A/C CONTROL HEAD ON-BOARD DIAGNOSTIC DISPLAY-INSPECT GROUP 87, NO. 94-10

Article Text

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ARTICLE BEGINNING

TECHNICAL SERVICE BULLETIN

A/C CONTROL HEAD ON-BOARD DIAGNOSTIC (OBD) DISPLAY, CHECKING

Model(s): 1992-94 Audi 100CS, S4, V8
1994 Audi 90CS, CS Quattro Sport
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SERVICE INFORMATION

This article contains Air Conditioning diagnostic information.

A/C CONTROL HEAD ON-BOARD DIAGNOSTIC (OBD) DISPLAY, CHECKING

In addition to A/C system On-Board Diagnostic (OBD) using the VAG 1551 Scan Tool (ST), the A/C control head contains a 61-channel OBD display which can be accessed without the use of special tools.

STARTING DISPLAY

- Switch ignition ON or start engine.

- Press and hold down RECIRCULATION button 1. See Fig. 1.

- Press and hold down upper AIR DISTRIBUTION button 2.

- Release both buttons.

* "01c" will be displayed ("01c" indicates channel 1, "02c" indicates channel 2, etc.).

To select a different channel,

- Press temperature + button to go to next higher channel.

- Press temperature - button to go to next lower channel.

To call up information about a particular channel,

- Select desired channel.

- Press RECIRCULATION button 1.

To leave memory display,

- Press AUTO button, or switch ignition OFF.

ON BOARD DIAGNOSTIC (OBD) DISPLAY, CHANNELS 1-61

NOTE: Air Flow Flap Motor (V 71) and Potentiometer (G 113) are not installed in USA/Canada vehicles. Disregard values displayed for these components.

Diagnostic Channel No.	Display
1	System malfunction - displayed as a Diagnostic Trouble Code (DTC), see chart, section 01-30
2	Digital value of Interior Temperature Sensor, in Headliner (G 86)
3	Digital value of Interior Temperature Sensor, in Instrument Panel (G 56)
4	Digital value of Fresh Air Intake Duct Temperature Sensor (G 89)
5	Digital value of Outside Air (Ambient) Temperature Sensor (G 17), front
6	Digital value of Outside Air (Ambient) Temperature Sensor
7	Digital value of Ambient Temperature Sensor At Fresh Air Blower (G 109)
8	Digital value of Temperature Regulator Flap Motor Potentiometer (G 92)
9	Delta value of Temperature Regulator Flap
10	Non-corrected specified value of Temperature Regulator Flap
11	Digital value of Central Flap Motor Potentiometer (G 112)
12	Specified value of Central Flap
13	Digital value of Footwell/Defroster Flap Motor Potentiometer (G 114)
14	Specified value of Footwell/Defroster Flap
15	Digital value of Air Flow Flap Motor Potentiometer (G 113)

16	Specified value of Air Flow Flap
17	Vehicle Speed (km/h)
18	Actual Fresh Air Blower voltage (Volts)
19	Specified Fresh Air Blower voltage (Volts)
20	A/C Compressor (A/C Clutch) voltage (Volts)
21	Number of low voltage occurrences, non-transient
22	Cycle condition of A/C Refrigerant High Pressure Switch (F 118)
23	Cyclings of the A/C Refrigerant High Pressure Switch (F 118)
24	Cyclings of the switches, absolute non-fluctuating
25	Analog/Digital value, Kick-Down Switch
26	Analog/Digital value, Engine Coolant Temperature (ECT) Warning Light
27	Coding value
28	Engine Speed (RPM)
29	A/C Compressor speed in rpm (Equals Engine Speed x 1.28)
30	Software version
31	Display check (all segments of A/C Control Head display light up)
32	Potentiometer malfunction counter, Temperature Regulator Flap
33	Potentiometer malfunction counter, Central Flap
34	Potentiometer malfunction counter, Footwell/Defroster Flap
35	Potentiometer malfunction counter, Air Flow Flap
36	Feedback value, cold end-stop, Temperature Regulator Flap Motor Potentiometer (G 92)
37	Feedback value, hot end-stop, Temperature Regulator Flap Motor Potentiometer (G 92), max. stop

