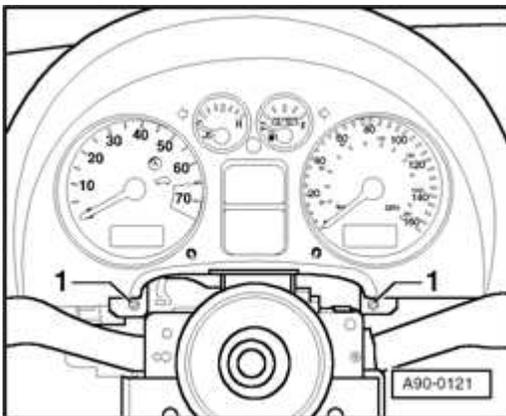


Fig. 177: Steering Column To Instrument Panel Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -1-.
- Pull out instrument cluster from bottom in order to disengage upper mounting clips.
- Pry off clips from rear of instrument cluster using 80-200.
- Release cable ties on rear of instrument cluster.

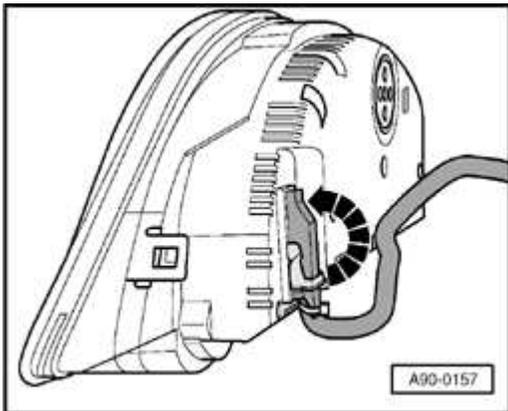


Fig. 178: Releasing Retainer Catches And Disconnecting Electrical Connections From Instrument Cluster

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release retainer catches in direction of -arrow- and disconnect electrical connections from instrument cluster.

Installing

Install in reverse order of removal, noting the following:

- If instrument cluster was replaced and input values were obtained automatically using VAS 5051/5052, follow the remaining tester prompts. Refer to **Instrument cluster, removing and installing** .
- If instrument cluster was replaced and individual input values were obtained using VAG 1551/1552, perform functional check of instrument cluster.
- If functional check is OK, enter input values. Refer to **Replacement instrument cluster input values, adapting** .

Instrument cluster, rear view

NOTE: All indicator & warning lamps are Light Emitting Diodes (LED). If one fails, the entire instrument cluster must be replaced.

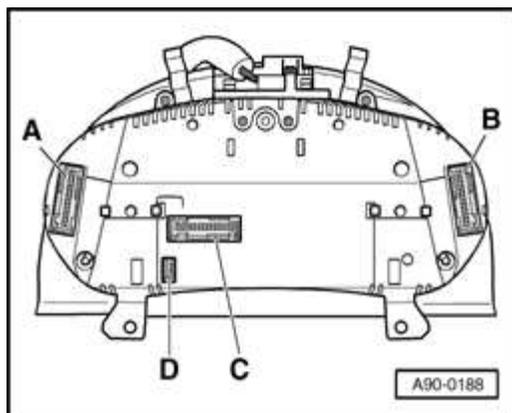


Fig. 179: Instrument Cluster, Rear View
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - 32-pin multi-connector, green

B - 32-pin multi-connector, blue

C - 32-pin multi-connector, grey

D - 4-pin multi-connector, black (where applicable)

Instrument cluster multi-pin connector assignments

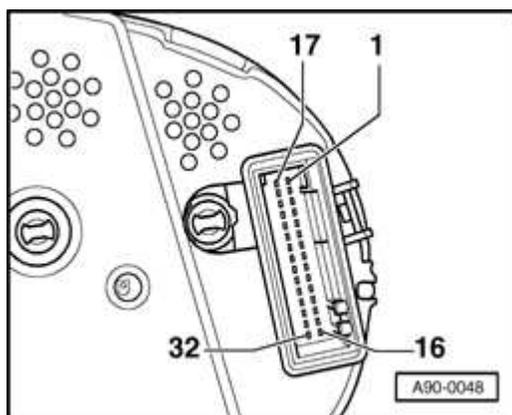


Fig. 180: 32-Pin Multi-Connector -T32-, Blue
Courtesy of VOLKSWAGEN UNITED STATES, INC.

32-pin multi-connector -T32-, blue

1 - Terminal 15

2006 Audi TT

ELECTRICAL Electrical Equipment

- 2 - Brake pad wear indicator
- 3 - Speedometer output 1
- 4 - Vacant
- 5 - Fuel gauge sender
- 6 - Fuel tank warning (OBD 2)
- 7 - Terminal 31 (sensor)
- 8 - Coolant temperature
- 9 - Terminal 31 (load)
- 10 - Oil pressure 2 (high)
- 11 - Engine speed signal
- 12 - Air conditioner shut-off
- 13 - Electronic Power Control (EPC)
- 14 - Convertible top
- 15 - Terminal 58d
- 16 - Vacant

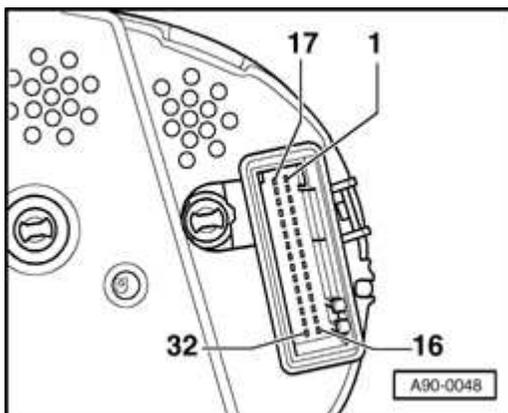


Fig. 181: 32-Pin Multi-Connector -T32-, Blue
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 17 - High beams
- 18 - Left turn signal
- 19 - Vacant
- 20 - Terminal 58s
- 21 - Door contact, driver's side
- 22 - Coolant level low
- 23 - Terminal 30
- 24 - Terminal 31 (load)
- 25 - Fuel consumption signal
- 26 - Right parking light
- 27 - Left parking light
- 28 - Speedometer input
- 29 - Brake fluid level
- 30 - S-contact
- 31 - Speedometer output 2
- 32 - ESP / ASR (traction control)

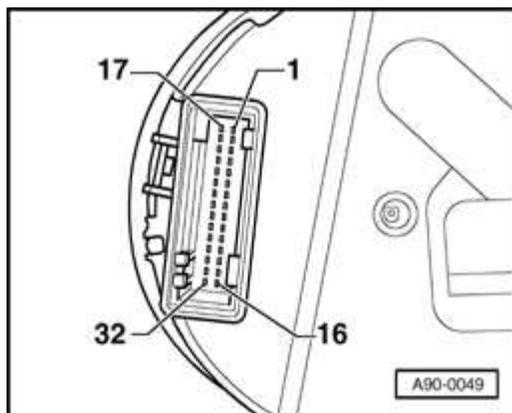


Fig. 182: 32-Pin Multi-Connector, -T32A-, Green
Courtesy of VOLKSWAGEN UNITED STATES, INC.

32-pin multi-connector, -T32a-, green

1 - Vacant

2 - Transponder 1

3 - Vacant

4 - Vacant

5 - W-wire

6 - Signal from central locking for detecting "door open"

7 - Right turn signal

8 - Vacant

9 - Vacant

10 - Airbag

11 - Standing time output

12 - Terminal 61

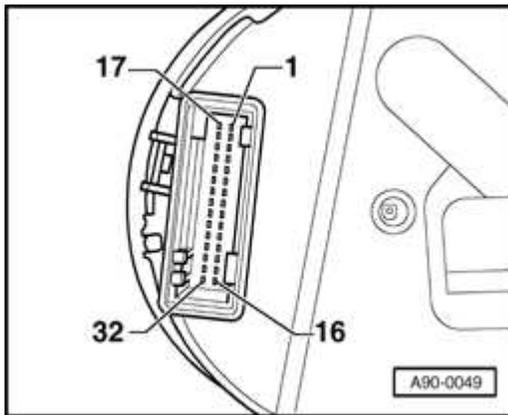
13 - Parking brake

14 - Engine check*

15 - Oil level / oil temperature

16 - Vacant

*) Where applicable



**Fig. 183: 32-Pin Multi-Connector, -T32A-, Green
Courtesy of VOLKSWAGEN UNITED STATES, INC.**

17 - Transponder 2

18 - CAN Bus - High + (Powertrain)

19 - CAN Bus - High - (Powertrain)

20 - CAN Bus - High shielding (Powertrain)*

21 - ABS monitor

22 - CAN Bus - Low + (Convenience)*

23 - CAN Bus - Low - (Convenience)*

24 - CAN Bus - Low shielding (Convenience)*

25 - Hood switch

26 - Vacant

27 - Belt buckle

28 - K-wire - Data Link Connector (DLC)

29 - Outside temperature input

30 - Terminal 58de (external dimmer potentiometer)

31 - Gear selector display

32 - Vacant

*) Where applicable

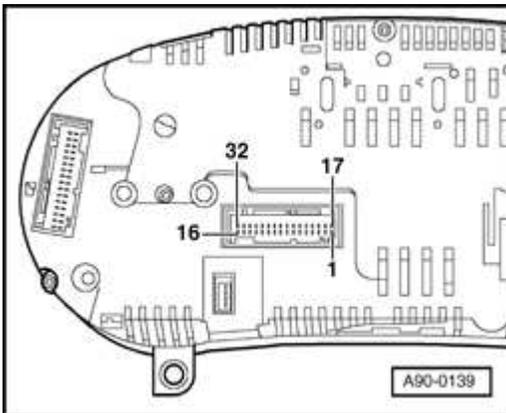


Fig. 184: 32-Pin Multi-Connector - T32B-, Grey
Courtesy of VOLKSWAGEN UNITED STATES, INC.

32-pin multi-connector - T32b-, grey

1 - Menu selector switch (menu)

2 - Menu selector switch (output A)

3 - Menu selector switch (output B)

4 - Menu selector switch (enter)

5 - CAN Bus - Low (display)

6 - CAN Bus - Low

7 - CAN Bus - Low

8 - 10 Vacant

11 - Enable signal

12 - Clock signal

13 - Data signal

14 - Brake lights

15 - Washer fluid low

16 - Backup lights / low-beam headlights

17 - On-board computer, left

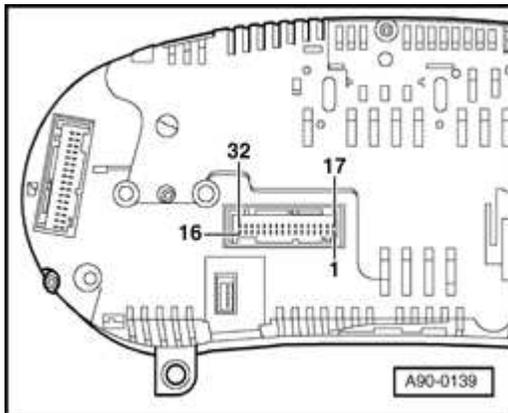


Fig. 185: 32-Pin Multi-Connector - T32B-, Grey
Courtesy of VOLKSWAGEN UNITED STATES, INC.

18 - On-board computer, right

19 - On-board computer, reset

20 - Remote-control radio input, auxiliary heater*

21 - Summer/winter switch-over*

22 - Auxiliary heater on*

23 - Switch selector, navigation*

24 - Switch selector, navigation*

25 - Switch selector, telematic (traffic guidance systems)*

26 - 32 Vacant

*) Where applicable

Speedometer Vehicle Speed Sensor (VSS) -G22-, checking

If the speedometer is inoperative:

- Check for speedometer vehicle speed sensor signal input to instrument cluster as follows:
- Connect scan tool. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions** .
- Select "Read Measuring Value Block" function 08. Refer to **Read Measuring Value Block (function 08)** .
- Select channel 001 and carry out road test.

WARNING:

- **When taking test readings while the vehicle is moving, VAG 1551/1552 or VAS 5052 Tool must always be secured to the rear seat and operated from this position.**
- **DO NOT USE VAS 5051 during a road test.**

If speed signal is indicated on scan tool, the instrument cluster is malfunctioning and must be replaced.

- Remove instrument cluster. Refer to **Instrument cluster, removing and installing** .

If speed signal is not indicated on scan tool, check signal at multi-pin terminal on rear of instrument cluster as follows:

- Remove instrument cluster. Refer to **Instrument cluster, removing and installing** .
- Connect test box VAG 1598 to blue 32-pin connector using adapter cable VAG 1598/25.
- Perform an acoustic continuity test of wire and sensor using multimeter between socket 28 and socket 9 (load Ground)
- Switch ignition off.

NOTE: For the Audi TT, the vehicle speed signal is generated by a hall effect sensor. Therefore, there must be battery voltage (about 12V) at the speedometer Vehicle Speed Sensor (VSS) -G22- during test.

Test:

Signal of continuity tester must switch off and on repeatedly while vehicle is rolled back and forth approximately 1 meter (1 yard).

If test is not OK:

- Check wiring connection to speedometer vehicle speed sensor using applicable wiring diagram.

If test is OK:

- Replace speedometer vehicle speed sensor.

Sender for Fuel Gauge -G-, checking

If the fuel gauge is malfunctioning, check whether the signal generated by the fuel level sender is being received by the instrument cluster.

- Connect scan tool. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions** .
- Select "Read Measuring Value Block" function 08. Refer to **Read Measuring Value Block (function 08)** .

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ELECTRICAL Electrical Equipment

- Select display group 002.

If fuel level is indicated on scan tool, the instrument cluster is malfunctioning and must be replaced.

- Removing instrument cluster. Refer to **Instrument cluster, removing and installing** .

If fuel level is not indicated on scan tool, check the signal at the multi-pin connector on instrument cluster.

- Remove instrument cluster. Refer to **Instrument cluster, removing and installing** .
- Connect test box VAG 1598 to the blue 32-pin connector using adapter VAG 1598/25.
- Use multimeter to measure the resistance between contacts 5 and 7 (sensor Ground).

Specifications:

Fuel tank empty:	approx. 54 ohms (front-wheel drive)
	approx. 59 ohms (all-wheel drive)
Fuel tank full:	approx. 290 ohms (front-wheel drive)
	approx. 282 ohms (all-wheel drive)

- If measured values do not match the specifications, test wiring between instrument cluster and fuel gauge sender -G (front-wheel drive / all-wheel drive) or -G169- (all-wheel drive) using wiring diagram.

Refer to Electrical Wiring Diagrams

- If there are no open circuits or short circuits, check fuel gauge sender -G (front-wheel drive / all-wheel drive) or -G169- (all-wheel drive).
- Check sender for fuel gauge.

Refer to

- **20 - FUEL PUMP, FUEL SUPPLY, EVAPORATIVE EMISSIONS** for 1.8 LITER 4-CYL. 5V TURBO GENERIC SCAN TOOL ENGINE CODE(S): AMU, BEA, ATC, AWP
- **20 - FUEL SUPPLY** for 3.2 LITER V6 4V GENERIC SCAN TOOL, ENGINE CODE: BHE
- If measured values match the specification, the malfunction is in the instrument cluster; replace the instrument cluster. Refer to **Instrument cluster, removing and installing** .

Sender for Fuel Gauge -G-, multi-pin connector assignments

CAUTION: Before beginning repairs on the electrical system

- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**

TT Coupe

Sender is located under rear seat bench

- Remove rear seat bench

Refer to **72 - SEAT - FRAMES**

TT Roadster

Sender is located under rear panel trim

- Remove rear panel trim

Refer to **70 - INTERIOR TRIM**

All

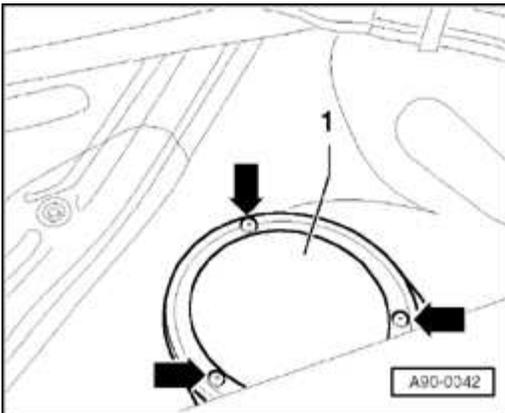


Fig. 186: Unscrewing Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - arrows-.
- Remove access panel -1-.

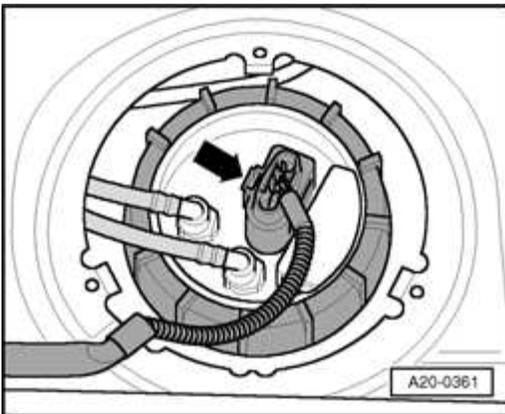


Fig. 187: Disengaging 4-Pin Electrical Harness Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector -arrow-.

Sender for Fuel Gauge -G- multi-pin connector assignments

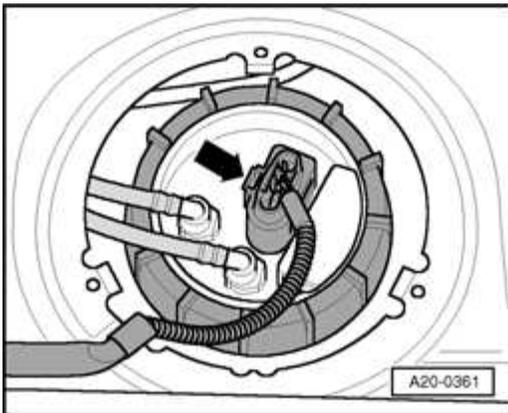


Fig. 188: Disengaging 4-Pin Electrical Harness Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1 - Fuel pump positive (+)
- 2 - Sender Ground (GND) (-)
- 3 - Sender to fuel gauge
- 4 - Fuel pump Ground (GND) (-)

Fuel consumption signal, testing

Special tools and equipment

- Multimeter Fluke 83 (or equivalent)
- VAG 1598 test box with VAG 1598/25 adapter
- VAG 1594 connector test kit
- Test box for relevant Engine Control Module (ECM)

Scan Tool (ST) and test equipment safety precautions

WARNING:

- **Due to weight, size and need for manual operation of test instruments while vehicle is driven on public roads, instrument must be used only with a Driver operating the vehicle and an Instrument Operator operating the test equipment.**

- **Do not use Instrument with Driver only. Always use two persons to conduct test.**
- **Do not place Instrument on lap of Driver or front seat passenger because emergency stop may dislodge Instrument and cause airbag deployment with risk of injury to Instrument Operator.**

WARNING: Use of Instrument in Audi TT Coup:

- **Place Instrument in rear seating area and secure by available safety belt.**
- **Instrument Operator must be seated in the other rear seating position, after sliding front passenger seat and moving the seat back as far forward as possible. Do not activate the seat back release lever.**
- **Instrument Operator must wear safety belt.**

Use of Instrument in Audi TT Roadster:

- **Use only Instrument VAG 1551/1552 or VAS 5052. DO NOT USE VAS 5051.**
- **Before test, deactivate passenger's airbag using key operated switch in glove compartment.**
- **Instrument Operator must be seated on passenger seat with safety belt worn.**
- **Place Instrument in foot well in front of passenger seat in a manner allowing the Operator to use the Instrument in a safe manner.**
- **After completion of test, re-activate front passenger airbag.**

CAUTION: To prevent damage to electronic and electrical components, note the following:

- **Always switch off the ignition before connecting or disconnecting test instruments.**
 - **During some of the tests the control module may identify and record DTCs. The Diagnostic Trouble Code (DTC) memory should therefore be checked and (if necessary) erased after completing the tests and any repair work that may be required.**
- Start engine and perform road test. Observe consumption display in instrument cluster

What is indicated in consumption display?

1. Always 0.0 L/100 km

- Signal wire may have a short circuit to Ground
- Switch ignition off.
- Connect relevant test box to Engine Control Module (ECM).

Refer to

- **24 MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMU
- **28 IGNITION/GLOW PLUG SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): ATC
- **24 MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AWP
- **24 MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): BEA
- **24 - MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO GENERIC SCAN TOOL ENGINE CODE(S): AMU, BEA, ATC, AWP

- **24 MULTIPORT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V FUEL INJECTION & IGNITION, ENGINE CODE(S): BHE
- **24 - MULTIPORT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V GENERIC SCAN TOOL, ENGINE CODE: BHE
- Remove instrument cluster. Refer to **Instrument cluster, removing and installing** and disconnect blue 32-pin connector from instrument cluster.
- Connect VAG 1598 test box to blue 32-pin connector using VAG 1598/25 adapter.
- Connect (+) test lead to VAG 1598/25 socket 25 using multimeter.
- Connect (-) test lead to relevant test box of Engine Control Module (ECM) and the related consumption signal socket of the ECM.
- Perform resistance measurement.

Specification: display < 2 Ohm

- Connect (+) test lead to relevant test box of Engine Control Module (ECM) using multimeter.
- Connect (-) test lead to Ground.
- Perform resistance measurement.

Specification: display < 9 MOhm

- If specified value is not obtained, wiring connection is OK.

2. Always 51 L/100 km

- Signal wire may have an open circuit
- Switch ignition off.
- Connect test box to Engine Control Module (ECM).

Refer to

- **24 MULTIPORT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V

TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMU

- **28 IGNITION/GLOW PLUG SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): ATC
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AWP
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): BEA
- **24 - MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO GENERIC SCAN TOOL ENGINE CODE(S): AMU, BEA, ATC, AWP
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V FUEL INJECTION & IGNITION, ENGINE CODE(S): BHE
- **24 - MULTIPOINT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V GENERIC SCAN TOOL, ENGINE CODE: BHE
- Remove instrument cluster. Refer to **Instrument cluster, removing and installing** and disconnect blue 32-pin connector from instrument cluster.
- Connect VAG 1598 test box to blue 32-pin connector using VAG 1598/25 adapter.
- Connect (+) test lead to VAG 1598/25 socket 25 using multimeter.
- Connect (-) test lead to relevant test box of Engine Control Module (ECM) and the related consumption signal socket of the ECM.
- Perform resistance measurement.

Specification: display < 2 Ohm

- Connect (+) test lead to relevant test box of Engine Control Module (ECM) using multimeter.
- Connect (-) test lead to Ground.
- Perform resistance measurement.

Specification: display < 9 MOhm

- If specified value is not obtained, wiring connection is OK.

3. Consumption gauge indication is illogical or constantly varying consumption value

- Consumption gauge indication does not match actual fuel consumption.
- Perform adaptation of fuel consumption gauge.

Engine Coolant Temperature (ECT) Sensor -G2-, checking

If the coolant temperature gauge is malfunctioning, check whether the coolant temperature sensor signal is being received by the instrument cluster.

- Connect scan tool. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions** .
- Select "Read Measuring Value Block" function 08. Refer to **Read Measuring Value Block (function 08)** .
- Select Display Group 003.

If coolant temperature is indicated on scan tool, the instrument cluster is malfunctioning and must be replaced.

- Removing instrument cluster. Refer to **Instrument cluster, removing and installing** .

If coolant temperature is not indicated on scan tool, test the signal at the multi-pin connector on the instrument cluster.

- Removing instrument cluster. Refer to **Instrument cluster, removing and installing** .
- Connect test box VAG 1598 to the blue 32-pin connector using adapter VAG 1598/25.
- Use multimeter to measure resistance between contacts 8 and 9 (load Ground).

Specifications:

- Coolant temperature 90 ° C: approx. 110 Ohm
- Coolant temperature 120 ° C: approx. 50 Ohm
- If measured values do not match specifications, test wiring between instrument cluster and coolant temperature sender using wiring diagram.

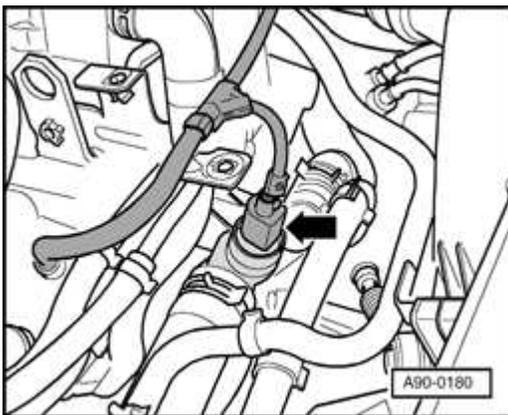
Refer to Electrical Wiring Diagrams

- If there are no open circuits or short circuits, replace the coolant temperature sender.

Engine Coolant Temperature (ECT) Sensor -G2-, multi-pin connector assignments

CAUTION: Before beginning repairs on the electrical system

- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**



**Fig. 189: Locating Engine Coolant Temperature Sensor -G2-
Courtesy of VOLKSWAGEN UNITED STATES, INC.**

Engine Coolant Temperature (ECT) Sensor -G2- -arrow- is located in the coolant flange/thermostat housing to the left of the cylinder head. Sensor is integrated with Engine Coolant Temperature (ECT) Sensor -G62-.

Engine Coolant Temperature (ECT) Sensor -G2-/-G62- multi-pin connector assignments

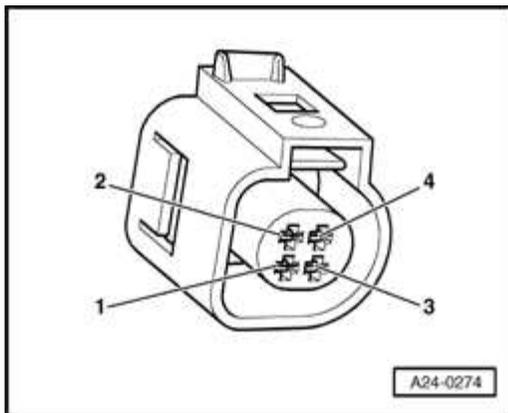


Fig. 190: Coolant Temperature Sensor Terminals
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1 - ECT signal to temperature gauge
- 2 - Ground (GND) (-)
- 3 - ECT signal to Engine Control Module (ECM) -J220-
- 4 - Sensor Ground (GND) (-)

INSTRUMENT CLUSTER FROM M.Y. 2000 - VIN 8N_Y040001 AND/OR SOFTWARE VERSIONS FROM D26 & D03

General information

The instrument cluster contains an electronic speedometer, tachometer, liquid crystal (LCD) displays for odometer, trip odometer, digital clock with date, as well as analog coolant temperature and fuel level gauges. Control and warning lamps are situated within the speedometer and tachometer faces.

A "Driver's Information System" LCD is located between the tachometer and speedometer. Displayed information includes an auto check system, outside air temperature, radio frequency and selectable trip computer functions.

The auto check system integrated with the Driver's Information System monitors the brake system, coolant temperature, fuel level, engine oil pressure, and displays the ambient temperature as a default.

The optional Navigation system display is also included in the Driver's Information

System (where applicable).

On Board Diagnostic (OBD), function

The instrument cluster is controlled by a microprocessor and has extensive On Board Diagnostic (OBD) capability. If malfunctions occur in any of the system components, corresponding DTCs are stored in the Diagnostic Trouble Code (DTC) memory of the instrument cluster.

If OBD recognizes instrument cluster malfunctions related to the:

- odometer
- speedometer calibration

the trip odometer display will change to show "dEF."

In this case, replace speedometer. Refer to **Instrument cluster, removing and installing** .

Other malfunctions recognized by OBD will not cause the trip odometer display to change as described above.

Before performing any troubleshooting or inspection, always begin by checking for DTCs using the On Board Diagnostic (OBD) program. DTCs stored in memory are retrieved/checked with VAG 1551/1552 scan tool or VAS 5051/5052 tester in mode "Self Diagnosis". Refer to **Application notes** .

Where applicable, also use VAS 5051/5052 tester in mode "Guided Fault Finding"

OBD program application notes. Refer to **OBD program application notes** .

OBD program application notes

OBD through m.y. 2000 - VIN 8N_Y0400001

Always confirm vehicle VIN and instrument cluster software version as per section title above. Confirm instrument cluster software version by initiating OBD program and reading information in display. Refer to **Instrument cluster On Board Diagnostic (OBD), initiating** .

Information in this section also applies to replacement instrument clusters with software version D26 installed in vehicles through VIN 8N_Y040000.

Vehicles from start of production through VIN 8N_Y040000 contain instrument clusters with software versions through D24 have limited Diagnostic Trouble Code (DTC), Read Measuring Value Block and Adaptation information not specifically covered in this section.

Information on clusters on vehicles up to VIN 8N_Y040000 with software versions through D24 are contained in section "Instrument cluster On Board Diagnostic (OBD) through VIN 8N_Y040000 and software versions D24". Refer to [Application notes](#) .

OBD from m.y. 2001

OBD program information for instrument clusters from m.y. 2001. Refer to [General Information](#) .

Message "dEF" on trip recorder display

If the control module in the instrument cluster detects a malfunction in its permanent memory, the letters "dEF" will appear on the trip recorder display.

- If "dEF" appears on the display, replace the instrument cluster. Refer to [Instrument cluster, removing and installing](#) .

Notes on replacing instrument cluster

- The instrument cluster must not be disassembled.
- If necessary, the instrument cluster can be replaced with an exchange unit (where applicable).
- Complete the damage report form and return it together with the malfunctioning instrument cluster.
- Malfunctioning units must always be returned in their original packing.
- Various input values must be adapted to replacement speedometer. Refer to [Replacement instrument cluster input values, adapting](#) .

Instrument cluster, removing and installing

Special tools, testers and auxiliary items needed

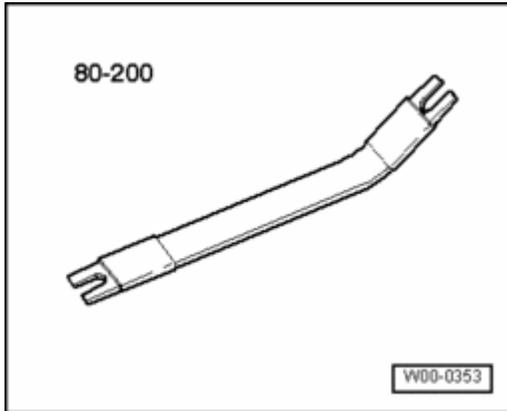


Fig. 191: Pry Lever 80-200

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry lever 80-200

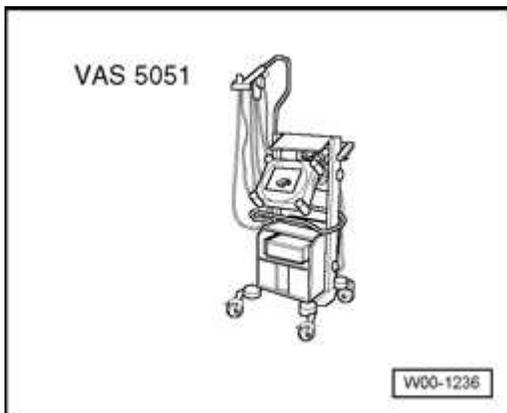


Fig. 192: VAS 5051 Vehicle Diagnosis, Testing and Information System

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAS 5051 Vehicle Diagnostic Testing and Information System
- Optional: VAS 5052 Vehicle Diagnostic and Service System
- Optional: VAG 1551/1552 Scan Tool (ST)

Preparation

Should instrument cluster require replacement, input values for replacement instrument must first be determined by using either of the two methods that follow:

VAS 5051/5052

- Determine input values automatically by connecting VAS 5051/5052 and select operating mode "Guided Fault Finding"
- Enter appropriate model, equipment and model year information and press ">" to confirm.

After all Control Modules have been registered and DTC memories checked,

- Select "Go to"
- Select "Function / Component Selection"
- Select "Control Module functions"
- Select "+17 - Instrument Cluster"
- Select function "Instrument cluster replacing"
- Follow testers prompts

VAG 1551/1552

- Determine input values individually using VAG 1551/1552. Refer to **Replacement instrument cluster input values, adapting** .

Removing

NOTE:

- **Instrument cluster must not be disassembled.**
- **It is not necessary to remove the steering wheel. For ease of illustration the steering wheel is not shown in the following illustrations.**
- **All removed cable ties are to be re-attached in same position on installation.**

CAUTION: Before beginning repairs on the electrical system

- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**

- Use adjuster to pull out and pivot steering wheel downwards as far as possible.
- Remove driver's storage compartment.

Refer to **68 - INTERIOR EQUIPMENT**

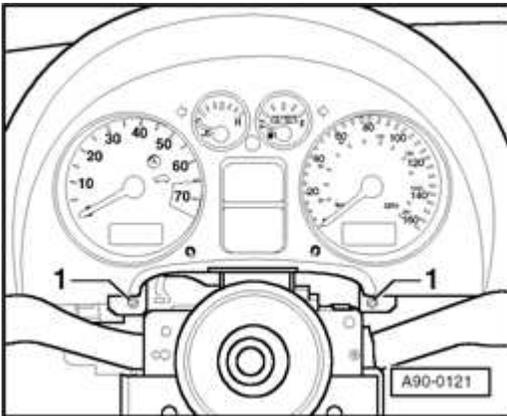


Fig. 193: Steering Column To Instrument Panel Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -1-.
- Pull out instrument cluster from bottom in order to disengage upper mounting clips.
- Pry off clips from rear of instrument cluster using 80-200.
- Release cable ties on rear of instrument cluster.

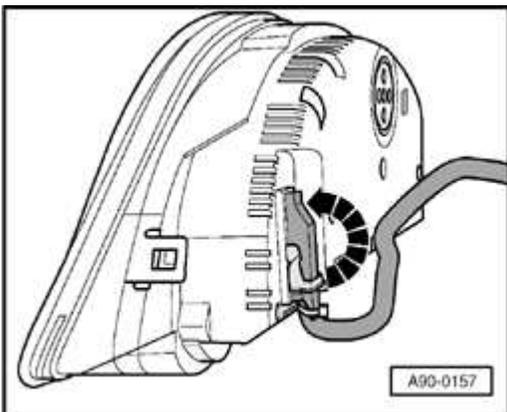


Fig. 194: Releasing Retainer Catches And Disconnecting Electrical Connections From Instrument Cluster
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release retainer catches in direction of -arrow- and disconnect electrical connections from instrument cluster.

Installing

Install in reverse order of removal, noting the following:

- If instrument cluster was replaced and input values were obtained automatically using the VAS 5051/5052, follow the remaining tester prompts. Refer to **Instrument cluster, removing and installing** .
- If instrument cluster was replaced and individual input values were obtained using the VAG 1551/1552, perform functional check of instrument cluster.
- If functional check is OK, enter input values. Refer to **Replacement instrument cluster input values, adapting** .

Instrument cluster, rear view

NOTE: All indicator & warning lamps are Light Emitting Diodes (LED). If one fails, the entire instrument cluster must be replaced.

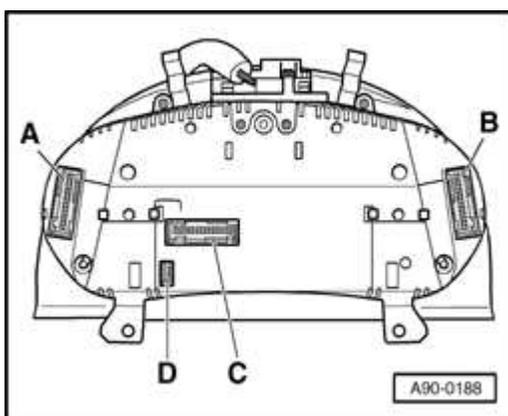


Fig. 195: Instrument Cluster, Rear View
Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - 32-pin multi-connector, green

B - 32-pin multi-connector, blue

C - 32-pin multi-connector, grey

D - 4-pin multi-connector, black (where applicable)

Instrument cluster multi-pin connector assignments

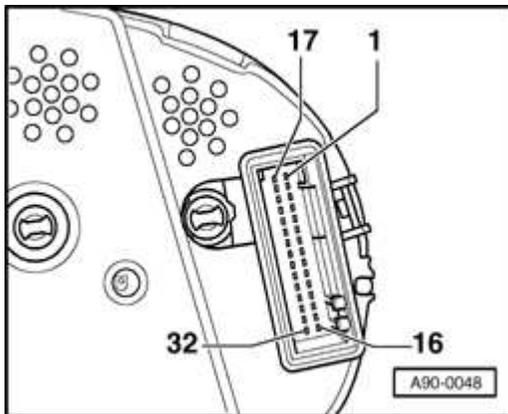


Fig. 196: 32-Pin Multi-Connector -T32-, Blue
Courtesy of VOLKSWAGEN UNITED STATES, INC.

