01-1

Motronic system, On Board Diagnostic (OBD)

On Board Diagnostic, technical data

Equipment

The advantages of OBD can only be fully exploited by using the vehicle diagnostic, testing and information system VAS5051 or the VAG1551 scan tool, in operating mode 1 "Rapid data transfer."

The DTC memory is equipped with a permanent memory and therefore does not depend on the power supply.

The stored malfunctions will be displayed after checking the DTC memory ⇒ Page 01-15 .

After eliminating malfunctions the DTC memory must be erased ⇒ Page 01-15 .

Important note:

- Every time the DTC memory is erased and the voltage supply to the Motronic Engine Control Module (ECM) -J220 has been interrupted the readiness code must be generated ⇒ Page 01-105 .

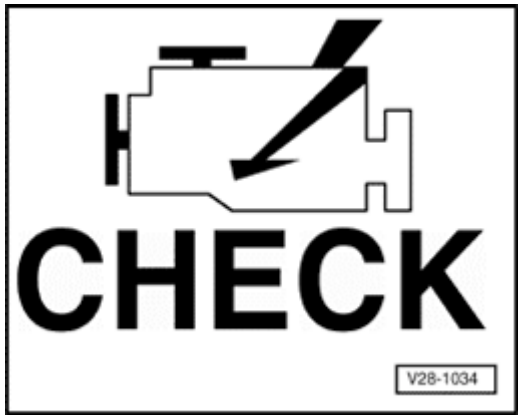
- The Exhaust Malfunction Indicator Light (MIL) in the instrument cluster will be switched on if the engine control module recognizes malfunctions which have an affect (decrease emissions) on exhaust emissions ⇒ Page 01-3 .

- Malfunctions relating to the electronic throttle are also indicated by a Electronic Power Control (EPC) warning light in the instrument cluster.

01-3

Exhaust Malfunction Indicator Light (MIL), significance

If the Engine Control Module (ECM) recognizes emission related malfunctions, this is indicates by the MIL coming on.



Component location of MIL

Note:

When a recognized malfunction switches on the MIL, it will either blink or light continuously. In either case, the DTC memory must be checked ⇒ *Page 01-15* .

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 be only continue with reduced power until the MIL goes out or stays on continuously.

Continuos MIL

If the MIL lights continuously, there is malfunction that affects exhaust emissions. In this case the DTC memory of the ECM and Transmission Control Module (TCM) (if equipped) must be checked.

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, the DTC memory of the ECM and TCM must be checked, as there may be malfunctions stored that do not switch the MIL on immediately.

01-4

Checking function

- Switch ignition on.

  - The MIL must light up

If the MIL does not light with ignition switched:

Cause:	Corrective action:
MIL is not activated or does not light up because of an open circuit.	- Switch ignition off - Connect VAG1598/31 test box ⇒ Page 24-20 - Bridge sockets 2 and 47 on test box - Switch ignition on. The MIL should light up. If the MIL does not light up: - Switch ignition off. - Check whether lamp is burned out and test voltage supply to lamp wiring diagram. If the lamp and the voltage

	supply are OK: - Check for open circuit or short circuit in wiring between engine control module and MIL using wiring diagram. Determine and eliminate malfunction.
	If there are no malfunctions in the wiring to the MIL:
Malfunction cause:	Engine control module (ECM) faulty ⇒Replace Engine Control Module (ECM) ⇒ Page 24-24 .

01-5

If MIL remains lit for more than 3 seconds (i.e. continuously) when ignition is on, proceed with test as follows:

- Start engine and allow it to run at idling speed.

  Specification: MIL should go out.

If the MIL does not go out:

- Check DTC memory of Engine Control Module (ECM).

If no DTCs are stored:

Cause:	Corrective action:
MIL is activated via short circuit to Ground (GND).	- Switch ignition off - Connect VAG1598/31 test box . Do not connect engine control module. - Measure resistance between vehicle Ground and socket 47 on test box. Specification: infinity (because the wire should not have any direct Ground connection) If the specification is not

	reached: - Determine and eliminate short circuit to Ground in wiring between engine control module and MIL using wiring diagram.
	If there are no malfunctions in the wiring to the MIL:
Malfunction cause:	Engine control module (ECM) faulty ⇒Replace Engine Control Module (ECM) ⇒ Page 24-24 .

01-6

Available functions

The prerequisites for selecting the desired functions can be taken from the following table.

Address words and functions on VAG1551 scan tool		Ignition ON, engine not running	Engine idling	Vehicle being driven
Address words				
00	Automatic Test Sequence	yes	yes	yes
01	Engine Electronics	yes	yes	yes
Functions				
01	Check Control Module Version	yes	yes	yes
02	Check DTC Memory	yes	yes	yes
03	Output Diagnostic Test Mode (DTM)	yes	no	no
04	Basic setting	yes	yes	yes
05	Erase DTC Memory	yes	yes	yes
06	End Output	yes	yes	yes
07	Code Control Module	no	no	no
08	Read Measuring Value Block	yes	yes	yes

01-7

Mode under Address word 33:	
Mode 1: Transmit diagnostic data	Switch ignition on or let engine run at idle
Mode 2: Transmit operating conditions	Switch ignition on or let engine run at idle
Mode 3: Check DTC Memory	Switch ignition on or let engine run at idle
Mode 4: Erase diagnostic data	Switch ignition on or let engine run at idle
Mode 5: Output of oxygen sensor signals	Switch ignition on or let engine run at idle
Mode 6: Transmit measured values	Switch ignition on or let engine run at idle
Mode 7: Check DTC Memory	Switch ignition on or let engine run at idle
Mode 8: Check tank leak test	Switch ignition on or let engine run at idle
Mode 9: Read out vehicle information	Let engine run at idle

Mode 1 to 9 can be selected under address word 33.

- Individual measured values can be read out under mode 1. Mode 1 is not recommended for authorized Audi service centers, since the data can be obtained much more accurately under address word 01 function 04 or function 08.
- Mode 2 displays operating conditions, for which malfunctions are recognized.
- With mode 3 the DTC memory will be checked and with mode 4 the DTC memory will be erased.

- Mode 5 displays the static dimensions of the oxygen sensors, which are legally required. Since these dimensions are not directly relevant to oxygen sensor diagnostics, mode 5 is insignificant for the authorized Audi center.
- With mode 6 all measured values can be checked from components and systems that are not constantly monitored.
- Using mode 7, DTCs can be checked for which the Malfunction Indicator Light (MIL) is not yet lit (MIL is not on, no DTCs under mode 3).
- Under mode 8 the tank leak test will be checked.
- With mode 9 the following vehicle information can be read out: Vehicle Identification Number (VIN), Part number and program/data level of the engine control module and the check sum (this value is a internal calculated value).

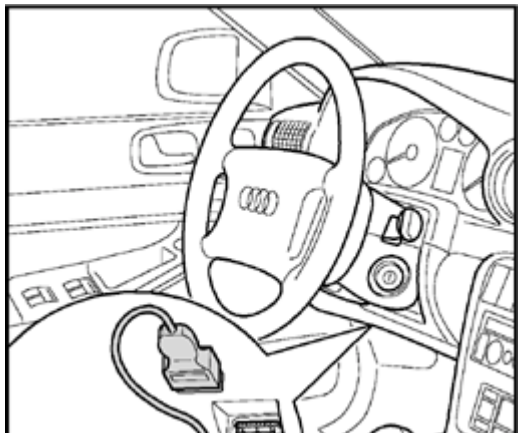
01-9

Vehicle diagnostic, testing and information system VAS5051 or VAG1551, connecting and selecting functions

Requirements

- Fuses for engine electronics OK
- Fuel pump relay OK
- Battery voltage at least 11 V
- Ground (GND) connection for engine and transmission OK

- Switch ignition off.



- Connect vehicle diagnostic, testing and information system VAS5051 with VAS5051/1 diagnostic cable. As an alternative, connect VAG1551 scan tool with VAG1551/3B diagnostic cable.

Note:

The Data Link Connector (DLC) is located below the dash, to the left of the steering column.

01-10

WARNING!

- ***When performing a road test and checks, the vehicle diagnostic, testing and information system VAS5051 as well as the VAG1551 may be secured only on rear seat, from where it is to be operated by a second technician.***

- ***Please follow safety precautions*** ⇒ ***Page 24-1***

Note:

Only the procedure for OBD VAG1551 is described below. For details of how to use the vehicle diagnostic, testing and information system VAS5051, please refer to its operating manual.

VAG - On Board Diagnostic HELP **1 - Rapid data transfer*** **2 - Blink code output***	Indicated on display * Appears alternately

01-11

- If no display appears, check diagnostic cables:

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

Depending on the function required:

- Switch ignition on.

  or

  Start engine ⇒ Page 01-6 , table of available functions.

- Switch on printer with PRINT button (indicator light in button lights up).

- Press button -1- to select "Rapid data transfer" operating mode.

Rapid data transfer	**HELP**
Insert address word XX	

Indicated on display:

Rapid data transfer	**Q**
01 - Engine Electronics	

- Press buttons -0- and -1- to insert "Engine electronics" address word 01.

- Press -Q- button to confirm input.

01-12

Rapid data transfer	**HELP**
Control module does not answer	

➢ If the display shows one of the messages reproduced here, run through the troubleshooting procedure as described in the Electrical Wiring Diagrams, Troubleshooting and Component Location binder.

⇒Electrical Wiring Diagrams, Troubleshooting and Component Locations

Rapid data transfer	**HELP**
K wire not switching to Ground	

Rapid data transfer	**HELP**
K wire not switching to B+	

01-13

Control module identification (example)

The display on VAG1551 will show the control module identification, for example:

4D0907551...	Engine Control Module (ECM) Part No.
2.7 L	Engine displacement
V6 / 5VT	Engine configuration
	(V6 5-valve Turbo[1])
♦ G or no display	"G" for vehicles with Cruise control system or not
♦ 0002	ECM Software version
♦ Coding 06711	Coding of ECM
♦ WSC 06388	Dealership code of VAG1551 with which the last coding was performed

[1)] The engine is a so called Biturbo engine, that means the engine is equipped with two turbo chargers. "Bi" (latin) stand for two.

01-14

If the coding differs from the vehicle version, then:

- Check coding of engine control module ⇒ Page 01-93 , Coding engine control module.

- Press →button.

Rapid data transfer	**HELP**
Select function XX	

Indicated on display:

Note:

After pressing the HELP button, an overview of the possible functions is printed out.

Diagnostic Trouble Code (DTC) Memory, checking and erasing

- Connect vehicle diagnostic, testing and information system VAS5051 or VAG1551 scan tool and select "Engine Electronics" by entering address word 01 ⇒ Page 01-9 . When doing this the engine must be idling.

Only if engine does not start:

- Check engine with ignition switched on.

- Switch on printer with PRINT button (indicator light in button lights up).

Rapid data transfer **HELP**

Select function XX

Indicated on display

- Operate scan tool according to information on display:
- Press buttons -0- and -2- to select function "Check DTC Memory" and confirm entry with -Q- button.

01-16

No DTC recognized

➢ Indicated on display

- Press → button.

or

X DTC recognized

➢ Indicated on display

The stored malfunctions will be displayed and printed out in sequence.

- Locate and eliminate printed out malfunctions according to DTC table ⇒ Page 01-19 .

Note:

- *If no malfunction is stored in the DTC memory, do not erase memory, otherwise readiness code must be generated.*
- *If the DTC memory was erased, generate readiness code ⇒ Page 01-105 .*

- Press → button.

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

- Press buttons -0- and -5- to select function "DTC Memory" and confirm entry with -Q- button.

Notes:

Attention! **DTC memory was not checked**	*Indicated on display:*

Test sequence has not been followed.

- Check DTC memory.

Under the following conditions the DTC memory will not be erased:

- *If Ignition was switched off after DTC memory has been checked.*
- *A static malfunction has not been eliminated.*

01-18

Rapid data transfer →

DTC Memory is erased!

Indicated on display:

- Press →button.
- After repairs, check DTC memory again.

Note:

During testing and repair work, malfunctions can be recognized from other control modules (e.g. disconnected harness connectors). Therefore on completion, the DTC memories of all control modules must be checked and erased.

End output

Rapid data transfer **HELP**

Select function XX

Indicated on display:

- Press buttons -0- and -6- to select function "End Output" and confirm entry with -Q- button.

Rapid data transfer **HELP**

Insert address word XX

Indicated on display:

- Switch ignition off and disconnect diagnostic connector.

