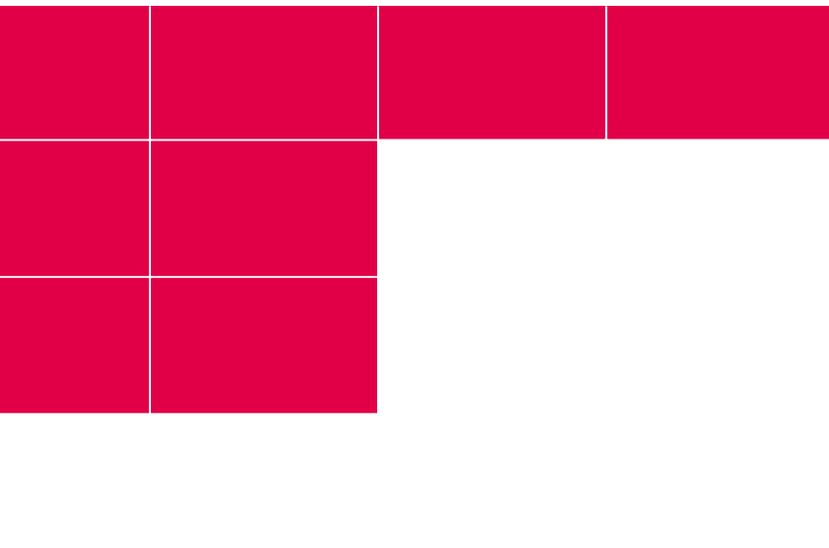




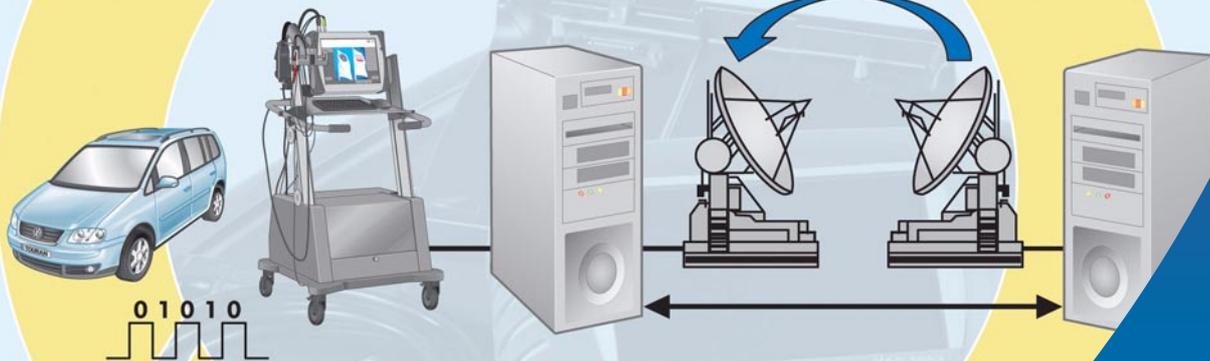
Self-study Programme 295

Diagnosis with VAS 5051, VAS 5052 and VAS 5053

Procedures and Function



VAS 5052



VAS 5053

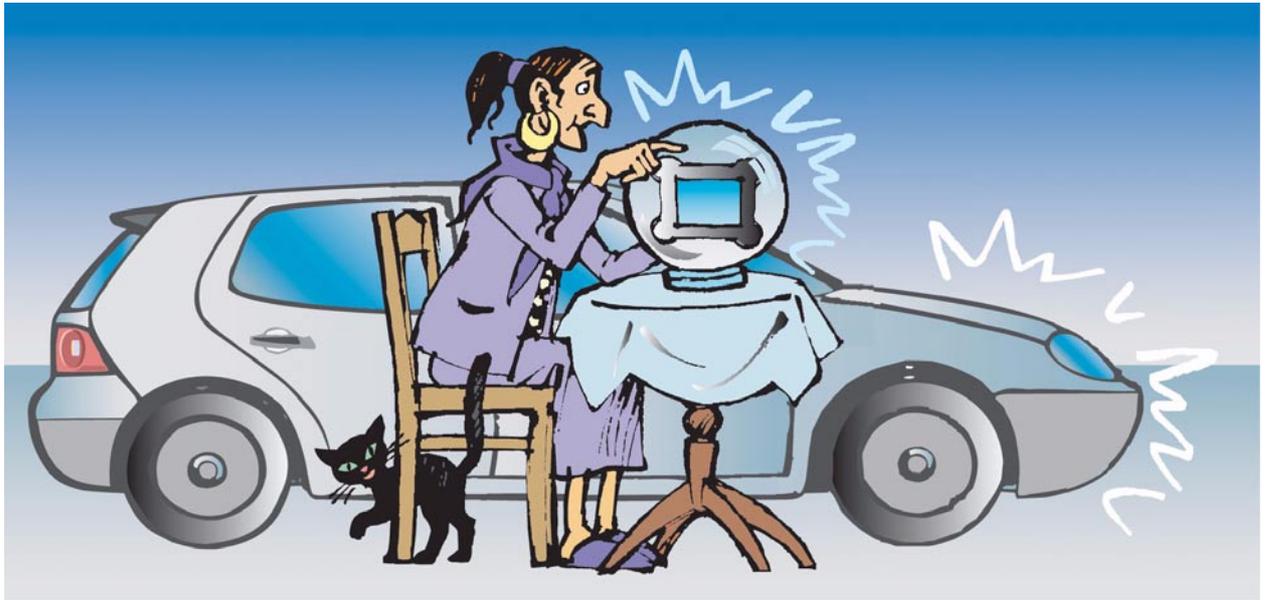


There are constantly new innovations in vehicles. Simple tools are not suitable for diagnosis on these vehicles, therefore increasingly complex diagnosis systems are required.

Diagnosis in Volkswagen and Audi vehicles was originally performed with the V.A.G 1550 tester and has been further developed with the V.A.G 1551 and V.A.G 1552 testers.

However, today's vehicles have electronic equipment that requires extensive diagnosis functions.

This self-study program should help you use the VAS 5051 vehicle diagnosis, measuring and information system, the VAS 5052 vehicle diagnosis and service information system and the VAS 5053 vehicle diagnosis system properly in the service core process and the diagnosis process.

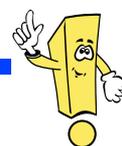


S295_001



This self-study program looks at innovations in diagnosis systems. Please refer to the operating manuals for the latest information on use of these diagnosis systems. The screenshots are examples and may differ from the screen content of the diagnosis systems. The number of screenshots has been reduced to the essential for reasons of clarity.

NEW



Important Note



The self-study programme shows the design and function of new developments. The contents will not be updated.

For current testing, adjustment and repair instructions, refer to the relevant service literature.

Contents



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Introduction



Core Service Activities in Networked Dealerships

The intermeshing of core service activities and all networking components ensures trouble-free procedures.

Appointment preparation

Thanks to the current expansion of the Volkswagen Audi workshop system VAWS to the second module in the service core process, staff handling appointments will be able to prepare orders in full.

An order can then be opened quickly when the vehicle is received without the help of the service assistant.

- Recognised work items from the ELSA are listed
- Prices are imported from PASS
- Packages are automatically set in order
- Required parts are automatically checked for availability in the parts warehouse and any orders are made
- Any further additions to the order are entered

Making appointments

When appointments are made, all customer, vehicle and replacement vehicle data should be entered.

The order data is then assigned manually and automatically to the respective work areas and required diagnosis and measuring equipment. Staff qualifications are also taken into consideration.



Receipt of vehicle

The service assistant receiving/ handing over the vehicle has all relevant data on his PC screen. If unexpected problems or questions arise, the service assistant can forward all new information and data straight to the workshop, to the spare parts department and to the dealership organisation. Querying the fault memory with the VAS 5052 and VAS 5053 allows the necessary repair work to be assessed in case of a complaint.

Creating an order

The customer order is created on a blank order sheet in the DMS and is forwarded to ELSA. ELSA ensures display and selection of the order and forwards it to the asanetwork. From there, the tasks are forwarded to the workshop equipment. After the order has been processed, feedback is sent to ELSA and DMS. This rules out the risk of losing information.



Post-processing

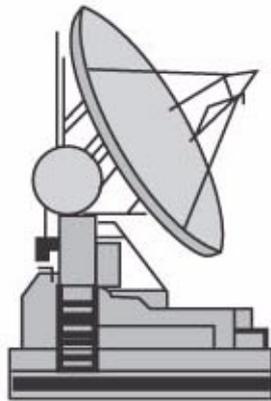
During post-processing by the call centre, you can access the system-supported appointment management again. All questions are sorted out with the customer, his remarks can easily be recorded.

The customer and vehicle data can be recorded completely from the first to the last customer contact.

Return of the vehicle/bill

The return of the vehicle/billing also benefits from the networking as all order data is transferred back to VAUDIS. Diagnosis and repair protocols, displays and the order text are available to the service assistant.

All customer questions can be answered directly and clearly. The bill is itemised and clear.



Creating repair and service orders

The precise preliminary work allows fast and reliable completion of the order. At the beginning of the order, the mechanic is informed which special tools and which spare parts are required. The observation of all agreements and order points ensure customer satisfaction. The VAS tester is used to carry out the repair, for example, the “Guided Fault Finding”, the service work and the “Guided Functions”.

Quality control / preparation of the vehicle return

It follows on immediately from the repair and service creation. In the networked dealership, the repair procedure can be referred to after the final check. In future, it will be possible for the service assistant to check the order status on the progress monitor.

Introduction



The Diagnosis, Testing and Information System VAS 5051, the Diagnosis and Service Information System VAS 5052 and the Diagnosis System VAS 5053 in the service core process

Creating repair and service orders

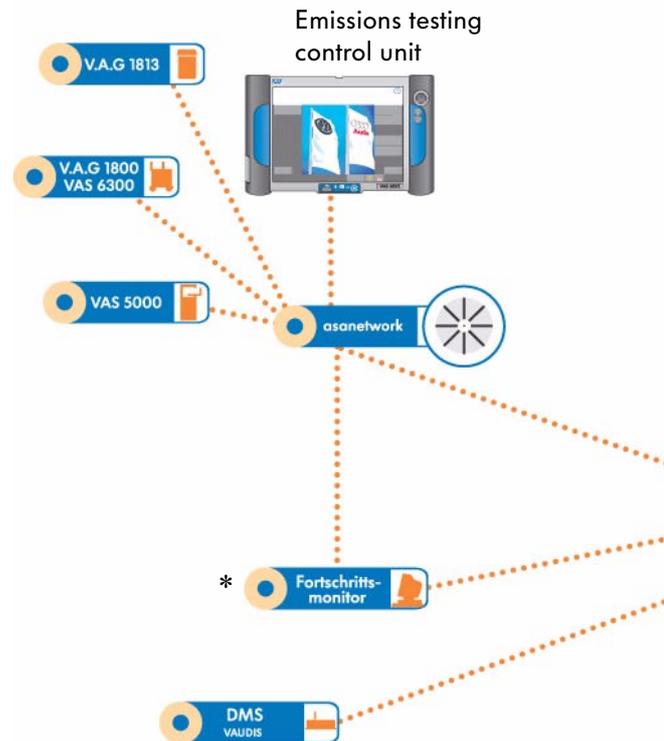
A large part of the repair work involves diagnosing faults.

The diagnosis is supported by the ELSA as well as the systems VAS 5051, VAS 5052 and VAS 5053. They can be used in all networked workstations and provide direct access to the latest literature (e.g. HST/TPL) as well as support from the manufacturer (e.g. SVM/Telediagnosis).

Data flow in the workshop

- During diagnosis, all customer and vehicle data is forwarded to the connected equipment e.g. VAS 5051, VAS 5052, V.A.G 1813 and can automatically be called up at any workstation.
- During a repair, technical problem solutions can be checked or additional information can be called up on a daily basis on the VW ServiceNet® or Audi-ServiceNet®.
- Connecting to the network allows functions like:
 - Software updates for control units
 - Secret and component protection (GeKo)
 - Software version management (SVM)
 - Transferring diagnosis protocols
 - Telediagnosis
 - Software-supported procedures
 - and many other future functions
- The ELSA electronic service information system is available with the latest data.

Networking overview



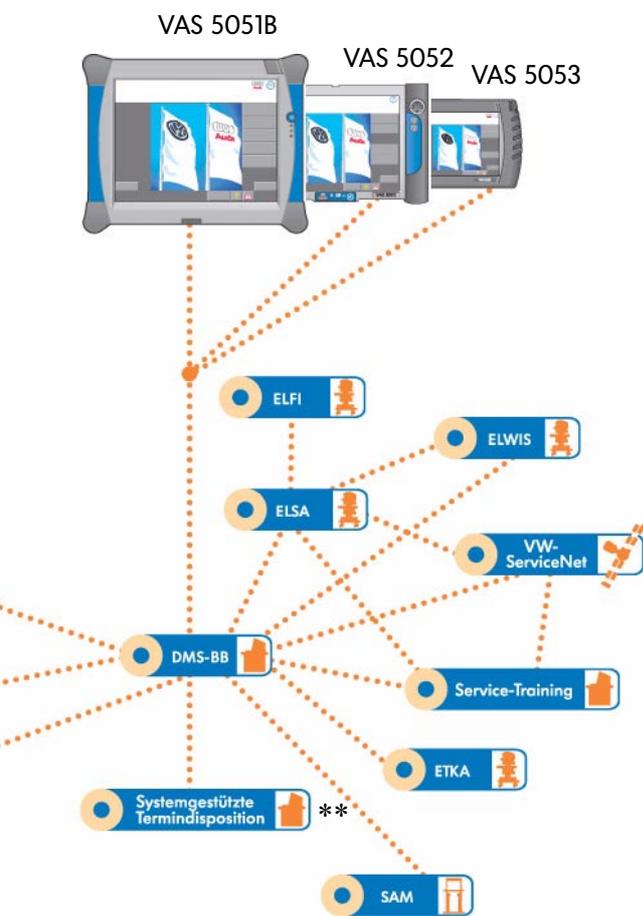


Data exchange between the sales areas and the workshop

- Data on the workshop capacity for making/preparing the appointment
- Data on the making/preparing the appointment and creating the order in the workshop area:
customer, vehicle and appointment data
- Feedback on the latest repair data from the workshop via the progress monitor:
The service assistant is informed about the repair progress and can intervene in the current process if necessary.
- Data return from the workshop to the dialog transfer for the quality control and the invoicing:
The data on necessary work time and work positions as well as the spare parts required are made available.

