

Diagnosis - Diagnostic Trouble Code (DTC) Memory

Note regarding diagnostic trouble code (DTC) readout:

- DTC memory: Fault display
 - Actual faults:** are on a **grey** background
 - Stored faults:** are on a **light** background

The signal plausibility is checked on all input and output connections during operation.

All malfunctions which occur are stored in the diagnostic trouble code memory of the IFI control module (N3/7).

The DTC memory remains active even if the ignition is turned "OFF" or the vehicle's battery is disconnected.

With emission related faults the CHECK ENGINE MIL (A1e26) lights up and/or the multifunction indicator displays: CHECK ENGINE
 ENGINE ELECTRONICS.

The faults are identified with an OBD failure code: See listing starting on page 5.

Such faults are for example:

- EGR lifting sender (B28/3)
- EGR valve vacuum transducer (Y31/1)
- Pressure control flap vacuum transducer (Y31/2)

Fault freeze frame data

Additionally, ambient conditions present at the time the fault occurs, can be displayed with the HHT. Only those freeze frame data are stored which were present when the fault first occurred. The freeze frame data may be indicated on several screen displays (up to 8 screen displays). The last two screen displays are for development purposes only.

Screen displays with the result √/F indicate the cause of the fault e.g.

- Voltage too high
- Voltage too low
- Signal too large
- Signal too small
- Value implausible

Substitution for missing signals.

The IFI control module (N3/7) replaces missing input signals with substitute values based on other signals available in order to maintain system function.

The substitute values may result in:

- Performance reduction/reduction of maximum engine rpm.
- Switching off anti-vibration control.
- EGR system malfunction.
- Cruise control malfunction.
- Intake MAP control malfunction.

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Notes for HHT

- Loose connections
Loose connections are stored if they occur several times in a certain time period. Therefore, they can appear only as stored DTC's and never as actual DTC's.
- Nominal values
All nominal values relative to the actual values shown on the HHT are listed in the Diagnostic Manual, Diesel Engines, Volume 1.1, section A.
- Actual value for engine coolant temperature
In case of an open or short circuit, the actual value is immediately replaced by a substitute value which is very close to the actual value. Therefore, a fault can not be recognized clearly. A readout of the fault is possible only via the diagnostic trouble code (DTC) memory.
- Actual value for engine rpm
In case of the engine rpm's, the HHT display indicates under menu selection 3/1 the closed throttle (idle) speed nominal value calculated by the control module on the left and the rpm actual value on the right.
- Actual value for injection quantity
In case of the injection quantity, the HHT display indicates under menu selection 3/2 engine test the injection quantity nominal value calculated by the control module on the left and the injection quantity actual value on the right.
- Actual value for intake manifold pressure
In case of the intake manifold pressure, the HHT display indicates under menu selection 3/2 engine test the intake manifold pressure nominal value calculated by the control module on the left and the intake manifold pressure actual value on the right.
The values should differ from each other only slightly. The permissible tolerances are presently unknown.

Notes regarding the Drive Authorization System Stage 2 (DAS)

- The activation of the drive authorization system stage 2 takes place only from the RCL control module via the CAN data bus to the IFI control module.
After activation of the DAS, the IFI control module renders the fuel injection system inoperable. This drive authorization system can only be activated or de-activated using either the IR transmitter or the master key.
The IFI control module and the RCL control module are permanently matched to one another via an identification code. This identification code can not be erased (see HHT actual value "drive authorization system" menu selection 3/7).
Troubleshooting of an IFI control module or the RCL control module by swapping control modules from another vehicle is no longer possible. If a new IFI control module is installed for test purposes only, a maximum of 40 engine starts can be performed before the control modules are permanently locked with each other. **After 40 engine starts, the IFI control module can no longer be used in any other vehicle.**
Before the first engine start, version coding must be performed on the IFI control module with the HHT. After that, identification must be initiated.

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Version coding with HHT

- a) Version coding can be performed automatically and manually only with the Hand-Held Tester (see menu selection 5 "Version coding").
- **Automatic**
Before removing the IFI control module, read existing version code with HHT. After installation of the new control module, enter the previously read version code (menu program in HHT).
 - **Manual**
If the code number can **not** be read, the vehicle equipment/version must be determined. The corresponding code number is obtained from the Spare Parts Microfiche, Group 54 and manually entered with the HHT.

The following vehicle version data must be observed for coding:

- Vehicle model
- ABS
- Manual transmission
- 4-speed automatic transmission
- With cruise control
- Without cruise control
- ETS
- Country version

When returning a new control module to a PDC, the code number must be erased.

Trial installation of a control module from an other vehicle is **not** possible. Trial installation of a new control module from spare parts stock is possible, but only to a maximum of 40 engine starts. After 40 engine starts, the control module is permanently assigned to the vehicle.

