01-1

On Board Diagnostic (OBD)

Function

The Multiport Fuel Injection (MFI) system is equipped with an Engine Control Module (ECM) -J220- with On Board Diagnostic (OBD) capability.

When malfunctions occur in sensors or components monitored by OBD, Diagnostic Trouble Codes (DTC) are stored in DTC memory.

Stored DTCs are identified using the VAG1551 Scan Tool (ST) ⇒ page 01-16 .

After the necessary repairs are completed, DTC memory must be erased ⇒ page 01-49 .

OBD II legal regulations require a display (readiness code) that shows inspection readiness for the annual exhaust emissions test. The readiness code shows that every component and/or system that affects exhaust emissions, which can lead to the Malfunction Indicator Lamp (MIL) being switched on, has been operated at least once with positive results.

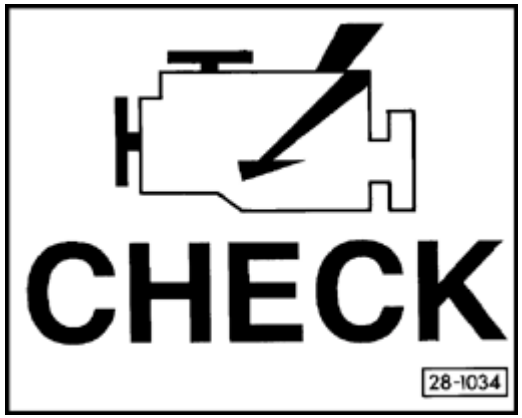
The readiness code is reset and/or erased and must be regenerated every time DTC memory is erased, the power supply to the ECM -J220- is interrupted (example: when connecting

VAG1598/22 test box), or the battery has been disconnected ⇒ page 01-73 .

01-2

Malfunction Indicator Lamp (MIL) function, checking

If a malfunction is recognized by the Engine Control Module (ECM) or the Transmission Control Module (TCM), this is indicated by the MIL coming on.



Malfunction Indicator Lamp (MIL)

Note:

When a recognized malfunction switches on the MIL, it will either blink or light continuously. In either case, DTC memory must be checked ⇒ page 01-16 .

- *If the MIL starts to blink, there is a malfunction that can lead to damage of the Three Way Catalytic Converter (TWC). In this case, driving should only continue using reduced power. The malfunction must be rectified as quickly as possible.*
- *If the MIL lights continuously, there is a malfunction that affects exhaust emissions. In this case, DTC memory must be checked, and the malfunction must be rectified as quickly as possible.*
- *Some malfunctions may occur without causing the MIL to come on. When driveability or performance problems are reported, and there is no indication from the MIL, the operation of the MIL must be checked. In addition, DTC memory must be checked, as there may be malfunctions stored that do not switch the MIL on immediately.*

01-3

Checking function

- Switch ignition on.

  MIL must light up.

- If MIL does not light when ignition is switched on, check wiring to MIL as follows:

Cause:	Remedy:
MIL is not triggered, or does not light, due to faulty wiring or open circuit.	- Switch ignition off. - Connect VAG1598/22 test box. - Connect jumper wire to bridge test box sockets 2 and 17. - Switch ignition on. • MIL must light up. If MIL does not light: - Switch ignition off. - Check bulb for MIL. If bulb is OK: - Check wiring for open circuit between MIL and Motronic ECM -J220- using applicable wiring diagram.

	If wiring is OK:
Malfunction: ▶	Motronic ECM -J220- is faulty; replace (⇒ page 01-68). Check and erase Diagnostic Trouble Code (DTC) memory and generate new readiness code ⇒ page 01-73 .

01-4

If MIL lights up when ignition is switched on, continue checking as follows:

- Start engine and let run at idle.

  MIL must go out after a few seconds.

If MIL does not go out:

- Check Diagnostic Trouble Code (DTC) memory ⇒ page 01-16 .

If there are no malfunctions stored in DTC memory:

Cause:	Remedy:
MIL is triggered continuously due to short circuit to Ground.	- Switch ignition off. - Connect VAG1598/22 test box. - Check resistance between test box socket 17 and vehicle Ground, specified value: ∞ Ω (no continuity) If the specified value is not obtained: - Check for short circuit to Ground in wiring from Motronic Engine Control Module (ECM) -J220- to MIL. - Trace malfunction using applicable wiring diagram and repair as necessary.
	If there is no continuity, and no short circuit to Ground:

Malfunction:	▶	Motronic ECM -J220- is faulty; replace (⇒ page 01-68). Check and erase Diagnostic Trouble Code (DTC) memory and generate new readiness code ⇒ page 01-73 .

01-5

On Board Diagnostic (OBD) technical data

Memory

- Temporary memory and permanent memory. If the engine control module is disconnected from the Battery Positive Voltage (B+) supply, the readiness code and learning values will be erased. Any malfunctions stored in DTC memory are not erased.

Data output

- Rapid data transfer

- Additional malfunction indication by Malfunction Indicator Lamp (MIL) lighting up

ECM identification

⇒ page 01-8 ; VAG1551 Scan Tool (ST), connecting and selecting "Engine Electronics" address word 01

ECM functions

- The Motronic ECM -J220- performs different OBD functions, carried out with the ignition switched on or with the engine running. Following are the conditions required to carry out each of the specific functions.

Address words:

Address word 00: Automatic Test Sequence	Ignition switched on -or- Engine running at idle
Address word 01: Engine Electronics	Ignition switched on -or- Engine running at idle
Address word 33: OBD II (generic scan tool)	Ignition switched on -or- Engine running at idle

01-6

Functions under "Engine Electronics" address word 01:

Function 01: Check Control Module Version	Ignition switched on -or- Engine running at idle
Function 02: Check DTC Memory	Engine running at idle, otherwise crank engine with starter motor for at least 5 sec., then do not switch ignition off
Function 03: Output Diagnostic Test Mode	Ignition switched on
Function 04: Basic Setting	Engine running at idle
Function 07: Code Control Module	Ignition switched on
Function 08: Read Measuring Value Block	Ignition switched on -or- Engine running at idle -or- Driving

01-7

Modes under address word 33:

Mode 1: Transfer diagnostic data	Ignition switched on -or- Engine running at idle
Mode 2: Transfer operating conditions	Ignition switched on -or- Engine running at idle
Mode 3: Check DTC memory	Ignition switched on -or- Engine running at idle
Mode 4: Erase diagnosis information	Ignition switched on -or- Engine running at idle
Mode 5: Output of HO2S signals	Ignition switched on -or- Engine running at idle
Mode 6: Transfer measuring values	Ignition switched on -or- Engine running at idle
Mode 7: Check DTC memory	Ignition switched on -or- Engine running at idle

- Under Address word 33, Modes 1-7 can be addressed.
- Under Mode 1, individual measuring values can be displayed. Mode 1 is not recommended for use in an Audi Service department, because these values can be displayed much more precisely using address word 01 and "Basic Setting" function 04 or "Read Measuring Value Block" function 08.
- Mode 2 shows the operating conditions under which the stored malfunctions were recognized.
- With Mode 3, DTC memory is checked-with Mode 4, DTC memory is erased.
- Mode 5 shows the statistical value of the oxygen sensors as mandated by law. As these values have no direct bearing on oxygen sensor diagnosis, Mode 5 is of no particular value in an Audi Service department.
- Under Mode 6, values can be checked for components and systems that are not continuously monitored.

- *With Mode 7 all malfunctions can be checked, even if they have not switched on the Malfunction Indicator Lamp (MIL) (if the MIL has not been switched on, there is no malfunction recognized under Mode 3)*

01-8

VAG1551/VAG1552 Scan Tool (ST), connecting and selecting "Engine Electronics" address word 01

WARNING!

