

Diagnosis – Table of Trouble Code Description

≥ 1		<b>Pressure sensor (B28)</b>
	System trouble code OBD trouble code	P0105 P0105
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately upon fault recognition
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	The intake manifold absolute pressure is registered by the pressure sensor (B28) and transmitted to the engine control module (IFI) (N3/7)
	Supply voltage Supply voltage Signal voltage Signal voltage Engine rpm	The engine control module (IFI) checks 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 < 800 rpm and the difference between Intake manifold pressure – atmospheric pressure > 210 mbar longer than 6 seconds

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≥ 2		<b>IAT sensor (B17)</b>
	System trouble code OBD trouble code	P0110 P0111
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	The engine control module (IFI) (N3/7) checks the voltage present at the IAT sensor for the threshold values. If the threshold is exceeded, the engine control module (IFI) replaces it with a substitute value.
	Signal voltage Signal voltage	The engine control module (IFI) checks the voltage values: > 4.7 V longer than 2 seconds < 0.2 V longer than 2 seconds



#### Diagnosis – Table of Trouble Code Description

≥ 4		<b>Fuel temperature sensor (Y1/1b1)</b>
	System trouble code OBD trouble code	P0180 P0181
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	The engine control module (IFI) (N3/7) checks the voltage present at the fuel temperature sensor for the threshold values. If the threshold is exceeded, the engine control module (IFI) replaces it with a substitute value.
	Signal voltage Signal voltage	The engine control module (IFI) checks the voltage values: < 0.2 V longer than 2 seconds > 4.7 V longer than 2 seconds

#### Diagnosis – Table of Trouble Code Description

≥ 5		<b>CAN data bus</b>
	System trouble code OBD trouble code	P0600 P0600
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	The instrument cluster (A1) transmits data to the engine control module (IFI) (N3/7) in a certain time cycle. The instrument cluster (A1) is recognized as defective, if these data are missing for longer than 1 second. The CAN internal resistance in the engine control module (IFI) is monitored during operation. Furthermore, the CAN element in the engine control module (IFI) is monitored.

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≥ 6		<b>Atmospheric pressure sensor in control module</b>
	System trouble code OBD trouble code	P1105 P0106
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	
	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

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≥ 7		<b>Fuel quantity actuator (Y23/1)</b>
	System trouble code OBD trouble code	P1220 P0200
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	Control deviation between fuel rack position sensor and fuel quantity actuator see nominal – actual value comparison
		The engine control module (IFI) (N3/7) checks the voltage values

### Diagnosis – Table of Trouble Code Description

≥ 8		<b>CAN communication, ETC or ETS interrupted</b>
	System trouble code OBD trouble code	P1221 P0600
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	The CAN communication from the transmission control module and the ETS/SPS control module is checked for existence and plausibility.



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≥ 9		<b>IFI/DFI accelerator pedal position sensor (R25/2)</b>
	System trouble code OBD trouble code	P1222 P0220
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	<p>Checking the supply voltage.                      If the IFI/DFI accelerator pedal position sensor (R25/2) is activated &gt; 20%, the idle speed contact display must be OFF, see HHT actual values.                      As of &lt; 1% the idle speed contact in the IFI/DFI accelerator pedal position sensor must be actuated.                      If the IFI/DFI accelerator pedal position sensor is not actuated, the display on the HHT must be 0%, see HHT actual values.</p> <p><b>Note:</b> During the test it should be observed, that the EGR lifting sender (B28/3) and the IFI/DFI accelerator pedal position sensor (R25/2) receive the same supply voltage. Therefore, both parts should be tested.</p>
	Supply voltage Supply voltage Signal voltage	<p>The engine control module(IFI) (N3/7) checks the voltage values:</p> <ul style="list-style-type: none"> <li>&gt; 5 V longer than 2 seconds</li> <li>&lt; 4.7 V longer than 2 seconds</li> <li>&gt; 4.7 V longer than 240 ms</li> </ul>

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≥ 10		<b>Fuel rack position sensor (Y23/1I1)</b>
	System trouble code OBD trouble code	P1223 P0200
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	
	Checked signal or condition	The engine control module (IFI) (N3/7) monitors the signal voltage and also monitors if the start and stop rest "stops" are reached, while the control module is in the after run mode.

