Porsche system - DME

Diagnostic trouble code and the related document

P0010

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test run (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0010

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0010

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0011

Diagnostic information

Outlet camshaft control

ⓘ **NOTE**
This fault is entered if there is a deviation in the actual value from the setpoint value of between 5° and 14° camshaft for a duration of > 2 seconds.

Diagnostic conditions

- Battery voltage 10 ... 16 V
- Time after engine starts > 30 seconds
- Engine and engine oil temperature -9 °C … 106 °C (16 °F … 223 °F)
- Engine speed 1,160 ... 6,000 rpm
- No fault in driver of solenoid hydraulic valve for camshaft adjustment
- No fault in camshaft sensor or crankshaft sensor

Possible fault causes

♦ Solenoid hydraulic valve for camshaft adjustment has mechanical fault (stuck, sluggish, blocked)
♦ Dirt in the oil circuit
♦ Sealing strips on Variocam actuator faulty (leaking, sluggish)
♦ Oil pressure too low
♦ Variocam actuator has mechanical fault

P0011

Diagnosis information

Inlet camshaft control system

ⓘ **NOTE**
This fault is entered if there is a difference in the actual value compared with the nominal value between the 5° and 14° camshaft within a period of between 2 and 5 seconds.

Diagnostic conditions

- Battery positive voltage 10 ... 16V
- Time after engine starts > 30 seconds
- Engine and engine-oil temperature -9°C ... 106°C
- Engine speed 1160 ... 6000 rpm
- No fault in solenoid hydraulic valve driver
- No fault in camshaft sensor or crankshaft sensor

Possible fault causes

- Mechanical fault in solenoid hydraulic valve (sticks, sluggish, blocked)
- Dirt in the oil circuit
- Sealing strips on VarioCam adjuster faulty (leak, sluggish)
- Oil pressure too low
- Mechanical fault in VarioCam actuator

P0013

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

♦ Solenoid hydraulic valve faulty (coil short circuit)
♦ Short circuit to B+ in control line to solenoid hydraulic valve
♦ DME control unit faulty

P0013

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery voltage 10 V …16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control unit faulty

P0013

Diagnostic information

Driver of solenoid hydraulic valve for camshaft adjustment

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (coil short circuit)
- Short circuit to B+ in circuit of solenoid hydraulic valve (P2091)
- Short circuit to ground in circuit of solenoid hydraulic valve (P2090)
- Open circuit in solenoid hydraulic valve circuit (P0013)
- DME control unit faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

ⓘ NOTE
The specified values apply only at an ambient temperature of approx. 20 °C (68 °F) (room temperature).

Setpoints, solenoid valve

♦ Internal resistance > 5 Ohm ⇒ < 15 Ohm

P0013

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery voltage 10 V …16 V
- Time after engine starts > 10 seconds

Possible fault causes

- ♦ Solenoid hydraulic valve for camshaft adjustment faulty (open circuit)
- ♦ Open circuit in the control line to solenoid hydraulic valve
- ♦ Open circuit in the power supply line to solenoid hydraulic valve
- ♦ DME control unit faulty

P0014

Diagnostic information

Outlet camshaft control

ⓘ **NOTE**
This fault is entered if there is a deviation in the actual value from the setpoint value of between 5° and 14° camshaft for a duration of > 2 seconds.

Diagnostic conditions

- Battery voltage 10 ... 16 V
- Time after engine starts > 30 seconds
- Engine and engine oil temperature -9 °C … 106 °C (16 °F … 223 °F)
- Engine speed 1,160 ... 6,000 rpm
- No fault in driver of solenoid hydraulic valve for camshaft adjustment
- No fault in camshaft sensor or crankshaft sensor

Possible fault causes

♦ Solenoid hydraulic valve for camshaft adjustment has mechanical fault (stuck, sluggish, blocked)
♦ Dirt in the oil circuit
♦ Sealing strips on Variocam actuator faulty (leaking, sluggish)
♦ Oil pressure too low
♦ Variocam actuator has mechanical fault

P0014

Diagnosis information

Inlet camshaft control system

NOTE
This fault is entered if there is a difference in the actual value compared with the nominal value between the 5° and 14° camshaft within a period of between 2 and 5 seconds.

Diagnostic conditions

- Battery positive voltage 10 ... 16V
- Time after engine starts > 30 seconds
- Engine and engine-oil temperature -9°C ... 106°C
- Engine speed 1160 ... 6000 rpm
- No fault in solenoid hydraulic valve driver
- No fault in camshaft sensor or crankshaft sensor

Possible fault causes

- Mechanical fault in solenoid hydraulic valve (sticks, sluggish, blocked)
- Dirt in the oil circuit
- Sealing strips on VarioCam adjuster faulty (leak, sluggish)
- Oil pressure too low
- Mechanical fault in VarioCam actuator

P0016

Diagnostic information

Position of crankshaft in relation to intake camshaft

NOTE
This fault is entered if there is a permanent deviation from the nominal value of 10° camshaft angle.

Diagnosis conditions

- Battery positive voltage 10 ... 16 V
- Engine idling
- Camshaft adaptation has taken place
- No fault in camshaft sensor
- No fault in crankshaft sensor

Possible fault causes

- Camshaft sensor faulty (internal phase shift)
- Solenoid valve for camshaft adjustment soiled (does not close fully)
- Timing set incorrectly

P0016

Diagnostic information

Crankshaft position vis-a-vis exhaust camshaft

ⓘ **NOTE**
This fault is entered if there is a permanent deviation in the actual value from the setpoint value of 10° camshaft.

Diagnostic conditions

- Battery voltage 10 ... 16 V
- Engine idling
- Camshaft adaptation has taken place
- No fault in camshaft sensor
- No fault in crankshaft sensor

Possible fault causes

♦ Camshaft sensor faulty (internal phase displacement)
♦ Solenoid valve for camshaft adjustment dirty (does not close completely)

P0017

Diagnostic information

Position of crankshaft in relation to intake camshaft

NOTE
This fault is entered if there is a permanent deviation from the nominal value of 10° camshaft angle.

Diagnosis conditions

- Battery positive voltage 10 ... 16 V
- Engine idling
- Camshaft adaptation has taken place
- No fault in camshaft sensor
- No fault in crankshaft sensor

Possible fault causes

- Camshaft sensor faulty (internal phase shift)
- Solenoid valve for camshaft adjustment soiled (does not close fully)
- Timing set incorrectly

P0017

Diagnostic information

Crankshaft position vis-a-vis exhaust camshaft

ⓘ **NOTE**
This fault is entered if there is a permanent deviation in the actual value from the setpoint value of 10° camshaft.

Diagnostic conditions

- Battery voltage 10 ... 16 V
- Engine idling
- Camshaft adaptation has taken place
- No fault in camshaft sensor
- No fault in crankshaft sensor

Possible fault causes

♦ Camshaft sensor faulty (internal phase displacement)
♦ Solenoid valve for camshaft adjustment dirty (does not close completely)

P0018

Diagnostic information

Position of crankshaft in relation to intake camshaft

NOTE
This fault is entered if there is a permanent deviation from the nominal value of 10° camshaft angle.

Diagnosis conditions

- Battery positive voltage 10 ... 16 V
- Engine idling
- Camshaft adaptation has taken place
- No fault in camshaft sensor
- No fault in crankshaft sensor

Possible fault causes

- Camshaft sensor faulty (internal phase shift)
- Solenoid valve for camshaft adjustment soiled (does not close fully)
- Timing set incorrectly

P0018

Diagnostic information

Crankshaft position vis-a-vis exhaust camshaft

ⓘ **NOTE**
This fault is entered if there is a permanent deviation in the actual value from the setpoint value of 10° camshaft.

Diagnostic conditions

- Battery voltage 10 ... 16 V
- Engine idling
- Camshaft adaptation has taken place
- No fault in camshaft sensor
- No fault in crankshaft sensor

Possible fault causes

♦ Camshaft sensor faulty (internal phase displacement)
♦ Solenoid valve for camshaft adjustment dirty (does not close completely)

P0019

Diagnostic information

Position of crankshaft in relation to intake camshaft

NOTE
This fault is entered if there is a permanent deviation from the nominal value of 10° camshaft angle.

Diagnosis conditions

- Battery positive voltage 10 ... 16 V
- Engine idling
- Camshaft adaptation has taken place
- No fault in camshaft sensor
- No fault in crankshaft sensor

Possible fault causes

- Camshaft sensor faulty (internal phase shift)
- Solenoid valve for camshaft adjustment soiled (does not close fully)
- Timing set incorrectly

P0019

Diagnostic information

Crankshaft position vis-a-vis exhaust camshaft

ⓘ **NOTE**
This fault is entered if there is a permanent deviation in the actual value from the setpoint value of 10° camshaft.

Diagnostic conditions

- Battery voltage 10 ... 16 V
- Engine idling
- Camshaft adaptation has taken place
- No fault in camshaft sensor
- No fault in crankshaft sensor

Possible fault causes

♦ Camshaft sensor faulty (internal phase displacement)
♦ Solenoid valve for camshaft adjustment dirty (does not close completely)

P0020

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0020

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0020

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test run (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0021

Diagnostic information

Outlet camshaft control

ⓘ **NOTE**
This fault is entered if there is a deviation in the actual value from the setpoint value of between 5° and 14° camshaft for a duration of > 2 seconds.

Diagnostic conditions

- Battery voltage 10 ... 16 V
- Time after engine starts > 30 seconds
- Engine and engine oil temperature -9 °C … 106 °C (16 °F … 223 °F)
- Engine speed 1,160 ... 6,000 rpm
- No fault in driver of solenoid hydraulic valve for camshaft adjustment
- No fault in camshaft sensor or crankshaft sensor

Possible fault causes

♦ Solenoid hydraulic valve for camshaft adjustment has mechanical fault (stuck, sluggish, blocked)
♦ Dirt in the oil circuit
♦ Sealing strips on Variocam actuator faulty (leaking, sluggish)
♦ Oil pressure too low
♦ Variocam actuator has mechanical fault

P0021

Diagnosis information

Inlet camshaft control system

NOTE
This fault is entered if there is a difference in the actual value compared with the nominal value between the 5° and 14° camshaft within a period of between 2 and 5 seconds.

Diagnostic conditions

- Battery positive voltage 10 ... 16V
- Time after engine starts > 30 seconds
- Engine and engine-oil temperature -9°C ... 106°C
- Engine speed 1160 ... 6000 rpm
- No fault in solenoid hydraulic valve driver
- No fault in camshaft sensor or crankshaft sensor

Possible fault causes

- Mechanical fault in solenoid hydraulic valve (sticks, sluggish, blocked)
- Dirt in the oil circuit
- Sealing strips on VarioCam adjuster faulty (leak, sluggish)
- Oil pressure too low
- Mechanical fault in VarioCam actuator

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

ⓘ NOTE
The specified values apply only at an ambient temperature of approx. 20 °C (68 °F) (room temperature).

Setpoints, solenoid valve

♦ Internal resistance > 5 Ohm ⇒ < 15 Ohm

P0023

Diagnostic information

Driver of solenoid hydraulic valve for camshaft adjustment

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (coil short circuit)
- Short circuit to B+ in circuit of solenoid hydraulic valve (P2095)
- Short circuit to ground in circuit of solenoid hydraulic valve (P2094)
- Open circuit in solenoid hydraulic valve circuit (P0023)
- DME control unit faulty

P0024

Diagnostic information

Outlet camshaft control

ⓘ **NOTE**
This fault is entered if there is a deviation in the actual value from the setpoint value of between 5° and 14° camshaft for a duration of > 2 seconds.

Diagnostic conditions

- Battery voltage 10 ... 16 V
- Time after engine starts > 30 seconds
- Engine and engine oil temperature -9 °C … 106 °C (16 °F … 223 °F)
- Engine speed 1,160 ... 6,000 rpm
- No fault in driver of solenoid hydraulic valve for camshaft adjustment
- No fault in camshaft sensor or crankshaft sensor

Possible fault causes

♦ Solenoid hydraulic valve for camshaft adjustment has mechanical fault (stuck, sluggish, blocked)
♦ Dirt in the oil circuit
♦ Sealing strips on Variocam actuator faulty (leaking, sluggish)
♦ Oil pressure too low
♦ Variocam actuator has mechanical fault

P0024

Diagnosis information

Inlet camshaft control system

NOTE
This fault is entered if there is a difference in the actual value compared with the nominal value between the 5° and 14° camshaft within a period of between 2 and 5 seconds.

Diagnostic conditions

- Battery positive voltage 10 ... 16V
- Time after engine starts > 30 seconds
- Engine and engine-oil temperature -9°C ... 106°C
- Engine speed 1160 ... 6000 rpm
- No fault in solenoid hydraulic valve driver
- No fault in camshaft sensor or crankshaft sensor

Possible fault causes

- Mechanical fault in solenoid hydraulic valve (sticks, sluggish, blocked)
- Dirt in the oil circuit
- Sealing strips on VarioCam adjuster faulty (leak, sluggish)
- Oil pressure too low
- Mechanical fault in VarioCam actuator

P0026

Diagnosis information - DME

Valve lift control driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0026

Diagnosis information - DME

Valve lift control driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0026

Diagnosis information - DME

Valve lift control driver, above limit value

Diagnostic conditions

- Short test run with 1 full-load acceleration (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0028

Diagnosis information - DME

Valve lift control driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0028

Diagnosis information - DME

Valve lift control driver, above limit value

Diagnostic conditions

- Short test run with 1 full-load acceleration (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0028

Diagnosis information - DME

Valve lift control driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0030

Diagnosis information - DME

Oxygen sensor heater, electric fault

Diagnostic conditions

- DME control module power supply 10 V … 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor heater, function

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the set point and actual temperature of the oxygen sensor, from which a faulty heating control can be deduced.
If the DME has detected a vehicle voltage > 16 V, oxygen sensing is also interrupted.

Diagnostic conditions

- DME control unit power supply 10 V … 16 V
- Exhaust temperature 300 °C (572 °F) ... 600 °C (1112 °F)
- Time after engine starts > 200 s
- Intake air temperature > -7 °C (19 °F)
- No overrun
- No other driver fault of oxygen sensor heater

Possible fault causes

- Vehicle voltage > 16 V
- Connector corrosion
- Contact resistance in the lines
- Oxygen sensor faulty
- DME control unit faulty

P0031

Diagnosis information - DME

Oxygen sensor heater, electric fault

Diagnostic conditions

- DME control module power supply 10 V … 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor heater, function

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the set point and actual temperature of the oxygen sensor, from which a faulty heating control can be deduced.
If the DME has detected a vehicle voltage > 16 V, oxygen sensing is also interrupted.

Diagnostic conditions

- DME control unit power supply 10 V … 16 V
- Exhaust temperature 300 °C (572 °F) ... 600 °C (1112 °F)
- Time after engine starts > 200 s
- Intake air temperature > -7 °C (19 °F)
- No overrun
- No other driver fault of oxygen sensor heater

Possible fault causes

- Vehicle voltage > 16 V
- Connector corrosion
- Contact resistance in the lines
- Oxygen sensor faulty
- DME control unit faulty

P0032

Diagnosis information - DME

Oxygen sensor heater, electric fault

Diagnostic conditions

- DME control module power supply 10 V … 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor heater, function

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the set point and actual temperature of the oxygen sensor, from which a faulty heating control can be deduced.
If the DME has detected a vehicle voltage > 16 V, oxygen sensing is also interrupted.

Diagnostic conditions

- DME control unit power supply 10 V … 16 V
- Exhaust temperature 300 °C (572 °F) ... 600 °C (1112 °F)
- Time after engine starts > 200 s
- Intake air temperature > -7 °C (19 °F)
- No overrun
- No other driver fault of oxygen sensor heater

Possible fault causes

- Vehicle voltage > 16 V
- Connector corrosion
- Contact resistance in the lines
- Oxygen sensor faulty
- DME control unit faulty

P0036

Diagnosis information - DME

Heater circuit, O2 sensor voltage behind catalytic converter, implausible signal

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the predetermined and actual temperature of the oxygen sensor which can be closed due to faulty heating control.

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature 250 °C ... 600 °C
- Intake air temperature > -7°C
- No other driver fault of oxygen sensor heater

Possible fault causes

- Plug corrosion
- Oxygen sensor faulty
- DME control module faulty

P0036

Diagnosis information - DME

Oxygen sensor heater, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit in the activation line to the oxygen sensor heater
- Open circuit in the voltage supply to the oxygen sensor heater
- Oxygen sensor faulty (oxygen sensor heater resistance too high)
- DME control module faulty

P0036

Diagnosis information - DME

Oxygen sensor heater, below limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to ground in control line to the oxygen sensor heater
- Oxygen sensor faulty (short circuit to sensor housing)
- DME control module faulty

P0036

Diagnosis information - DME

Oxygen sensor heater, above limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line to the oxygen sensor heater
- Oxygen sensor faulty (internal short circuit)
- DME control module faulty

P0037

Diagnosis information - DME

Heater circuit, O2 sensor voltage behind catalytic converter, implausible signal

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the predetermined and actual temperature of the oxygen sensor which can be closed due to faulty heating control.

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature 250 °C ... 600 °C
- Intake air temperature > -7°C
- No other driver fault of oxygen sensor heater

Possible fault causes

- Plug corrosion
- Oxygen sensor faulty
- DME control module faulty

P0037

Diagnosis information - DME

Oxygen sensor heater, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit in the activation line to the oxygen sensor heater
- Open circuit in the voltage supply to the oxygen sensor heater
- Oxygen sensor faulty (oxygen sensor heater resistance too high)
- DME control module faulty

P0037

Diagnosis information - DME

Oxygen sensor heater, below limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to ground in control line to the oxygen sensor heater
- Oxygen sensor faulty (short circuit to sensor housing)
- DME control module faulty

P0037

Diagnosis information - DME

Oxygen sensor heater, above limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line to the oxygen sensor heater
- Oxygen sensor faulty (internal short circuit)
- DME control module faulty

P0038

Diagnosis information - DME

Heater circuit, O2 sensor voltage behind catalytic converter, implausible signal

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the predetermined and actual temperature of the oxygen sensor which can be closed due to faulty heating control.

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature 250 °C ... 600 °C
- Intake air temperature > -7°C
- No other driver fault of oxygen sensor heater

Possible fault causes

- Plug corrosion
- Oxygen sensor faulty
- DME control module faulty

P0038

Diagnosis information - DME

Oxygen sensor heater, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit in the activation line to the oxygen sensor heater
- Open circuit in the voltage supply to the oxygen sensor heater
- Oxygen sensor faulty (oxygen sensor heater resistance too high)
- DME control module faulty

P0038

Diagnosis information - DME

Oxygen sensor heater, below limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to ground in control line to the oxygen sensor heater
- Oxygen sensor faulty (short circuit to sensor housing)
- DME control module faulty

P0038

Diagnosis information - DME

Oxygen sensor heater, above limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line to the oxygen sensor heater
- Oxygen sensor faulty (internal short circuit)
- DME control module faulty

Diagnosis information - DME

O2 sensors upstream interchanged

"Interchanged oxygen sensors" means that the sensor connected to the DME control module as a sensor for bank 1 is in reality placed in the exhaust pipe of bank 2 and vice versa.

Diagnostic conditions

- Oxygen sensing active

NOTE

- In this context, please also observe the function description.

Possible fault causes

- Oxygen sensor upstream interchanged (sensor for bank 1 is in exhaust assembly of bank 2 and vice versa)
- Engine harness repaired incorrectly (cable interchanged)

Function description - DME

O2 sensors upstream interchanged

The function detects interchanged oxygen sensors via oxygen sensing for both banks. If a fault is present, the values reaching the stop are swapped over.

Procedure of the function:
- After the oxygen sensors upstream are operational, the oxygen sensing is released. The mixture is regulated depending on the oxygen sensor values measured using the sensors for each bank.
- If the oxygen sensors upstream were interchanged, the mixture made rich would be detected on the opposite bank. The same applies to making the mixture lean.
- Since the oxygen sensors measure the mixture corrections of the opposite bank, the oxygen sensing values reaching the stop are swapped over (i.e., the upper limit value for one bank and the lower limit value for the other bank) and remain there.

