

Audi 80 1992 ➤

KE III Jetronic/ignition system (5-cyl.)								
Engine ID	NG							

Edition 09.1991



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List of Workshop Manual Repair GroupsList of Workshop Manual
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KE III Jetronic/ignition system (5-cyl.)

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 FEI and KE III Jetronic control units	5
2.3 Fault table	6
3 Final control diagnosis	9
3.1 Final control diagnosis	9
3.2 Preparing differential pressure regulator for current measurement	10
3.3 Implementing final control diagnosis	11
4 Checking wiring of diagnostic connectors	13
4.1 Checking wiring of diagnostic connectors	13
4.2 Checking power supply for "black" diagnostic connector	14
4.3 Checking wiring between "white" diagnostic connector and KE III Jetronic/FEI control unit	14
25 - Mixture preparation, Injection	16
1 Servicing KE III Jetronic injection system	16
1.1 Servicing KE III Jetronic injection system	16
1.2 Safety precautions	16
1.3 Rules for cleanliness	16
1.4 Technical data	17
1.5 Exploded view of fitting locations	18
1.6 Exploded view of upper part of intake manifold	22
1.7 Exploded view of lower part of intake manifold	26
1.8 Wiring and component check using test box V.A.G 1598 A	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 Checking cold start valve -N17	40
1.13 Checking idling-speed stabilisation valve -N71	45
1.14 Checking elevation sender -F96	49
1.15 Checking and adjusting idling switch -F60 and full throttle switch -F81	52
1.16 Vehicles with manual gearbox	53
1.17 Vehicles with automatic gearbox	57
1.18 Checking throttle valve potentiometer -G69 - vehicles with automatic gearbox	61
1.19 Matching automatic gearbox control unit and throttle valve potentiometer -G69	63
1.20 Checking air-flow meter potentiometer -G19	64
1.21 Checking pressure regulator -N73	71
1.22 Basic setting of throttle valve	73
1.23 Checking intake system for leaks (unmetered air)	74
2 Servicing fuel system	75
2.1 Servicing fuel system	75
2.2 Exploded view of fuel distributor	76
2.3 Checking idling speed, CO content and ignition point	80
2.4 Vehicles with catalytic converter and Lambda probe	83
2.5 Vehicles with no catalytic converter and Lambda probe	86
2.6 Connecting remote control V.A.G 1348/3A with adapter lead V.A.G 1348/3-2	88
2.7 Connecting pressure gauge V.A.G 1318 with test adapter 1318/4	89
2.8 Checking system pressure, differential pressure and holding pressure	90



2.9	Checking injectors (injection quantity comparison measurement)	94
2.10	Checking air-shrouded injectors and inserts for leaks	97
2.11	Removing and installing injectors	98
2.12	Removing and installing injector insert	100
2.13	Checking adjusting lever and control plunger	101
2.14	Checking and adjusting rest position and idle motion of sensor plate	102
2.15	Basic setting of adjusting lever	104
2.16	Adjusting stop bolt for control plunger	105
2.17	Checking cold acceleration enrichment	106
2.18	Checking overrun shutoff and operation of idling-speed switch	109
3	Checking Lambda control	111
3.1	Checking Lambda control	111
3.2	Checking Lambda probe -G39 and Lambda control	111
3.3	Checking Lambda probe heater -Z19	113
3.4	Removing and installing Lambda probe	116
4	Checking fuel tank breather system	117
4.1	Checking fuel tank breather system	117
4.2	Checking activated charcoal filter solenoid valve -N80	117
5	Checking additional signals	122
5.1	Checking additional signals	122
5.2	Checking air-conditioner compressor signal	122
5.3	Checking engine-speed signal	123
5.4	Checking vehicle-speed signal - vehicles for Sweden only	124
5.5	Checking gear signal	126
6	Vacuum diagram	127
6.1	Vacuum diagram	127
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28 - Ignition system		129
1	Checking ignition system	129
1.1	Checking ignition system	129
1.2	Safety precautions	129
1.3	Adjustment data, spark plugs	129
1.4	Servicing ignition system	130
1.5	Basic setting of ignition distributor	134
1.6	Checking ignition transformer -N152	136
1.7	Checking output stage for ignition transformer	138
1.8	Checking coolant temperature sender -G62	142
1.9	Replacing FEI control unit	145
1.10	Checking power supply for FEI control unit	147
1.11	Checking knock sensor	149
1.12	Checking Hall sender -G40	151

01 - Self-diagnosis

1 - Self-diagnosis

1.1 - Self-diagnosis

Following data evaluation, the KE III Jetronic control unit -J21 and the FEI control unit -J154 distinguish between various faults => Fault table, Page 6 and store them until the ignition is switched off.

The self-diagnosis features can only be utilised with the fault reader V.A.G 1551 in mode 2 "Flash code output".

Note:

The fault reader V.A.G 1552 and the vehicle diagnostic, testing and information system VAS 5051 are not provided with mode 2 "Flash code output" and can thus not be employed for self-diagnosis of KE III Jetronic control unit and FEI control unit.

Data can only be output with the ignition switched on or the engine running and at an engine speed of less than 2500 rpm. Data output is terminated at higher engine speeds.

1.2 - Technical data of self-diagnosis

Fault memory/KE III Jetronic control unit	
- Non-volatile memory	no
- Volatile memory	yes
Fault memory/FEI 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
- FEI control unit	no

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1.3 - Safety precautions

Pay attention to the following if testers and measuring instruments have to be used in the course of a test drive on vehicles fitted with front passenger's airbag.

Attention:

- ◆ **Always attach testers and measuring instruments to back seat and have them operated from there by a second person.**
- ◆ **If testers and measuring instruments were to be operated from front passenger's seat, person sitting there could suffer injury in the event of an accident due to triggering of front passenger's airbag.**



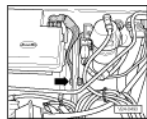
1.4 - Connecting fault reader V.A.G 1551

Test requirements:

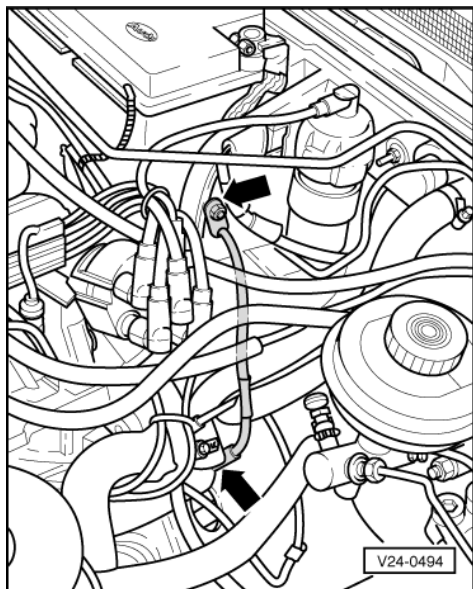
- Vehicle supply voltage OK
- Voltage supply and fuses for appropriate system OK

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

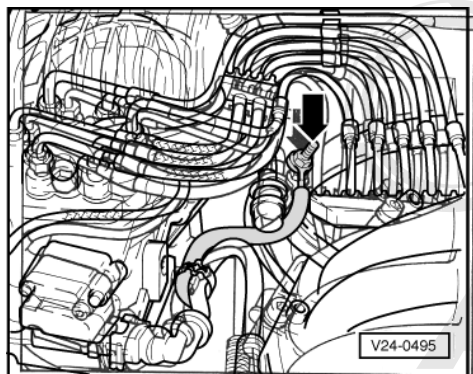
- Fuel pump relay OK; checking => Page 35
- Earth connections checked
- Prior to fault memory interrogation, final control diagnosis, wiring check and component replacement, check following earth connections for corrosion and poor contact:



- ♦ -> Attachment point of battery earth strap to body -arrow-

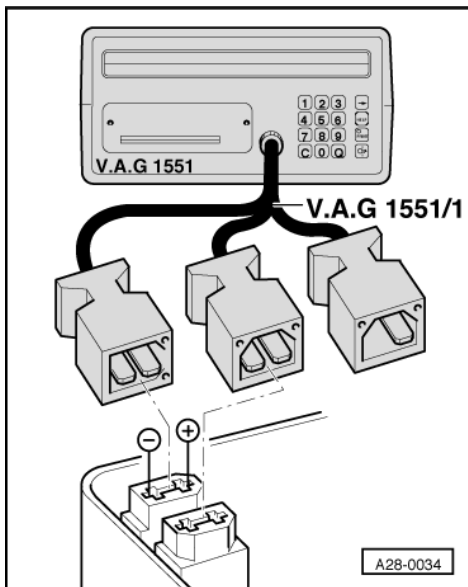


- ♦ -> Attachment points of earth wire between battery bracket (body) and gearbox -arrows-



- ♦ -> Earth attachment point at intake manifold -arrow- (this earth point is only to be used for KE III Jetronic and FEI control unit)

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- Detach cover from relay plate with fuse box in plenum chamber.
- ➔ Use diagnostic wire V.A.G 1551/1 to connect up fault reader V.A.G 1551.

Attention:
 Heed safety precautions => Page **1** .

- With ignition switched off, attach black connector to black diagnostic connection.

➔ Indicated on display:

V.A.G SELF-DIAGNOSIS HELP
 1 - Rapid data transfer 1)
 2 - Flash code output1)

- 1) Displayed alternately

Note:

*If display remains blank, check power supply for black diagnostic connector => Page **14** .*

- Attach white connector to white diagnostic connection (blue connector is not used).
- Switch on printer of fault reader by pressing Print key. Lamp in key must light.

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

- Leave engine running on completion of test drive.

or

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

- Switch on ignition.
- Enter "2" for "Flash code output".

➔ Indicated on display:

Start flash code output
 by pressing key



2 - Interrogating and erasing fault memory

2.1 - Interrogating and erasing fault memory

On interrogation, the content of the fault memory of the FEI control unit -J154 is displayed first and then that of the KE III Jetronic control unit -J21.

Note:

If engine will not start, crank it with starter for at least 5 seconds and then always leave ignition switched on.

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- Perform test drive. Conditions:
 - Duration at least 5 minutes
 - Coolant temperature at least 80 ° C
 - Engine speed greater than 3000 rpm
 - Accelerator briefly floored
- Leave engine running on completion of test drive.

Note:

Never switch off engine after test drive as this would erase fault memory.

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

-> Indicated on display:

Start flash code output
by pressing key

- Press =>key.

The stored faults/flash codes of the FEI control unit are consecutively displayed and printed out.

or

-> If no fault has been stored, the following display appears.

Flash code: 4444
No faults detected

Notes:

- ♦ If printer is not on, press => key for display of next fault.

No ♦ flash code received

-> If adjacent display appears:

- Check wiring of white diagnostic connector => Page 14 .

-> Following display appears after indication of last fault/display "Flash code 4444 No faults detected".

Flash code: 0000
End of output

Notes:

- ♦ If printer is on, V.A.G 1551 switches to interrogation of fault memory of KE III Jetronic control unit.
- ♦ If printer is not on, press => key to switch fault reader to next step.
- ♦ Idling speed is increased during interrogation of fault memory content of KE III Jetronic control unit.
- ♦ If engine stops, leave ignition on and complete fault memory interrogation.

The stored faults/flash codes of the KE III Jetronic control unit are consecutively displayed and printed out.

or

-> If no fault has been stored, the following display appears.

Flash code: 4444
No faults detected

Notes:

- ♦ If printer is not on, press ⇒ key for display of next fault.

No ♦ Flash code received

-> If adjacent display appears:

- Check wiring of white diagnostic connector => Page 14 .

-> Following display appears after indication of last fault/display "Flash code 4444 No faults detected".

Flash code: 0000
End of output

After completing output of fault memory content of respective control unit or following display of flash code 4444 (no faults detected), flash code 0000 (end of output) appears. This flash code is repeated until ignition is switched off or engine speed increased to in excess of 2500 rpm.

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- Switch off ignition to erase fault memory.
- Use fault table to locate and eliminate faults printed out=>Page 6 .
- On completion of repair work, perform test drive and interrogate fault memory of FEI and KE III Jetronic control units again.

Note:

In the event of problems not detected by self-diagnosis:

=> Binder "Fault-finding, Engine"

2.2 - Flash codes and text output of FEI and KE III Jetronic control units

Flash code	Additional text display on fault reader V.A.G 1551	Fault stored in	
		FEI control unit -J154	KE III Jetronic control unit -J21
0 0 0 0	End of output	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	No engine speed information	-	x
2 1 2 3	Full throttle switch -F81	x	x
2 1 4 1	First knock control	x	-
2 1 4 2	Knock sensor 1 -G61	x	-
2 2 2 3	Elevation sender -F96	x	x
2 2 3 2	Air-mass meter/air-flow meter potentiometer -G70/-G19	x	x

Flash code	Additional text display on fault reader V.A.G 1551	Fault stored in	
		FEI control unit -J154	KE III Jetronic control unit -J21
2 2 3 3	Air-mass meter -G70 reference voltage	x	-
2 3 1 2	Coolant temperature sender -G62	x	x
2 3 4 1	Lambda control	-	x



Flash code	Additional text display on fault reader V.A.G 1551	Fault stored in	
		FEI control unit -J154	KE III Jetronic control unit -J21
2 3 4 2	Lambda probe -G39 with heater	-	x
4 4 3 1	Idling-speed stabilisation valve -N71	-	x
4 4 4 4	No faults detected	x	x

2.3 - Fault table

Notes:

- ♦ Listed in the following in ascending order of flash codes are all the faults detected by the FEI control unit - J154 and the KE III Jetronic control unit -J21 and displayed on V.A.G 1551 during interrogation of the fault memory content.
- ♦ Do not immediately replace components indicated as being defective by V.A.G 1551, but rather: Start by checking wiring and connectors to these components in line with current flow diagram. Also use current flow diagram to check earth connections.

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

- ♦ If flash codes 2121, 2123, 2223 are displayed during fault memory interrogation of one control unit only, start by checking wiring between FEI and KE III Jetronic control units.
- ♦ If idling speed increases with warm engine to in excess of 1200 rpm and if it is in specified range after re-starting engine (=> Flash codes 2122 and 2232), this may be due to loose contacts in wiring to potentiometer at air-flow meter or between FEI control unit pin 17 and KE III Jetronic control unit pin 30.
- ♦ If idling speed drops sharply when air conditioner is switched on (on vehicles fitted with air conditioner), check air-conditioner compressor signal => Page 122.
- ♦ If idling speed drops sharply on engaging gear (vehicles with automatic gearbox), check gear signal => Page 126.

Output on printer of V.A.G 1551	Possible cause of trouble	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 FEI control unit	- Replace FEI control unit => Page 145
1231 Speedometer sender/road speed sender -G22/-G68	- Open circuit/short circuit in wiring between dash panel insert and KE III Jetronic control unit	- Eliminate open circuit in wiring/short circuit => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
	- Speedometer sender/road speed sender -G22/-G68 defective	- Check vehicle speed signal => Page 124

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Notes on flash code 1231:

- ♦ Fault display need only be heeded if speedometer display is OK.
- ♦ Effects: Engine may cut out on actuating clutch in overrun phase.

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
2121 Idling switch -F60	- Throttle cable setting - Floor covering pressing 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
	- Setting of -F60	- Check and adjust -F60 => Page 59
	- Short circuit in -F60/open circuit or short circuit in wiring	
	- -F60 sticking	

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
2122 No engine speed information	- Open circuit in wiring between FEI control unit pin 17 and KE III Jetronic control unit pin 30 - No engine speed signal from FEI control unit knock control	- Eliminate open circuit in wiring => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
	- Hall sender -G40 defective	- Check Hall sender -G40 => Page 151
	- FEI control unit defective	- Replace FEI control unit => Page 145
2123 Full throttle switch -F81	- Setting of -F81	- Check and adjust -F81 => Page 60
	- Short circuit in -F81/open circuit or short circuit in wiring	
	- -F81 sticking	

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
2141 First knock control	- Engine knocking, pinging	- Check compression pressure => 5-cyl. Engine (2-valve), Mechanics; Repair Group 15; Removing and installing cylinder head; Checking compression pressure Removing and installing cylinder head; Checking compression pressure
	- Ignition point incorrectly set	- Check ignition point => Page 80
	- Poor fuel grade (less than 91 RON)	- Fill tank with fuel with at least 91 RON
	- Open circuit in wiring of screen of knock sensor 1 -G61	- Eliminate open circuit in wiring => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder Replace -G61 and tighten to 20 Nm

Note on flash code 2141:

Effects: Slight loss of power, slight increase in fuel consumption, maximum vehicle speed not reached

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Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
2142 Knock sensor 1 -G61	- Open circuit/short circuit in wiring between -G61 and FEI control unit	- Eliminate open circuit in wiring/short circuit => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
	- -G61 loose/corrosion caused by moisture in connector	- Check -G61 => Page 149
	- -G61 defective	- Replace -G61 and tighten to 20 Nm
	- No knock detection by FEI control unit	- Replace FEI control unit => Page 145

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
2223 Elevation sender -F96	- Open circuit in wiring/short circuit between control units and -F96	- Check -F96 => Page 49
	- -F96 defective	- Replace -F96
2232 Air-mass meter/air-flow meter potentiometer -G70/-G19	- Open circuit in wiring/short circuit between KE III Jetronic control unit and air-flow meter potentiometer -G19	- Check air-flow meter potentiometer -G19 => Page 64
	- Open circuit in wiring between KE III Jetronic control unit pin 21 (load signal) and FEI control unit pin 8	- Eliminate open circuit in wiring => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
2233 Air-mass meter -G70 reference voltage	- Open circuit in wiring between KE III Jetronic control unit pin 26 and FEI control unit pin 21	- Eliminate open circuit in wiring => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
2312 Coolant temperature sender -G62	- Loose contact/corrosion caused by moisture in connector	- Check coolant temperature sender -G62 => Page 142
	- Open circuit/short circuit in wiring between -G62 and KE III Jetronic or FEI control unit	- Eliminate open circuit in wiring/short circuit => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
	- -G62 defective	- Replace -G62

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

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
2341 Lambda control	- Unmetered air at air intake elbow or hoses of intake system	- Check intake system for leaks (unmetered air) => Page 74
	- CO content not in specified range	- Check idling speed, CO content and ignition point => Page 80

Output on printer of V.A.G 1551	Possible cause of trouble	Fault remedy
	- Short to earth in wire to Lambda probe -G39	- Check Lambda probe -G39 and Lambda control => Page 111
	- Activated charcoal filter solenoid valve -N80 leaking, permanently open	- Check activated charcoal filter solenoid valve -N80 for leaks => Page 118
2342 Lambda probe -G39 with heater	- Open circuit in wire to Lambda probe -G39/Lambda probe defective	- Check Lambda probe -G39 and Lambda control => Page 111
4431 Idling-speed stabilisation valve - N71	- Open circuit in wiring/short to earth between -N71 and KE III Jetronic control unit	- Check -N71 => Page 45

Note on flash codes 2341 and 2342:

Fault display can be ignored on vehicles with no catalytic converter and Lambda probe.

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3 - Final control diagnosis

3.1 - Final control diagnosis

Notes:

- ◆ Final control diagnosis can only be performed with engine stopped and ignition switched on.
- ◆ Final control diagnosis is terminated if engine is started or an engine speed pulse is detected.
- ◆ The control elements are checked acoustically or by means of touch.
- ◆ Final control diagnosis involves actuating the full throttle switch.
- ◆ During final control diagnosis the individual control elements are actuated until ⇒ key is pressed to select next control element. Exception: Cold start valve -N17 is only actuated for 10 seconds.
- ◆ Final control diagnosis function checks pressure regulator -N73 by measuring its current. For measurement of this current, differential pressure regulator has to be prepared for checking => Page 10 .
- ◆ To repeat final control diagnosis, switch ignition off and on again.

The final control diagnosis function actuates the following components in the stated sequence. As a check, each control element is assigned a flash code which is displayed on actuating the corresponding control element.

Flash code	Actuation sequence
4341	Pressure regulator -N73
4343	Activated charcoal filter solenoid valve - N80
4431	Idling-speed stabilisation valve -N71
4443	Cold start valve -N17

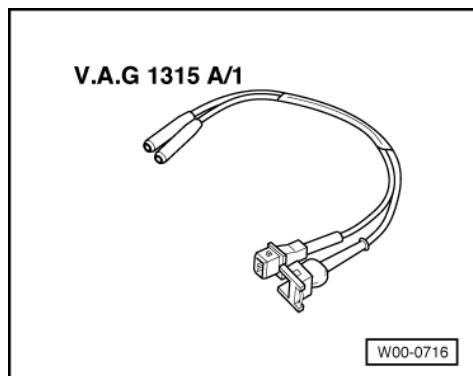
Test requirements:

- Full throttle switch OK
- Differential pressure regulator prepared for current measurement
=> Page 10

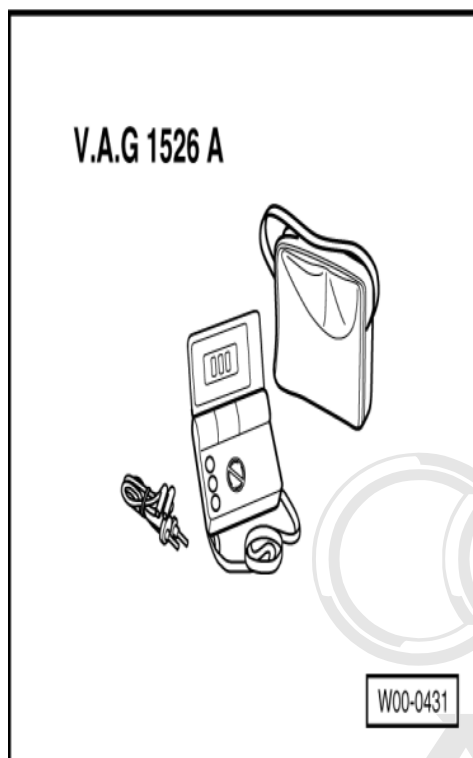


3.2 - Preparing differential pressure regulator for current measurement

Special tools and workshop equipment required



- ♦ Test lead V.A.G 1315A/1

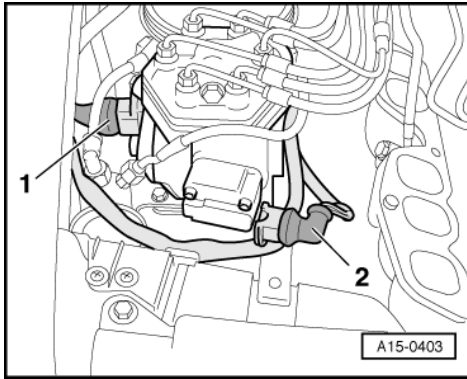


- ♦ V.A.G 1526 A

Requirement:

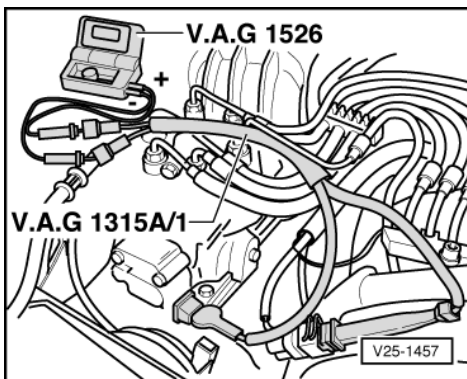
- Differential pressure regulator OK, checking => Page 71

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Sequence of operations

- -> Unplug connector -2- from differential pressure regulator.



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



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3.3 - Implementing final control diagnosis

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

-> Indicated on display:

Start flash code output
by pressing key

- Press ⇒ key on V.A.G 1551 until "Permanent short to earth on stimulation wire" appears on display.

-> Indicated on display:

Permanent short to earth on stimulation
wire

- Press ⇒key.

Note:

-> If adjacent display appears:

No flash code received

- Check wiring of white diagnostic connector => Page 14 .

-> Indicated on display:



Flash code: 4341
Pressure regulator -N73

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

If readings do not match specifications:

- Check differential pressure regulator => Page 71 .
- Press =>key.

-> Indicated on display:

Flash code: 4343
Activated charcoal filter solenoid valve
-N80

- Actuate full throttle switch.

Note:

Control elements are only activated as long as full throttle switch is actuated.

Valve must click.

If valve does not click:

- Check activated charcoal filter solenoid valve -N80 => Page 117 .
- Press =>key.

-> Indicated on display:

Flash code: 4431
Idling-speed stabilisation valve -N71

- Actuate full throttle switch.

Idling-speed stabilisation valve must click.

If valve does not click:

- Check idling-speed stabilisation valve -N71 => Page 45 .

- Press =>key.
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-> Indicated on display:

Flash code: 4443
Cold start valve -N17

- Actuate full throttle switch.

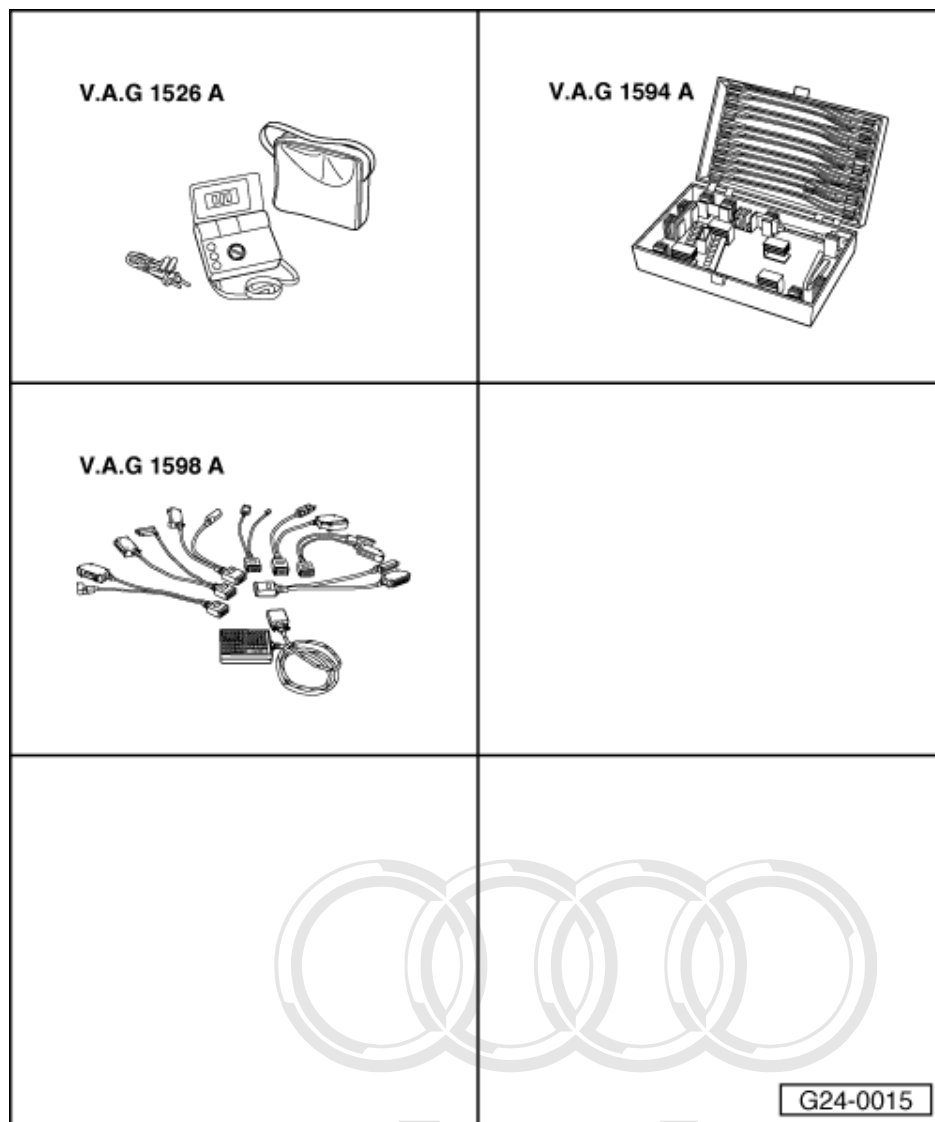
Valve must click for 10 seconds.

If valve does not click:

- Check cold start valve -N17 => Page 40 .
- Switch off ignition.

4 - Checking wiring of diagnostic connectors

4.1 - Checking wiring of diagnostic connectors



Special tools and workshop equipment required

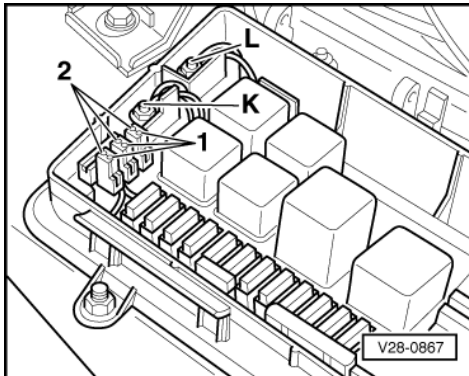
- ◆ V.A.G 1526 A
- ◆ V.A.G 1594 A
- ◆ V.A.G 1598 A
- ◆ V.A.G 1598/2
- ◆ V.A.G 1598/3

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Attention:
 Switch off ignition before checking wiring.



4.2 - Checking power supply for "black" diagnostic connector



-> Installation position of diagnostic connectors: In relay plate with fuse box in plenum chamber
Contact assignment for "black" diagnostic connector:

- 1 - Earth
- 2 - Terminal 30 (fused via fuse 21)

- Connect up multimeter for voltage measurement as follows.

Black diagnostic connector Contact	Measure to
1	Battery positive
2	Body earth

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- Specification: approx. battery voltage in each case

If readings do not match specifications:

- If necessary, eliminate open circuit in wiring/short circuit.

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

4.3 - Checking wiring between "white" diagnostic connector and KE III Jetronic/FEI control unit

Note:

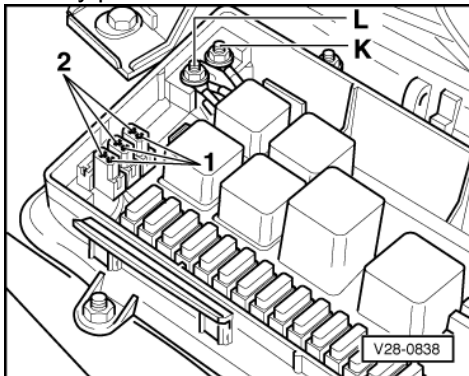
The L-wire test described below must be implemented if the following display appears on the connected fault reader V.A.G 1551.

-> Indicated on display:

No flash code received

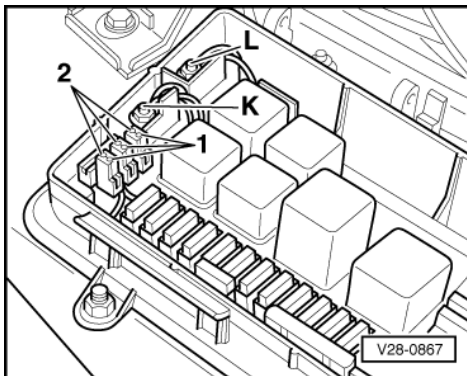
Checking L-wire

Wiring between "white" diagnostic connector and KE III Jetronic/FEI control unit is routed via wiring junction L in relay plate with fuse box.



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

-> Installation position of wiring junctions K and L06.92: In relay plate with fuse box in plenum chamber



-> Installation position of wiring junctions K and L07.92ä: In relay plate with fuse box in plenum chamber

KE III Jetronic control unit:

- Remove KE III Jetronic control unit and engage it in service position => Page 31 .
- With 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 only (not to control unit) => Page 29 .
- Check for open circuit and short to earth/positive in the following wiring.

White diagnostic connector Contact	Wiring junction	Test box V.A.G 1598 A Socket
1	L	13

- If necessary, eliminate open circuit in wiring/short circuit.

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

FEI control unit:

- Remove FEI control unit => Page 145 .
- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 30 .
- Check for open circuit and short to earth/positive in the following wiring.

White diagnostic connector Contact	Wiring junction	Test box V.A.G 1598 A Socket
1	L	3

- If necessary, eliminate open circuit in wiring/short circuit.

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



25 - Mixture preparation, Injection

1 - Servicing KE III Jetronic injection system

1.1 - Servicing KE III Jetronic injection system

1.2 - Safety precautions

Attention:

Heed the following so as to avoid possible injury and/or the destruction of the injection and ignition system:

- ♦ Never touch/disconnect ignition cables with engine running or at cranking speed.
- ♦ Always switch off ignition before disconnecting and connecting ignition system wires (also applies to H.T. wires and measuring instrument leads).
- ♦ If engine is to be operated at cranking speed without it starting (e.g. compression test), unplug connector from output stage for ignition coil.
- ♦ Boost starting with rapid charger is only permitted for up to 1 minute at a maximum of 16.5 V.
- ♦ Always switch off ignition before washing engine.
- ♦ Always switch off ignition before disconnecting and connecting battery so as not to damage KE III Jetronic or FEI control unit.
- ♦ For connection of measuring instruments (e.g. voltage tester V.A.G 1527 B, portable multimeter V.A.G 1526 A), always make use of adapter set V.A.G 1594 A.

Pay attention to the following if testers and measuring instruments have to be used in the course of a test drive on vehicles fitted with front passenger's airbag.

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Attention:

- ♦ **Always attach testers and measuring instruments to back seat and have them operated from there by a second person.**
- ♦ **If testers and measuring instruments were to be operated from front passenger's seat, person sitting there could suffer injury in the event of an accident due to triggering of front passenger's airbag.**

1.3 - Rules for cleanliness

When working on fuel supply/injection system, pay careful attention to the following rules:

- ♦ Carefully clean all joints and adjacent areas before disconnecting.
- ♦ Place parts removed on a clean surface and cover them over. Do not use fluffy cloths.
- ♦ Carefully cover or seal opened components if repairs are not to be performed immediately.
- ♦ Only install clean components:
 - Do not remove replacement parts from wrapping until immediately prior to installation.
 - Do not use parts that have been stored loose (e.g. in tool boxes).
- ♦ When system is open:
 - Do not work with compressed air if at all possible.
 - Do not move vehicle unless absolutely necessary.
- ♦ Unplugged connectors:
 - Protect against dirt and damp.

Only connect when dry.

1.4 - Technical data

Engine codes		NG (2.3 l / 98 kW engine)
KE III Jetronic control unit	Part no.	=>Parts List
	Speed governing rpm	6500 ... 6700
Idling-speed setting	Speed cannot be adjusted; regulated by idling speed stabilisation	720 ... 860 rpm 1)
CO content	Check value	0.1 ... 1.1 % by vol.
Differential pressure regulator current	Test specification	-3 ... +3 mA
	Setting	0 ±1 mA
System pressure		6.1 ... 6.5 bar
Differential pressure	Differential pressure regulator connector unplugged	0.3 ... 0.5 bar below system pressure
	Differential pressure regulator connector attached	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

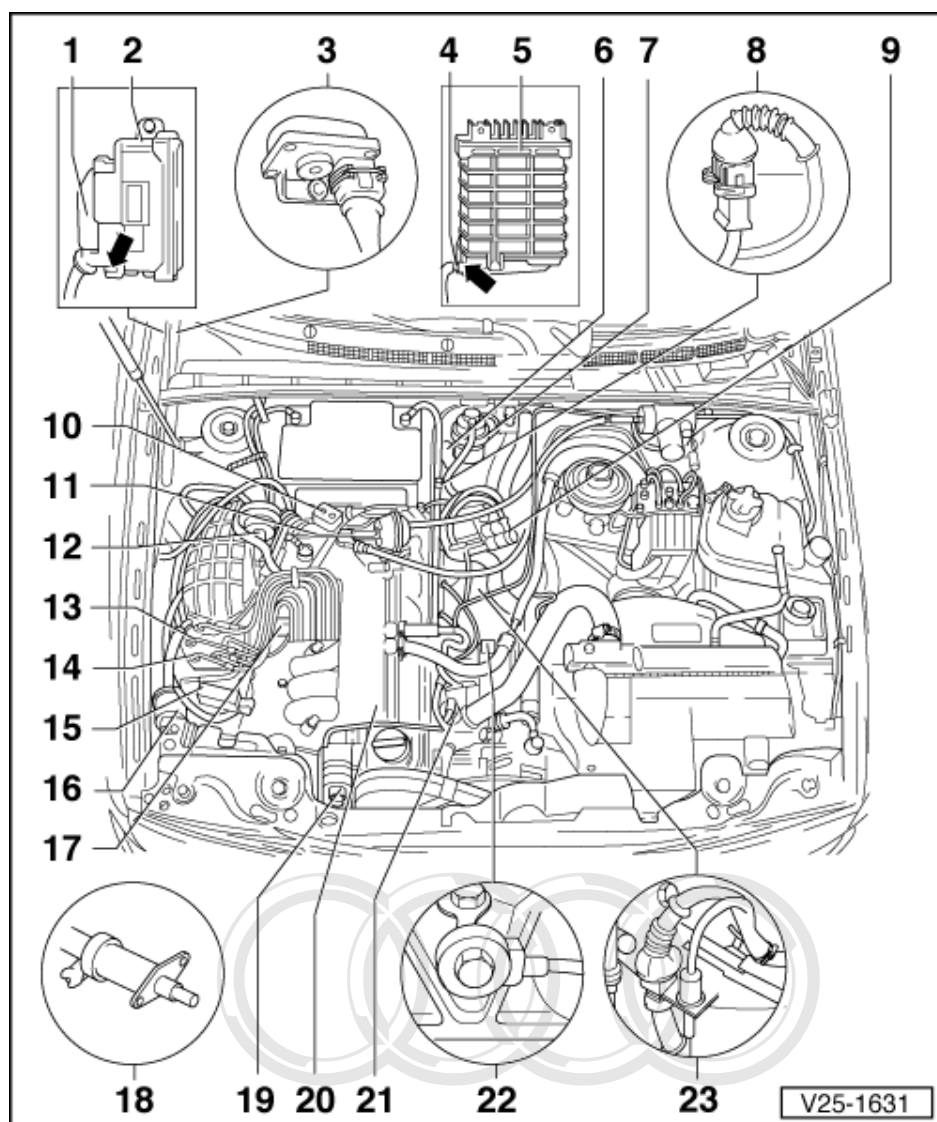
1) Current values:

=> Exhaust emission test binder

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1.5 - Exploded view of fitting locations

**1 Connector**

- ♦ For FEI control unit
- ♦ Wait 30 seconds after switching off ignition before unplugging or attaching connector

2 FEI control unit -J154

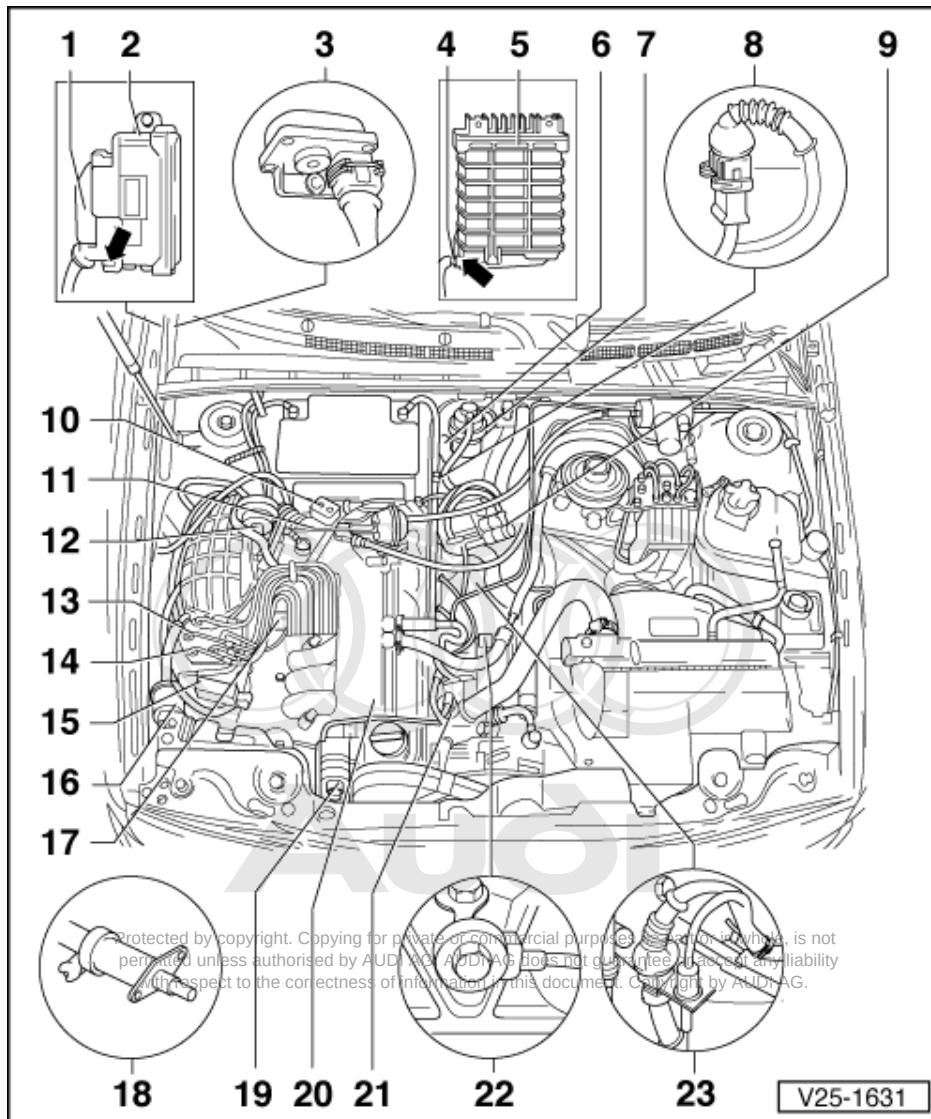
- ♦ Fitting location: A-pillar in front passenger's footwell behind trim
- ♦ Removing and installing => Page 145

3 Elevation sender -F96

- ♦ Fitting location: A-pillar in front passenger's footwell behind trim

4 Connector

- ♦ For KE III Jetronic control unit
- ♦ Wait 30 seconds after switching off ignition before unplugging or attaching connector



5 KE III Jetronic control unit -J21

- ♦ Between bulkhead and air duct in passenger's footwell
- ♦ Removing and installing=>Page **31**

