

A/C system, electrical testing

Notes:

- ◆ Vehicles 1997 ➤ ⇒ [page 01-135](#) .
- ◆ VAG1598 test box must not be connected to - E87- when performing On Board Diagnostic with VAG1551 Scan Tool (ST)

Test equipment required

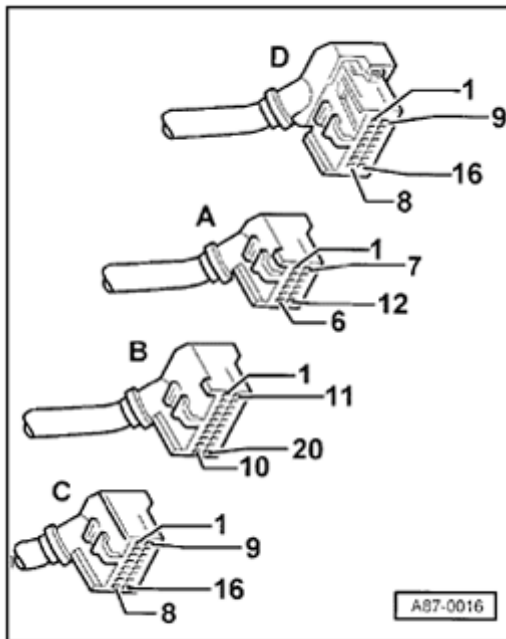
- ◆ VAG1598 test box with adapter cables VAG1598/11, VAG1598/12 and VAG1594 adapter set
- ◆ Fluke 83 multimeter (US 1119) or equivalent
- ◆ US 1115 LED tester
- ◆ Thermometer

Requirements

- Battery Positive Voltage (B+) OK
- Ground (GND) connections on engine and transmission OK
- Fuse No. 42 (S42), 51 (S51), 225 (S225) and 15 (S15) OK

CAUTION!

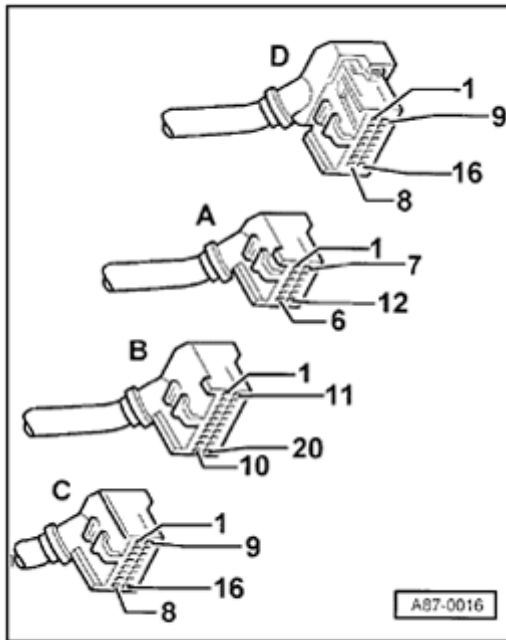
Switch multimeter to the appropriate measuring range before



connecting the test leads to avoid damaging electronic components.

VAG1598 test box, connecting

- Switch off ignition.
- Remove A/C control head -E87- and disconnect all connectors, -A-, -B-, -C- and -D- ⇒ [page 87-120](#) .



A

- Connect VAG1598/11 and 12 adapter cables to corresponding connectors of the vehicle wiring harness (to -E87-).
- Connect VAG1598 test box to the respective adapter cable for performing measurements.

Notes:

- ◆ Do not connect -E87-.
- ◆ When using VAG1598/12 adapter cable, the terminal assignment of the sockets is identical with the terminal assignment of -E87-.
- ◆ When using VAG1598/11 adapter cable, the terminal assignment of the sockets is not identical to the terminal assignment of -E87- ⇒ [terminal assignment, page 01-117](#) .

Connector terminal assignment of VAG1598 test box with VAG1598/11 adapter cable

Notes:

- ◆ *The terminal assignment of VAG1598/11 adapter cable connectors A and B is not identical to the terminal assignment of sockets on the VAG1598 test box.*
- ◆ *The terminal assignment of VAG1598/11 adapter cable terminal C is identical to the terminal assignment of sockets on the VAG1598 test box.*
- ◆ *The terminal assignment of VAG1598/12 adapter cable terminal D is identical to the terminal assignment of sockets on the VAG1598 test box*
- ◆ *As a result of splitting the connectors to A/C control head -E87- using two adapter cables (VAG1598/11 and 12), no ground connection exists for the test when VAG1598/11 adapter cable is connected. When performing various electrical tests, it is therefore necessary to use an external Ground source (vehicle body etc.) or a second VAG1598 test box (when adapter cable VAG1598/12 is connected, Ground exists at sockets 14 and 15).*