"Interchanged oxygen sensors" means that the sensor connected to the DME control module as a sensor for bank 1 is in reality placed in the exhaust pipe of bank 2 and vice versa.

Diagnosis information - DME

O2 sensors downstream interchanged

"Interchanged oxygen sensors" means that the sensor connected to the DME control module as a sensor for bank 1 is in reality placed in the exhaust pipe of bank 2 and vice versa.

Diagnostic conditions

- "Downstream sensor interchange diagnosis" short test carried out using the PIWIS Tester

► The diagnostic conditions can only be established via the short test "Downstream sensor interchange diagnosis" using the PIWIS Tester.
► This function is not active during normal driving.

NOTE
♦ In this context, please also observe the function description.

Possible fault causes

♦ Oxygen sensor downstream interchanged (sensor for bank 1 is in exhaust assembly of bank 2 and vice versa)
♦ Engine harness repaired incorrectly (cable interchanged)

Function description - DME

O2 sensors downstream interchanged

The function can only be activated as a short test using the PIWIS Tester.
Interchanged oxygen sensors are detected via the contradictory oxygen sensor voltages for both banks.

Procedure of the function:
- After the oxygen sensors downstream are operational, the mixture of one bank is made rich and that of the other bank is made lean.
- If the oxygen sensors downstream are interchanged, the mixture made rich is detected on the opposite bank.

The same applies to making the mixture lean.
- The oxygen sensors upstream are not involved in this function.

"Interchanged oxygen sensors" means that the sensor connected to the DME control module as a sensor for bank 1 is in reality placed in the exhaust pipe of bank 2 and vice versa.

Diagnosis information - DME

Oxygen sensor heater, function

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the set point and actual temperature of the oxygen sensor, from which a faulty heating control can be deduced.
If the DME has detected a vehicle voltage > 16 V, oxygen sensing is also interrupted.

Diagnostic conditions

- DME control unit power supply 10 V … 16 V
- Exhaust temperature 300 °C (572 °F) ... 600 °C (1112 °F)
- Time after engine starts > 200 s
- Intake air temperature > -7 °C (19 °F)
- No overrun
- No other driver fault of oxygen sensor heater

Possible fault causes

- Vehicle voltage > 16 V
- Connector corrosion
- Contact resistance in the lines
- Oxygen sensor faulty
- DME control unit faulty

P0050

Diagnosis information - DME

Oxygen sensor heater, electric fault

Diagnostic conditions

- DME control module power supply 10 V … 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor heater, function

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the set point and actual temperature of the oxygen sensor, from which a faulty heating control can be deduced.
If the DME has detected a vehicle voltage > 16 V, oxygen sensing is also interrupted.

Diagnostic conditions

- DME control unit power supply 10 V … 16 V
- Exhaust temperature 300 °C (572 °F) ... 600 °C (1112 °F)
- Time after engine starts > 200 s
- Intake air temperature > -7 °C (19 °F)
- No overrun
- No other driver fault of oxygen sensor heater

Possible fault causes

- Vehicle voltage > 16 V
- Connector corrosion
- Contact resistance in the lines
- Oxygen sensor faulty
- DME control unit faulty

P0051

Diagnosis information - DME

Oxygen sensor heater, electric fault

Diagnostic conditions

- DME control module power supply 10 V … 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor heater, function

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the set point and actual temperature of the oxygen sensor, from which a faulty heating control can be deduced.
If the DME has detected a vehicle voltage > 16 V, oxygen sensing is also interrupted.

Diagnostic conditions

- DME control unit power supply 10 V … 16 V
- Exhaust temperature 300 °C (572 °F) ... 600 °C (1112 °F)
- Time after engine starts > 200 s
- Intake air temperature > -7 °C (19 °F)
- No overrun
- No other driver fault of oxygen sensor heater

Possible fault causes

- Vehicle voltage > 16 V
- Connector corrosion
- Contact resistance in the lines
- Oxygen sensor faulty
- DME control unit faulty

P0052

Diagnosis information - DME

Oxygen sensor heater, electric fault

Diagnostic conditions

- DME control module power supply 10 V … 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Oxygen sensor faulty
- DME control module faulty

P0056

Diagnosis information - DME

Oxygen sensor heater, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit in the activation line to the oxygen sensor heater
- Open circuit in the voltage supply to the oxygen sensor heater
- Oxygen sensor faulty (oxygen sensor heater resistance too high)
- DME control module faulty

P0056

Diagnosis information - DME

Heater circuit, O2 sensor voltage behind catalytic converter, implausible signal

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the predetermined and actual temperature of the oxygen sensor which can be closed due to faulty heating control.

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature 250 °C ... 600 °C
- Intake air temperature > -7°C
- No other driver fault of oxygen sensor heater

Possible fault causes

- Plug corrosion
- Oxygen sensor faulty
- DME control module faulty

P0056

Diagnosis information - DME

Oxygen sensor heater, below limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to ground in control line to the oxygen sensor heater
- Oxygen sensor faulty (short circuit to sensor housing)
- DME control module faulty

P0056

Diagnosis information - DME

Oxygen sensor heater, above limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line to the oxygen sensor heater
- Oxygen sensor faulty (internal short circuit)
- DME control module faulty

P0057

Diagnosis information - DME

Oxygen sensor heater, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit in the activation line to the oxygen sensor heater
- Open circuit in the voltage supply to the oxygen sensor heater
- Oxygen sensor faulty (oxygen sensor heater resistance too high)
- DME control module faulty

P0057

Diagnosis information - DME

Heater circuit, O2 sensor voltage behind catalytic converter, implausible signal

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the predetermined and actual temperature of the oxygen sensor which can be closed due to faulty heating control.

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature 250 °C ... 600 °C
- Intake air temperature > -7°C
- No other driver fault of oxygen sensor heater

Possible fault causes

- Plug corrosion
- Oxygen sensor faulty
- DME control module faulty

P0057

Diagnosis information - DME

Oxygen sensor heater, below limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to ground in control line to the oxygen sensor heater
- Oxygen sensor faulty (short circuit to sensor housing)
- DME control module faulty

P0057

Diagnosis information - DME

Oxygen sensor heater, above limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line to the oxygen sensor heater
- Oxygen sensor faulty (internal short circuit)
- DME control module faulty

P0058

Diagnosis information - DME

Oxygen sensor heater, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit in the activation line to the oxygen sensor heater
- Open circuit in the voltage supply to the oxygen sensor heater
- Oxygen sensor faulty (oxygen sensor heater resistance too high)
- DME control module faulty

Diagnosis information - DME

Heater circuit, O2 sensor voltage behind catalytic converter, implausible signal

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the predetermined and actual temperature of the oxygen sensor which can be closed due to faulty heating control.

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature 250 °C ... 600 °C
- Intake air temperature > -7°C
- No other driver fault of oxygen sensor heater

Possible fault causes

- Plug corrosion
- Oxygen sensor faulty
- DME control module faulty

P0058

Diagnosis information - DME

Oxygen sensor heater, below limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to ground in control line to the oxygen sensor heater
- Oxygen sensor faulty (short circuit to sensor housing)
- DME control module faulty

P0058

Diagnosis information - DME

Oxygen sensor heater, above limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line to the oxygen sensor heater
- Oxygen sensor faulty (internal short circuit)
- DME control module faulty

P0069

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P0069

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P0069

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P0069

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P0069

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P0069

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P0069

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P0069

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P0071

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0072

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0073

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0074

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0076

Diagnosis information - DME

Valve lift control driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0076

Diagnosis information - DME

Valve lift control driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0076

Diagnosis information - DME

Valve lift control driver, above limit value

Diagnostic conditions

- Short test run with 1 full-load acceleration (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0077

Diagnosis information - DME

Valve lift control driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0077

Diagnosis information - DME

Valve lift control driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0077

Diagnosis information - DME

Valve lift control driver, above limit value

Diagnostic conditions

- Short test run with 1 full-load acceleration (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0078

Diagnosis information - DME

Valve lift control driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0078

Diagnosis information - DME

Valve lift control driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0078

Diagnosis information - DME

Valve lift control driver, above limit value

Diagnostic conditions

- Short test run with 1 full-load acceleration (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0082

Diagnosis information - DME

Valve lift control driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0082

Diagnosis information - DME

Valve lift control driver, above limit value

Diagnostic conditions

- Short test run with 1 full-load acceleration (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0082

Diagnosis information - DME

Valve lift control driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0083

Diagnosis information - DME

Valve lift control driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0083

Diagnosis information - DME

Valve lift control driver, above limit value

Diagnostic conditions

- Short test run with 1 full-load acceleration (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0083

Diagnosis information - DME

Valve lift control driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0084

Diagnosis information - DME

Valve lift control driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P0084

Diagnosis information - DME

Valve lift control driver, above limit value

Diagnostic conditions

- Short test run with 1 full-load acceleration (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P0084

Diagnosis information - DME

Valve lift control driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P0111

Diagnosis information - DME

Intake air temperature sensor, over limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s

Possible fault causes

- Short circuit to ground in signal wire
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P0111

Diagnosis information - DME

Intake air temperature sensor, below limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s
- No fault in ambient temperature sensor (via CAN)

Possible fault causes

- Short circuit to B+ in signal wire
- open circuit in the signal leads
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P0111

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too low)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Previous engine switch-off temperature > 40 °C
- Engine temperature has cooled off by > 20K before restart
- Engine starting temperature -35 °C … 70 °C
- Time after engine starts > 2 s
- No fault detected for ambient temperature sensor (via CAN)

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0111

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too high)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 52 … 300 kg/h

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0111

Diagnosis information - DME

intake air temperature sensor - signal implausible (signal remains at fixed value)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine starting temperature < 81 °C
- Engine temperature > 70 °C
- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 40 … 300 kg/h
- No idling, no thrust shutdown
- No fault detected for ambient temperature sensor (via CAN)
- No fault detected for vehicle speed sensor

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0112

Diagnosis information - DME

Intake air temperature sensor, over limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s

Possible fault causes

- Short circuit to ground in signal wire
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P0112

Diagnosis information - DME

Intake air temperature sensor, below limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s
- No fault in ambient temperature sensor (via CAN)

Possible fault causes

- Short circuit to B+ in signal wire
- open circuit in the signal leads
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P0112

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too low)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Previous engine switch-off temperature > 40 °C
- Engine temperature has cooled off by > 20K before restart
- Engine starting temperature -35 °C … 70 °C
- Time after engine starts > 2 s
- No fault detected for ambient temperature sensor (via CAN)

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0112

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too high)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 52 … 300 kg/h

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0112

Diagnosis information - DME

intake air temperature sensor - signal implausible (signal remains at fixed value)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine starting temperature < 81 °C
- Engine temperature > 70 °C
- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 40 … 300 kg/h
- No idling, no thrust shutdown
- No fault detected for ambient temperature sensor (via CAN)
- No fault detected for vehicle speed sensor

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0113

Diagnosis information - DME

Intake air temperature sensor, over limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s

Possible fault causes

- Short circuit to ground in signal wire
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P0113

Diagnosis information - DME

Intake air temperature sensor, below limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s
- No fault in ambient temperature sensor (via CAN)

Possible fault causes

- Short circuit to B+ in signal wire
- open circuit in the signal leads
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P0113

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too low)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Previous engine switch-off temperature > 40 °C
- Engine temperature has cooled off by > 20K before restart
- Engine starting temperature -35 °C … 70 °C
- Time after engine starts > 2 s
- No fault detected for ambient temperature sensor (via CAN)

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0113

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too high)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 52 … 300 kg/h

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0113

Diagnosis information - DME

intake air temperature sensor - signal implausible (signal remains at fixed value)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine starting temperature < 81 °C
- Engine temperature > 70 °C
- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 40 … 300 kg/h
- No idling, no thrust shutdown
- No fault detected for ambient temperature sensor (via CAN)
- No fault detected for vehicle speed sensor

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0116

Diagnosis information - DME

Coolant temperature sensor function

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in sensor line to coolant temperature sensor
♦ Open circuit in ground supply to coolant temperature sensor
♦ Coolant temperature sensor faulty
♦ Thermostat faulty (stuck open)
♦ Tiptronic vehicles only: coolant shutoff valve open (mechanical fault, lack of vacuum…)
♦ DME control module faulty

P0116

Diagnosis information - DME

Electric coolant temperature sensor

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- ♦ Short circuit to B+/ground or open circuit in the sensor line
- ♦ Open circuit in ground supply to coolant temperature sensor
- ♦ Coolant temperature sensor faulty
- ♦ DME control module faulty

P0117

Diagnosis information - DME

Coolant temperature sensor function

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in sensor line to coolant temperature sensor
♦ Open circuit in ground supply to coolant temperature sensor
♦ Coolant temperature sensor faulty
♦ Thermostat faulty (stuck open)
♦ Tiptronic vehicles only: coolant shutoff valve open (mechanical fault, lack of vacuum…)
♦ DME control module faulty

P0117

Diagnosis information - DME

Electric coolant temperature sensor

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- ♦ Short circuit to B+/ground or open circuit in the sensor line
- ♦ Open circuit in ground supply to coolant temperature sensor
- ♦ Coolant temperature sensor faulty
- ♦ DME control module faulty

P0118

Diagnosis information - DME

Coolant temperature sensor function

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in sensor line to coolant temperature sensor
♦ Open circuit in ground supply to coolant temperature sensor
♦ Coolant temperature sensor faulty
♦ Thermostat faulty (stuck open)
♦ Tiptronic vehicles only: coolant shutoff valve open (mechanical fault, lack of vacuum…)
♦ DME control module faulty

P0118

Diagnosis information - DME

Electric coolant temperature sensor

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+/ground or open circuit in the sensor line
- Open circuit in ground supply to coolant temperature sensor
- Coolant temperature sensor faulty
- DME control module faulty

P0121

Diagnosis information - DME

Accelerator pedal potentiometer, below limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ the accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to ground in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0121

Diagnosis information - DME

Accelerator pedal potentiometer, above limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to B+ in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0121

Diagnosis information - DME

Accelerator pedal potentiometer 1, implausible signal

ⓘ **NOTE**
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Pedal sensor faulty

P0122

Diagnosis information - DME

Accelerator pedal potentiometer, below limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ the accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to ground in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0122

Diagnosis information - DME

Accelerator pedal potentiometer, above limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to B+ in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0122

Diagnosis information - DME

Accelerator pedal potentiometer 1, implausible signal

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Pedal sensor faulty

P0123

Diagnosis information - DME

Accelerator pedal potentiometer, below limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ the accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to ground in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0123

Diagnosis information - DME

Accelerator pedal potentiometer, above limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to B+ in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0123

Diagnosis information - DME

Accelerator pedal potentiometer 1, implausible signal

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Pedal sensor faulty

P0127

Diagnosis information - DME

Intake air temperature sensor, over limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s

Possible fault causes

- Short circuit to ground in signal wire
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P0127

Diagnosis information - DME

Intake air temperature sensor, below limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s
- No fault in ambient temperature sensor (via CAN)

Possible fault causes

- Short circuit to B+ in signal wire
- open circuit in the signal leads
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P0127

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too low)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Previous engine switch-off temperature > 40 °C
- Engine temperature has cooled off by > 20K before restart
- Engine starting temperature -35 °C … 70 °C
- Time after engine starts > 2 s
- No fault detected for ambient temperature sensor (via CAN)

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0127

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too high)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 52 … 300 kg/h

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0127

Diagnosis information - DME

intake air temperature sensor - signal implausible (signal remains at fixed value)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine starting temperature < 81 °C
- Engine temperature > 70 °C
- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 40 … 300 kg/h
- No idling, no thrust shutdown
- No fault detected for ambient temperature sensor (via CAN)
- No fault detected for vehicle speed sensor

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P0130

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0130

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0130

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0130

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0130

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0130

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0130

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0131

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0131

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0131

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0131

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0131

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0131

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0131

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0132

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0132

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0132

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0132

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0132

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0132

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0132

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0133

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0133

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0133

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0133

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0133

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0133

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0133

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0134

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0134

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0134

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0134

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0134

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0134

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0134

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0135

Diagnosis information - DME

Oxygen sensor heater, electric fault

Diagnostic conditions

- DME control module power supply 10 V … 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Oxygen sensor faulty
- DME control module faulty

P0135

Diagnosis information - DME

Oxygen sensor heater, function

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the set point and actual temperature of the oxygen sensor, from which a faulty heating control can be deduced.
If the DME has detected a vehicle voltage > 16 V, oxygen sensing is also interrupted.

Diagnostic conditions

- DME control unit power supply 10 V … 16 V
- Exhaust temperature 300 °C (572 °F) ... 600 °C (1112 °F)
- Time after engine starts > 200 s
- Intake air temperature > -7 °C (19 °F)
- No overrun
- No other driver fault of oxygen sensor heater

Possible fault causes

- Vehicle voltage > 16 V
- Connector corrosion
- Contact resistance in the lines
- Oxygen sensor faulty
- DME control unit faulty

P0137

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P0137

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0137

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0137

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0137

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P0138

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P0138

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0138

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0138

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0138

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P0139

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P0139

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0139

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0139

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0139

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P013A

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P013A

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

P013A

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P013A

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P013A

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P013A

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P013C

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P013C

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P013E

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P013E

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P013E

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P013E

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P013E

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P0140

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P0140

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0140

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0140

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0140

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P0141

Diagnosis information - DME

Heater circuit, O2 sensor voltage behind catalytic converter, implausible signal

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the predetermined and actual temperature of the oxygen sensor which can be closed due to faulty heating control.

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature 250 °C ... 600 °C
- Intake air temperature > -7°C
- No other driver fault of oxygen sensor heater

Possible fault causes

- Plug corrosion
- Oxygen sensor faulty
- DME control module faulty

P0141

Diagnosis information - DME

Oxygen sensor heater, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit in the activation line to the oxygen sensor heater
- Open circuit in the voltage supply to the oxygen sensor heater
- Oxygen sensor faulty (oxygen sensor heater resistance too high)
- DME control module faulty

P0141

Diagnosis information - DME

Oxygen sensor heater, below limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to ground in control line to the oxygen sensor heater
- Oxygen sensor faulty (short circuit to sensor housing)
- DME control module faulty

P0141

Diagnosis information - DME

Oxygen sensor heater, above limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line to the oxygen sensor heater
- Oxygen sensor faulty (internal short circuit)
- DME control module faulty

P014A

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P014A

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P014A

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0150

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0150

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0150

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0150

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0150

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0150

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0150

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0151

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0151

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0151

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0151

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0151

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0151

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0151

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0152

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0152

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0152

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0152

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0152

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0152

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0152

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0153

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0153

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0153

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0153

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0153

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0153

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0153

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0154

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P0154

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P0154

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P0154

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P0154

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0154

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P0154

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P0155

Diagnosis information - DME

Oxygen sensor heater, function

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the set point and actual temperature of the oxygen sensor, from which a faulty heating control can be deduced.
If the DME has detected a vehicle voltage > 16 V, oxygen sensing is also interrupted.

Diagnostic conditions

- DME control unit power supply 10 V … 16 V
- Exhaust temperature 300 °C (572 °F) ... 600 °C (1112 °F)
- Time after engine starts > 200 s
- Intake air temperature > -7 °C (19 °F)
- No overrun
- No other driver fault of oxygen sensor heater

Possible fault causes

- Vehicle voltage > 16 V
- Connector corrosion
- Contact resistance in the lines
- Oxygen sensor faulty
- DME control unit faulty

P0155

Diagnosis information - DME

Oxygen sensor heater, electric fault

Diagnostic conditions

- DME control module power supply 10 V … 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Oxygen sensor faulty
- DME control module faulty

P0157

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P0157

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P0157

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0158

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P0158

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- Short circuit to B+ in signal wire
- Oxygen sensor faulty
- DME control module faulty

P0158

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0159

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P0159

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P0159

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0160

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P0160

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P0161

Diagnosis information - DME

Oxygen sensor heater, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit in the activation line to the oxygen sensor heater
- Open circuit in the voltage supply to the oxygen sensor heater
- Oxygen sensor faulty (oxygen sensor heater resistance too high)
- DME control module faulty

P0161

Diagnosis information - DME

Heater circuit, O2 sensor voltage behind catalytic converter, implausible signal

NOTE
The function checks the sensor temperature (by measuring the internal resistance of the Nernst cell) depending on the exhaust temperature. This can be used to discover discrepancies between the predetermined and actual temperature of the oxygen sensor which can be closed due to faulty heating control.