- ***When driving or riding in an airbag-equipped vehicle, NEVER hold the scan tool or other test equipment in your hands or lap while in motion. Objects between you and the airbag increase the risk of injury in an accident.***

- ***During a test drive in an airbag-equipped vehicle, test equipment must always be fastened to and operated from the rear seat by a second technician.***

Required special tools and test equipment

- VAG1551 Scan Tool (ST) with VAG1551/3 adapter cable

Note:

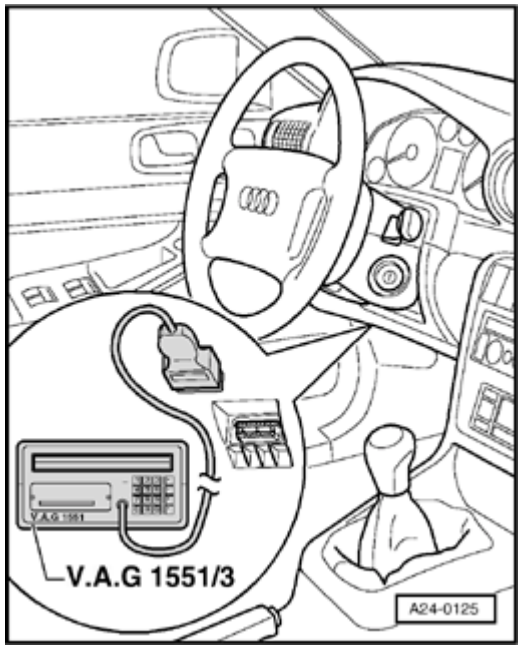
VAG1552 can also be used, but there is no print-out capability.

Requirements

- Fuses for engine electronics OK

- Battery Positive Voltage (B+) OK (at least 11 volts)
- Engine and transmission GND connections OK ⇒ Electrical Wiring Diagrams, Troubleshooting & Component Locations binder
- Fuel pump relay OK

01-9



Connecting

- Locate Data Link Connector (DLC), under driver's knee bar to left of steering wheel.
- Connect VAG1551 Scan Tool (ST) with VAG1551/3 adapter cable to DLC.
- Switch ignition on, or start engine, depending on function to be selected (⇒ page 01-5).

Notes:

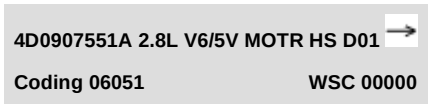
- *If scan tool displays do not appear as indicated:*

⇒ *Scan tool operating instructions*

- *If "Error in communication link" is displayed, disconnect adapter cable at scan tool, reconnect, and repeat procedure.*

- Operate scan tool and advance through program sequence by following display:
  - Press button -1- to select "Rapid data transfer" operating mode 01.
  - Press buttons -0- and -1- to insert "Engine Electronics" address word 01, and press -Q- button to confirm input.

01-10



Indicated on display (ECM identification and coding, example)

4D0 _ _ _	Engine Control Module (ECM) Part No.
2.8 L	Engine displacement
V6/5V	Engine type:
	V-engine, 6-cylinder, 5-valve
MOTR	Motronic
HS	Manual transmission
AT	Automatic transmission
D..	ECM software version
Coding	ECM coding
	Coding variations ⇒ page 01-14
WSC 12345	Plant number: indicates where VAG1551 scan tool was used for last coding and/or adaptation (as long as factory coding has not been changed, WSC 00000 is displayed)

01-11

Notes:

If the ECM version that corresponds to the vehicle is not displayed, replace ECM ⇒ page 01-68 . Incorrect ECM coding leads to:

- *Performance problems (e.g. jerky shifting, abrupt load changes, etc.)*
- *Increased fuel consumption*
- *Elevated exhaust gas values*
- *Reduction in transmission service life*
- *Storage of non-existent malfunctions in DTC memory*
- *Necessary functions not being carried out (oxygen sensor control, actuation of EVAP canister system, etc.)*

- Press → button to advance through program sequence.

Rapid data transfer HELP	
Select function XX	

Indicated on display

- Continue as specified in procedures for specific OBD functions.

01-12

Code Control Module (scan tool function 07)

If vehicle coding information is not as specified, or if the ECM has been replaced, the ECM must be coded as follows.

Required special tools and test equipment

- VAG1551 Scan Tool (ST) with VAG1551/3 adapter cable

Coding procedure

- Connect VAG1551/VAG1552 Scan Tool (ST) and press buttons -0- and -1- to insert "Engine Electronics" address word 01 (ignition switched on) ⇒ page 01-8 .

Rapid data transfer HELP **Select function XX**	Indicated on display

- Press buttons -0- and -7- to select "Code Control Module" function 07, and press -Q- button to confirm input.

Code Control Module HELP **Input code number XXXXX (0-32000)**	Indicated on display

- Input applicable code number for vehicle, and press -Q- button to confirm input. ECM coding variations ⇒ page 01-14 .

Function is unknown or →	If indicated on display:

cannot be carried out at the moment	Incorrect code number has been entered.

01-13

4D0907551A 2.8L V6/5V MOTR HS D01 →	
Coding 06051	**WSC 00000**

Rapid data transfer	**HELP**
Select function XX	

➢ Indicated on display (ECM identification and coding, e.g. 06051)

- Press → button to advance through program sequence.

➢ Indicated on display

- Press buttons -0- and -6- to select "End Output" function 06, and press -Q- button to confirm input.

Notes:

The Motronic ECM -J220- only uses the code that has been entered after the ignition has been switched off once. Incorrect coding leads to:

- *Performance problems (e.g. jerky shifting, abrupt load changes, etc.)*
- *Increased fuel consumption*
- *Elevated exhaust gas values*
- *Storage of non-existent malfunctions in DTC memory*
- *Reduction in transmission service life*

01-14

ECM coding variations

Country/Emissions	Drivetrain/Options	Transmission	Vehicle type
00 = ----------	0 = Front-wheel-drive without traction control (ASR)	0 = 5-speed manual	0 = ---------- ------
01 = ----------	1 = Front-wheel-drive with traction control (ASR)	1 = ----------	1 = A4
02 = ----------	2 = All-wheel-drive without traction control (ASR)	2 = ----------	2 = ---------- ------
03 = ----------	3 = All-wheel-drive with traction control (ASR)	3 = ----------	3 = ---------- ------
04 = ----------	4 = ----------	4 = ----------	4 = ---------- ------
05 = ----------	5 = ----------	5 = Automatic trans. 01V	5 = ---------- ------
06 = USA, equipped with EVAP system Leak Detection Pump (LDP)	6 = ----------	6 = ----------	6 = ---------- ------

01-15

Code number structure (example)					
USA vehicle with Leak Detection Pump (LDP):	0	6			
Front-wheel-drive without traction control (ASR):			0		
Automatic transmission 01V:				5	
Audi A4:					1
Code number:	0	6	0	5	1

Note:

Vehicles with traction control (ASR) can be recognized by the ASR control light in the instrument cluster or by ABS/ASR On Board Diagnostic (OBD).

⇒ Repair Manual, Brake System, Repair Group 01

01-16

Check DTC Memory (scan tool function 02)

Required special tools and test equipment

- VAG1551 Scan Tool (ST) with VAG1551/3 adapter cable

Checking

- Connect VAG1551/VAG1552 Scan Tool (ST) and press buttons -0- and -1- to insert "Engine Electronics" address word 01 (engine running at idle) ⇒ page 01-8 .

Note:

If engine does not start:

- Operate starter to crank engine for approx. 6 seconds, then do not switch ignition off.

- Press PRINT button to switch scan tool printer on (indicator light in button lights up).

Rapid data transfer	**HELP**
Select function XX	

Indicated on display

- Press buttons -0- and -2- to select "Check DTC Memory" function 02, and press -Q- button to confirm input.