Data flow between the workshop and the spare parts service

- The spare parts service is integrated in the service process from appointment preparation:
In the service support process, the spare parts competence centres ensure that the parts flow is trouble-free in both directions.



S295_003

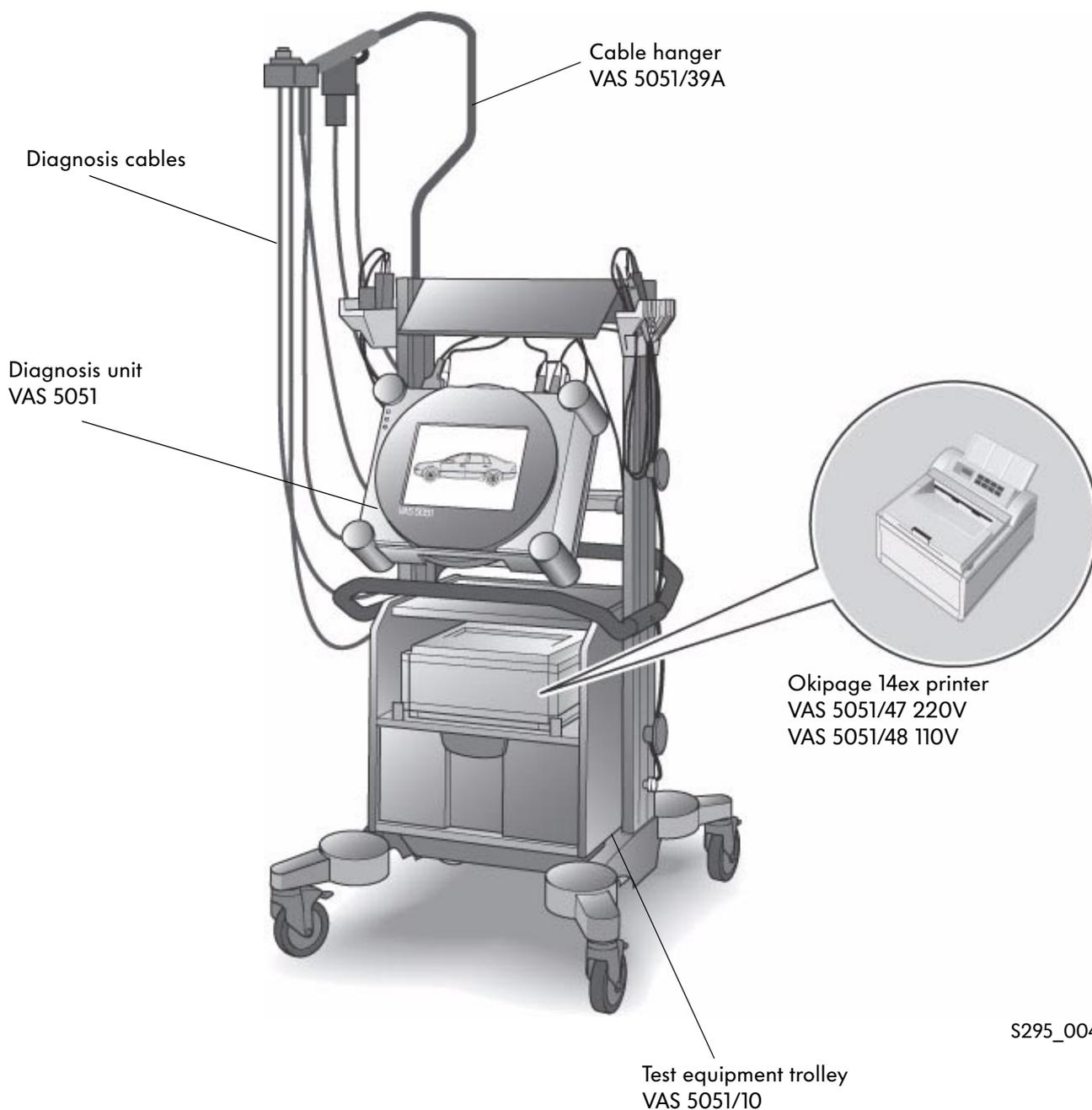
* Progress monitor

** System-supported appointment management

Diagnosis Systems

The Vehicle Diagnosis, Testing and Information System VAS 5051

Equipment



S295_004



Please refer to the latest equipment catalogue for the exact content.

VAS 5051

The Diagnosis, Testing and Information System
VAS 5051 is a PC-based test unit and has the following modes:

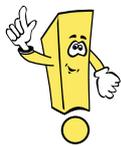
- Vehicle self-diagnosis
- OBD (on-board diagnosis)
- Test Instruments
- Guided fault finding
- Guided functions
- Administration
- Applications



S295_006

Diagnosis Systems

The Vehicle Diagnosis, Testing and Information System VAS 5051B



New diagnosis unit

Follow-up unit for VAS 5051 with additional functions and higher speed

Equipment



S295_007



Please refer to the latest equipment catalogue for the exact content.

VAS 5051B

The VAS 5051B vehicle diagnosis, testing and information system has the following modes:

- Vehicle self-diagnosis
- OBD (on-board diagnosis)
- Test Instruments
- Guided fault finding
- Guided functions
- Administration
- Applications
- Elsa Win (not included)

Properties

- Compatibility with existing units
- Use of existing trolleys and measuring leads
- Full network capability
- Same operating system as previous units



S295_008

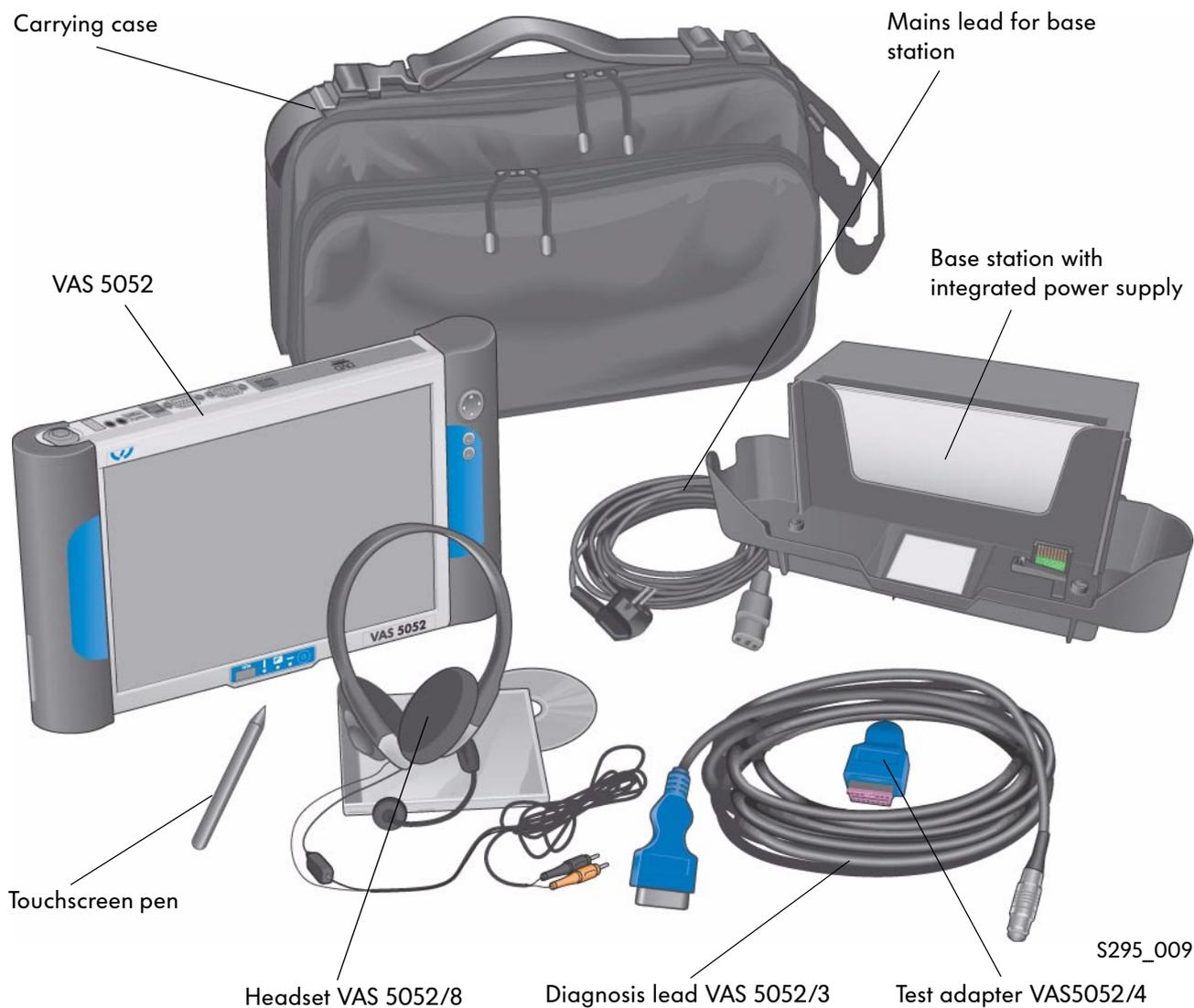
New technical features in the VAS 5051B Vehicle Diagnosis, Testing and Information System

- 15" display
- "Elsa Win" compatible
- Modern processor performance
- Expansion options via standard interfaces, e.g. USB printer
- Battery operation approx. 3 hours
- DSO measurement with a sampling rate of 40MHz with single-channel measurement 20MHz for two-channel measurement

Diagnosis Systems

Vehicle Diagnosis and Service Information System VAS 5052

Equipment



Please refer to the latest equipment catalogue for the exact content.

VAS 5052

The VAS 5051B vehicle diagnosis and service information system has the following modes:

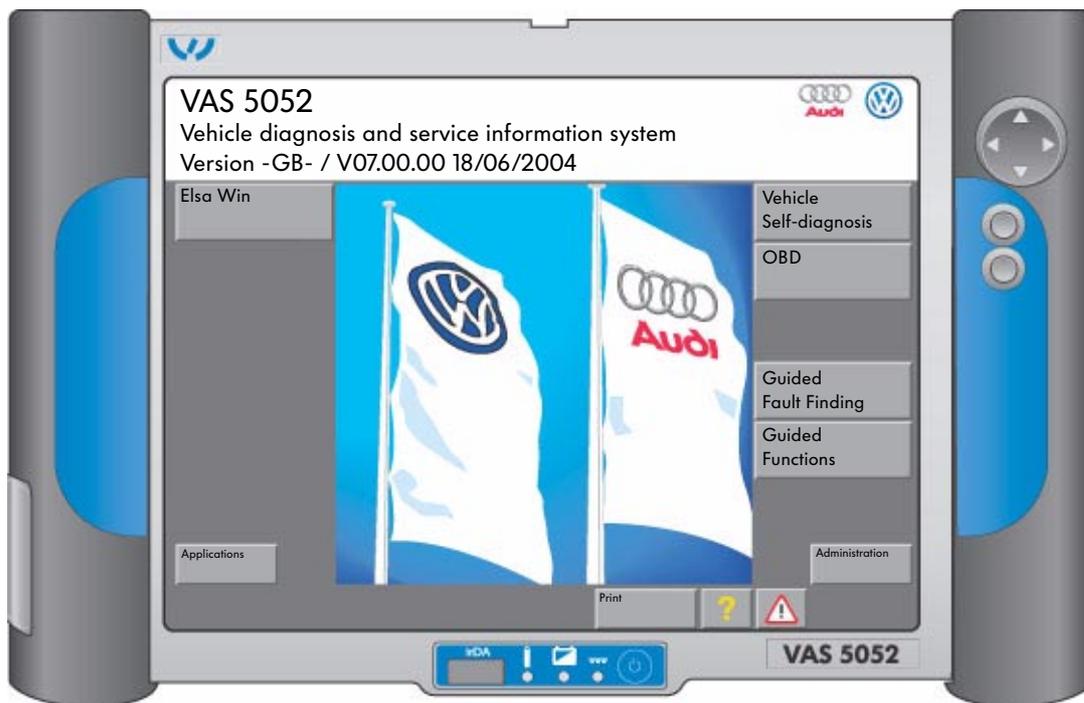
- Vehicle self-diagnosis
- OBD (on-board diagnosis)
- Guided fault finding
- Guided functions
- Elsa Win
- Administration
- Applications

Description

The VAS 5052 has been updated using the basic CD V06.00.00.

If necessary, the data for the operating modes “Guided Fault Finding” and “Guided Functions” can be installed.

The measuring information is recorded using external units and subsequent manual input. The guided fault finding can thus be used above all for mobile diagnosis and test drives.



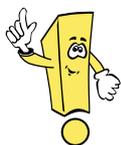
S295_010



All new information and the complete functions are only available when the unit is used on the dealership network.

Diagnosis Systems

VAS 5053 Vehicle Diagnosis System



New diagnosis unit

Compact for vehicle receipt, vehicle service and mobile use.

Equipment



Please refer to the latest equipment catalogue for the exact content.



VAS 5053

The VAS 5053 vehicle diagnosis system has the modes:

- Vehicle self-diagnosis
- OBD
- Guided functions
- Administration
- Applications



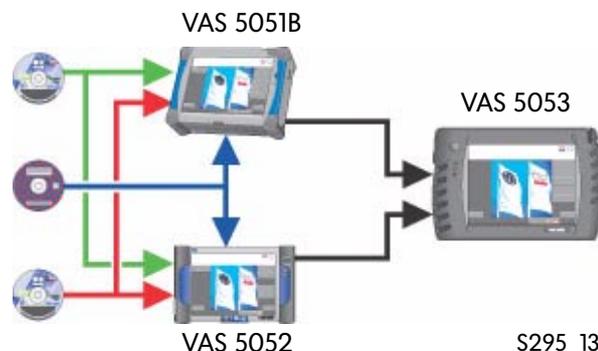
S295_012

Technical data for vehicle diagnosis system VAS 5053

- 6.5" TFT colour display
- "Elsa Win" compatible
- Modern processor performance
- Interfaces on tester:
 - 1 x USB, 1 x LAN, PC-CARD, Compact Update
- Interfaces on the base station:
 - 2 x USB
 - 1 x LAN
 - Power supply connection
- Battery operation approx. 3 hours

Software installation

The installation or update of the software is performed using the VAS 5051B, VAS 5052 or a standard PC together with the included USB cable.



S295_137

Diagnosis Systems

Accessories for communication with the vehicle systems

Various diagnosis leads are required to communicate with the systems (control units) installed in the vehicle.