38	Feedback value, cold end-stop, Central Flap Motor Potentiometer (G 112)
39	Feedback value, hot end-stop, Central Flap Motor Potentiometer (G 112)
40	Feedback value, cold end-stop, Footwell/Defroster Flap Motor Potentiometer (G 114)
41	Feedback value, hot end-stop, Footwell/Defroster Flap Motor Potentiometer (G 114)
42	Feedback value, cold end-stop, Air Flow Flap Motor Potentiometer (G 113)
43	Feedback value, hot end-stop, Air Flow Flap Motor Potentiometer (G 113)
44	Vehicle operation cycle counter
45	Calculated interior temperature (internal software, in digits)
46	Outside (ambient) temperature, filtered, for regulation (internal software)
47	Outside (ambient) temperature, unfiltered, (Internal software, In øC)
48	Outside (ambient) temperature, unfiltered (in digits)
49	Malfunction counter for speedometer (vehicle speed) signal
50	Standing time (in minutes)
51	Engine Coolant Temperature (ECT), in øC
52	Graphics channel 1 = 88.8, see DIAGNOSTIC CHANNEL 52 - GRAPHICS CHANNEL 1 NOTE: When Diagnostic Channel 52 is selected, "--.-" is displayed first. A/C compressor switch-off conditions are identified by illuminated segments of the "88.8" display.
53	Graphics channel 2 = 88.8, see DIAGNOSTIC CHANNEL 53 - GRAPHICS CHANNEL 2 NOTE: When Diagnostic Channel 53 is selected, "-- -" is displayed first. A/C system electrical outputs are identified by illuminated segments of the "88.8" display.

54	³ Control characteristics
55	³ Outside (ambient) temperature, in øC or øF depending on ³ øC or øF setting on A/C control head
56	³ Temperature in øC, from Interior Temperature Sensor, in ³ Headliner (G 86)
57	³ Temperature in øC, from Interior Temperature Sensor, in ³ Instrument Panel (G 56)
58	³ Temperature in øC, from Fresh Air Intake Duct Temperature ³ Sensor (G 89)
59	³ Temperature in øC, from Outside Air (Ambient) Temperature ³ Sensor (G 17), front
60	³ Temperature in øC, from Ambient Temperature Sensor At ³ Fresh Air Blower (G 109)
61	³ Software version (latest)

MALFUNCTIONS DISPLAYED ON DIAGNOSTIC CHANNEL 1

NOTE: * If more than one malfunction exists, the A/C Control Head display will automatically alternate between the different Diagnostic Trouble Codes (DTC's).
* After repairing malfunctions, erase DTC's from A/C control head memory using VAG 1551 Scan Tool (ST).

Diagnostic Trouble Code (DTC)	Malfunction	Remarks
00.0	No malfunction present	
02.1	Interior Temperature Sensor, in Headliner (G 86), static open	Digital default value of 128 is programmed if sensor fails.
02.2	Interior Temperature Sensor, in Headliner (G 86), static short	See DTC 02.1
02.3	Interior Temperature Sensor, in Headliner (G 86), sporadic open	
02.4	Interior Temperature Sensor, in Headliner (G 86),	