01-17

X DTC recognized	⇐	Indicated on display (number of stored malfunctions, or "No DTC recognized")

Note:

If scan tool displays do not appear as indicated:

⇒ *Scan tool operating instructions*

If one or more malfunctions are stored:

Stored malfunctions are displayed one after another, and are printed out along with applicable DTCs.

Rapid data transfer HELP **Select function XX**	⇐	Indicated on display (after all stored malfunctions)

If no DTCs are recognized:

- Press → button to advance through program sequence.
- Press buttons -0- and -6- to select "End Output" function 06, and press -Q- button to confirm input.
- Repair malfunctions according to Diagnostic Trouble Code (DTC) table ⇒ page 01-18 .
- Erase DTC memory ⇒ page 01-49 .

01-18

Diagnostic Trouble Code (DTC) table

Notes:

- *The DTC table is organized according to SAE and VAG diagnostic trouble codes.*
- *The column labeled "MIL" specifies the MIL switching condition associated with that DTC.*
- *DTCs that do not switch on the MIL after the malfunction is recognized by the ECM are identified by the MIL switching condition "Off."*
- *DTCs that do switch on the MIL immediately after the malfunction is recognized by the ECM are identified by the MIL switching condition "Immed."*
- *DTCs that are recognized by the ECM and switch on the MIL after two consecutive driving cycles (Dcy) are identified by the MIL switching condition "2 Dcy."*
- *Always correct malfunctions that are designated "immediately" as soon as possible, followed by those malfunctions that are designated "2 Dcy."*
- *When all repairs have been completed, erase DTC memory (⇒ page 01-49) and then generate new readiness code ⇒ page 01-73 .*
- *DTCs that are recognized as a result of intermittent malfunctions, or DTCs that are not erased after repairs, are classified as sporadic malfunctions. These are identified by the designation "SP" appearing in the display.*
- *A sporadic malfunction will be erased if it no longer occurs after 50 driving cycles during which the engine reaching*

operating temperature.

01-19

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P0102	16486	Mass or Volume Air Flow Circ. Low Input	2 Dcy	- Check Mass Air Flow (MAF) sensor -G70- ⇒ page 24-68
P0103	16487	Mass or Volume Air Flow Circ. High Input		
P0112	16496	Intake Air Temp. Circ. Low Input	2 Dcy	- Check Intake Air Temperature (IAT) sensor -G42- ⇒ page 24-82
P0113	16497	Intake Air Temp. Circ. High Input		
P0116	16500	Engine Coolant Temp. Circ. Range/Performance	2 Dcy	- Check Engine Coolant Temperature (ECT) sensor -G62- ⇒ page 24-75
P0117	16501	Engine Coolant Temp. Circ. Low Input		
P0118	16502	Engine Coolant Temp. Circ. High Input		
P0121	16505	Throttle/Pedal Pos. Sensor A	2	

		Circ. Range/Performance	Dcy	- Check Throttle Position (TP) sensor -G69- ⇒ page 24-128
P0122	16506	Throttle/Pedal Pos. Sensor A Circ. Low Input		
P0123	16507	Throttle/Pedal Pos. Sensor A Circ. High Input		

01-20

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P0130	16514	O2 Sensor Circ., Bank1-Sensor1 Malfunction	2 Dcy	- Check Heated Oxygen Sensor (HO2S) -G39- and O2S control (bank 1, sensor1) ⇒ page 24-22
P0131	16515	O2 Sensor Circ., Bank1-Sensor1 Low Voltage		
P0132	16516	O2 Sensor Circ., Bank1-Sensor1 High Voltage		
P0133	16517	O2 Sensor Circ., Bank1-Sensor1 Slow Response	2 Dcy	- Check HO2S -G39- aging (bank 1, sensor1) ⇒ page 24-60
P0134	16518	O2 Sensor Circ., Bank1-Sensor1 No Activity Detected	2 Dcy	- Check HO2S -G39- and O2S control (bank 1, sensor1) ⇒ page 24-22
P0136	16520	O2 Sensor Circ., Bank1-Sensor2 Malfunction	2 Dcy	- Check Oxygen Sensor (O2S) behind Three Way Catalytic Converter (TWC) -G130- (bank 1, sensor 2) ⇒ page 24-42

P0137	16521	O2 Sensor Circ., Bank1-Sensor2 Low Voltage		
P0138	16522	O2 Sensor Circ., Bank1-Sensor2 High Voltage		
P0140	16524	O2 Sensor Circ., Bank1-Sensor2 No Activity Detected		

01-21

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P0150	16534	O2 Sensor Circ., Bank2-Sensor1 Malfunction	2 Dcy	- Check Heated Oxygen Sensor (HO2S) -G108- and Oxygen Sensor (O2S) control (bank 2, sensor 1) ⇒ page 24-22
P0151	16535	O2 Sensor Circ., Bank2-Sensor1 Low Voltage		
P0152	16536	O2 Sensor Circ., Bank2-Sensor1 High Voltage		
P0153	16537	O2 Sensor Circ., Bank2-Sensor1 Slow Response	2 Dcy	- Check HO2S -G108- aging (bank 2, sensor 1) ⇒ page 24-63
P0154	16538	O2 Sensor Circ., Bank2-Sensor1 No Activity Detected	2 Dcy	- Check HO2S -G108- and O2S control (bank 2, sensor 1) ⇒ page 24-22
P0156	16540	O2 Sensor Circ., Bank2-Sensor2 Malfunction	2 Dcy	- Check O2S 2 behind Three Way Catalytic Converter (TWC) -G131- (bank 2, sensor 2) ⇒ page 24-52

P0157	16541	O2 Sensor Circ., Bank2-Sensor2 Low Voltage		
P0158	16542	O2 Sensor Circ., Bank 2-Sensor2 High Voltage		
P0160	16544	O2 Sensor Circ., Bank2-Sensor2 No Activity Detected		

01-22

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P0300	16684	Random/Multiple Cylinder Misfire Detected	2 Dcy / blink	- Fuel level too low, check fuel level and add if necessary - Check misfire detection ⇒ page 28-16 - Check fuel injectors ⇒ page 24-102 - Carry out output Diagnostic Test Mode (DTM) ⇒ page 01-51 - Check engine speed (RPM) sensor -G28- ⇒ page 24-88
P0301	16685	Cyl. 1 Misfire Detected		
P0302	16686	Cyl. 2 Misfire Detected		
P0303	16687	Cyl. 3 Misfire Detected		
P0304	16688	Cyl. 4 Misfire Detected		
P0305	16689	Cyl. 5		

		Misfire Detected		
P0306	16690	Cyl. 6 Misfire Detected		

01-23

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P0321	16705	Ign./Distributor Eng. Speed Inp. Circ. Range/Performance	2 Dcy	- Check engine speed (RPM) sensor - G28- ⇒ page 24-88
P0322	16706	Ign./Distributor Eng. Speed Inp. Circ. No Signal	Immed.	

Note on misfire malfunctions:

For malfunctions that may be caused by low fuel volume (i.e. combustion misfire) a low-fuel malfunction (DTC "P1250") is also stored when there is less than 2 gallons of fuel remaining in the tank.