6 Output stage for ignition transformer

- ♦ Checking => Page **138**
- ♦ Cannot be replaced separately

7 Ignition transformer -N152

- ♦ Checking => Page **136**

8 Connector

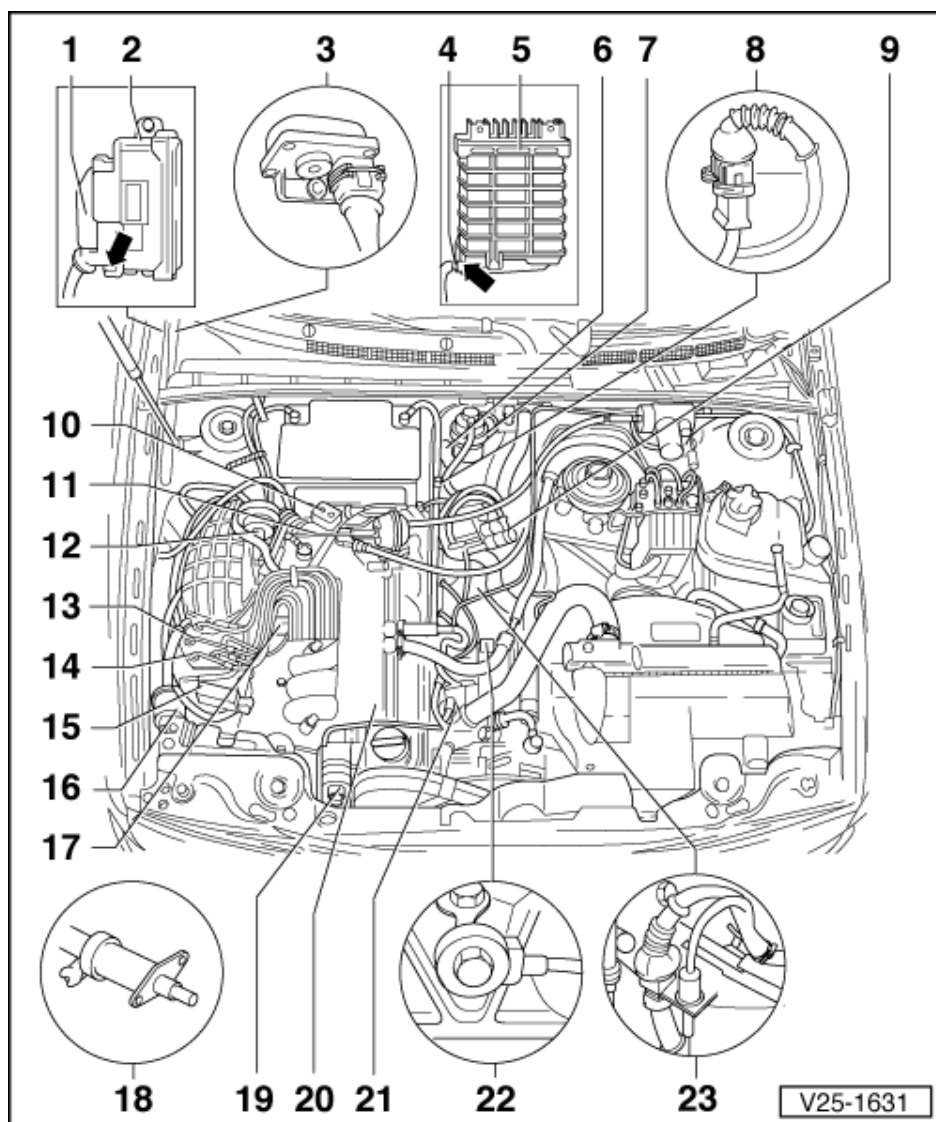
- ♦ For knock sensor 1 -G61

9 Ignition distributor -O

- ♦ With Hall sender -G40

10 Full throttle switch -F81

11 Idling switch -F60



12 Activated charcoal filter solenoid valve -N80

- ♦ Checking => Page 9

13 Fuel distributor

14 Air-flow meter potentiometer -G19

- ♦ Checking =>Page 64
- ♦ Cannot be replaced separately

15 Pressure regulator -N73

16 Fuel pressure regulator

17 CO measurement pipe

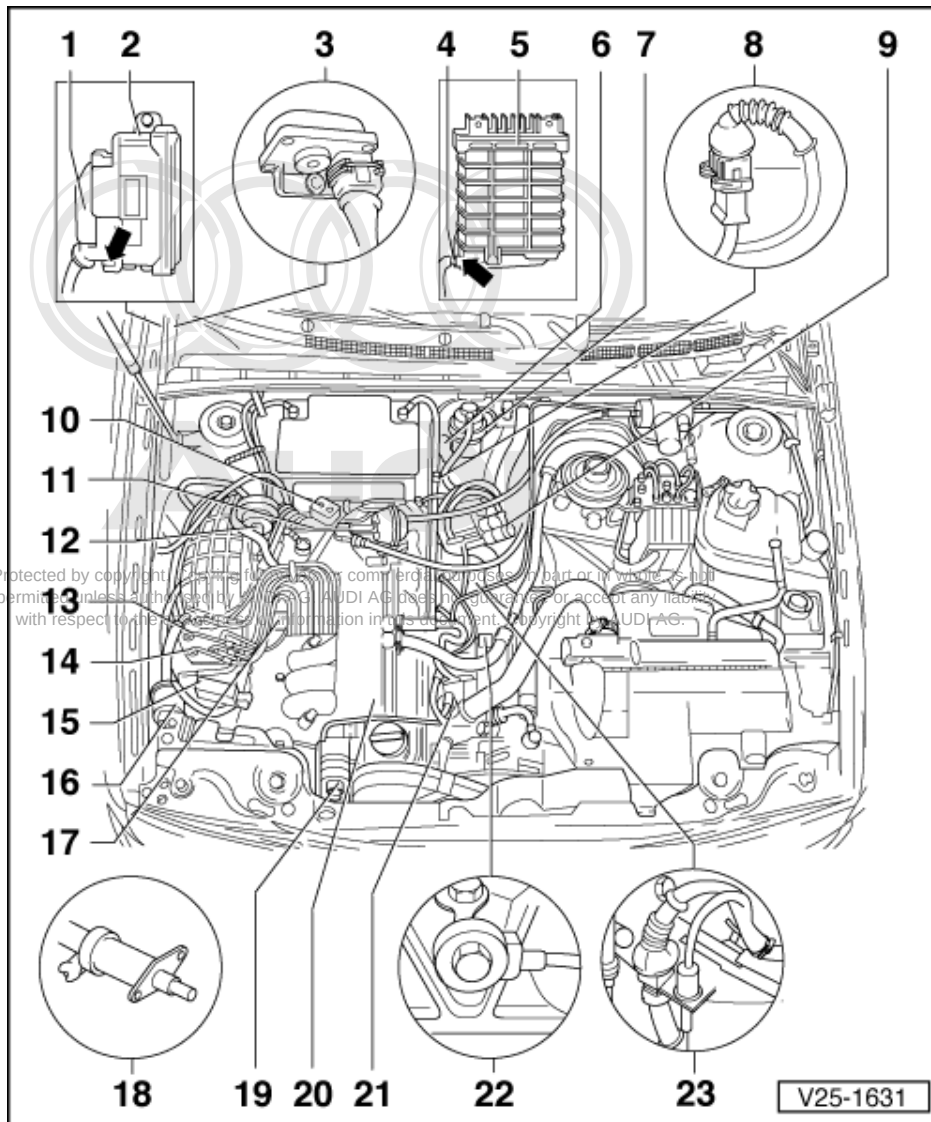
- ♦ With cap

18 Cold start valve -N17

- ♦ Checking => Page 40
- ♦ Bolt (10 Nm) to intake manifold
- ♦ Bolt on (15 Nm) fuel pipe



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19 Idling-speed stabilisation valve -N71

- ♦ Checking => Page 45

20 Intake manifold

21 Coolant temperature sender -G62

- ♦ Resistance values => Page 142

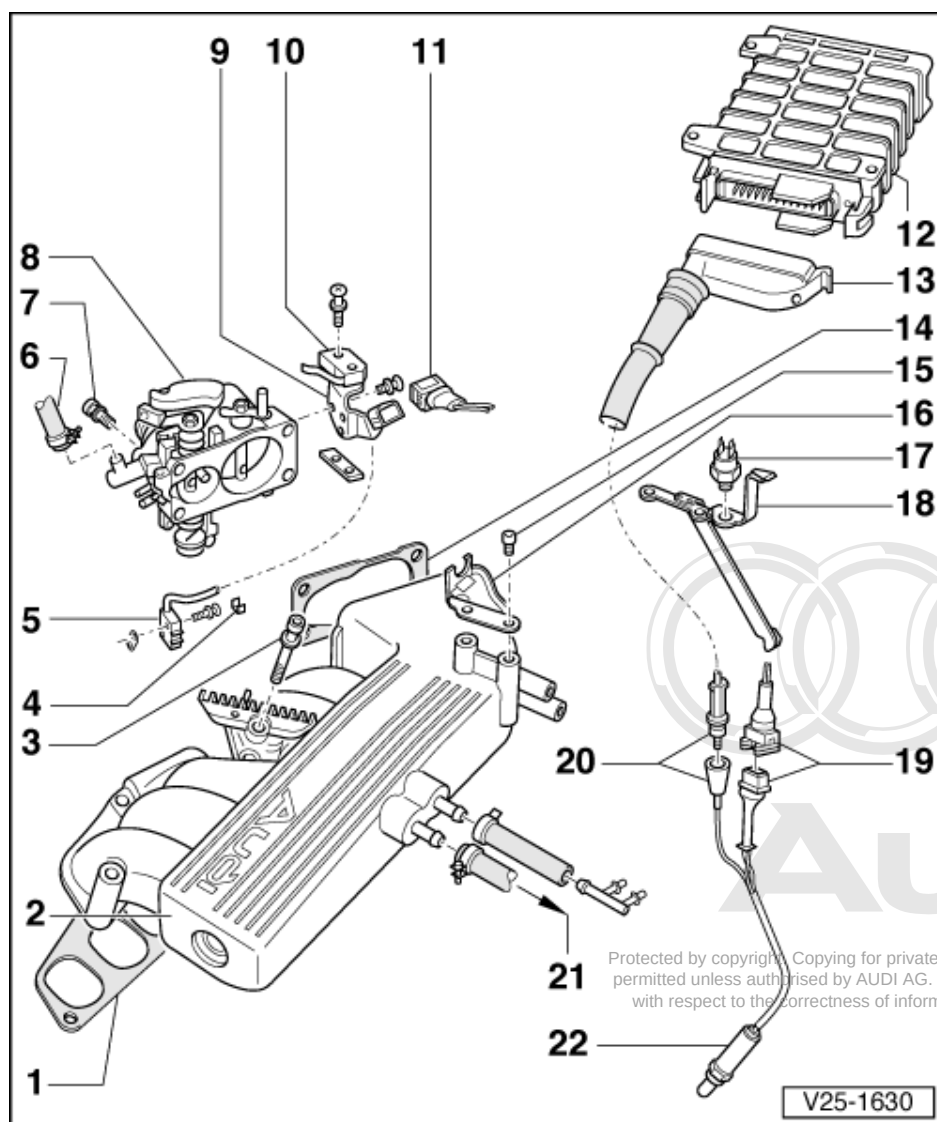
22 Knock sensor 1 -G61

23 Connectors

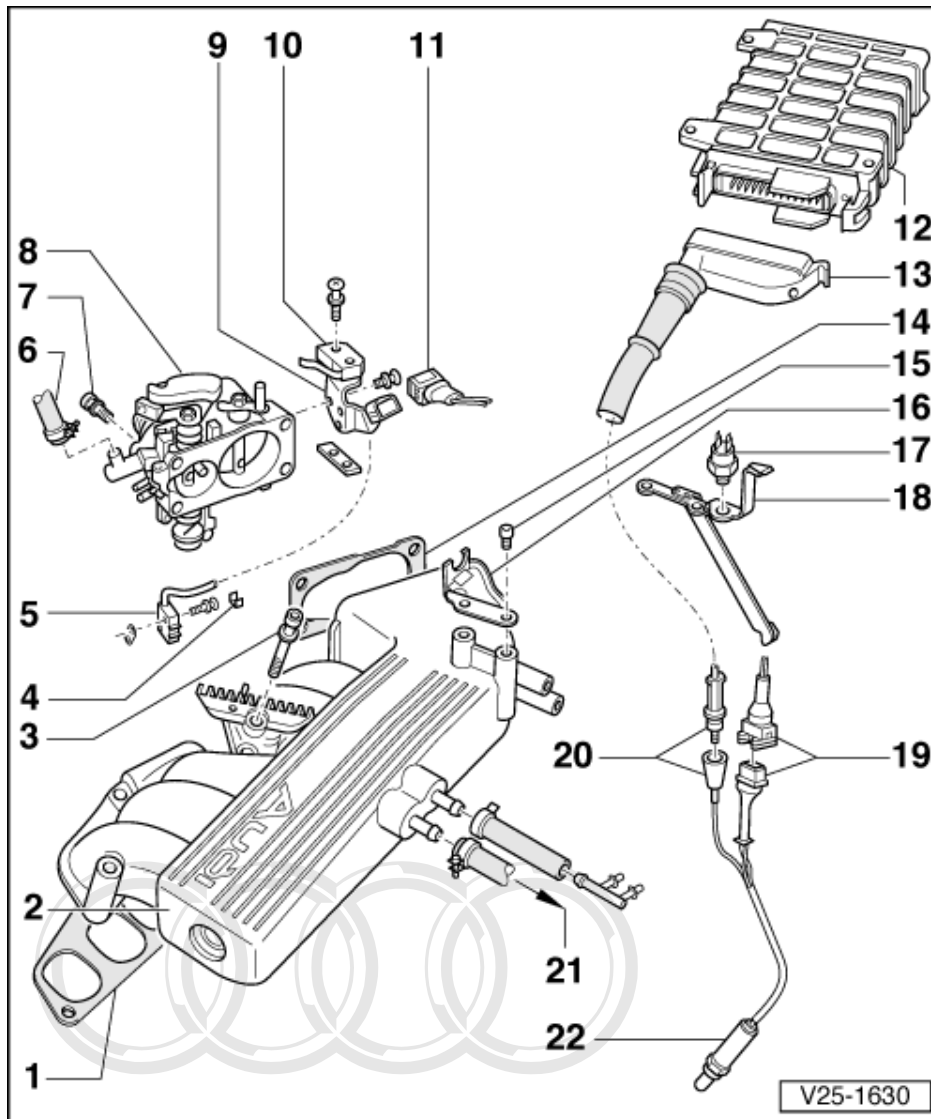
- ♦ a - 2-pin, for Lambda probe heater
-Z19
- ♦ b - 1-pin, for signal of Lambda probe
-G39



1.6 - Exploded view of upper part of intake manifold



- 1 Gasket
 - ♦ Replace
- 2 Upper part of intake manifold
- 3 20 Nm
- 4 Clip
- 5 Idling switch -F60
 - ♦ Checking =>Page 58
 - ♦ Adjusting => Page 55
- 6 To activated charcoal filter solenoid valve -N80



7 20 Nm

8 Throttle-valve assembly

- ♦ Basic setting of throttle valve
=> Page 73

9 Bracket

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10 Full throttle switch -F81

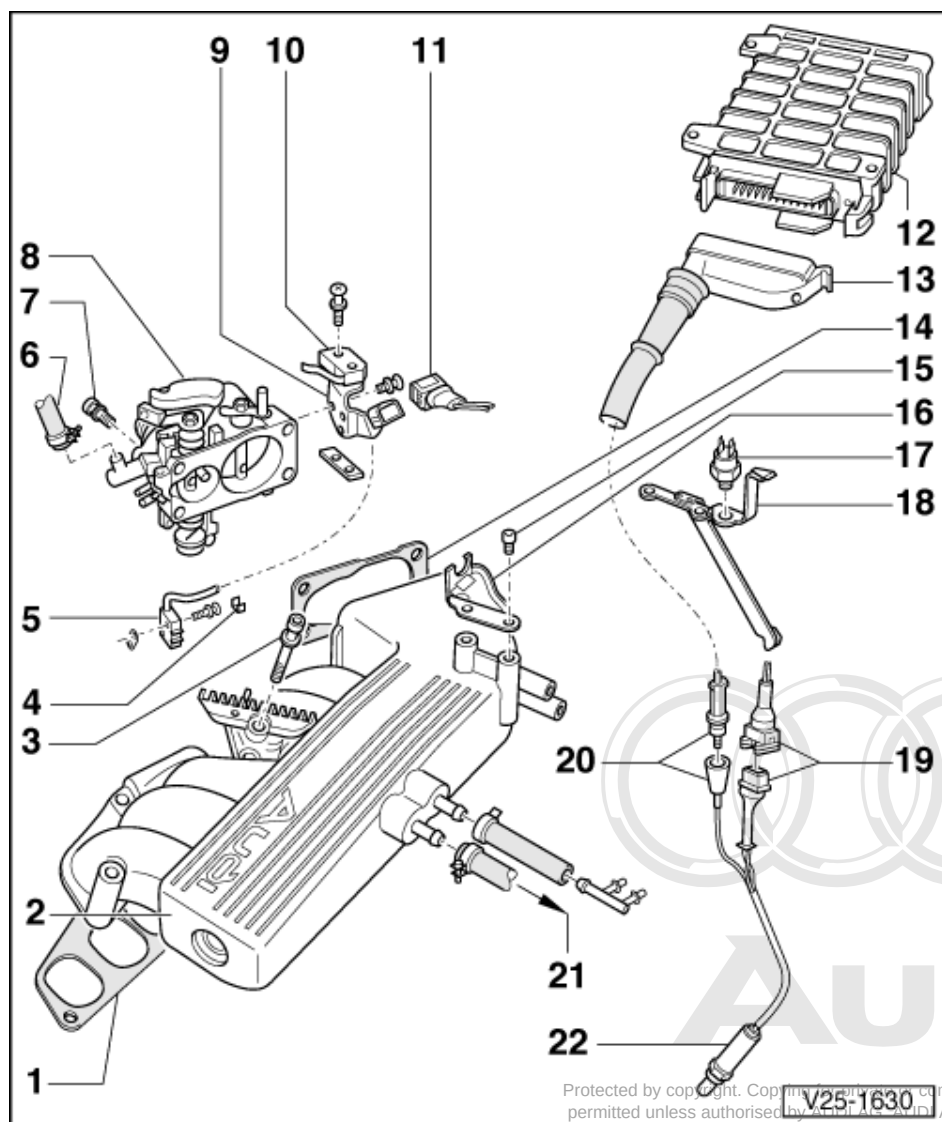
- ♦ Checking =>Page 60
- ♦ Adjusting => Page 57

11 Connector

- ♦ Press wire clip to unplug

12 KE III Jetronic control unit -J21

- ♦ Between bulkhead and air duct in passenger's footwell
- ♦ Removing and installing=>Page 31



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13 Connector

- ♦ For KE III Jetronic control unit
- ♦ Wait 30 seconds after switching off ignition before unplugging or attaching connector

14 Gasket

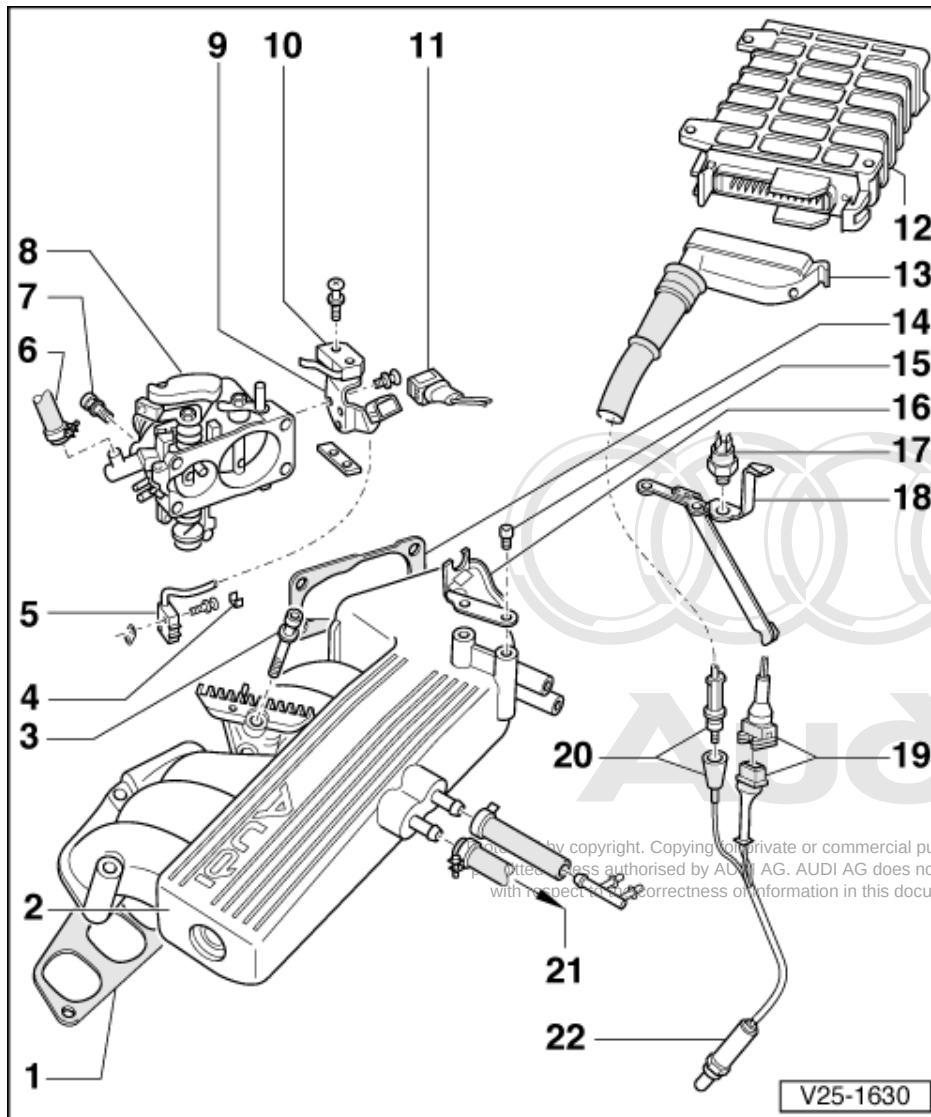
- ♦ Replace

15 10 Nm**16 Support bracket**

- ♦ For throttle cable

17 Fan run-on thermo-switch -F87**18 Bracket**

- ♦ For fan run-on thermo-switch -F87



19 Connector for Lambda probe heating

- ♦ Checking Lambda-probe heater -Z19 =>Page **114**

20 Connector for Lambda probe

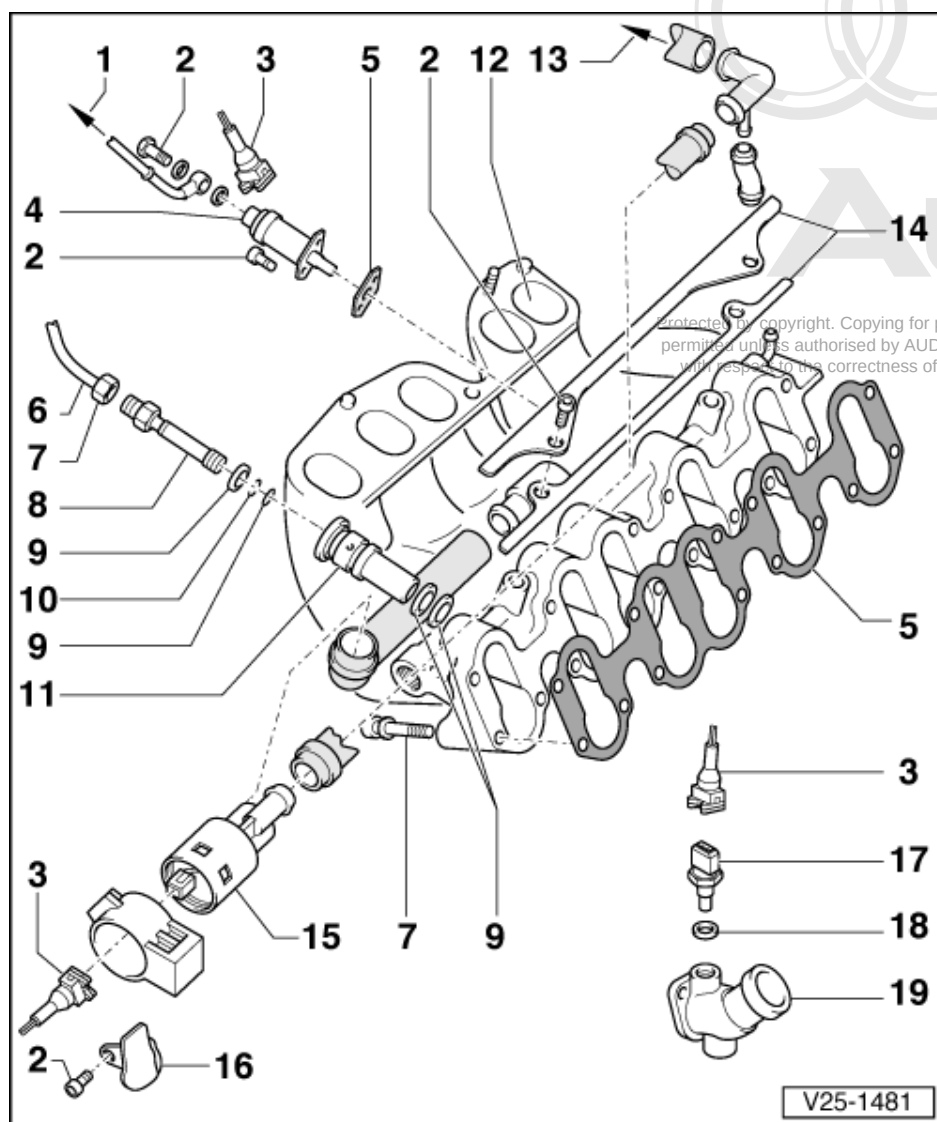
21 To brake servo

22 Lambda probe, 55 Nm

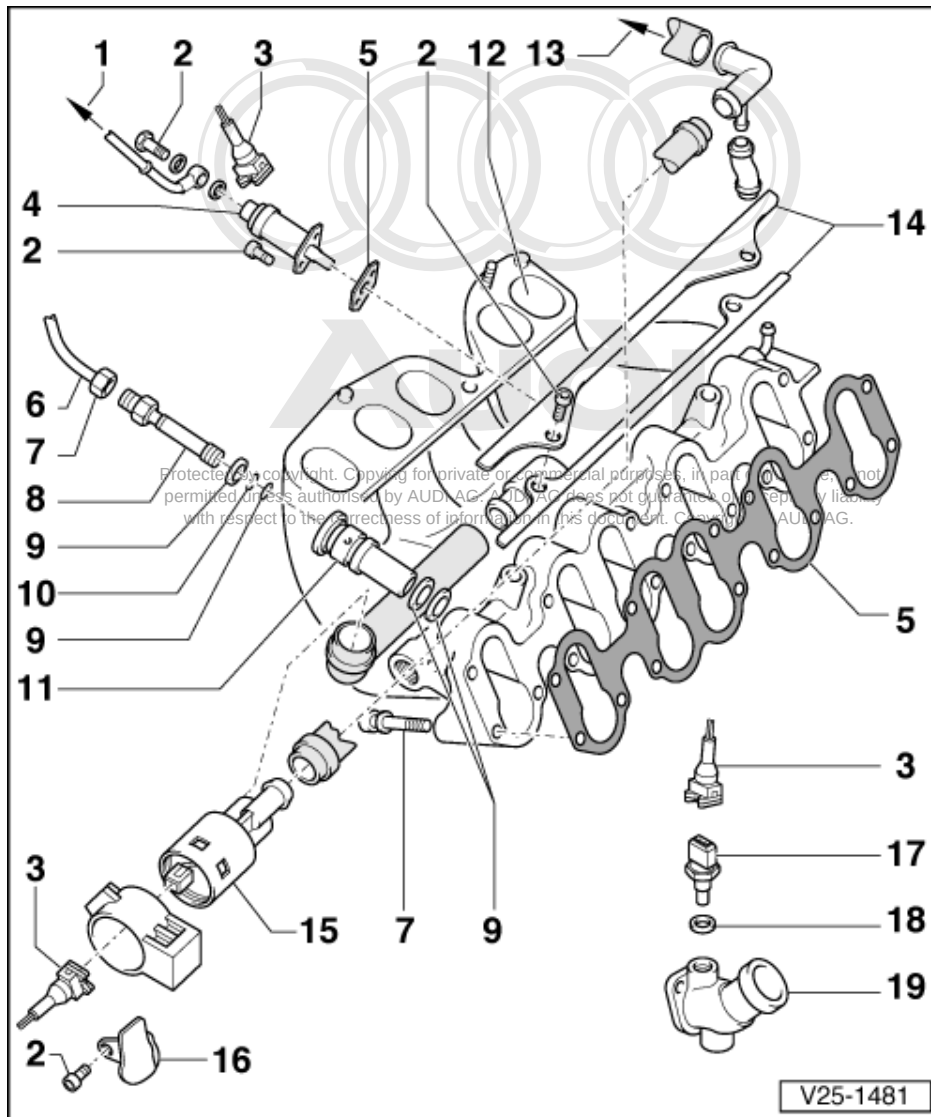
- ♦ Grease thread only with hot bolt paste G 052 112 A3; paste must not be allowed to come into contact with slits in probe body
- ♦ Checking =>Page **111**



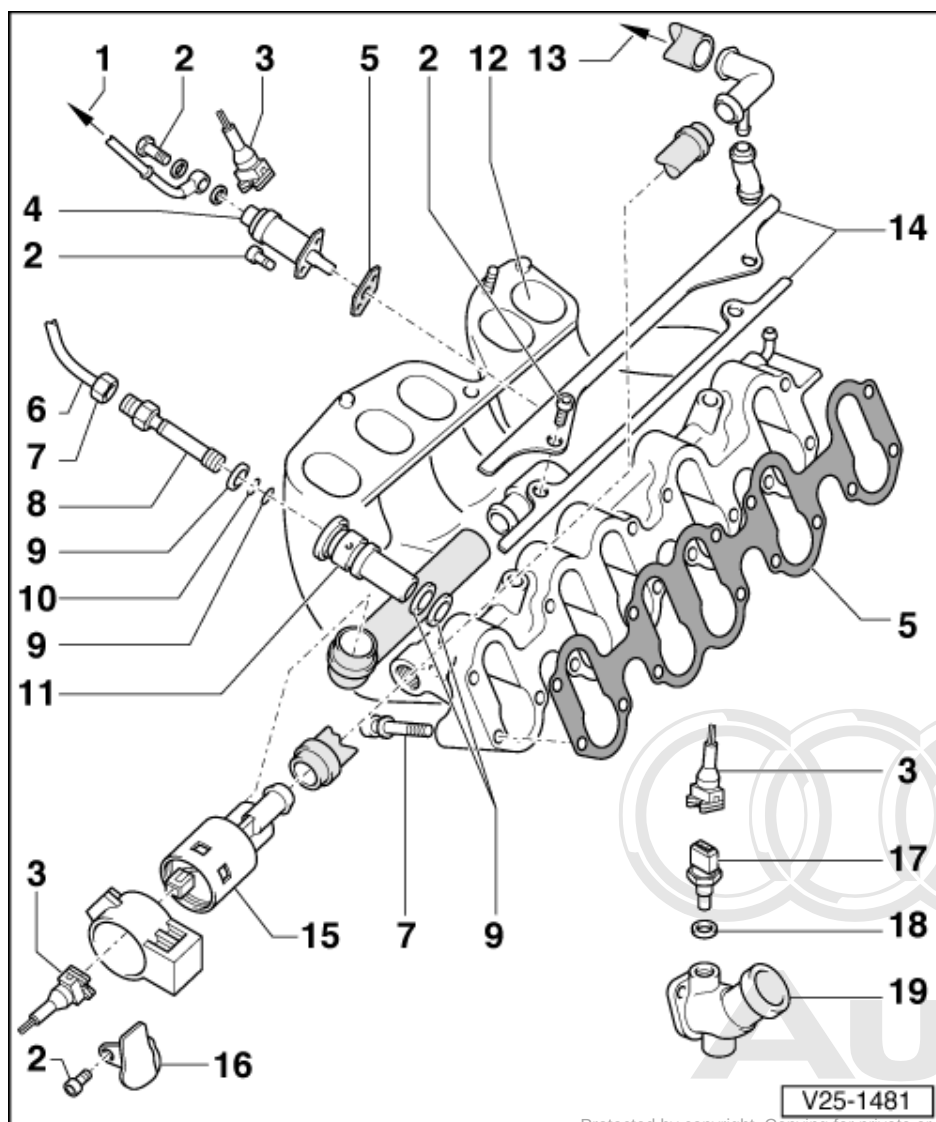
1.7 - Exploded view of lower part of intake manifold



- 1 To fuel distributor
- 2 10 Nm
- 3 Connector
 - ♦ Press wire clip to unplug
- 4 Cold start valve -N17
 - ♦ Checking => Page 40
- 5 Gasket
 - ♦ Replace
- 6 To fuel distributor
- 7 20 Nm
- 8 Injector
 - ♦ Checking => Page 94



- 9 O-ring
 - ♦ Replace
- 10 Circlip
- 11 Injector insert
 - ♦ Removing and installing
=> Page 100
- 12 Lower part of intake manifold
- 13 To air intake elbow
- 14 Holder
 - ♦ For injectors
- 15 Idling-speed stabilisation valve -N71
 - ♦ Checking => Page 45
- 16 Holder

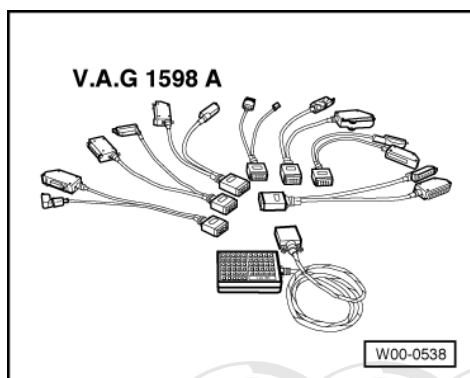


- 17 Coolant temperature sender -G62**
- ♦ Resistance values => Page 142
- 18 Sealing ring**
- ♦ Replace
- 19 Connection**

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1.8 - Wiring and component check using test box V.A.G 1598 A

Special tools and workshop equipment required



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

Notes:

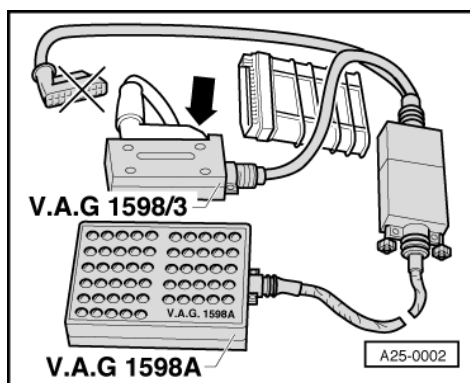
- ◆ Wait 30 seconds after switching off ignition before unplugging or attaching connectors of KE III Jetronic/FEI control unit.
- ◆ Test box V.A.G 1598 A is not to be connected during diagnosis using fault reader V.A.G 1551.
- ◆ Use test leads from adapter set V.A.G 1594 A for connecting testers to test box.

Attention:

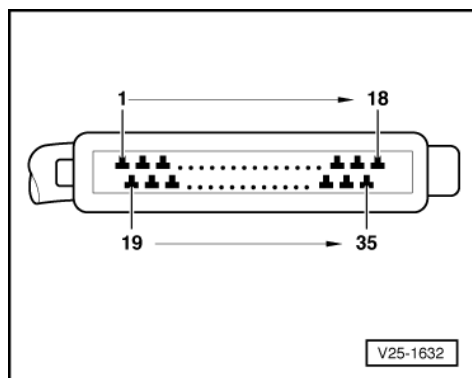
So as not to destroy electronic components, select required measuring range before connecting test leads and observe test conditions.

KE III Jetronic control unit

- Switch off ignition.



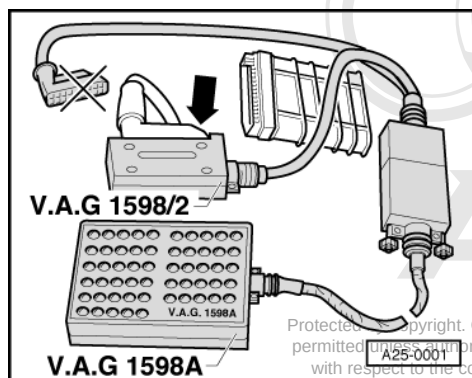
- Remove KE III Jetronic control unit and engage it in service position => Page 31 .
- -> With ignition switched off, use adapter V.A.G 1598/3 to connect test box V.A.G 1598 A to connector of KE III Jetronic control unit only (not to control unit).

**Notes:**

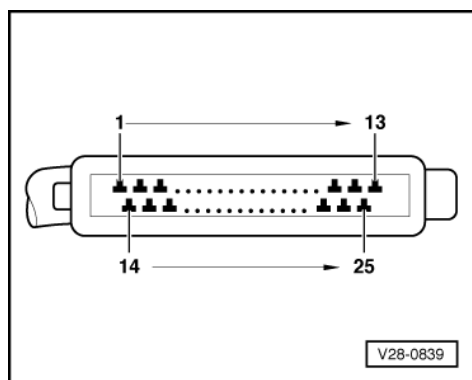
- ♦ -> Contact assignment at connector of KE III Jetronic control unit.
- ♦ Contact assignment is identical to socket assignment of test box V.A.G 1598 A.
- Perform testing as described in appropriate repair operations.

FEI control unit

- Switch off ignition.
- Remove FEI control unit => Page 145 .



- -> With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit).

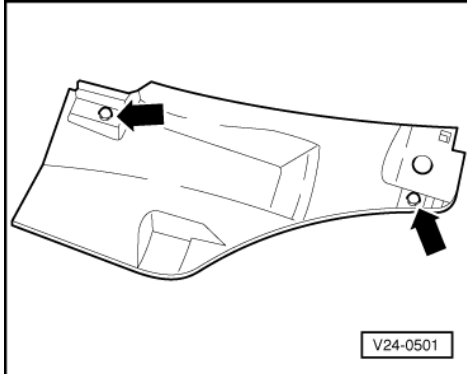
Notes:

- ♦ -> Contact assignment at connector of FEI control unit.
- ♦ Contact assignment is identical to socket assignment of test box V.A.G 1598 A.
- Perform testing as described in appropriate repair operations.

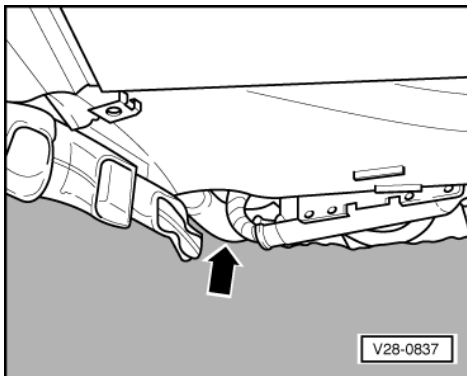
1.9 - Replacing KE III Jetronic control unit

Fitting location => Exploded view of fitting locations - Page **18**

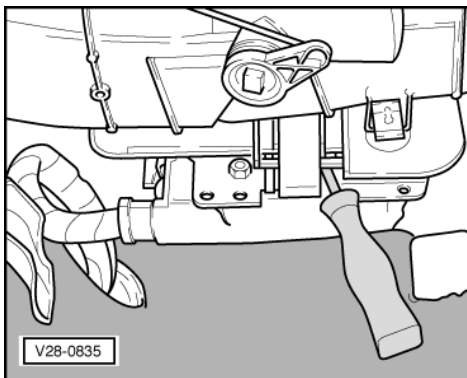
Removing



- Switch off ignition.
- -> Remove cover beneath glove box -arrows-.



- -> Pull off condensate hose -arrow- on vehicles with air conditioner.



- -> Insert screwdriver next to retainer **between control-unit mounting plate and plastic slot**.
- Turn screwdriver if necessary to disengage retainer tabs at mounting plate above retainer from plastic slot recess.
- Pull down control unit slightly and remove screwdriver.
- Pull down control unit 3 ... 4 cm. In this position, control unit engages in a second recess (service position).

Notes:

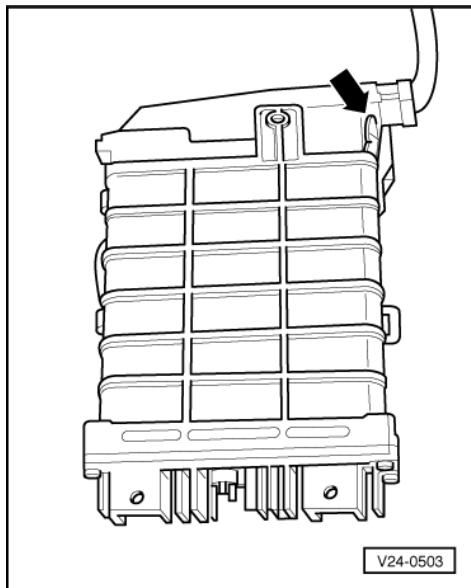
- ◆ In service position, test box V.A.G 1598 A can be connected with adapter V.A.G 1598/3 for measurement and test purposes to engine wiring harness.



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- ♦ Wait 30 seconds after switching off ignition before unplugging or attaching connector of KE III Jetronic control unit.



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

Note:

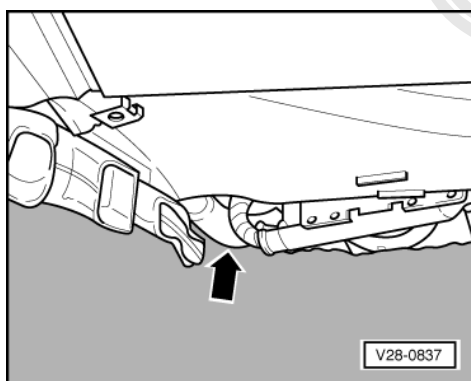
The following operations are only necessary if the control unit is to be completely removed.

- Unfasten catch as described and carefully pull control unit downwards out of slot.
- To remove control unit on vehicles with air conditioner, carefully press detached condensate drain hose aside so that side flange of control unit does not damage drain hose.

Installing

Notes:

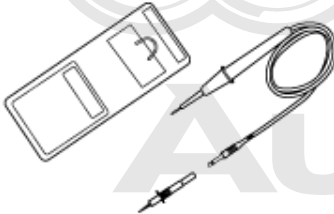
- ♦ Wait 30 seconds after switching off ignition before unplugging or attaching connector of KE III Jetronic control unit.



- ♦ -> On vehicles with air conditioner, check whether condensate drain hose -arrow- has been connected before installing cover beneath glove box.

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1.10 - Checking power supply for KE III Jetronic control unit

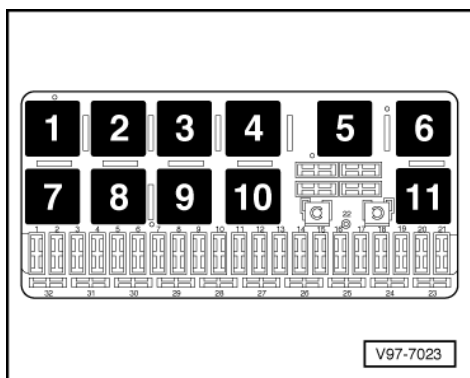
V.A.G 1526 A 	V.A.G 1527 B  Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.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



- -> Fuse S28 OK (in fuse box)

Checking power supply

- With 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 only (not to control unit) => Page 29 .
- Connect up multimeter for voltage measurement as follows.

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

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

If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

Checking earth supply

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- Connect up multimeter for voltage measurement as follows.

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

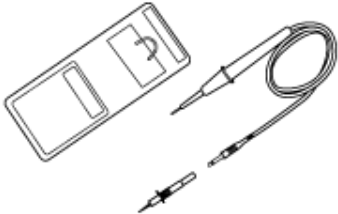
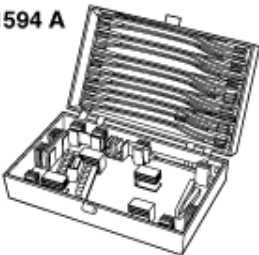
1) Vehicles with manual gearbox only

- Specification: approx. battery voltage in each case

If readings do not match specifications:

- Use current flow diagram to check wiring between connector of KE III Jetronic control unit and earth points.
- Eliminate open circuit in wiring if necessary.

1.11 - Checking fuel-pump relay -J17 and actuation

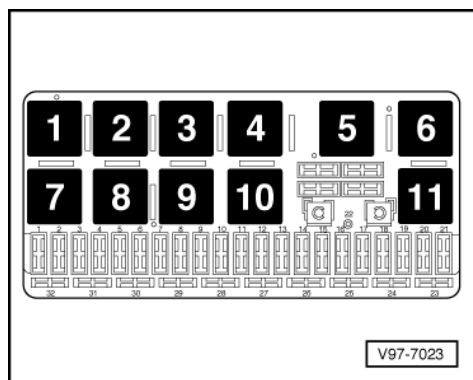
V.A.G 1526 A 	V.A.G 1527 B 
V.A.G 1594 A 	V.A.G 1598 A 
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Special tools and workshop equipment required

- ♦ 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



Note:



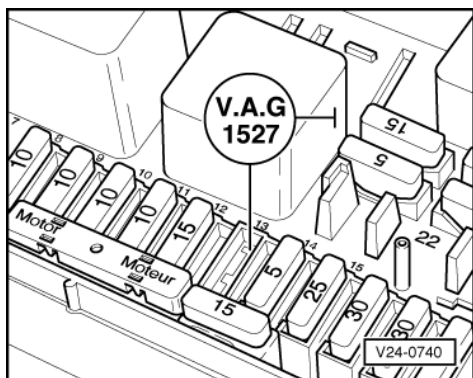
-> Fitting location of fuel-pump relay: On relay plate with fuse box in plenum chamber, position 10

Test requirement:

- Battery voltage at least 11 V

Checking operation of fuel-pump relay

- Detach cover from relay plate with fuse box in plenum chamber.



