

Audi 100 1991 ➤

KE III Jetronic/Ignition System (5-cylinder)

Engine ID	AAR								
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Edition 12.1990

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List of Workshop Manual Repair GroupsList of Workshop Manual Repair GroupsList of Workshop Manual Repair Groups Audi 100 1991 ➤

KE III Jetronic/Ignition System (5-cylinder)

Repair Group

01 - Self-diagnosis

25 - Mixture preparation, Injection

28 - Ignition system



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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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Contents

01 - Self-diagnosis	1
1 Self-diagnosis	1
1.1 Self-diagnosis	1
1.2 Technical data of self-diagnosis	1
1.3 Safety precautions	1
1.4 Connecting fault reader V.A.G 1551	2
2 Interrogating and erasing fault memory	4
2.1 Interrogating and erasing fault memory	4
2.2 Flash codes and text output of VEZ control unit and KE III Jetronic control unit	5
2.3 Fault table	6
3 Final control diagnosis	9
3.1 Final control diagnosis	9
3.2 Preparing differential pressure regulator for differential pressure regulator current measurement	9
3.3 Performing final control diagnosis	11
4 Testing diagnostic connector wiring connections	13
4.1 Testing diagnostic connector wiring connections	13
4.2 Testing voltage supply to "black" diagnostic connector	14
4.3 Check wiring between diagnostic connector "brown" and KE III Jetronic control unit or VEZ control unit	14
25 - Mixture preparation, Injection	16
1 Servicing KE III Jetronic fuel injection system	16
1.1 Servicing KE III Jetronic fuel injection system	16
1.2 Safety precautions	16
1.3 Rules for cleanliness	16
1.4 Technical data	17
1.5 Fitting locations overview	18
1.6 Upper part of intake manifold - Overview	22
1.7 Intake manifold lower part - Overview	26
1.8 Checking wiring and components with test box V.A.G 1598	29
1.9 Replacing KE III Jetronic control unit	31
1.10 Checking power supply for KE III Jetronic control unit	33
1.11 Checking fuel pump relay -J17 and actuation	35
1.12 Testing cold start valve -N17	41
1.13 Checking idling stabilisation valve -N71	46
1.14 Testing altitude sender -F96	50
1.15 Checking and adjusting idling speed switch -F60 and full throttle switch -F81	54
1.16 Vehicles with manual gearbox	55
1.17 Vehicles with automatic gearbox:	59
1.18 Checking throttle valve potentiometer -G69 - vehicles with automatic gearbox	63
1.19 Adapting automatic gearbox control unit and throttle valve potentiometer -G69 to each other	65
1.20 Checking air flow meter potentiometer -G19	66
1.21 Checking differential pressure regulator -N73	72
1.22 Basic throttle valve setting	74
1.23 Checking intake air system for leaks (unmetered air)	75
2 Servicing fuel system	77
2.1 Servicing fuel system	77
2.2 Fuel distributor overview	77
2.3 Checking idling speed, CO content and ignition point	82
2.4 Vehicles with catalytic converter and lambda probe	85
2.5 Vehicles without catalytic converter and without lambda probe	88
2.6 Connecting remote control V.A.G 1348/3A with adapter cable V.A.G 1348/3-2	90



2.7	Connecting pressure gauge V.A.G 1318 with test adapter 1318/4	91
2.8	Checking system pressure, differential pressure and holding pressure	92
2.9	Checking injectors (comparison measurement of injection quantity)	96
2.10	Leak testing air-shrouded injectors and inserts	99
2.11	Removing and installing injectors	100
2.12	Removing and installing injector insert	102
2.13	Checking adjusting lever and control piston	103
2.14	Checking and adjusting rest position and free play of baffle plate	103
2.15	Basic setting of adjusting lever	106
2.16	Adjusting stop bolt for control piston	107
2.17	Checking cold / acceleration enrichment	108
2.18	Checking overrun cut-off and function of idling switch	111
3	Checking lambda control	113
3.1	Checking lambda control	113
3.2	Testing Lambda probe -G39 and Lambda control	113
3.3	Testing lambda probe heater -Z19	115
3.4	Removing and installing lambda probe	118
4	Checking fuel tank breather	119
4.1	Checking fuel tank breather	119
4.2	Checking activated charcoal filter system solenoid valve 1 -N80	119
5	Checking auxiliary signals	124
5.1	Checking auxiliary signals	124
5.2	Testing signal from air conditioner compressor	124
5.3	Checking engine speed signal	125
5.4	Checking vehicle speed signal	126
5.5	Checking gear signal	128
6	Vacuum diagram	129
6.1	Vacuum diagram	129
28 - Ignition system		131
1	Checking ignition system	131
1.1	Checking ignition system	131
1.2	Safety precautions	131
1.3	Test data, spark plugs	131
1.4	Servicing ignition system	132
1.5	Basic setting of ignition distributor	136
1.6	Testing ignition coils	138
1.7	Checking output stage for ignition coil	140
1.8	Checking coolant temperature sender -G62	144
1.9	Replacing VEZ control unit	147
1.10	Checking power supply to VEZ control unit	149
1.11	Checking knock sensor	151
1.12	Checking Hall sender -G40	153

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01 - Self-diagnosis

1 - Self-diagnosis

1.1 - Self-diagnosis

The KE III Jetronic control unit -J21 and the VEZ control unit -J154 analyses the information and distinguishes between different faults =>Fault table, Page 6 and stores these until ignition is switched off.

The possibilities offered by self-diagnosis can only be utilised with fault reader V.A.G 1551, mode 2 "flash code output".

Note:

Fault reader V.A.G 1552 and vehicle diagnostic, testing and information system VAS 5051 are not equipped with mode 2 "flash code output", therefore they cannot be used for self-diagnosis of the KE III Jetronic control unit and the VEZ control unit.

The data output is only possible with the ignition switched on or with the engine running and an engine speed of less than 2500 rpm. A higher engine speed terminates the data output.

1.2 - Technical data of self-diagnosis

Fault memory of KE III Jetronic control unit	
- Non-volatile memory	no
- Volatile memory	yes
Fault memory of VEZ control unit	
- Non-volatile memory	no
- Volatile memory	yes
Data output	
- Rapid data transfer	no
- Flash code output	yes
Final control diagnosis	
- KE III Jetronic control unit	yes
- VEZ control unit	no

1.3 - Safety precautions

Note the following points on vehicles equipped with a passenger airbag when carrying out a road test which involves use of testing and measuring equipment:

Important

- ◆ Always install testers and measuring instruments on the back seat and have a second person operate them from there.
- ◆ If test equipment is operated from the front passenger seat, the person sitting there could be injured if the front passenger airbag were triggered in the event of an accident.



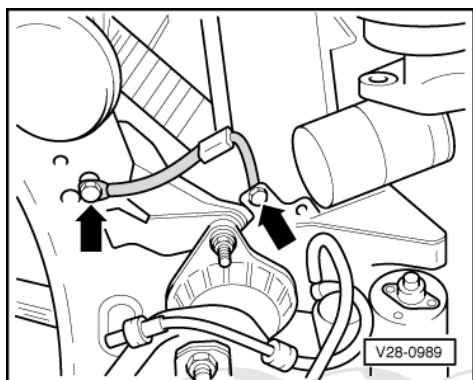
1.4 - Connecting fault reader V.A.G 1551

Test requirements:

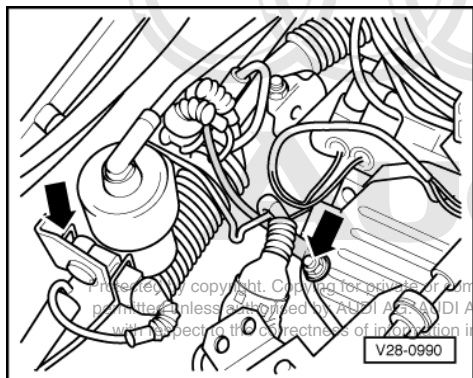
- Supply voltage of vehicle electrical system OK
- Voltage supply and fuses for the relevant systems OK.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

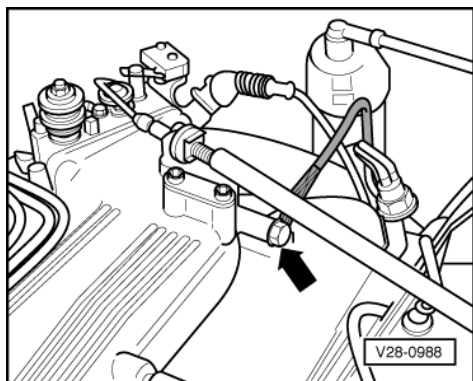
- Fuel pump relay OK; checking =>Page 35 .
- Earth connections checked.
- Test following earth connections for corrosion and poor connection before interrogating fault memory, final control diagnosis, test of wiring and also before replacing components:



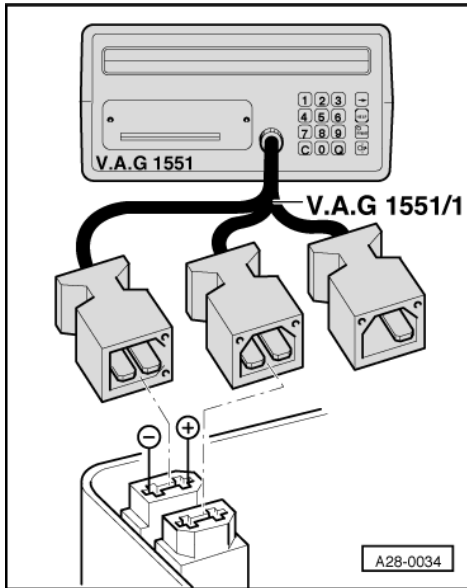
- ♦ Anchorage point of battery earth strap to body.
- ♦ -> Anchorage points of earth strap between right engine mounting and body -arrows- (shown from vehicle underside).



- ♦ -> Anchorage points of earth strap between cylinder block and body -arrows-.



- ♦ -> Earth connection point on intake manifold -arrow- (this earth point must only be used for KE III Jetronic and VEZ control unit).



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- Remove cover from additional relay carrier I on left of plenum chamber.
- -> Connect fault reader V.A.G 1551 with diagnostic line V.A.G 1551/1.

Important
Note the safety precautions =>

- Make sure that ignition is switched off, then connect black connector to black diagnostic connection.

-> Indicated on display:

V.A.G

- 1) Appears alternately

Note:

If the display remains blank, test voltage supply to black diagnostic connector => Page 14.

- Connect white connector to brown diagnostic connection (blue connector not required).
- Switch on the fault reader printer with the print key. The indicator lamp in the key must illuminate.

For function "Interrogating fault memory"
=> Page 4 :

- After road test, allow engine to continue running.

or

For function "Final control diagnosis" => Page 9 :

- Switch the ignition on.
- Press key "2" for "Flash code output".

-> Indicated on display:

Flash code output
with the □ key



2 - Interrogating and erasing fault memory

2.1 - Interrogating and erasing fault memory

When interrogating fault memory, fault memory content of VEZ control unit -J154 is displayed first and then fault memory content of KE III Jetronic control unit -J21.

Note:

If the engine will not start, turn it for at least 5 seconds with the starter; the engine must then be left on.

- Perform a road test. Conditions:
 - Duration at least 5 minutes
 - Coolant temperature at least 80 °C
 - Engine speed greater than 3000 rpm
 - Accelerator fully depressed for a short time
- After road test, allow engine to continue running.

Note:

Do not switch off engine after conducting road test (fault memory is erased).

- Connect fault reader V.A.G 1551 => Page **2**.

-> Indicated on display

Flash code output
with the ☐ key

- Press =>key.

Any faults (flash codes) stored in the fully-electronic ignition control unit will appear in sequence on the display and on the print-out.

or

-> If no faults have been stored in the memory, this message will appear on the display:

Flash code: 4444
No fault detected

Notes:

- ♦ If the printer is switched off, press the => key to display the next fault.

No ♦Flash code received

-> Indicated on display

- Check brown diagnostic connector wiring => Page **14**.

-> After the last fault or "Flash code 4444 No faults recognised" has been displayed, this message will appear on the display:

Flash code: 0000
Output ends

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Notes:

- ♦ With the printer switched on, V.A.G 1551 will now advance to the next step and interrogate the fault memory of the KE III Jetronic control unit.
- ♦ If printer is switched off, press => key to continue on fault reader.
- ♦ The idling speed will be increased while the fault memory of the KE III Jetronic control unit is interrogated.
- ♦ If the engine stops, do not switch off ignition, but complete interrogation of fault memory.

Any faults (flash codes) stored in the KE III Jetronic control unit will appear in sequence on the display and on the print-out.

or

-> If no faults have been stored in the memory, this message will appear on the display:

Flash code: 4444
No fault detected

Notes:

- ◆ If the printer is switched off, press the ➔ key to display the next fault.

No ◆ Flash code received

-> Indicated on display

- Check brown diagnostic connector wiring => Page 14 .

-> After the last fault or "Flash code 4444 No faults recognised" has been displayed, this message will appear on the display:

Flash code: 0000
Output ends

After completion of output of fault memory content of corresponding control unit or after display of flash code 4444 (no faults recognised), flash code 0000 (output ends) is displayed. This flash code is repeated until ignition is switched off or speed is increased to above 2500 rpm.

- Switch off ignition in order to erase fault memory.
- Locate and eliminate faults listed on printout as per fault table => Page 6 .
- After repairs, carry out a road test and repeat interrogation of fault memory of VEZ control unit and of KE III Jetronic control unit.

Note:

If problems have been reported but no faults are detected by the self-diagnosis:

=> Binder "Engine Fault-finding"

2.2 - Flash codes and text output of VEZ control unit and KE III Jetronic control unit

Flash code	Additional text display on fault reader V.A.G 1551	Fault stored in	
		VEZ control unit -J154	KE III Jetronic control unit -J21
0 0 0 0	Output ends	X	X
1 1 1 1	Control unit defective	X	X
1 2 3 1	Road speed sender -G68	-	X
2 1 2 1	Idling switch -F60	X	X
2 1 2 2	Speed information missing	-	X
2 1 2 3	Full throttle switch -F81	X	X
2 1 4 1	First knock regulation	X	-
2 1 4 2	Knock sensor 1 -G61	X	-
2 2 2 3	Altitude sensor - F96	X	X
2 2 3 2	Air mass/air flow meter -G70/-G19	X	X



Flash code	Additional text display on fault reader V.A.G 1551	Fault stored in	
		VEZ control unit -J154	KE III Jetronic control unit -J21
2 2 3 3	Air mass meter reference voltage -G70	x	-
2 3 1 2	Coolant temperature sender -G62	x	x
2 3 4 1	Lambda control	-	x
2 3 4 2	Lambda probe -G39 with heater	-	x
4 4 3 1	Idling stabilisation valve -N71	-	x
4 4 4 4	No fault recognised!	x	x

2.3 - Fault table

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Notes:

- ♦ All the faults detected by VEZ control unit -J154 and KE III Jetronic control unit -J21 and displayed by V.A.G 1551 on interrogating content of fault memory, are listed according to flash code.
- ♦ Do not immediately renew components indicated as faulty by the V.A.G 1551 but first check the wiring and connectors of these components according to the current flow diagram. Also check the earth connections according to the current flow diagram.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

- ♦ If flash codes 2121, 2123, 2223 are only displayed by one control unit during interrogation of fault memory, first test wiring between VEZ control unit and KE III Jetronic control unit.
- ♦ If idling speed rises to above 1200 rpm with engine at operating temperature and lies within specified range (=> flash codes 2122 and 2232) once engine is restarted, this can be caused by loose contacts in wiring to potentiometer on air flow meter or between VEZ control unit, pin 17 and KE III Jetronic control unit, pin 30.
- ♦ If on vehicles with air conditioner, the idling speed drops steeply when air conditioner is switched on, check air conditioner compressor signal => Page 124 .
- ♦ If on vehicles with automatic gearbox, the idling speed drops significantly when engaging a gear, check gear signal => Page 128 .

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
1111 Control unit defective	- Internal fault in KE III Jetronic control unit	- Replace KE III Jetronic control unit => Page 31
	- Internal fault in VEZ control unit	- Replace VEZ control unit =>Page 147
1231 Road speed sender -G22/-G68	- Open circuit or short in wiring between dash panel insert and KE III Jetronic control unit	- Rectify open circuit or short circuit. => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
	- Road speed sender -G22/-G68 defective	- Check speed signal => Page 126

Notes on flash code 1231:

- ♦ Only note fault display if speed display is OK.
- ♦ Effects: Engine may stall when de-clutching on the overrun.

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
2121 Idling switch -F60	- Throttle cable setting - Floor mat pressing down on accelerator pedal	- Adjust throttle cable => Fuel Supply System - Petrol Engines; Repair group 20; Servicing accelerator mechanism; Adjusting throttle cable Servicing accelerator mechanism; Adjusting throttle cable
	- Adjusting -F60	- Test -F60 and adjust=> Page 61
	- Short circuit in -F60 or open circuit or short circuit in wiring	
	- -F60 sticking	

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
2122 Speed information missing	- Open circuit between VEZ control unit, pin 17 and KE III Jetronic control unit, pin 30 - No speed signal from knock control of VEZ control unit	- Rectify open circuit in wiring => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
	- Hall sender -G40 faulty	- Test Hall sender -G40 =>Page 153
	- VEZ control unit defective	- Replace VEZ control unit =>Page 147
2123 Full throttle switch -F81	- Adjusting -F81	- Check -F81 and adjust=> Page 62
	- Short circuit in -F81 or open circuit or short circuit in wiring	
	- -F81 sticking	

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
2141 First knock regulation	- Engine knocking, pinging	- Check compression => 5-cylinder Engine (2-valve), Mechanical Components; Repair group 15; Removing and installing cylinder head; Checking compression Removing and installing cylinder head; Checking compression
	- Ignition point incorrectly set	- Check ignition point => Page 82
	- Poor quality fuel (less than RON 91)	- Refuel with fuel of at least 91 RON
	- Open circuit in screening of knock sensor -G61	- Rectify open circuit in wiring => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder Replace -G61 and tighten to 20 Nm

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Note on flash code 2141:

Effects: Slight loss of power, slightly increased fuel consumption, top speed is not reached.

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
2142 Knock sensor 1 -G61	- Open circuit or short circuit in wiring between -G61 and VEZ control unit	- Rectify open circuit or short circuit. => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder



Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
	- -G61 loose or corrosion caused by moisture in connector	- Check -G61 => Page 151
	- -G61 defective	- Replace -G61 and tighten to 20 Nm
	- No knock detection by VEZ control unit	- Replace VEZ control unit =>Page 147

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
2223 Altitude sensor -F96	- Open circuit or short circuit between control units and -F96	- Check -F96 => Page 50
	- -F96 defective	- - F96
2232 Air mass/air flow meter -G70/-G19	- Open circuit or short circuit between KE III Jetronic control unit and air flow meter potentiometer -G19	- Test air flow meter potentiometer -G19 => Page 66
	- Open circuit between KE III Jetronic control unit, pin 21 (load signal) and VEZ control unit, pin 8	- Rectify open circuit in wiring => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
2233 Air mass meter reference voltage -G70	- Open circuit between KE III Jetronic control unit, pin 26 and VEZ control unit, pin 21	- Rectify open circuit in wiring => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
2312 Coolant temperature sender -G62	- Loose contact or corrosion due to moisture in connector plug	- Check coolant temperature sender Check -G62 => Page 144
	- Open circuit or short circuit in wiring between -G62 and KE III Jetronic control unit or VEZ control unit	- Rectify open circuit or short circuit. => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
	- -G62 defective	- -G62

Note on flash code 2233:

Unlike on "Air mass meter reference voltage -G70" display, the reference voltage of the load and altitude signal is monitored by KE III Jetronic control unit.

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
2341 Lambda control	- Unmetered air in air intake elbow or hoses of intake system	- Check for leaks (unmetered air) in intake air system =>Page 75
	- CO content outside specified range	- Check idling speed, CO content and ignition point => Page 82
	- Wiring to the lambda probe -G39 has a short to earth	- Check lambda probe -G39 and lambda control => Page 113
	- Activated charcoal filter system solenoid valve 1 -N80 leaking, constantly open	- Check activated charcoal filter system solenoid valve 1 -N80 for leaks=>Page 120
2342 Lambda probe -G39 with heater	- Wiring to the lambda probe -G39 has open circuit or lambda probe defective	- Check lambda probe -G39 and lambda control => Page 113

Output on printer V.A.G 1551	Possible causes of fault	Fault remedy
4431 Idling stabilisation valve -N71	- Open circuit or short circuit to earth between -N71 and KE III Jetronic control unit	- Check -N71 => Page 46

Note on flash codes 2341 and 2342:

On vehicles without catalytic converter and without lambda probe, ignore fault display.

3 - Final control diagnosis

3.1 - Final control diagnosis

Notes:

- ◆ The final control diagnosis can only be performed with the engine stopped and the ignition switched on.
- ◆ The final control diagnosis is terminated if the engine is started or if an engine speed pulse is detected.
- ◆ The control elements can be checked acoustically or by way of touch.
- ◆ Full throttle switch must be actuated for final control diagnosis.
- ◆ During the final control diagnosis, individual control elements continue to be actuated until the test programme is advanced to the next control element by pressing the ➔ key. However, cold start valve -N17 is actuated for 10 seconds only.
- ◆ Differential pressure regulator -N73 is tested during final control diagnosis by measuring differential pressure regulator current. To measure differential pressure regulator current, differential pressure regulator must be prepared for testing => Page **9**.
- ◆ To repeat the final control diagnosis, switch the ignition off and on again.

The final control diagnosis activates the following components in the stated order. For checking purposes, a flash code is assigned to every control element, which is displayed on actuation of the corresponding control element.

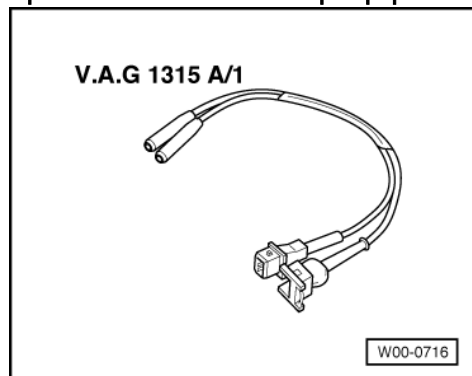
Flash code	Actuation sequence
4341	Differential pressure regulator -N73
4343	Solenoid valve 1 for activated charcoal filter -N80
4431	Idling stabilisation valve -N71
4443	Cold start valve -N17

Test requirements:

- Full throttle switch OK
- Differential pressure regulator prepared for differential pressure regulator current measurement => Page **9**.

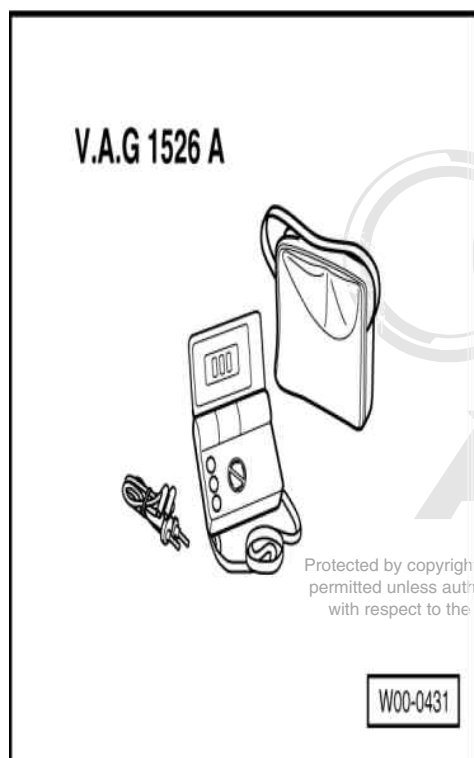
3.2 - Preparing differential pressure regulator for differential pressure regulator current measurement

Special tools and workshop equipment required





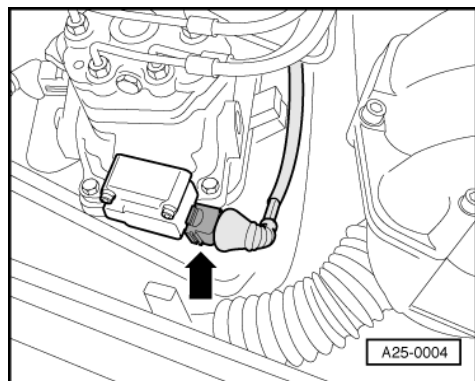
- ♦ Test lead V.A.G 1315A/1



- ♦ V.A.G 1526 A

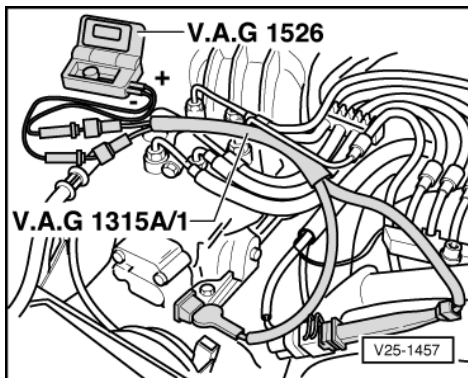
Prerequisite:

- Check that differential pressure regulator is OK =>Page **72** .



Procedure

- -> Detach connector -arrow- from differential pressure regulator.



- -> Set multimeter to measuring range 200 mA and connect using test lead V.A.G 1315 A/1 between differential pressure regulator and connector of differential pressure regulator.

3.3 - Performing final control diagnosis

- Connect fault reader V.A.G 1551 => Page 2.

-> Indicated on display

Flash code output
with the  key

- Press the  key on V.A.G 1551 until "permanent earth connection on initiating line" appears on display.

-> Indicated on display

Permanent earth connection on initiating
line

- Press  key.

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Note:

-> Indicated on display

No flash code received

- Check white diagnostic connector wiring => Page 14.

-> Indicated on display

Flash code: 4341
Differential pressure regulator -N73

- Read off differential pressure regulator current on multimeter.
 - Specification: approx. 100 mA
- Operate full throttle switch.
 - Specification: approx. 10 mA

If the specifications are not obtained:

- Test differential pressure regulator => Page 72.
- Press  key.

-> Indicated on display

Flash code: 4343
Solenoid valve 1 for activated charcoal
filter -N80

- Operate full throttle switch.



The injector valve should click.

Note:

The corresponding control elements are only actuated as long as full throttle switch is operated.

If the injector does not click:

- Check solenoid valve 1 for activated charcoal filter -N80 => Page **119** .
- Press =>key.

-> Indicated on display

Flash code: 4431
Idling stabilisation valve -N71

- Operate full throttle switch.

Idling stabilisation valve must click.

If the injector does not click:

- Check idling stabilisation valve -N71 => Page **46** .
- Press =>key.

-> Indicated on display

Flash code: 4443
Cold start valve -N17

- Operate full throttle switch.

Valve should click for 10 seconds.

If the injector does not click:

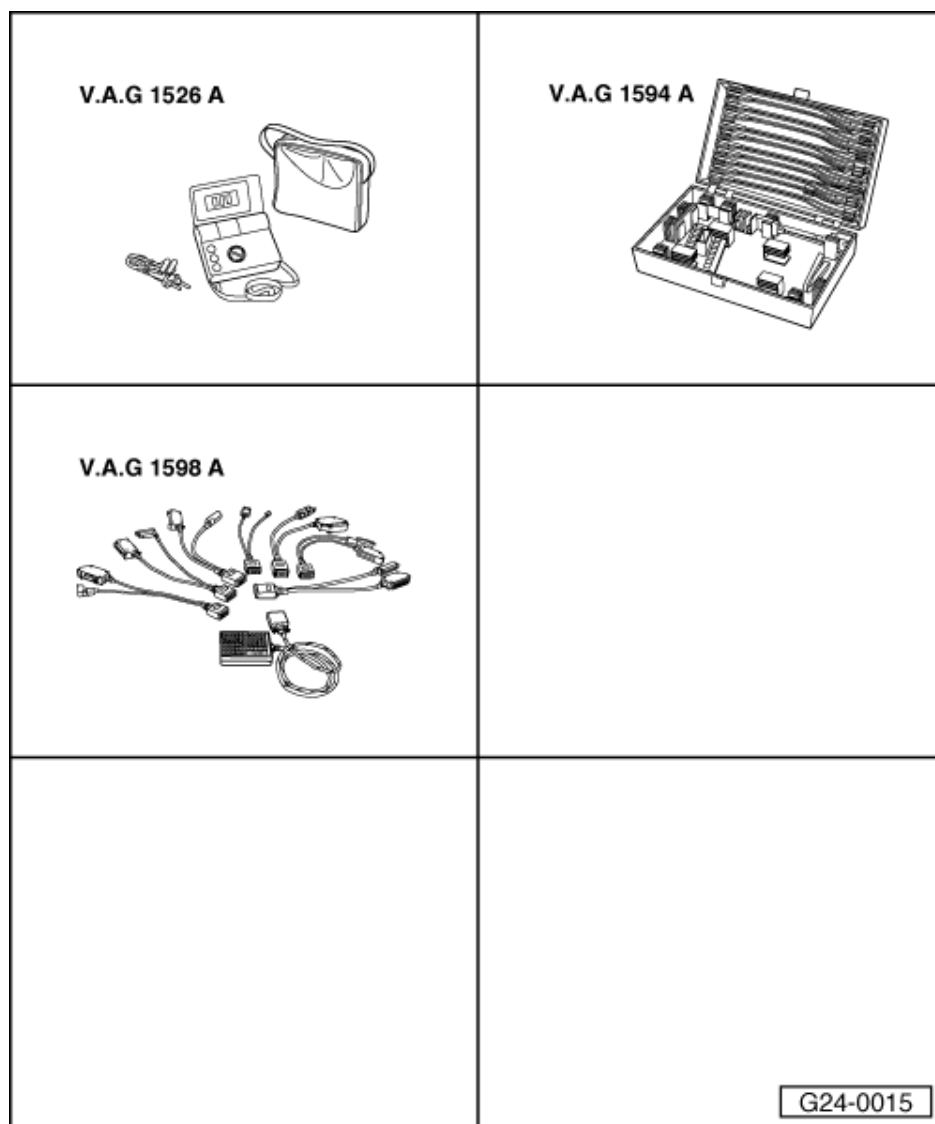
- Test cold start valve -N17 => Page **41** .
- Switch ignition off.



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4 - Testing diagnostic connector wiring connections

4.1 - Testing diagnostic connector wiring connections



Special tools and workshop equipment required

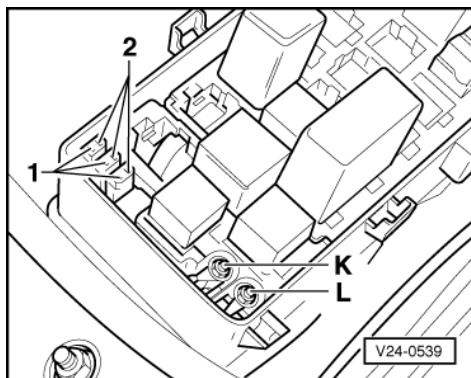
- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/2
- ♦ V.A.G 1598/3

Important
Switch off ignition before checking wiring.

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4.2 - Testing voltage supply to "black" diagnostic connector



-> Installation position of diagnostic connector: In auxiliary relay carrier I in plenum chamber on left.

Contact assignment for black diagnostic connector:

- 1 - Earth
- 2 - Terminal 30 (protected by fuse S19)

- Connect multimeter as follows to measure voltage:

Black diagnostic connector Contact	Measure to
1	Battery positive
2	Car body earth point

- Specification: approx. battery voltage

If the specifications are not obtained:

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

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4.3 - Check wiring between diagnostic connector "brown" and KE III Jetronic control unit or VEZ control unit

Note:

The following check of L-wire is to be performed if the following display appears on the connected fault reader V.A.G 1551:

-> Indicated on display:

No flash code received

Checking L-wire

Note:

There is a direct wiring connection from engine control unit to brown diagnostic connector. In contrast, other vehicle systems with self-diagnosis are connected to the wiring junctions K and L.

KE III Jetronic control unit:

- Remove KE III Jetronic control unit
=>Page **31** .
- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page **29** .
- Check for open circuit and short to positive or earth in the following wiring connections:

Brown diagnostic connector Contact	Test box V.A.G 1598 A Socket
1	13

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

VEZ control unit:

- Remove VEZ control unit => Page **147** .
- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page **30** .
- Check for open circuit and short to positive or earth in the following wiring connections:

Brown diagnostic connector Contact	Test box V.A.G 1598 A Socket
1	3

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder



25 - Mixture preparation, Injection

1 - Servicing KE III Jetronic fuel injection system

1.1 - Servicing KE III Jetronic fuel injection system

1.2 - Safety precautions

Important

The fuel system is pressurised. Before opening the system place a cloth around the connection. Then release pressure by carefully loosening the connection.

To prevent injuries to persons and/or damage to the fuel injection and ignition system, the following must be noted:

- ♦ Do not touch or disconnect ignition wiring when the engine is running or at starter speed.
- ♦ Always switch off the ignition before connecting or disconnecting ignition system wiring. This also applies to HT cables and measuring instrument leads.
- ♦ To operate engine at starting speed without actually starting it (for example, to check the compression), unplug connector from output stage for ignition coil.
- ♦ For assisted starts with a rapid charging unit the maximum permissible voltage is 16.5 V and the maximum charging time is 1 minute.
- ♦ Always switch off the ignition before washing the engine.
- ♦ Only disconnect and connect the battery with the ignition switched off, otherwise KE III Jetronic control unit or VEZ control unit may be damaged.
- ♦ Always use adapter set V.A.G 1594 A for connecting up measuring instruments (e.g. voltage tester V.A.G 1527 B, hand-held multimeter V.A.G 1526 A etc.)

Note the following points on vehicles equipped with a passenger airbag when carrying out a road test which involves use of testing and measuring equipment:

Important

- ♦ **Always install testers and measuring instruments on the back seat and have a second person operate them from there.**
- ♦ **If test equipment is operated from the front passenger seat, the person sitting there could be injured if the front passenger airbag were triggered in the event of an accident.**

1.3 - Rules for cleanliness

When working on the fuel supply/injection system, carefully observe the following 6 cleanliness rules:

- ♦ Thoroughly clean all unions and the adjacent areas before disconnecting.
- ♦ Place removed parts on a clean surface and cover. Use lint-free cloths.
- ♦ Carefully cover or seal open components if repairs cannot be carried out immediately.
- ♦ **Only install clean components.** Only remove replacement parts from packaging immediately prior to installation. Do not use parts that have been stored loose (e.g. in toolboxes etc.).
- ♦ When the system is open:
 - Do not work with compressed air if this can be avoided.
 - Do not move vehicle unless absolutely necessary.

- ♦ Unplugged electrical connectors:
Protect from dirt and moisture.
Make sure connections are dry when attaching.

1.4 - Technical data

Engine code letters		AAR (2.3 l / 98 kW engine)
KE III Jetronic	Part no.	=>Parts list
control unit	Engine speed limitation rpm	6500...6700
Idling speed adjustment	Not adjustable - controlled by the idling speed stabilisation	650...790 rpm ¹⁾
CO content	Check value	0.1...1.1 % by vol.
Differential pressure regulator current	Test value	-3...+3 mA
	Setting value	0 ± 1 mA
System pressure		6.1...6.5 bar
Differential pressure	Connector disconnected from differential pressure regulator	0.3...0.5 bar below system pressure
	Connector connected to differential pressure regulator	1.2...1.5 bar below system pressure
Holding pressure	After 10 minutes	3.5 bar
	After 20 minutes	3.4 bar
Injectors	Spray pressure	4.3...4.6 bar

1) Current values:

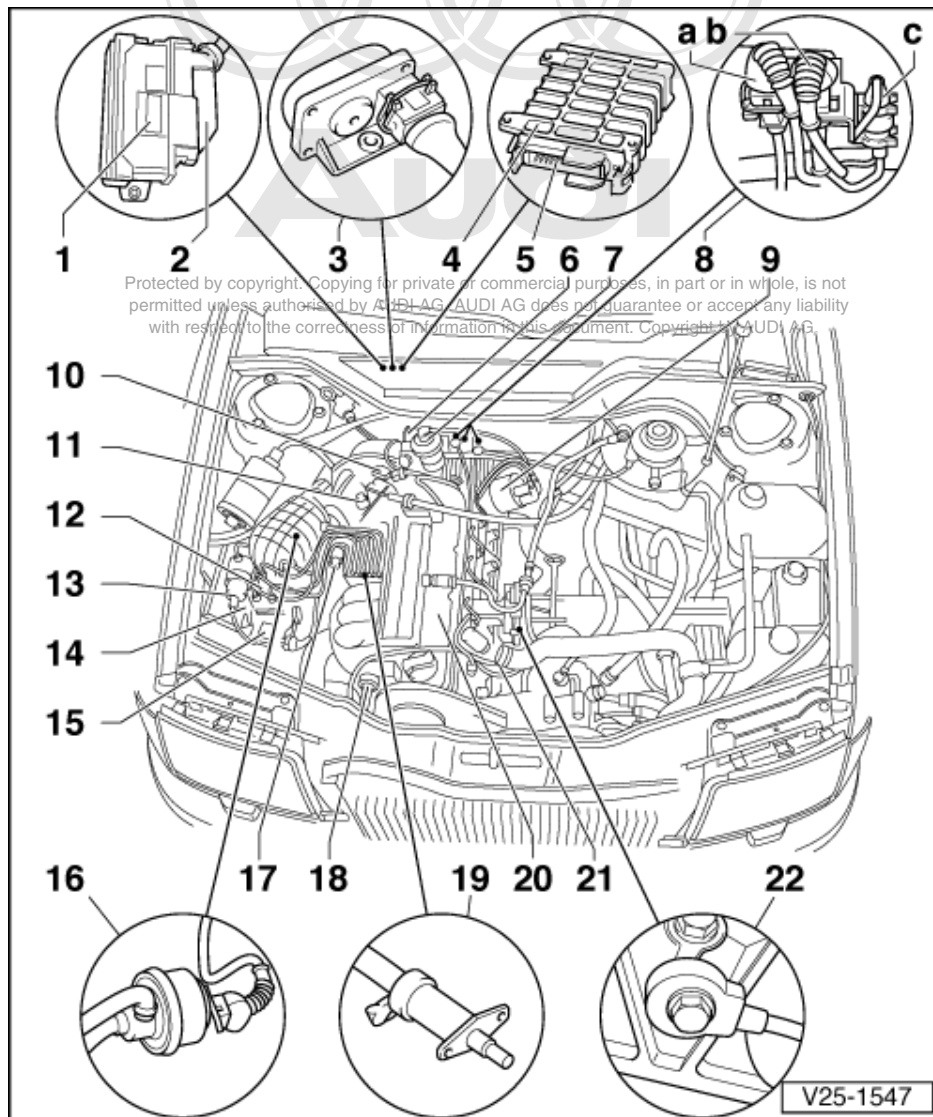
=> "Exhaust Emission Test" binder



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1.5 - Fitting locations overview

**1 VEZ control unit -J154**

- ◆ In electronics box in passenger footwell
- ◆ Removing and installing=>Page **147** .

2 Connector

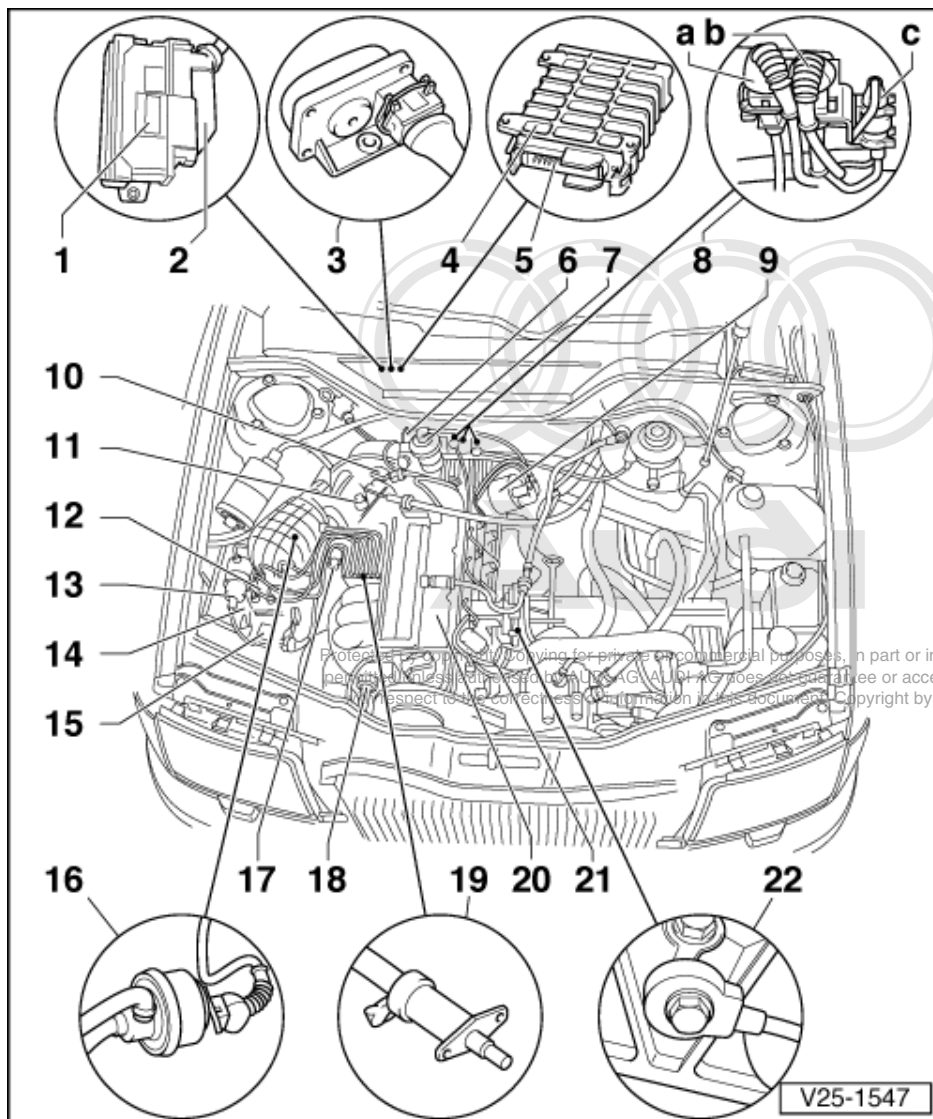
- ◆ For VEZ control unit
- ◆ Allow 30 seconds after switching off ignition before detaching or attaching connector.

3 Altitude sensor - F96

- ◆ In electronics box in passenger footwell
- ◆ Checking => Page **50**

4 KE III Jetronic control unit -J21

- ◆ In electronics box in passenger footwell
- ◆ Removing and installing=>Page **31** .



5 Connector

- ♦ For KE III Jetronic control unit
- ♦ Allow 30 seconds after switching off ignition before detaching or attaching connector.

