

Diagnosis – Trouble Code Description

➤ 1		Hot film MAF sensor (B2/5)
1	System DTC code OBD trouble code	P0100 P0100
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately upon fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Hot film MAF sensor signal threshold values and plausibility (air flow after air cleaner element) Threshold values of voltage supply
5	Voltage supply Voltage supply Signal voltage Signal voltage Engine rpm	< 4.7 V longer than 2 seconds > 5.0 V longer than 2 seconds > 4.7 V longer than 2 seconds < 0.2 V longer than 2 seconds < 650 rpm and current airflow (mass) < 280mg/H or > 700mg/H longer than 10 seconds

Diagnosis – Trouble Code Description

≥ 2		Pressure sensor (B28)
1	System DTC code OBD trouble code	P0105 P0235
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately upon fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Intake manifold pressure is sensed by pressure sensor (B28) and is signalled to the engine control module (IFI) (N3/7)
5	Voltage supply Voltage supply Signal voltage Signal voltage Engine rpm	The engine control module (IFI) tests the voltage values < 4.7 V longer than 2 seconds > 5.0 V longer than 2 seconds > 4.6 V longer than 2 seconds < 0.4 V longer than 2 seconds < 650 rpm and the difference between the intake manifold pressure and atmospheric pressure > 150mbar longer than 6 seconds

Diagnosis – Trouble Code Description

≥ 3		IAT sensor (B17)
1	System DTC code OBD trouble code	P0110 P0110
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	The engine control module (IFI) (N3/7) checks the current voltage at the IAT sensor to the voltage threshold values. If the threshold values are exceeded, an alternate value is established.
5	Signal voltage Signal voltage	The engine control module (IFI) (N3/7) checks the voltage values. > 4.7 V longer than 2 seconds < 0.2 V longer than 60 seconds

Diagnosis – Trouble Code Description

≥ 4		ECT sensor (B11)
1	System DTC code OBD trouble code	P0115 P0115
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	<p>After ignition: "ON" an internal elapsed time span occurs within the engine control module (IFI) (N3/7) , this time span is at: Coolant temperature of: > 10 °C 2 minutes Coolant temperature of: < 9 °C > 5 minutes The internal time span within the engine control module (IFI) (N3/7) is interrupted if the engine rpm is: < 100 rpm or the injection pump injection stroke is < 15mg/ per stroke.</p> <p>If the internal time span has elapsed and the coolant temperature has not attained 5 °C or has not increased to 40 °C, the ECT sensor is then recognized as defective.</p>
5	Signal voltage Signal voltage	<p>The engine control module (IFI) (N3/7) checks the voltage values. < 0.2 V longer then 500milli-seconds > 4.7 V longer then 500milli-seconds With an engine rpm of > 1000 rpm and with an injection amount of > 15mg/stroke, the coolant temperature (after 2-5 minutes) must attain a value of 5 °C, or increase to > 40 °C (depending on coolant temperature with ignition: ON), other wise a fault will be stored in the DTC memory.</p>

Diagnosis – Trouble Code Description

≥ 5		Fuel temperature sensor (Y1/1b1)
1	System DTC code OBD trouble code	P0180 P0180
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	The engine control module (IFI) (N3/7) checks the current voltage value of the fuel temperature sensor to the threshold values. If the threshold values are exceeded, an alternate value is established.
5	Signal voltage Signal voltage	The engine control module (IFI) (N3/7) checks the voltage values. < 0.2 V longer than 2 seconds > 4.7 V longer than 2 seconds

≥ 6		Compression ignition miss
1	System DTC code OBD trouble code	P0300 P0300
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Uneven engine rpm
5	Engine rpm Injection amount ECT	450-1400 rpm/min 2-30mg/stroke > 20 °C

Diagnosis – Trouble Code Description

➤ 7		CAN data bus
1	System DTC code OBD trouble code	P0600 P0600
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	The combination instrument cluster sends to the engine control module (IFI) (N3/7) data within a time raster. If the data is not received within 1 second, a defective combination instrument cluster is recognized. During operation, the CAN connection resistance value is monitored via the IFI control module. At the same time, the CAN element within the IFI control module is checked as well.

➤ 8		Atmospheric pressure sensor in control module
1	System DTC code OBD trouble code	P1105 P1105
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	
5	Signal voltage Signal voltage	The engine control module (IFI) (N3/7) checks the voltage values > 4.7 V longer than 2 seconds < 2.2 V longer than 2 seconds

Diagnosis – Trouble Code Description

➤ 9		Fuel quantity actuator (Y23/1)
1	System DTC code OBD trouble code	P1220 P0200
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately upon fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Control deviation: fuel rack position sensor and fuel quantity actuator see nominal/actual value comparisons
5		The engine control module (IFI) (N3/7) checks the voltage values

➤ 10		IFI/DFI accelerator pedal position sensor (R25/2)
1	System DTC code OBD trouble code	P1222 P0220
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately upon fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Test for supply voltage If the IFI/DFI accelerator pedal position sensor is activated > 20%, then the idle speed contact must be at OFF, see HHT actual values. Beyond < 1%, the idle speed contact in the IFI/DFI accelerator pedal position sensor must be activated. If the the IFI/DFI accelerator pedal position sensor is not activated, then the display in the HHT must show 0%, see HHT actual values. Hint: When testing, observe that the EGR lifting sender (B28/3) and IFI/DFI accelerator pedal position sensor (R25/2) must both have the same voltage supply, therefore test both components.
5	Voltage supply Voltage supply Signal voltage	The engine control module (IFI) (N3/7) checks the voltage values. > 5 V longer then 2 seconds < 4.7 V longer than 2 seconds > 4.7 V longer than 240 milli-seconds

Diagnosis – Trouble Code Description

➤ 11		Fuel rack position sensor (Y23/1I1)
1	System DTC code OBD trouble code	P1223 P0200
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately upon fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	
5		The engine control module (IFI) (N3/7) checks the voltage values. Via control module delayed shut-off, verification if the Start and Stop contacts are achieved, are checked.