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Connector A -E87-	VAG1598 Socket	E87 Connector B	VAG1598 Socket	E87 Connector C	VAG1598 Socket
1	41	1	21	1	1
2	42	2	22	2	2
3	43	3	23	3	3
4	44	4	24	4	4
5	45	5	25	5	5
6	46	6	26	6	6
7	47	7	27	7	7
8	48	8	28	8	8
9	49	9	29	9	9
10	50	10	30	10	10
11	51	11	31	11	11
12	52	12	32	12	12
		13	33	13	13
		14	34	14	14
		15	35	15	15
		16	36	16	16
		17	37		
		18	38		
		19	39		



Electrical testing, 1996

Note:

Electrical testing, 1997 ➤ ⇒ [page 01-135](#) .

Test number	Component(s) tested:	Page
1	- A/C control head -E87- voltage supply, ground connection and illumination.	⇒ Page 01-120
2	- Temperature sensors G17, G56 and G89	⇒ Page 01-122
3	- Fresh Air Blower V2 and Control module for fresh air blower J126	⇒ Page 01-124
4	- Air/temperature distribution flap motors and related potentiometers V68/-G92-, -V70-/G112, V71/G113 and V85/G114)	⇒ Page 01-126
5	- A/C compressor speed sender G111 - Refrigerant pressure switches -F118- and -F73- - Interior Temperature Sensor Fan V42 - "A/C compressor intervention" output - "Excessive engine temperature" signal	⇒ Page 01-128
6	- A/C Clutch Relay J44 - Actuation for coolant fan stage 1	⇒ Page 01-133

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Test No. 1 (A/C control head -E87- voltage supply, ground connection and illumination)

VAG1598/12 adapter cable Measuring range: Voltage measurement (20 V)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
1.1	9 + 14	Terminal 75x and ground connection at -E87-	<ul style="list-style-type: none"> Ignition on 	- approx. battery voltage	- Repair voltage supply or ground connection using wiring diagram.
1.2	9 + 15	Ground connection at -E87-	<ul style="list-style-type: none"> Ignition on 	- approx. battery voltage	- Repair ground connection using wiring diagram.

VAG1598/11 adapter cable Measuring range: Resistance measurement (200 ohm)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
1.3	49 + 52	Ground connection at -E87-		- less than 20 W	- Repair ground connection using wiring diagram.

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VAG1598/12 adapter cable Measuring range: Voltage measurement (20 V)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
1.4	13 and ground	Terminal 30 at E87	<ul style="list-style-type: none"> Ignition off 	- approx. battery voltage	- Repair voltage supply using wiring diagram.
1.5	7 and ground	Terminal 58 at E87	<ul style="list-style-type: none"> Ignition on Parking lights on 	- approx. battery voltage	- Repair voltage supply using wiring diagram.
1.6	7 and ground	Terminal 58 at E87	<ul style="list-style-type: none"> Ignition on Parking lights on 	- less than 2 V	- Rectify short circuit to positive using wiring diagram.
1.7	45 and ground	Terminal 58D at E87	<ul style="list-style-type: none"> Ignition on Parking lights on 	- 0 to 12 V (depends on setting of illumination rheostat)	- Determine and rectify open circuit or short circuit using wiring diagram.
1.8	45 and ground	Terminal 58D at E87	<ul style="list-style-type: none"> Ignition on Parking lights off 	- less than 2 V	- Rectify short circuit to positive using wiring diagram.

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Test No. 2 (temperature sensors G17, G56 and G89)

VAG1598/11 adapter cable Measuring range: Resistance measurement (20 kohm)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
2.1	48 + 52	Outside Air Temperature Sensor G17	<ul style="list-style-type: none"> Measure temperature at mounting location of sensor 	- => resistance table, page 01-123 (Resistance values depend on measured temperatures at mounting location of sensor(s))	<ul style="list-style-type: none"> - Determine and rectify short circuit, open circuit in wiring or contact resistance using wiring diagram. - Replace applicable temperature sensor => page 87-106
2.2	50 + 52	Instrument Panel Interior Temperature Sensor G56	<ul style="list-style-type: none"> Measure temperature at mounting location of sensor 		
2.3	47 + 52	Fresh Air Intake Duct Temperature Sensor G89	<ul style="list-style-type: none"> Measure temperature at mounting location of sensor 		

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Temperature sensor resistances (based on ambient temperature, resistance in k ohm)