32-pin multi-connector -T32-, blue

- 1 - Terminal 15
- 2 - Brake pad wear indicator
- 3 - Speedometer output 1
- 4 - Vacant
- 5 - Fuel gauge sender
- 6 - Fuel tank warning (OBD 2)
- 7 - Terminal 31 (sensor)
- 8 - Coolant temperature
- 9 - Terminal 31 (load)
- 10 - Oil pressure 2 (high)

- 11 - Engine speed signal
- 12 - Air conditioner shut-off
- 13 - Electronic Power Control (EPC)
- 14 - Convertible top
- 15 - Terminal 58d
- 16 - Vacant

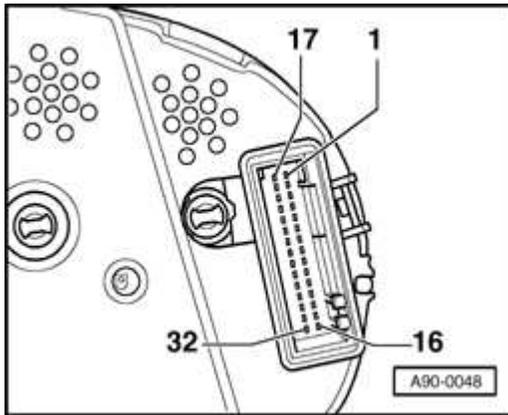


Fig. 197: 32-Pin Multi-Connector -T32-, Blue
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 17 - High beams
- 18 - Left turn signal
- 19 - Vacant
- 20 - Terminal 58s
- 21 - Door contact, driver's side
- 22 - Coolant level low
- 23 - Terminal 30
- 24 - Terminal 31 (load)

- 25 - Fuel consumption signal
- 26 - Right parking light
- 27 - Left parking light
- 28 - Speedometer input
- 29 - Brake fluid level
- 30 - S-contact
- 31 - Speedometer output 2
- 32 - ESP / ASR (traction control)

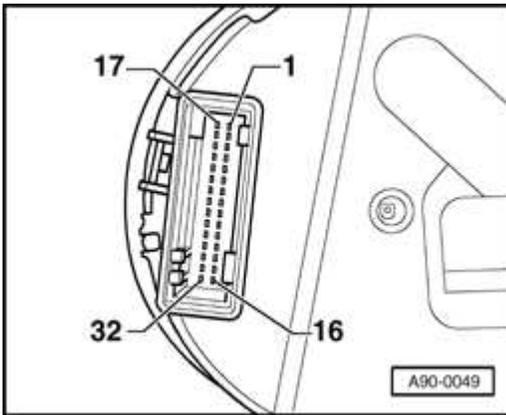


Fig. 198: 32-Pin Multi-Connector, -T32A-, Green
Courtesy of VOLKSWAGEN UNITED STATES, INC.

32-pin multi-connector, -T32a-, green

- 1 - Door contact (all doors)*
- 2 - Transponder 1
- 3 - Vacant
- 4 - Vacant
- 5 - W-wire

6 - Signal from central locking for detecting "door open"

7 - Right turn signal

8 - Vacant

9 - Vacant

10 - Airbag

11 - Standing time output

12 - Terminal 61

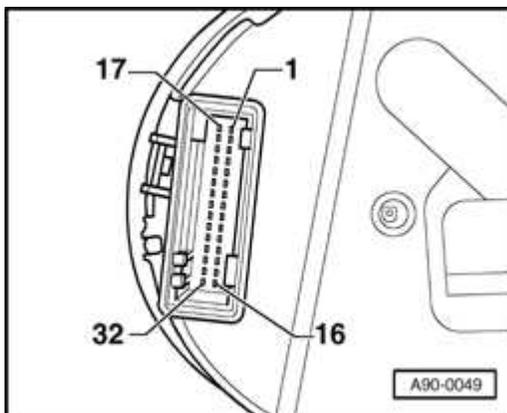
13 - Parking brake

14 - Engine check*

15 - Oil level / oil temperature

16 - Vacant

*) Where applicable



**Fig. 199: 32-Pin Multi-Connector, -T32A-, Green
Courtesy of VOLKSWAGEN UNITED STATES, INC.**

17 - Transponder 2

18 - CAN Bus - High + (Powertrain)

2006 Audi TT

ELECTRICAL Electrical Equipment

- 19 - CAN Bus - High - (Powertrain)
 - 20 - CAN Bus - High shielding (Powertrain)*
 - 21 - ABS monitor
 - 22 - CAN Bus - Low + (Convenience)*
 - 23 - CAN Bus - Low - (Convenience)*
 - 24 - CAN Bus - Low shielding (Convenience)*
 - 25 - Hood switch
 - 26 - Vacant
 - 27 - Belt buckle
 - 28 - K-wire - Data Link Connector (DLC)
 - 29 - Outside temperature input
 - 30 - Terminal 58de (external dimmer potentiometer)
 - 31 - Gear selector display
 - 32 - Vacant
- *) Where applicable

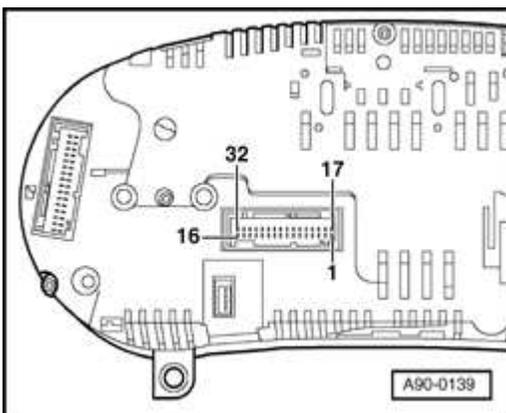


Fig. 200: 32-Pin Multi-Connector - T32B-, Grey
Courtesy of VOLKSWAGEN UNITED STATES, INC.

32-pin multi-connector - T32b-, grey

- 1 - Menu selector switch (menu)
- 2 - Menu selector switch (output A)
- 3 - Menu selector switch (output B)
- 4 - Menu selector switch (enter)
- 5 - CAN Bus - Low (display)
- 6 - CAN Bus - Low
- 7 - CAN Bus - Low
- 8 - 10 Vacant
- 11 - Enable signal
- 12 - Clock signal
- 13 - Data signal
- 14 - Brake lights
- 15 - Washer fluid low
- 16 - Tail lights / low-beam headlights
- 17 - On-board computer, left

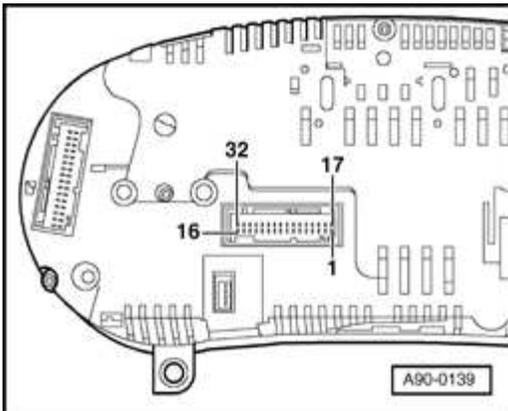


Fig. 201: 32-Pin Multi-Connector - T32B-, Grey
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 18 - On-board computer, right
- 19 - On-board computer, reset
- 20 - Vacant
- 21 - Summer/winter switch-over*
- 22 - Vacant
- 23 - Switch selector, navigation*
- 24 - Switch selector, navigation*
- 25 - 32 Vacant

*) Where applicable

Speedometer Vehicle Speed Sensor (VSS) -G22-, checking

If the speedometer is inoperative:

- Check for speedometer vehicle speed sensor signal input to instrument cluster as follows:
- Connect scan tool. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle**

Diagnostic and Service System, connecting and selecting functions .

- Select "Read Measuring Value Block" function 08. Refer to **Read Measuring Value Block (function 08)** .
- Select channel 001 and carry out road test.

- WARNING:**
- **When taking test readings while the vehicle is moving, VAG 1551/1552 or VAS 5052 must always be secured to the rear seat and operated from this position.**
 - **DO NOT USE VAS 5051 during a road test.**

If the speed signal is indicated on the scan tool display, the instrument cluster is malfunctioning and must be replaced.

If the speed signal is not displayed on the scan tool display, the signal must be checked at the multi-pin terminal on the rear of the instrument cluster as follows:

- Remove instrument cluster. Refer to **Instrument cluster, removing and installing** .
- Connect test box VAG 1598 to blue 32-pin connector using adapter cable VAG 1598/25.
- Perform an acoustic continuity test of wire and sensor using multimeter between socket 28 and socket 9 (load Ground)
- Switch ignition off.

NOTE: For the Audi TT, the vehicle speed signal is generated by a hall effect sensor. Therefore, there must be battery voltage (about 12V) at the speedometer Vehicle Speed Sensor (VSS) -G22- during test.

Test:

Signal of continuity tester must switch off and on repeatedly while vehicle is rolled back and forth approximately 1 meter (1 yard).

If test is not OK:

- Check wiring connection to speedometer vehicle speed sensor using applicable wiring diagram.

If test is OK:

- Replace speedometer vehicle speed sensor.

Sender for Fuel Gauge -G-, checking

If the fuel gauge is malfunctioning, check whether the signal generated by the fuel level sender is being received by the instrument cluster.

- Connect scan tool. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions** .
- Select "Read Measuring Value Block" function 08. Refer to **Read Measuring Value Block (function 08)** .
- Select display group 002.

If the fuel level is indicated on the scan tool, the instrument cluster is malfunctioning and must be replaced.

- Removing instrument cluster. Refer to **Instrument cluster, removing and installing** .

If the fuel level is not indicated on the scan tool, test the signal at the multi-pin connector on the instrument cluster.

- Removing instrument cluster. Refer to **Instrument cluster, removing and installing** .
- Connect test box VAG 1598 to the blue 32-pin connector using adapter VAG 1598/25.
- Use multimeter to measure the resistance between contacts 5 and 7 (sensor Ground).

2006 Audi TT

ELECTRICAL Electrical Equipment

Specifications:

Fuel tank empty:	approx. 54 ohms (front-wheel drive)
	approx. 59 ohms (all-wheel drive)
Fuel tank full:	approx. 290 ohms (front-wheel drive)
	approx. 282 ohms (all-wheel drive)

- If the values do not match the specifications, test wiring between instrument cluster and fuel gauge sender -G (front-wheel drive / all-wheel drive) or -G169- (all-wheel drive) using wiring diagram.

Refer to Electrical Wiring Diagrams, Troubleshooting & Component Locations binder

- If there are no open circuits or short circuits, check fuel gauge sender -G (front-wheel drive / all-wheel drive) or -G169- (all-wheel drive).
- Check sender for fuel gauge.

Refer to

- **20 - FUEL PUMP, FUEL SUPPLY, EVAPORATIVE EMISSIONS** for 1.8 LITER 4-CYL. 5V TURBO GENERIC SCAN TOOL ENGINE CODE(S): AMU, BEA, ATC, AWP
- **20 - FUEL SUPPLY** for 3.2 LITER V6 4V GENERIC SCAN TOOL, ENGINE CODE: BHE
- If the value obtained matches the specification, the malfunction is in the instrument cluster; replace the instrument cluster. Refer to **Instrument cluster, removing and installing** .

Sender for Fuel Gauge -G-, multi-pin connector assignments

CAUTION: Before beginning repairs on the electrical system

- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**

TT Coupe

Sender is located under rear seat bench

- Remove rear seat bench

Refer to **72 - SEAT - FRAMES**

TT Roadster

Sender is located under rear panel trim

- Remove rear panel trim

Refer to **70 - INTERIOR TRIM**

All

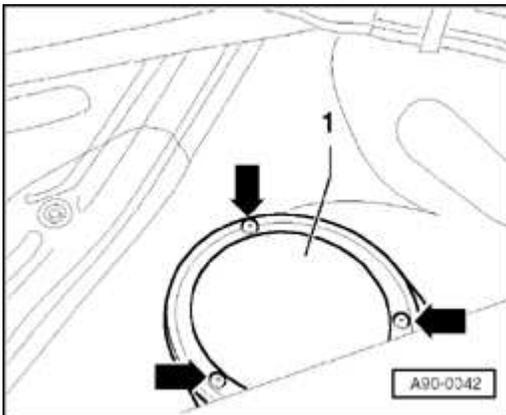


Fig. 202: Unscrewing Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws - arrows-
- Remove access panel -1-

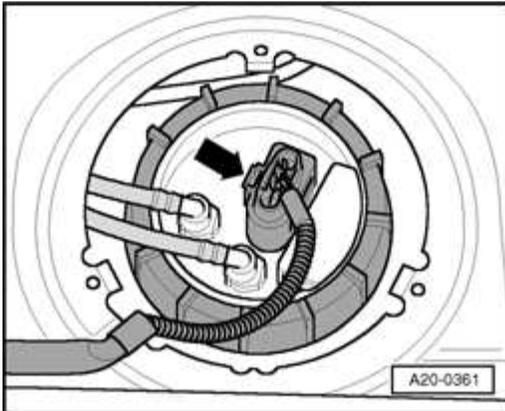


Fig. 203: Disengaging 4-Pin Electrical Harness Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connector -arrow-.

Sender for Fuel Gauge -G- multi-pin connector assignments

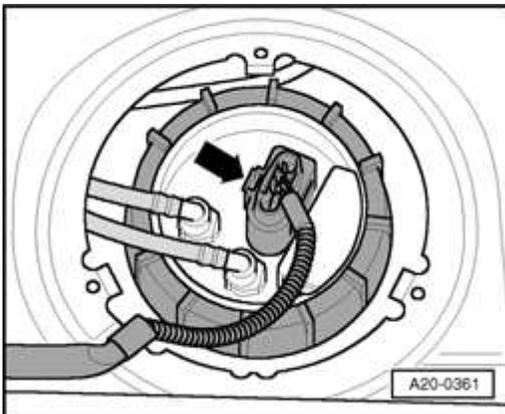


Fig. 204: Disengaging 4-Pin Electrical Harness Connector
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1 - Fuel pump positive (+)
- 2 - Sender Ground (GND) (-)
- 3 - Sender to fuel gauge
- 4 - Fuel pump Ground (GND) (-)

Fuel consumption signal, testing

Special tools and equipment

- Multimeter Fluke 83 (or equivalent)
- VAG 1598 test box with VAG 1598/25 adapter
- VAG 1594 connector test kit
- Test box for relevant Engine Control Module (ECM)

Scan Tool (ST) and test equipment safety precautions

WARNING:

- **Due to weight, size and need for manual operation of test instruments while vehicle is driven on public roads, instrument must be used only with a Driver operating the vehicle and an Instrument Operator operating the test equipment.**
- **Do not use Instrument with Driver only. Always use two persons to conduct test.**
- **Do not place Instrument on lap of Driver or front seat passenger because emergency stop may dislodge Instrument and cause airbag deployment with risk of injury to Instrument Operator.**

WARNING: Use of Instrument in Audi TT Coup:

- **Place Instrument in rear seating area and secure by available safety belt.**
- **Instrument Operator must be seated in the other rear seating position, after sliding front passenger seat and moving the seat back as far forward as possible. Do not activate the seat back release lever.**
- **Instrument Operator must wear safety belt.**

Use of Instrument in Audi TT Roadster:

- **Use only Instrument VAG 1551/1552 or VAS 5052. DO NOT USE VAS 5051.**
- **Before test, deactivate passenger's airbag using key operated switch in glove compartment.**
- **Instrument Operator must be seated on passenger seat with safety belt worn.**
- **Place Instrument in foot well in front of passenger seat in a manner allowing the Operator to use the Instrument in a safe manner.**
- **After completion of test, re-activate front passenger airbag.**

CAUTION: To prevent damage to electronic and electrical components, note the following:

- **Always switch off the ignition before connecting or disconnecting test instruments.**
 - **During some of the tests the control module may identify and record DTCs. The Diagnostic Trouble Code (DTC) memory should therefore be checked and (if necessary) erased after completing the tests and any repair work that may be required.**
- Start engine and perform road test. Observe consumption display in instrument cluster

What is indicated in consumption display?

1. Always 0.0 L/100 km

- Signal wire may have a short circuit to Ground
- Switch ignition off.

- Connect relevant test box to Engine Control Module (ECM).

Refer to

- **24 MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMU
- **28 IGNITION/GLOW PLUG SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): ATC
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AWP
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): BEA
- **24 - MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO GENERIC SCAN TOOL ENGINE CODE(S): AMU, BEA, ATC, AWP
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V FUEL INJECTION & IGNITION, ENGINE CODE(S): BHE
- **24 - MULTIPOINT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V GENERIC SCAN TOOL, ENGINE CODE: BHE
- Remove instrument cluster. Refer to **Instrument cluster, removing and installing** and disconnect blue 32-pin connector from instrument cluster.
- Connect VAG 1598 test box to blue 32-pin connector using VAG 1598/25 adapter.
- Connect (+) test lead to VAG 1598/25 socket 25 using multimeter.
- Connect (-) test lead to relevant test box of Engine Control Module (ECM) and the related consumption signal socket of the ECM.
- Perform resistance measurement.

Specification: display < 2 Ohm

- Connect (+) test lead to relevant test box of Engine Control Module (ECM) using multimeter.

- Connect (-) test lead to Ground.
- Perform resistance measurement.

Specification: display < 9 MOhm

- If specified value is not obtained, wiring connection is OK.

2. Always 51 L/100 km

- Signal wire may have an open circuit
- Switch ignition off.
- Connect test box to Engine Control Module (ECM).

Refer to

- **24 MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AMU
- **28 IGNITION/GLOW PLUG SYSTEM** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): ATC
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): AWP
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO FUEL INJECTION & IGNITION, ENGINE CODE(S): BEA
- **24 - MULTIPOINT FUEL INJECTION (MFI)** for 1.8 LITER 4-CYL. 5V TURBO GENERIC SCAN TOOL ENGINE CODE(S): AMU, BEA, ATC, AWP
- **24 MULTIPOINT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V FUEL INJECTION & IGNITION, ENGINE CODE(S): BHE
- **24 - MULTIPOINT FUEL INJECTION (MFI)** for 3.2 LITER V6 4V GENERIC SCAN TOOL, ENGINE CODE: BHE
- Remove instrument cluster. Refer to **Instrument cluster, removing and installing** and disconnect blue 32-pin connector from instrument cluster.
- Connect VAG 1598 test box to blue 32-pin connector using VAG 1598/25

adapter.

- Connect (+) test lead to VAG 1598/25 socket 25 using multimeter.
- Connect (-) test lead to relevant test box of Engine Control Module (ECM) and the related consumption signal socket of the ECM.
- Perform resistance measurement.

Specification: display < 2 Ohm

- Connect (+) test lead to relevant test box of Engine Control Module (ECM) using multimeter.
- Connect (-) test lead to Ground.
- Perform resistance measurement.

Specification: display < 9 MOhm

- If specified value is not obtained, wiring connection is OK.

3. Consumption gauge indication is illogical or constantly varying consumption value

- Consumption gauge indication does not match actual fuel consumption.
- Perform adaptation of fuel consumption gauge.

Engine Coolant Temperature (ECT) Sensor -G2-, checking

If the coolant temperature gauge in the instrument cluster is not working properly, check whether the coolant temperature sensor signal is being received by the instrument cluster.

- Connect scan tool. Refer to **VAG 1551/1552 Scan Tool (ST), VAS 5051 Vehicle Diagnostic Testing and Information System or VAS 5052 Vehicle Diagnostic and Service System, connecting and selecting functions** .
- Select "Read Measuring Value Block" function 08. Refer to **Read Measuring Value Block (function 08)** .
- Select Display Group 003.

If the coolant temperature is indicated on scan tool, instrument cluster is malfunctioning and must be replaced.

- Removing instrument cluster. Refer to **Instrument cluster, removing and installing** .

If the coolant temperature is not indicated on scan tool, test the signal at the multi-pin connector on the instrument cluster.

- Removing instrument cluster. Refer to **Instrument cluster, removing and installing** .
- Connect test box VAG 1598 to the blue 32-pin connector using adapter VAG 1598/25.
- Use multimeter to measure resistance between contacts 8 and 9 (load Ground).

Specifications:

- Coolant temperature 90 ° C: approx. 110 Ohm
- Coolant temperature 120 ° C: approx. 50 Ohm
- If measured values do not match specifications, test wiring between instrument cluster and coolant temperature sender using wiring diagram.

Refer to Electrical Wiring Diagrams

- If there are no open circuits or short circuits, replace the coolant temperature sender.

Engine Coolant Temperature (ECT) Sensor -G2-, multi-pin connector assignments

CAUTION: Before beginning repairs on the electrical system

- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**

4-cylinder engine

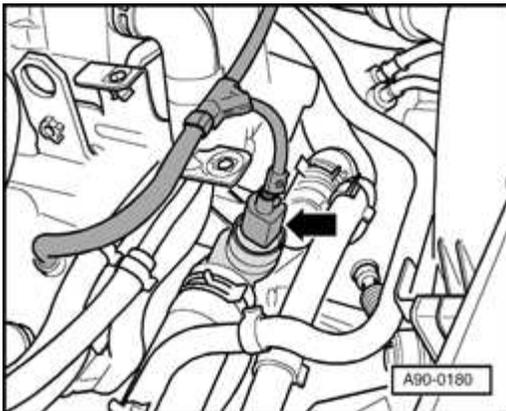


Fig. 205: Locating Engine Coolant Temperature Sensor -G2-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Engine Coolant Temperature (ECT) Sensor -G2- -arrow- is located in the coolant flange/thermostat housing to the left of the cylinder head. Sensor is integrated with Engine Coolant Temperature (ECT) Sensor -G62-.

6-cylinder engine

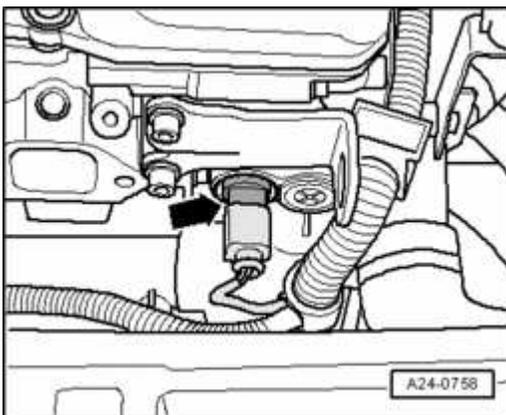


Fig. 206: Location Of Engine Coolant Temperature (ECT) Sensor -G62-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Engine Coolant Temperature (ECT) Sensor -G2- -arrow- is located in the coolant flange/thermostat housing in cylinder head. Sensor is integrated with Engine Coolant Temperature (ECT) Sensor -G62-.

Engine Coolant Temperature (ECT) Sensor -G2-/-G62- multi-pin connector assignments

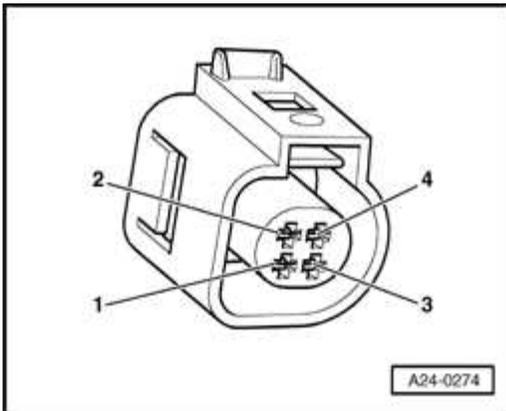


Fig. 207: Coolant Temperature Sensor Terminals
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- 1 - ECT signal to temperature gauge
- 2 - Ground (GND) (-)
- 3 - ECT signal to Engine Control Module (ECM) -J220-
- 4 - Sensor Ground (GND) (-)

Garage Door Opener Control Module -J530-, removing and installing

Removing

CAUTION: Before beginning repairs on the electrical system

- **Switch off all electrical consumers.**
- **Switch off ignition and remove ignition key.**

- Remove front bumper cover

Refer to **63 BUMPERS**

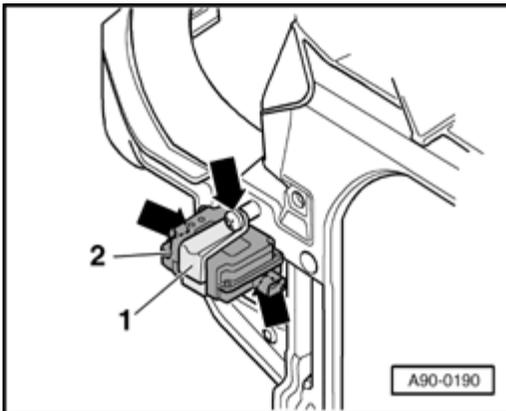


Fig. 208: Control Module, Screws And Retainer
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Remove retainer -1-.
- Remove control module - 2-
- Disconnect electrical connection.

Removing

Install in reverse order of removal, noting the following:

Tightening torque

Component	Nm
Control module bracket to lock carrier	3

92 WINDSHIELD WIPER & WASHER SYSTEM

WINDSHIELD WIPER SYSTEM

Windshield wiper system, removing and installing

Special tools, testers and auxiliary items needed

2006 Audi TT

ELECTRICAL Electrical Equipment



Fig. 209: Torque Wrench V.A.G 1331
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- VAG 1331 Torque wrench (or equivalent 5 - 50 Nm)

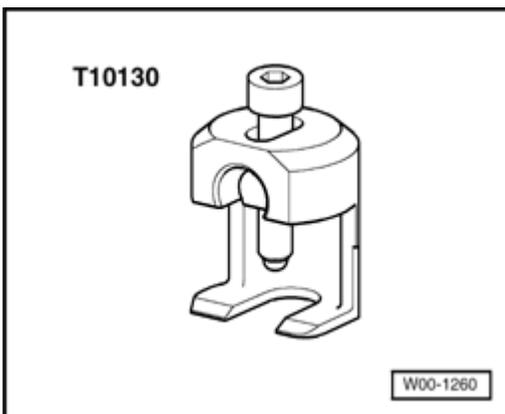


Fig. 210: T10130 Puller
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Puller T10130

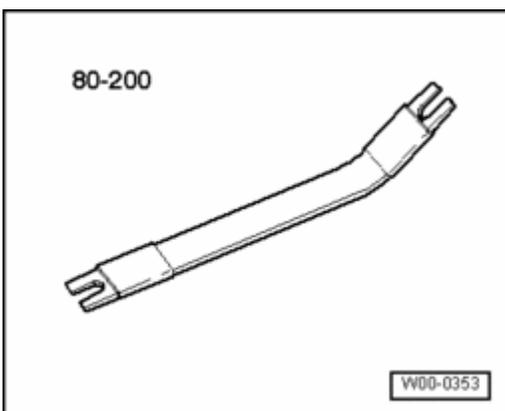


Fig. 211: Pry Lever 80-200

Courtesy of VOLKSWAGEN UNITED STATES, INC.

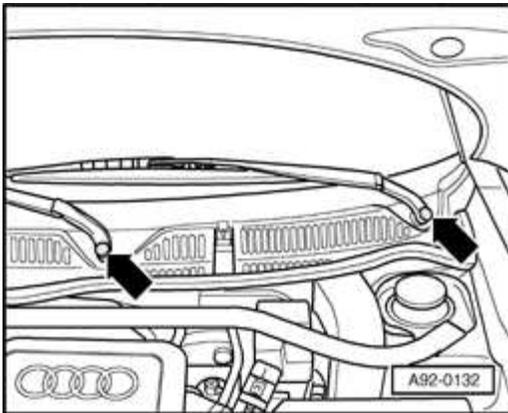
- Pry lever 80-200

Removing

NOTE: Before removing wiper arms, briefly run wipers and confirm wiper motor is in park position. Only then can the wiper arm end position be correctly set when installing.

CAUTION: Before proceeding

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

**Fig. 212: Prying Off Covers At Wiper Arms**

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pry-off caps -arrows- with a screwdriver.
- Loosen nuts (do not remove).

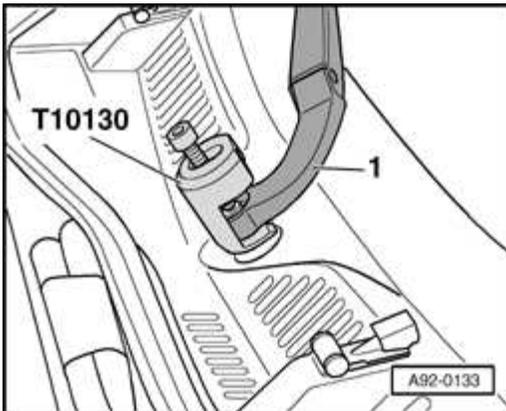


Fig. 213: Using Puller T10130 To Remove Wiper Arms From Wiper Shafts
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Place locating arms of puller T10130 under wiper arm -1- as illustrated.
- Turn spindle screw clockwise until it engages the wiper shaft and previously loosened nut (the nut serves as a centering guide for spindle).
- Continue to turn spindle screw clockwise until wiper arm -1- releases from shaft.
- Turn spindle screw counterclockwise until puller can be released from assembly.
- Remove nut completely and remove wiper arm -1-.
- Repeat for remaining wiper arm.

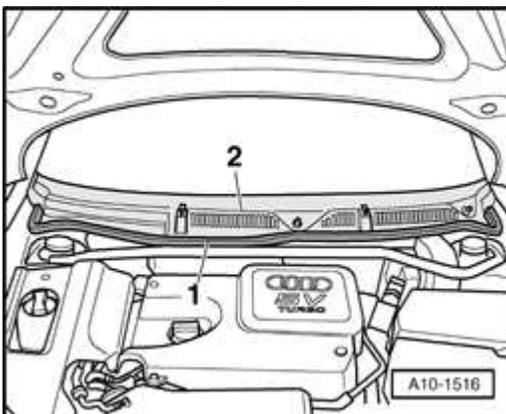


Fig. 214: Pulling Off Rubber Seal On Plenum Chamber Cover & Plenum Chamber Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove rubber seal -1-.
- Carefully pry out plenum cover -2- at edge of windshield and lift up.
- Detach washer jet connections on rear of plenum cover -2- and take off cover.

Windshield wiper assembly, removing

CAUTION: Avoid scratching fender paintwork when removing wiper assembly by applying adhesive tape to edge of fender.

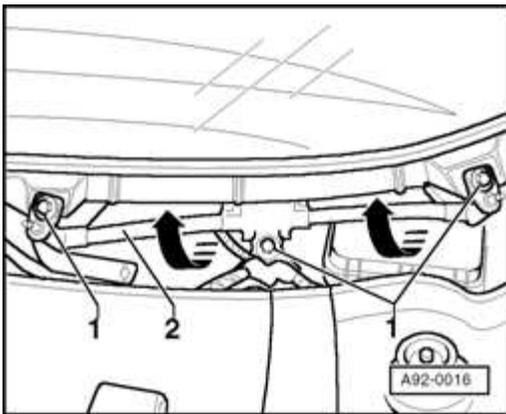


Fig. 215: Tilting Front Of Wiper Frame Upward
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -1- (10 mm A/F).
- Disconnect electrical connection from wiper motor.
- Carefully tilt front of wiper frame -2- upward (arrows), then take whole assembly from plenum from the left.

Wiper linkage & wiper motor, removing

- Use lever 80-200 to pry linkage rods from ball joints.

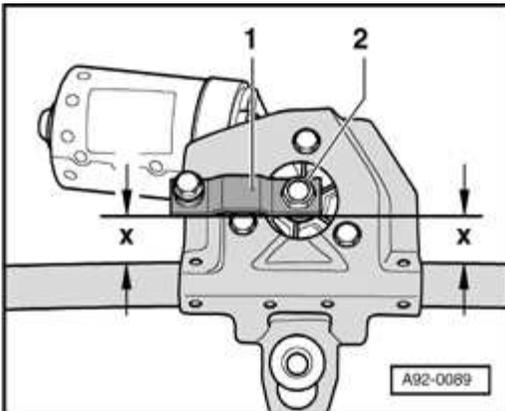


Fig. 216: Crank Aligned Parallel With Wiper Frame And Identifying Dimensions X

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut -2-.
- Remove crank.

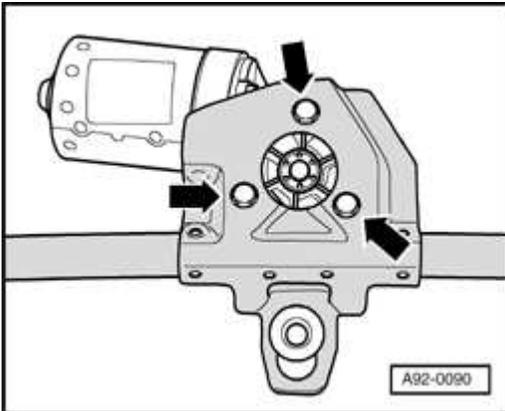


Fig. 217: Wiper Motor Bracket Screws

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bolts -arrows- from wiper motor bracket.
- Remove wiper motor from bracket.

Installing

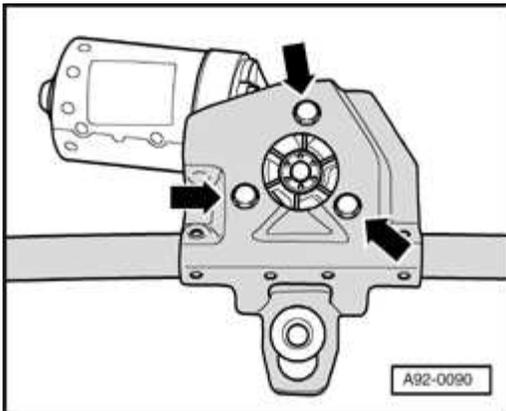


Fig. 218: Wiper Motor Bracket Screws
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Bolt wiper motor onto wiper motor bracket -arrows-, tightening torque: 9 Nm
- Reconnect electrical connection to wiper motor.
- Reinstall wiper frame (wiper motor first) into plenum, tightening torque: 5 Nm.
- Briefly run wipers and confirm wiper motor is in park position.
- Switch off ignition and remove ignition key.

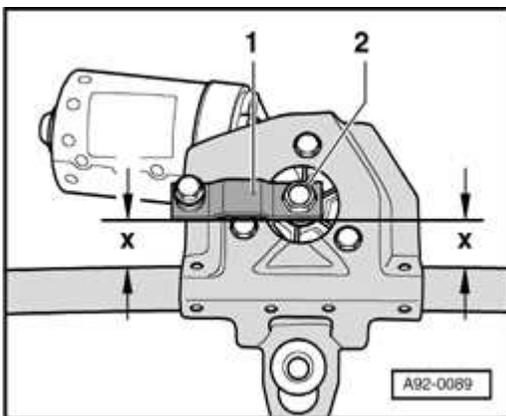


Fig. 219: Crank Aligned Parallel With Wiper Frame And Identifying Dimensions X

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Align crank -1- in parallel with wiper frame and tighten nut -2- to 18 Nm.
- Dimensions -x- must be equal.

Remaining installation in reverse of removal, noting the following:

- Set wiper blades to park position. Refer to **Wiper blade park position, setting**.

Tightening torques

Component	Nm
Wiper motor to wiper frame	9
Wiper frame to plenum	5
Crank to wiper motor	18
Wiper arm to wiper shaft	16

Wiper blade park position, setting

- Briefly operate wiper motor and allow it to return to park position.

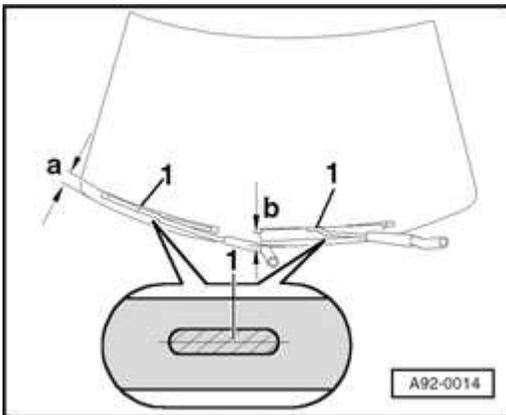


Fig. 220: Wiper Blade Park Position

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Check if wiper blades rest against marking -1- on windshield
- Check dimensions -a- and -b-.

Specifications:

- $a = 25 + 5 \text{ mm}$
- $b = 35 + 5 \text{ mm}$

NOTE: Dimensions given here are the minimum distances between the ends of the wiper blades and the plenum cover at the bottom edge of the windshield.

If specifications not met

- Remove wiper arms. Refer to Windshield wiper system, removing and installing .
- Align wiper arms to meet specification and tighten nuts to 16 Nm.

Tightening torque

Component	Nm
Wiper arm to wiper shaft	16

Wiper blade contact angle, adjusting

NOTE: Possible causes for wiper blade skip:

- Windshield scratched
- Wiper blade rubber has become detached from arm or is split
- Wiper arm/blade loose or bent
- Wiper blades coated with wax or worn out

If the wiper blades are skipping and none of the causes listed apply, check and if necessary adjust the contact angle of the wiper arms before installing new wiper blades.

