Auxiliary input signals, checking

Rear window defroster signal, checking

Requirement

- Engine Control Module (ECM) coding OK ⇒ page 01-247 .

Checking

- Using VAG 1551 scan tool, select "Read Measuring Value Block" function 08, display group 004, display field 4 ⇒ page 01-249 .

Read measuring value block 4 →

1 2 3 4

➢ Indicated on display, note value in display field 4

Specified value: 0XX_XX

CAUTION!

Do not use the shift inputs (identified by an X) during the RPM increase check.

- Switch ON rear window defroster.

Specified value: 1XX_XX

If display value is OK:

- Press → button.
- Select "End Output" function 06.
- Press -Q- button to confirm input.

24-89

If display value does not change:

- Switch ignition OFF and connect VAG 1598/19 test box to ECM harness connector ⇒ page 01-255 .

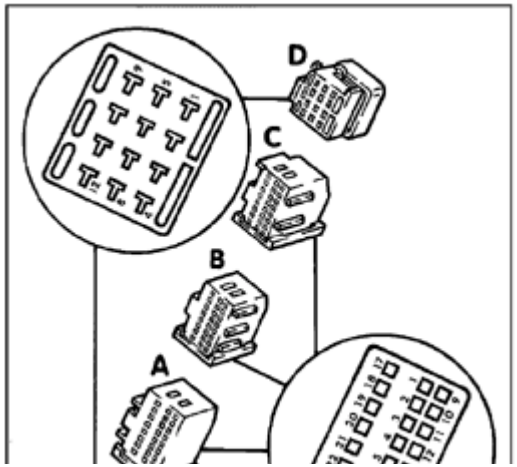
- Connect VAG 1527B voltage tester between VAG 1598/19 test box socket C14 and Ground (GND).

- Switch ignition ON.

- Switch ON rear window defroster.

- Voltage tester must light up

If voltage tester does not light up:



- Check wiring for continuity between C14 and rear window defroster using wiring diagram.

If wiring is OK:

- Check rear window defroster using wiring diagram.

If rear window defroster is OK:

- Replace ECM ⇒ page 01-265 .

24-90

A/C compressor shut-off signal, checking

Note:

The A/C compressor is switched off during acceleration by the Engine Control Module (ECM) and at wide open throttle by the Transmission Control Module (TCM) via the kickdown switch.

A/C compressor shut-off is bi-directional ("in"and "out").

- *IN: Shortly before switching the A/C compressor on, voltage is applied to the ECM which causes the Idle Air Control (IAC) valve to open a little more to adjust to the higher load.*

- *OUT: When accelerating from a standstill position and at lower speed, the A/C compressor is shut off for approx. 12 seconds via control by the ECM. If the accelerator pedal is released early enough, the duration is reduced to a minimal 3 seconds.*

Checking requirements

- A/C function OK

- No malfunctions stored in DTC memory
- Vehicle at room temperature; above 15 °C (59 °F)

24-91

Checking

- Start engine and let idle.

- Switch A/C on, push "AUTO" button, set temperature to "LO" and blower speed to "HI".

  - A/C compressor symbol must light up and A/C must run.

- Using VAG 1551 scan tool, select "Basic Setting" function 04, display group 004 ⇒ page 01-150 .

  - A/C compressor must stop (visual check)

If the A/C compressor does not shut off:

- Switch A/C off (press "minus" button for fresh air blower in A/C control head repeatedly, until all indicators are off).

  Continue to let engine run in idle.

- Using VAG 1551 scan tool, select "Read Measuring Value Block" function 08, display group 004.

Read measuring value block 4 →

1 2 3 4

Indicated on display; note value in display field 4

CAUTION!

Do not use the shift inputs (identified by an X) during the RPM increase check.

- Switch on A/C as described.

  Specified value: X1X_XX

24-92

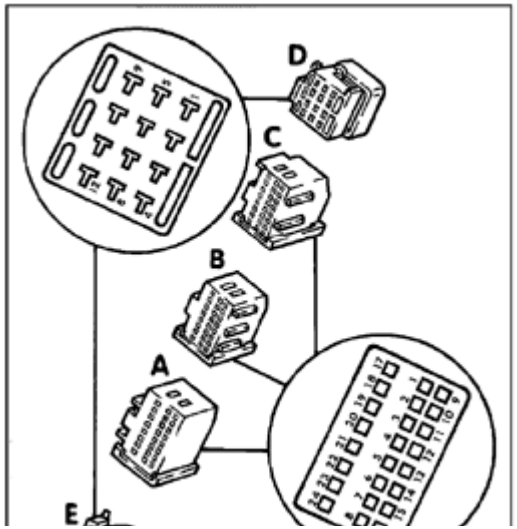
If the specified values are obtained:

- Press → button.
- Select "End Output" function 06.
- Press -Q- button to confirm input.