01-19

Diagnostic Trouble Code (DTC) table

Notes:

- *If malfunctions occur in the sensors and components being monitored, they will be stored in the DTC memory together with an indication of the type of malfunction. Notes on Engine Power Control (EPC) (drive by wire)* ⇒ *Page 24-139* .
- *Malfunctions relating to the electronic throttle are also indicated by the EPC (Electronic Power Control) warning light in the instrument cluster.*
- *Malfunction which decrease exhaust emissions are indicated by an Exhaust Malfunction Indicator Light (MIL), the MIL is located in the instrument cluster. As soon as certain malfunction are recognized, the MIL is switched on immediately. There are also malfunctions, were the MIL is switched on only after the engine is started again.*
- *Sporadically occurring malfunctions (temporary malfunctions) will be indicated on the VAG1551 display as "SP."*
- *The DTC table is arranged according to the 5-digit DTC in the left-hand column.*
- *If a malfunction is stored in the DTC memory and then does not occur again during the next 40 engine warm-up phases, the DTC will be automatically erased.*
- *Components that are indicated as being faulty by the VAG1551 should not be replaced immediately. Always start by checking the wiring, connectors and Ground (GND) connections for the component using the current wiring diagram. This is particularly important in the case of sporadic malfunctions (indicated by the letters "SP"on the scan tool display).*
- *If the connector for the engine control module is disconnected or if the battery is disconnected, all the learned values (adaptation values) stored in the control module will be erased, although the contents of the DTC memory will remain intact. The next time the engine is started the idling may be rough at first. In this case let the engine run at idle for a few*

minutes until the adaptation is fully carried out.

- *After erasing the DTC memory ⇒ Page 01-15 , generate readiness code ⇒ Page 01-105 .*

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0101	16485	Mass Air Flow (MAF) sensor -G70- Implausible signal	- Check Mass Air Flow (MAF) sensor ⇒ Page 24-59
P0102	16486	Mass or Volume Air Flow Circuit Low input 2)	- Check Mass Air Flow (MAF) sensor -G70 ⇒ Page 24-59
P0103	16487	Mass or Volume Air Flow Circuit High Input 2)	
P0106	16490	Manifold Abs.Pressure or Bar. Pressure Range/Performance 2) 4)	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Repair Group 21; Turbocharger; Checking Charge Air Pressure Sensor -G31*

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

4) Absolute manifold pressure will be determined by the Charge Air Pressure Sensor -G31 (instead of displayed -G71), the air pressure is determined by the Barometric Pressure (BARO) Sensor -F96 (in Engine Control Module (ECM))

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0112	16496	Intake Air Temp. Circ. Low Input[2)]	- Check Intake Air Temperature (IAT) sensor ⇒ Page 28-17
P0113	16497	Intake Air Temp. High Input[2)]	
P0116	16500	Engine Coolant Temp. Circ. Range/Performance	- Check Engine Coolant Temperature (ECT) sensor ⇒ Page 28-25
P0117	16501	Engine Coolant Temp. Circ. Low Input [2)]	
P0118	16502	Engine Coolant Temp. Circ. High Input [2)]	

[2)] With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-22

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0130	16514	02 Sensor Circ., Bank1-Sensor1 Malfunction 2)	- Check oxygen sensor control or oxygen sensor heater and wiring ⇒ Page 24-79
P0131	16515	02 Sensor Circ., Bank1-Sensor1 Low Voltage 2)	
P0132	16516	02 Sensor Circ., Bank1-Sensor1 High Voltage 2)	
P0133	16517	02 Sensor Circ., Bank1-Sensor1 Slow Response2)	
P0134	16518	02 Sensor Circ., Bank1-Sensor1 No Activity Detected2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-23

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0136	16520	02 Sensor Circ., Bank1-Sensor2 Malfunction 2)	- Check oxygen sensor heater ⇒ Page 24-114 - Check oxygen sensor signal wire and activation ⇒ Page 24-122
P0137	16521	02 Sensor Circ., Bank1-Sensor2 Low Voltage 2)	
P0138	16522	02 Sensor Circ., Bank1-Sensor2 High Voltage2)	
P0139	16523	02 Sensor Circ., Bank1-Sensor2 Slow Response2)	- Check oxygen sensor and oxygen sensor control behind catalytic converter ⇒ Page 24-100
P0140	16524	02 Sensor Circ., Bank1-Sensor2 No Activity Detected 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-24

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0150	16534	02 Sensor Circ., Bank2-Sensor1 Malfunction 2)	- Check oxygen sensor control or oxygen sensor heater and wiring ⇒ Page 24-79
P0151	16535	02 Sensor Circ., Bank2-Sensor1 Low voltage 2)	
P0152	16536	02 Sensor Circ., Bank2-Sensor1 High Voltage 2)	
P0153	16537	02 Sensor Circ., Bank2-Sensor1 Slow Response 2)	
P0154	16538	02 Sensor Circ., Bank2-Sensor1 No Activity Detected 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-25

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0156	16540	02 Sensor Circ., Bank2-Sensor2 Malfunction 2)	- Check oxygen sensor heater ⇒ Page 24-114 - Check oxygen sensor signal wire and activation ⇒ Page 24-122
P0157	16541	02 Sensor Circ., Bank2-Sensor2 Low Voltage 2)	
P0158	16542	02 Sensor Circ., Bank2-Sensor2 High Voltage 2)	
P0159	16543	02 Sensor Circ., Bank2-Sensor2 Slow Response 2)	- Check oxygen sensor and oxygen sensor control behind catalytic converter ⇒ Page 24-100
P0160	16544	02 Sensor Circ., Bank2-Sensor2 No Activity Detected 2)	- Check oxygen sensor heater ⇒ Page 24-114

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-26

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0236	16620	Charge air pressure sensor -G31- Implausible signal	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 21; Boost pressure system with turbocharger; charge air pressure sensor -G31-, checking*
P0237	16621	Turbocharger Boost Sensor (A) Circ Low Input 2)	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Repair Group 21; Turbocharger; Checking Charge Air Pressure Sensor -G31*
P0238	16622	Turbocharger Boost Sensor (A) Circ High Input 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-27

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0300	16684	Random/Multiple Cylinder Misfire Detected[2)]	- Check cause for misfire ⇒ Page 28-52 - Check fuel tank level
P0301	16685	Cyl.1 Misfire Detected [2)]	
P0302	16686	Cyl.2 Misfire Detected [2)]	
P0303	16687	Cyl.3 Misfire Detected [2)]	
P0304	16688	Cyl.4 Misfire Detected [2)]	
P0305	16689	Cyl.5 Misfire Detected [2)]	
P0306	16690	Cyl.6 Misfire Detected [2)]	

[2)] With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

The Malfunction Indicator Light (MIL) will blink if the Engine Control Module (ECM) recognizes misfire that could damage the catalytic converters.

Notes:

- *On malfunction which could be caused by lack of fuel (e.g.: misfire) the malfunction P1250 "Fuel level too low" will be displayed in addition. That means, the misfiring was detected due to lack of fuel in the tank and not due to a technical malfunction.*

- *Depending on malfunction recognition, the MIL comes on immediately or after it has been confirmed.*

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0321	16705	Ign./Distributor Eng. Speed Inp. Circ. Range/Performance 2)	- Check Engine Speed Sensor ⇒ Page 28-21
P0322	16706	Ign./Distributor Eng. Speed Inp. Circ. No Signal 2)	
P0327	16711	Knock Sensor 1 Circ. Low Input	- Check Knock Sensor ⇒ Page 28-41
P0328	16712	Knock Sensor 1 Circ. High Input	
P0332	16716	Knock Sensor 2 Circ. Low Input	
P0333	16717	Knock Sensor 2 Circ. High Input	
P0341	16725	Camshaft Pos. Sensor Circ. Range/Performance 2)	- Check Camshaft Position Sensor ⇒ Page 28-45
P0346	16730	Camshaft Pos. Sensor Circ. 2 Range/Performance 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-29

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0421	16805	Warm Up Catalyst, Bank 1 Efficiency Below Threshold 2)	- Generate readiness code ⇒ Page 01-99 , if same DTC is displayed again, replace warm up catalytic converter bank 1 ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Repair Group 26; Components of Exhaust system removing and installing, Catalytic converter removing and installing*
P0431	16815	Warm Up Catalyst, Bank 2 Efficiency Below Threshold 2)	- Generate readiness code ⇒ Page 01-99 , if same DTC is displayed again, replace warm up catalytic converter bank 1 ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Repair Group 26; Components of Exhaust system removing and installing, Catalytic converter removing and installing*

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

Important note:

The warm up catalytic converters are located between the two oxygen sensors of the relevant cylinder bank. The warm up catalytic converters (little smaller than main catalytic converter) are located closer to the engine, not to be misunderstood with the main catalysts you see immediately once the vehicle is lifted.

DTC		Description of malfunction	Corrective action
P0441	16825	EVAP Emission Contr. Sys. Incorrect Purge Flow 2)	- Check EVAP canister purge regulator valve, perform output Diagnostic Test Mode (DTM) ⇒ Page 01-75
P0442	16826	EVAP Emission Contr. Sys. (Small Leak) Leak Detected 2)	- Check EVAP system and tank system for leaks ⇒ *Repair Manual, Fuel Supply System, Repair Group 20, Components of EVAP system servicing, carry out tank leak test*
P0455	16839	EVAP Emission Contr. Sys. (Gross Leak) Leak Detected	
P0456	16840	Tank ventilation system Pin-hole leak detected	- Checking fuel supply and ventilation systems for leaks ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Repair Group 20; Fuel supply, gas engine; EVAP canister system components, servicing; tank leak diagnostic, performing.*

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-31

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0501	16885	Vehicle Speed Sensor Range/Performance 2)	- Check Vehicle Speed Signal (VSS) ⇒ Page 24-182
P0506	16890	Idle Control System RPM Lower than Expected2)	- Carry out adaptation of Throttle Valve Control Module ⇒ Page 24-146
P0507	16891	Idle Control System RPM Higher than Expected2)	- Check for unmetered (false) air ⇒ Page 24-76
P0560	16944	System Voltage Malfunction	- Check control module voltage supply ⇒ Page 28-32
P0562	16946	System Voltage Low Voltage	
P0563	16947	System Voltage High Voltage	
P0571	16955	Cruise/Brake Switch (A) Circ. Incorrect Signal	- Check brake light switch and/or brake pedal switch ⇒ Page 24-185 ⇒ *Repair Manual, Electrical Equipment, Repair Group 01, On Board*

			Diagnostic for Cruise Control System

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-32

DTC		Description of malfunction	Corrective action
SAE	VAG		
P0601	16985	Internal Contr. Module Memory Check Sum Error[2)]	- Replace Engine Control Module (ECM) ⇒ Page 24-24
P0604	16988	Internal Contr. Module Random Access Memory (RAM) Error [2)]	
P0605	16989	Internal Contr. Module ROM Test Error [2)]	
P0606	16990	Control module faulty	- Replace Engine Control Module (ECM) ⇒ Page 24-24

[2)] With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1102	17510	O2 Sensor Heating Circ., Bank1-Sensor1 Short to B+ 2)	- Check oxygen sensor heater ⇒ Page 24-114
P1105	17513	O2 Sensor Heating Circ., Bank1-Sensor2 Short to B+ 2)	
P1107	17515	O2 Sensor Heating Circ., Bank2-Sensor1 Short to B+ 2)	
P1110	17518	O2 Sensor Heating Circ., Bank2-Sensor2 Short to B+ 2)	
P1111	17519	O2 Control (Bank 1) System too lean	- Check oxygen sensor adaptation values and oxygen sensor control ⇒ Page 24-86
P1112	17520	O2 Bank 1 System too rich	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-34

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1113	17521	Bank1-Sensor1 Internal Resistance too High 2)	- Check oxygen sensor heater ⇒ Page 24-114 - Check oxygen sensor signal wire and activation ⇒ Page 24-122
P1114	17522	Bank1-Sensor2 Internal Resistance too High 2)	
P1115	17523	O2 Sensor Heater Circ., Bank1-Sensor1 Short to Ground 2)	- Check oxygen sensor heater ⇒ Page 24-114
P1116	17524	O2 Sensor Heater Circ., Bank1-Sensor1 Open 2)	
P1117	17525	O2 Sensor Heater Circ., Bank1-Sensor2 Short to Ground 2)	
P1118	17526	O2 Sensor Heater Circ., Bank1-Sensor2 Open 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is

recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1119	17527	O2 Sensor Heater Circ., Bank2-Sensor1 Short to Ground 2)	- Check oxygen sensor heater ⇒ Page 24-114 .
P1120	17528	O2 Sensor Heater Circ., Bank2-Sensor1 Open 2)	
P1121	17529	O2 Sensor Heater Circ., Bank2-Sensor2 Short to Ground 2)	
P1122	17530	O2 Sensor Heater Circ., Bank2-Sensor2 Open 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-36

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1127	17535	Long Term Fuel Trim mult., Bank1 System too rich 2)	- Carry out road test (Fuel in engine oil) - Check fuel pressure ⇒ Page 24-33 - Check Mass Air Flow (MAF) Sensor ⇒ Page 24-59 - Check for unmetered (false) air ⇒ Page 24-76 - Check oxygen sensor before catalytic converter ⇒ Page 24-81 - Check oxygen sensor behind catalytic converter ⇒ Page 24-100 - Check fuel injectors ⇒ Page 24-43
P1128	17536	Long Term Fuel Trim mult., Bank1 System too lean 2)	
P1129	17537	Long Term Fuel Trim mult., Bank2 System too rich 2)	
P1130	17538	Long Term Fuel Trim mult., Bank2 System too lean 2)	
P1131	17539	Bank2-Sensor1 Internal Resistance too High 2)	- Check oxygen sensor heater ⇒ Page 24-114 . - Check oxygen sensor signal wire and activation ⇒ Page 24-122

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

Note:

mult. = multiplikative means that the malfunction affects the entire RPM and load range.