6 Output stage for ignition coil

- ♦ Checking => Page 140
- ♦ Cannot be renewed separately

7 Ignition coil

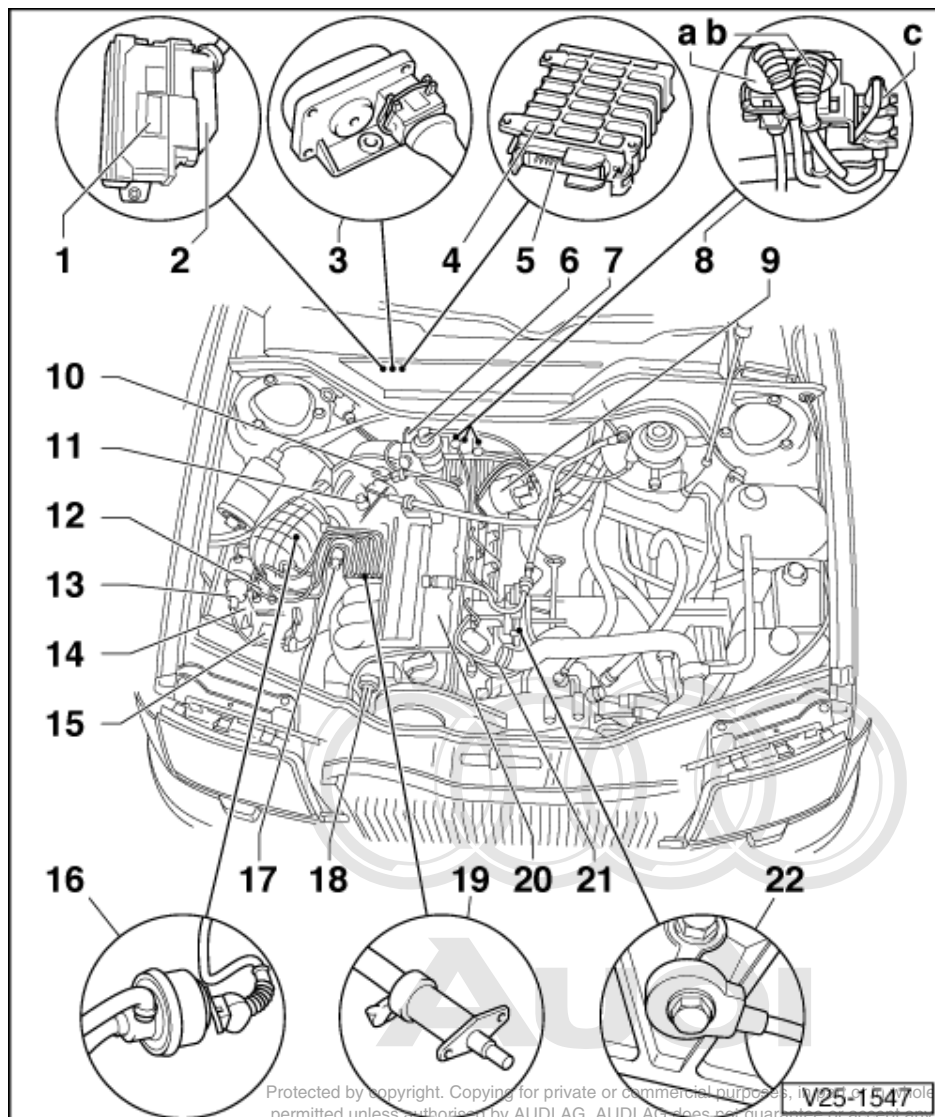
- ♦ Checking => Page 138

8 Connectors

- ♦ a - for knock sensor 1 -G61
- ♦ b - for lambda probe heater -Z19
- ♦ c - for signal of lambda probe -G39

9 Distributor -O

- ♦ With Hall sender -G40



10 Full throttle switch -F81

11 Idling switch -F60

12 Fuel distributor

13 Fuel pressure regulator

14 Air flow meter potentiometer -G19

- ♦ Checking => Page 66
- ♦ Cannot be renewed separately

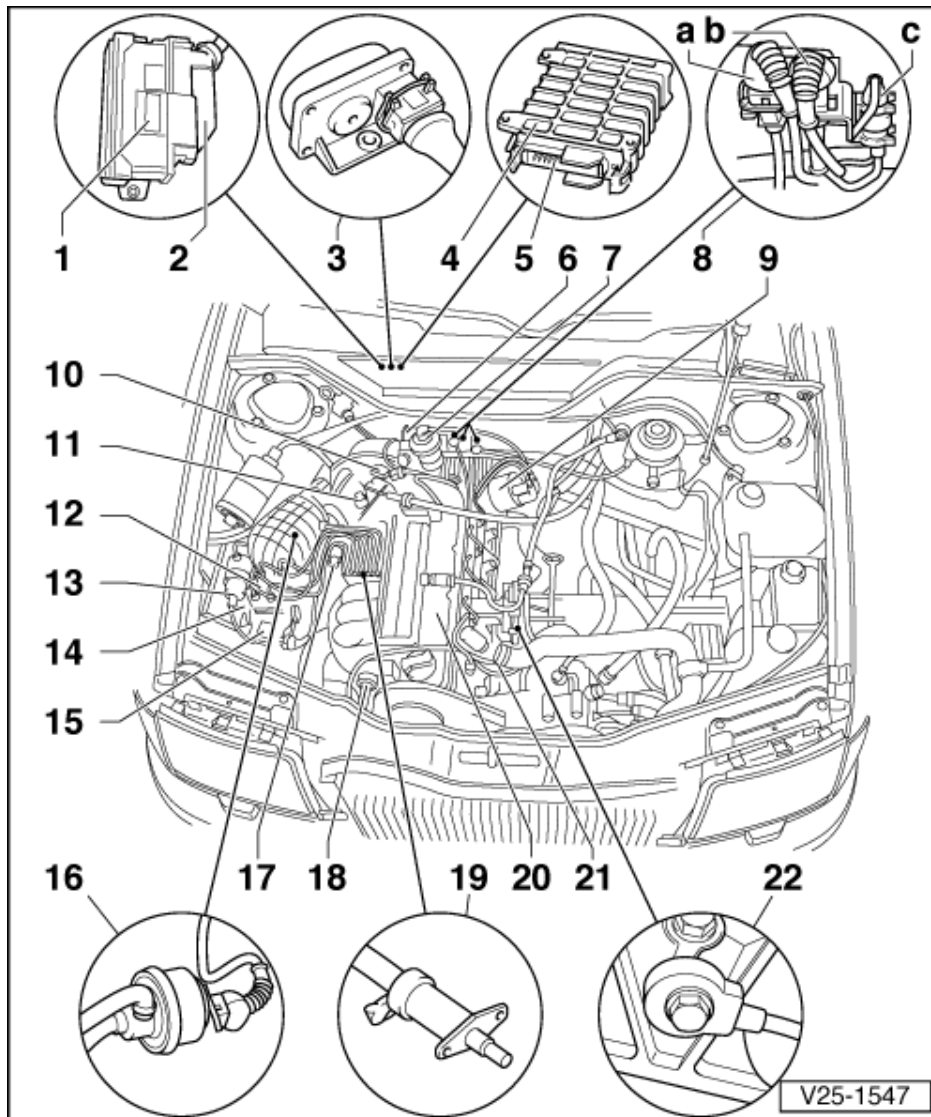
15 Differential pressure regulator -N73

16 Solenoid valve 1 for activated charcoal filter -N80

- ♦ Checking => Page 9

17 CO test pipe

- ♦ With cap



18 Idling stabilisation valve -N71

- ♦ Checking => Page 46

19 Cold start valve -N17

- ♦ Checking => Page 41
- ♦ Tighten to intake manifold to 10 Nm
- ♦ Tighten fuel line to 15 Nm

20 Intake manifold

21 Coolant temperature sender -G62

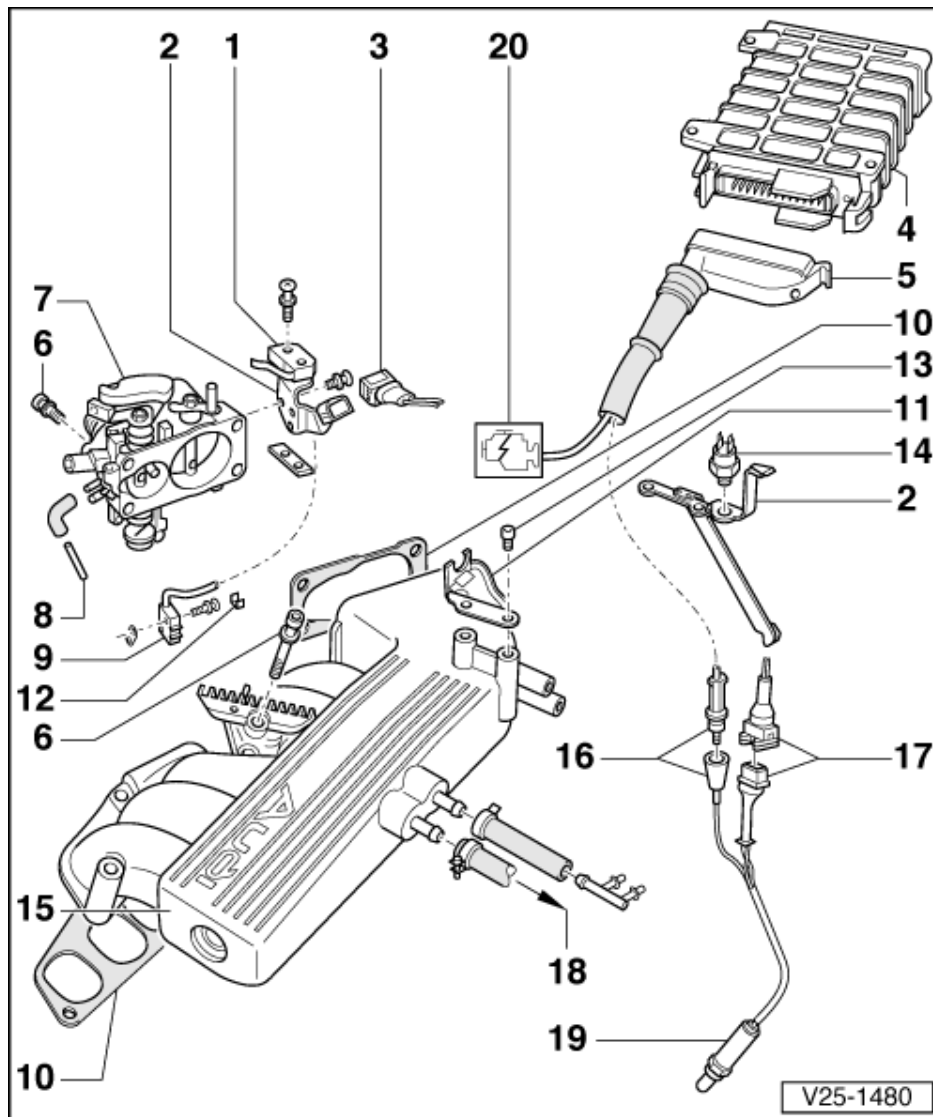
- ♦ Resistance values =>Page 144 .

22 Knock sensor 1 -G61

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1.6 - Upper part of intake manifold - Overview



1 Full throttle switch -F81

- ♦ Checking => Pages 62
- ♦ Adjusting => Page 59

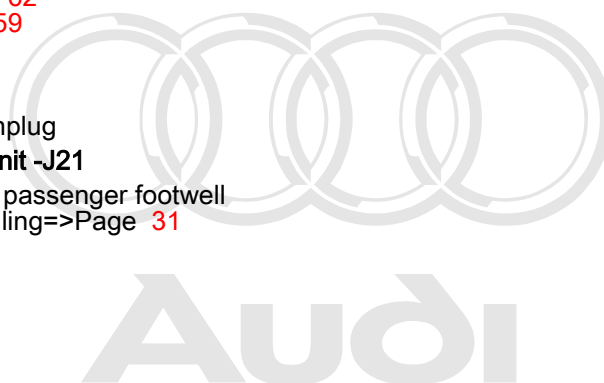
2 Bracket

3 Connector

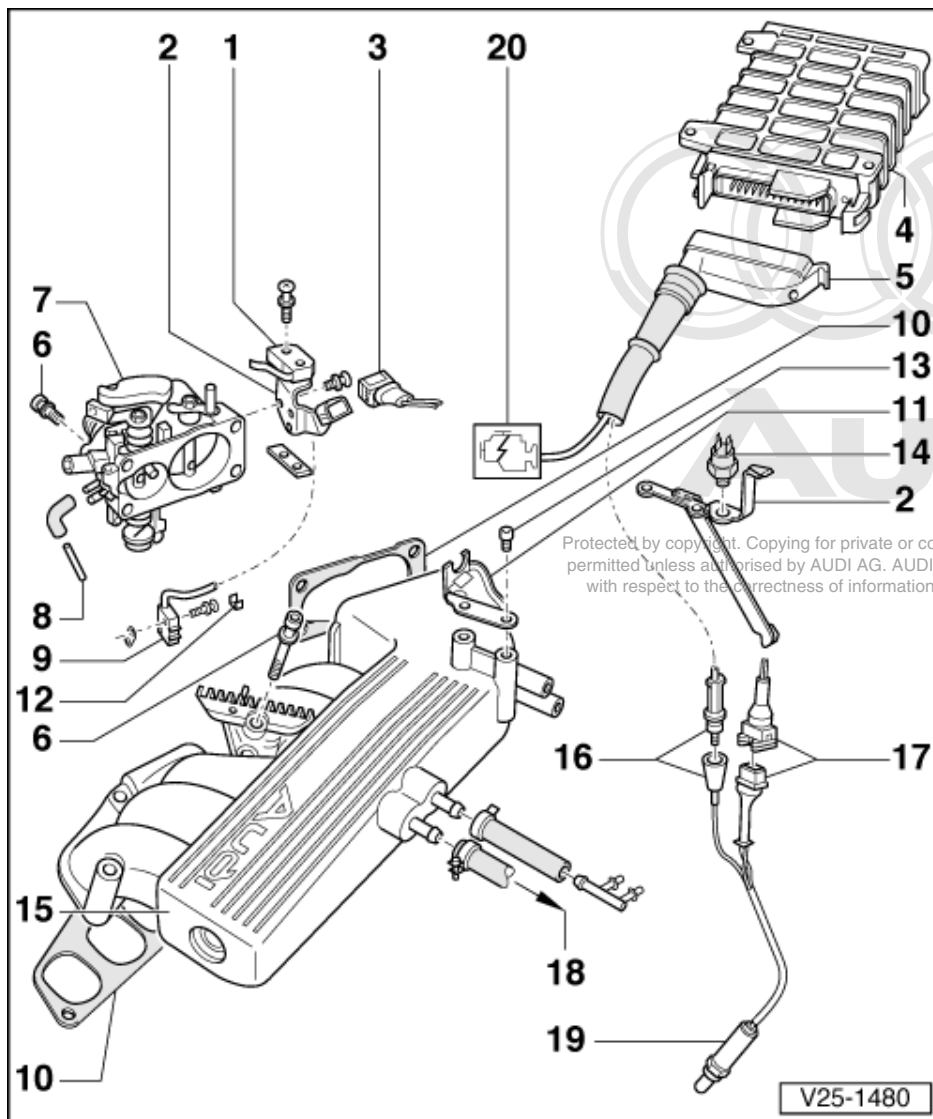
- ♦ Press wire lock to unplug

4 KE III Jetronic control unit -J21

- ♦ In electronics box in passenger footwell
- ♦ Removing and installing=>Page 31



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5 Connector

- ◆ For KE III Jetronic control unit
- ◆ Allow 30 seconds after switching off ignition before detaching or attaching connector.

6 20 Nm

7 Throttle valve connection

- ◆ Basic setting of throttle valve => Page 74

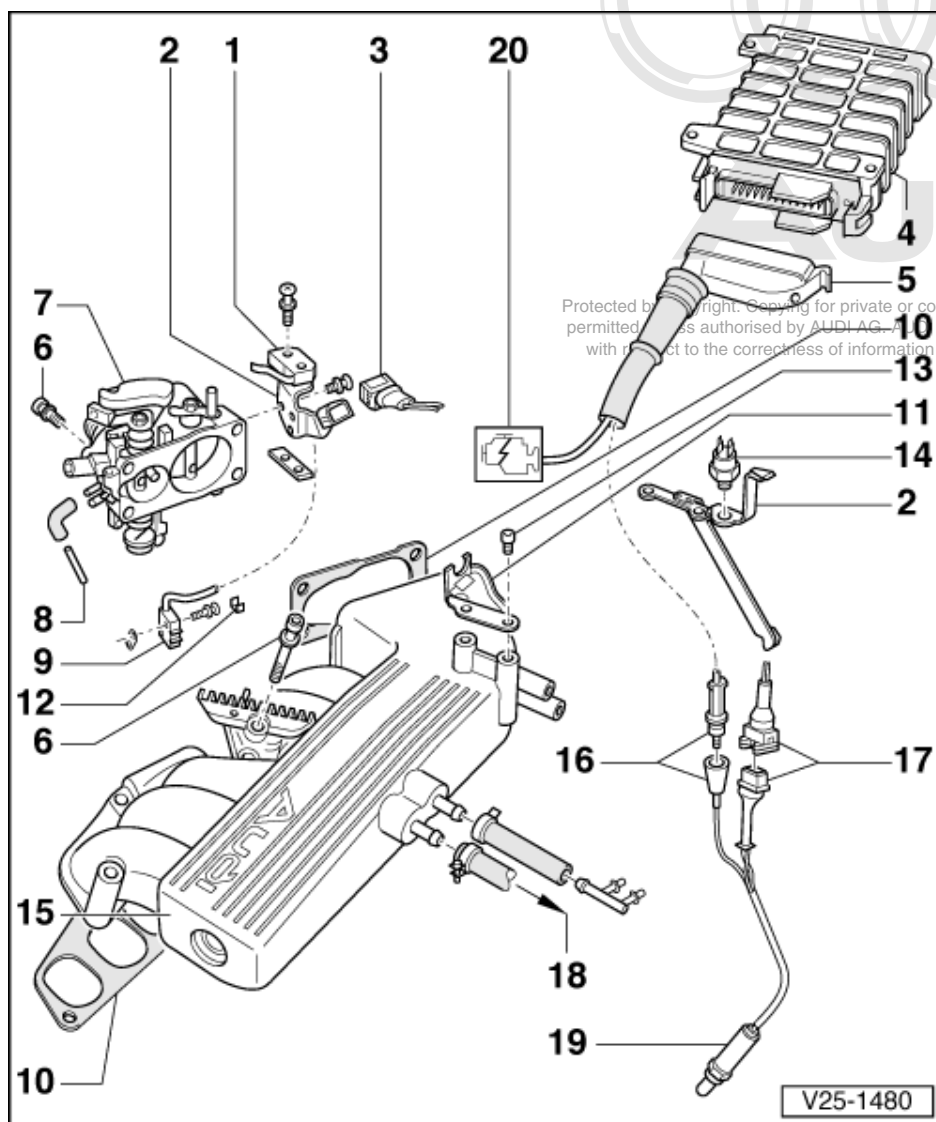
8 To solenoid valve 1 for actuated charcoal filter -N80

9 Idling switch - F60

- ◆ Checking => Pages 60
- ◆ Adjusting => Page 57

10 Seal

- ◆ Replace

**11 Support bracket**

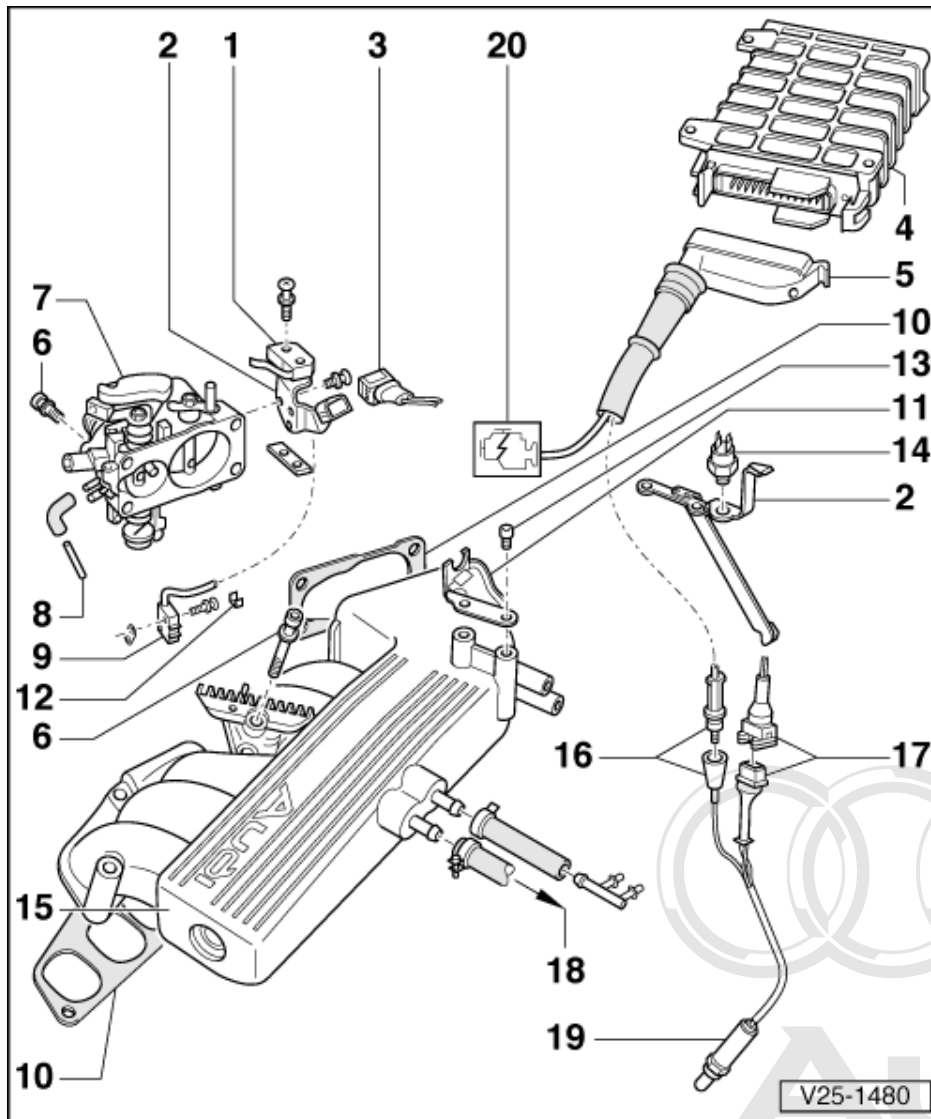
- ♦ For throttle cable

12 Clip**13 10 Nm****14 Fan run-on thermoswitch -F87****15 Intake manifold - upper part****16 Connector**

- ♦ b - 1-way, for signal of lambda probe -G39

17 Connector

- ♦ For lambda probe heater -Z19
- ♦ Test lambda probe heater -Z19 => Page 116



18 To brake servo

19 Lambda probe - 55 Nm

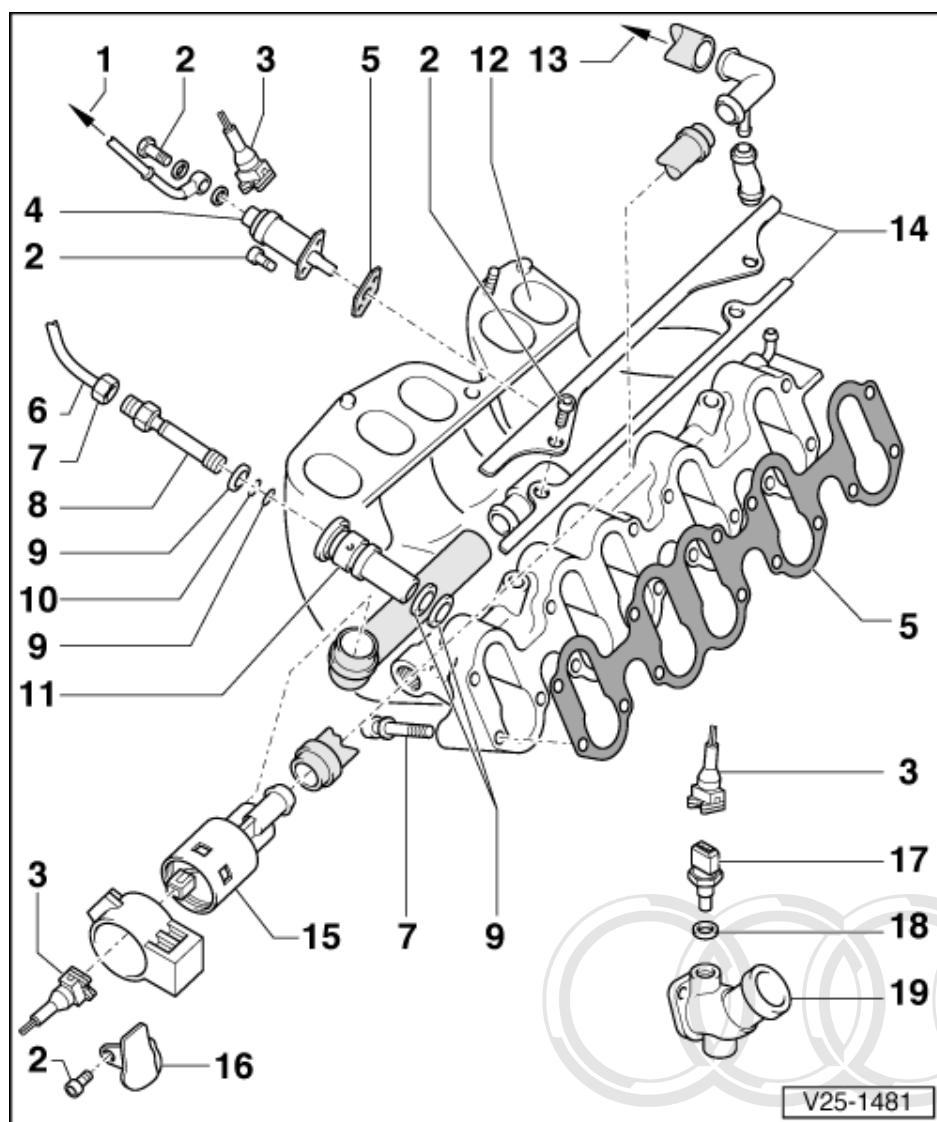
- ♦ Grease only the thread with high-temperature lubricant "G 052 112 A3", ensuring that the lubricant does not get into the slots on the probe body.
- ♦ Checking => Page 113

20 Not installed

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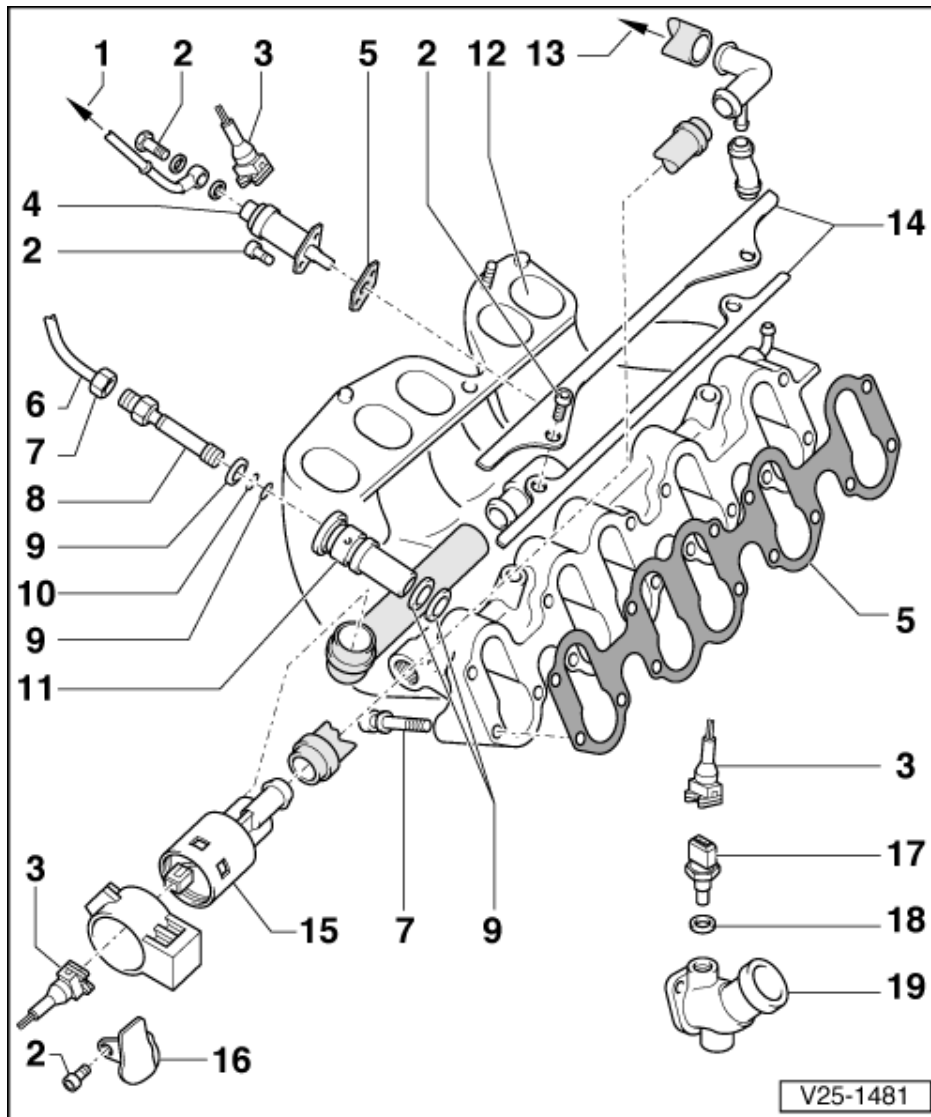


1.7 - Intake manifold lower part - Overview



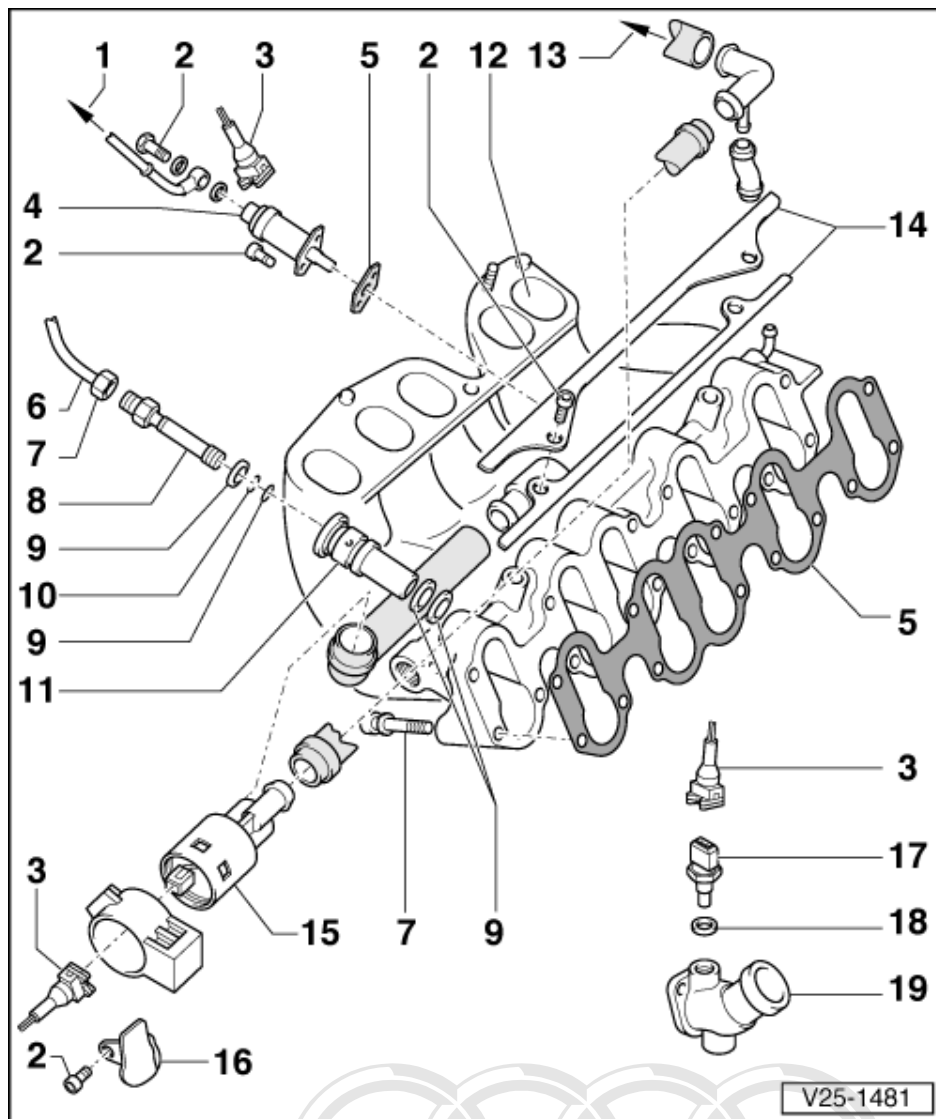
- 1 To fuel distributor
- 2 10 Nm
- 3 Connector
 - ◆ Press wire lock to unplug
- 4 Cold start valve -N17
 - ◆ Checking => Page 41
- 5 Seal
 - ◆ Replace
- 6 To fuel distributor
- 7 20 Nm
- 8 Injector
 - ◆ Checking => Page 96

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- 9 O-ring
 - ♦ Replace
- 10 Circlip
- 11 Insert for injector
 - ♦ Removing and installing=>Page 102
- 12 Intake manifold - lower part
- 13 To air intake elbow
- 14 Bracket
 - ♦ For injectors
- 15 Idling stabilisation valve -N71
 - ♦ Checking => Page 46
- 16 Bracket

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17 Coolant temperature sender -G62

- ♦ Resistance values =>Page **144**

18 Sealing ring

- ♦ Replace

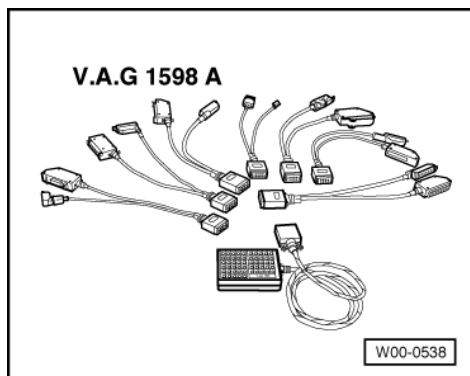
19 Pipe union



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1.8 - Checking wiring and components with test box V.A.G 1598

Special tools and workshop equipment required



- ◆ V.A.G 1598 A
- ◆ V.A.G 1598/2
- ◆ V.A.G 1598/3

Notes:

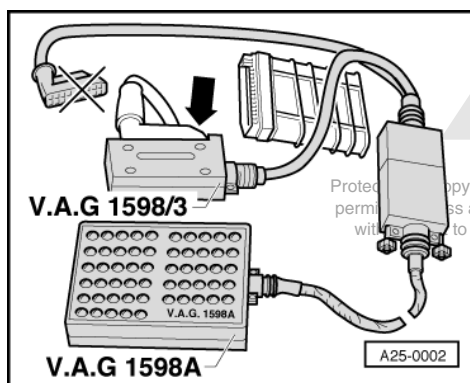
- ◆ Allow 30 seconds after switching off ignition before detaching or attaching connectors of KE III Jetronic control unit or VEZ control unit.
- ◆ Test box V.A.G 1598 A must not be connected when performing diagnosis with fault reader V.A.G 1551.
- ◆ To connect the test equipment to the test box, use auxiliary cables from adapter cable set V.A.G 1594 A.

Important

To prevent damage to the electronic components, select appropriate measuring range before connecting the measuring cables and observe the test requirements.

KE III Jetronic control unit

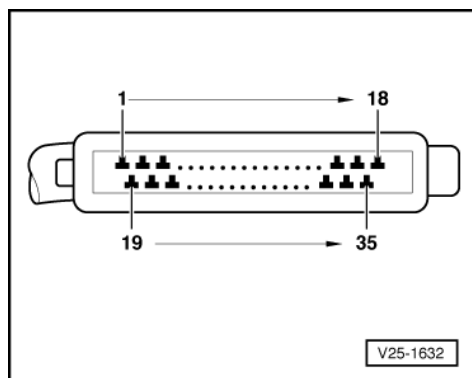
- Switch ignition off.



- Remove KE III Jetronic control unit => Page 31 .
- -> With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected).



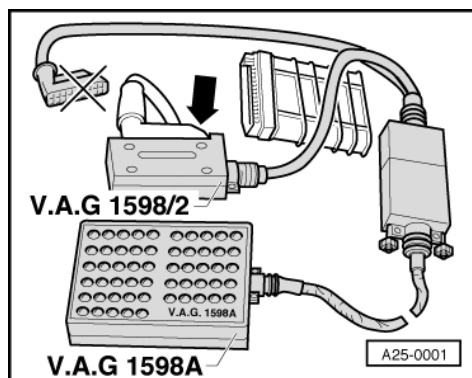
Notes:



- ♦ -> Contact assignment on connector of KE III Jetronic control unit.
- ♦ The contact layout is identical to the socket layout on test box V.A.G 1598 A.
- Carry out test as described in the appropriate repair procedures.

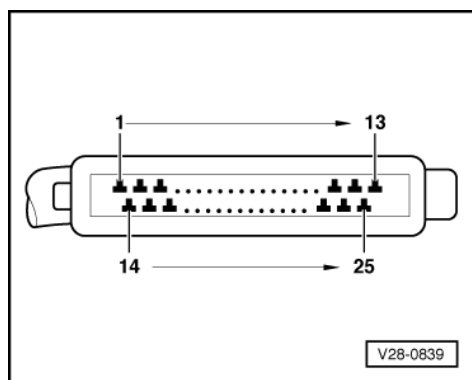
VEZ control unit

- Switch ignition off.
- Remove VEZ control unit => Page 147 .

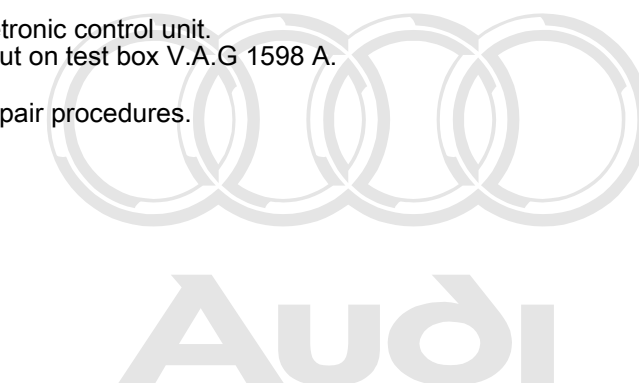


- -> With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected).

Notes:



- ♦ -> Contact assignment on connector of VEZ control unit.
- ♦ The contact layout is identical to the socket layout on test box V.A.G 1598 A.
- Carry out test as described in the appropriate repair procedures.

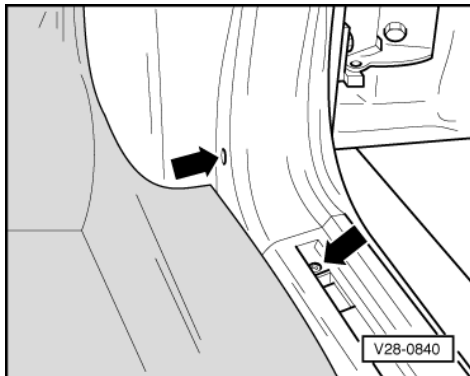


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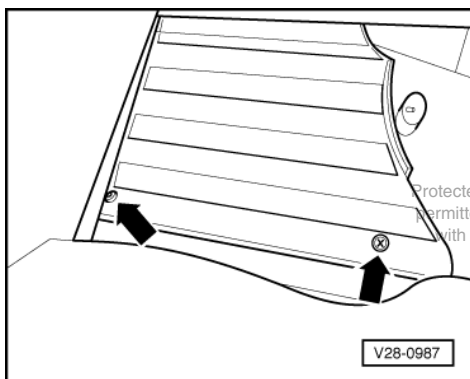
1.9 - Replacing KE III Jetronic control unit

Fitting location => Fitting locations overview, Page 18

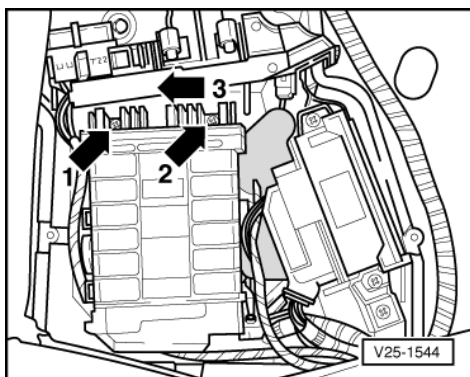
Removing



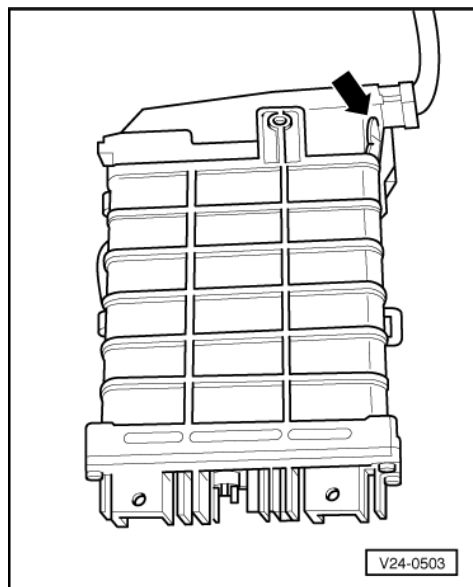
- Switch ignition off.
- -> Remove the lower part of the right A pillar trim and the front door sill panel tread strip
- Pull back floor covering at front of right footwell. (If necessary, cut open the perforated seam on the left with a knife.)



- -> Unscrew bolts -arrows- for electronics box cover.
- Carefully detach upper and lower sections of cover.



- -> Pull out cross strut -arrow 3- with attached parts.
- Screw out bolts -arrow 1- and -arrow 2-.
- Remove control unit.



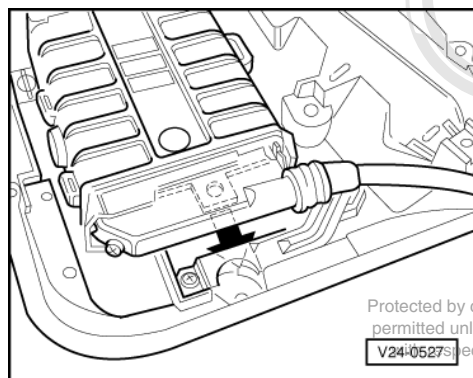
- -> To release control unit connector, pull open clip -arrow- and disconnect control unit connector.

Note:

Connector of KE III Jetronic control unit is only to be unplugged or attached 30 seconds after switching off ignition.

Installing

Installation is carried out in the reverse order; note the following:

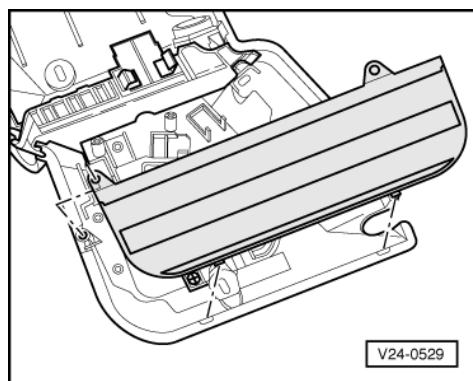


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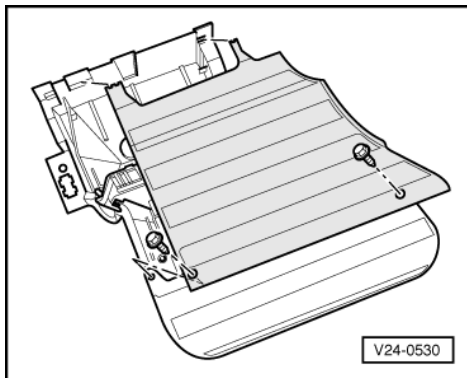
Note:

Connector of KE III Jetronic control unit is only to be unplugged or attached 30 seconds after switching off ignition.

- -> Push the lug of the control unit into the fixture of the electronics box.

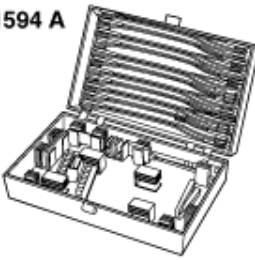


- -> Guide the bottom cover part into both openings of the electronics box in the right footwell.



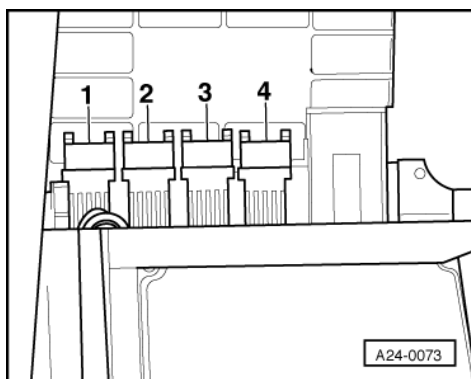
- -> Attach the top cover part into both openings of the electronics box in the right footwell.

1.10 - Checking power supply for KE III Jetronic control unit

V.A.G 1526 A 	V.A.G 1527 B 
V.A.G 1594 A 	V.A.G 1598 A 
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**Special tools and workshop equipment required**

- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3

Test requirements:

- -> Fuse S70 OK (in brown holder in electronics box in passenger's footwell)

Checking power supply

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .
- Connect multimeter as follows to measure voltage:

Test box V.A.G 1598 A Socket	Measure to
14	Engine earth

- Switch the ignition on.
- Specification: approx. battery voltage

If specification is not attained:

- Eliminate open circuit or short circuit using the current flow diagram.

Checking earth connection

- Connect multimeter as follows to measure voltage:

Test box V.A.G 1598 A Socket	Measure to
18	Battery positive
34 1)	Battery positive
35	Battery positive

- 1) Only on vehicles with manual gearbox.

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- Specification: approx. battery voltage

If the specifications are not obtained:

- Check wiring between connector of KE III Jetronic control unit and earth points according to current flow diagram.

- Rectify open circuit, if necessary.

1.11 - Checking fuel pump relay -J17 and actuation

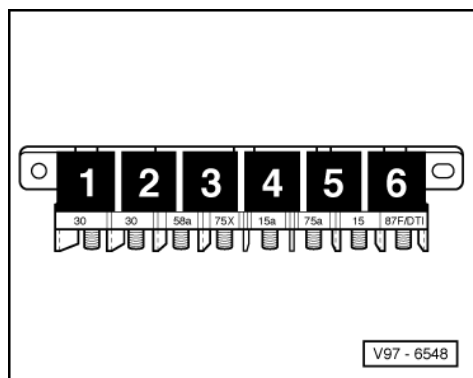


Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3



Note:



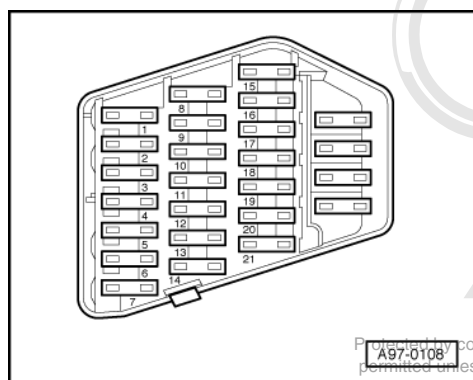
-> Fitting location of fuel pump relay: On central electrics below dash panel on left, contact point 6

Test requirements:

- Battery voltage at least 11 V

Functional check of fuel pump relay

- Take off the cover of the left fuse holder.



- -> Pull out fuse S17.
- Connect up voltage tester V.A.G 1527 B between one of the contacts of fuse S17 and engine earth.
- Operate starter briefly.
 - Activation of fuel-pump relay (central electrics beneath dash panel on left, position 6) must be heard and felt; LED must light

If the relay does not respond:

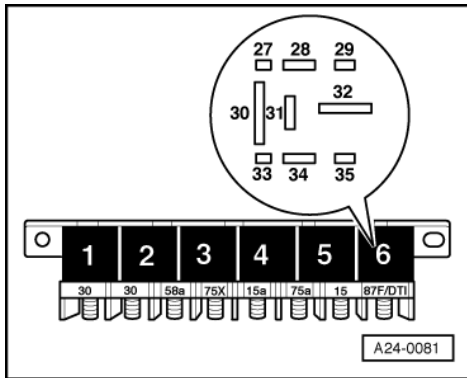
- Check actuation => Page 39

If the relay operates, but the LED does not come on:

- Repeat test at other contact of fuse S17.

If LED still does not light:

- Disconnect fuel pump relay.



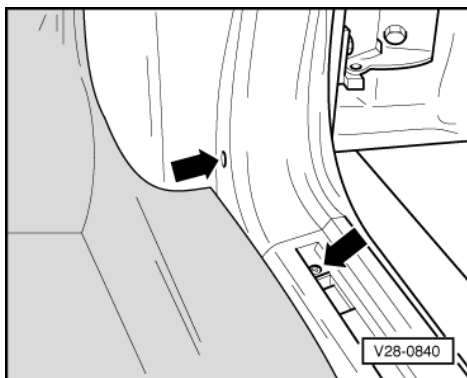
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- -> Check for open circuit in the following wiring according to current flow diagram:

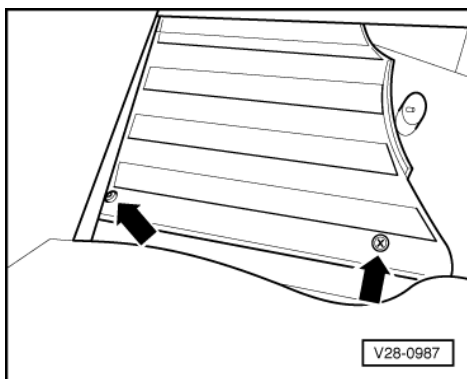
Central electrics, position 6 Contact	Retainer
30	S17

If wiring is OK:

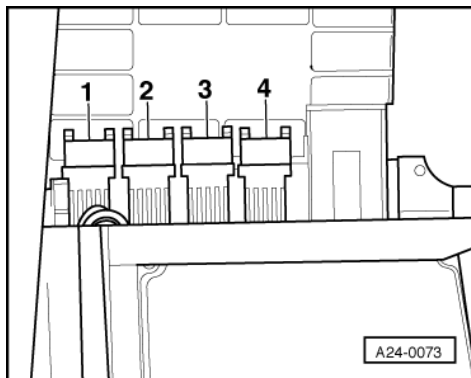
- Replace the fuel pump relay -J17.