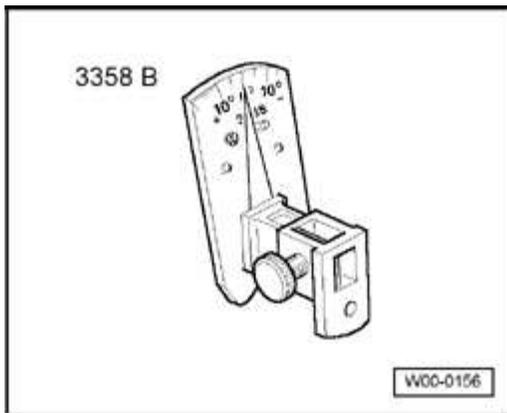


Fig. 221: Wiper Blade Adjuster VAS 3358B
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Special tools, testers and auxiliary equipment required

- Windshield Wiper Adjuster Tool 3358 B

Contact angle, checking

- Move wiper arms to park position.
- Remove wiper blades.

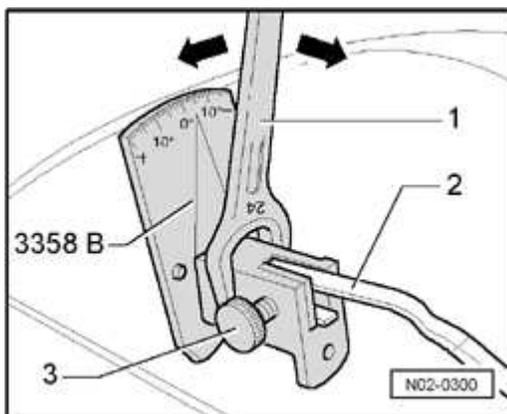


Fig. 222: Checking The Angle Setting Of Windshield Wiper Arm Using Wiper Blade Adjuster VAS 3358B

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert wiper arm -2- in wiper arm adjusting tool 3358 B and secure with locking screw -3-.
- Compare angle indicated with specification in the table

Contact angle specifications

Contact angle	Audi TT
Driver's side	- 4.0 °
Passenger side	- 4.5 °
Tolerance	- 1.5 °

Wiper arms, adjusting

- Move wiper arms to park position.
- Remove wiper blade.

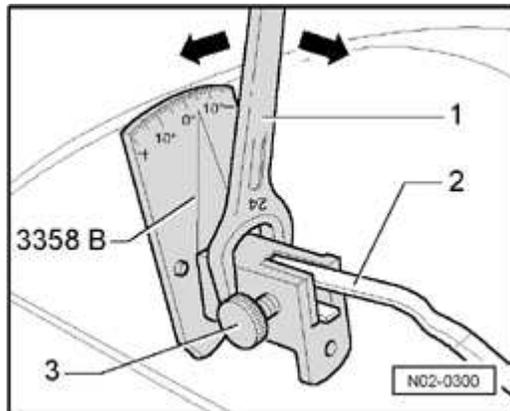


Fig. 223: Checking The Angle Setting Of Windshield Wiper Arm Using Wiper Blade Adjuster VAS 3358B

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert wiper arm -2- in wiper arm adjusting tool 3358 B and secure with locking screw -3-.
- Place open-end wrench -1- (24 mm A/F) over adjusting tool and adjust contact angle of wiper arm -2- (arrows) according to specifications. Refer to **Wiper blade contact angle, adjusting**
- Loosen locking screw -3- and remove wiper arm -2- from adjusting tool.
- Insert wiper arm -2- in wiper arm adjusting tool 3358 B again and secure with locking screw -3-.
- Compare indicated angle with specification. Refer to **Wiper blade contact angle, adjusting** .

- If necessary, repeat setting and checking procedure until angle is as specified.
- Remove adjusting tool and install wiper blade.

WINDSHIELD WASHER SYSTEM

Washer fluid reservoir, removing and installing

NOTE: The washer fluid reservoir supplies washer fluid to both the windshield washers and headlight washer system where equipped.

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

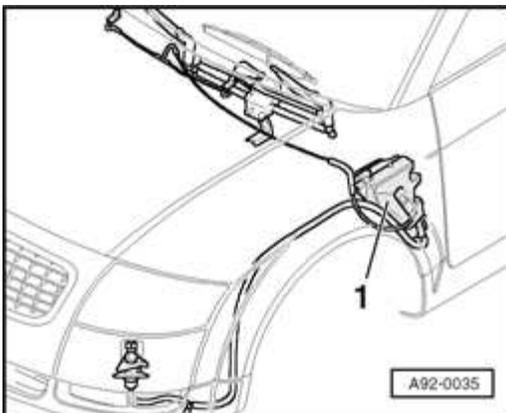


Fig. 224: Locating Washer Fluid Reservoir
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Washer fluid reservoir -1- is located at rear of left wheel housing and secured to fender and A-pillar.

Removing

- Lift cap for washer fluid reservoir and remove circlip from filler connection.
- Remove front left wheel and wheel housing liner.

Refer to **66 EXTERIOR EQUIPMENT**

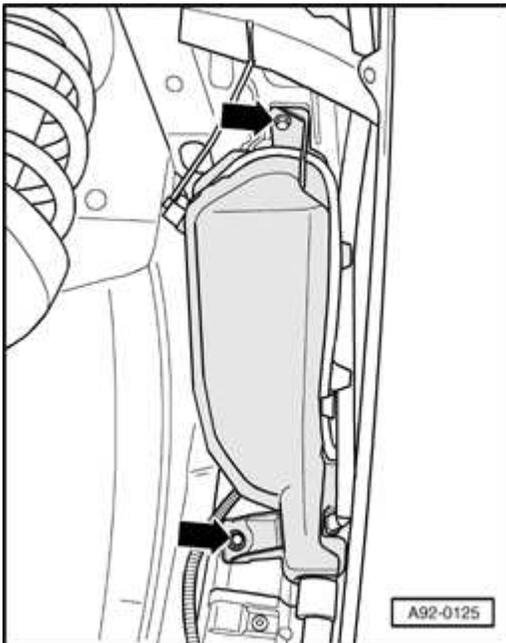


Fig. 225: Reservoir And Screws

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Lower reservoir slightly in fender opening.

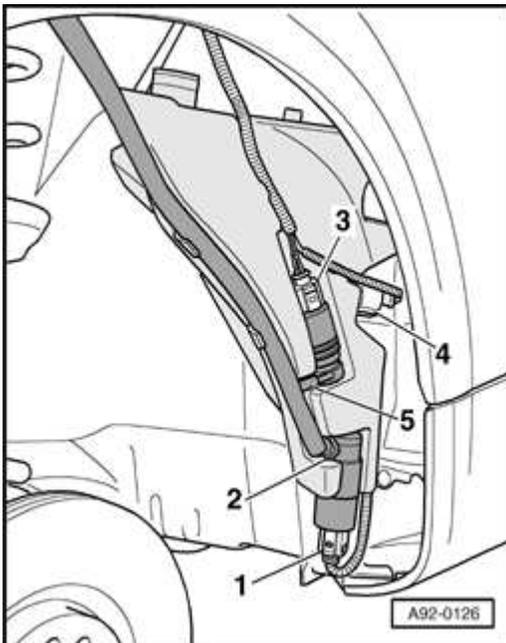


Fig. 226: Washer Fluid Reservoir Remove/Install Components

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connections -1-, -3- and -4-
- Depress retainer and remove washer hose coupling -2- from pump.
- Remove washer hose -5- from pump.
- Remove washer fluid hoses from retainers (clips).

Installing

Install in reverse order of removal, noting the following:

NOTE: Ensure washer hose couplings engage audibly when reinstalling.

Tightening torque

Component	Nm
Washer fluid reservoir to body	7

Spray jets, removing and installing

Removing

- Disconnect electrical connections for spray jet heaters.
- Remove plenum cover and wiper arms. Refer to **Windshield wiper system, removing and installing** .
- Separate washer hose from plenum cover where applicable.

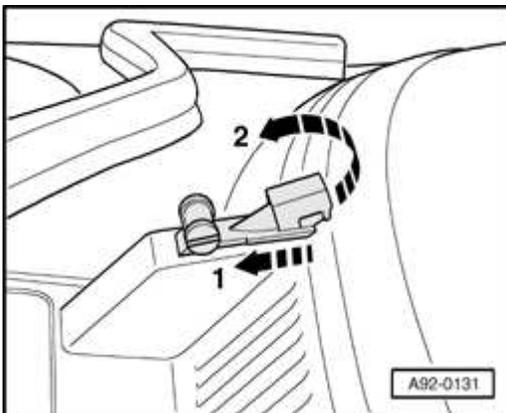


Fig. 227: Pushing Jet And Lifting Jet From Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Push jet -1- in direction of -arrow1-.
- Lift jet from cover -arrow2- and remove.
- Disconnect washer hoses from cable ties and pull off from jet.

Installing

Install in reverse order of removal, noting the following:

- NOTE:**
- **Ensure washer hose couplings engage audibly when reinstalling.**
 - **Replace all remove cable ties.**
- Set wiper blade park position. Refer to Wiper blade park position, setting .

Spay jets, adjusting

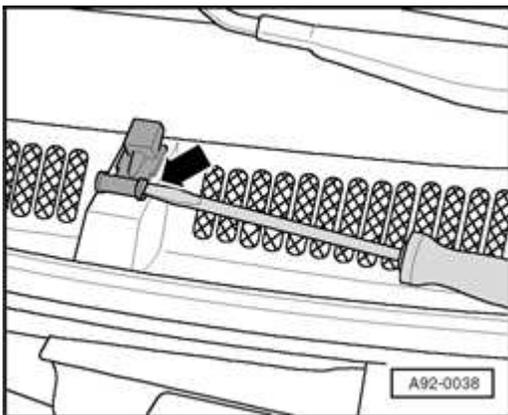


Fig. 228: Adjusting Height Setting Of The Washer Jet Using A Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Adjust height of jet (fan-shaped spray pattern) using a screwdriver as illustrated -arrow-.
- Mark top of spray contact area on windshield using a water-soluble marker pen.

NOTE: The distance is measured from the spray jet.

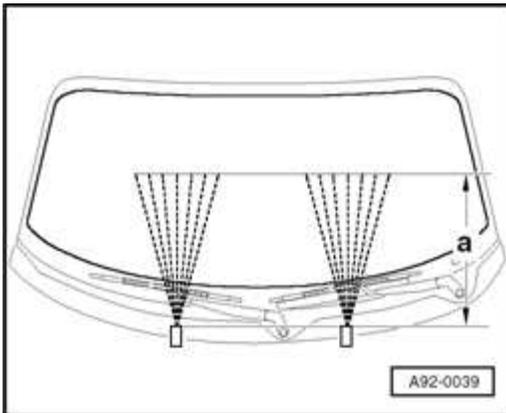


Fig. 229: Identifying Washer Jet Spray Dimensions
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Distance: $a = 400 \text{ mm}$

HEADLIGHT WASHER SYSTEM

Headlight washer spray jets, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

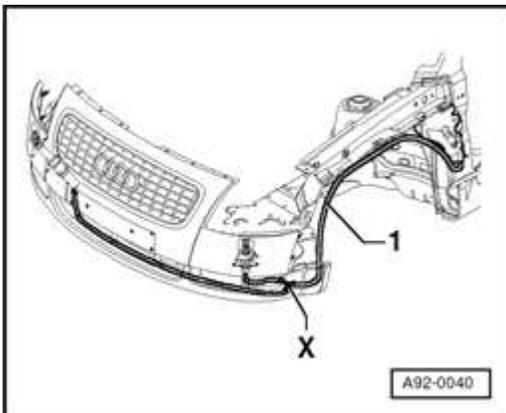


Fig. 230: Washer Fluid Reservoir Hose
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- The two headlight washer spray jets are supplied from the washer fluid reservoir via hose -1-.

Removing

- Remove front bumper

Refer to **63 BUMPERS**

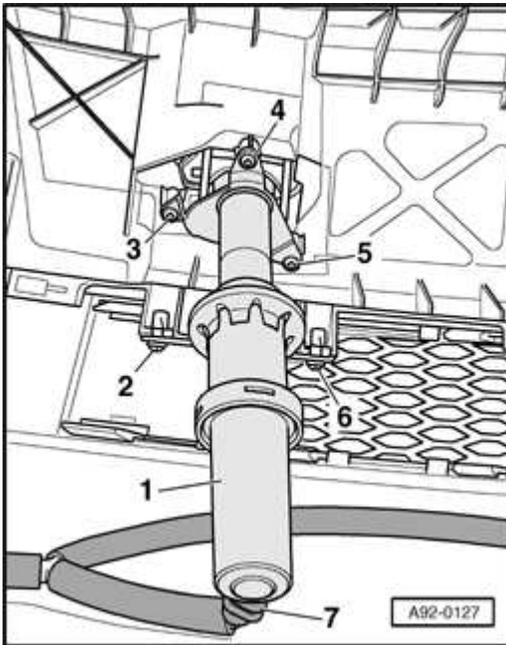


Fig. 231: Headlight Washer Spray Jets Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Depress retainer and remove hose coupling -7- at jet -1-.
- Remove screws -3-, -4- and -5-.
- Remove screws -2- and -6- at mounting.
- Remove spray jet.

Installing

Install in reverse order of removal, noting the following:

- Install front bumper

Refer to **63 BUMPERS** .

Tightening torque

2006 Audi TT

ELECTRICAL Electrical Equipment

Component	Nm
Spray jet to bumper	2.5

Headlight washer spray jets, adjusting

NOTE: Spray jets are pre-set at production and do not require adjustment after installation.

Headlight washer fluid reservoir, removing and installing

NOTE: The washer fluid reservoir supplies washer fluid to both the windshield washers and headlight washer system. Removing and installing. Refer to Washer fluid reservoir, removing and installing .

94 LIGHTS, SWITCHES - EXTERIOR

HALOGEN HEADLIGHTS

Halogen headlights, assembly

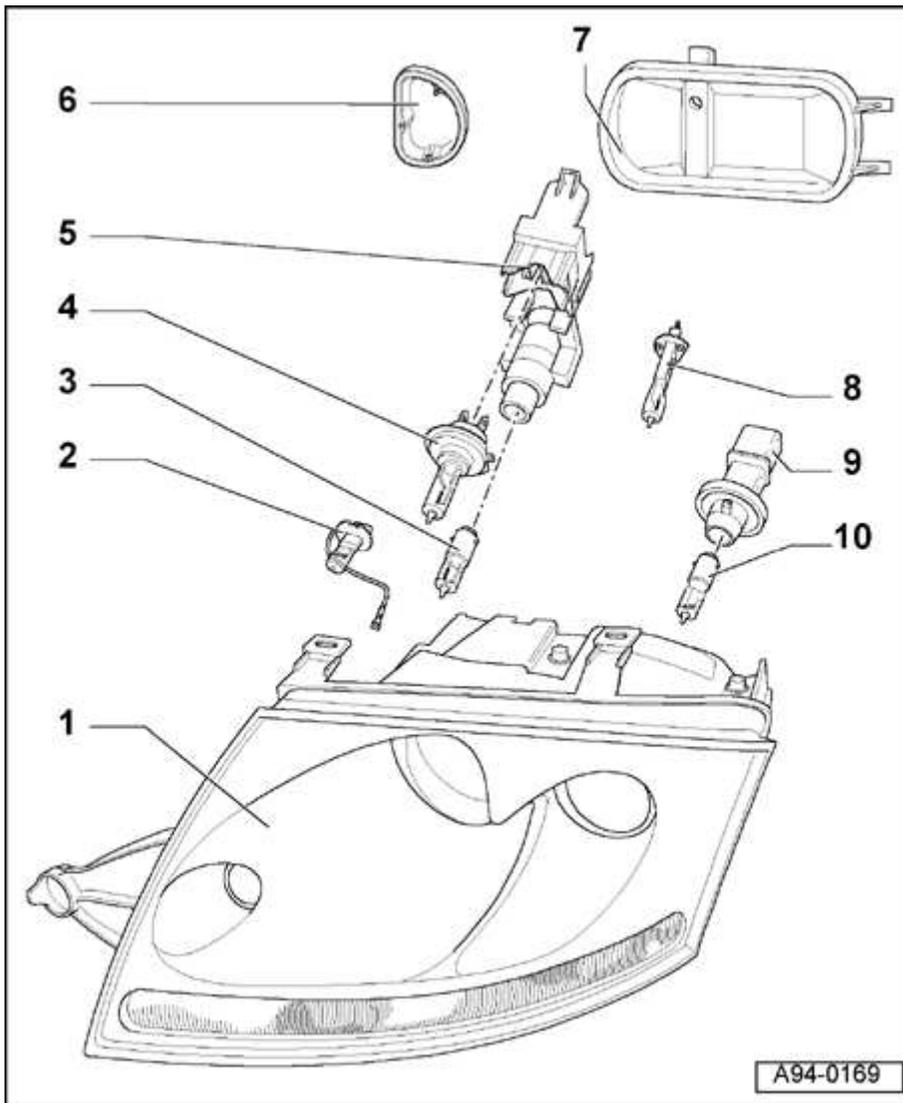


Fig. 232: Halogen Headlights Assembly

Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE: After performing any repairs or service that could affect headlight aim, check/adjust aim. Refer to Halogen headlights, adjusting . See also: 01 MAINTENANCE .

1 - Headlight housing

- Lense bonded to housing, cannot be replaced separately
- Removing and installing. Refer to Headlight housing, removing and installing .

2 - Fog Light bulb -L22-/-L23-

- H3 - 12 V, 55 W
- Replacing. Refer to **Fog light bulbs, replacing**

3 - Parking/side marker light bulb -M1-/-M3-

- H6 - 12 V, 6 W
- Replacing. Refer to **Parking/side marker light bulb, replacing**

4 - High Beam Headlight bulb -M30-/M32-

- H7 - 12 V, 55 W
- Replacing. Refer to **Halogen high beam bulb, replacing**

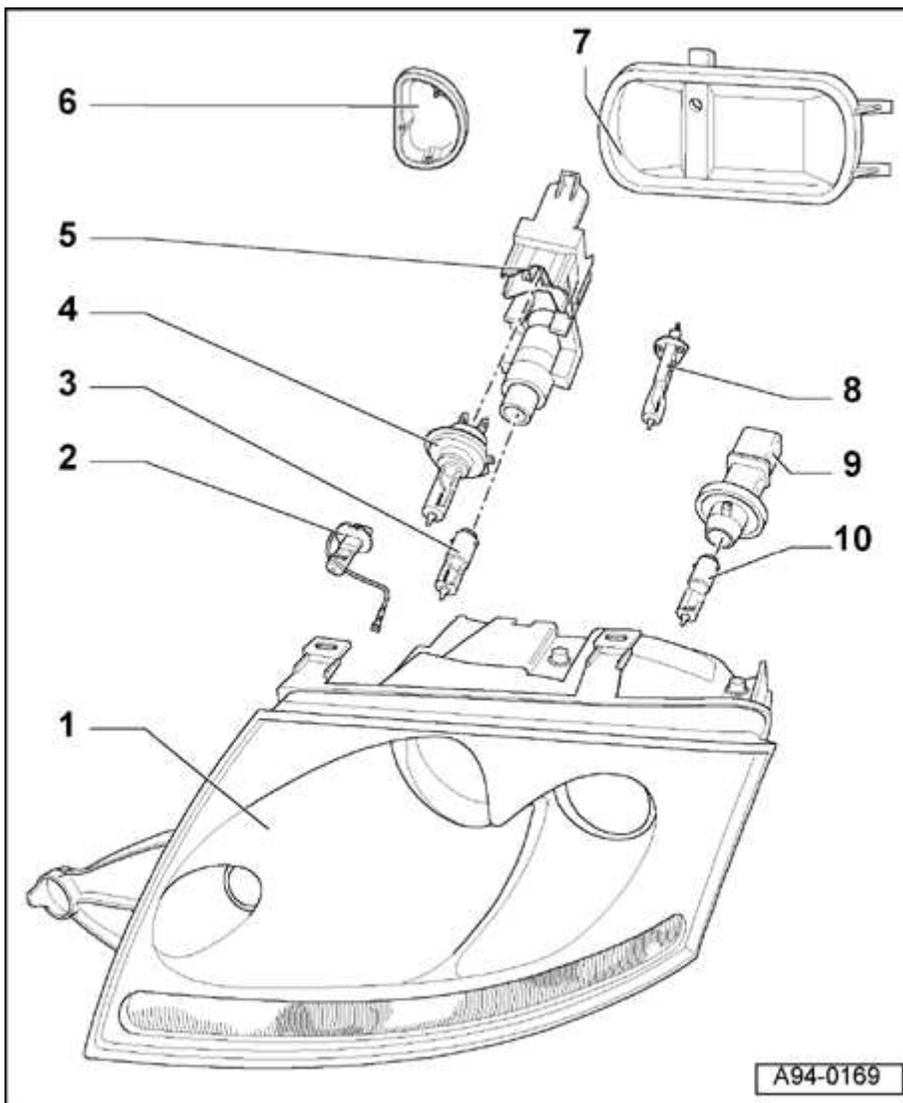


Fig. 233: Halogen Headlights Assembly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

5 - Bulb holder

- for high beam headlight bulb
- for parking/side marker light bulb

6 - Cover (small)

7 - Cover (large)

8 - Low Beam Headlight bulb -M29-/M31-

- H1 - 12 V, 55 W
- Replacing. Refer to **Halogen low beam bulb, replacing**

9 - Turn signal light bulb holder

10 - Front Turn Signal Light bulb -M5-/-M7-

- H21 - 12 V, 21 W
- Replacing. Refer to **Turn signal bulb, replacing**

Headlight housing, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Ensure light switch is in position -O-.
- Remove front bumper trim

Refer to **63 BUMPERS**

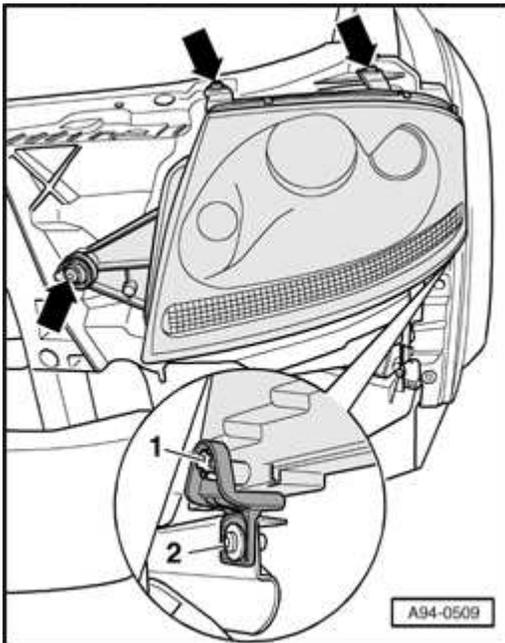


Fig. 234: Headlight Housing Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Slide headlight towards radiator in order to disengage mounting pin -1- from retainer -2-.
- Disconnect electrical connections.
- Remove headlight housing from opening.

Installing

Install in reverse order of removal, noting the following:

- Connect electrical connections.

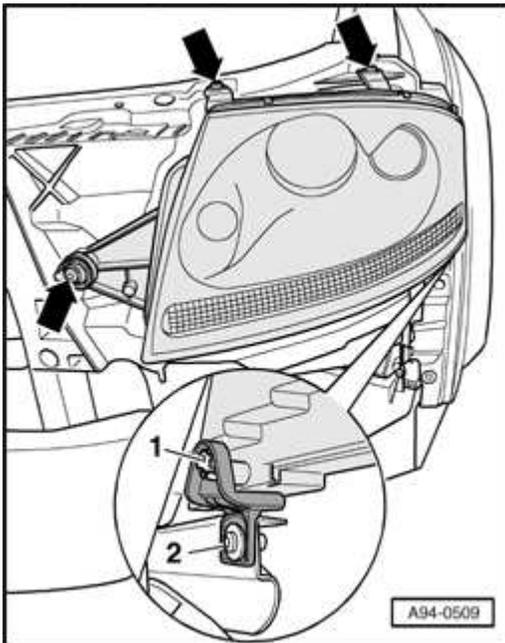


Fig. 235: Headlight Housing Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engage mounting pin -1- in retainer -2-.
- Install screws -arrows- and hand-tighten only.
- Install front bumper trim

Refer to **63 BUMPERS**

Check headlight housing alignment with bumper trim. If alignment is necessary, proceed as follows:

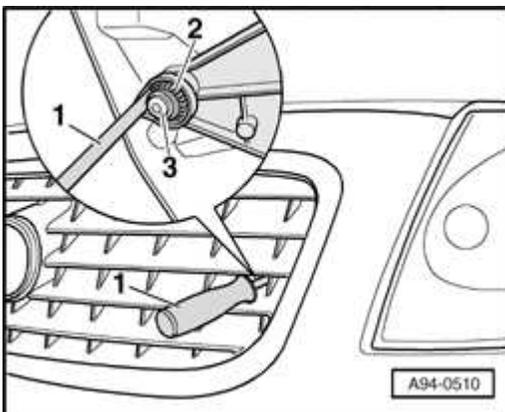


Fig. 236: Headlight Housing Alignment

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen screw -3-.
- Turn adjuster -2- as necessary to bring headlight housing in alignment with bumper trim.

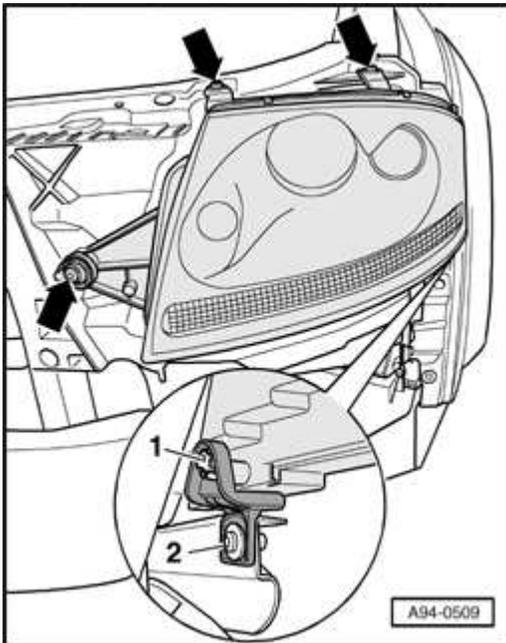


Fig. 237: Headlight Housing Remove/Install Components
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten all screws -arrows-.
- Check/adjust headlights after installing. Refer to **Halogen headlights, adjusting** .

Tightening torque

Component	Nm
Headlight housing to lock carrier	6.5

Halogen headlights, adjusting

Special tools, testers and auxiliary items needed

- VAS 5107 Optical headlight aimer

NOTE: Adjust headlights using detailed aiming procedure and specifications

Refer to **01 MAINTENANCE**

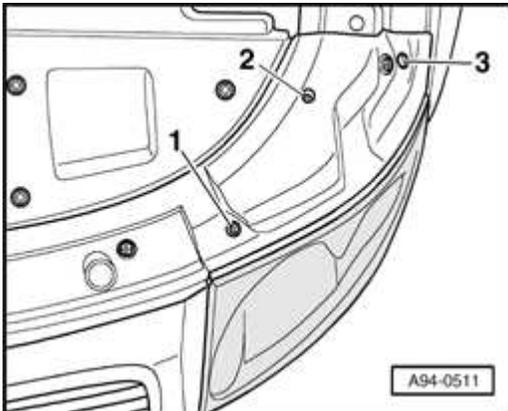


Fig. 238: Adjustment Screws On Left Headlight
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Adjustment screws on left headlight shown. Arrangement on right headlight is mirror image.

1 - Not applicable

2 - Height adjustment screw

3 - Lateral adjustment screw

- Turn adjustment screws to achieve specification

Refer to **01 MAINTENANCE**

- Always check headlight adjustment after installing new bulb.

Halogen low beam bulb, replacing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

- Ensure light switch is in position -O-.

Left headlight:

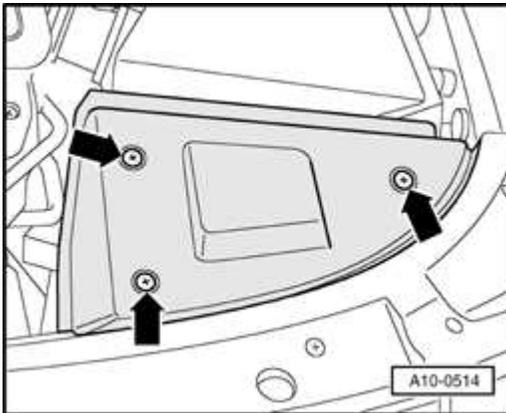


Fig. 239: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.

Right headlight:

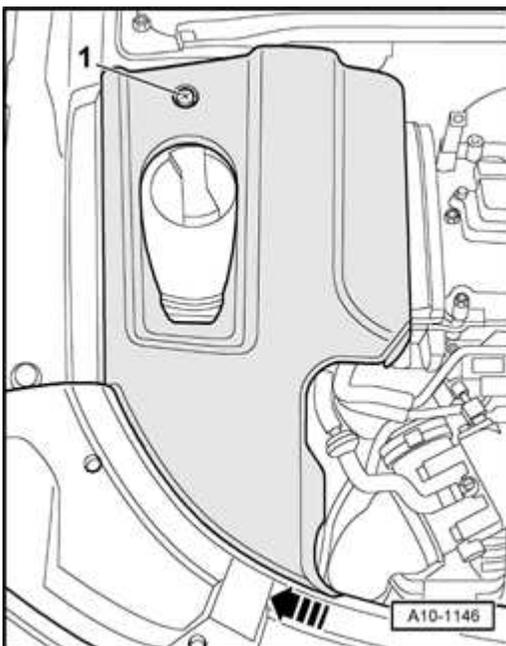


Fig. 240: Removing Screw And Coolant Expansion Tank Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

- Remove housing cover from headlight.

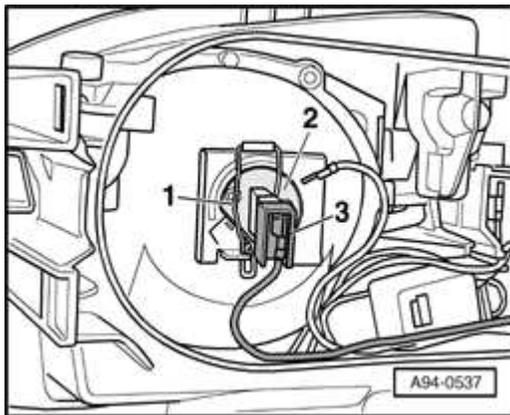


Fig. 241: Spring Clip, Bulb And Electrical Connection
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection -3- at low beam bulb.
- Disengage spring clip -1- and remove bulb -2- from housing.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands. Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

- Insert new bulb in housing.
- Secure bulb with spring clip.
- Reconnect electrical connection and close housing cover.

Halogen high beam bulb, replacing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

- Ensure light switch is in -O- position.

Left headlight:

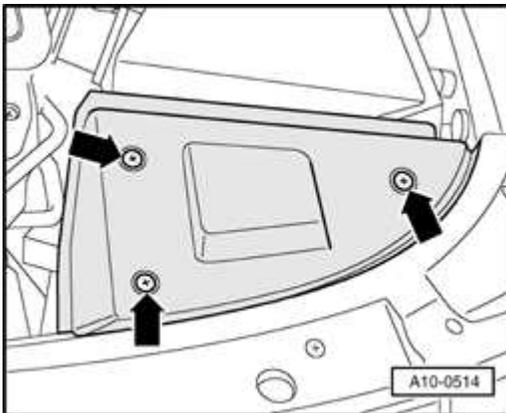


Fig. 242: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.

Right headlight:

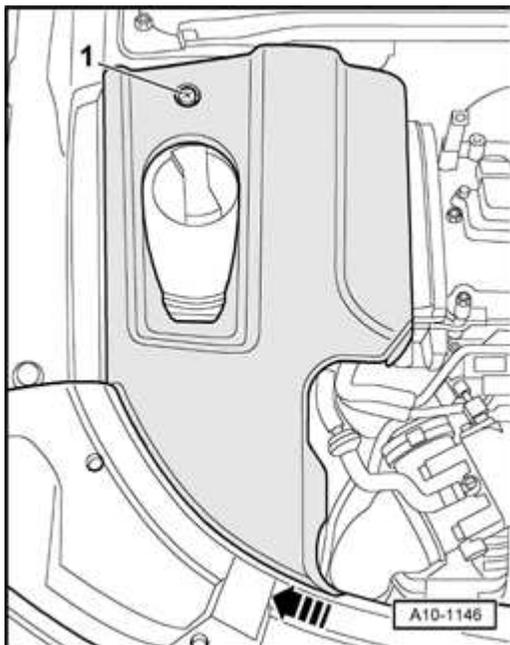


Fig. 243: Removing Screw And Coolant Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

- Remove housing cover from headlight.

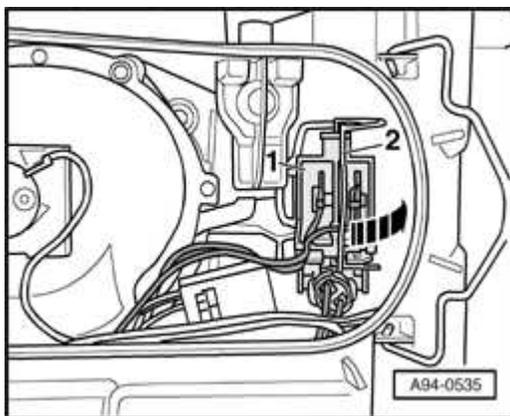


Fig. 244: Disengaging Spring Clip And Removing Bulb Holder From Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage spring clip -2- and remove bulb holder -1- from housing.

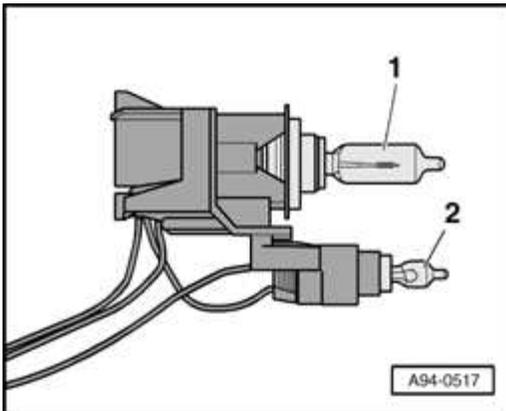


Fig. 245: Headlight Bulb And Parking Light Bulb
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bulb -1- from holder.

NOTE: Do not disturb parking light bulb -2-.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands. Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

- Insert new bulb in holder.
- Secure bulb holder with spring clip.
- Close housing cover.

Parking/side marker light bulb, replacing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

- Ensure light switch is in -O- position.

Left headlight:

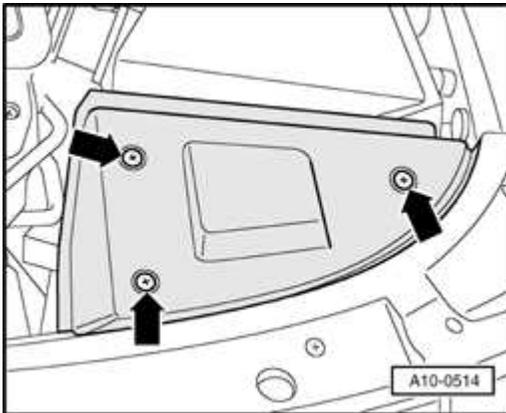


Fig. 246: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.

Right headlight:

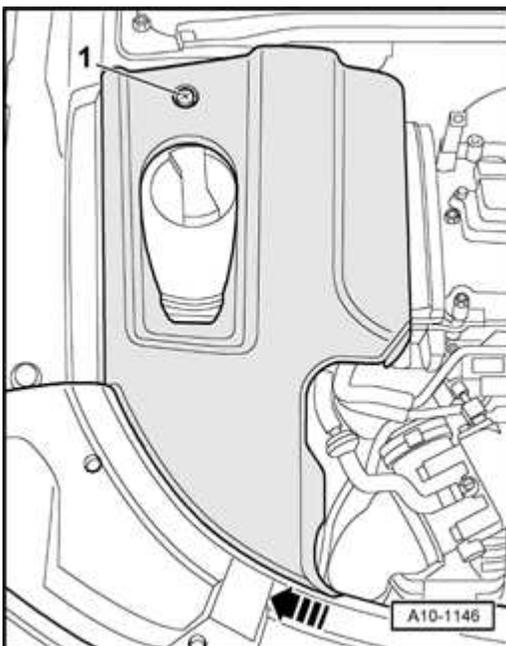


Fig. 247: Removing Screw And Coolant Expansion Tank Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

- Remove housing cover from headlight.