01-37

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1136	17544	Long Term Fuel Trim Add. Fuel, Bank1 System too Lean 2)	- Carry out road test (fuel in engine oil) - Check fuel pressure ⇒ Page 24-33 - Check Mass Air Flow (MAF) Sensor ⇒ Page 24-59 - Check oxygen sensor before catalytic converter ⇒ Page 24-81 - Check oxygen sensor behind catalytic converter ⇒ Page 24-100 - Check EVAP canister valve 1 ⇒ Page 24-134
P1137	17545	Long Term Fuel Trim Add. Fuel, Bank1 System too Rich 2)	
P1138	17546	Long Term Fuel Trim Add. Fuel, Bank2 System too Lean 2)	
P1139	17547	Long Term Fuel Trim Add. Fuel, Bank2 System too Rich 2)	
P1140	17548	Bank2-Sensor2 Internal Resistance too High 2)	- Check oxygen sensor heater ⇒ Page 24-114 . - Check oxygen sensor signal wire and activation ⇒ Page 24-122

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

Note:

add. = additive means that the malfunction in only at idle.

01-38

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1147	17555	O2 Control (Bank2) System too Lean	- Check oxygen sensor adaptation values and oxygen sensor control ⇒ Page 24-86
P1148	17556	O2 Control (Bank2) System too Rich	
P1149	17557	O2 Control (Bank1) Out of Range	- Check oxygen sensor adaptation values and oxygen sensor control ⇒ Page 24-86 - Check fuel pressure ⇒ Page 24-33 - Check for unmetered (false) air ⇒ Page 24-76
P1150	17558	O2 Control (Bank2) Out of Range	

01-39

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1171	17579	Throttle Actuation Potentiometer Signal 2 Range/Performance [1) 3)]	- Check throttle actuation potentiometer ⇒ Page 24-153 .
P1172	17580	Throttle Actuation Potentiometer Signal 2 Signal too Low [1) 3)]	
P1173	17581	Throttle Actuation Potentiometer Signal 2 Signal too High [1) 3)]	
P1176	17584	O2 Correction Behind Catalyst, B1 Limit Attained [2)]	- Check oxygen sensor aging of oxygen sensors before catalytic converters ⇒ Page 24-93
P1177	17585	O2 Correction Behind Catalyst, B2 Limit Attained [2)]	- Check oxygen sensors and oxygen sensor control behind catalytic converters ⇒ Page 24-100

[1)] With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM immediately after the malfunction has been recognized. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

[2)] With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

3) 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 01-3 .

01-40

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1213	17621	Cyl. 1-Fuel Inj. Circ. Short to B+ 2)	- Check fuel injectors ⇒ Page 24-39
P1214	17622	Cyl. 2-Fuel Inj. Circ. Short to B+ 2)	
P1215	17623	Cyl. 3-Fuel Inj. Circ. Short to B+ 2)	
P1216	17624	Cyl. 4-Fuel Inj. Circ. Short to B+ 2)	
P1217	17625	Cyl. 5-Fuel Inj. Circ. Short to B+ 2)	
P1218	17626	Cyl. 6-Fuel Inj. Circ. Short to B+ 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1225	17633	Cyl. 1-Fuel Inj. Circ. Short to Ground 2)	- Check fuel injectors ⇒ Page 24-39
P1226	17634	Cyl. 2-Fuel Inj. Circ. Short to Ground 2)	
P1227	17635	Cyl. 3-Fuel Inj. Circ. Short to Ground 2)	
P1228	17636	Cyl. 4-Fuel Inj. Circ. Short to Ground 2)	
P1229	17637	Cyl. 5-Fuel Inj. Circ. Short to Ground 2)	
P1230	17638	Cyl. 6-Fuel Inj. Circ. Short to Ground 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-42

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1237	17645	Cyl. 1-Fuel Inj. Circ. Open Circ. 2)	- Check fuel injectors ⇒ Page 24-39
P1238	17646	Cyl. 2-Fuel Inj. Circ. Open Circ. 2)	
P1239	17647	Cyl. 3-Fuel Inj. Circ. Open Circ. 2)	
P1240	17648	Cyl. 4-Fuel Inj. Circ. Open Circ. 2)	
P1241	17649	Cyl. 5-Fuel Inj. Circ. Open Circ. 2)	
P1242	17650	Cyl. 6-Fuel Inj. Circ. Open Circ. 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-43

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1250	17658	Fuel Level Too Low [4]	- Fill fuel tank and erase DTC memory - Check DTC memory from instrument cluster. ⇒ *Repair Manual, Electrical Equipment, Repair Group 01*

[4] The malfunction "Fuel Level too Low" will be stored if the fuel level in the tank is or was too low. The malfunction remains as a static malfunction and will not be set a sporadic malfunction even if the customer fills the tank with fuel in the meantime. Therefore it is possible to recognize malfunctions which have been stored due to lack of fuel e.g.: misfiring or malfunction regarding oxygen sensor control.

01-44

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1287	17695	Turbocharger bypass valve Open	- Check recirculating valve for turbocharger -N249 ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 21, checking Recirculating valve for turbocharger*
P1288	17696	Turbocharger bypass valve Short to B+	
P1289	17697	Turbocharger bypass valve Short to Ground	
P1296	17704	Cooling System Malfunction [2)]	- Check Engine Coolant Temperature (ECT) sensor ⇒ Page 28-25 ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 19, Cooling, Components for cooling system, engine side*
P1297	17705	Charger/throtle-valve connection, Pressure loss	- Check hoses between turbocharger and throttle valve: ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 21; Turbocharger*

[2)] For these malfunctions, ECM does not switch on the Malfunction Indicator Lamp (MIL) unless malfunction is recognized again after another engine start. Significance of MIL ⇒ Page 01-3 .

01-45

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1325	17733	Cyl.1-Knock Contr. Limit Attained	- Check Knock Control ⇒ Page 28-34
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	

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1335	17743	Engine Torque Monitoring 2 Control Limit Exceeded [1) 3)]	- Check hoses ⇒ Page 24-170 - Check Intake Air Temperature (IAT) sensor ⇒ Page 28-17 - Check Mass Air Flow (MAF) sensor ⇒ Page 24-59 - Check Engine Coolant Temperature (ECT) sensor ⇒ Page 28-25
P1336	17744	Engine Torque Monitoring Adaptation at limit	- Check hoses ⇒ Page 24-170 - Check Intake Air Temperature (IAT) sensor ⇒ Page 28-17 - Check Mass Air Flow (MAF) sensor ⇒ Page 24-59 - Check Engine Coolant Temperature (ECT) sensor ⇒ Page 28-25

[1)] With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

[3)] With this malfunction the exhaust Malfunction Indicator Light (MIL) is switched on by the ECM, immidiately after the malfunction has been recognized. Significance of MIL ⇒ Page 01-3 .

01-47

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1337	17745	Camshaft Pos. Sensor, Bank1 Short to Ground 2)	- Check Camshaft Position (CMP) sensor ⇒ Page 28-45
P1338	17746	Camshaft Pos. Sensor, Bank1 Open Circ./Short to B+ 2)	
P1340	17748	Crankshaft Pos./Engine Speed Sensor Out of Sequence 2)	- Check phase position of Camshaft Position (CMP) sensor ⇒ Page 28-45
P1347	17755	Bank2, Crankshaft-/Camshaft os.Sens.Sign. Out of Sequence 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

Note:

DTC -17748- (Crankshaft Pos./Engine Speed Sensor) indicates -G163.

01-48

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1355	17763	Cyl. 1, ignition circuit Open Circuit 2)	- Check activation of power output stages ⇒ Page 28-11
P1356	17764	Cyl. 1, ignition circuit Short to B+ 2)	
P1357	17765	Cyl. 1, ignition circuit Short to ground 2)	
P1358	17766	Cyl. 2, ignition circuit Open Circuit 2)	
P1359	17767	Cyl. 2, ignition circuit Short Circuit to B+ 2)	
P1360	17768	Cyl. 2, ignition circuit Short Circuit to ground 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1361	17769	Cyl. 3, ignition circuit Open Circuit 2)	- Check activation of power output stages ⇒ Page 28-11
P1362	17770	Cyl. 3, ignition circuit Short to B+ 2)	
P1363	17771	Cyl. 3, ignition circuit Short to ground 2)	
P1364	17772	Cyl. 4, ignition circuit Open Circuit 2)	
P1365	17773	Cyl. 4, ignition circuit Short Circuit to B+ 2)	
P1366	17774	Cyl. 4, ignition circuit Short Circuit to ground 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1367	17775	Cyl. 5, ignition circuit Open Circuit 2)	- Check activation of power output stages ⇒ Page 28-11
P1368	17776	Cyl. 5, ignition circuit Short to B+ 2)	
P1369	17777	Cyl. 5, ignition circuit Short to ground 2)	
P1370	17778	Cyl. 6, ignition circuit Open Circuit 2)	
P1371	17779	Cyl. 6, ignition circuit Short Circuit to B+ 2)	
P1372	17780	Cyl. 6, ignition circuit Short Circuit to ground 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-51

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1386	17794	Internal Control Module Knock Control Circ.Error	- Replace Engine Control Module (ECM) ⇒ Page 24-24
P1387	17795	Internal Control Module Altitude Sensor Error [2)]	
P1388	17796	Internal Control Module Drive by wire error [1) 3)]	

[1)] With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

[2)] With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

[3)] 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 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1391	17799	Camshaft Pos. Sensor, Bank2 Short to Ground 2)	- Check Camshaft Position (CMP) sensor ⇒ Page 28-45
P1392	17800	Camshaft Pos. Sensor, Bank2 Open Circ./Short to B+ 2)	
P1410	17818	Tank Ventilation Valve Circ. Short to B+	- Check EVAP canister purge regulator valve ⇒ Page 24-134
P1411	17819	Sec. Air Inj.Sys.,Bank2 Flow too low 2)	- Check fuse for secondary air injection pump. - Check vacuum hoses - Check piping from pump to secondary air injection valve (Combi valve) ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Exhaust system, Secondary air injection system*
P1414	17822	Sec. Air Inj.Sys.,Bank2 Leak Detected 2)	- Check piping from pump to secondary air injection valve (combi valve) bank 2 ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Exhaust system, Secondary air injection system*

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-53

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1420	17828	Sec. Air Inj. Valve Circ. Electrical Malfunction 2)	- Check Secondary Air Injection (AIR) Solenoid Valve -N112 ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Exhaust system, Secondary air injection system, Checking Secondary Air Injection (AIR) Solenoid Valve -N112*
P1421	17829	Sec. Air Inj. Valve Circ. Short to Ground 2)	
P1422	17830	Sec. Air Inj. Valve Circ. Short to B+ 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-54

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1423	17831	Sec. Air Inj.Sys.,Bank1 Flow too low 2)	- Check fuse for secondary air injection pump - Check vacuum hoses - Check piping from pump to secondary air injection valve (Combi valve) ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Exhaust system, Secondary air injection system*
P1424	17832	Sec. Air Inj. Sys., Bank1 Leak Detected 2)	- Check piping from pump to secondary air injection valve (Combi valve) bank 1 ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Exhaust system, Secondary air injection system*
P1425	17833	Tank Vent. Valve Short to Ground 2)	- Check EVAP canister valve 1 ⇒ Page 24-134
P1426	17834	Tank Vent. Valve Open 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1432	17840	Sec. Air Inj.Valve Open 2)	- Check Secondary Air Injection (AIR) Solenoid Valve -N112 ⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Exhaust system, Secondary air injection system, Checking Secondary Air Injection (AIR) Solenoid Valve -N112*
P1433	17841	Sec. Air Inj. Sys. Pump Relay Circ. Open 2)	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Exhaust system, Secondary air injection system, Checking Secondary Air Injection (AIR) Pump Relay -J299*
P1434	17842	Sec. Air Inj. Sys. Pump Relay Circ. Short to B+ 2)	
P1435	17843	Sec. Air Inj. Sys. Pump Relay Circ. Short to Ground 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-56