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≥ 11		<b>CKP sensor (IFI/DFI) (L5/6)</b>
	System trouble code OBD trouble code	P1335 P0725
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	Checking for dynamic plausibility, e.g. the time from one impulse to the next must not deviate by a specified time
		Engine is shut off

#### Diagnosis – Table of Trouble Code Description

≥ 12		<b>EGR lifting sender (B28/3)</b>
	System trouble code OBD trouble code	P1401 P0403
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	Monitoring of supply and signal voltage
	Signal voltage Supply voltage Supply voltage Signal voltage, ignition <b>ON</b>	The engine control module (IFI) (N3/7) checks the voltage values: > 4.7 V longer than 2 seconds > 5 V longer than 2 seconds <4.7 V longer than 2 seconds >1.3 V longer than 2 seconds

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≥ 13		<b>EGR valve pressure transducer (Y31/1)</b>
	System trouble code OBD trouble code	P1404 P0400
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	<p>Positive or negative control deviation.</p> <p><b>Positive control deviation</b> The desired value from the engine control module (IFI) (N3/7) (nominal value) was for an extended period of time (4 seconds) by more than 2.5 mm <b>below</b> specification.</p> <p><b>Negative control deviation</b> The desired value from the engine control module (IFI) (N3/7) (nominal value) was for an extended period of time (4 seconds) was <b>exceeded</b> by more than 1.5 mm .</p> <p>Explanation for control deviation: Nominal value <b>minus</b> actual value.</p> <p>Short circuit or end stage idling.</p> <p><b>Flow check</b> The following sequence is performed during the flow check:</p> <ul style="list-style-type: none"> <li>– EGR valve closed</li> <li>– Pressure control flap closed</li> <li>– With the pressure control flap and the EGR valve closed, the intake manifold pressure is measured.</li> <li>– EGR valve opened</li> <li>– With the pressure control flap closed and the EGR valve opened the intake manifold pressure is measured.</li> <li>– The difference between closed and opened EGR valve must be &gt; 10 mbar otherwise a failure is set in the DTC memory.</li> </ul>

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≥ 14		<b>Pressure control flap vacuum transducer (Y31/2)</b>
	System trouble code OBD trouble code	P1470 P0120
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	<b>Nominal – actual value comparison</b> The engine control module (IFI) (N3/7) checks the electrical wiring and for permanent control deviations. Monitoring for positive or negative control deviations. Monitoring the final stage for short and open circuit.
	Positive control deviation  Negative control deviation	Positive or negative control deviation. <b>Positive control deviation</b> The desired value from the IFI control module (nominal value) was for an extended period of time (6 seconds) by more than 210 mbar <b>below</b> specification. <b>Negative control deviation</b> The desired value from the IFI control module (nominal value) was for an extended period of time (6 seconds) was <b>exceeded</b> by more than 75 mbar. Explanation for control deviation: Nominal value <b>minus</b> actual value.

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≥ 15		<b>Shifting induction pipe switchover valve (Y22/6)/resonance intake manifold flap</b>
	System trouble code OBD trouble code	P1475 P0200
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	<p>If the shifting induction pipe switchover valve Y22/6 <b>is energized</b>, then this means that: the resonance intake manifold flap 99/4 is <b>not supplied</b> with vacuum and the resonance intake line switch (S35/1) <b>is not actuated</b>.</p> <p>If the shifting induction pipe switchover valve Y22/6 <b>is not energized</b>, then this means that: the resonance intake manifold flap 99/4 <b>is supplied</b> with vacuum and the resonance intake line switch (S35/1) <b>is actuated</b>.</p> <p>The engine control module (IFI) (N3/7) checks the activation. The engine control module (IFI) (N3/7) recognizes a failure, if the problems exist longer than approx. 2 seconds.</p> <p>The monitoring of the switches takes place at an engine speed &gt; 1000 rpm.</p> <p>Monitoring the final stage for short and open circuit.</p>