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature 250 °C ... 600 °C
- Intake air temperature > -7°C
- No other driver fault of oxygen sensor heater

Possible fault causes

- Plug corrosion
- Oxygen sensor faulty
- DME control module faulty

P0161

Diagnosis information - DME

Oxygen sensor heater, below limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Corrosion in plug
- Short circuit to ground in control line to the oxygen sensor heater
- Oxygen sensor faulty (short circuit to sensor housing)
- DME control module faulty

P0161

Diagnosis information - DME

Oxygen sensor heater, above limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line to the oxygen sensor heater
- Oxygen sensor faulty (internal short circuit)
- DME control module faulty

P0195

Diagnosis information - DME

Oil temperature sensor - signal implausible

NOTE
This function compares the coolant temperature with the oil temperature. A fault is detected as soon the discrepancy between the two values exceeds a certian level.

Diagnostic conditions

- Engine running

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0195

Diagnosis information - DME

Oil temperature sensor - above limit value

Diagnostic conditions

- Engine running

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0195

Diagnosis information - DME

Oil temperature sensor - below limit value

Diagnostic conditions

- Time after engine starts > 120 s

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0195

Diagnosis information - DME

Oil temperature sensor - signal remains at fixed value

Diagnostic conditions

- Engine temperature increase from 30 °C to 60 °C

Possible fault causes

- Oil temperature sensor faulty

P0196

Diagnosis information - DME

Oil temperature sensor - signal implausible

NOTE
This function compares the coolant temperature with the oil temperature. A fault is detected as soon the discrepancy between the two values exceeds a certian level.

Diagnostic conditions

- Engine running

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0196

Diagnosis information - DME

Oil temperature sensor - above limit value

Diagnostic conditions

- Engine running

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0196

Diagnosis information - DME

Oil temperature sensor - below limit value

Diagnostic conditions

- Time after engine starts > 120 s

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0196

Diagnosis information - DME

Oil temperature sensor - signal remains at fixed value

Diagnostic conditions

- Engine temperature increase from 30 °C to 60 °C

Possible fault causes

- Oil temperature sensor faulty

P0197

Diagnosis information - DME

Oil temperature sensor - signal implausible

NOTE
This function compares the coolant temperature with the oil temperature. A fault is detected as soon the discrepancy between the two values exceeds a certian level.

Diagnostic conditions

- Engine running

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0197

Diagnosis information - DME

Oil temperature sensor - above limit value

Diagnostic conditions

- Engine running

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0197

Diagnosis information - DME

Oil temperature sensor - below limit value

Diagnostic conditions

- Time after engine starts > 120 s

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0197

Diagnosis information - DME

Oil temperature sensor - signal remains at fixed value

Diagnostic conditions

- Engine temperature increase from 30 °C to 60 °C

Possible fault causes

- Oil temperature sensor faulty

P0198

Diagnosis information - DME

Oil temperature sensor - signal implausible

NOTE
This function compares the coolant temperature with the oil temperature. A fault is detected as soon the discrepancy between the two values exceeds a certian level.

Diagnostic conditions

- Engine running

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0198

Diagnosis information - DME

Oil temperature sensor - above limit value

Diagnostic conditions

- Engine running

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0198

Diagnosis information - DME

Oil temperature sensor - below limit value

Diagnostic conditions

- Time after engine starts > 120 s

Possible fault causes

- Fault in instrument cluster control module
- Oil temperature sensor faulty

P0198

Diagnosis information - DME

Oil temperature sensor - signal remains at fixed value

Diagnostic conditions

- Engine temperature increase from 30 °C to 60 °C

Possible fault causes

- Oil temperature sensor faulty

P0201

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0201

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0201

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0202

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0202

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0202

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0203

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0203

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0203

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0204

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0204

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0204

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0205

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0205

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0205

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0206

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0206

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0206

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0222

Diagnosis information - DME

Accelerator pedal potentiometer, below limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ the accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to ground in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0222

Diagnosis information - DME

Accelerator pedal potentiometer, above limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to B+ in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0222

Diagnosis information - DME

Accelerator pedal potentiometer 1, implausible signal

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Pedal sensor faulty

P0223

Diagnosis information - DME

Accelerator pedal potentiometer, below limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ the accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to ground in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0223

Diagnosis information - DME

Accelerator pedal potentiometer, above limit value

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Short circuit to B+ in signal wire
♦ Pedal sensor faulty
♦ DME control module faulty

P0223

Diagnosis information - DME

Accelerator pedal potentiometer 1, implausible signal

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
♦ The accelerator pedal angle is calculated from the remaining potentiometer signal.
♦ Maximum pedal value is limited to 30 %.
♦ Dynamism is limited.

Diagnostic conditions

- Time after ignition on > 30 s
- Supply voltage > 7 V

Possible fault causes

♦ Pedal sensor faulty

P0230

Diagnosis information - DME

Fuel pump relay, above limit value

Diagnostic conditions

- Control module power supply DME > 7 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0230

Diagnosis information - DME

Fuel pump relay faulty, open circuit

Diagnostic conditions

- Engine start

Possible fault causes

- Open circuit in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0230

Diagnosis information - DME control unit

Delivery rate of electric fuel pump X too low

ⓘ **NOTE**
The delivery rate of the specified fuel pump was detected as being too low by the lambda control and switchover between the two fuel pumps.

Diagnostic conditions

- Test drive (different load ranges)

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Fuel line constricted / leaking
♦ Electric fuel pump faulty

P0230

Diagnosis information - DME

Fuel pump relay, below limit value

Diagnostic conditions

- Engine start

Possible fault causes

- Short circuit to ground in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0234

Diagnosis information - DME control unit

Boost pressure control deviation

NOTE
The boost pressure is judged to be too small and increased through the boost-pressure control.
The fault is detected if the boost pressure control cannot adjust the boost pressure correctly within a control limit.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

♦ Charge-air cooler or charge-air line(s) (pressure-side) leaks between turbocharger and engine
♦ Charge air cooler or Charge air line(s) (pressure-side) between Turbocharger and Engine Narrowed / Blocked

♦ Diverter valve does not close (sufficiently)
♦ Wrong value from boost pressure sensor on DME control unit
♦ Boost pressure adjuster fails to adjust (sufficiently)
♦ 1 Turbocharger blocked / Faulty

Fault effects

♦ Boost pressure control switched off (Boost pressure low)
♦ Reduction Engine torque

P0234

Diagnosis information - DME control unit

Intake air system leak

NOTE
A leak is detected upstream of the throttle valve (hose reduction detection) in suction and charging mode through comparison of various measured variables and characteristic maps.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

♦ Charge-air cooler or charge-air line(s) (pressure-side) leaks between turbocharger and engine

Fault effects

♦ Boost pressure control switched off (Boost pressure low)
♦ Reduction Engine torque

P0234

Diagnosis information - DME control unit

Boost pressure control limit exceeded

NOTE
The boost pressure is judged to be too large and reduced through the boost-pressure control. The fault is detected if the boost pressure control cannot adjust the boost pressure correctly within a control limit.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

- Boost pressure adjuster fails to adjust (sufficiently)
- Wrong value from boost pressure sensor on DME control unit
- Diverter valve does not open (sufficiently)

Fault effects

- Boost pressure control switched off (Boost pressure low)
- Reduction Engine torque

P0237

Diagnosis information - DME control unit

Boost pressure sensor

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 0.200 V (P0237)
or
♦ > 4.787 V (P0238)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 500 hpa (P1638)
or
♦ > 2600 hpa (P1638)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P0237

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ [measured value + 30 hpa] < [ambient pressure - 400 hpa] (P1636)
or
♦ [measured value - 30 hpa] < [ambient pressure + 200 hpa] (P1637)

Diagnostic conditions

- Engine speed < 1000 rpm
- Throttle position < 5 %
- No fault entered for: ambient pressure sensor or throttle potentiometer

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Boost pressure sensor faulty
♦ Ambient pressure sensor faulty (DME control unit)

P0238

Diagnosis information - DME control unit

Boost pressure sensor

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 0.200 V (P0237)
or
♦ > 4.787 V (P0238)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P0238

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 500 hpa (P1638)
or
♦ > 2600 hpa (P1638)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P0238

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ [measured value + 30 hpa] < [ambient pressure - 400 hpa] (P1636)
or
♦ [measured value - 30 hpa] < [ambient pressure + 200 hpa] (P1637)

Diagnostic conditions

- Engine speed < 1000 rpm
- Throttle position < 5 %
- No fault entered for: ambient pressure sensor or throttle potentiometer

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Boost pressure sensor faulty
♦ Ambient pressure sensor faulty (DME control unit)

P025A

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Open circuit Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
- ♦ Power or ground supply faulty Fuel pump control unit
- ♦ Fuel pump control unit Faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P025A

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

♦ Short circuit to B+ Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
♦ Fuel pump control unit Faulty

P025A

Diagnosis information - DME

Fuel pump control unit

ⓘ NOTE
♦ The fuel pump control unit is controlled by the DME via a PWM signal.

Diagnostic conditions

● Engine start

Possible fault causes

♦ Short circuit to B+/ground or open circuit of the control line to the fuel pump control unit
♦ Fuel pump relay faulty (permanently closed)
♦ Fuel line clogged/blocked
♦ Electric fuel pump sluggish/blocked
♦ Fuel pump control unit faulty

P025A

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

♦ Fault in area Electric fuel pump (See ⓘ)
♦ Short circuit to ground Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
♦ Fuel pump control unit Faulty

ⓘ INFORMATION

♦ If the fuel pump control unit detects an external or internal fault, it connects the control line to ground for a certain time.
♦ This short circuit to ground is recognised as the fault type >>Below limit value<<, just like an actual short circuit to ground of the control line.

P025C

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Open circuit Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
- ♦ Power or ground supply faulty Fuel pump control unit
- ♦ Fuel pump control unit Faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P025C

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

♦ Short circuit to B+ Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
♦ Fuel pump control unit Faulty

P025C

Diagnosis information - DME

Fuel pump control unit

ⓘ NOTE

♦ The fuel pump control unit is controlled by the DME via a PWM signal.

Diagnostic conditions

- Engine start

Possible fault causes

♦ Short circuit to B+/ground or open circuit of the control line to the fuel pump control unit
♦ Fuel pump relay faulty (permanently closed)
♦ Fuel line clogged/blocked
♦ Electric fuel pump sluggish/blocked
♦ Fuel pump control unit faulty

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

♦ Fault in area Electric fuel pump (See ⓘ)
♦ Short circuit to ground Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
♦ Fuel pump control unit Faulty

ⓘ INFORMATION

♦ If the fuel pump control unit detects an external or internal fault, it connects the control line to ground for a certain time.
♦ This short circuit to ground is recognised as the fault type >>Below limit value<<, just like an actual short circuit to ground of the control line.

P025D

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Open circuit Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
- ♦ Power or ground supply faulty Fuel pump control unit
- ♦ Fuel pump control unit Faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P025D

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

♦ Short circuit to B+ Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
♦ Fuel pump control unit Faulty

P025D

Diagnosis information - DME

Fuel pump control unit

ⓘ NOTE

♦ The fuel pump control unit is controlled by the DME via a PWM signal.

Diagnostic conditions

● Engine start

Possible fault causes

♦ Short circuit to B+/ground or open circuit of the control line to the fuel pump control unit
♦ Fuel pump relay faulty (permanently closed)
♦ Fuel line clogged/blocked
♦ Electric fuel pump sluggish/blocked
♦ Fuel pump control unit faulty

P025D

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

♦ Fault in area Electric fuel pump (See ⓘ)
♦ Short circuit to ground Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
♦ Fuel pump control unit Faulty

ⓘ INFORMATION

♦ If the fuel pump control unit detects an external or internal fault, it connects the control line to ground for a certain time.
♦ This short circuit to ground is recognised as the fault type >>Below limit value<<, just like an actual short circuit to ground of the control line.

P0261

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0261

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0261

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0262

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0262

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0262

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0264

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0264

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0264

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0265

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0265

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0265

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0267

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0267

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0267

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0268

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0268

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0268

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0270

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0270

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0270

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0271

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0271

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0271

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0273

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0273

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0273

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0274

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0274

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0274

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0276

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0276

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0276

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0277

Diagnosis information - DME

Injection valve, open circuit

NOTE
Open circuit leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Open circuit in the control line to the injection valve
- Open circuit in the voltage supply to the injection valve
- Injection valve faulty (open circuit)
- DME control module faulty

P0277

Diagnosis information - DME

Injection valve, below limit value

NOTE
A short circuit to ground leads to a permanently open injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to ground in control line to the injection valve
- DME control module faulty

P0277

Diagnosis information - DME

Injection valve, above limit value

NOTE
A short circuit to B+ leads to a permanently closed injection valve. Therefore, simultaneous misfires can be entered.

Diagnostic conditions

- Engine start
- Supply voltage > 7 V

Possible fault causes

- Short circuit to B+ in control line to the injection valve
- Injection valve faulty (short circuit)
- DME control module faulty

P0299

Diagnosis information - DME control unit

Boost pressure control deviation

NOTE
The boost pressure is judged to be too small and increased through the boost-pressure control.
The fault is detected if the boost pressure control cannot adjust the boost pressure correctly within a control limit.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

♦ Charge-air cooler or charge-air line(s) (pressure-side) leaks between turbocharger and engine
♦ Charge air cooler or Charge air line(s) (pressure-side) between Turbocharger and Engine Narrowed / Blocked

♦ Diverter valve does not close (sufficiently)
♦ Wrong value from boost pressure sensor on DME control unit
♦ Boost pressure adjuster fails to adjust (sufficiently)
♦ 1 Turbocharger blocked / Faulty

Fault effects

♦ Boost pressure control switched off (Boost pressure low)
♦ Reduction Engine torque

P0299

Diagnosis information - DME control unit

Intake air system leak

NOTE
A leak is detected upstream of the throttle valve (hose reduction detection) in suction and charging mode through comparison of various measured variables and characteristic maps.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

♦ Charge-air cooler or charge-air line(s) (pressure-side) leaks between turbocharger and engine

Fault effects

♦ Boost pressure control switched off (Boost pressure low)
♦ Reduction Engine torque

P0299

Diagnosis information - DME control unit

Boost pressure control limit exceeded

NOTE
The boost pressure is judged to be too large and reduced through the boost-pressure control. The fault is detected if the boost pressure control cannot adjust the boost pressure correctly within a control limit.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

- Boost pressure adjuster fails to adjust (sufficiently)
- Wrong value from boost pressure sensor on DME control unit
- Diverter valve does not open (sufficiently)

Fault effects

- Boost pressure control switched off (Boost pressure low)
- Reduction Engine torque

P0300

Diagnosis information - DME

Random/multiple cylinder misfire detected

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

Diagnostic conditions

- Engine running
- Engine load > 4 % up to 25 %, depending on engine speed
- Intake air temperature > -30 °C (-22 °F)
- No fault in crankshaft sensor
- In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked
⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow

⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

Diagnosis information - DME

Cylinder-specific misfire

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

● Detecting the misfire can block the fuel injection for the remainder of the driving cycle after a permanent misfire is detected on the cylinder in question. Misfire detection remains active.

Diagnostic conditions

● Engine running
● Engine load > 4 % up to 25 %, depending on engine speed
● Intake air temperature > -30 °C (-22 °F)
● No fault in crankshaft sensor
● In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked

⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow
⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0301

Diagnosis information - DME

Random/multiple cylinder misfire detected

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

Diagnostic conditions

- Engine running
- Engine load > 4 % up to 25 %, depending on engine speed
- Intake air temperature > -30 °C (-22 °F)
- No fault in crankshaft sensor
- In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked
⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow

⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0301

Diagnosis information - DME

Cylinder-specific misfire

ⓘ NOTE 1
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ NOTE 2
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

● Detecting the misfire can block the fuel injection for the remainder of the driving cycle after a permanent misfire is detected on the cylinder in question. Misfire detection remains active.

Diagnostic conditions

● Engine running
● Engine load > 4 % up to 25 %, depending on engine speed
● Intake air temperature > -30 °C (-22 °F)
● No fault in crankshaft sensor
● In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked

⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow
⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0302

Diagnosis information - DME

Random/multiple cylinder misfire detected

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

Diagnostic conditions

- Engine running
- Engine load > 4 % up to 25 %, depending on engine speed
- Intake air temperature > -30 °C (-22 °F)
- No fault in crankshaft sensor
- In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked
⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow

⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0302

Diagnosis information - DME

Cylinder-specific misfire

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

● Detecting the misfire can block the fuel injection for the remainder of the driving cycle after a permanent misfire is detected on the cylinder in question. Misfire detection remains active.

Diagnostic conditions

● Engine running
● Engine load > 4 % up to 25 %, depending on engine speed
● Intake air temperature > -30 °C (-22 °F)
● No fault in crankshaft sensor
● In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked

⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow
⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0303

Diagnosis information - DME

Random/multiple cylinder misfire detected

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

Diagnostic conditions

- Engine running
- Engine load > 4 % up to 25 %, depending on engine speed
- Intake air temperature > -30 °C (-22 °F)
- No fault in crankshaft sensor
- In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked
⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow

⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0303

Diagnosis information - DME

Cylinder-specific misfire

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

● Detecting the misfire can block the fuel injection for the remainder of the driving cycle after a permanent misfire is detected on the cylinder in question. Misfire detection remains active.

Diagnostic conditions

● Engine running
● Engine load > 4 % up to 25 %, depending on engine speed
● Intake air temperature > -30 °C (-22 °F)
● No fault in crankshaft sensor
● In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked

⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow
⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0304

Diagnosis information - DME

Random/multiple cylinder misfire detected

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

Diagnostic conditions

- Engine running
- Engine load > 4 % up to 25 %, depending on engine speed
- Intake air temperature > -30 °C (-22 °F)
- No fault in crankshaft sensor
- In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked
⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow

⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

Diagnosis information - DME

Cylinder-specific misfire

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

● Detecting the misfire can block the fuel injection for the remainder of the driving cycle after a permanent misfire is detected on the cylinder in question. Misfire detection remains active.

Diagnostic conditions

● Engine running
● Engine load > 4 % up to 25 %, depending on engine speed
● Intake air temperature > -30 °C (-22 °F)
● No fault in crankshaft sensor
● In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked

⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow
⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0305

Diagnosis information - DME

Random/multiple cylinder misfire detected

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

Diagnostic conditions

- Engine running
- Engine load > 4 % up to 25 %, depending on engine speed
- Intake air temperature > -30 °C (-22 °F)
- No fault in crankshaft sensor
- In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked
⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow

⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0305

Diagnosis information - DME

Cylinder-specific misfire

ⓘ NOTE 1
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ NOTE 2
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

● Detecting the misfire can block the fuel injection for the remainder of the driving cycle after a permanent misfire is detected on the cylinder in question. Misfire detection remains active.

Diagnostic conditions

● Engine running
● Engine load > 4 % up to 25 %, depending on engine speed
● Intake air temperature > -30 °C (-22 °F)
● No fault in crankshaft sensor
● In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked

⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow
⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0306

Diagnosis information - DME

Random/multiple cylinder misfire detected

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

Diagnostic conditions

- Engine running
- Engine load > 4 % up to 25 %, depending on engine speed
- Intake air temperature > -30 °C (-22 °F)
- No fault in crankshaft sensor
- In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked
⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow

⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0306

Diagnosis information - DME

Cylinder-specific misfire

ⓘ **NOTE 1**
The fault types have a special meaning in the case of misfires:
♦ Fault type Implausible signal: Exhaust-related fault after engine start
♦ Fault type Limit value not reached: Exhaust-related fault during driving
♦ Fault type Limit value exceeded: Fault damaging to catalytic converter

ⓘ **NOTE 2**
♦ The sum fault P0300 is always entered in addition to other misfires It is possible that misfires have occurred for one or more cylinders.

● Detecting the misfire can block the fuel injection for the remainder of the driving cycle after a permanent misfire is detected on the cylinder in question. Misfire detection remains active.