If display value changes:

- The following display is possible: "A/C system not switched on as described."

If the display value does not change, even though the A/C system was switched on as described:



- Check wiring for continuity between connector terminal C11 and ECM or TCM using wiring diagram.

If wiring is OK:

- Check A/C system or automatic transmission:

⇒ *Repair Manual, Heating & Air Conditioning, Repair Group 01; connect VAG 1551 scan tool and select "Check DTC Memory" function 02*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01; connect VAG 1551 scan tool and select "Check DTC Memory" function 02*

24-93

If X1X_XX is displayed:

- Briefly press accelerator pedal to apply wide open throttle.

  - Display must switch briefly to X0X_XX, then X1X_XX must appear again after several seconds.

If display does not change as described:

- Check whether A/C compressor was shut off while accelerator pedal was being pressed.

- Check A/C system or automatic transmission.

⇒ *Repair Manual, Heating & Air Conditioning, Repair Group 01; connect VAG 1551 scan tool and select "Check DTC Memory" function 02*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01* ; connect VAG 1551 scan tool and select "Check DTC Memory" function 02

If the display does not change as described:

- Replace ECM ⇒ page 01-265 .

24-94

Engine speed (RPM) signal, checking

Notes:

The RPM signal is routed from the ECM to various electronic systems (e.g. automatic transmission, ABS, etc.). The RPM signal is monitored by the different electronic systems.

Carry out the following check only if the tachometer (in the instrument cluster) is inoperative, or if the A/C compressor is not running.

- Connect VAG 1367 engine-tester to tachometer using wiring diagram.

- Connect VAG 1367 engine-tester signal wire (green terminal) to instrument cluster RPM terminal and A/C control module RPM terminal (connector remains connected).

- Start engine and let idle.

  - RPM must be displayed again

If the specified value is obtained, the malfunction is in instrument cluster or on A/C control module.

If the RPM is not displayed on VAG 1367 engine-

tester:

- Check wiring between ECM terminal C10 and instrument cluster or A/C control module using wiring diagram.

If wiring is OK:

- Replace ECM ⇒ page 01-265 .

24-95

Fuel consumption signal, checking

Notes:

- *The consumption signal is internally calculated by the ECM using "injection time."*
- *The consumption signal is routed to both the trip computer and the Transmission Control Module (TCM).*
- *The consumption signal is monitored by the TCM*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01; On Board Diagnostic*

Carry out the following check only if DTC memory contains a stored DTC for the TCM related to the consumption signal, or a missing or false consumption signal, determined during the trip computer check.

- Remove instrument cluster or TCM.

⇒ *Repair Manual, Electrical Equipment, Repair*

Group 90; Instrument cluster, repairing

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01, On Board Diagnostic*

- Connect VAG 1598 test box to instrument cluster harness connector (I/P insert not connected) or to TCM harness connector (TCM not connected).

⇒ *Repair Manual, Electrical Equipment, Repair Group 90; Instrument cluster, repairing*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V; Repair Group 01, On Board Diagnostic*

24-96

- Switch Fluke 83 multimeter to voltage measurement range and connect between signal wire (trip computer 20-pin connector) and Ground (GND), using wiring diagram.

- Start engine and let idle.

  Specified value: approx. 0.3 to 0.6 volts, corresponding to engine speed (RPM)

- Vary engine speed continuously from 1000 to 4000 RPM.

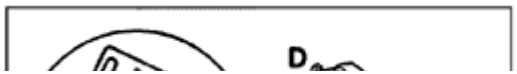
  Specified value: approx. 0.3 to 0.6 volts, corresponding to engine speed (RPM)

If the specified value is not obtained, even though the trip computer shows no consumption value or there is a stored malfunction in the TCM:

- Stop engine (switch ignition off).

- Replace trip computer and/or TCM as required.

If the specified value is not obtained:



- Check wiring between ECM terminal C12 and black 20-pin trip computer connector, using wiring diagram.

If wiring OK and the specified value is not obtained:

- Replace ECM ⇒ page 01-265 .

24-97

Vehicle speed signal, checking

Note:

The vehicle speed signal originates from the vehicle speed sensor (on the transmission) and is routed to the instrument cluster as well as to the Engine Control Module (ECM).

- Speedometer in instrument cluster OK

Checking

- Using VAG 1551 scan tool, select "Read Measuring Value Block" function 08, display group 003 ⇒ page 01-249 .

Read measuring value block 3 →

1 2 3 4

Indicated on display

- Observe display field 4 while accelerating from standstill.

  Specified values:

  - 0 mph (at standstill)
  - Actual speed (vehicle driven)

- Press → button.
- Select "End Output" function 06.
- Press -Q- button to confirm input.

24-98

If no vehicle speed is displayed between standstill and moving:

- Switch ignition OFF and connect VAG 1598/19 test box ⇒ page 01-255 .