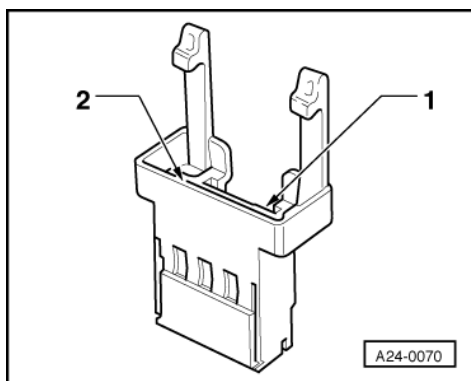
- Re-insert the fuel pump relay and fuse S17.
- -> Remove the lower part of the right A pillar trim and the front door sill panel tread strip
- Pull back floor covering at front of right footwell. (If necessary, cut open the perforated seam on the left with a knife.)



- -> Unscrew bolts -arrows- for electronics box cover.
- Carefully detach upper and lower sections of cover.



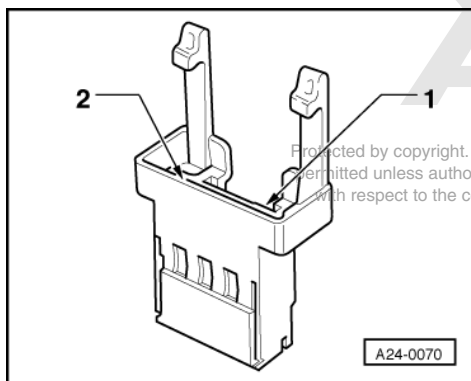
- -> Pull out fuse S73 in red holder.



- -> Connect voltage tester V.A.G 1527 B with auxiliary wires from V.A.G 1594 A between earth and contact -1- for fuse S73 in red holder.
- Operate starter briefly.
 - Activation of fuel-pump relay (central electrics beneath dash panel on left, position 6) must be heard and felt; LED must light

If the relay does not respond:

- Check actuation => Page 39



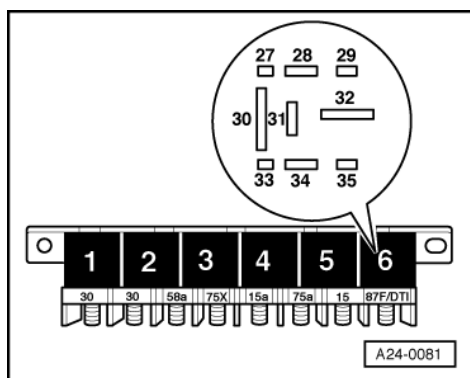
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If the relay operates, but the LED does not come on:

- -> Repeat test at contact -2- for fuse S73 in red holder.

If LED still does not light:

- Disconnect fuel pump relay.



- -> Check for open circuit in the following wiring according to current flow diagram:

Central electrics, position 6 Contact	Retainer
31	S73

- Rectify open circuit, if necessary.

If the wiring is OK:

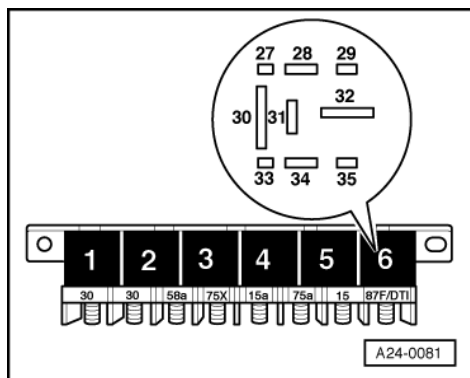
- Replace the fuel pump relay -J17.
- Re-insert fuel pump relay and fuse S73 in red holder.

Checking the power supply and actuation of the fuel pump relay

- **Disconnect fuel pump relay.** Part of this document, or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Checking power supply

- Switch the ignition on.



- -> Connect multimeter as follows to measure voltage.

Central electrics, position 6 Contacts	Specification
28 + 34	approx. battery voltage
32 + 34	approx. battery voltage

- Switch ignition off.

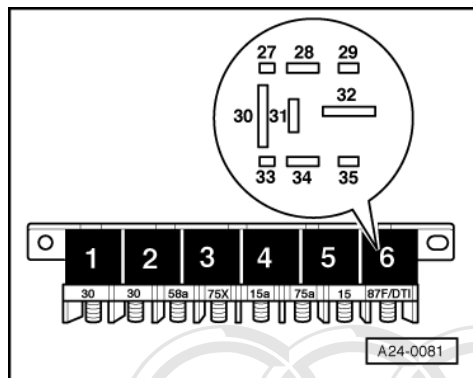
If the specifications are not obtained:



- Check the wiring connections.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

Checking actuation



- -> Connect voltage tester V.A.G 1527 B as follows:

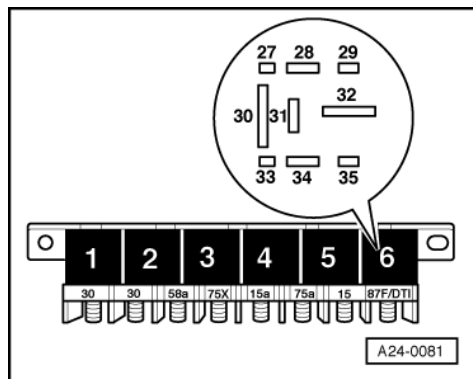
Fuel pump relay base	
Contact	Contact
28	29

- Switch the ignition on.
 - The LED should illuminate for about 1 second
- Operate starter.
 - The LED should illuminate and remain on during the starting operation.

If the LED does not illuminate:

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- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connection:

Central electrics, position 6 Contact	Test box V.A.G 1598 A Socket
29	14

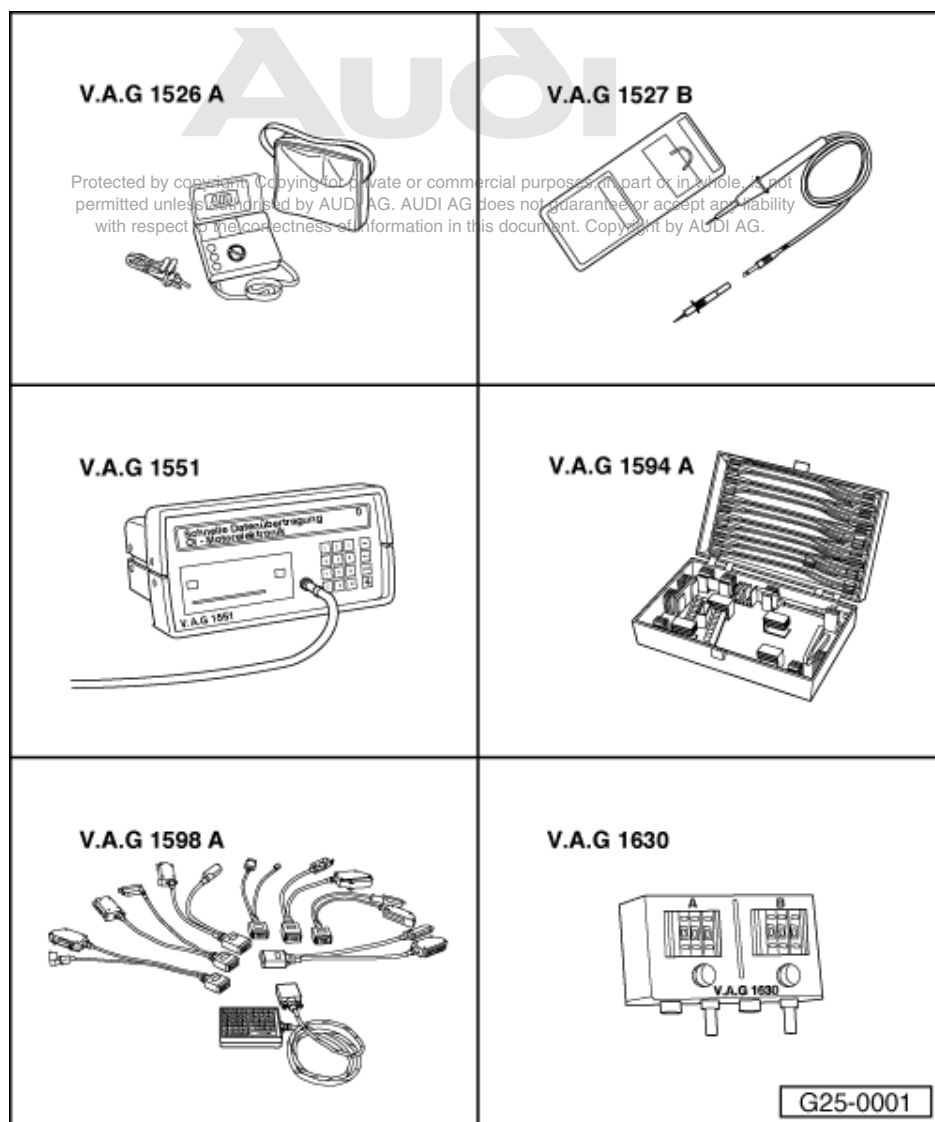
- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If no fault is found:

- Replace the fuel pump relay -J17.

1.12 - Testing cold start valve -N17



Special tools and workshop equipment required

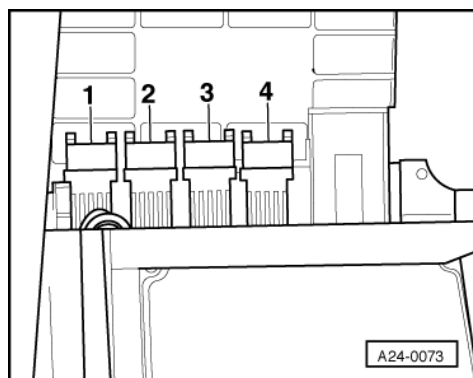
- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1551 with V.A.G 1551/1
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3
- ♦ V.A.G 1630

Fitting location => Fitting locations overview, Page 18

If cold start valve does not react during final control diagnosis:

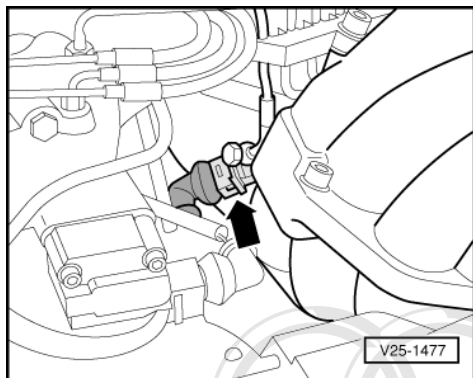


Checking power supply

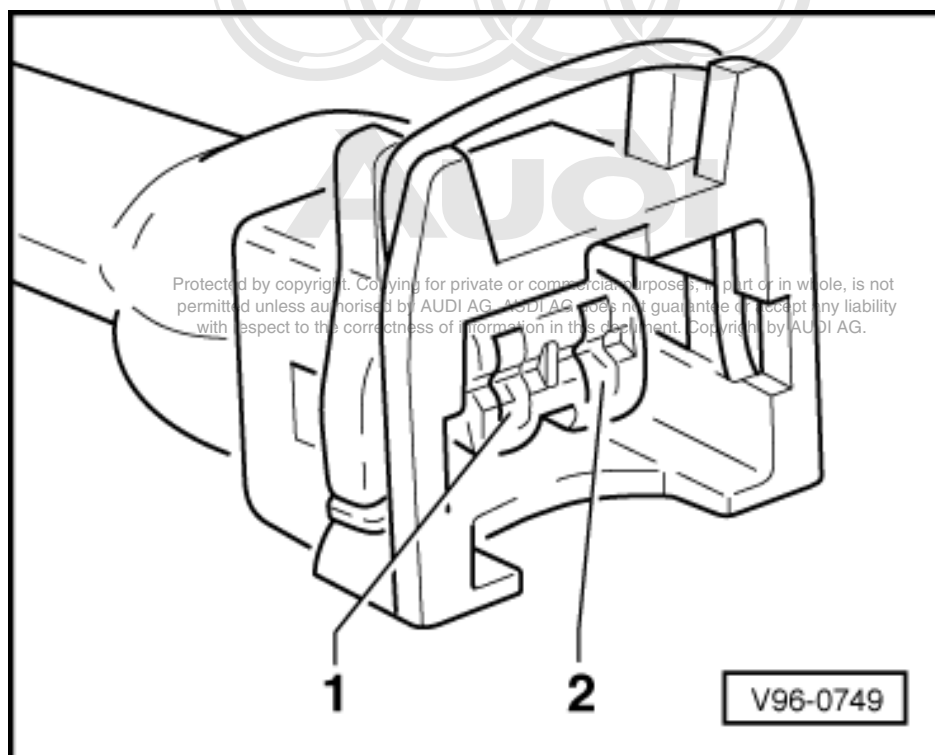


Test requirements:

- -> Fuse S70 OK (in brown holder in electronics box in passenger's footwell)



- -> Unplug connector from cold start valve -arrow-.



- -> Connect multimeter as follows to measure voltage.

Connector Contact	Measure to
1	Engine earth

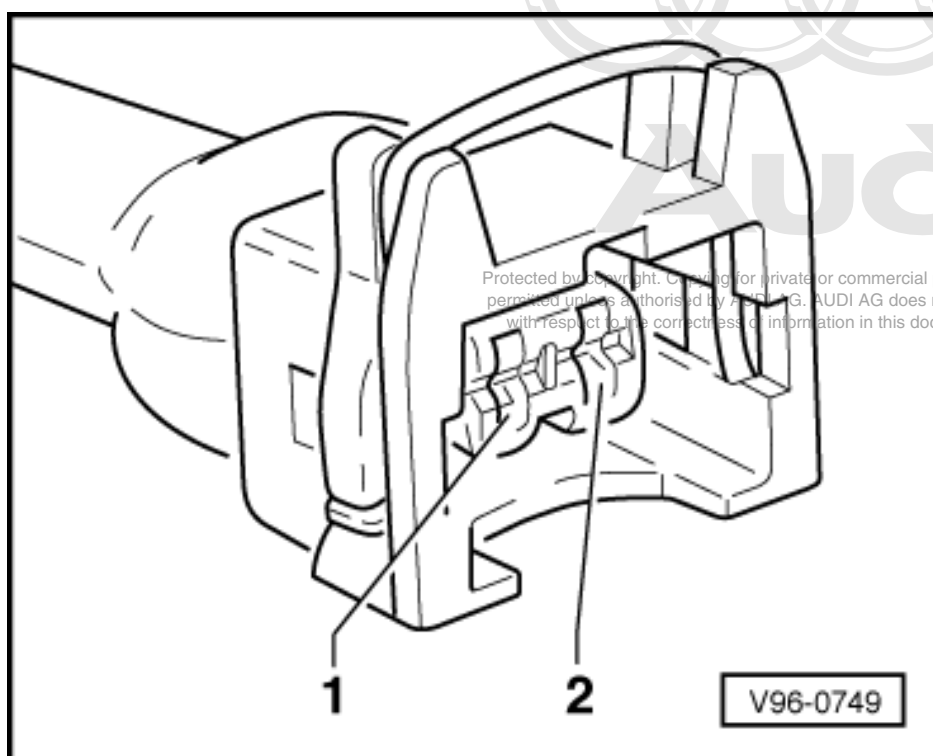
- Switch the ignition on.
 - Specification: approx. battery voltage

If specification is not attained:

- Eliminate open circuit or short circuit using the current flow diagram.

If specification is attained:

- Check actuation.



Checking actuation

- -> Connect voltage tester V.A.G 1527 B between contacts 1 and 2.

Notes:

- ◆ Cold start valve is only actuated for approx. 10 seconds during final control diagnosis. This prevents engine becoming over-rich.
- ◆ To repeat test, final control diagnosis must be re-started.
- Start final control diagnosis and actuate cold start valve -N17 (flash code 4443) => Page 9 .
 - The LED should flash.

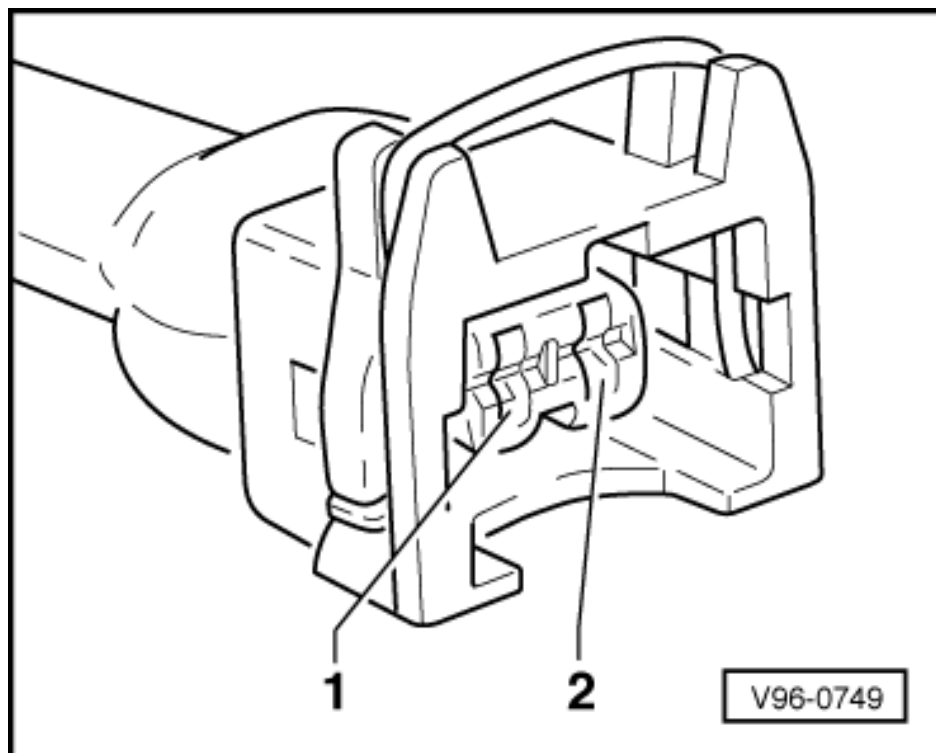
If specification is attained:

- Replace the cold start valve



If specification is not attained:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page **29** .



- -> Check for open circuit and short to positive or earth in the following wiring connection:

Connector Contact	Test box V.A.G 1598 A Socket
2	16

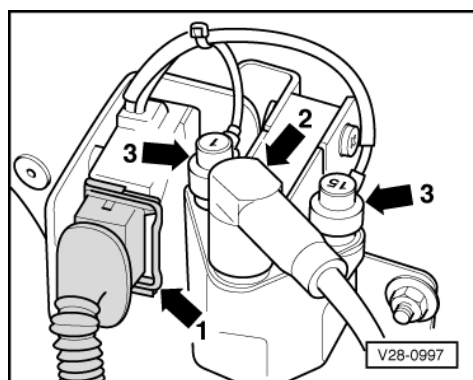
- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

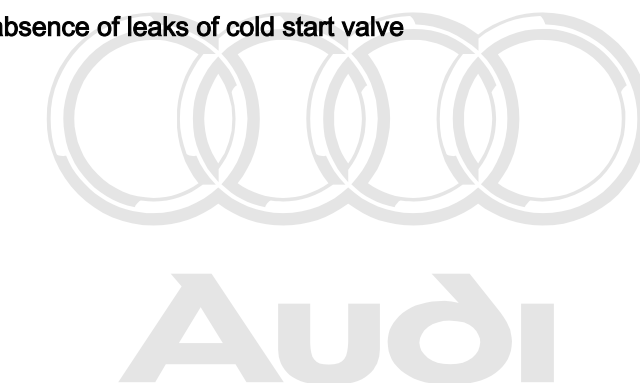
If wiring is OK, and no actuation takes place:

- Replace KE III Jetronic control unit =>Page **31** .

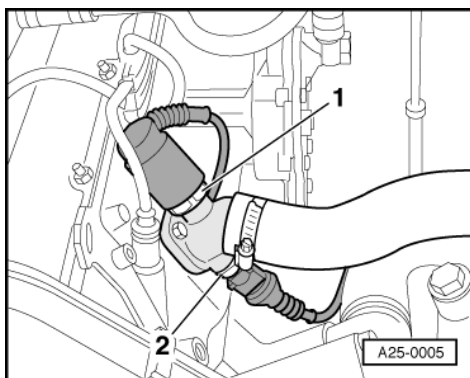
Testing spray pattern, injection time and absence of leaks of cold start valve



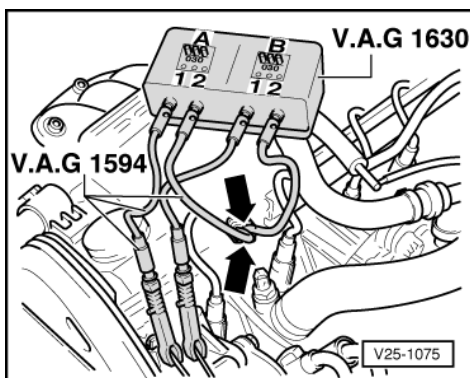
- -> Unplug connector -arrow 1- from output stage.



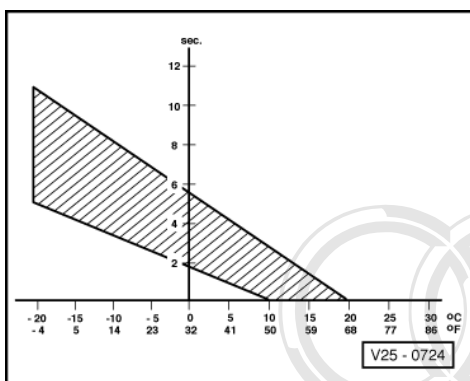
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- -> Unplug connector at coolant temperature sender -G62 -2-.



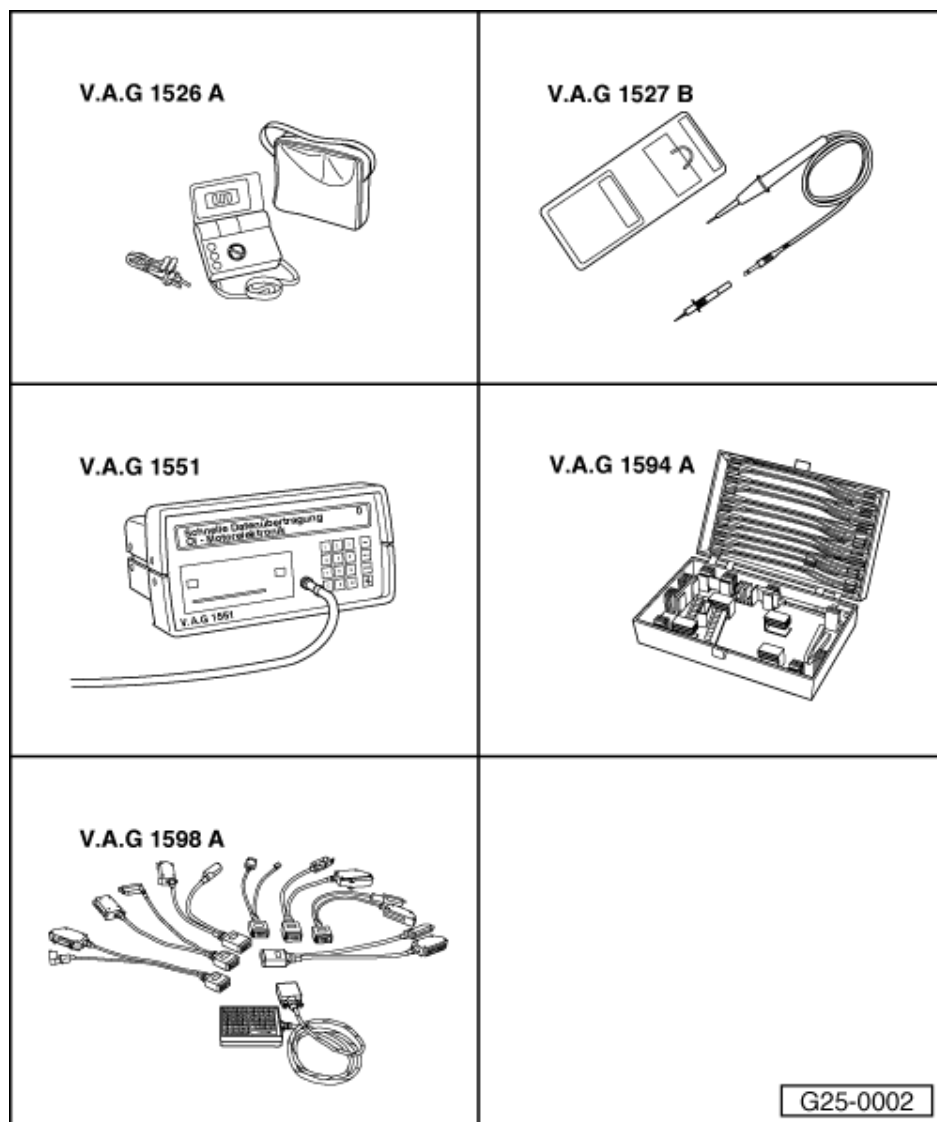
- -> Connect side A and B of digital potentiometer V.A.G 1630 to unplugged connector of coolant temperature sender and to earth.
- Set side A and B of V.A.G 1630 to 3.0 kW.
- Detach cold start valve with fuel line connected from intake manifold and hold in a measuring container.
- Operate starter.



- -> The cold start valve should eject a pulsating spray in a uniform cone for 2...3 seconds. Dry off the cold start valve at the nozzle.
- No drip should drop from the cold start valve within 1 minute. The cold start valve must also not be moist on the outside.



1.13 - Checking idling stabilisation valve -N71



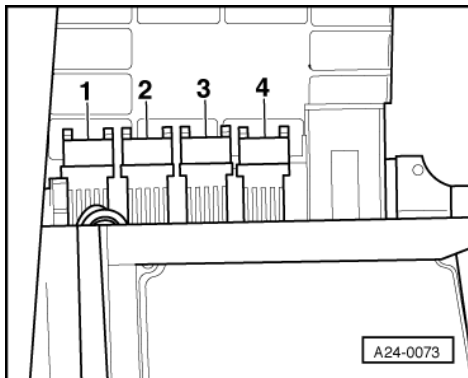
Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1551 with V.A.G 1551/1
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3

Fitting location => Fitting locations overview, Page **18**

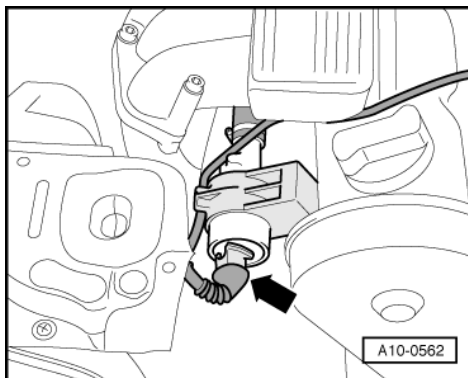
If idling stabilisation valve does not react in final control diagnosis:

Checking power supply

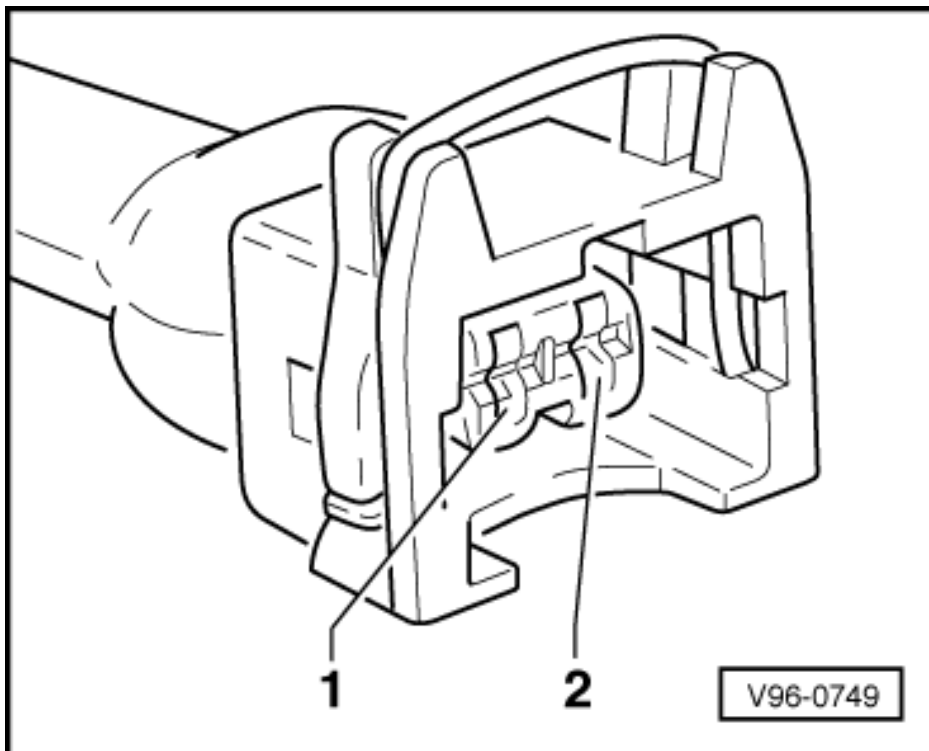


Test requirements:

- -> Fuse S70 OK (in brown holder in electronics box in passenger's footwell)



- -> Detach connector -arrow- from idling stabilisation valve.



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- -> Connect multimeter as follows to measure voltage.

Connector Contact	Measure to
1	Engine earth

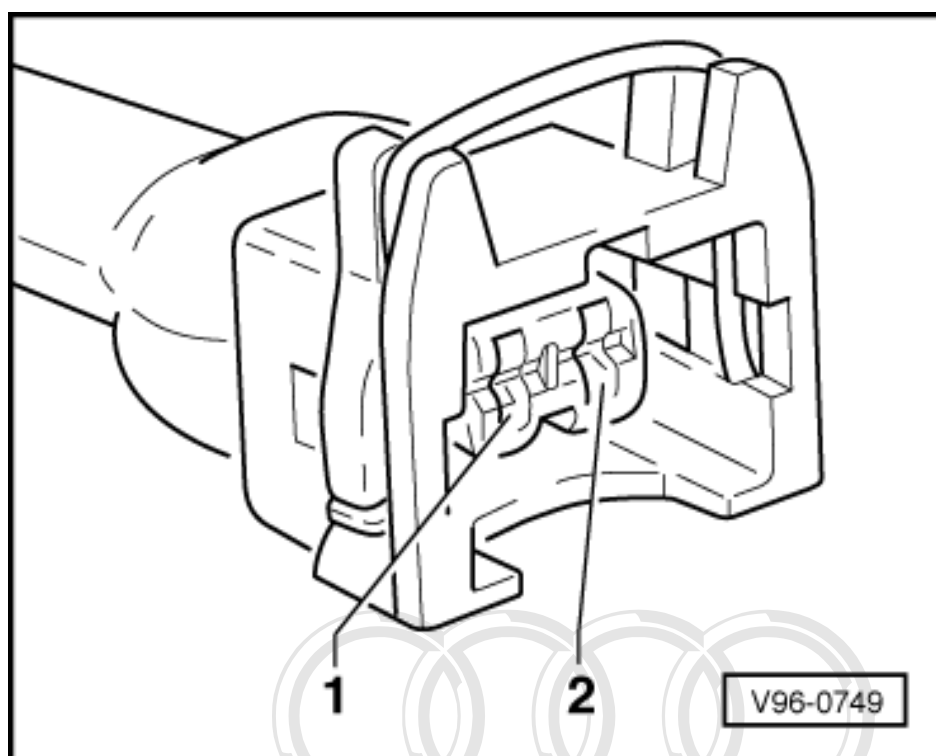
- Switch the ignition on.
- Specification: approx. battery voltage

If specification is not attained:

- Eliminate open circuit or short circuit using the current flow diagram.

If specification is attained:

- Check actuation.



Checking actuation

- -> Connect voltage tester V.A.G 1527 B between contacts 1 and 2.
- Start final control diagnosis and actuate idling stabilisation valve -N71 (flash code 4431) => Page 9 .
- The LED should flash.

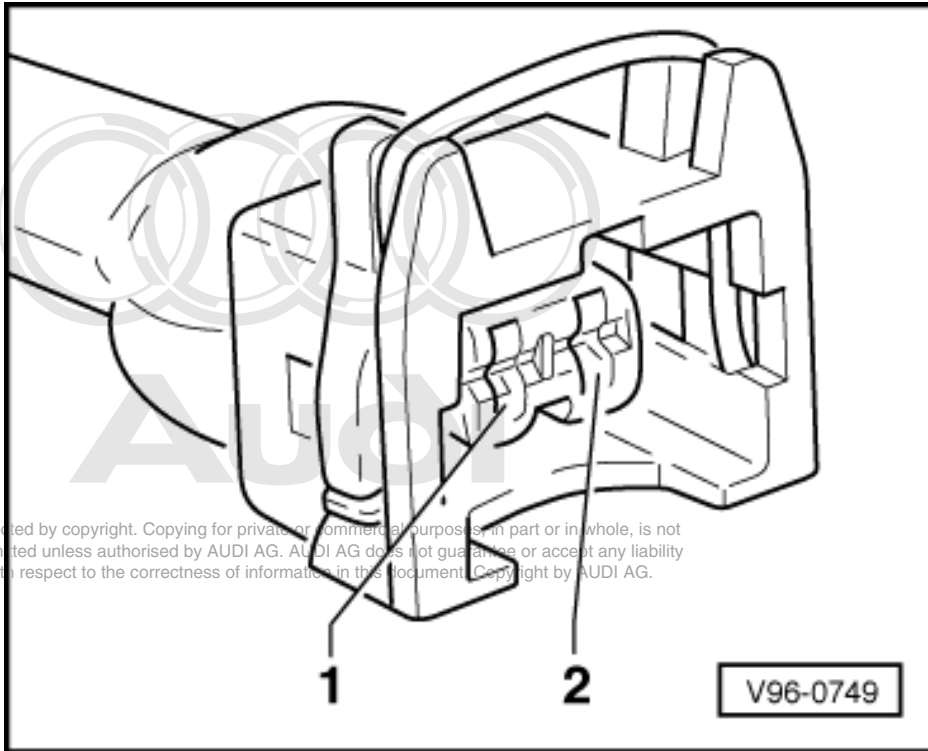
If specification is attained:

- Renew idling stabilisation valve.

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If specification is not attained:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



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- -> Check for open circuit and short to positive or earth in the following wiring connection:

Connector Contact	Test box V.A.G 1598 A Socket
2	17

- Rectify any open/short circuit as necessary.

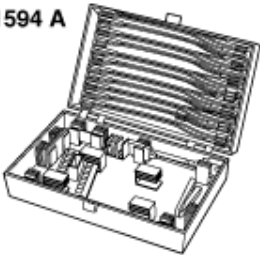
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If wiring is OK, and no actuation takes place:

- Replace KE III Jetronic control unit
=>Page 31 .



1.14 - Testing altitude sender -F96

V.A.G 1526 A 	V.A.G 1594 A 
V.A.G 1598 A 	
	G24-0015

Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/2
- ♦ V.A.G 1598/3

Fitting location => Fitting locations overview, Page **18**

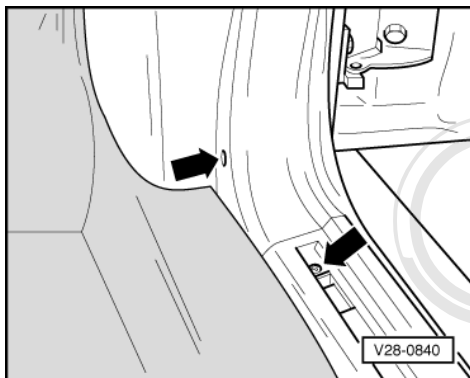
Notes:

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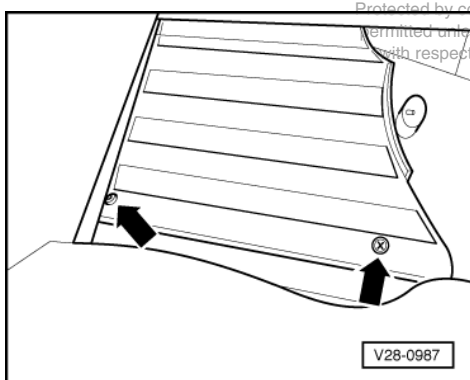
- ♦ The altitude sender cannot be tested using workshop tools. Only the power supply is checked.
- ♦ Only carry out following test when the corresponding fault is displayed during interrogation of fault memory.

Test sequence

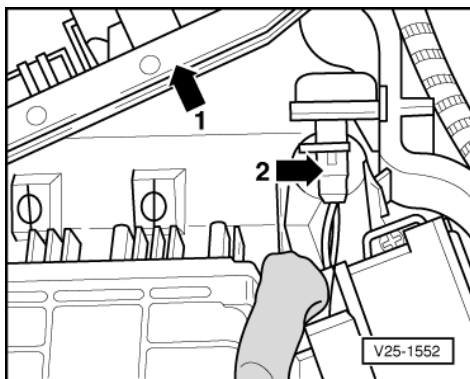
- Switch ignition off.



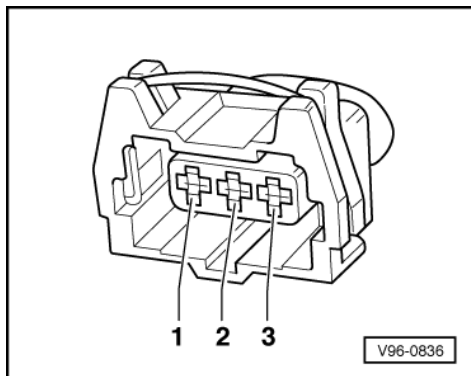
- -> Remove the lower part of the right A pillar trim and the front door sill panel tread strip
- Pull back floor covering at front of right footwell. (If necessary, cut open the perforated seam on the left with a knife.)



- -> Unscrew bolts -arrows- for electronics box cover.
- Carefully detach upper and lower sections of cover.



- -> Pull out cross strut -arrow 1- with attached parts.
- Unplug connector at altitude sender -arrow 2-.



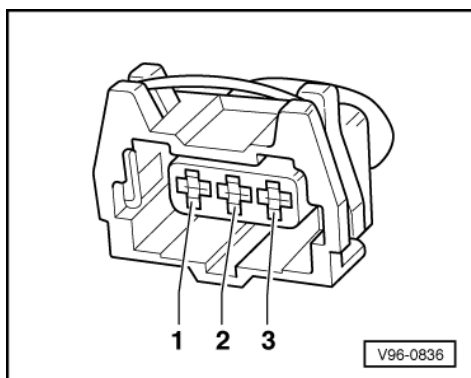
- -> Connect multimeter as follows to measure voltage.

Connector Contact	Measure to
1	Engine earth

- Switch the ignition on.
- Specification: approx. 5 V

If specification is not attained:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connection:

Connector Contact	Test box V.A.G 1598 A Socket
1	25

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

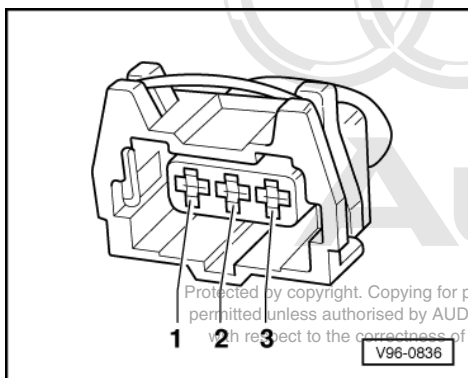
If the wiring is OK:

- Replace KE III Jetronic control unit
=>Page 31 .

If specification is attained:

- Switch the ignition on.

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- -> Connect multimeter as follows to measure voltage.

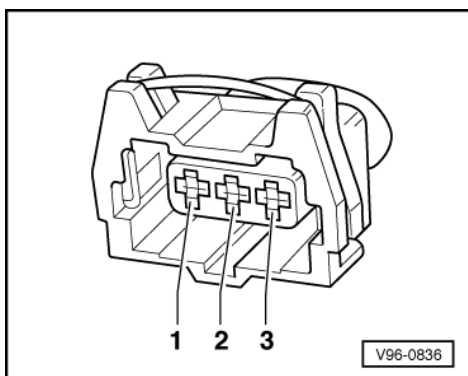
Connector Contact	Specification
1 + 3	4.5...5.0 V
2 + 3	4.5...5.0 V

If the specifications are not obtained:

- Eliminate open circuit or short circuit using the current flow diagram.

If specifications are attained:

- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29.



- -> Check for open circuit and short to positive or earth in the following wiring connections:

Connector Contact	Test box V.A.G 1598 A Socket
1	2
2	21

- Rectify any open/short circuit as necessary.

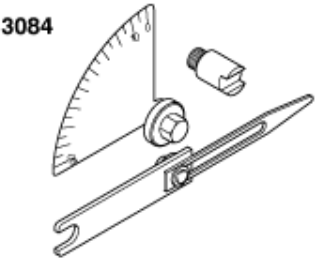
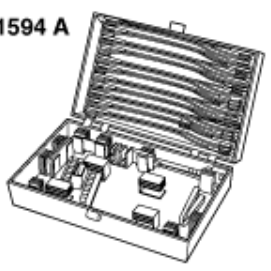
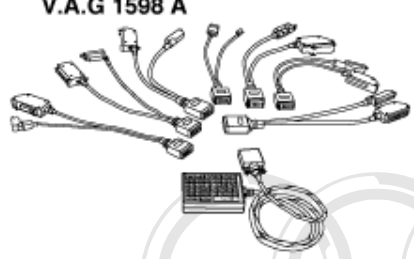
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If no wiring fault is detected:

- Replace altitude sender.



1.15 - Checking and adjusting idling speed switch -F60 and full throttle switch -F81

 3084	 V.A.G 1526 A
 V.A.G 1594 A	 V.A.G 1598 A
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Special tools and workshop equipment required

- ♦ Protractor 3084
- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/2
- ♦ V.A.G 1598/3
- ♦ Feeler gauge

Fitting location => Fitting locations overview, Page **18**

Idling switch -F60 supplies the control units with "throttle valve closed" information for:

- Idling stabilisation
- Overrun cut-off
- VEZ ignition system

Full throttle switch -F81 supplies the control units with "throttle valve fully open" information for:

- Full throttle enrichment

- VEZ ignition system

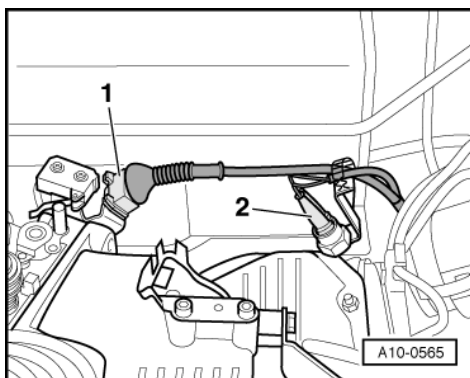
Notes:

- ◆ Idling speed switch -F60 and full throttle switch -F81 share a common connector.
- ◆ Vehicles with automatic gearbox are fitted with throttle valve potentiometer -G69, in addition to idling speed switch -F60 and full throttle switch -F81. The switches are integrated in the throttle valve potentiometer housing, but are fitted with their own connector
- ◆ Only carry out following tests when the corresponding fault is displayed during interrogation of fault memory.

1.16 - Vehicles with manual gearbox

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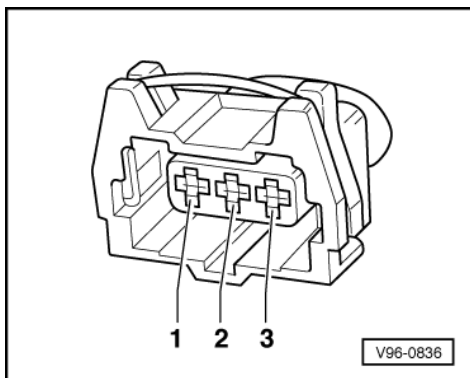
Checking wiring



- -> Unplug connector from throttle valve switch -1-.

Note:

Idling speed switch -F60 and full throttle switch -F81 share a common connector.



- -> Connect multimeter as follows to measure voltage.

Connector Contact	Measure to
2	Engine earth

- Switch the ignition on.
 - Specification: approx. battery voltage

If specification is not attained:

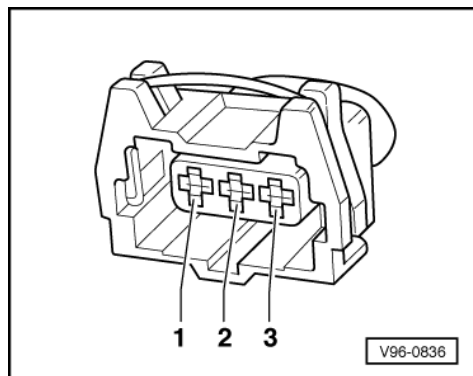
- Eliminate open circuit or short circuit using the current flow diagram.