01-24

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P0327	16711	Knock Sensor1 Circ. Low Input	Immed.	- Check knock sensors and knock sensor control ⇒ page 28-8
P0328	16712	Knock Sensor1 Circ. High Input		
P0332	16716	Knock Sensor2 Circ. Low Input		
P0333	16717	Knock Sensor2 Circ. High Input		
P0411	16795	Sec. Air Inj. Sys. Incorrect Flow Detected	2 Dcy	- Check Secondary Air Injection (AIR) system ⇒ Repair Manual, 2.8 Liter V6 5V Engine Mechanical, Repair Group 26
P0422	16806	Main Catalyst, Bank1 Efficiency Below Threshold	2 Dcy	- Check Heated Oxygen Sensor (HO2S) -G39- and O2S control (bank 1, sensor1) ⇒ page 24-22

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P0432	16816	Main Catalyst, Bank2 Efficiency Below Threshold	2 Dcy	- Check HO2S -G108- and O2S control (bank 2, sensor 1) ⇒ page 24-22
P0441	16825	EVAP Emission Contr. Sys. Incorrect Purge Flow	Off	- Check Evaporative Emissions (EVAP) canister purge regulator valve -N80- ⇒ output Diagnostic Test Mode (DTM), ⇒ page 01-51
P0442	16826	EVAP Emission Contr. Sys. (Small Leak) Leak Detected	Off	- Check Evaporative Emission (EVAP) system ⇒Repair Manual, Fuel Supply System, Repair Group 20
P0455	16839	EVAP Emission Contr. Sys. (Gross Leak) Leak Detected	Off	- Check Evaporative Emission (EVAP) system ⇒Repair Manual, Fuel Supply System, Repair Group 20
P0501	16885	Vehicle Speed Sensor Range/Performance	2 Dcy	- Check vehicle speed signal ⇒ page 24-168

01-26

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P0506	16890	Idle Control System RPM Lower Than Expected	2 Dcy	- Check idle speed ⇒ page 24-16 - Check throttle valve control module ⇒ page 24-128 - Check fuel pressure, fuel pressure regulator, and residual fuel pressure ⇒ page 24-111
P0507	16891	Idle Control System RPM Higher Than Expected		
P0601	16985	Internal Contr. Module Memory Check Sum Error	2 Dcy	Replace ECM ⇒ page 01-68
P0604	16988	Internal Contr. Module Random Access Memory (RAM) Error		
P1102	17510	O2 Sensor Heating Circ., Bank1-Sensor1 Short to B+	2 Dcy	- Check Oxygen Sensor (O2S) heater -Z19- (bank 1, sensor 1, before TWC) ⇒ page 24-34
P1105	17513	O2 Sensor Heating Circ., Bank1-Sensor2 Short to B+	2 Dcy	- Check O2S heater -Z29- (bank 1, sensor 2, behind TWC) ⇒ page 24-52

P1107	17515	O2 Sensor Heating Circ., Bank2-Sensor1 Short to B+	2 Dcy	- Check O2S heater -Z28- (bank 2, sensor 1, before TWC) ⇒ page 24-34

01-27

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1110	17518	O2 Sensor Heating Circ., Bank2-Sensor2 Short to B+	2 Dcy	- Check O2S heater -Z30- (bank 2, sensor 2, behind TWC) ⇒ page 24-52
P1127	17535	Long Term Fuel Trim mult., Bank1 System too Rich 1)	2 Dcy	- Check Mass Air Flow (MAF) sensor -G70- ⇒ page 24-68 - Check Heated Oxygen Sensor (HO2S) -G39- (bank 1, sensor 1) and O2S control ⇒ page 24-22 - Check Oxygen Sensor (O2S) behind Three Way Catalytic Converter (TWC) -G130- (bank 1, sensor 2) and O2S control ⇒ page 24-42 - Check fuel pressure, fuel pressure regulator and residual fuel pressure ⇒ page 24-111 - Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51

1) The term "mult." = multiplicative; applies to entire engine speed (RPM) and load range.

01-28

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1128	17536	Long Term Fuel Trim mult., Bank1 System too Lean 1)	2 Dcy	- Check Heated Oxygen Sensor (HO2S) -G39- (bank 1, sensor 1) and O2S control ⇒ page 24-22 - Check Oxygen Sensor (O2S) behind Three Way Catalytic Converter (TWC) -G130- (bank 1, sensor 2) and O2S control ⇒ page 24-42 - Check fuel pressure, fuel pressure regulator and residual fuel pressure ⇒ page 24-111 - Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51 - Check EVAP canister purge regulator valve ⇒ output Diagnostic Test Mode (DTM), ⇒ page 01-51

1) The term "mult." = multiplicative; applies to entire engine speed (RPM) and load range.

01-29

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1129	17537	Long Term Fuel Trim mult., Bank2 System too Rich 1)	2 Dcy	- Check Mass Air Flow (MAF) sensor -G70- ⇒ page 24-68 - Check Heated Oxygen Sensor (HO2S) 2 -G108- (bank 2, sensor 1) and O2S control ⇒ page 24-22 - Check Oxygen Sensor (O2S) 2 behind Three Way Catalytic Converter (TWC) -G131- (bank 2, sensor 2) and O2S control ⇒ page 24-42 - Check fuel pressure, fuel pressure regulator and residual fuel pressure ⇒ page 24-111 - Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51

1) The term "mult." = multiplicative; applies to entire engine speed (RPM) and load range.

01-30

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1130	17538	Long Term Fuel Trim mult., Bank2 System too Lean 1)	2 Dcy	- Check Heated Oxygen Sensor (HO2S) 2 -G108- (bank 2, sensor 1) and O2S control ⇒ page 24-22 - Check Oxygen Sensor (O2S) 2 behind Three Way Catalytic Converter (TWC) -G131- (bank 2, sensor 2) and O2S control ⇒ page 24-42 - Check fuel pressure, fuel pressure regulator and residual fuel pressure ⇒ page 24-111 - Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51 - Check EVAP canister purge regulator valve ⇒ output Diagnostic Test Mode (DTM), ⇒ page 01-51

1) The term "mult." = multiplicative; applies to entire engine speed (RPM) and load range.

01-31

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1136	17544	Long Term Fuel Trim Add. Fuel, Bank1 System too Lean 2)	2 Dcy	- Check intake air system for leaks ("false air") ⇒ page 24-126 - Check Heated Oxygen Sensor (HO2S) -G39- (bank 1, sensor 1) and O2S control ⇒ page 24-22 - Check Mass Air Flow (MAF) sensor -G70- ⇒ page 24-68 - Check fuel pressure, fuel pressure regulator and residual fuel pressure ⇒ page 24-111 - Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51

2) The term "Add." = additive; applies only with engine running at idle speed.

01-32

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1137	17545	Long Term Fuel Trim Add. Fuel, Bank1 System too Rich 2)	2 Dcy	- Check Heated Oxygen Sensor (HO2S) -G39- (bank 1, sensor 1) and O2S control ⇒ page 24-22 - Check fuel pressure, fuel pressure regulator and residual pressure ⇒ page 24-111 - Check exhaust system for leakage ⇒ Repair Manual, 2.8 Liter V6 5V Engine Mechanical, Repair Group 26

2) The term "Add." = additive; applies only with engine running at idle speed.

01-33

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1138	17546	Long Term Fuel Trim Add. Fuel, Bank2 System too Lean 2)	2 Dcy	- Check intake air system for leaks ("false air") ⇒ page 24-126 - Check Heated Oxygen Sensor (HO2S) 2 -G108- (bank 2, sensor 1) and O2S control ⇒ page 24-22 - Check Mass Air Flow (MAF) sensor -G70- ⇒ page 24-68 - Check fuel pressure, fuel pressure regulator and residual fuel pressure ⇒ page 24-111 - Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51

2) The term "Add." = additive; applies only with engine running at idle speed.

01-34

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1139	17547	Long Term Fuel Trim Add. Fuel, Bank2 System too Rich 2)	2 Dcy	- Check Heated Oxygen Sensor (HO2S) 2 -G108- (bank 2, sensor 1) and O2S control ⇒ page 24-22 - Check fuel pressure, fuel pressure regulator and residual pressure ⇒ page 24-111 - Check exhaust system for leakage ⇒ Repair Manual, 2.8 Liter V6 5V Engine Mechanical, Repair Group 26
P1141	17549	Load Calculation Cross Check Range/Performance	2 Dcy	- Check Mass Air Flow (MAF) sensor -G70- ⇒ page 24-68 - Check throttle valve control module ⇒ page 24-128
P1171	17579	Throttle Actuation Potentiometer Signal 2 Range/Performance 1)	Immed.	- Check throttle actuation potentiometer ⇒ page 24-136 .