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- -> Pull out fuse S13.
- Connect up voltage tester V.A.G 1527 B as follows.

Fuse S13	Measure to
Rear contact	Engine earth

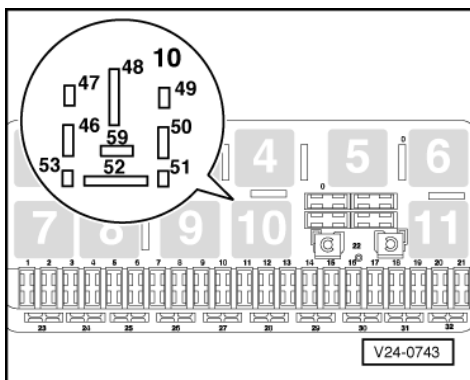
- Briefly operate starter.
 - Energisation of fuel-pump relay must be heard and felt; LED must light

If relay is not energised:

- Check actuation => Page 38 .

If relay is energised but LED does not light:

- Pull off fuel-pump relay.



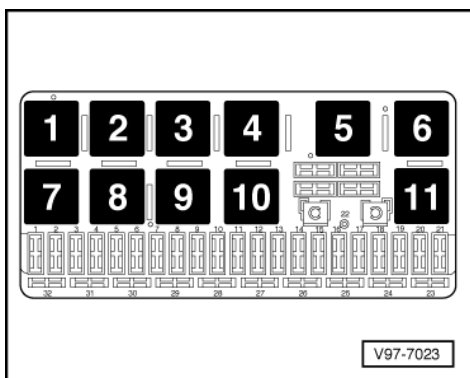
- -> Use current flow diagram to check for open circuit in the following connection.

Relay plate, position 10 Contact	Fuse
52	S13

- Replace relay plate if necessary.

If connection is OK:

- Replace fuel pump relay -J17.
- Re-insert fuel-pump relay and fuse S13.



- -> Pull out auxiliary fuse S25.
- Connect up voltage tester V.A.G 1527 B with test leads from V.A.G 1594 A between earth and one of the two contacts for fuse S25.
- Briefly operate starter.
 - Energisation of fuel-pump relay (on relay plate with fuse box in plenum chamber, position 10) must be heard and felt; LED must light

If relay is not energised:

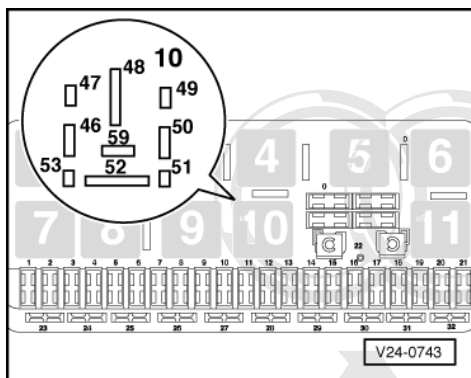
- Check actuation => Page 38 .

If relay is energised but LED does not light:

- Repeat test at other contact for fuse S25.

If LED still does not light:

- Pull off fuel-pump relay.



- -> Use current flow diagram to check for open circuit in the following wiring.

Relay plate, position 10 Contact	Fuse
59	S25

- Eliminate open circuit in wiring if necessary.

If wiring is OK:

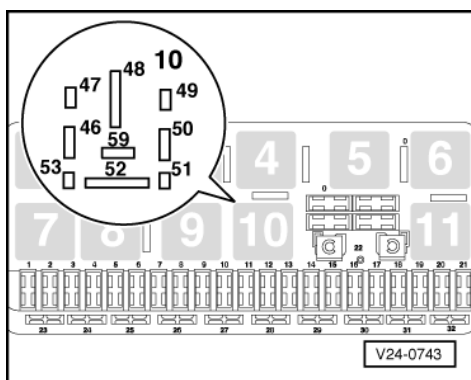
- Replace fuel pump relay -J17.
- Re-insert fuel-pump relay and auxiliary fuse S25.

Checking power supply and actuation of fuel-pump relay

- Detach cover from relay plate with fuse box in plenum chamber.
- Pull off fuel-pump relay.

Checking power supply

- Switch on ignition.



- -> Connect up multimeter for voltage measurement as follows.

Relay plate, position 10 Contact	Specification
46 + 50	approx. battery voltage
48 + 50	approx. battery voltage

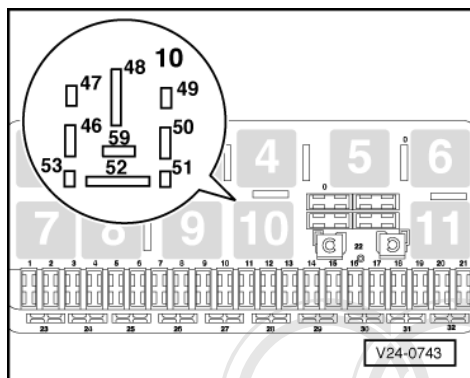
- Switch off ignition.

If readings do not match specifications:

- Check wiring.

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

Checking actuation



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

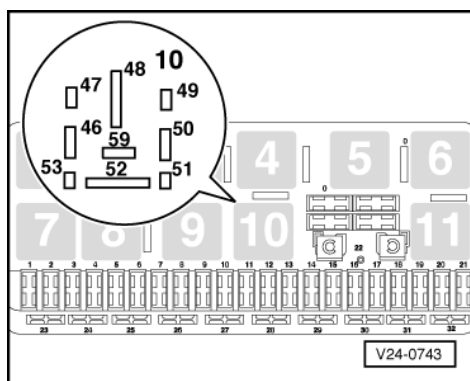
Relay plate, position 10	
Contact	Contact
46	47

- Switch on ignition.
 - LED must light for approx. 1 second
- Operate starter.
 - LED must light constantly during starting

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If LED does not light:

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

Relay plate, position 10 Contact	Test box V.A.G 1598 A Socket
47	14

- If necessary, eliminate open circuit in wiring/short circuit.

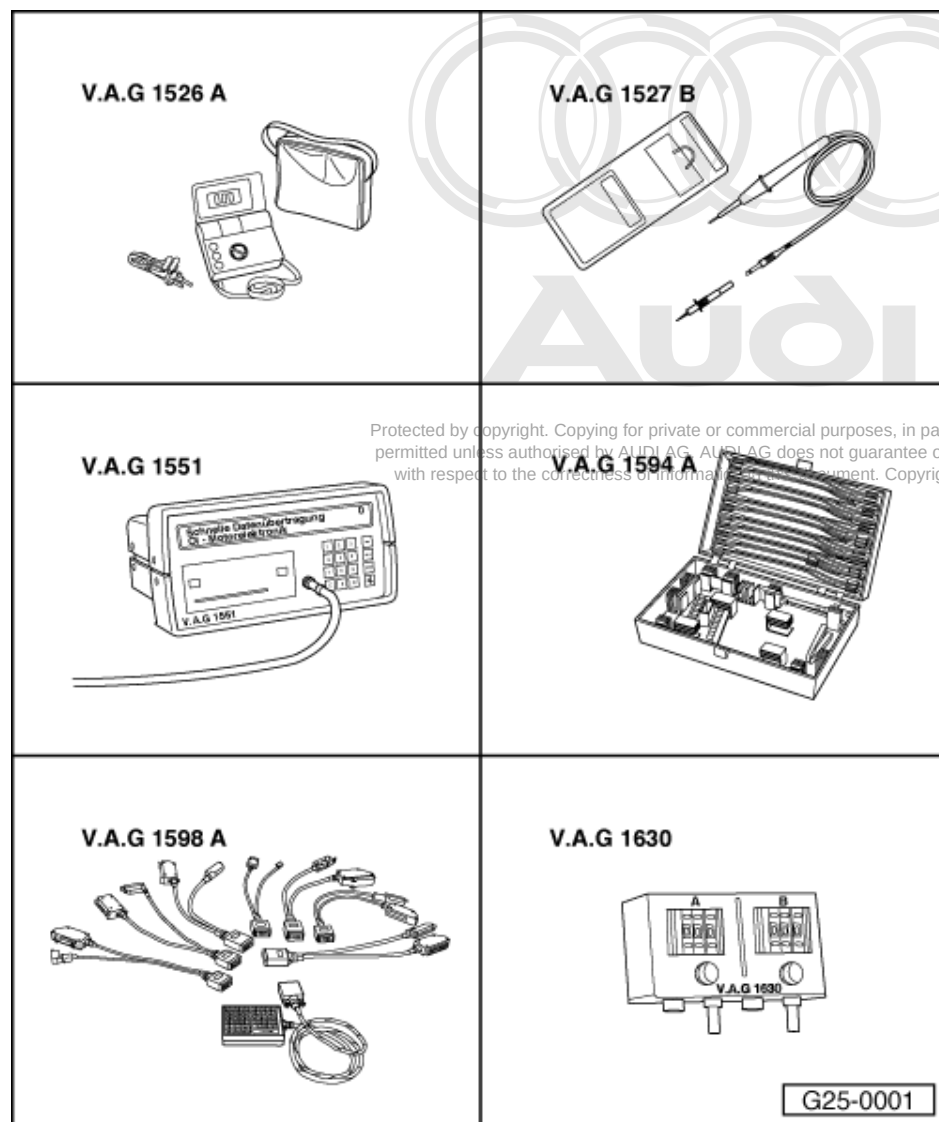
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder



If no fault is found:

- Replace fuel pump relay -J17.

1.12 - Checking cold start valve -N17



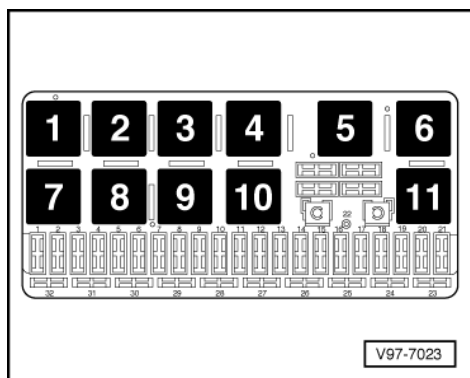
Special tools and workshop equipment required

- ♦ 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 => Exploded view of fitting locations - Page **18**

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

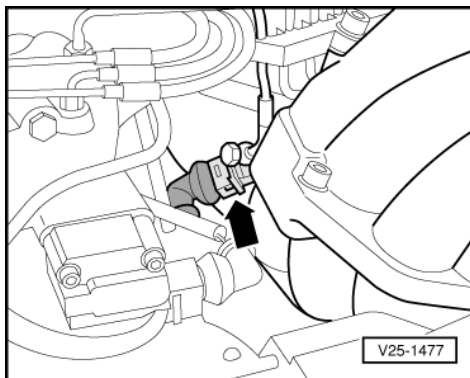
Checking power supply



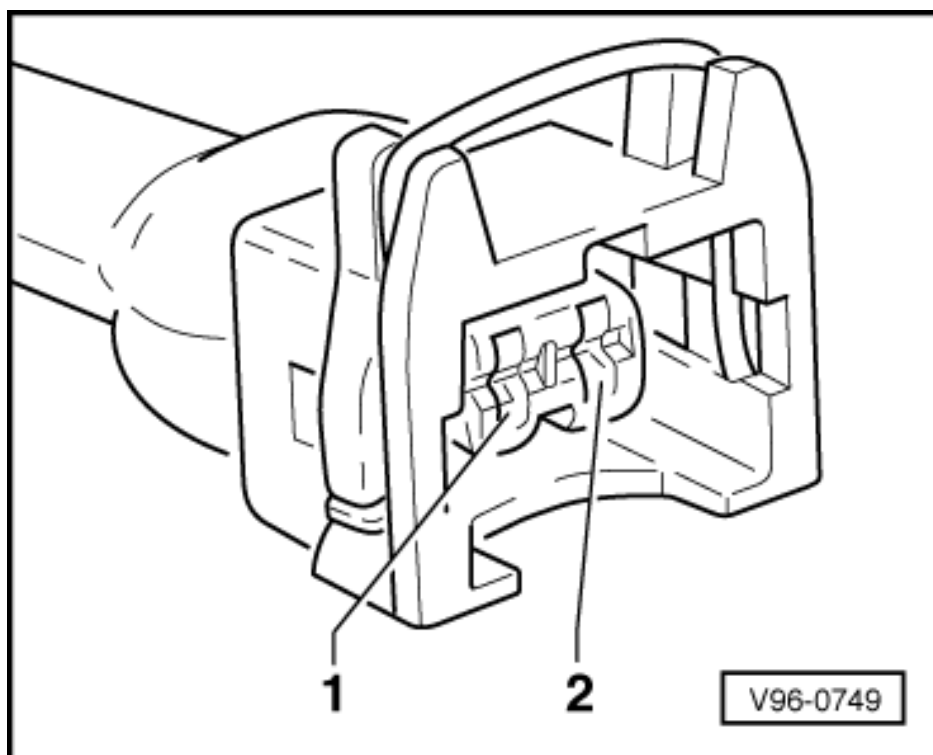
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Test requirement:

- -> Fuse S28 OK (in fuse box)



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





- -> Connect up multimeter for voltage measurement as follows.

Connector Contact	Measure to
1	Engine earth

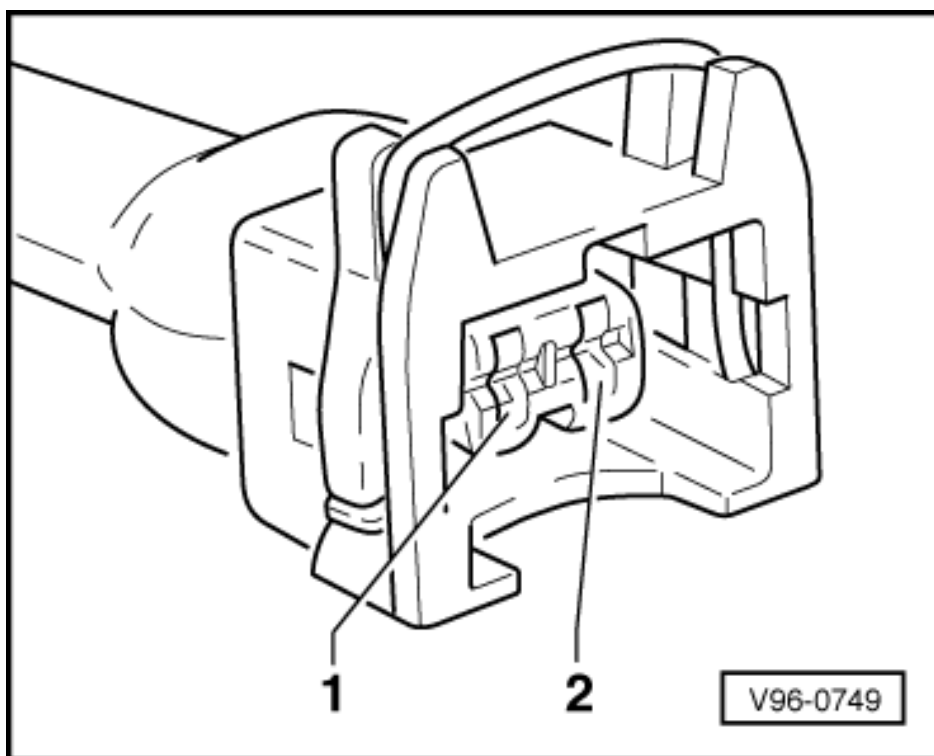
- Switch on ignition.
 - Specification: approx. battery voltage

If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

If reading matches specification:

- Check actuation.



Checking actuation

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

Notes:

- ♦ Cold start valve is only actuated for approx. 10 seconds to prevent over-enrichment of engine.
- ♦ Renewed testing involves re-starting final control diagnosis.
- Start final control diagnosis and actuate cold start valve -N17 (flash code 4443) => Page 9 .
 - LED must flash

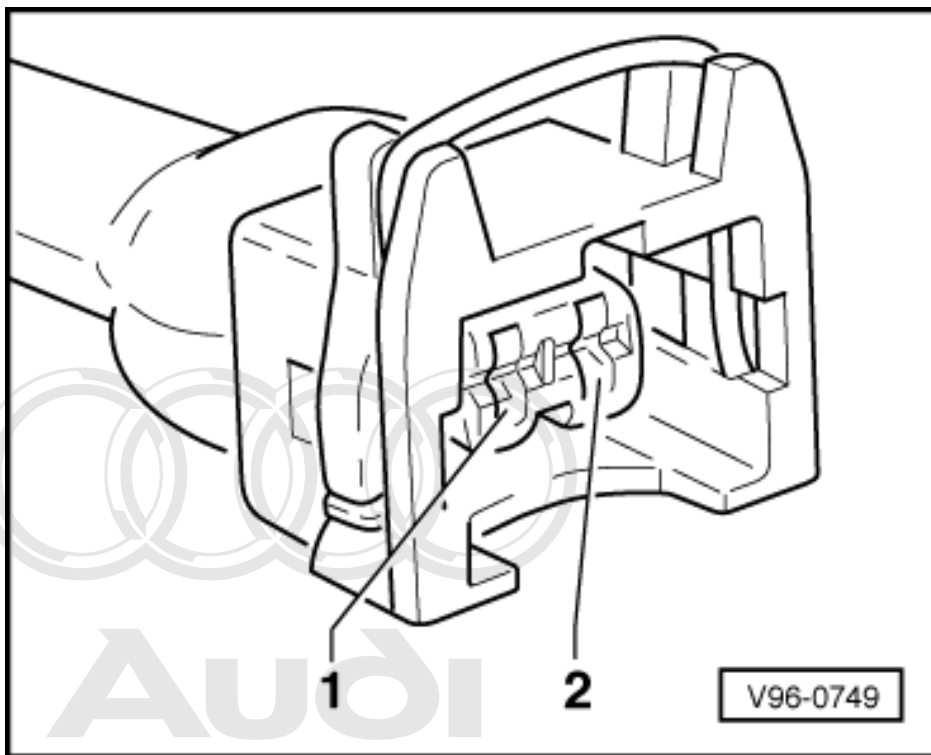
If reading matches specification:

- Replace cold start valve.

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If reading does not match specification:

- With 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 only (not to control unit) => Page 29 .



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=> Check for open circuit and short to earth/positive in the following wiring.

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

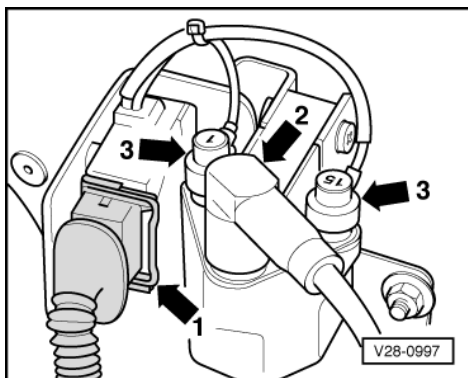
- If necessary, eliminate open circuit in wiring/short circuit.

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

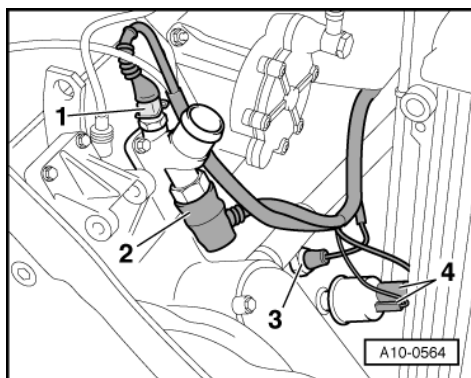
If wiring is OK and there is no actuation:

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

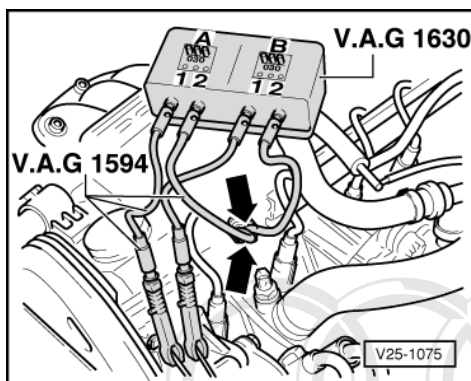
Checking spray pattern, injection period and freedom from leaks of cold start valve



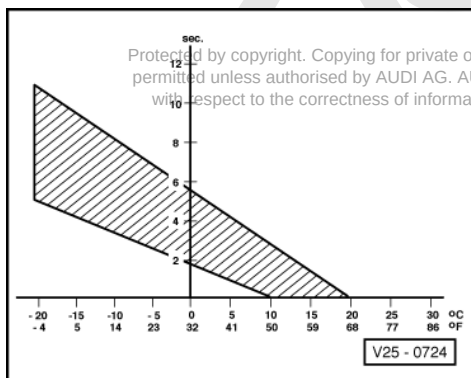
- -> Unplug connector -arrow 1- from output stage.



- -> Unplug connector at coolant temperature sender -G62 -1-.

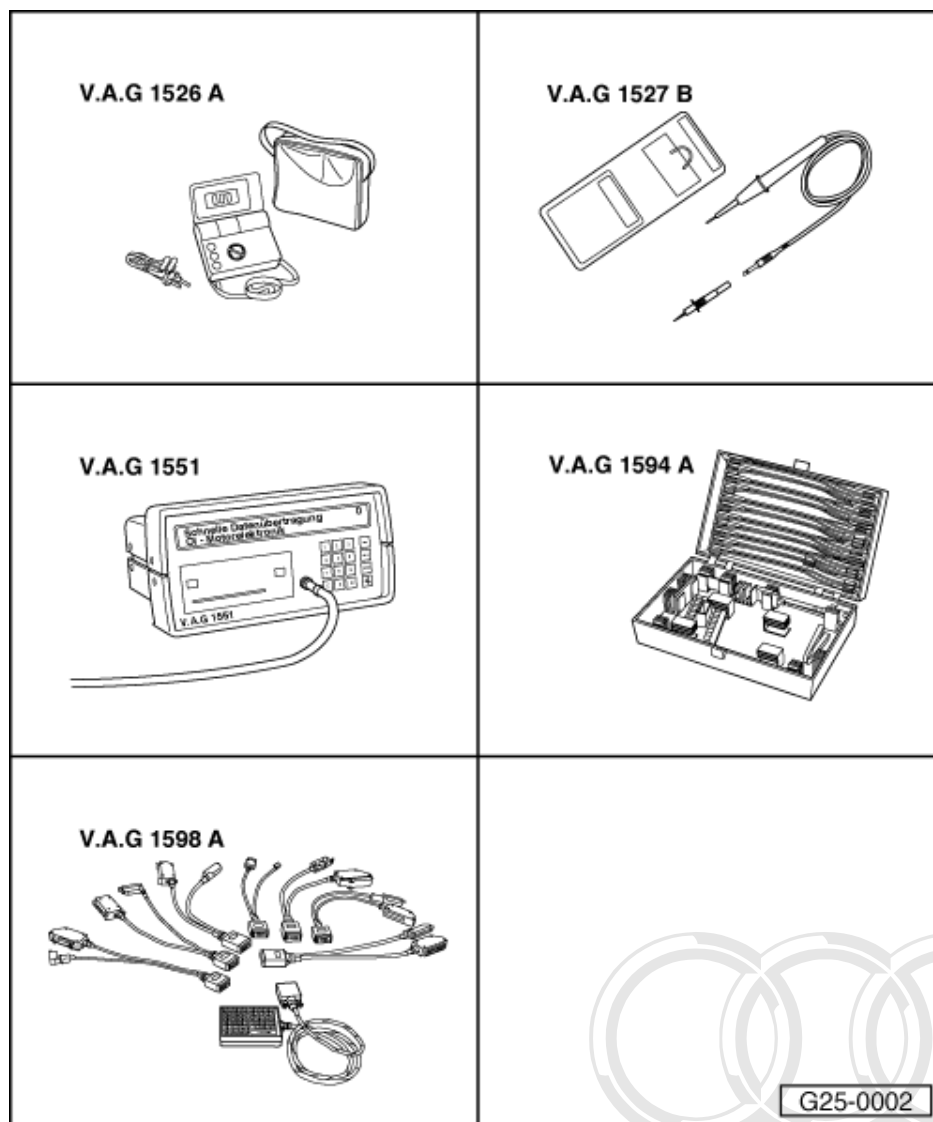


- -> Connect sides A and B of digital potentiometer V.A.G 1630 to unplugged connector of coolant temperature sender and earth.
- Set sides A and B of V.A.G 1630 to 3.0 kW.
- Detach cold start valve with fuel pipe connected from intake manifold and hold valve over a graduated beaker.
- Operate starter.



- -> For 2 ... 3 seconds, cold start valve spray must exhibit an even conical pattern
- Dry off nozzle of cold start valve.
- Cold start valve must not dribble within 1 minute; outside of cold start valve must also not become moist

1.13 - Checking idling-speed 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

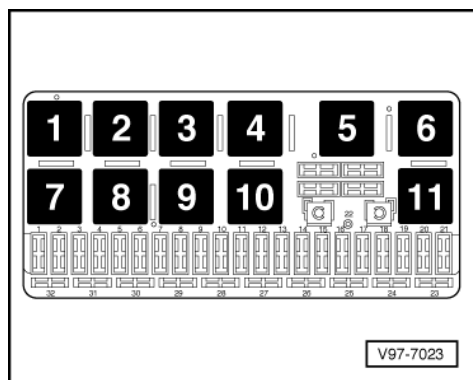
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Fitting location => Exploded view of fitting locations - Page **18**

If idling-speed stabilisation valve does not react during final control diagnosis:

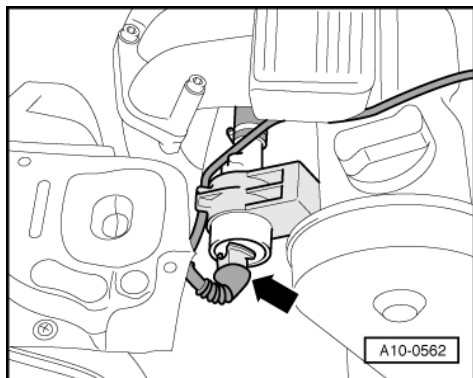


Checking power supply

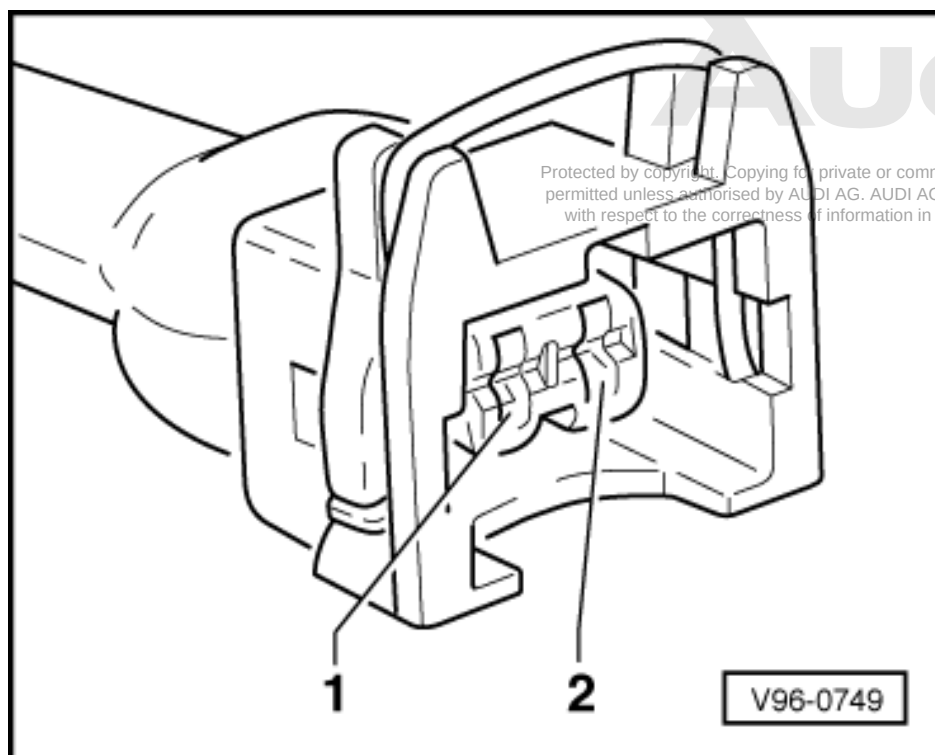


Test requirement:

- -> Fuse S28 OK (in fuse box)



- -> Unplug connector -arrow- at idling-speed stabilisation valve.



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- -> Connect up multimeter for voltage measurement as follows.

Connector Contact	Measure to
1	Engine earth

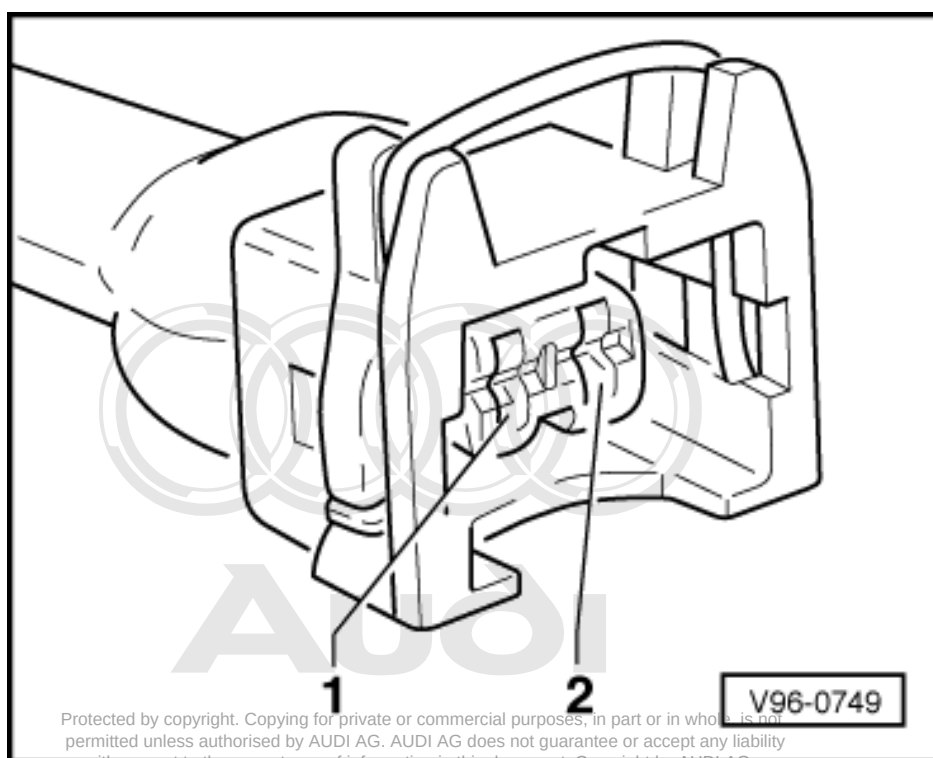
- Switch on ignition.
 - Specification: approx. battery voltage

If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

If reading matches specification:

- Check actuation.



Checking actuation

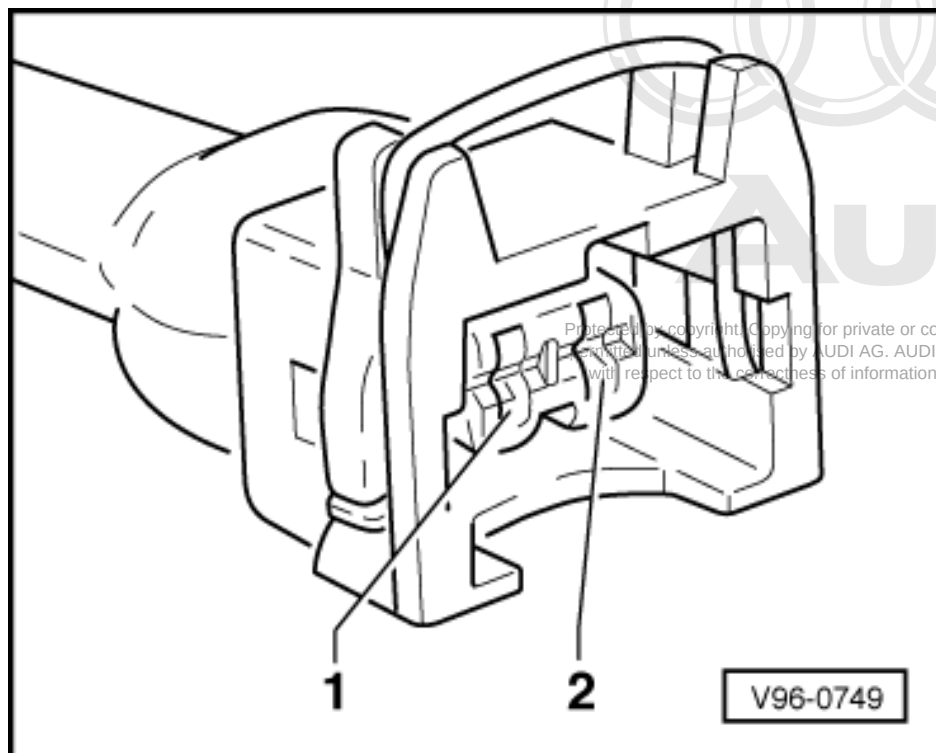
- -> Connect up voltage tester V.A.G 1527 B between contacts 1 and 2.
- Start final control diagnosis and actuate idling-speed stabilisation valve -N71 (flash code 4431) => Page 9.
- LED must flash

If reading matches specification:

- Replace idling-speed stabilisation valve.

If reading does not match specification:

- With 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 only (not to control unit) => Page 29.



- -> Check for open circuit and short to earth/positive in the following wiring.

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

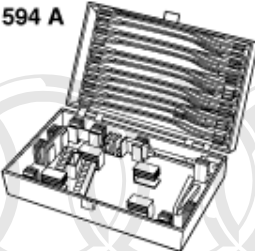
- If necessary, eliminate open circuit in wiring/short circuit.

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

If wiring is OK and there is no actuation:

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

1.14 - Checking elevation sender -F96

V.A.G 1526 A 	V.A.G 1594 A 
V.A.G 1598 A 	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.
	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 => Exploded view of fitting locations - Page **18**

Notes:

- ◆ The elevation sender cannot be checked with the equipment available to workshops. A check is only made on the power supply.
- ◆ The following check is only to be performed if the corresponding fault is displayed on fault memory interrogation.

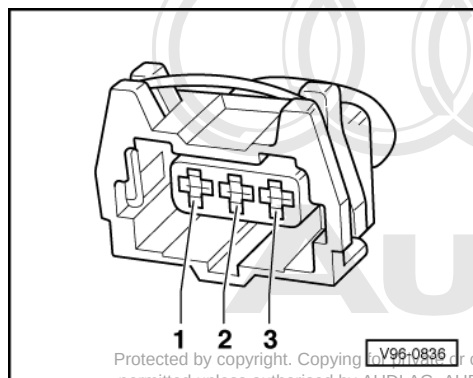
Test sequence

- Remove lower right A-pillar trim.



=> General Body Repairs, Interior; Repair Group 70; Trim; Removing and installing lower right A-pillar trim Trim
Removing and installing lower right A-pillar trim

- Unplug connector at elevation sender.



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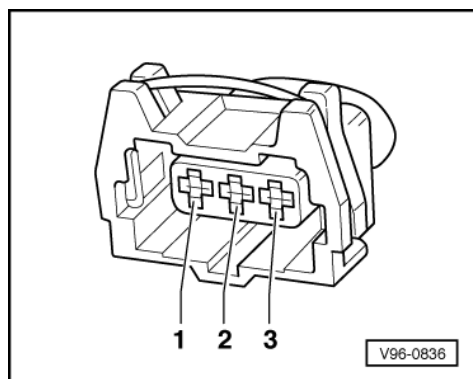
- -> Connect up multimeter for voltage measurement as follows.

Connector Contact	Measure to
1	Engine earth

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

If reading does not match specification:

- With 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 only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.

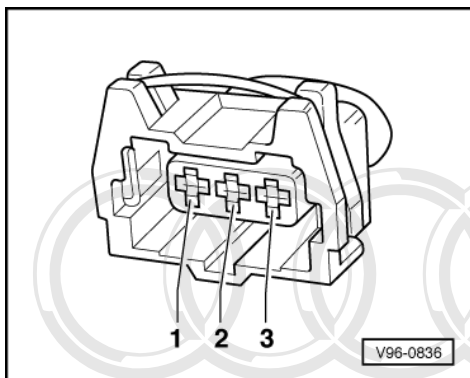
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If wiring is OK:

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

If reading matches specification:

- Switch on ignition.



- -> Connect up multimeter for voltage measurement as follows.

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

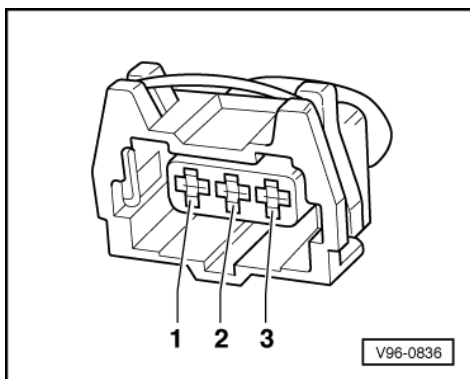
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If readings do not match specifications:

- Use current flow diagram to eliminate open circuit in wiring.

If readings match specifications:

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.

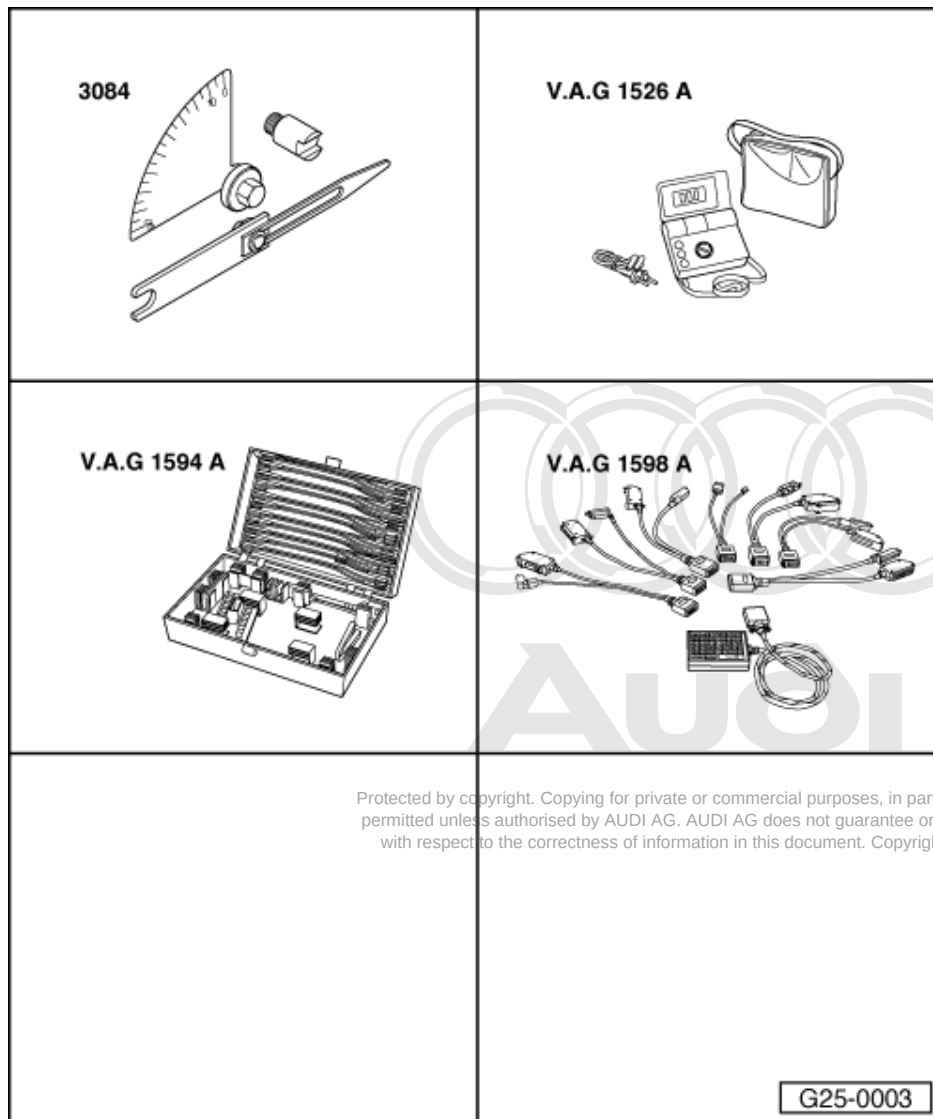
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If no fault is found in wiring:

- Replace elevation sender.



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



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 => Exploded view of fitting locations - Page **18**

The idling switch -F60 supplies the control units with the information "Throttle valve closed" for:

- Idling-speed stabilisation
- Overrun shutoff
- FEI ignition system

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

- Full throttle enrichment

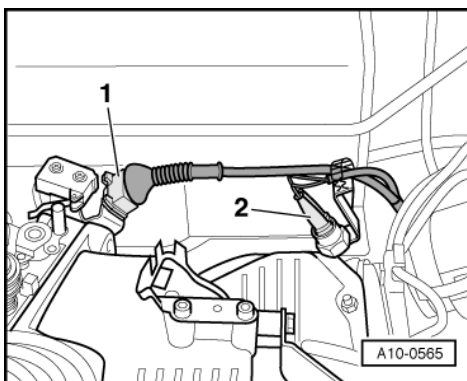
- FEI ignition system

Notes:

- ◆ Idling switch -F60 and full throttle switch -F81 have a joint plug connection.
- ◆ In addition to the idling switch -F60 and full throttle switch -F81 vehicles with automatic gearbox are fitted with throttle valve potentiometer -G69. The switches are integrated into the throttle valve potentiometer housing, but have a separate plug connection.
- ◆ The following checks are only to be performed if the corresponding fault is displayed on fault memory interrogation.

1.16 - Vehicles with manual gearbox

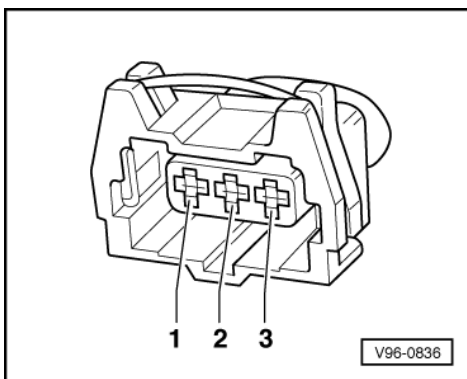
Checking wiring



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

Note:

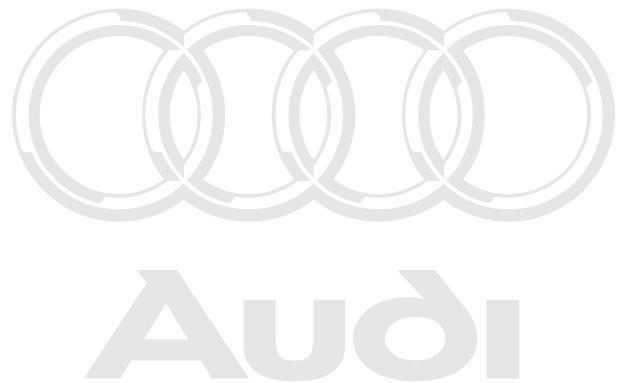
Idling switch -F60 and full throttle switch -F81 have a joint plug connection.



- -> Connect up multimeter for voltage measurement as follows.