Diagnostic conditions

● Engine running
● Engine load > 4 % up to 25 %, depending on engine speed
● Intake air temperature > -30 °C (-22 °F)
● No fault in crankshaft sensor
● In the event of misfires while driving: level road conditions (= not a bumpy road)

Possible fault causes

♦ If misfires occur for only one cylinder:
⇒ electrical fault in the activation line between DME and ignition coil
⇒ Spark plug connector faulty
⇒ Ignition coil faulty
⇒ Spark plug faulty
⇒ Secondary air
⇒ Mechanical or electrical fault in injection valve
⇒ Valve seat or valve faulty
⇒ Valve lift control faulty
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for a bank:
⇒ Electrical fault or loose contact in the activation line to the solenoid valve of the camshaft control
⇒ Solenoid valve of camshaft control has electrical or mechanical fault or is blocked

⇒ Hall-sender rotor (sensor wheel) faulty / twisted out of position
⇒ Secondary air
⇒ Intake camshaft adjustment too slow
⇒ Intake camshaft timing incorrect
⇒ Outlet camshaft timing incorrect
⇒ Fault in valve lift control
⇒ Oxygen sensor faulty (also loose contact in wiring harness) ^
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

♦ If misfires occur for both banks:
⇒ Wrong / poor fuel
⇒ Tank empty
⇒ Water in tank
⇒ Use of an engine-block heater
⇒ Secondary air
⇒ Exhaust system blocked/constricted
⇒ Foreign matter in intake system; this can also lead to sporadic misfires for changing cylinders

P0324

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P0324

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P0324

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P0324

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P0324

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P0324

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P0324

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P0324

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

Diagnosis information - DME

Knock sensor, below limit value

NOTE
If a fault is detected:
♦ The timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range, and
♦ Knock control adaptation remains.
Knock control being triggered can be an indication of engine damage (increased noise level).

Diagnostic conditions

- Engine speed > 3600 rpm
- Engine load > 45 %

Possible fault causes

♦ Open circuit in the signal leads
♦ Short circuit to ground in signal wire
♦ Knock sensor loose
♦ Knock sensor faulty

Diagnosis information - DME

Knock sensor, below limit value

NOTE
If a fault is detected:
♦ The timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range, and
♦ Knock control adaptation remains.
Knock control being triggered can be an indication of engine damage (increased noise level).

Diagnostic conditions

- Engine speed > 3600 rpm
- Engine load > 45 %

Possible fault causes

♦ Open circuit in the signal leads
♦ Short circuit to ground in signal wire
♦ Knock sensor loose
♦ Knock sensor faulty

P0335

Diagnosis information - DME

Crankshaft sensor, open circuit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion in plug
♦ Open circuit or short circuit to B+ or ground
♦ Crankshaft sensor faulty
♦ DME control module faulty

P0336

Diagnosis information - DME

Crankshaft sensor, open circuit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion in plug
♦ Open circuit or short circuit to B+ or ground
♦ Crankshaft sensor faulty
♦ DME control module faulty

P0337

Diagnosis information - DME

Crankshaft sensor, open circuit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion in plug
♦ Open circuit or short circuit to B+ or ground
♦ Crankshaft sensor faulty
♦ DME control module faulty

P0338

Diagnosis information - DME

Crankshaft sensor, open circuit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion in plug
♦ Open circuit or short circuit to B+ or ground
♦ Crankshaft sensor faulty
♦ DME control module faulty

P0339

Diagnosis information - DME

Crankshaft sensor, open circuit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion in plug
♦ Open circuit or short circuit to B+ or ground
♦ Crankshaft sensor faulty
♦ DME control module faulty

P0341

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0341

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ NOTE
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0341

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0341

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0341

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0341

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0341

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0342

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0342

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0342

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0342

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0342

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0342

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0342

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0343

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0343

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0343

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0343

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0343

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0343

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0343

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0344

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0344

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0344

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0344

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0344

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0344

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0344

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0346

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0346

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0346

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0346

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0346

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0346

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0347

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0347

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0347

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0347

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion in the connector
♦ Hall sensor faulty

P0347

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0347

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0347

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0348

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0348

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0348

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0348

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0348

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0348

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0348

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0349

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0349

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0349

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0349

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0349

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0349

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0349

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0351

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P0352

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P0353

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P0354

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P0355

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P0366

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0366

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0366

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0366

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0366

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0366

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0366

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0367

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0367

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ NOTE
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0367

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0367

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0367

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0367

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0367

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0368

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0368

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0368

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0368

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0368

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0368

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0368

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0369

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0369

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0369

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0369

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0369

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0369

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0369

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0391

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0391

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0391

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0391

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0391

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0391

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0391

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0392

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0392

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0392

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0392

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0392

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0392

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0392

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0393

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0393

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ NOTE
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0393

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0393

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0393

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0393

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0393

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0394

Diagnosis information - DME

Camshaft sensor, limit value exceeded

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal wire

P0394

Diagnosis information - DME

Camshaft sensor, open circuit, implausible signal

ⓘ **NOTE**
Diagnosis detects that the signal is missing. This may be caused by an electrical open circuit or due to the fact that individual parts or all rotor parts of the sensor wheel on the camshaft are missing.
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Open circuit in the signal line
♦ Hall sensor faulty
♦ Hall sensor rotor (sensor wheel on camshaft) faulty

P0394

Diagnosis information - DME

Camshaft sensor, open circuit

NOTE
The diagnosis detects the missing signal. This can be caused by an electrical interruption or by individual or all rotary parts of the sensor wheel on the camshaft being missing.
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running
- No other camshaft sensor faults

Possible fault causes

- Open circuit in the signal lead
- Hall sensor faulty
- Hall sender rotor (sensor wheel on camshaft) is faulty

P0394

Diagnosis information - DME

Camshaft sensor, implausible signal

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

- Loose contact or corrosion in the connector
- Hall sensor faulty

P0394

Diagnosis information - DME

Camshaft sensor, lower than limit value

NOTE
When this fault is detected, the ignition angle is retarded.
If both hall sensor signals are missing, the starting process will take approximately 10 s.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal wire

P0394

Diagnosis information - DME

Camshaft sensor - below limit value

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground in signal line

P0394

Diagnosis information - DME

Camshaft sensor - limit value exceeded

ⓘ **NOTE**
If a fault is detected, the ignition timing is retarded.
The starting operation takes approx. 10 s if both Hall sensor signals are missing.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+ in signal line

P0412

Diagnosis information **- system**

Secondary air valve leak

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

The secondary air pump continues pumping after the secondary air valve is closed. The lambda control detects whether the secondary air valve closes completely.

- Engine cold start
- No lambda control fault

Fault setting condition(s)

- Leaking secondary air valve
- If only one fault code is set (bank 1 or bank 2), it is necessary to check the connection from the secondary air valve to the bank which is not faulty, since the excessively high air amount was not detected here

P0412

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to B+ in control line to secondary air valve

P0412

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Open circuit in secondary air valve circuit

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P0412

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to ground in the secondary air valve circuit
- Secondary air valve fuse faulty

P0413

Diagnosis information **- system**

Secondary air valve leak

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

The secondary air pump continues pumping after the secondary air valve is closed. The lambda control detects whether the secondary air valve closes completely.

- Engine cold start
- No lambda control fault

Fault setting condition(s)

- Leaking secondary air valve
- If only one fault code is set (bank 1 or bank 2), it is necessary to check the connection from the secondary air valve to the bank which is not faulty, since the excessively high air amount was not detected here

P0413

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to B+ in control line to secondary air valve

P0413

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Open circuit in secondary air valve circuit

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P0413

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to ground in the secondary air valve circuit
- Secondary air valve fuse faulty

P0414

Diagnosis information **- system**

Secondary air valve leak

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

The secondary air pump continues pumping after the secondary air valve is closed. The lambda control detects whether the secondary air valve closes completely.

- Engine cold start
- No lambda control fault

Fault setting condition(s)

- Leaking secondary air valve
- If only one fault code is set (bank 1 or bank 2), it is necessary to check the connection from the secondary air valve to the bank which is not faulty, since the excessively high air amount was not detected here

P0414

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to B+ in control line to secondary air valve

P0414

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Open circuit in secondary air valve circuit

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P0414

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to ground in the secondary air valve circuit
- Secondary air valve fuse faulty

P0418

Diagnosis information - DME

Driver of secondary air pump relay

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of control line to secondary-air pump relay
- Open circuit in the power supply to the secondary-air pump relay
- Secondary-air pump relay faulty
- DME control module faulty

P0420

Diagnostic information - DME

Catalytic converter conversion

ⓘ **NOTE**
The catalytic-converter monitoring function compares the amplitude of the oxygen sensor behind the catalytic converter with the amplitude of a calculated limit-value catalytic converter during defined mixture leaning and enrichment phases. The amplitudes permit a conclusion to be drawn about the oxygen storage capacity of the catalytic converter.

Diagnostic conditions

- Perform following short tests in sequence:
  1. All models: Oxygen-sensor short tests
  2. Short test Basic mixture adaptations
  3. Short test Catalytic-converter conversion

or:

- Engine start temperature > -15 °C (5 °F)
- Catalytic-converter temperature 385 .... 635°C (725 .... 1,175 °F)
- Loading of carbon canister < 8
- Lambda control ahead of catalytic converter active
- Oxygen sensors behind catalytic converter ready for operation
- 50 seconds >cumulative< within the following load/rev range
- Engine speed 1,280 .... 2,880 rpm
- Engine load >relative charge< 22 .... 41%
- No faults in oxygen sensors, tank vent, secondary-air pump relay, secondary-air valve relay, throttle adjuster, hot-film mass air flow sensors; no misfiring.

Possible fault causes

- If an oxygen sensor fault is entered::
  - ♦ Corresponding fault cause
    ► Remedy oxygen-sensor fault according to instructions
    then
    ► Then perform short test as described above

♦ Oxygen sensors ahead of and behind catalytic converter interchanged >Position in exhaust system<
♦ Valve lift error
♦ aged oxygen sensor ahead of or behind catalytic converter
♦ Catalytic converter faulty >Conversion rate of the primary catalytic converter too low<

⚠ IMPORTANT

If the primary catalytic converter is faulty, the main catalytic converter must be checked for damage and replaced as well if necessary.

P0421

Diagnostic information - DME

Catalytic converter conversion

ⓘ **NOTE**
The catalytic-converter monitoring function compares the amplitude of the oxygen sensor behind the catalytic converter with the amplitude of a calculated limit-value catalytic converter during defined mixture leaning and enrichment phases. The amplitudes permit a conclusion to be drawn about the oxygen storage capacity of the catalytic converter.

Diagnostic conditions

- Perform following short tests in sequence:
  1. All models: Oxygen-sensor short tests
  2. Short test Basic mixture adaptations
  3. Short test Catalytic-converter conversion

or:

- Engine start temperature > -15 °C (5 °F)
- Catalytic-converter temperature 385 .... 635°C (725 .... 1,175 °F)
- Loading of carbon canister < 8
- Lambda control ahead of catalytic converter active
- Oxygen sensors behind catalytic converter ready for operation
- 50 seconds >cumulative< within the following load/rev range
- Engine speed 1,280 .... 2,880 rpm
- Engine load >relative charge< 22 .... 41%
- No faults in oxygen sensors, tank vent, secondary-air pump relay, secondary-air valve relay, throttle adjuster, hot-film mass air flow sensors; no misfiring.

Possible fault causes

- If an oxygen sensor fault is entered::
  - ♦ Corresponding fault cause
    ► Remedy oxygen-sensor fault according to instructions
    then
    ► Then perform short test as described above

♦ Oxygen sensors ahead of and behind catalytic converter interchanged >Position in exhaust system<
♦ Valve lift error
♦ aged oxygen sensor ahead of or behind catalytic converter
♦ Catalytic converter faulty >Conversion rate of the primary catalytic converter too low<

⚠ IMPORTANT

If the primary catalytic converter is faulty, the main catalytic converter must be checked for damage and replaced as well if necessary.

P0430

Diagnostic information - DME

Catalytic converter conversion

ⓘ **NOTE**
The catalytic-converter monitoring function compares the amplitude of the oxygen sensor behind the catalytic converter with the amplitude of a calculated limit-value catalytic converter during defined mixture leaning and enrichment phases. The amplitudes permit a conclusion to be drawn about the oxygen storage capacity of the catalytic converter.

Diagnostic conditions

- Perform following short tests in sequence:
  1. All models: Oxygen-sensor short tests
  2. Short test Basic mixture adaptations
  3. Short test Catalytic-converter conversion

or:

- Engine start temperature > -15 °C (5 °F)
- Catalytic-converter temperature 385 .... 635°C (725 .... 1,175 °F)
- Loading of carbon canister < 8
- Lambda control ahead of catalytic converter active
- Oxygen sensors behind catalytic converter ready for operation
- 50 seconds >cumulative< within the following load/rev range
- Engine speed 1,280 .... 2,880 rpm
- Engine load >relative charge< 22 .... 41%
- No faults in oxygen sensors, tank vent, secondary-air pump relay, secondary-air valve relay, throttle adjuster, hot-film mass air flow sensors; no misfiring.

Possible fault causes

- If an oxygen sensor fault is entered::
  - ♦ Corresponding fault cause
    ► Remedy oxygen-sensor fault according to instructions
    then
    ► Then perform short test as described above

♦ Oxygen sensors ahead of and behind catalytic converter interchanged >Position in exhaust system<
♦ Valve lift error
♦ aged oxygen sensor ahead of or behind catalytic converter
♦ Catalytic converter faulty >Conversion rate of the primary catalytic converter too low<

⚠ IMPORTANT

If the primary catalytic converter is faulty, the main catalytic converter must be checked for damage and replaced as well if necessary.

P0431

Diagnostic information - DME

Catalytic converter conversion

ⓘ **NOTE**
The catalytic-converter monitoring function compares the amplitude of the oxygen sensor behind the catalytic converter with the amplitude of a calculated limit-value catalytic converter during defined mixture leaning and enrichment phases. The amplitudes permit a conclusion to be drawn about the oxygen storage capacity of the catalytic converter.

Diagnostic conditions

- Perform following short tests in sequence:
  1. All models: Oxygen-sensor short tests
  2. Short test Basic mixture adaptations
  3. Short test Catalytic-converter conversion

or:

- Engine start temperature > -15 °C (5 °F)
- Catalytic-converter temperature 385 .... 635°C (725 .... 1,175 °F)
- Loading of carbon canister < 8
- Lambda control ahead of catalytic converter active
- Oxygen sensors behind catalytic converter ready for operation
- 50 seconds >cumulative< within the following load/rev range
- Engine speed 1,280 .... 2,880 rpm
- Engine load >relative charge< 22 .... 41%
- No faults in oxygen sensors, tank vent, secondary-air pump relay, secondary-air valve relay, throttle adjuster, hot-film mass air flow sensors; no misfiring.

Possible fault causes

- If an oxygen sensor fault is entered::
  - ♦ Corresponding fault cause
    ► Remedy oxygen-sensor fault according to instructions
    then
    ► Then perform short test as described above

♦ Oxygen sensors ahead of and behind catalytic converter interchanged >Position in exhaust system<
♦ Valve lift error
♦ aged oxygen sensor ahead of or behind catalytic converter
♦ Catalytic converter faulty >Conversion rate of the primary catalytic converter too low<

⚠ IMPORTANT

If the primary catalytic converter is faulty, the main catalytic converter must be checked for damage and replaced as well if necessary.

P0440

Diagnosis information - DME

Fuel tank ventilation system above/below limit value

NOTE

- Diagnosis of the tank vent's permeability is performed by evaluating the force alteration when the tank vent is activated. Depending on the load of the active charcoal filter, the purge air contributes more or less to the formation of the mixture.
- This test is performed independently of the output stage diagnosis.

Diagnostic conditions

- Battery positive voltage 11 ... 15.5 V
- Time after engine starts 600 s
- Engine temperature > 60 °C
- Ambient temperature > 3.8 °C

Vehicle speed = 0 km/h

- Correction factor, height > 0.730
- Active charcoal filter load > 2.0
- No faults detected for hot-film mass air flow meter, throttle valve adjusting unit, tank vent output stage, coolant temperature sensor, vehicle speed, idle speed control

Possible fault causes

- Tank vent faulty (stuck open or closed)
- Tank vent installed back to front
- Purge air line leaking
- Purge air line trapped or blocked

P0441

Diagnosis information - DME

Fuel tank ventilation system above/below limit value

NOTE
• Diagnosis of the tank vent's permeability is performed by evaluating the force alteration when the tank vent is activated. Depending on the load of the active charcoal filter, the purge air contributes more or less to the formation of the mixture. • This test is performed independently of the output stage diagnosis.

Diagnostic conditions

• Battery positive voltage 11 ... 15.5 V
• Time after engine starts 600 s
• Engine temperature > 60 °C
• Ambient temperature > 3.8 °C
Vehicle speed = 0 km/h
• Correction factor, height > 0.730
• Active charcoal filter load > 2.0
• No faults detected for hot-film mass air flow meter, throttle valve adjusting unit, tank vent output stage, coolant temperature sensor, vehicle speed, idle speed control

Possible fault causes

♦ Tank vent faulty (stuck open or closed)
♦ Tank vent installed back to front
♦ Purge air line leaking
♦ Purge air line trapped or blocked

P0444

Diagnosis information - DME

Electric tank vent

Diagnostic conditions

- Supply voltage > 7 V
- Engine running with occasional activation of tank vent

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit in tank vent power supply
- Tank vent faulty
- DME control module faulty

P0445

Diagnosis information - DME

Electric tank vent

Diagnostic conditions

- Supply voltage > 7 V
- Engine running with occasional activation of tank vent

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit in tank vent power supply
- Tank vent faulty
- DME control module faulty

P0447

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, heater driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in heater control line for DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P0447

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, pump driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground of control line to pump motor of DTML module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P0447

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, valve driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in control line to change-over valve of DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P0448

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, heater driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in heater control line for DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P0448

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, pump driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground of control line to pump motor of DTML module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P0448

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, valve driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in control line to change-over valve of DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P0455

Diagnosis information - DME

Leakage in fuel tank system

Diagnostic conditions

- Vehicle speed = 0 km/h
- Engine speed = 0 rpm
- Correction factor, height > 0.73
- Coolant temperature upon starting the engine may be no more than 6.8 K above ambient temperature
- Coolant temperature when engine starts > 3.8 °C
- Period for which the engine needs to have been running before ignition is switched off > 20 minutes
- Ignition has been switched off for at least 10 seconds.
- Ambient temperature 4 … 35.3 °C
- Active charcoal filter load < 3 for minor leak
- Fuel tank fuel level 10 … 54 litres
- Battery positive voltage 11.02 ... 14.5 V
- No fuel tank filling
- No faults detected for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
- No output stage faults detected for DMTL pump motor, DMTL switch-over valves and tank vent
- No fault detected for tank vent (flow)

► The diagnostic conditions can also be established using the PIWIS Tester via the short test "tank leakage test". After the test has begun, the ignition must be switched off.

NOTE

- In this context, please also observe the function description.

Possible fault causes

- Tank cap not closed correctly, leaking or missing
- Purge air line leaking
- Tank vent leaking
- DMTL (Tank Leakage Diagnostics Module) leaking
- Leakage in fuel tank system

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P0456

Diagnosis information - DME

Leakage in fuel tank system

Diagnostic conditions

- Vehicle speed = 0 km/h
- Engine speed = 0 rpm
- Correction factor, height > 0.73
- Coolant temperature upon starting the engine may be no more than 6.8 K above ambient temperature
- Coolant temperature when engine starts > 3.8 °C
- Period for which the engine needs to have been running before ignition is switched off > 20 minutes
- Ignition has been switched off for at least 10 seconds.
- Ambient temperature 4 … 35.3 °C
- Active charcoal filter load < 3 for minor leak
- Fuel tank fuel level 10 … 54 litres
- Battery positive voltage 11.02 ... 14.5 V
- No fuel tank filling
- No faults detected for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
- No output stage faults detected for DMTL pump motor, DMTL switch-over valves and tank vent
- No fault detected for tank vent (flow)

► The diagnostic conditions can also be established using the PIWIS Tester via the short test "tank leakage test". After the test has begun, the ignition must be switched off.