	³ sporadic short	³
03.1	³ Interior Temperature Sensor, ³ in Instrument Panel (G 56), ³ static open	³ See DTC 02.1
03.2	³ Interior Temperature Sensor, ³ in Instrument Panel (G 5B), ³ static short	³ See DTC 02.1
03.3	³ Interior Temperature Sensor, ³ in Instrument Panel (G 56), ³ sporadic open	³
03.4	³ Interior Temperature Sensor, ³ in Instrument Panel (G 56). ³ sporadic short	³
04.1	³ Fresh Air Intake Duct ³ Temperature Sensor (G 89), ³ static open	³ Value supplied by Temp. ³ Sensor (G 17) is used if ³ sensor fails
04.2	³ Fresh Air Intake Duct ³ Temperature Sensor (G 89), ³ static short	³ See DTC 04.1
04.3	³ Fresh Air Intake Duct ³ Temperature Sensor (G 89), ³ sporadic open	³
04.4	³ Fresh Air Intake Duct ³ Temperature Sensor (G 89), ³ sporadic short	³
05.1	³ Outside Air (Ambient) ³ Temperature Sensor (G 17), ³ front, static open	³ Value supplied by Temp. ³ Sensor (G 89) is used if ³ sensor fails
05.2	³ Outside Air (Ambient) ³ Temperature Sensor (G 17), ³ front, static short	³ See DTC 05.1 ³ Digital default value of ³ 128 is programmed if ³ sensors (G 89) and (G 17) ³ both fail.
05.3	³ Outside Air (Ambient) ³ Temperature Sensor (G 17), ³ front, sporadic open	³
05.4	³ Outside Air (Ambient) ³ Temperature Sensor (G 17), ³ front, sporadic short	³
06.1	³ Engine Coolant Temperature	³ Engine Coolant Temperature

	³ Sensor (ECT), A/C (G 110), ³ static open	³ is calculated if sensor should fail or is not installed; diagnosis occurs only above 0øC.
06.2	³ Engine Coolant Temperature Sensor (ECT), A/C (G 110), ³ static short	³ See DTC 06.1
06.3	³ Engine Coolant Temperature Sensor (ECT), A/C (G 110), ³ sporadic open	³
06.4	³ Engine Coolant Temperature Sensor (ECT), A/C (G 110), ³ sporadic short	³
07.1	³ Ambient Temperature Sensor At Fresh Air Blower (G 109), ³ static open	³ Programmed corrective value = 0
07.2	³ Ambient Temperature Sensor At Fresh Air Blower (G 109), ³ static short	³ See DTC 07.1
07.3	³ Ambient Temperature Sensor At Fresh Air Blower (G 109), ³ sporadic open	³
07.4	³ Ambient Temperature Sensor At Fresh Air Blower (G 109), ³ sporadic short	³
08.1	³ Temperature Regulator Flap Motor Potentiometer (G 92), ³ static open	³ Temperature Regulator Flap Motor will no longer be controlled automatically; manual adjustment only.
08.2	³ Temperature Regulator Flap Motor Potentiometer (G 92), ³ static short	³ See DTC 08.1
08.3	³ Temperature Regulator Flap Motor Potentiometer (G 92), ³ sporadic open	³
08.4	³ Temperature Regulator Flap Motor Potentiometer (G 92), ³ sporadic short	³
08.5	³ Temperature Regulator Flap, ³ static block	³ Motor is cycled; software attempts to eliminate block.

08.6	Temperature Regulator Flap Motor Potentiometer (G 92), malfunction	
08.7	Temperature Regulator Flap, sporadic block	
11.1	Central Flap Motor Potentiometer (G 112), static open	Central Flap Motor will no longer be controlled automatically; manual adjustment only.
11.2	Central Flap Motor Potentiometer (G 112), static short	See DTC 11.1
11.3	Central Flap Motor Potentiometer (G 112), sporadic open	
11.4	Central Flap Motor Potentiometer (G 112), sporadic short	
11.5	Central Flap, static block	Motor is cycled; software attempts to eliminate block.
11.6	Central Flap Motor Potentiometer (G 112), malfunction	
11.7	Central Flap, sporadic block	
13.1	Footwell/Defroster Flap Motor Potentiometer (G 114), static open	Footwell/Defroster Flap Motor will no longer be controlled automatically; manual adjustment only.
13.2	Footwell/Defroster Flap Motor Potentiometer (G 114), static short	See DTC 13.1
13.3	Footwell/Defroster Flap Motor Potentiometer (G 114), sporadic open	
13.4	Footwell/Defroster Flap Motor Potentiometer (G 114), sporadic short	
13.5	Footwell/Defroster Flap, static block	Motor is cycled; software attempts to eliminate block.
13.6	Footwell/Defroster Flap Motor Potentiometer (G 114),	