Connector Contact	Measure to
2	Engine earth

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



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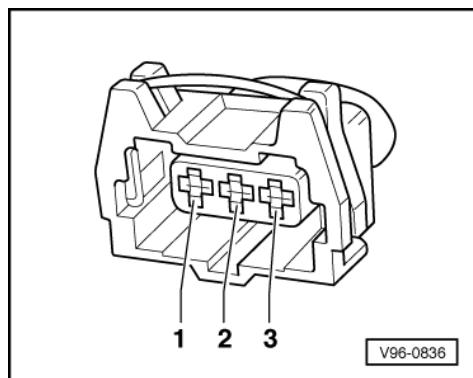
If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

If reading matches specification:

FEI control unit:

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page **29** .



- -> Check for open circuit and short to earth/positive in the following wiring.

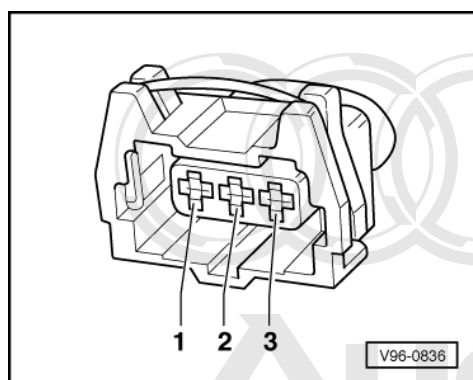
Connector Contact	Test box V.A.G 1598 A Socket
1	7
3	9

- If necessary, eliminate open circuit in wiring/short circuit.

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

KE III Jetronic control unit:

- With 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 only (not to control unit) => Page **29** .



- -> Check for open circuit and short to earth/positive in the following wiring.

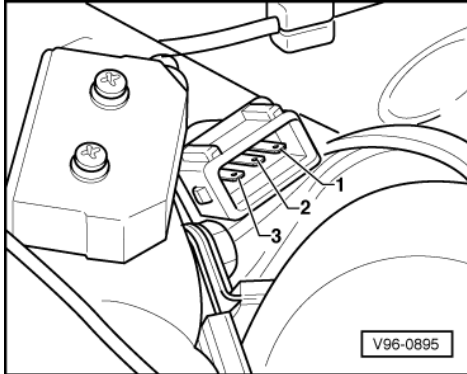
Connector Contact	Test box V.A.G 1598 A Socket
1	28
3	31

- If necessary, eliminate open circuit in wiring/short circuit.

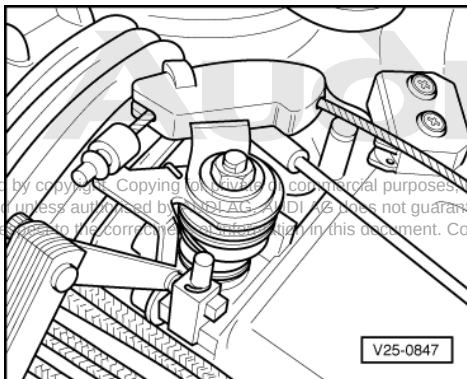
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

Checking idling switch -F60

Test requirement:



- Basic setting of throttle valve OK; checking => Page 73
- -> Connect up multimeter for resistance measurement between contacts 1 and 2.
 - Specification: 0 ω
- Open throttle valve slightly.



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

If readings match specifications:

- Check full throttle switch => Page 56 .

If readings do not match specifications:

- Adjust idling-speed switch => Page 55 .

Adjusting idling-speed switch

- Remove throttle valve unit.
- Slacken off bolts of idling-speed switch and adjust switching point by moving switch in elongated holes.

Feeler gauge not inserted:

- Specification: 0 ω



Feeler gauge inserted 0.3 mm:

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

If readings match specifications:

- Tighten bolts and secure with locking fluid.

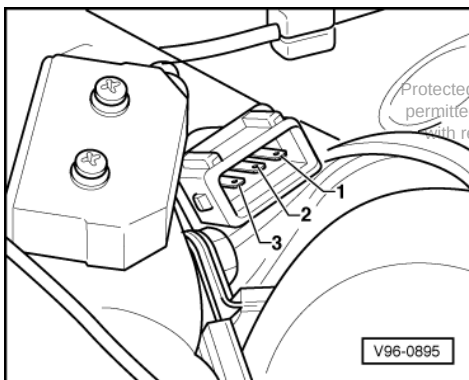
If readings do not match specifications:

- Replace and adjust idling switch -F60 and full throttle switch -F81.

Note:

If fault is found in one switch, both switches always have to be replaced.

Checking full throttle switch -F81



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

If readings do not match specifications:

- Check switching point of full throttle switch => Page 56 .

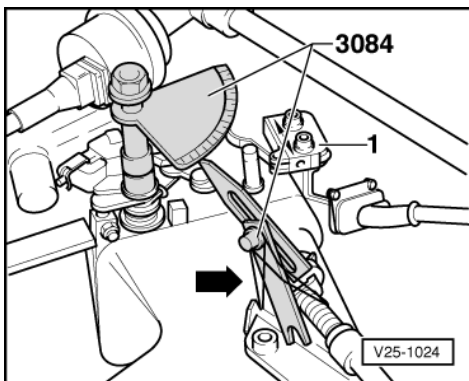
If readings match specifications:

- Replace and adjust idling switch -F60 and full throttle switch -F81.

Note:

If fault is found in one switch, both switches always have to be replaced.

Checking switching point of full throttle switch -F81



- -> Attach pointer for protractor 3084 -arrow- to throttle valve unit.
- Screw graduated disc for protractor 3084 onto 2nd stage throttle shaft. If necessary, unscrew nut for throttle lever.
- Press throttle lever onto full throttle stop and set graduated disc to "0".
- Close throttle valve by approx. 30° and slowly press it in direction of full throttle stop again until full throttle switch -1- cuts in.
 - Specification: 0 ω
 - At switching point 10 ± 2° before full throttle stop

If reading does not match specification:

- Adjust full throttle switch.

Adjusting full throttle switch -F81

- Slacken off bolts of full throttle switch and adjust switching point by moving switch in elongated holes.
- Tighten bolts and secure with locking fluid.

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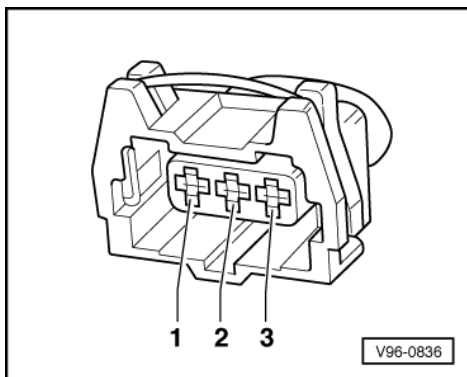
1.17 - Vehicles with automatic gearbox

Note:

Idling switch -F60 and full throttle switch -F81 are integrated into housing of throttle valve potentiometer -G69 but have a separate plug connection.

Checking wiring

- Unplug connector at throttle valve switch.



- -> Connect up multimeter for voltage measurement as follows.

Connector Contact	Measure to
2	Engine earth

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

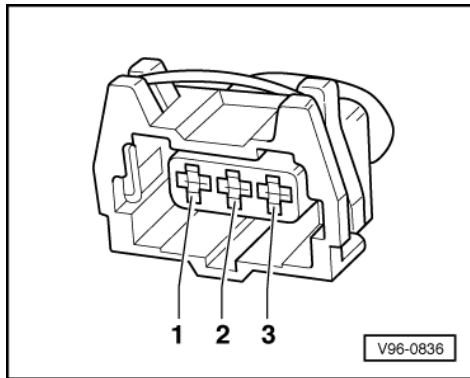
If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

If reading matches specification:

FEI control unit:

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

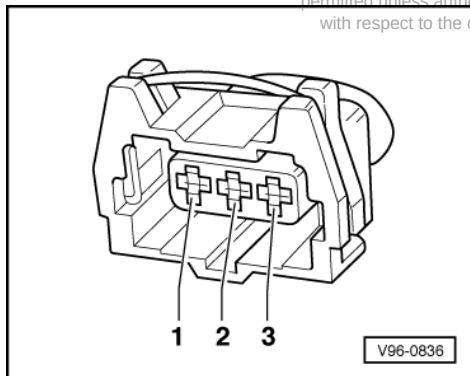
- If necessary, eliminate open circuit in wiring/short circuit.

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

KE III Jetronic control unit:

- With 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 only (not to control unit) => Page 29.

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- -> Check for open circuit and short to earth/positive in the following wiring.

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

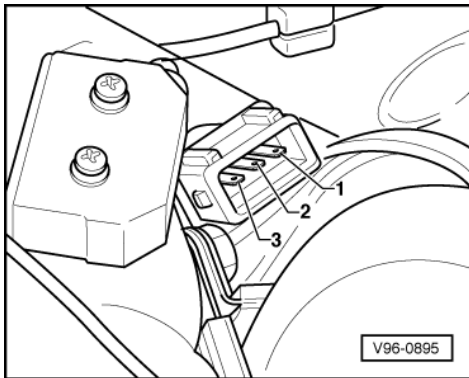
- If necessary, eliminate open circuit in wiring/short circuit.

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

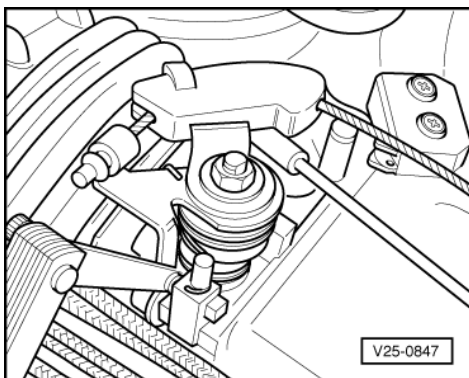
Checking idling switch -F60

Test requirement:

- Basic setting of throttle valve OK; checking => Page 73



- -> Connect up multimeter for resistance measurement between contacts 1 and 2.
- Specification: 0 ω
- Open throttle valve slightly.



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

If readings match specifications:

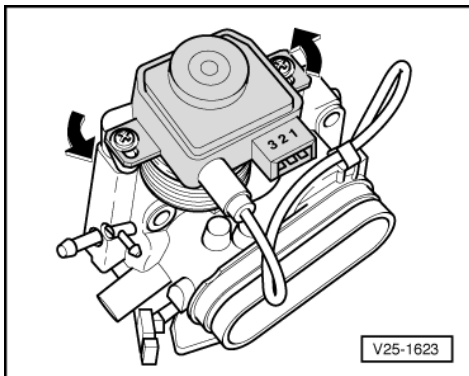
- Check full throttle switch => Page 60 .

If readings do not match specifications:

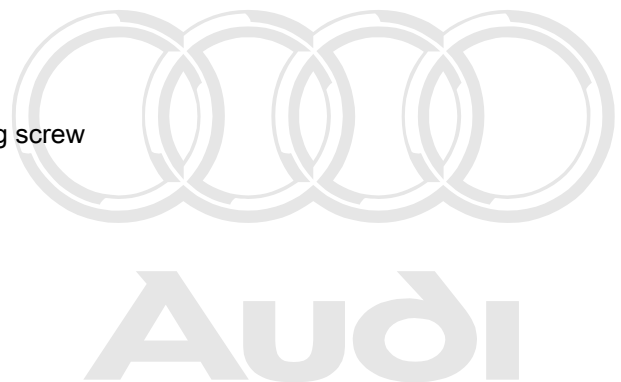
- Adjust idling-speed switch.

Adjusting idling-speed switch

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



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



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Note:

Throttle valve is not to be moved.

- Tighten bolts of throttle valve potentiometer in this position.
- Check setting => Page 58.

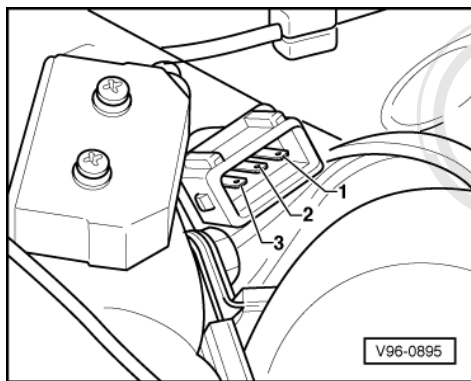
If readings still do not match specifications:

- Replace and adjust throttle valve potentiometer -G69.

Note:

If fault is found in one switch, throttle valve potentiometer assembly must be replaced.

Checking full throttle switch -F81



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

If readings do not match specifications:

- Check switching point of full throttle switch.

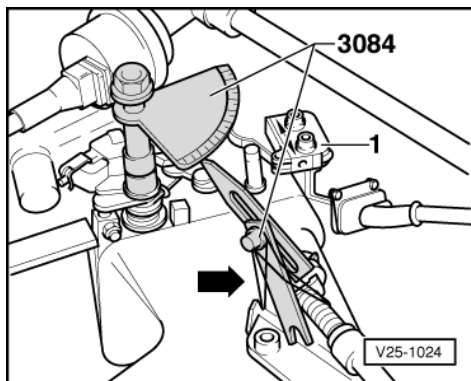
If readings match specifications:

- Replace and adjust throttle valve potentiometer -G69.

Note:

If fault is found in one switch, throttle valve potentiometer assembly must be replaced.

Checking switching point of full throttle switch -F81

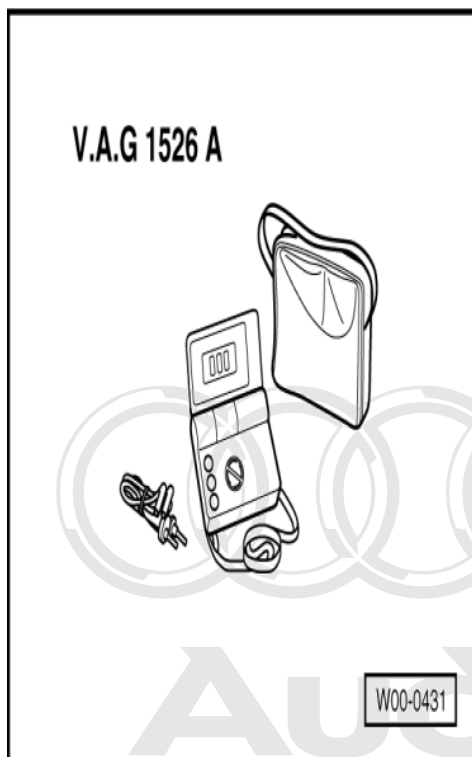


- -> Attach pointer for protractor 3084 -arrow- to throttle valve unit.
- Screw graduated disc for protractor 3084 onto 2nd stage throttle shaft. If necessary, unscrew nut for throttle lever.
- Press throttle lever onto full throttle stop and set graduated disc to "0".
- Close throttle valve by approx. 30° and slowly press it in direction of full throttle stop again until full throttle switch -1- cuts in.
 - Specification: 0 ω
 - At switching point 10 ± 2° before full throttle stop

Adjusting full throttle switch -F81

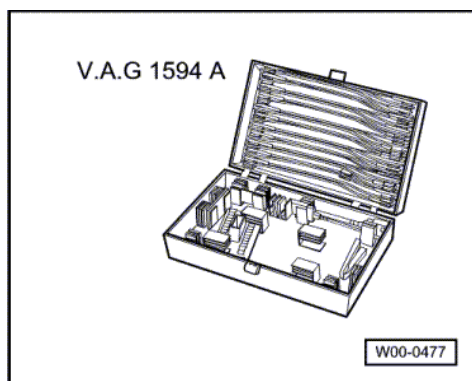
Adjustment of idling switch -F60 => Page 59 also sets full throttle switch.

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



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♦ V.A.G 1526 A





- ♦ V.A.G 1594 A

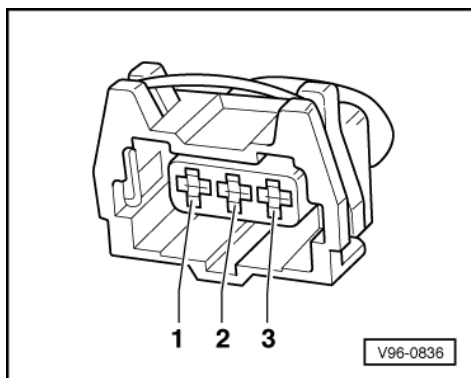
Fitting location: On underside of throttle valve assembly -item **23**

Notes:

- ♦ This test is only to be performed if a corresponding fault is listed in the fault memory of the automatic gearbox 097.
- ♦ After working on throttle valve potentiometer, automatic gearbox control unit and throttle valve potentiometer must also be matched => Page **63** .

Checking power supply

- Unplug connector at throttle valve potentiometer.
- Switch on ignition.



- -> Connect up multimeter for voltage measurement as follows.

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

- Specification: in each case 4.5 ... 5.5 V

If readings match specifications:

- Check internal resistance of throttle valve potentiometer
=> Page **63** .

If a reading does not match specification:

- Check for open circuit and short to earth/positive in the following wiring.

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Connector Contact	Automatic gearbox control unit -J217- Contact
1	=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder
2	
3	

- If necessary, eliminate open circuit in wiring/short circuit.

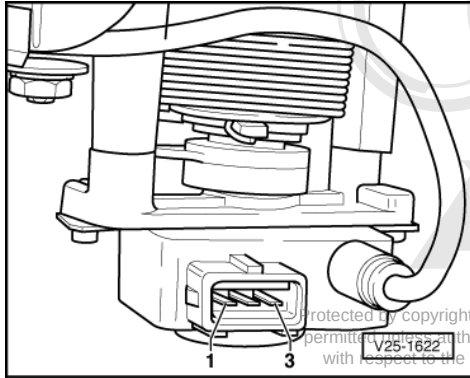
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

Note:

Exclusive use is to be made of gold-plated contacts when repairing contacts in connector.

Checking internal resistance

- Unplug connector at throttle valve potentiometer.



- -> Connect up multimeter for resistance measurement between contacts 1 and 2.
 - Specification: 1.5 ... 2.6 kΩ
- Connect up multimeter for resistance measurement between contacts 2 and 3.
 - Specification: 0.75 ... 1.3 kΩ
- Move throttle lever slowly into full throttle position.
 - Specification: Resistance increasing to max. 3.6 kΩ

If a reading does not match specification:

- Replace throttle valve potentiometer.

Checking setting of throttle valve potentiometer -G69

- To check setting of throttle valve potentiometer, proceed in the same manner as for checking setting of idling switch -F60 => Page 58 .

Adjusting throttle valve potentiometer -G69

- To adjust throttle valve potentiometer, proceed in the same manner as for adjusting idling switch -F60 => Page 59 .

1.19 - Matching automaticgearboxcontrol unit and throttle valve potentiometer -G69

Note:

Automatic gearbox control unit and throttle valve potentiometer must be matched after performing the following work:

- ◆ Replacement of automatic gearbox control unit
- ◆ Removal and installation/replacement of throttle valve potentiometer

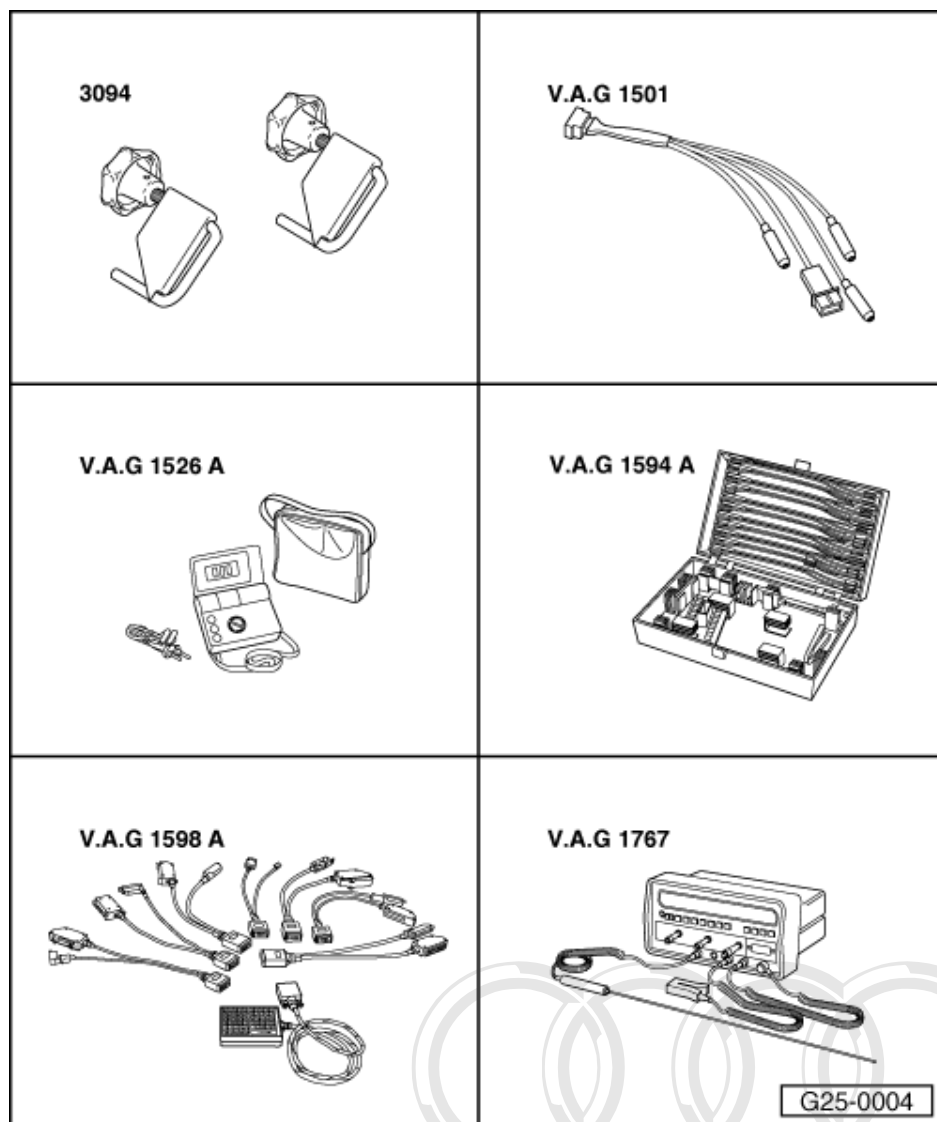
Sequence of operations

- Attach connector to throttle valve potentiometer.
- Start basic setting.

=> Automatic Gearbox 097; Repair Group 01; Self-diagnosis of automatic gearbox 097; Starting basic setting
 Self-diagnosis of automatic gearbox 097 Starting basic setting



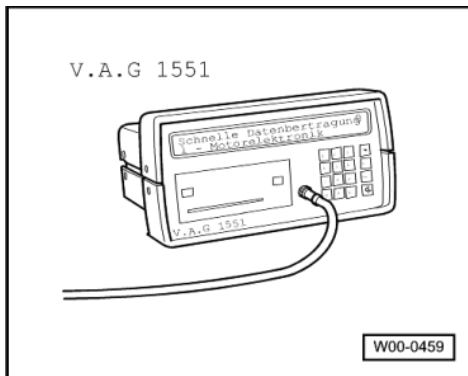
1.20 - Checking air-flow meter potentiometer -G19



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 => Exploded view of fitting locations - Page **18**

Notes:

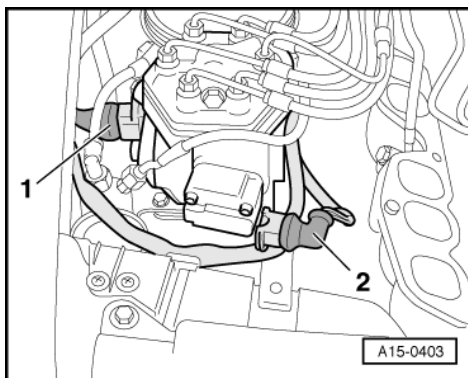
- ♦ This test is to be performed if flash code "2232" is displayed on interrogating fault memory.
- ♦ Air-flow meter potentiometer -G19 can only be replaced together with air-flow meter.

Test requirements:

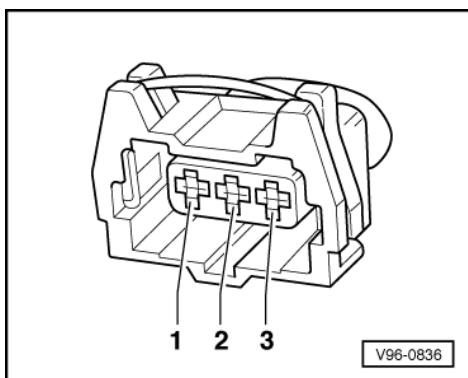
- Coolant temperature at least 85 °C
- No faults stored in fault memory
- Final control diagnosis implemented
- Air conditioner switched off
- No leaks at oil filler neck cap
- Dipstick fully inserted
- Electr. loads switched off (radiator fan must not run during test)
- Ignition point and CO content OK

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Test sequence



- -> Unplug connector -1- at potentiometer.





- -> Connect up multimeter for voltage measurement as follows.

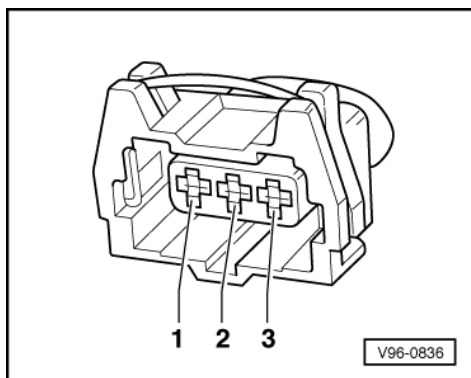
Connector Contact	Measure to
3	Battery positive

- Specification: approx. battery voltage

If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

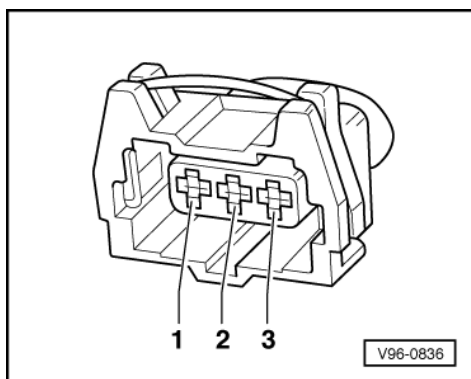
If wiring is OK:



- -> Connect up multimeter for voltage measurement between contacts 1 and 3.
- Switch on ignition.
 - Specification: 4.35 ... 5.35 V
- Read supply voltage (U1) off multimeter and note down value.

If reading does not match specification:

- With 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 only (not to control unit) => Page 29 .



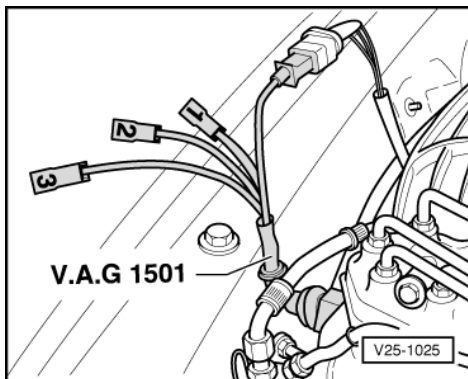
- -> Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.

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

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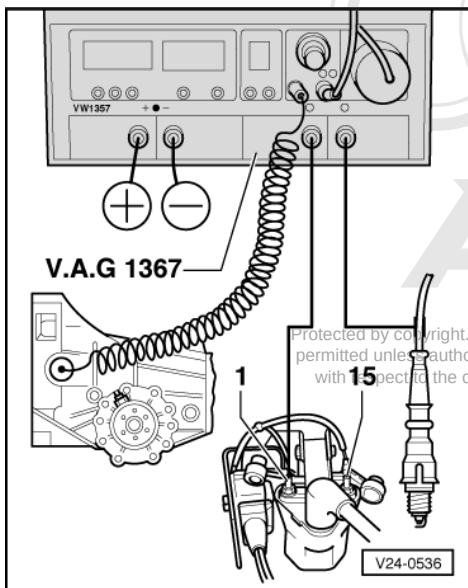


If no fault is found in wiring:

- -> Connect up test lead V.A.G 1501 between air-flow meter potentiometer and connector.
- Connect up multimeter for voltage measurement between contacts 2 and 3 of test lead V.A.G 1501.
- Switch on ignition, sensor plate in rest position.
 - Specification: 0 ... 200 mV

Note:

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



- -> With ignition switched off, connect up ignition tester V.A.G 1767 (or V.A.G 1367).

=> Operating instructions

Notes:

- ◆ Take particular care to ensure that TDC sender of ignition tester V.A.G 1367 is fully inserted in gearbox housing.
- ◆ Ignition point is displayed directly on V.A.G 1767 (or V.A.G 1367). There is no need to aim timing light at ignition point 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 let it idle.



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

-> Indicated on display:

Start flash code output
by pressing key

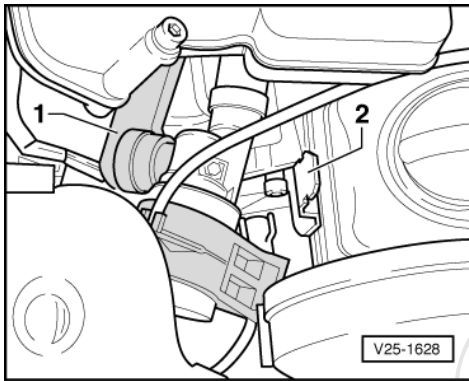
- Press => key on V.A.G 1551 until "Permanent short to earth on stimulation wire" appears on display.

-> Indicated on display:

Permanent short to earth on stimulation
wire

Note:

FEI control unit only supplies a constant ignition point 4 seconds after pressing => key on V.A.G 1551.



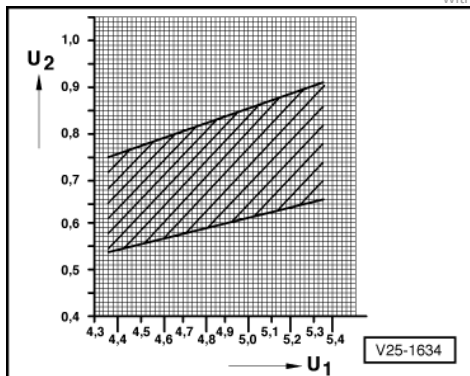
- -> Pull rubber holder of idling-speed stabilisation valve -N71 off retaining bracket -2-.
- Pull idling-speed stabilisation valve -N71 forwards slightly and unplug connector.

Note:

Idling speed increases slightly after unplugging connector.

- Use hose clamp 3094 to pinch off one of the two hoses -1- at the idling-speed stabilisation valve -N71 until the following values are attained.
 - Idling speed specification: 800 ± 20 rpm
 - Ignition point specification: $13 \dots 17^\circ$ before TDC
- Read output voltage (U2) off multimeter and note down value

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U1 - -> Supply voltage between contacts 1 + 3

U2 - Output voltage at idling speed
between contacts 2 + 3

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

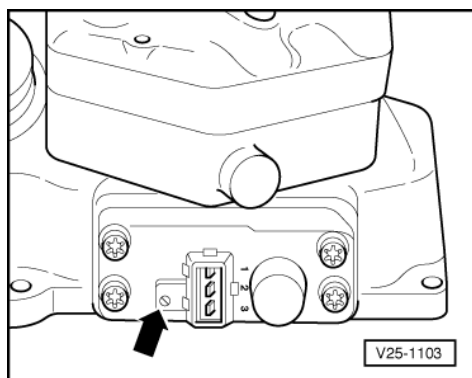
If output voltage measured at an idling speed of 800 ± 20 rpm is applied or if it is slightly outside lower tolerance range:

- Check intake system for leaks (unmetered air) => Page **74** .
- Repeat test after eliminating leakage.

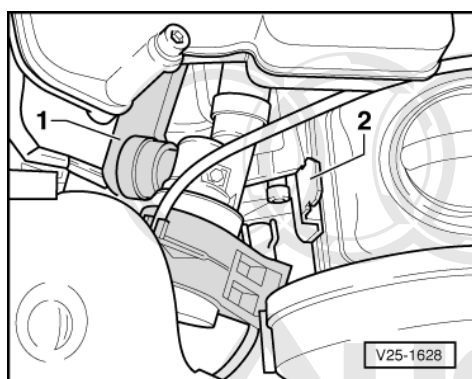
If no leakage is found:

- Re-adjust potentiometer with trimming screw.

Re-adjusting potentiometer with trimming screw

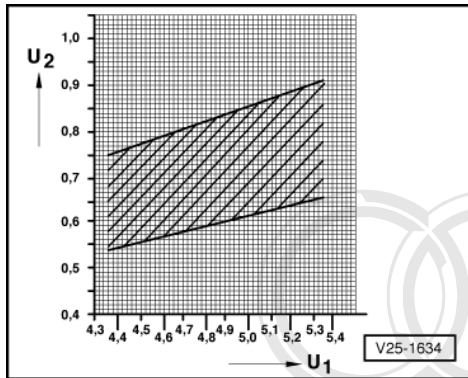


- Switch off ignition.
- Disconnect test lead V.A.G 1501 at potentiometer.
- -> Carefully remove sealing compound over trimming screw -arrow-.
- Re-connect test lead V.A.G 1501 to potentiometer.
- Connect up multimeter for voltage measurement between contacts 2 and 3 of test lead V.A.G 1501.



- -> Rubber holder of idling-speed stabilisation valve -N71 pulled off retaining bracket -2-
- Idling-speed stabilisation valve -N71 pulled forwards slightly and connector unplugged

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- **Start engine and let it idle.**
 - Use hose clamp 3094 to pinch off one of the two hoses -1- at the idling-speed stabilisation valve -N71 until the following value is attained.
 - Idling speed specification: 800 ± 20 rpm



- -> Turn trimming screw at potentiometer until output voltage (U_2) is in centre of tolerance range with allowance for supply voltage (U_1).

If tolerance range is not attained:

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

Note:

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Potentiometer need not be adjusted after replacing air-flow meter with potentiometer.

If tolerance range is attained:

- Secure trimming screw with locking fluid.
- Switch off ignition to erase fault memory.

1.21 - Checking pressure regulator -N73

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

Special tools and workshop equipment required

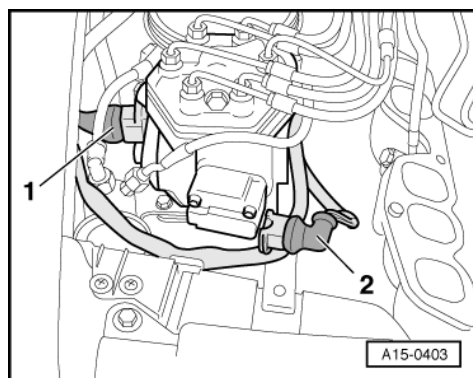
- ◆ V.A.G 1526 A
- ◆ V.A.G 1594 A
- ◆ V.A.G 1598 A
- ◆ V.A.G 1598/3

Fitting location => Exploded view of fitting locations - Page **18**

If reading did not match specification during final control diagnosis
 => Page **12** :



Checking internal resistance

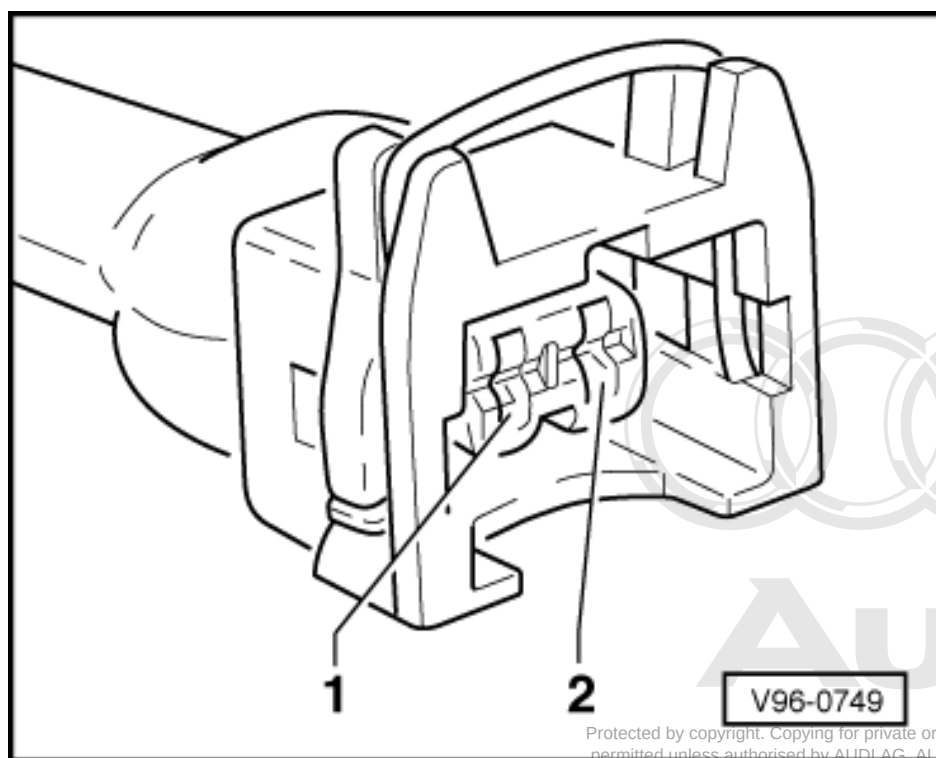


- -> Unplug connector -2- from differential pressure regulator.
- Connect up multimeter for resistance measurement to differential pressure regulator.
- Specification: 17.5 ... 21.5 Ω

If reading does not match specification:

- Check actuation.

Checking actuation



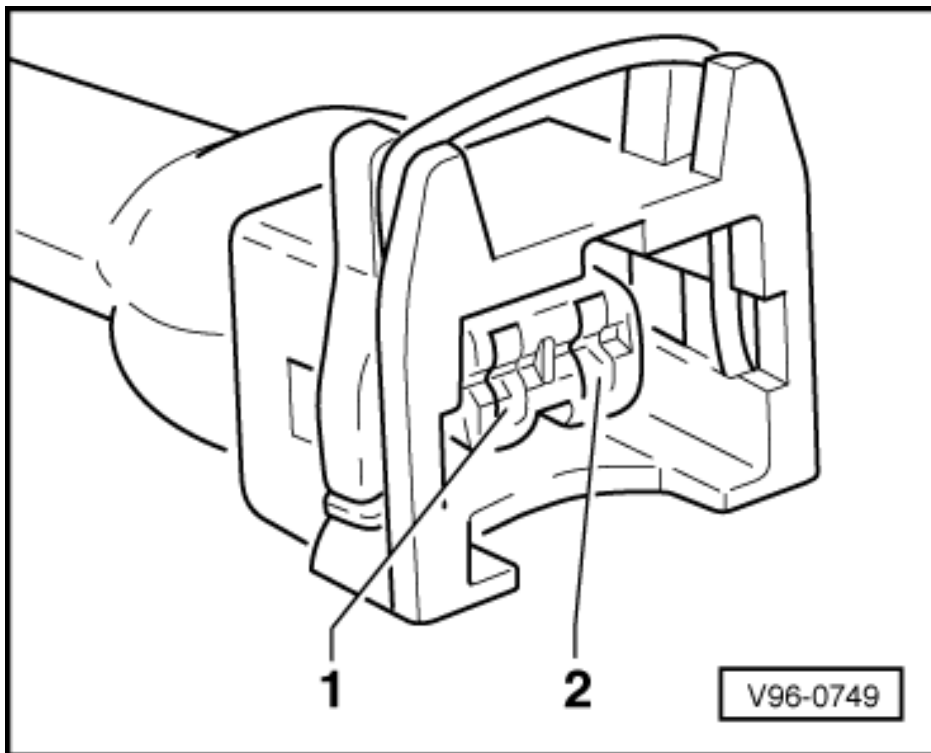
- -> Connect up multimeter for voltage measurement between contacts 1 and 2.
- Specification: 4.5 ... 5.0 V

If reading matches specification:

- Replace pressure regulator -N73.

If reading does not match specification:

- With 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 only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.

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

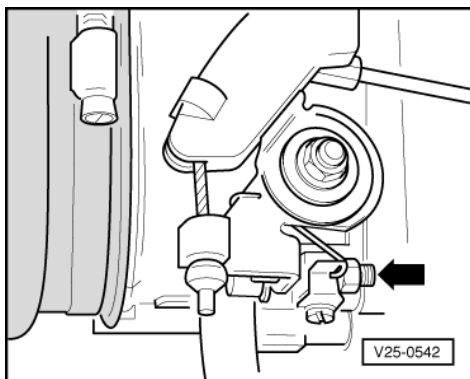
If no fault is found in wiring:

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

1.22 - Basic setting of throttle valve

Note:

Limiting screw is set at factory and is not to be altered. If screw has been inadvertently turned, perform the following adjustment procedure and mark the screw with locking fluid again.



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- -> Screw out limiting screw -arrow- until there is a gap between limiting screw and stop.
- Then screw in limiting screw until it makes contact with stop.

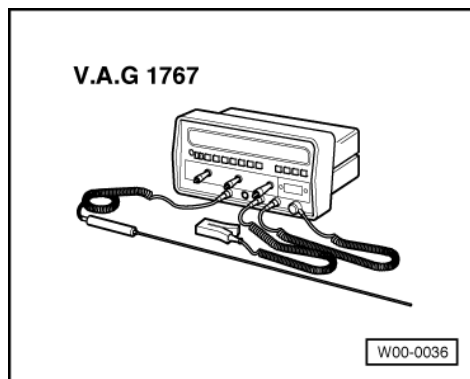
Note:

For precise determination of limiting screw stop point, insert a thin sheet of paper between limiting screw and stop. Establish exact stop point by constantly moving sheet of paper and at the same time turning limiting screw.

- Screw in limiting screw 1/2 a turn from stop point determined in the above manner.
- Mark screw with locking fluid.
- Check idling speed and CO content => Page 80 .
- Check idling switch -F60 => Page 58 .

1.23 - Checking intake system for leaks (unmetered air)

Special tools and workshop equipment required

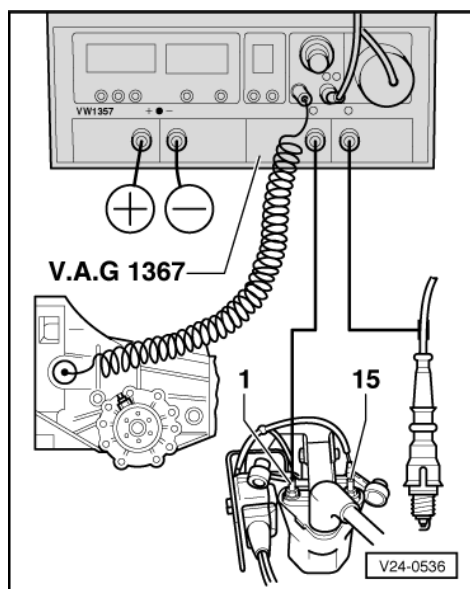


- ♦ Ignition tester V.A.G 1767 or V.A.G 1367 with clip-on trigger V.A.G 1367/8
- ♦ Engine leak detector spray G 001 800 A1

Notes:

- ♦ Due to the vacuum in the intake system, the leak detector spray is drawn in with the unmetered air. The spray reduces the ignition performance of the mixture, thus causing a drop in engine speed and a sharp increase in CO content.
- ♦ Always heed the safety instructions on the can.

Test sequence



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- -> With ignition switched off, connect up ignition tester V.A.G 1767 (or V.A.G 1367).