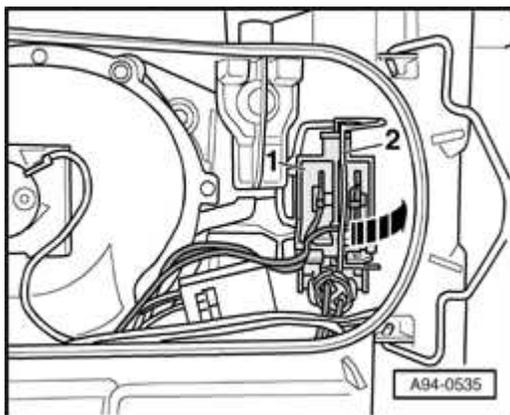


Fig. 248: Disengaging Spring Clip And Removing Bulb Holder From Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage spring clip -2- and remove bulb holder -1- from housing.

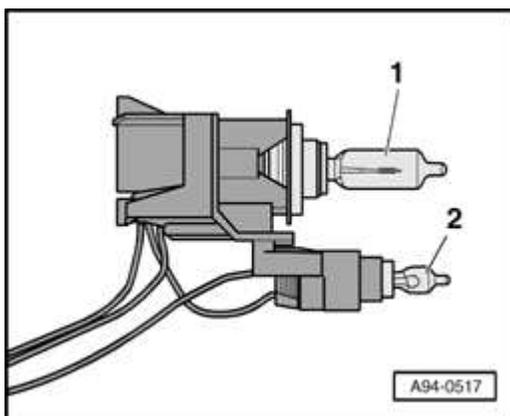


Fig. 249: Headlight Bulb And Parking Light Bulb
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bulb -2- from holder.

NOTE: Do not disturb high beam bulb -1-.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands. Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

- Insert new bulb in holder.
- Secure bulb holder with spring clip.
- Close housing cover.

Turn signal bulb, replacing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

- Ensure turn signals or emergency flashers are not in operation.

Left headlight:

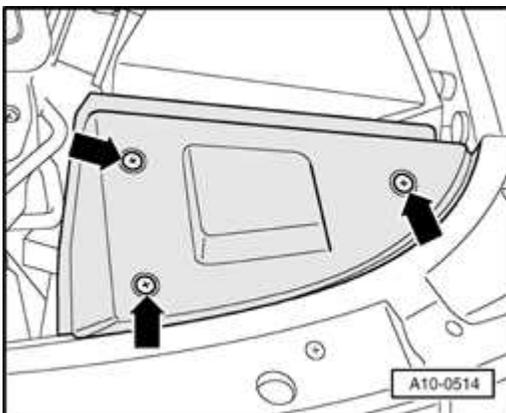


Fig. 250: Removing Cover Above Battery

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.

Right headlight:

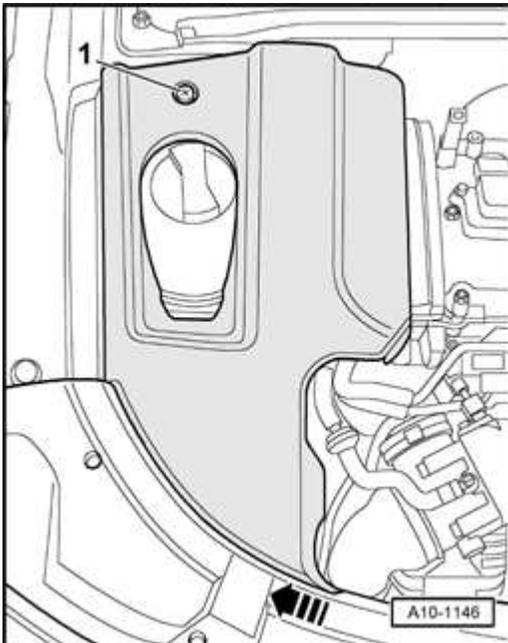


Fig. 251: Removing Screw And Coolant Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

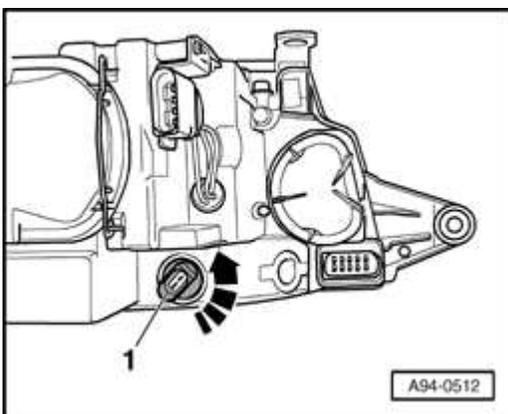


Fig. 252: Turning Holder Counter-Clockwise

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn holder -1- counter-clockwise -arrow- and remove from housing.
- Twist and remove bulb from holder.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands. Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

- Insert new bulb in holder.
- Insert holder into housing and turn clockwise to secure.

Headlight securing lugs, servicing

NOTE:

- A broken headlight securing lug can be replaced by installing a repair set. Complete replacement of the headlight housing is unnecessary.
 - Repair is identical for housings with normal (halogen) and High Intensity Gas Discharge (HID) lamps.
 - Note different repair parts for left and right headlights.
- Remove applicable headlight housing. Refer to **Headlight housing, removing and installing** .

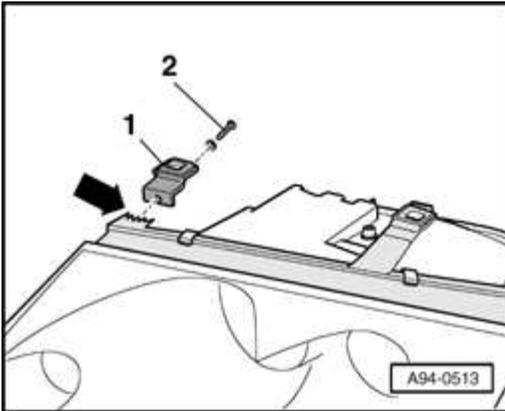


Fig. 253: Remnants Of Broken Mounting Tab, Mounting Tab And Screw
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove remnants of broken mounting tab -arrow-.
- Secure mounting tab -1- using screw -2- and washer.

Tightening torque

Component	Nm
Headlight housing to lock carrier	6.5

HEADLIGHTS WITH HIGH INTENSITY GAS DISCHARGE (HID) LAMPS

Headlights with High Intensity Gas Discharge (HID) Lamps, assembly

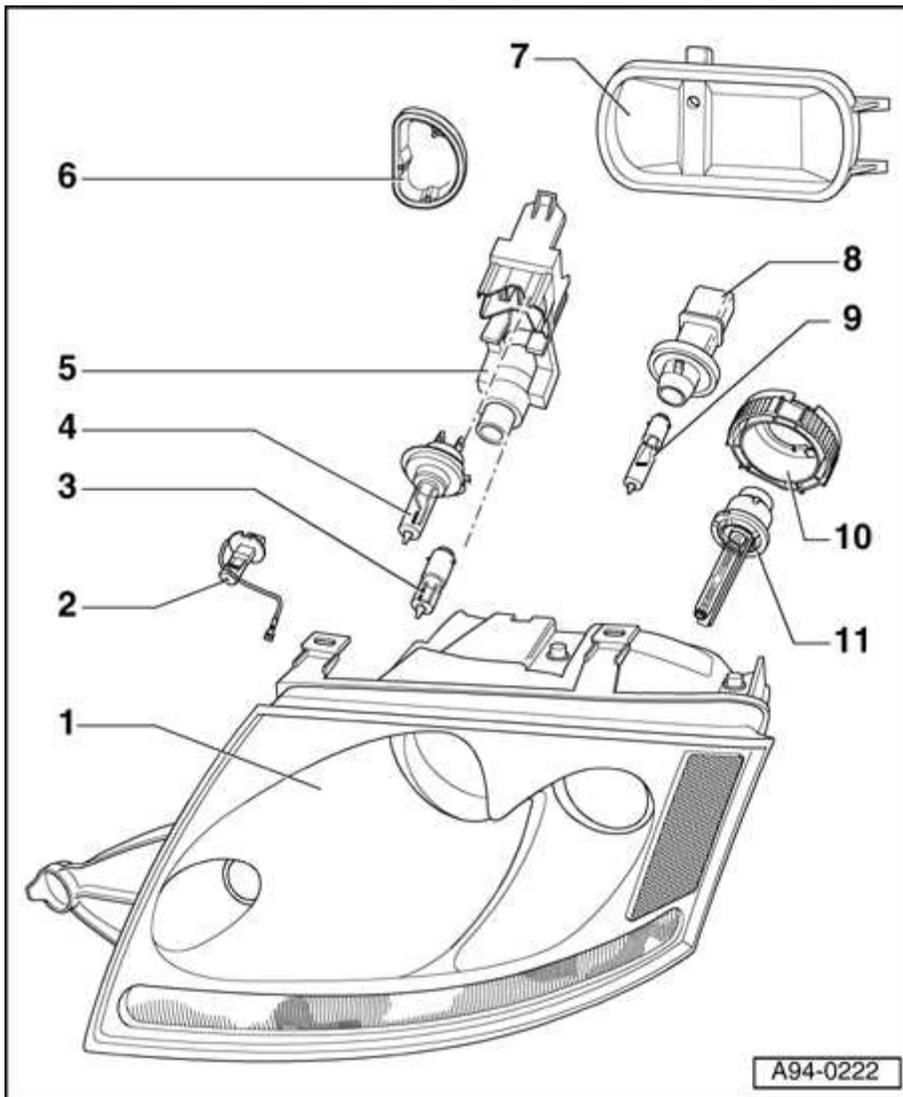


Fig. 254: Headlights With High Intensity Gas Discharge Lamps Assembly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

WARNING:

- **HIGH VOLTAGE!**
- Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp system marked with the yellow "HIGH VOLTAGE!" symbol.
- After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.

NOTE:

- After performing any repairs or service that could affect headlight aim, check/adjust aim. Refer to .Halogen headlights, adjusting . See also: 01 MAINTENANCE .
- Headlights with HID lamps are equipped with automatic vertical headlight aim control system. Refer to General information .

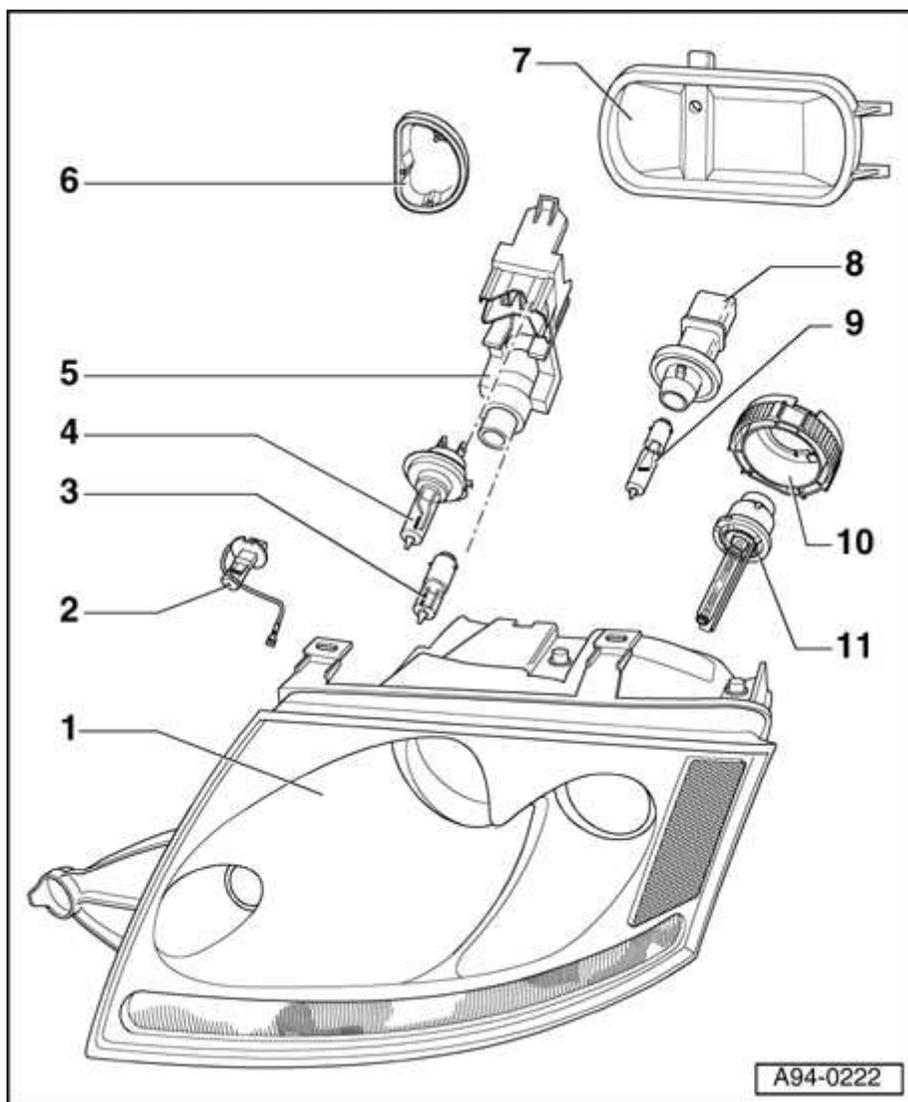


Fig. 255: Headlights With High Intensity Gas Discharge Lamps Assembly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

1 - Headlight housing

- Lense bonded to housing, cannot be replaced separately.
- From approx. 04.00, High Intensity Gas Discharge Lamp Control Modules - J343- and -J344 are mounted directly to housing.
- Removing and installing. Refer to **Headlight housing, removing and installing** .

2 - Fog Light bulb -L22-/-L23

- H3 - 12 V, 55 W
- Replacing. Refer to **Fog light bulbs, replacing**

3 - Parking/side marker light bulb -M1-/-M3-

- H6 - 12 V, 6 W
- Replacing. Refer to **Parking/side marker light bulb, replacing**

4 - High Beam Headlight bulb -M30-/-M32-

- H7 - 12 V, 55 W
- Replacing. Refer to **Halogen high beam bulb, replacing**

5 - High beam and parking/side marker light bulb holder

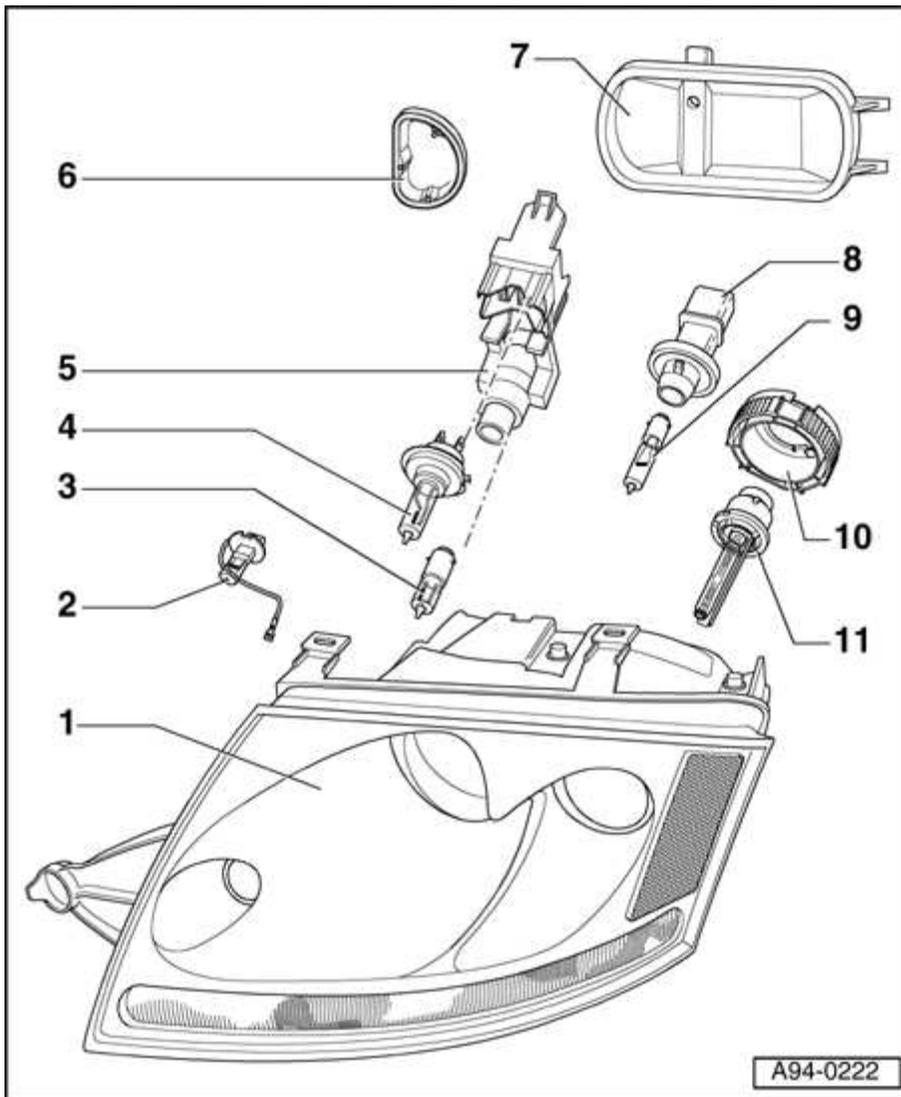


Fig. 256: Headlights With High Intensity Gas Discharge Lamps Assembly
Courtesy of VOLKSWAGEN UNITED STATES, INC.

6 - Cover (small)

7 - Cover (large)

8 - Turn signal bulb holder

9 - Front Turn Signal Light bulb -M5-/-M7-

- H21 - 12 V, 21 W
- Replacing. Refer to **Turn signal bulb, replacing**

10 - Securing ring (bayonet connection) for HID bulb

11 - HID bulb -L13-/-L14-

- 35 W, D2S
- Replacing. Refer to HID bulb, replacing

Headlight housing, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .

WARNING:

- **HIGH VOLTAGE!**
- Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp system marked with the yellow "HIGH VOLTAGE!" symbol.
- After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.

Removing

- Disconnect battery. Refer to Battery, disconnecting and reconnecting .

- Remove front bumper trim

Refer to **63 BUMPERS**

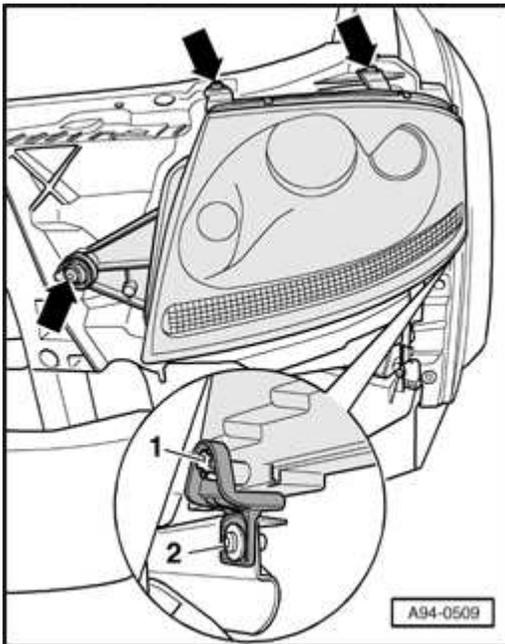


Fig. 257: Headlight Housing Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Slide headlight towards radiator in order to disengage mounting pin -1- from retainer -2-.
- Disconnect electrical connections.
- Remove headlight housing from opening.

Installing

Install in reverse order of removal, noting the following:

- Connect electrical connections.

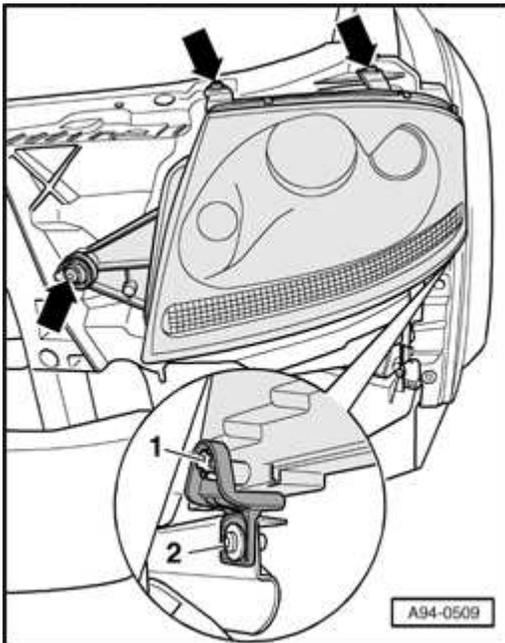


Fig. 258: Headlight Housing Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Engage mounting pin -1- in retainer -2-.
- Install screws -arrows- and hand-tighten only.
- Install front bumper trim

Refer to **63 BUMPERS**

Check headlight housing alignment with bumper trim. If alignment is necessary, proceed as follows:

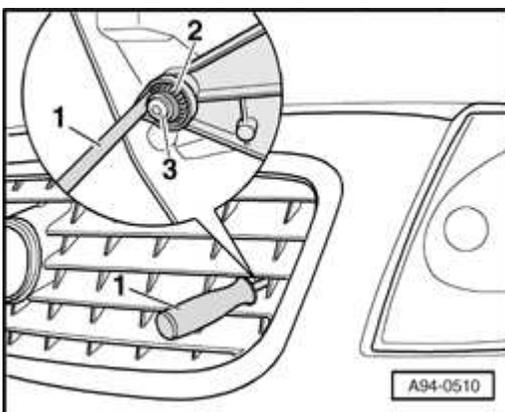


Fig. 259: Headlight Housing Alignment

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen screw -3-.
- Turn adjuster -2- as necessary to bring headlight housing in alignment with bumper trim.

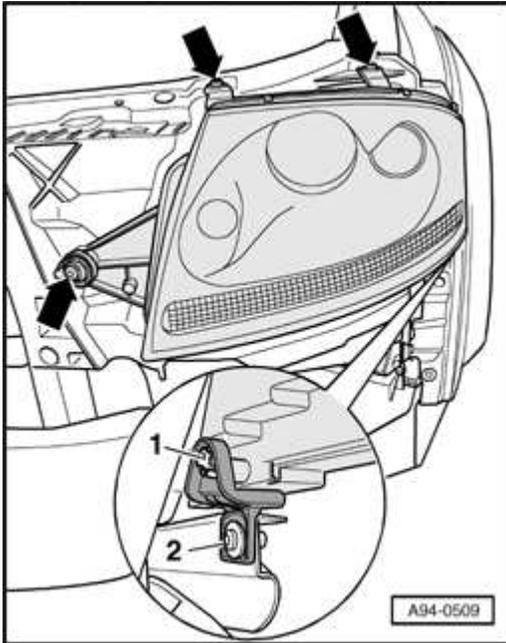


Fig. 260: Headlight Housing Remove/Install Components
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Tighten all screws -arrows-.
- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .
- Check/adjust headlights after installing. Refer to **Halogen headlights, adjusting** .

Tightening torque

Component	Nm
Headlight housing to lock carrier	6.5

HID headlights, adjusting

Special tools, testers and auxiliary items needed

- VAS 5107 Optical headlight aimer
- VAS 5051 Vehicle Diagnostic Testing and Information System
- Optional: VAS 5051 Vehicle Testing and Service System

NOTE:

- **On vehicles with HID headlights, always check, erase and then perform basic setting of fault memory before manually adjusting adjuster screws.**
- **Adjust headlights using detailed aiming procedure and specifications**

Refer to **01 MAINTENANCE**

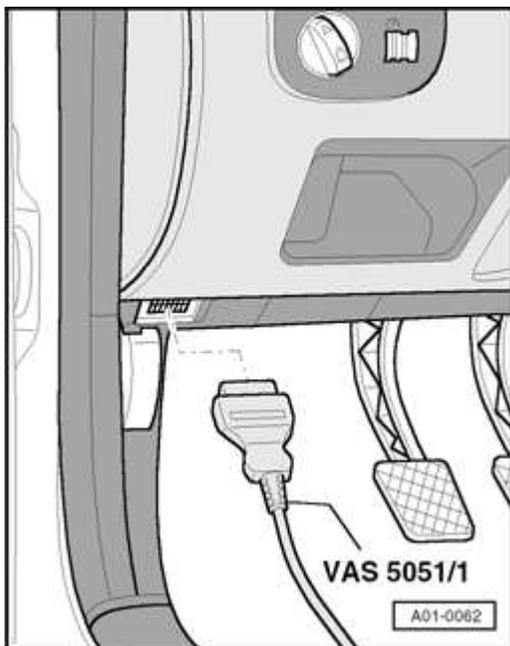
Preparation

Fig. 261: Connecting VAS 5051 Tester To DLC
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Connect VAS 5051/5052 to Data Link Connector (DLC) with adapter cable as illustrated.
- Select operating mode "Vehicle Self Diagnosis".
- Select vehicle system "55 - Automatic vertical headlight aim control".

Basic setting, initiating

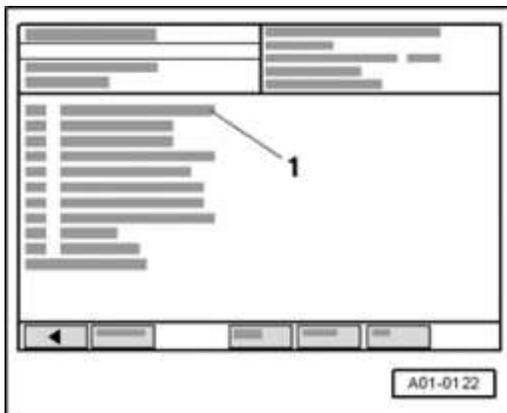


Fig. 262: Diagnostic System VAS 5051: Display -- Basic Setting
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Indicated on VAS 5051/5052:

- From list -1- select function "04 - Basic setting".

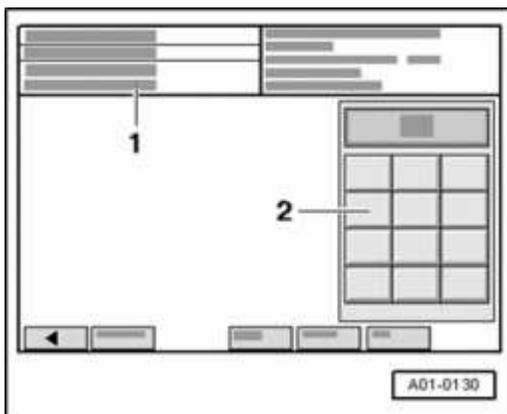


Fig. 263: Diagnostic System VAS 5051: Display - Display Group And Key Pad
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Indicated on VAS 5051/5052:

1 - Enter display group

- Use keypad -2- to enter "001" for "Display group number 001"
- Touch -Q- key to confirm entry..

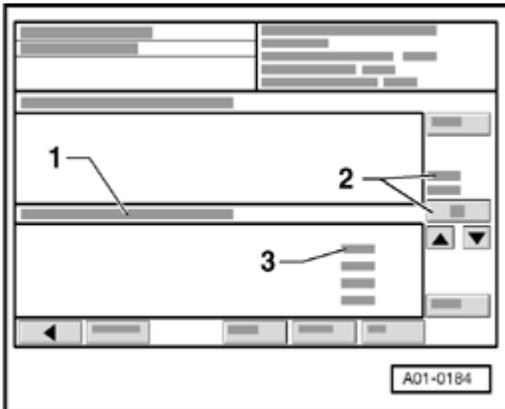


Fig. 264: Diagnostic System VAS 5051: Display - Basic Setting, Display Group 1 And Wait

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Indicated on VAS 5051:

1 - Basic setting

2 - Display group 1

3 - Wait

- Headlights are moved to adjustment position
- Wait until next display appears.

3 - Headlight adjustment

- Headlights are now in adjustment position

NOTE: Basic setting 1 deactivates control mode and "Headlights not adjusted" is entered in fault memory.

Adjusting

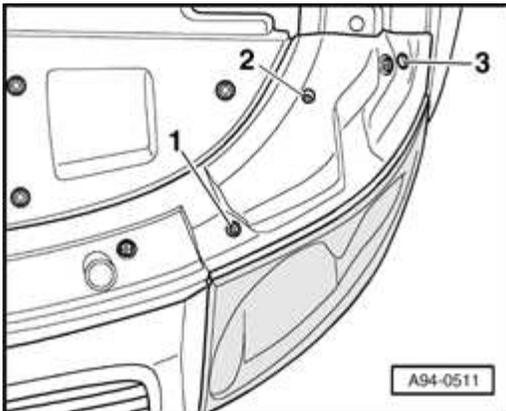


Fig. 265: Adjustment Screws On Left Headlight
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Adjustment screws on left headlight shown. Arrangement on right headlight is mirror image.

1 - Not applicable

2 - Height adjustment screw

3 - Lateral adjustment screw

- Turn adjustment screws to achieve specification

Refer to **01 MAINTENANCE**

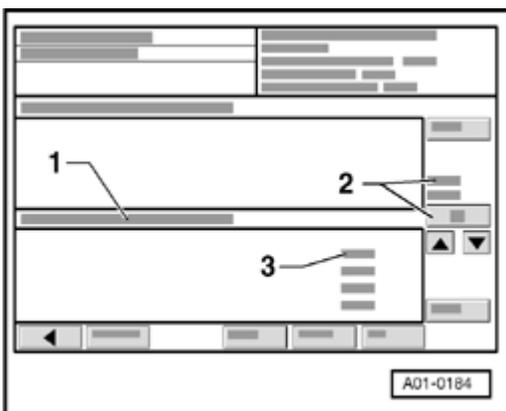


Fig. 266: Diagnostic System VAS 5051: Display - Basic Setting, Display Group 1 And Wait
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Indicated on VAS 5051:

- Touch s key to switch to display group 002.

1 - Basic setting

2 - Display group 2

3 - Control position learned

- Headlight range control module now recognizes this position as the control position

NOTE: Entry in fault memory ("Headlights not adjusted") is erased and control mode re-activated.

- End function "04 - Basic setting" by touching <-- key.
- Touch "06 - End output".

HID bulb, replacing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .

WARNING: • HIGH VOLTAGE!

- Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp system marked with the yellow "HIGH VOLTAGE!" symbol.
- After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.

Removing

- Disconnect battery. Refer to Battery, disconnecting and reconnecting .

Left headlight:

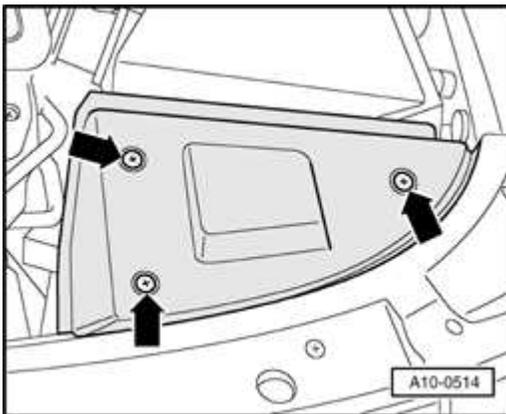


Fig. 267: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.

Right headlight:

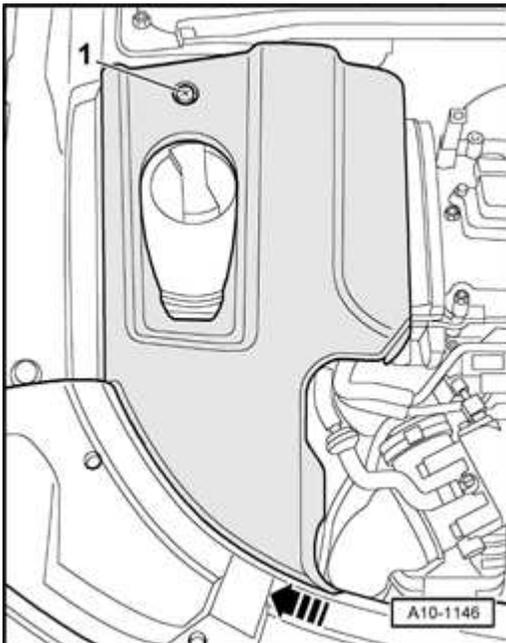


Fig. 268: Removing Screw And Coolant Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

- Remove housing cover from headlight.

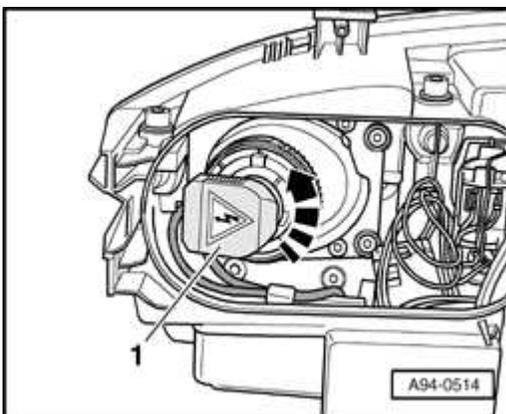


Fig. 269: Disconnecting Electrical Connection At HID Lamp By Turning Counter-Clockwise
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection -1- at HID lamp by turning counter-clockwise

-arrow-.

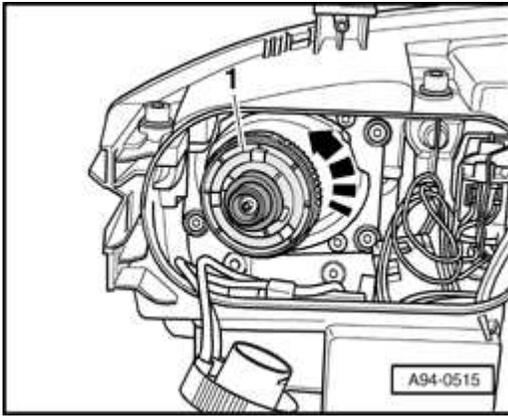


Fig. 270: Detaching Retaining Ring For HID Lamp By Turning Counter-Clockwise

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Detach retaining ring -1- for HID lamp by turning counter-clockwise -arrow-.
- Pull HID lamp out from headlight housing.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands. Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

NOTE:

- **Note installation position: Lug at top of bulb holder must engage in recess of bulb.**
- **Retaining ring can only be installed in one position.**
- Insert new bulb in housing.
- Secure HID lamp with retaining ring.
- Reconnect electrical connection and close housing cover.

- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Halogen high beam bulb, replacing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to **Battery, disconnecting and reconnecting** .

WARNING:

- **HIGH VOLTAGE!**
- Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp system marked with the yellow "HIGH VOLTAGE!" symbol.
- After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.

Removing

- Disconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Left headlight:

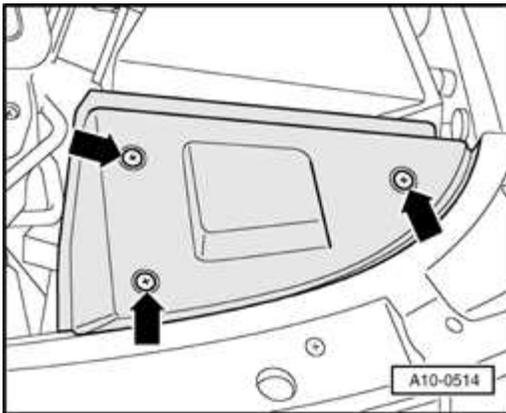


Fig. 271: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.

Right headlight:

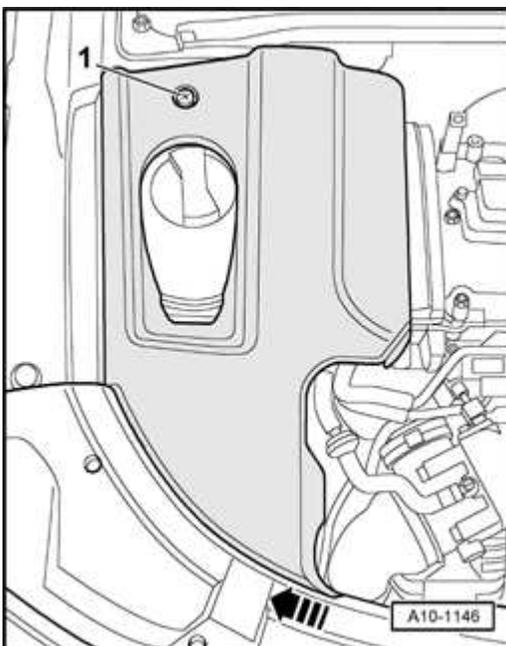


Fig. 272: Removing Screw And Coolant Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

- Remove housing cover from headlight.

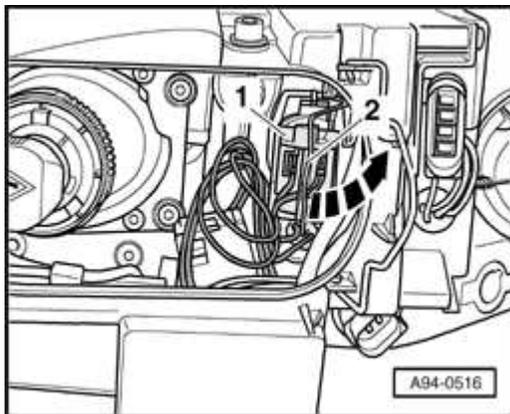


Fig. 273: Disengaging Spring Clip And Removing Bulb Holder From Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage spring clip -2- and remove bulb holder -1- from housing.