If specification is attained:

VEZ control unit:

- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connections:

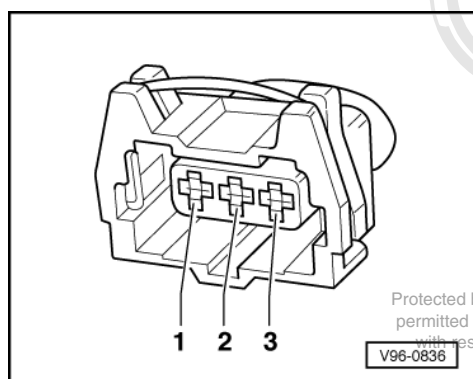
Connector Contact	Test box V.A.G 1598 A Socket
1	7
3	9

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

KE III Jetronic control unit:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



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- -> Check for open circuit and short to positive or earth in the following wiring connections:

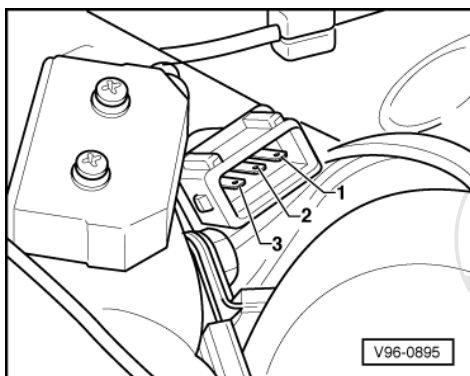
Connector Contact	Test box V.A.G 1598 A Socket
1	28
3	31

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

Checking idling switch -F60

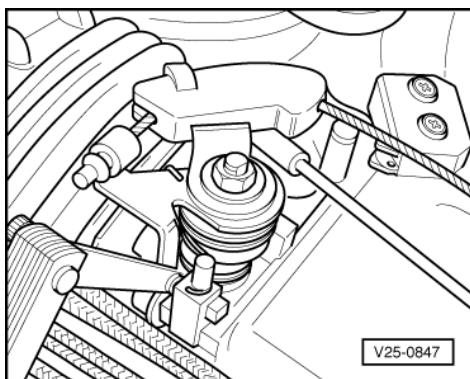
Test requirements:



- Checking basic setting of throttle valve OK => Page 74 .
- -> Connect multimeter between contacts 1 and 2 to measure resistance.
- Specification: 0 ω

- Open throttle valve slightly.

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- -> Specification: $\infty \omega$ (no continuity)
Air gap between throttle valve stop and adjuster screw 0.15...0.50 mm (measured using feeler gauge)

If specifications are attained:

- Check full throttle switch => Page 58 .

If the specifications are not obtained:

- Adjust idling switch =>Page 57 .

Adjusting idling switch

- Remove the throttle valve unit.
- Loosen bolts of idling speed switch and adjust switching point by altering position of switch in slots.

Feeler gauge not inserted:

- Specification: 0 ω

Feeler gauge inserted 0.3 mm:

- Specification: $\infty \omega$ (no continuity)

If specifications are attained:

- Tighten fastening bolts and secure with locking paint.

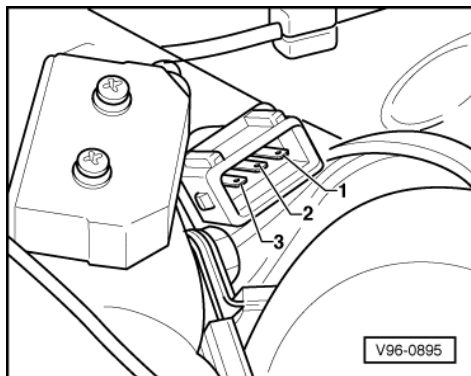
If the specifications are not obtained:

- Check and adjust idling speed switch -F60 and full throttle switch -F81

Note:

If a fault is detected on one of the switches, both switches must always be replaced together.

Checking full throttle switch -F81



- -> Connect multimeter between contacts 2 and 3 to measure resistance.
 - Specification: $\infty \omega$ (no continuity)
- Press throttle valve lever to full throttle position.
 - Specification: 0ω

If the specifications are not obtained:

- Check switching point of full throttle switch => Page 58 .

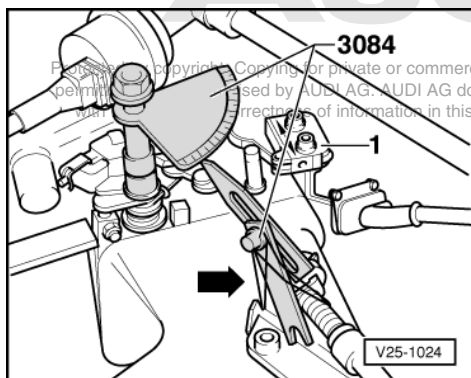
If specifications are attained:

- Check and adjust idling speed switch -F60 and full throttle switch -F81

Note:

If a fault is detected on one of the switches, both switches must always be replaced together.

Checking switching point of full throttle switch -F81



- -> Secure indicator of protractor 3084 -arrow- to throttle valve unit.
- Screw degree disc for protractor 3084 onto throttle valve shaft of 2nd stage. If necessary remove nut for throttle valve lever.
- Push throttle valve lever to full throttle stop and set degree disc to "0".

- Close throttle valve by approx. 30° and slowly push throttle valve back towards full throttle stop, until full throttle switch -1- actuates.
 - Specification: 0 ω
at switching point 10 ± 2° before full throttle stop

If specification is not attained:

- Adjust full throttle switch.

Adjusting full throttle switch -F81

- Loosen bolts of full throttle switch and adjust switching point by altering position of switch in slots.
- Tighten fastening bolts and secure with locking paint.

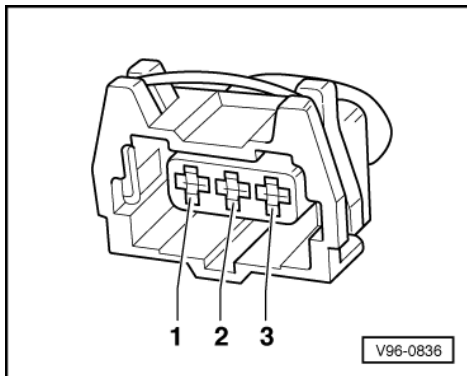
1.17 - Vehicles with automatic gearbox:

Note:

Idling switch -F60 and full throttle switch -F81 are integrated in the throttle valve potentiometer housing -G69, but are fitted with their own connector.

Checking wiring

- Detach connector from throttle valve switch.



- -> Connect multimeter as follows to measure voltage.

Connector Contact	Measure to
2	Engine earth

- Switch the ignition on.
 - Specification: approx. battery voltage

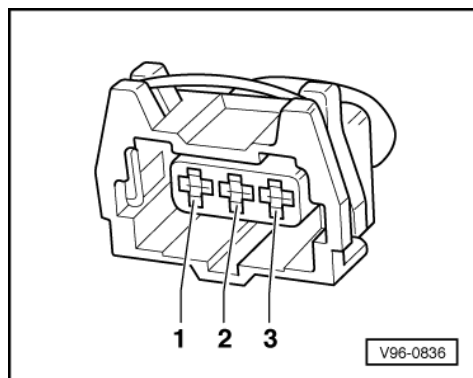
If specification is not attained:

- Eliminate open circuit or short circuit using the current flow diagram.

If specification is attained:

VEZ control unit:

- With the ignition switched off, use adapter V.A.G. 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29



- -> Check for open circuit and short to positive or earth in the following wiring connections:

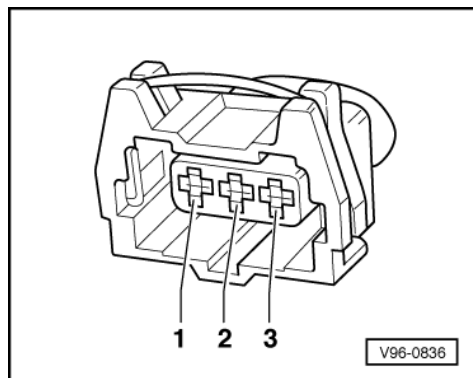
Connector Contact	Test box V.A.G 1598 A Socket
1	7
3	9

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

KE III Jetronic control unit:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connections:

Connector Contact	Test box V.A.G 1598 A Socket
1	28
3	31

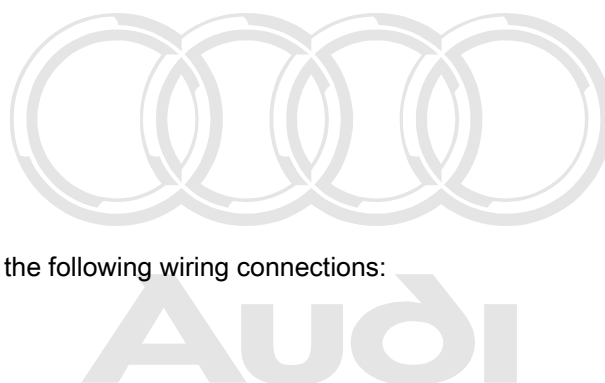
- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

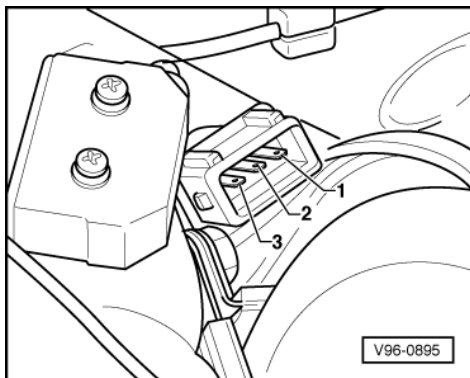
Checking idling switch -F60

Test requirements:

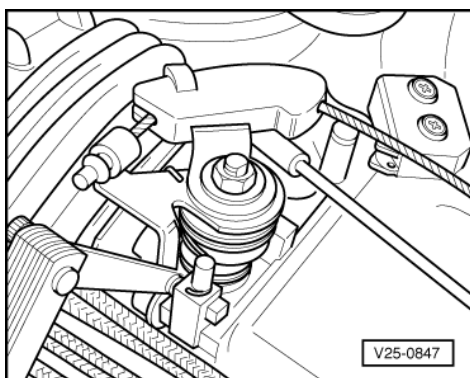
- Checking basic setting of throttle valve OK => Page 74 .



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- -> Connect multimeter between contacts 1 and 2 to measure resistance.
- Specification: $0 \, \Omega$
- Open throttle valve slightly.



- -> Specification: $\infty \, \Omega$ (no continuity)
- Air gap between throttle valve stop and adjuster screw 0.15...0.50 mm (measured using feeler gauge)

If specifications are attained:

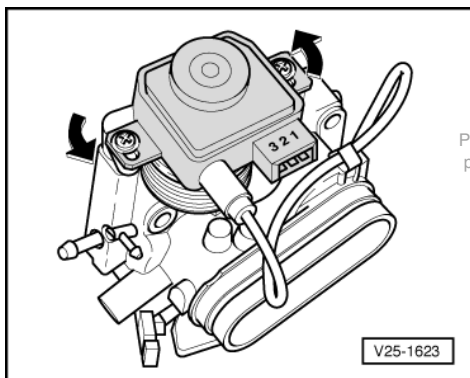
- Check full throttle switch => Page 62 .

If the specifications are not obtained:

- Adjust idling switch.

Adjusting idling switch

- Remove the throttle valve unit.
- Slacken off both bolts of throttle valve potentiometer.



- -> Turn throttle valve potentiometer in direction of arrow until a stop is felt.



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Note:

Do not move the throttle valve.

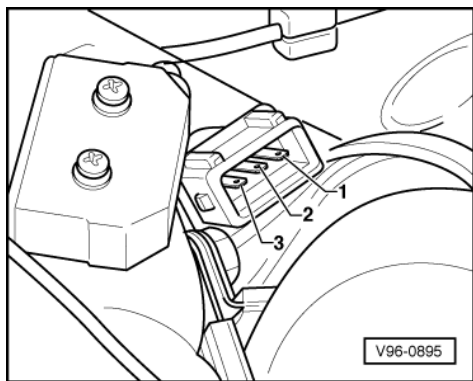
- Tighten bolts of throttle valve potentiometer in this position.
- Check adjustment => Page 60.

If the specifications are still not attained:

- Replace and adjust throttle valve potentiometer -G69.

Note:

If a fault is detected on one of the switches, the complete throttle valve potentiometer must be replaced.

Checking full throttle switch -F81

- -> Connect multimeter between contacts 2 and 3 to measure resistance.
 - Specification: $\infty \omega$ (no continuity)
- Press throttle valve lever to full throttle position.
 - Specification: 0ω

If the specifications are not obtained:

- Check switching point of full throttle switch.

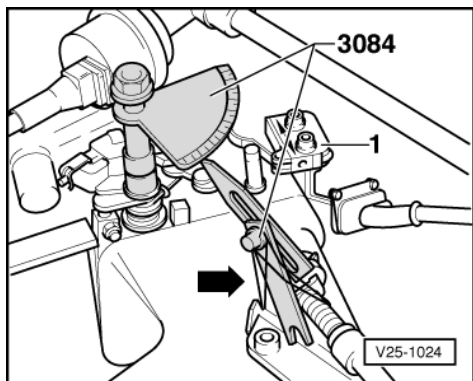
If specifications are attained:

- Replace and adjust throttle valve potentiometer -G69.

Note:

If a fault is detected on one of the switches, the complete throttle valve potentiometer must be replaced.

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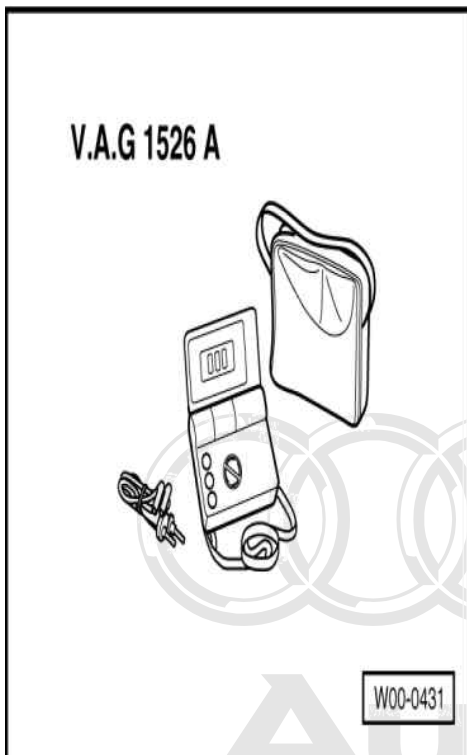
Checking switching point of full throttle switch -F81

- -> Secure indicator of protractor 3084 -arrow- to throttle valve unit.
- Screw degree disc for protractor 3084 onto throttle valve shaft of 2nd stage. Remove nut for throttle valve lever.
- Push throttle valve lever to full throttle stop and set degree disc to "0".
- Close throttle valve by approx. 30° and slowly push throttle valve back towards full throttle stop, until full throttle switch -1- actuates.
 - Specification: 0 ω
 - at switching point 10 ± 2° before full throttle stop

Adjusting full throttle switch -F81

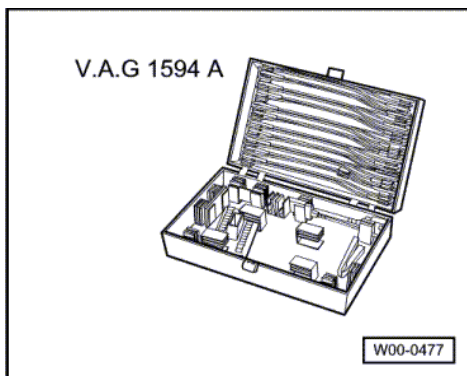
Adjusting idling switch -F60 => Page **61** also automatically adjusts full throttle switch.

1.18 - Checking throttle valve potentiometer -G69 - vehicles with automatic gearbox



Special tools and workshop equipment required

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- ♦ V.A.G 1526 A





- ♦ V.A.G 1594 A

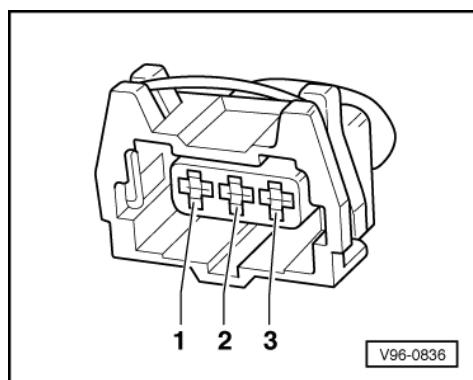
Fitting location: On underside of throttle valve connection -Item 23

Notes:

- ♦ This check is only to be performed if a corresponding fault has been stored in fault memory of automatic gearbox 097.
- ♦ After working on throttle valve potentiometer, it is also necessary to adapt automatic gearbox control unit and throttle valve potentiometer to each other => Page 65 .

Checking power supply

- Detach connector from throttle valve potentiometer.
- Switch the ignition on.



- -> Connect multimeter as follows to measure voltage.

Connector Contact	Measure to
1	Engine earth
1	Connector, contact 2
2	3

- Specification: 4.5...5.5 V

If specifications are attained:

- Check internal resistance of throttle valve potentiometer => Page 65 .

If a specification is not met:

- Check for open circuit and short to earth/positive or earth in the following wiring connections:

Connector Contact	Control unit for automatic gearbox -J217 Contact
1	=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder.
2	
3	

- Rectify any open/short circuit as necessary.

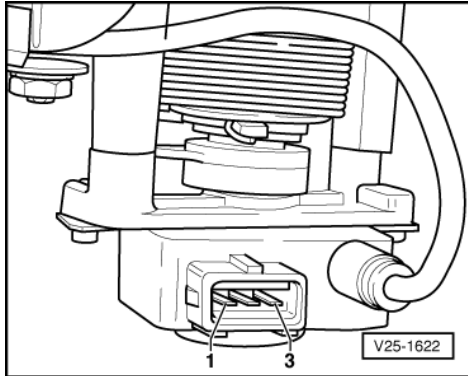
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

Note:

Use only gold-plated contacts when repairing the contacts in the connectors.

Checking internal resistance

- Detach connector from throttle valve potentiometer.



- -> Connect multimeter between contacts 1 and 2 to measure resistance.
 - Specification: 1.5...2.6 kΩ
- Connect multimeter between contacts 2 and 3 to measure resistance.
 - Specification: 0.75...1.3 kΩ
- Slowly move the throttle valve lever to full throttle position.
 - Specification: Increasing resistance up to max. 3.6 kΩ

If a specification is not met:

- Renew throttle valve potentiometer.

Adjusting throttle valve potentiometer -G69

- Adjustment of throttle valve potentiometer is checked in the same way as adjustment of idling switch -F60
=> Page 60 .

Adjusting throttle valve potentiometer -G69

- Adjustment of throttle valve potentiometer is carried out in the same way as adjustment of idling switch -F60
=> Page 61 .

1.19 - Adapting automatic gearbox control unit and throttle valve potentiometer -G69 to each other

Note:

The automatic gearbox control unit and the throttle valve potentiometer have to be adapted to each other after carrying out the following work:

- ◆ After replacing the automatic gearbox control unit
- ◆ Removing and installing or replacing the throttle valve potentiometer

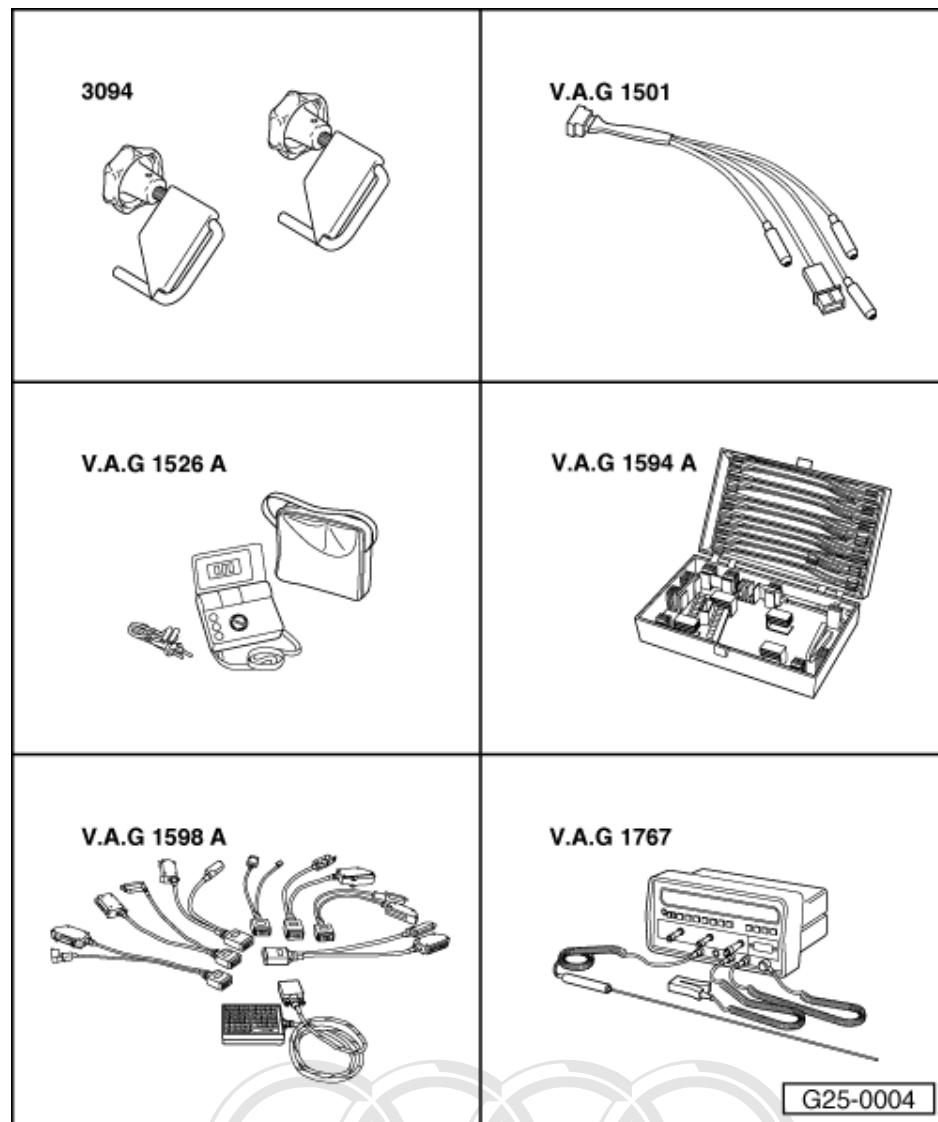
Procedure

- Plug in connector to throttle valve potentiometer.
- Start the basic setting.



=> Automatic Gearbox 097; Repair group 01; Self-diagnosis of the automatic gearbox 097; initiating basic setting
Self-diagnosis of the automatic gearbox 097 initiating basic setting

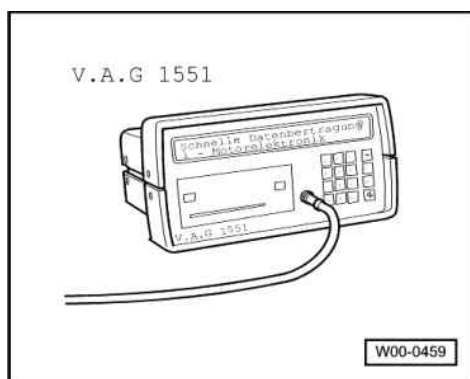
1.20 - Checking air flow meter potentiometer -G19



Special tools and workshop equipment required

- ♦ Hose clamps 3094
- ♦ V.A.G 1501
- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3
- ♦ V.A.G 1767 or V.A.G 1367 with V.A.G 1367/8

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- ♦ V.A.G 1551 with V.A.G 1551/1

Fitting location => Fitting locations overview, Page 18

Notes:

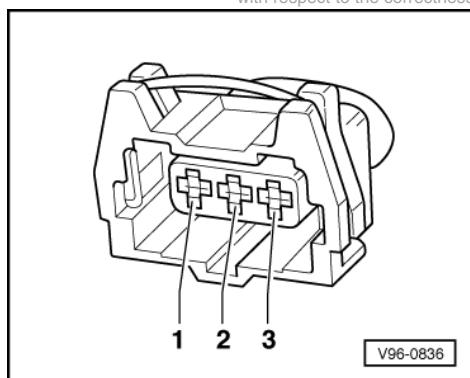
- ♦ Carry out this check if flash code "2232" is displayed when fault memory is interrogated.
- ♦ Air flow meter potentiometer -G19 can only be replaced together with air flow meter.

Test requirements:

- Coolant temperature at least 85 °C.
- No faults stored in fault memory
- Final control diagnosis has been performed
- Air conditioning switched off.
- Cap on oil filler neck tight.
- Dipstick fully inserted.
- Electrical consumers switched off (radiator fan must not run during the test).
- Ignition point and CO content OK.

Test sequence

- Detach connector from potentiometer



- -> Connect multimeter as follows to measure voltage.

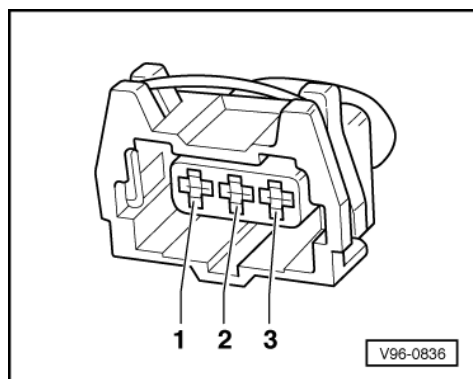
Connector Contact	Measure to
3	Battery positive

- Specification: approx. battery voltage

If specification is not attained:

- Eliminate open circuit or short circuit using the current flow diagram.

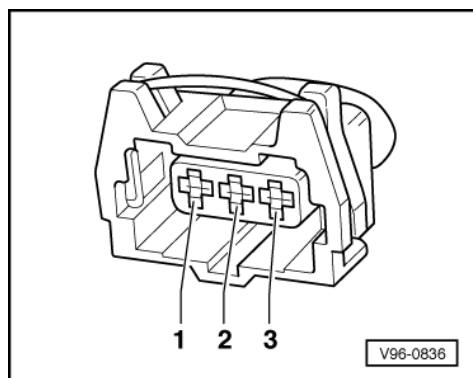
If the wiring is OK:



- -> Connect multimeter between contacts 1 and 3 to measure voltage.
- Switch the ignition on.
 - Specification: 4.35...5.35 V
- Read supply voltage (U1) off multimeter and note value.

If specification is not attained:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



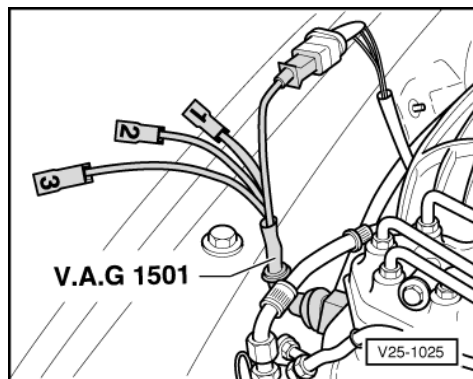
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- -> Check for open circuit and short to positive or earth in the following wiring connection:

Connector Contact	Test box V.A.G 1598 A Socket
1	26
2	23

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

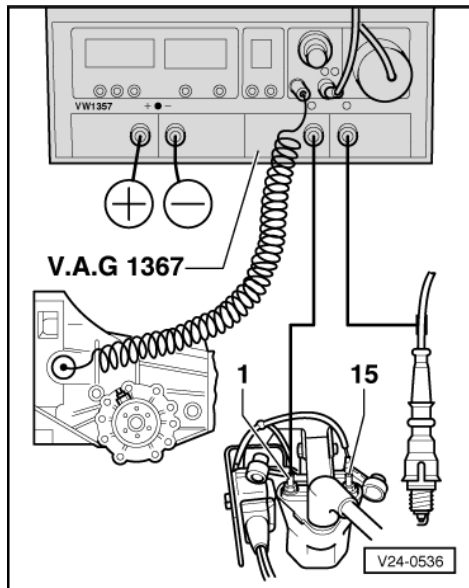


If no wiring fault is detected:

- -> Connect test lead V.A.G 1501 between air flow meter potentiometer and connector.
- Connect multimeter between contact 2 and 3 of test lead V.A.G 1501 to measure voltage.
- Switch the ignition on, baffle plate in rest position.
 - Specification: 0...200 mV

Note:

Maximum adjustment range: From displayed value up to max. 200 mV.



- -> Connect ignition tester V.A.G 1767 (or V.A.G 1367) with ignition switched off:

=> Operating Instructions

Notes:

- ◆ The TDC sender of ignition tester V.A.G 1367 must be inserted into the gearbox housing as far as the stop.
- ◆ The ignition point is indicated directly on V.A.G 1767 (or V.A.G 1367). It is not necessary to use a strobe light aimed at the timing notches.
- ◆ Incorrect measurements may occur with ignition tester V.A.G 1767 if triggering probe is slightly open (e.g. excessive tension on helical cable).
- Start engine and run at idling speed.
- Connect fault reader V.A.G 1551 => Page 2.

-> Indicated on display

Flash code output
with the  key

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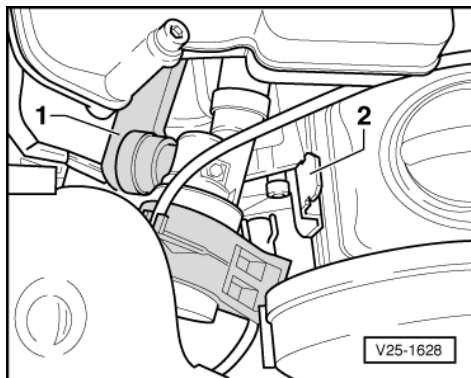
- Press the  key on V.A.G 1551 until "permanent earth connection on initiating line" appears on display.

-> Indicated on display

Permanent earth connection on initiating
line

Note:

A constant ignition point from VEZ control unit is only applied 4 seconds after pressing  key on V.A.G 1551.



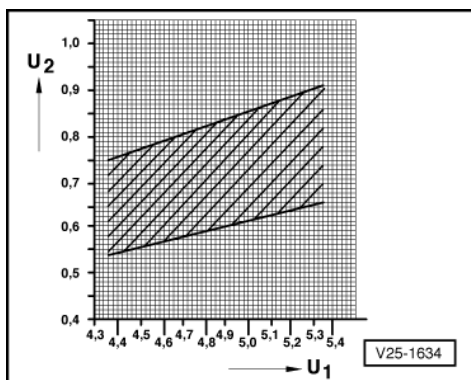
- -> Detach rubber retainer of idling stabilisation valve -N71 from retaining bracket -2-.
- Pull idling stabilisation valve -N71 slightly forward and disconnect connector.

Note:

Idling speed increases slightly after disconnecting connector.

- Increase speed until following values are obtained:
 - Specification, idling speed: 800 ± 20 rpm
 - Specification, ignition point: $13...17^\circ$ before TDC
- Read output voltage (U2) off multimeter and note down value.

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U1 - -> Supply voltage
between contact 1 + 3
U2 - Output voltage at idling speed
between contact 2 + 3

- Compare output voltage (U2) allowing for supply voltage (U1).

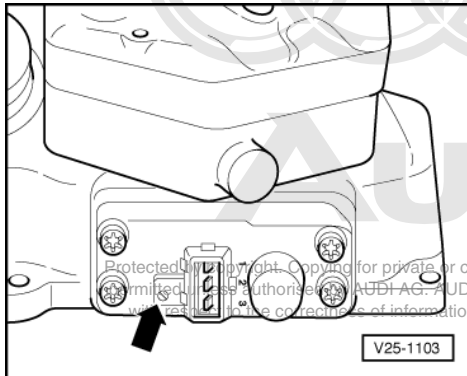
If, at an idling speed of 800 ± 20 rpm, the measured output voltage is at or slightly outside of lower tolerance range:

- Check for leaks (unmetered air) in intake air system => Page 75 .
- Repeat test after eliminating leaks.

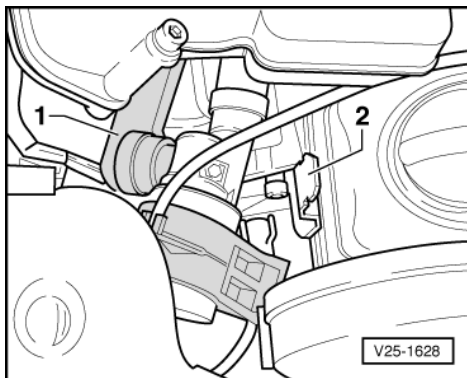
If no leaks are detected:

- Re-adjust potentiometer with trim screw.

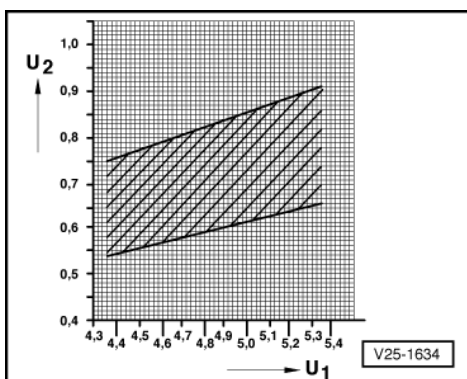
Re-adjusting potentiometer with trim screw



- Switch ignition off.
- Disconnect test lead V.A.G 1501 on potentiometer.
- -> Carefully remove sealing compound over trim screw -arrow-.
- Reconnect test lead V.A.G 1501 to potentiometer.
- Connect multimeter between contact 2 and 3 of test lead V.A.G 1501 to measure voltage.



- -> Rubber retainer of idling stabilisation valve -N71 pulled off retaining bracket -2-.
- Idling stabilisation valve -N71 pulled slightly forward and connector disconnected.
- Start engine and run at idling speed.
- Increase speed until following value is obtained:
 - Specification, idling speed: 800 ±20 rpm



- -> Turn trim screw on potentiometer so that output voltage (U_2) lies at centre of tolerance range, allowing for supply voltage (U_1).

If tolerance range is not attained:

- Unscrew fuel distributor from air flow meter and replace air flow meter with potentiometer.



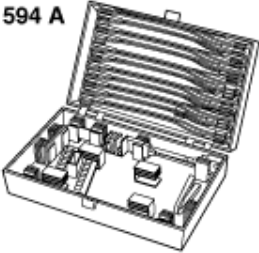
Note:

After air flow meter has been replaced with potentiometer, adjustment of potentiometer is not necessary.

If tolerance range is attained:

- Secure trim screw with locking paint.
- Switch off ignition in order to erase fault memory.

1.21 - Checking differential pressure regulator -N73

V.A.G 1526 A 	V.A.G 1594 A 
V.A.G 1598 A 	
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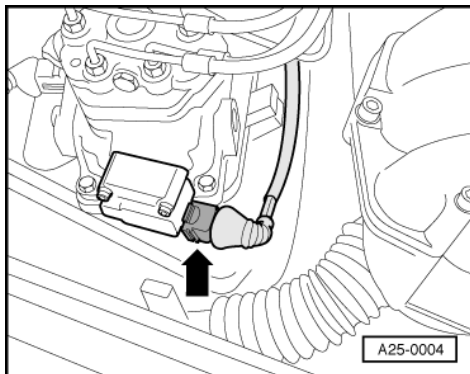
Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3

Fitting location => Fitting locations overview, Page **18**

If specification is not attained during final control diagnosis => Page **11** :

Checking internal resistance

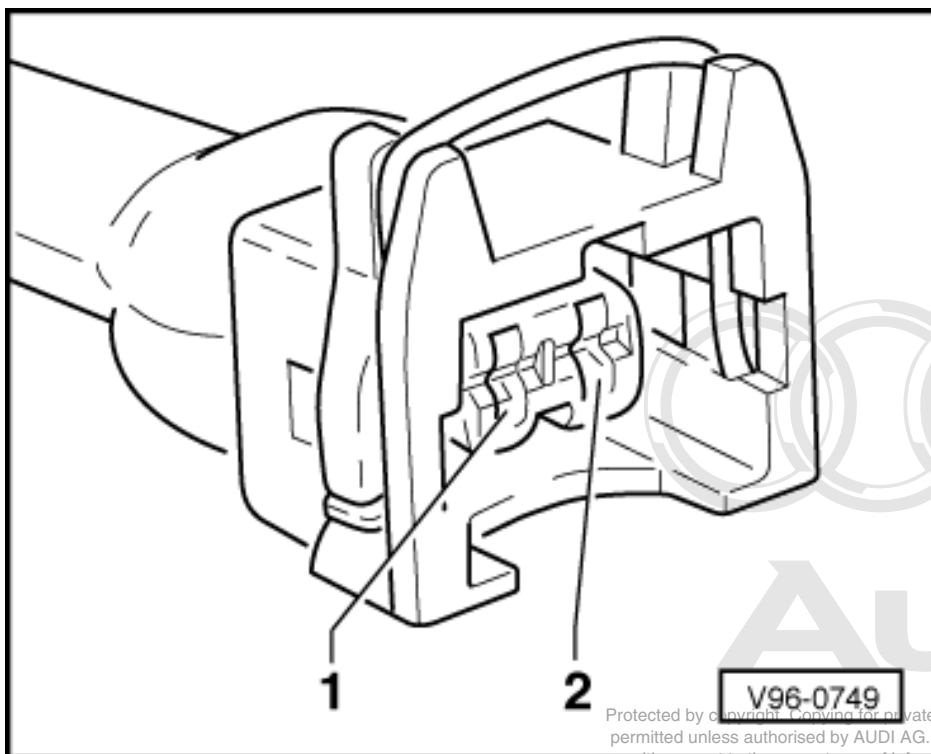


- -> Pull connector -arrow- off differential pressure regulator.
- Connect multimeter to differential pressure regulator to measure resistance.
 - Specification: 17.5...21.5 ω

If specification is not attained:

- Check actuation.

Checking actuation



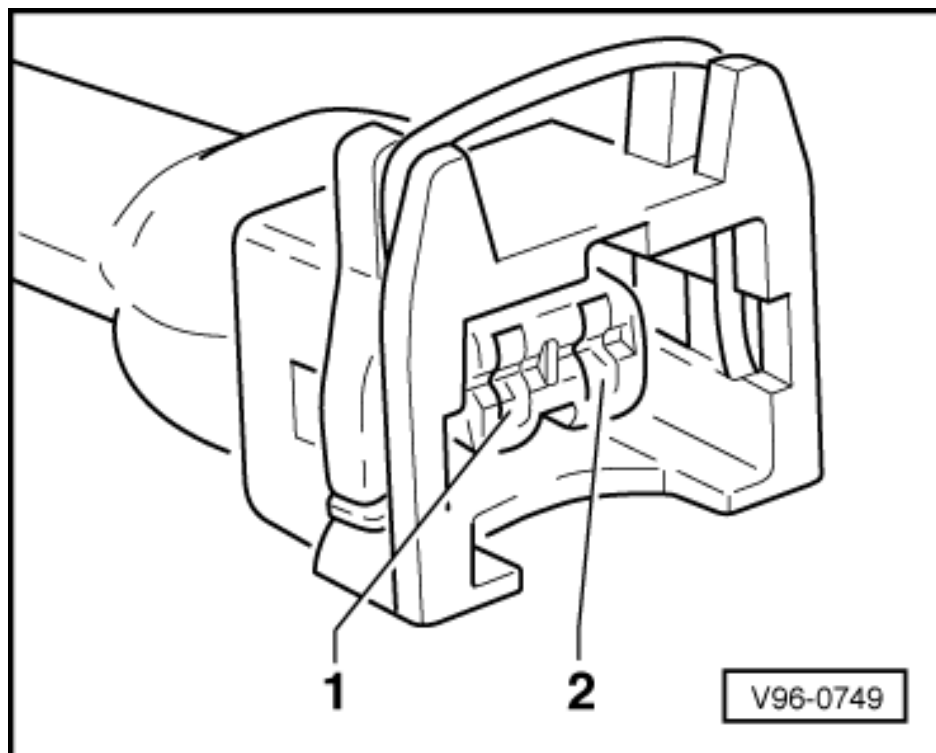
- -> Connect multimeter between contacts 1 and 2 to measure voltage.
 - Specification: 4.5...5.0 V

If specification is attained:

- Replace differential pressure regulator -N73.

If specification is not attained:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connections:

Connector Contact	Test box V.A.G 1598 A Socket
1	4
2	5

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If no wiring fault is detected:

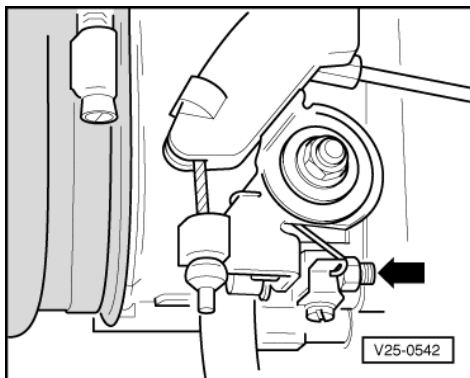
- Replace KE III Jetronic control unit
=>Page 31 .

1.22 - Basic throttle valve setting

Note:

The limiting screw position is set at the factory and must not be altered. Should the screw have been turned inadvertently, carry out the setting procedure described below and once again mark the screw with locking varnish

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- -> Screw out the limiting screw -arrow- sufficiently until a gap exists between the limiting screw and the stop
- Now screw in the limiting screw sufficiently until it touches the stop

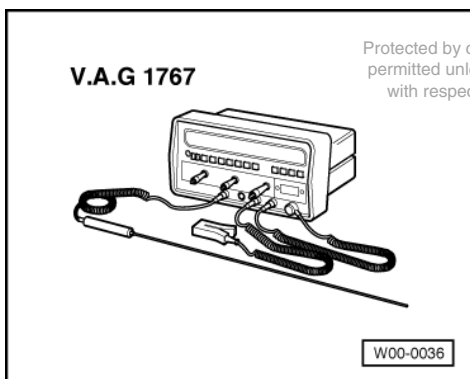
Note:

Place a thin sheet of paper between the limiting screw and the stop in order to determine accurately the actual contact point of the limiting screw and the stop. Continually turn the sheet of paper and at the same time turn the limiting screw in order to determine the exact contact point.

- Screw in the limiting screw a further 1/2 turn from the contact point that you have determined.
- Mark the screw with locking varnish.
- Check idling speed and CO content => Page 82 .
- Check idling switch -F60 => Page 60 respectively.

1.23 - Checking intake air system for leaks (unmetered air)

Special tools and workshop equipment required



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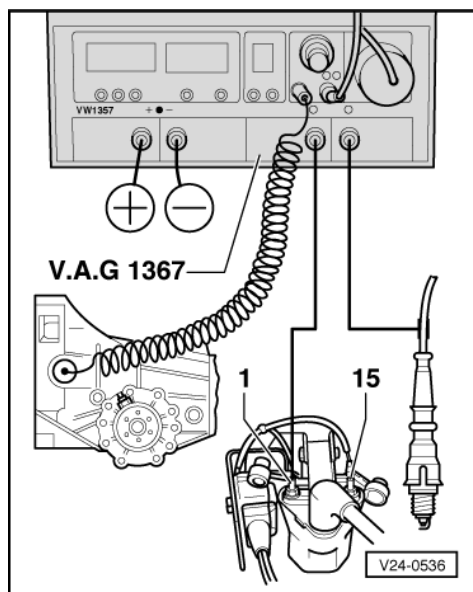
- ♦ Ignition tester V.A.G 1767 or V.A.G 1367 with HT pick-up clamp V.A.G 1367/8
- ♦ Engine leak detector spray G 001 800 A1

Notes:

- ♦ The vacuum in the intake system will cause the leak detector spray to be drawn in with the unmetered air. The leak detector spray reduces the ignitability of the mixture. This leads to a drop in engine speed and to a significant increase of the CO content.
- ♦ The safety precautions listed on the container must be adhered to.



Test sequence



- -> Connect ignition tester V.A.G 1767 (or V.A.G 1367) with ignition switched off:

=> Operating Instructions

- Start engine and run at idling speed.
- Read off the idling speed on the ignition tester V.A.G 1767 (or V.A.G 1367).
- Systematically spray parts of the intake system with engine leak detector spray.
 - Air intake elbow, crankcase breather hoses, hoses to activated charcoal filter, activated charcoal filter solenoid valves and vacuum pipes.

If engine speed does not change:

- Switch ignition off.

If engine speed drops:

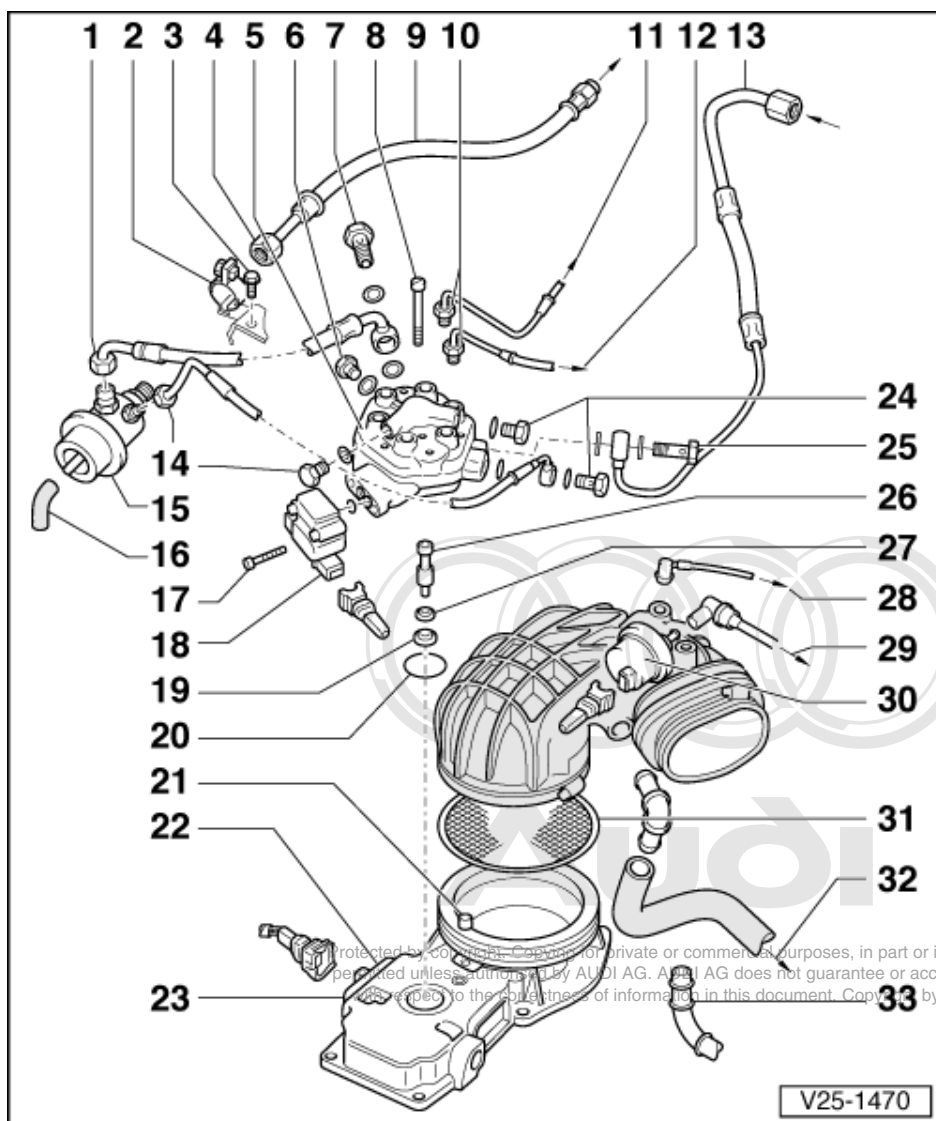
- Switch ignition off.
- Check sprayed areas of intake system for leaks and rectify if necessary.