Temperature measured at mounting location of sensor	Instrument Panel Interior Temperature Sensor -G56-	Outside Air Temperature Sensor -G17- and Fresh Air Intake Duct Temperature Sensor -G89-
-40 ° C (-40 ° F)	(100)	(34.7)
-30 ° C (-22 ° F)	(52.7)	18.1
-20 ° C (1 ° F)	(28.6)	9.95
-10 ° C (14 ° F)	16.2	5.59
0 ° C (32 ° F)	9.40	3.28
5 ° C (41 ° F)	7.27	2.54
10 ° C (50 ° F)	5.66	1.99
15 ° C (59 ° F)	4.45	1.57
20 ° C (68 ° F)	3.50	1.25
25 ° C (77 ° F)	2.79	1.00
30 ° C (86 ° F)	2.23	0.80
35 ° C (95 ° F)	1.80	0.65
40 ° C (104 ° F)	1.45	0.53
50 ° C (122 ° F)	0.79	0.36
60 ° C (140 ° F)	0.67	0.25

70 ° C (158 ° F)	0.47	-
80 ° C (176 ° F)	0.33	-

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Test No. 3 (Fresh Air Blower V2 and Control module for fresh air blower J126)

VAG1598/11 adapter cable Measuring range: Voltage measurement (20 V)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
3.1	16 and ground	Control module for fresh air blower J126	<ul style="list-style-type: none"> Ignition on 	<ul style="list-style-type: none"> - Voltage less than 5 V - Blower does not run. 	<ul style="list-style-type: none"> - Determine and rectify short circuit to positive in wiring/connections between J126 and -E87- using wiring diagram. - Replace J126
3.2	14 and ground	Voltage supply for Fresh Air Blower V2	<ul style="list-style-type: none"> Ignition on 	<ul style="list-style-type: none"> - approx. battery voltage 	<ul style="list-style-type: none"> - Repair voltage supply using wiring diagram.
3.3	11 and ground	Voltage supply for J126 (via V2)	<ul style="list-style-type: none"> Ignition on 	<ul style="list-style-type: none"> - approx. battery voltage 	

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VAG1598/11 adapter cable LED voltage tester US 1115					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
3.4	13 + 16	Control module for fresh air blower - J126-	<ul style="list-style-type: none"> Ignition on 	<ul style="list-style-type: none"> LED in voltage tester comes on Fresh air blower runs 	<ul style="list-style-type: none"> Determine and rectify open circuit in wiring/connections between -J126- and -E87-. Check Fresh Air Blower V2 operates freely. Replace -J126-.

Test No. 4 (air/temperature distribution flap motors and related potentiometers)

VAG1598/11 adapter cable Measuring range: Resistance measurement (20 kilo ohm)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
4.1	52 + 28 29 37 30	Potentiometer (in flap motor) -G92- (-V68-) -G112- (-V70-) -G113- (-V71-) -G114- (-V85-)		- greater than 0.1kW and less than 5.7kW (depends on position of flap motor)	- Determine and rectify open circuit in wiring, contact resistance or short circuit using wiring diagram. - Replace applicable flap motor ⇒ page 87-106 .
4.2	8 + 28 29 37 30	Potentiometer (in flap motor) -G92- (-V68-) -G112- (-V70-) -G113- (-V71-) -G114- (-V85-)		- greater than 0.1kW and less than 5.7kW (depends on position of flap motor)	

Notes:

- ◆ Potentiometer resistance (Specified values: 3.6 k to 5.7 k between flap motor terminal 3 and 4) can only be measured

directly at the flap motor (parallel circuit).

- ◆ *Potentiometers resistance (between flap motor terminal 3 and 5, plus 4 and 5) depends on the position of the flap motor. Measure only with installed flap motor. The upper specified value is not achieved in test steps 4.1 and 4.2 (to achieve this value, all connectors of the other flap motors would have to be unplugged during the measurement, parallel circuit).*
- ◆ *If -E87- recognizes DTC" potentiometer short circuit to ground or open circuit/short circuit to positive", test all potentiometers.*

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VAG1598/12 adapter cable Measuring range: Resistance measurement (200 ohm)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
4.3	2 + 10	Temperature Regulator Flap Motor -V68-		20 W to 100 W	- Determine and rectify open circuit in wiring, contact resistance or short circuit using wiring diagram. - Replace applicable flap motor ⇒ page 87-106 .
4.4	4 + 12	Central Flap Motor -V70-		20 W to 100 W	
4.5	5 + 13	Air Flow Flap Motor -V71-		20 W to 100 W	
4.6	3 + 11	Footwell/Defroster Flap Motor -V85-		20 W to 100 W	

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Test No. 5 (A/C Compressor Speed Sensor -G111-, refrigerant pressure switches -F118-, -F73- and Interior Temperature Sensor Fan -V42-)

Note:

Electrical test steps 5.1 to 5.4 do not apply to vehicles equipped with Nippondenso compressors (A/C compressor speed sensor G111 is not installed on Nippondenso compressors).