	³ failure	³
	³	³
13.7	³ Footwell/Defroster Flap,	³
	³ sporadic block	³
15.1	³ Air Flow Flap Motor	³ Digital value internally
	³ Potentiometer (G 113),	³ programmed for limp-home
	³ static open	³ mode.
	³	³
15.2	³ Air Flow Flap Motor	³ See DTC 15.1
	³ Potentiometer (G 113),	³
	³ static short	³
	³	³
15.3	³ Air Flow Flap Motor	³
	³ Potentiometer (G 113),	³
	³ sporadic open	³
	³	³
15.4	³ Air Flow Flap Motor	³
	³ Potentiometer (G 113),	³
	³ sporadic short	³
	³	³
15.5	³ Air Flow Flap, static block	³ Motor is cycled; software
	³	³ attempts to eliminate
	³	³ block.
15.6	³ Air Flow Flap Motor	³
	³ Potentiometer (G 113),	³
	³ failure	³
	³	³
15.7	³ Air Flow Flap, sporadic block	³
17.0	³ Vehicle Speed Signal faulty	³
18.1	³ Fresh air blower voltage,	³
	³ static	³
	³	³
18.3	³ Fresh air blower voltage.	³
	³ sporadic	³
20.1	³ A/C compressor voltage not	³ Compressor remains off
	³ OK - static	³ until voltage is greater
	³	³ than 10.8 V for at least
	³	³ 25 seconds.
20.3	³ A/C compressor voltage not	³
	³ OK - sporadic	³
22.1	³ A/C refrigerant High	³ Compressor remains off
	³ Pressure Switch (F 118),	³ until switch closes.
	³ static open	³
	³	³
22.3	³ A/C Refrigerant High	³
	³ Pressure Switch (F 118),	³
	³ sporadic open	³

22.5	A/C Refrigerant High Pressure Switch (F 118), 120X open	Compressor re-engagement circuit, VAG 1551 Scan Tool (ST) function
29.1	Belt slip detection "soft", static	
29.2	Belt slip detection "hard", static	
29.3	Belt slip detection "soft", sporadic	
29.4	Belt slip detection "hard", sporadic	

DIAGNOSTIC CHANNEL 52 - GRAPHICS CHANNEL 1

A/C COMPRESSOR SWITCH-OFF CONDITIONS (Refer to Fig. 2.)

NOTE: If an A/C compressor switch-off condition exists, a segment of the "88.8" display, noted below as an alpha-numeric code, will illuminate.

The conditions listed below are causes of A/C compressor switch-off.

a1 - Slippage or blockage, A/C Refrigerant High Pressure Switch, 120x off
b1 - Engine Speed (RPM) less than 200 - 500
c1 -
d1 - Engine Speed (RPM) greater than 6000
e1 -
f1 -
*g1 - System function OK
a2 - A/C manually switched off (A/C standby canceled)
b2 - Low voltage
c2 - Kick-down switch (via Transmission Control Module (TCM), compressor off for 12 seconds max.)
d2 - Engine Coolant Temperature (ECT) warning light switch
e2 - A/C Refrigerant Low Pressure Switch (F 73)
f2 - A/C Refrigerant High Pressure Switch (F 118)
*g2 - System function OK
a3 - ECON mode selected
b3 - OFF selected
c3 - Outside (ambient) temperature too low
d3 - Engine management system (compressor will remain off for 3-12 seconds)
e3 - High pressure occurrences more than 30 times
f3 - Ambient Temperature Sensor At Fresh Air Blower (G 109) less than 27øF (-3øC)

*g3 - System function OK

Decimal point visible - A/C compressor ON
Decimal point not visible - A/C compressor OFF

* = Segments g1, g2 and g3 must illuminate simultaneously to indicate system function is OK.