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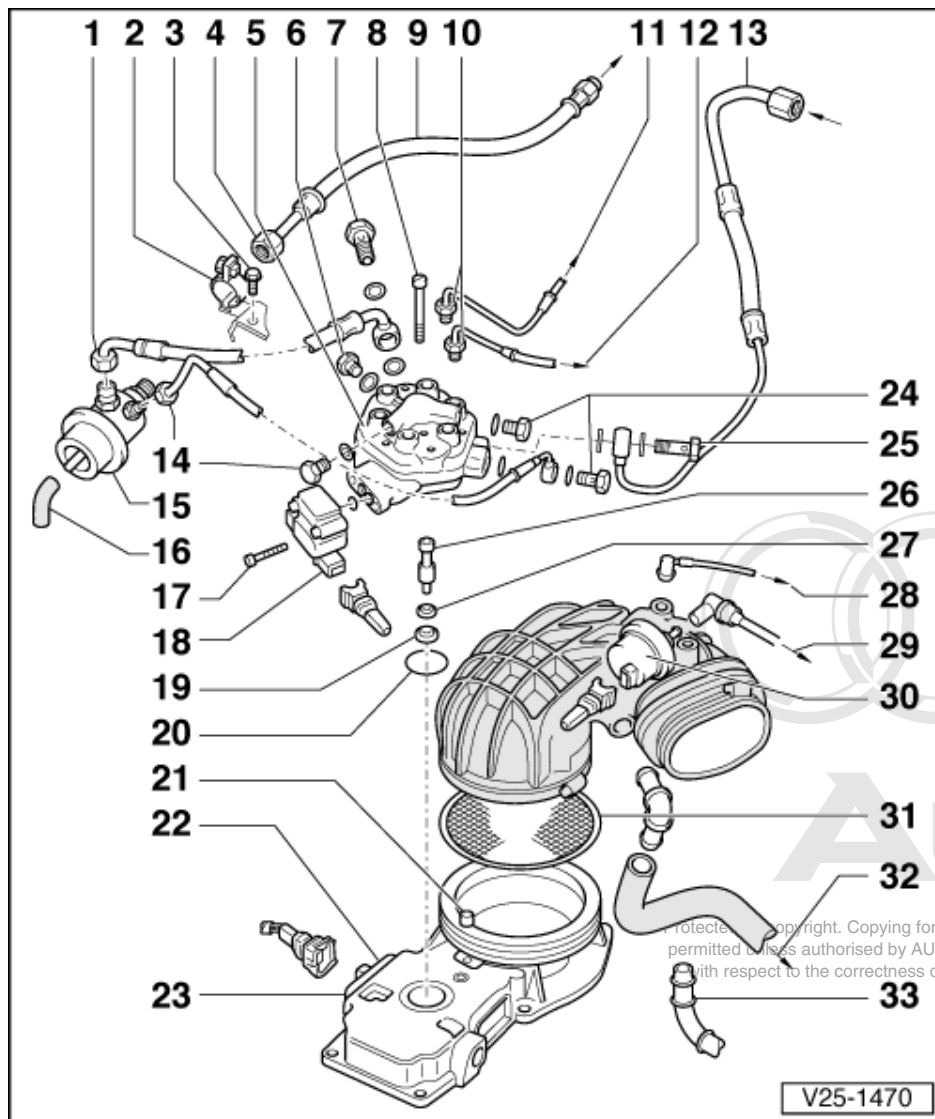
2 - Servicing fuel system

2.1 - Servicing fuel system



2.2 - Fuel distributor overview

- 1 20 Nm
- 2 Bracket
- 3 3.5 Nm
- 4 20 Nm
- 5 Fuel distributor
 - ♦ Check =>Check idling speed injection tolerance, Page 98
 - ♦ Check and if necessary adjust free play of baffle plate after installation =>Page 103
- 6 Screw plug - 10 Nm
 - ♦ Measuring connection for pressure tests



7 20 Nm

8 3.5 Nm

- ♦ Mark with locking varnish

9 Fuel return pipe

- ♦ To fuel tank

10 10 Nm

11 To injector

12 To cold start valve

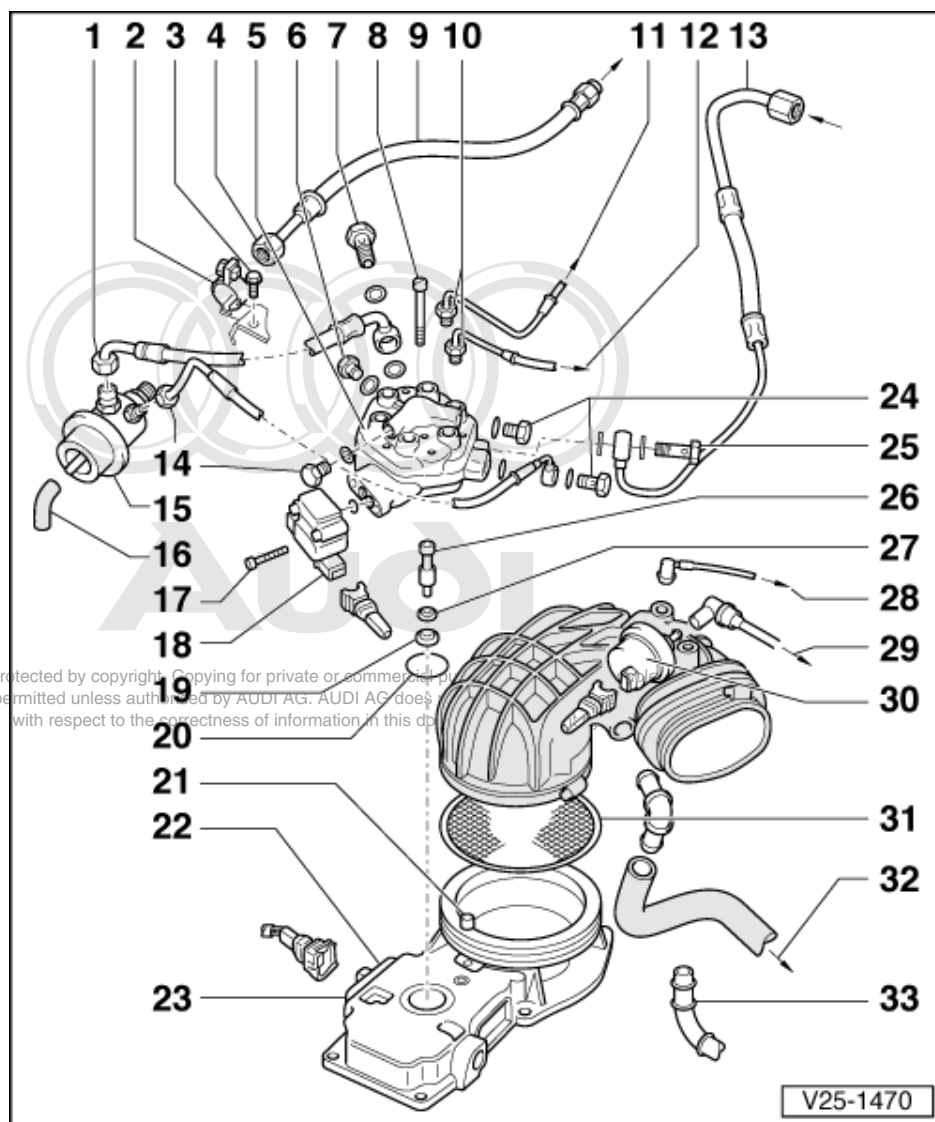
13 Fuel feed pipe

- ♦ From fuel tank

14 10 Nm

15 Fuel pressure regulator

- ♦ Check system pressure, differential pressure and holding pressure
=>Page 92 .



16 Breather pipe

- ♦ To air cleaner upper section

17 Bolt

- ♦ Non-magnetic

18 Differential pressure regulator -N73

- ♦ Checking => Page 72
- ♦ Check system pressure, differential pressure and holding pressure
=>Page 92 .

19 Stop bolt

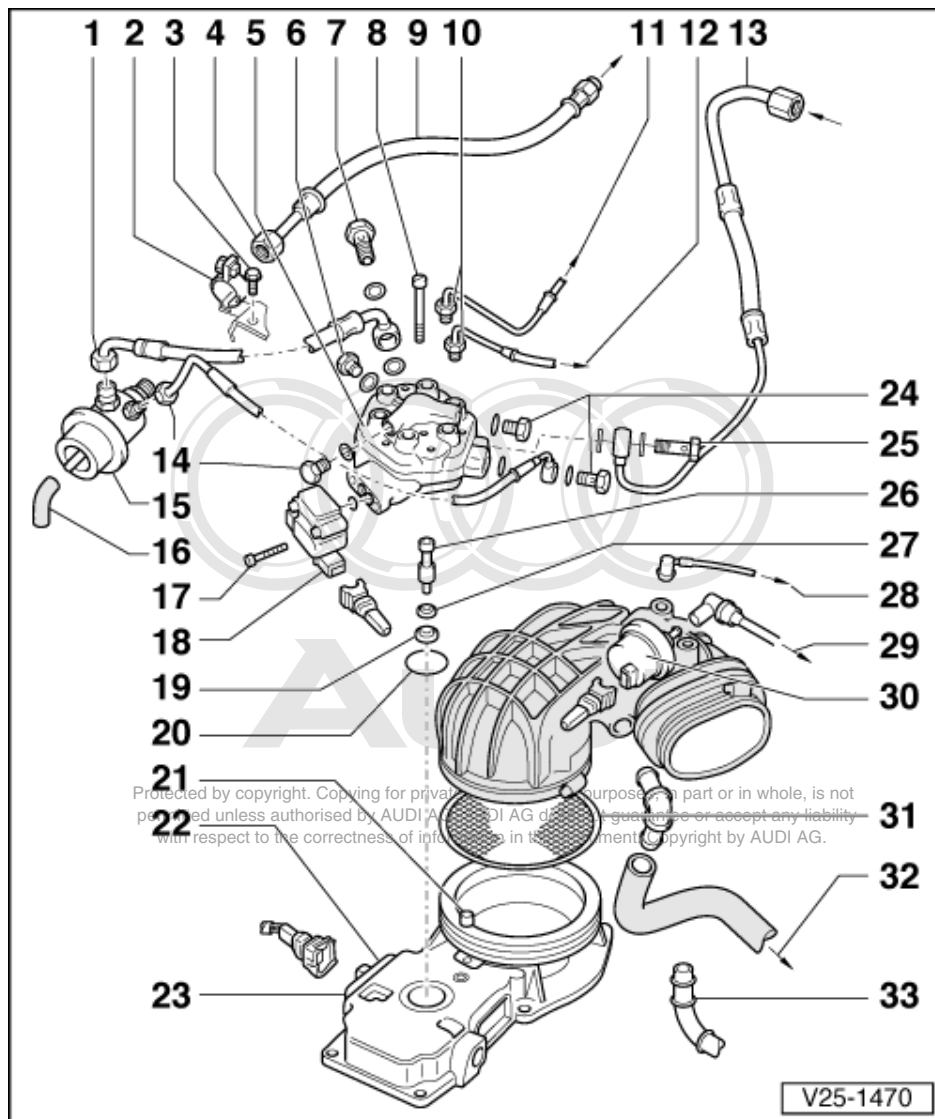
- ♦ For control piston
- ♦ Adjusting => Page 107

20 O-ring

- ♦ Replace

21 Securing plug

- ♦ Remove before adjusting
- ♦ Check idling speed and CO content => Page 82



22 Air flow meter potentiometer -G19

- ♦ Checking => Page **66**

23 Air flow meter

- ♦ Check adjusting lever => Page **103**
- ♦ Check and adjust rest position and free play of baffle plate=>Page **103**

24 10 Nm

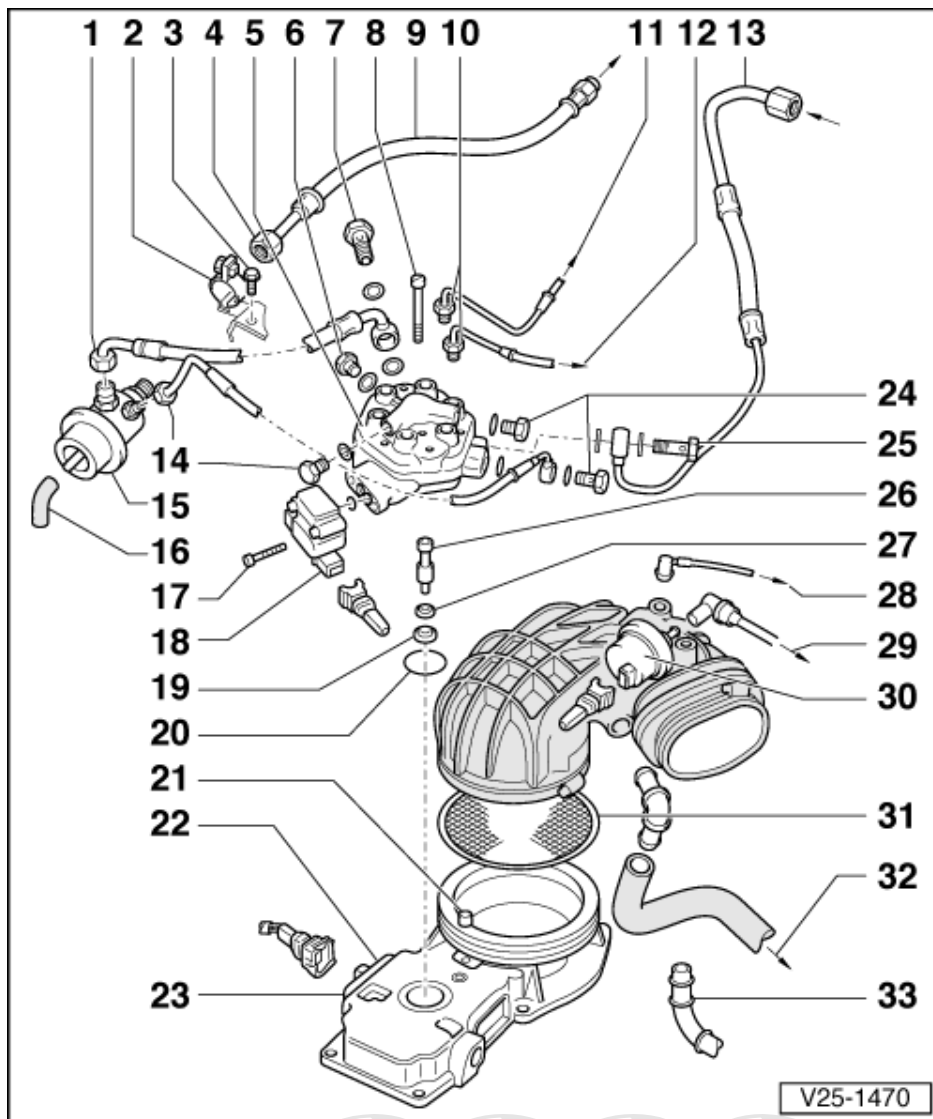
25 20 Nm

26 Control piston

- ♦ Check adjusting lever and control piston => Page **103**

27 Sealing ring

- ♦ Installation position: Small diameter faces control piston
- ♦ Seals only in rest position of baffle plate

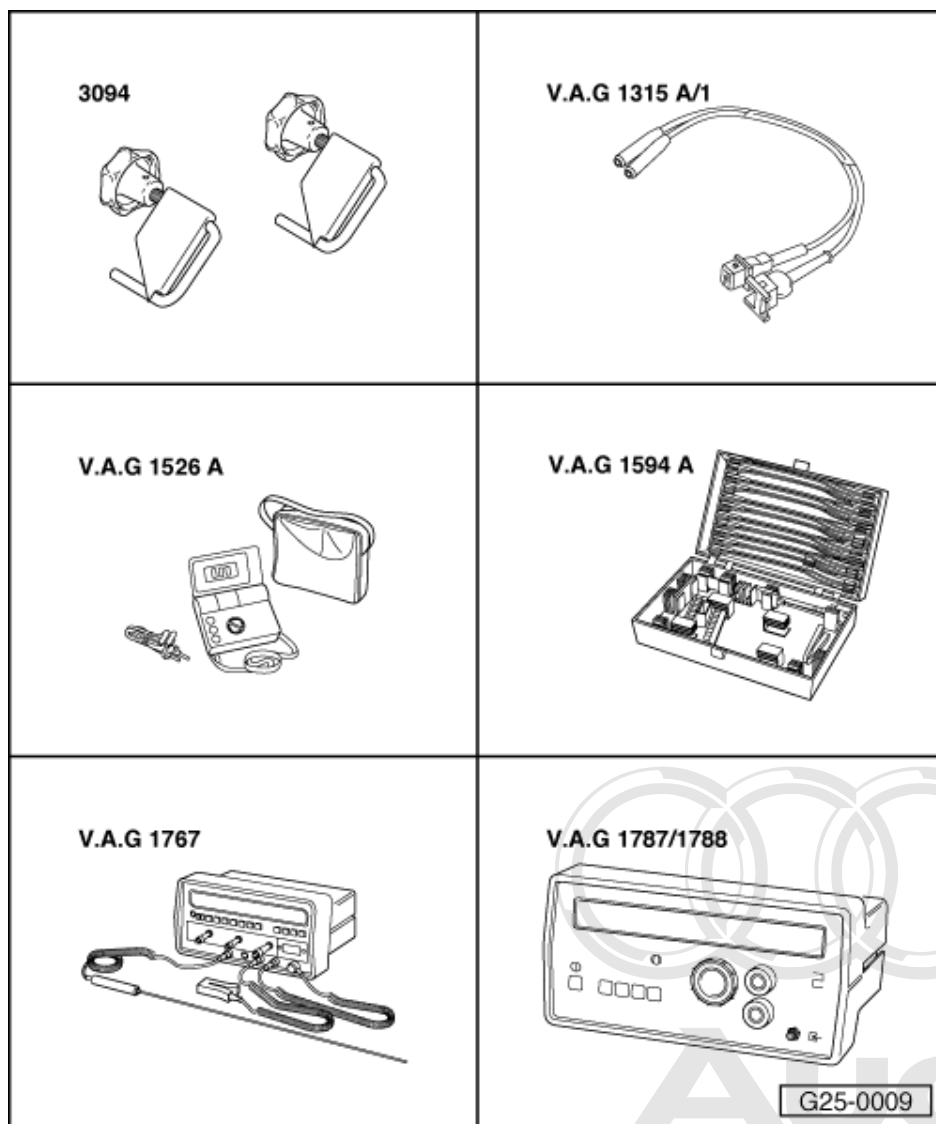


- 28 To shut-off valve for activated charcoal filter
29 To activated charcoal filter
30 Solenoid valve 1 for activated charcoal filter -N80
31 Strainer
♦ Installation position: Bulge points upwards
32 Idling stabilisation valve -N71
33 Crankcase breather

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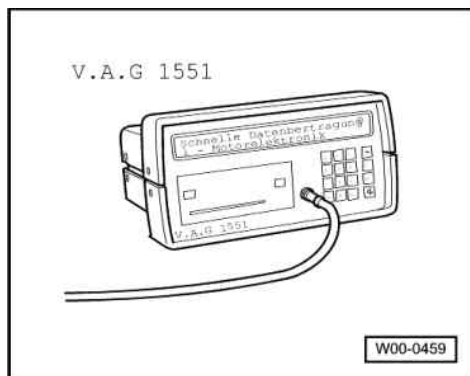
2.3 - Checking idling speed, CO content and ignition point



Special tools and workshop equipment required

- ♦ Hose clamps 3094
- ♦ V.A.G 1315A/1
- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1767 or V.A.G 1367 with V.A.G 1367/8
- ♦ V.A.G 1788

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- ♦ V.A.G 1551 with V.A.G 1551/1

Test requirements:

- No leaks in exhaust system
- Coolant temperature at least 85 °C.
- Electrical consumers switched off (radiator fan must not run during the test).
- Throttle valve in idling position
- Accelerator cable correctly adjusted

=> Fuel Supply System - Petrol Engines; Repair group 20; Servicing accelerator mechanism; Adjusting throttle cable Servicing accelerator mechanism Adjusting throttle cable

- Pressure gauge not connected.
- Lambda control OK (vehicles with catalytic converter)
- Air conditioner switched off.
- Vehicles with automatic gearbox: Selector lever in position P or N.

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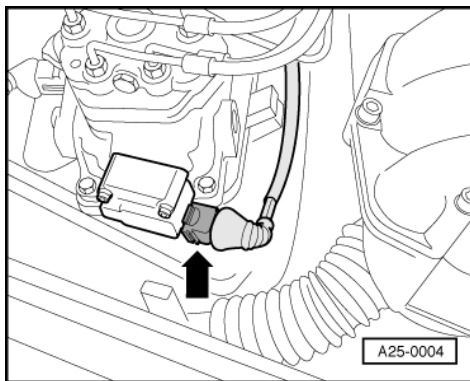
If injector pipes were loosened or replaced: Rev engine several times up to 3000 rpm and allow to idle for at least 2 minutes.

Connect test equipment

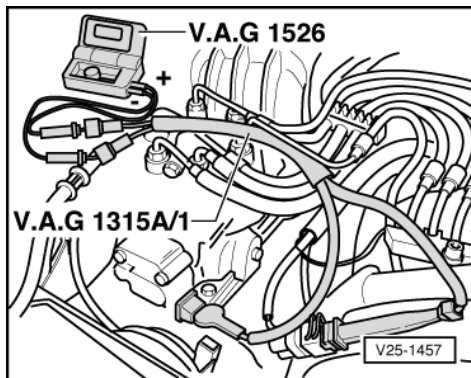
- Connect fault reader V.A.G 1551 => Page 2.
- Interrogate fault memory => Page 4. The fault memory must be clear. If necessary, rectify any faults and erase the fault memory. Switch off the engine, then start up again. Perform road test and interrogate the fault memory again to make sure it is clear.
- Connect exhaust tester V.A.G 1788.

=> Operating Instructions

- Insert measuring probe into exhaust tailpipe.



- -> Pull connector -arrow- off differential pressure regulator.

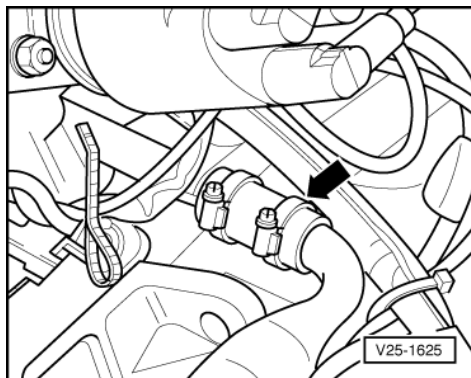


- -> Set multimeter to measuring range 200 mA and connect to test lead V.A.G 1315 A/1 between differential pressure regulator and connector of differential pressure regulator.
- Block hose from ACF valve to activated charcoal filter with hose clamp 3094.
- Pull out oil dipstick.

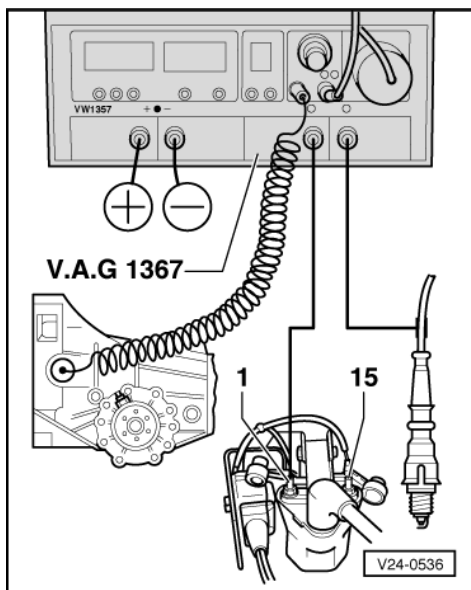
Note:

To avoid oil splashes, cover guide tube with cloth.

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- -> Pull off crankcase breather hose -arrow-, seal metal pipe with suitable plug.



- -> Connect ignition tester V.A.G 1767 (or V.A.G 1367) with ignition switched off:

=> Operating Instructions

Notes:

- ◆ The TDC sender of ignition tester V.A.G 1367 must be inserted into the gearbox housing as far as the stop.
- ◆ The ignition point is indicated directly on V.A.G 1767 (or V.A.G 1367). It is not necessary to use a strobe light aimed at the timing notches.
- ◆ Incorrect measurements may occur with ignition tester V.A.G 1767 if triggering probe is slightly open (e.g. excessive tension on helical cable).

2.4 - Vehicles with catalytic converter and lambda probe

A - Checking idling speed

Note:

The idling speed cannot be adjusted.

- Connect test equipment => Page 83 .
- Start engine and run at idling speed.
- Read off the idling speed on the ignition tester V.A.G 1767 (or V.A.G 1367).
 - Specification: 650...790 rpm1)

1) Current values:

=> "Exhaust Emission Test" binder

B - Checking CO content and ignition point

- On V.A.G 1551 press key "2" for "Flash code output".

-> Indicated on display

Flash code output
with the  key

- Press the  key on V.A.G 1551 until "permanent earth connection on initiating line" appears on display.

Note:

A constant ignition point from VEZ control unit is only applied 4 seconds after pressing  key on V.A.G 1551.

-> Indicated on display

Permanent earth connection on initiating
line

- Continue test sequence depending on altitude of workshop.

Altitude of workshop below 1000 m:

- Read off differential pressure regulator current (for CO content) on hand-held multimeter.
 - Test value -3...+3 mA

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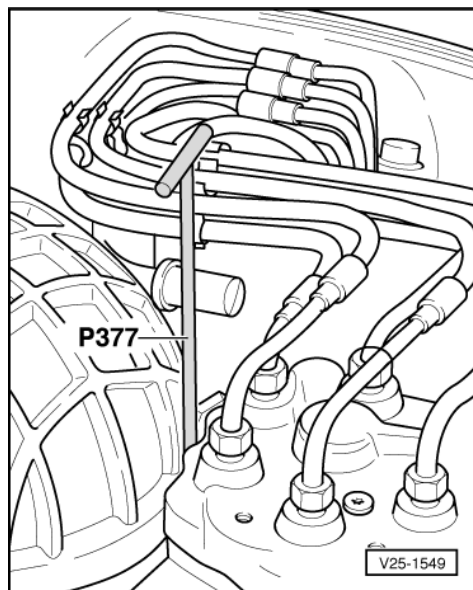
Note:

If displayed differential pressure regulator current (for CO content) is outside tolerance range, differential pressure regulator current must be adjusted before checking ignition point.

- Switch ignition off.
- Drill plug for adjusting screw for differential pressure regulator current centrally with $\varnothing$ 2.5 mm drill to 3.5 ... 4.0 mm depth.



- Remove swarf.



- Insert self-tapping screw $\varnothing 3$ mm.
- Pull out plug using pliers.
- Start engine and run at idling speed.
- ➔ Adjust differential pressure regulator current (for CO content) by turning adjusting screw.
 - Setting value 0 ± 1 mA (fluctuating)
- ◆ When adjusting differential pressure regulator current do not press down adjusting key, do not accelerate with adjusting key inserted.
- ◆ After every adjustment, remove adjusting key and briefly accelerate, before differential pressure regulator current is read off at idling speed.
- Press key "2" for "Flash code output".

-> Indicated on display

Flash code output
with the $\square$ key

- Press the $\Rightarrow$ key on V.A.G 1551 until "permanent earth connection on initiating line" appears on display.

-> Indicated on display

Permanent earth connection on initiating
line

- Continue test sequence.

Continuation of test sequence:

- Read off CO content on exhaust tester.
- Read off ignition point on ignition tester V.A.G 1767 (or V.A.G 1367).

Note:

If ignition point displayed is not within tolerance range, set ignition point while system is still in setting mode "Permanent earth connection on initiating line".

- Adjust ignition point by turning ignition distributor.
 - Setting value $15 \pm 1^\circ$

- Again read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367) and CO content on exhaust tester.
- Exit setting mode by pressing ➔key and increasing speed to above 2500 rpm.
 - The ignition point may vary within the range 0 ...10 °before TDC

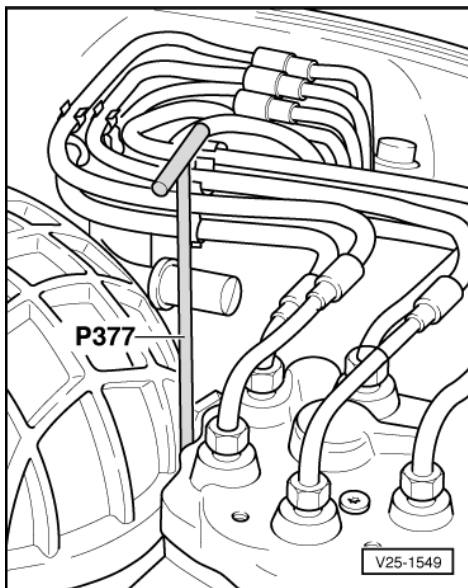
Workshop at altitude above 1000 m:

- Disconnect lambda probe connector (green wire).
- Read off differential pressure regulator current (for CO content) on hand-held multimeter and note down value.
 - Measured value = correction value of altitude sender
- Re-connect lambda probe connector.
- Read off differential pressure regulator current on hand-held multimeter.
 - Maximum permissible deviation from noted value: ± 3 mA

Note:

If differential pressure regulator current deviates by more than 3mA from noted value, differential pressure regulator current must be adjusted before checking ignition point.

- Switch ignition off.
- Drill plug for adjustment screw for differential pressure regulator current centrally with $\varnothing 2.5$ mm drill to 3.5...4.0 mm depth.
- Remove swarf.
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- Insert self-tapping screw $\varnothing 3$ mm
- Pull out plug using pliers.



- Start engine and run at idling speed.
- ➔ Adjust differential pressure regulator current (for CO content) to initially noted value by turning adjusting screw.
 - Tolerance ± 1 mA
- ◆ When adjusting differential pressure regulator current do not press down adjusting key, do not accelerate with adjusting key inserted.
- ◆ After every adjustment, remove adjusting key and briefly accelerate, before differential pressure regulator current is read off at idling speed.
- Press key "2" for "Flash code output".

-> Indicated on display



Flash code output
with the  key

- Press the ➡ key on V.A.G 1551 until "permanent earth connection on initiating line" appears on display.

-> Indicated on display

Permanent earth connection on initiating
line

- Continue test sequence.

Continuation of test sequence:

- Read off CO content on exhaust tester.
- Read off ignition point on ignition tester V.A.G 1767 (or V.A.G 1367).

Note:

If ignition point displayed is not within tolerance range, set ignition point while system is still in setting mode "Permanent earth connection on initiating line".

- Adjust ignition point by turning ignition distributor.
- Setting value $15 \pm 1^\circ$
- Again read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367) and CO content on exhaust tester.
- Exit setting mode by pressing ➡ key and increasing speed to above 2500 rpm.
 - The ignition point may vary within the range $0 \dots 10^\circ$ before TDC

2.5 - Vehicles without catalytic converter and without lambda probe

A - Checking idling speed

Note:

The idling speed cannot be adjusted.

- Connect test equipment => Page 83 .
- Start engine and run at idling speed.
- Read off the idling speed on the ignition tester V.A.G 1767 (or V.A.G 1367).
 - Specification: 650...790 rpm¹⁾

1) Current values:

=> "Exhaust Emission Test" binder

B - Checking CO content and ignition point

- On V.A.G 1551 press key "2" for "Flash code output".

-> Indicated on display

Flash code output
with the  key

- Press the ➡ key on V.A.G 1551 until "permanent earth connection on initiating line" appears on display.

Note:

A constant ignition point from VEZ control unit is only applied 4 seconds after pressing ➡ key on V.A.G 1551.

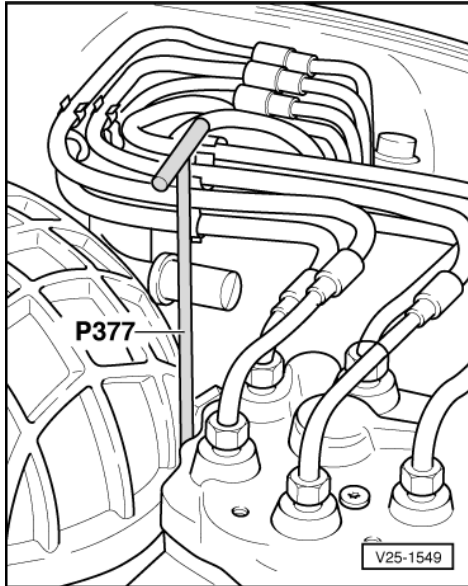
-> Indicated on display

Permanent earth connection on initiating line

- Read off CO content on exhaust tester.

Note:

If displayed CO content is outside tolerance range, CO content must be adjusted before checking ignition point.



- Switch ignition off.
- Drill plug for adjustment screw for CO content centrally with $\varnothing$ 2.5 mm drill to 3.5...4.0 mm depth.
- Remove swarf.
- Insert self-tapping screw $\varnothing$ 3 mm.
- Pull out plug using pliers.
- Start engine and run at idling speed.
- > Adjust CO content by turning adjusting screw.
- Setting value 1.0 ± 0.2 vol. %
- ◆ When adjusting CO content do not press down adjusting key, do not accelerate with adjusting key inserted.
- ◆ After every adjustment, remove adjusting key and briefly accelerate, before CO content is read off at idling speed.
- Press key "2" for "Flash code output".

-> Indicated on display

Flash code output
with the  key

- Press the $\Rightarrow$ key on V.A.G 1551 until "permanent earth connection on initiating line" appears on display.

-> Indicated on display

Permanent earth connection on initiating line

- Continue test sequence.

Continuation of test sequence:

- Read off CO content on exhaust tester.
- Read off ignition point on ignition tester V.A.G 1767 (or V.A.G 1367).

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Note:

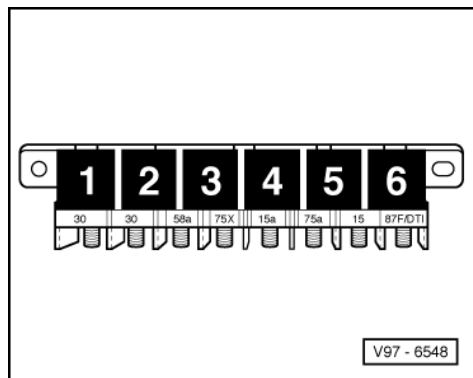
If ignition point displayed is not within tolerance range, set ignition point while system is still in setting mode "Permanent earth connection on initiating line".

- Adjust ignition point by turning ignition distributor.
 - Setting value $15 \pm 1^\circ$
- Again read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367) and CO content on exhaust tester.
- Exit setting mode by pressing ➔key and increasing speed to above 2500 rpm.
 - The ignition point may vary within the range $0...10^\circ$ before TDC

Note:

Concerns only vehicles without lambda control: If CO content increases after idling test with crankcase breather hose fitted, this is not due to an incorrect setting, but due to over-richness from crankcase resulting from oil dilution after repetitive shorts trips. After a prolonged, fairly fast drive on out-of-town roads the fuel proportion in the oil will reduce and the CO content will normalise again. A short-term solution is achieved by changing the oil.

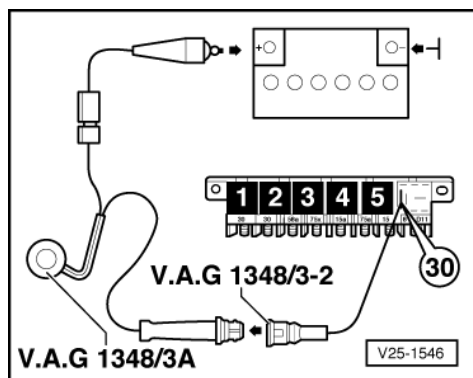
2.6 - Connecting remote control V.A.G 1348/3A with adapter cable V.A.G 1348/3-2



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Procedure

- ➔ Pull out fuel pump relay (on central electrics beneath dash panel on left, position 6).

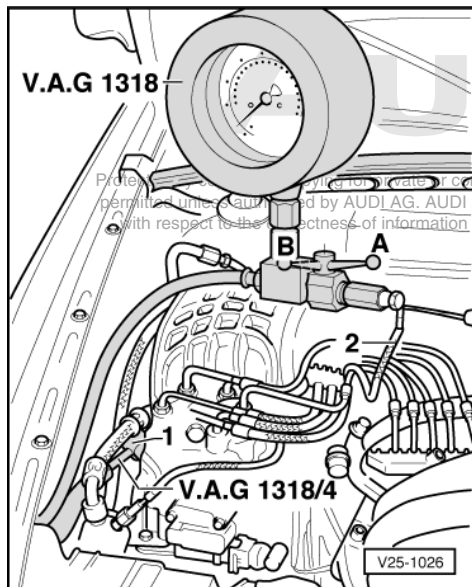


- ➔ Connect remote control V.A.G 1348/3A with adapter cable V.A.G 1348/3-2 to contact 30 of relay socket of position 6.
- Connect clamp to vehicle battery (+).

2.7 - Connecting pressure gauge V.A.G 1318 with test adapter 1318/4

Note:

Always use new sealing rings.



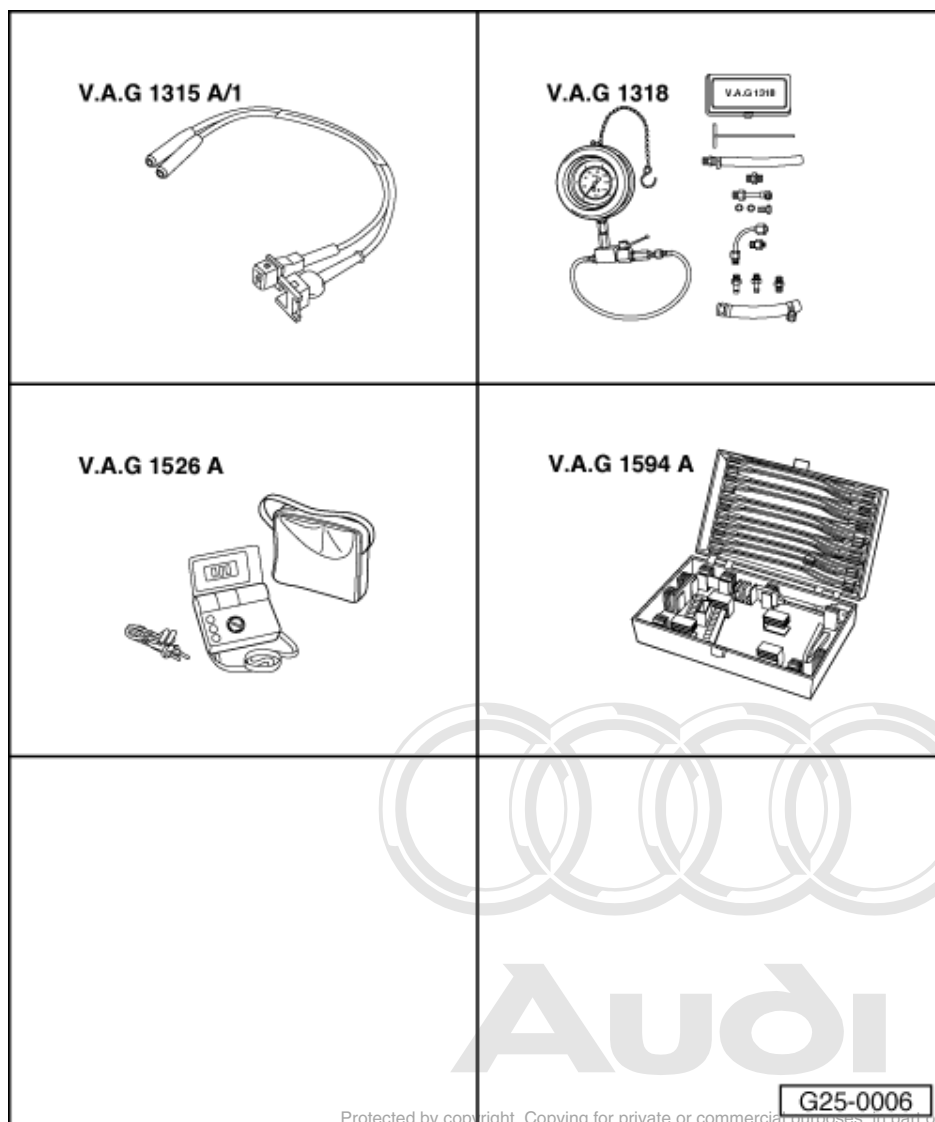
- -> Connect pressure gauge V.A.G 1318 with test adapter 1318/4 to measuring point -1- of fuel distributor.
- Unscrew line -2- from cold start valve and connect this to pressure gauge V.A.G 1318; Lever on pressure gauge in position -open- (lever in direction of flow).

Position of cut-off valve:

- A - Open
- B - Closed



2.8 - Checking system pressure, differential pressure and holding pressure



G25-0006

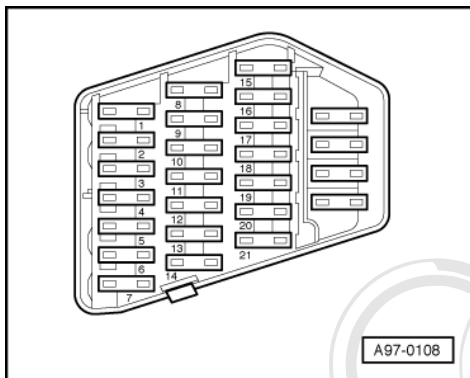
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Special tools and workshop equipment required

- ♦ V.A.G 1315 A/1
- ♦ V.A.G 1318
- ♦ V.A.G 1318/4
- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ Measuring container, fuel tight

Test requirements:

- Battery voltage at least 11 V



- -> Fuse S17 OK (in fuse box)
- Fuel pump relay OK; checking => Page 35 .
- Fuel pump OK; checking:

=> Fuel Supply System - Petrol Engines; Repair group 20; Fuel supply Fuel supply

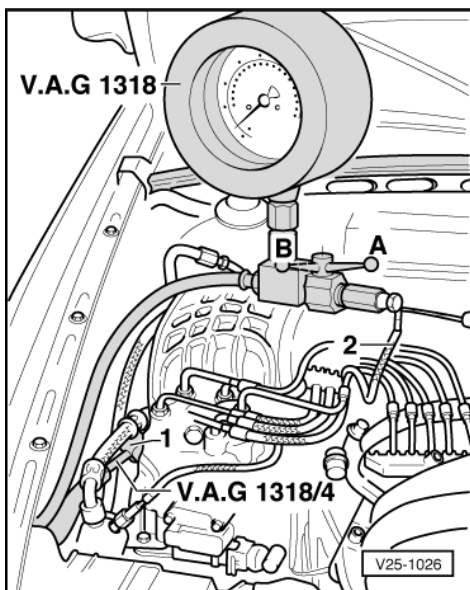
- Fuel filter OK
- Remote control V.A.G 1348/3A with adapter cable V.A.G 1348/3-2 connected => Page 90 .
- Pressure gauge V.A.G 1318 with test adapter 1318/4 connected => Page 91 .

Important

The fuel system is pressurised. Before opening the system place a cloth around the connection. Then release pressure by carefully loosening the connection.

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Checking system pressure and fuel pressure regulator



- -> Open cut-off valve on pressure gauge V.A.G 1318 -Position A-
- Press remote control switch.
 - Specification: 6.1...6.5 bar

If specification is not attained:

- Renew pressure regulator.

If nominal value is exceeded:

- Disconnect return hose from pressure regulator at connection of return hose/return line and hold in a container.



- Repeat test.

If the specification is attained:

- Check that return line is not blocked.

If specification is again exceeded:

- Renew pressure regulator.

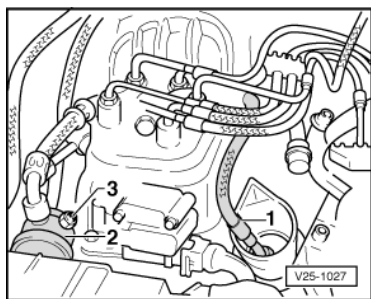
Checking differential pressure

- Close cut-off valve on pressure gauge V.A.G 1318 (lever at right angles to direction of flow).
- Detach connector from differential pressure regulator.
- Press remote control switch.

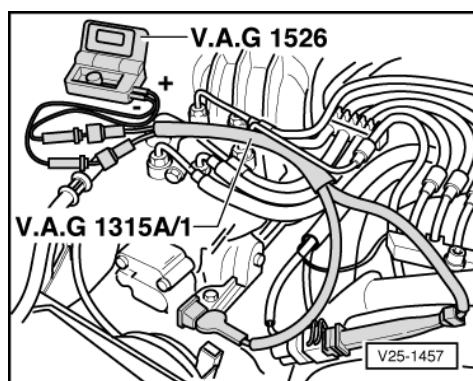
- Specification of differential pressure: 0.3...0.5 bar below system pressure

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If specification not attained or exceeded:



- -> Unscrew thin line -1- on fuel pressure regulator -2- and hold in a measuring container.
- Seal connection -3- on fuel pressure regulator.
- Press remote control switch.
- Specification of overflow volume: 130...150 cm³
- Replace fuel pressure regulator, if necessary.
- Screw thin line securely back onto fuel pressure regulator.