VAG1598/11 adapter cable Measuring range: Resistance measurement (20 kilo ohm)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
5.1	5 + 49	A/C Compressor Speed Sender -G111-		- 0.8 kW to 1.5 kW	- Determine and rectify open circuit in wiring, contact resistance or short circuit using wiring diagram. - Replace -G111- ⇒ page 87-63 .
5.2	5 and ground	A/C Compressor Speed Sender -G111-		- greater than 2 kW	- Determine and rectify short circuit using wiring diagram. - Replace -G111- ⇒ page 87-63 .

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VAG1598/11 adapter cable Measuring range: Voltage measurement (20 V)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
5.3	5 and ground	A/C Compressor Speed Sender -G111-	<ul style="list-style-type: none"> • Engine running • Compressor not running 	- less than 1 V	- Determine and rectify short circuit using wiring diagram.

VAG1598/11 adapter cable Measuring range: Voltage measurement (2 V)					
Note: ⇒ additional test steps before proceeding with this test.					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
5.4	5 and ground	A/C Compressor Speed Sender - G111-	<ul style="list-style-type: none"> • Engine running • Compressor running <p>- Relay for A/C Clutch removed</p> <p>- Bridge terminals 30 + 87 at relay connector base (A/C Clutch switched on)</p>	- greater than 0.05 V (depends on engine speed)	- Replace -G111- ⇒ page 87-63 .

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VAG1598/11 adapter cable Measuring range: Resistance measurement (200 ohm)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
5.5	2 + 49	A/C Refrigerant High Pressure Switch -F118-		- less than 20 W	- Determine and rectify open circuit in wiring or contact resistance using wiring diagram.1) - Replace -F118- ⇒ page 87-25 .

1)If code 1 "high-pressure switch -F118 open" is displayed in measuring value block 1 as a compressor cut-off condition: -Test connections to -F118- for loose terminal using wiring diagram. -Test actuation of Coolant Fan V7 stage 1 ⇒ [Output Diagnostic Test Mode, page 01-42](#) . Test actuation of Coolant Fan V7 stage 2 ⇒ [page 01-42](#) . If no fault can be determined, check for refrigerant system malfunction, refrigerant system pressure test ⇒ [page 87-190](#) .

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VAG1598/11 adapter cable Measuring range: Voltage measurement (20 V)					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
5.6	3 + ground	A/C Refrigerant Low Pressure Switch -F73-	<ul style="list-style-type: none"> Ignition on 	- approx. battery voltage	<ul style="list-style-type: none"> - Determine and rectify open circuit in voltage supply using wiring diagram. - -F73- malfunction ⇒ page 87-66 - Refrigerant circuit empty, refrigerant system pressure test ⇒ page 87-190

VAG1598/11 adapter cable Measuring range: Amperage (20 amps (A))					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
5.7	44 + ground	Interior Temperature Sensor Fan -V42-	<ul style="list-style-type: none"> Ignition on 	<ul style="list-style-type: none"> - less than 1 A - Blower V42 runs 	- Determine and rectify open circuit, short circuit to positive/ground in the wiring/connections between V42 and -E87- using wiring diagram.

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VAG1598/11 adapter cable LED voltage tester US 1115					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
5.8	13 + 12	"AC compressor intervention" output	<ul style="list-style-type: none"> • Engine running 	- LED in voltage tester does not come on	<ul style="list-style-type: none"> - Determine and rectify short circuit to ground using wiring diagram. - Rectify cut-off condition for A/C compressor in ECM. - Rectify cut-off condition for A/C compressor in TCM -J217-.
5.9	13 + 51	"Engine temperature too high" signal	<ul style="list-style-type: none"> • Engine running 	- LED in voltage tester does not come on	<ul style="list-style-type: none"> - Determine and rectify short circuit to ground using wiring diagram. - Rectify cut-off condition for A/C compressor in Instrument Cluster.

Test No. 6 (A/C Clutch Relay J44, actuation of Coolant Fan V7 stage 1)

VAG1598/12 adapter cable Measuring range: Amperage (20 amps (A))					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
6.1	8 + 14	A/C Clutch Relay - J44-	<ul style="list-style-type: none"> • Engine running 	<ul style="list-style-type: none"> - less than 1 A - Compressor engaged and running. 	<ul style="list-style-type: none"> - Determine and rectify open circuit or short circuit to positive in wiring/connections between A/C Clutch - N25-, -J44- and -E87- using wiring diagram. - A/C Refrigerant Low Pressure Switch -F73- open, test ⇒ page 01-131 - Replace -J44-. - Repair or replace A/C Clutch -N25- ⇒ page 87-85 .