NOTE

- In this context, please also observe the function description.

Possible fault causes

- Tank cap not closed correctly, leaking or missing
- Purge air line leaking
- Tank vent leaking
- DMTL (Tank Leakage Diagnostics Module) leaking
- Leakage in fuel tank system

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P0458

Diagnosis information - DME

Electric tank vent

Diagnostic conditions

- Supply voltage > 7 V
- Engine running with occasional activation of tank vent

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit in tank vent power supply
- Tank vent faulty
- DME control module faulty

P0459

Diagnosis information - DME

Electric tank vent

Diagnostic conditions

- Supply voltage > 7 V
- Engine running with occasional activation of tank vent

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit in tank vent power supply
- Tank vent faulty
- DME control module faulty

P0460

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0461

Diagnosis information - DME

Tank fuel level

Diagnostic conditions

- Normal driving
- Fuel consumption, measured in the DME, after the last refuelling operation > 15 litres
- No fuel level sender fault stored in the instrument cluster control unit

NOTE

- In this context, please also observe the function description

Possible fault causes

- Fuel level sender faulty / stuck

Function description - DME

Tank fuel level (plausibility check)

The DME calculates a fuel consumption figure and compares it to the measured values from the fuel level sender.

Procedure of the function:
- During initialisation of diagnosis, the tank fuel level from the instrument cluster is stored in the DME.
- Afterwards, the DME uses the injected fuel quantity to calculate the fuel consumption.
- When the total consumption has reached a value of 15 litres, the tank fuel level from the instrument cluster is stored again.
- The values at the beginning and end of diagnosis are compared.
- A fault is recognised if the difference between the two tank fuel levels deviates too much from the calculated 15 litres.
- The function operates constantly and is re-initialised every 15 litres. It is interrupted and re-initialised only by a refuelling process.

Diagnosis information - DME

Secondary air system

NOTE
The secondary-air diagnosis does not take place during the secondary air injection after a cold start but instead at a later time ("intrusive check").
To do this, the secondary-air pump is activated and the lean mixture is determined by the oxygen sensor.

The secondary air diagnostics can be activated via the short test menu on the PIWIS Tester.

Diagnostic conditions

- Secondary air system diagnosis is not yet performed in this cycle
- Correction factor, height > 0.73
- Intake air temperature 5 °C ... 60 ° C
- Engine starting temperature < 42 °C
- Engine temperature 5 °C ... 102 ° C
- Exhaust temperature < 650°C
- Mass air flow 13 kg/h ... 50 kg/h
- Oxygen sensors in front of catalytic converter ready for operation
- Idle speed
- Time after engine starts > 590 s
- No relevant faults stored

Possible fault causes

- Secondary-air pump relay mechanically faulty (jams)
- Power supply to secondary-air pump faulty
- Air duct cross section narrowed (pinched/blocked)
- Electric switch-over valve does not function
- Pneumatic switch-over valve does not function
- Leak in vacuum system
- Secondary-air pump, electrical or mechanical fault

P0492

Diagnosis information - DME

Secondary air system

NOTE
The secondary-air diagnosis does not take place during the secondary air injection after a cold start but instead at a later time ("intrusive check").
To do this, the secondary-air pump is activated and the lean mixture is determined by the oxygen sensor.

The secondary air diagnostics can be activated via the short test menu on the PIWIS Tester.

Diagnostic conditions

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- Time after engine starts > 590 s
- No relevant faults stored

Possible fault causes

- Secondary-air pump relay mechanically faulty (jams)
- Power supply to secondary-air pump faulty
- Air duct cross section narrowed (pinched/blocked)
- Electric switch-over valve does not function
- Pneumatic switch-over valve does not function
- Leak in vacuum system
- Secondary-air pump, electrical or mechanical fault

P0501

Diagnosis information - DME

Vehicle speed signal

Diagnostic conditions

- Engine speed 1480 ... 2520 rpm
- Coolant temperature > 30 °C
- Thrust shutdown for at least 3 seconds

Possible fault causes

- Fault entry in PSM control module
- Wheel speed sensor faulty
- Contact resistance between wheel speed sensor and PSM control module

P0502

Diagnosis information - DME

Vehicle speed signal

Diagnostic conditions

- Engine speed 1480 ... 2520 rpm
- Coolant temperature > 30 °C
- Thrust shutdown for at least 3 seconds

Possible fault causes

- Fault entry in PSM control module
- Wheel speed sensor faulty
- Contact resistance between wheel speed sensor and PSM control module

P0503

Diagnosis information - DME

Vehicle speed signal

Diagnostic conditions

- Engine speed 1480 ... 2520 rpm
- Coolant temperature > 30 °C
- Thrust shutdown for at least 3 seconds

Possible fault causes

- Fault entry in PSM control module
- Wheel speed sensor faulty
- Contact resistance between wheel speed sensor and PSM control module

P0506

Diagnosis information - DME

Idle speed control

The fault "Idle speed control" is detected when the DME cannot set the specified idle speed for a certain amount of time.

Diagnostic conditions

- Engine idling

Possible fault causes

Fault type "Over limit value"
- Secondary air behind throttle valve

Fault type "Below limit value"
- Air cleaner blocked/frozen
- Air guide between air cleaner and throttle valve blocked
- Secondary unit sluggish
- Exhaust system blocked

P0507

Diagnosis information - DME

Idle speed control

The fault "Idle speed control" is detected when the DME cannot set the specified idle speed for a certain amount of time.

Diagnostic conditions

- Engine idling

Possible fault causes

Fault type "Over limit value"
- Secondary air behind throttle valve

Fault type "Below limit value"
- Air cleaner blocked/frozen
- Air guide between air cleaner and throttle valve blocked
- Secondary unit sluggish
- Exhaust system blocked

P050A

Diagnosis information - DME

Idle speed control

The fault "Idle speed control" is detected when the DME cannot set the specified idle speed for a certain amount of time.

Diagnostic conditions

- Engine idling

Possible fault causes

Fault type "Over limit value"
- Secondary air behind throttle valve

Fault type "Below limit value"
- Air cleaner blocked/frozen
- Air guide between air cleaner and throttle valve blocked
- Secondary unit sluggish
- Exhaust system blocked

P050D

Diagnosis information - DME

Idle speed control

The fault "Idle speed control" is detected when the DME cannot set the specified idle speed for a certain amount of time.

Diagnostic conditions

- Engine idling

Possible fault causes

Fault type "Over limit value"
- Secondary air behind throttle valve

Fault type "Below limit value"
- Air cleaner blocked/frozen
- Air guide between air cleaner and throttle valve blocked
- Secondary unit sluggish
- Exhaust system blocked

P0513

Diagnosis information - DME

Immobiliser

Diagnostic conditions

- Ignition switched on for 5 seconds

NOTE
- The diagnostic function monitors the response of the PAS control unit.
- This fault is set if there are discrepancies in the immobiliser codes.
- The vehicle will not start.

Possible fault causes

- Incorrect immobiliser code entered in DME or PAS

P0521

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P0521

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P0521

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P0521

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P0521

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P0521

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P0522

Diagnosis information - DME

Oil pressure sensor

Diagnostic conditions

- Engine start recognised

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Oil pressure sensor faulty

P0523

Diagnosis information - DME

Oil pressure sensor

Diagnostic conditions

- Engine start recognised

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Oil pressure sensor faulty

P0524

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P0524

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P0524

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P0524

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P0545

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The DME control unit detects an excessive deviation between the calculated exhaust temperature and that measured by the exhaust temperature sensor.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Exhaust temperature sensor not installed or incorrectly installed
♦ Exhaust temperature sensor faulty

P0545

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The exhaust temperature sensor control unit indicates that it or an exhaust temperature sensor is faulty.

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Exhaust temperature sensor faulty
♦ Exhaust temperature sensor control unit faulty

P0545

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The PWM signal from the exhaust temperature sensor control unit is above or below a limit threshold .

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Loose contact or corrosion on connectors or lines between the exhaust temperature sensor control unit and DME control unit
♦ Short circuit to B+/ground/between lines or open circuit in lines between exhaust temperature sensor control unit and DME control unit
♦ Power supply for exhaust temperature sensor control unit faulty
♦ Exhaust temperature sensor faulty
♦ DME control unit faulty

P0546

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The DME control unit detects an excessive deviation between the calculated exhaust temperature and that measured by the exhaust temperature sensor.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Exhaust temperature sensor not installed or incorrectly installed
♦ Exhaust temperature sensor faulty

P0546

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The exhaust temperature sensor control unit indicates that it or an exhaust temperature sensor is faulty.

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Exhaust temperature sensor faulty
♦ Exhaust temperature sensor control unit faulty

P0546

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The PWM signal from the exhaust temperature sensor control unit is above or below a limit threshold .

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Loose contact or corrosion on connectors or lines between the exhaust temperature sensor control unit and DME control unit
♦ Short circuit to B+/ground/between lines or open circuit in lines between exhaust temperature sensor control unit and DME control unit
♦ Power supply for exhaust temperature sensor control unit faulty
♦ Exhaust temperature sensor faulty
♦ DME control unit faulty

P0548

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The DME control unit detects an excessive deviation between the calculated exhaust temperature and that measured by the exhaust temperature sensor.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Exhaust temperature sensor not installed or incorrectly installed
♦ Exhaust temperature sensor faulty

P0548

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The exhaust temperature sensor control unit indicates that it or an exhaust temperature sensor is faulty.

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Exhaust temperature sensor faulty
♦ Exhaust temperature sensor control unit faulty

P0548

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The PWM signal from the exhaust temperature sensor control unit is above or below a limit threshold .

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Loose contact or corrosion on connectors or lines between the exhaust temperature sensor control unit and DME control unit
♦ Short circuit to B+/ground/between lines or open circuit in lines between exhaust temperature sensor control unit and DME control unit
♦ Power supply for exhaust temperature sensor control unit faulty
♦ Exhaust temperature sensor faulty
♦ DME control unit faulty

P0549

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The DME control unit detects an excessive deviation between the calculated exhaust temperature and that measured by the exhaust temperature sensor.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Exhaust temperature sensor not installed or incorrectly installed
♦ Exhaust temperature sensor faulty

P0549

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The exhaust temperature sensor control unit indicates that it or an exhaust temperature sensor is faulty.

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Exhaust temperature sensor faulty
♦ Exhaust temperature sensor control unit faulty

P0549

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The PWM signal from the exhaust temperature sensor control unit is above or below a limit threshold .

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Loose contact or corrosion on connectors or lines between the exhaust temperature sensor control unit and DME control unit
♦ Short circuit to B+/ground/between lines or open circuit in lines between exhaust temperature sensor control unit and DME control unit
♦ Power supply for exhaust temperature sensor control unit faulty
♦ Exhaust temperature sensor faulty
♦ DME control unit faulty

P0560

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P0560

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P0560

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P0560

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P0560

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P0560

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P0560

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P0560

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P0562

Diagnosis information - DME

Power supply, limit value exceeded or not reached

NOTE
The fault is detected if for at least 3 s the connected current is:
- lower than 10 V (below lower limit value) or
- greater than 16 V (upper limit value exceeded).

If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- For fault type limit value exceeded and limit value not reached:
  - Time after engine starts > 240 s

- Only for fault type limit value exceeded:
  - No vehicle speed fault detected
  - Vehicle speed > 25 km/h (16 mph)

Possible fault causes

- DME control module supply voltage above limit value / below limit value
- DME control module faulty

P0563

Diagnosis information - DME

Power supply, limit value exceeded or not reached

NOTE
The fault is detected if for at least 3 s the connected current is:
- lower than 10 V (below lower limit value) or
- greater than 16 V (upper limit value exceeded).

If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- For fault type limit value exceeded and limit value not reached:
  - Time after engine starts > 240 s

- Only for fault type limit value exceeded:
  - No vehicle speed fault detected
  - Vehicle speed > 25 km/h (16 mph)

Possible fault causes

- DME control module supply voltage above limit value / below limit value
- DME control module faulty

Diagnosis information - CAN

Steering wheel electronics (CAN comfort) control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The steering wheel electronics control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored. Steering wheel electronics control module wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for steering wheel electronics control module
- Steering wheel electronics control module is incorrectly coded
- Short circuit or open circuit in the CAN comfort
- Steering wheel electronics control module faulty (in most cases the cause is not the steering wheel electronics control module but incorrect coding!)

Fault effects

- Communication via the CAN comfort is no longer possible.
- No other control modules are able to communicate with the steering wheel electronics control module.

Affected contacts on the steering wheel electronics control module connector
Connector A:

- 1 ground supply - terminal 31
- 2 power supply - terminal 30
- 8 CAN comfort low
- 9 CAN comfort high
- 13 power supply - terminal 15

P0571

Diagnosis information - DME

Brake light switch

NOTE

♦ The PSM control unit only reads in the switch states.
♦ Evaluation and diagnosis are performed in the DME (DFI) control unit.
♦ Diagnosis checks the unambiguity of the states which are output via the brake light switch.
♦ This fault is set if the state <brake actuated> or <brake not actuated> is not unambiguously detected.

Diagnostic conditions

- Ignition on
- Battery positive voltage between 10 V and 16 V

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the lines
♦ Brake light switch loose or installed at an angle
♦ Holder bent
♦ Brake light switch faulty

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0603

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P0603

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P0603

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P0603

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P0603

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P0603

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P0603

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P0603

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P0604

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P0604

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P0604

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P0604

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P0604

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P0604

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P0604

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P0604

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P0605

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P0605

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P0605

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P0605

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P0605

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P0605

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P0605

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P0605

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P0606

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P0606

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P0606

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P0606

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P0606

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P0606

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P0606

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P0606

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P0607

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P0607

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P0607

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P0607

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P0607

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P0607

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P0607

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P0607

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P0621

Diagnosis information - DME

Battery warning light

Diagnostic conditions

- Engine running
- Normal driving for 2 minutes

Possible fault causes

- Open circuit in line between generator and DME
- Short circuit to ground in line between generator and DME
- Short circuit to B+ in line between generator and DME
- Generator faulty

P0627

Diagnosis information - DME

Fuel pump relay, above limit value

Diagnostic conditions

- Control module power supply DME > 7 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0627

Diagnosis information - DME

Fuel pump relay faulty, open circuit

Diagnostic conditions

- Engine start

Possible fault causes

- Open circuit in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0627

Diagnosis information - DME control unit

Delivery rate of electric fuel pump X too low

ⓘ NOTE
The delivery rate of the specified fuel pump was detected as being too low by the lambda control and switchover between the two fuel pumps.

Diagnostic conditions

- Test drive (different load ranges)

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Fuel line constricted / leaking
- ♦ Electric fuel pump faulty

P0627

Diagnosis information - DME

Fuel pump relay, below limit value

Diagnostic conditions

- Engine start

Possible fault causes

♦ Short circuit to ground in control line (relay terminal 85)
♦ Fuel pump relay faulty
♦ DME control module faulty

P0628

Diagnosis information - DME

Fuel pump relay, above limit value

Diagnostic conditions

- Control module power supply DME > 7 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0628

Diagnosis information - DME

Fuel pump relay faulty, open circuit

Diagnostic conditions

- Engine start

Possible fault causes

- Open circuit in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0628

Diagnosis information - DME control unit

Delivery rate of electric fuel pump X too low

ⓘ **NOTE**
The delivery rate of the specified fuel pump was detected as being too low by the lambda control and switchover between the two fuel pumps.

Diagnostic conditions

- Test drive (different load ranges)

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Fuel line constricted / leaking
♦ Electric fuel pump faulty

P0628

Diagnosis information - DME

Fuel pump relay, below limit value

Diagnostic conditions

- Engine start

Possible fault causes

- Short circuit to ground in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0629

Diagnosis information - DME

Fuel pump relay, above limit value

Diagnostic conditions

- Control module power supply DME > 7 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P0629

Diagnosis information - DME

Fuel pump relay faulty, open circuit

Diagnostic conditions

- Engine start

Possible fault causes

♦ Open circuit in control line (relay terminal 85)
♦ Fuel pump relay faulty
♦ DME control module faulty

P0629

Diagnosis information - DME control unit

Delivery rate of electric fuel pump X too low

ⓘ **NOTE**
The delivery rate of the specified fuel pump was detected as being too low by the lambda control and switchover between the two fuel pumps.

Diagnostic conditions

- Test drive (different load ranges)

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Fuel line constricted / leaking
- ♦ Electric fuel pump faulty

P0629

Diagnosis information - DME

Fuel pump relay, below limit value

Diagnostic conditions

- Engine start

Possible fault causes

♦ Short circuit to ground in control line (relay terminal 85)
♦ Fuel pump relay faulty
♦ DME control module faulty

P0638

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P0638

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P0638

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P0638

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P0638

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P0645

Diagnosis information - DME

Magnetic clutch driver, below limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Magnetic clutch NOT actuated (e.g. ECO operation)

Possible fault causes

- Short circuit to ground in control line to magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P0645

Diagnosis information - DME

Magnetic clutch driver, open circuit

NOTE
The control line from the DME control module to the relay of the magnetic clutch in NOT switched-on state is monitored.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Magnetic clutch NOT actuated (e.g. ECO operation)

Possible fault causes

- Open circuit in control line to magnetic clutch relay
- Open circuit in the power supply to the magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P0645

Diagnosis information - DME

Magnetic clutch driver, above limit value

NOTE
The control line from the DME control module to the relay of the magnetic clutch is monitored in switched-on state.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Ignition on
- Magnetic clutch activated

Possible fault causes

- Short circuit to B+ in control line to magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P0646

Diagnosis information - DME

Magnetic clutch driver, below limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Magnetic clutch NOT actuated (e.g. ECO operation)

Possible fault causes

- Short circuit to ground in control line to magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P0646

Diagnosis information - DME

Magnetic clutch driver, open circuit

NOTE
The control line from the DME control module to the relay of the magnetic clutch in NOT switched-on state is monitored.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Magnetic clutch NOT actuated (e.g. ECO operation)

Possible fault causes

- Open circuit in control line to magnetic clutch relay
- Open circuit in the power supply to the magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P0646

Diagnosis information - DME

Magnetic clutch driver, above limit value

NOTE
The control line from the DME control module to the relay of the magnetic clutch is monitored in switched-on state.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Ignition on
- Magnetic clutch activated

Possible fault causes

- Short circuit to B+ in control line to magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P0647

Diagnosis information - DME

Magnetic clutch driver, below limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Magnetic clutch NOT actuated (e.g. ECO operation)

Possible fault causes

- Short circuit to ground in control line to magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P0647

Diagnosis information - DME

Magnetic clutch driver, open circuit

NOTE
The control line from the DME control module to the relay of the magnetic clutch in NOT switched-on state is monitored.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Magnetic clutch NOT actuated (e.g. ECO operation)

Possible fault causes

- Open circuit in control line to magnetic clutch relay
- Open circuit in the power supply to the magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P0647

Diagnosis information - DME

Magnetic clutch driver, above limit value

NOTE
The control line from the DME control module to the relay of the magnetic clutch is monitored in switched-on state.
The demand comes from the air conditioning control.
Approval is given in the DME control module.

Diagnostic conditions

- Supply voltage > 7 V
- Ignition on
- Magnetic clutch activated

Possible fault causes

- Short circuit to B+ in control line to magnetic clutch relay
- Relay for magnetic clutch faulty
- DME control module faulty

P064A

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Open circuit Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
- ♦ Power or ground supply faulty Fuel pump control unit
- ♦ Fuel pump control unit Faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P064A

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

♦ Short circuit to B+ Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
♦ Fuel pump control unit Faulty

P064A

Diagnosis information - DME

Fuel pump control unit

ⓘ NOTE
♦ The fuel pump control unit is controlled by the DME via a PWM signal.

Diagnostic conditions

● Engine start

Possible fault causes

♦ Short circuit to B+/ground or open circuit of the control line to the fuel pump control unit
♦ Fuel pump relay faulty (permanently closed)
♦ Fuel line clogged/blocked
♦ Electric fuel pump sluggish/blocked
♦ Fuel pump control unit faulty

P064A

Diagnosis information - Control unit DME (DFI)

Fuel pump control unit: Activation

Diagnostic conditions

- Engine start (Electric fuel pump activated)

Possible fault causes

♦ Fault in area Electric fuel pump (See ⓘ)
♦ Short circuit to ground Control lead Control unit DME (DFI) ⇒ Fuel pump control unit
♦ Fuel pump control unit Faulty

ⓘ INFORMATION

♦ If the fuel pump control unit detects an external or internal fault, it connects the control line to ground for a certain time.
♦ This short circuit to ground is recognised as the fault type >>Below limit value<<, just like an actual short circuit to ground of the control line.