Diagnosis leads VAS 5051/5A and 6A

The diagnosis leads VAS 5051/5A and 6A for the VAS 5051 allow diagnosis via diagnosis CAN (Controller Area Network) and the US standard J1850.

They replace the previous diagnosis leads VAS 5051/1 (EU) and VAS 5051/5 (USA).

Connector colour: grey
Lead length: 3 m (5A) and 5 m (6A)



S295_013



Only the diagnosis leads VAS 5051/5A and 6A are suitable for diagnosis on vehicles with Diagnosis Controller Area Network.

When the diagnosis lead VAS 5051/5A is used, the voltage for the VAS 5051 is supplied via the diagnosis connector in the vehicle (vehicle battery) if it is not connected to the 230V mains.

Diagnosis lead VAS 5052/3

The diagnosis lead VAS 5052/5A for the VAS 5052 allows diagnosis via diagnosis CAN (Controller Area Network) and the US standard J1850.

If the VAS 5052 not connected to the base station, the voltage supply via the diagnosis connection in the vehicle (vehicle battery).

Connector colour: blue
Length: 5m

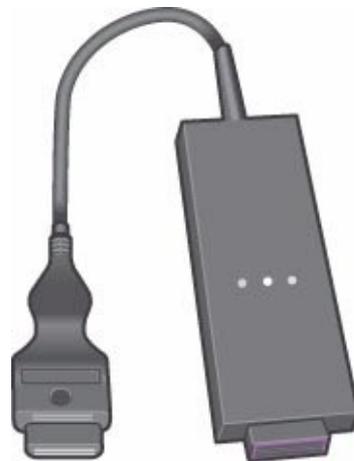


S295_014

K-lead adapter VAS 6017B

The new K-lead adapter VAS 6017B is required for the Audi A4 2001 >, Audi A4 2005 > and the Audi A6 July 2001 > to exchange data with all control units that are connected to the diagnosis connector T16 via various K-leads or CAN data bus lines. It should be plugged in before the respective diagnosis line. It is reverse compatible and replaces the previous K-lead adapter VAS 6017A. The yellow LED illuminates while the control unit is addressed.

As soon as the control unit responds, the yellow LED and the corresponding green LED (K1 and K2) illuminates.
(See also SSP 254 Audi A4 '01 - Technology)



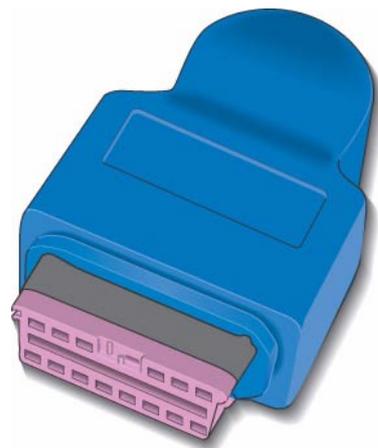
S295_015



Test adapter VAS 5052/4

The test adapter is used to check the VAS 5052/3 diagnosis lead and the tester interface. When the self-test is carried out, the test adapter VAS 5052/4 needs to be connected to the VAS 5052/3 diagnosis lead to test the VAS 5052/3 diagnosis lead.

The self-test is required if no diagnosis communication is possible. It is called up via the "Administration" menu item on the VAS 5052 and asks you to connect the test adapter during the program procedure. The further procedure appears as a mask on the screen.



S295_016

Diagnosis Systems

The Software Structure

The software required for the diagnosis systems is split between two CDs.



Basic CDs

The basic CDs contain the operating system and the procedure software as well as the software for the operating modes:

- Self-Diagnosis
- OBD
- Test Instruments
- Administration
- Applications
- Guided Fault Finding (only procedure)
- Guided Functions (only procedure)

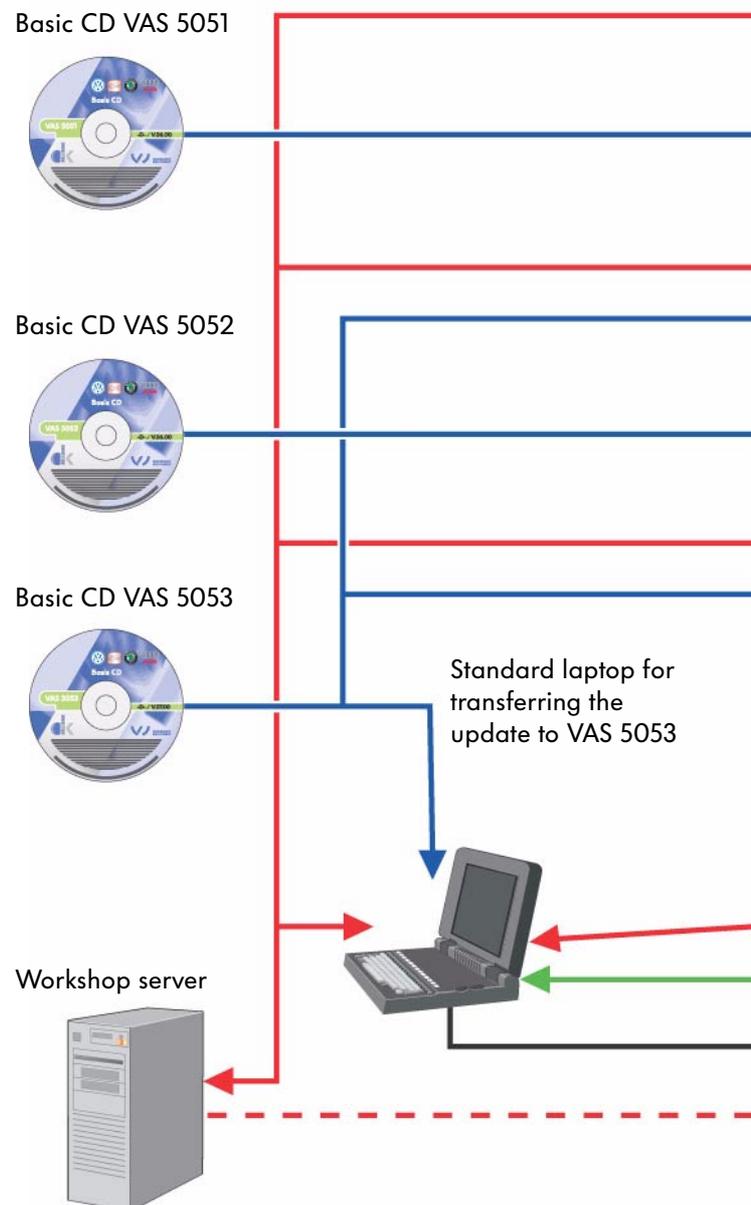
The basic CDs cover all brands and provide a platform for all brands. They are required to run the brand CDs and need to be installed first.



Once the basic CD has been installed, the number of the software version before the point is changed. A compatible brand CD has to be installed next so that the “Guided Fault Finding” and “Guided Functions” modes are available again.



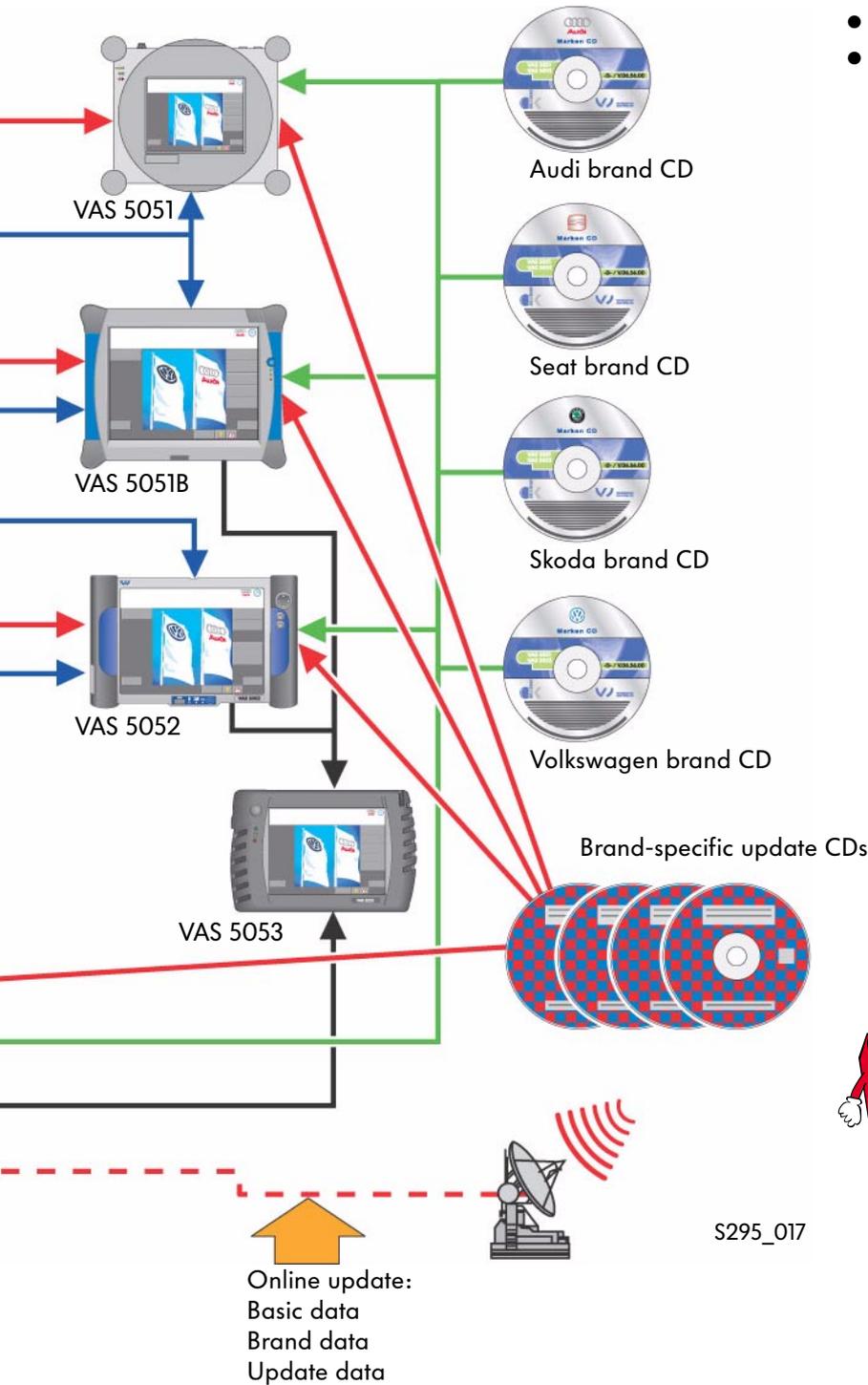
The basic CDs for the diagnosis systems VAS 5051, VAS 5052 and VAS 5053 are different and only work with the respective diagnosis systems they are intended for. Incorrect use can lead to the equipment not functioning.





Brand CDs

The brand CDs include the data for the modes:



- Guided fault finding
 - Guided functions
- They are brand-specific and cannot run without a basic CD.



Since 1 July 2004, it has been possible in Germany to download updates of brand-specific functions and new versions. There are therefore no more brand and update CDs.

S295_017

Operating modes

Overview

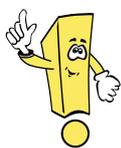
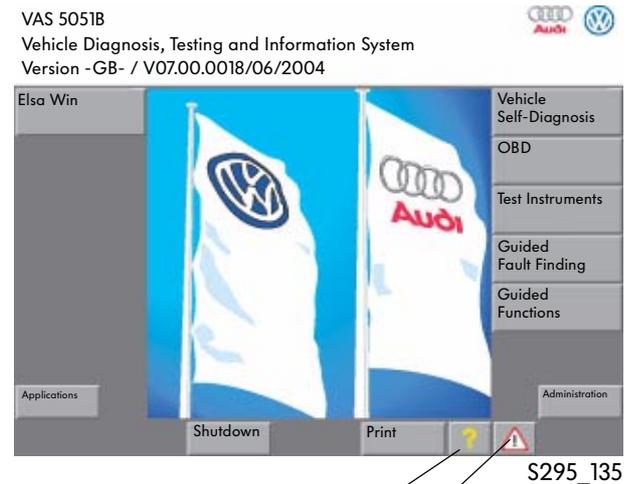
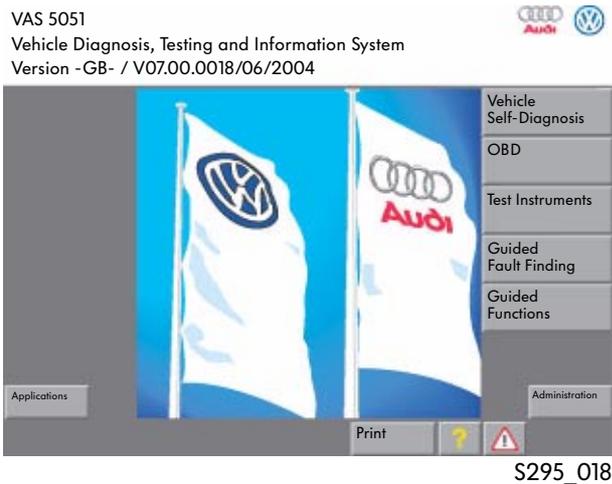
The diagnosis functions of the VAS diagnosis units are subdivided into individual modes. Operation in the individual modes is identical with all systems.

VAS 5051 modes

- Vehicle Self-Diagnosis
- OBD (on-board diagnosis)
- Test Instruments
- Guided Fault Finding
- Guided Functions
- Administration
- Applications

VAS 5051B modes

- Vehicle Self-Diagnosis
- OBD (on-board diagnosis)
- Test Instruments
- Guided Fault Finding
- Guided Functions
- Administration
- Applications
- ELSA Win (not included)



New keys from basic-CD 7.00

- Help
- Notes

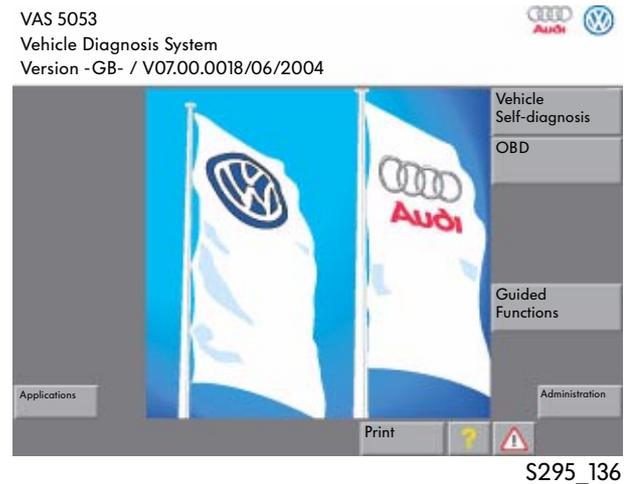
Please refer to the operating manual for the exact functions.