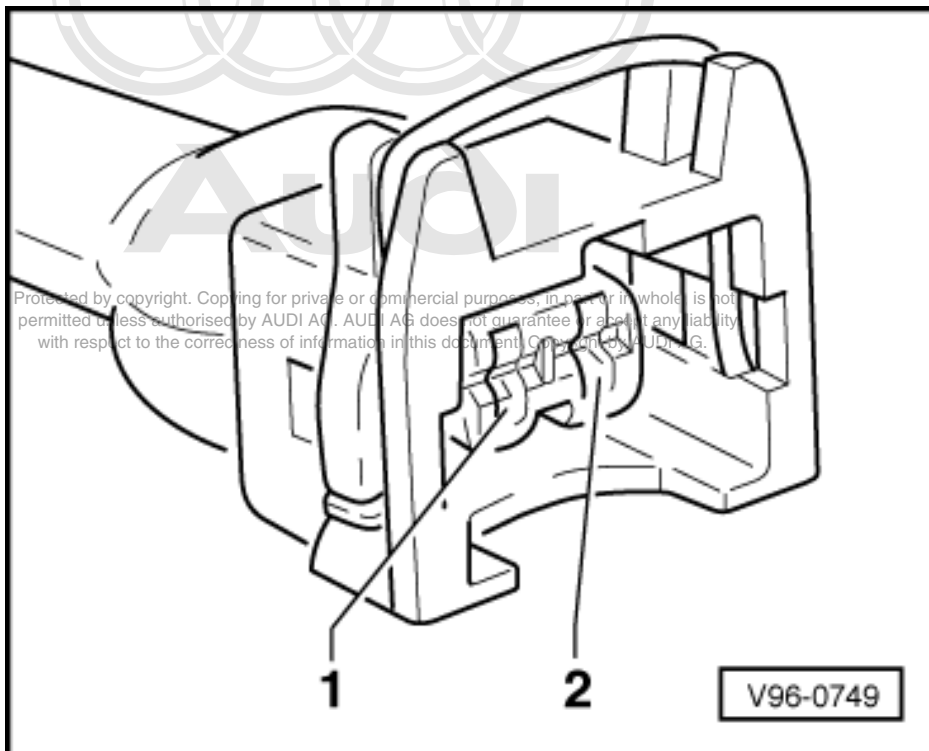
- -> Set multimeter to measuring range 200 mA and connect to test lead V.A.G 1315 A/1 between differential pressure regulator and connector of differential pressure regulator.
- Switch the ignition on.
- Press remote control switch.
- Specification of differential pressure: 1.2...1.5 bar below system pressure
- Specification of differential pressure regulator current: 95...105 mA

If specification for differential pressure is exceeded or not attained:

- Replace differential pressure regulator.

If specification for differential pressure and differential pressure regulator current is exceeded or not attained:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connections:

Connector Contact	Test box V.A.G 1598 A Socket
1	4
2	5

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If no wiring fault is detected:

- Replace KE III Jetronic control unit
=>Page 31 .

Checking holding pressure:

Note:

Only carry out following test on vehicles with hot starting problems.

- Press switch on remote control for approx. 5 seconds.
- Check holding pressure on gauge.
 - After 10 minutes the remaining pressure should be at least 3.5 bar.
 - After 20 minutes the remaining pressure should be at least 3.4 bar.

If holding pressure drops below minimum value, the following faults are possible:



- ♦ Non-return valve in fuel pump defective:

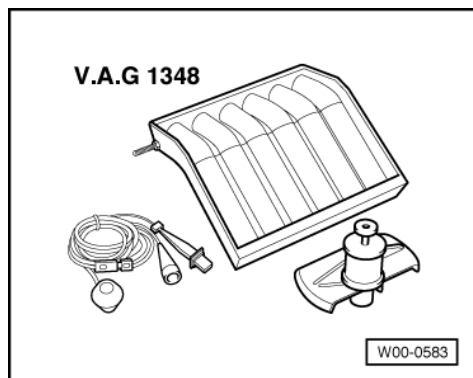
=> Fuel Supply System - Petrol Engines; Repair group 20; Fuel supply Fuel supply

- ♦ Free play of baffle plate not OK, check =>Page **103** .
- ♦ Check screw connections of injection and fuel lines on fuel distributor for leaks.
- ♦ Fuel pressure regulator defective

Note:

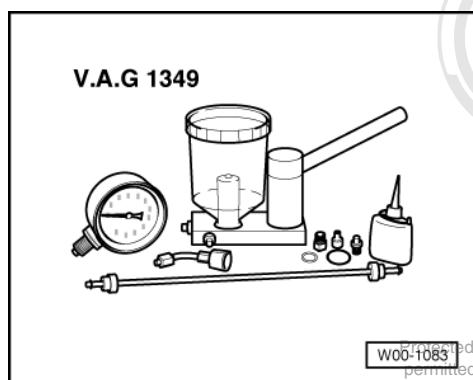
Before removing the pressure gauge, release fuel pressure at the gauge.

2.9 - Checking injectors (comparison measurement of injection quantity)



Special tools and workshop equipment required

- ♦ Quantity comparison measuring instrument V.A.G 1348
- ♦ Adjusting device V.A.G 1348/1A
- ♦ Measuring device V.A.G 1348/2B



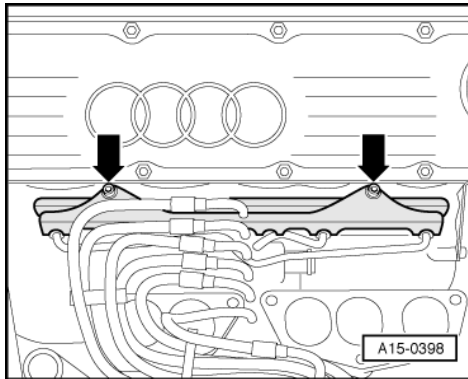
- ♦ Injector tester V.A.G 1349

Note:

Spray pattern of injectors with Viton seals cannot be tested.

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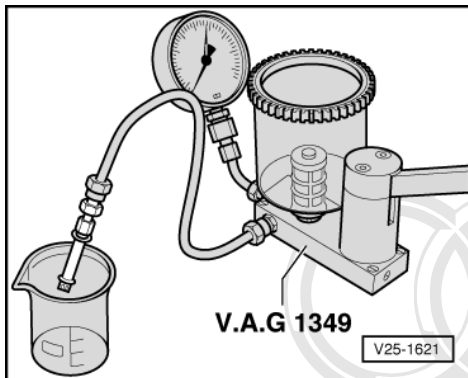
Check spray pressure and for leaks



- Remove upper part of intake manifold:

=> 5-cylinder Engine (2-valve), Mechanical Components; Repair group 15; Removing and installing cylinder head; Removing and installing upper part of intake manifold Removing and installing cylinder head Removing and installing upper part of intake manifold

- -> Unscrew bolts -arrows-.
- Remove retaining plates.
- Remove injectors from lower part of intake manifold and set aside.
- Disconnect fuel line on injector to be checked.



- -> Connect injector to V.A.G 1349.
- Bleed line to injector with union nut open by operating lever on V.A.G 1349 several times.
- Tighten union nut.
- Bleed injector by operating lever on V.A.G 1349 rapidly 10...15 times.
- Open cut-off valve.
- Check spray pressure by operating lever slowly.
 - Specification: 3.7 ... 4.8 bar

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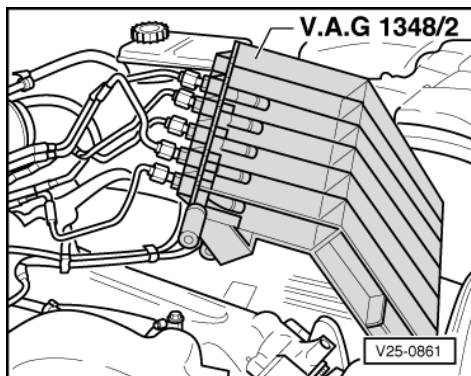
If specification is not attained:

- Replace injector.

If specification is attained:

- Carefully increase pressure up to just below opening pressure and wait.
 - No drip should emerge from injector within 2 minutes.

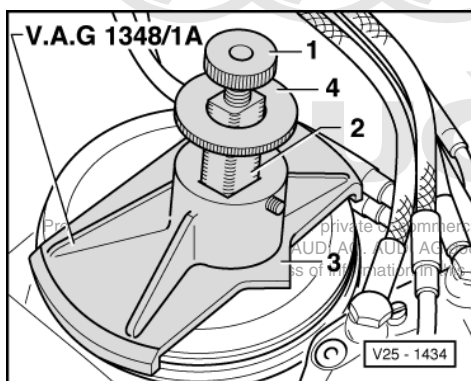
Checking idling speed injection tolerance



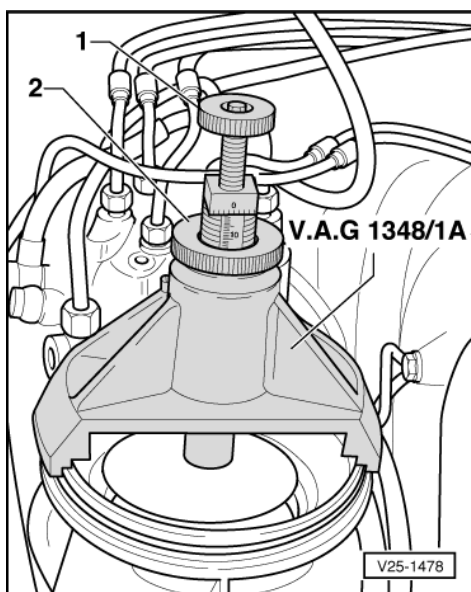
- Connect remote control V.A.G 1348/3A with adapter cable V.A.G 1348/3-2 => Page 90 .
- Screw fuel lines back onto injectors.
- -> Insert all injectors into V.A.G 1348/2.

Note:

Ensure that fuel lines are routed free of kinks, if necessary remove from retaining clips.



- -> Screw adjusting screw -1- and knurled nut -4- on V.A.G 1348/1A into upper end position and pull slide -2- upwards.
- Position V.A.G 1348/1A on edge of air flow meter so that tip -3- points towards fuel distributor.
- Push in slide -2- up to stop.
- Hold baffle plate in rest position by hand.
- Screw adjusting screw -1- in until magnetic base makes contact with securing bolts of baffle plate.



- -> Turn knurled nut -2- 15 mm downwards.
- Press switch on remote control for 20 seconds.
- Compare fuel quantities of injectors with each other.
 - Maximum permissible deviation: 2.5 ml on all injectors

Note:

Hold measuring device horizontal.

If deviation is greater:

- Interchange injectors with greatest and smallest injection quantities.
- Empty V.A.G 1348/2.
- Repeat test.

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If differing fuel quantity has migrated with injector:

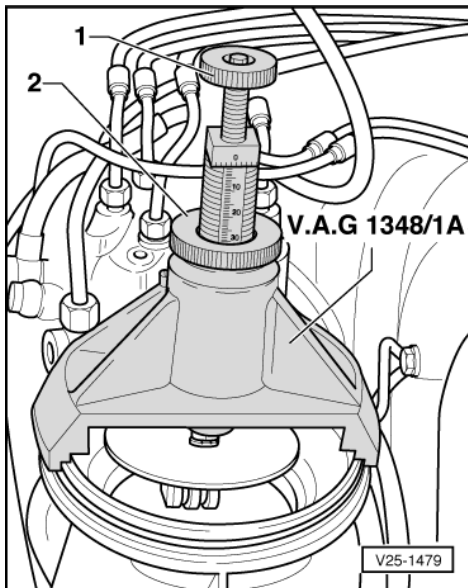
- ♦ Injector defective

If differing fuel quantity has remained at same cylinder:

- ♦ Line to injector restricted or fuel distributor defective

Checking full throttle injection tolerance

- Empty V.A.G 1348/2.



- -> Turn knurled nut -2- 30 mm downwards.
- Press switch on remote control for 20 seconds.
- Compare fuel quantities of injectors with each other.
 - Maximum permissible deviation: 8.0 ml on all injectors

Note:

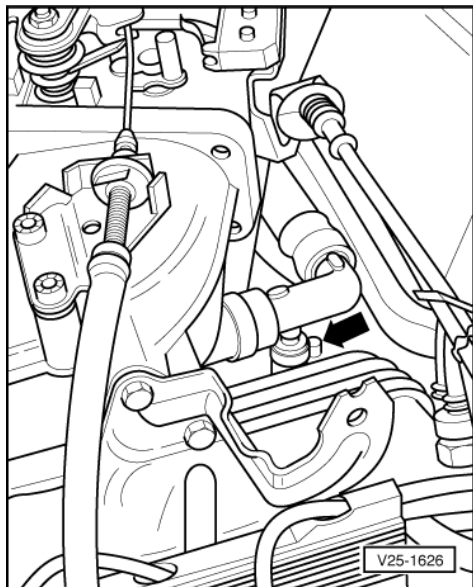
Hold measuring device horizontal.

2.10 - Leak testing air-shrouded injectors and inserts

- Remove upper part of intake manifold:



=> 5-cylinder Engine (2-valve), Mechanical Components; Repair group 15; Removing and installing cylinder head; Removing and installing upper part of intake manifold Removing and installing cylinder head Removing and installing upper part of intake manifold



- -> Disconnect hose -arrow- to the air-shrouded injectors.

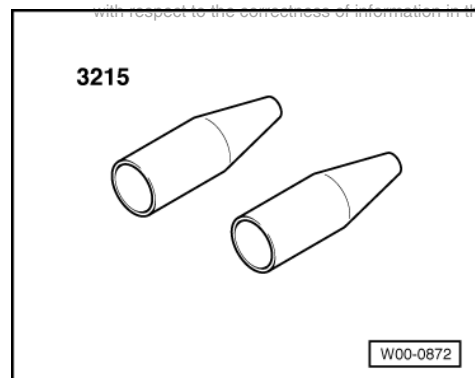
Note:

Shown in illustration with CCS box removed.

- Spray injectors and injector inserts with non-flammable leak detector spray.
- Using a compressed air gun, apply a pressure of 1 bar in hose connection piece -arrow- to air-shrouded injectors. Attach auxiliary hose if necessary.
- If bubbles emerge between cylinder head and injector insert, check injector insert, replace if necessary => Page 102 .
- If bubbles emerge between injector insert and injector, replace O-rings => Page 100 .

2.11 - Removing and installing injectors

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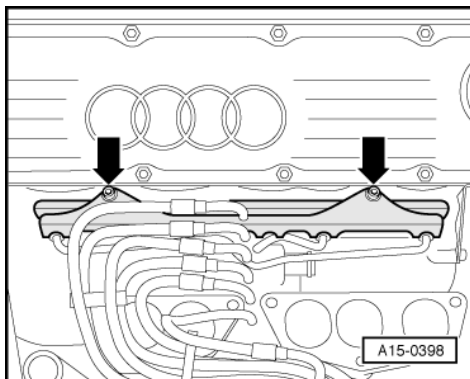


- ♦ Assembly sleeves 3215

Removing

- Remove upper part of intake manifold:

=> 5-cylinder Engine (2-valve), Mechanical Components; Repair group 15; Removing and installing cylinder head; Removing and installing upper part of intake manifold Removing and installing cylinder head Removing and installing upper part of intake manifold



- -> Unscrew bolts -arrows-.
- Remove retaining plates.
- Pull out injector from lower part of intake manifold.

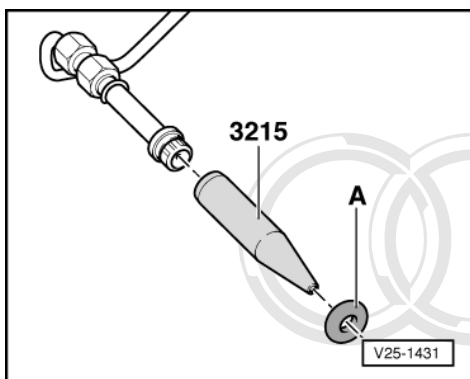
Note:

Ensure that fuel lines are not kinked.

- If injector is to be replaced, it must be unscrewed from injector pipe.
- Remove upper and lower O-ring on injector.

Installing

Installation is carried out in the reverse order; note the following:



- -> Lubricate large O-ring -A- (green) with fuel and push it onto assembly sleeve 3215.
- Fit assembly sleeve 3215 onto injector and push O-ring in until it catches in rear annular groove of injector.
- Lubricate small O-ring with fuel and insert it in front groove of injector.

Tightening torques

Component	Nm
Retaining plates to lower part of intake manifold	10
Injector pipe to injector	20

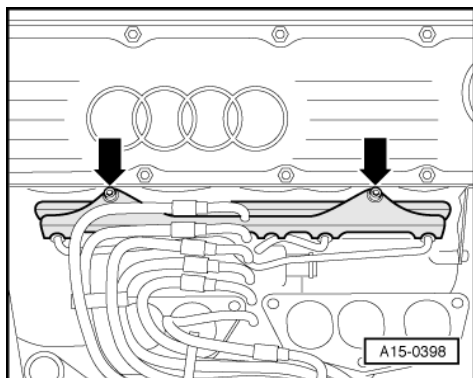
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2.12 - Removing and installing injector insert

Removing

- Remove upper part of intake manifold:

=> 5-cylinder Engine (2-valve), Mechanical Components; Repair group 15; Removing and installing cylinder head; Removing and installing upper part of intake manifold Removing and installing cylinder head Removing and installing upper part of intake manifold



- -> Unscrew bolts -arrows-.
- Remove retaining plates.
- Pull out injector from lower part of intake manifold.

Note:

Ensure that fuel lines are not kinked.

- Carefully lever out injector insert using a screwdriver.

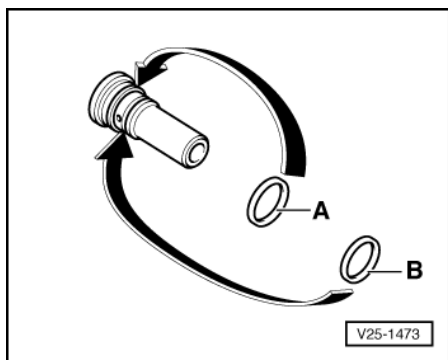
Note:

Replace damaged injector insert.

Installing

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Installation is carried out in the reverse order; note the following:



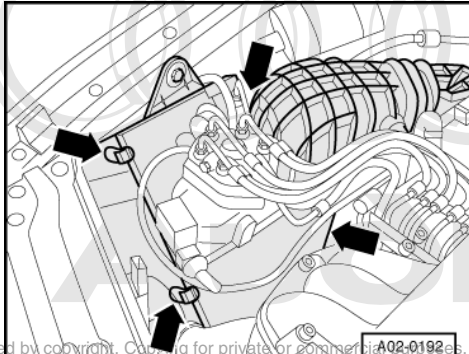
- -> Lubricate black O-ring -A- with fuel and insert it in upper annular groove on injector insert.
- Lubricate green O-ring -B- with fuel and insert it in lower groove on injector insert.
- Insert injector insert into lower part of intake manifold and push it in with fingers until felt to engage.

2.13 - Checking adjusting lever and control piston

- Actuate starter for approx. 10 seconds to build up the control pressure.

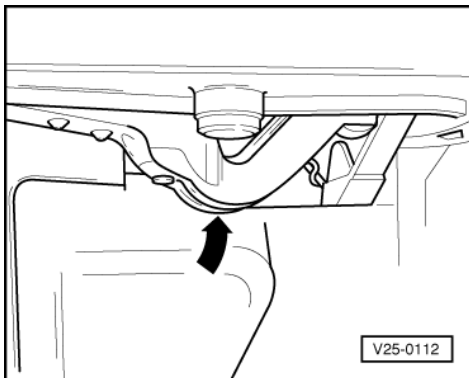
or

- Press switch of remote control for approx. 10 seconds (connect remote control V.A.G 1348/3A with adapter cable V.A.G 1348/3-2 => Page 90).
- Detach air intake cowl.



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- -> Release clips around air cleaner housing -arrows-.
- Pull out mixture control unit with upper section of air cleaner housing from above.



- -> Lift baffle plate -arrow- from below.
- The lever must have even resistance throughout entire travel.
- There must be no noticeable resistance during rapid downwards movement
- Replace air flow meter if necessary.

If lever moves upwards with difficulty, but downwards with ease, the control piston is sticking:

- Replace fuel distributor.

If lever moves upwards and downwards with difficulty:

- Renew air flow meter.

2.14 - Checking and adjusting rest position and free play of baffle plate

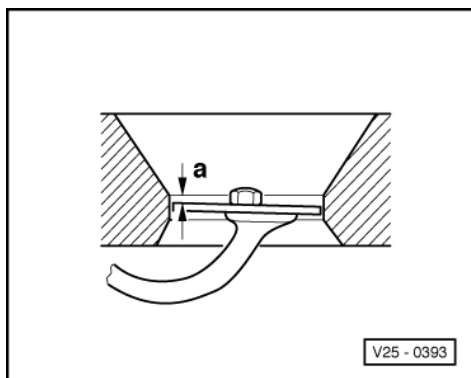
Test requirements:

- Engine oil temperature at least 50 °C



Test sequence

- Actuate starter for approx. 10 seconds to build up the control pressure.
- or
- Press switch of remote control for approx. 10 seconds (connect remote control V.A.G 1348/3A with adapter cable V.A.G 1348/3-2 => Page 90).
- Detach air intake cowl.

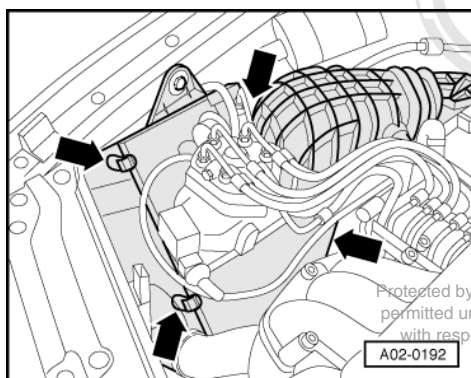


Checking rest position

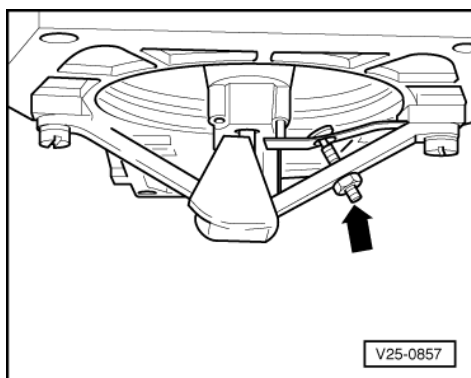
- -> Upper edge of baffle plate must lie under tapered edge of air funnel by dimension -a-.
- Dimension a = 1.9 + 1.1 mm

Adjusting rest position

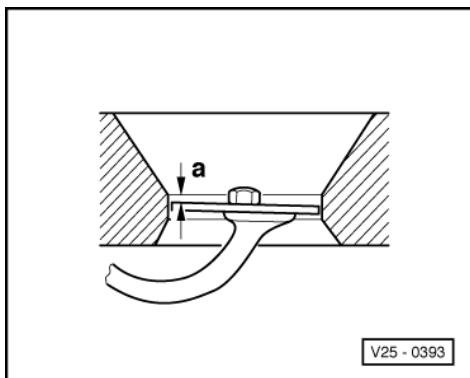
- Detach air intake cowl.



- -> Release clips around air cleaner housing -arrows-.
- Pull out mixture control unit with upper section of air cleaner housing from above.
- Remove filter element.

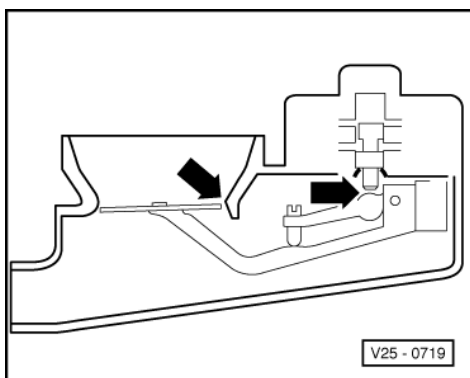


- -> Adjust rest position of baffle plate at adjusting screw -arrow- so ...



- -> ...that upper edge of baffle plate lies under tapered edge of air funnel by dimension -a-.
- Dimension $a = 1.9 + 1.1 \text{ mm}$

Checking free play of baffle plate



-> The free play is the play between control piston and adjusting lever -arrow right-, measured at fuel distributor side of baffle plate -arrow left-.

- Actuate starter for approx. 10 seconds to build up the control pressure.
- or
- Press switch of remote control for approx. 10 seconds (connect remote control V.A.G 1348/3A with adapter cable V.A.G 1348/3-2 => Page 90).
- Lift baffle plate slightly until a resistance is felt.
 - Free play min.: perceptible play
 - Free play max.: up to tapered edge
air funnel = 2.1 mm

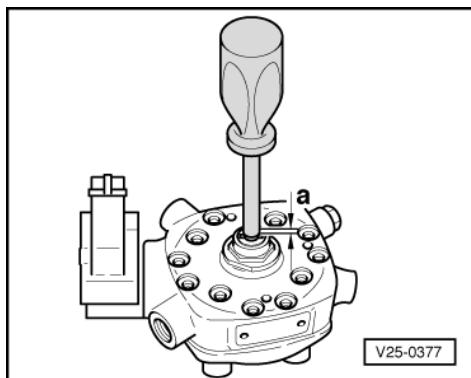
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If free play is not OK:

- Adjust free play on fuel distributor.



Adjusting free play on fuel distributor



- -> Adjust free play of baffle plate using e.g. tool Hazet 2566 at stop bolt for control piston.

Change dimension -a-:

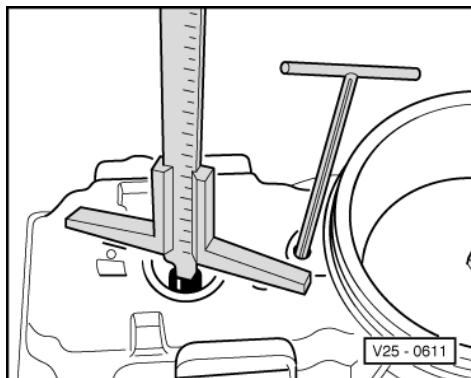
- Screw in = free play increases
 - Screw out = free play decreases
 - 1/4 turn = approx. 1.3 mm at baffle plate
- Check idling speed, CO content and ignition point => Page 82 .

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2.15 - Basic setting of adjusting lever

Note:

The basic setting of adjusting lever is only necessary when replacing fuel distributor or air flow meter.



- -> Measure distance between contact surfaces for fuel distributor on air flow meter and roller of adjusting lever.
- Specification: 21.3 ± 0.1 mm
- Adjust distance at CO adjusting screw if necessary.

Note:

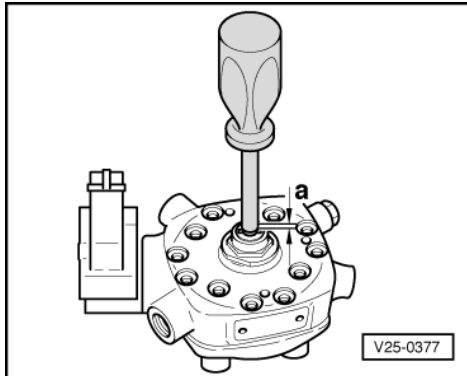
This setting loses its validity after adjustment of CO content (differential pressure regulator current) to specification.

2.16 - Adjusting stop bolt for control piston

Note:

Adjustment of stop bolt is only necessary after replacement of seal for control piston.

- Perform following steps before turning stop bolt:
 - Mark position of stop bolt using a scribe.



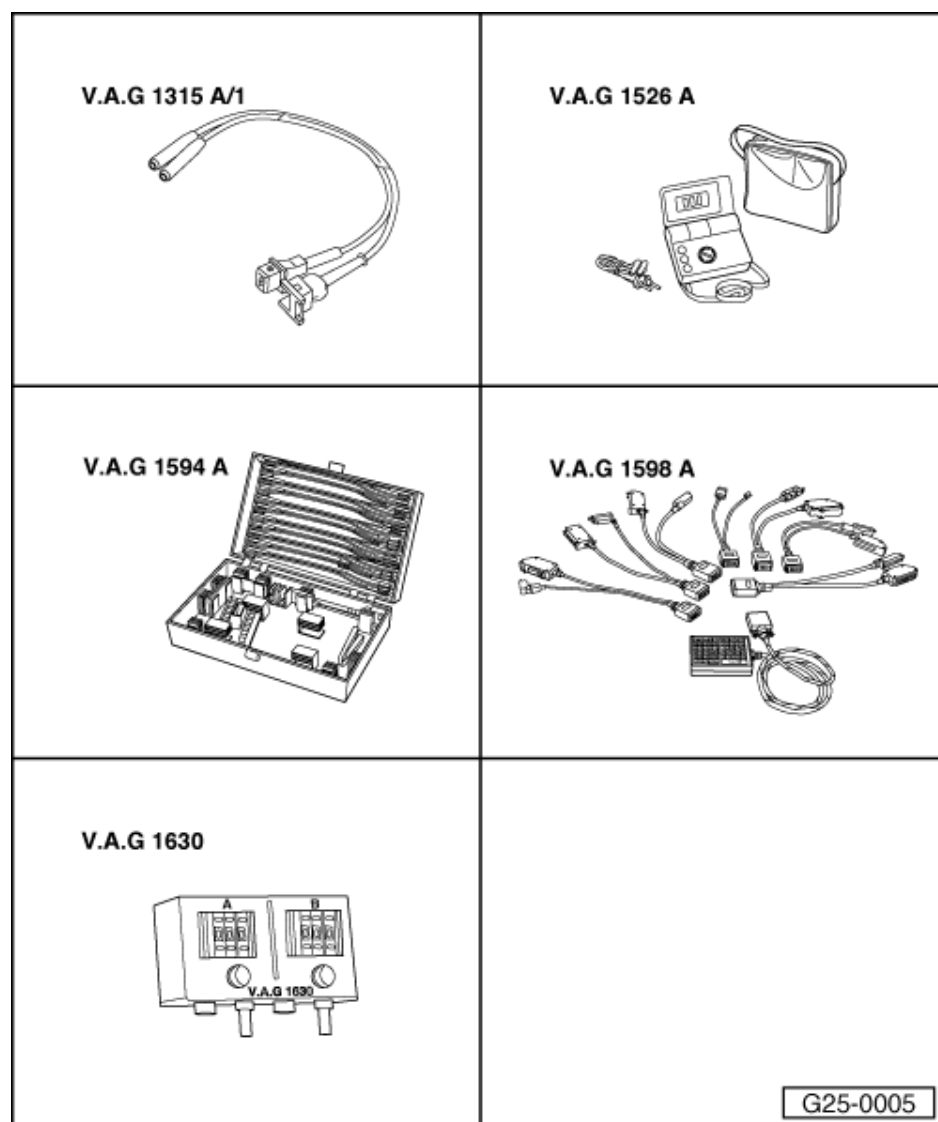
- -> Measure distance -a- between stop bolt and collar of hexagon nut and note down this value. Unscrew stop bolt for control piston using e.g. tool Hazet 2566. Replace sealing ring for stop bolt.
- Smaller $\varnothing$ of sealing ring faces control piston. Screw in stop bolt up to noted value -a-.
- Check rest position and free play of baffle plate => Page 103.

Notes:

- ◆ Mechanical cleaning of control piston is not permissible.
- ◆ If control piston shows heavy scoring or if cleaning with clean petroleum cleansing fluid does not result in ease of movement, the fuel distributor must be replaced.



2.17 - Checking cold / acceleration enrichment



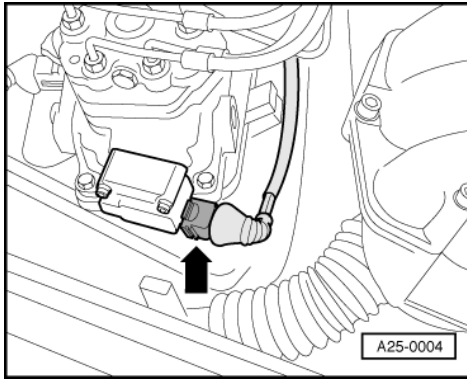
Special tools and workshop equipment required

- ♦ V.A.G 1315 A/1
- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3
- ♦ V.A.G 1630

Test requirements:

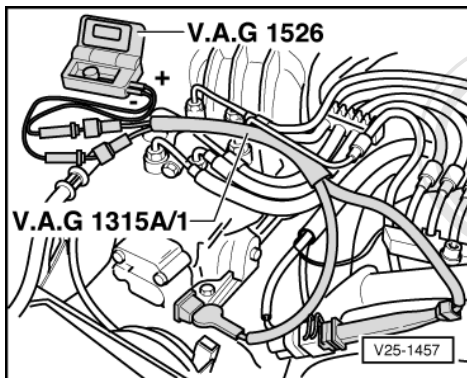
- No faults stored in fault memory
- Check that differential pressure regulator is OK =>Page 72 .

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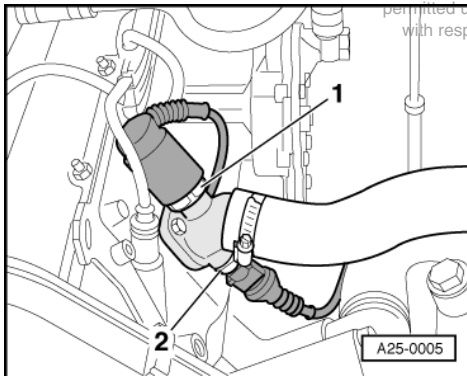
Test sequence

- -> Detach connector -arrow- from differential pressure regulator.

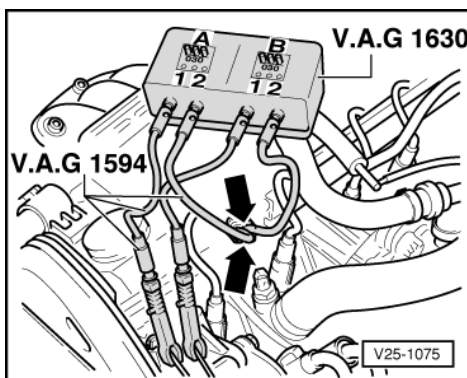


- -> Set multimeter to measuring range 200 mA and connect to test lead V.A.G 1315 A/1 between differential pressure regulator and connector of differential pressure regulator.

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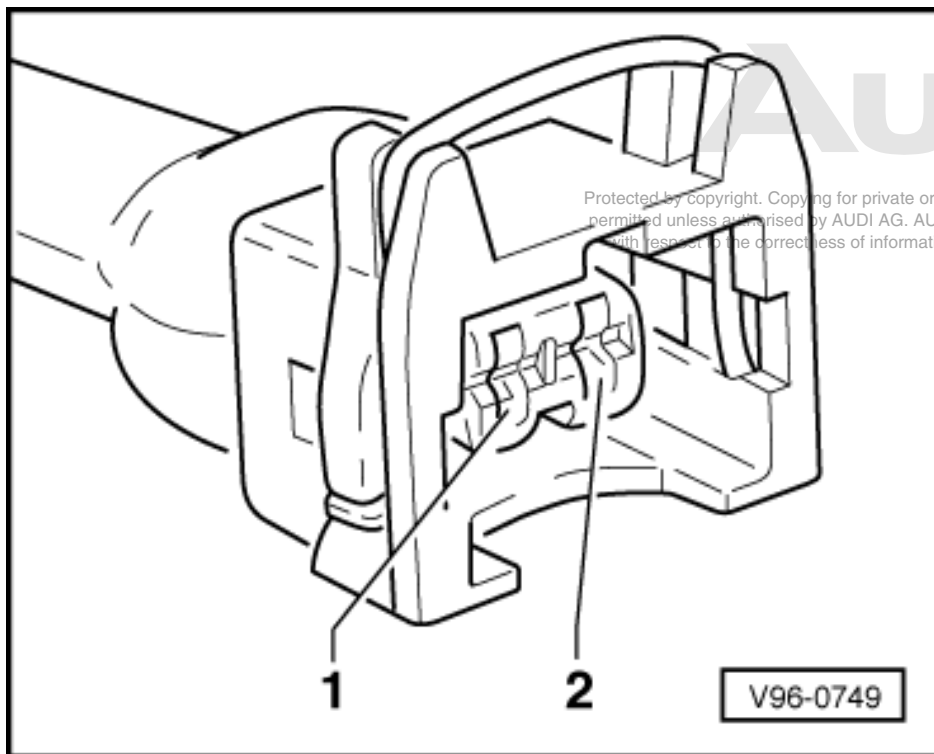
- -> Unplug connector at coolant temperature sender -G62 -2-.



- -> Connect side A and B of digital potentiometer V.A.G 1630 to unplugged connector of coolant temperature sender and to earth.
- Set side A and B of V.A.G 1630 to 3.0 kW.
- Start engine and run at idling speed.
- Read off differential pressure regulator current on multimeter and note down value.
- Fully open throttle valve suddenly and release accelerator mechanism again (burst of throttle).
 - Specification: Brief increase, min.: 6.0 mA

If specification is not attained:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connection:

Connector -G62 Contact	Test box V.A.G 1598 A Socket
2	3

- Rectify any open/short circuit as necessary.

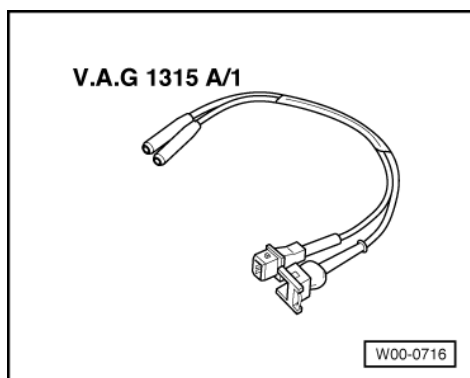
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If the wiring is OK:

- Replace KE III Jetronic control unit =>Page 31 .

2.18 - Checking overrun cut-off and function of idling switch

Special tools and workshop equipment required



- ♦ Test lead V.A.G 1315A/1



- ♦ V.A.G 1526 A

Test requirements:

- Check that differential pressure regulator is OK =>Page **72**.
- Coolant temperature at least 85 °C.
- Electrical consumers switched off (radiator fan must not run during the test).
- Air conditioning switched off.

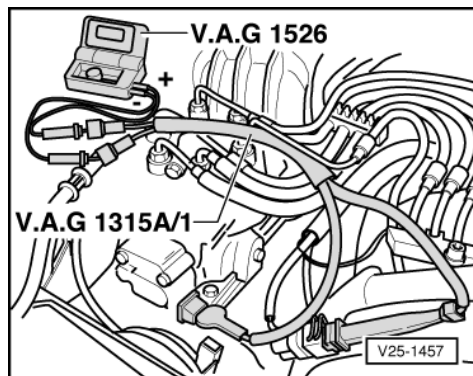
Note:

The following check also checks the function of idling switch.



Test sequence

- Detach connector from differential pressure regulator.



- -> Set multimeter to measuring range 200 mA and connect to test lead V.A.G 1315 A/1 between differential pressure regulator and connector of differential pressure regulator.
- Switch the ignition on.
 - Differential pressure regulator current must be displayed in positive range

If differential pressure regulator current is displayed in negative range:

- Interchange connections on V.A.G 1315 A/1.
- Increase engine speed to over 4000 rpm and suddenly release accelerator mechanism.
 - Specification: Briefly -50...-60 mA

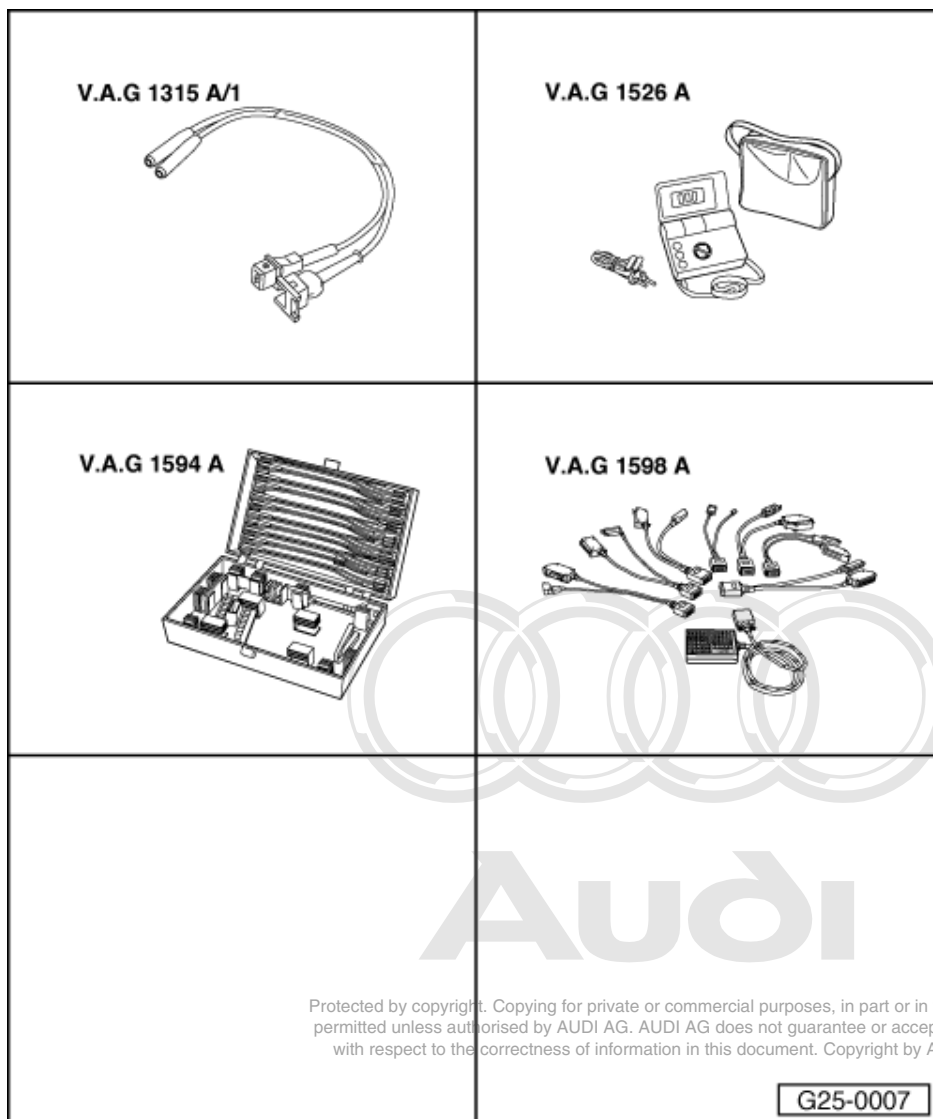
If no value is displayed:

- Check idling switch -F60
=> Page 60 respectively.

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3 - Checking lambda control

3.1 - Checking lambda control



3.2 - Testing Lambda probe -G39 and Lambda control

Special tools and workshop equipment required

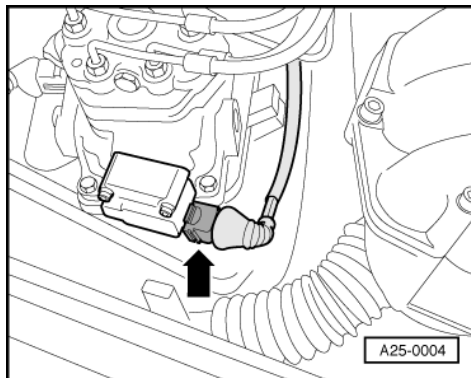
- ◆ V.A.G 1315 A/1
- ◆ V.A.G 1526 A
- ◆ V.A.G 1594 A
- ◆ V.A.G 1598 A
- ◆ V.A.G 1598/3

Test requirements:

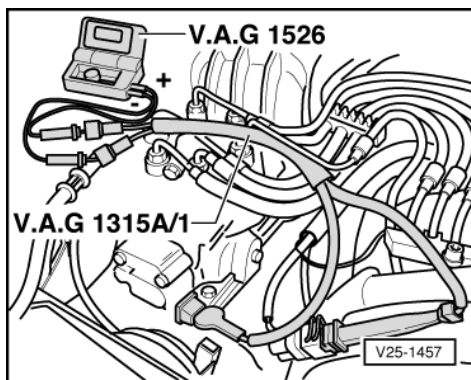
- Coolant temperature at least 85 °C.
- Idling speed OK
- Check that differential pressure regulator is OK =>Page 72 .
- No leak in exhaust system between catalytic converter and cylinder head.
- Lambda probe heater OK; testing => Page 116 .



- Coolant temperature sender -G62 OK; checking => Page 144 .

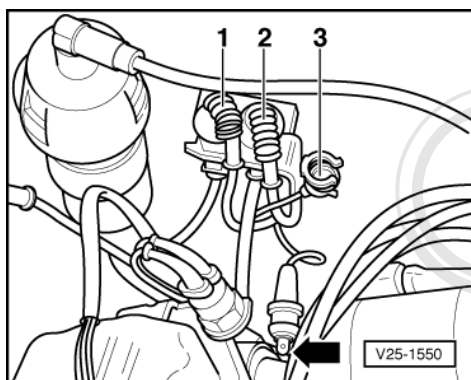
Test sequence

- -> Pull connector -arrow- off differential pressure regulator.



- -> Set multimeter to measuring range 200 mA and connect to test lead V.A.G 1315 A/1 between differential pressure regulator and connector of differential pressure regulator.
- Start engine and run at idling speed for at least 2 minutes.
- Read off differential pressure regulator current on multimeter and note down value.
- Pull out oil dipstick.
 - Specification: The differential pressure regulator current must rise

If specification is not attained:



- -> Detach connector -3- for lambda probe.
- Hold signal wire -arrow- to engine control unit against engine earth for approx. 15 seconds.
 - Specification: The differential pressure regulator current must rise

If specification is not attained: Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .

- Check for open circuit and short to positive or earth in the following wiring connections:

Connector Contact	Test box V.A.G 1598 A Socket
Signal wire	7

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

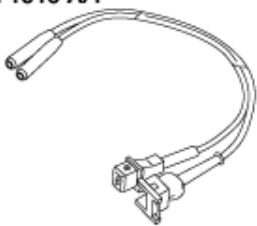
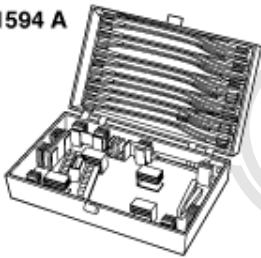
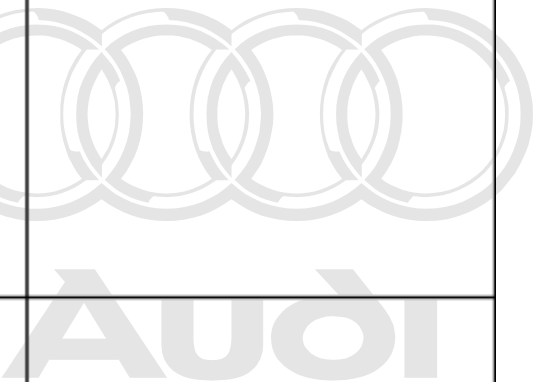
If the wiring is OK:

- Install KE III Jetronic control unit.
- Plug in connector to lambda probe.
- Start engine and run at idling speed.
 - The differential pressure regulator current must drop to original value and then fluctuate

If differential pressure regulator current does not fluctuate:

- Fit a new Lambda probe.