P0650

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0660

Diagnosis information - DME

Electric tuning flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to tuning flap solenoid valve
- Tuning flap solenoid valve faulty
- DME control module faulty

P0661

Diagnosis information - DME

Electric tuning flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to tuning flap solenoid valve
- Tuning flap solenoid valve faulty
- DME control module faulty

P0662

Diagnosis information - DME

Electric tuning flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to tuning flap solenoid valve
- Tuning flap solenoid valve faulty
- DME control module faulty

P0663

Diagnosis information - DME

Electric distributor pipe flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to distributor pipe flap solenoid valve
- Distributor pipe flap solenoid valve faulty
- DME control module faulty

P0664

Diagnosis information - DME

Electric distributor pipe flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to distributor pipe flap solenoid valve
- Distributor pipe flap solenoid valve faulty
- DME control module faulty

P0665

Diagnosis information - DME

Electric distributor pipe flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to distributor pipe flap solenoid valve
- Distributor pipe flap solenoid valve faulty
- DME control module faulty

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0705

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

Diagnosis information - Tiptronic

Starter locking contact/ATF temperature sensor

ⓘ **NOTE**
The ATF temperature sensors are housed in the electrical part of the hydraulic control unit. If the component is faulty, the complete electrical part of the hydraulic control unit must be replaced.
The ATF temperature sensor and the starter locking contact are connected in series, this means:

♦ fault can be deleted only in positions D and R;
♦ current ATF temperature can be read out under actual values only in positions D and R;
♦ in position P or N, the last ATF temperature measured (in position D or R) is displayed under actual values.
If a fault is detected:
♦ when the maximal temperature of 148° C is exceeded the DME control module is given the command to reduce power;

Diagnostic conditions:

- Ignition on
- ATF level OK
- Selector lever in position D or R

Possible fault causes:

♦ ATF level too low
♦ ATF temperature > 148 °C
♦ ATF temperature sensor faulty
♦ Tiptronic control module faulty

Diagnosis information - Tiptronic

ATF temperature sensor

NOTE
The ATF temperature sensor is accommodated in the wiring harness of the hydraulic control unit. If the component is faulty, the complete wiring harness of the hydraulic control unit must be replaced.
If a fault is detected, a substitute value of 80 °C (176 °F) is used.

Diagnostic conditions:

- Ignition on
- ATF level OK

Possible fault causes:

- ATF level too low
- ATF temperature < -50 °C (-58 °F) or > 170 °C (338 °F)
- Short circuit to B+/ground / between lines or open circuit
- ATF temperature sensor faulty
- Tiptronic control module faulty

P0712

Diagnosis information - Tiptronic

ATF temperature sensor, implausible state

NOTE
The fault is detected when the ATF temperature for specific boundary conditions (start temperature, vehicle speed, etc.) within a time window:
- rises less than 3 degrees Celsius,

or
- rises more than 10 degrees Celsius.

Diagnostic conditions:

- No electric fault for ATF temperature sensor detected
- ATF level OK
- Cold starting
- Test drive (with transmission output speed > 800 rpm)

Possible fault causes:

- ATF level too low
- ATF cooling faulty
- ATF temperature sensor faulty
- Control module faulty

Fault reaction:

- The engine temperature is accepted as a substitute value.

P0712

Diagnosis information - Tiptronic

ATF temperature sensor, electric fault

NOTE
The fault is detected when the sensor voltage:
- > 4.5 V (short circuit to B+ or open circuit),
- 2.3 ... 2.7 V (--- / short circuit to sensor / short circuit between wires)
- < 0.5 V (short circuit to ground)

The ATF temperature sensor is accommodated in the wiring harness of the hydraulic control unit. If the component is faulty, the complete wiring harness of the hydraulic control unit must be replaced.

Diagnostic conditions:

- Switch on ignition (if necessary, switch off first)
- Internal function test completed

Possible fault causes:

- Short circuit to B+/ground/between lines or open circuit
- ATF temperature sensor faulty
- Tiptronic control module faulty

Fault reaction:

- The engine temperature is accepted as a substitute value.

P0712

Diagnosis information - DME control unit

Transmission oil temperature

ⓘ **NOTE**
Nominal values:
♦ 60 °C = 2.8 ... 3.5 kΩ
♦ 80 °C = 1.0 ... 1.3 kΩ
♦ 120 °C = 0.4 ... 0.6 kΩ

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Temperature sensor for transmission oil faulty
♦ DME control unit faulty

P0713

Diagnosis information - Tiptronic

Starter locking contact/ATF temperature sensor

ⓘ **NOTE**
The ATF temperature sensors are housed in the electrical part of the hydraulic control unit. If the component is faulty, the complete electrical part of the hydraulic control unit must be replaced.
The ATF temperature sensor and the starter locking contact are connected in series, this means:

♦ fault can be deleted only in positions D and R;
♦ current ATF temperature can be read out under actual values only in positions D and R;
♦ in position P or N, the last ATF temperature measured (in position D or R) is displayed under actual values.
If a fault is detected:
♦ when the maximal temperature of 148° C is exceeded the DME control module is given the command to reduce power;

Diagnostic conditions:

- Ignition on
- ATF level OK
- Selector lever in position D or R

Possible fault causes:

♦ ATF level too low
♦ ATF temperature > 148 °C
♦ ATF temperature sensor faulty
♦ Tiptronic control module faulty

P0713

Diagnosis information - Tiptronic

ATF temperature sensor

NOTE
The ATF temperature sensor is accommodated in the wiring harness of the hydraulic control unit. If the component is faulty, the complete wiring harness of the hydraulic control unit must be replaced.
If a fault is detected, a substitute value of 80 °C (176 °F) is used.

Diagnostic conditions:

- Ignition on
- ATF level OK

Possible fault causes:

- ATF level too low
- ATF temperature < -50 °C (-58 °F) or > 170 °C (338 °F)
- Short circuit to B+/ground / between lines or open circuit
- ATF temperature sensor faulty
- Tiptronic control module faulty

P0713

Diagnosis information - Tiptronic

ATF temperature sensor, implausible state

NOTE
The fault is detected when the ATF temperature for specific boundary conditions (start temperature, vehicle speed, etc.) within a time window:
- rises less than 3 degrees Celsius,

or
- rises more than 10 degrees Celsius.

Diagnostic conditions:

- No electric fault for ATF temperature sensor detected
- ATF level OK
- Cold starting
- Test drive (with transmission output speed > 800 rpm)

Possible fault causes:

- ATF level too low
- ATF cooling faulty
- ATF temperature sensor faulty
- Control module faulty

Fault reaction:

- The engine temperature is accepted as a substitute value.

P0713

Diagnosis information - Tiptronic

ATF temperature sensor, electric fault

NOTE
The fault is detected when the sensor voltage:
- > 4.5 V (short circuit to B+ or open circuit),
- 2.3 ... 2.7 V (--- / short circuit to sensor / short circuit between wires)
- < 0.5 V (short circuit to ground)

The ATF temperature sensor is accommodated in the wiring harness of the hydraulic control unit. If the component is faulty, the complete wiring harness of the hydraulic control unit must be replaced.

Diagnostic conditions:

- Switch on ignition (if necessary, switch off first)
- Internal function test completed

Possible fault causes:

- Short circuit to B+/ground/between lines or open circuit
- ATF temperature sensor faulty
- Tiptronic control module faulty

Fault reaction:

- The engine temperature is accepted as a substitute value.

P0713

Diagnosis information - DME control unit

Transmission oil temperature

ⓘ **NOTE**
Nominal values:
♦ 60 °C = 2.8 ... 3.5 kΩ
♦ 80 °C = 1.0 ... 1.3 kΩ
♦ 120 °C = 0.4 ... 0.6 kΩ

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Temperature sensor for transmission oil faulty
♦ DME control unit faulty

P0715

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0730

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0740

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0743

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0748

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0753

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0758

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0763

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0778

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P0830

Diagnosis information - DME

Clutch switch

Diagnostic conditions

- Normal driving with several gear changes

NOTE
- The diagnostic function monitors whether a signal arrives from the clutch switch during gear changes. The fault is stored when it is recognised that a certain number of gear changes have taken place without a signal being received from the clutch switch.
- The signal from the clutch switch comes from the instrument cluster via the CAN. This fault is not recognised there.

Fault effect:
- When this fault is set, the cruise control will not function and drivability will be restricted.

Possible fault causes

- Car is driven without actuating the clutch
- Clutch switch faulty
- Open circuit in the voltage supply of the clutch switch
- Open circuit in the line between the clutch switch and instrument cluster
- Instrument cluster faulty

P1041

Diagnosis information - DME

Electric air cleaner flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to air cleaner flap solenoid valve
- Air cleaner flap solenoid valve faulty
- DME control module faulty

P1042

Diagnosis information - DME

Electric air cleaner flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to air cleaner flap solenoid valve
- Air cleaner flap solenoid valve faulty
- DME control module faulty

P1043

Diagnosis information - DME

Electric air cleaner flap

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine running > 10 s

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to air cleaner flap solenoid valve
- Air cleaner flap solenoid valve faulty
- DME control module faulty

P1084

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ NOTE
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1084

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1084

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1084

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1084

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ **NOTE**
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1084

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
♦ Turbocharger sluggish / jammed

P1084

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1084

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1085

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ NOTE
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1085

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1085

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1085

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1085

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ NOTE
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1085

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
♦ Turbocharger sluggish / jammed

P1085

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1085

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1086

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ NOTE
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1086

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1086

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1086

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1086

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ **NOTE**
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1086

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
- ♦ Electronic adjuster for turbocharger sluggish / faulty
- ♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
- ♦ Turbocharger sluggish / jammed

P1086

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1086

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1090

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1090

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1090

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

P1091

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1091

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1091

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1091

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1092

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1092

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1092

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

P1093

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1093

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1093

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1093

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

P1095

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1095

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1095

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1095

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

P1096

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1096

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start
- No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1096

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1096

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

P1097

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1097

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start
- No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1097

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1097

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

P1098

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1098

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1098

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1098

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

P1099

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1099

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

P1099

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

Function description - DME

Diagnosis of plausibility of MAF sensor signal

- The measured value supplied by the MAF sensor is compared to a value from a map. This map is determined by engine speed, throttle valve position, ambient pressure and intake air temperature.
- The mass air flow upstream of the throttle valve is identified as implausible if the measured value deviates too greatly from the map.
- If the switching cups stick on a small stroke on one or both banks (e.g., oil duct blocked), the MAF sensor can also be detected as faulty. This is because the expected increase in the air-flow rate does not occur.
- The monitoring of electrical faults (open circuit, short circuit) takes place in a separate diagnosis.

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too high)

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start
- No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

NOTE

♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

Diagnosis information - DME

Mass air flow ahead of throttle valve implausible (too low)

Diagnostic conditions

● Supply voltage 10 V ... 16 V
● Engine start
● No faults detected for throttle valve adjusting unit, ambient pressure sensor, intake temperature sensor, speed sensor

ⓘ **NOTE**
♦ In this context, please also observe the function description.

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Clogged air cleaner
♦ Leakage between hot-film mass air flow sensor and throttle valve adjusting unit
♦ Throttle valve stiff or heavily soiled
♦ One or both cylinder banks gets stuck in the small valve lift
♦ DME control unit faulty (ambient pressure sensor at fault detection threshold)

Diagnosis information - DME

Hot-film mass air flow meter - above/below limit value

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in sensor line to hot-film mass air flow meter
- Open circuit in power supply line (12V), ground supply line or sensor power supply line (5V) to the hot-film mass air flow meter
- Hot-film mass air flow meter faulty
- DME control module faulty

P1107

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P1143

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P1147

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1147

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1147

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1147

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1147

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1147

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1147

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1148

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1148

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1148

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1148

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1148

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1148

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1149

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1149

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1149

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1149

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1149

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1149

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1149

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1150

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1150

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1150

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1150

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1151

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1151

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1151

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1151

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1151

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1151

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1151

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1152

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1152

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1152

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1152

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1152

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1152

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1152

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1153

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1153

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1153

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1153

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1153

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1153

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1153

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1157

Diagnosis information - DME

Engine compartment temperature sensor - electric fault

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+/ground or open circuit in the signal line
- Open circuit in ground supply to engine compartment temperature sensor
- Engine compartment temperature sensor faulty
- DME control module faulty

P1158

Diagnosis information - DME

Engine compartment temperature sensor - electric fault

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Short circuit to B+/ground or open circuit in the signal line
- Open circuit in ground supply to engine compartment temperature sensor
- Engine compartment temperature sensor faulty
- DME control module faulty

P1161

Diagnosis information - DME

Oil pressure sensor

Diagnostic conditions

- Power supply voltage > 7 V
- Engine temperature > 80° C
- Engine speed one after the other for at least 10 s each:
  - > 4000 rpm
  - < 720 rpm
  - Engine is not running (0 rpm) and ignition on

Possible fault causes

- Short circuit to B+/ground or open circuit in the signal line
- Oil pressure sensor faulty
- DME control module faulty

P1162

Diagnosis information - DME

Oil pressure sensor

Diagnostic conditions

- Power supply voltage > 7 V
- Engine temperature > 80° C
- Engine speed one after the other for at least 10 s each:
  - ♦ > 4000 rpm
  - ♦ < 720 rpm
  - ♦ Engine is not running (0 rpm) and ignition on

Possible fault causes

- ♦ Short circuit to B+/ground or open circuit in the signal line
- ♦ Oil pressure sensor faulty
- ♦ DME control module faulty

P1163

Diagnosis information - DME

Oil pressure switch, below limit value

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine speed > 2520 rpm for at least 4 s

Possible fault causes

- There is no oil pressure
- Short circuit to B+ or ground in the signal line
- Oil pressure switch faulty
- DME control module faulty

P1163

Diagnosis information - DME

Oil pressure switch, above limit value

Diagnostic conditions

- Power supply voltage > 7 V
- Engine is not running (0 rpm) + ignition on for at least 60 s

Possible fault causes

- Short circuit to B+ or open circuit in the signal line
- Oil pressure switch faulty
- DME control module faulty

P1163

Diagnosis information - DME

Oil pressure switch, above limit value

Diagnostic conditions

- Power supply voltage > 7 V
- Engine is not running (0 rpm) + ignition on for at least 60 s

Possible fault causes

- Short circuit to B+ or open circuit in the signal line
- Oil pressure switch faulty
- DME control module faulty

P1163

Diagnosis information - DME

Oil pressure switch, below limit value

Diagnostic conditions

- Power supply voltage > 7 V
- Engine start-up and subsequent engine speed > 2520 rpm for at least 4 s

Possible fault causes

- There is no oil pressure
- Short circuit to B+ or ground in the signal line
- Oil pressure switch faulty
- DME control module faulty

P1164

Diagnosis information - DME

Oil pressure sensor

Diagnostic conditions

- Power supply voltage > 7 V
- Engine temperature > 80° C
- Engine speed one after the other for at least 10 s each:
  - > 4000 rpm
  - < 720 rpm
  - Engine is not running (0 rpm) and ignition on

Possible fault causes

- Short circuit to B+/ground or open circuit in the signal line
- Oil pressure sensor faulty
- DME control module faulty

P1165

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1165

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1165

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1165

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1165

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ **NOTE**
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1165

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
♦ Turbocharger sluggish / jammed

P1165

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1165

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1166

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ NOTE
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1166

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1166

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1166

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1166

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ **NOTE**
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:
D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1166

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
- ♦ Electronic adjuster for turbocharger sluggish / faulty
- ♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
- ♦ Turbocharger sluggish / jammed

P1166

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1166

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1167

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ NOTE
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1167

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1167

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1167

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1167

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ NOTE
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1167

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
- ♦ Electronic adjuster for turbocharger sluggish / faulty
- ♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
- ♦ Turbocharger sluggish / jammed

P1167

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1167

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1175

Diagnosis information - DME

Intake air temperature sensor, over limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s

Possible fault causes

- Short circuit to ground in signal wire
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P1175

Diagnosis information - DME

Intake air temperature sensor, below limit value

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine running
- Time after engine starts > 25 s
- No fault in ambient temperature sensor (via CAN)

Possible fault causes

- Short circuit to B+ in signal wire
- open circuit in the signal leads
- Intake air temperature sensor (in the hot-film mass air flow meter) faulty
- DME control module faulty

P1175

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too low)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Previous engine switch-off temperature > 40 °C
- Engine temperature has cooled off by > 20K before restart
- Engine starting temperature -35 °C … 70 °C
- Time after engine starts > 2 s
- No fault detected for ambient temperature sensor (via CAN)

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P1175

Diagnosis information - DME

Intake air temperature sensor - signal implausible (too high)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 52 … 300 kg/h

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P1175

Diagnosis information - DME

intake air temperature sensor - signal implausible (signal remains at fixed value)

NOTE
If a fault is detected, a substitute value of 60 °C is used.

Diagnostic conditions

- Engine starting temperature < 81 °C
- Engine temperature > 70 °C
- Vehicle speed > 35 km/h
- Mass air flow via hot-film mass air flow meter 40 … 300 kg/h
- No idling, no thrust shutdown
- No fault detected for ambient temperature sensor (via CAN)
- No fault detected for vehicle speed sensor

Possible fault causes

- Intake air temperature sensor faulty (in the hot-film mass air flow meter)

P1251

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1251

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1251

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1251

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1251

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ **NOTE**
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:
D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1251

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
♦ Turbocharger sluggish / jammed

P1251

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1251

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - Switch off ignition
  - Switch on ignition

Possible fault causes

- Short circuit to B+/ground/between lines or open circuit in the lines
- Power or ground supply faulty
- Electronic adjuster for turbocharger faulty
- DME control unit faulty

P1252

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ NOTE
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1252

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1252

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1252

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1252

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ **NOTE**
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1252

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
- ♦ Electronic adjuster for turbocharger sluggish / faulty
- ♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
- ♦ Turbocharger sluggish / jammed

P1252

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1252

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1253

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ NOTE
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1253

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1253

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1253

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1253

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ NOTE
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1253

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
- ♦ Electronic adjuster for turbocharger sluggish / faulty
- ♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
- ♦ Turbocharger sluggish / jammed

P1253

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1253

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1254

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1254

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1254

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1254

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1254

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ **NOTE**
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1254

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
♦ Turbocharger sluggish / jammed

P1254

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1254

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1261

Diagnosis information - DME control unit

Boost pressure adjuster temperature, bank X

ⓘ NOTE
The electronic adjuster indicates that the temperature threshold of 135 °C has been exceeded.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Distance between engine and electronic adjuster for turbocharger is too small

P1261

Diagnosis information - DME control unit

Signal to boost pressure adjuster bank X faulty

ⓘ **NOTE**
The electronic adjuster indicates that the signal from the DME control unit is faulty (frequency, period, ...). It is not used by the electronic adjuster.

Diagnostic conditions

- Engine running, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1261

Diagnosis information - DME control unit

Boost pressure adjuster output stage, bank X

Diagnostic conditions

- Ignition on

Possible fault causes

♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Electronic adjuster for turbocharger faulty
♦ DME control unit faulty

P1261

Diagnosis information - DME control unit

Boost pressure adjuster, bank X, not adapted

Diagnostic conditions

- Ignition on, then:
- switch off ignition
- switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger not adapted

P1261

Diagnosis information - DME control unit

Boost pressure adjuster bank X sluggish

ⓘ **NOTE**
The electronic adjuster indicates that the current position deviates from the requested position by min 2.5° for more than 2 s.

Diagnostic conditions

- Test drive (different load ranges), then:

D Switch off ignition
D Switch on ignition

Possible fault causes

♦ Electronic adjuster for turbocharger sluggish / faulty
♦ Connecting rod electronic adjuster for turbocharger / turbocharger is sluggish / blocked
♦ Turbocharger sluggish / blocked

P1261

Diagnosis information - DME control unit

Boost pressure adjuster adjustment range, bank X

ⓘ **NOTE**
The electronic adjuster indicates that the current adjustment range of the boost pressure adjuster deviates from the adjustment range taught during the teaching process (is exceeded or not reached).