VAS 5052 modes

- Vehicle Self-Diagnosis
- OBD (on-board diagnosis)
- Guided Fault Finding
- Guided Functions
- Administration
- Applications
- Elsa Win (not included)

VAS 5053 modes

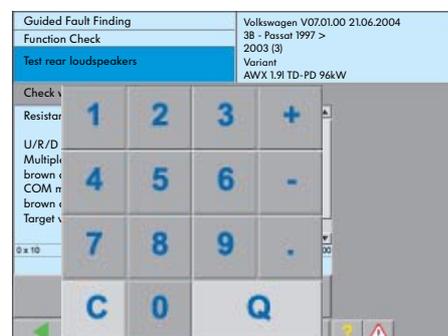
- Vehicle Self-Diagnosis
- OBD (on-board diagnosis)
- Guided Functions
- Administration
- Applications



Test Instruments

If electrical measured values are required, they will have to be entered as substitute values using a virtual keyboard.

If a measurement with the DSO is necessary, a message will appear stating that this measurement is only possible with the VAS 5051. Stored specified curves are displayed.



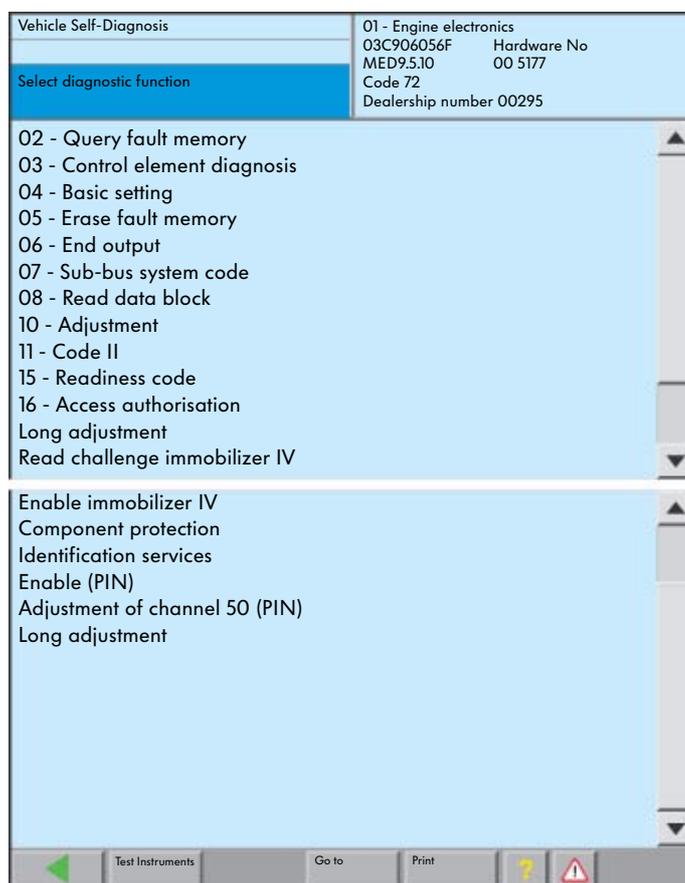
Vehicle Self-Diagnosis

The diagnosis functions in the VAS 5051, 5051B, VAS 5052 and VAS 5053

Overview

After selecting the “Vehicle Self-Diagnosis” mode and choosing a vehicle system, the possible diagnosis functions of the vehicle system are queried once the communication between the VAS diagnosis system and the vehicle system is set up.

If the vehicle has a diagnosis interface for data bus, only the diagnosis functions that are actually possible for the respective vehicle system will be displayed on the mask. On vehicles without a data bus diagnostic interface, all diagnosis functions that are possible with the VAS diagnosis system will be listed.



S295_020



The necessary information on the repair group 01 vehicle self-diagnosis is only available in the ELSA in vehicles up to model year 1997.

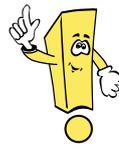
In vehicles from model year 1998, this information is available in the “Guided Fault Finding” or the “Guided Functions”.

After selecting the “Vehicle Self-Diagnosis” mode, the new functions “Collection Services” and “Gateway Component List” as well as ambient conditions are available depending on whether a data bus diagnosis interface is present.

Collection Services

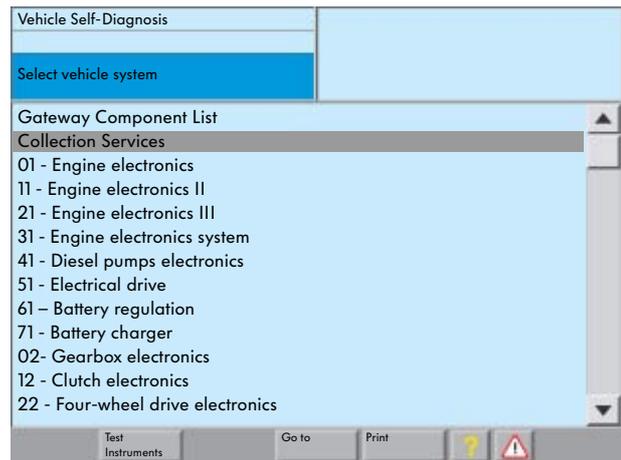
After selecting the “Collection Services” function, the following diagnosis functions are available depending on whether a data bus diagnosis interface is present:

- **Query fault memory - Whole system**
This function allows you to query the fault memories of all systems installed in the vehicle.
- **Query fault memory - Whole system***
The fault memories of all vehicle systems entered in the screen mask “Select vehicle system” are deleted in succession.
- **Switch on transport mode***
In transport mode, almost all convenience functions are switched off so the maximum period out of operation without battery discharge is guaranteed.
- **Switch off transport mode***
This function is used to switch the convenience functions on again.

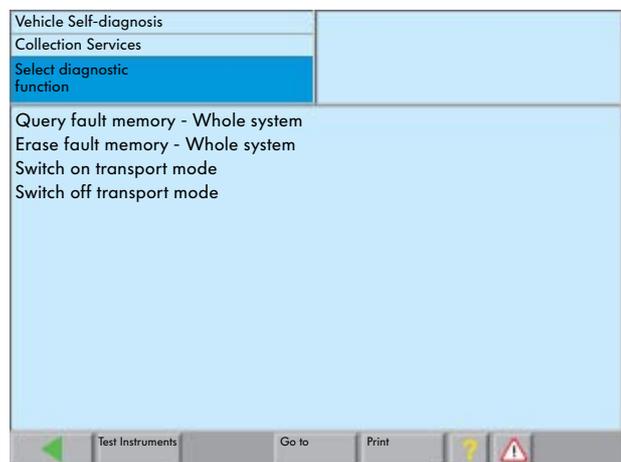


New functions:

- Collection Services
- Gateway Component List
- Ambient Conditions



S295_021



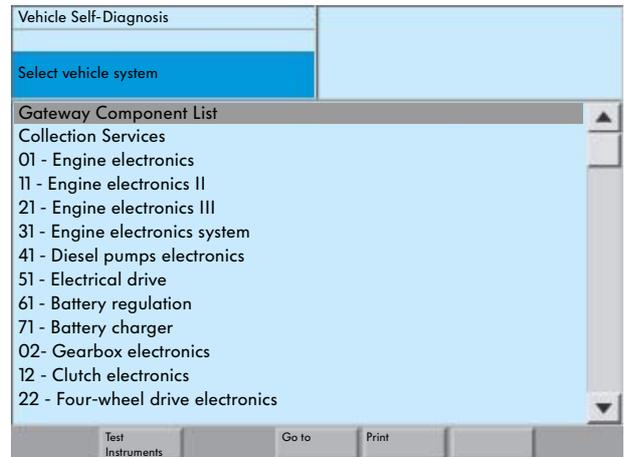
S295_022

* Only for vehicles with diagnosis interface for data bus

Vehicle Self-diagnosis

Gateway Component List

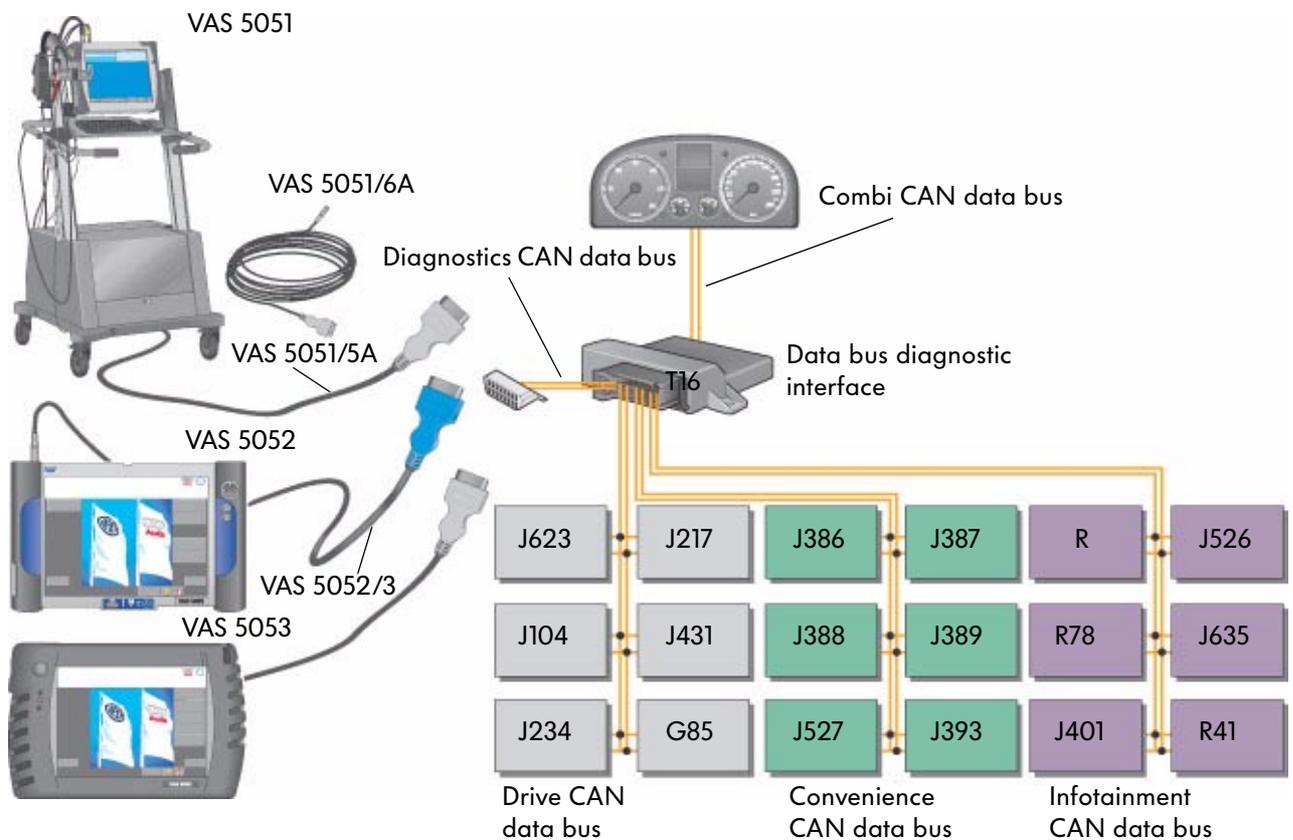
After selecting the operating mode "Vehicle Self-Diagnosis", the diagnosis function "Gateway Component List" is available for vehicles with diagnosis communication via the CAN data bus and the diagnosis interface for data bus (e.g. Audi A8 2003 >, VW Touran 2003 >, VW Golf 2004 >).



S295_023



Diagnosis communication via the data bus diagnostic interface



S295_025

When starting via the function “Gateway Component List”, a detailed list of the vehicle systems and their current status is read from the data bus diagnostic interface.

Vehicle Self-Diagnosis	Audi	V07.58.00 21/062004
Gateway Component List	Audi A8 2003>	
	2004 (4)	
Communication Setup	Saloon	
	ASE 4.0 TDI / 2002	
01 - Engine electronics	OK	0000
61 - Battery regulation	Fault	0010
02 - Gearbox electronics	Not accessible	1100
42 - Driver's door electronics	OK	0000
52 - Front passenger's door electronics	OK	0000
62 - Rear left door electronics	OK	0000
72 - Rear right door electronics	OK	0000
03 - Brake electronics	Fault	0010
53 - Parking brake	Not coded	0001
34 - Adaptive suspension	Not accessible	1000
05 - Access and start authorisation	Fault	1010
15 - Airbag	OK	0000
55 - Headlight range control	Not coded	1011

S295_024



Status table

Display in the Gateway Component List	Meaning	Bit sequence
OK	The control unit takes part in the data bus communication. No faults are stored in the control unit.	0000
Cannot be accessed or no communications	The control unit is logged onto the gateway (coded), but there is no communication with the control unit.	Static 11xx Sporadic 1000
Fault	An error has been stored in the corresponding control unit. You can select the control unit and export the fault memory by touching the screen.	x010
Not logged in or not coded	The control unit is installed in the vehicle and takes part in data communication, but is not logged onto the data bus diagnostic interface (coded).	X0X1



Several statuses cannot be shown at the same time for each vehicle system. Positions with an “X” are not evaluated and can display the values 0 or 1.

Vehicle Self-Diagnosis

Displaying the ambient conditions

Some control units also store ambient conditions in addition to the fault memory entries.

The ambient conditions can be displayed with the “Ambient Conditions” button if they are present in the “Read Fault Memory” diagnostic function.



The “Ambient Conditions” button is only displayed if ambient conditions are actually stored.

Vehicle Self-Diagnosis			01 - Engine electronics	
Fault memory content			8E0907557	
Query fault memory			2.0L R4/5VS	
8 Fault / notices recognised			Code 11501	
			Dealership number 00295	
18010	P1602	002		
Voltage supply terminal 30				
Voltage too low				
Sporadic				
17973	P1565	008		
Throttle valve module - J338				
Lower limit not reached				
18395	P1987	001	Note	
Function limited by brake temperature				

Position: 1

Ambient Conditions button

Sort: Kilometres, Time, Priority, Frequency

Selection of sort method

S295_026

Sort method

The ambient conditions can be sorted manually according to the following categories:

- km reading
- Time
- Priority
- Fault frequency



A “Note” label for the fault entry only appears from fault priority 6. The fault does not have to originate from the internal system.