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1453	17861	Exhaust gas temperature sensor 1 Open/short to B+	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB,Repair Group 26, Checking Sensor -1- for exhaust temperature*
P1454	17862	Exhaust gas temperature sensor 1 Short to ground	
P1455	17863	Exhaust gas temperature sensor 1 Range/performance	
P1456	17864	Exhaust gas temperature control bank 1 Limit attained	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB,Repair Group 26, Checking exhaust gas temperature control*
P1457	17865	Exhaust gas temperature sensor 2 Open/short to B+	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB,Repair Group 26, Checking Sensor -2- for exhaust temperature*
P1458	17866	Exhaust gas temperature sensor 2 Short to ground	
P1459	17867	Exhaust gas temperature	

		sensor 2 Range/performance	
P1460	17868	Exhaust gas temperature control bank 2 Limit attained	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB,Repair Group 26, Checking exhaust gas temperature control*

01-57

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1461	17869	Exhaust gas temperature control bank 1 Range/Performance	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Checking exhaust gas temperature control*
P1462	17870	Exhaust gas temperature control bank 2 Range/Performance	

01-58

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1470	17878	EVAP Emission Contr. LDP Circ Electrical Malfunction 2)	- Check Leak Detection Pump (LDP) ⇒ *Repair Manual, Fuel Supply System, Repair Group 20, Components of EVAP system servicing, Checking Leak Detection Pump (LDP) -V144*
P1471	17879	EVAP Emission Contr. LDP Circ Short to B+ 2)	
P1472	17880	EVAP Emission Contr. LDP Circ Short to Ground 2)	
P1473	17881	EVAP Emission Contr. LDP Circ Open Circuit 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-59

DTC		Description of malfunction	Corrective
SAE	VAG		
P1475	17883	EVAP Emission Contr. LDP Circ Malfunction/Signal Circ. Open 2)	- Check hoses (pressure/vacuum) to leak detection pump - Check wiring to pump according to wiring diagram ⇒ *Repair Manual, Fuel Supply System, Repair Group 20, Components of EVAP system servicing, Diagram of EVAP system*
P1476	17884	EVAP Emission Contr. LDP Circ Malfunction/Insufficient Vacuum 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1477	17885	EVAP Emission Contr. LDP Circ Malfunction 2)	- Check Leak Detection Pump (LDP) ⇒ *Repair Manual, Fuel Supply System, Repair Group 20, Components of EVAP system servicing, Checking Leak Detection Pump (LDP) -V144*
P1478	17886	EVAP Emission Contr. LDP Circ Clamped Tube Detected 2)	- Check hoses (pressure/vacuum) to LDP. ⇒ *Repair Manual, Fuel Supply System, Repair Group 20, Components of EVAP system servicing, Diagram of EVAP system*

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-61

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1500	17908	Fuel Pump Relay Circ. Electrical Malfunction 2)	- Check Fuel Pump (FP) relay ⇒ Page 24-33
P1501	17909	Fuel Pump Relay Circ. Short to ground 2)	
P1502	17910	Fuel Pump Relay Circ. Short to B+ 2)	

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-62

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1519	17927	Intake Camshaft Contr., Bank1 Malfunction 2)	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code (s): APB, Repair Group 15, Checking camshaft adjustment, Checking function of camshaft adjustment*
P1522	17930	Intake Camshaft Contr., Bank2 Malfunction 2)	
P1523	17931	Crash Signal from Airbag Control Unit Range/Performance	- Check Crash-Signal ⇒ Page 24-196

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-63

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1529	17937	Camshaft Control Circuit Short to B+ 2)	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 15, Checking camshaft adjustment, Checking solenoid valves for camshaft adjustment*
P1530	17938	Camshaft Control Circuit Short to Ground 2)	
P1531	17939	Camshaft Control Circuit Open 2)	
P1539	17947	Clutch pedal switch Range/Performance 2)	- Check Clutch Vacuum Vent Valve Switch ⇒ Page 24-191

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

01-64

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1542	17950	Throttle Actuation Potentiometer Range/Performance 1) 3)	- Check angle sensor for throttle drive ⇒ Page 24-153
P1543	17951	Throttle Actuation Potentiometer Signal too Low 1) 3)	
P1544	17952	Throttle Actuation Potentiometer Signal too High 1) 3)	- Check angle sensor for throttle drive ⇒ Page 24-153
P1545	17953	Throttle Pos. Contr. Malfunction 1) 3)	- Check throttle valve control module ⇒ Page 24-145
P1546	17954	Boost Pressure Contr.Valve Short to B+	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code (s): APB, Repair Group 21, Turbocharger system*
P1547	17955	Boost Pressure Contr.Valve Short to Ground	

P1548	17956	Boost Pressure Contr.Valve Open	

1) With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM immediately after the malfunction has been recognized. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

3) With this malfunction the exhaust Malfunction Indicator Light (MIL) is switched on by the ECM, immidiately after the malfunction has been recognized. Significance of MIL ⇒ Page 01-3 .

01-65

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1555	17963	Charge Pressure Upper Limit exceeded	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 21, Turbocharger system*
P1556	17964	Charge Pressure Contr. Negative Deviation	⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 21, Turbocharger system*
P1557	17965	Charge Pressure Contr. Positive Deviation	

01-66

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1558	17966	Throttle Actuator Electrical Malfunction 1)3)	- Check throttle valve control module ⇒ Page 24-145
P1559	17967	Idle Speed Contr. Throttle Pos. Adaptation Malfunction 2)	- Perform adaptation ⇒ Page 24-146
P1560	17968	Maximum Engine Speed Exceeded	- Repair mechanical damage
P1564	17972	Idle Speed Control Throttle Position Low Voltage During Adaptation	- Charge battery or repeat adaptation ⇒ Page 24-146
P1565	17973	Idle Speed Control Throttle Position Lower Limit not Attained 1) 3)	- Check throttle valve control module ⇒ Page 24-145
P1568	17976	Idle Speed Control Throttle Position Mechanical Malfunction 1) 3)	

1) With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

3) 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 01-3 .

01-67

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1569	17977	Cruise control switch Incorrect signal	- Check switch for Cruise Control System (CCS) ⇒ *Repair Manual, Electrical Equipment, Repair Group 01, On Board Diagnostic for CCS*
P1570	17978	Control Module Locked	- Perform adaptation for immobilizer to ECM ⇒ *Repair Manual, Electrical Equipment, Repair Group 01, On Board Diagnostic of immobilizer*
P1579	17987	Idle Speed Contr.Throttle Pos. Adaptation not started	- Perform adaptation of throttle valve control module while maintaining test requirements ⇒ Page 24-146
P1600	18008	Power Supply (B+) Terminal 15 Low Voltage	- Check voltage supply for Engine Control Module (ECM) ⇒ Page 28-32
P1602	18010	Power Supply (B+) Terminal 30 Low Voltage	

01-68

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1603	18011	Internal Control Module Malfunction 2)	- Replace Engine Control Module (ECM) ⇒ Page 24-24 .
P1604	18012	Internal Control Module Malfunction 1)3)	
P1606	18014	Rough Road Spec Engine Torque ABS-ECU Electrical Malfunction	- Check wire connection between ECM and ABS control module ⇒ Page 24-198 ⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*
P1609	18017	Crash shut-down activated	Accident with airbag triggered or a output Test Diagnostic Mode (TDM) has been carried out, therefore erase DTC Memory in ECM; Notes crash signal ⇒ Page 24-196
P1612	18020	Electronic Control Module 2) Incorrect Coding	- Check or code Engine Control Module (ECM) ⇒ Page 01-93

1) With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

3) 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 01-3 .

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1620	18028	Engine coolant temperature signal Open/short to B+	- Check coolant temperature signal ⇒ Page 24-181
P1621	18029	Engine coolant temperature signal Short to ground	
P1622	18030	Engine coolant temperature signal Range/Performance	

Note for malfunctions P1620, P1621 and P1622:

The Engine Control Module (ECM) receives the "Coolant temperature signal" from the instrument cluster. When the ECM receives this signal the boost pressure will be decreased.

01-70

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1624	18032	MIL Request Sign. active	Exhaust relevant malfunction from Transmission Control Module (TCM), MIL is switched on by TCM - Check DTC Memory of TCM ⇒ *Repair Manual, Automatic Transmission, Repair Group 01, Perform On Board Diagnostic*
P1626	18034	Data-Bus Powertrain [2)] Missing message from fuel injection pump	- Check CAN-Bus ⇒ Page 24-201

[2)] With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

Note for malfunction P1624:

- *MIL stands for Malfunction Indicator Light. Once the Engine Control Module (ECM) recognizes a malfunction that decreases the exhaust emissions it switches the MIL on.*
- *The MIL is switched on only by the Engine Control Module (ECM), since the ECM has the only connection to the MIL..*
- *Malfunction that decrease the exhaust emissions can also be recognized by the Transmission Control Module (TCM), These malfunction are also indicated by the MIL.*

- *Once the TCM recognizes a malfunction that decreases the exhaust emissions it sends a message to the ECM, the ECM then switches the MIL on. Parallel to this is the malfunction P1624 stored in the ECM noting that the MIL is switched on due to a transmission problem and not because of a engine problem.*

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1630	18038	Accelera. Pedal Pos. Sensor 1 Signal too Low 1) 3)	- Check acceleration pedal position sensor ⇒ Page 24-159
P1631	18039	Accelera. Pedal Pos. Sensor 1 Signal too High 1) 3)	
P1633	18041	Accelera. Pedal Pos. Sensor 2 Signal too Low 1) 3)	
P1634	18042	Accelera. Pedal Pos. Sensor 2 Signal too High 1) 3)	

1) With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

3) 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 01-3 .

01-72

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1639	18047	Accelera. Pedal Pos. Sensor1+2 Range/Performance 1) 3)	- Check acceleration pedal position sensor ⇒ Page 24-159
P1640	18048	Internal Control Module (EEPROM) Error 2)	- Replace Engine Control Module (ECM) ⇒ Page 24-24 .
P1648	18056	Data Bus Powertrain Malfunction	- Check data exchange between Engine-/ABS-/Transmission control module ⇒ Page 24-201
P1649	18057	Data Bus Powertrain Missing message from ABS Control Module	- Check DTC memory of ABS control module ⇒ *Repair Manual, Brake System On Board Diagnostic (OBD), Repair Group 01, checking DTC memory of ABS control module* - Check data exchange between Engine-/ABS-/Transmission control module ⇒ Page 24-201

1) With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

3) 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 01-3 .

01-73

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1650	18058	Powertrain CAN-bus Missing message from instrument cluster	- Check data transfer ⇒ Page 24-201
P1654	18062	Check DTC memory of the instrument cluster	- Check DTC memory of instrument cluster and repair malfunctions
P1676	18084	Drive by Wire-MIL Circ. Electrical Malfunction [1)]	- Significance of Electronic Power Control (EPC) warning light ⇒ Page 24-142
P1677	18085	Drive by Wire-MIL Circ. Short to B+ [1)]	
P1690	18098	Malfunction Indication Light Malfunction [2)]	- Check wiring for exhaust Malfunction Indicator Light (MIL) ⇒ Page 01-4
P1693	18101	Malfunction Indication Light Short circuit to B+ [2)]	

[1)] With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

[2)] With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

Note:

The malfunction light for power acceleration -K132- is also called the EPC warning lamp.

DTC		Description of malfunction	Corrective action
SAE	VAG		
P1851	18259	Data Bus Powertrain Missing Message from Brake Contr	- Check DTC memory of ABS control module ⇒ *Repair Manual, Brake System On Board Diagnostic (OBD), Repair Group 01, checking DTC memory of ABS control module* - Check data exchange between Engine-/ABS-/Transmission control module ⇒ Page 24-201
P1853	18261	Data Bus Powertrain Unplausible Message from Brake Contr.	
P1854	18262	Data Bus Powertrain Hardware Defective	
P3262	19718	Exhaust bank 1/2 oxygen sensors behind catalytic converter mixed up	- Check harness connectors for oxygen sensors and check installed position of oxygen sensors behind catalytic converter.