3.3 - Testing lambda probe heater -Z19

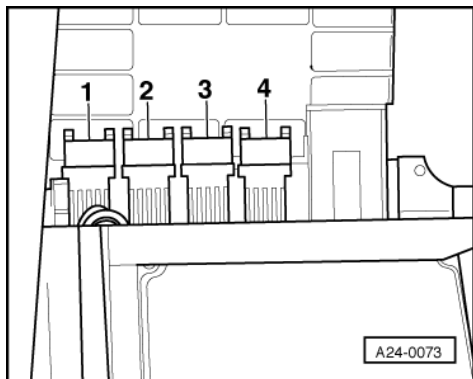
V.A.G 1315 A/1 	V.A.G 1526 A 
V.A.G 1594 A 	
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G24-0014	



Special tools and workshop equipment required

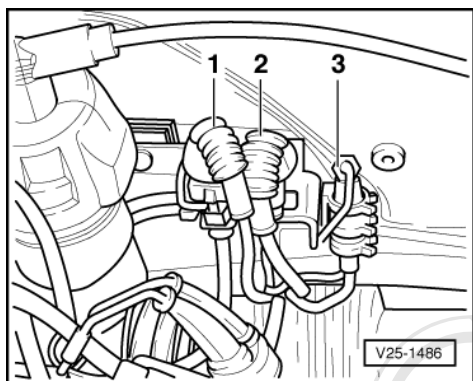
- ♦ V.A.G 1315 A/1
- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A

Test requirements:



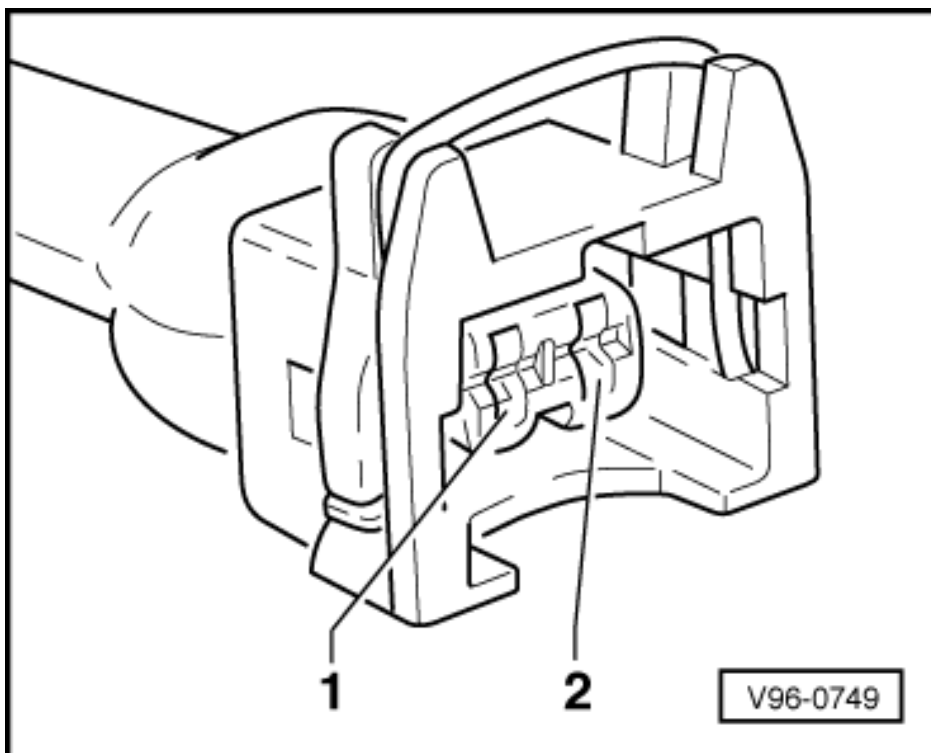
- -> Fuse S73 OK (in red holder in electronics box in passenger's footwell)
- Fuel pump relay OK; checking =>Page **35** .
- Engine cold

Test sequence



- -> Unplug connector -2- of lambda probe heater.

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- -> Connect multimeter between contacts 1 and 2 to measure voltage.
- Start engine and run at idling speed.
 - Specification: approx. battery voltage

If specification is not attained:

- Rectify open circuit.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If specification is attained:

- Connect auxiliary measurement lead V.A.G 1315 A/1 to the 2-way connector.
- Switch multimeter to 10 A measuring range (connect measurement lead to 10 A connection).
- Start engine and run at idling speed.
 - Specification: 0.5...3.0 A

Note:

The current input decreases as the lambda probe becomes warmer.

If specification is not attained:

- Fit a new Lambda probe.

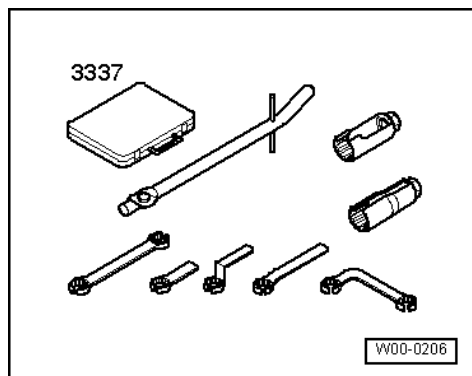
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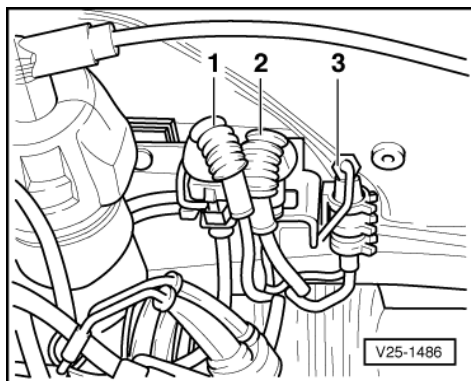
3.4 - Removing and installing lambda probe

Special tools and workshop equipment required



- ♦ Set of ring spanners for lambda probe 3337
- ♦ High-temperature lubricant G 052 112 A3

Procedure



- -> Unplug connectors -2- and -3- for lambda probe.
- Undo cable ties.
- Screw out Lambda probe using special tool 3337.

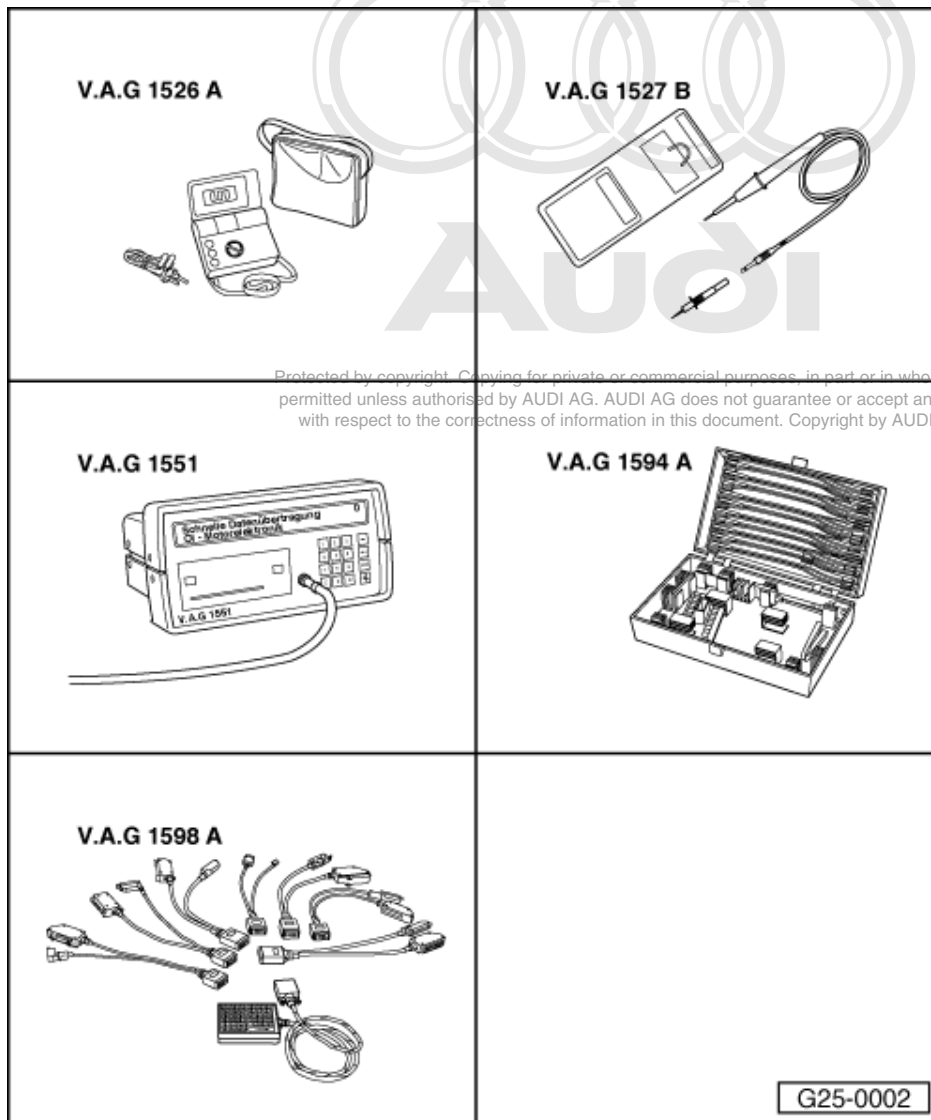
When installing, note the following points:

Notes:

- ♦ The screw thread on the lambda probe is coated with assembly paste. This paste must not be allowed to penetrate the openings on the probe.
- ♦ Tightening torque 55 Nm.

4 - Checking fuel tank breather

4.1 - Checking fuel tank breather



4.2 - Checking activated charcoal filter system solenoid valve 1 -N80

Special tools and workshop equipment required

- ◆ V.A.G 1526 A
- ◆ V.A.G 1527 B
- ◆ V.A.G 1551 with V.A.G 1551/1
- ◆ V.A.G 1594 A
- ◆ V.A.G 1598 A
- ◆ V.A.G 1598/3

Fitting location => Fitting locations overview, Page 18



Checking for leaks

ACF solenoid valve -N80 remains closed when de-energised.

- Disconnect hoses from ACF valve but leave the electrical connector plugged in.
- Connect auxiliary hose to one connection of ACF valve.
- Start final control diagnosis =>Page 9 and actuate ACF solenoid valve -N80.

-> Indicated on display

Flash code: 4343
Solenoid valve 1 for activated charcoal
filter -N80

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The valve should click...

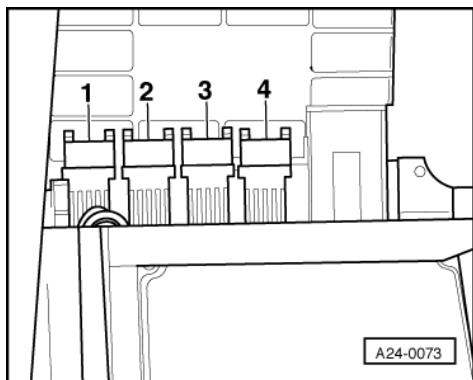
...and should open and close (check by blowing into the auxiliary hose).

If valve does not open and close properly:

- Fit a new ACF valve.

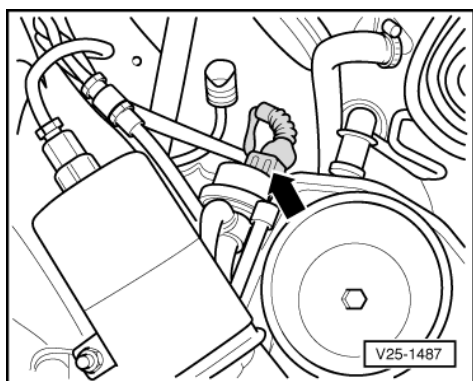
If solenoid valve does not react during final control diagnosis:

Checking power supply

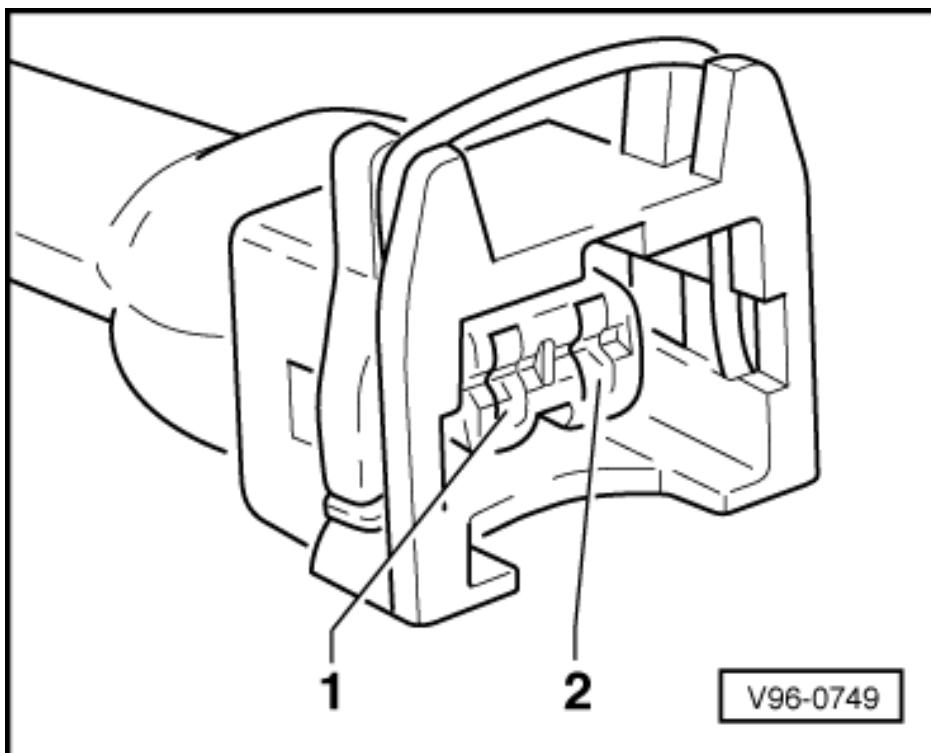


Test requirements:

- -> Fuse S70 OK (in brown holder in electronics box in passenger's footwell)



- -> Detach connector -arrow- from ACF valve.



- -> Connect voltage tester V.A.G 1527 B as follows:

Connector Contact	Measure to
1	Engine earth

- Switch the ignition on.
 - Specification: approx. battery voltage

If specification is not attained:

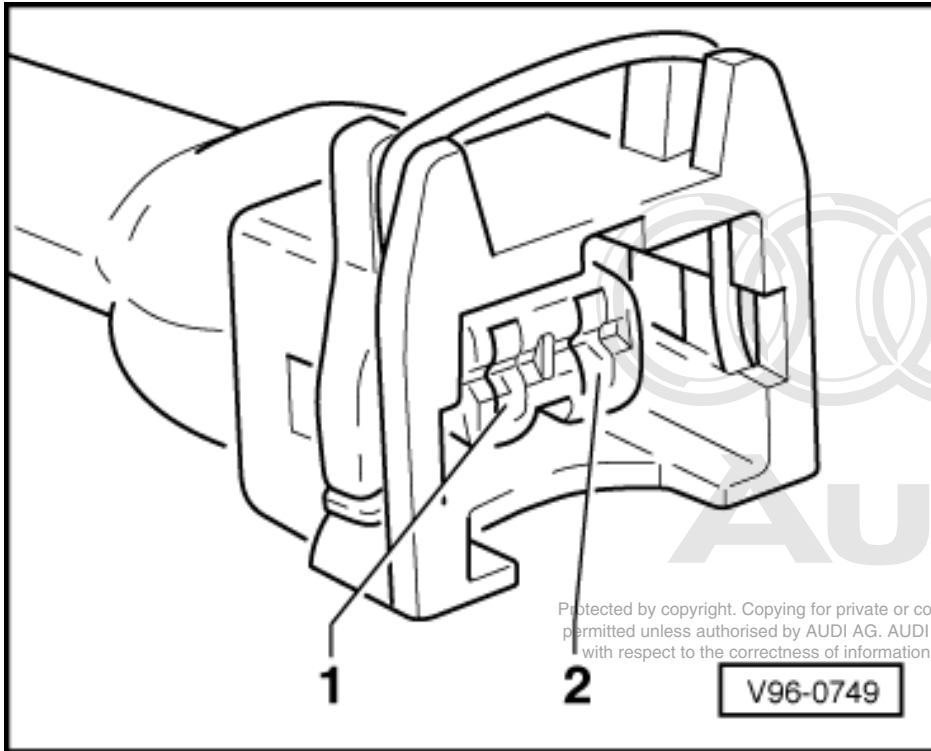
- Eliminate open circuit or short circuit using the current flow diagram.

Checking actuation

- Unplug connector on ACF valve.



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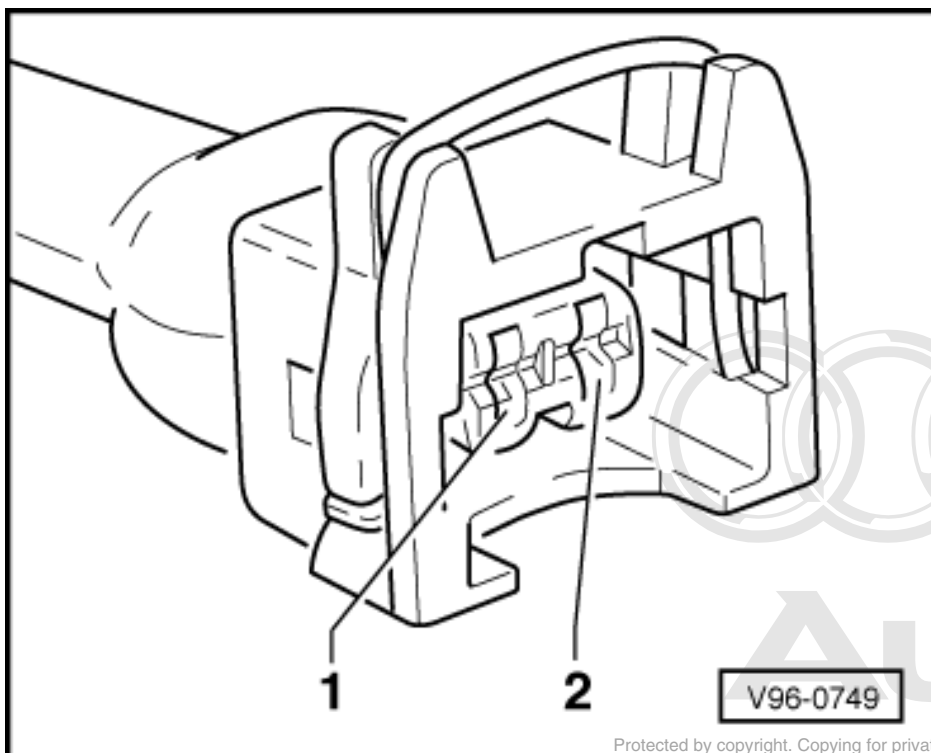
- -> Connect voltage tester V.A.G 1527 B between contacts 1 and 2.
- Start final control diagnosis and actuate ACF valve => Page 9 .
 - The LED should flash.

If LED does flash:

- Fit a new ACF valve.

If the LED lamp does not flash or if it illuminates continuously:

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



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- -> Check for open circuit and short to positive or earth in the following wiring connection:

Connector Contact	Test box V.A.G 1598 A Socket
2	15

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If wiring is OK, and no actuation takes place:

- Replace KE III Jetronic control unit =>Page 31 .



5 - Checking auxiliary signals

5.1 - Checking auxiliary signals

V.A.G 1526 A 	V.A.G 1594 A 
V.A.G 1598 A 	
	G24-0015

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5.2 - Testing signal from air conditioner compressor

Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3

Note:

This check is only to be performed if on vehicles with air conditioner, the idling speed drops steeply when air conditioner is switched on.

Test sequence

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .
- Connect multimeter between socket 33 and socket 35 of test box to measure voltage.
- Switch the ignition on.
- Switch on air conditioner system.
 - Specification: approx. battery voltage

If specification is not attained:

- Check for open circuit and short to positive or earth in the following wiring connections:

Test box V.A.G 1598 A Socket	Magnetic clutch control unit -J153 Contact
33	=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

- Rectify any open/short circuit as necessary.
- If the wiring connection is OK test the signal for the magnetic clutch control unit:

=> Heating, Air Conditioner; Repair group 01; Self-diagnosis for air conditioner; Performing final control diagnosis
Self-diagnosis for air conditioner Performing final control diagnosis

5.3 - Checking engine speed signal

Notes:

- ♦ Rev. counter in dash panel insert is actuated by KE III Jetronic control unit.
- ♦ Checking engine speed signal:

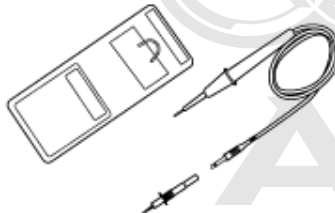
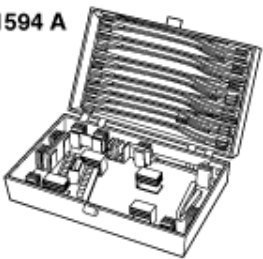
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder



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5.4 - Checking vehicle speed signal

V.A.G 1526 A 	V.A.G 1527 B  Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.
V.A.G 1594 A 	V.A.G 1598 A 
	G24-0019

Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3

Test requirements:

- Speedometer function and display OK

Test sequence

- Raise vehicle using a vehicle hoist until the front left wheel is off the ground.
- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A to connector of KE III Jetronic control unit and also to control unit => Page 29.
- Connect voltage tester V.A.G 1527 B as follows:

Test box V.A.G 1598 A Socket	Measure to
---	-------------------

29	Battery positive
----	------------------

- Switch the ignition on.
 - The LED must light up dimly.
- Rotate the front left wheel.
 - The LED should flash.

If LED does not flash:

- Check for open circuit and short to positive or earth in the following wiring connections:

Test box V.A.G 1598 A Socket	Dash panel insert Contact
29	29

If no wiring fault is detected:

- Pull off adapter V.A.G 1598/3 from KE III Jetronic control unit.

If LED now flashes:

- Replace KE III Jetronic control unit =>Page 31 .

If LED still does not flash:

- Establish which "recipients" of the road speed signal (e.g. radio, automatic gearbox, air conditioner etc.) are using the speed signal, disconnect them one by one from the dash panel insert, then keep repeating the test until the cause of the problem has been identified.

5.5 - Checking gear signal



Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/3

Note:

This check is only to be performed if on vehicles with automatic gearbox, the idling speed drops steeply when engaging a gear.

Test sequence

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .
- Connect voltage tester V.A.G 1527 B between socket 14 and socket 34 of test box to measure voltage.
- Switch the ignition on.
- Actuate foot brake and move gear selector lever to position "P" or "N".
 - The LED should illuminate.
- Actuate foot brake and engage any other gear.

- LED should not illuminate.

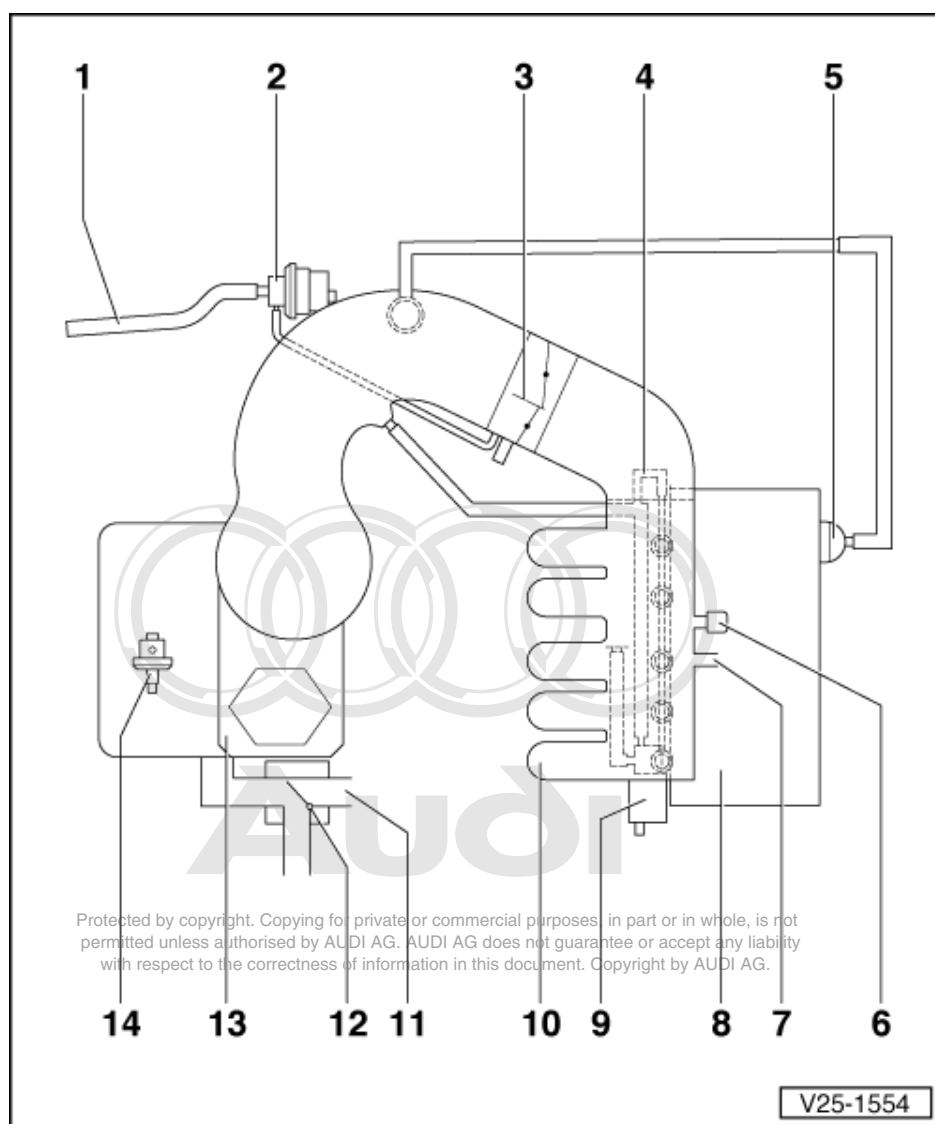
If LED lamp does not illuminate or go out as described:

- Check for open circuit and short to positive or earth in the following wiring connections:

Test box V.A.G 1598 A Socket	Control unit for Selector lever lock -J221 Contact
34	=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

6 - Vacuum diagram

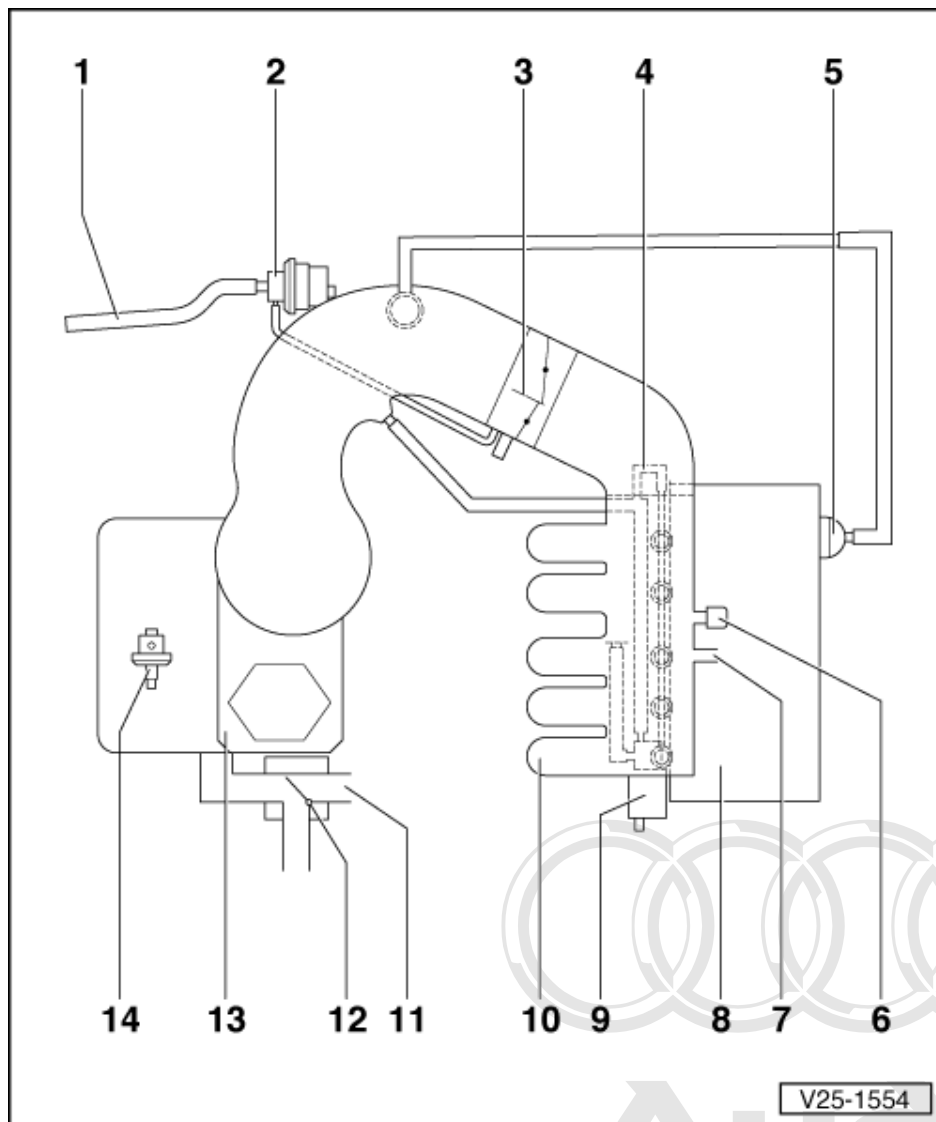
6.1 - Vacuum diagram



- 1 To activated charcoal filter
- 2 Solenoid valve 1 for activated charcoal filter -N80
- 3 Throttle valve unit
- 4 To air-shrouded injectors



- 5 Crankcase breather
- 6 Cap
- 7 To brake servo
- 8 Cylinder head
- 9 Idling stabilisation valve -N71



- 10 Intake manifold
- 11 Intake air preheating
- 12 Control box
- 13 Mixture control unit
- 14 Fuel pressure regulator

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28 - Ignition system

1 - Checking ignition system

1.1 - Checking ignition system

1.2 - Safety precautions

To prevent injuries to persons and/or damage to the fuel injection and ignition system, the following must be noted:

- ◆ Do not touch or disconnect ignition wiring when the engine is running or at starter speed.
- ◆ Always switch off the ignition before connecting or disconnecting ignition system wiring. This also applies to HT cables and measuring instrument leads.
- ◆ To operate engine at starting speed without actually starting it (for example, to check the compression), unplug connector from output stage for ignition coil.
- ◆ For assisted starts with a rapid charging unit the maximum permissible voltage is 16.5 V and the maximum charging time is 1 minute.
- ◆ Always switch off the ignition before washing the engine.
- ◆ Only disconnect and connect the battery with the ignition switched off, otherwise KE III Jetronic control unit or VEZ control unit may be damaged.
- ◆ Vehicles that have an actual or suspected fault in the ignition system, must not be towed unless the connector at the power output stage is unplugged.
- ◆ Do not connect a capacitor to terminal 1 (-).
- ◆ Do not replace the distributor rotor 1 kw (Identification: R1) with a different type even for radio interference suppression.
- ◆ Always use adapter set V.A.G 1594 A for connecting up measuring instruments (e.g. voltage tester V.A.G 1527 B, hand-held multimeter V.A.G 1526 A etc.)

1.3 - Test data, spark plugs

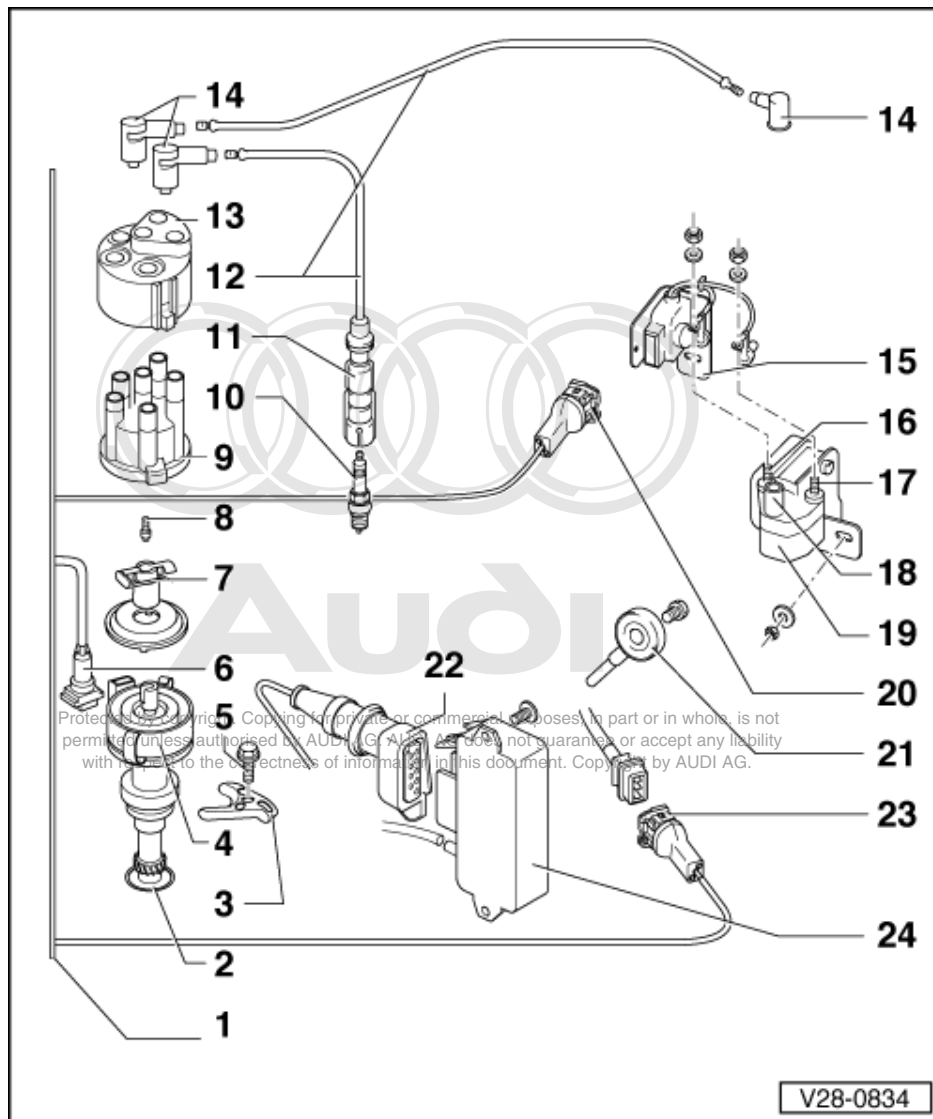
Engine code letters			AAR (2.3 l / 98 kW engine)
VEZ- Part no.			=>Parts list
Control unit			
Ignition point 1)	Test value	°before TDC	13... 17
	Setting value	°before TDC	15 ± 1
Firing order			1-2-4-5-3
Spark plugs 2)	Tightening torque	Nm	30

1) Engine oil temperature min. 80 °C

2) Current values:

=> "Exhaust Emission Test" binder

1.4 - Servicing ignition system



1 Wiring harness

- ♦ For KE III Jetronic control unit
- ♦ For VEZ control unit

2 O-ring

- ♦ Replace

3 Clip

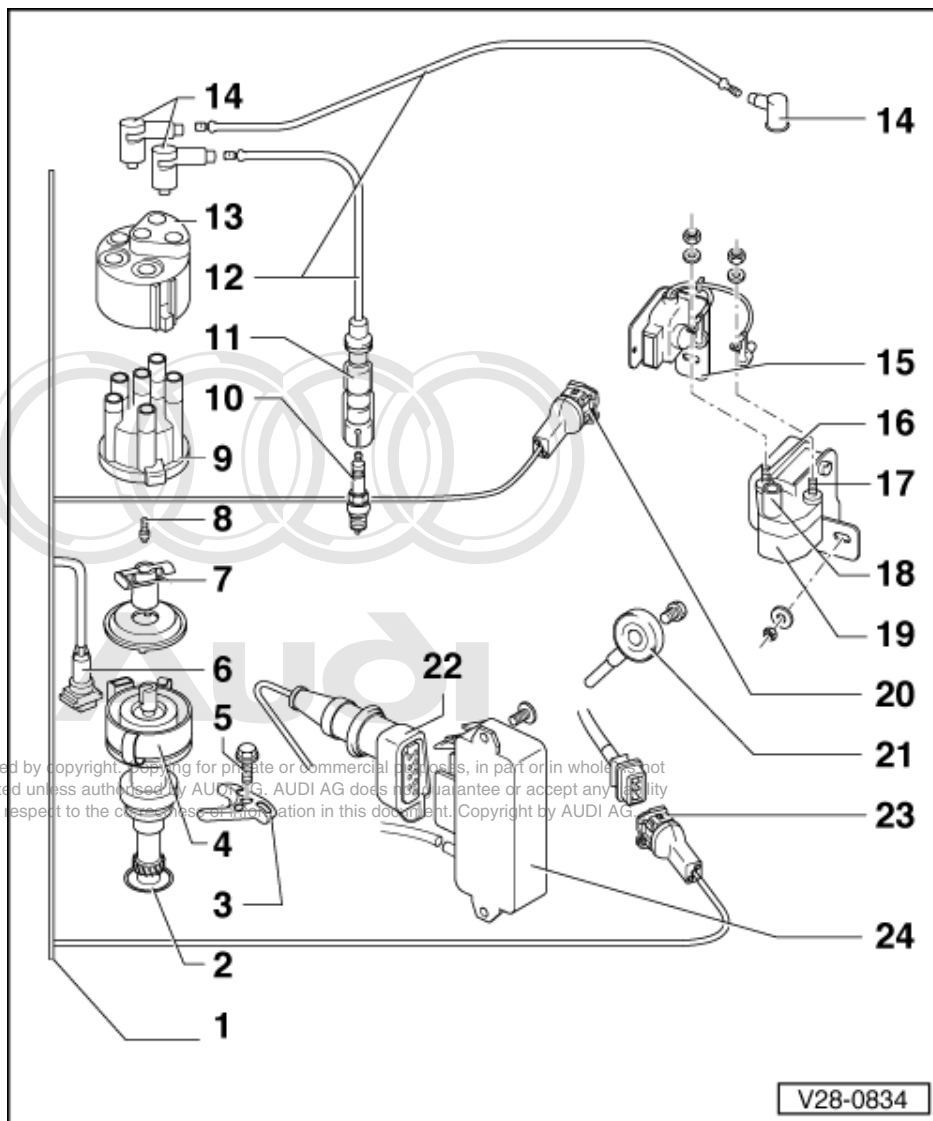
4 Distributor

- ♦ Basic setting =>Page 136 .
- ♦ Testing and setting ignition => Page 82
- ♦ Checking Hall sender=>Page 153 .

5 25 Nm

6 3-pin connector

- ♦ For Hall sender -G40
- ♦ Press wire lock to unplug



7 Rotor arm

- ◆ Identification: R1
- ◆ 0.6...1.4 kW

8 Carbon brush with spring

- ◆ Inspect for wear, damage and ease of movement

9 Distributor cap

- ◆ Test for cracks and signs of tracking
- ◆ Test contact wear
- ◆ Clean before fitting

10 Spark plug - 30 Nm

- ◆ Type and electrode gap

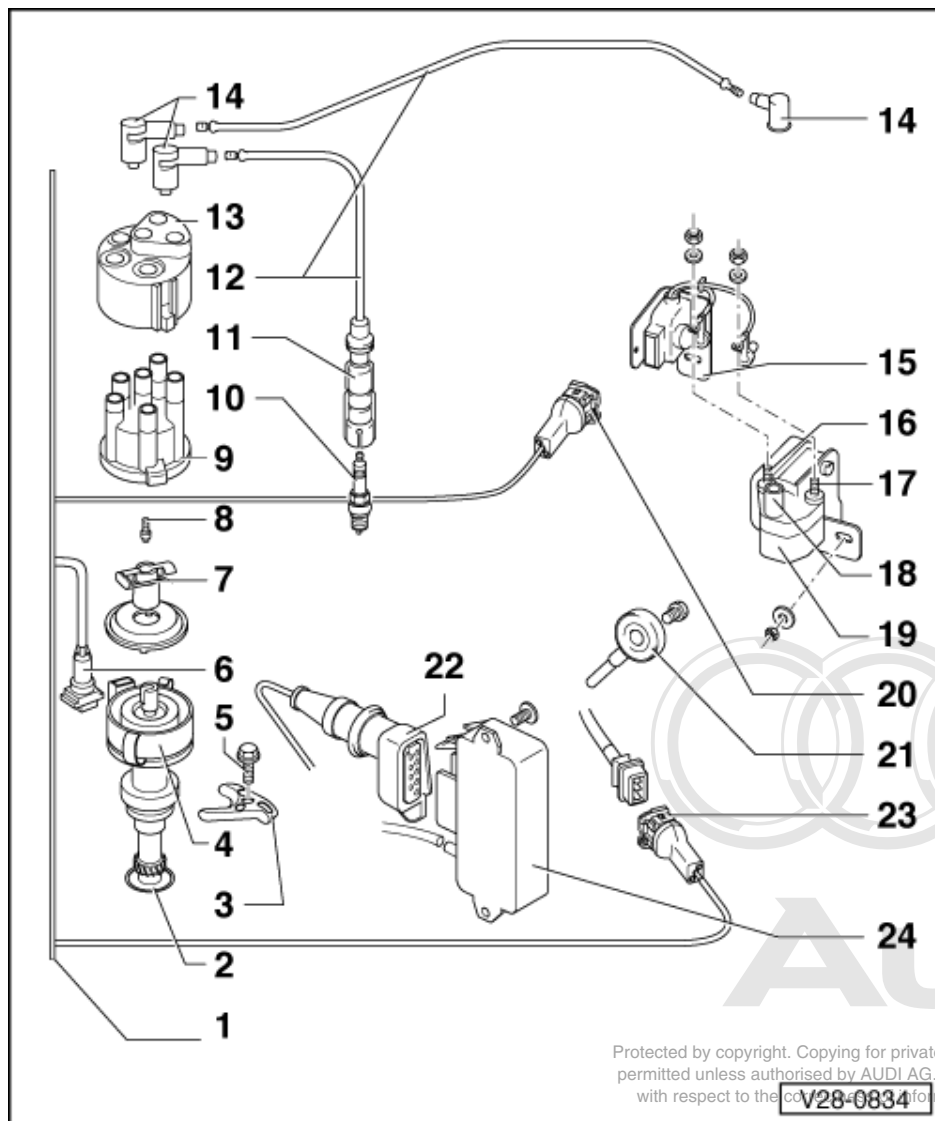
=> "Exhaust Emission Test" binder

11 Spark plug connectors

- ◆ 4...6 kW

12 Ignition cable

- ◆ Test for continuity

**13 Screening**

- ♦ For radio interference suppression

14 Suppressor

- ♦ 0.6...1.4 kW

15 Output stage for ignition coil

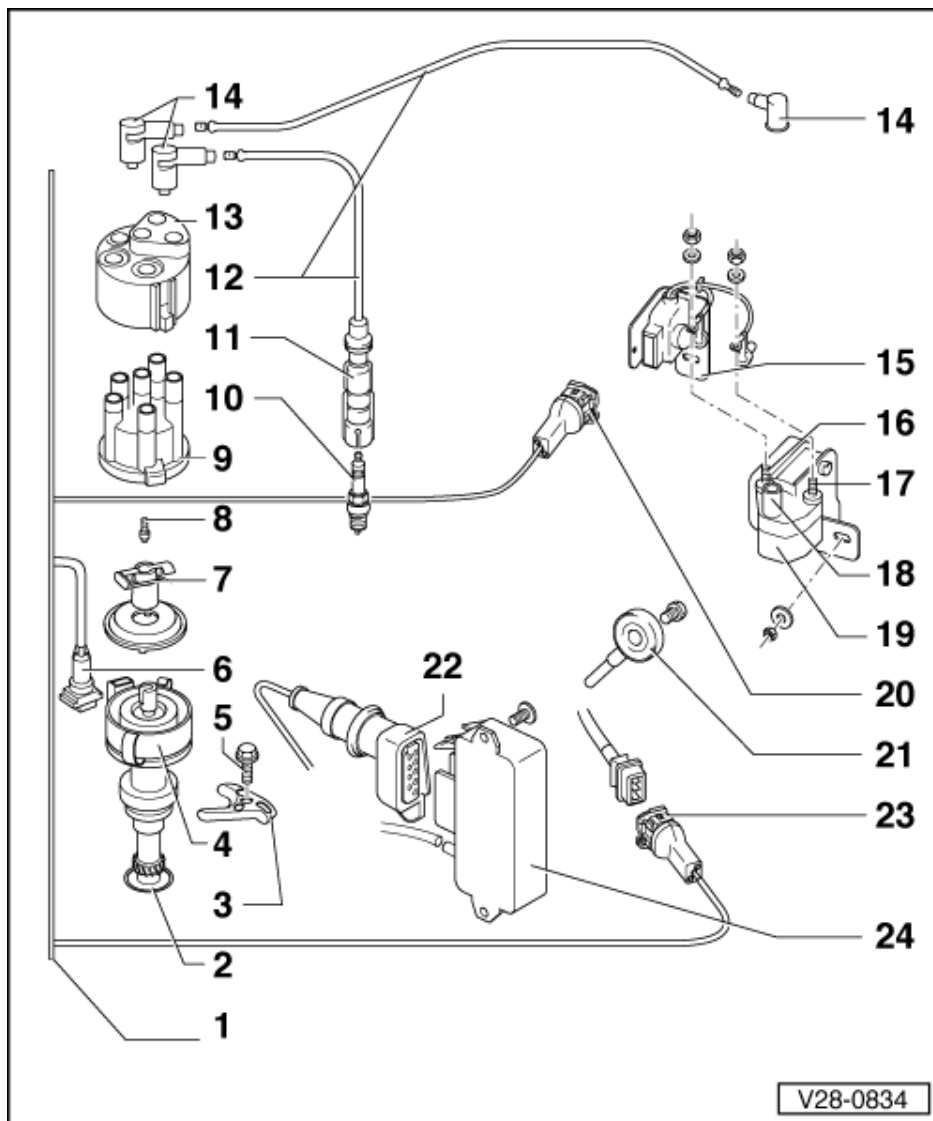
- ♦ Checking => Page 140
- ♦ Cannot be renewed separately

16 Terminal 1(-)**17 Terminal 15(+)****18 Terminal 4****19 Ignition coil**

- ♦ Checking => Page 138

20 3-pin connector

- ♦ Press wire lock to unplug



21 Knock sensor 1 -G61

- ♦ Fitting location => Fig. 136
- ♦ Ensure to observe tightening torque 20 Nm

22 Connector

- ♦ For VEZ control unit
- ♦ Allow 30 seconds after switching off ignition before detaching or attaching connector.