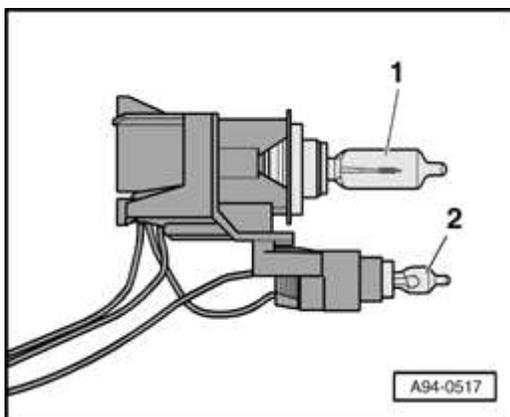


Fig. 274: Headlight Bulb And Parking Light Bulb
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bulb -1- from holder.

NOTE: Do not disturb parking/side marker bulb -2-.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands.

Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

- Insert new bulb in holder.
- Secure bulb holder with spring clip.
- Close housing cover.
- Reconnect battery. Refer to Battery, disconnecting and reconnecting .

Parking/side marker light bulb, replacing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .

WARNING:

- **HIGH VOLTAGE!**
- Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp system marked with the yellow "HIGH VOLTAGE!" symbol.
- After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.

Removing

- Disconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Left headlight:

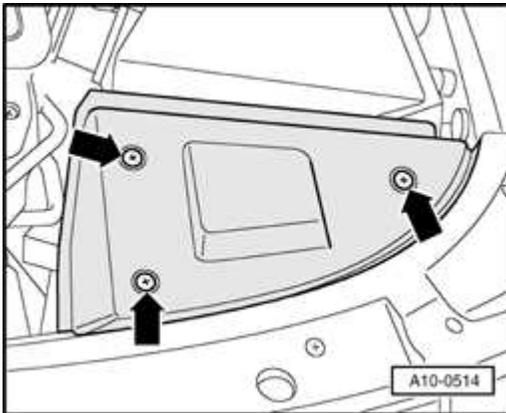


Fig. 275: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.

Right headlight:

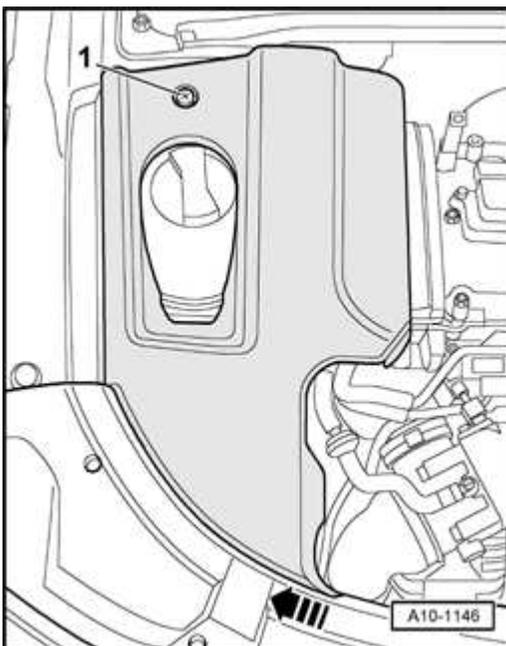


Fig. 276: Removing Screw And Coolant Expansion Tank Cover

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

- Remove housing cover from headlight.

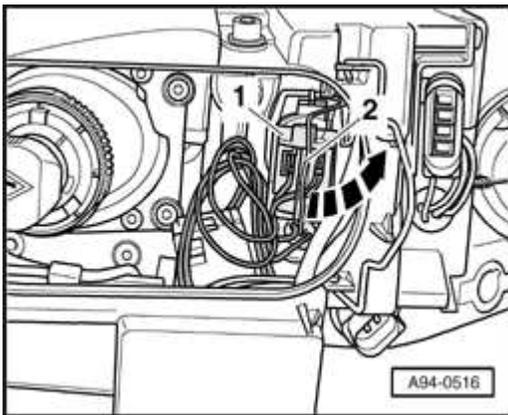


Fig. 277: Disengaging Spring Clip And Removing Bulb Holder From Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage spring clip -2- and remove bulb holder -1- from housing.

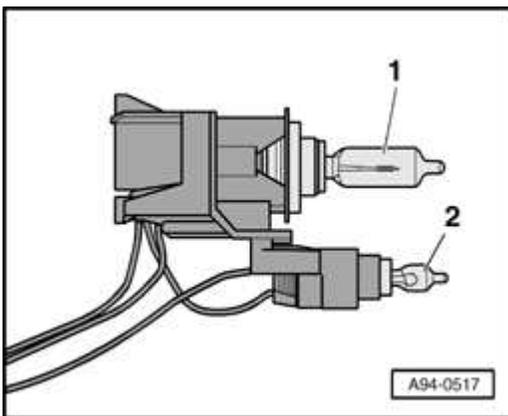


Fig. 278: Headlight Bulb And Parking Light Bulb
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bulb -2- from holder.

NOTE: Do not disturb high beam bulb -1-.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands. Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

- Insert new bulb in holder.
- Secure bulb holder with spring clip.
- Close housing cover.
- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Turn signal bulb, replacing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to **Battery, disconnecting and reconnecting** .

WARNING:

- **HIGH VOLTAGE!**
- Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp system marked with the yellow "HIGH

VOLTAGE!"symbol.

- After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.

Removing

- Disconnect battery. Refer to **Battery, disconnecting and reconnecting** .

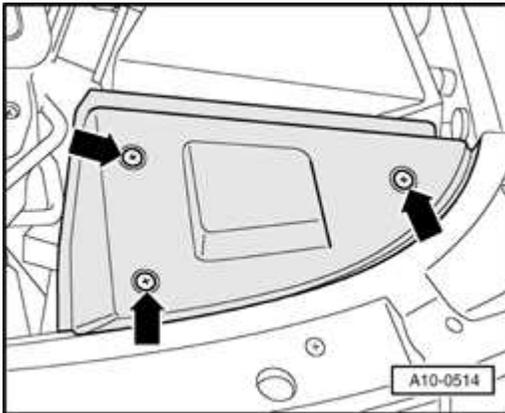
Left headlight:

Fig. 279: Removing Cover Above Battery
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.
- Remove battery if necessary. Refer to **Battery, removing and installing** .

Right headlight:

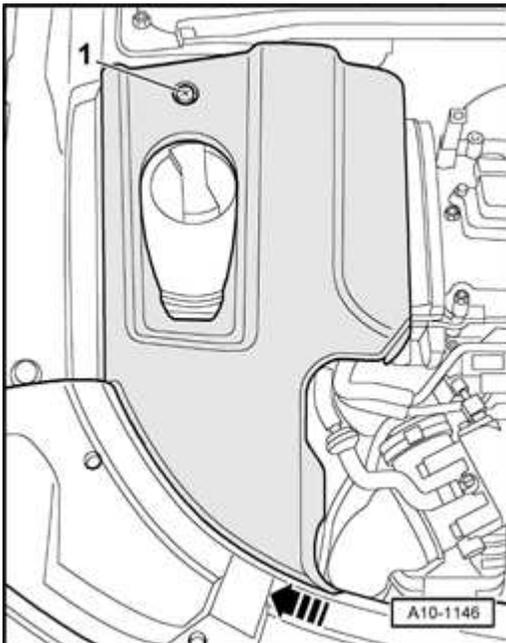


Fig. 280: Removing Screw And Coolant Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

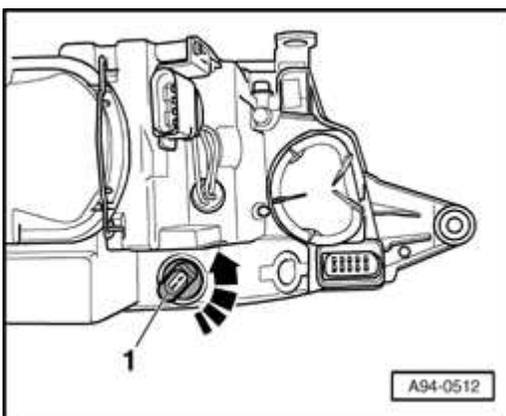


Fig. 281: Turning Holder Counter-Clockwise
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn holder -1- counter-clockwise -arrow- and remove from housing.
- Twist and remove bulb from holder.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands. Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

- Insert new bulb in holder.
- Reinstall battery if necessary.
- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Headlight Beam Adjusting Motors -V48- and -V49-, removing and installing

- NOTE:**
- Headlight beam adjusting motors cannot be replaced separately.
 - If either adjusting motor malfunctions, the complete headlight housing must be replaced.

High Intensity Gas Discharge Lamp Control Modules -J343- and -J344- through approx. 03.00, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to **Battery, disconnecting and reconnecting** .

WARNING:

- **HIGH VOLTAGE!**
- Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp system marked with the yellow "HIGH VOLTAGE!" symbol.
- After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.

Removing

- Remove appropriate headlight. Refer to **Headlight housing, removing and installing** .

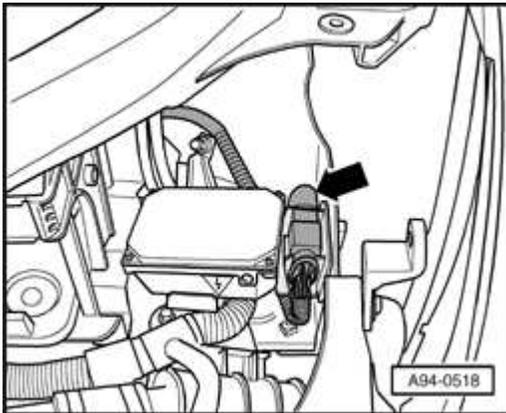


Fig. 282: Electrical Connection At Retainer

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect and remove electrical connection -arrow- from retainer.

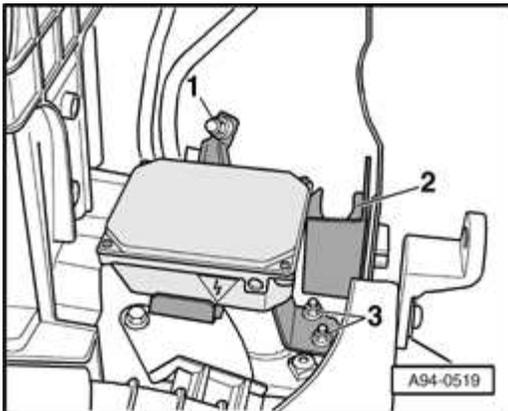


Fig. 283: Retainer And Nuts

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Swivel retainer -2- to rear.
- Remove nuts -3-.
- Remove module from engine compartment.

Installing

Install in reverse order of removal, noting the following:

NOTE: Re-attach all cable ties at same location when installing.

- Install headlight. Refer to Headlight housing, removing and installing ..

Tightening torques

Component	Nm
Retainer to body	6
Control module to retainer	1.2

High Intensity Gas Discharge Lamp Control Modules -J343- and -J344- from approx. 04.00, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.

- **Switch ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**
- **When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .**

WARNING:

- **HIGH VOLTAGE!**
- **Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp system marked with the yellow "HIGH VOLTAGE!" symbol.**
- **After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.**

Removing

Left headlight:

- Remove battery. Refer to Battery, removing and installing .

Right headlight:

- Disconnect battery. Refer to Battery, disconnecting and reconnecting .

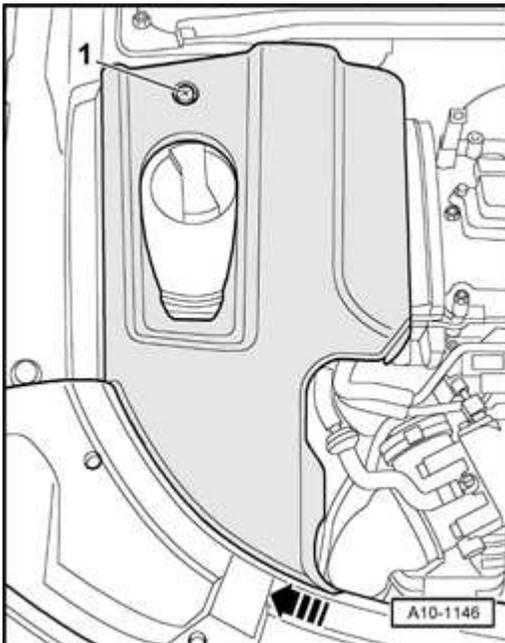


Fig. 284: Removing Screw And Coolant Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

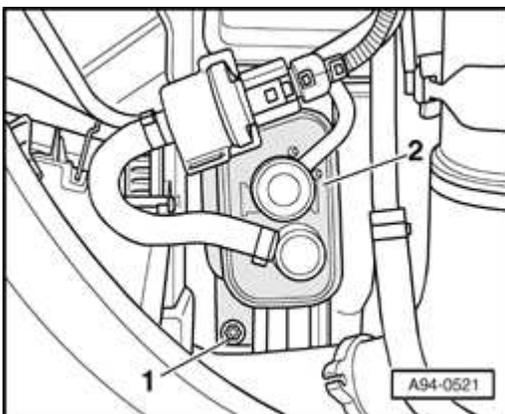


Fig. 285: Charcoal Filter And Nut
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut -1- at activated charcoal filter -2-.
- Unclip breather pipes from retainers.
- Lay aside activated charcoal filter with connected pipes.

Both sides (continued):

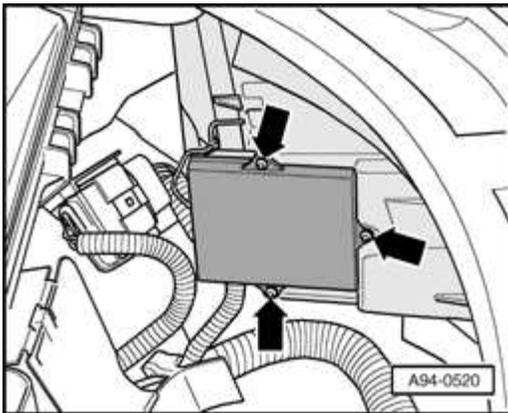


Fig. 286: Headlight Module And Screws
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows-.
- Remove module from headlight.

Installing

Install in reverse order of removal, noting the following:

- Check gasket between igniter for HID lamp and headlight housing.
- Reinstall battery if necessary.
- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Tightening torques

Component	Nm
Control module to headlight	1.2
Activated charcoal filter to body	10

Headlight securing lugs, servicing

NOTE:

- A broken headlight securing lug can be replaced by installing a repair set. Complete replacement of the headlight housing is unnecessary.
- Repair is identical for housings with normal (halogen) and High Intensity Gas Discharge (HID) lamps. Refer to

Headlight securing lugs, servicing .

FOG LIGHTS

Fog lights, removing and installing

Fog lights are integrated into the headlight housing.

Halogen headlights, removing and installing. Refer to **Headlight housing, removing and installing**

HID headlights, removing and installing. Refer to **Headlight housing, removing and installing**

Fog light bulbs, replacing

Removing

Vehicles with HID headlights:

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to **Battery, disconnecting and reconnecting .**

WARNING:

- **HIGH VOLTAGE!**
- Always disconnect negative (-) battery terminal prior to servicing any parts of the HID lamp

system marked with the yellow "HIGH VOLTAGE!" symbol.

- After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.

Removing

Vehicles with halogen headlights:

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Left headlight:

- Remove battery if necessary. Refer to Battery, removing and installing .

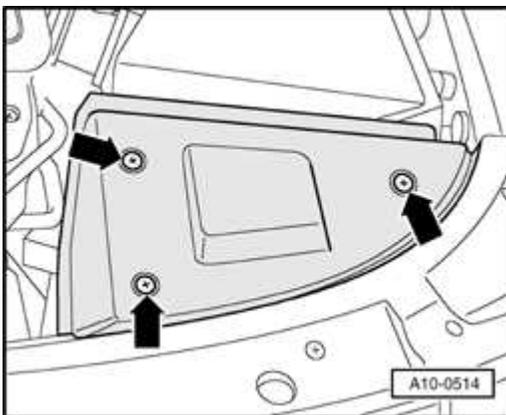


Fig. 287: Removing Cover Above Battery

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrows-.

Right headlight:

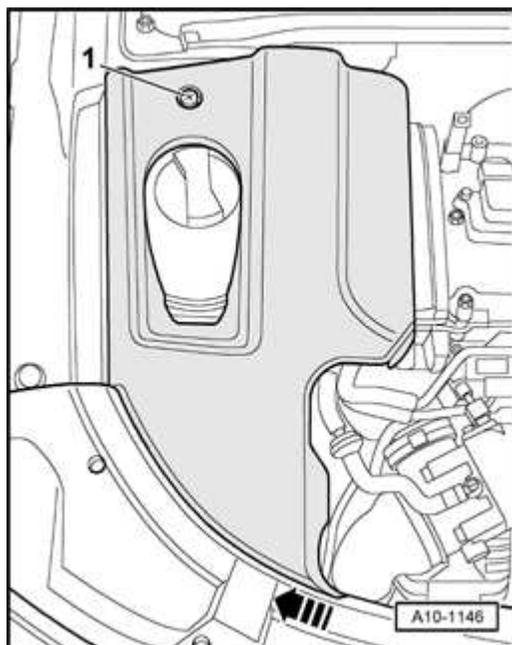


Fig. 288: Removing Screw And Coolant Expansion Tank Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -1- and remove cover over expansion tank -arrow-.

Both sides (continued):

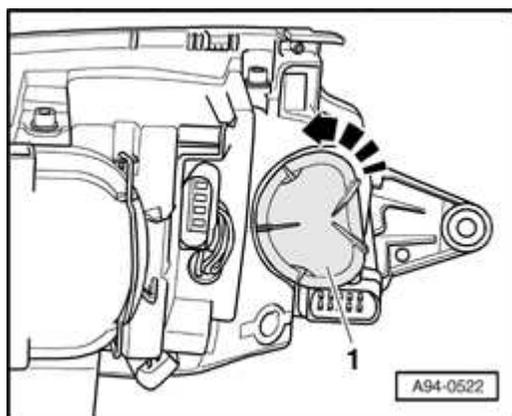


Fig. 289: Removing Cover By Turning Counter-Clockwise
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -1- by turning counter-clockwise -arrow-.

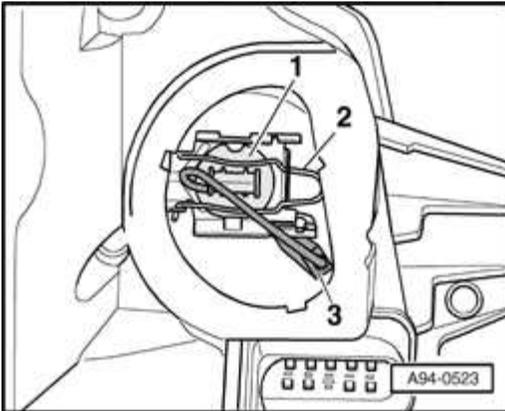


Fig. 290: Bulb, Spring Clip And Electrical Connection
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disengage spring clip -2- and remove bulb -1- from housing.
- Disconnect electrical connection -3-.

Installing

Install in reverse order of removal, noting the following:

CAUTION: Do not touch glass portion of bulb with bare hands. Even the smallest amount of moisture and/or contaminants from fingers that evaporates on the bulb during operation can cause the glass to cloud over.

- Insert new bulb in housing.
- Note bulb installation position
- Secure bulb with spring clip.
- Reconnect electrical connection and close housing cover.
- Reinstall battery if necessary. Refer to **Battery, removing and installing** .
- Adjust fog lights. Refer to **Fog lights, adjusting** .

Fog lights, adjusting

Special tools, testers and auxiliary items needed

- VAS 5107 Optical headlight aimer

NOTE: Adjust fog lights using detailed aiming procedure and specifications

Refer to **01 MAINTENANCE**

Adjusting

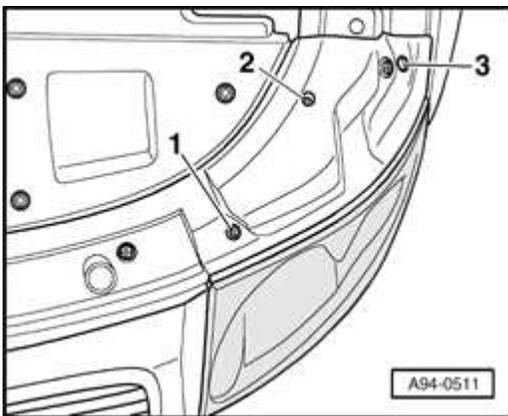


Fig. 291: Adjustment Screws On Left Headlight
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn adjusting screw -1- to set height. No provision is made for lateral adjustment.

NOTE: Do not disturb headlight adjustment screws -2- and -3-.

SIDE MOUNTED TURN SIGNALS

Side mounted turn signals, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

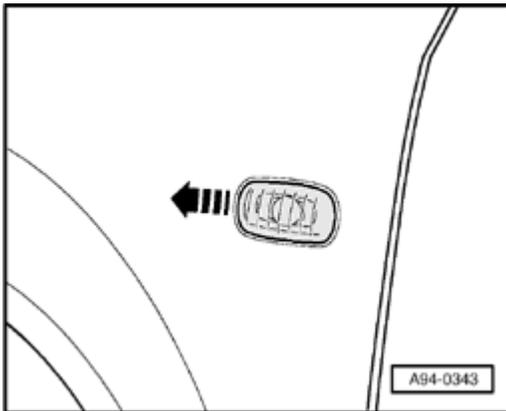


Fig. 292: Pushing Turn Signal Lens/Housing Against Retainer
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully push turn signal lens/housing in direction of -arrow- against retainer.
- Remove lens/housing from fender opening.
- To replace bulb, remove bulb holder from housing and remove bulb from holder.

Installing

- Install in reverse order of removal.

REAR LIGHTS

Rear lights, assembly

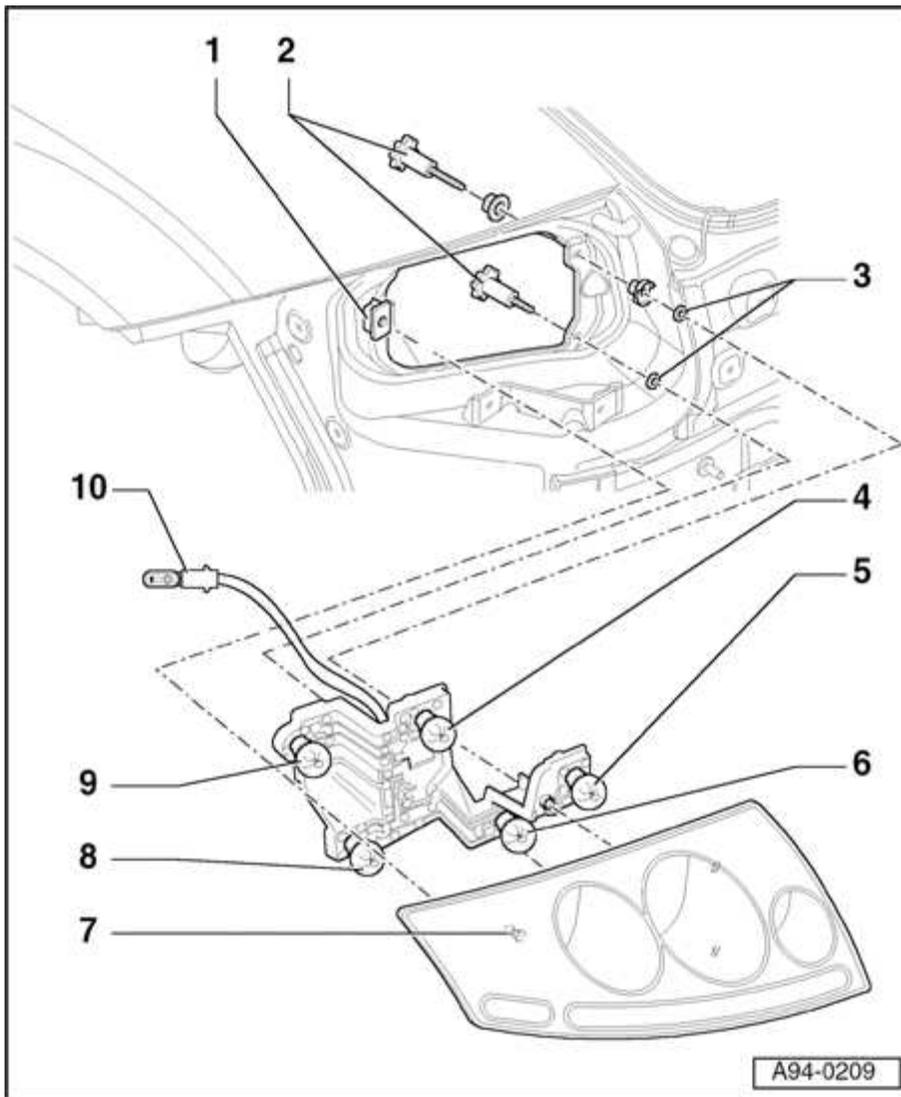


Fig. 293: Rear Lights Assembly

Courtesy of VOLKSWAGEN UNITED STATES, INC.

NOTE: Left rear light assembly is shown. Bulb arrangement in right rear light assembly is mirror image.

1 - Securing clips

2 - Securing bolts

3 - Plastic washers

4 - Tail light bulb

- 12 V, 21/5 W

5 - Rear fog light bulb (or back-up light bulb on right side of vehicle)

- 12 V, 21 W

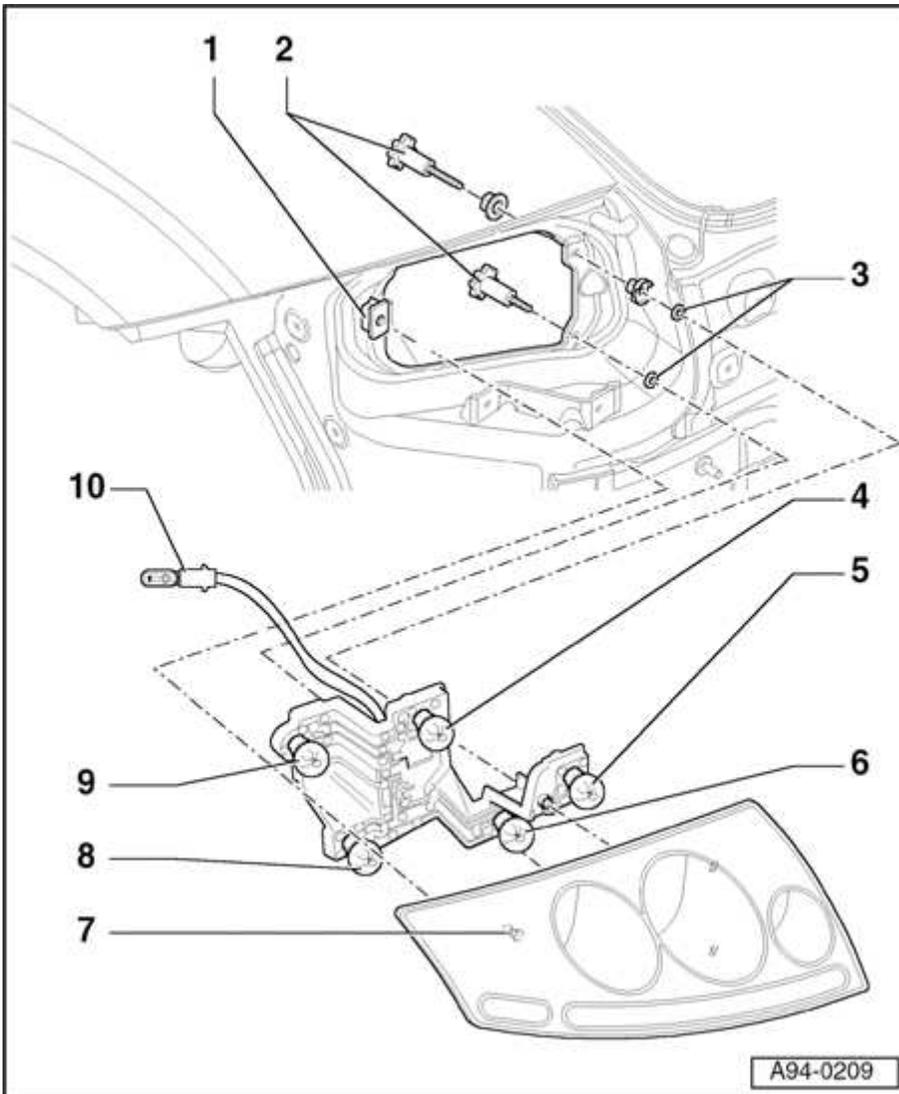


Fig. 294: Rear Lights Assembly

Courtesy of VOLKSWAGEN UNITED STATES, INC.

6 - Turn signal bulb

- 12 V, 21 W

7 - Ball pin on rear light housing

- Engages in plastic clip -1-
- Can be adjusted to align rear light with body contours

8 - Turn signal bulb

- 12 V, 21 W

9 - Brake light/tail light bulb

- 12 V, 21/5 W

10 - Side marker light bulb

- 12 V, 5 W glass socket lamp

Rear light housing and bulb holder, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Ensure light switch is in -O- position.
- Open appropriate luggage compartment storage area.

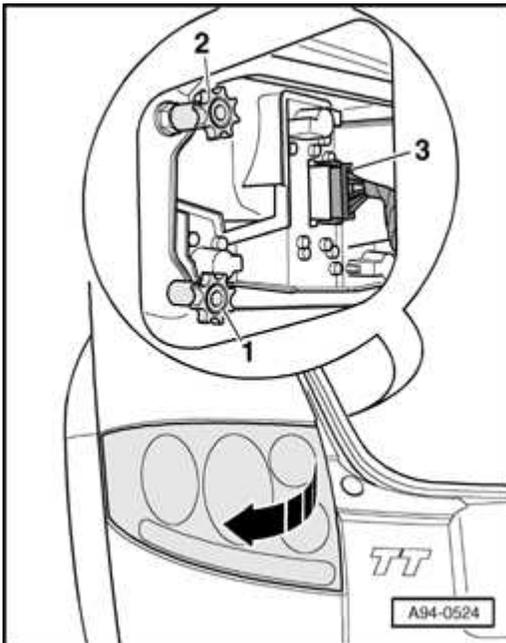


Fig. 295: Swivelling Rear Light Outwards And Identifying Electrical Connection And Knurled Fasteners

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection -3-.
- Remove knurled fasteners -1- and -2-.
- Swivel rear light outwards -arrow- as illustrated
- Disengage retaining pin from body.

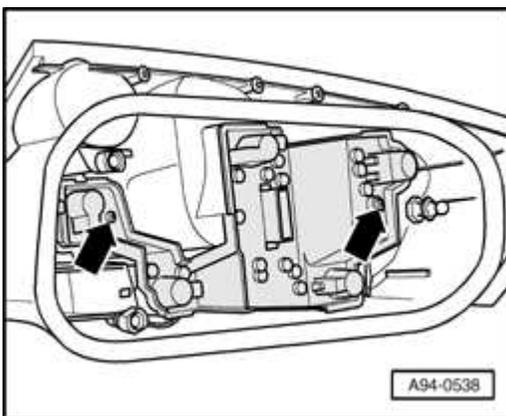


Fig. 296: Bulb Holder Screws

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -arrows- and remove bulb holder from rear light housing.

- Twist and remove bulbs from holder.

Installing

Install in reverse order of removal, noting the following:

- NOTE:**
- **Ensure tight seal between body and rear light housing.**
 - **Align rear light housing to body contours if necessary. Refer to Rear light housing, alignment .**

Tightening torque

Component	Nm
Knurled fastener to rear light	3.5

Rear light housing, alignment

Longitudinal adjustment

- Remove rear light housing. Refer to **Rear light housing and bulb holder, removing and installing** .

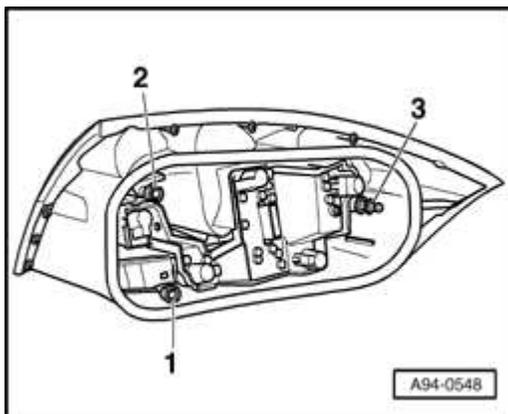


Fig. 297: Locating Adjuster Screws
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Gradually alter length of adjusters -1... 3-.
- Temporarily fit rear light housing to check adjustment. Housing must be flush with body contour.

- If alignment is OK, reinstall rear light. Refer to **Rear light housing and bulb holder, removing and installing** .

Height adjustment

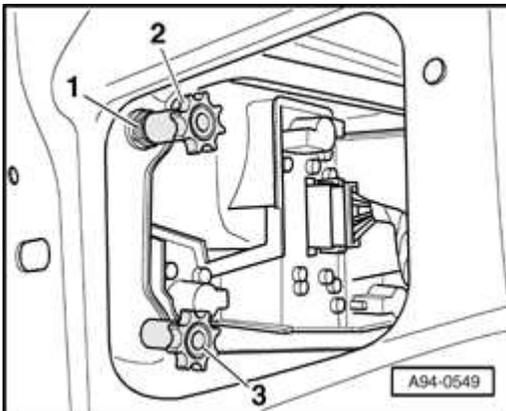


Fig. 298: Knurled Fasteners And Nut
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen knurled fasteners -2- and -3- by approx. 2 turns.
- Loosen nut -1- approx. 1 turn and move rear light upwards or downwards in order to achieve equal gaps with rear lid and rear trim.
- If alignment is OK, tighten all fasteners.

Tightening torques

Component	Nm
Lock nut to adjusting scREW	10
Knurled fastener to rear light housing	3.5

HIGH-MOUNT BRAKE LIGHT

High mount brake light - Coupe, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

NOTE:

- Do not operate brake pedal.
- In the event of a malfunctioning LED, the complete high-mount brake light assembly must be replaced.
- Open rear lid and unclip/remove tray.

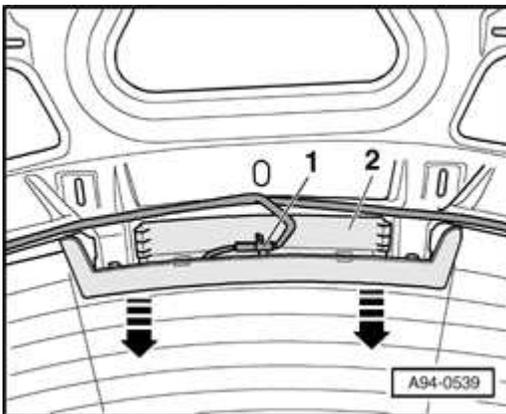


Fig. 299: High Mount Brake Light Assembly And Electrical Connection
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide high mount brake light assembly -2- forward and remove from rear window. If necessary, gently lever the assembly out on the left and right edges using a screwdriver.
- Pull electrical connection out from retainer clip.
- Disconnect electrical connection -1-.

Installing

- Install in reverse order of removal.
- Ensure electrical connection is securely located in retainer.
- Confirm brake light function.

High mount brake light - Roadster, removing and installing

Removing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

NOTE:

- Do not operate brake pedal.
- In the event of a malfunctioning LED, the complete high-mount brake light assembly must be replaced.

- Open rear lid.

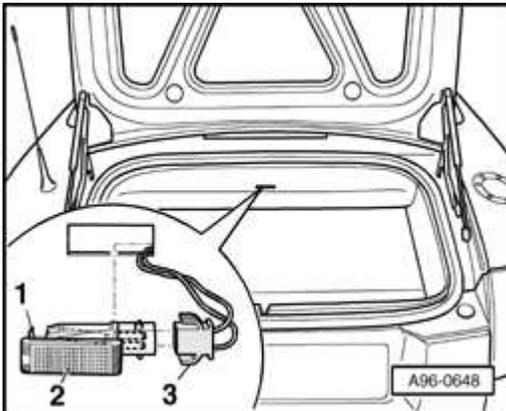


Fig. 300: Luggage Compartment Light, Locating Tabs And Electrical Connection

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Depress locating tabs -1- using a flat screwdriver and remove luggage compartment light -2- from trim.

NOTE: Electrical connection -3- remains connected.