- Connect VAG 1527B voltage tester between test box sockets 13C (signal) and 10D (B+).

- Raise front of vehicle until left-front wheel is free to rotate.

Note:

The right front wheel must NOT rotate.

- Switch ignition ON.

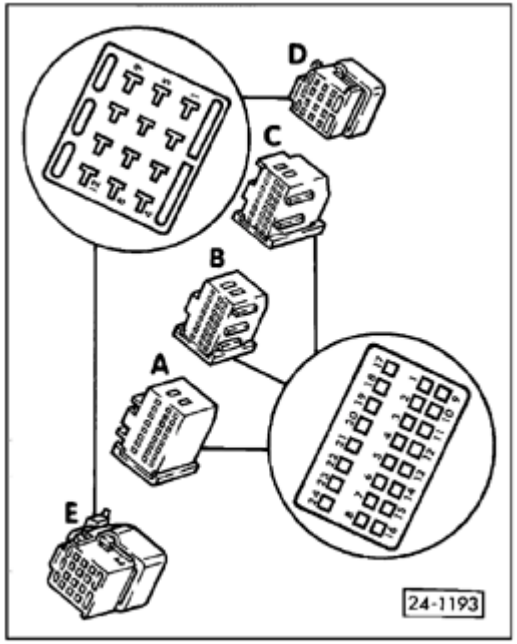
  - Voltage tester must light up at half strength

- Rotate left front wheel by hand.

  - Voltage tester must become brighter (flash)

If tester does not light up (become brighter) or flash:

- Check wiring between test box socket 13X and



vehicle speed sensor, using wiring diagram.

- Find and eliminate open circuit in wiring between terminal C13 and vehicle speed sensor.

If wiring is OK, replace vehicle speed sensor.

If voltage tester does not light up (become brighter) or flash, replace ECM ⇒ page 01-265 .

24-99

Transmission Range (TR) selector lever position signal, checking

Note:

The Engine Control Module (ECM) uses this signal to recognize the transmission range selector lever position. When a driving mode is selected, idle speed should drop by approx. 50 RPM to reduce creep.

Checking requirement

- Control module coding OK ⇒ page 01-247 .

- Switch ignition ON.

- Using VAG 1551 scan tool, select "Read Measuring Value Block" function 08, display group 004, display field 4 ⇒ page 01-249 .

Read measuring value block 4 →

1 2 3 4

Indicated on display

Specified value: XXX_1X (TR selector lever in P or N)

- Apply brake and select drive mode (1, 2, 3, R or D).

Specified value: XXX_0X

CAUTION!

Do not use the shift inputs (identified by an X) during the selector lever position check.

24-100

- Press → button.

- Select "End Output" function 06 and press -Q- button to confirm input.

If a display did NOT change, even though coding is OK:

- Connect VAG 1598/19 test box to ECM harness connector ⇒ page 01-255 .

- Connect VAG 1527B voltage tester between test box sockets 11B (signal) and 10B (constant B+/terminal 30).

  - Voltage tester must light up (with TR selector lever in P or N), then go out with drive mode (1, 2, 3, R or D) selected

If voltage tester lights up and goes out when drive mode is selected, even though the range indicator in the "Read measuring value block" is OK:

- Replace ECM ⇒ page 01-265 .

If voltage tester lights up constantly or not at all:

- Check wiring for short to ground, short to B+ or open circuit between

ECM terminal 11B and multi-function switch, using wiring diagram.

If wiring is OK:

- Check multi-function switch.

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01; Electrical test.*

24-101

Shift procedure, checking

Notes:

- *The Engine Control Module (ECM) uses this signal to briefly retard the ignition during shifting to reduce the mechanical jerking felt between shifts.*
- *The shift signal is monitored by the Transmission Control Module (TCM).*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01; On Board Diagnostic*

Carry out the following check only if a shift-related DTC is stored in the TCM DTC memory.

Checking requirement

- Control module coding OK ⇒ page 01-247

CAUTION!

Always use a second technician to operate the VAG 1551 scan tool while driving.

- Test drive and select "Read Measuring Value Block" function 08, display group 004 ⇒ page 01-249 .

24-102

Read measuring value block 4 →

1 2 3 4

Indicated on display; note display field 4

Specified value: XXX_X0

- Shift value must increase briefly during shifting.

Specified value: XXX_X1

Notes:

Due to its short signal duration, shifting cannot always be observed on the VAG 1551 scan tool.

CAUTION!

Do not use the shift inputs (identified by an X) during the shift signal check.

- Press → button.
- Select "End Output" function 06.
- Press -Q- button to confirm input.

If the change in the shift signal display did not occur, even though the control module coding was OK:

- Connect VAG 1598/19 test box to ECM harness connector ⇒ page 01-255 .
- Check wiring for open or short circuit between ECM and TCM, using wiring diagram.