1) With this malfunction the EPC (Electronic Power Control) Malfunction Indicator Light (MIL) in the instrument cluster is switched on by the ECM. Significance of EPC malfunction indicator light ⇒ Page 24-142 .

2) With this malfunction the exhaust Malfunction Indicator Light (MIL) is only switched on by the ECM, if the malfunction is recognized after the engine has been restarted. Significance of MIL ⇒ Page 01-3 .

Output Diagnostic Test Mode (DTM)

Notes:

- *The DTM can only be performed with the ignition switched on and the engine not running.*
- *The DTM is terminated if the engine is started or if an engine speed pulse is detected.*
- *During the DTM, individual control elements will be activated for approx. 1 minute, or until the test program is advanced to the next control element by pressing the → button.*
- *The control elements can be tested either by listening or by touching.*
- *If the DTM is to be repeated, the engine must be started. The engine control module needs to detect an engine speed of more than 300 rpm.*
- *The electric fuel pump runs continuously throughout the DTM.*

01-76

The DTM activates the following components in the stated sequence:

Activation sequence	
1.	EVAP Canister Purge Regulator Valve -N80-
2.	Secondary Air Injection (AIR) Solenoid Valve -N112- (This display appears only on vehicles with automatic transmission)
3.	Secondary Air Injection (AIR) Pump Relay -J299- (This display appears only on vehicles with automatic transmission)
4.	Wastegate Bypass Regulator Valve -N75
5.	Camshaft adjustment
6.	Leak Detection Pump for EVAP system
7.	Recirculating valve for turbocharger -N249
8.	Cylinder 1 Fuel Injector -N30
9.	Cylinder 4 Fuel Injector -N33
10.	Cylinder 3 Fuel Injector -N32
11.	Cylinder 6 Fuel Injector -N84
12.	Cylinder 2 Fuel Injector -N31

13.	Cylinder 5 Fuel Injector -N83

01-77

Test requirements

- Fuses for engine electronics OK
- Fuel pump relay OK

- Connect vehicle diagnostic, testing and information system VAS 5051 or VAG1551 scan tool and select engine electronics control module by entering address word "01" ⇒ Page 01-9 . When doing this the ignition must be switched on.

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

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

Rapid data transfer Q **03 - Output Diagnostic Test Mode**	Indicated on display

01-78

Actuating EVAP Canister Purge Regulator Valve -N80

- Confirm input with -Q- button.

Output Diagnostic Test Mode →

EVAP canister purge regulator valve -N80

Indicated on display

This solenoid valve will continue to be actuated (i.e. will click) until the → button is pressed to advance program to next control element.

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

- Check EVAP Canister Purge Regulator Valve -N80 ⇒ Page 24-134 .

01-79

Actuating Secondary Air Injection (AIR) Solenoid Valve -N112

Note:

Only vehicles with automatic transmission are equipped with a secondary air injection system. Vehicles with manual transmission do not have a secondary air injection system. For this reason are on vehicles with manual transmission the following components Secondary Air Injection (AIR) Solenoid Valve -N112 and Secondary Air Injection (AIR) Pump Relay -J299 not displayed.

- Press →button.

Output Diagnostic Test Mode →

Secondary Air (AIR) Injection valve -N112

< Indicated on display

This solenoid valve will continue to be actuated (i.e. will click) until the → button is pressed to advance the program to the next control element.

If the secondary air injection valve does not click:

- Check Secondary Air Injection (AIR) Solenoid Valve -N112

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Checking secondary air injection valve*

01-80

Actuating Secondary Air Injection (AIR) Pump Relay -J299

Note:

Only vehicles with automatic transmission are equipped with a secondary air injection system. Vehicles with manual transmission do not have a secondary air injection system. For this reason is on vehicles with manual transmission the following component Secondary Air Injection (AIR) Pump Relay -J299 not displayed.

- Press →button.

Output Diagnostic Test Mode →

Secondary air pump relay -J299

Indicated on display

The Secondary Air Injection (AIR) Pump Relay -J299- activates the Secondary Air Injection (AIR) Pump Motor -V101-, which runs for approx: 1 minute at intervals.

If the Secondary Air Injection (AIR) Pump Motor -V101- does not run at intervals:

- Check Secondary Air Injection (AIR) Pump Relay -J299.

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 26, Checking Secondary Air Injection (AIR) Pump Relay -J299*

01-81

Activating Wastegate Bypass Regulator Valve -N75-

- Press →button.

Output Diagnostic Test Mode →

Wastegate bypass regulator valve -N75

Indicated on display

This solenoid valve is activated for 1 minute (clicks), unless → button is pressed first to switch to the next actuator.

If valve is not activated (does not click):

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 21, Turbocharger, Checking Wastgate Bypass Regulator Valve -N75*

Actuating camshaft adjustment valves -N205-, -N208-

- Press →button.

Output Diagnostic Test Mode →

Camshaft Adjustment

Indicated on display

- Camshaft adjustment valves 1 and 2 (-N205 and -N208) will continue to be activated (or will click) for about 1 minute.

If camshaft adjustment valve 1 or 2 is not activated:

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 15, Camshaft adjustment, checking camshaft adjustment valves*

01-82

Actuating Leak Detection Pump (LDP) -V144-

- Press →button.

Output Diagnostic Test Mode →

EVAP system leak detection pump

Indicated on display

The change over valve in the LDP is activated for approximately 1 minute (clicks), unless the → button pressed to switch to the next actuator.

Note:

The clicking can be heard by listening in the area of the left rear wheel housing.

If valve is not actuated (does not click):

⇒ *Repair Manual, Fuel Supply System, Repair Group 20, Components of EVAP system servicing, Checking Leak Detection Pump (LDP) -V144*

01-83

Activating Recirculating valve for turbocharger -N249

- Press →button.

Output Diagnostic Test Mode →

Recirculating valve for turbocharg -N249

Indicated on display

This solenoid valve is activated for 1 minute (clicks), unless → button is pressed first to switch to the next actuator.

If valve is not activated (does not click):

⇒ *Repair Manual, 2.7 Liter V6 5V BiTurbo Engine Mechanical, Engine Code(s): APB, Repair Group 21, Turbocharger, Checking Recirculating valve for turbocharger -N249*

Actuating fuel injectors

Note:

The fuel injectors are activated in firing order that means Cyl.1, Cyl.4, Cyl.3, Cyl.6, Cyl.2, Cyl,5

- Press →button.

Output Diagnostic Test Mode →

Cylinder 1 fuel injectors -N30

Indicated on display

- Press →button.

After pressing → button, fuel injector must click five times.

01-84

If the fuel injector does not click:

- Check fuel injectors ⇒ Page 24-39 .

- Press →button.

Output Diagnostic Test Mode → **Cylinder 4 fuel injectors -N33**	➢	Indicated on display

- Press →button.

Output Diagnostic Test Mode → **Cylinder 4 fuel injectors -N33**	➢	Indicated on display

After pressing arrow button, fuel injector must click five times.

If the fuel injector does not click:

- Check fuel injectors ⇒ Page 24-39 .

01-85

- Press →button.

Output Diagnostic Test Mode →
Cylinder 3 fuel injectors -N32

Indicated on display

- Press →button.

Output Diagnostic Test Mode →
Cylinder 3 fuel injectors -N32

Indicated on display

After pressing → button, fuel injector must click five times.

If the fuel injector does not click:

- Check fuel injectors ⇒ Page 24-39 .
- Press →button.

Output Diagnostic Test Mode →
Cylinder 6 fuel injectors -N84

Indicated on display

- Press →button.

Output Diagnostic Test Mode →
Cylinder 6 fuel injectors -N84

Indicated on display

After pressing → button, fuel injector must click five times.

If the fuel injector does not click:

- Check fuel injectors ⇒ Page 24-39 .
- Press →button.

01-86

Output Diagnostic Test Mode → **Cylinder 2 fuel injectors -N31**	⮜	Indicated on display - Press →button.
Output Diagnostic Test Mode → **Cylinder 2 fuel injectors -N31**	⮜	Indicated on display After pressing → button, fuel injector must click five times. If the fuel injector does not click: - Check fuel injectors ⇒ Page 24-39 . - Press →button.
Output Diagnostic Test Mode → **Cylinder 5 fuel injectors -N83**	⮜	Indicated on display - Press →button. After pressing → button, fuel injector must click five times.
Output Diagnostic Test Mode → **Cylinder 5 fuel injectors -N83**	⮜	Indicated on display If the fuel injector does not click: - Check fuel injectors ⇒ Page 24-39 . - Press →button.

01-87

Output Diagnostic Test Mode →	
END	

Indicated on display

- Press →button.

Rapid data transfer **HELP**	
Select function XX	

Indicated on display (function selection):

Note:

The output Diagnostic Test Mode (DTM) cannot be re-initiated until the engine is started and ignition switched off and then on again.

Basic setting

With the ignition on and engine not running, the following operation can be performed in the "Basic setting" mode (function 04):

- Adaptation of throttle valve control module to ECM ⇒ Page 24-146

- Vehicles with automatic transmission: Adaptation of kick down function of accelerator pedal position sensor to ECM ⇒Display group 63 (⇒ Page 24-166)

With the engine running, the following operations can be performed in the basic setting mode "Function 04":

- Learning process (adaptation) for oxygen sensor control ⇒ every display group

- Troubleshooting by targeted activation and deactivation of oxygen sensor control ⇒ display group 99 (Observe note on page ⇒ Page 24-81).

01-89

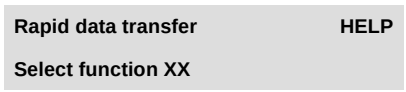
Test requirements for operations with engine running

- No DTCs stored in DTC memory
- Coolant temperature at least 85 ° C
- Electrical consumers switched off (radiator fan must not run during test)
- A/C switched off

- Connect vehicle diagnostic, testing and information system VAS 5051 or VAG1551 scan tool and select engine electronics control module by entering address word "01" ⇒ Page 01-9 . When doing this the engine must be idling.

- Check and erase DTC memory ⇒ Page 01-15 . There should be no malfunctions stored in the DTC memory. (If necessary repair malfunctions, erase DTC memory and switch off engine. Start engine again, road test the vehicle and check DTC memory again to check).

- Continue to run engine at idle.



Indicated on display

- Press buttons -0- and -4- to select function "Basic Setting"

System in Basic Setting
04 - Basic Setting

Indicated on display

- Confirm entry by pressing -Q- button.

System in Basic Setting
Input display group number XXX

Indicated on display

- Select required display group number from the Display Group Overview in "Read Measuring Value Block" section.

Note:

Display Group 000 is used here as an example to illustrate the procedure.

- Press buttons -0- three times.

(000 is to select Display Group 000)

Note:

When the display group is selected the EVAP valve is closed and the air conditioner compressor is switched off.

System in Basic Setting	**Q**
Input display group number	**000**

Indicated on display

- Confirm entry by pressing -Q- button.

System in basic setting 0 →

Indicated on display

1 2 3 4 5 6 7 8 9 10

01-91

Display group 000 (indicated values decimal)												
• Engine running at idle (Coolant Temperature not less than 80 °C)												
1	2	3	4	5	6	7	8	9	10	◀ Display fields	Specification	Represents
										Adaptation value of mixture formation, bank 2	108 - 148	-4 to 4%
										Adaptation value of mixture formation, bank 1	108 - 148	-4 to 4%
										Control value of mixture formation bank 2 (If out of specification perform road test)	122 - 136	-4 to 4%
										Control value of mixture formation bank 2 (If out of specification perform road test)	122 - 136	-4 to 4%
										Adaptation value torque loss at idle	124 - 140	-3 to 5%
										Idle torque	126 - 135	-1.5 to 1.5%
										Throttle valve angle	1 - 7	0.4 to 2.75%
										Engine speed (idle speed)	77 - 83	770 - 830 RPM
										Engine load (without consumers)	21 - 34	15 - 26%
										Engine Coolant Temperature (requirement for basic setting)	177 - 203	85 - 105 °C

1) Up-to-date specifications:

- Allow engine to idle for a few minutes: Coolant temperature at least 80 ° C.

Notes:

- *When the PRINT button is pressed the current display will be printed out.*
- *Press C button before selecting further display groups.*

- If readouts in all display fields match specifications, press → button.

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

- Press buttons -0- and -6- to select function "End Output".

Rapid data transfer HELP **06 - End Output**	Indicated on display

- Confirm with -Q- button.