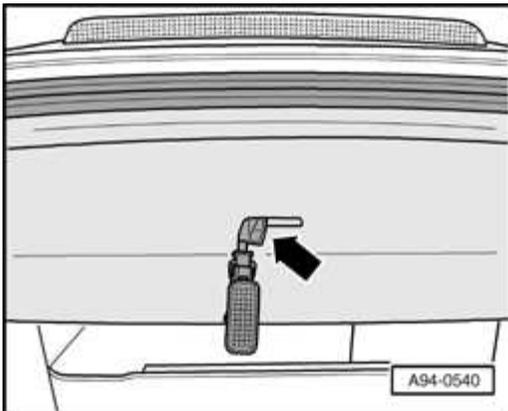


Fig. 301: Pulling Luggage Compartment Light Wiring Harness Out From Opening In Trim And Disconnecting Electrical Connection
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull luggage compartment light wiring harness out from opening in trim and disconnect electrical connection -arrow-.
- Close rear lid.

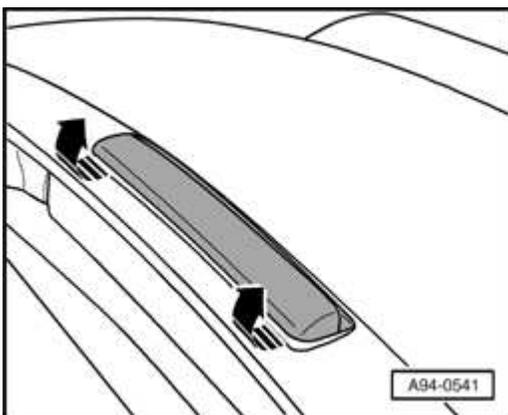


Fig. 302: Unclipping Cover For High Mount Brake Light From The Front (Leading) Edge Towards The Rear Of The Vehicle
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully unclip cover for high mount brake light from the front (leading) edge towards the rear of the vehicle as shown -arrows-.

CAUTION: DO NOT unclip cover from rear edge towards the front of the vehicle. Damage to cover and/or light assembly will result.

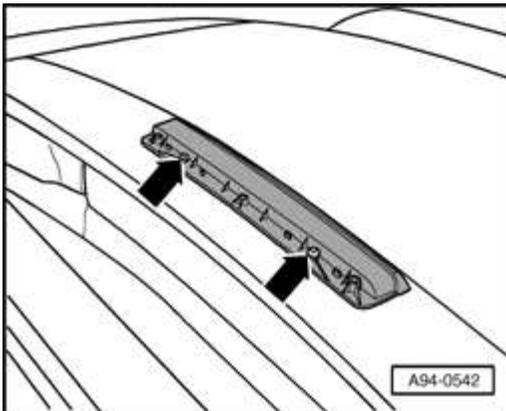


Fig. 303: Rake Light Assembly Screws

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove retaining screws -arrows-.
- Remove brake light assembly upwards while routing wiring harness through body opening.

Installing

- Install in reverse order of removal, noting the following:
- Route wiring harness through body opening into luggage compartment (use a guide wire if necessary) in order to reconnect electrical connection at luggage compartment light harness.
- Confirm brake light function.

Tightening torques

Component	Nm
Brake light housing to body	2.5

LICENSE PLATE LIGHT

License plate light, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

- Ensure light switch is in -O- position.

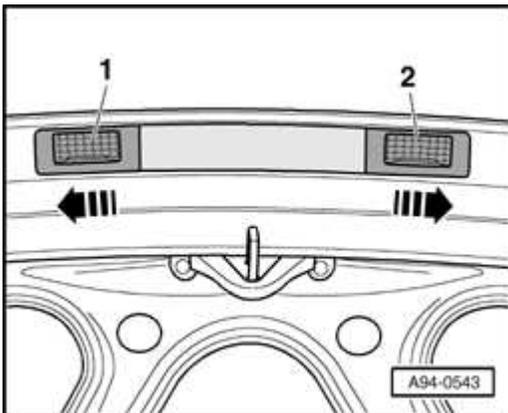


Fig. 304: Pressing Left And Right License Plate Light Towards Outside Of Vehicle

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press left -1- and right -2- license plate light towards outside of vehicle - arrows-.
- Remove from opening in rear lid.

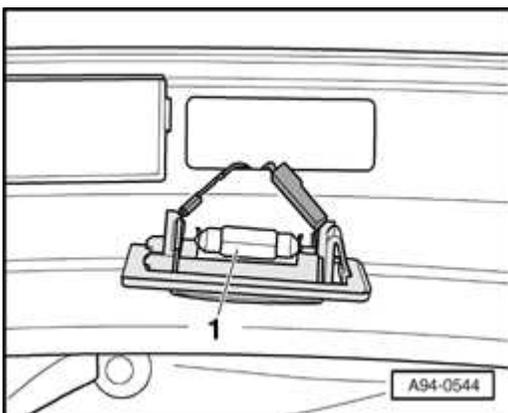


Fig. 305: License Plate Light

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bulb -1- (12 V, 5 W) from clip holders.

Installing

Install in reverse order of removal.

STEERING COLUMN SWITCHES

Steering column switches, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .

WARNING: Special safety precautions apply to vehicles equipped with airbags. Refer to 69 - PASSENGER PROTECTION - AIRBAGS, SEAT BELTS .

Removing

- Pull out steering column as far as possible and tilt downward.
- Center steering wheel in straight ahead position.
- Remove steering wheel with airbag unit.

Refer to 69 - PASSENGER PROTECTION - AIRBAGS, SEAT BELTS

- Remove driver's storage compartment.

Refer to 68 - INTERIOR EQUIPMENT

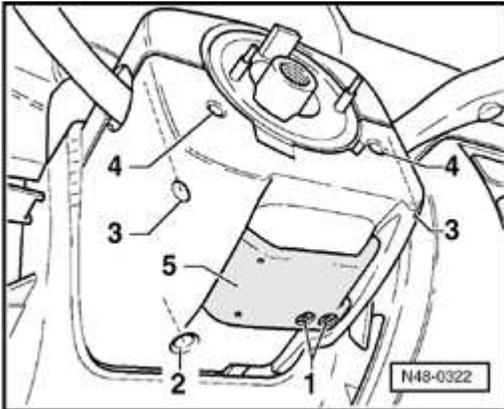


Fig. 306: Lower Steering Column Switch Trim Bolts, & Height & Reach Adjustment Handle

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -1- and remove handle for steering column adjustment -5-.
- Remove screws -2...4-.
- Detach upper and lower steering column trim sections.

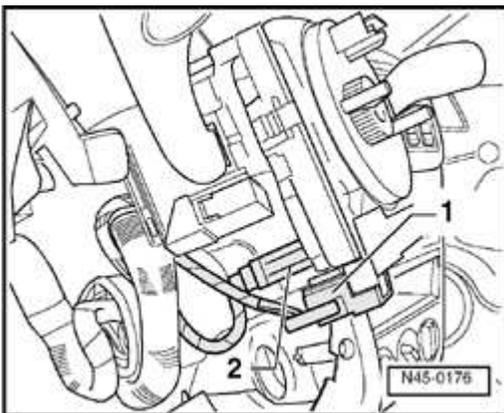


Fig. 307: Steering Angle Sensor Connectors

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connections -1- and -2-.

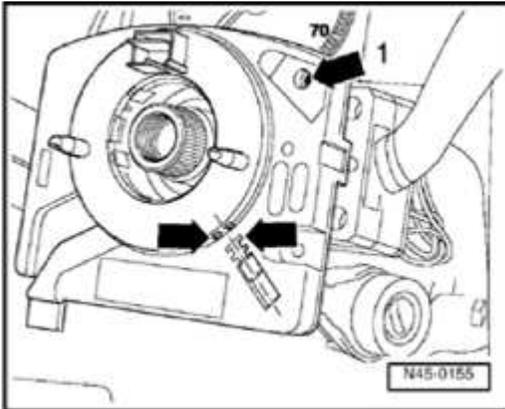


Fig. 308: Locating Steering Wheel Alignment Marks
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Confirm straight ahead position of steering column and front wheels.
- Yellow dot must be visible in hole -arrow 1- and two marks -arrows- must be aligned as illustrated.

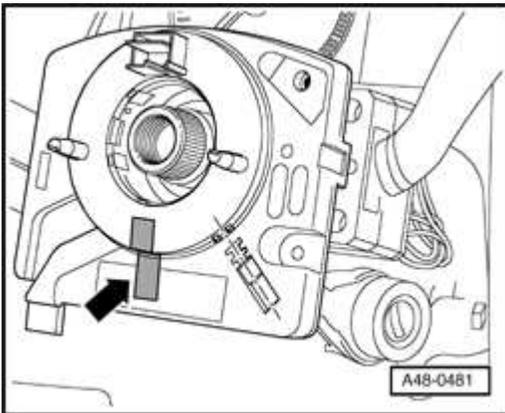


Fig. 309: Securing Spiral Spring With Slip Ring In Center Position With Adhesive Strip
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Secure spiral spring with slip ring in center position with adhesive strip -arrow-

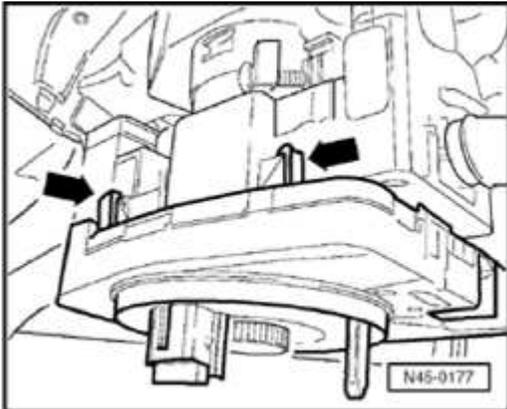


Fig. 310: Steering Angle Sensor Hooks
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully release upper fasteners -arrows-.
- Carefully release lower fasteners and detach housing of spiral spring with slip ring and steering angle sensor from steering column switch.

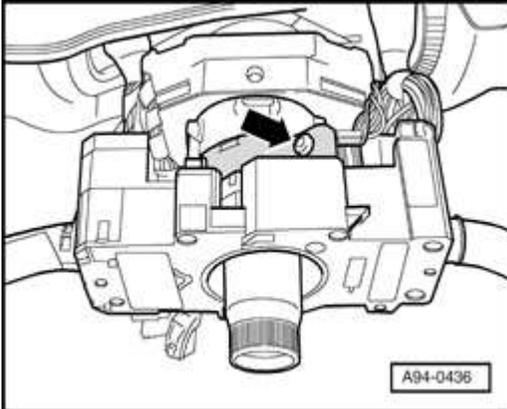


Fig. 311: Locating Steering Column Switch Clamp Bolt
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Loosen clamp bolt -arrow- until steering column switch can be removed.
- Disconnect electrical connections at steering column switch.

Installing

Install in reverse order of removal, noting the following:

- Slide housing of spiral spring with slip ring and steering angle sender onto steering column switch until all fasteners are heard to engage.

- Remove adhesive fastening strip or remove transportation seal in case new component is installed.

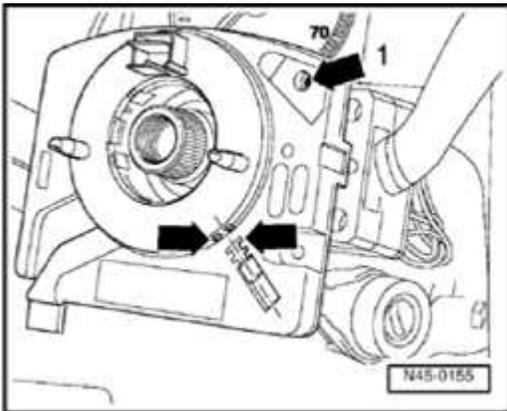


Fig. 312: Locating Steering Wheel Alignment Marks
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Confirm steering angle sensor centered:
- Yellow dot must be visible in hole -arrow 1- and two marks -arrows- must be aligned.
- Install steering wheel and airbag unit.

Refer to **69 - PASSENGER PROTECTION - AIRBAGS, SEAT BELTS**

- On vehicles with ABS/ESP Mark 20, perform OBD function 04 - Basic setting for steering angle sensor -G85-.

Refer to **01 ON BOARD DIAGNOSTIC (OBD)** .

- On vehicles with ABS/ESP Mark 60, perform OBD function 04 - Basic setting for steering angle sensor -G85- and perform ESP test drive (basic setting 093)

Refer to VAS 5051/5052 in operating mode "Guided Fault Finding".

Multi-pin connectors at steering column switch

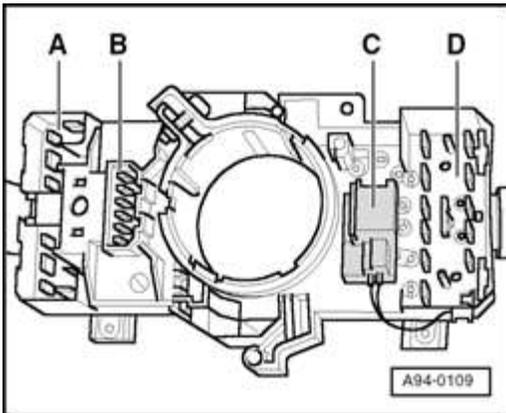


Fig. 313: Multi-Pin Connectors At Steering Column Switch
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

A - Connection for windshield wiper switch

B - Connection for on-board computer and intermittent wipe function

C - Connection for cruise control system

D - Connection for turn signal switch

Terminal assignments at multi-pin connectors

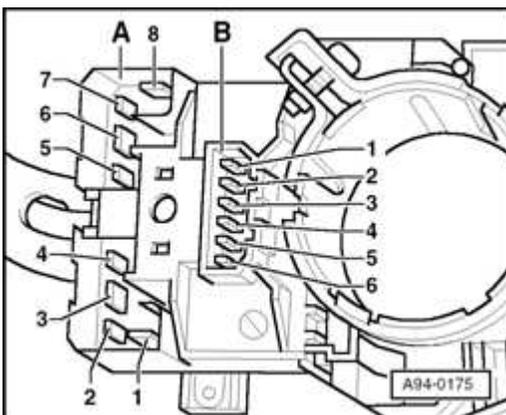


Fig. 314: Multi-Pin Connector For Windshield Wiper Switch And Multi-Pin Connector For On-Board Computer
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Multi-pin connector for windshield wiper switch -A-

1 - Terminal 53

2 - Open

3 - Open

4 - Terminal 53c

5 - Open

6 - Terminal 53 b

7 - Intermittent wipe

8 - Terminal 53a

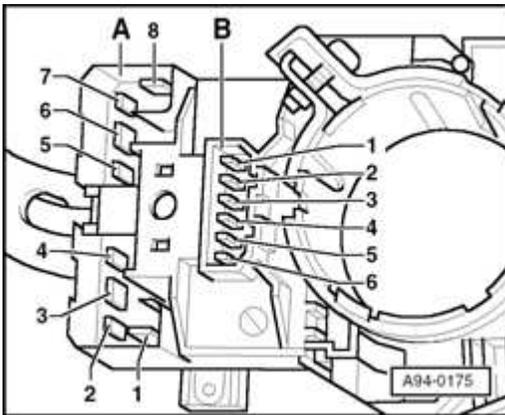


Fig. 315: Multi-Pin Connector For Windshield Wiper Switch And Multi-Pin Connector For On-Board Computer

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Multi-pin connector for on-board computer -B-

1 - On-board computer rocker switch: right

2 - On-board computer rocker switch: left

3 - Terminal 31

4 - On-board computer: Reset

5 - Intermittent wipe relay

6 - Terminal 31

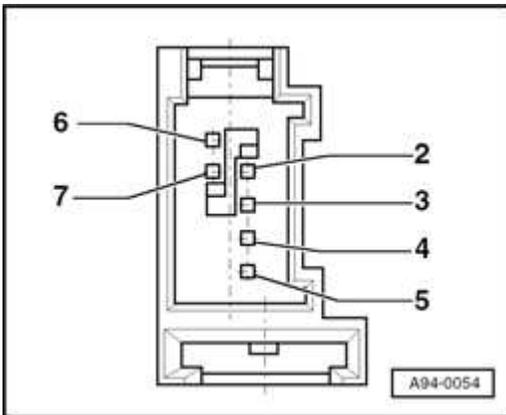


Fig. 316: Multi-Pin Connector For Cruise Control System
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Multi-pin connector for cruise control system -C-

2 - Engine control module, pin 75 (resume / increase speed)

3 - Engine control module, pin 57 (set / reduce speed)

4 - Engine control module, pin 38 (on / off + erase; main switch off completely)

5 - Engine control module, pin 76 (temporarily off without erasing; main switch not engaged in "off" position)

6 - Terminal 15

7 - Engine control module, pin 38 (on / off + erase; main switch off completely)

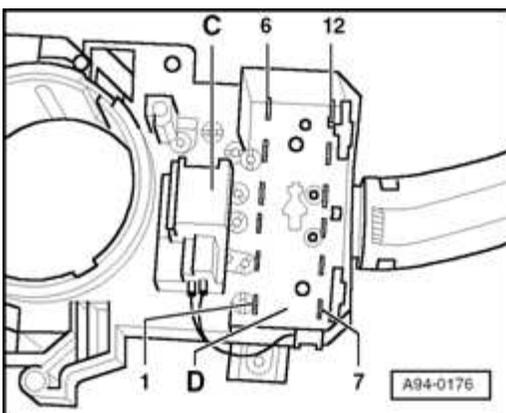


Fig. 317: Multi-Pin Connector For Turn Signal Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Multi-pin connector for turn signal switch -D-

- 1 - Terminal 30 (battery +)
- 2 - Terminal 30 (battery +)
- 3 - Terminal L (left turn signals)
- 4 - Terminal P (parking lights)
- 5 - Terminal 49a (turn signals)
- 6 - Open
- 7 - Terminal 56 (headlights)
- 8 - Terminal 56b (low beam)
- 9 - Terminal PL (left parking lights)
- 10 - Terminal PR (right parking lights)
- 11 - Terminal R (right turn signals)
- 12 - Terminal 56a (high beam headlights)

IGNITION/STARTER SWITCH AND LOCK CYLINDER

Lock cylinder, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Obtain the anti-theft radio security code.**
- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**

- **When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .**

WARNING: Special safety precautions apply to vehicles equipped with airbags. Refer to 69 - PASSENGER PROTECTION - AIRBAGS, SEAT BELTS .

NOTE:

- **On vehicles with anti-theft immobilizer, the reader coil is attached to lock cylinder and cannot be replaced separately.**
- **Lock cylinder must be replaced if reader coil malfunctions. Refer to Reader coil, replacing .**

Removing

- **Remove steering column switches. Refer to Steering column switches, removing and installing .**
- **Where applicable, disconnect electrical connection at reader coil.**

Vehicles with automatic transmission:

- **Shift selector lever to "P".**

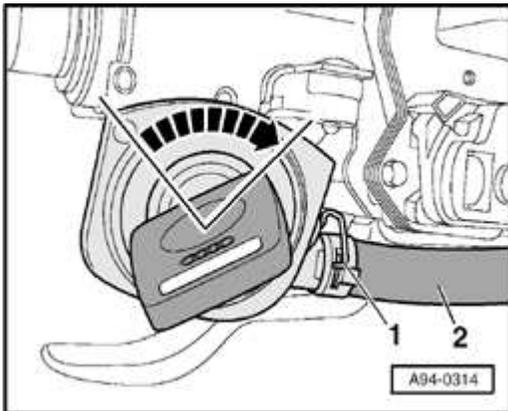


Fig. 318: Turn Ignition Key To "Ignition On" Position
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn ignition key to "Ignition ON" position -arrow-.
- Lift interlock lever -1- slightly and pull interlock cable -2- out of ignition lock housing.

All models:

NOTE: Spare key is required for removal of lock cylinder as the following operations can only be performed with an ignition key with a flat grip, i.e. no light and no remote control.

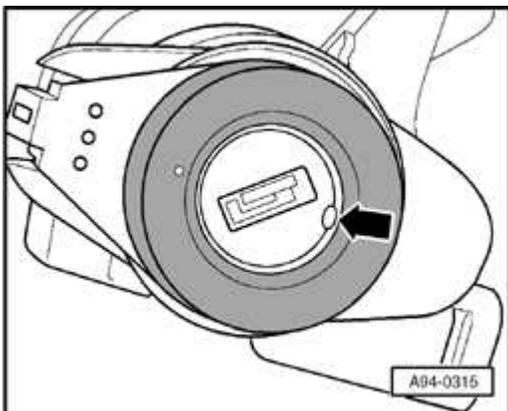


Fig. 319: Aligning Recess In Trim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Turn spare key to "ignition ON" position, thus aligning recess in trim -arrow- with hole in ignition lock.

NOTE: Illustration shows correct lock position without ignition key.

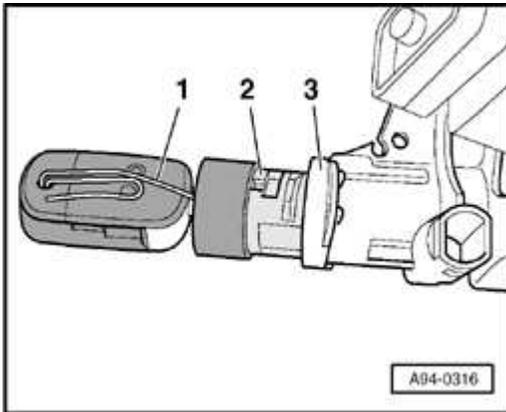


Fig. 320: Identifying Steel Wire In Hole, Lock Cylinder And Reader Coil Out Of Steering Lock Housing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert steel wire or pin (\varnothing approx. 1.5 mm) as far as it will go into hole -1- and in doing so pull lock cylinder -2- with reader coil out of steering lock housing -3-.

CAUTION: Do not lock steering without lock cylinder in place. Steering lock will become blocked and require replacement.

Installing

Install in reverse order of removal, noting the following:

- Insert spare key in lock cylinder and turn to "Ignition on" position.

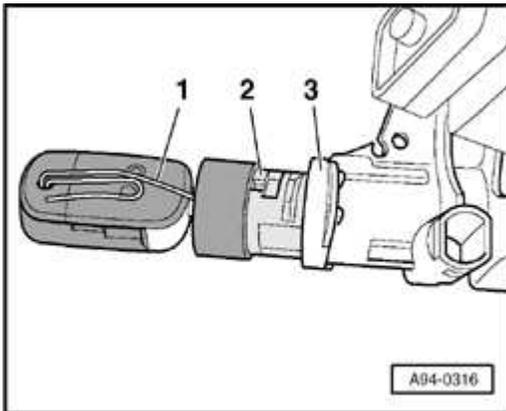


Fig. 321: Identifying Steel Wire In Hole, Lock Cylinder And Reader Coil Out Of Steering Lock Housing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Insert steel wire/pin -1- in hole on end face as far as it will go.
- Insert lock cylinder -2- with reader coil in steering lock housing -3-.
- Then pull out steel wire and firmly press in lock cylinder until catch is heard to engage.
- Where applicable, reconnect electrical connection at immobilizer reader coil.

Ignition/starter switch, removing and installing

Removing

- Remove steering column switches. Refer to **Steering column switches, removing and installing** .

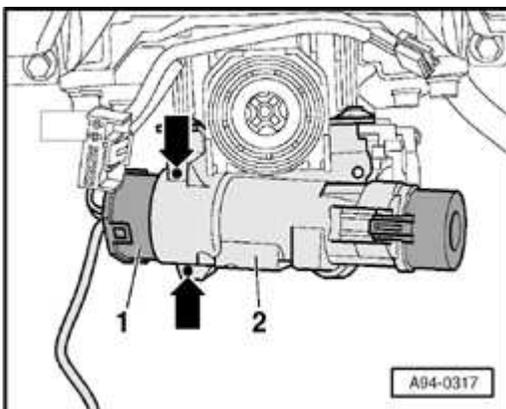


Fig. 322: Locating Screws , Ignition/Starter Switch And Steering Lock Housing
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection -1- at ignition/starter switch.
- Remove locking fluid from screws -arrows-.
- Loosen screws -arrows- slightly and pull ignition/starter switch out of steering lock housing -2-.

Installing

Install in reverse order of removal, noting the following:

NOTE: Ignition/starter switch and lock cylinder must be in "Ignition ON" position when installing.

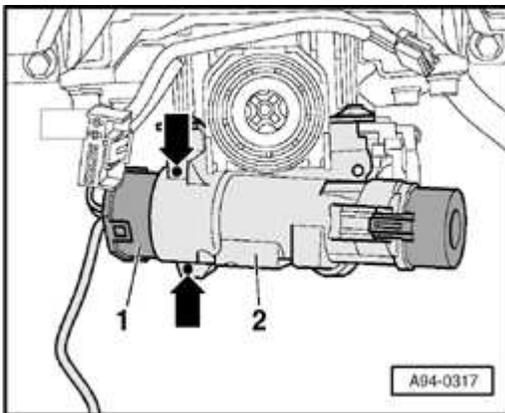


Fig. 323: Locating Screws , Ignition/Starter Switch And Steering Lock Housing
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Apply locking fluid to lock housing screws -2-.

Connection assignment at ignition/starter switch

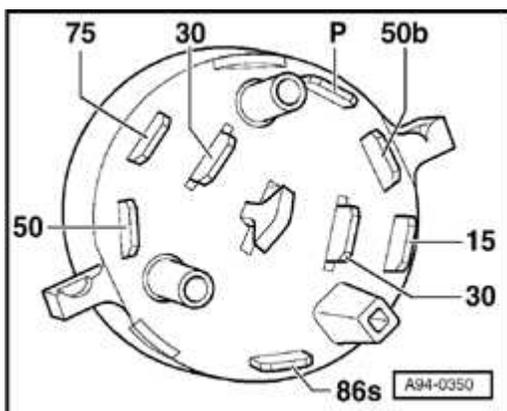


Fig. 324: Connection Assignment At Ignition/Starter Switch
Courtesy of VOLKSWAGEN UNITED STATES, INC.

15 - Terminal 15

30 - Terminal 30

50 - Terminal 50

50b- Terminal 50b

75 - Terminal 75

86s- Terminal 86s

P - Park position

AUTOMATIC VERTICAL HEADLIGHT AIM CONTROL SYSTEM

General information

The automatic vertical headlight aim control system is installed on vehicles with High Intensity Gas Discharge (HID) headlights.

The system contains the following components:

- Level control system sensors at front and rear axles
- Headlight range control module
- Headlight beam adjusting motors integrated with headlight units

When driving, the system automatically adapts the headlight beam inclination dependent on vehicle suspension movement and load. Headlight glare to oncoming traffic is minimized.

On Board Diagnostic (OBD), function

The headlight range control module is controlled by a microprocessor and has On Board Diagnostic (OBD) capability. If malfunctions occur in any of the system components, corresponding DTCs are stored in the Diagnostic Trouble Code (DTC)

memory.

Before performing any troubleshooting or inspection, always begin by checking for DTCs using the On Board Diagnostic (OBD) program. DTCs stored in memory are retrieved/checked with VAS 5051/5052 tester in mode "Guided Fault Finding".

Automatic vertical headlight aim control system, layout

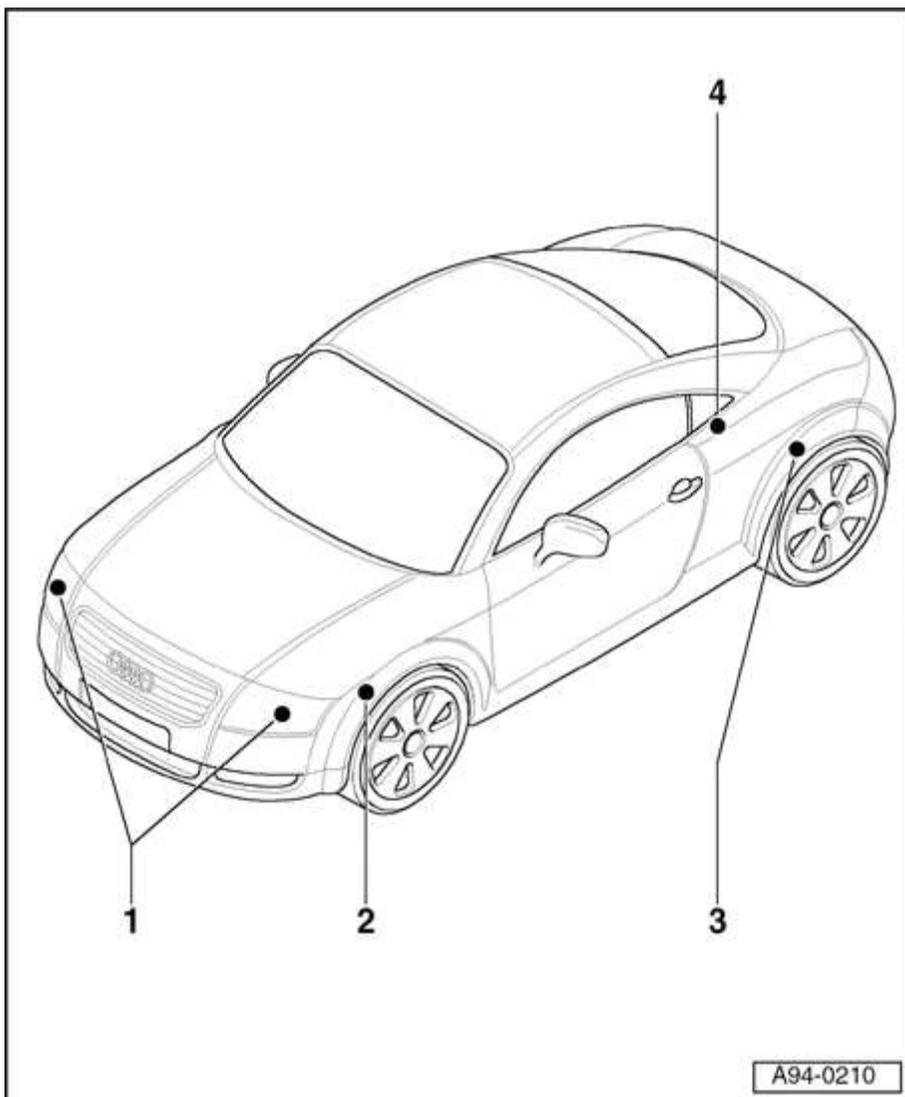


Fig. 325: Automatic Vertical Headlight Aim Control System Layout
Courtesy of VOLKSWAGEN UNITED STATES, INC.

WARNING:

- **HIGH VOLTAGE!**
- **Always disconnect negative (-) battery terminal**

prior to servicing any parts of the HID lamp system marked with the yellow "HIGH VOLTAGE!" symbol.

- **After disconnecting battery, briefly turn headlights on and off in order discharge any residual voltage.**

1 - Headlights with High Intensity Gas Discharge (HID) Lamps

- With Headlight Beam Adjusting Motors -V48- & -V49-
- Removing and installing. Refer to **Headlight housing, removing and installing** .

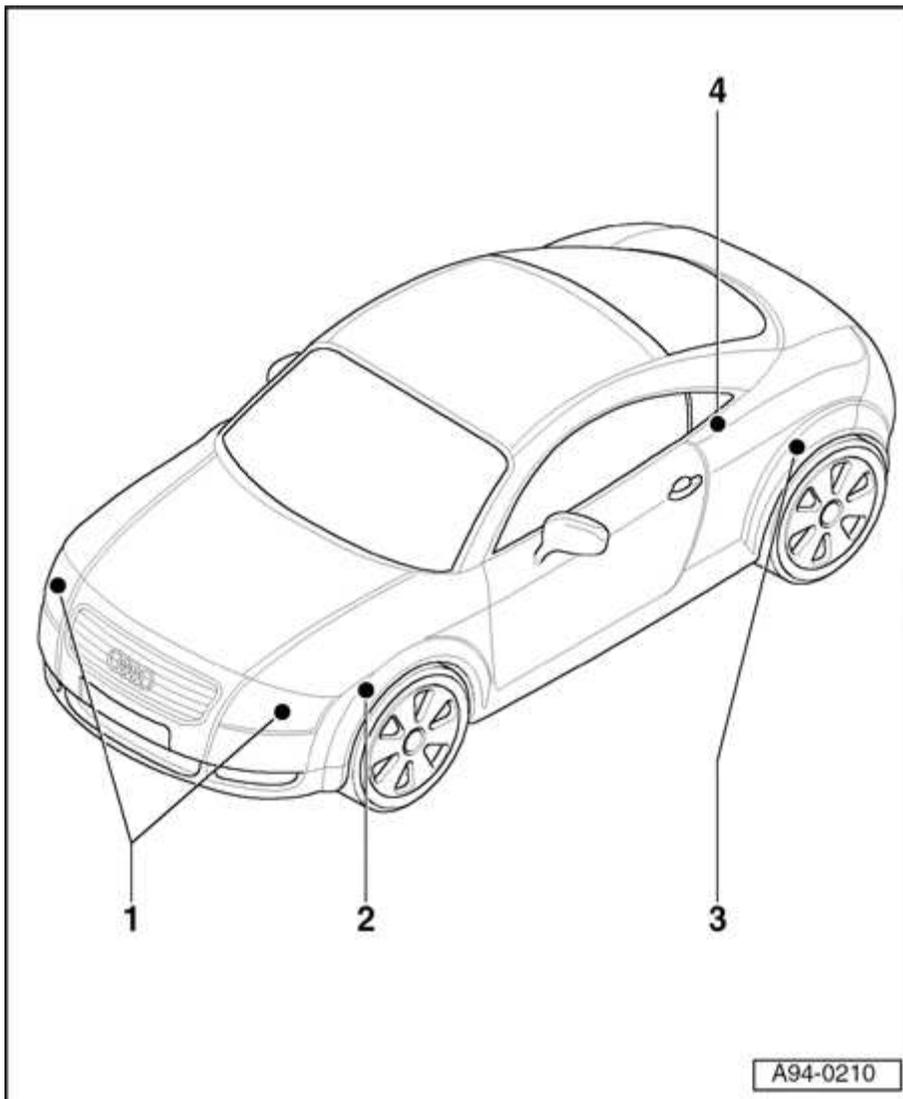


Fig. 326: Automatic Vertical Headlight Aim Control System Layout
Courtesy of VOLKSWAGEN UNITED STATES, INC.

2 - Left Front Level Control System Sensor -G78-

- Located at left front control arm of front axle
- Removing and installing. Refer to **Left Front Level Control System Sensor - G78-, removing and installing**

3 - Left rear level control system sensor -G76-

- Front-wheel drive: located at rear axle
- Removing and installing. Refer to **Left Rear Level Control System Sensor -**

G76-, removing and installing

- All-wheel drive: located at rear crossmember left
- Removing and installing. Refer to **Left Rear Level Control System Sensor - G76-, removing and installing**

4 - Headlight Range Control Module -J431-

- Coupe: located below rear seat bench
- Removing and installing. Refer to **Headlight Range Control Module -J431- - Coupe, removing and installing**
- Roadster: located behind bulkhead, center, below convertible top storage compartment, on floor
- Removing and installing. Refer to **Headlight Range Control Module -J431- - Roadster, removing and installing**

Headlight Range Control Module -J431- - Coupe, removing and installing

Removing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
 - Switch ignition off and remove ignition key.
-
- Remove rear seat bench.

Refer to **72 - SEAT - FRAMES**

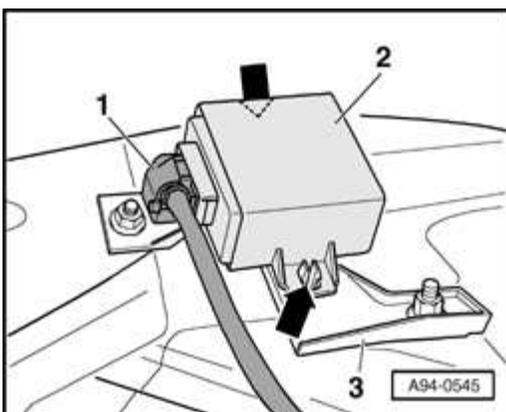


Fig. 327: Headlight Range Control Module -J431- - Coupe Remove/Install Components

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release clips -arrows-.
- Remove module -2- from bracket -3-.
- Disconnect electrical connection -1-.

Installing

Install in reverse order of removal, noting the following:

OBD function - "Basic setting" must be performed on -J431- when replacing

Refer to VAS 5051/5052 in operating mode "Guided Fault Finding".