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VAG1598/12 adapter cable Measuring range: Amperage (20 amps (A))					
Test step	VAG1598 socket	Test of	Test conditions - additional steps	Specified values	Corrective action
6.2	16 + 14	Control of Coolant Fan control (FC) relay -J26- (for stage 1 operation of Coolant Fan -V7-)	<ul style="list-style-type: none"> Engine running 	<ul style="list-style-type: none"> - less than 1 A - Fan runs in stage 1. 	<ul style="list-style-type: none"> - Determine and rectify open circuit or short circuit to positive in wiring/connections between -J26- and -E87- using wiring diagram. - Check -V7- ⇒ Repair Group 19

Note:

Testing operation of coolant fan via refrigerant high pressure switch F23 ⇒ [page 87-64](#) .

Electrical testing, 1997 ➤

Note:

Electrical testing, 1996 ⇒ [page 01-119](#).

Notes:

- ◆ VAG1598 test box must not be connected to A/C control head -E87- when performing On Board Diagnostic with VAG1551 Scan Tool (ST)
- ◆ Further notes, test requirements, connecting adapter cables and test equipment ⇒ [page 01-115](#).
- ◆ From m.y. 1997, do not connect VAG1598 test box to -E87- for test steps 1.1 through 5.7. (Test box only to be connected for test steps 5.8, 5.9 and 5.10).

Test number	Component(s) tested:	Page
1	- A/C control head -E87-, voltage supply and ground connection - Signal for time span ignition off	⇒ Page 01-136
2	- Temperature sensors -G17-, G56, -G89- -G191- and -G192-	⇒ Page 01-138
3	- Fresh air blower -V2-, Control module for fresh air blower -J126-	⇒ Page 01-140
4	- Air/temperature distribution flap motors and related potentiometers (-V68-/-G92-, -V70-/-G112-, -V71-/-G113-, -V85-/-G114-)	⇒ Page 01-141

5	- A/C pressure switch -F129- - "A/C compressor intervention" output - "Excessive engine temperature" signal - Interior temperature sensor fan -V42-	⇒ Page 01-142
6	- A/C clutch relay -J44-, A/C clutch -N25-, actuation - Coolant fan -V7-, actuation	⇒ Page 01-146

Test No. 1 (A/C control head -E87- voltage supply, ground connection)

Adapter cable VAG1598/12					
Measuring range: Voltage measurement (20 V)					
Test Step	VAG1598 socket	Test of	Test conditions - additional steps	Specified value	Corrective action
1.1	9 + 14	Terminal 15 and ground connection at -E87-	• Ignition on	- approx. battery voltage.	- Repair voltage supply or ground connection using wiring diagram.
1.2	9 + 15	terminal 15 and ground connection at -E87-	• Ignition on	- approx. battery voltage.	- Repair ground connection using wiring diagram.
1.3	⇒ page 01-120				
1.4	Not for 1997. Terminal 30 no longer connected				
1.5 to 1.8	⇒ These test steps are conducted only for vehicles up to and including m.y. 1997 (A/C control head with Part. No. 8D0 820 043 and Part No. 8L0 820 043 up to Part No. index letter "C").				

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Adapter cable VAG1598/11					
LED Voltage tester VAG1527B					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
1.9	term.15 1) + 33	Signal for time span ignition off	<ul style="list-style-type: none"> • Ignition on 	- LED lights up	- Diagnose and repair short or open circuit in wiring/connections using wiring diagram.
1.10	term.15 1) + 33	Signal for time span ignition off	<ul style="list-style-type: none"> • Ignition on <p>- Start engine.</p>	<p>- LED lights up</p> <p>- LED flickers briefly (time signal) and then lights up again</p>	<p>- Diagnose and repair short or open circuit in wiring/connections using wiring diagram.</p> <p>- Check signal from instrument cluster.</p>
1) Terminal 15 (ignition) is available at -E87- connector -D-, terminal -9-.					

Test No. 2 (Temperature Sensors -G17-, -G56-, -G89-, G191-, G192-.)