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Electronic adjuster for turbocharger taught incorrectly (new turbocharger?)
- ♦ Electronic adjuster for turbocharger sluggish / faulty
- ♦ Connecting rod electronic adjuster for turbocharger / turbocharger is broken / detached or blocked
- ♦ Turbocharger sluggish / jammed

P1261

Diagnosis information - DME control unit

Signal from boost pressure adjuster bank X faulty

ⓘ **NOTE**
The feedback signal from the electronic adjuster is faulty (frequency, period, ...). It is not used by the DME control unit.

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1261

Diagnosis information - DME control unit

Electrical fault in boost pressure adjuster bank X

Diagnostic conditions

- Ignition on, then:
  - D Switch off ignition
  - D Switch on ignition

Possible fault causes

- ♦ Short circuit to B+/ground/between lines or open circuit in the lines
- ♦ Power or ground supply faulty
- ♦ Electronic adjuster for turbocharger faulty
- ♦ DME control unit faulty

P1265

Diagnosis information - POSIP

Crash output

Diagnostic conditions:

- Ignition on
- Internal function test completed

Possible fault causes:

- Short circuit to B+/ground or open circuit in the line
- DME control module faulty
- POSIP triggering unit faulty

P1266

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1266

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1266

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1266

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1266

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P1266

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1266

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- ♦ Ambient pressure sensor (DME control unit) faulty

P1266

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1346

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1346

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1346

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1346

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1347

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1347

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1347

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1347

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1347

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - Engine idle speed > 15 s
  - Full-load acceleration (2nd gear)
  - Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - Full-load acceleration (2nd gear)
  - Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1350

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1350

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1350

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1350

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1351

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1351

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1351

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1351

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1352

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1352

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1352

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1352

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1353

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1353

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1353

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1353

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

P1354

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1354

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1354

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1354

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1354

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - Engine idle speed > 15 s
  - Full-load acceleration (2nd gear)
  - Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - Full-load acceleration (2nd gear)
  - Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1355

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1355

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1355

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1355

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - Engine idle speed > 15 s
  - Full-load acceleration (2nd gear)
  - Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - Full-load acceleration (2nd gear)
  - Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1356

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1356

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1356

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1356

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1359

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1359

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1359

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1359

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1360

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1360

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1360

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1361

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1361

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1361

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1361

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1362

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1362

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1362

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1362

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - Engine idle speed > 15 s
  - Full-load acceleration (2nd gear)
  - Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - Full-load acceleration (2nd gear)
  - Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1363

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1363

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1363

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1363

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1364

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1364

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1364

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1364

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1371

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1371

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1371

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1371

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1372

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1372

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1372

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1372

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1373

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1373

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1373

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1373

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1374

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1374

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1374

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1374

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1381

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1381

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1381

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1381

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1382

Diagnosis information - DME

Valve lift control, below limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- Valve(s) of a cylinder stay jammed on small stroke
- Valves of different cylinders stay jammed on small stroke (parity check error)

⇒ Please read the information at the beginning of the document!

Diagnosis information - DME

Valve lift control

ⓘ **NOTE:**

● Valves of a bank are stuck in the wrong lift

⚠ Delete the fault memory and perform the valve lift short test. Bank 1 is faulty if fault P1381 is set **after the short test**, and bank 2 is faulty if fault P1382 is set

► The faults P1381 and P1382 do not indicate which bank is in the wrong lift before the short test (driving)

Diagnostic conditions

● Large lift = engine speed in all gears > 4000 rpm
● Oil temperature < 130 °C (266 °F)

Possible fault causes

♦ Faulty solenoid hydraulic valve for valve lift control (VTC)
♦ Faulty activation by DME control unit
♦ Faulty power supply of valve lift control (fuse)
♦ Faulty hydraulic connection to valve lift control

P1382

Diagnosis information - DME

Valve lift control parity check error, implausible signal

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine at idle speed and then full-load acceleration in 2nd gear

Possible fault causes

- In at least one cylinder, the valves jam on a small stroke
and
- in at least one cylinder, the valves jam on a large stroke.

⇒ Please read the information at the beginning of the document!

P1382

Diagnosis information - DME

Valve lift control, above limit value

NOTE: EXTREMELY IMPORTANT TO OBSERVE!

- For this diagnostic, the cylinder preceding in the firing order can also be affected.

- If misfires are entered simultaneously (P0300 to P0306), these must be worked through first.

- If only valve lift errors are entered, please also check the cylinders preceding in the firing order.

- **Example:** If the valve lift error for cylinder 4 (bank 2) is entered, the mechanism of the valve lift switching of cylinder 2 (bank 1) is also to be checked (firing order: 1-6-2-4-3-5).

- Valve lift error detected via evaluation of rough running, similar to detecting misfiring.

- Parity check errors during valve lift control only entered together with cylinder-specific faults.

Diagnostic conditions

- Engine idling

Possible fault causes

- Valve(s) of a cylinder stay jammed in large stroke
- Valves of different cylinders stay jammed in large stroke (parity check error)

⇒ Please read the information at the beginning of the document!

P1382

Diagnosis information - DME control unit

Valve lift control after cold start bank X

Diagnostic conditions

- Cold start (engine oil temperature - 12 °C ... + 60 °C), then:
  - D Engine idle speed > 15 s
  - D Full-load acceleration (2nd gear)
  - D Warm running (engine oil temperature + 60 °C ...+ 80 °C)
  - D Full-load acceleration (2nd gear)
  - D Engine idle speed > 15 s
- Time since engine start > 10 minutes

Possible fault causes

♦ The valves of the specified bank are stuck in small or large lift travel

P1385

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1385

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1385

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1385

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1385

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P1385

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1385

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P1385

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1386

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1386

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1386

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1386

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1386

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P1386

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1386

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P1386

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1480

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, heater driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in heater control line for DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P1480

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, pump driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground of control line to pump motor of DTML module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P1480

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, valve driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in control line to change-over valve of DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P1481

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, heater driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in heater control line for DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P1481

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, pump driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground of control line to pump motor of DTML module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P1481

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, valve driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in control line to change-over valve of DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P1482

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, heater driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in heater control line for DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P1482

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, pump driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground of control line to pump motor of DTML module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P1482

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, valve driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in control line to change-over valve of DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P1484

Diagnosis information - DME

DMTL - Tank leakage diagnosis module

ⓘ NOTE
In this context, please also observe the document >>Function description<<.

Diagnostic conditions

ⓘ NOTE
♦ The diagnostic conditions can also be produced with the PIWIS Tester via the short test >> Tank leakage test<<.
♦ The ignition must be switched off after the start of the test.

● Short test

or:
● Vehicle speed = 0 km/h
● Engine speed = 0 rpm
● Altitude correction factor > 0.73
● When the engine is started, the coolant temperature may be only 6.8 K above the ambient temperature
● Coolant temperature when engine starts > 3.8 °C (38.8 °F)
● Time that the engine must have been running for before the ignition is switched off > 20 minutes
● Ignition switched off for at least 10 seconds
● Ambient temperature 4 ... 35.3 °C (39.2 ... 95.5 °F)
● Carbon canister loading < 3 for very fine leak
● Fuel level 10 ... 54 litres
● Battery positive voltage 11,02 ... 14.5 V
● No refuelling process
● No fault for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
● No driver fault for DMTL pump motor, DMTL change-over valves and tank vent
● No fault for tank vent (flow)

Possible fault causes

♦ Wrong data version in the control unit (also if DMTL tank leakage diagnosis module was replaced)
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

Diagnosis information - DME

DMTL - Tank leak diagnosis module

ⓘ NOTE
In this context, please also observe the document >>Function description<<.

Diagnostic conditions

ⓘ NOTE
♦ The diagnostic conditions can also be produced with the PIWIS Tester via the short test >> Tank leak test<<.
♦ The ignition must be switched off after the start of the test.

● Short test

or:
● Vehicle speed = 0 km/h
● Engine speed = 0 rpm
● Altitude correction factor > 0.73
● When the engine is started, the coolant temperature may be only 6.8 K above the ambient temperature
● Coolant temperature when engine starts > 3.8 °C (38.8 °F)
● Time that the engine must have been running for before the ignition is switched off > 20 minutes
● Ignition switched off for at least 10 seconds
● Ambient temperature 4 ... 35.3 °C (39.2 ... 95.5 °F)
● Carbon canister loading < 3 for very fine leak
● Fuel level 10 ... 54 litres
● Battery positive voltage 11.02 ... 14.5 V
● No refuelling process
● No fault for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
● No driver fault for DMTL pump motor, DMTL change-over valves and tank vent
● No fault for tank vent (flow)

Possible fault causes

♦ DMTL - Tank leak diagnosis module faulty

P1485

Diagnosis information - DME

DMTL - Tank leakage diagnosis module

ⓘ NOTE
In this context, please also observe the document >>Function description<<.

Diagnostic conditions

ⓘ NOTE
♦ The diagnostic conditions can also be produced with the PIWIS Tester via the short test >> Tank leakage test<<.
♦ The ignition must be switched off after the start of the test.

● Short test

or:
● Vehicle speed = 0 km/h
● Engine speed = 0 rpm
● Altitude correction factor > 0.73
● When the engine is started, the coolant temperature may be only 6.8 K above the ambient temperature
● Coolant temperature when engine starts > 3.8 °C (38.8 °F)
● Time that the engine must have been running for before the ignition is switched off > 20 minutes
● Ignition switched off for at least 10 seconds
● Ambient temperature 4 ... 35.3 °C (39.2 ... 95.5 °F)
● Carbon canister loading < 3 for very fine leak
● Fuel level 10 ... 54 litres
● Battery positive voltage 11,02 ... 14.5 V
● No refuelling process
● No fault for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
● No driver fault for DMTL pump motor, DMTL change-over valves and tank vent
● No fault for tank vent (flow)

Possible fault causes

♦ Wrong data version in the control unit (also if DMTL tank leakage diagnosis module was replaced)
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P1485

Diagnosis information - DME

DMTL - Tank leak diagnosis module

ⓘ NOTE
In this context, please also observe the document >>Function description<<.

Diagnostic conditions

ⓘ NOTE
♦ The diagnostic conditions can also be produced with the PIWIS Tester via the short test >> Tank leak test<<.
♦ The ignition must be switched off after the start of the test.

● Short test

or:
● Vehicle speed = 0 km/h
● Engine speed = 0 rpm
● Altitude correction factor > 0.73
● When the engine is started, the coolant temperature may be only 6.8 K above the ambient temperature
● Coolant temperature when engine starts > 3.8 °C (38.8 °F)
● Time that the engine must have been running for before the ignition is switched off > 20 minutes
● Ignition switched off for at least 10 seconds
● Ambient temperature 4 ... 35.3 °C (39.2 ... 95.5 °F)
● Carbon canister loading < 3 for very fine leak
● Fuel level 10 ... 54 litres
● Battery positive voltage 11.02 ... 14.5 V
● No refuelling process
● No fault for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
● No driver fault for DMTL pump motor, DMTL change-over valves and tank vent
● No fault for tank vent (flow)

Possible fault causes

♦ DMTL - Tank leak diagnosis module faulty

P1486

Diagnosis information - DME

DMTL - Tank leakage diagnosis module

ⓘ NOTE
In this context, please also observe the document >>Function description<<.

Diagnostic conditions

ⓘ NOTE
♦ The diagnostic conditions can also be produced with the PIWIS Tester via the short test >> Tank leakage test<<.
♦ The ignition must be switched off after the start of the test.

● Short test

or:
● Vehicle speed = 0 km/h
● Engine speed = 0 rpm
● Altitude correction factor > 0.73
● When the engine is started, the coolant temperature may be only 6.8 K above the ambient temperature
● Coolant temperature when engine starts > 3.8 °C (38.8 °F)
● Time that the engine must have been running for before the ignition is switched off > 20 minutes
● Ignition switched off for at least 10 seconds
● Ambient temperature 4 ... 35.3 °C (39.2 ... 95.5 °F)
● Carbon canister loading < 3 for very fine leak
● Fuel level 10 ... 54 litres
● Battery positive voltage 11,02 ... 14.5 V
● No refuelling process
● No fault for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
● No driver fault for DMTL pump motor, DMTL change-over valves and tank vent
● No fault for tank vent (flow)

Possible fault causes

♦ Wrong data version in the control unit (also if DMTL tank leakage diagnosis module was replaced)
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P1486

Diagnosis information - DME

DMTL - Tank leak diagnosis module

ⓘ NOTE
In this context, please also observe the document >>Function description<<.

Diagnostic conditions

ⓘ NOTE
♦ The diagnostic conditions can also be produced with the PIWIS Tester via the short test >> Tank leak test<<.
♦ The ignition must be switched off after the start of the test.

● Short test

or:
● Vehicle speed = 0 km/h
● Engine speed = 0 rpm
● Altitude correction factor > 0.73
● When the engine is started, the coolant temperature may be only 6.8 K above the ambient temperature
● Coolant temperature when engine starts > 3.8 °C (38.8 °F)
● Time that the engine must have been running for before the ignition is switched off > 20 minutes
● Ignition switched off for at least 10 seconds
● Ambient temperature 4 ... 35.3 °C (39.2 ... 95.5 °F)
● Carbon canister loading < 3 for very fine leak
● Fuel level 10 ... 54 litres
● Battery positive voltage 11.02 ... 14.5 V
● No refuelling process
● No fault for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
● No driver fault for DMTL pump motor, DMTL change-over valves and tank vent
● No fault for tank vent (flow)

Possible fault causes

♦ DMTL - Tank leak diagnosis module faulty

P1487

Diagnosis information - DME

DMTL - Tank leakage diagnosis module

ⓘ NOTE
In this context, please also observe the document >>Function description<<.

Diagnostic conditions

ⓘ NOTE
♦ The diagnostic conditions can also be produced with the PIWIS Tester via the short test >> Tank leakage test<<.
♦ The ignition must be switched off after the start of the test.

● Short test

or:
● Vehicle speed = 0 km/h
● Engine speed = 0 rpm
● Altitude correction factor > 0.73
● When the engine is started, the coolant temperature may be only 6.8 K above the ambient temperature
● Coolant temperature when engine starts > 3.8 °C (38.8 °F)
● Time that the engine must have been running for before the ignition is switched off > 20 minutes
● Ignition switched off for at least 10 seconds
● Ambient temperature 4 ... 35.3 °C (39.2 ... 95.5 °F)
● Carbon canister loading < 3 for very fine leak
● Fuel level 10 ... 54 litres
● Battery positive voltage 11,02 ... 14.5 V
● No refuelling process
● No fault for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
● No driver fault for DMTL pump motor, DMTL change-over valves and tank vent
● No fault for tank vent (flow)

Possible fault causes

♦ Wrong data version in the control unit (also if DMTL tank leakage diagnosis module was replaced)
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P1487

Diagnosis information - DME

DMTL - Tank leak diagnosis module

ⓘ NOTE
In this context, please also observe the document >>Function description<<.

Diagnostic conditions

ⓘ NOTE
♦ The diagnostic conditions can also be produced with the PIWIS Tester via the short test >> Tank leak test<<.
♦ The ignition must be switched off after the start of the test.

● Short test

or:
● Vehicle speed = 0 km/h
● Engine speed = 0 rpm
● Altitude correction factor > 0.73
● When the engine is started, the coolant temperature may be only 6.8 K above the ambient temperature
● Coolant temperature when engine starts > 3.8 °C (38.8 °F)
● Time that the engine must have been running for before the ignition is switched off > 20 minutes
● Ignition switched off for at least 10 seconds
● Ambient temperature 4 ... 35.3 °C (39.2 ... 95.5 °F)
● Carbon canister loading < 3 for very fine leak
● Fuel level 10 ... 54 litres
● Battery positive voltage 11.02 ... 14.5 V
● No refuelling process
● No fault for ambient pressure sensor, coolant temperature sensor, vehicle speed sensor
● No driver fault for DMTL pump motor, DMTL change-over valves and tank vent
● No fault for tank vent (flow)

Possible fault causes

♦ DMTL - Tank leak diagnosis module faulty

P1504

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P1504

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P1504

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P1504

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P1504

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P1507

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1507

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1507

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1507

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1507

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P1507

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1507

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- ♦ Ambient pressure sensor (DME control unit) faulty

P1507

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1508

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1508

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1508

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1508

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1508

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P1508

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1508

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P1508

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1509

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1509

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1509

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1509

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1509

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P1509

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1509

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- ♦ Ambient pressure sensor (DME control unit) faulty

P1509

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1511

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P1511

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P1511

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P1511

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P1511

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P1514

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P1514

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P1514

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P1514

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P1514

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P1517

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P1517

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P1517

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P1517

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P1517

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P1522

Diagnosis information - DME

Fuel pump relay, above limit value

Diagnostic conditions

- Control module power supply DME > 7 V
- Engine running

Possible fault causes

- Short circuit to B+ in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P1522

Diagnosis information - DME

Fuel pump relay faulty, open circuit

Diagnostic conditions

- Engine start

Possible fault causes

- Open circuit in control line (relay terminal 85)
- Fuel pump relay faulty
- DME control module faulty

P1522

Diagnosis information - DME control unit

Delivery rate of electric fuel pump X too low

ⓘ NOTE
The delivery rate of the specified fuel pump was detected as being too low by the lambda control and switchover between the two fuel pumps.

Diagnostic conditions

- Test drive (different load ranges)

Possible fault causes

- ♦ Loose contact or corrosion on connectors or lines
- ♦ Fuel line constricted / leaking
- ♦ Electric fuel pump faulty

P1522

Diagnosis information - DME

Fuel pump relay, below limit value

Diagnostic conditions

- Engine start

Possible fault causes

♦ Short circuit to ground in control line (relay terminal 85)
♦ Fuel pump relay faulty
♦ DME control module faulty

Diagnosis information - DME

Time information via CAN missing or implausible

ⓘ NOTE

♦ The DME control unit receives time information from the instrument cluster at regular intervals (approx. 4 sec.) when the ignition is on.
♦ The fault is detected when:
● the time information remains unchanged for longer than 60 seconds;
or
● the time information deviates from the internal time of the DME control unit;
or
● the time information changes too frequently
(e.g. due to a loose contact in the CAN, since switching between the actual time and stand-by time takes place).

Diagnostic conditions

● Instrument cluster ready for operation
● No detection of CAN fault
● Engine running, then:
● Switch off engine, then immediately:
● Switch on ignition for > 10 minutes

Possible fault causes

♦ Wrong software version in DME control unit (e.g. US data for EU vehicle)
♦ Wrong software version in gateway
♦ Wrong software version in instrument cluster
♦ Fault in CAN (e.g. loose contact)
♦ Instrument cluster faulty

P1530

Diagnosis information - instrument cluster

Front lid open

When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then checked and any faults
are stored.

Diagnostic conditions

- Vehicle speed > 20 km/h

Possible fault causes

- Front lid lock faulty
- Microswitch in front lid lock faulty
- Open circuit in CAN convenience
- Short circuit to B+/ground in CAN convenience
- Instrument cluster faulty
- Front control module faulty

Fault effects

This fault is entered if the front lid is not correctly closed when the vehicle is moving faster than 20 km/h.

P1530

Diagnosis information - DME control unit

Time information via CAN missing

ⓘ **NOTE**
The DME control unit receives time information from the instrument cluster at regular intervals when the ignition is on.

Diagnostic conditions

- Ignition off < 72 hour(s)
  D then switch on ignition
- Ignition on > 60 s
- Vehicle voltage > 9 V
- Instrument cluster ready for operation

Possible fault causes

- ♦ CAN comfort failure
- ♦ Gateway control unit failure
- ♦ CAN drive failure
- ♦ Instrument cluster failed or faulty

P1530

Diagnosis information - instrument cluster

Supply voltage

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then tested and any faults are stored.

Note
If fuse 6 (80A) in the current distributor is faulty, the ignition cannot e switched on (terminal 15) and thus the instrument cluster does not perform a diagnosis.