24-103

Upshift and downshift signals, checking

Notes:

- *The Engine Control Module (ECM) uses this signal in connection with the shift signal to determine whether the current signal is an upshift or downshift.*
- *The signal for upshift and downshift is monitored by the Transmission Control Module (TCM).*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01; On Board Diagnostic*

Checking requirement

- Control module coding OK ⇒ page 01-247 .

24-104

Throttle position sensor output signal, checking

Notes:

- *The Transmission Control Module (TCM) interprets this information as a load signal.*
- *This signal is monitored by the TCM.*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01; On Board Diagnostic*

Checking requirement

- Control module coding OK ⇒ page 01-247 .

24-105

Malfunction Indicator Lamp (MIL) wire from Transmission Control Module (TCM), checking

Notes:

- *If a malfunction is recognized by the Engine Control Module (ECM) or the Transmission Control Module (TCM), it is indicated by the Malfunction Indicator Lamp (MIL) in the instrument cluster.*
- *If the TCM recognizes a malfunction, the MIL is switched on via the ECM.*
- *The MIL wiring is monitored by the ECM.*

Checking requirement

- Control module coding OK ⇒ page 01-247 .

24-106

- Switch ignition ON.

- Using VAG 1551 scan tool, select "Read Measuring Value Block" function 08, display group 027, display field 1 ⇒ page 01-249 .

Read measuring value block 27 →

1 2 3 4

Indicated on display; note display field 1

Specified value: 0

- Start engine and let idle.

Specified value: 1

- Press → button.
- Select "End Output" function 06.
- Press -Q- button to confirm input.

If the specified value is not obtained, even though coding is OK:

- Connect VAG 1598/19 test box to ECM harness connector ⇒ page 01-255 .
- Check wiring for open or short circuit between ECM and TCM, using wiring diagram.

24-107

Fuel level signal (from instrument cluster), checking

Notes:

- *If the fuel level in the tank is too low (less than 3.2 gal); combustion misfire, oxygen sensor and fuel system malfunctions could occur. In these cases the malfunction "Fuel tank level too low" is stored in DTC memory.*
- *The fuel tank level signal is monitored by the Engine Control Module (ECM).*

Checking requirements:

- Control Module coding OK ⇒ page 01-247 .
- Fuel content greater than 3.2 gal (12 liters).
- Instrument cluster fuel gauge OK.

24-108

- Switch ignition ON.

- Using VAG 1551 scan tool, select "Read Measuring Value Block" function 08, display group 027, display field 2 ⇒ page 01-249 .

Read measuring value block 27 →

1 2 3 4

Indicated on display; note display field 2

Specified value: 0

- Start engine and let idle.

Specified value: 1

- Press → button.
- Select "End Output" function 06.
- Press -Q- button to confirm input.

If the specified value is not obtained, even though coding is OK:

- Connect VAG 1598/19 test box to ECM harness connector ⇒ page 01-255 .
- Check wiring for open or short circuit between ECM and instrument cluster, using wiring diagram.

24-109

Rough road condition signal, checking

ABS control module with ABS/EDL

Notes:

- *Misfires can result in malfunctions such as "Combustion misfire" being recorded in DTC memory due to road wheel malfunctions.*
- *If the ABS control module recognizes a free turning wheel, it generates a rough road signal.*
- *If the Engine Control Module (ECM) recognizes the rough road signal, misfire recognition is switched off in the ECM.*
- *The rough road signal is created to check whether DTC 18014 "Rough Road Spec Engine Torque ABS-SG Electrical Malfunction" is stored in DTC memory. The "Combustion misfire" malfunction results from this signal and can be ignored.*
- *The rough road signal is monitored by the ECM.*

Checking requirement

- Control module coding OK ⇒ page 01-247 .

Checking

- Switch ignition OFF.

- Connect VAG 1598/19 test box to ECM harness connector ⇒ page 01-255 .

- Check signal wire for open or short circuit between ECM and ABS control module, using wiring diagram.

- Find and eliminate open or short circuit; repair as necessary.

If wiring is OK:

- Replace ABS control module.

If the ABS control module is OK, but the malfunction is still occurring:

- Replace ECM ⇒ page 01-265 .

ABS control module with ABS/EDL/ASR

Notes:

- *The torque signal is monitored by the "Automatic Traction Control" Control Module and by the ECM.*

⇒ *Repair Manual, Brake System On Board Diagnostic (OBD), Repair Group 01*

- *Vehicles with automatic traction control (ASR) can be recognized by the ASR indicator light in the instrument cluster or by control module identification displayed during the ABS On Board Diagnostic program sequence.*

⇒ *Repair Manual, Brake System On Board Diagnostic (OBD), Repair Group 01*

Checking requirement

- Control module coding OK ⇒ page 01-247 .