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

01-93

Control module, coding

Notes:

- *If the correct coding for the vehicle is not displayed, or if the control module has been replaced, the control module must be coded.*

- Connect vehicle diagnostic, testing and information system VAS 5051 or VAG1551 scan tool and select engine electronics control module by entering address word "01" ⇒ Page 01-9 . When doing this the ignition must be switched on.

The display of VAG1551 will show the control module coding (example).

The relevant vehicle coding must be displayed, note coding table ⇒ Page 01-94 .

01-94

Coding variations of Engine Control Module (ECM)

Country/ Emission standard	Power train / Additional systems	Transmission	Type of vehicle
00 = ----------	0 = ----------	0 = ----------	0 = ----------
01 = ----------	1 = ----------	1 = 6-speed manual transmission	1 = A4
02 = ----------	2 = ----------	2 = ----------	2 = ----------
03 = ----------	3 = ----------	3 = ----------	3 = ----------
04 = ----------	4 = ----------	4 = ----------	4 = ----------
05 = ----------	5 = ----------	5 = 5-speed automatic transmission (ZF) (5HP24)	5 = ----------
06 = USA; TLEV (Exhaust emission standard) NOTE: Vehicles with Leak Detection Pump (LDP)	6 = All-wheel drive without Anti Slip Regulation (ASR)/Electronic Stability Program (ESP) (with CAN-Bus system)	6 = ----------	6 = ----------
07 = ----------	7 = All-wheel drive with Anti Slip Regulation (ASR)/Electronic Stability Program (ESP) (with CAN-Bus system)	7 = ----------	7 = ----------

Notes:

- *TLEV = Transient Low Emission Vehicles. ESP = Electronic Stability Program*
- *If the vehicle is equipped with ESP can be identified at the ESP switch in the dash panel.*

01-95

Determine the code number according to the following example:

USA; TLEV (emission standard)	06			
All-wheel drive without ASR/ESP		6		
6-Speed manual transmission			1	
Audi A4				1
Code number	06	6	1	1

01-96

If an incorrect coding is displayed:

- Press →button.

Rapid data transfer HELP **Select function XX**	When indicated on display

- Press buttons "07" for the function "Code Control Module" and press Q button to confirm input.

Code Control Module Q **Input code number XXXXX (0-32000)**	When indicated on display

- Input control module coding according to coding table and press -Q- button to confirm input ⇒ Page 01-94 .

Function unknown or → **cannot be carried out currently**	If this message appears:

Check in parts catalog if the correct control module has been installed (part number). It also possible that an incorrect code number was entered. If necessary repeat coding.

- Press →button.

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

- Press buttons -0- and -6- to select function "End Output" and confirm entry with -Q- button.

01-97

Read Measuring Value Block

Test requirements

- Coolant temperature at least 80 ° C
- Electrical consumers switched off (radiator fan must not run during the check)
- A/C switched off

- Connect vehicle diagnostic, testing and information system VAS 5051 or VAG1551 scan tool and select engine electronics control module by entering address word "01" ⇒ Page 01-9 . When doing this the engine must be idling.

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

- Press buttons -0- and -8- to select function "Read Measuring Value Block" and confirm entry with -Q- button.

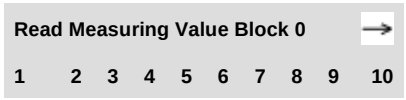
Read Measuring Value Block **Input display group number XXX**	Indicated on display

01-98

- Input relevant Display Group number (3 figures) and confirm entry by pressing -Q- button.

Note:

The display group number required is indicated in the instructions for testing functions and components given in the relevant sections of this Manual.



Indicated on display for display group 000:

Note:

To change to another display group proceed as follows:

Display group	VAG1551 scan tool	VAS5051 tester
Higher	Press button 3	Press ▲ button
Lower	Press button 1	Press ▼ button

Readiness code

The readiness code is a 8 digit display in measuring value block 086, display field 1. Each of the 8 digits is assigned to a specific exhaust related system.

If the function of these systems is checked via a test by On Board Diagnostic (OBD), which is successfully completed, then the position assigned to this system will be switched from "1" to "2." This occurs regardless of whether the test is indicated as "OK" or "not OK" as long as the test is successfully completed.

If a test is completed, but indicated as "not OK", a DTC will be stored in the DTC memory. Check DTC memory ⇒ Page 01-15 .

When the readiness code is generated after a successfully completed test, "00000000" will be displayed. (Measuring value block 086, display field 1).

01-100

The readiness code will be reset to "1 1 1 1 1 1 1 1" if:

- The DTC memory was erased
- A new Engine Control Module was installed
- If the voltage supply has been disconnected from the Engine Control Module (ECM)

In this case the readiness code must be generated ⇒ Page 01-105 .

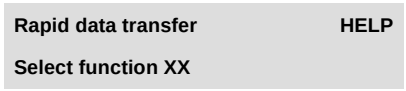
During driving operation in various load conditions, exhaust relevant tests are performed by the control module within a "short trip" and readiness code is generated on its own. In this case, however, concluding control possibilities are not available, meaning that it will not be indicated whether all positions of the readiness code are set to "0."

01-101

Readiness code, checking

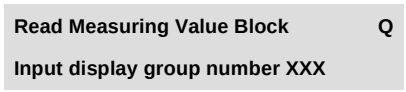
Test sequence

- Connect vehicle diagnostic, testing and information system VAS5051 or VAG1551 scan tool to vehicle and select Control module for engine electronics "Address Word" 01 ⇒ Page 01-9 . The ignition must be switched on.



When indicated on display

- Press buttons -0- and -8- to select "Read Measuring Value Block" and press -Q- button to confirm input.



When indicated on display

- Press buttons "086" for "display group number 086" and press -Q- button to confirm input.

When indicated on display

- Check readiness code in display field 1
  - Specified value: 0 0 0 0 0 0 0 0

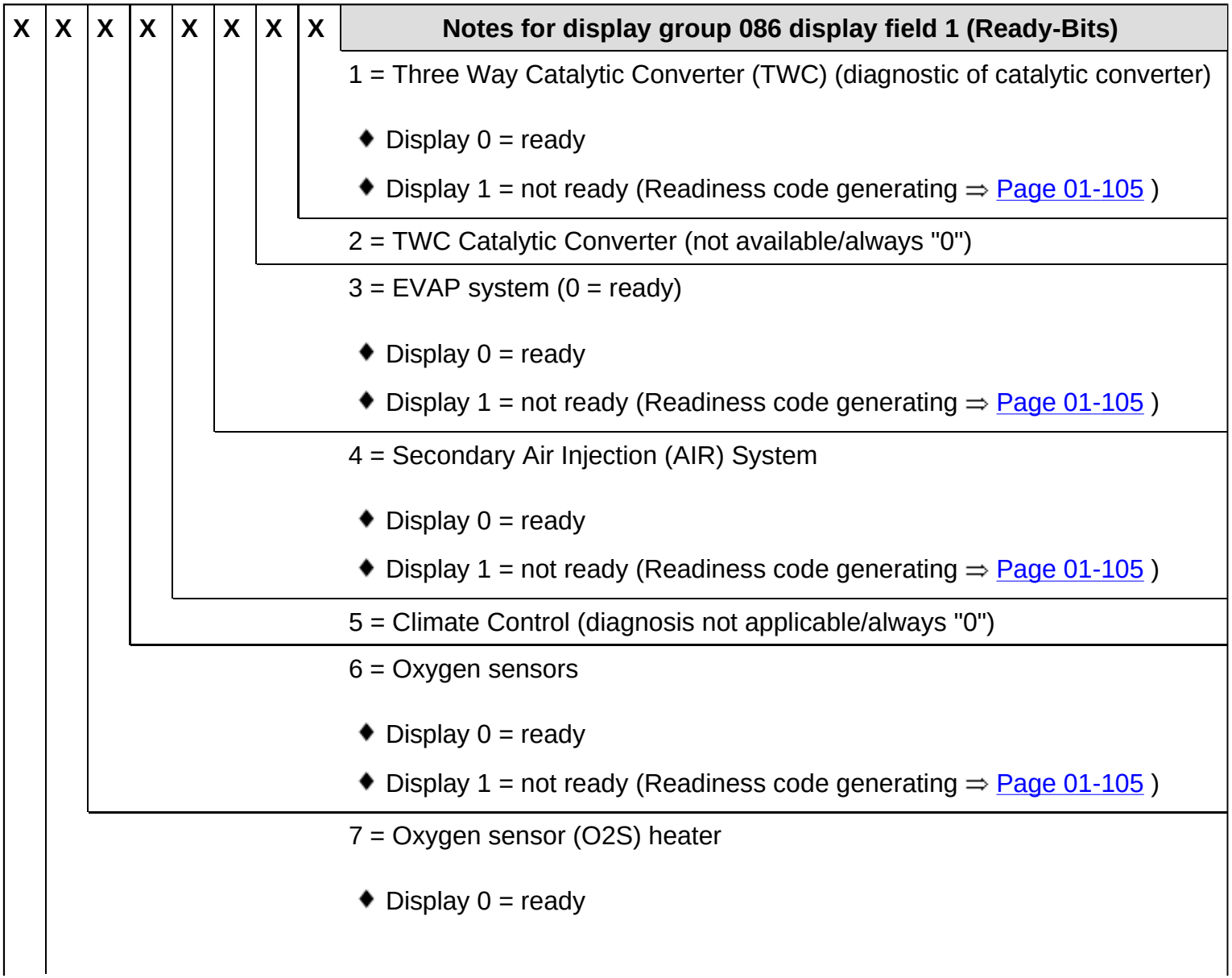
01-102

	Display fields			
	1	2	3	4
Display Group 086: Readiness code				
Display	**0 0 0 0 0 0 0 0**	X X X X X X X X	X X X X X X X X	**X X X X X X X X**
Indicated	**Ready-bits** **completed tests**	Cycle-Flags Performed cycles	Cycle-Flags Performed cycles	Cycle-Flags Performed cycles
Work area	**1 = not completed** **0 = completed**	1 = not completed 0 = completed	1 = not completed 0 = completed	1 = not completed 0 = completed
Specified value	**0 0 0 0 0 0 0 0**	X X X X X X X X	X X X X X X X X	X X X X X X X X
Note:	**Readiness code significance on next pages**			

Note for display field 1:

This display field indicates which diagnosis was checked last after the DTC memory was erased or if the control module was replaced. After erasing the DTC memory, all values that can be checked will be reset to 1, after successful testing these values will be reset to 0.

01-103


X X X X X X X X
Notes for display group 086 display field 1 (Ready-Bits)
1 = Three Way Catalytic Converter (TWC) (diagnostic of catalytic converter)
Display 0 = ready
Display 1 = not ready (Readiness code generating ⇒ Page 01-105)
2 = TWC Catalytic Converter (not available/always "0")
3 = EVAP system (0 = ready)
Display 0 = ready
Display 1 = not ready (Readiness code generating ⇒ Page 01-105)
4 = Secondary Air Injection (AIR) System
Display 0 = ready
Display 1 = not ready (Readiness code generating ⇒ Page 01-105)
5 = Climate Control (diagnosis not applicable/always "0")
6 = Oxygen sensors
Display 0 = ready
Display 1 = not ready (Readiness code generating ⇒ Page 01-105)
7 = Oxygen sensor (O2S) heater
Display 0 = ready

- Display 1 = not ready

8 = Exhaust Gas Recirculation (EGR) system (not applicable/always "0")

Note:

The readiness code is only set if all position are displayed with "0."

01-104

If the specified value in display field 1:
"00000000" is obtained:

- Press →button.

Rapid data transfer **HELP**	
Select function XX	

Indicated on display (function selection)

- Check DTC memory ⇒ Page 01-15 (No malfunction should be stored in the DTC memory).

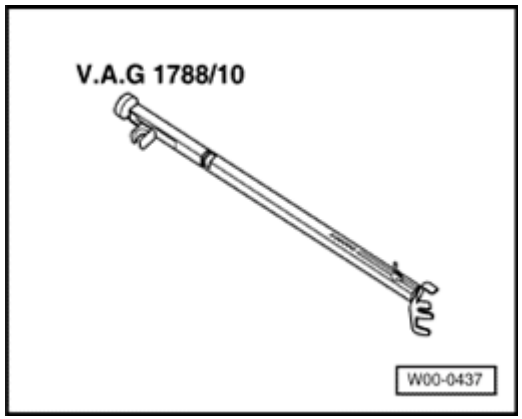
If specified value is not reached:

- Generate readiness code ⇒ Page 01-105 .