Adapter cable VAG1598/11					
Measuring range: Resistance measurement (20 KΩ / 200 KΩ)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
2.1 to 2.3	⇒ page 01-122				
2.4	26 + 49	Sender for outlet temperature, center -G191-.	- Measure temperature at mounting location of sensor.	- Dependant on temperature at mounting location of sensor	- Diagnose and repair short, open circuit or contact resistance in wiring/connections using wiring diagram.
2.5	25 + 49	Sender for outlet temperature, floor outlet -G192-.	- Measure temperature at mounting location of sensor.	Confirm using temperature/resistance table ⇒ page 01-139	- Replace sensor(s)

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Temperature sensor resistances (based on ambient temperature, resistance in k ohm)

Temperature measured at mounting location of sensor	Sender for outlet temperature, center -G191-	Sender for outlet temperature, floor outlet -G192-
-30 ° C (-22 ° F)	(141)	(52,7)
-20 ° C (1 ° F)	(85)	(28,6)
-10 ° C (14 ° F)	(47)	16,2
0 ° C (32 ° F)	(29)	9,40
5 ° C (41 ° F)	(23,2)	7,27
10 ° C (50 ° F)	18,6	5.66
15 ° C (59 ° F)	15	4,45
20 ° C (68 ° F)	12,2	3,50
25 ° C (77 ° F)	10	2,79
30 ° C (86 ° F)	8,2	2,23
35 ° C (95 ° F)	6,8	1,80
40 ° C (104 ° F)	5,7	1,45
50 ° C (122 ° F)	4,0	0,97
60 ° C (140 ° F)	2,9	0,67
70 ° C (158 ° F)	2,1	0,47

Test No. 3 (Fresh Air Blower -V2- and Control Module for Fresh Air Blower -J126-)

Adapter cable VAG1598/11					
Measuring range: Voltage measurement (20 V)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
3.1 to 3.3	⇒ page 01-124				

Adapter cable VAG1598/11					
LED Voltage tester VAG1527B					
Test step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
3.4	14 + 16	Control module for fresh air blower - J126-	<ul style="list-style-type: none"> Ignition on 	<ul style="list-style-type: none"> - LED lights up - Fresh air blower running. 	<ul style="list-style-type: none"> - Diagnose and repair open circuit in wiring between -J126- and -E87- using wiring diagram. - Fresh Air Blower -V2- check for ease of movement. - Replace -J126-.

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Test No. 4 (air/temperature distribution flap motors and related potentiometers)

Adapter cable VAG1598/12					
Measuring range: Resistance measurement (20 KΩ)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
4.1 to 4.6	⇒ page 01-126				
4.7	14 + 2 3 4 5	Short to ground of wiring to flap motors -V68-, -V85-, -V70-, -V71-	<ul style="list-style-type: none"> Ignition off 	- ∞ Ohm	- Diagnose and repair short to ground in wiring/connections using wiring diagram.

Adapter cable VAG1598/12					
Measuring range: Voltage measurement (20 V)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
4.8	14 + 2 3	Short to positive of wiring to flap motors -V68-, -V85-, -	<ul style="list-style-type: none"> Ignition on 	- less than 1V	- Diagnose and repair short to positive in wiring/connections using wiring

	4 5	V70-, -V71-		diagram.
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Note:

If DTC's for several flap motors are shown and malfunction is not determined in test 4, check wiring for short between individual flap motors (e.g. -V85- and -V70-, measured value between sockets 3 and 4 must be ∞ Ohm).

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Test No. 5 (A/C pressure switch -F129-, "A/C compressor intervention" signal, engine temperature signal from instrument cluster and Interior Temperature Sensor Fan -V42-)

Adapter cable VAG1598/11					
Measuring range: Resistance measurement (200 Ω)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
5.1 to 5.6	Not for 1997. A/C compressor speed sender -G111-, A/C high pressure switch -F118- and Low pressure switch -F73- are no longer installed				

Adapter cable VAG1598/11					
Measuring range: Current measurement (20 A)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
5.7	⇒ page 01-131				

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A/C control head -E87- connected to test box with adapter cable VAG1598/11					
LED Voltage tester VAG1527B					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
5.8	14 + 12	"A/C compressor intervention" output.	<ul style="list-style-type: none"> • Engine running. • A/C compressor off - Switch on A/C compressor	- LED lights up - LED lights up slightly dimmer.	- Diagnose and repair open or short circuit in wiring/connections using wiring diagram. - Diagnose and eliminate A/C compressor cut-off condition(s) from Engine Control Module (ECM) or Transmission Control Module (TCM) - Diagnose and repair short circuit to ground in wiring/connections using wiring diagram.
5.9	Ground and 51	"Engine temperature too high" signal.	<ul style="list-style-type: none"> • Engine running. 	- LED lights up.	- Diagnose and repair short circuit to ground in wiring/connections using wiring diagram. - Diagnose and eliminate A/C compressor cut-off condition from Instrument cluster