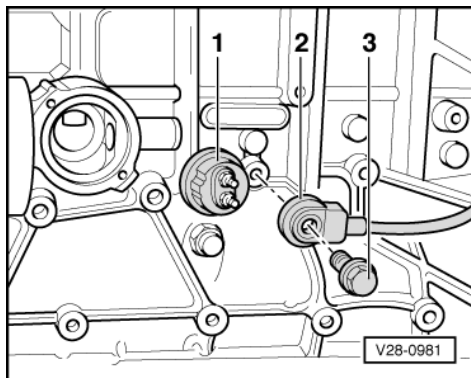
23 3-pin connector

- ♦ For knock sensor 1 -G61
- ♦ Press wire lock to unplug

24 VEZ control unit -J154

- ♦ In electronics box in passenger footwell
- ♦ Removing and installing=>Page 147 .
- ♦ After replacing, check and if necessary adjust ignition point =>Page 82 .

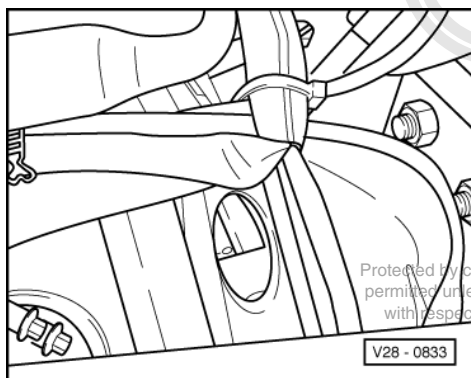
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-> Fig.1 Fitting location of knock sensor

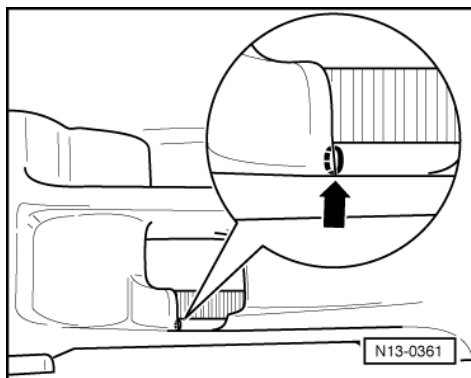
- 1 - Oil pressure switch / oil pressure sender
- 2 - Knock sensor 1
- 3 - Hexagon bolt - 20 Nm

1.5 - Basic setting of ignition distributor

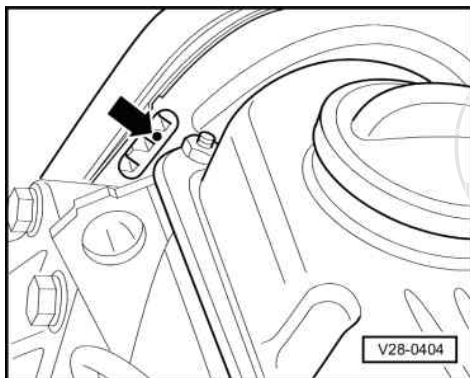


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- Turn the crankshaft to TDC of No. 1 cylinder marking at centre bolt of crankshaft toothed belt sprocket in direction of engine rotation ...
- -> Vehicles with manual gearbox



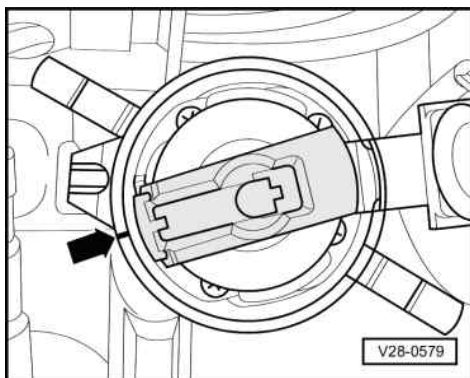
- -> Vehicles with automatic gearbox



- -> ...at same time, marking -arrow- at rear of camshaft sprocket must line up with the upper edge of the gasket. Turn crankshaft 1 turn further, if necessary.

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- Remove distributor cap leaving leads connected.
- Remove dust cap.
- Loosen clamp of ignition distributor.

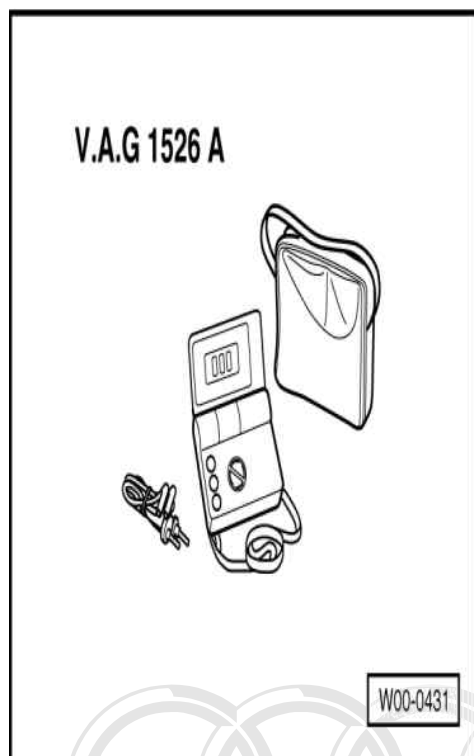


- -> Position distributor rotor so that it points towards the marking -arrow- for cylinder 1 on the distributor housing.
- Tighten bolt of clamp for ignition distributor to 25 Nm.
- Check ignition point => Page 82 .

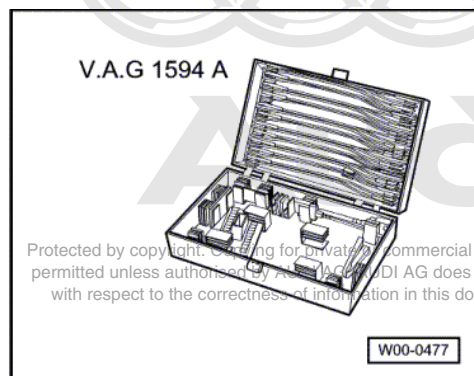


1.6 - Testing ignition coils

Special tools and workshop equipment required



- ♦ V.A.G 1526 A



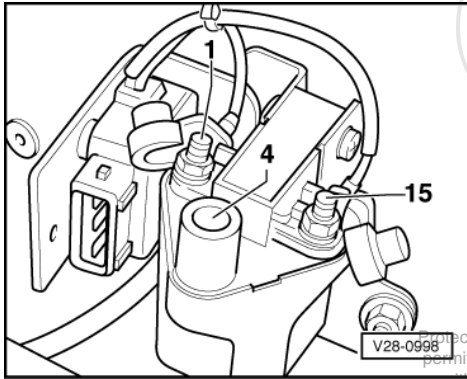
- ♦ V.A.G 1594 A

Notes:

- ♦ Inspect the wires between the power output stage and ignition coil for corrosion and damage.
- ♦ Check output stage for ignition coil => Page 140 .

Test sequence

- Unplug the connector from the power output stage and the main ignition wire from the ignition coil.



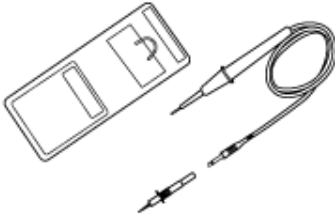
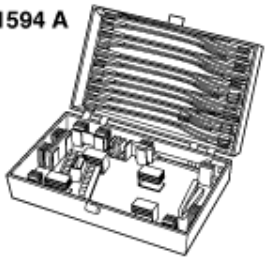
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- -> Use hand-held multimeter V.A.G 1526 to test primary resistance between terminals 1 and 15.
 - Specification: 0.5...1.5 ω
 - Test secondary resistance with hand-held multimeter between terminals 4 and 15.
 - Specification: 5...9 k ω

If a specification is not met:

- Replace the common component ignition coil with output stage.



1.7 - Checking output stage for ignition coil

V.A.G 1526 A 	V.A.G 1527 B 
V.A.G 1594 A 	V.A.G 1598 A 
	G24-0019

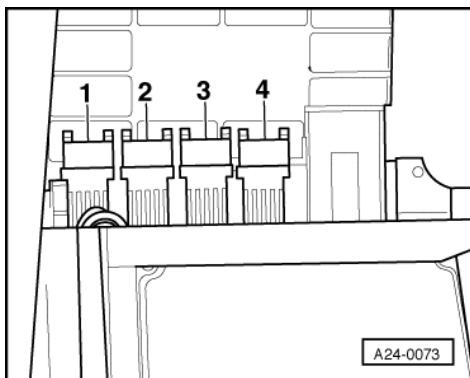
Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/2



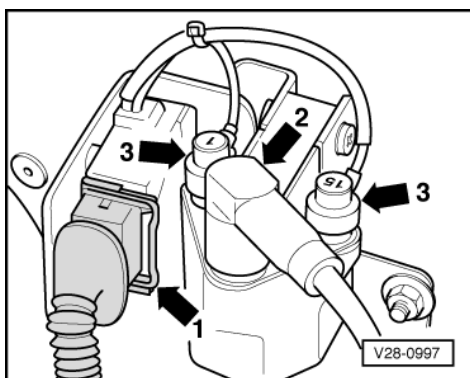
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Test requirements:

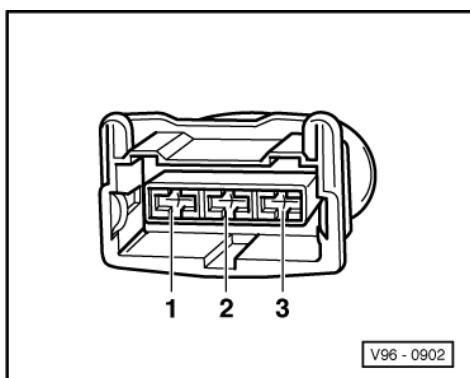


- -> Fuse S71 OK (in black holder in electronics box in passenger's footwell)
- Ignition coil OK; checking =>page **138** .

Checking power supply



- -> Unplug connector -arrow 1- from output stage.



- -> Connect multimeter between contacts 1 and 3 to measure voltage.
- Switch the ignition on.
 - Specification: approx. battery voltage

If specification is not attained:

- Connect multimeter as follows to measure voltage:

Connector Contact	Measure to
1	Engine earth



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Connector Contact	Measure to
3	Battery positive

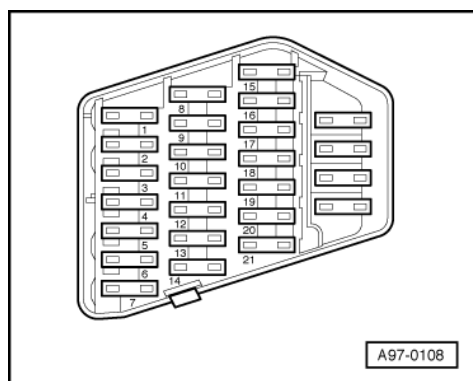
- Switch the ignition on.
 - Specification: approx. battery voltage

If specification is not attained:

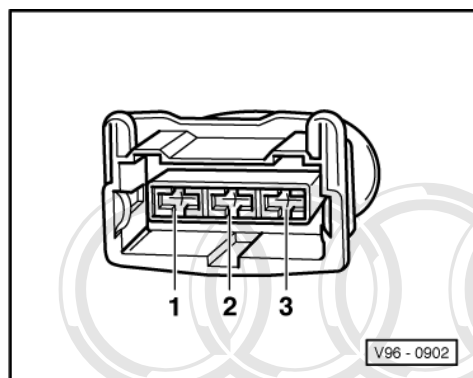
- Eliminate open circuit or short circuit using the current flow diagram.

Checking actuation

Test requirements:



- Hall sender OK, checking => Page 153 .
- -> Pull out fuse S17.

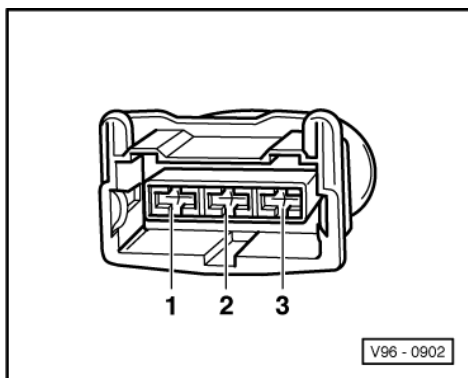


- -> Connect voltage tester V.A.G 1527 B between contacts 1 and 2.
- Operate starter.
 - The LED should flash.

If LED does not flash:

- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29 .

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- -> Check for open circuit and short to positive or earth in the following wiring connection:

Connector Contact	Test box V.A.G 1598 A Socket
2	16

- Additionally check wiring for mutual short circuit.
- Rectify any open/short circuit as necessary.

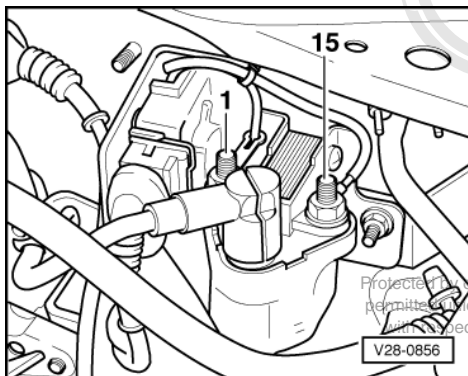
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If the wiring is OK:

- Replace VEZ control unit => Page 31 .

If power supply and actuation are OK:

- Switch ignition off.
- Plug in the connector and the ignition wire at the ignition coil again.



- -> Connect voltage tester V.A.G 1527 B with test leads and terminals to contacts 1 and 15 at ignition coil.

Important

During the following test do not touch terminals of ignition coil or test wires.

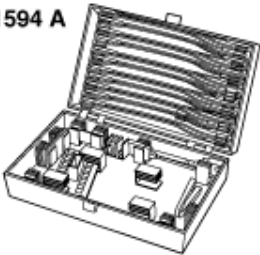
- Operate starter.
 - The LED lamps should flash

If LED lamps do not flash:

- Replace the common component ignition coil with output stage.



1.8 - Checking coolant temperature sender -G62

V.A.G 1526 A 	V.A.G 1594 A 
V.A.G 1598 A 	
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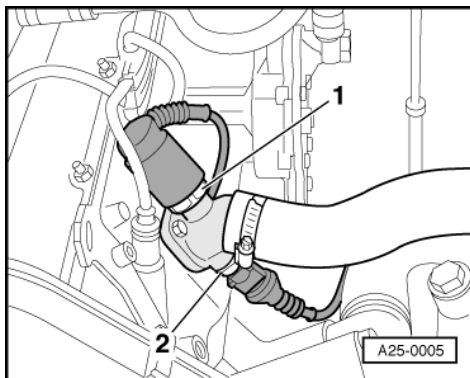
Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/2
- ♦ V.A.G 1598/3

Fitting location => Fitting locations overview, Page **18**

Note:

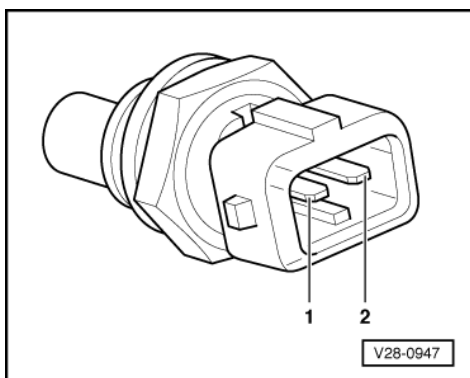
- ♦ Only carry out following test when the corresponding fault is displayed during interrogation of fault memory.



- ♦ The coolant temperature sender transmits the coolant temperature via two separate sensors to KE III Jetronic control unit and VEZ control unit.

Checking internal resistance

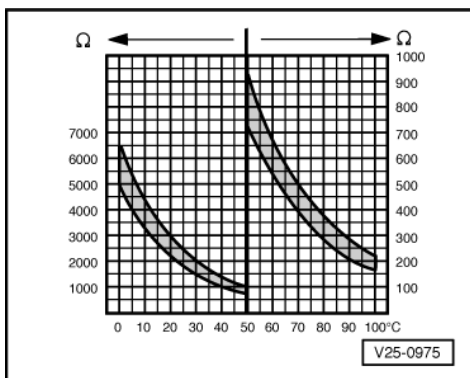
- -> Unplug connector at coolant temperature sender -G62 -2-.



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- -> Connect multimeter as follows to measure resistance:

Sender Contact	Measure to
1	Engine earth
2	Engine earth



-> Specifications:

Coolant temperature	Resistance
approx. 20 °C	approx. 2.5 kΩ



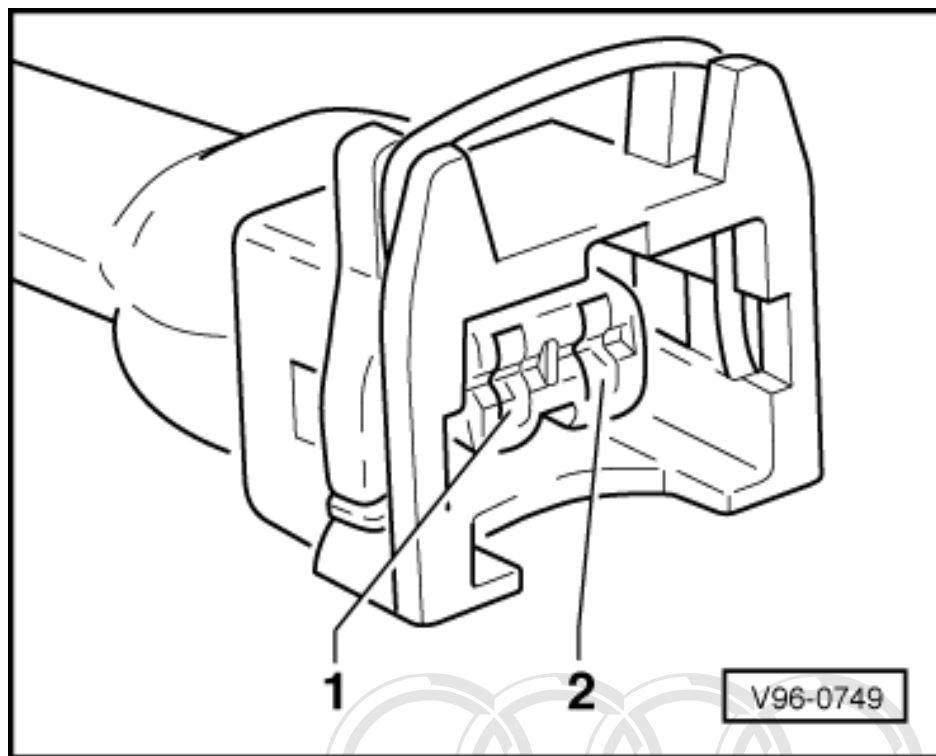
Coolant temperature	Resistance
approx. 80 °C	approx. 330 Ω

If the specifications are not obtained:

- Replace coolant temperature sender.

Checking wiring to KE III Jetronic control unit

- With the ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A only to connector of KE III Jetronic control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connections:

Connector Contact	Test box V.A.G 1598 A Socket
2	3

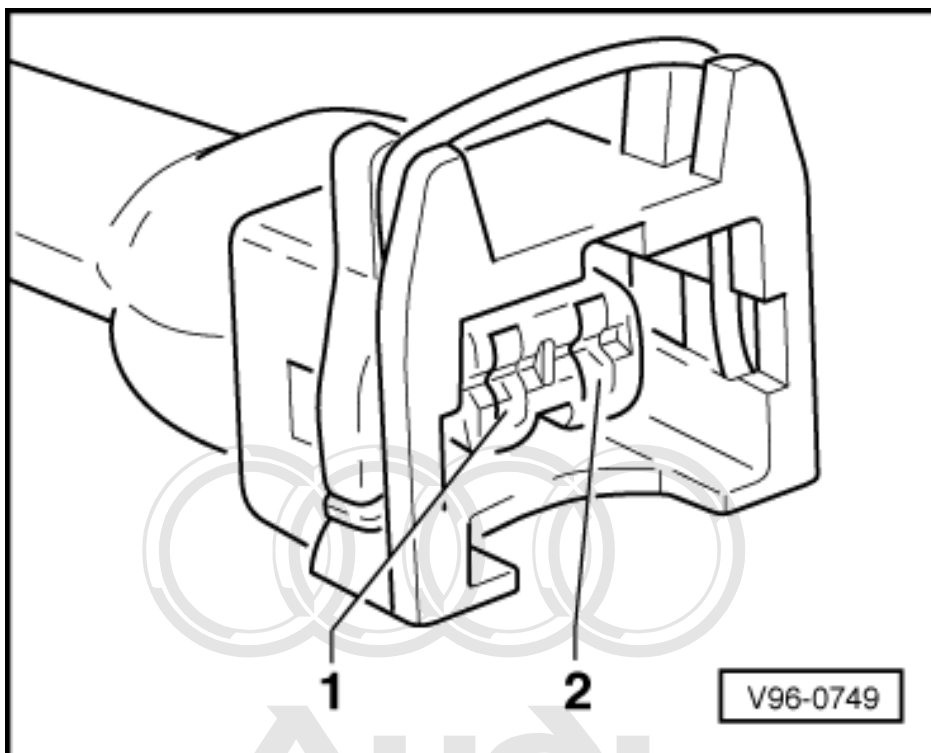
- Rectify any open/short circuit as necessary.

If no fault is found:

- Replace KE III Jetronic control unit =>Page 31 .

Checking wiring to VEZ control unit

- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connections:

Connector Contact	Test box V.A.G 1598 A Socket
1	25

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

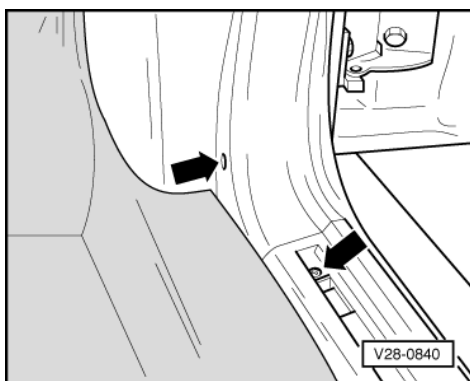
If no fault is found:

- Replace VEZ control unit => Page 147 .

1.9 - Replacing VEZ control unit

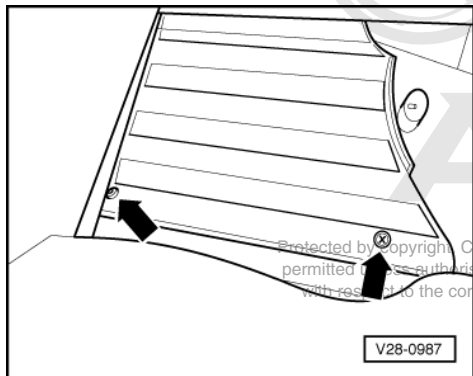
Fitting location => Fitting locations overview, Page 18

Removing

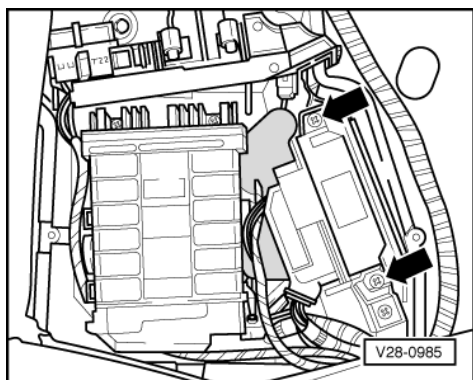




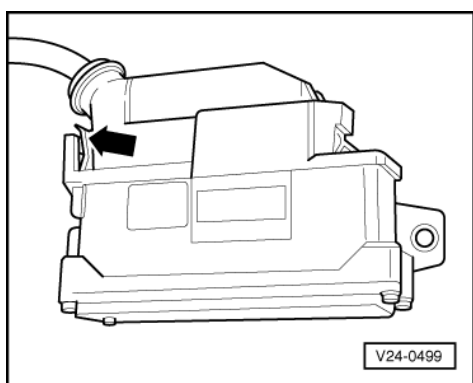
- Switch ignition off.
- -> Remove the lower part of the right A pillar trim and the front door sill panel tread strip
- Pull back floor covering at front of right footwell. (If necessary, cut open the perforated seam on the left with a knife.)



- -> Unscrew bolts -arrows- for electronics box cover.
- Carefully detach upper and lower sections of cover.



- -> Unscrew bolts -arrows-.
- Remove control unit.



- -> To release control unit connector, pull open clip -arrow- and disconnect control unit connector.

Note:

Allow 30 seconds after switching off ignition before detaching or attaching connector of VEZ control unit.

Installing

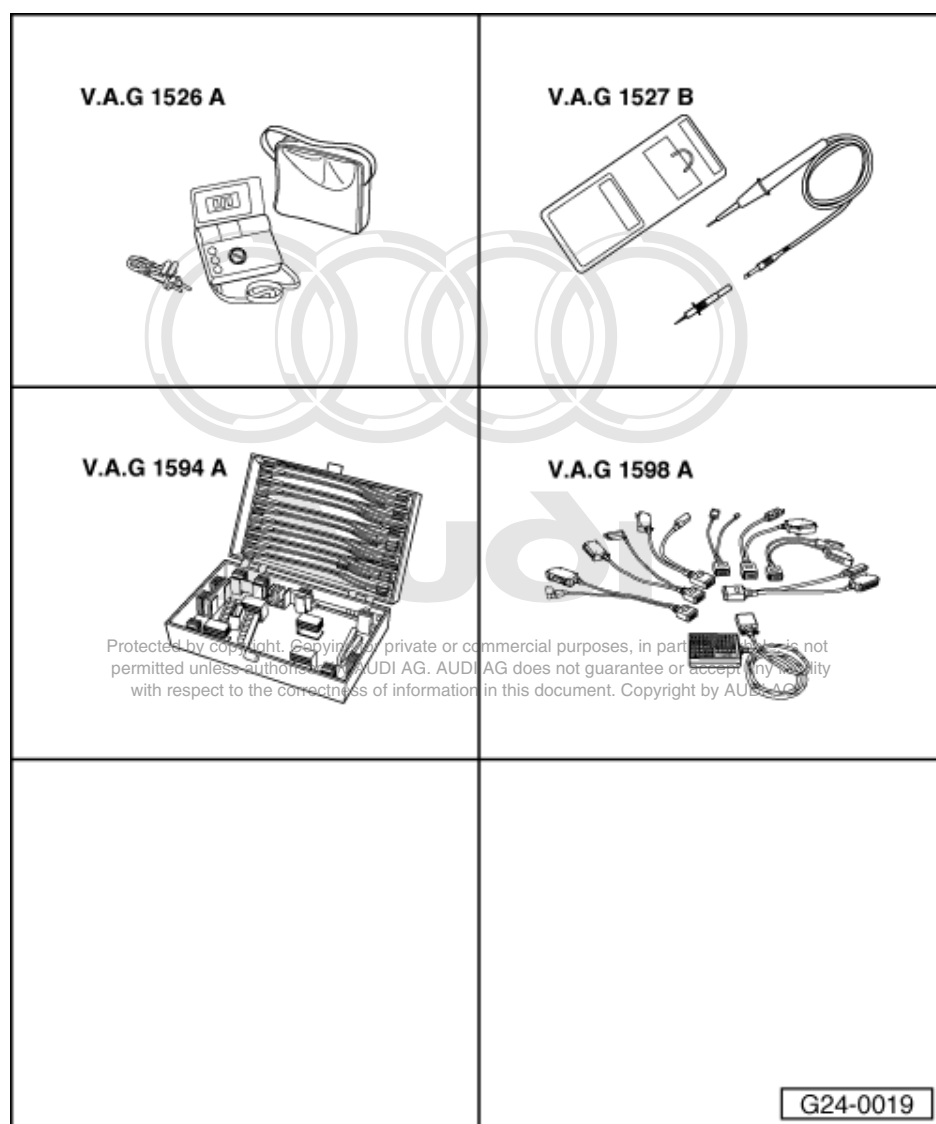
Installation is carried out in the reverse order; note the following:

Note:

Allow 30 seconds after switching off ignition before detaching or attaching connector of VEZ control unit.

- Ensure that wiring harness is not kinked.
- If VEZ control unit is replaced, check and if necessary adjust ignition point =>Page 82 .

1.10 - Checking power supply to VEZ control unit

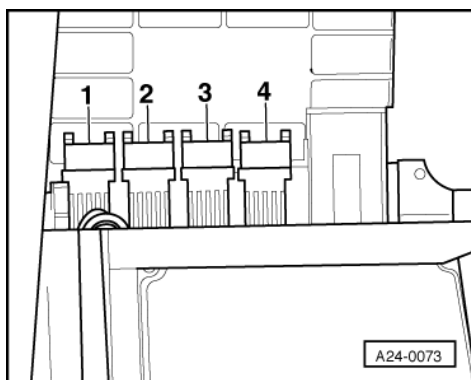


Special tools and workshop equipment required

- ♦ V.A.G 1526 A
- ♦ V.A.G 1527 B
- ♦ V.A.G 1594 A
- ♦ V.A.G 1598 A
- ♦ V.A.G 1598/2



Test requirements:



- -> Fuse S71 OK (in black holder in electronics box in passenger's footwell)

Checking power supply

- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29 .
- Connect multimeter as follows to measure voltage:

Test box V.A.G 1598 A Socket	Measure to
6	Engine earth

- Switch the ignition on.
 - Specification: approx. battery voltage

Note:

On vehicles with immobiliser, the power supply goes to terminal 6 via relay I for immobiliser -J341.

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If specification is not attained:

- Eliminate open circuit or short circuit using the current flow diagram.

Checking earth connection

- Connect multimeter as follows to measure voltage:

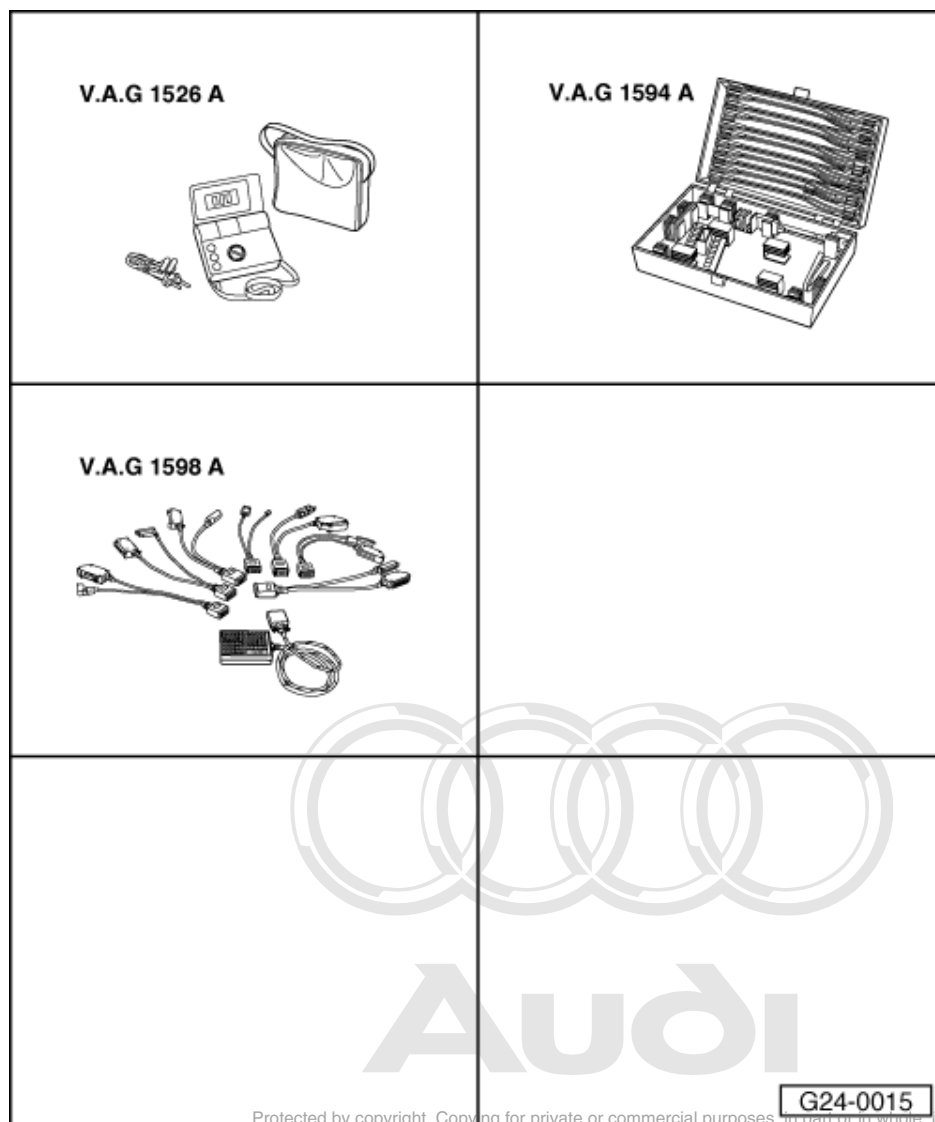
Test box V.A.G 1598 A Socket	Measure to
20	Battery positive
22	Battery positive

- Specification: approx. battery voltage

If the specifications are not obtained:

- Test wiring between connector of VEZ control unit and earth points according to current flow diagram.
- Rectify open circuit, if necessary.

1.11 - Checking knock sensor



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Special tools and workshop equipment required

- ◆ V.A.G 1526 A
- ◆ V.A.G 1594 A
- ◆ V.A.G 1598 A
- ◆ V.A.G 1598/2

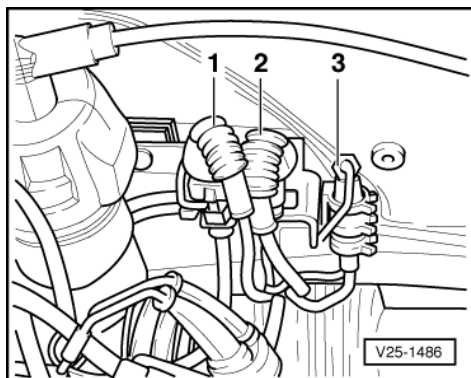
Fitting location => Fitting locations overview, Page **18**

Notes:

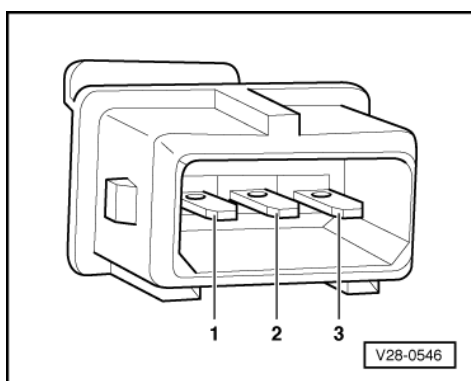
- ◆ The knock sensor itself cannot be tested electrically => interrogate fault memory, from page **4**.
- ◆ It is important that the knock sensor is tightened to the exact torque of 20 Nm if it is to operate properly.
- ◆ Inspect the connectors for traces of corrosion.
- ◆ Use only gold plated contacts when repairing the contacts in the connectors for the knock sensors.



Testing wiring of knock sensor



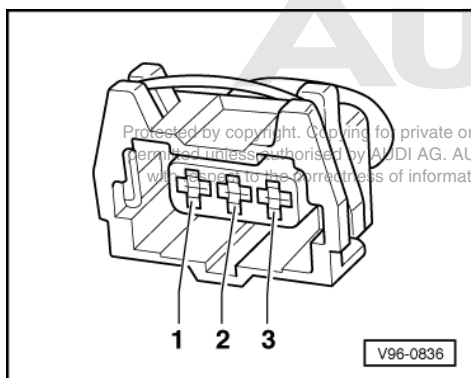
- -> Unplug knock sensor connector -1- in engine compartment.



- -> Connect multimeter between contacts of connector to measure resistance.
 - Specification: $\infty \omega$
(There must be no connection between any of the wires).
- If connection exists at the wire, replace the knock sensor.

Checking wiring from knock sensor to VEZ control unit

- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connections:

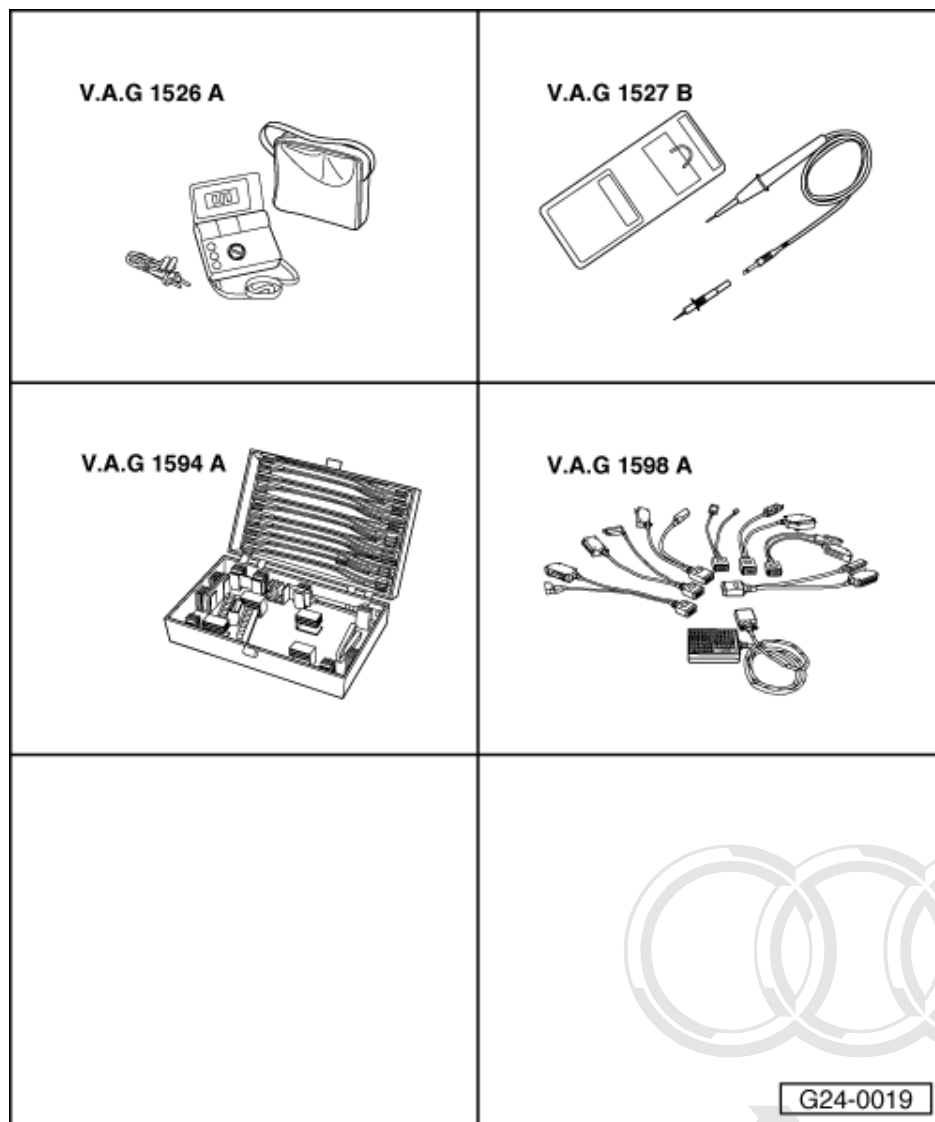
Connector Contact	Test box V.A.G 1598 A Socket
1 (signal)	13
2 (earth)	12

3 (screening)	12
---------------	----

- Rectify any open/short circuit as necessary.

=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

1.12 - Checking Hall sender -G40



Special tools and workshop equipment required

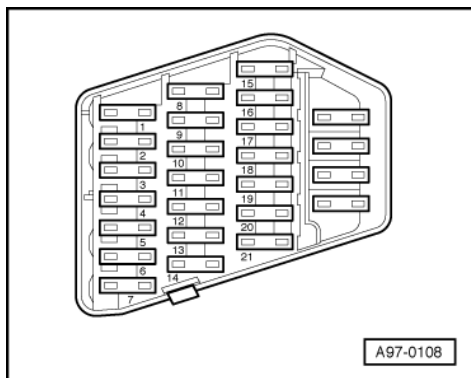
- ◆ V.A.G 1526 A
- ◆ V.A.G 1527 B
- ◆ V.A.G 1594 A
- ◆ V.A.G 1598 A
- ◆ V.A.G 1598/2

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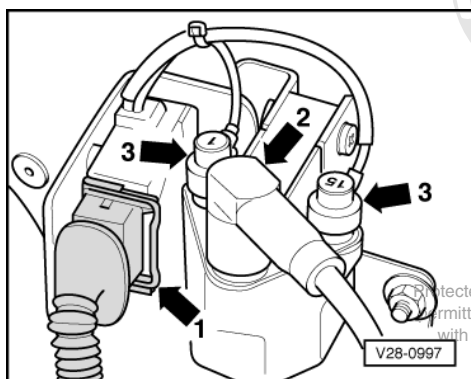
Fitting location => Fitting locations overview, Page 18



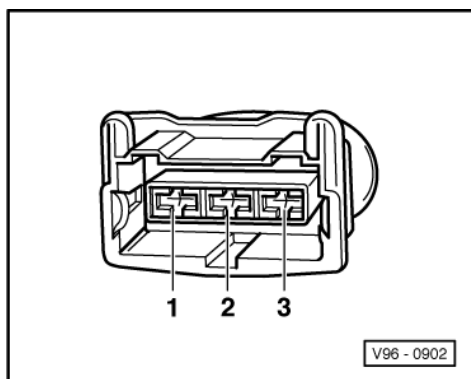
Test sequence



- -> Pull out fuse S17.



- -> Unplug connector -arrow 1- from output stage.



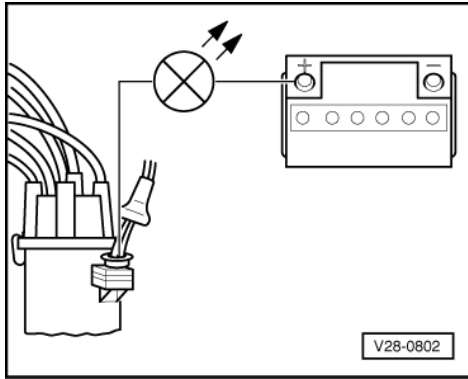
- -> Connect voltage tester V.A.G 1527 B as follows:

Connector Contact	Measure to
2 (signal)	Engine earth

- Operate starter briefly.
 - The LED should flash.

If LED does not flash:

- Push back rubber grommet of plug for Hall sender but leave plug attached.



- -> Connect voltage tester V.A.G 1527 B between contact 2 (Hall sender signal) and battery positive.

Note:

Pin assignment is marked on back of connector.

- Operate starter briefly.
 - The LED should flash.

Note:

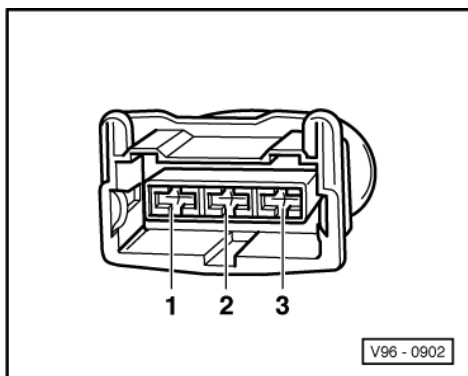
Voltage testers with a low current consumption continue to glow faintly between actuation from the engine control unit (rather than extinguishing completely) and become much brighter when actuated.

If LED does not flash:

- Check power supply for Hall sender => Page 156
- On vehicles with immobiliser, also check that signal wire of Hall sender from relay II for immobiliser -J342 is connected to earth.

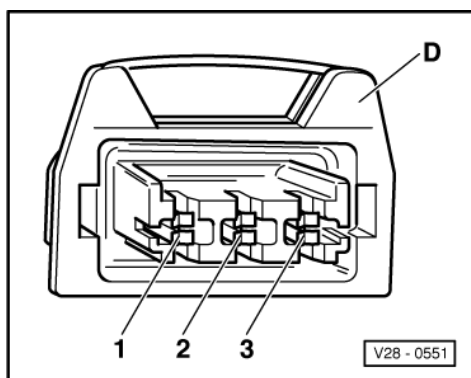
If LED now flashes:

- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connection:

Connector of output stage Contact	Test box V.A.G 1598 A Socket
2	16



- -> Check for open circuit and short to positive or earth in the following wiring connection:

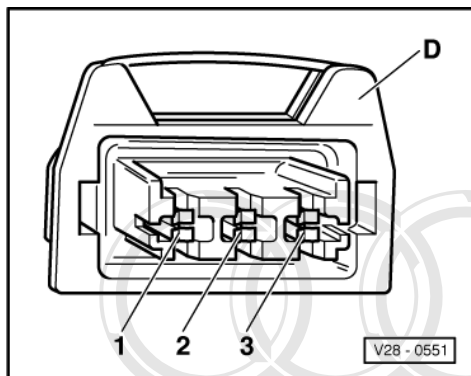
Connector of Hall sender Contact	Test box V.A.G 1598 A Socket
2	24

If no wiring fault is detected:

- Replace VEZ control unit => Page 147 .

Checking power supply

- Unplug the connector of the Hall sender at the ignition distributor.



- -> Connect multimeter between contacts 3 (positive) and 1 (earth) to measure voltage.
- Switch the ignition on.
 - Specification: at least 9 V

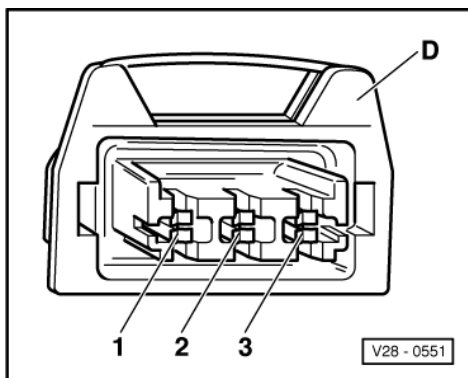
If specification is attained, but LED lamp does not flash:

- Fit a new Hall sender.

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If specification is not attained:

- With the ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A only to connector of VEZ control unit (control unit remains disconnected) => Page 29 .



- -> Check for open circuit and short to positive or earth in the following wiring connections:

Connector Contact	Test box V.A.G 1598 A Socket
1	10
3	4

If no wiring fault is detected:

- Replace VEZ control unit => Page **147** .



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