From basic CD 7.0

If no standard ambient conditions are stored, the screen colour may change.

Composition

The ambient conditions are made up of standard ambient conditions and specific ambient conditions.

Standard ambient conditions

- Date of first storage
- Time of first storage
- km reading for first stored fault
- Priority: Rating 1-8
- Fault frequency: Counter up to 255 Number of definite cases since first occurrence

Specific ambient conditions

- Measured values specific to control unit

Standard ambient conditions

Specific ambient conditions

Vehicle Self-Diagnosis	01 - Engine electronics	
Fault memory content	8E0907557	
Query fault memory	2.0L R4/5VS	
8 Fault / notices recognised	Code 11501	
	Dealership number 00295	
17973	P1565	008
Throttle valve module - J338		
Lower limit not reached		
Standard values:		
Date	07/03/04	
Time	10:05:17	
Kilometre reading	35624	
Priority	1	
Fault frequency	6	
Error counter	3	
Measured values:		
Ignition angle	27 <°	
Engine speed	3550 rpm	
Battery voltage	11.7 V	

Priority list

S295_027

Priority	Meaning for the vehicle
1	Fault with great influence on the vehicle availability, the vehicle should be stopped immediately.
2	Fault that requires direct visit to workshop.
3	Fault that does not require an immediate visit to the workshop, but can be combined with a service appointment.
4	Faults that lead to a required action, the vehicle availability may be limited in some cases (e.g. increased bias current)
5	Fault without influence on the vehicle availability or not relevant to customer service.
6	Note: Fault with long-duration influence on the vehicle availability and thus relevant to customer service (e.g. filling level, wear, ageing)
7	Note: The fault has an influence on the convenience function, but no influence on the vehicle availability and is not relevant to customer service.
8	General note



Test Instruments

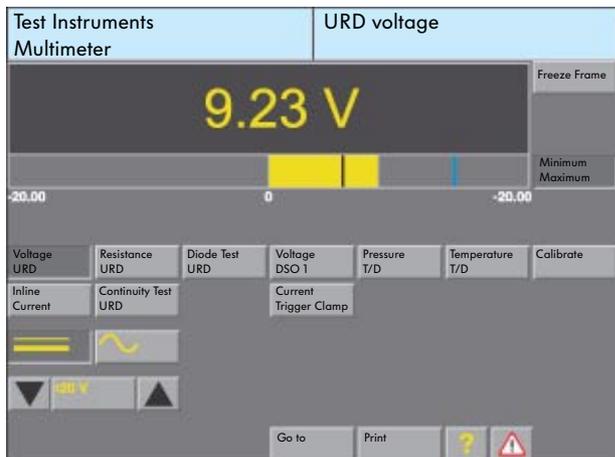
Test instruments in the VAS 5051

The VAS 5051 has the “Test Instruments” mode.



All measurements on pages 28 and 29 are described in SSP 202 “Vehicle Diagnosis, Testing and Information System VAS 5051” and can be checked there. They are only listed here for the sake of completeness.

- Voltage measurement direct voltage max. 50 V



S295_028

- Current measurement
Inline direct and alternating current measurement (measuring instrument connected in series) max. 10 A



S295_029

- Current measurement
Direct and alternating current measurement with trigger clamp 50 A, 100 A, 500 A or 1000 A



S295_030

- Resistance measurement
Automatic or manual measuring range selection

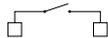


S295_031

- Continuity test
Graphical display of results
Connection



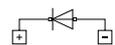
Open circuit



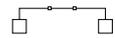
- Diode test
Graphical display of results
Diode in conducting direction



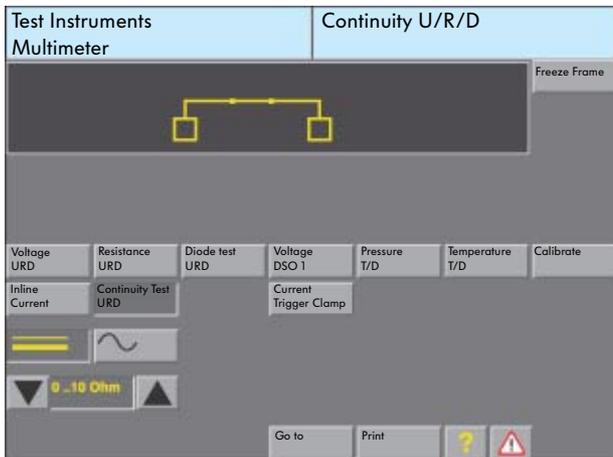
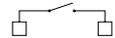
Diode in blocking direction



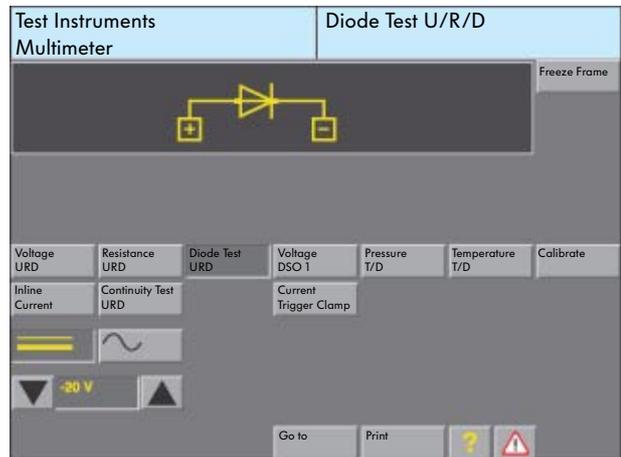
Short-circuit



Open circuit



S295_032



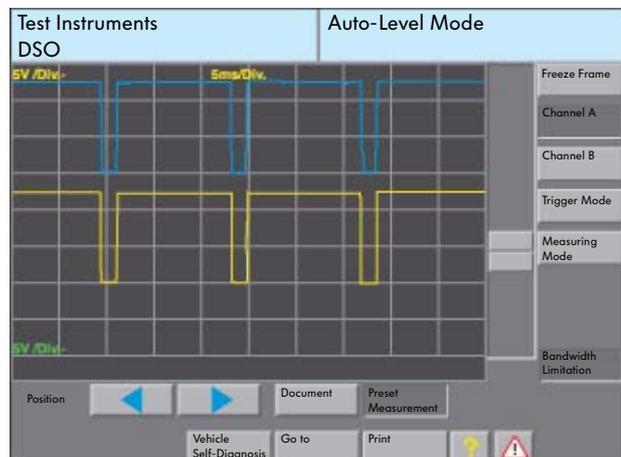
S295_033

- Voltage measurement with additional DSO probe (digital storage oscilloscope) up to +/- 400 V

- Digital storage oscilloscope (DSO)

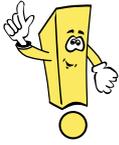


S295_034



S295_035

Test Instruments



In the “Test Instruments” mode, new extensions are available.

Parallel operation of the modes “Test Instruments”, “Vehicle Self-Diagnosis” and “OBD”

It is possible to use the modes “Test Instruments”, “Vehicle Self-Diagnosis” and “OBD” parallel. Measured values from the “Vehicle Self-Diagnosis” and “OBD” modes can also be displayed cyclically in the masks “Multimeter” and “DSO”, the “Test Instruments” modes in addition to the measuring data and measuring curves.

The following combinations are possible:

- Measured values or measured curves from the “Test Instruments” mode and measured values from the “Read Data Block” function from the “Vehicle Self-Diagnosis” mode
- Measured values or measured curves from the “Test Instruments” mode and measured values from the “Basic Setting” function from the “Vehicle Self-Diagnosis” mode
- Measured values or measured curves from the “Test Instruments” mode and measured values from the “Control Element Diagnosis” function from the “Vehicle Self-Diagnosis” mode
- Measured values or measured curves from the “Test Instruments” mode and measured values from the “OBD” mode

The following functions are still recorded in the “Test Instruments” mode:

- Min and max display in the “DSO” function
- Current measurement with the trigger clamp in the “DSO” function
- Long-time measurement in the “DSO” function



You no longer switch over to the “DSO” function with the “DSO” button, but with the “Go to” button and then by selecting “DSO”.

Display of measured value blocks from the “Vehicle Self-Diagnosis” mode to the “Test Instruments” mode, “Multimeter” or “DSO” function

So that the measured values from the “Read Data Block” and “Basic Setting” self-diagnosis functions are displayed in the “Test Instruments” mode, the “Read Data Block” or “Basic Setting” function and then a channel (e.g. 90) have to be selected in the “Vehicle Self-Diagnosis” mode.

You then switch to the “Test Instruments” mode with the “Test Instruments” button. The “Multimeter” function is displayed automatically. The “DSO” function can be selected using the “Go to” button. After pressing the “Measured Value Self-Diagnosis” button, up to four measured values are displayed.



“DSO” mask with display of a measured value block from the “Vehicle Self-Diagnosis”

Measured values from the vehicle self-diagnosis

Data block 90 from engine control unit

“Bandwidth Limitation” button (5051B only)
The same measuring parameters are set as for the VAS 5051 so that the DSO images can be compared.

“Measured Value Self-diagnosis” button

“Vehicle Self-Diagnosis” button for switching between the “Vehicle Self-Diagnosis” and “Test Instruments” modes

“Go to” button for selecting the “Multimeter” or “DSO” function

0 rpm 99% 0 $^{\circ}$ 0.0 $^{\circ}$ after TDC

RPM Pulse duty factor Adjustment of target Adjustment of actual

S295_036



If the measured values are not selected in “Vehicle Self-Diagnosis” mode, no measured values will be displayed in “Test Instruments” mode.

Test Instruments

Display of control element value from the “Vehicle Self-Diagnosis” mode “Test Instruments” mode, “Multimeter” or “DSO” function

To display values from the “Control Element Diagnosis” it is necessary to start the “Vehicle Self-Diagnosis” mode.

Then you switch to the “Test Instruments” mode. In the “Multimeter” or “DSO” mask, you have to press the “Measured Value Self-Diagnosis” button.

After returning to the “Vehicle Self-Diagnosis” mode, the control element of the required system can be started. Switching to the “Test Instruments” mode again displays the values obtained from the control element diagnosis.



“DSO” mask with displayed values from control element diagnosis from the “Vehicle Self-Diagnosis”

Measured values from the vehicle self-diagnosis

Data block 90 from engine control unit

“Vehicle Self-Diagnosis” button for switching between the “Vehicle Self-Diagnosis” and “Test Instruments” modes

“Go to” button for selecting the “Multimeter” or “DSO” function

“Measured Value Self-Diagnosis” button

Test Instruments DSO Auto-Level Mode Injector N30

20 /Div.- 20ms/Div.-

0 rpm 99% 0 <° 0.0° after TDC

Document Preset Measurement

Vehicle Self-Diagnosis Go to Print ? !

S295_037



To select the next control element, return to “Vehicle Self-Diagnosis”.

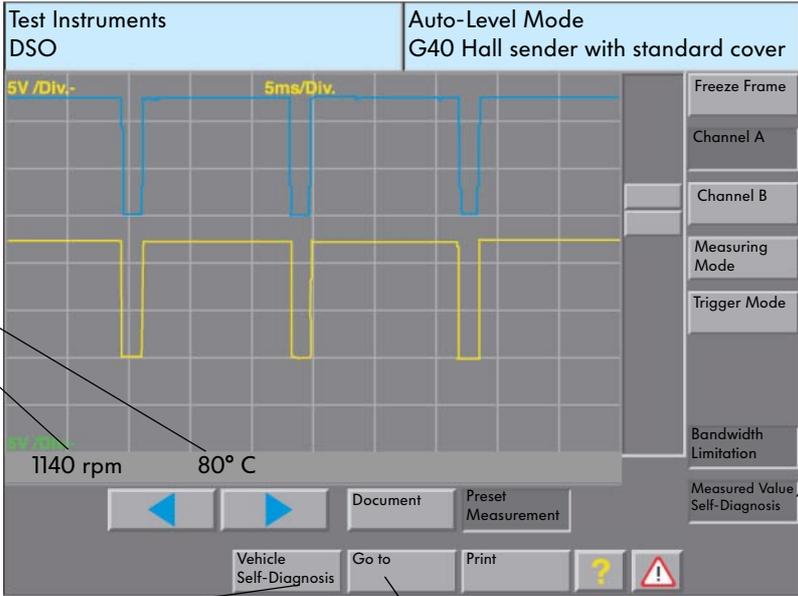
Display of values from the “OBD” mode in the “Test Instruments” mode, “Multimeter” or “DSO” function

The same rules apply as for the display of values from the mode “Vehicle Self-Diagnosis”, “Read Data Block” and “Basic Setting” function.

There are, however, the following limitations:

- Only the first four values are displayed when more than four OBD values are measured
- Only the actual values without target value details are displayed

“DSO” mask with display values from the OBD



The screenshot shows a software interface for a Digital Storage Oscilloscope (DSO). The top left corner displays "Test Instruments DSO" and "Auto-Level Mode G40 Hall sender with standard cover". The main display area shows two waveforms: a blue one at the top and a yellow one below it. The blue waveform is labeled "5V /Div.-" and the yellow one is labeled "5ms/Div.". Below the waveforms, two numerical values are displayed: "1140 rpm" and "80° C". The interface includes a control panel on the right with buttons for "Freeze Frame", "Channel A", "Channel B", "Measuring Mode", "Trigger Mode", "Bandwidth Limitation", and "Measured Value Self-Diagnosis". At the bottom, there are buttons for "Vehicle Self-Diagnosis", "Go to", "Print", and a warning icon. The text "S295_038" is visible at the bottom right of the interface.