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A/C control head -E87- connected to test box with adapter cable VAG1598/11					
Measuring range: Current measurement (200 mA)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
5.10	Ground and 12	"A/C compressor intervention" output.	<ul style="list-style-type: none"> • Engine running. • A/C compressor off <p>- Switch on A/C compressor</p> <p>- Remove multimeter connector probes from test box</p>	<p>- Less than 5 mA</p> <p>- Less than 50 mA</p> <p>- Compressor does not engage</p> <p>- Compressor engages</p>	<p>- Diagnose and repair short circuit to positive in wiring/connections using wiring diagram.</p> <p>- Replace A/C control head -E87-.</p> <p>- Diagnose and eliminate A/C compressor cut-off condition(s) from Engine Control Module (ECM) or Transmission Control Module (TCM)</p> <p>⇒ Repair Manual, Fuel Injection and Ignition</p> <p>⇒ Repair Manual, Automatic Transmission</p> <p>- Diagnose and repair short circuit to ground in wiring/connections using wiring diagram.</p>

Adapter cable VAG1598/11 connected.					
Measuring range: Resistance measurement (200 Ω)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
5.11	2 + 42	A/C pressure switch - F129- (between terminals 1 and 2)	<ul style="list-style-type: none"> • Ignition off 	- Less than 20 Ω	- Diagnose and repair open circuit or contact resistance in wiring/connections using wiring diagram.1). - Check A/C pressure switch -F129- \Rightarrow page 87-67 .

1) If compressor cut-off condition code 1, "A/C pressure switch -F129- open" etc. appears in read measuring value block, display group 1, display field 1: - check for intermittent contact in wiring/connections to -F129- using wiring diagram - check function of Coolant Fan -V7- stage 1 with Output DTM (function ⁰³) \Rightarrow [page 01-42](#) - check A/C pressure switch -F129- function (actuation of -V7- stage 2, terminals 3 and 4 \Rightarrow [page 87-67](#)). If no fault is determined, check A/C refrigerant system pressures \Rightarrow [page 87-190](#) .

Test No. 6 (A/C Clutch Relay -J44-, actuation of Coolant Fan -V7- stage 1)

Adapter cable VAG1598/12 connected.					
Measuring range: Amperage measurement (20 A)					
Test Step	VAG1598 socket	Test of	Test conditions - additional work	Specified Value	Corrective action
6.1 + 6.2	⇒ page 01-133				

Note:

Actuation of -V7- stage 2 via A/C pressure switch -F129- ⇒ [page 87-67](#) .

Notes:

The following test steps are only performed for A/C control heads -E87- with two displays:

- ◆ Teststep 2.2 (the instrument panel interior temperature sensor -G56- is installed in A/C control heads -E87- with one display)
- ◆ Test step 5.7 (the interior temperature sensor fan -V42- is installed in A/C control heads -E87- with one display)

Switch on test area at VAG1526 multimeter: voltage test (20 V =)					
<ul style="list-style-type: none"> • VAG1598/11 adapter cable connected 					
Test step	VAG1598A socket	Test of	Test requirements - additional operations	Specified value	Corrective action
1.15 4)	46 + Ground 3)	Power supply terminal 58 of A/C control head -E87-	<ul style="list-style-type: none"> • Ignition switched on • Park light switched on 	◆ approx. battery voltage	- Locate and repair open circuit or short circuit to Ground in wiring connection to A/C control head -E87- using wiring diagram
1.16 4)	46 + Ground 3)	Power supply terminal 58 of A/C control head -E87-	<ul style="list-style-type: none"> • Ignition switched on • Park light 		- Locate and repair open circuit or short circuit to Ground in wiring connection to A/C control head -E87- using wiring diagram.

			switched off	◆ smaller than 2 V	
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3) Ground is at, for example, connector D, socket 14 and 15.

4) Only perform this test step for an A/C control head with one display.

01-148

Switch on test area at VAG1526 multimeter: voltage test (20 V)					
<ul style="list-style-type: none"> VAG1598/12 adapter cable connected 					
Test step	VAG1598A socket	Test of	Test requirements - additional operations	Specified value	Corrective action
1.17 4)	8 + 14	<ul style="list-style-type: none"> Terminal 15 and Ground connection at A/C control head -E87- (power supply for A/C clutch) 	<ul style="list-style-type: none"> Ignition switched on 	<ul style="list-style-type: none"> approx. battery voltage 	- Repair power supply or Ground connection according to wiring diagram

4) Only perform this test step for an A/C control head with one display.