1) With this malfunction the exhaust Malfunction Indicator Light (MIL) is switched on by the ECM, immediately after the malfunction has been recognized. Significance of MIL ⇒ page 01-2 .

2) The term "Add." = additive; applies only with engine running at idle speed.

01-35

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1176	17584	O2 Correction Behind Catalyst, B1 Limit Attained	Off	- Check intake air system for leaks ("false air") ⇒ page 24-126 - Check Heated Oxygen Sensor (HO2S) aging (bank 1, sensor 1) ⇒ page 24-60 - Check Oxygen Sensor (O2S) heater -Z29- (bank 1, sensor 2) ⇒ page 24-52 - Check O2S behind TWC (bank 1, sensor 2) ⇒ page 24-42
P1177	17585	O2 Correction Behind Catalyst, B2 Limit Attained	Off	- Check intake air system for leaks ("false air") ⇒ page 24-126 - Check Heated Oxygen Sensor (HO2S) 2 aging (bank 2, sensor 1) ⇒ page 24-63 - Check Oxygen Sensor (O2S) 2 heater -Z29- (bank 2, sensor 2) ⇒ page 24-52 - Check O2S 2 behind TWC (bank 2, sensor 2) ⇒ page 24-42

01-36

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1196	17604	O2 Sensor Heater Circ., Bank1-Sensor1 Electrical Malfunction	2 Dcy	- Check Oxygen Sensor (O2S) heater -Z19- (bank 1, sensor 1) ⇒ page 24-34
P1197	17605	O2 Sensor Heater Circ., Bank2-Sensor1 Electrical Malfunction	2 Dcy	- Check Oxygen Sensor (O2S) heater -Z28- (bank 2, sensor 1) ⇒ page 24-34
P1198	17606	O2 Sensor Heater Circ., Bank1-Sensor2 Electrical Malfunction	2 Dcy	- Check Oxygen Sensor (O2S) heater -Z29- (bank 1, sensor 2) ⇒ page 24-52
P1199	17607	O2 Sensor Heater Circ., Bank2-Sensor2 Electrical Malfunction	2 Dcy	- Check Oxygen Sensor (O2S) heater -Z30- (bank 2, sensor 2) ⇒ page 24-52
P1213	17621	Cyl.1-Fuel Inj. Circ. Short to B+	Immed.	- Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51
P1214	17622	Cyl.2-Fuel Inj. Circ. Short to B+		- Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51

01-37

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1215	17623	Cyl.3-Fuel Inj. Circ. Short to B+		- Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51
P1216	17624	Cyl.4-Fuel Inj. Circ. Short to B+		- Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51
P1217	17625	Cyl.5-Fuel Inj. Circ. Short to B+		- Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51

01-38

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1218	17626	Cyl.6-Fuel Inj. Circ. Short to B+	Immed.	- Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51
P1225	17633	Cyl.1-Fuel Inj. Circ. Short to Ground		
P1226	17634	Cyl.2-Fuel Inj. Circ. Short to Ground		
P1227	17635	Cyl.3-Fuel Inj. Circ. Short to Ground		
P1228	17636	Cyl.4-Fuel Inj. Circ. Short to Ground		
P1229	17637	Cyl.5-Fuel Inj. Circ. Short to Ground		

P1230	17638	Cyl.6-Fuel Inj. Circ. Short to Ground		

01-39

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1237	17645	Cyl.1-Fuel Inj. Circ. Open Circuit	Immed.	- Check fuel injectors ⇒ page 24-102 and ⇒ Output Diagnostic Test Mode (DTM) ⇒ page 01-51
P1238	17646	Cyl.2-Fuel Inj. Circ. Open Circuit		
P1239	17647	Cyl.3-Fuel Inj. Circ. Open Circuit		
P1240	17648	Cyl.4-Fuel Inj. Circ. Open Circuit		
P1241	17649	Cyl.5-Fuel Inj. Circ. Open Circuit		
P1242	17650	Cyl.6-Fuel Inj. Circ. Open Circuit		

01-40

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1250	17658	Fuel Level Too Low	Off	- Fuel volume less than 2 gallons; add fuel - Check "fuel level low" signal ⇒ page 24-176 - Check fuel level sensor signal and fuel gauge ⇒ *Repair Manual, Electrical Equipment, Repair Group 01 (instrument cluster diagnostics, Read Measuring Value Block)*

Note on misfire malfunctions:

For malfunctions that may be caused by low fuel volume (i.e. combustion misfire) a low-fuel malfunction (DTC "P1250") is also stored when there is less than 2 gallons of fuel remaining in the tank.

01-41

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1325	17733	Cyl.1-Knock Contr. Limit Attained	Off	- Check knock sensors and knock sensor control ⇒ page 28-8
P1326	17734	Cyl.2-Knock Contr. Limit Attained		
P1327	17735	Cyl.3-Knock Contr. Limit Attained		
P1328	17736	Cyl.4-Knock Contr. Limit Attained		
P1329	17737	Cyl.5-Knock Contr. Limit Attained		
P1330	17738	Cyl.6-Knock Contr. Limit Attained		
P1337	17745	Camshaft Pos. Sensor, Bank1 Short to Ground	2 Dcy	- Check Camshaft Position (CMP) sensor 2 -G163- ⇒ page 28-5
P1338	17746	Camshaft Pos. Sensor, Bank1		

		Open Circ./Short to B+		
P1386	17794	Internal Control Module Knock Control Circ. Error	2 Dcy	- Replace ECM ⇒ page 01-68

01-42

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1391	17799	Camshaft Pos. Sensor, Bank2 Short to Ground	2 Dcy	- Check Camshaft Position (CMP) sensor -G40- ⇒ page 28-2
P1392	17800	Camshaft Pos. Sensor, Bank2 Open Circ./Short to B+		
P1410	17818	Tank Ventilation Valve Circ. Short to B+	2 Dcy	- Check Evaporative Emissions (EVAP) canister purge regulator valve ⇒ output Diagnostic Test Mode (DTM), ⇒ page 01-51
P1421	17829	Sec. Air Inj. Valve Circ. Short to Ground	Immed.	- Check Secondary Air Injection (AIR) system ⇒ output Diagnostic Test Mode (DTM), ⇒ page 01-51
P1422	17830	Sec. Air Inj. Sys. Contr. Valve Circ. Short to B+		
P1425	17833	Tank Vent Valve Short to Ground	2 Dcy	- Check Evaporative Emissions (EVAP) canister purge regulator valve ⇒ output Diagnostic Test Mode (DTM), ⇒ page 01-51

P1426	17834	Tank Vent Valve Open		

01-43

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1432	17840	Sec. Air Inj. Valve Open	2 Dcy	- Check Secondary Air Injection (AIR) system ⇒ output Diagnostic Test Mode (DTM), ⇒ page 01-51
P1433	17841	Sec. Air Inj. Sys. Pump Relay Circ. Open		
P1434	17842	Sec. Air Inj. Sys. Pump Relay Circ. Short to B+		
P1435	17843	Sec. Air Inj. Sys. Pump Relay Circ. Short to Ground		
P1436	17844	Sec. Air Inj. Sys. Pump Relay Circ. Electrical Malfunction		
P1471	17879	EVAP Emission Contr. LDP Circ. Short to B+	Off	- Check Leak Detection Pump (LDP) ⇒ page 24-124
P1472	17880	EVAP Emission Contr. LDP		