DIAGNOSTIC CHANNEL 53 - GRAPHICS CHANNEL 2

ACTIVE ELECTRICAL OUTPUTS (Refer to ig. 2.)

NOTE: * When an A/C system electrical output is activated, a segment of the "88.8" display, noted below as an alpha-numeric code, will illuminate.
* The decimal point in the "88.8" display will not illuminate in this channel.

a1 - Fan for interior temperature sensor
b1 - Fresh air/recirculation flap closed (recirculation mode)
c1 - Heater valve closed
d1 - Bi-directional wiring harness
e1 - A/C compressor ON
f1 - Coolant fan first speed ON
*g1 - System function OK
a2 -
b2 - Air flow flap open
c2 - Air flow flap closed
d2 -
e2 - Footwell/defroster flap in "footwell" position
f2 - Footwell/defroster flap in "defrost" position
*g2 - System function OK
a3 -
b3 - Central flap in "instrument panel outlet" position
c3 - Central flap in "footwell outlet/defrost" position
d3 -
e3 - Temperature flap in "cold air" position
f3 - Temperature flap in "warm air" position
*g3 - System function OK

* = Segments g1, g2 and g3 must illuminate simultaneously to indicate system function is OK.

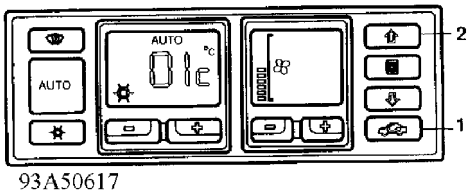

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Fig. 1: A/C Control Head Display

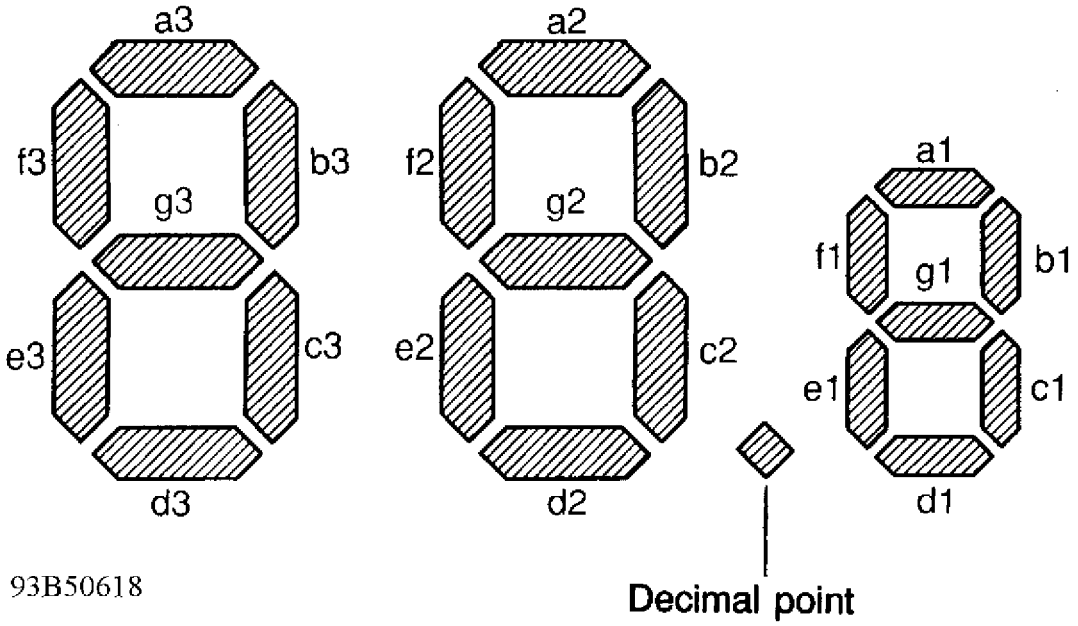

Fig. 2: 88.8 Display Segments

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