01-105

Readiness code, generating

Required special tools and test equipment



- VAG1788/10 RPM adjuster

Requirements

- Electrical consumers switched off (radiator fan must NOT run during test)
- Coolant temperature min. 80 °C (185 °F)

01-106

Work step 1: Check DTC memory

- Connect Vehicle Diagnostic, Test and Information system VAS5051 or VAG1551 scan tool to vehicle and select control module for engine electronics using "address word" 01 ⇒ Page 01-9 . The ignition is switched on.

Rapid data transfer HELP **Select function XX**	When indicated on display

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

X DTC recognized!	Number of stored DTCs or "No DTC recognized" will be indicated on display.

If a DTC is stored:

- Repair malfunction, erase DTC memory. Road test vehicle and then re-check DTC memory as a control measure.

If no DTC is stored:

- Press →button.

01-107

Work step 2: Erase DTC Memory

Test requirements

- Ignition switched on

Rapid data transfer HELP **Select function XX**	When indicated on display

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

Note:

When DTC memory is erased, readiness code is reset and must therefore be re-generated.

Rapid data transfer → **DTC memory is erased**	When indicated on display

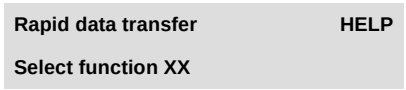
- Press →button.

01-108

Work step 3: Adaptation Throttle Valve Control Module to Engine Control Module (ECM)

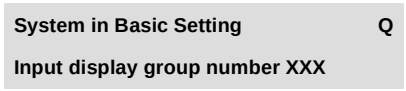
Test requirements

- Ignition switched on.



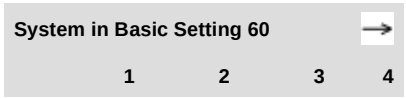
When indicated on display

- Press buttons "04" for the function "Basic Setting" and press Q button to confirm input.



When indicated on display

- Input "060" for "display group number 60" and press Q button to confirm input.



When indicated on display

- Check readiness code in display field 3 and 4:

01-109

	Display fields			
	1	2	3	4
Display group 060: Adaptation of throttle valve control module				
Display	xx %	xx %	**x**	**---**
Indicated	Throttle valve angle (angle sensor 1)	Throttle valve angle (angle sensor 2)	**Adaptation step counter**	**Adaptation condition**
Work area	0 - 100 %	0 - 100 %	**0 - 8**	**ADP. runs** **ADP. OK** **ADP. ERROR**
Specified value	3 - 93 %	97 - 3 %	**8**	**ADP. OK**
Note:			**During adaptation, adaptation step counter must reach the number 8. (Some numbers may be skipped).**	**If "ADP. ERROR." is displayed: Check DTC memory ⇒ Page 01-15 .** **If specified value is not obtained: ⇒Note, Page ⇒ Page 24-152 .**

Note for display field 3:

During adaptation different digits are displayed in display field 3, which indicate the particular adaptation condition. It is not important what the adaptation step counter (display field 3) displays during adaptation, rather that display field 4 displays the

specification value "ADP. OK.

01-110

If specified value "ADP. OK" is obtained:

- Press -C- button.

Work step 4: Diagnosis of EVAP canister purge regulator valve

- Start engine (vehicles with manual transmission depress clutch pedal)

Note:

If necessary, ECM must be re-selected with the "address word" 01 following engine start, and the function "initiate basic setting" selected with "04."

Test requirements

- Engine at idle
- Coolant temperature > 85 ° C (display group 4, display field 3)

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

- Press button -0-, -7- and -0- to select "display group number 070" and confirm input with -Q- button.

System in Basic Setting 70 →	⮜	When indicated on display

1	2	3	4

- Check specified value in display field 4:

Note:

If test is not initiated or the display jumps from "Test ON" to "Test OFF" slightly accelerate engine briefly, test will be repeated.

01-111

	Display fields			
	1	2	3	4
Display group 070: Diagnostic of EVAP canister purge regulator valve				
Display	xx %	xx.x %	xx %	**Test ON**
Indicated	EVAP valve duty cycle during diagnosis	Oxygen sensor control deviation during diagnosis	Relative Ground via EVAP valve	**Diagnostic condition**
Work Range	min.: 0 % max.: 100 %	min.: -25.0 % max.: 25.0 %		**Test OFF** **Test ON** **EVAP OK** **EVAP n.OK** **Abort**
Specified value	xx %	-5.0 to 4.0 %	xx - xx % [1)]	**EVAP OK**
Note:				**If "EVAP n. OK" is displayed: Check DTC memory ⇒ Page 01-15 . Check EVAP canister purge regulator valve -N80 ⇒ Page 24-134**

[1)] A display appears only, if the diagnostic result occurred via deviation from the Idle Air Control (IAC) in a specified tolerance range and not from deviation from the oxygen sensor control (e.g.: oxygen sensor 1 from EVAP canister). Display field 3 is only indicated if there is a deviation.

01-112

If the specified value "EVAP OK" is reached:

- Press -C- button

Work step 5: Diagnosis of tank leak test

Note:

This diagnostic is locked the first 230 seconds after engine is started.

Test requirements

- Engine at idle
- Coolant temperature greater 85 ° C (Display group 4, display field 3)
- Intake air temperature less 95 ° C (Display group 4, display field 4)

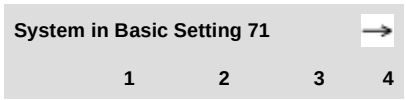
System in Basic System Q

Input display group number XXX

When indicated on display

- Press buttons -0-, -7- and -1- to select display group number "071" and press -Q- button to confirm input.

01-113



When indicated on display

During test is "Test ON" displayed in display field 4. Continue to hold test conditions until a diagnostic result is displayed in display field 4.

- Check specified value in display field 4:

Note:

- *Test duration for tank leak test takes approximately 60 seconds.*
- *Should the diagnosis be repeated several times, open fuel filler cap each time to release pressure in tank.*

01-114

	Display fields			
	1	2	3	4
Display group 071: Diagnostic of tank leak test				
Display	Reed open	---	System Test	**Test ON**
Indicated	Condition Reed-contact	malfunction message	System condition	**Diagnostic condition and Diagnostic result**
Work range	Reed open Reed closed	Small leak Large leak System not OK	System Test Measurement Measurement END	**Test OFF** **Test ON** **Syst. OK** **Syst. not OK** **Abort**
Specified value	Reed open	---	Measurement END	**Syst. OK**
Note				**If "System not OK" is displayed: Check DTC memory ⇒ Page 01-15 .**

01-115

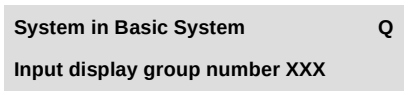
If specified value in display field "System OK" is reached:

- Press -C- button.

Work step 6: Diagnosis of fuel supply system

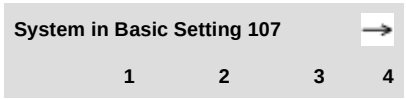
Test requirements

- Engine at idle
- Oxygen sensor control active



When indicated on display

- Press buttons -1-, -0- and -7- to select display group number 107 and confirm with -Q- button.



When indicated on display

- Check specified values in display field 4.

Note:

If display "Test ON" does not appear in the display field, switch the engine off and restart afterward and repeat work step 6. (Diagnostic of fuel supply system)

After the engine has been started it might be necessary to select "Address word 01" and initiate the function "04 Basic Setting" again.

01-116

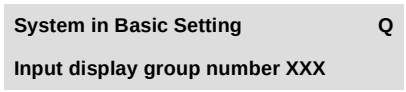
	Display fields			
	1	2	3	4
Display group 107: Diagnostic of fuel supply				
Display	xxx /RPM	x.x %	x.x %	**Test ON**
Indicated	Engine speed (actual)	Oxygen sensor control average value (Bank 1)	Oxygen sensor control average value (Bank 2)	**Diagnostic condition**
Work range	min.: 750 /RPM max.: 6800 /RPM	min.: -25.0 % max.: 25.0 %	min.: -25.0 % max.: 25.0 %	**Test OFF** **Test ON** **Syst. OK** **Syst. n OK**
Value	750 - 850/RPM	-18.0 % to 12.0 %	-18.0 % to 12.0 %	Syst. OK
Note				**If "Syst. n OK" appears, check DTC memory ⇒ Page 01-15 .**

01-117

If specified value in display "System OK" is reached:

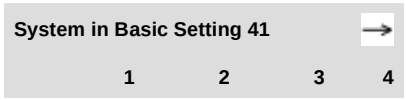
- Press -C- button.

Work step 7: Diagnosis of oxygen sensor heater



When indicated on display

- Press buttons -0-, -4- and -1- to select display group number 041 and confirm with -Q- button.



When indicated on display

- Check specified value in display field 1 and 3:

Note:

Increasing engine speed accelerates the obtaining of specified values.

01-118

	Display fields			
	1	2	3	4
Display group 041: Oxygen sensor heater, bank 1				
Display	**xxx kOhm**	**Heater before before CAT ON**	**xxx kOhm**	**Heater before behind CAT ON**
Indicated	**Bank 1, Sensor 1**	**Condition of heater**	**Bank 1, Sensor 2**	**Condition of heater**
Work range		**Heater b. CAT ON** **Heater b. TWC OFF**		**Heater a. CAT ON** **Heater a. CAT OFF**
Specified value	**0 - 0.5 kOhm**	**Heater b. CAT ON/OFF**	**0 - 0.9 kOhm**	**Heater a. CAT ON/OFF**

Important note for display fields 1,2,3 and 4:

- *Display fields 1 and 3 will not indicate any value if the operating temperature of the oxygen sensors is not reached, that means both fields are empty. (Increase Engine Speed to reach specified value).*
- *After the operating temperature is reached, the display fields 1 and 3 must display a value of less than 0.5K Ohm*
- *Only proceed with test after value of less than 0.5K Ohm is displayed with in display fields 1 and 3.*
- *The Engine Control Module (ECM) cycles at certain operating conditions the oxygen sensor heating, that means, the heater is certain operating conditions ON or OFF. It is therefore possible that the specification in display field 2 and 4 appears periodically as "Heater b. CAT OFF" or "Heater a. CAT OFF"*

- Press -C- button.

- Press buttons -0-, -4- and -2- to select "display group number 042" and confirm input with -Q- button.

01-119

	Display fields			
	1	2	3	4
Display group 042: Oxygen sensor heater, bank 1				
Display	**xxx kOhm**	**Heater before before CAT ON**	**xxx kOhm**	**Heater before behind CAT ON**
Indicated	**Bank 1, Sensor 1**	**Condition of heater**	**Bank 1, Sensor 2**	**Condition of heater**
Work range		**Heater b. CAT ON** **Heater b. TWC OFF**		**Heater a. CAT ON** **Heater a. CAT OFF**
Specified value	**0 - 0.5 kOhm**	**Heater b. CAT ON/OFF**	**0 - 0.9 kOhm**	**Heater a. CAT ON/OFF**
Note	**Observe note below**		**Observe note below**	

Important note for display fields 1,2,3 and 4:

- *Display fields 1 and 3 will not indicate any value if the operating temperature of the oxygen sensors is not reached, that means both fields are empty. (Increase Engine Speed to reach specified value).*
- *After the operating temperature is reached, the display fields 1 and 3 must display a value of less than 0.5K Ohm*
- *Only proceed with test after value of less than 0.5K Ohm is displayed with in display fields 1 and 3.*

- *The Engine Control Module (ECM) cycles at certain operating conditions the oxygen sensor heating, that means, the heater is certain operating conditions ON or OFF. It is therefore possible that the specification in display field 2 and 4 appears periodically as "Heater b. CAT OFF" or "Heater a. CAT OFF"*

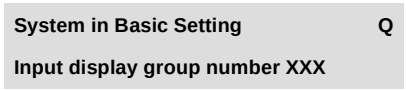
- Press -C- button.

01-120

Work step 8: Diagnosis oxygen sensor aging before catalytic converter

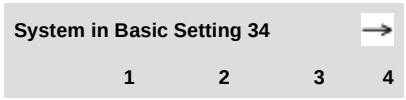
Test requirements

- Engine running at 1900 - 2200 RPM



Indicated on display

- Press buttons -0-, -3- and -4- to select "display group number 034" and confirm with -Q- button.