=> Operating instructions

- Start engine and let it idle.
- Read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367).
- Systematically apply engine leak detector spray to intake system components.
 - Air intake elbow, crankcase breather hoses, hoses to activated charcoal filter, activated charcoal filter solenoid valve and vacuum pipes

If engine speed does not change:

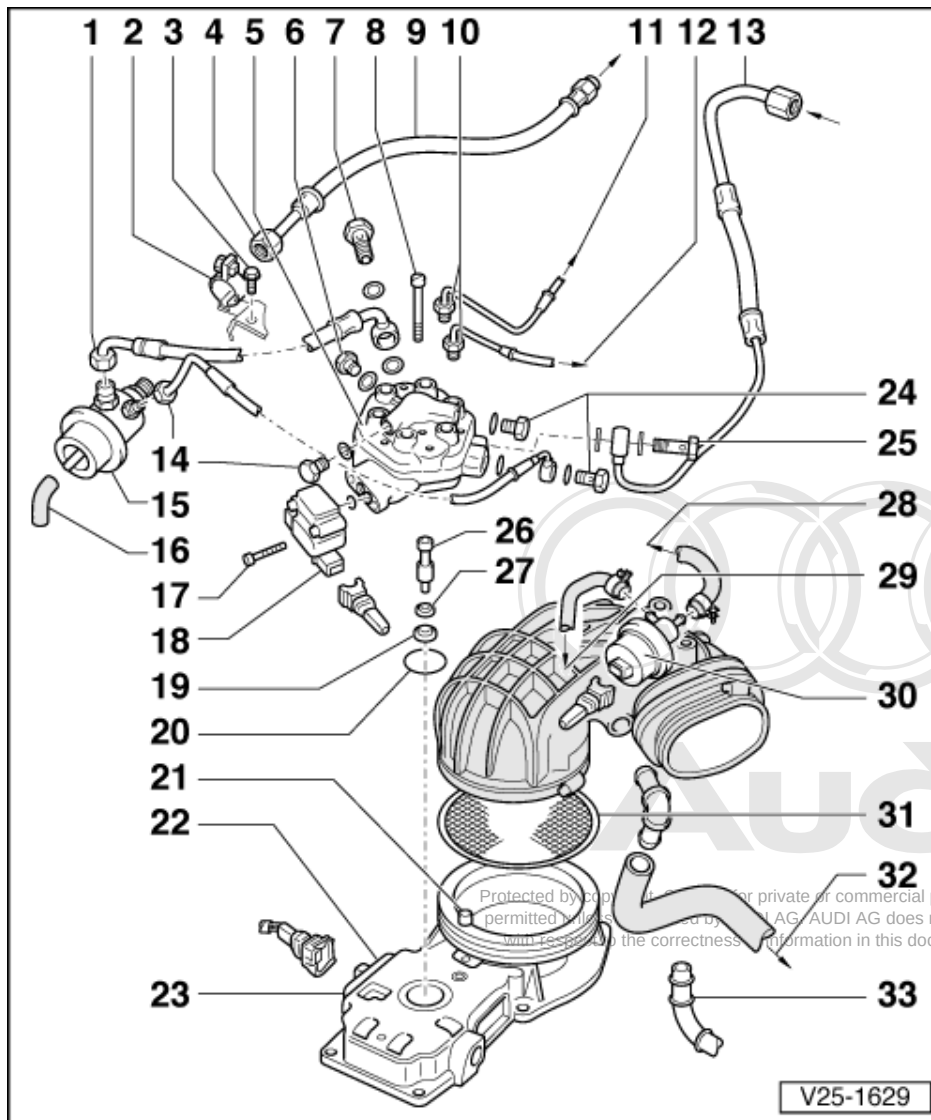
- Switch off ignition.

If engine speed decreases:

- Switch off ignition.
- Check sprayed section of intake system for leaks and rectify fault.

2 - Servicing fuel system

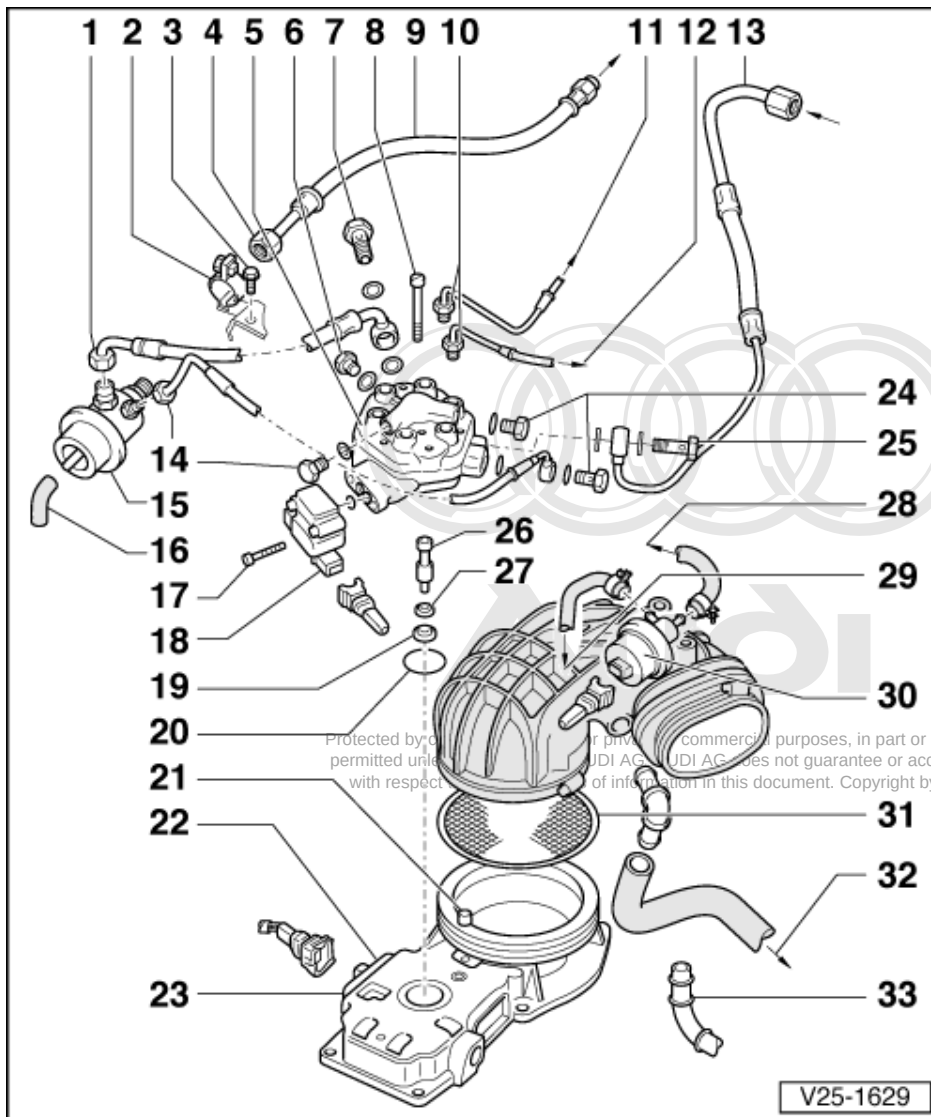
2.1 - Servicing fuel system





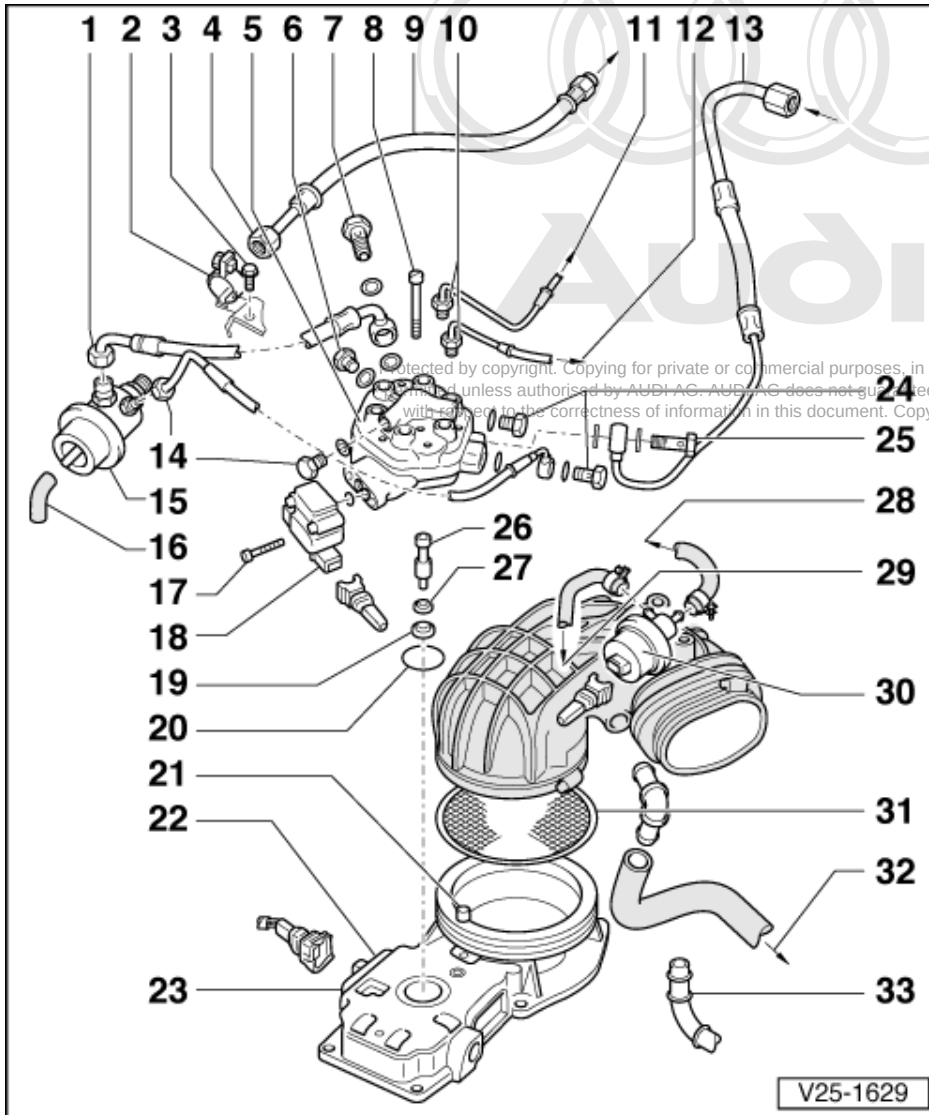
2.2 - Exploded view of fuel distributor

- 1 20 Nm
- 2 Bracket
- 3 3.5 Nm
- 4 20 Nm
- 5 Fuel distributor
 - ♦ Checking =>Checking idle injection tolerance, Page 96
 - ♦ Following installation, check and if necessary adjust idle motion of sensor plate => Page 102
- 6 Screw plug, 10 Nm
 - ♦ Measurement connection for pressure tests



- 7 20 Nm
- 8 3.5 Nm
 - ♦ Mark with locking fluid
- 9 Fuel return pipe
 - ♦ To fuel tank
- 10 10 Nm
- 11 To injector
- 12 To cold start valve
- 13 Fuel supply pipe

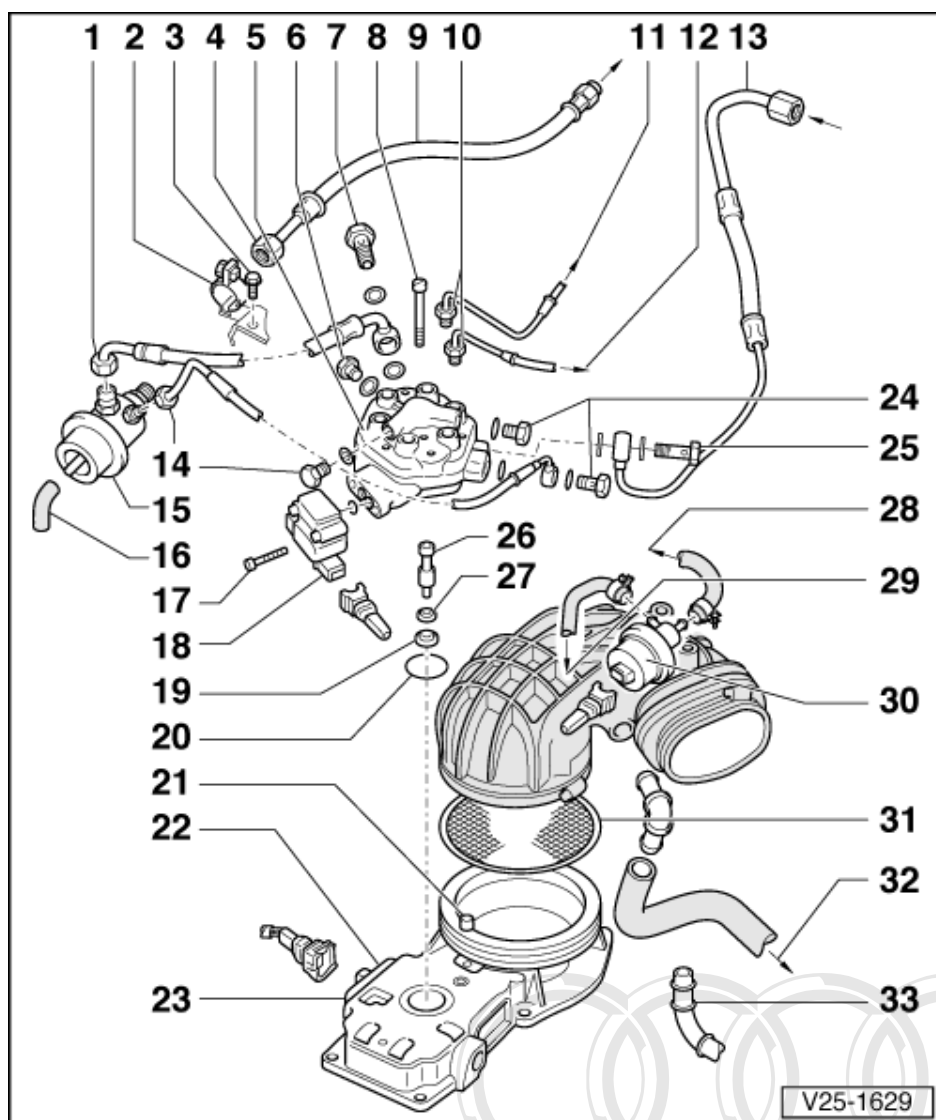
- ♦ From fuel tank
- 14 10 Nm**
- 15 Fuel pressure regulator**
 - ♦ Checking system pressure, differential pressure and holding pressure
=> Page 90



- 16 Breather hose**
 - ♦ To upper part of air cleaner
- 17 Bolt**
 - ♦ Antimagnetic
- 18 Pressure regulator -N73**
 - ♦ Checking =>Page 71
 - ♦ Checking system pressure, differential pressure and holding pressure
=> Page 90
- 19 Stop bolt**
 - ♦ For control plunger
 - ♦ Adjusting => Page 105
- 20 O-ring**
 - ♦ Replace
- 21 Retaining plug**
 - ♦ Take out prior to adjustment



- ♦ Checking idling speed and CO content=>Page 80

**22 Air-flow meter potentiometer -G19**

- ♦ Checking =>Page 64

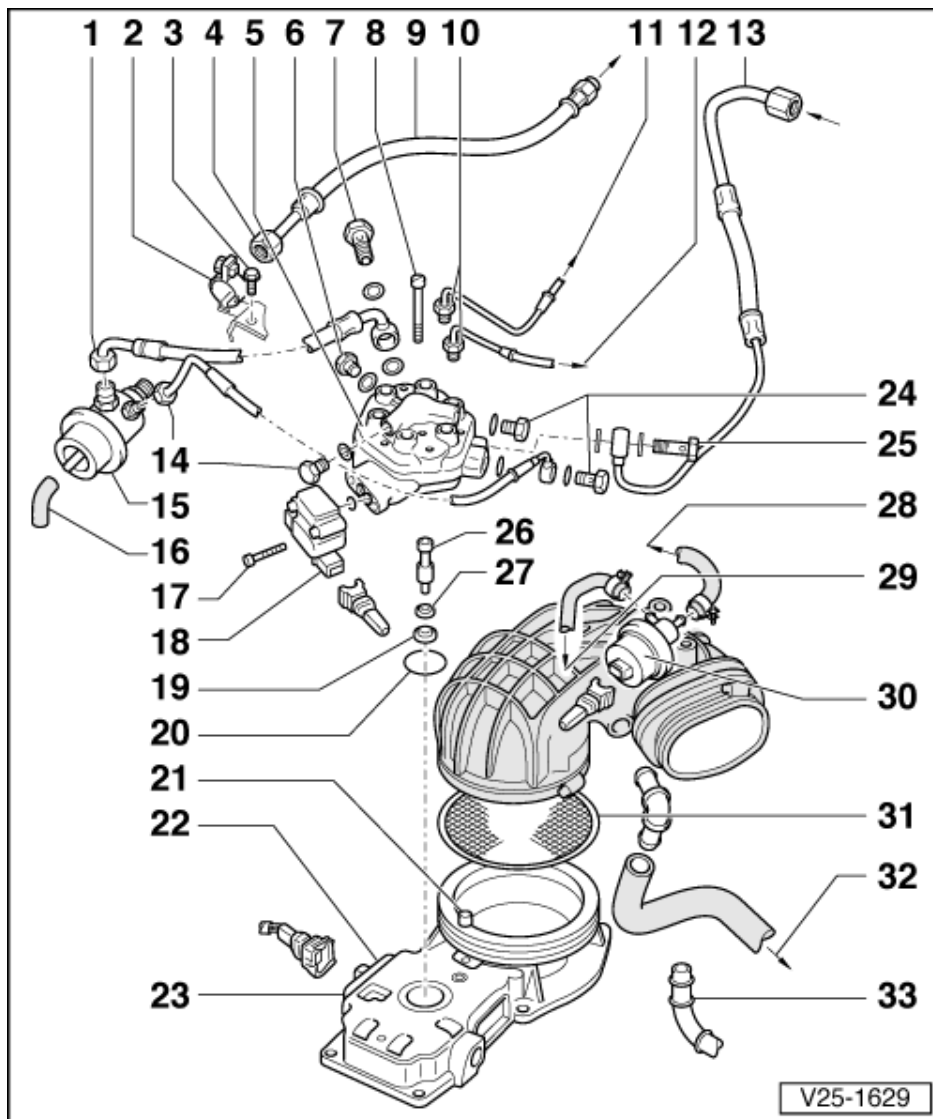
23 Air-flow meter

- ♦ Checking adjusting lever
=>Page 101
- ♦ Checking and adjusting rest position
and idle motion of sensor plate
=> Page 102

24 10 Nm**25 20 Nm****26 Control plunger**

- ♦ Checking adjusting lever and control plunger => Page 101

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27 Sealing ring

- ♦ Installation position: Small diameter facing control plunger
- ♦ Only provides seal in rest position of sensor plate

28 To activated charcoal filter

29 To throttle valve unit

30 Activated charcoal filter solenoid valve -N80

31 Strainer

- ♦ Installation position: Curved side facing upwards

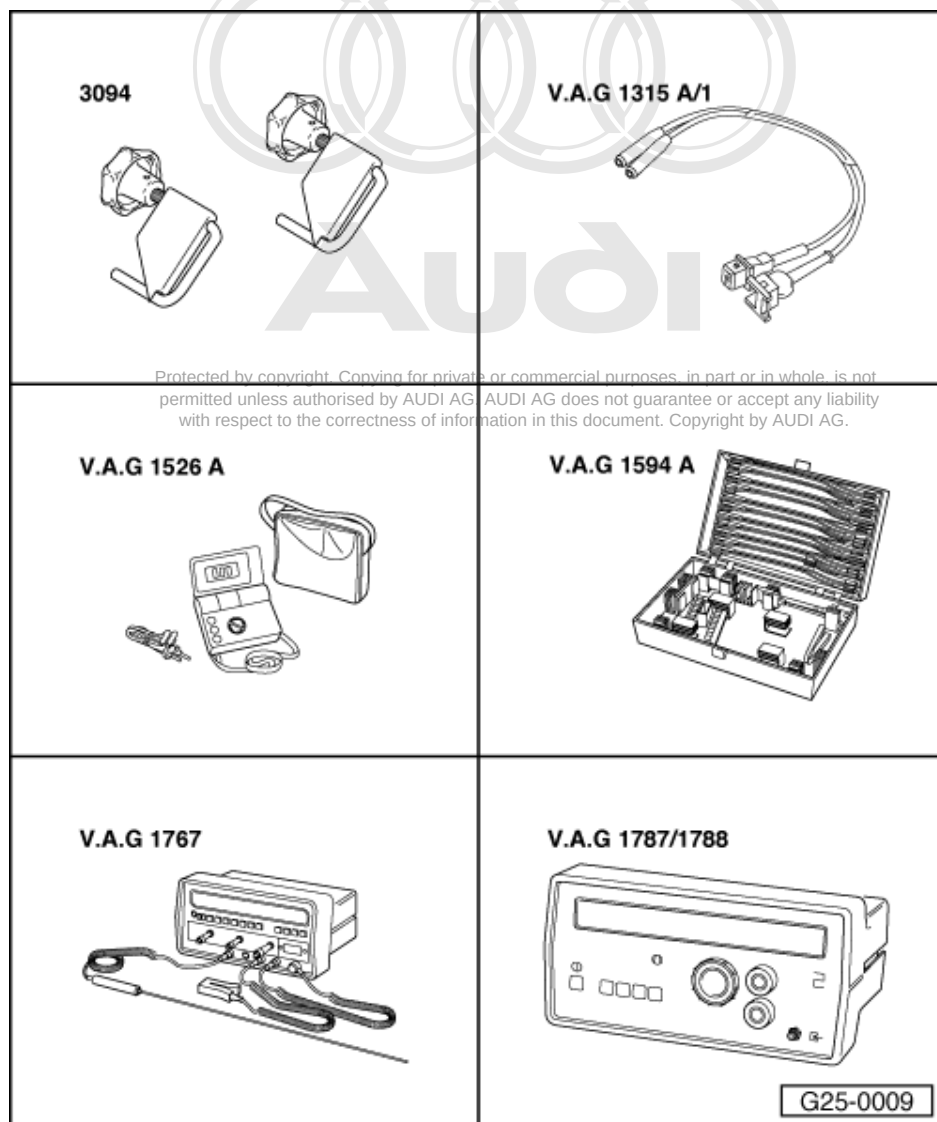
32 Idling-speed stabilisation valve -N71

33 Crankcase breather

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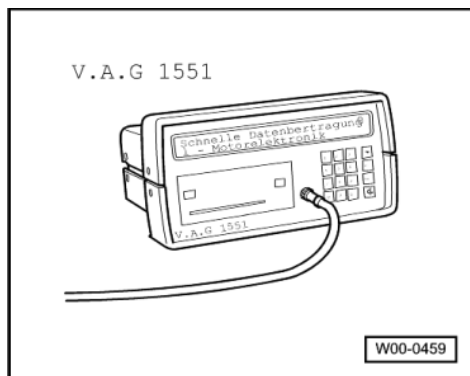


2.3 - Checking idling speed, CO content and ignition point



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



- ◆ V.A.G 1551 with V.A.G 1551/1

Test requirements:

- No leaks in exhaust system
- Coolant temperature at least 85 °C
- Electr. loads switched off (radiator fan must not run during test)
- Throttle valve in idle position
- Throttle cable correctly adjusted

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

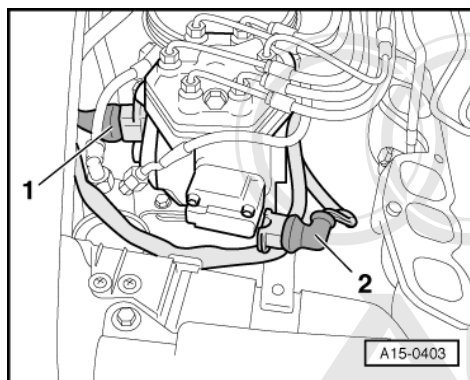
- No pressure gauge connected
- Lambda control OK (vehicles with catalytic converter)
- Air conditioner switched off
- Vehicles with automatic gearbox: Selector lever set to P or N
- If injector pipes have been unfastened or replaced: Rev up engine several times to 3000 rpm and leave it idling for at least 2 minutes

Connecting testers

- Connect up fault reader V.A.G 1551 => Page **2**.
- Interrogate fault memory => Page **4**. There must not be any faults stored. If necessary, eliminate fault, erase fault memory, switch off and re-start engine, perform test drive and re-interrogate fault memory as a check.
- Connect up exhaust tester V.A.G 1788.

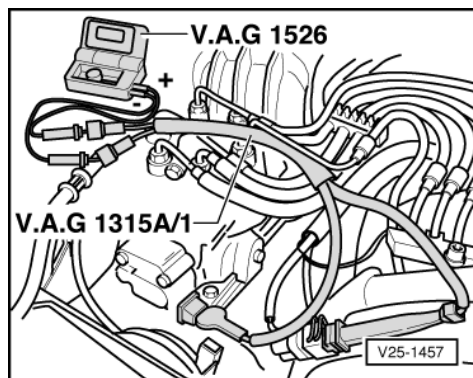
=> Operating instructions

- Insert measurement probe in exhaust tailpipe.

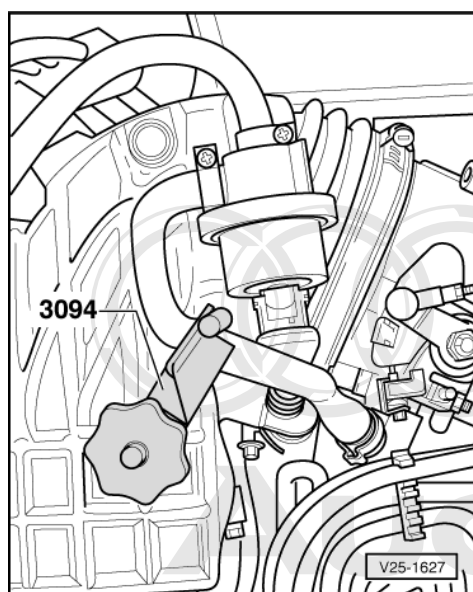


- -> Unplug connector -2- from differential pressure regulator.

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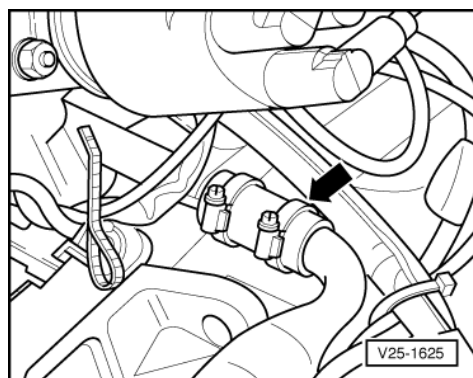
- -> Set multimeter to 200 mA measuring range and connect it up with test lead V.A.G 1315 A/1 between differential pressure regulator and its connector.



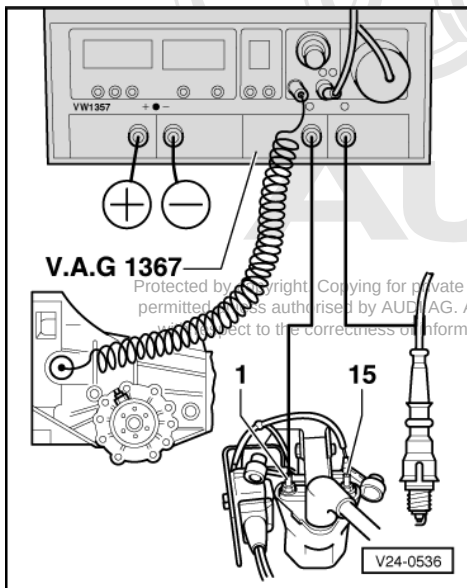
- -> Use hose clamp 3094 to pinch off hose between ACF valve and throttle valve assembly.
 - Pull out dipstick.
- with respect to the correctness of information in this document. Copyright by AUDI AG.

Note:

Place rag on guide tube to avoid oil spatter.



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



- -> With ignition switched off, connect up ignition tester V.A.G 1767 (or V.A.G 1367).

=> Operating instructions

Notes:

- ♦ Take particular care to ensure that TDC sender of ignition tester V.A.G 1367 is fully inserted in gearbox housing.
- ♦ Ignition point is displayed directly on V.A.G 1767 (or V.A.G 1367). There is no need to aim timing light at ignition point 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:

Idling speed cannot be adjusted.

- Connect up testers => Page 81 .
- Start engine and let it idle.
- Read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367).
 - Specification: 720 ... 860 rpm 1)

1) Current values:

=> Exhaust emission test binder

B - Checking CO content and ignition point

- Enter "2" on V.A.G 1551 for "Flash code output".

-> Indicated on display:

Start flash code output
by pressing key



- Press ⇒ key on V.A.G 1551 until "Permanent short to earth on stimulation wire" appears on display.

Note:

FEI control unit only supplies a constant ignition point 4 seconds after pressing ⇒ key on V.A.G 1551.

-> Indicated on display:

Permanent short to earth on stimulation wire

- Continue with test sequence in line with height above sea level of workshop.

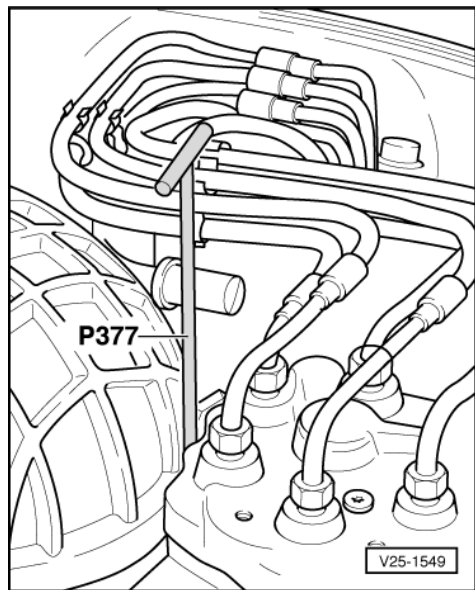
Height above sea level of workshop less than 1000 m:

- Read off differential pressure regulator current (for CO content) on portable multimeter.
 - Test specification: -3 ... +3 mA

Note:

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

- Switch off ignition.
- Use bit ø 2.5 mm to drill 3.5 ... 4.0 mm deep hole in centre of plug for adjusting screw for differential pressure regulator current.
- Remove swarf.



- Screw in self-tapping screw ø 3 mm.
- Use pliers to pull out plug.
- Start engine and leave it idling.
- -> Adjust differential pressure regulator current (for CO content) by turning adjusting screw.
 - Setting 0 ± 1 mA (fluctuating)

- ♦ When adjusting differential pressure regulator current, do not press down adjusting key and do not accelerate with adjusting key inserted.
- ♦ After each adjustment operation, remove adjusting key and accelerate briefly before reading off differential pressure regulator current at idling speed.

- Enter "2" for "Flash code output".

-> Indicated on display:

Start flash code output
by pressing key

- Press ⇒ key on V.A.G 1551 until "Permanent short to earth on stimulation wire" appears on display.

-> Indicated on display:

Permanent short to earth on stimulation
wire

- Continue with 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 outside tolerance, it must be adjusted whilst system is still in adjustment mode "Permanent short to earth on stimulation wire".

- Adjust ignition point by turning ignition distributor.
 - Setting $15 \pm 1^\circ$
- Read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367) and CO content on exhaust tester again.
- Exit from adjustment mode by pressing ⇒ key and increasing engine speed to in excess of 2500 rpm.
 - Ignition point may then fluctuate

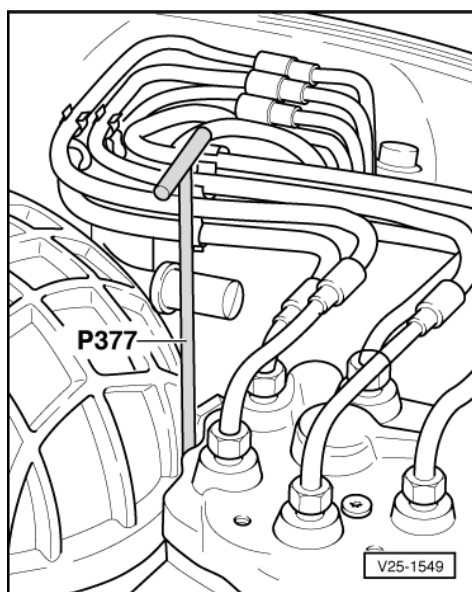
Height above sea level of workshop greater than 1000 m:

- Unplug Lambda-probe connector (green wire).
- Read off differential pressure regulator current (for CO content) on portable multimeter and note down value.
 - Measured value = Correction value of elevation sender
- Re-attach connector of Lambda probe.
- Read off differential pressure regulator current on portable multimeter.
 - Max. deviation from value noted down: ± 3 mA

Note:

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

- Switch off ignition.
- Use bit $\varnothing 2.5$ mm to drill 3.5 ... 4.0 mm deep hole in centre of plug for adjusting screw for differential pressure regulator current.
- Remove swarf.
- Screw in self-tapping screw $\varnothing 3$ mm.
- Use pliers to pull out plug.



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- Start engine and leave it idling.
- ➔ Adjust differential pressure regulator current (for CO content) to value noted down on commencement by turning adjusting screw.
-Tolerance ± 1 mA
- ◆ When adjusting differential pressure regulator current, do not press down adjusting key and do not accelerate with adjusting key inserted.
- ◆ After each adjustment operation, remove adjusting key and accelerate briefly before reading off differential pressure regulator current at idling speed.
- Enter "2" for "Flash code output".

-> Indicated on display:

Start flash code output
by pressing key

- Press ➔ key on V.A.G 1551 until "Permanent short to earth on stimulation wire" appears on display.

-> Indicated on display:

Permanent short to earth on stimulation
wire

- Continue with 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 outside tolerance, it must be adjusted whilst system is still in adjustment mode "Permanent short to earth on stimulation wire".

- Adjust ignition point by turning ignition distributor.
-Setting $15 \pm 1^\circ$
- Read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367) and CO content on exhaust tester again.
- Exit from adjustment mode by pressing ➔ key and increasing engine speed to in excess of 2500 rpm.
- Ignition point may then fluctuate

2.5 - Vehicles with no catalytic converter and Lambda probe

A - Checking idling speed

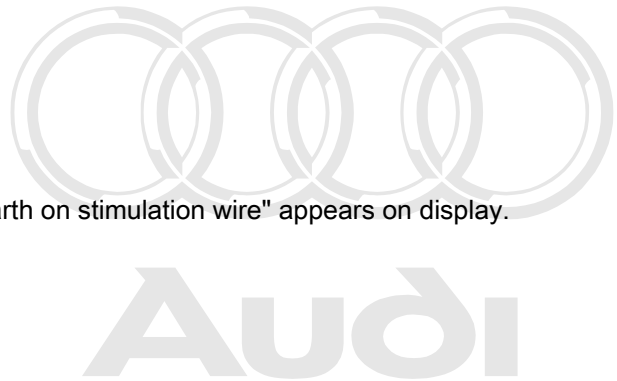
Note:

Idling speed cannot be adjusted.

- Connect up testers => Page 81 .
- Start engine and let it idle.
- Read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367).
- Specification: 720 ... 860 rpm 1)

1) Current values:

=> Exhaust emission test binder



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B - Checking CO content and ignition point

- Enter "2" on V.A.G 1551 for "Flash code output".

-> Indicated on display:

Start flash code output
by pressing key

- Press ⇒ key on V.A.G 1551 until "Permanent short to earth on stimulation wire" appears on display.

Note:

FEL control unit only supplies a constant ignition point 4 seconds after pressing ⇒ key on V.A.G 1551.

-> Indicated on display:

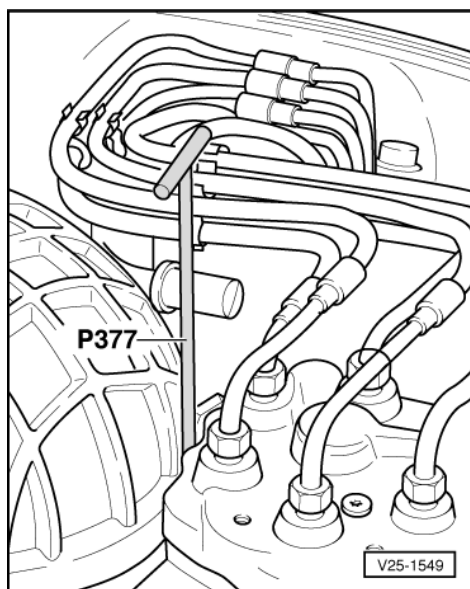
Permanent short to earth on stimulation
wire

- Read off CO content on exhaust tester.

Note:

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

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- Switch off ignition.
 - Use bit Ø 2.5 mm to drill 3.5 ... 4.0 mm deep hole in centre of plug for CO adjusting screw.
 - Remove swarf.
 - Screw in self-tapping screw Ø 3 mm.
 - Use pliers to pull out plug.
 - Start engine and leave it idling.
 - > Adjust CO content by turning adjusting screw.
 - Setting 1.0 ±0.2 % by vol.
- ◆ When adjusting CO, do not press down adjusting key and do not accelerate with adjusting key inserted.
 - ◆ After each adjustment operation, remove adjusting key and accelerate briefly before reading off CO content at idling speed.
- Enter "2" for "Flash code output".

-> Indicated on display:

Start flash code output
by pressing key



- Press ➔ key on V.A.G 1551 until "Permanent short to earth on stimulation wire" appears on display.

-> Indicated on display:

Permanent short to earth on stimulation wire

- Continue with 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:

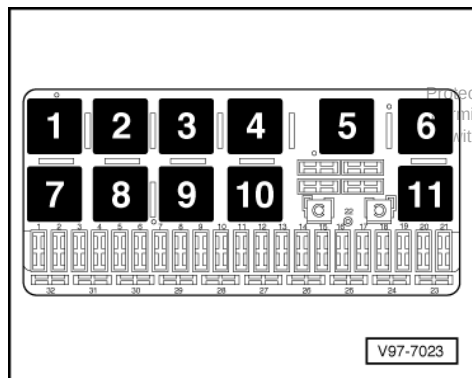
If ignition point displayed is outside tolerance, it must be adjusted whilst system is still in adjustment mode "Permanent short to earth on stimulation wire".

- Adjust ignition point by turning ignition distributor.
- Setting $15 \pm 1^\circ$
- Read off idling speed on ignition tester V.A.G 1767 (or V.A.G 1367) and CO content on exhaust tester again.
- Exit from adjustment mode by pressing ➔ key and increasing engine speed to in excess of 2500 rpm.
- Ignition point may then fluctuate

Note:

Applies only to vehicles with no Lambda control: If CO content increases after checking idling speed with crankcase breather hose attached, this is not the result of an incorrect setting, but is caused by enrichment from the crankcase due to oil dilution on account of predominantly short-distance driving. After a lengthy cross-country drive at good speed, the amount of fuel in the oil decreases and the CO content returns to normal. This can also be achieved quickly by way of an oil change.

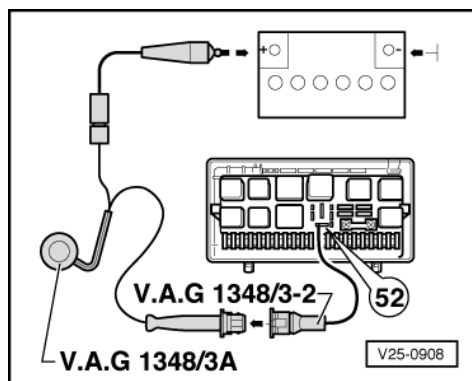
2.6 - Connecting remote control V.A.G 1348/3A with adapter lead V.A.G 1348/3-2



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Sequence of operations

- ➔ Pull off fuel-pump relay (on relay plate with fuse box in plenum chamber, position 10).

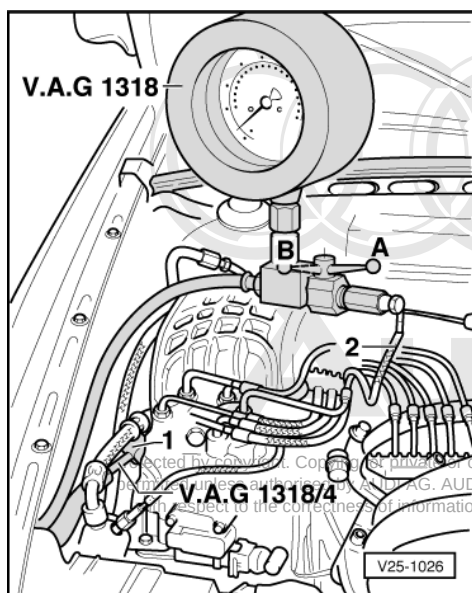


- -> Connect remote control V.A.G 1348/3A with adapter lead V.A.G 1348/3-2 to contact 52 of relay socket (position 10).
- Connect pick-off to vehicle battery (+).

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

Note:

Always use new sealing rings.



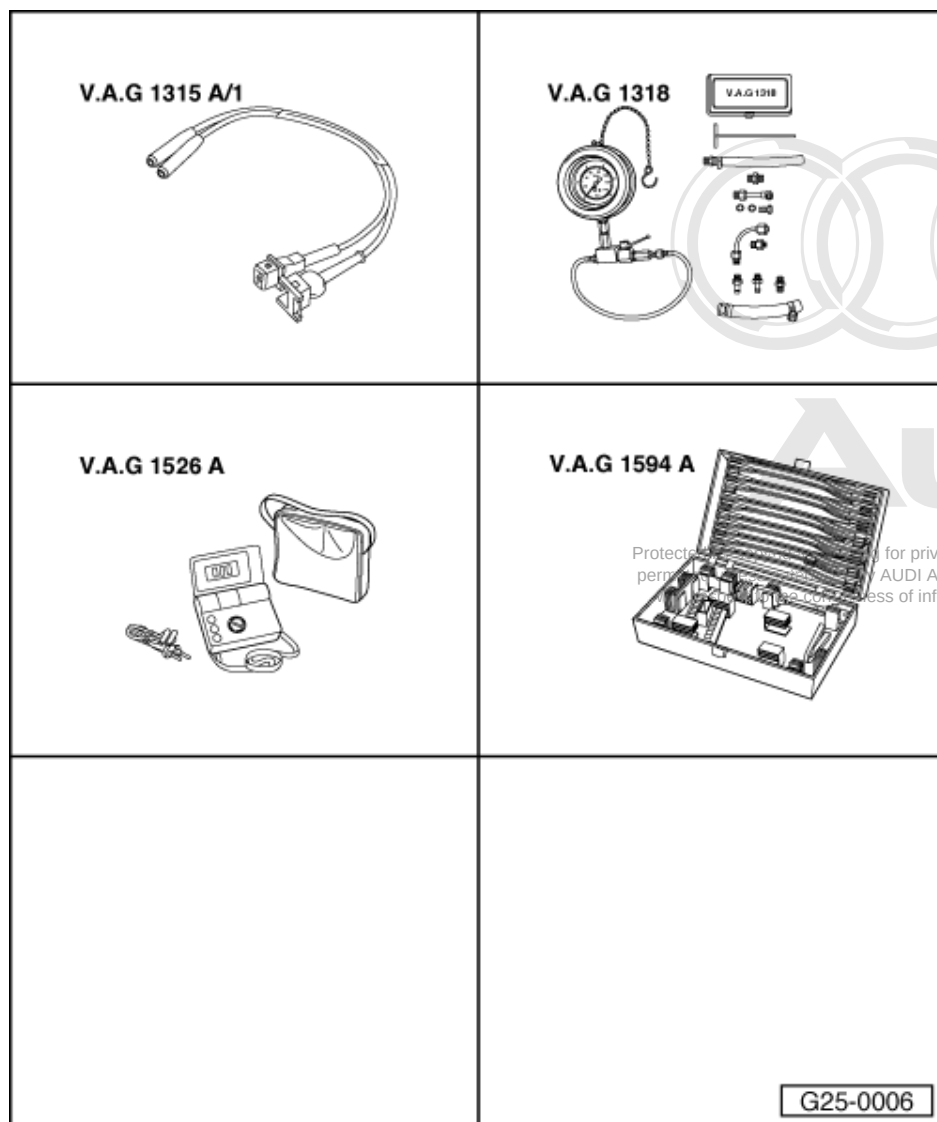
- -> Connect pressure gauge V.A.G 1318 with test adapter 1318/4 to measurement point -1- of fuel distributor.
- Unscrew pipe -2- at cold start valve and connect it to pressure gauge V.A.G 1318; pressure gauge lever in -open- position (lever in direction of flow).