		Circ. Short to Ground		
P1473	17881	EVAP Emission Contr. LDP Circ. Open Circ.		
P1476	17884	EVAP Emission Contr. LDP Circ. Malfunction/Insufficient Vacuum	Off	- Check Evaporative Emission (EVAP) system ⇒Repair Manual, Fuel Supply System, Repair Group 20
P1477	17885	EVAP Emission Contr. LDP Circ. Malfunction		

01-44

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1500	17908	Fuel Pump Relay Circ. Electrical Malfunction	Immed.	- Check fuel pump relay and relay actuation ⇒ page 24-95
P1501	17909	Fuel Pump Relay Circ. Short to Ground		
P1502	17910	Fuel Pump Relay Circ. Short to B+		
P1505	17913	Closed Throttle Pos. Switch Does Not Close/Open Circ.	2 Dcy	- Check throttle body and throttle valve control module ⇒ page 24-128
P1512	17920	Intake Manifold Changeover Valve Circ. Short to B+	Immed.	- Check Intake Manifold Tuning (IMT) valve (change-over valve) ⇒ page 24-154
P1515	17923	Intake Manifold Changeover Valve Circ. Short to Ground		
P1516	17924	Intake Manifold Changeover Valve Circ. Open		

P1519	17927	Intake Camshaft Contr., Bank1 Malfunction	2 Dcy	- Check camshaft adjustment ⇒ page 28-29
P1522	17930	Intake Camshaft Contr., Bank2 Malfunction		

01-45

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1543	17951	Throttle Actuation Potentiometer Signal too Low	2 Dcy	- Check throttle drive and angle sensor for throttle drive ⇒ page 24-136
P1544	17952	Throttle Actuation Potentiometer Signal too High		
P1545	17953	Throttle Pos. Contr. Malfunction		
P1558	17966	Throttle Actuator Electrical Malfunction		
P1559	17967	Idle Speed Contr. Throttle Pos. Adaptation Malfunction (Adaptation of throttle valve control module to engine control module interrupted by application of accelerator pedal or by starting engine.)	Off	- Check adaptation of throttle valve control module to Engine Control Module (ECM) ⇒ page 24-150
P1560	17968	Maximum Engine Speed Exceeded	Off	- Carry out engine mechanical repairs as necessary

01-46

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1564	17972	Idle Speed Contr. Throttle Pos. Low Voltage During Adaptation (Supply voltage under 10 V during adaptation of throttle valve control module to engine control module.)	Off	- Check voltage supply to ECM ⇒ page 24-90
P1565	17973	Idle Speed Contr. Throttle Pos. Lower Impact Not Attained (Lower specification not attained during adaptation of throttle valve control module to engine control module, e.g., accelerator pedal cable incorrectly adjusted, throttle body dirty, etc.)	2 Dcy	- Clean throttle body - Check accelerator pedal cable adjustment ⇒Repair Manual, Fuel Supply System, Repair Group 20
P1600	18008	Power Supply (B+) Terminal 15 Low Voltage	Immed.	- Check voltage supply to Engine Control Module (ECM) ⇒ page 24-90

01-47

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1602	18010	Power Supply (B+) Terminal 30 Low Voltage	Off	- Check voltage supply to ECM ⇒ page 24-90
P1606	18014	Rough Road Spec Engine Torque ABS-ECU Electrical Malfunction	Off	- Check ABS control module signal for rough road recognition ⇒ page 24-174
P1612	18020	Electronic Control Module Incorrect Coding (Vehicle with automatic transmission is coded for manual transmission.)	Immed.	- Code ECM ⇒ page 01-12
		Electronic Control Module Incorrect Coding (Vehicle with ASR is not coded for ASR)	Off	

01-48

Diagnostic Trouble Code (DTC)		Malfunction text	MIL	Corrective action
SAE	VAG			
P1624	18032	MIL Request Sign. active	Immed.	- Check DTC memory for Transmission Control Module (TCM) and correct malfunctions ⇒ Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 01
P1626	18034	CAN-Bus Missing Message from Transm. Contr.	2 Dcy	- Check CAN-Bus ⇒ page 24-172
P1640	18048	Internal Contr. Module (EEPROM) Error	2 Dcy	- Replace ECM ⇒ page 01-68
P1681	18089	Contr. Unit Programming Programming not Finished	Immed.	- Replace ECM ⇒ page 01-68
P1690	18098	Malfunction Indicator Light Malfunction	Off	- Check wire from ECM to Malfunction Indicator Light (MIL) ⇒ page 01-2

Note for DTC P1624/18032:

If this malfunction is detected by the Transmission Control Module (TCM), the MIL is switched on by the ECM. In this case, the ECM stores the malfunction "MIL Request Sign. active" (DTC P1624/18032). After repairing the malfunction, erase DTC memory of the ECM.

01-49

Erase DTC Memory (scan tool function 05)

Required special tools and test equipment

- VAG1551 Scan Tool (ST) with VAG1551/3 adapter cable

Test condition

- Malfunction(s) repaired

Note:

If DTC memory has been erased, generate new readiness code ⇒ *page 01-73* .

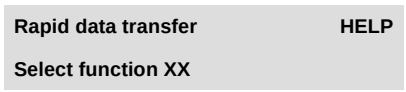
Erasing

- Connect VAG1551/VAG1552 Scan Tool (ST) and press buttons -0- and -1- to insert "Engine Electronics" address word 01 (engine running at idle) ⇒ page 01-8 .

Rapid data transfer HELP
Select function XX

Indicated on display

- Press buttons -0- and -2- to select "Check DTC Memory" function 02, and press -Q- button to confirm input.
- Press → button to advance through program sequence until all stored malfunctions have been displayed.



Indicated on display

01-50

- Press buttons -0- and -5- to select "Erase DTC Memory" function 05, and press -Q- button to confirm input.

Rapid data transfer →

DTC Memory is erased

Indicated on display

- Press → button to advance through program sequence.

Rapid data transfer **HELP**

Select function XX

Indicated on display

- Press buttons -0- and -6- to select "End Output" function 06, and press -Q- button to confirm input.
- Road test.

⇒ Safety precautions for road testing vehicle page 24-9

- Initiate "Automatic Test Sequence" by pressing -0- button twice to insert address word 00.
- Check readiness code ⇒ page 01-70 . If DTC memory has been erased, or ECM has been disconnected, generate readiness code ⇒ page 01-73 .

01-51

Output Diagnostic Test Mode (DTM) (scan tool function 03)

Notes:

- *The output Diagnostic Test Mode (DTM) can be activated only with ignition switched on and the engine not running.*
- *The output DTM is interrupted if the engine is started, or if a rotary pulse from the ignition system is recognized.*
- *When operating in the output DTM, the individual output signals are actuated until the program sequence is advanced by pressing the →button.*
- *Output signals are checked by listening for the sound of the component being actuated, or feeling for mechanical evidence of actuation, such as clicking, vibration, etc.*
- *Without letting the engine run, briefly switch the ignition off for approx. 20 seconds before repeating the output checks.*
- *During the entire output DTM sequence, the electric fuel pump will run.*

- *The output DTM will be interrupted after 10 minutes.*

- *Component locations ⇒ page 24-1*

01-52

The following components are actuated in sequence:

1. Cylinder 1 fuel injector -N30-
2. Cylinder 2 fuel injector -N31-
3. Cylinder 3 fuel injector -N32-
4. Cylinder 4 fuel injector -N33-
5. Cylinder 5 fuel injector -N83-
6. Cylinder 6 fuel injector -N84-
7. EVAP canister purge regulator valve -N80-
8. Secondary AIR solenoid valve -N112-
9. Secondary AIR pump relay -J299-
10. Intake manifold tuning valve -N156-

    (change-over valve)
11. Camshaft adjustment 1 (Valves -1- and -2- for camshaft adjustment, -N205- and -N208-)

Required special tools and testing equipment

- VAG1551 Scan Tool (ST) with VAG1551/3 adapter cable

Test conditions

- Fuse for Engine Control Module (ECM) OK
- Closed Throttle Position (CTP) switch -F60- OK
- Fuel pump relay OK

01-53

Test sequence

- Connect VAG1551/VAG1552 scan tool and insert "Engine Electronics" address word 01 (ignition on) ⇒ page 01-8 .