Indicated on display

- Check specified value in display field 4:

01-121

	Display fields			
	1	2	3	4
Display group 034: Oxygen sensor aging before catalytic converter (bank 1)				
Display	xxxx/RPM	xxx ° C	x.x seconds	**Test ON**
Indicated	Engine speed (RPM)	Exhaust temperature	Period duration of oxygen sensor before CAT	**Diagnostic condition**
Work range	0 - 6800/RPM	70 - 850 ° C	0.0 - 3.0 Seconds	**Test OFF** **Test ON** **B1-S1 OK** **B1-S1 not OK**
Specified value	1900 - 2200/RPM	Greater than 260 ° C	0.1 - 1.0 Seconds	**B1-S1 OK**
Note				**If "B1-S1 not OK" is displayed: Check DTC memory ⇒ Page 01-15 .**

If specified value of "B1-S1 OK" is reached:

- Press -C- button.

Test requirements

- Engine running at 1900 - 2200 RPM

- Press buttons -0-, -3- and -5- to select "display group number 035" and confirm with -Q- button.

01-122

	Display fields			
	1	2	3	4
Display group 035: Oxygen sensor aging before catalytic converter (Bank 2)				
Display	xxxx/RPM	xxx °C	x.x seconds	**Test ON**
Indicated	Engine speed (RPM)	Exhaust temperature	Period duration of oxygen sensor before TWC	**Diagnostic condition**
Work range	0 - 6800/RPM	70 - 850 °C	0.0 - 3.0 Seconds	**Test OFF** **Test ON** **B2-S1 OK** **B2-S1 not OK**
Specified value	1900 - 2200/RPM	greater than 260 °C	0.1 - 1.0 Seconds	**B2-S1 OK**
Note				**IF "B2-S1 not OK" is displayed: Check DTC memory ⇒ Page 01-15 .**

If specified value of "B2-S1 OK" is reached:

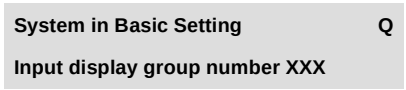
- Press -C- button.

01-123

Work step 9: Diagnosis of operational readiness of oxygen sensors behind TWC

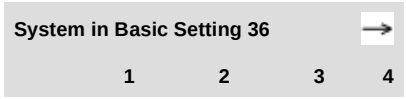
Test requirements

- Engine at idle



Indicated on Display

- Press buttons -0-, -3- and -6- to select "display group number 036" and press -Q- button to confirm input.



Indicated on display

- Check specified values in display fields 2 and 4.

01-124

	Display fields			
	1	2	3	4
Display group 036: Operational readiness of oxygen sensors behind TWC (Bank 1 and Bank 2)				
Display	x.xxx Volt	**Test ON**	x.xxx Volt	**Test ON**
Indicated	Voltage of oxygen sensor behind TWC, bank 1	**Diagnostic condition**	Voltage of oxygen sensor behind TWC, bank 2	**Diagnostic condition**
Work range	0.000V - 1.000 Volt	**Test OFF** **Test ON** **B1-S2 OK** **B1-S2 not OK**	0.000V - 1.000Volt	**Test OFF** **Test ON** **B2-S2 OK** **B2-S2 not OK**
Value	less than 0.4 Volt or greater than 0.5 Volt	**B1-S2 OK**	less than 0.4 Volt or greater than 0.5 Volt	**B2-S2 OK**
Note		**IF "B1-S2 not OK" is displayed: Check DTC Memory ⇒ Page 01-15 .**		**If "B2-S2 not OK" is displayed: Check DTC memory ⇒ Page 01-15 .**

If the specified value in display field 2 "B1-S2 OK" and in display field 4 "B2-S2 OK" is reached:

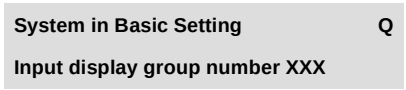
- Press -C- button.

01-125

Work step 10: Diagnosis of oxygen sensor control system

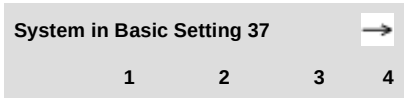
Test requirements

- Engine at idle



➢ Indicated on display

- Press buttons -0-, -3- and -7- to select "display group numbers 037" and confirm with -Q- button.



➢ Indicated on display

- Check specified value in display field 4.

01-126

	Display fields			
	1	2	3	4
Display group 037: Oxygen sensor control system (Bank 1)				
Display	xx.x %	x.xxx Volt	xxx ms	**Test ON**
Indicated	Load	Voltage of oxygen sensor behind TWC, bank 1	Correction value between oxygen sensors 1 and 2, bank 1	**Diagnostic condition**
Work range	0 - 175 %	0.000 - 1.000 Volt	---	**Test OFF** **Test ON** **Syst. OK** **Syst. not OK**
Specified value	13.5 - 25.0 %	0.000 - 1.000 Volt	-500ms to 800ms	**Syst. OK**
Note				**If "Syst. not OK" is displayed: Check DTC memory ⇒ Page 01-15 .**

If specified value of "System OK" is reached:

- Press -C- button.
- Press buttons -0-, -3- and -8- to select "display group number 038" and confirm input with -Q- button.

01-127

	Display fields			
	1	2	3	4
Display group 038: Oxygen sensor control system (Bank 2)				
Display	xx.x %	x.xxx Volt	xxx ms	**Test ON**
Indicated	Load	Voltage of oxygen sensor behind TWC, bank 2	Correction value between oxygen sensors 1 and 2, bank 2	**Diagnostic condition**
Work range	0 - 175 %	0.000 - 1.000 Volt	---	**Test OFF** **Test ON** **Syst. OK** **Syst. not OK**
Value	13.5 - 25.0 %	0.000 - 1.000 Volt	-500ms to 800ms	**Syst. OK**
Note				**If "Syst. not OK" is displayed: Check DTC memory ⇒ Page 01-15 .**

If specified value of "System OK" is reached:

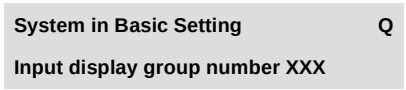
- Press -C- button.

01-128

Work step 11: Diagnosis of oxygen sensor aging behind catalytic converter

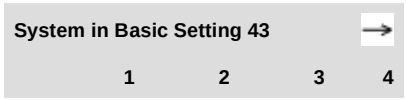
Test requirements

- Engine running at 1900 - 2200 RPM



Indicated on display

- Press buttons -0-, -4- and -3- to select "display group number 043" and confirm input with -Q- button.



Indicated on display

- Check specified value in display field 4.

01-129

	Display fields			
	1	2	3	4
Display group 043: Oxygen sensor aging oxygen sensor behind TWC (Bank 1)				
Display	xxxx/RPM	xxx ° C	x.xxx V	**Test ON**
Indicated	Engine speed (RPM)	Catalyst temperature	Voltage of oxygen sensor behind TWC Bank 1	**Diagnostic condition**
Work range	0 - 6800/RPM	70 - 850 ° C	0.000 - 1.000 Volt	**Test OFF** **Test ON** **B1-S2 OK** **B1-S2 not OK**
Specified value	1900 - 2200/RPM	greater than 320 ° C	0.000 - 1.000 Volt	**B1-S2 OK**
Note				**If "B1-S2 not OK" is displayed: Check DTC memory ⇒ Page 01-15 .**

If specified value of "B1-S2 OK" is reached:

- Press -C- button.

Test requirements

- Engine running at 1900 - 2200 RPM

- Press buttons -0-, -4- and -4- to select "display group number 044" and confirm input with -Q- button.

01-130

	Display fields			
	1	2	3	4
Display group 044: Oxygen sensor aging oxygen sensor behind TWC (Bank 2)				
Display	xxxx/RPM	xxx ° C	x.xxx Volt	**Test ON**
Indicated	Engine speed (RPM)	Catalyst temperature	Voltage of oxygen sensor behind TWC Bank 2	Diagnostic condition
Work range	0 - 6800/RPM	70 - 850 ° C	0.000 - 1.000 Volt	Test OFF Test ON B2-S2 OK B2-S2 not OK
Specified value	1900 - 2200/RPM	greater than 320 ° C	0.000 - 1.000 Volt	B2-S2 OK
Note				**If "B2-S2 not OK" is displayed: Check DTC memory ⇒ Page 01-15 .**

If specified value of "B2-S2 OK" is reached:

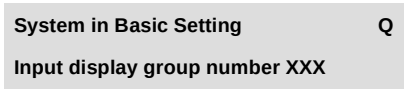
- Press -C- button.

01-131

Work step 12: Diagnosis of catalytic converter

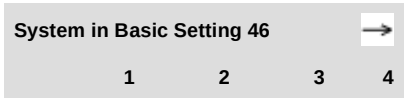
Test requirements

- Engine running at 1900 - 2200 RPM



Indicated on display

- Press buttons -0-, -4- and -6- to select "display group number 046" and confirm input with -Q- button.



Indicated on display

- Check specified value in display field 4.

Note:

The test duration for catalytic converter diagnosis takes approx.: 60 seconds.

01-132

	Display fields			
	1	2	3	4
Display group 046: Diagnostic of catalytic converter (Bank 1)				
Display	xxxx/RPM	xxx ° C	x.x s	**---**
Indicated	Engine speed (RPM)	Catalyst temperature	Catalytic converter conversion	**Diagnostic condition**
Work range	0 - 6800/RPM	70 - 850 ° C	0.0 - 0.99	**Test OFF** **Test ON** **Cat B1 OK** **Cat B1 not OK**
Specified value	1900 - 2200/RPM	greater than 350 ° C	0.0 - 0.80	**Cat B1 OK**
Note				**If "Cat B1 not OK" is displayed: Check DTC memory ⇒ Page 01-15 . If no malfunction is stored replace catalytic converter.**

If the specified value "Cat B1 OK" is reached:

- Press -C- button

- Engine running at 1900 - 2200 RPM

- Press buttons -0-, -4- and -7- to select "display group number 047" and confirm input with -Q- button.

01-133

	Display fields			
	1	2	3	4
Display group 047: Diagnostic of catalytic converter (Bank 2)				
Display	xxxx/RPM	xxx ° C	x.x seconds	**---**
Indicated	Engine speed (RPM)	Catalyst temperature	Catalytic converter conversion	**Diagnostic condition**
Work range	0 - 6800/RPM	70 - 850 ° C	0.0 - 0.99	**Test OFF** **Test ON** **Cat B2 OK** **Cat B2 not OK**
Specified value	1900 - 2200/RPM	greater than 350 ° C	0.0 - 0.80	**Cat B2 OK**
Note				**If "Cat B2 not OK" is displayed: Check DTC memory ⇒ Page 01-15 . If no malfunction is stored replace catalytic converter.**

If the specified value "Cat B2 OK" is reached:

- Press -C- button

01-134

Work step 13: Diagnosis of Secondary Air Injection (AIR) system (only on vehicles with automatic transmission), on vehicles with manual transmission continue with work step 14 ⇒ **Page 01-136**

Note:

The secondary air pump runs for a few seconds during the secondary air injection system diagnosis.

- Engine at idle sped

System in Basic Setting Q
Input display group number XXX

Indicated on display

- Press buttons -0-, -7- and -7- to select "display group number 077" and confirm input with -Q- button.

System in Basic Setting 77			→
1	**2**	**3**	**4**

Indicated on display

- Check specified value in display field 4.

Note:

The test duration for the secondary air injection system takes approximately 60 seconds.

01-135

	Display fields			
	1	2	3	4
Display group 077: Diagnostic of secondary air injection system (Bank 1)				
Display	xxxx/RPM	xx.x g/s	xx %	**Test ON**
Indicated	Engine speed (RPM)	Air mass	Relative air mass secondary air injection system	**Diagnostic condition**
Work range	0 - 6800/RPM			**Test OFF** **Test ON** **Syst. OK** **Syst. not OK** **Abort**
Value	750 - 850/RPM		+10 % to -100 %	**Syst. OK**
Note				**If "Syst. not OK": Check DTC memory** ⇒ **Page 01-15** **.**

If the specified value of "Syst. OK" is reached:

- Press -C- button.
- Press buttons -0-, -7- and -8- to select "display group number 078" and confirm input with -Q- button.

01-136

	Display fields			
	1	2	3	4
Display group 078: Diagnostic of secondary air injection system (Bank 2)				
Display	xxxx/RPM	xx.x g/s	xx %	**Test ON**
Indicated	Engine speed (RPM)	Air mass	Relative air mass secondary air injection system	**Diagnostic condition**
Work range	0 - 6800/RPM			**Test OFF** **Test ON** **Syst. OK** **Syst. not OK** **Abort**
Value	750 - 850/RPM		+10 % to -100 %	**Syst. OK**
Note				**If "Syst. not OK": Check DTC memory ⇒ Page 01-15 .**

If the specified value of "Syst. OK" is reached:

- Press → button.

Work step 14: Readiness code, displaying

- Display readiness code again (measure of control) ⇒ Page 01-101 .