Measured values from the OBD

“Measured Value Self-Diagnosis” button

“Vehicle Self-Diagnosis” button for switching between the “OBD” and “Test Instruments” modes

“Go to” button for selecting the “Multimeter” or “DSO” function



Test Instruments

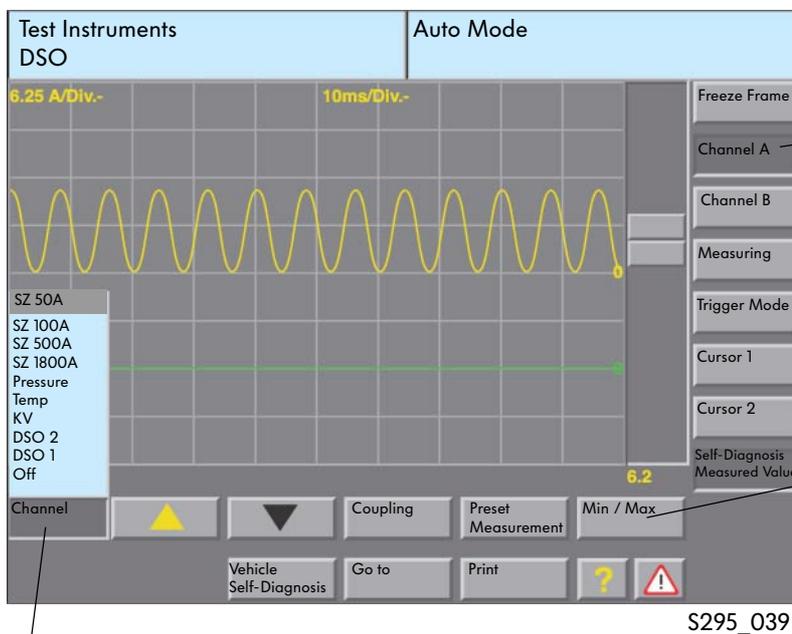
Current measurement with the trigger clamp in the “Test Instruments” mode, “DSO” function

The “DSO” function has been added to the test instruments. This expansion allows current values to be measured with the trigger clamp in the “DSO” function.

The measuring range for the connected trigger clamp is set automatically by the VAS 5051. The recognition occurs via the coding resistor in the respective connector.

The measurement can be in the DSO channel A or B, a parallel voltage measurement is possible using the channel that is not being used.

“DSO” trigger clamp selection for current measurement



Button: Channel A for current measurement in the DSO Channel A

Button: Min/max for displaying the minimum and maximum values at the bottom of the oscillogram

Button: Channel for selection the test connection

- Off Channel disabled
- DSO 1 DSO 1 measuring lead
- DSO 2 DSO 2 measuring lead
- KV Kilo-Volt probe (optional)
- Temp. Temperature sensor (optional)
- Pressure Pressure sensor (optional)
- SZ 1800A Trigger clamp 1800 A (optional)
- SZ 500A Trigger clamp 500 A (optional)
- SZ 100A Trigger clamp 100 A
- SZ 50A Trigger clamp 50 A



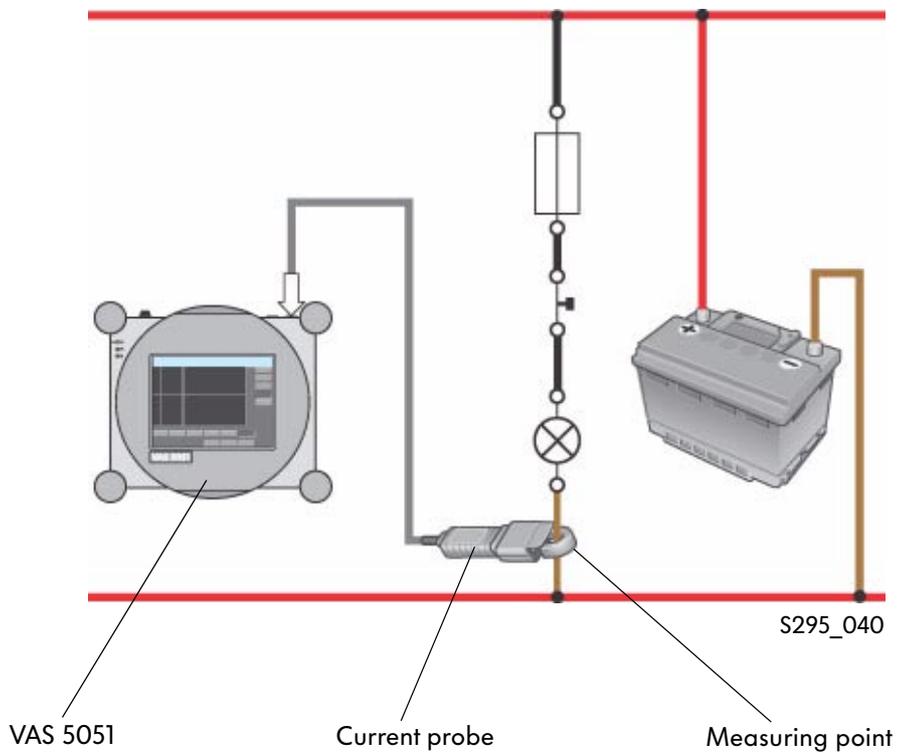
You will find further information on use of the “Digital Storage Oscilloscope” function in SSP 202 “Vehicle Diagnostic, Testing and Information System VAS 5051” or in the operating manual for the VAS 5051.

Connecting the trigger clamp

The line to be measured is held in the trigger clamp.

To avoid incorrect measurements, the trigger clamp should be closed properly.

Connecting the trigger clamp



Before carrying out a trigger clamp measurement, the trigger clamp has to be calibrated. This is automatic when you select a trigger clamp. The trigger clamp needs to be relieved, i.e. a cable cannot be held.

Test Instruments

Long-time measurement in the “Test Instruments” mode, “DSO” function

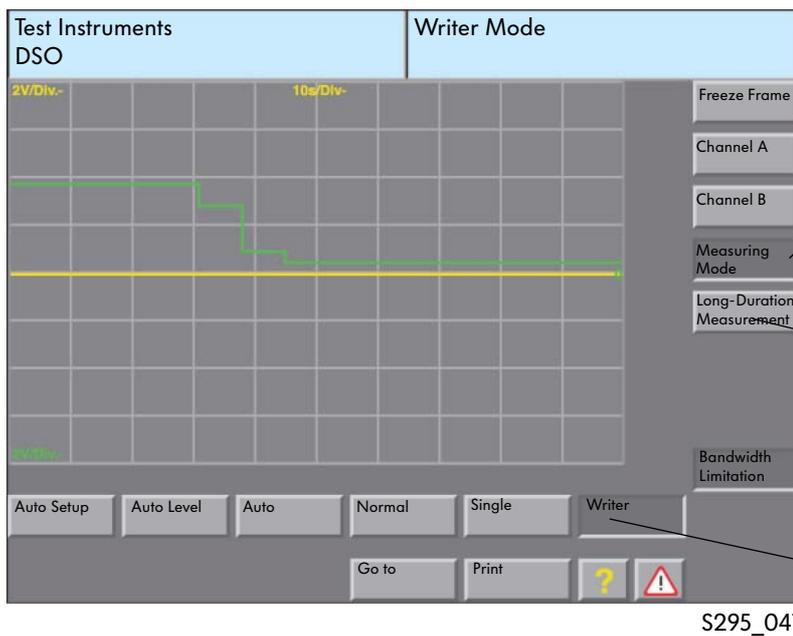
In the “Test Instruments” mode, function “DSO”, a long-duration measurement can be made in “Writer” measuring mode. Using the long-time measurement, voltage or current values can be recorded over several hours. This is recommended, for example, to test the sleep mode for CAN data bus systems, to check the bias current or other signals.

The long-duration measurement is only possible in “Writer” measuring mode.

It is selected by pressing the “Measuring Mode” button and the “Writer” button.



“DSO” mask with button for setting the long-duration measurement



Button: Measuring Mode

Button: Long-Duration Measurement

After pressing the “Writer” button the “Long-Duration Measurement” button appears.

Settings

The long-duration measurement needs to be started manually. It can be stopped manually or after a specific time.

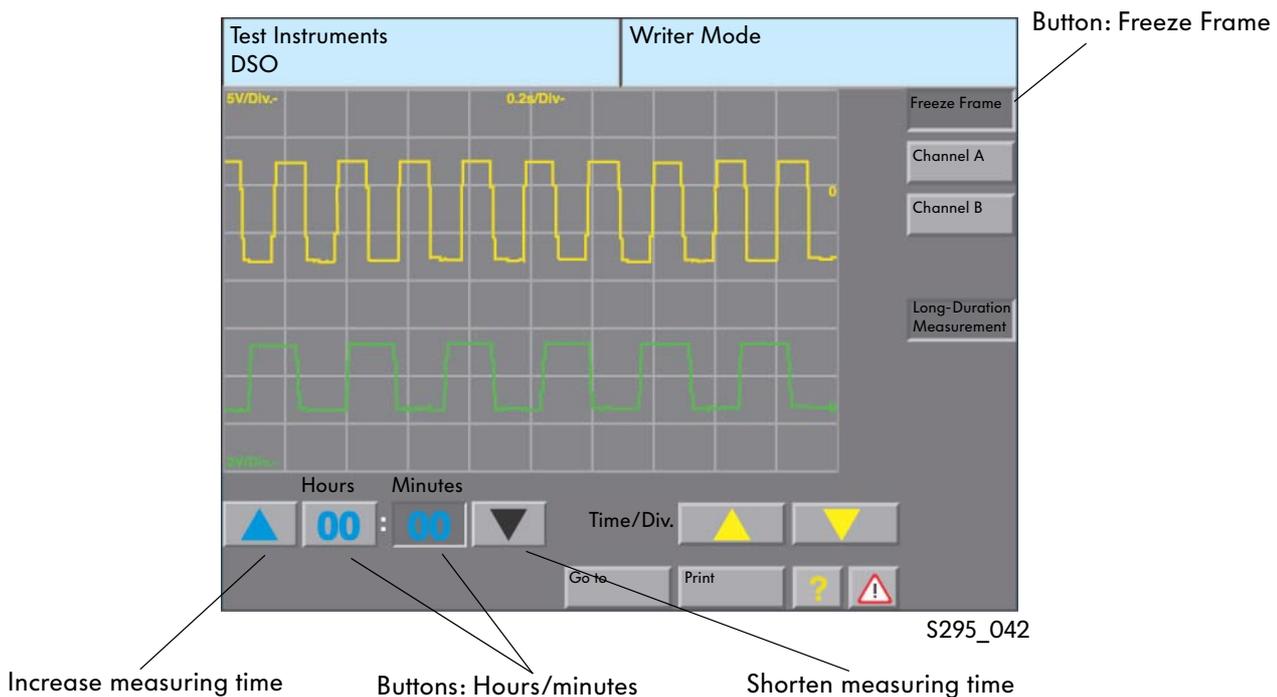
Start/stop long-duration measurement

The long-time measurement is started and stopped with the “Freeze Frame” button.

- Start
Deactivating the “Freeze Frame” button starts the long-duration measurement.
The “Freeze Frame” button is deactivated when the button colour is light grey.
- Stop
Activating the “Freeze Frame” button stops the long-duration measurement.
The “Freeze Frame” button is activated when the button colour is dark grey.



“DSO” mask with setting elements for long-duration measurement



Measuring time

The “Hours” and “Minutes” buttons can be used to set the running time of the long-duration measurement.

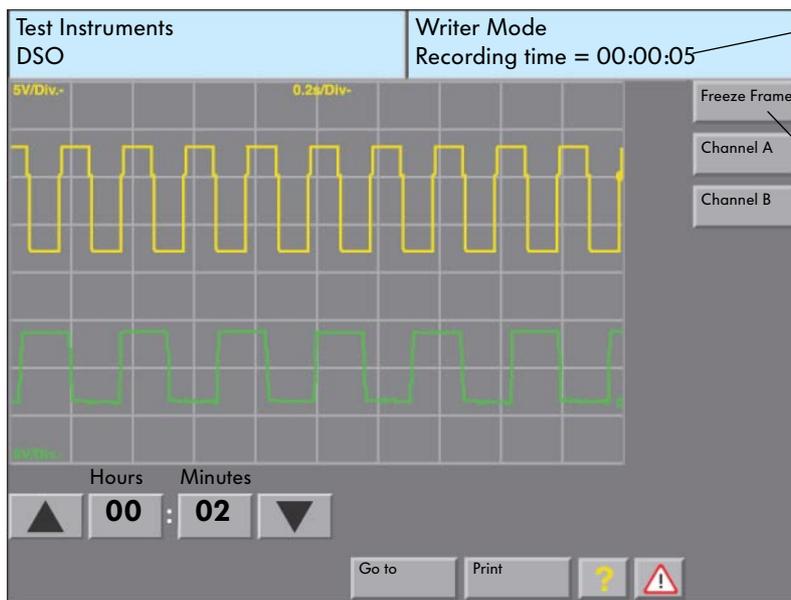
During the measurement, the remaining time for the measurement is displayed in these buttons.

Test Instruments

Long-duration measurement procedure

During the measurement in writer mode, the running time is displayed at the top right of the mask. No changes can be made to the measurement settings. It can only be cancelled early by pressing the “Freeze Frame” button.

“DSO” mask with setting elements for long-duration measurement



Display of running time

“Freeze Frame” button for cancelling the measurement early

S295_043

The measuring time

The measuring time is limited depending on the resolution of the time axis.

Resolution time axis	Sampling rate	Recording time duration in hh:mm
10 s/Div.	5 Hz	55:33
5 s/Div.	10 Hz	27:46
2 s/Div.	25 Hz	11:06
1 s/Div.	50 Hz	05:33
0.5 s/Div.	100 Hz	02:46
0.2 s/Div.	250 Hz	01:06
0.1 s/Div.	500 Hz	00:33
50 ms/Div.	1 kHz	00:16
20 ms/Div.	2.5 kHz	00:06
10 ms/Div.	5 kHz	00:03
5 ms/Div.	10 kHz	00:01

End of long-duration measurement

The long-duration measurement ends once the set time has expired. The freeze frame function is switched on automatically and the signal pattern is displayed in the mask compressed. For a more precise assessment, a special area can be selected.

“DSO” mask after ending the long-duration measurement



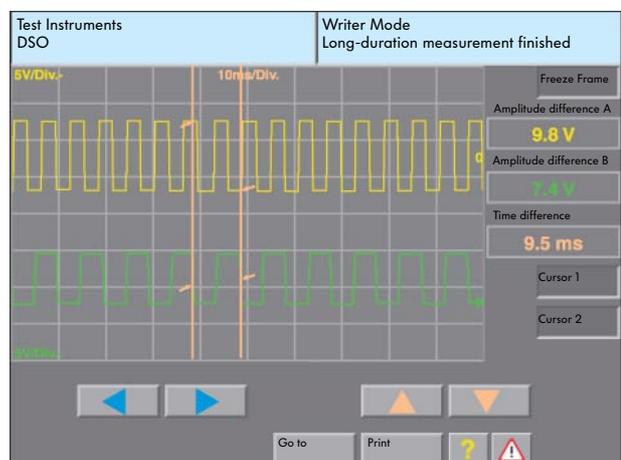
S295_044

Selecting the area to be enlarged

By marking (tapping or touching) an area on the mask (screen) and then pressing the “Zoom” button, a section of the signals can be enlarged. When you press the button again, the zoom function is switched off.