Rapid data transfer HELP
Select function XX

Indicated on display

- Press buttons -0- and -3- to select "Output Diagnostic Test Mode" function 03.

Rapid data transfer Q
03 - Output Diagnostic Test Mode

Indicated on display

Fuel injectors:

- Press -Q- button to confirm input.

Output Diagnostic Test Mode →
Cylinder 1 Fuel Injector-N30

Indicated on display

Note:

The fuel pump relay must be activated, the fuel pump must run, and you must clearly hear the flow of fuel in the fuel pressure regulator. If the fuel pump does not run, check fuel pump relay and connections ⇒ page 24-95 .

- Operate throttle valve at throttle body.

  As soon as the Closed Throttle Position (CTP) switch opens, cylinder 1 fuel injector must be actuated (click) 5 times.

01-54

To check remaining fuel injectors:

- Press → button and open the throttle valve again.

  As soon as the Closed Throttle Position (CTP) switch opens, the applicable fuel injector must be actuated (click) 5 times.

- Repeat for each fuel injector.

To skip individual tests:

- Press → button to advance through program sequence.

If one or more of the fuel injectors is not actuated:

- Check fuel injectors ⇒ page 24-102 .

01-55

EVAP canister purge regulator valve -N80-:

- Press → button.

Output Diagnostic Test Mode →
EVAP Canister Purge Regulator Valve-N80

Indicated on display

The valve will click until pressing the → button to advance the program sequence.

If the valve is not actuated (does not click):

- Check EVAP canister purge regulator valve ⇒ page 24-116 .

Secondary Air Injection (AIR) solenoid valve -N112-:

- Press → button.

Output Diagnostic Test Mode →
Secondary Air Injection Valve-N112

Indicated on display

The valve will click until pressing the → button to advance the program sequence.

If the valve is not actuated (does not click):

- Check secondary air injection solenoid valve -N112- ⇒ Repair Manual, 2.8 Liter V6 5V Engine Mechanical, Repair Group 26.

01-56

Secondary Air Injection (AIR) pump relay -J299-:

- Press → button.

Output Diagnostic Test Mode →

Secondary Air Injection Relay-J299

Indicated on display

The relay will be actuated and turn on the secondary AIR pump motor until pressing the → button to advance the program sequence.

If the relay is not actuated (does not click) or the motor does not run:

- Check secondary air injection pump relay -J299- ⇒ Repair Manual, 2.8 Liter V6 5V Engine Mechanical, Repair Group 26.

Intake manifold tuning valve -N156- (change-over valve):

- Press → button.

Output Diagnostic Test Mode →

Intake Manifold Changeover Valve-N156

Indicated on display

The valve will click until pressing the → button to advance the program sequence.

If the valve is not actuated (does not click):

- Check intake manifold tuning valve -N156- ⇒ page 24-116 .

01-57

Valves -1- and -2- for camshaft adjustment, -N205-, -N208-:

- Press → button.

Output Diagnostic Test Mode → **Camshaft Adjustment 1**	⮜	Indicated on display

Valves 1 and 2 for camshaft adjustment, -N205- and -N208-, are actuated (click) until pressing the → button to advance the program sequence and end the output DTM.

If one of the valves is not actuated (does not click):

- Check valves for camshaft adjustment ⇒ page 28-29
- Press → button.

Rapid data transfer **HELP** **Select function XX**	⮜	Indicated on display

Note:

Before selecting "Output Diagnostic Test Mode" function 03 again, switch off the ignition for approx. 20 seconds.

01-58

Basic Setting (scan tool function 04)

Notes:

- *The specified values for the "Basic Setting" and "Read Measuring Value Block" functions are described in the respective component test descriptions.*
- *Disconnecting the battery or the Engine Control Module (ECM) harness connector will erase all learned values and the readiness code. Diagnostic Trouble Code (DTC) memory, however, will not be erased. After reconnecting the battery and/or the ECM, the engine may idle unevenly and there may be some temporary loss of driveablity. If so, let the engine run at idle for a few minutes until the learning process has been completed.*
- *No learning will take place if a malfunction affecting engine regulation is stored in DTC memory (this does not include sporadic malfunctions).*
- *Basic settings are established with the engine running.*
- *In "Basic Setting" display groups 60 or 98, with the engine stopped and the ignition switched*

on, adaptation of the throttle valve control module -J338- takes place. Adaptation of throttle valve control module -J338- (with "Basic Setting" function 04 and display group 60) ⇒ page 24-150 .

- *In "Basic Setting" display groups 88 or 99, oxygen sensor control is switched off. This makes it possible to check for malfunctions that may be caused by oxygen sensor control being switched on or off. In the selected display group, press buttons -4- and -8- to switch back and forth between "Read Measuring Value Block" function 08 and "Basic Setting" function 04.*

01-59

Notes:

After selecting "Basic Setting" function 04, the ECM takes the following actions:

- *EVAP canister purge regulator valve is closed*
- *A/C compressor is switched off*

Requirements

- Vehicle stationary, engine running at idle
- Accelerator pedal not depressed
- Selector lever in "P" or "N" position
- No malfunctions stored in DTC memory
- Engine coolant temperature at least 80 ° C (176 ° F)
- All electrical consumers switched off (coolant fan must not run during test)

  A/C switched off (press "-" button on A/C

- control head repeatedly until the display is erased)

01-60

Test sequence

- Connect VAG1551/VAG1552 Scan Tool (ST) and press buttons -0- and -1- to insert "Engine Electronics" address word 01 (engine running at idle) ⇒ page 01-8 .

Rapid data transfer HELP **Select function XX**	Indicated on display

- Operate scan tool while observing messages on display:

Note:

By pressing the HELP button an overview of possible functions will be printed out.

- Press buttons -0- and -4 to select "Basic Setting" function 04, and press -Q- button to confirm input.

System in Basic Setting Q **Input display group number XXX**	Indicated on display

Note:

Display group number 0 (000) is used as an example to demonstrate the procedure.

01-61

To change to another display group:

Display group	VAG1551	VAG1552
higher	Press -3- button	Press ↑ button
lower	Press -1- button	Press ↓ button
skip	Press -C- button	Press -C- button

- Press -0- button three times to input display group number 0 (000), and press -Q- button to confirm input.

System in Basic Setting →

1 2 3 4 5 6 7 8 9 10

➢ Indicated on display

Notes:

- *In display group 0 the measuring values are displayed in decimal form.*
- *The display can be printed out by pressing the PRINT button.*

- If specified values were attained in all display fields, press → button to advance through program sequence.

Rapid data transfer **HELP**

Select function XX

➢ Indicated on display

-
Press buttons -0- and -6- to select "End Output" function 06, and press

-Q- button to confirm input.

- If one of the specified values is not attained ⇒ page 01-63 evaluation of display group 000.
- Continue by using procedures in "Corrective action" column.