Position of cut-off valve:

- A - open
- B - closed



2.8 - Checking system pressure, differential pressure and holding pressure

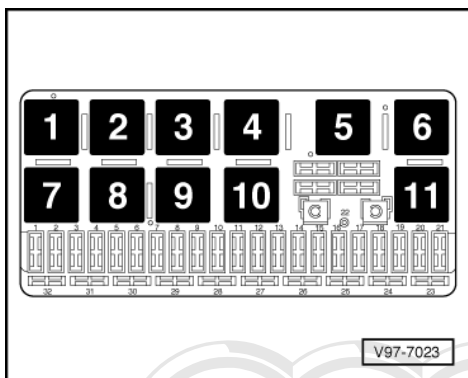


Special tools and workshop equipment required

- ♦ 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
- ♦ Fuel-resistant beaker

Test requirements:

- Battery voltage at least 11 V



- -> Fuse S13 OK
- Fuel pump relay OK; checking => Page **35**
- Fuel pump OK; checking

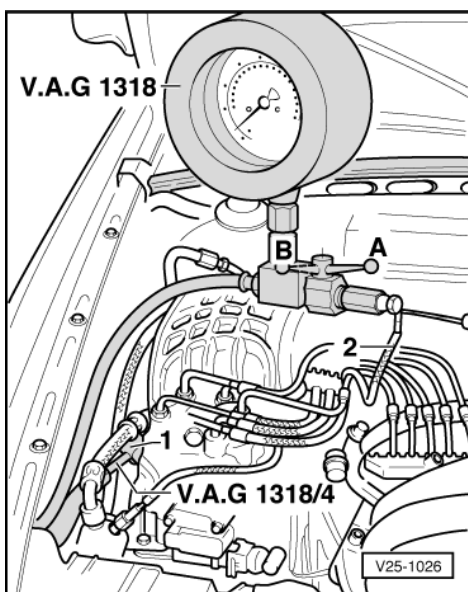
=> Fuel Supply System - Petrol Engines; Repair Group 20; Fuel Supply Fuel Supply

- Fuel filter OK
- Remote control V.A.G 1348/3A connected with adapter lead V.A.G 1348/3-2 => Page **88**
- Pressure gauge V.A.G 1318 connected with test adapter 1318/4
=> Page **89**

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Checking system pressure and fuel pressure regulator



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

If reading does not match specification:

- Replace pressure regulator.

If reading exceeds specification:

- Disconnect return hose from pressure regulator at return hose/pipe connection and hold over a suitable vessel.



- Repeat test.

If reading now matches specification:

- Check return pipe for blockage.

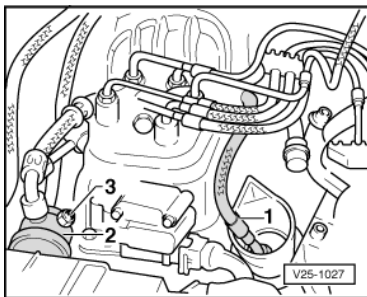
If reading still exceeds specification:

- Replace pressure regulator.

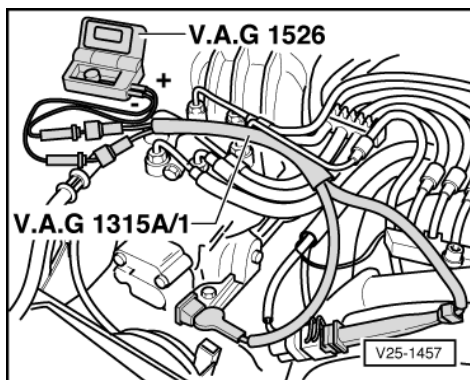
Checking differential pressure

- Close cut-off valve of pressure gauge V.A.G 1318 (lever at right angles to direction of flow).
- Unplug connector from differential pressure regulator.
- Press switch on remote control.
 - Differential pressure specification:
0.3 ... 0.5 bar below system pressure

If reading exceeds or drops below specification:



- -> Unscrew thin pipe -1- at fuel pressure regulator -2- and hold over graduated beaker.
- Seal connection -3- at fuel pressure regulator.
- Press switch on remote control.
 - Overflow specification: 130 ... 150 cm³
- If necessary, replace differential pressure regulator.
- Re-connect thin pipe to fuel pressure regulator.



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

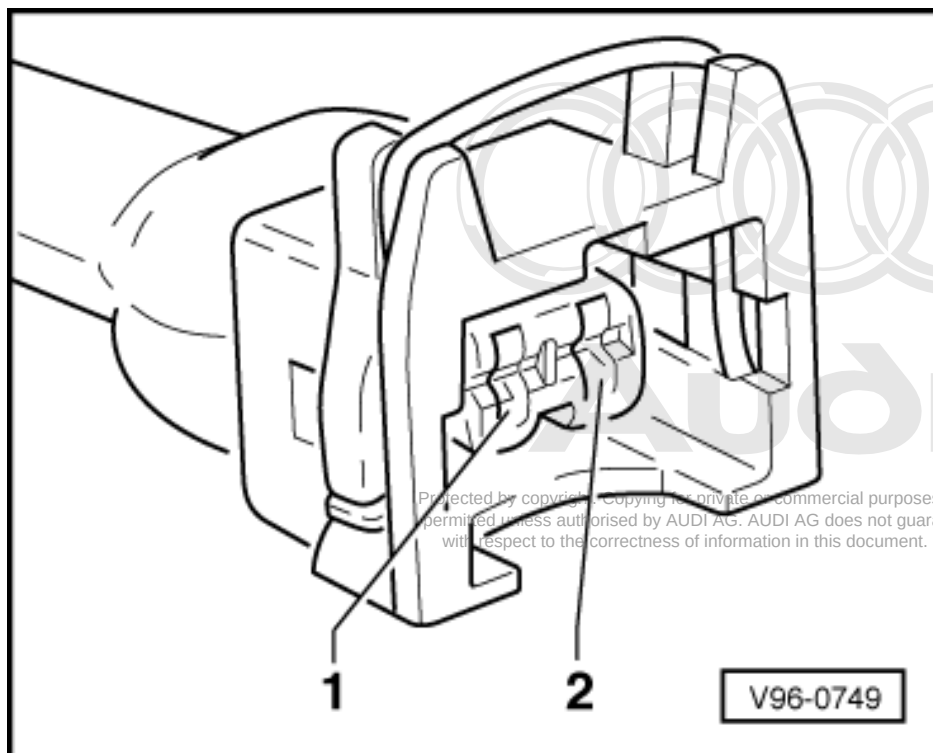
If reading exceeds or drops below differential pressure specification:

- Replace differential pressure regulator.



If reading exceeds or drops below differential pressure and differential pressure regulator current specifications:

- With 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 only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.

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

If no fault is found in wiring:

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

Checking holding pressure

Note:

This test is only to be performed on vehicles with warm starting problems.

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



Possible faults if holding pressure drops below minimum values:

- ♦ Non-return valve in fuel pump defective

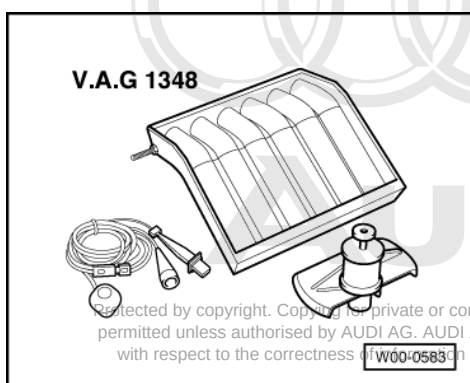
=> Fuel Supply System - Petrol Engines; Repair Group 20; Fuel Supply Fuel Supply

- ♦ Idle motion of sensor plate not OK; checking => Page **102** .
- ♦ Check injector and fuel pipe unions at fuel distributor for leaks
- ♦ Fuel pressure regulator defective

Note:

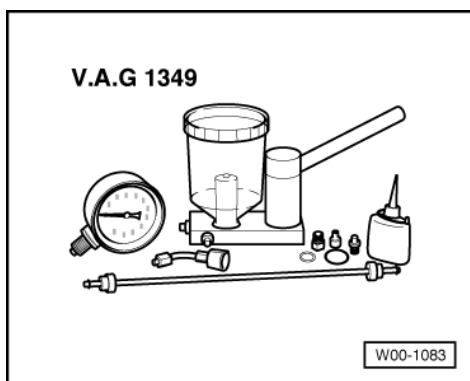
Drain fuel at measuring device before detaching pressure gauge.

2.9 - Checking injectors (injection quantity comparison measurement)



Special tools and workshop equipment required

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

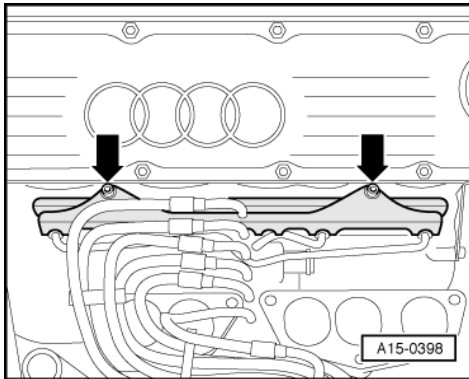


- ♦ Injector tester V.A.G 1349

Note:

Spray pattern of injectors with Viton seals cannot be checked.

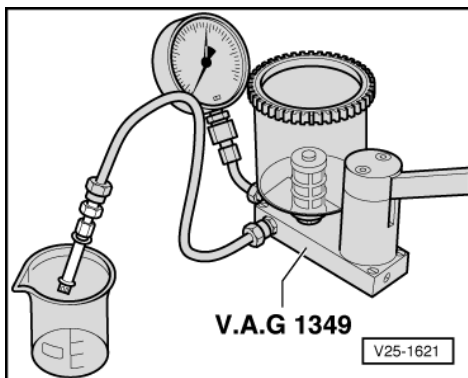
Checking spray pressure and freedom from leaks



- Remove upper part of intake manifold.

=> 5-cyl. Engine (2-valve), Mechanics; 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

- -> Screw out bolts -arrows-.
- Detach retainers.
- Pull injectors out of lower part of intake manifold and lay them aside.
- Disconnect fuel pipe at injector to be checked.



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

If reading does not match specification:

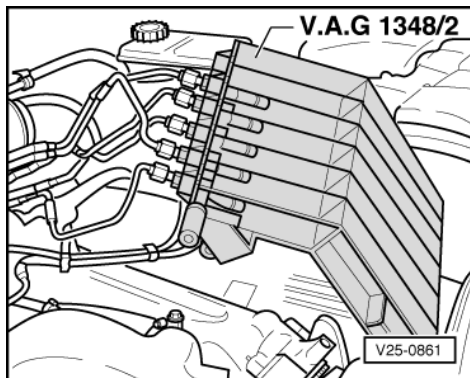
- Replace injector.

If reading matches specification:

- Carefully increase pressure up to just less than opening pressure and then wait.
 - Injector must not dribble within 2 minutes



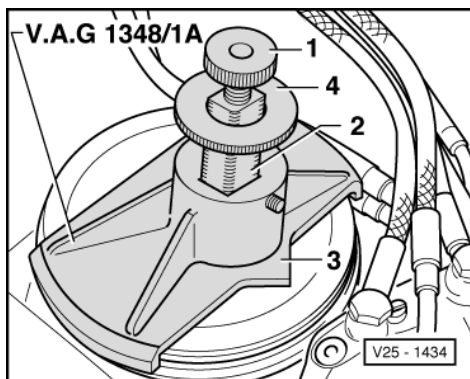
Checking idle injection tolerance



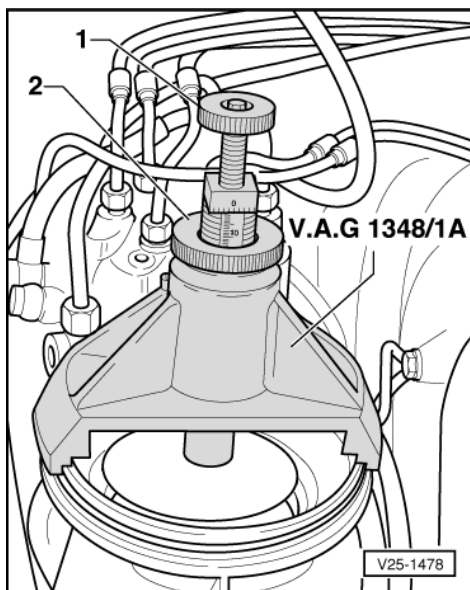
- Connect up remote control V.A.G 1348/3A with adapter lead V.A.G 1348/3-2 => Page 88 .
- Re-connect fuel pipes to injectors.
- -> Insert all injectors in V.A.G 1348/2.

Note:

Make sure fuel pipes are not kinked; remove from retaining clips if necessary.



- -> Screw adjusting screw -1- and knurled nut -4- at V.A.G 1348/1A into upper end position and pull slide -2- upwards.
- Position V.A.G 1348/1A on rim of air-flow meter such that tip -3- points in direction of fuel distributor.
- Push in slide -2- as far as it will go.
- Hold sensor plate manually in rest position.
- Screw in adjusting screw -1- until magnetic base makes contact with securing bolt of sensor plate.



- -> Screw down knurled nut -2- by 15 mm.
- Press switch on remote control for 20 seconds.
- Compare fuel quantities of injectors.
 - Permissible difference: max. 2.5 ml for all injectors

Note:

Hold measuring device horizontal.

If difference is greater:

- Interchange injectors with highest and lowest injection quantity.
- Drain V.A.G 1348/2.
- Repeat test.

If difference in fuel quantity accompanies injector:

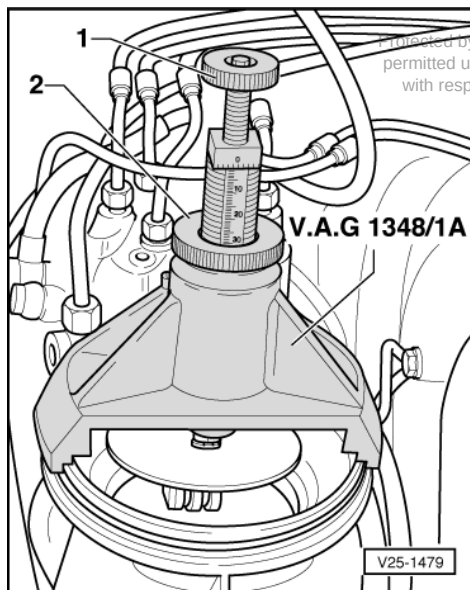
- ♦ Injector defective

If difference in fuel quantity is still found at same cylinder:

- ♦ Pipe to injector constricted or fuel distributor defective

Checking full throttle injection tolerance

- Drain V.A.G 1348/2.



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- -> Screw down knurled nut -2- by 30 mm.
- Press switch on remote control for 20 seconds.
- Compare fuel quantities of injectors.
 - Permissible difference: max. 8.0 ml for all injectors

Note:

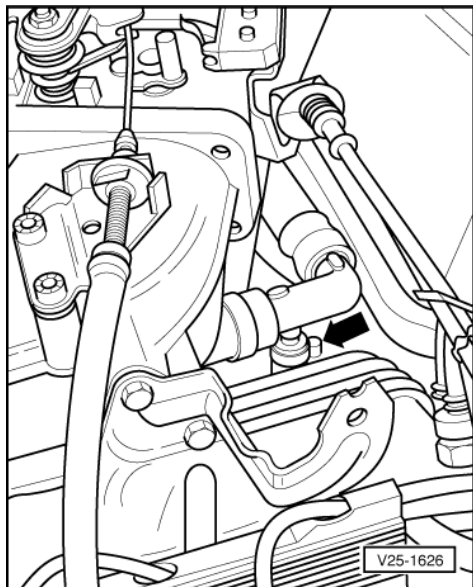
Hold measuring device horizontal.

2.10 - Checking air-shrouded injectors and inserts for leaks

- Remove upper part of intake manifold.



=> 5-cyl. Engine (2-valve), Mechanics; 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



- -> Pull off hose -arrow- to air-shrouded injectors.

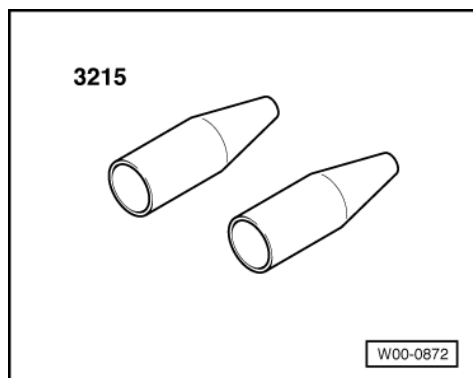
Note:

Shown in Fig. with cruise control unit removed.

- Apply non-flammable leak detector spray to injectors and injector inserts.
- Use compressed-air gun to inject a pressure of 1 bar into hose connection -arrow- to air-shrouded injectors. Attach adapter hose if necessary.
- In the event of bubbles between cylinder head and injector insert, check and if necessary replace injector insert => Page 100 .
- In the event of bubbles between injector insert and injector, replace O-rings => Page 98 .

2.11 - Removing and installing injectors

Special tools and workshop equipment required



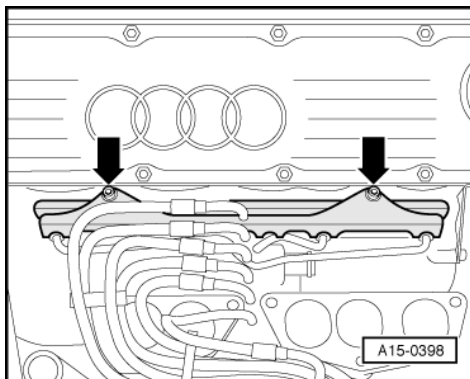
- ♦ Assembly sleeves 3215

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Removing

- Remove upper part of intake manifold.

=> 5-cyl. Engine (2-valve), Mechanics; 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



- -> Screw out bolts -arrows-.
- Detach retainers.
- Pull injector out of lower part of intake manifold.

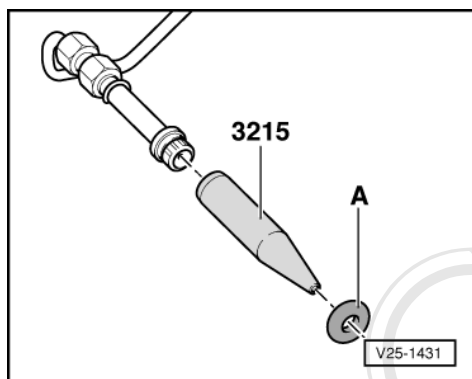
Note:

Take care not to kink fuel pipes.

- Injector must be unscrewed from injector pipe for injector replacement.
- Detach upper and lower O-ring at injector.

Installing

Install in reverse order, paying attention to the following:



- -> Moisten large O-ring -A- (green) with fuel and slip it onto assembly sleeve 3215.
- Attach assembly sleeve 3215 to injector and push O-ring into rear annular groove of injector until it engages.
- Moisten small O-ring with fuel and insert it in front groove at injector.

Tightening torques

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

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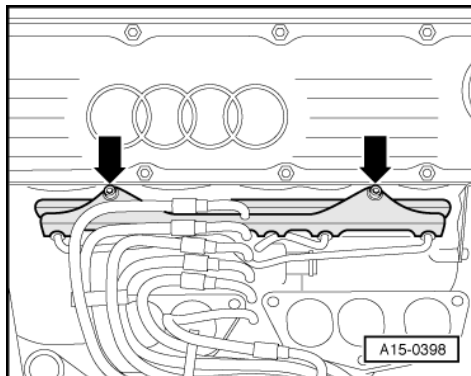


2.12 - Removing and installing injector insert

Removing

- Remove upper part of intake manifold.

=> 5-cyl. Engine (2-valve), Mechanics; 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



- -> Screw out bolts -arrows-.
- Detach retainers.
- Pull injector out of lower part of intake manifold.

Note:

Take care not to kink fuel pipes.

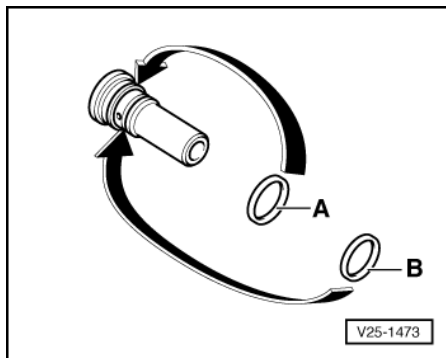
- Use screwdriver to carefully prise out injector insert.

Note:

Replace damaged injector insert.

Installing

Install in reverse order, paying attention to the following:

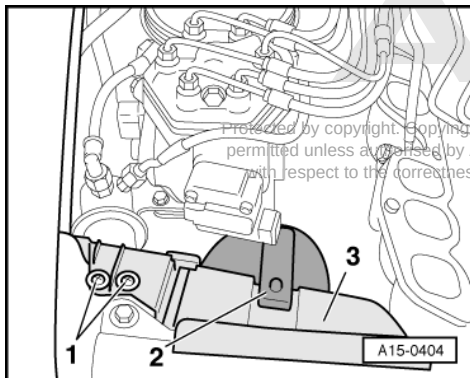


- -> Moisten black O-ring -A- with fuel and insert it in upper annular groove at injector insert.
- Moisten green O-ring -B- with fuel and insert it in lower groove at injector insert.
- Position injector insert in lower part of intake manifold and press it in with fingers until it is felt to engage.

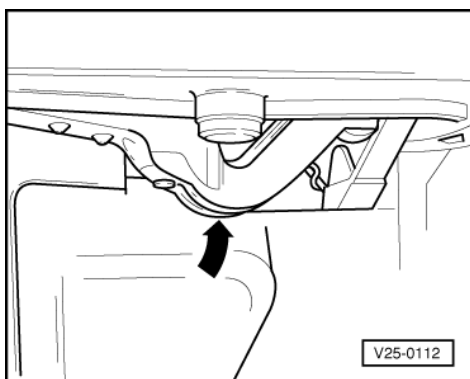
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2.13 - Checking adjusting lever and control plunger

- Operate starter for approx. 10 seconds to build up control pressure.
- or
- Press switch on remote control for approx. 10 seconds (connecting remote control V.A.G 1348/3A with adapter lead V.A.G 1348/3-2 => Page 88).
- Unfasten hose clamps of air intake elbow.



- -> Unfasten retainer tab -2- of air intake hose at headlight cover.
- Press both retainers to rear and pull off lamp cover -3- upwards.
- Screw out the two cross-head bolts -1- and detach right section of lamp cover.
- Unfasten clamps all round air cleaner housing.
- Pull off mixture control unit with upper part of air cleaner housing upwards.



- -> Lift sensor plate -arrow- from underneath.
- Lever resistance must be uniform over entire distance
- No resistance must be felt on rapid downwards movement
- If necessary, replace air-flow meter.

If lever is difficult to move upwards but moves easily downwards, then control plunger is sticking:

- Replace fuel distributor.

If lever is difficult to move in both directions:

- Replace air-flow meter.



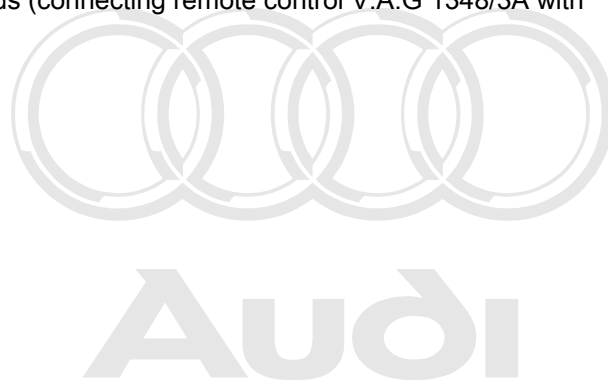
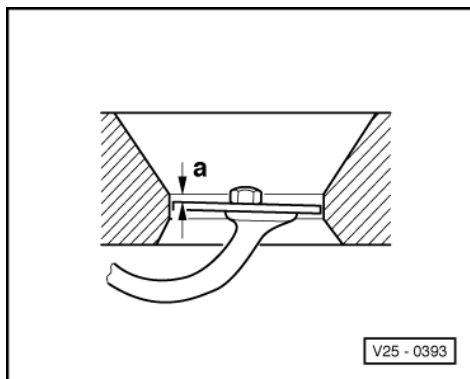
2.14 - Checking and adjusting rest position and idle motion of sensor plate

Test requirement:

- Engine oil temperature at least 50 °C

Test sequence

- Operate starter for approx. 10 seconds to build up control pressure.
- or
- Press switch on remote control for approx. 10 seconds (connecting remote control V.A.G 1348/3A with adapter lead V.A.G 1348/3-2 => Page 88).
- Detach air intake elbow.

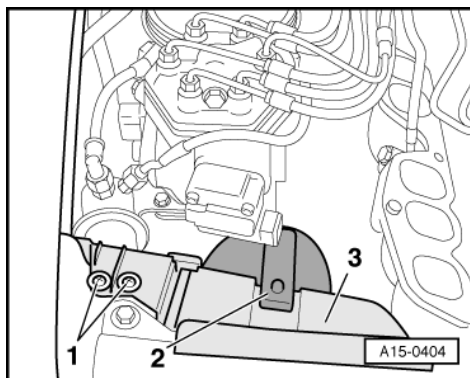


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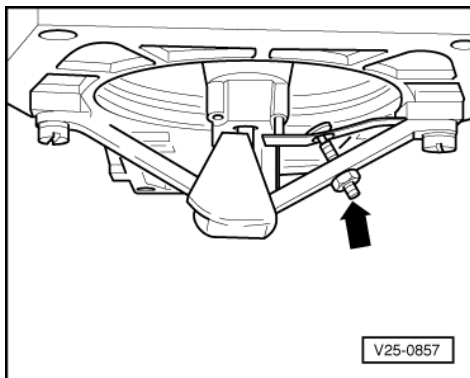
Checking rest position

- -> Top edge of sensor plate must be below tapered edge of venturi (dimension -a-).
- Dimension a = 1.9 + 1.1 mm

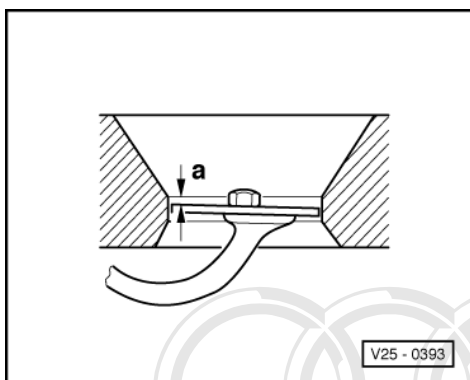
Adjusting rest position



- Unfasten hose clamps of air intake elbow.
- -> Unfasten retainer tab -2- of air intake hose at headlight cover.
- Press both retainers to rear and pull off lamp cover -3- upwards.
- Screw out the two cross-head bolts -1- and detach right section of lamp cover.
- Unfasten clamps all round air cleaner housing.
- Pull off mixture control unit with upper part of air cleaner housing upwards.

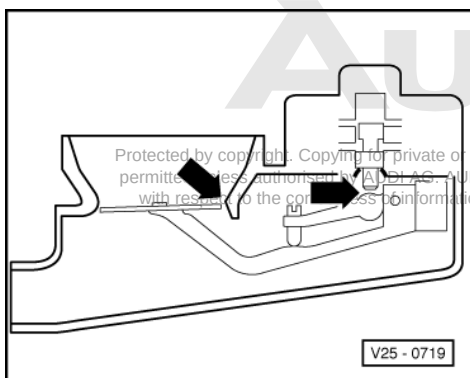


- Take out filter element.
- -> Adjust rest position of sensor plate at adjusting screw -arrow- such that ...



- -> ... top edge of sensor plate is below tapered edge of venturi (dimension -a-).
- Dimension $a = 1.9 \pm 1.1 \text{ mm}$

Checking idle motion of sensor plate



-> Idle motion refers to the clearance between control plunger and adjusting lever -right arrow- measured on side of sensor plate facing fuel distributor -left arrow-.

- Operate starter for approx. 10 seconds to build up control pressure.
- or
- Press switch on remote control for approx. 10 seconds (connecting remote control V.A.G 1348/3A with adapter lead V.A.G 1348/3-2 => Page 88).
- Lift sensor plate slightly until resistance is felt.
 - Min. idle motion: Palpable clearance
 - Max. idle motion: As far as tapered edge of

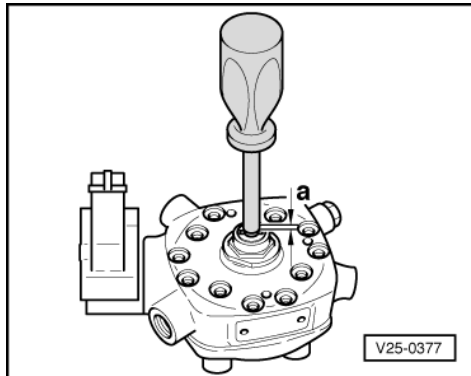


venturi = 2.1 mm

If idle motion is not OK:

- Adjust idle motion at fuel distributor.

Adjusting idle motion at fuel distributor



- -> Set idle motion of sensor plate e.g. using Hazet tool 2566 at stop bolt for control plunger.

Alteration to dimension -a-:

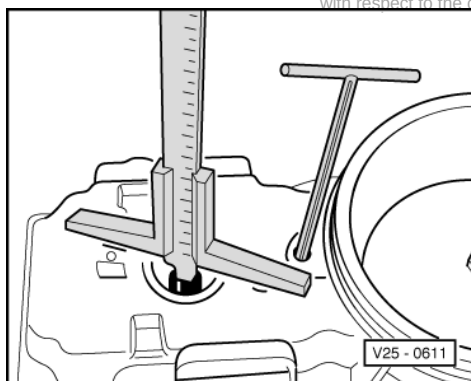
- Screw in = Greater idle motion
 - Screw out = Less idle motion
 - 1/4 turn = approx. 1.3 mm at sensor plate
- Check idling speed, CO content and ignition point => Page 80 .

2.15 - Basic setting of adjusting lever

Note:

Basic setting of adjusting lever is only necessary if fuel distributor or air-flow meter is replaced.

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- -> Measure distance between resting surfaces for fuel distributor at air-flow meter and roller of adjusting lever.
- Specification: 21.3 ± 0.1 mm
- If necessary, adjust distance at CO adjusting screw.

Note:

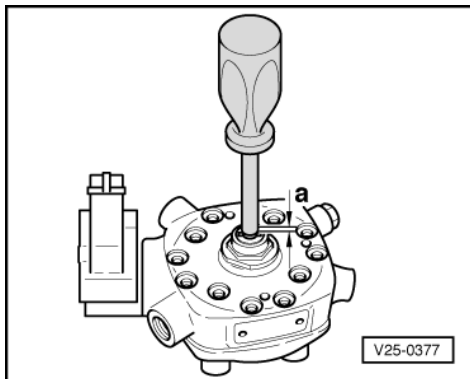
This setting is no longer valid after adjusting CO content (differential pressure regulator current) to specified value.

2.16 - Adjusting stop bolt for control plunger

Note:

Stop bolt only has to be adjusted after replacing gasket for control plunger.

- Perform the following operations before turning stop bolt:
 - Use scriber to mark position of stop bolt.



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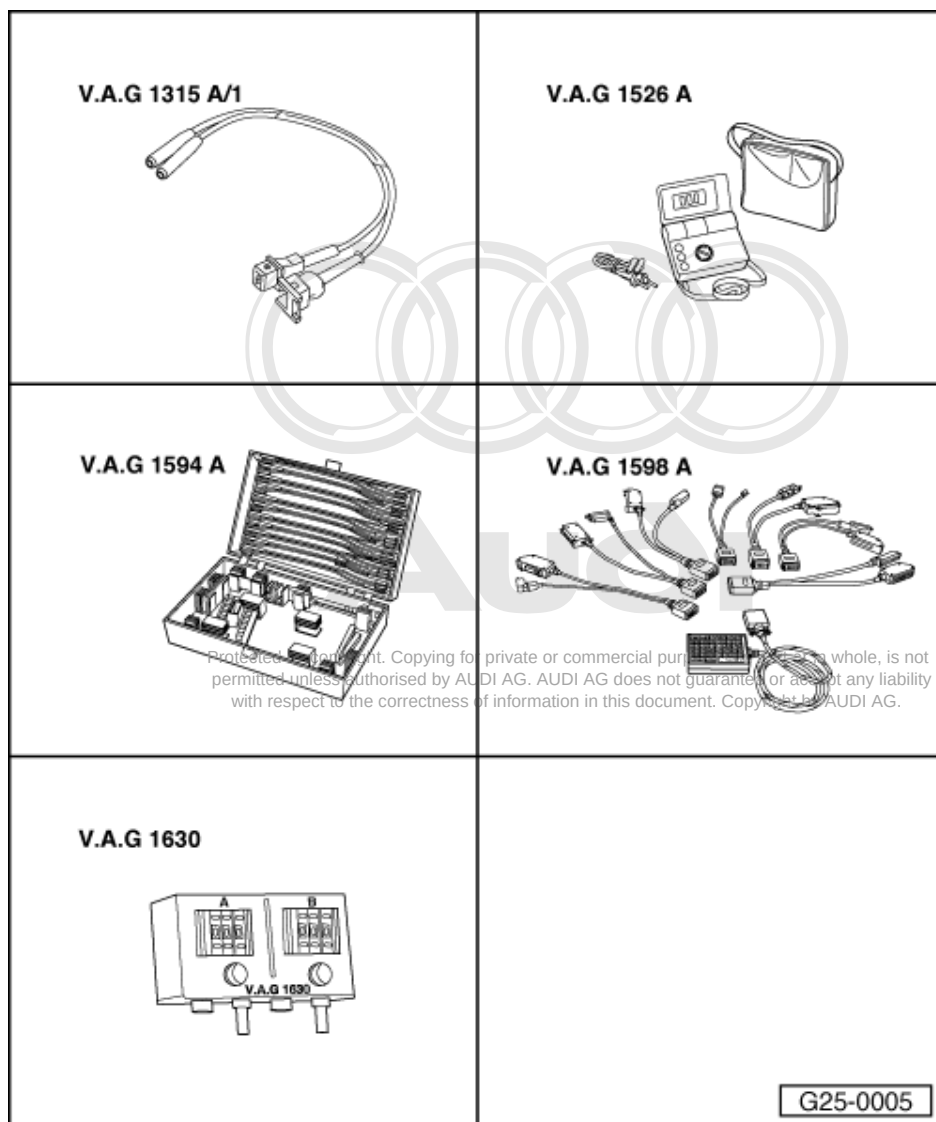
- -> Measure distance -a- between stop bolt and collar of hexagon nut and note down value. Screw out stop bolt for control plunger e.g. using Hazet tool 2566. Replace sealing ring for stop bolt.
 - Small $\varnothing$ of sealing ring faces control plunger
- Screw in stop bolt as far as value -a- noted down.
- Check rest position and idle motion of sensor plate => Page 102 .

Notes:

- ♦ Mechanical cleaning of control plunger is not permitted.
- ♦ If control plunger is severely scored or if freedom of movement cannot be achieved by applying clean naphtha, replace fuel distributor.



2.17 - Checking cold acceleration enrichment

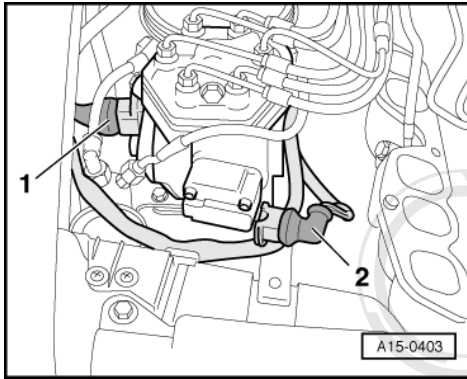


Special tools and workshop equipment required

- ♦ 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

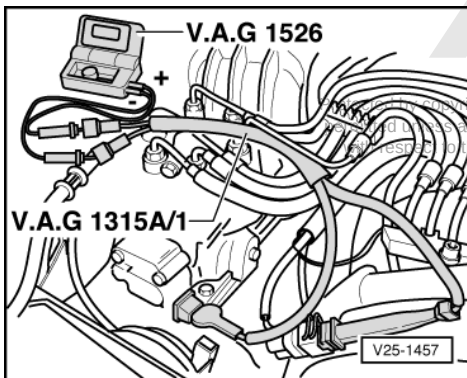
Test requirements:

- No faults stored in fault memory
- Differential pressure regulator OK; checking => Page 71

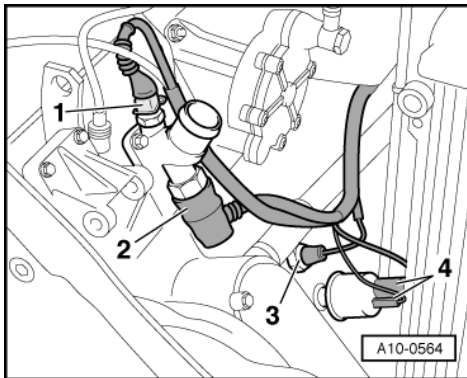


Test sequence

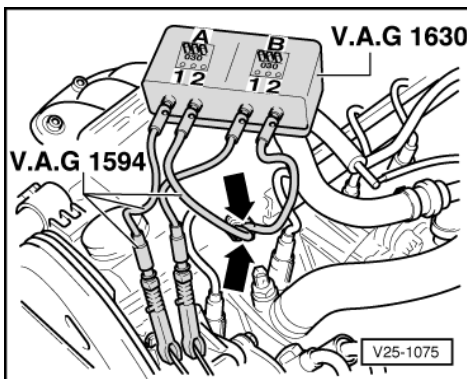
- -> Unplug connector -2- from differential pressure regulator.



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



- -> Unplug connector at coolant temperature sender -G62 -1-.

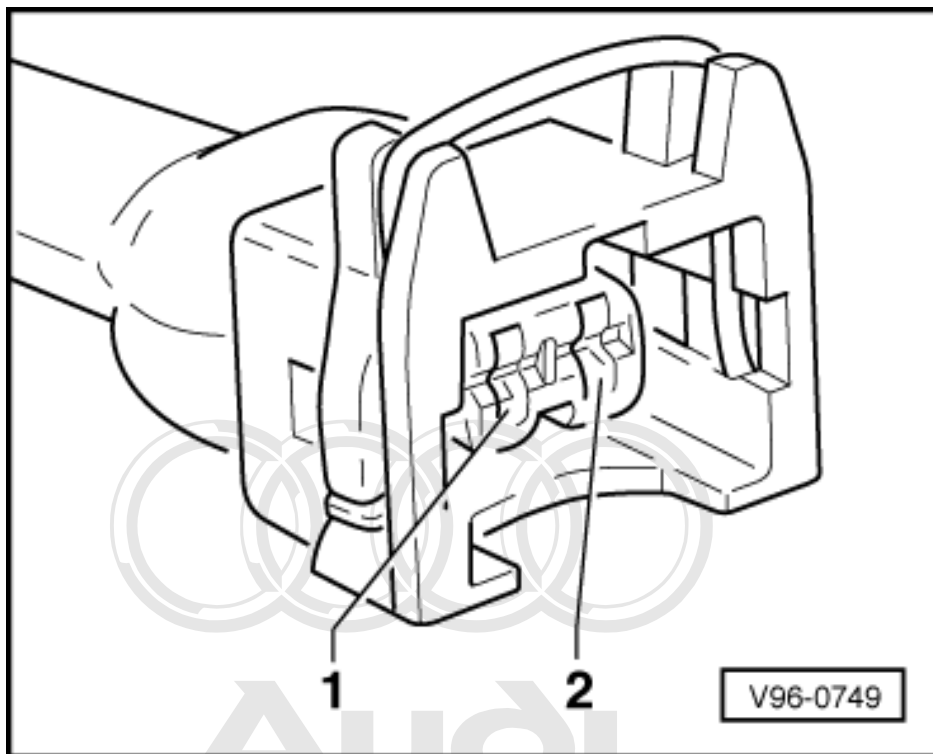




- -> Connect sides A and B of digital potentiometer V.A.G 1630 to unplugged connector of coolant temperature sender and earth.
- Set sides A and B of V.A.G 1630 to 3.0 kW.
- Start engine and let it idle.
- Read off differential pressure regulator current on multimeter and note down value.
- Abruptly open throttle valves as far as they will go and release accelerator mechanism again (burst of throttle).
 - Specification: Brief increase min. 6.0 mA

If reading does not match specification:

- With 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 only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.

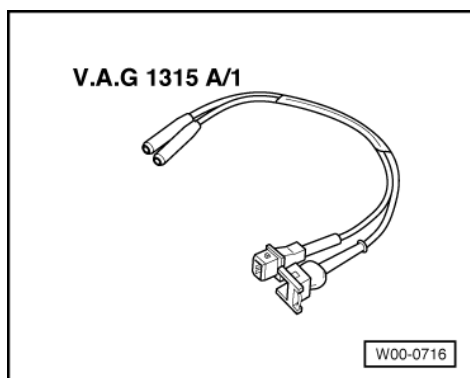
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If wiring is OK:

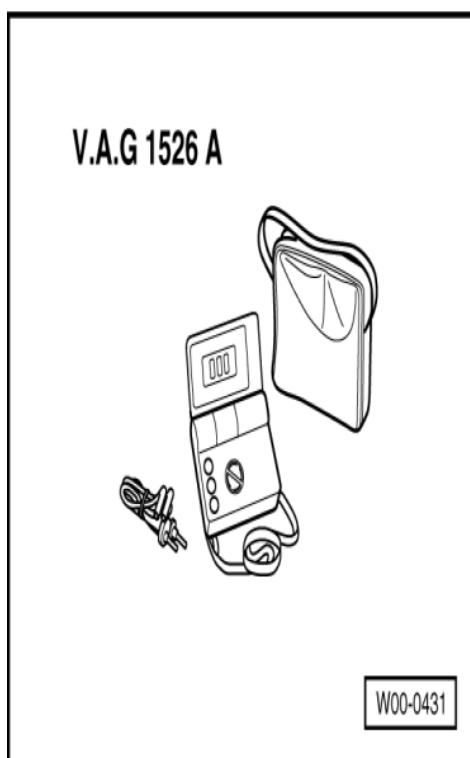
- Replace KE III Jetronic control unit => Page 31 .

2.18 - Checking overrun shutoff and operation of idling-speed switch

Special tools and workshop equipment required



- ♦ Test lead V.A.G 1315A/1



- ♦ V.A.G 1526 A

Test requirements:

- Differential pressure regulator OK; checking => Page 71
- Coolant temperature at least 85 °C
- Electr. loads switched off (radiator fan must not run during test)
- Air conditioner switched off

Note:

The following test also checks operation of the idling-speed switch.

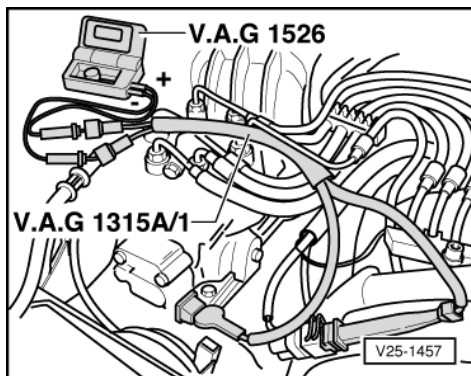


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Test sequence

- Unplug connector from differential pressure regulator.



- -> Set multimeter to 200 mA measuring range and connect it up with test lead V.A.G 1315 A/1 between differential pressure regulator and its connector.
- Switch on ignition.
 - Positive differential pressure regulator current must be displayed

If negative differential pressure regulator current is displayed:

- Interchange connections at V.A.G 1315 A/1
- Increase engine speed to in excess of 4000 rpm and abruptly release accelerator mechanism.
 - Specification: Briefly -50 ... -60 mA

If no value is displayed:

- Check idling switch -F60 => Page 58 .