➤ 12		CKP sensor (L5/6)
1	System DTC code OBD trouble code	P1335 P0725
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Check of dynamic plausibility, therefore the time span from one impluse to the next impluse must not change over a defined time span
5		Engine is shut down

Diagnosis – Trouble Code Description

➤ 13		EGR valve pressure transducer (Y31/1)
1	System DTC code OBD trouble code	P1403 / P1404 P0400
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Negative control deviation The desired value from the control module (nominal value) was exceeded over a long time (5 seconds) and by more than 150mg/stroke as well Explanation of deviation: Nominal value minus actual value

Diagnosis – Trouble Code Description

≥ 14		Boost pressure control/pressure control flap vacuum transducer (Y31/5)
1	System DTC code OBD trouble code	P1470 P0243
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Nominal and actual values comparison The engine control module (IFI) (N3/7) checks the electrical wiring and the remaining control deviation Monitoring of both positive and negative control deviation Monitoring of endstage for short circuits and open circuits
5	Positive control deviation Negative control deviation	Positive or negative control deviation Positive control deviation: The desired value from the control module (nominal value) was not attained over a long time (10 seconds) and by more than 300mbar as well Negative control deviation: The desired value from the control module (nominal value) was exceeded over a long time (10 seconds) and by more than 300mbar as well Explanation of deviation: Nominal value minus actual value

Diagnosis – Trouble Code Description

≥ 15		Preglow control
1	System DTC code OBD trouble code	P1480 P0380
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Function of the preglow indicator lamp is checked
5	Ignition: ON	


Diagnosis – Trouble Code Description

➤ 16		Glow plug failure, cylinder 1-2 Glow plug failure, cylinder 3-4 Glow plug failure, cylinder 5-6
1	System DTC code OBD trouble code	P1481 P1365 P1367 P1369
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	During preglow function
4	Fault indication	The preglow indicator lamp is activated in the combination instrument cluster for 1 minute after starting.
5	Ignition: ON	

➤ 17		Preglow control module end stage (N14/2)
1	System DTC code OBD trouble code	P1482 P0380
2	Storage of DTC and activation of CHECK ENGINE MIL	After two consecutive trips with fault
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Function, communication and wiring between engine control module (IFI) (N3/7) and preglow control module end stage
5	Ignition: ON	


Diagnosis – Trouble Code Description

➤ 18		Passenger-side fuse and relay module (K40/4) activation
1	System DTC code OBD trouble code	P1610 P0560
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after the next engine start
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Hold-relay in passenger-side fuse and relay module
5	Ignition: ON	


➤ 19		Internal reference voltage (engine control module) (IFI) (N3/7)
1	System DTC code OBD trouble code	P1611 P0200
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Internal check of engine control module (IFI) (N3/7) for over/under voltage
5		 Replace engine control module as necessary

Diagnosis – Trouble Code Description


➤ 20		Engine control module (IFI) (N3/7), Circuit 15
1	System DTC code OBD trouble code	P1612 P0560
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	If when ignition is switched ON, there is no voltage supply via circuit 15, a fault is present
5	Voltage supply	11 – 14 V
6		Replace engine control module (IFI) (N3/7)

➤ 20		Engine control module (IFI) (N3/7)
1	System DTC code OBD trouble code	P1613 P0200
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Internal check for delayed control module shut-off
5		 Replace engine control module as necessary

Diagnosis – Trouble Code Description

➤ 22		Engine control module (IFI) (N3/7), microprocessor/fuel calculation
1	System DTC code OBD trouble code	P1614 P0200
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	Internal check of engine control module during operation and delayed shut-off
5		 <p>Engine control module or injection pump fault (based on fault type), be certain to check supplied fault code data (HHT freeze frame) as well</p>

Diagnosis – Trouble Code Description

➤ 23		Engine control module (IFI) (N3/7), EEPROM or incorrectly coded
1	System DTC code OBD trouble code	P1617 P0200
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	With ignition ON and during delayed shut-off
5		 Check version coding and correct as necessary

Diagnosis – Trouble Code Description

➤ 24		IFI electrohydraulic shut-off actuator (Y1/1)
1	System DTC code OBD trouble code	P1622 P0215
2	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after fault recognition
3	Monitoring time and frequency of test	Continuously
4	Checked signal or condition	The end stage is checked for a short circuit. Additionally, a plausibility check is performed during the engine control module shut-off delay function. During the test, the engine control module is de-energized and the engine rpm is monitored. If the engine rpm does not fall below 500 rpm within 2 seconds, then a fault is recognized and the engine is shut-off via the fuel quantity actuator (IFI) (Y23/1)