01-62

Display group 000 (display in decimal values)											
• Engine running at idle; ECM in "Basic Setting" function 04											
Display fields											**Specified value**	**Corresponds to**
1	2	3	4	5	6	7	8	9	10	Idle learn value (additive) for O2S control, bank 2	115-141	-0.65 to +0.65 ms
										Idle learn value (additive) for O2S control, bank 1	115-141	-0.65 to +0.65 ms
										O2S control bank 2 (if outside of tolerance, conduct test drive)	77-179	-10 to +10 %
										O2S control bank 1 (if outside of tolerance, conduct test drive)	77-179	-10 to +10 %
										Learn value-idle air flow	118-138	-5.0 to +5.0 kg/h
										Idle air control value	118-138	-5.0 to +5.0 kg/h
										Throttle angle	0-12	0-5 ∠°
										Engine speed (with electrical consumers switched off) All-wheel drive vehicles Front-wheel drive vehicles	 62-74 74-86	 620-740 RPM 740-860 RPM
										Engine load (with electrical consumers switched off)	20-50	1.0-2.5 ms

Engine coolant temperature (necessary for "Basic Setting")	170-204	80-105 °C

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Display group 000-evaluation

Display field 1	Possible malfunction cause	Corrective action
greater than 204	♦ Engine coolant temperature (ECT) sensor - G62-	- Check ECT sensor ⇒ page 24-75
less than 170	♦ Engine coolant temperature (ECT) sensor - G62-	- Check ECT sensor ⇒ page 24-75
	♦ Coolant thermostat faulty (open)	- Check thermostat ⇒ Repair Manual, 2.8 Liter V6 5V Engine Mechanical, Repair Group 19
Display field 2	**Possible malfunction cause**	**Corrective action**
greater than 50	♦ Electrical consumers switched on	- Switch off electrical consumers
	♦ Oxygen Sensor (O2S) control at limit	- Check HO2S and O2S control before TWC ⇒ page 24-22 - Check HO2S aging, bank 1, sensor 1 (before TWC) ⇒ page 24-60 - Check HO2S aging, bank 2, sensor 1 (before TWC) ⇒ page 24-63
less than 20	♦ Intake air leaks ("false air")	- Check intake air system for leaks ⇒ page 24-126

	♦ Fuel pressure regulator faulty or hose disconnected	- Check fuel pressure regulator ⇒ page 24-111

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Display field 3	Possible malfunction cause	Corrective action
less than 62 (all-wheel drive) or less than 74 (front-wheel drive)	♦ Drive range selected ♦ Throttle valve control module faulty	- Move selector lever to "P" or "N" position - Check idle speed ⇒ page 24-16 - Check throttle valve control module ⇒ page 24-128
less than 74 (front-wheel drive)	♦ Supply voltage (terminal 15) to terminal 10 of Engine Control Module (ECM) missing	- Check supply voltage (terminal 15) to terminal 10 of ECM using applicable wiring diagram
greater than 74 (all-wheel drive) or greater less than 86 (front-wheel drive)	♦ Closed Throttle Position (CTP) switch open ♦ Throttle valve control module faulty ♦ Intake air leaks ("false air")	- Check idle speed ⇒ page 24-16 - Check throttle valve control module ⇒ page 24-128 - Check intake air system for leaks ⇒ page 24-126

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Display field 4	Possible malfunction cause	Corrective action
less than 0	(Not possible)	---
greater than 12	♦ Adaptation of throttle valve control module to ECM not complete	- Check adaptation of throttle valve control module ⇒ page 24-150
greater than 12	♦ Throttle Position (TP) sensor in throttle valve control module faulty	- Check throttle valve control module ⇒ page 24-128
greater than 12	♦ Throttle valve mechanism sticking ♦ Contamination in intake air ducting near throttle valve	- Check by visual inspection and repair as necessary
greater than 12	♦ Accelerator pedal cable adjustment	- Adjust accelerator pedal cable ⇒ *Repair Manual, Fuel Supply System, Repair Group 20*
Display fields 5 + 6	**Possible malfunction cause**	**Corrective action**
less than 118	♦ Intake air leaks ("false air") after throttle valve	- Check intake air system for leaks ⇒ page 24-126
greater than 138	♦ Increased engine load	- Switch off electrical consumers
	♦ Throttle valve mechanism sticking ♦ Contamination in intake air ducting near throttle valve	- Check by visual inspection and repair as necessary

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Display fields 7 + 8	Possible malfunction cause	Corrective action
less than 77	♦ Mixture too rich-oxygen sensor control adjusts toward too lean ♦ Oxygen sensor control at limit ♦ Too much fuel vapor from EVAP canister ♦ Fuel pressure regulator faulty, or hose disconnected	- Check HO2S and O2S control before TWC ⇒ page 24-22 - Check fuel pressure regulator ⇒ page 24-111
greater than 179	♦ Mixture too lean-oxygen sensor control adjusts toward too rich ♦ Intake air leaks ("false air") ♦ Fuel injector(s) faulty ♦ Oxygen sensor control at limit ♦ Secondary air system	- Check HO2S and O2S control before TWC ⇒ page 24-22 - Check intake air system for leaks ⇒ page 24-126 - Check fuel injector(s) ⇒ page 24-102 - Check secondary air system ⇒ Output Diagnostic Test Mode (DTM), page 01-51 and ⇒ Repair Manual, 2.8 Liter V6 5V Engine Mechanical, Repair Group 26
128	♦ Too little fuel ♦ Oxygen sensor control blocked	- Check fuel level in tank - Check HO2S and O2S control before TWC ⇒ page 24-22

Display field 9 + 10	Possible malfunction cause	Corrective action
less than 115 or greater than 141	♦ Display group 32, evaluating ⇒ page 24-27	

VAG1598/22 test box, connecting

Notes:

- *Switch the ignition off and wait at least 10 seconds before disconnecting the Engine Control Module (ECM) harness connector.*
- *Disconnecting the battery or the Engine Control Module (ECM) harness connector will erase all learned values and the readiness code. Diagnostic Trouble Code (DTC) memory, however, will not be erased. After reconnecting the battery and/or the ECM, the engine may idle unevenly and there may be some temporary loss of driveablity. If so, let the engine run at idle for a few minutes until the learning process has been completed.*

- Switch ignition off.

- Disconnect ECM.

- Connect VAG1598/22 adapter cable to ECM harness connector.

- Generate readiness code ⇒ page 01-73 .

Note:

If the DTC memory has been erased or the ECM was disconnected from its power supply, a new readiness code must be generated ⇒ page 01-73 .

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Engine Control Module (ECM), replacing

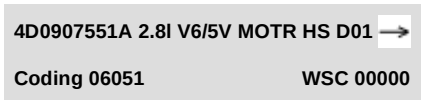
Notes:

- *Switch the ignition off and wait at least 10 seconds before disconnecting the Engine Control Module (ECM) harness connector.*
- *Disconnecting the battery or the Engine Control Module (ECM) harness connector will erase all learned values and the readiness code. After reconnecting the battery and/or the ECM, the engine may idle unevenly and there may be some temporary loss of driveablity. If so, let the engine run at idle for a few minutes until the learning process has been completed* ⇒ *page 01-58* *.*
- *After installation of a new ECM, set ECM coding and carry out adaptation of the throttle valve control module -J338-.*

If the ECM has been replaced, carry out the following steps in the sequence listed.

- Connect VAG1551/VAG1552 Scan Tool (ST) and press buttons -0- and -1- to insert "Engine Electronics" address word 01 (with ignition switched on) ⇒ page 01-8 .

Indicated on display (ECM identification and coding)



- Print out ECM coding and compare with code table ⇒ page 01-14 .

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- Press → button.

Rapid data transfer HELP

Select function XX

➢ Indicated on display

- Switch ignition off.
- Replace faulty ECM.
- Check ECM coding ⇒ page 01-12 .
- Carry out adaptation of throttle valve control module -J388- to ECM ⇒ page 24-150 .
- Generate readiness code ⇒ page 01-73 .

Note:

If the DTC memory has been erased or the ECM was disconnected from its power supply, a new readiness code must be generated ⇒ page 01-73 .