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≥ 16		<b>Resonance intake line switchover valve (Y22/7)/resonance intake line flap</b>
	System trouble code OBD trouble code	P1476 P0200
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	<p>If the switchover valve Y22/7 <b>is energized</b>, then this means that: the resonance intake line flap 99/2 is <b>not supplied</b> with vacuum and the resonance intake line switch (S35/1) <b>is not actuated</b>.</p> <p>If the switchover valve Y22/7 <b>is not energized</b>, then this means that: the resonance intake line flap 99/2 <b>is supplied</b> with vacuum and the resonance intake line switch S35/1 <b>is actuated</b>.</p> <p>The engine control module (IFI) (N3/7) checks the activation. The engine control module (IFI) (N3/7) recognizes a failure if the problems exist longer than approx. 2 seconds.</p> <p>The monitoring of the switches takes place at an engine speed &gt; 1000 rpm.</p> <p>Monitoring the final stage for short and open circuit.</p>



#### Diagnosis – Table of Trouble Code Description

≥ 17		<b>Preglow control</b>
	System trouble code OBD trouble code	P1480 P0380
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	The function of the preglow indicator lamp is checked.
	Ignition: <b>ON</b>	

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≥ 18		<b>Glow plug failure, cylinder 1 – 2</b> <b>Glow plug failure, cylinder 3 – 4</b> <b>Glow plug failure, cylinder 5 – 6</b>
	System trouble code OBD trouble code	P1481 P1365 P1367 P1369
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	During the preglow procedure
	Checked signal or condition	
	Ignition: <b>ON</b>	


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➤ 19		<b>Preglow control module (N14/2)</b>
	System trouble code OBD trouble code	P1482 P0380
	Storage of DTC and activation of CHECK ENGINE MIL	Two consecutive trips with fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	
	Ignition: <b>ON</b>	

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≥ 20		<b>Voltage supply missing or relay module (K40)</b>
	System trouble code OBD trouble code	P1610 P0560
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	
	Ignition: <b>ON</b>	


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≥ 21		<b>Engine control module (IFI) (N3/7)</b>
	System trouble code OBD trouble code	P1611 / P1613 P0200
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	With code: P1611: Internal check of engine control module (IFI) (N3/7) for under/over voltage With code: P1613: Internal check of engine control module (IFI) (N3/7) for after run
		 Control module fault: replace engine control module (IFI) (N3/7)


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≥ 22		<b>Engine control module (IFI) (N3/7), circuit 15</b>
	System trouble code OBD trouble code	P1612 P0560
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	If no voltage supply via circuit 15 is supplied to the engine control module (IFI (N3/7) with ignition <b>ON</b> , a fault is present.
	Supply voltage	11 – 14 V

## Diagnosis – Table of Trouble Code Description

≥ 23		<b>Engine control module (IFI) (N3/7) fuel metering actuator or fuel rack position sensor</b>
	System trouble code OBD trouble code	P1614 P0200
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	Internal check in control module during operation and after engine shut-off
		 Engine control module or injection pump fault (based on fault type), be certain to check supplied fault code data (HHT freeze frame) as well

#### Diagnosis – Table of Trouble Code Description

≥ 24		<b>Engine control module (IFI) (N3/7) or not properly version coded</b>
	System trouble code OBD trouble code	P1617 P0200
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	With ignition <b>ON</b> and during after running
		 Check version coding and correct



Diagnosis – Table of Trouble Code Description

≥ 25		<b>IFI electrohydraulic shut-off actuator (Y1/1)</b>
	System trouble code OBD trouble code	P1622 P0215
	Storage of DTC and activation of CHECK ENGINE MIL	Immediately after occurrence of fault
	Monitoring time and frequency of test	Continuously
	Checked signal or condition	<p>The final stage of the electrohydraulic shut-off actuator is checked for short circuit. In addition, a plausibility check is performed during engine control module after run:</p> <p>Prerequisite      Engine speed &lt; 800 rpm                          Vehicle speed &lt; 3 km/h</p> <p>During the electrohydraulic shut-off actuator test, the actuator is deenergized and the engine speed is monitored. If the engine speed does not drop below 500 rpm within 2 seconds a IFI electrohydraulic shut-off actuator (Y1/1) failure is recognized and the engine is turned off via the fuel metering actuator (Y23/1k1).</p> <p>Increases the engine speed to &gt; 1300 rpm or by more than 740 rpm during the electrohydraulic shut-off actuator test, a shut-off actuator failure (Y1/1) is recognized also and the engine is turned off via the fuel metering actuator.(Y23/1k1).</p>
	Signal voltage Signal voltage	<p><b>i</b> The engine speed must drop within 2 seconds &lt; 500 rpm after turning off engine.</p> <p>Short circuit of electrohydraulic actuator against battery +</p>