The cursors mark out the selected area. You can enlarge or reduce the area by moving the cursor.

“DSO” with zoomed display



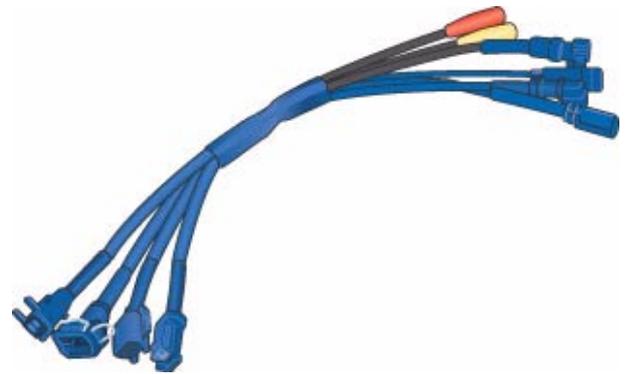
S295_045



Test Instruments

Test instrument adapters

The adapters are used in conjunction with the VAS 5051 as well as the V.A.G 1715 and V.A.G 1526/1526A multimeters for simple, fast and safe detection of a wide range of electrical and electronic signals from components.



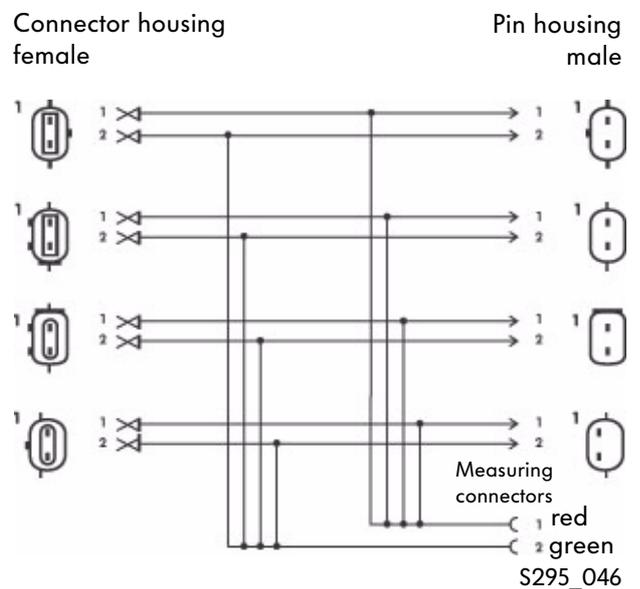
S295_051

Test instrument adapter/DSO (2-pole) VAS 5255

Use:
Measurements

- on injection valves
- on the solenoid valve for the activated charcoal filter system

Circuit diagram

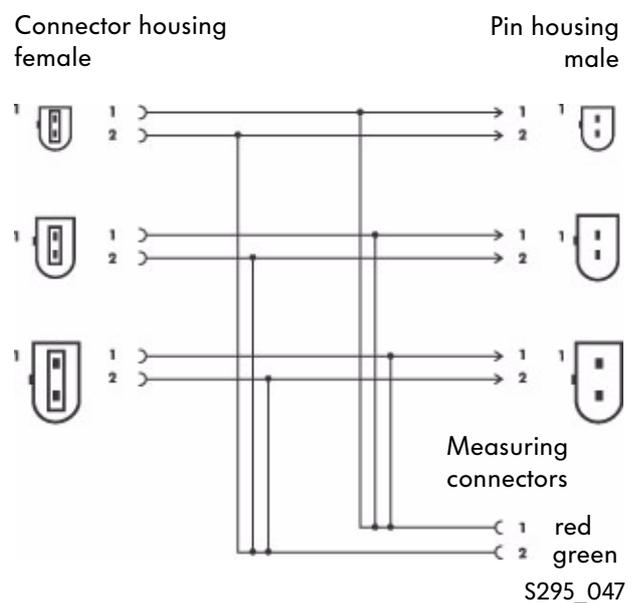


Test instrument adapter/DSO (2-pole) VAS 5256

Use:
Measurements

- on ABS speed senders (inductive)
- on ABS speed senders (Hall sender)

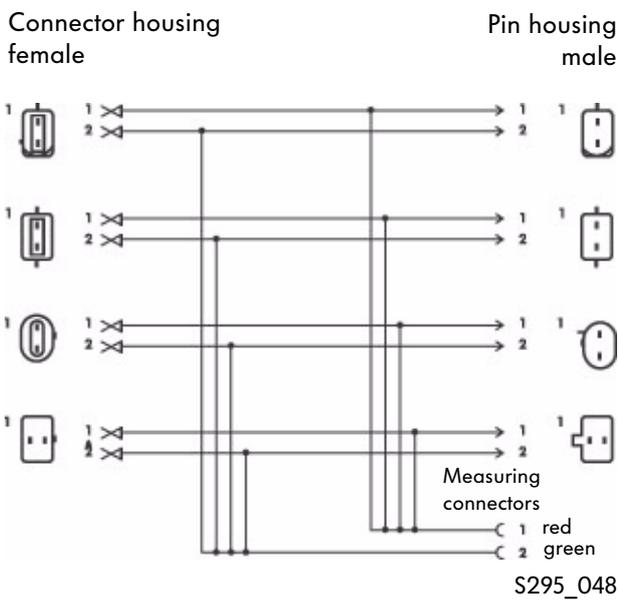
Circuit diagram



**Test instrument adapter/DSO (2-pole)
VAS 5256/1**

Due to the wide range of different ABS connectors, it was necessary to split the VAS 5256 adapter into the VAS 5256 and VAS 5256/1 adapters.

Circuit diagram

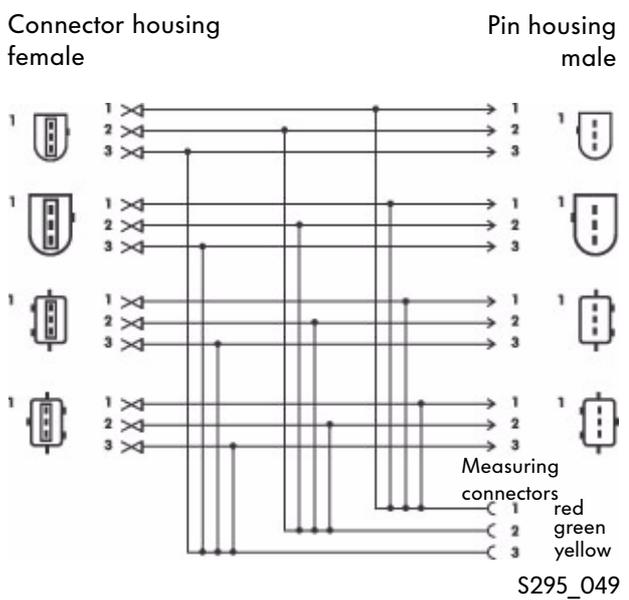


**Test instrument adapter/DSO (3-pole)
VAS 5257**

Use:
Measurements

- on engine speed sender
- on Hall sender

Circuit diagram

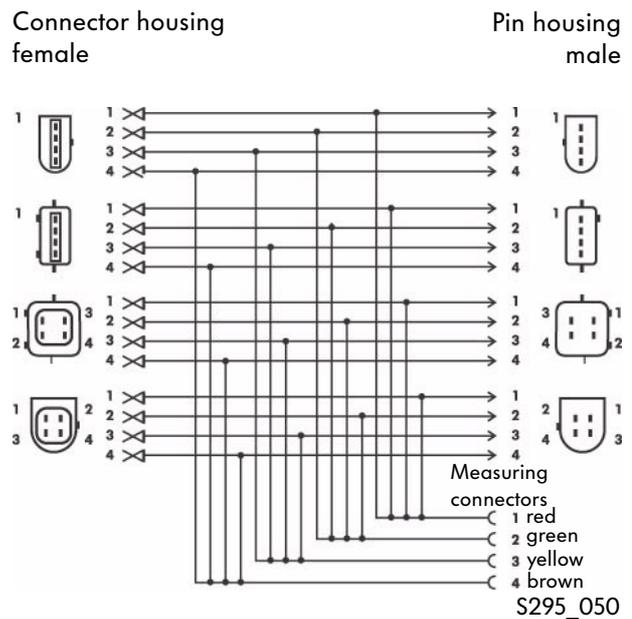


**Test instrument adapter/DSO (4-pole)
VAS 5258**

Use:
Measurements

- on coolant temperature sender

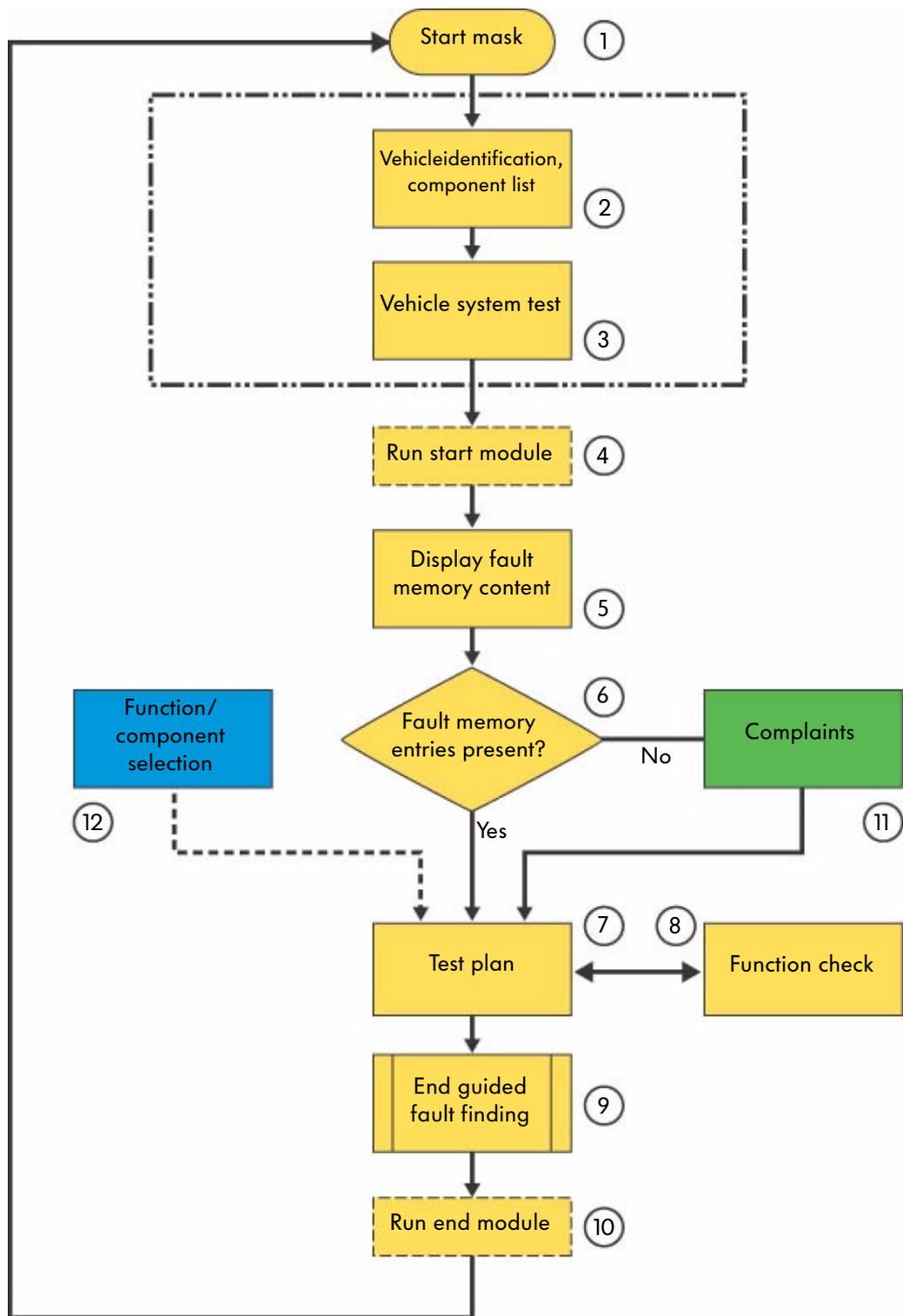
Circuit diagram



Guided Fault Finding

The basic procedure for guided fault finding

Procedure diagram



S295_052

Guided Fault Finding

The “Guided Fault Finding” allows you to repair faults that are entered in the fault memory as well as sort out complaints that should be rectified on the basis of perceptions. You are guided through the VAS diagnosis system and extensive tools are provided as required.