3 - Checking Lambda control

3.1 - Checking Lambda control



3.2 - Checking 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

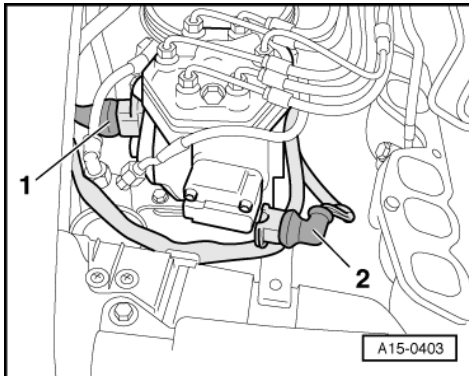
Test requirements:

- Coolant temperature at least 85 °C
- Idling speed OK
- Differential pressure regulator OK; checking => Page 71
- No leaks in exhaust system between catalytic converter and cylinder head
- Lambda-probe heater OK; checking => Page 114

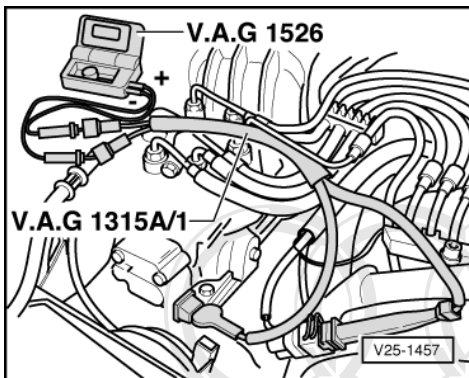


- Coolant temperature sender -G62 OK; checking => Page 142

Test sequence



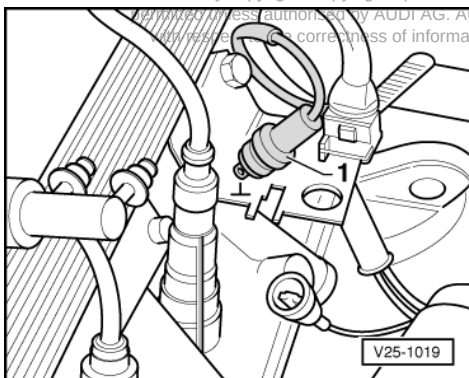
- -> Unplug connector -2- from differential pressure regulator.



- -> Set multimeter to 200 mA measuring range and connect it up with test lead V.A.G 1315 A/1 between differential pressure regulator and its connector.
- Start engine and let it idle for at least 2 minutes.
- Read off differential pressure regulator current on multimeter and note down value.
- Pull out dipstick.
 - Specification: Differential pressure regulator current must increase

If reading does not match specification:

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- -> Unplug connector for Lambda probe.
- Hold signal wire -1- to engine control unit on engine earth for approx. 15 seconds.
 - Specification: Differential pressure regulator current must increase

If reading does not match specification:

- With 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 only (not to control unit) => Page 29.

- Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.

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

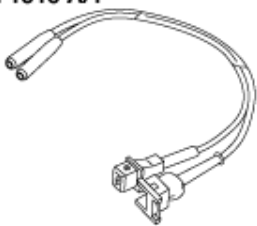
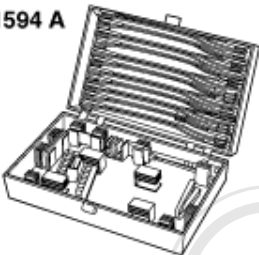
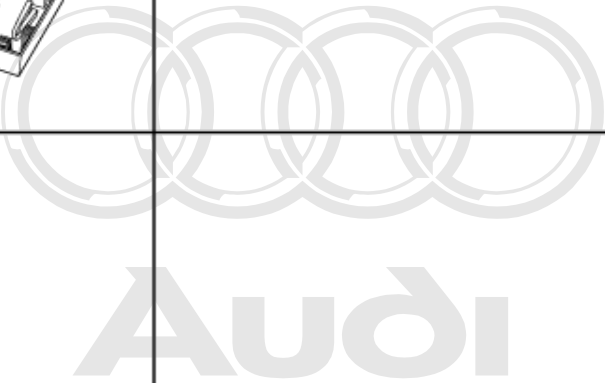
If wiring is OK:

- Install KE III Jetronic control unit.
- Attach connector to Lambda probe.
- Start engine and let it idle.
 - Differential pressure regulator current must drop to original value and then fluctuate

If differential pressure regulator current does not fluctuate:

- Replace Lambda probe.

3.3 - Checking Lambda probe heater -Z19

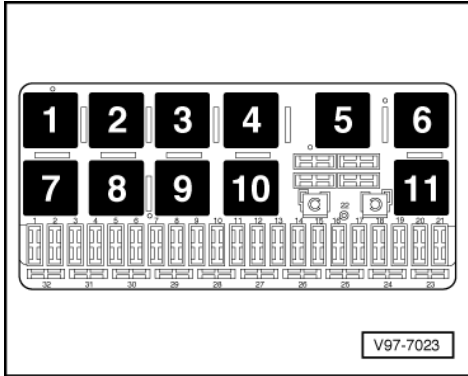
V.A.G 1315 A/1 	V.A.G 1526 A 
V.A.G 1594 A 	
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Special tools and workshop equipment required

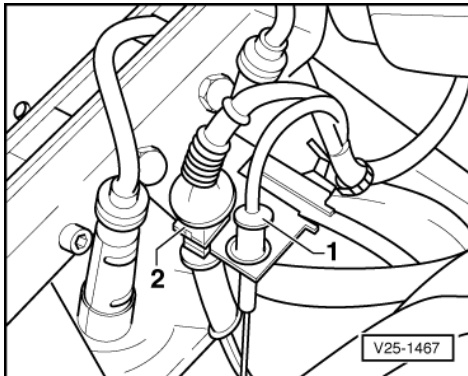
- ♦ V.A.G 1315 A/1
- ♦ V.A.G 1526 A
- ♦ V.A.G 1594 A

Test requirements:



- -> Fuse S25 OK (in fuse box)
- Fuel pump relay OK; checking => Page 35
- Engine cold

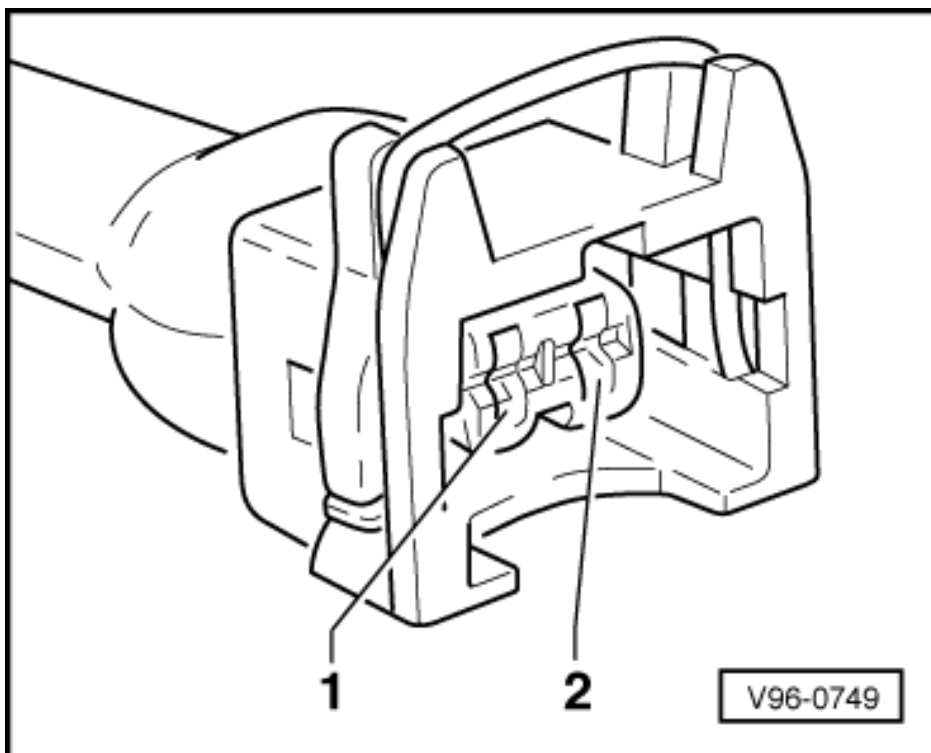
Test sequence



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



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- -> Connect up multimeter for voltage measurement between contacts 1 and 2.
- Start engine and let it idle.
 - Specification: approx. battery voltage

If reading does not match specification:

- Eliminate open circuit in wiring.

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

If reading matches specification:

- Connect auxiliary test lead V.A.G 1315 A/1 to 2-pin connector.
- Switch multimeter to 10 A measuring range (connect test lead to 10 A connection).
- Start engine and leave it idling.
 - Specification: 0.5 ... 3.0 A

Note:

Current input decreases as Lambda probe becomes warmer.

If reading does not match specification:

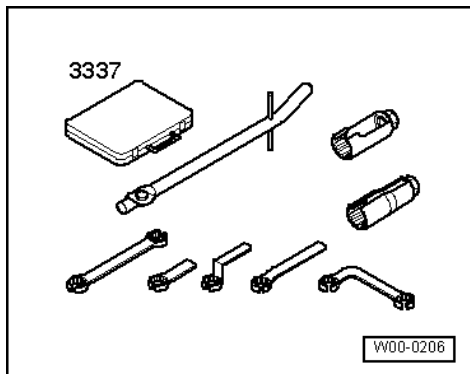
- Replace Lambda probe.

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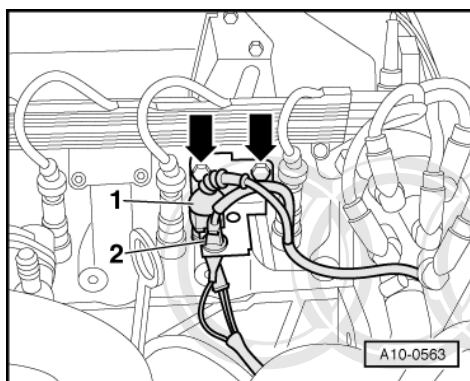
3.4 - Removing and installing Lambda probe

Special tools and workshop equipment required



- ♦ Ring spanner set for Lambda probe 3337
- ♦ Hot bolt paste G 052 112 A3

Sequence of operations



- -> Unplug connectors -1- and -2- for Lambda probe.
- Unfasten cable ties.
- Use special tool 3337 to screw out Lambda probe.

Pay attention to the following on installation:

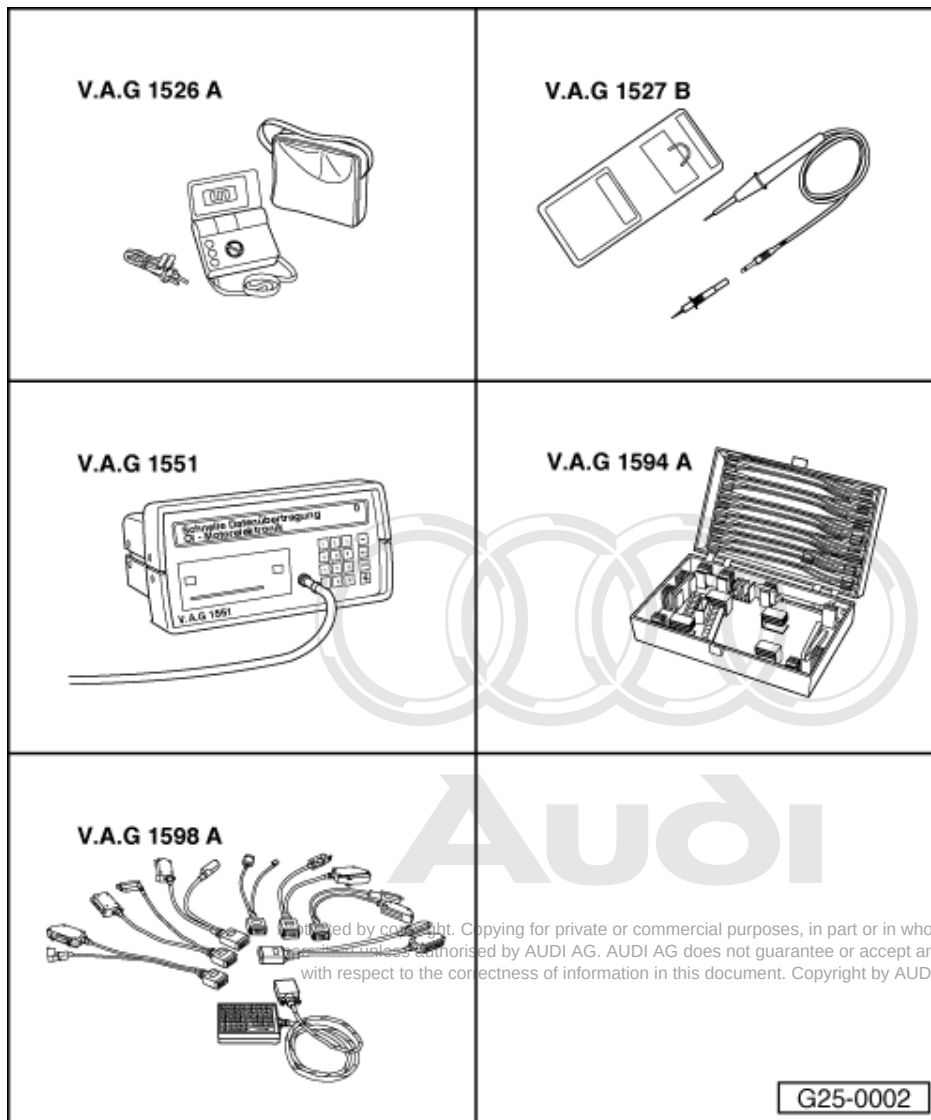
Notes:

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- ♦ The thread of the Lambda probe is coated with an assembly paste, which must not be allowed to ingress into the openings in the probe.
- ♦ Tightening torque 55 Nm

4 - Checking fuel tank breather system

4.1 - Checking fuel tank breather system



4.2 - Checking activated charcoal filter solenoid valve -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 => Exploded view of fitting locations - Page **18**



Leak test

Activated charcoal filter solenoid valve -N80 is closed when deenergised.

- Pull hoses off ACF valve; leave connector attached.
- Connect test hose to one connection of ACF valve.
- Start final control diagnosis =>Page 9 and actuate activated charcoal filter solenoid valve -N80.

-> Indicated on display:

Flash code: 4343
Activated charcoal filter solenoid valve
-N80

Valve must click...

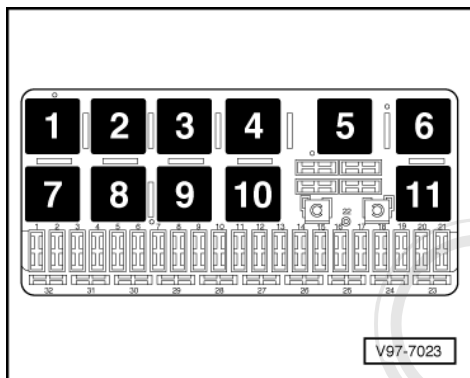
...and must open and close (can be checked by blowing into test hose).

If valve does not open and close properly:

- Replace ACF valve.

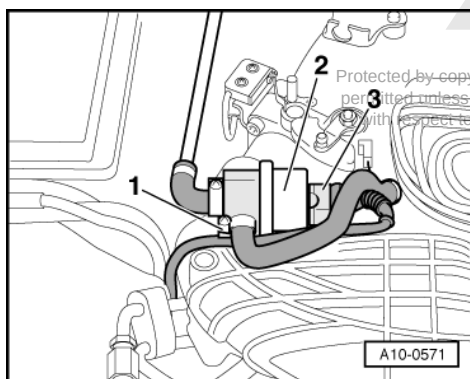
If solenoid valve does not react during final control diagnosis:

Checking power supply

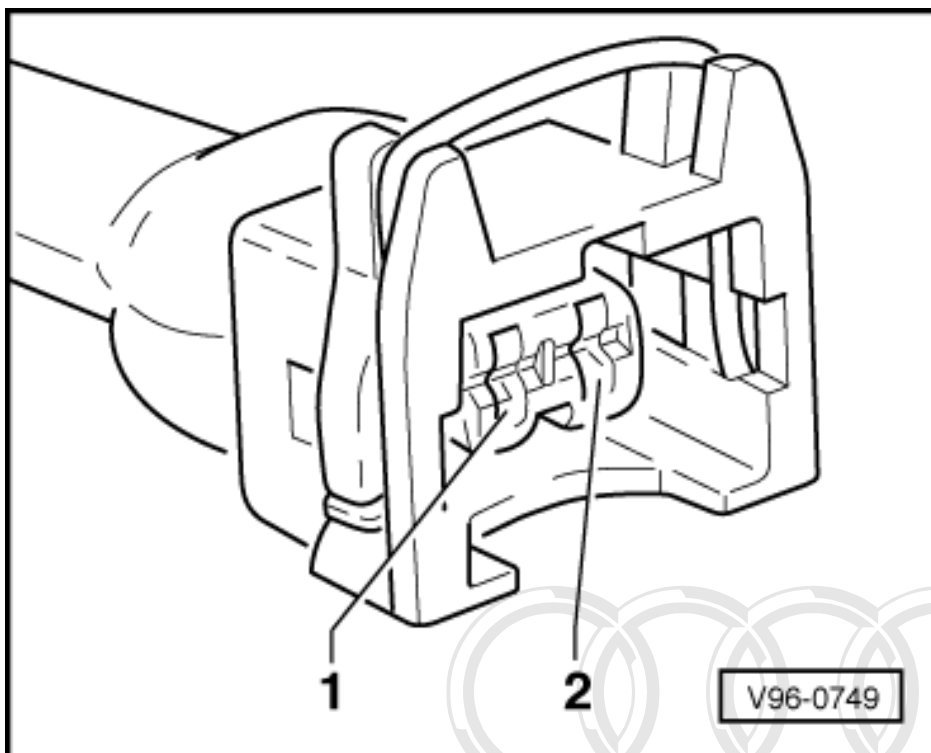


Test requirement:

- -> Fuse S28 OK (in fuse box)



- -> Unplug connector -3- at ACF valve -2-.



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

Connector Contact	Measure to
1	Engine earth

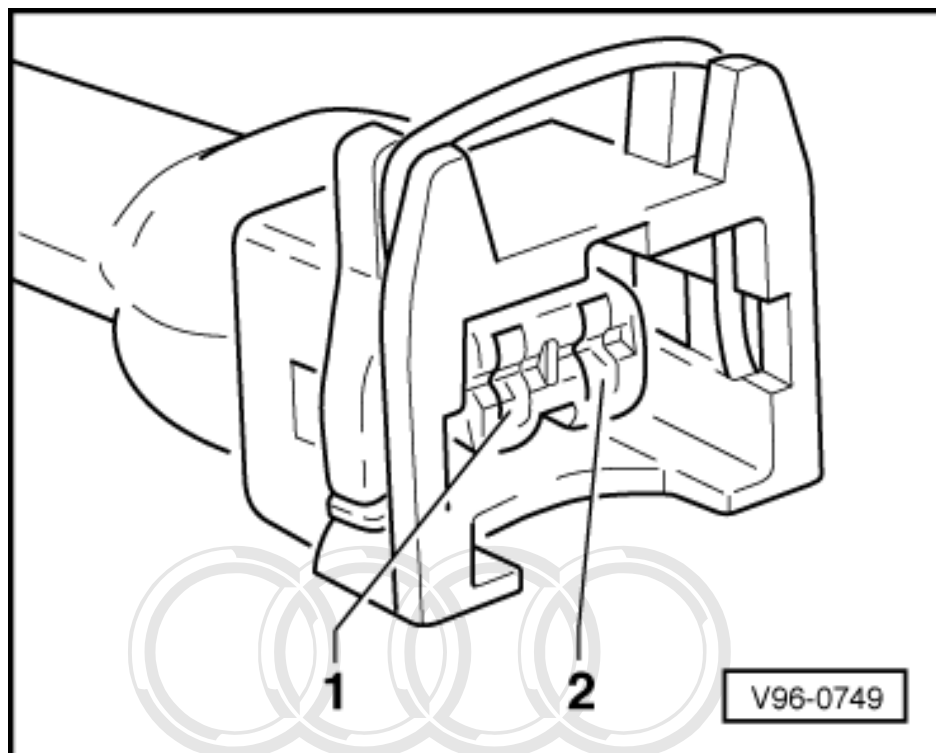
- Switch on ignition.
- Specification: approx. battery voltage

If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

Checking actuation

- Unplug connector at ACF valve.



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

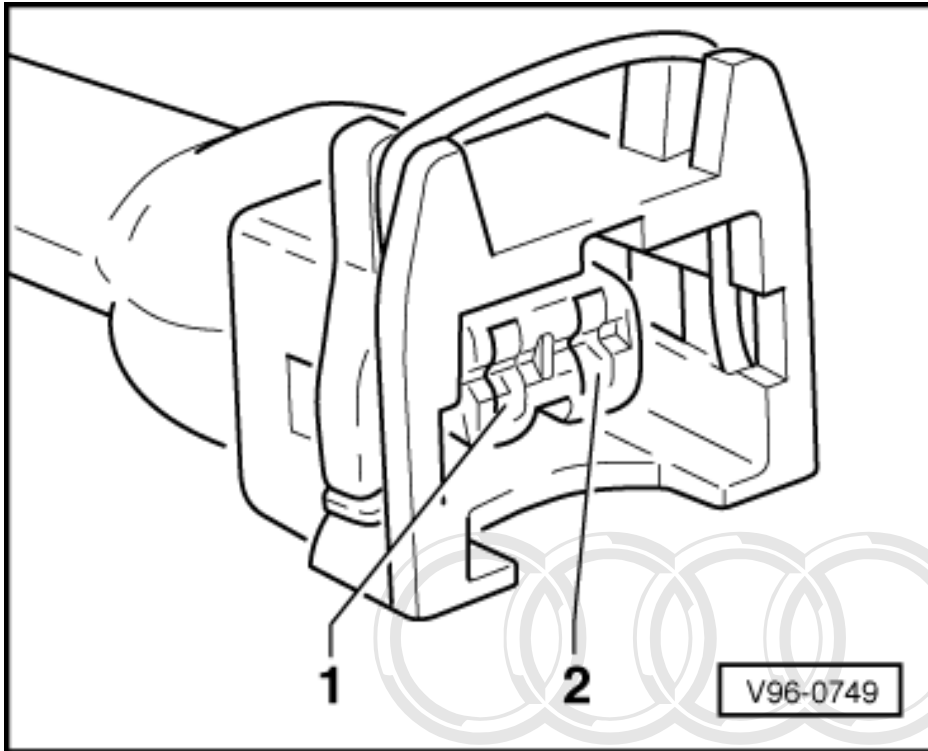
If LED flashes:

- Replace ACF valve.

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If LED does not flash or if it is permanently lit:

- With 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 only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.
- => "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If wiring is OK and there is no actuation:

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



5 - Checking additional signals

5.1 - Checking additional signals

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

5.2 - Checking air-conditioner compressor signal

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 test is only to be performed if there is a sharp drop in idling speed when air conditioner is switched on (vehicles fitted with air conditioner).

Test sequence

- With 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 only (not to control unit) => Page 29 .
- Connect up multimeter for voltage measurement between sockets 33 and 35 of test box.
- Switch on ignition.
- Switch on air conditioner.
 - Specification: approx. battery voltage

If reading does not match specification:

- Check for open circuit and short to earth/positive in the following wiring.

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

- If necessary, eliminate open circuit in wiring/short circuit.
- If wiring is OK, check magnetic coupling control unit signal.

=> Heating, Air Conditioner; Repair Group 01; Air conditioner self-diagnosis; Performing final control diagnosis
 Air conditioner self-diagnosis 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

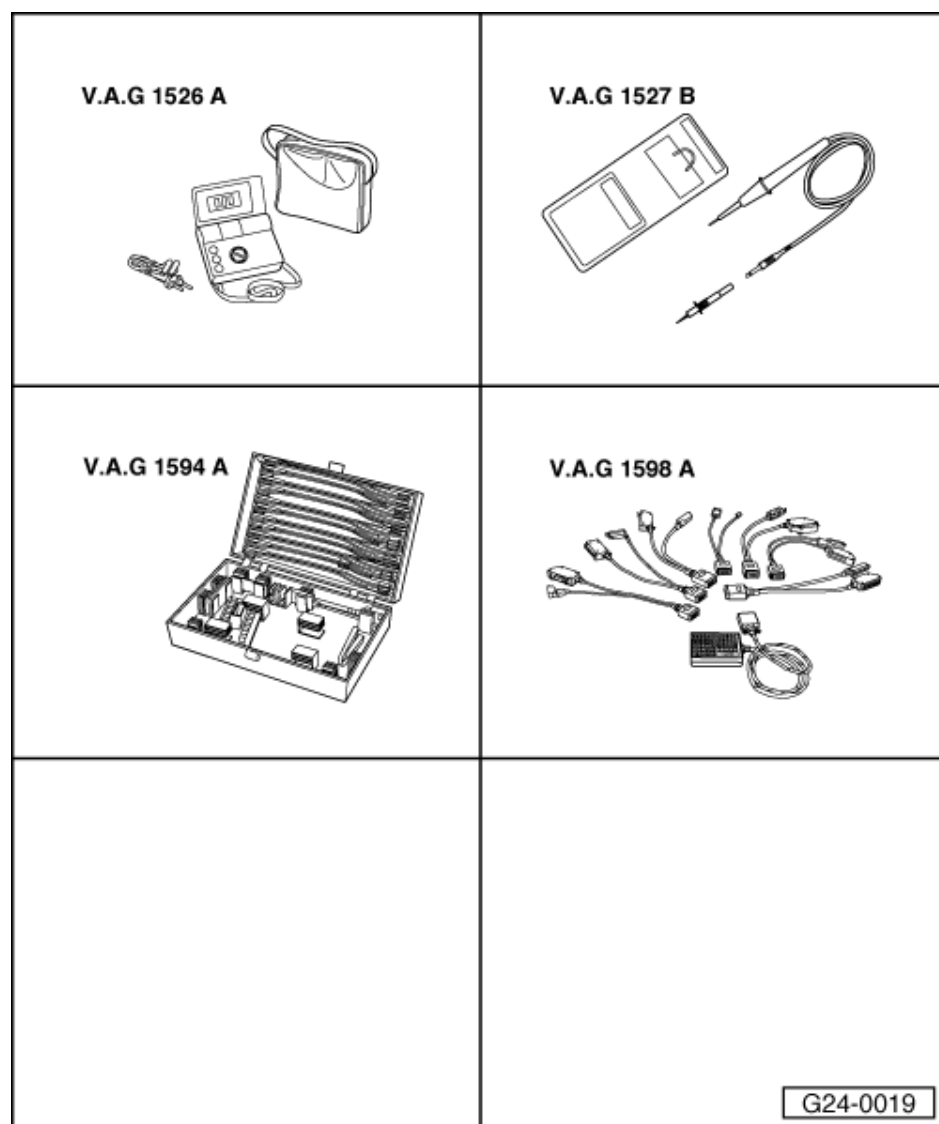
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder



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5.4 - Checking vehicle-speed signal - vehicles for Sweden only



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 requirement:

- Speedometer function and display OK

Test sequence

- Raise vehicle (if at all possible using lifting platform) until front left wheel is free to turn.
- With 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 actual control unit => Page 29.
- Connect up voltage tester V.A.G 1527 B as follows.

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

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

- Switch on ignition.
 - LED must light faintly
- Turn front left wheel.
 - LED must flash

If LED does not flash:

- Check for open circuit and short to earth/positive in the following wiring.

Test box V.A.G 1598 A Socket	Dash panel insert Contact
29	=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If no fault is found in wiring:

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

If LED now flashes:

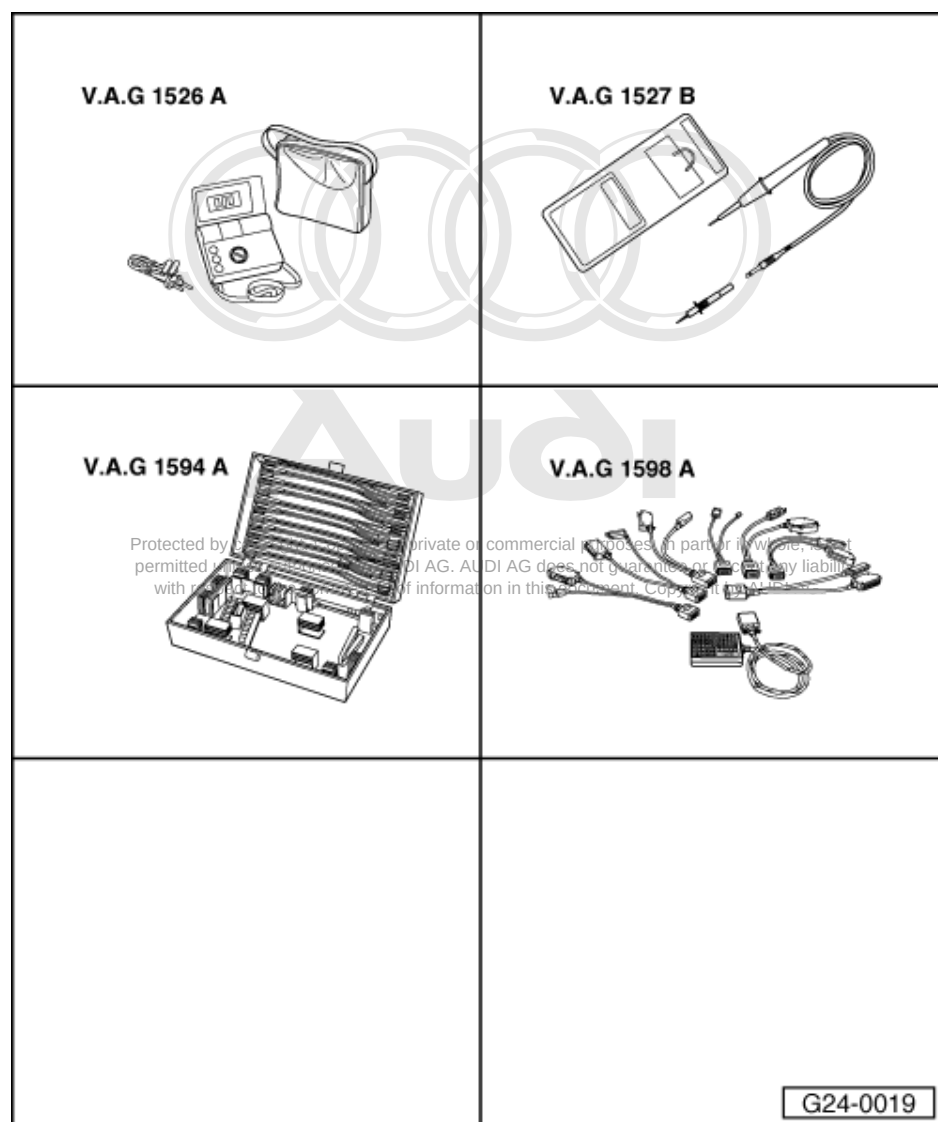
- Replace KE III Jetronic control unit => Page **31** .

If LED still does not flash:

- Identify all components making use of vehicle-speed signal (e.g. radio, automatic gearbox, air conditioner), consecutively disconnect them from dash panel insert and repeat test until cause has been established.



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 test is only to be performed if there is a sharp drop in idling speed on engaging gear on vehicles with automatic gearbox.

Test sequence

- With 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 only (not to control unit) => Page 29.
- Connect up voltage tester V.A.G. 1527 B for voltage measurement between sockets 14 and 34 of test box.
- Switch on ignition.
- Press foot brake and shift selector lever to position "P" or "N".
 - LED must light
- Press foot brake and engage any other gear.

- LED must not light

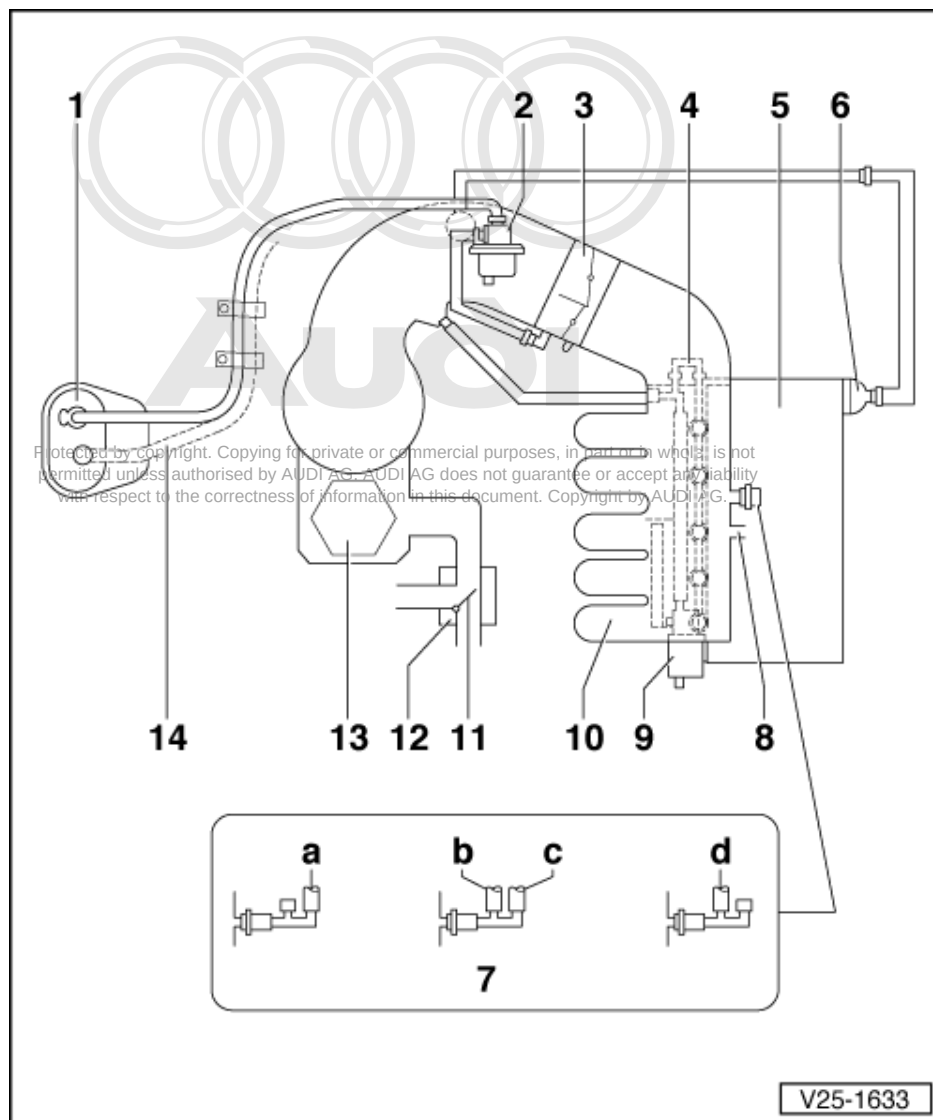
If LED does not light/go out as described:

- Check for open circuit and short to earth/positive in the following wiring.

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

6 - Vacuum diagram

6.1 - Vacuum diagram

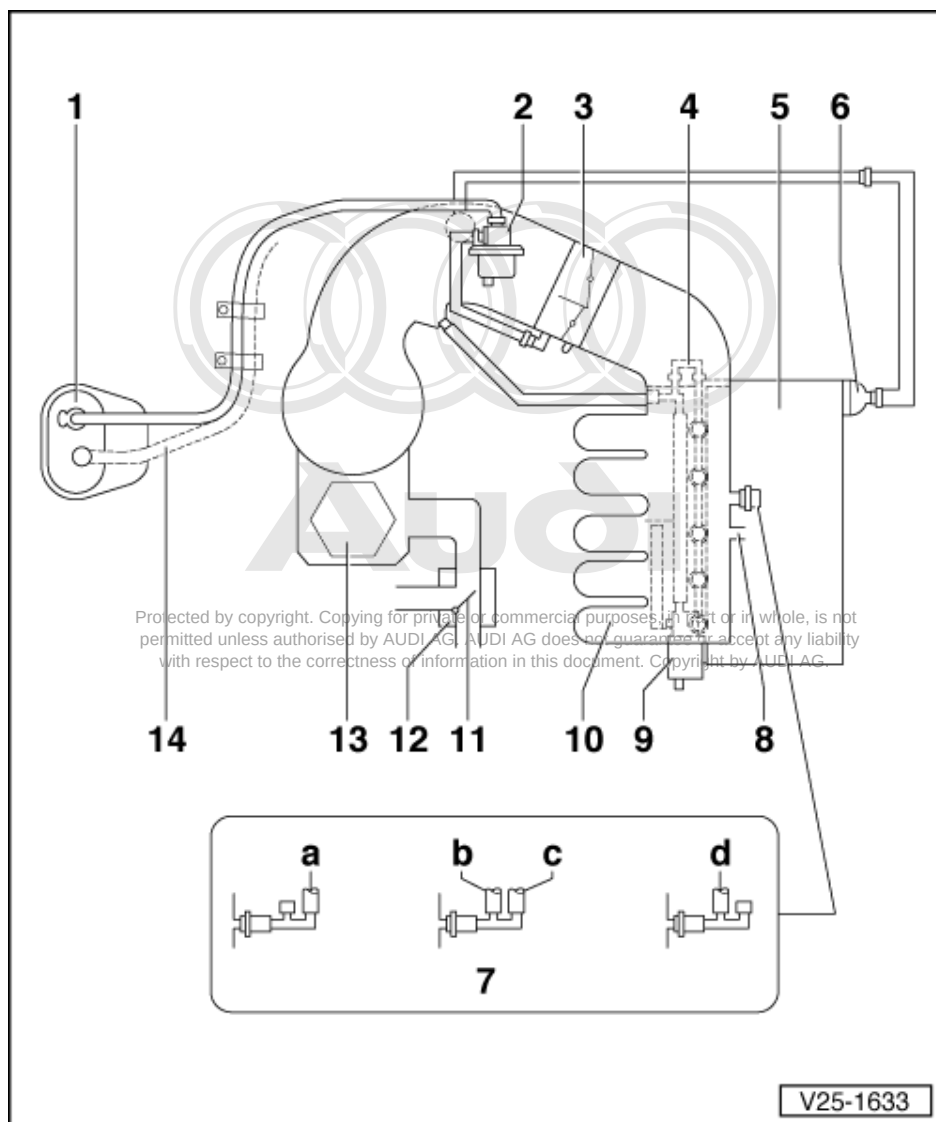


- 1 Activated charcoal filter
- 2 Activated charcoal filter solenoid valve -N80
- 3 Throttle valve assembly
- 4 To air-shrouded injectors



- 5 Cylinder head
- 6 Crankcase breather
- 7 Vacuum connections

- a - For air conditioner/sealed with dummy plug
- b - For differential lock (four-wheel drive vehicles)/sealed with dummy plug
- c - For air conditioner (four-wheel drive vehicles)/sealed with dummy plug
- d - For differential lock (four-wheel drive vehicles)/sealed with dummy plug



- 8 To brake servo
- 9 Idling-speed stabilisation valve -N71
- 10 Intake manifold
- 11 Intake-air preheater
- 12 Control box
- 13 Mixture control unit
- 14 To fuel tank

28 - Ignition system

1 - Checking ignition system

1.1 - Checking ignition system

1.2 - Safety precautions

Heed the following so as to avoid possible injury and/or the destruction of the injection and ignition system:

- ◆ Never touch/disconnect ignition cables with engine running or at cranking speed.
- ◆ Always switch off ignition before disconnecting and connecting ignition system wires (also applies to H.T. wires and measuring instrument leads).
- ◆ If engine is to be operated at cranking speed without it starting (e.g. compression test), unplug connector from output stage for ignition coil.
- ◆ Boost starting with rapid charger is only permitted for up to 1 minute at a maximum of 16.5 V.
- ◆ Always switch off ignition before washing engine.
- ◆ Always switch off ignition before disconnecting and connecting battery so as not to damage KE III Jetronic or FEI control unit.
- ◆ Vehicles with a definite or suspected fault in the ignition system are only to be towed after unplugging connector at output stage.
- ◆ Never connect capacitor to terminal 1 (-).
- ◆ 1 kW ignition distributor rotor (identification: R1) is never to be replaced with a different rotor (including radio interference suppression).
- ◆ For connection of measuring instruments (e.g. voltage tester V.A.G 1527 B, portable multimeter V.A.G 1526 A), always make use of adapter set V.A.G 1594 A.