Operating Cycle version only

One operating cycle is reached if:

- Engine coolant temperature > 60° C
- Engine rpm for 5 seconds at 2500 rpm
- Ignition **OFF** for 5 seconds
- Engine rpm for 5 seconds at 2500 rpm
- Ignition **OFF** for 5 seconds
- Engine rpm for 5 seconds at 2500 rpm

See HHT Menu 3/8 Memory storage enablement OBD II.

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Prerequisite for DTC memory readout

1. Fuse on relay module (K40) in order.
2. Connect HHT to data link connector (X11/4, 38-pole) according to connection diagram (see section 0).
Yellow wire to socket 4.

Electrical wiring diagram:

Electrical Troubleshooting Manual, Model 210


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DTC 	OBD DTC	Possible cause	DTC Description	Test step/Remedy ¹⁾
		No malfunction in system		–
P0105	P0105	Pressure sensor (B28)	13 \geq 1	23 \Rightarrow 6.0
P0110	P0111	IAT sensor (B17)	13 \geq 2	23 \Rightarrow 5.0
P0115	P0115	ECT sensor (B11/4)	13 \geq 3	23 \Rightarrow 4.0
P0180	P0181	Fuel temperature sensor (Y1/1b1)	13 \geq 4	23 \Rightarrow 23.0
P0400	P0400	EGR, Pressure control, intake manifold pressure	13 \geq 5	23 \Rightarrow 31.0
P0500		VSS		23 \Rightarrow 15.0
P0600	²⁾	CAN data bus		23 \Rightarrow 25.0
P0703		Stop lamp switch (S9/1)		23 \Rightarrow 12.0 + 13.0
P1105	P0106	Atmospheric pressure sensor in control module	13 \geq 6	N3/7
P1220	P0200	Fuel quantity actuator (IFI) (Y23/1)	13 \geq 7	23 \Rightarrow 8.0
P1222	P0220	IFI accelerator pedal position sensor (R25/2)	13 \geq 8	23 \Rightarrow 10.0

1) Observe Preparation for Test, see 22.


2) The DTC P0600 can be displayed even if no malfunction is present

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DTC 	OBD DTC	Possible cause		Test step/Remedy ¹⁾
P1223	P0200	Fuel rack position sensor (Y23/111)	13 \geq 9	23 \Rightarrow 9.0
P1335	P0725	CKP sensor (IFI) (L5/6)	13 \geq 10	23 \Rightarrow 7.0
P1401	P0403	EGR lifting sender (B28/3)	13 \geq 11	23 \Rightarrow 30.0
P1470	P0120	Pressure control flap vacuum transducer (Y31/2)	13 \geq 12	23 \Rightarrow 32.0
P1475	P0200	Resonance intake line switchover valve (Y22/7)	13 \geq 13	23 \Rightarrow 26.0
P1476	P0200	Resonance intake manifold switchover valve (Y22/6)	13 \geq 14	23 \Rightarrow 27.0
P1480	P0380	Preglow control	13 \geq 15	24 \Rightarrow 1.0 – 4.0
P1520		Cruise control switch (S40)		23 \Rightarrow 16.0
P1610		Voltage supply missing or relay module (K40)		23 \Rightarrow 3.0
P1611	P0200	IFI control module (N3/7)	13 \geq 16	N3/7
P1612		IFI control module (N3/7) voltage, circuit 15	13 \geq 17	23 \Rightarrow 2.0
P1613	P0200	IFI control module (N3/7)	13 \geq 18	N3/7
P1614	P0200	IFI control module (N3/7) or fuel metering actuator (Y23/1k1) or fuel rack position sensor (Y23/111)	13 \geq 19	23 \Rightarrow 8.0 + 9.0
P1615	P0560	IFI control module (N3/7) supply voltage	13 \geq 20	23 \Rightarrow 1.0

¹⁾ Observe Preparation for Test, see 22.

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DTC 	OBD DTC	Possible cause		Test step/Remedy ¹⁾
P1617	P0200	Control module or not coded	13 \geq 21	see HHT “version coding” menu selection 5
P1622	P0200	Electrohydraulic shut-off actuator (Y1/1)	13 \geq 22	23 \Rightarrow 22.0
P1625		CHECK ENGINE MIL		23 \Rightarrow 17.0
P1630		Drive authorization signal		see section A4 or HHT actual values “drive authorization” menu selection 3/7
P1705		Starter lock-out/backup lamp switch (S16/1)		23 \Rightarrow 11.0 + 29.0
P1780		Modulating pressure switchover valve (AT/CC) (Y3/4) or upshift delay switchover valve (AT/CC) (Y3/5)		23 \Rightarrow 19.0 + 21.0
P1781		Upshift delay switchover valve (AT/CC) (Y3/5)		23 \Rightarrow 21.0

¹⁾ Observe Preparation for Test, see 22.