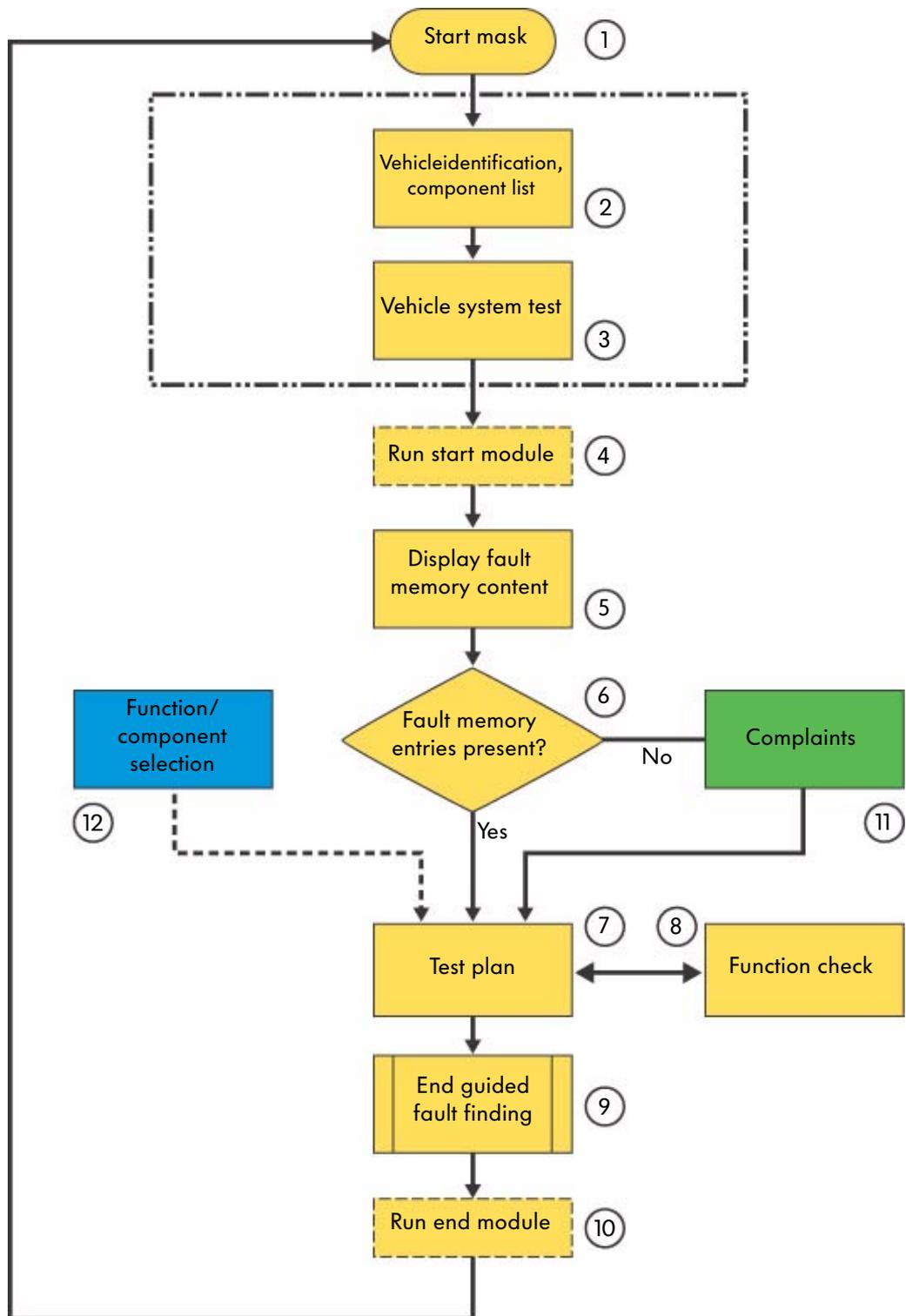
Explanation

- 1 Start mask
The guided fault finding is started from the start mask.
- 2 Vehicle identification
The guided fault finding starts with selection of the brand. There is then a check to see whether the vehicle has a data bus diagnostic interface and therefore the specified component list can be read. The vehicle is then identified.
- 3 Vehicle identification, vehicle system test
The vehicle system test follows. In a mask, all electronic vehicle systems that can occur under the basic features of the specific vehicle are displayed.
Using the vehicle communications, there is a check to see which vehicle systems and variants are installed in the connected vehicle and their fault memories are read.
- 4 Run start module
The start module can be started automatically in the “Guided Fault Finding” and before the fault memory entries are displayed. It can, for example, check the update status of control units and, if necessary, automatically initiate update programming or send results from the vehicle system test to the vehicle manufacturer via an online connection.
- 5 Fault memory content
In this mask, the fault memory content and the associated fault text are listed according to control unit.
- 6 Fault memory entries
If fault memory entries are present, the procedure will branch to the test plan or to the “Complaint Report” mask.



Guided Fault Finding

Procedure diagram



S295_052

7 Test plan

When you switch to the "Test Plan" the results from the previous "Fault Memory Content" and "Complaint Reports" masks that have already been run through are evaluated and the system test plan is then created automatically. A separate test plan can also be created with the "Function and Component Selection". Both test plans are displayed as a list.

The result of a function check leads to a new assessment of the test plan. The list of function tests may grow here.

8 Function check

A function check is a series of test steps to localise a fault to the level of individual components, cables and connectors or control units. As a result, the test program provides a statement on the state of the tested vehicle functions, modules or parts. The function test uses guide dialogs as an interface between the use and the diagnosis system and uses all functions of the vehicle self-diagnosis.

The VAS 5051 incorporates the internal measuring instruments in the function test. When you are using the VAS 5052, these measurements have to be carried out with external test instruments. The respective function check dialogs allow you to enter substitute values manually.

9 Exiting "Guided Fault Finding"

You exit the "Guided Fault Finding" with the "Go to" button. Among other things, it allows "Pause", "Cancel" or "Exit" of the "Guided Fault Finding".

Pause

This function allows you to pause or store the diagnostic steps briefly.

Cancel

The "Guided Fault Finding" mode is ended without being completed. You are taken back to the "Select Brand" mask. The fault memories are queries and erased.

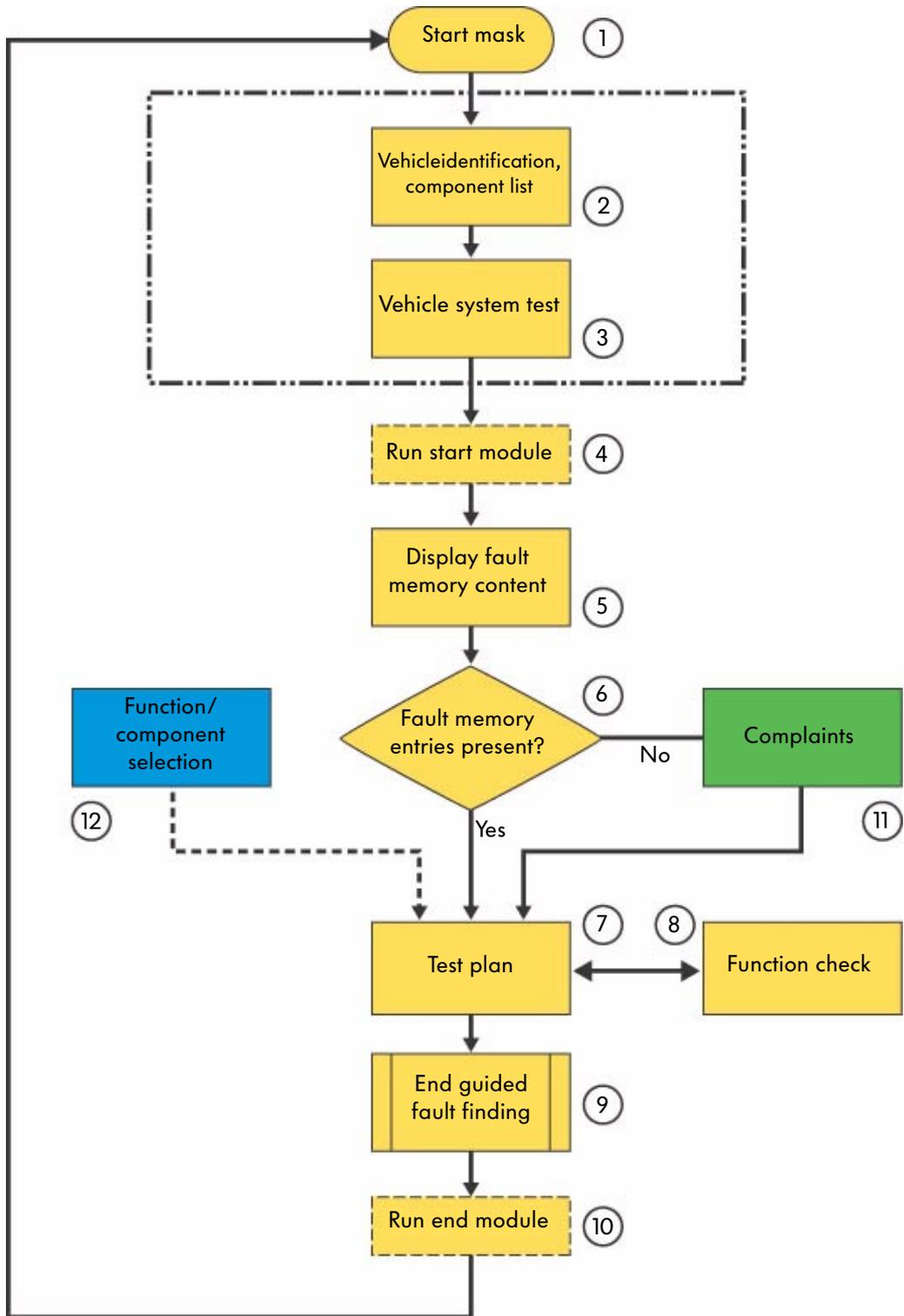
Exit

This function ends the "Guided Fault Finding". The fault memories of the vehicle systems are erased and then read again. If there are still error memory entries or new ones have been added, this will be displayed and the guided fault finding can be continued or cancelled. When the "Guided Fault Finding" is ended in OBD vehicles, there is a warning that the Readiness Code may have been deleted and you have the option of creating it again.



Guided Fault Finding

Procedure diagram



S295_052

10 Run end module

The end module is automatically started when you exit the “Guided Fault Finding” and can include one or more function checks that are carried out outside the test plan and are not entered there. Supports, for example, the automatic transfer of the diagnosis protocols via an online connection to the vehicle manufacturer. It is listed before the return to the start mask.

11 Technical problem solving/complaint

If a fault is not recognised in the vehicle system test, the “Guided Fault Finding” will automatically switch to the selection of complaints. A symptom will have to be selected. Next the selected complaint is transferred to the test plan. You can switch to this step at any time by pressing the “Go to” button and selecting the fault memory symptom.

12 Function/component selection

Here you can select functions or components that could be the source of the fault from experience. The selected functions and/or components are entered in the “User-Defined Test Plan” and the test can be started from there. If you press the “Go to” button and select “Document”, you can call up a document associated with the function or component.



Guided Fault Finding

The contents of the guided fault finding in the vehicle diagnosis, testing and information system VAS 5051 as well as in the vehicle diagnosis and service information system VAS 5052

Overview

Guided fault finding allows

- vehicle specific query of the fault memory,
 - determining the cause of the fault with a dynamic fault finding program,
 - fault finding for a complaint related to the repair group or perception (HST/TPL),
 - the components and the function check via the "Go to" button,
 - the work time determination for the fault finding using the diagnosis protocol,
 - carrying out online functions and (e.g. software update of control units etc.),
 - erasing all fault memories upon exit.
- If there are still fault memory entries or new ones have been added, they will be displayed. If a fault was stored in the engine control unit of OBD vehicles, the readiness code will be deleted.



Entry via the vehicle selection

The screenshot illustrates the guided fault finding process through several overlapping windows:

- Window 1 (Top):** Shows 'Guided Fault Finding' with 'Vehicle Identification' set to 'S295_053'.
- Window 2:** 'Select brand' window showing 'Volkswagen' and 'Audi'.
- Window 3:** 'Select type' window listing various Audi models (A2, A3, A4, Cabriolet, A6, A8, TT, etc.) and 'Remaining vehicles for online'.
- Window 4:** 'Select model year' window showing '2003 (3)' and '2004 (4)'. The '2003 (3)' option is selected.
- Window 5:** 'Select body shape' window showing 'Saloon' as the selected option.
- Window 6 (Bottom):** 'Function/component selection' window listing engine specifications such as 'ASN 3.0l Motronic / 162 kW', 'BBJ 3.0l Motronic / 160 kW', 'ASB 3.0l TDI / 165 kW', 'BFL 3.7l Motronic / 206 kW', 'ASE 4.0l TDI / 202 kW', 'BFM 4.2l Motronic / 246 kW', and 'BHT 6.0l Motronic / 331 kW'.

Each window includes a 'Mode' button at the bottom left and a 'Go to' button at the bottom right of the final window. The ID 'S295_057' is visible in the bottom right corner of the overall interface.

Querying all fault memories

When the vehicle identification is targeted and correct, all electronic vehicle systems (control units) that could occur in the identified vehicle are displayed.

In the communication with the vehicle, there is a check of which vehicle systems and variants are present and their fault memory is queried.

All queried systems are indicated with a black bar.

Once the query has been completed the following message appears:

Fault memory query

Guided Fault Finding	Audi
Function/component selection	V07:58.00 21/06/2004
Vehicle Identification	Audi A8 2003> 2004 (4) Saloon ASE 4.01 TDI / 202 kW
19 - Data bus diagnostic interface	✓
01 - Diesel direct injection and glow system (master)	✓
11 - Diesel direct injection and glow system (slave)	✓
02 - Automatic gearbox 09E	✓
03 - ABS/EDS four-wheel drive Bosch 5.7	Fault ?
13 - Adaptive cruise control	?
34 - Adaptive suspension	✓
53 - Parking brake	✓
65 - Tyre pressure monitor	Fault
05 - Vehicle authorisation system	
05 - Vehicle authorisation system with keyless entry	Hand icon
06 - Passenger side seat adjustment	✓
07 - Front display/operating unit	Fault
07 - Front display/operating unit, Japan	
08 - Automatic air conditioning	✓
09 - Onboard supply	Hand icon
0E - Single CD player (pos. 1)	<==

S295_077

Please check that the recognised systems are complete.
(black background)

If an installed system cannot be recognised, it should be selected manually.

Only then can the system components be accessed via the function/component selection.

OK

S295_059

By pressing the “OK” and “Continue”, the fault memory content is displayed.

“Continue” button

Status symbols in the vehicle system test

Symbol	Meaning
Vehicle system display	
Normal text	Control unit not identified or deselected
Inverted text (black bar)	Control unit identified
Status line	
✓	Fault memory empty — no fault set
?	The control unit entered in the data bus diagnosis interface could not be recognised.
Fault	Fault set in the fault memory
Hand icon	Control unit does not have a communication interface
Hand icon (pointing)	Control unit selected manually
Hand icon (pointing away)	Control unit deselected manually
<==	Control unit being queried



On some vehicles, after the fault memory has been queried, you are requested to send the fault memory content to the Audi SVM via an online connection.

Guided Fault Finding

Fault memory content

The fault memory content of the individual control units are displayed after switching to the "Fault Memory Content" mask.

The fault code and the fault type are displayed in a standard company text.

Using the "Ambient Conditions" button, standard and vehicle-specific conditions that occur when the fault occurs can be displayed.

Address word and name of control unit

Fault type

Address word and name of control unit	Fault type
01 - Engine electronics 2 Fault / notice recognised	
16497 P0113 000 Intake air temperature sender G42 Signal too large Fault not stored	
16622 P0239 00 Charge air pressure signal too large	
09 - Electronic central electrical system 3 Fault / notices recognised	

"Ambient Conditions" button

Ambient Conditions

Sort method

Standard

Kilometres

Static/Sporadic

Time

Fault code

Fault code OBD

S295_060

Selection of sort method



On the basic CD 7.0, it is possible to sort the fault order according to the standard ambient conditions stored in the control unit if the control unit supports this function. Faults for which no ambient conditions have been stored are placed at the end and have a violet background.