Headlight Range Control Module -J431- - Roadster, removing and installing

Removing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

- Remove rear side panel trim

Refer to **70 - INTERIOR TRIM**

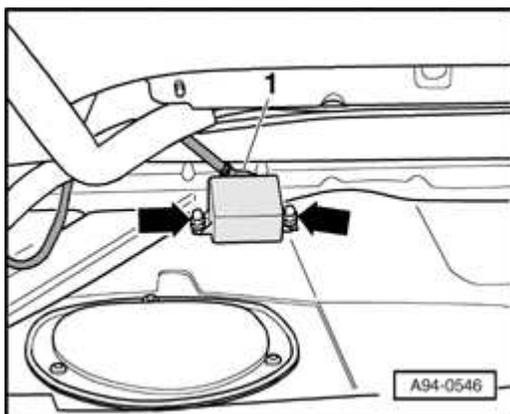


Fig. 328: Headlight Range Control Module -J431- - Roadster Remove/Install Components

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release nuts -arrows-.
- Remove module -1-.
- Disconnect electrical connection -1-.

Installing

Install in reverse order of removal, noting the following:

OBD function - "Basic setting" must be performed on -J431- when replacing

Refer to VAS 5051/5052 in operating mode "Guided Fault Finding".

Tightening torques

Component	Nm
Control module to body	2.5

Left Front Level Control System Sensor -G78-, removing and installing

Removing (front-wheel drive and all-wheel drive)

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

The sensor is mounted above the front axle at the control arm.

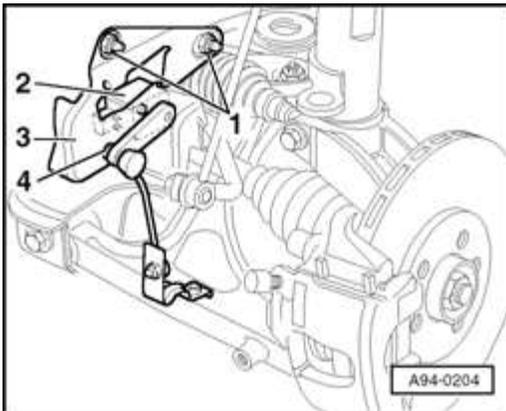


Fig. 329: Left Front Level Control System Sensor -G78- Remove/Install Components

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nut -4- and detach linkage.
- Sensor -1- is mounted to the securing bracket -3- at vehicle.
- Remove sensor and securing bracket by removing both nuts -2-.
- Disconnect harness connector.

- By removing both socket head bolts (3mm) at level control system sensor, it can be removed from the securing bracket -3-.

Installing

Install in reverse order of removal.

Left Rear Level Control System Sensor -G76-, removing and installing

Removing (front-wheel drive)

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Sensor (front-wheel drive) is mounted above the rear axle.

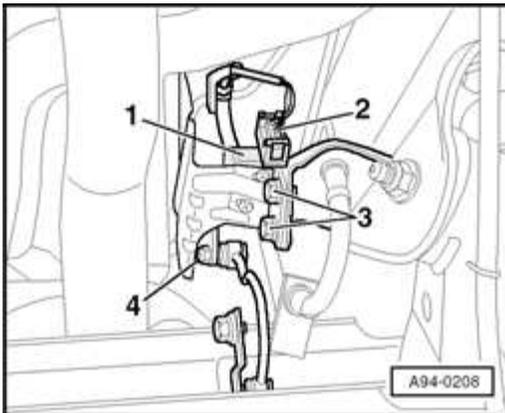


Fig. 330: Left Rear Level Control System Sensor -G76- Remove/Install Components (Front-Wheel Drive)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection -2-.
- Remove nut -4- and detach linkage.
- Remove both bolts -3- and remove control system sensor -1- together with bracket.
- By removing both socket head bolts (3mm) at level control system sensor -1-, it can be removed from the bracket.

Installing

Install in reverse order of removal.

Removing (all-wheel drive)

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Sensor (all-wheel drive) is mounted above the rear axle at the component carrier.

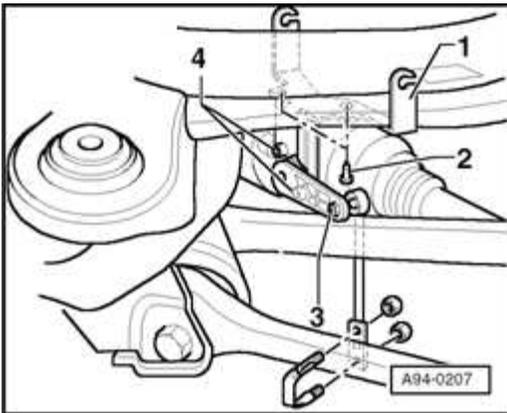


Fig. 331: Left Rear Level Control System Sensor -G76- Remove/Install Components (All-Wheel Drive)

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connection.
- Remove nut -3- and detach linkage. Linkage is mounted to the crossmember with a bracket and two nuts.
- Remove both socket head bolts -4- (3mm) at level sensor and remove it from bracket -1-.
- If necessary, bracket -1- can be removed from component carrier by removing both bolts -2-.

Installing

Install in reverse order of removal.

96 LIGHTS, SWITCHES - INTERIOR, ANTI-THEFT

INTERIOR LIGHTS AND SWITCHES

Switches in instrument panel, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Remove radio

Refer to **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER**

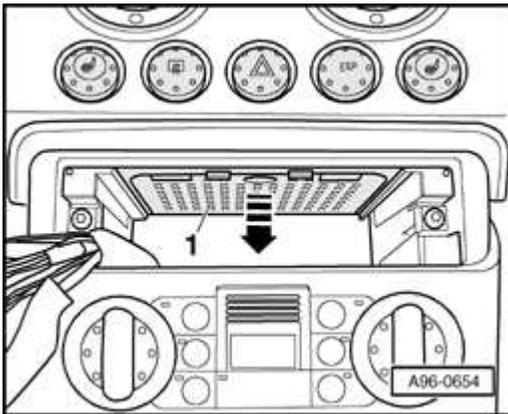


Fig. 332: Pulling Down Cover Plate In Top Of Radio Slot Opening
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Pull down cover plate -1- in top of radio slot opening -arrow- and remove from opening.

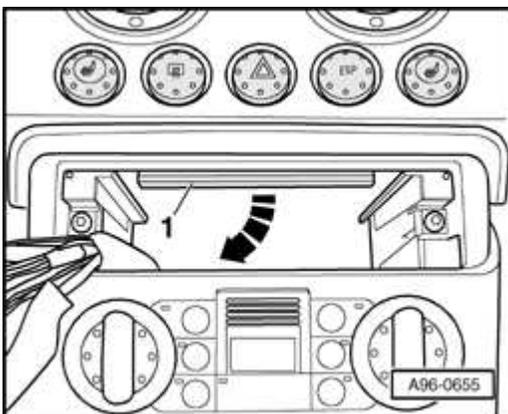


Fig. 333: Releasing Switches By Pulling Retainer Clip Downwards
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Reach upwards through radio slot and release switches by pulling retainer clip -1- downwards -arrow-.
- Press switch to front out of instrument panel.
- Take switch out of instrument panel through radio slot.
- Disconnect electrical connection.

Installing

Install in reverse order of removal of removal, noting the following:

- Press clip upwards until it engages.
- Reconnect electrical connection.
- Insert cover plate in top of radio slot.

NOTE: Cover plate can only be fitted in one position.

Light Switch -E1-, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

- Ensure light switch is in -O- position.

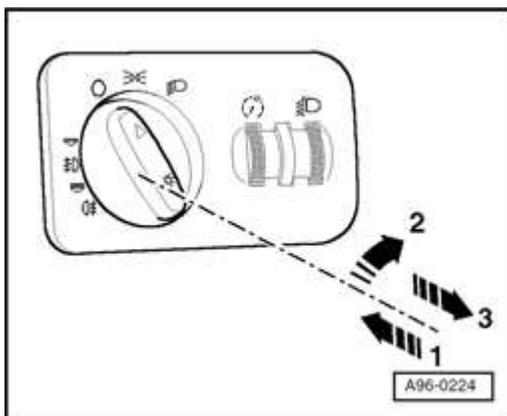


Fig. 334: Pressing Light Switch While Turning To Right And Holding Switch In Position While Pulling Out Of Housing

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Press light switch -arrow 1- while turning to right -arrow 2-.
- Hold switch in this position and pull out of housing -arrow 3-.

- Disconnect electrical connections.

Installing

Install in reverse order of removal of removal, noting the following:

- Press switch into switch housing until catch engages.

Glove compartment light (switch) -W6-, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Special tools and equipment required

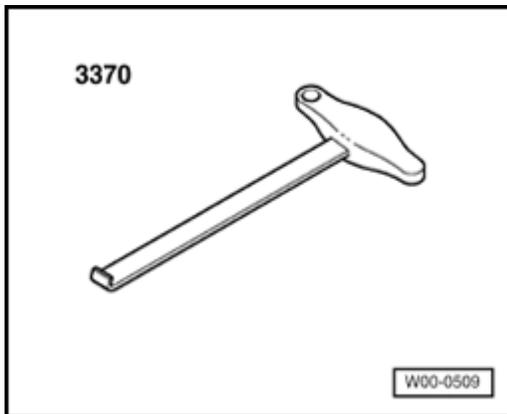


Fig. 335: Identifying Special Hook 3370

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Hook 3370

Removing

- Ensure light switch to -0- position.
- Open glove box if necessary.

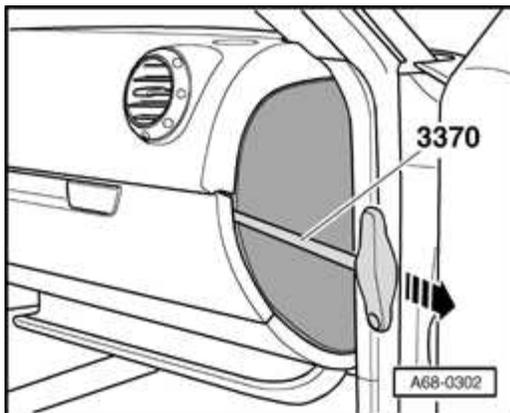


Fig. 336: Removing Right Instrument Panel End Trim Using Hook 3370
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use hook 3370 to remove right instrument panel end trim -arrow-.

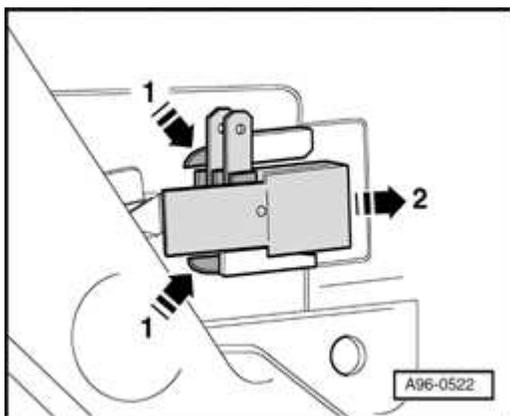


Fig. 337: Depressing Both Release Tabs And Pulling Switch Out Of Guide At Glove Box
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Depress both release tabs -arrows 1- and pull switch out of guide at glove box - arrow2-.
- Disconnect electrical connections.

Installing

Install in reverse order of removal of removal.

Switches in front center console, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

- Ensure light switch is in -O- position.
- Slide back cover over switch console.

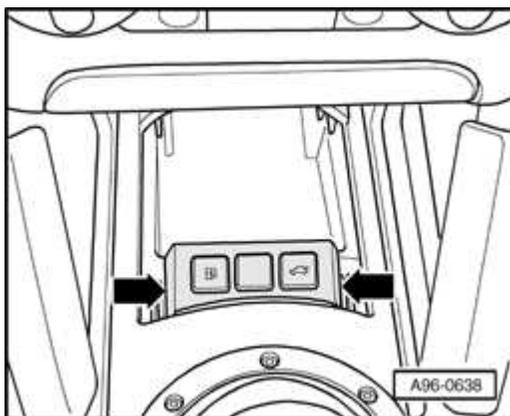


Fig. 338: Switch Mount Out Of Center Console
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use flat screwdriver to carefully pry switch mount out of center console - arrows-.
- Disconnect electrical connections.

Installing

Install in reverse order of removal of removal, noting the following:

- Press switch mount into center console until fasteners engage.

Switch mount in rear center console, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.

- **Switch ignition off and remove ignition key.**

Removing

- Ensure light switch is in -O- position.

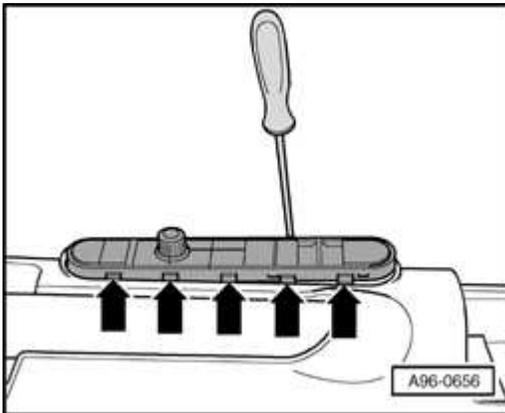


Fig. 339: Releasing Retainer Tabs At Switch Mount Using Flat Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use flat screwdriver to carefully release retainer tabs -arrows- at switch mount.
- Lift out switch mount.
- Disconnect electrical connections.

Installing

Install in reverse order of removal of removal, noting the following:

- Press switch mount into center console until fasteners engage.

Driver's Interior Locking Switch -E150-, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Remove switch mount in rear center console. Refer to **Switch mount in rear center console, removing and installing** .

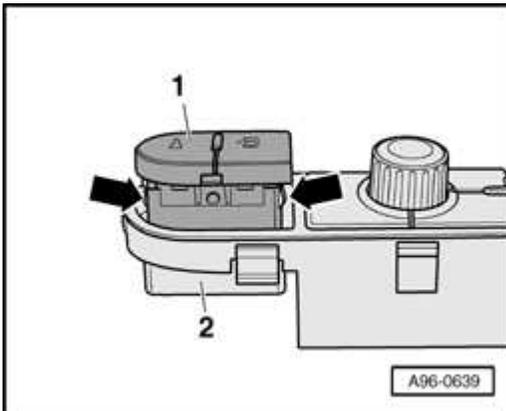


Fig. 340: Driver's Interior Locking Switch -E150- Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use small knife or feeler gauge to release retainer tabs -arrows-.
- Pull switch -1- upwards out of switch mount -2-.

Installing

Install in reverse order of removal of removal, noting the following:

- Press switch into switch mount until fasteners engage.

Function Selector Switch 2 (Navigation), removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Remove switch mount in rear center console. Refer to **Switch mount in rear center console, removing and installing** .

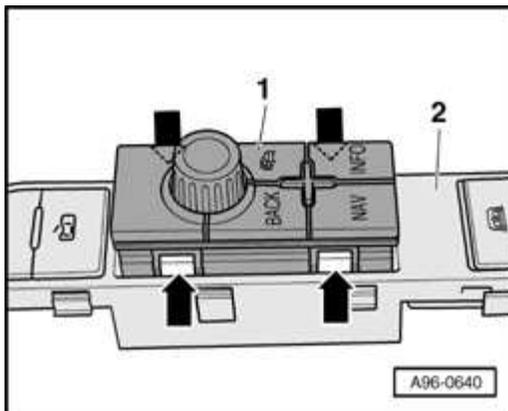


Fig. 341: Function Selector Switch 2 (Navigation) Remove/Install Components
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use small knife or feeler gauge to release retainer tabs -arrows-.
- Pull switch -1- upwards out of switch mount -2-.

Installing

Install in reverse order of removal of removal, noting the following:

- Press switch into switch mount until fasteners engage.

Wind Deflector Switch, -E278-, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Remove switch mount in rear center console. Refer to **Switch mount in rear center console, removing and installing** .

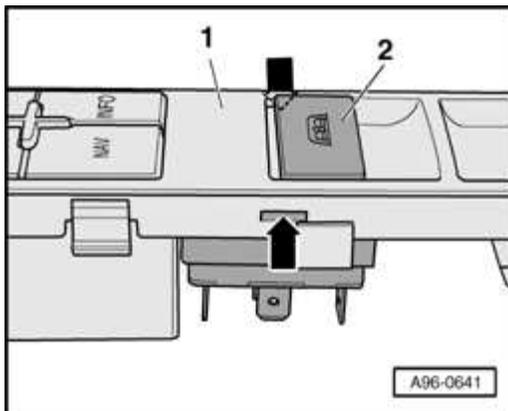


Fig. 342: Wind Deflector Switch, -E278- Remove/Install Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use small knife or feeler gauge to release retainer tabs -arrows-.
- Pull switch -2- downwards out of switch mount -1-.

Installing

Install in reverse order of removal of removal, noting the following:

- Press switch into switch mount until fasteners engage.

Convertible Top Operation Switch -E137-, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Remove switch mount in rear center console. Refer to **Switch mount in rear center console, removing and installing** .

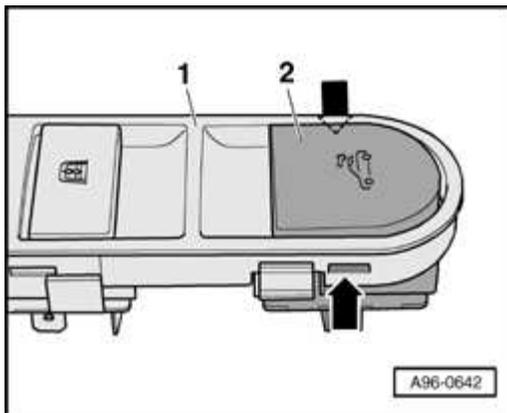


Fig. 343: Convertible Top Operation Switch -E137-, Remove/Install Components

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use small knife or feeler gauge to release retainer tabs -arrows-.
- Pull switch -2- out of switch mount -1-.

Installing

Install in reverse order of removal of removal, noting the following:

- Press switch into switch mount until fasteners engage.

Mirror Adjustment Switch -E43-, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Remove window lifter switch. Refer to **Window lifter switches, removing and installing** .

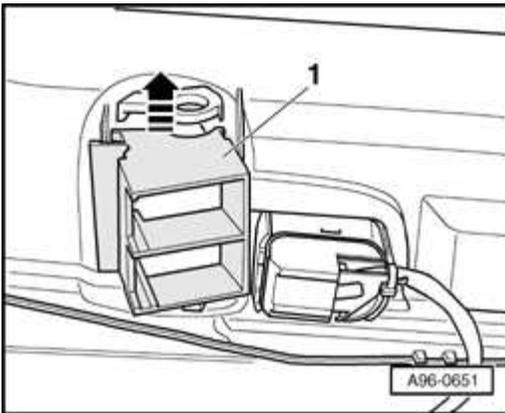


Fig. 344: Sliding Mounting Frame Out Of Door Trim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide mounting frame -1- out of door trim in direction of arrow.

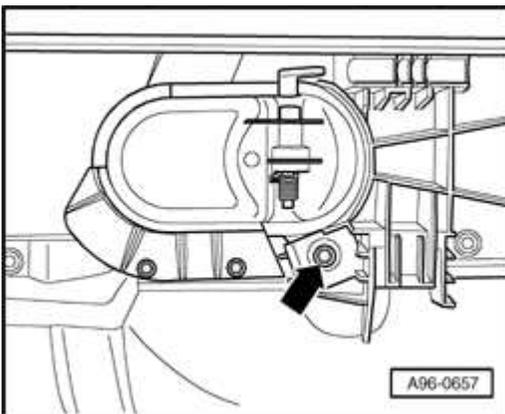


Fig. 345: Mirror Adjustment Switch Screw
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screw -arrow-.

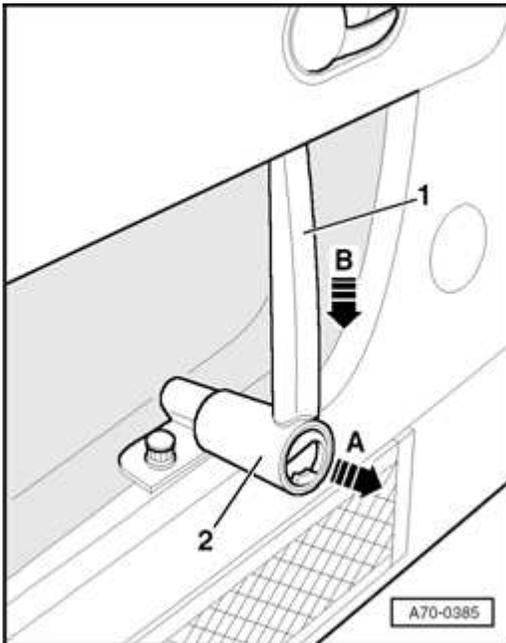


Fig. 346: Sliding Switch Trim Off Door Trim And Pulling Grab Handle Out Of Door Trim

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Slide switch trim -2- off door trim in direction of -arrow A-.
- Pull grab handle -1- out of door trim in direction of -arrow B-.

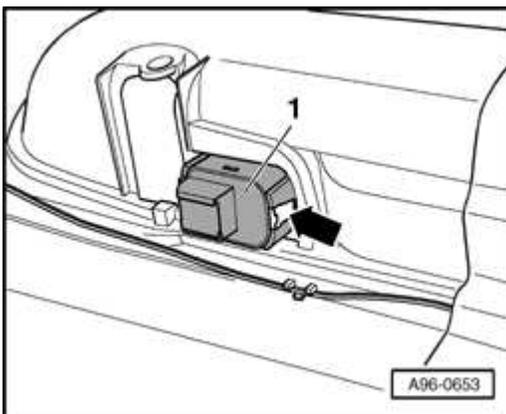


Fig. 347: Releasing Clip And Pulling Mirror Adjustment Switch Upwards Out Of Door Trim

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully release clip -arrow- and pull mirror adjustment switch -1- upwards out of door trim.

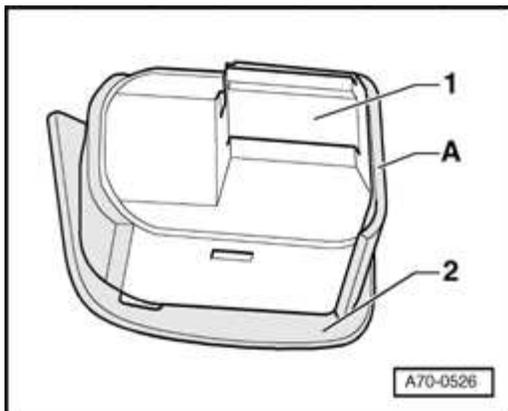


Fig. 348: Separating Mirror Adjustment Switch From Trim
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Separate mirror adjustment switch -1- from trim -2- (release fastener -A-).

Installing

Install in reverse order of removal of removal, noting the following:

- Press mirror adjustment switch into mirror adjustment trim until fasteners engage.
- Press switch into switch mount until fasteners engage.

Window lifter switches, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

NOTE: Driver's window lifter switch illustrated. Procedure is the same for all switches.

- Remove applicable door panel

Refer to **70 - INTERIOR TRIM**

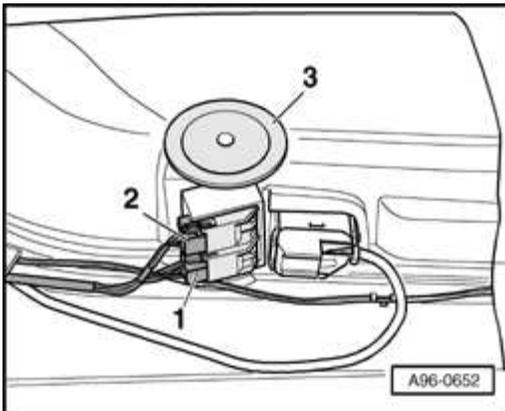


Fig. 349: Door Trim Electrical Connections And Guide Sleeve
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Disconnect electrical connections -1- and -2-.
- Pull guide sleeve -3- out of door trim.

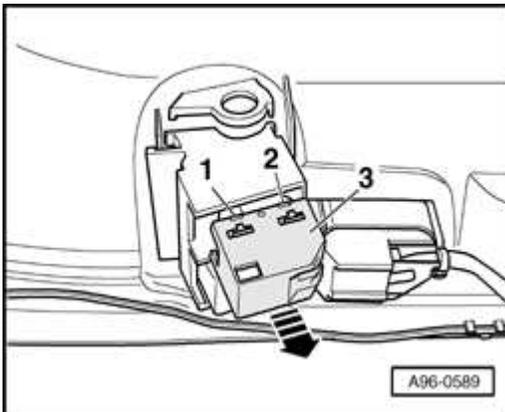


Fig. 350: Removing Window Lifter Switches
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use small screwdriver to carefully release fasteners -arrows-.
- Remove switch -3- from door panel -arrow-.

Installing

Install in reverse order of removal of removal.

Door contact switches, removing and installing

Door contact switches are integrated with the applicable door lock and cannot be

replaced separately.

- Replace door lock

Refer to **57 FRONT DOORS, CENTRAL LOCKING SYSTEM**

Garage Door Opener Control Head -E284-, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

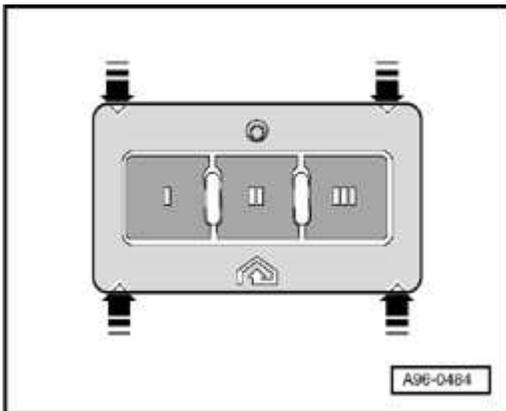


Fig. 351: Prying Control Head Out Of Windshield Frame
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Carefully pry control head out of windshield frame at locations marked with -arrows-.
- Disconnect electrical connection.

Installing

Install in reverse order of removal of removal.

Rear lid contact switch, removing and installing

The rear lid contact switch is integrated into the rear lid lock and cannot be replaced

separately.

- Replace rear lid lock

Refer to **55 HOOD, LIDS**

Font interior/reading light - Coupe, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Press switch at interior light/reading light to position -O-.

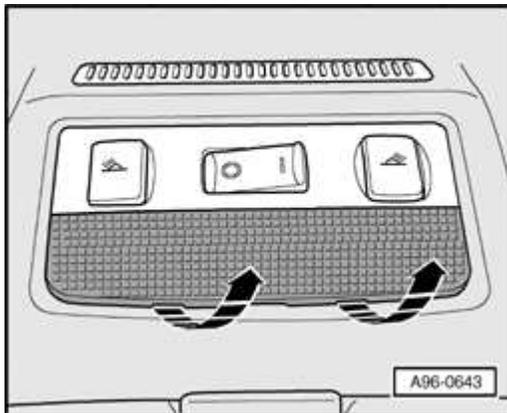


Fig. 352: Interior Light/Reading Light Lens Clips
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip lens at interior light/reading light -arrows-.

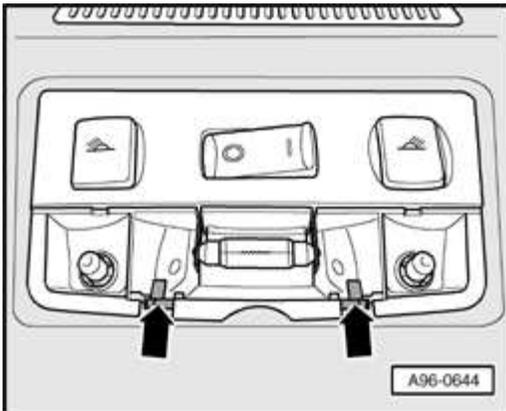


Fig. 353: Interior/Reading Light Retainer Tabs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Release retainer tabs -arrows- and remove interior/reading light out of roof opening.
- Disconnect electrical connection.

Installing

Install in reverse order of removal, noting the following:

- Press on lens for interior/reading light until it engages.

Front interior/reading light bulbs - Coupe, replacing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Press switch at interior/reading light to position -O-.

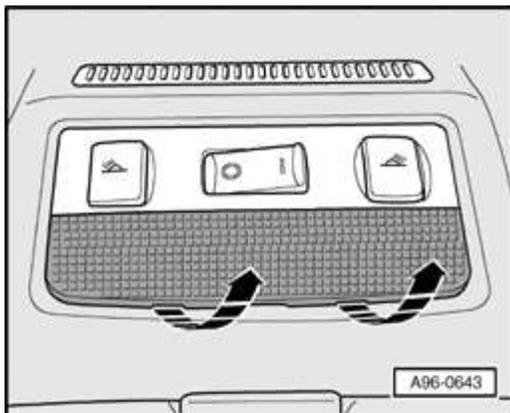


Fig. 354: Interior Light/Reading Light Lens Clips
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip lens at interior light/reading light -arrows-.

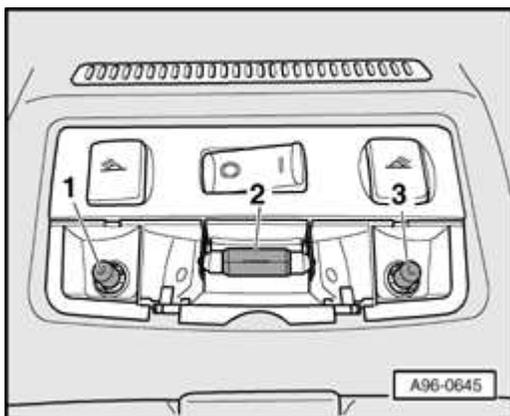


Fig. 355: Locating Bulbs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove bulb -2- (12 V, 10 W) from clamp-type holder.
- Twist and remove bulb -1- or -3- (12 V, 5 W) from holder.

Installing

Install in reverse order of removal, noting the following:

- Press on lens for interior light/reading light until it engages.

Front interior/reading light - Roadster, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Special tools and equipment required

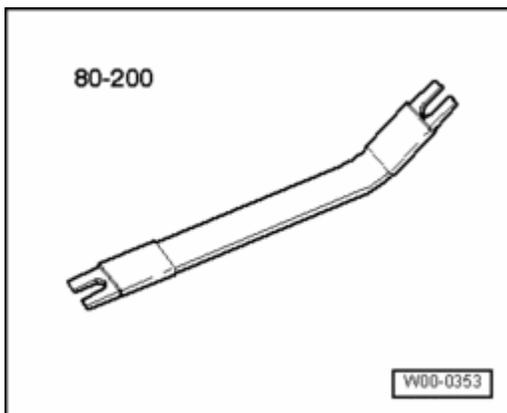


Fig. 356: Pry Lever 80-200

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Lever 80-200

Removing

- Press switch at interior/reading light to position -O-.

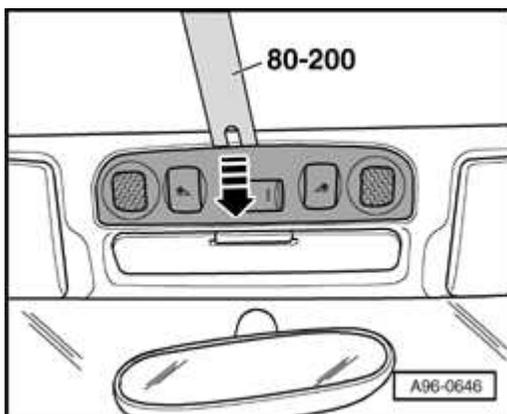


Fig. 357: Prying Rear Edge Of Interior Light Out Of Windshield Frame Using Lever 80-200

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use lever 80-200 to carefully pry rear edge of interior light out of windshield frame -arrow-.

CAUTION: Use care not to damage retainer tabs on removal.

- Disconnect electrical connection..

Installing

Install in reverse order of removal, noting the following:

- Start by inserting connector end of interior light in windshield frame.
- Press interior light into windshield frame until it engages.

Front interior/reading light bulbs - Roadster, replacing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Remove interior/reading light. Refer to **Front interior/reading light - Roadster, removing and installing** .

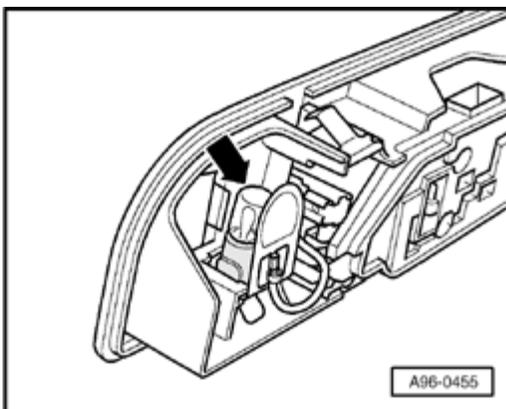


Fig. 358: Front Interior/Reading Light Bulbs
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Twist and remove bulb 12 V, 5 W -arrow- out of holder.

Installing

Install in reverse order of removal, noting the following:

- Start by inserting connector end of interior light in windshield frame.
- Press interior light into windshield frame until it engages.

Luggage compartment lights - Coupe, removing and installing

NOTE: Remove luggage compartment lights to replace bulbs (12 V, 5 W)

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

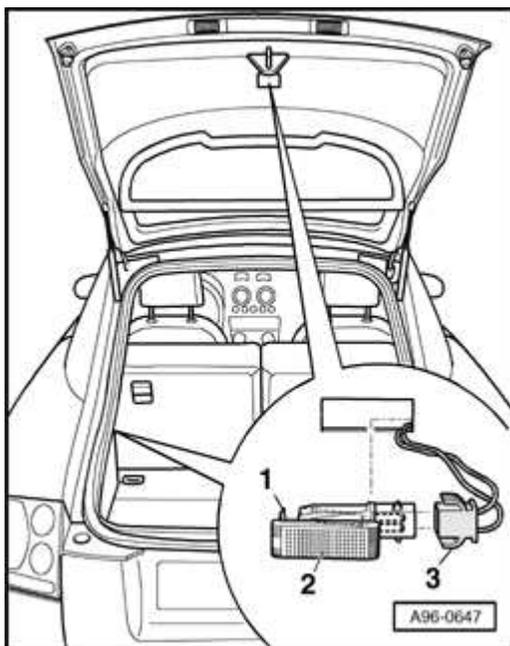


Fig. 359: Luggage Compartment Lights Remove/Install Components - Coupe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use flat screwdriver to depress retainer -1- and pry out luggage compartment light -2-.
- Disconnect electrical connection-3-.
- Remove bulb from holder.

Installing

Install in reverse order of removal, noting the following:

- Insert luggage compartment light in opening and engage on opposite side.

Luggage compartment light - Roadster, removing and installing

NOTE: Remove luggage compartment lights to replace bulbs (12 V, 5 W)

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

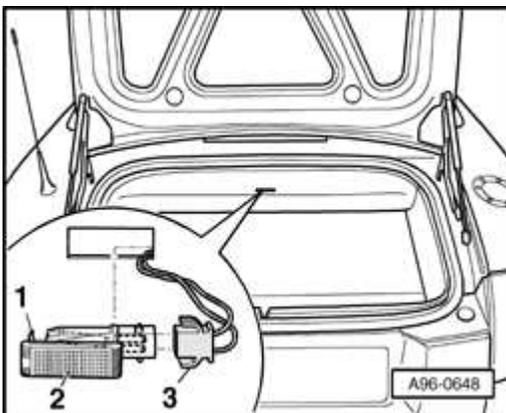


Fig. 360: Luggage Compartment Light, Locating Tabs And Electrical Connection

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use flat screwdriver to press in retainer tab -1- and prise out luggage

compartment light -2-.

- Disconnect electrical connection.-3-.
- Remove bulb from holder.

Installing

Install in reverse order of removal, noting the following:

- Insert luggage compartment light in opening and engage on opposite side.

Glove compartment light, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

NOTE: Remove luggage glove compartment light to replace bulb (12 V, 5 W)

Removing

- Ensure light switch is in -O- position.

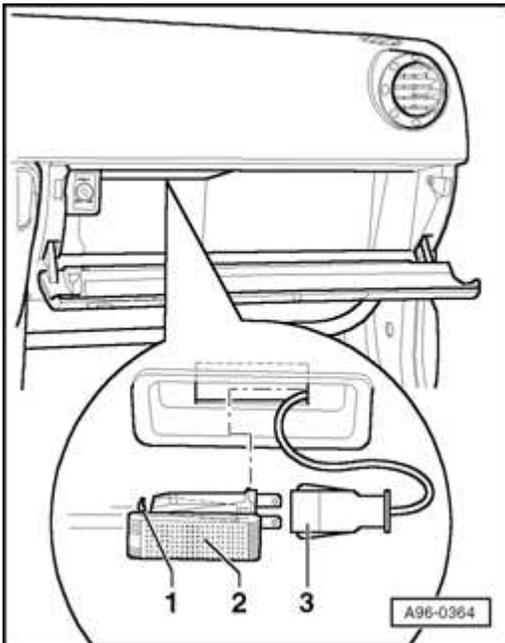


Fig. 361: Glove Box Light, Retainer And Electrical Connection
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use flat screwdriver to depress retainer -1- and pry out glove box light -2-.
- Disconnect electrical connection.-3-.