01-149

VAG1527 B Voltage Tester					
<ul style="list-style-type: none"> A/C control head -E87- connected at test box (VAG1598/11 and /12 adapter cables) VAG1598/11 adapter cable connected 					
Test step	VAG1598A socket	Test of	Test requirements - additional operations	Specified value	Corrective action
5.9 5)	Ground + 51	"Engine temperature too high" signal	<ul style="list-style-type: none"> Engine running 	◆ LED on voltage tester lights	<ul style="list-style-type: none"> - Locate short circuit to Ground and repair according wiring diagram - Eliminate A/C compressor cut-off conditions in instrument cluster

5) Only perform this test step for vehicles of m.y. 1997 or later

Notes:

- ◆ Ignition key coding is transmitted to the A/C control head -E87- from the instrument cluster along with the coolant temperature and the signal "engine temperature too high" when ignition is switched on for vehicles as of m.y. 1999 (data message). Key coding can only be processed by A/C control heads -E87- with part number 8D0 820 043 after index "M." No information can be transmitted if the coolant temperature is too high.
- ◆ When ignition is switched on, A/C control head -E87- begins with the setting that was valid when the ignition was last switched off with this key (temperature, air distribution, fresh air blower RPM).

◆ *The signal from instrument cluster (data message) cannot be checked with tools available.*

⇒ [Repair Manual, "Electrical Equipment," Repair Group 90, instrument cluster, repairing.](#)

01-150

List of changes to electrical tests, 1998

VAG1527B voltage tester					
VAG1598/11 adapter cable connected					
Test step	VAG1598 sockets	Test of	Test conditions - additional operations	Specified value	Corrective action
1.9	33 + GND	Signal for "ignition off" period	<ul style="list-style-type: none"> • Ignition switched on 	LED on voltage tester lights	- Repair open circuit or short circuit according to wiring diagram.
1.10	33 + GND	Signal for "ignition off" period	<ul style="list-style-type: none"> • Ignition switched on - Start engine. 	LED in voltage tester lights up When starting engine, LED briefly flickers in voltage tester (time signal) and then lights constantly	<ul style="list-style-type: none"> - Repair open circuit or short circuit according to wiring diagram. - Check instrument cluster.
Note:					
<i>Test steps 1.9 and 1.10 apply only for vehicles beginning m.y. 1997 (A/C control head with Part No. 8L0 820 043 up to Part No. index letter "C").</i>					

01-151

Voltage test - switch multimeter to 20V measuring range					
VAG1598/11 adapter cable connected					
Test step	VAG1598 sockets	Test of	Test conditions - additional operations	Specified value	Corrective action
1.11	7 + GND	Terminal 58s on - E87-	<ul style="list-style-type: none"> • Ignition switched on • Parking light switched on 	0 to 12 V	- Repair open circuit or short circuit according to wiring diagram.
1.12	7+ GND	Terminal 58s on - E87-	<ul style="list-style-type: none"> • Ignition switched on • Parking light switched off 	approx. 0 V.	- Repair short to B+ according to wiring diagram.

Notes:

- ◆ *Test steps 1.11 to 1.14 apply for vehicles beginning m.y. 1998 (A/C control head with Part No. 8L0 820 043 from Part No. index letter "D").*
- ◆ *The Ground connection can be made via connector D, terminals 14 and 15 (for example).*
- ◆ *The voltage at terminal 58s is dependent on the adjustment of the illumination dimmer control.*

01-152

Voltage test - switch multimeter to 20V measuring range					
VAG1598/11 adapter cable connected					
Test step	VAG1598 sockets	Test of	Test conditions - additional operations	Specified value	Corrective action
1.13	45 + GND	Terminal 58d on - E87-	<ul style="list-style-type: none"> • Ignition switched on • Parking light switched on 	0 to 12 V	- Repair open circuit or short circuit according to wiring diagram.
1.14	45 + GND	Terminal 58d on - E87-	<ul style="list-style-type: none"> • Ignition switched on • Parking light switched off 	0 to 12 V	- Repair open circuit or short circuit according to wiring diagram.

Notes:

- ◆ *Test steps 1.11 - 1.14 apply for vehicles beginning m.y. 1998 (A/C control head with Part No 8L0 820 043 from Part No. index letter "D").*
- ◆ *The Ground connection can be made via connector D, terminals 14 and 15 (for example).*
- ◆ *The voltage to terminal 58d is created as a square-wave signal from the instrument cluster. The brightness of the display on A/C control head -E87- is determined by the period of activation. The multimeter will indicate the average value.*

- ◆ *The period of activation for terminal 58d is dependent on the setting of the illumination dimmer control and on the brightness level detected by the photo sensor in the instrument cluster.*