1.3 - Adjustment data, spark plugs

Engine codes			NG (2.3 l / 98 kW engine)
FEI control unit	Part no.		=>Parts List
Ignition point 1)	Test specification	° before TDC	13 ... 17
	Setting	° before TDC	15 ± 1
Firing order			1-2-4-5-3
Spark plugs 2)	Tightening torque	Nm	30
Ignition transformer	Secondary resistance		5 ... 9 kW
	Primary resistance		0.5 ... 1.5 ω
Spark gap		mm	0.7 ... 0.9

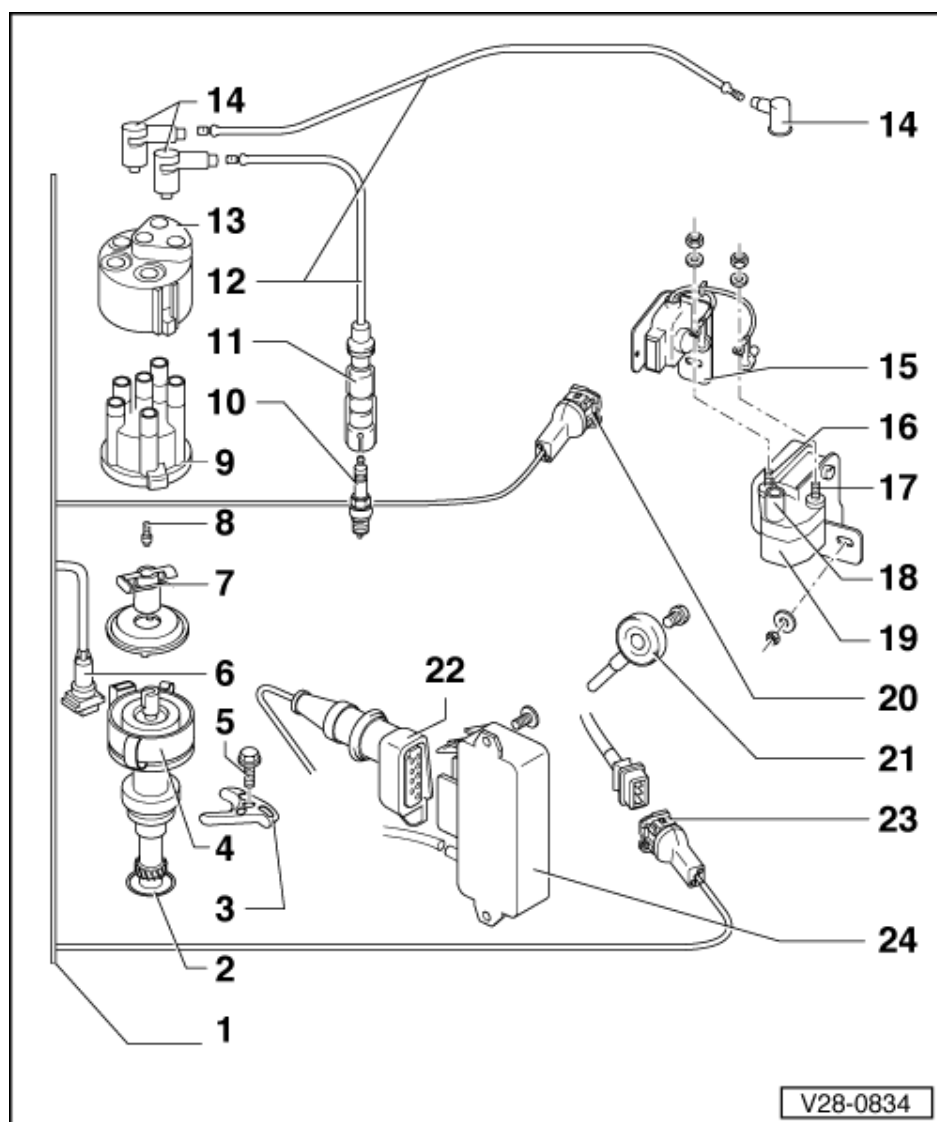
1) Engine-oil temperature at least 80 ° C

2) Current values:

=> Exhaust emission test binder



1.4 - Servicing ignition system

**1 Wiring harness**

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

2 O-ring

- ♦ Replace

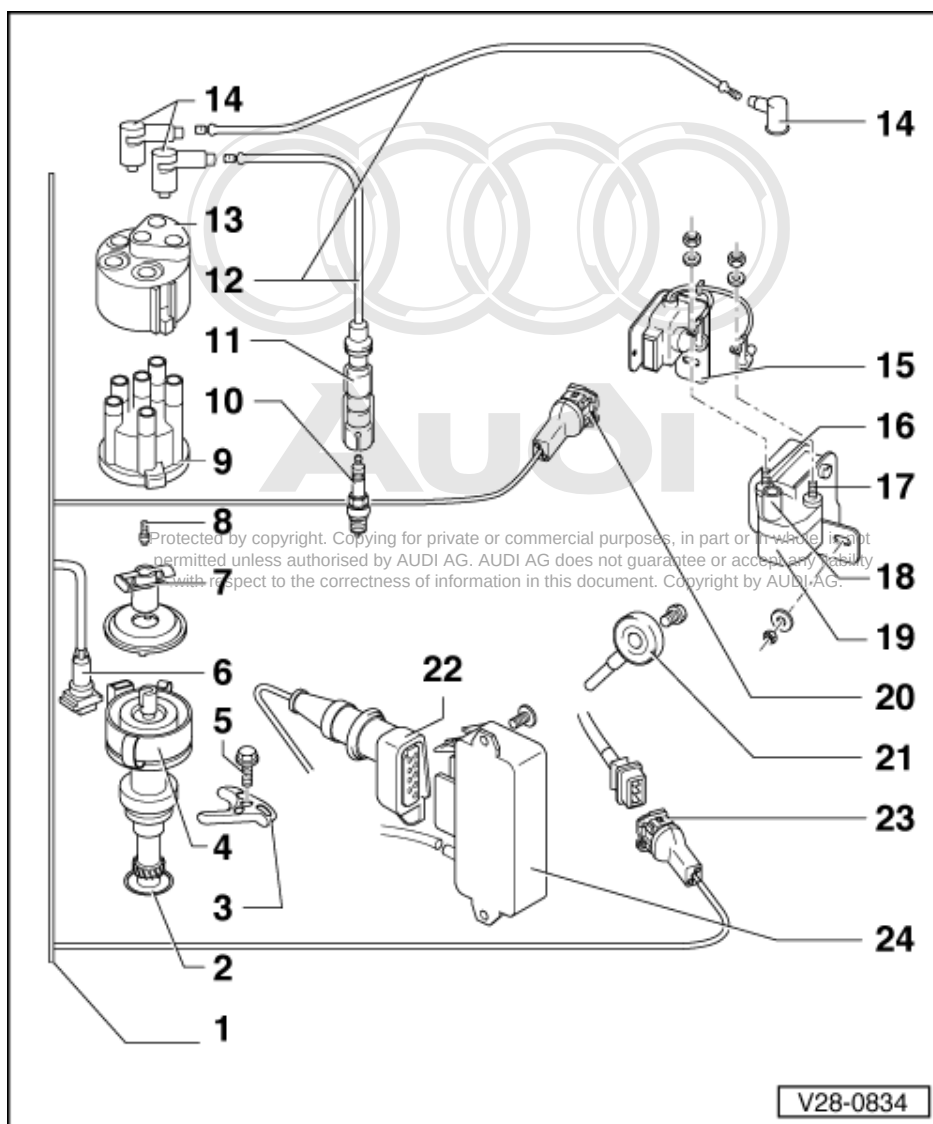
3 Clamp**4 Ignition distributor**

- ♦ Basic setting=> Page 134
- ♦ Checking and adjusting ignition point => Page 80
- ♦ Checking Hall sender => Page 151

5 25 Nm**6 3-pin connector**

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

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7 Ignition distributor rotor

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

8 Carbon brush with spring

- ◆ Check for wear, damage and freedom of movement

9 Distributor cap

- ◆ Watch out for cracks and traces of leakage current
- ◆ Check contact wear
- ◆ Clean before fitting

10 Spark plug, 30 Nm

- ◆ Type and spark gap

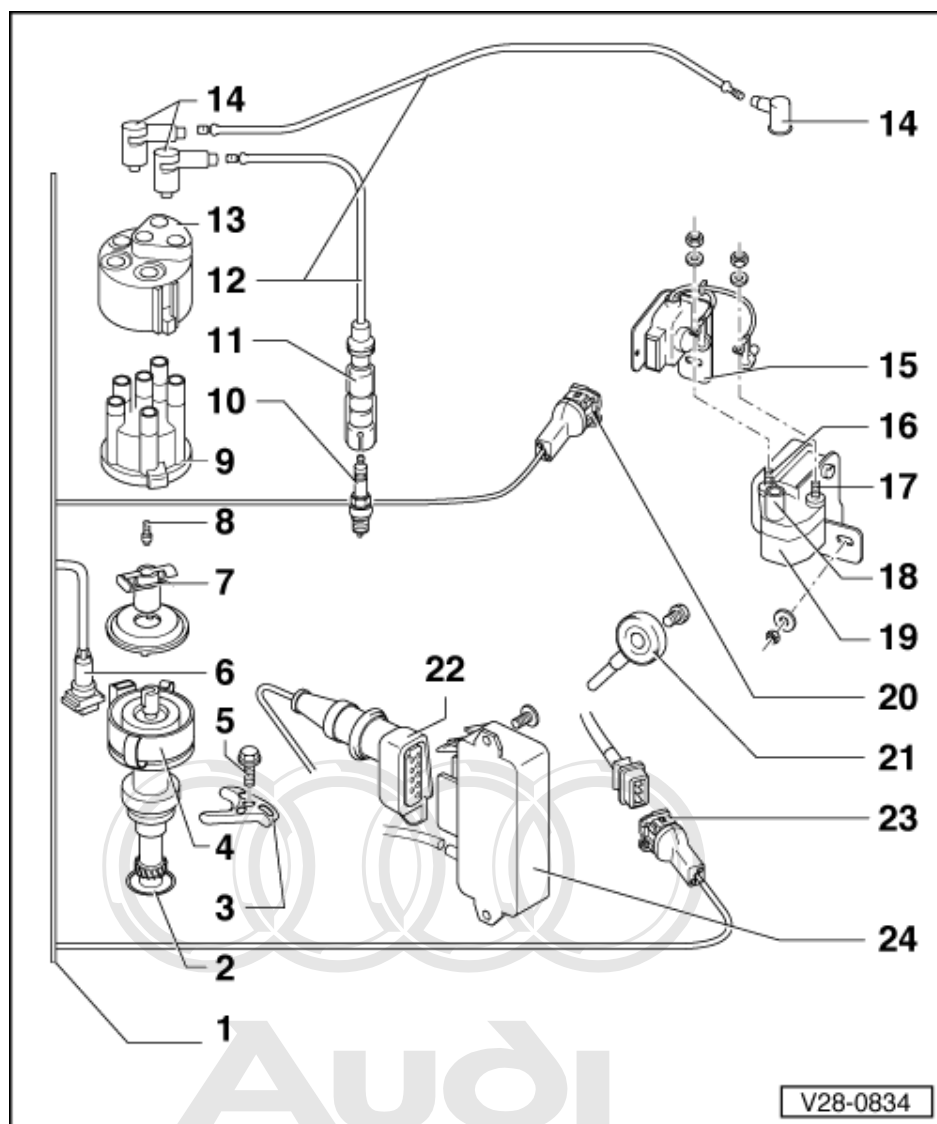
=> Exhaust emission test binder

11 Spark plug connector

- ◆ 4...6 kW

12 Ignition cable

- ◆ Check for continuity

**13 Screen**

- ♦ For radio interference suppression

14 Interference suppression connector

- ♦ 0.6...1.4 kW

15 Output stage for ignition transformer

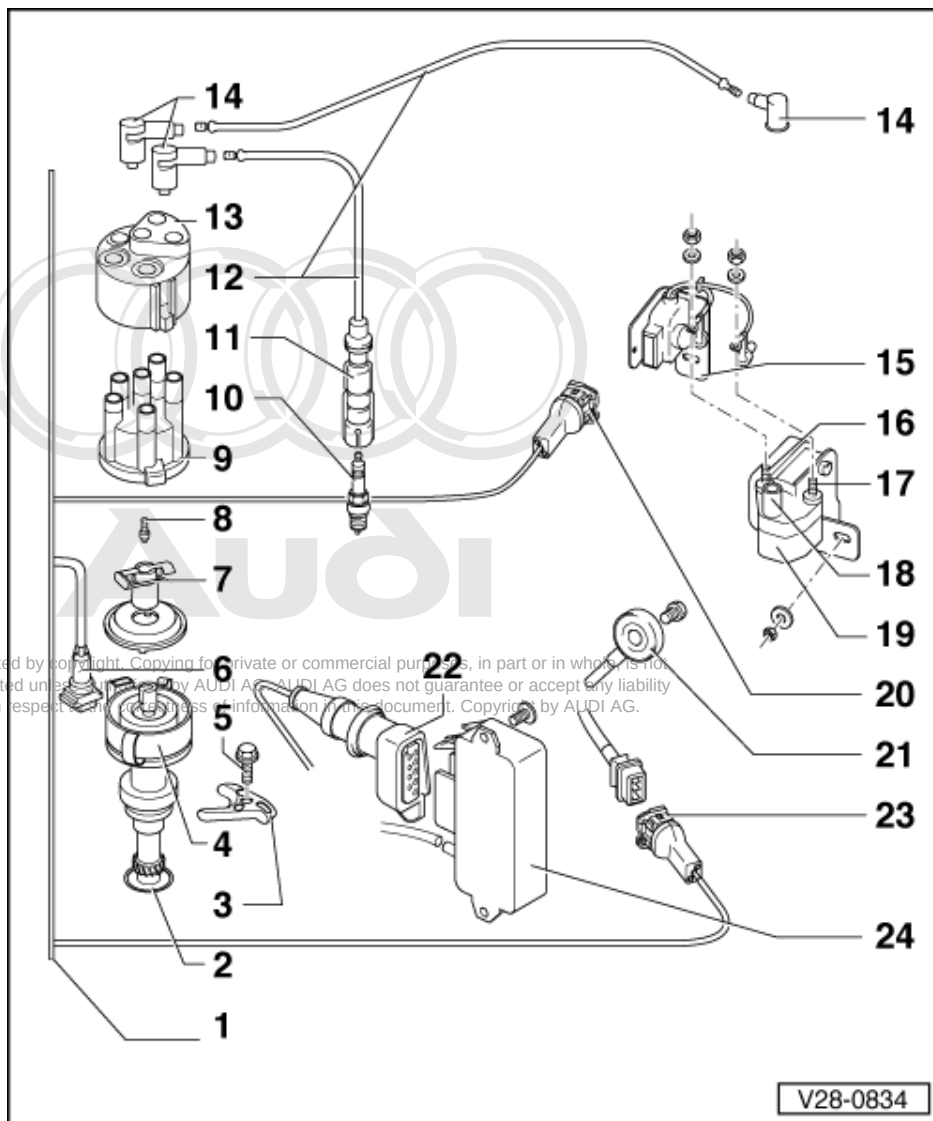
- ♦ Checking => Page 138
- ♦ Cannot be replaced separately

16 Terminal 1 (-)**17 Terminal 15 (+)****18 Terminal 4****19 Ignition transformer -N152**

- ♦ Checking => Page 136

20 3-pin connector

- ♦ For ignition transformer output stage
- ♦ Press wire clip to unplug



21 Knock sensor 1 -G61

- ♦ Fitting location =>Fig. 134
- ♦ Tightening torque 20 Nm (must be observed)

22 Connector

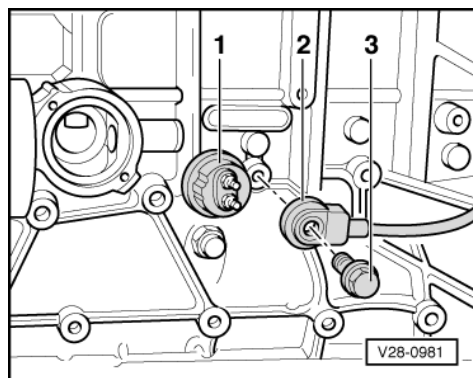
- ♦ For FEI control unit
- ♦ Wait 30 seconds after switching off ignition before unplugging or attaching connector

23 3-pin connector

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

24 FEI control unit -J154

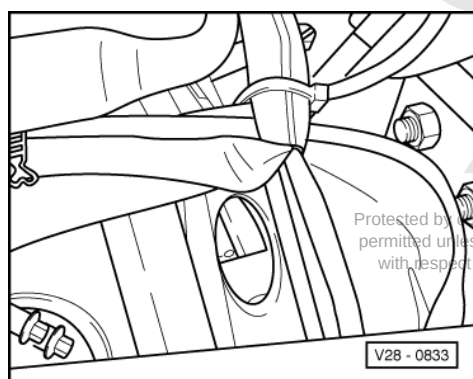
- ♦ In front passenger's footwell beneath support bracket
- ♦ Removing and installing=>Page 145
- ♦ After replacement, check and if necessary adjust ignition point=>Page 80



-> Fig.1 Fitting location of knock sensor

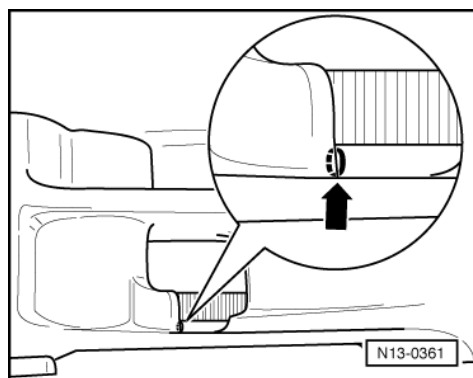
- 1 - Oil pressure switch/oil pressure sender
- 2 - Knock sensor 1
- 3 - Hexagon bolt, 20 Nm

1.5 - Basic setting of ignition distributor

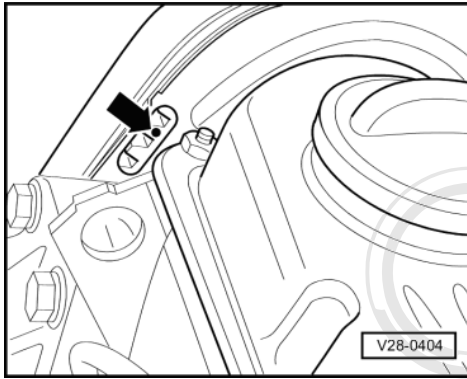


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- Set crankshaft at central bolt of crankshaft toothed belt sprocket in direction of engine rotation to no. 1 cyl. 1TDC mark ...
 - -> Vehicles with manual gearbox

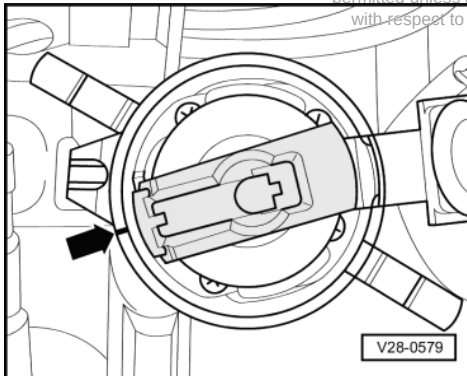


- -> Vehicles with automatic gearbox



- -> ... at the same time, mark -arrow- on rear of camshaft sprocket must coincide with top edge of gasket. If necessary, give crankshaft 1 further turn.
- Detach ignition distributor cap; leave wires connected.
- Detach dust cap.
- Unfasten ignition distributor clamp.

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- -> Position distributor rotor such that it faces mark -arrow- for no. 1 cylinder at distributor housing.
- Tighten bolt of clamp for ignition distributor to 25 Nm.
- Check ignition point => Page 80 .



1.6 - Checking ignition transformer -N152

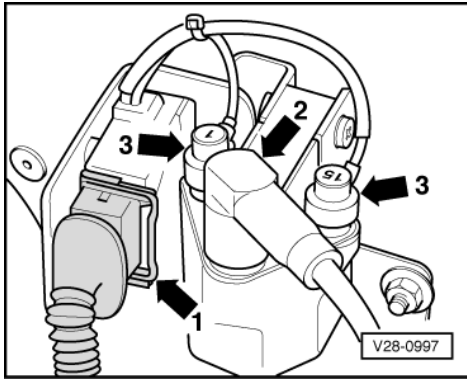
V.A.G 1526 A 	V.A.G 1594 A 
V.A.G 1598 A  Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorized by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright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

Notes:

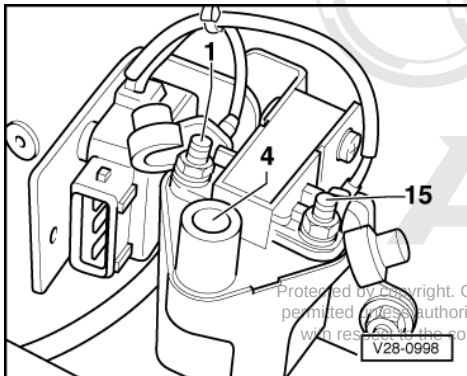
- ♦ Check for corrosion/damage in wiring between output stage and ignition transformer.



- ♦ Checking output stage for ignition transformer => Page 138 .

Test sequence

- -> Unplug connector -arrow 1- from output stage and main ignition cable -arrow 2- from ignition transformer.



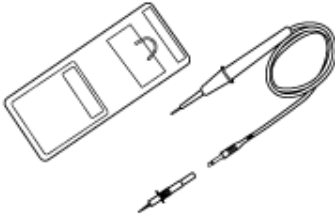
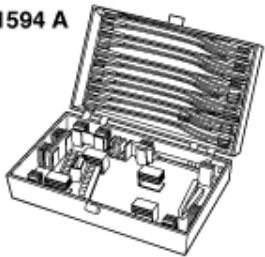
- -> Check primary resistance with portable multimeter V.A.G 1526 A between terminals 1 and 15.
 - Specification: 0.5 ... 1.5 Ω
- Check secondary resistance with portable multimeter between terminals 4 and 15.
 - Specification: 5 ... 9 $k\Omega$

If a reading does not match specification:

- Replace ignition transformer.



1.7 - Checking output stage for ignition transformer

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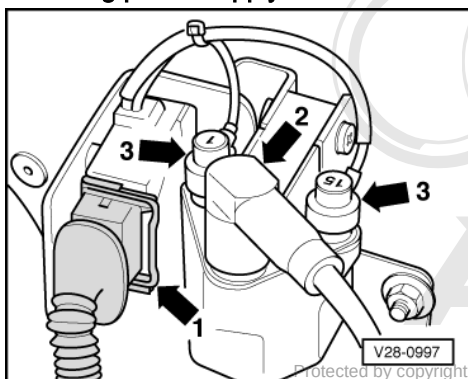
Special tools and workshop equipment required

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

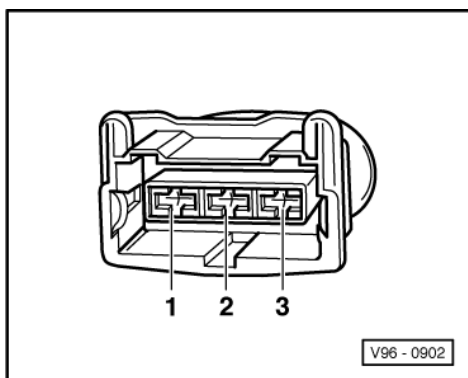
Test requirement:

- Ignition transformer OK; checking => Page **136**

Checking power supply



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



- -> Connect up multimeter for voltage measurement between contacts 1 and 3.
- Switch on ignition.
 - Specification: approx. battery voltage

If reading does not match specification:

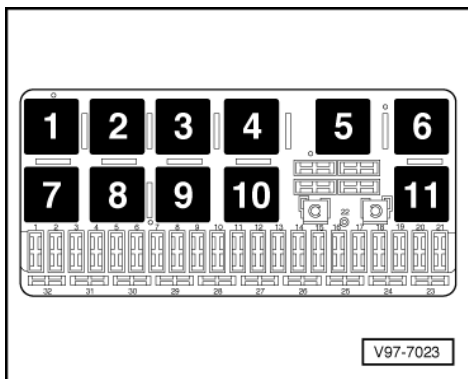
- Connect up multimeter for voltage measurement as follows.

Connector Contact	Measure to
1	Engine earth
3	Battery positive

- Switch on ignition.
 - Specification: approx. battery voltage in each case

If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

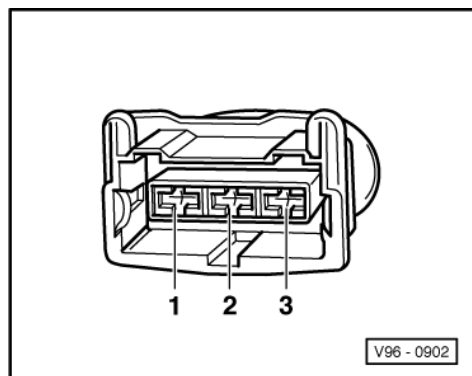




Checking actuation

Test requirement:

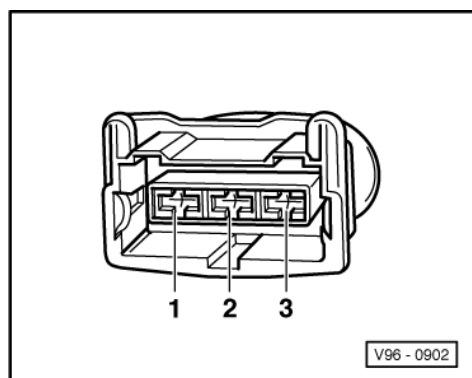
- Hall sender OK; checking => Page 151
- -> Pull out fuse S13.



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

If LED does not flash:

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

- Additionally check wires for mutual short circuit.
- If necessary, eliminate open circuit in wiring/short circuit.

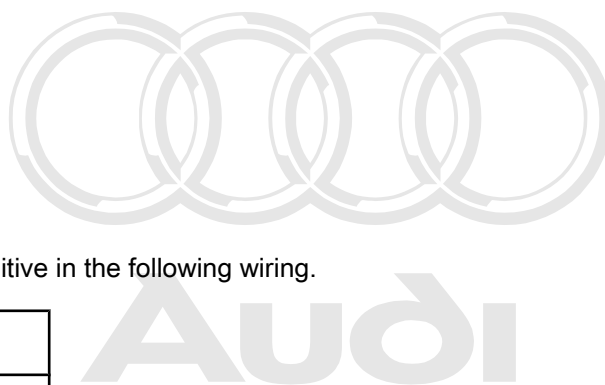
=> "Current Flow Diagrams, Electrical Fault-finding and Fitting Locations" binder

If wiring is OK:

- Replace FEI control unit => Page 31 .

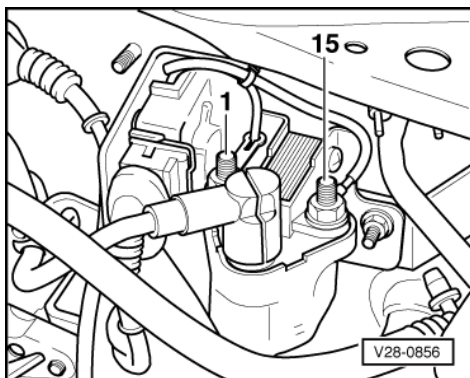
If power supply and actuation are OK:

- Switch off ignition.



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- Re-attach connector and ignition cable at ignition transformer.



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

Attention:

When performing following test, avoid contact with connecting elements of ignition transformer and test leads.

- Operate starter.
 - LEDs must flash

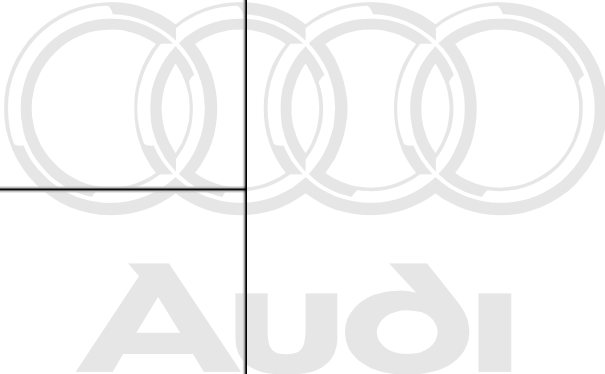
If LEDs do not flash:

- Replace output stage with ignition transformer.

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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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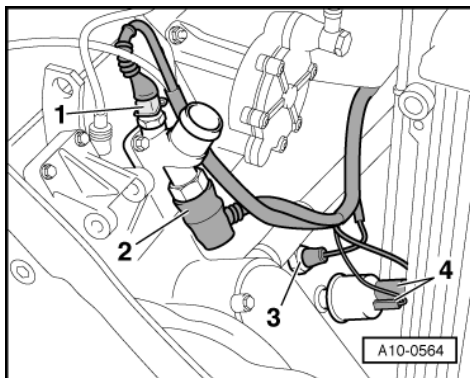
Special tools and workshop equipment required

- ♦ 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 => Exploded view of fitting locations - Page **18**

Note:

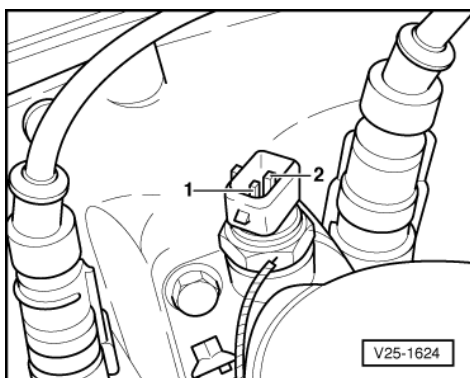
- ♦ The following check is only to be performed if the corresponding fault is displayed on fault memory interrogation.



- ♦ The coolant temperature sender transmits the coolant temperature by way of two separate sensors to the KE III Jetronic and FEI control units.

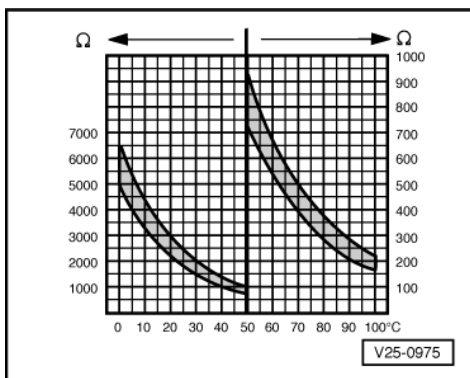
Checking internal resistance

- -> Unplug connector at coolant temperature sender -G62 -1-.



- -> Connect up multimeter for resistance measurement as follows.

Sender Contact	Measure to
1	Engine earth
2	Engine earth



-> Specifications:

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

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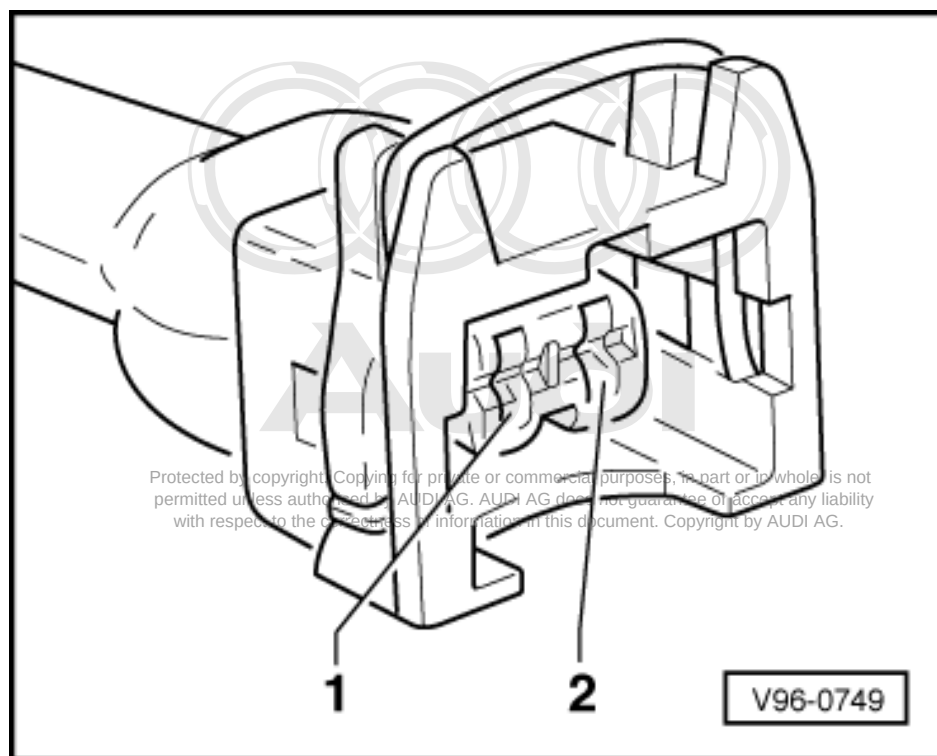
Coolant temperature	Resistance
approx. 80 °C	approx. 330 Ω

If readings do not match specifications:

- Replace coolant temperature sender.

Checking wiring to KE III Jetronic control unit

- With 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 only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

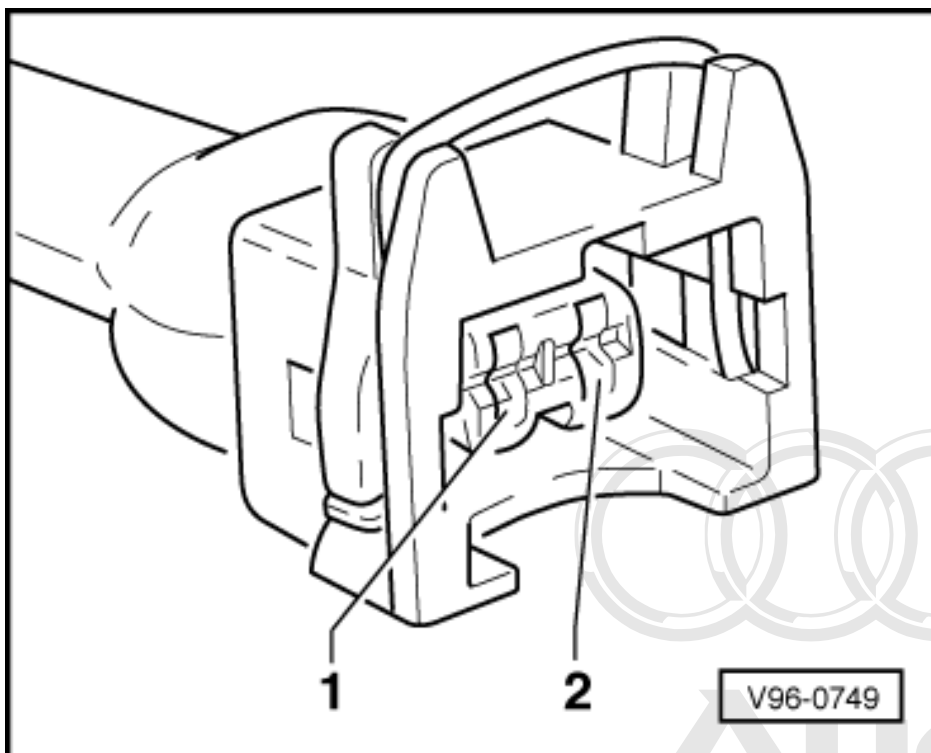
- If necessary, eliminate open circuit in wiring/short circuit.

If no fault is found:

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

Checking wiring to FEI control unit

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

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- If necessary, eliminate open circuit in wiring/short circuit.

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

If no fault is found:

- Replace FEI control unit => Page 145 .

1.9 - Replacing FEI control unit

Fitting location => Exploded view of fitting locations - Page 18

Removing

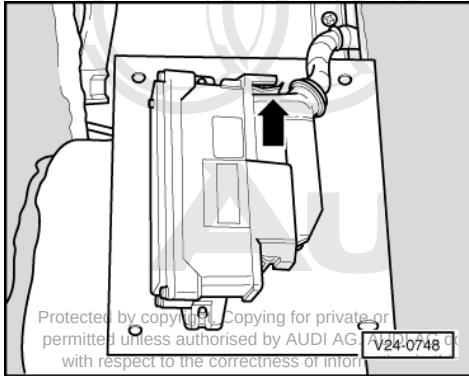




- Switch off ignition.
- Remove lower right A-pillar trim.

=> General Body Repairs, Interior; Repair Group 70; Trim; Removing and installing lower right A-pillar trim Trim
Removing and installing lower right A-pillar trim

- -> Unscrew FEI control unit from holder -arrows-.



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

Note:

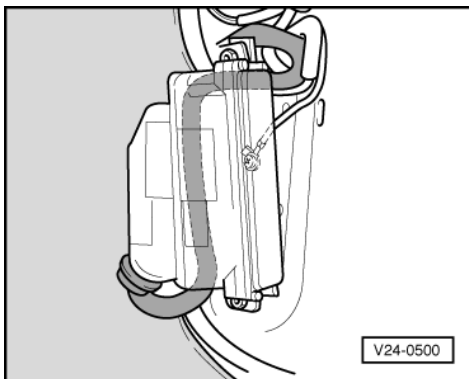
Wait 30 seconds after switching off ignition before unplugging or attaching connector of FEI control unit.

Installing

Install in reverse order, paying attention to the following:

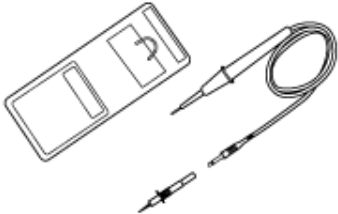
Note:

Wait 30 seconds after switching off ignition before unplugging or attaching connector of FEI control unit.



- -> Make sure wiring harness is not kinked.
- Following replacement of FEI control unit, check and if necessary adjust ignition point => Page 80 .

1.10 - Checking power supply for FEI control unit

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

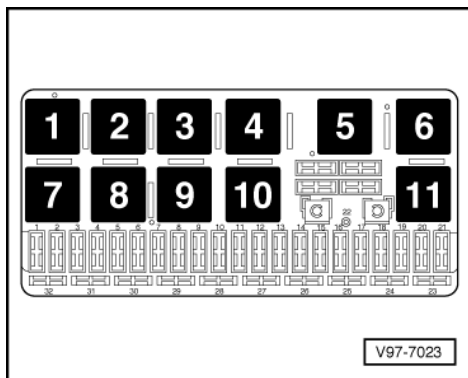
Special tools and workshop equipment required

- ◆ 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 requirement:



- -> Fuse S27 OK (in fuse box)

Checking power supply

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 29.
- Connect up multimeter for voltage measurement as follows.

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

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

If reading does not match specification:

- Use current flow diagram to eliminate open circuit in wiring.

Checking earth supply

- Connect up multimeter for voltage measurement as follows.

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

- Specification: approx. battery voltage in each case

If readings do not match specifications:

- Use current flow diagram to check wiring between connector of FEI control unit and earth points.
- Eliminate open circuit in wiring if necessary.

1.11 - Checking knock sensor

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

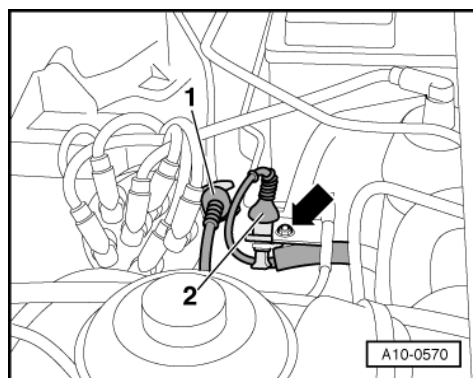
Fitting location => Exploded view of fitting locations - Page **18**

Notes:

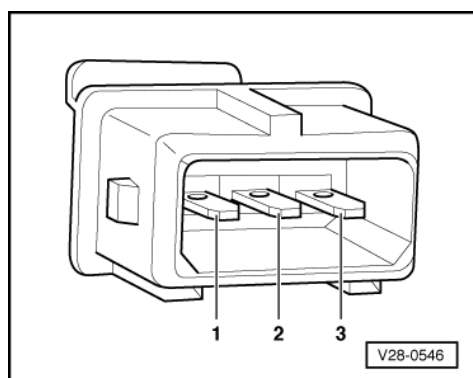
- ◆ Electrical checking of actual knock sensor is not possible => Interrogating fault memory, Page **4** onwards.
- ◆ Knock sensor will only operate properly if it has been tightened to exactly 20 Nm.
- ◆ Check connectors for traces of corrosion.
- ◆ Exclusive use is to be made of gold-plated contacts when repairing contacts in knock sensor connector.

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Checking knock sensor wiring



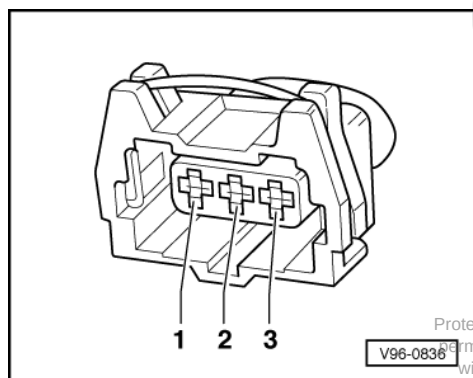
- -> Unplug connector -2- of knock sensor in engine compartment.



- -> Connect up multimeter for resistance measurement between connector contacts.
- Specification: $\infty \Omega$
 (No mutual connection between wires)
- Replace knock sensor if there is a connection between wires.

Checking wiring between knock sensor and FEI control unit

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 29.



- -> Check for open circuit and short to earth/positive in the following wiring.

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

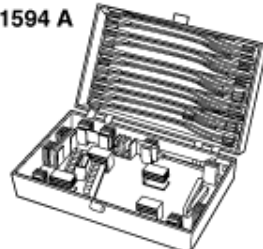
Connector Contact	Test box V.A.G 1598 A Socket
3 (screen)	12

- If necessary, eliminate open circuit in wiring/short circuit.

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

1.12 - Checking Hall sender -G40

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

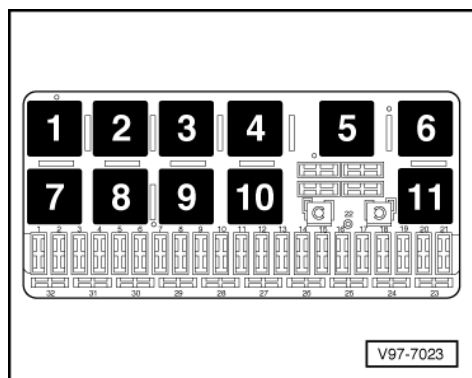
Special tools and workshop equipment required

- ◆ 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

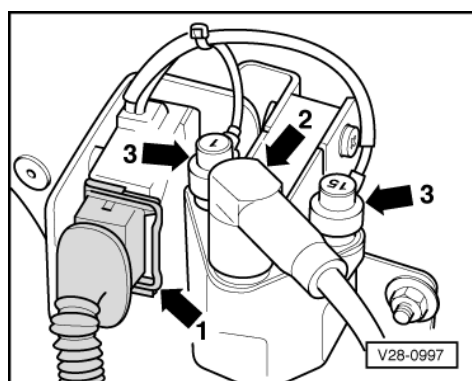
Fitting location => Exploded view of fitting locations - Page **18**



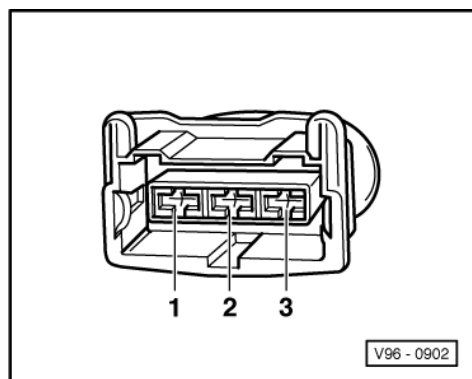
Test sequence



- -> Pull out auxiliary fuse S25.



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



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

Connector Contact	Measure to
2 (signal)	Engine earth

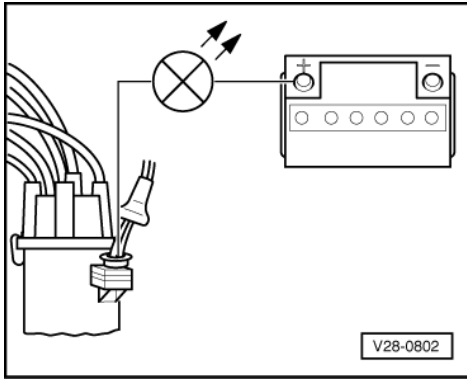
- Briefly operate starter.
 - LED must flash

If LED does not flash:

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



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- -> Connect up 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.

- Briefly operate starter.
 - LED must flash

Note:

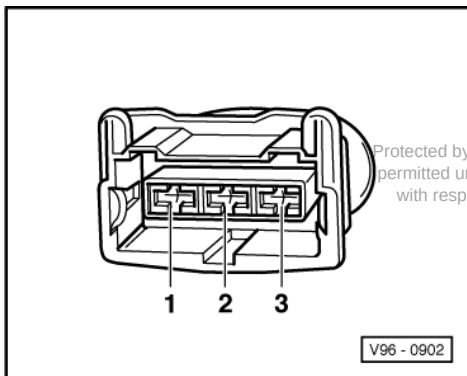
Voltage testers with a low current input do not go out completely between actuation of engine control unit, but rather continue to glow slightly and become distinctly brighter on actuation.

If LED does not flash:

- Check power supply for Hall sender => Page 154 .

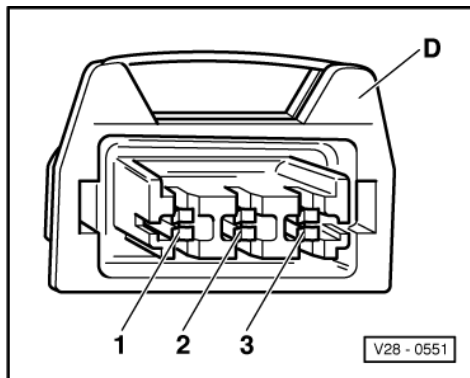
If LED now flashes:

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page 29 .



- -> Check for open circuit and short to earth/positive in the following wiring.

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



- -> Check for open circuit and short to earth/positive in the following wiring.

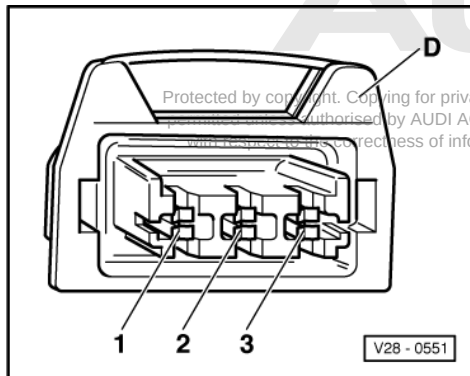
Connector of Hall sender Contact	Test box V.A.G 1598 A Socket
2	24

If no fault is found in wiring:

- Replace FEI control unit => Page **145** .

Checking power supply

- Unplug connector of Hall sender at ignition distributor.



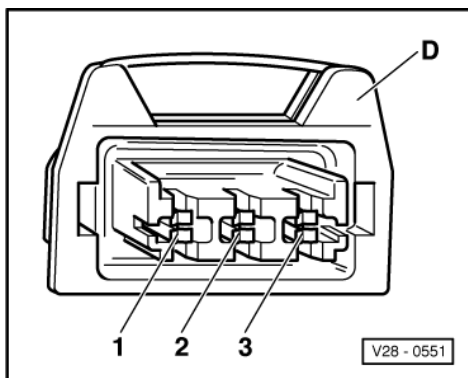
- -> Connect up multimeter for voltage measurement to contacts 3 (positive) and 1 (earth).
- Switch on ignition.
 - Specification: min. 9 V

If reading matches specification, but LED does not flash:

- Replace Hall sender.

If reading does not match specification:

- With ignition switched off, use adapter V.A.G 1598/2 to connect test box V.A.G 1598 A to connector of FEI control unit only (not to control unit) => Page **29** .



- -> Check for open circuit and short to earth/positive in the following wiring.

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

If no fault is found in wiring:

- Replace FEI control unit => Page **145** .

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