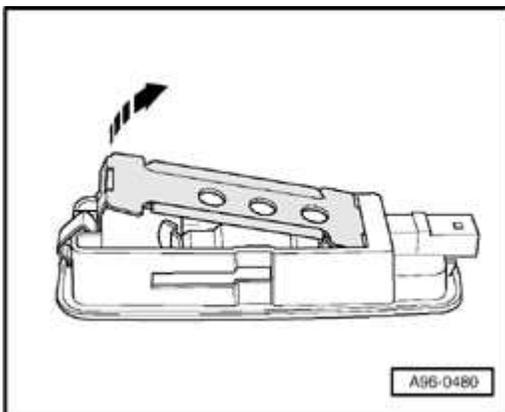


Fig. 362: Bulb Holder And Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove cover -arrow-.
- Remove bulb from holder.

Installing

Install in reverse order of removal, noting the following:

- Insert glove box light in opening and engage on opposite side.

Removing and installing make-up mirror light - Coupe

- NOTE:**
- **Left make-up mirror light is illustrated. Right light is mirror-image.**
 - **Make-up mirror light bulb: 12 V, 5 W**

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**

Removing

- Close make-up mirror in sun visor.

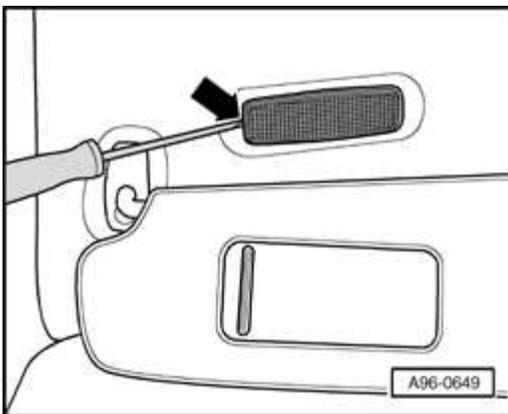


Fig. 363: Prying Make-Up Mirror Light At Recess Using Flat Screwdriver
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Use flat screwdriver to carefully pry make-up mirror light at recess -arrow-.
- Disconnect electrical connection.

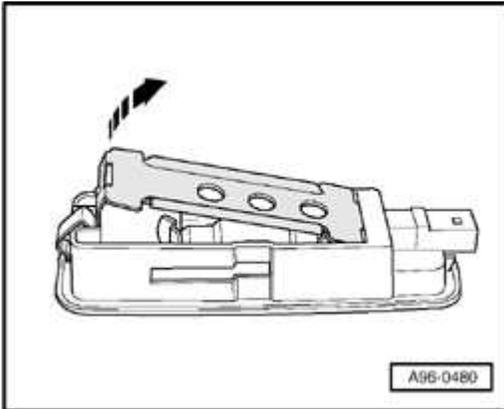


Fig. 364: Bulb Holder And Cover
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Detach cover -arrow-.
- Remove bulb from holder.

Installing

Install in reverse order of removal.

HORN

Horn, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

Removing

- Remove bumper.

Refer to **63 BUMPERS**

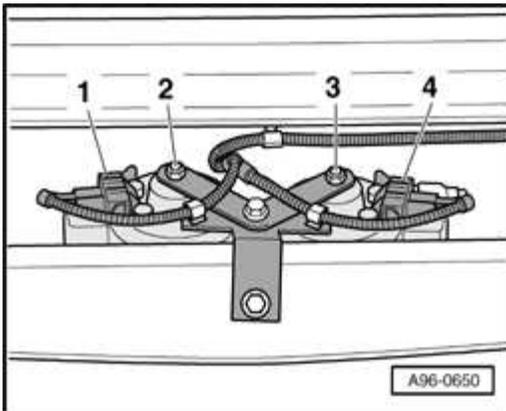


Fig. 365: Horn Bracket Nuts And Electrical Connections
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove nuts -2- and -3- and remove horns from bracket.
- Disconnect electrical connections -1- and -4-.

Installing

- Install in reverse order of removal.

Tightening torques

Component	Nm
Horn to bracket	11

ANTI-THEFT IMMOBILIZER

General information

TT models from 09.00 production are equipped with Immobilizer Generation III.

Generation III has the same functionality as the previous version. However, in addition to the normal data exchange between the immobilizer control module and ignition key, Gen. III includes data exchange between the immobilizer control module and Engine Control Module (ECM).

Data exchange between the Immobilizer control module and ECM takes place over the vehicle CAN-Bus network.

- NOTE:**
- For Immobilizer III, the Engine Control Module (ECM) is actively incorporated into the evaluation and monitoring. The control module for immobilizer is integrated into the instrument cluster.

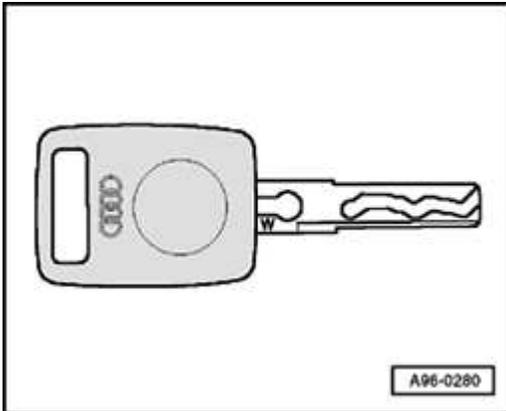


Fig. 366: Identifying Key
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- For immobilizer III, the keys are marked with an inscribed "W". The code consists of a fixed code and a variable code portion.

Function

Immobilizer III consists of:

- an adapted control module for anti-theft immobilizer (integrated in instrument cluster)
- a warning light in instrument cluster
- an induction coil at ignition lock
- an adapted Engine Control Module (ECM)
- and adapted ignition keys with electronics (transponder).

The control module for anti-theft immobilizer is integrated in the instrument cluster, e.g. if control module is malfunctioning, instrument cluster must be replaced. Refer to **Instrument cluster, removing and installing** .

The anti-theft immobilizer is a system for enabling/locking the Engine Control Module (ECM) via the CAN wire.

The transponder code consists of a fixed code and a variable code. This is different for every start procedure and therefore acts as a copy protection for the transponder.

Every immobilizer contains a different computational rule for the variable code that remains the same for its entire service life. During adaptation of the vehicle key, the immobilizer writes this computational rule into the transponder and simultaneously learns the fixed code of the current key.

The fixed code identifies each individual key so that a key that is lost can be blocked from usage. Each time the ignition is switched on, the induction coil for immobilizer reads the transponder's fixed code and then the variable code and determines whether this key is authorized for vehicle start.

The warning lamp lights up briefly (max. 3 seconds) and then goes out when an authorized vehicle key is used.

When an unauthorized vehicle key is used or when a system malfunction occurs, the warning lamp blinks constantly during ignition "on".

On Board Diagnostic (OBD), function

The electronic anti-theft immobilizer has extensive On Board Diagnostic (OBD) capabilities. If malfunctions occur in any of the system components, corresponding Diagnostic Trouble Codes (DTC) are stored in the DTC memory of the anti-theft immobilizer.

Before performing any troubleshooting or inspection, always begin by checking for DTCs using the On Board Diagnostic (OBD) program. DTCs stored in memory are retrieved/checked with VAS 5051/5052 in mode "Vehicle Self Diagnosis"

Where applicable, also use VAS 5051/5052 tester in mode "Guided Fault Finding".

NOTE: All OBD program functions for anti-theft immobilizer must only be performed using VAS 5051/5052 tester.

WARNING: Anti-theft immobilizer OBD program functions described here must only be performed on a non-moving vehicle. DO NOT USE VAS 5051 during a road test.

NOTE: The following description refers only to use of VAS 5051/5052 tester.

Notes for use and adaptation of vehicle key

Engine will only start when an authorized vehicle key is used, i.e. one of the keys adapted to the immobilizer.

During adaptation of the vehicle keys (Refer to **Adaptation of vehicle keys**), all vehicle keys, including replacement and emergency keys, must always be adapted to the immobilizer.

If new or extra vehicle keys are required, adaptation of all vehicle keys must be performed.

If adaptation cannot be performed for all vehicle keys, e.g. key lost during a trip, the customer must be informed that adaptation must eventually be performed for any and all vehicle keys.

Especially when a key has been lost, all vehicle keys should be re-adapted, since this will render the lost key unauthorized for vehicle start.

Malfunctioning transponder and/or loss of key

- The transponder is integrated into the vehicle key.
- If the transponder is malfunctioning or if a key was lost, the complete vehicle key must be replaced.
- Order the replacement key with integrated transponder according to the lock number.
- Perform adaptation of all vehicle keys using OBD program. Refer to **Adaptation of vehicle keys**

OR

- Perform adaptation of all vehicle keys using OBD program. Refer to VAS 5051/5052 in mode "Guided Fault Finding".

Reader coil, replacing

- The reader coil is connected to the lock cylinder and cannot be replaced separately.
- The induction coil and lock cylinder must be replaced together.
- Order a new lock cylinder with vehicle specific lock number via the distributor or importer.
- Replace lock cylinder. Refer to **Lock cylinder, removing and installing** .

Lock set or instrument cluster, procedure for replacing

NOTE: To ensure later identification of the anti-theft immobilizer, the following steps must always be performed when replacing the lock set or instrument cluster.

1. Lock set with 2 part sticker

NOTE: Stickers on the key tag of new lock set provide identification of mechanical lock.



Fig. 367: Right Sticker With Bar-Code

Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove right sticker -2- (with bar-code) from key chain of new lock set and destroy it.
- Remove remaining left sticker -1- (without bar-code) from new key chain and adhere to customer key chain instead of the previous left sticker.

2. Control module for anti-theft immobilizer integrated in instrument cluster.

In order to replace the lock set & instrument cluster, a coded "secret number" must first be determined in conjunction with the 14 digit identification number of the anti-theft immobilizer.

Immobilizer identification number is read upon initiation of On Board Diagnostic (OBD). Refer to **Instrument cluster On Board Diagnostic (OBD), initiating** .

Effective calendar date 03.11.2002, the immobilizer secret number is encoded for increased security. The encoded number is now 7-digits and is referred to as a "PIN" ("Personal Identification Number").

All models with anti-theft immobilizer are affected, regardless of generation.

The process to obtain the 7-digit PIN remains the same as with the 4-digit "secret number" previously used - that is: request via the "Warranty Information Network" (WIN). However, WIN Administration now requires additional information from both the vehicle and Dealer in order to generate the 7-digit PIN.

The PIN is only valid on the day it is requested. Thereafter, a new PIN is required.

The 7-digit PIN can only be processed and input using either the VAS 5051 or VAS 5052 with basis CD version 3.10 and higher. VAG 1551/1552 Scan Tools are unable to process or input this number.

A correct Importer/Dealer number must reside in the VAS 5051/5052 in order to request a PIN.

The requested PIN is intended for internal use only, is worthless to other Dealers and must not be shared with the customer.

- CAUTION:**
- **All Dealership VAS 5051 and VAS 5052 testers in service MUST be programmed with the correct Importer/Dealer number, as well as correct date and time.**
 - **Adaptation functions of the anti-theft immobilizer are not possible with incorrect data!**

Immobilizer adaptation when replacing instrument cluster. Refer to **Adaptation after replacing instrument cluster** .

System test

NOTE: **After every successful login procedure, the anti-theft immobilizer is switched free for 10 minutes, i.e. a system or function test does not make sense during this time.**

- Switch ignition off for at least 5 minutes.
- Cover induction coil with a metal plate with cut-out, e.g. by placing a fitting shim washer onto the ignition lock and inserting the ignition key into the ignition lock through the hole.

or

- Disconnect electrical wire of induction coil at connector between ignition/starter switch and control module for anti-theft immobilizer.
- Start engine.

Engine must not run and immobilizer control lamp in instrument cluster must blink.

- Initiate On Board Diagnostic (OBD) program of anti-theft immobilizer using VAS 5051/5052 tester in mode "Vehicle Self-Diagnosis".
- Check DTC memory

One of the following DTCs is indicated:

01176 - Key signal too small

or

01128 - Induction coil of anti-theft immobilizer -D2-

- Erase DTC memory
- End output.

97 WIRING

FUSE AND RELAY PANELS

Main fuse panel, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .

Removing

- Disconnect battery. Refer to Battery, disconnecting and reconnecting .

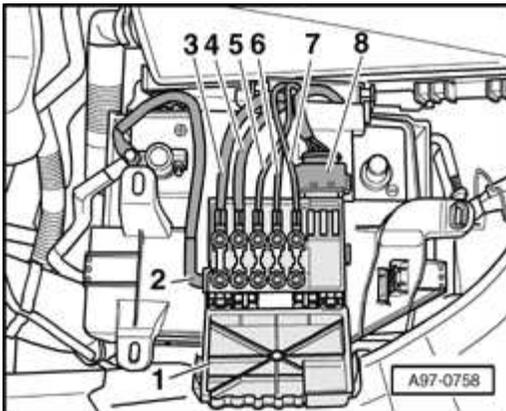


Fig. 368: Main Fuse Panel Cover, Nuts And Electrical Connection
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Open cover -1-.
- Remove nuts -2... 7-.
- Disconnect electrical connection -8- and move to side.

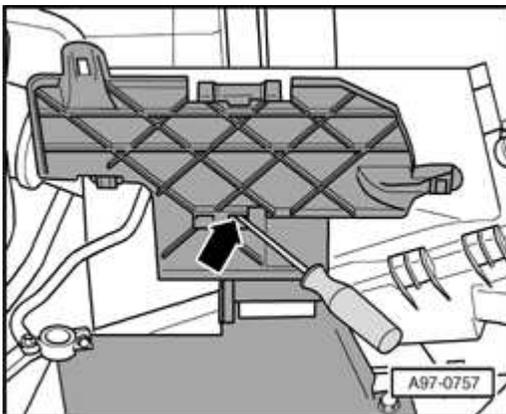


Fig. 369: Unclipping Main Fuse Box From Mount
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Unclip main fuse box from mount -arrow-.
- Remove fuse box for main fuse.

NOTE:

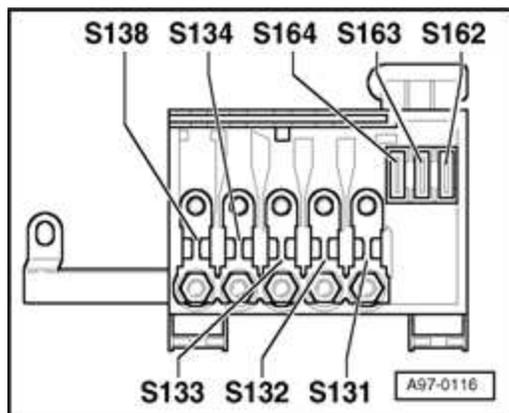


Fig. 370: Identifying Fuses In Main Fuse Box/Battery
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Individual fuse assignments

Refer to Wiring Diagrams and/or Component Locations

Installing

Install in reverse order of removal, noting the following:

- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Tightening torque

Component	Nm
Wire terminals to fuse box	6

Fuse panel, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all

applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .

Removing

NOTE: All removed cable ties are to be replaced and attached in original location.

- Disconnect battery. Refer to Battery, disconnecting and reconnecting .
- Remove driver's lower instrument panel trim

Refer to 68 - INTERIOR EQUIPMENT

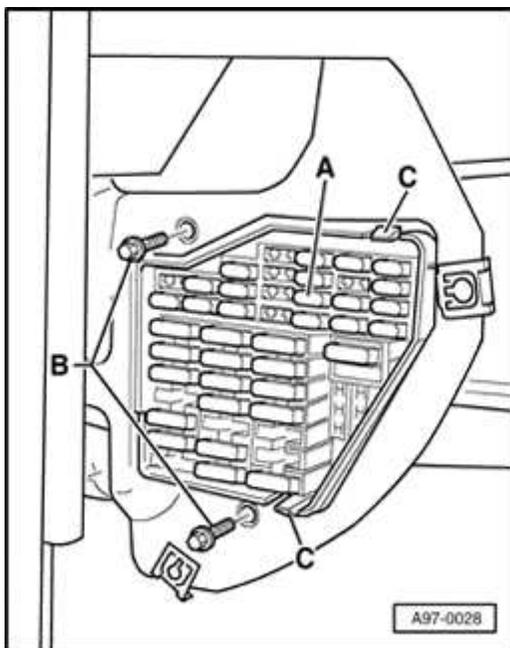


Fig. 371: Identifying Fuse Holder, Screws & Locking Tab
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -B-.
- Release clips -C- and push fuse panel behind and below instrument panel.

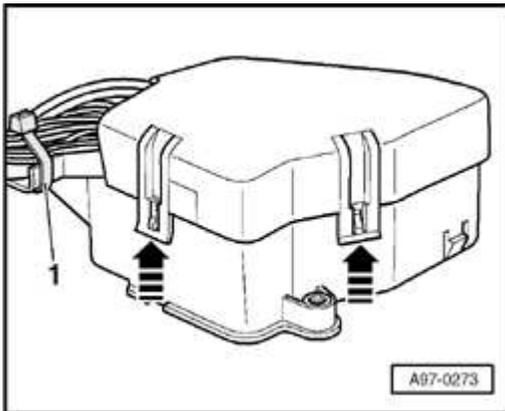


Fig. 372: Fuse Panel Cover And Cable Tie
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Cut cable tie -1-.
- Release cover -arrows-.
- Remove fuses.

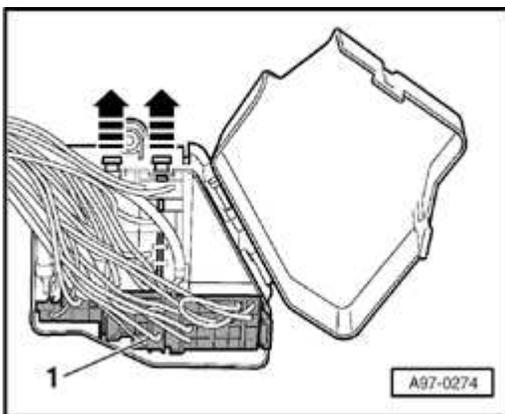


Fig. 373: Removing Retaining Strip For Connectors
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove retaining strip for connectors -arrows-.
- Remove connectors.
- Unclip socket -1-.

NOTE:

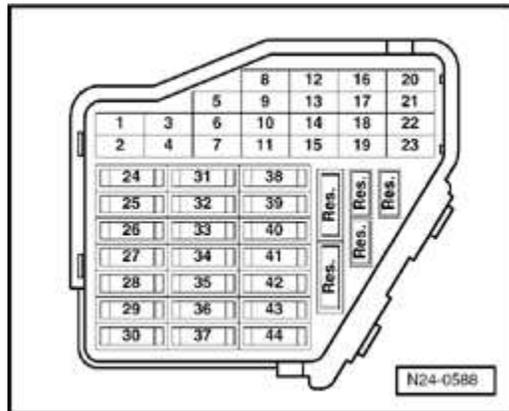


Fig. 374: Identifying Main Fuse Panel
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Individual fuse assignments

Refer to Wiring Diagrams and/or Component Locations

Installing

Install in reverse order of removal of removal, noting the following:

NOTE: All removed cable ties are to be replaced and attached in original location.

- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Tightening torque

Component	Nm
Fuse box to instrument panel central tube	3

Micro central electric and 13-position relay panel, removing and installing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

- **Disconnect negative (-) battery terminal.**
- **When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .**

Removing

NOTE: All removed cable ties are to be replaced and attached in original location.

- Disconnect battery. Refer to Battery, disconnecting and reconnecting .
- Remove driver's lower instrument panel trim

Refer to **68 - INTERIOR EQUIPMENT**

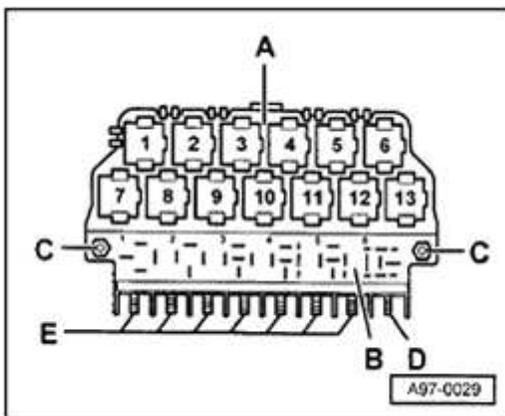


Fig. 375: Relay Panel And Components
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Remove screws -C-. If necessary, remove all terminal connections -D- and -E-.
- Remove relays and control modules.
- Unclip appropriate relay carrier.
- Remove central electric and 13-position relay panel downwards.

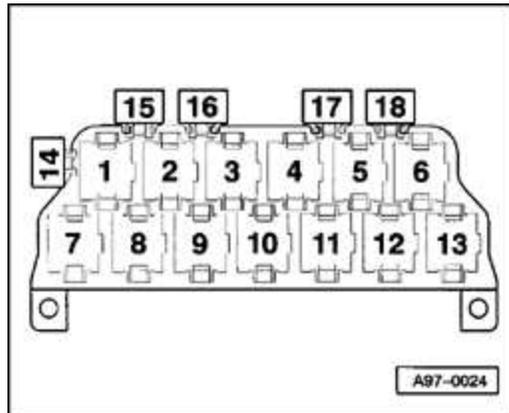
NOTE:

Fig. 376: Starting Interlock Relay -J207-
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Individual terminal and relay assignments

Refer to Wiring Diagrams and/or Component Locations

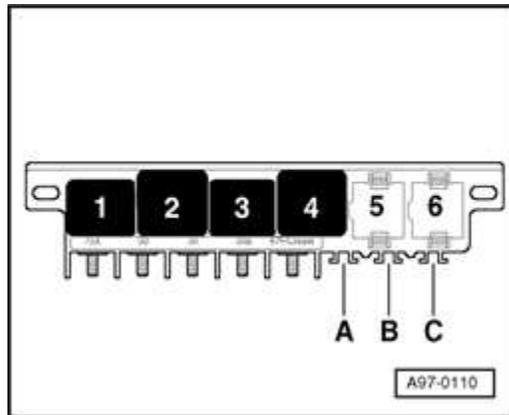
NOTE:

Fig. 377: Identifying Fuel Pump (FP) Relay J17
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Individual terminal and relay assignments

Refer to Wiring Diagrams and/or Component Locations

Installing

Install in reverse order of removal, noting the following:

NOTE: All removed cable ties are to be replaced and attached in

original location.

- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .

Tightening torque

Component	Nm
Central electric/relay panel to mounting	2

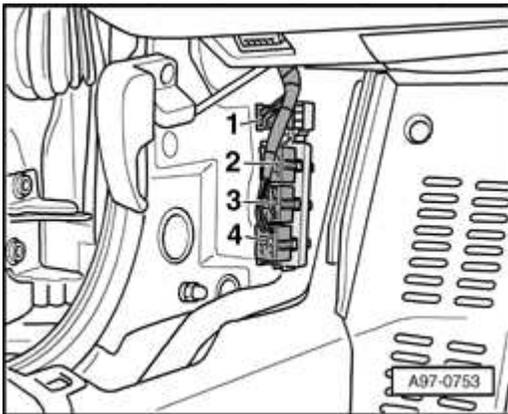
Connector station on left A-pillar

Fig. 378: Left Connector Station On Left A-Pillar
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

Left connector station -arrow- is located in left footwell beneath A-pillar trim

CAUTION: Before beginning repairs on the electrical system:

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- Remove A-pillar trim.

Refer to **70 - INTERIOR TRIM**

1 - Central locking - brown

2 - Power window - red

3 - Power mirror - blue

4 - Loudspeaker - green

NOTE: Individual connector and terminal assignments

Refer to Wiring Diagrams and/or Component Locations

Connector station on right A-pillar

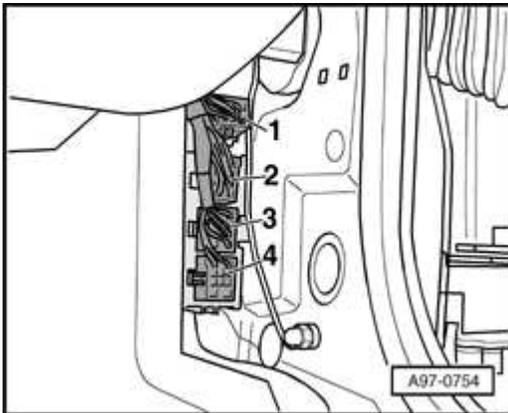


Fig. 379: Right Connector Station On Left A-Pillar
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Right connector station -arrow- is located in right footwell beneath A-pillar trim

CAUTION: Before beginning repairs on the electrical system:

- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.

- Remove A-pillar trim.

Refer to **70 - INTERIOR TRIM**

1 - Central locking - brown

2 - Power window - red

3 - Power mirror - blue

4 - Loudspeaker - green

NOTE: Individual connector and terminal assignments

Refer to Wiring Diagrams and/or Component Locations

Auxiliary relay panel in left rear engine compartment, removing and installing

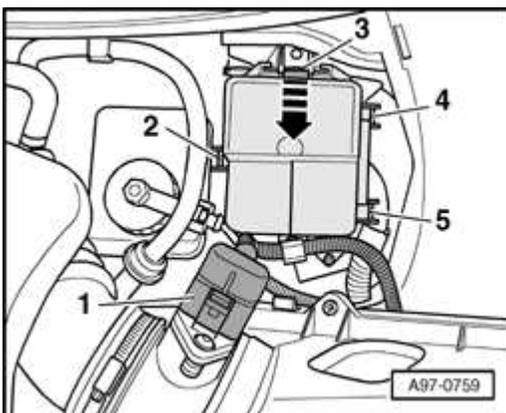
CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.
- Switch off all electrical consumers.
- Switch ignition off and remove ignition key.
- Disconnect negative (-) battery terminal.
- When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .

Relay panel is located on left of engine compartment in front of bulkhead

Removing

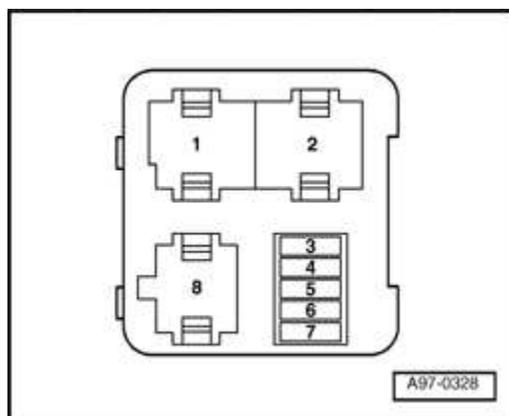
- Disconnect battery. Refer to Battery, disconnecting and reconnecting .



**Fig. 380: Releasing Tab And Disengaging Relay Carrier Upwards At Bulkhead
Courtesy of VOLKSWAGEN UNITED STATES, INC.**

- Disconnect electrical connection -1- at air-mass meter.
- Release tab -3- in direction of arrow and disengage relay carrier upwards at bulkhead.
- Release clips -2-, -4- and -5- and remove cover.

NOTE:



**Fig. 381: Individual Connector And Terminal Assignments
Courtesy of VOLKSWAGEN UNITED STATES, INC.**

Individual connector and terminal assignments

Refer to Wiring Diagrams and/or Component Locations

Installing

Install in reverse order of removal, noting the following:

- Reconnect battery. Refer to **Battery, disconnecting and reconnecting** .

WIRING HARNESSES AND CONNECTORS, REPAIRING

Wiring harnesses and connectors, repairing

CAUTION: Before beginning repairs on the electrical system:

- Obtain the anti-theft radio security code.

- **Switch off all electrical consumers.**
- **Switch ignition off and remove ignition key.**
- **Disconnect negative (-) battery terminal.**

- **When reconnecting battery terminals, observe all applicable Notes and torque specifications, as well as instructions on performing OBD program and electrical system function checks as specified in this article. Refer to Battery, disconnecting and reconnecting .**

General information

The Audi TT has a single wiring harness (for all connections) instead of separate wiring harnesses.

Always use repair set VAS 1978 when repairing the wiring harness or electrical connectors on the Audi TT

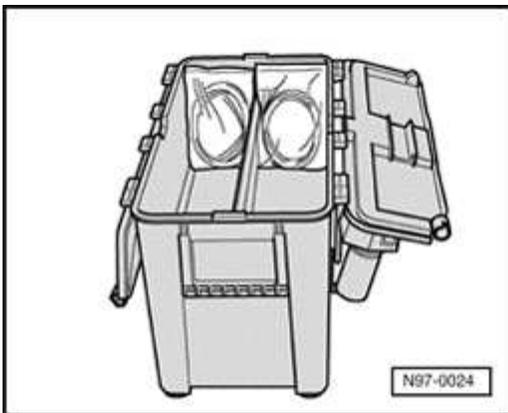


Fig. 382: Opened Wiring Harness Repair Kit VAS 1978
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Wiring harness repair set VAS 1978

Detailed instructions for using VAS 1978 are given in the manual supplied with the repair set.

The manual also gives examples showing how to repair open circuits in wiring and

malfunctioning plug connectors.

NOTE: Repairs must not be performed on shielded wiring associated with the ABS system.

0.22 mm² or 0.35 mm² wiring, repairing

NOTE:

- Repair set VAS 1978 includes repair wires of three different thicknesses (0.5 mm², 1.5 mm² and 4.0 mm² cross sections), with corresponding crimp connectors.
- Use 0.5 mm² repair wire to repair 0.35 mm² wiring.
- Perform the repair as follows:

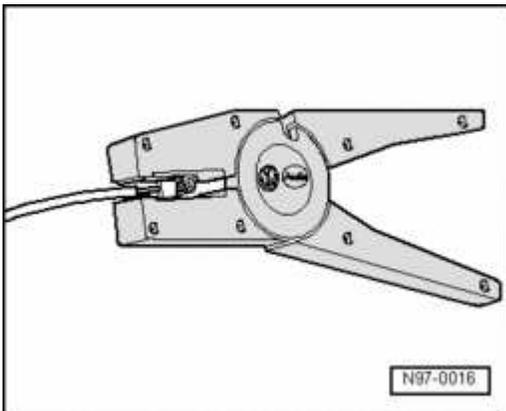


Fig. 383: Stripping Insulation At Wiring Using Stripping Pliers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Using the special pliers, strip off the insulation at the ends of the 0.35 mm² wiring so that the length of bare metal is twice as long as the joint required (approx. 12 - 14 mm).
- Fold back the bare metal to half this length.
- Using the special pliers, strip off the ends of the 0.5 mm² wire (approx. 6 - 7 mm).

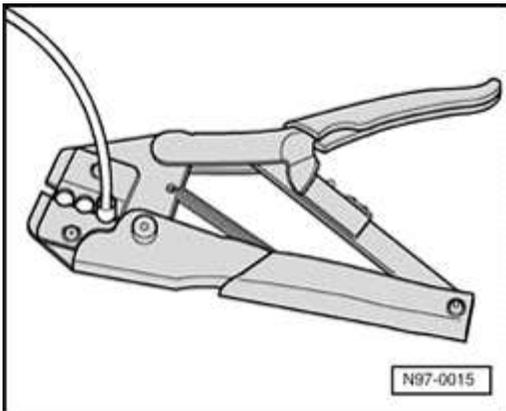


Fig. 384: Crimping On Both Sides With Crimping Pliers
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- Using crimp connectors on the ends of the wires, crimp on both sides with crimping pliers.
- Do not crimp the insulation on the wires
- Make sure that the correct crimping slot is used (red color code for 0.5 mm² wires)

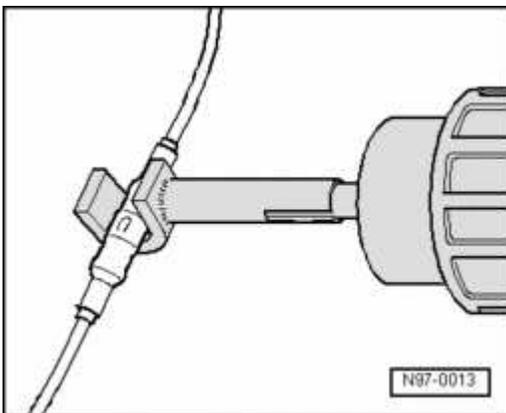


Fig. 385: Heating Crimp Connection Using Hot Air Gun
Courtesy of VOLKSWAGEN UNITED STATES, INC.

- After crimping the connector, seal it by shrinking with a hot air blower.
- Heat the crimp connector from the center outward until it is completely sealed and the adhesive comes out.
- Set the hot air blower to the correct temperature (refer to operating manual).

- When heating the connector, take care not to damage any other wiring, plastic parts or insulating material with the hot nozzle.
- If the wire was originally taped, wrap it again with yellow insulating tape. If necessary, secure the wiring with new cable ties.

Safety precautions for repairing wiring and plug connectors

CAUTION:

- **Disconnect the battery Ground strap before working on the electrical system.**
- **Before starting a repair, it is important to identify the cause of damage (e.g. sharp edges on body panels, malfunctioning electrical components, corrosion, etc.).**
- **Repairs may not be performed on wiring associated with the airbag system or on shielded leads (such as wiring for speed senders or knock sensors).**
- **Additional information (e.g. for removing and installing the components) is listed in the relevant article).**
- **Only use yellow wires for repairs to wiring harnesses.**
- **A yellow wire or a section of wiring wrapped with yellow insulating tape always indicates a previous repair.**
- **Check the function of the components or system affected after every repair; if necessary, check DTC memory and reset systems to the basic setting.**

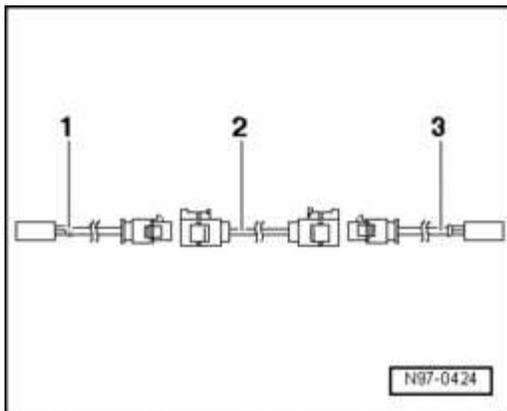


Fig. 386: Assembly Overview Of Antenna Wire
Courtesy of VOLKSWAGEN UNITED STATES, INC.

For servicing purposes, the antenna cable system consists of the following individual antenna cable sections:

- 1 - Adapter cable to radio - Length approx. 30 cm.
- 2 - Connector cable - Available in various lengths.
- 3 - Adapter cable to antenna - Length approx. 30 cm.

Antenna connector cable, replacing

NOTE: The antenna cable system (antenna connector and adaptor cable sections) depends on the available and optional audio equipment installed in the vehicle. The antenna cable system may also include routing to an antenna selection control module, splitter, antenna booster or other signal processing unit as required by the radio system. Refer to **91 RADIO, TELEPHONE, NAVIGATION, TRIP COMPUTER** . Regardless of layout, only the faulty antenna cable section (antenna connector cable or adaptor) must be replaced.

- Disconnect cable connections from faulty antenna connector/adaptor sections from unit (radio, antenna etc.).
- Determine the routing of the antenna cable system in the vehicle and calculate the total length of the entire antenna cable layout between units (radio, antenna

etc.).

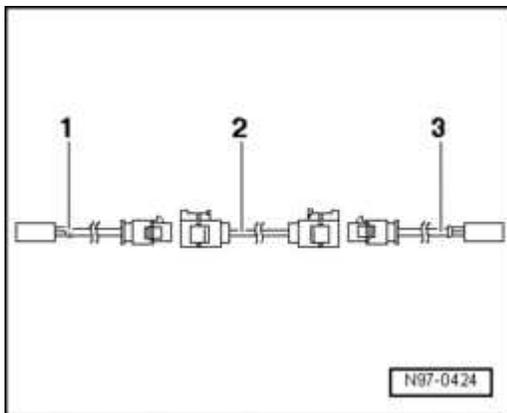


Fig. 387: Assembly Overview Of Antenna Wire
Courtesy of VOLKSWAGEN UNITED STATES, INC.

Calculation of the total length includes the required adapter cable sections -1 and/or -3-, and connector cable section -2- where applicable.

- Subtract 60 cm from the total length calculation for a connector cable to account for the adapter cable sections.
- Using the calculated length, obtain the appropriate connector cable (and adaptor cable if necessary)
- Cut the cable connection from the faulty antenna cable section.

The faulty antenna cable section remains in the vehicle.

- Remove interior trim as necessary. Refer to **68 - INTERIOR EQUIPMENT** and **70 - INTERIOR TRIM** .
- Overlay and install replacement antenna cable section parallel with old cable.

CAUTION: Antenna cable must not be kinked or bent excessively during installation. Do not attempt to bend antenna cable in a radius smaller than 50mm.

- Connect replacement antenna cable sections as required.
- Reinstall interior trim as necessary. Refer to **68 - INTERIOR EQUIPMENT** and **70 - INTERIOR TRIM** .

2006 Audi TT

ELECTRICAL Electrical Equipment

- Perform functional test of radio/antenna system.