- Ignition on (in case of undervoltage)
- Engine running (in case of overvoltage)

Possible fault causes
- Fuse faulty
- Open circuit in the lines
- Generator or generator regulator faulty
- Line short circuit to B+/ground

Fault effects
- Instrument cluster does not function

Affected contacts on the instrument cluster connector
Connector [A …]:

- 2 Terminal 30
- 18 Terminal 30
- 1 Terminal 31
- 17 Terminal 31

P1530

Diagnosis information - instrument cluster

Instrument cluster faulty

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then checked and any faults are stored.

- Ignition on

Possible fault causes
♦ Internal function sequences not OK

Fault effects
♦ Instrument cluster does not function

P1530

Diagnosis information - instrument cluster

Light faulty

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then tested and any faults are stored.

- Ignition on

Possible fault causes

- Light faulty

Fault effects

- Corresponding light does not function

P1530

Diagnosis information - DME (DFI)

Time information via CAN missing or implausible

ⓘ NOTE

♦ The DME (DFI) control unit receives time information from the instrument cluster at regular intervals (approx. 4 sec.) when the ignition is on.
♦ The fault is detected when:
- the time information remains unchanged for longer than 60 seconds;

or
- the time information deviates from the internal time of the DME (DFI) control unit;

or
- the time information changes too frequently
  (e.g. in the event of loose contact in CAN)

Diagnostic conditions

- Instrument cluster ready for operation
- No detection of CAN fault
- Engine running, then:
- Switch off engine, then immediately:
- Switch on ignition for > 10 minutes

Possible fault causes

♦ Wrong software version in DME (DFI) control unit (e.g. US data for EU vehicle)
♦ Wrong software version in gateway
♦ Wrong software version in instrument cluster
♦ Fault in CAN (e.g. loose contact)
♦ Instrument cluster faulty

Diagnosis information - DME

Time information via CAN missing or implausible

ⓘ NOTE

♦ The DME control unit receives time information from the instrument cluster at regular intervals (approx. 4 sec.) when the ignition is on.
♦ The fault is detected when:
● the time information remains unchanged for longer than 60 seconds;
or
● the time information deviates from the internal time of the DME control unit;
or
● the time information changes too frequently
(e.g. due to a loose contact in the CAN, since switching between the actual time and stand-by time takes place).

Diagnostic conditions

● Instrument cluster ready for operation
● No detection of CAN fault
● Engine running, then:
● Switch off engine, then immediately:
● Switch on ignition for > 10 minutes

Possible fault causes

♦ Wrong software version in DME control unit (e.g. US data for EU vehicle)
♦ Wrong software version in gateway
♦ Wrong software version in instrument cluster
♦ Fault in CAN (e.g. loose contact)
♦ Instrument cluster faulty

P1531

Diagnosis information - instrument cluster

Front lid open

When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then checked and any faults
are stored.

Diagnostic conditions

- Vehicle speed > 20 km/h

Possible fault causes

- Front lid lock faulty
- Microswitch in front lid lock faulty
- Open circuit in CAN convenience
- Short circuit to B+/ground in CAN convenience
- Instrument cluster faulty
- Front control module faulty

Fault effects

This fault is entered if the front lid is not correctly closed when the vehicle is moving faster than 20 km/h.

P1531

Diagnosis information - DME control unit

Time information via CAN missing

ⓘ **NOTE**
The DME control unit receives time information from the instrument cluster at regular intervals when the ignition is on.

Diagnostic conditions

- Ignition off < 72 hour(s)
  D then switch on ignition
- Ignition on > 60 s
- Vehicle voltage > 9 V
- Instrument cluster ready for operation

Possible fault causes

- ♦ CAN comfort failure
- ♦ Gateway control unit failure
- ♦ CAN drive failure
- ♦ Instrument cluster failed or faulty

P1531

Diagnosis information - instrument cluster

Supply voltage

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then tested and any faults are stored.

Note
If fuse 6 (80A) in the current distributor is faulty, the ignition cannot e switched on (terminal 15) and thus the instrument cluster does not perform a diagnosis.

- Ignition on (in case of undervoltage)
- Engine running (in case of overvoltage)

Possible fault causes
- Fuse faulty
- Open circuit in the lines
- Generator or generator regulator faulty
- Line short circuit to B+/ground

Fault effects
- Instrument cluster does not function

Affected contacts on the instrument cluster connector
Connector [A …]:

- 2 Terminal 30
- 18 Terminal 30
- 1 Terminal 31
- 17 Terminal 31

P1531

Diagnosis information - instrument cluster

Instrument cluster faulty

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then checked and any faults are stored.

- Ignition on

Possible fault causes
♦ Internal function sequences not OK

Fault effects
♦ Instrument cluster does not function

P1531

Diagnosis information - instrument cluster

Light faulty

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then tested and any faults are stored.

- Ignition on

Possible fault causes

- Light faulty

Fault effects

- Corresponding light does not function

P1531

Diagnosis information - DME (DFI)

Time information via CAN missing or implausible

ⓘ NOTE

♦ The DME (DFI) control unit receives time information from the instrument cluster at regular intervals (approx. 4 sec.) when the ignition is on.
♦ The fault is detected when:
- the time information remains unchanged for longer than 60 seconds;

or
- the time information deviates from the internal time of the DME (DFI) control unit;

or
- the time information changes too frequently
  (e.g. in the event of loose contact in CAN)

Diagnostic conditions

- Instrument cluster ready for operation
- No detection of CAN fault
- Engine running, then:
- Switch off engine, then immediately:
- Switch on ignition for > 10 minutes

Possible fault causes

♦ Wrong software version in DME (DFI) control unit (e.g. US data for EU vehicle)
♦ Wrong software version in gateway
♦ Wrong software version in instrument cluster
♦ Fault in CAN (e.g. loose contact)
♦ Instrument cluster faulty

P1532

Diagnosis information - DME

Time information via CAN missing or implausible

ⓘ NOTE

♦ The DME control unit receives time information from the instrument cluster at regular intervals (approx. 4 sec.) when the ignition is on.
♦ The fault is detected when:
- the time information remains unchanged for longer than 60 seconds;

or
- the time information deviates from the internal time of the DME control unit;

or
- the time information changes too frequently

(e.g. due to a loose contact in the CAN, since switching between the actual time and stand-by time takes place).

Diagnostic conditions

- Instrument cluster ready for operation
- No detection of CAN fault
- Engine running, then:
- Switch off engine, then immediately:
- Switch on ignition for > 10 minutes

Possible fault causes

♦ Wrong software version in DME control unit (e.g. US data for EU vehicle)
♦ Wrong software version in gateway
♦ Wrong software version in instrument cluster
♦ Fault in CAN (e.g. loose contact)
♦ Instrument cluster faulty

P1532

Diagnosis information - instrument cluster

Front lid open

When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then checked and any faults
are stored.

Diagnostic conditions

- Vehicle speed > 20 km/h

Possible fault causes

- Front lid lock faulty
- Microswitch in front lid lock faulty
- Open circuit in CAN convenience
- Short circuit to B+/ground in CAN convenience
- Instrument cluster faulty
- Front control module faulty

Fault effects

This fault is entered if the front lid is not correctly closed when the vehicle is moving faster than 20 km/h.

P1532

Diagnosis information - DME control unit

Time information via CAN missing

ⓘ **NOTE**
The DME control unit receives time information from the instrument cluster at regular intervals when the ignition is on.

Diagnostic conditions

- Ignition off < 72 hour(s)
  D then switch on ignition
- Ignition on > 60 s
- Vehicle voltage > 9 V
- Instrument cluster ready for operation

Possible fault causes

- ♦ CAN comfort failure
- ♦ Gateway control unit failure
- ♦ CAN drive failure
- ♦ Instrument cluster failed or faulty

P1532

Diagnosis information - instrument cluster

Supply voltage

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then tested and any faults are stored.

Note
If fuse 6 (80A) in the current distributor is faulty, the ignition cannot e switched on (terminal 15) and thus the instrument cluster does not perform a diagnosis.

- Ignition on (in case of undervoltage)
- Engine running (in case of overvoltage)

Possible fault causes
- Fuse faulty
- Open circuit in the lines
- Generator or generator regulator faulty
- Line short circuit to B+/ground

Fault effects
- Instrument cluster does not function

Affected contacts on the instrument cluster connector
Connector [A …]:

- 2 Terminal 30
- 18 Terminal 30
- 1 Terminal 31
- 17 Terminal 31

P1532

Diagnosis information - instrument cluster

Instrument cluster faulty

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then checked and any faults are stored.

- Ignition on

Possible fault causes
♦ Internal function sequences not OK

Fault effects
♦ Instrument cluster does not function

P1532

Diagnosis information - instrument cluster

Light faulty

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then tested and any faults are stored.

- Ignition on

Possible fault causes

- Light faulty

Fault effects

- Corresponding light does not function

P1532

Diagnosis information - DME (DFI)

Time information via CAN missing or implausible

ⓘ NOTE

♦ The DME (DFI) control unit receives time information from the instrument cluster at regular intervals (approx. 4 sec.) when the ignition is on.
♦ The fault is detected when:
- the time information remains unchanged for longer than 60 seconds;

or
- the time information deviates from the internal time of the DME (DFI) control unit;

or
- the time information changes too frequently
  (e.g. in the event of loose contact in CAN)

Diagnostic conditions

- Instrument cluster ready for operation
- No detection of CAN fault
- Engine running, then:
- Switch off engine, then immediately:
- Switch on ignition for > 10 minutes

Possible fault causes

♦ Wrong software version in DME (DFI) control unit (e.g. US data for EU vehicle)
♦ Wrong software version in gateway
♦ Wrong software version in instrument cluster
♦ Fault in CAN (e.g. loose contact)
♦ Instrument cluster faulty

P1533

Diagnosis information - DME

Time information via CAN missing or implausible

ⓘ NOTE

♦ The DME control unit receives time information from the instrument cluster at regular intervals (approx. 4 sec.) when the ignition is on.
♦ The fault is detected when:
- the time information remains unchanged for longer than 60 seconds;

or
- the time information deviates from the internal time of the DME control unit;

or
- the time information changes too frequently

(e.g. due to a loose contact in the CAN, since switching between the actual time and stand-by time takes place).

Diagnostic conditions

- Instrument cluster ready for operation
- No detection of CAN fault
- Engine running, then:
- Switch off engine, then immediately:
- Switch on ignition for > 10 minutes

Possible fault causes

♦ Wrong software version in DME control unit (e.g. US data for EU vehicle)
♦ Wrong software version in gateway
♦ Wrong software version in instrument cluster
♦ Fault in CAN (e.g. loose contact)
♦ Instrument cluster faulty

P1533

Diagnosis information - instrument cluster

Front lid open

When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then checked and any faults
are stored.

Diagnostic conditions

- Vehicle speed > 20 km/h

Possible fault causes

- Front lid lock faulty
- Microswitch in front lid lock faulty
- Open circuit in CAN convenience
- Short circuit to B+/ground in CAN convenience
- Instrument cluster faulty
- Front control module faulty

Fault effects

This fault is entered if the front lid is not correctly closed when the vehicle is moving faster than 20 km/h.

P1533

Diagnosis information - DME control unit

Time information via CAN missing

ⓘ **NOTE**
The DME control unit receives time information from the instrument cluster at regular intervals when the ignition is on.

Diagnostic conditions

- Ignition off < 72 hour(s)
  D then switch on ignition
- Ignition on > 60 s
- Vehicle voltage > 9 V
- Instrument cluster ready for operation

Possible fault causes

- ♦ CAN comfort failure
- ♦ Gateway control unit failure
- ♦ CAN drive failure
- ♦ Instrument cluster failed or faulty

P1533

Diagnosis information - instrument cluster

Supply voltage

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then tested and any faults are stored.

Note
If fuse 6 (80A) in the current distributor is faulty, the ignition cannot e switched on (terminal 15) and thus the instrument cluster does not perform a diagnosis.

- Ignition on (in case of undervoltage)
- Engine running (in case of overvoltage)

Possible fault causes
- Fuse faulty
- Open circuit in the lines
- Generator or generator regulator faulty
- Line short circuit to B+/ground

Fault effects
- Instrument cluster does not function

Affected contacts on the instrument cluster connector
Connector [A …]:

- 2 Terminal 30
- 18 Terminal 30
- 1 Terminal 31
- 17 Terminal 31

P1533

Diagnosis information - instrument cluster

Instrument cluster faulty

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then checked and any faults are stored.

- Ignition on

Possible fault causes
♦ Internal function sequences not OK

Fault effects
♦ Instrument cluster does not function

P1533

Diagnosis information - instrument cluster

Light faulty

Diagnostic conditions
When the ignition is switched on (terminal 15), the instrument cluster first tests internal function sequences.
If they are OK, all diagnosable outputs are then tested and any faults are stored.

- Ignition on

Possible fault causes

- Light faulty

Fault effects

- Corresponding light does not function

P1533

Diagnosis information - DME (DFI)

Time information via CAN missing or implausible

ⓘ NOTE

♦ The DME (DFI) control unit receives time information from the instrument cluster at regular intervals (approx. 4 sec.) when the ignition is on.
♦ The fault is detected when:
- the time information remains unchanged for longer than 60 seconds;

or
- the time information deviates from the internal time of the DME (DFI) control unit;

or
- the time information changes too frequently
  (e.g. in the event of loose contact in CAN)

Diagnostic conditions

- Instrument cluster ready for operation
- No detection of CAN fault
- Engine running, then:
- Switch off engine, then immediately:
- Switch on ignition for > 10 minutes

Possible fault causes

♦ Wrong software version in DME (DFI) control unit (e.g. US data for EU vehicle)
♦ Wrong software version in gateway
♦ Wrong software version in instrument cluster
♦ Fault in CAN (e.g. loose contact)
♦ Instrument cluster faulty

P1536

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1536

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1536

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1536

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1536

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1536

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1536

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1537

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1537

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1537

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
- at engine speed < 1,000 rpm => required pressure < 6.2 bar
- at engine speed > 3,008 rpm => required pressure > 1.5 bar
- The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

- Engine idling > 1 minute, then:
- Engine speed > 3,010 rpm, then:
- Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1537

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1537

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1537

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1537

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1538

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1538

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1538

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1538

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1538

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1538

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1538

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1539

Diagnosis information - DME

Oil pressure-regulating valve: power supply

ⓘ NOTE

♦ The oil pressure-regulating valve is supplied with 12 V while the engine is running.
♦ A short circuit to B+ can therefore be detected only during control unit after-running.

Diagnostic conditions

- Engine running, then:
- Ignition off for > 1 minute

Possible fault causes

♦ Short circuit to B+ of the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1539

Diagnosis information - DME

Oil pressure too low

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
- Oil temperature
- Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected.
♦ The red warning message >Oil pressure too low< is displayed in the instrument cluster

Diagnostic conditions

- Engine running
- No fault P0521, P0522 or P0523 entered

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, oil pump, dirt in oil circuit, oil circuit faulty, etc.)

P1539

Diagnosis information - DME

Oil pressure sensor implausible

ⓘ NOTE

♦ The engine oil pressure is set by the oil pressure-regulating valve.
♦ The oil pressure depends on:
● Oil temperature
● Engine speed

♦ If the oil pressure is outside a defined range, a fault is detected:
● at engine speed < 1,000 rpm => required pressure < 6.2 bar
● at engine speed > 3,008 rpm => required pressure > 1.5 bar
● The measured oil pressure is compared with the ambient pressure in the control unit after-run phase (after ignition off) => required value < 0.5 bar difference.

Diagnostic conditions

● Engine idling > 1 minute, then:
● Engine speed > 3,010 rpm, then:
● Ignition off and ignition key removed for > 1 minute

Possible fault causes

♦ Oil pressure too low
(oil level, oil pump, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure sensor faulty (incorrect trimming compared with ambient pressure sensor)

P1539

Diagnosis information - DME

Oil pump activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range (PWM signal for oil-pressure regulating valve implausible).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure too high
(dirt in oil circuit, oil circuit faulty)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1539

Diagnosis information - DME

Oil pressure control limit value

ⓘ NOTE

♦ The measured oil pressure is compared with the setpoint oil pressure.
♦ Among other things, the setpoint oil pressure depends on:
● Ambient conditions (temperatures, off period etc.)
● Operating point of the engine
♦ A fault is detected if the measured oil pressure is outside a defined range for > 30 seconds.

Diagnostic conditions

● Engine running

Possible fault causes

♦ Oil pressure too low
(oil level, oil thinning, dirt in oil circuit, oil circuit faulty, etc.)
♦ Oil pressure too high
(oil thickening, dirt in oil circuit, oil circuit faulty)
♦ Oil pressure sensor faulty (incorrectly trimmed)
♦ Oil pressure-regulating valve faulty
♦ Oil pump faulty

P1539

Diagnosis information - DME

Oil pressure-regulating valve: activation

ⓘ NOTE

♦ The oil pressure-regulating valve is controlled via a PWM signal.
♦ Among other things, the PWM signal is dependent on:
- Ambient conditions (temperatures, off period etc.)
- Operating point of the engine
- Measured oil pressure (at oil pressure sensor)

♦ A fault is detected if the PWM signal is outside a defined range for > 8 seconds.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to B+/ground/between wires or open circuit in the control line to the oil pressure-regulating valve
♦ Open circuit in the power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1539

Diagnosis information - DME

Oil pressure-regulating valve: power supply

Diagnostic conditions

- Engine running

Possible fault causes

♦ Short circuit to ground or open circuit in power supply line to the oil pressure-regulating valve
♦ Oil pressure-regulating valve faulty

P1550

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1550

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1550

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1550

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1550

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P1550

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1550

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P1550

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1551

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1551

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1551

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1551

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1551

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P1551

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1551

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P1551

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1552

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1552

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1552

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1552

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1552

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P1552

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1552

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P1552

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1553

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1553

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1553

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1553

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1553

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P1553

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1553

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P1553

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1554

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P1554

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P1554

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P1554

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P1554

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P1554

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P1554

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P1554

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P1576

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1603

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1608

Diagnosis information - CAN

Steering wheel electronics (CAN drive) control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The steering wheel electronics control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored. Steering wheel electronics control module wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for steering wheel electronics control module
- Steering wheel electronics control module is incorrectly coded
- Short circuit or open circuit in the CAN drive
- Steering wheel electronics control module faulty (in most cases the cause is not the steering wheel electronics control module but incorrect coding!)

Fault effects

- Communication via the CAN drive is no longer possible.
- No other control modules are able to communicate with the steering wheel electronics control module.

Affected contacts on the steering wheel electronics control module connector
Connector A:

- 1 ground supply - terminal 31
- 2 power supply - terminal 30
- 8 CAN drive low
- 9 CAN drive high
- 13 power supply - terminal 15

Diagnosis information - CAN

Air-conditioning system regulator, communication

NOTE
Internal function test completed!

Diagnostic conditions
The air-conditioning system regulator initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Air-conditioning system regulator wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for air-conditioning system regulator
- Air-conditioning system regulator incorrectly coded
- Short circuit or open circuit in the CAN comfort
- Air-conditioning system regulator faulty (in most cases the cause is not the air-conditioning system regulator but incorrect coding!)

Fault effects

- Communication via the CAN comfort is no longer possible.
- No other control modules are able to communicate with the air-conditioning system regulator.

Affected contacts on the air-conditioning system regulator connector
Connector A:

- 1 ground supply - terminal 31
- 2 power supply - terminal 30
- 8 CAN comfort low
- 9 CAN comfort high
- 13 power supply - terminal 15

P1613

Diagnosis information - CAN

Vehicle electrical system control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The vehicle electrical system control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Vehicle electrical system control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- "Ignition on"

Possible fault causes

- Power supply for the vehicle electrical system control module is incorrect
- Vehicle electrical system control module is incorrectly coded
- Short circuit or open circuit in the CAN comfort
- Vehicle electrical system control module faulty (in most cases the cause is not the vehicle electrical system control module but incorrect coding!)

Fault effects

- Communication via the CAN comfort is no longer possible.
- No other control modules are able to communicate with the vehicle electrical system control module.

Affected contacts on the vehicle electrical system control module connector
Connector A:

- 27 power supply - terminal 15
- 37 CAN comfort high
- 38 CAN comfort low
- 42 ground supply

Connector B:

- 3 power supply - terminal 30
- 21 wake-up

P1614

Diagnosis information - CAN

Steering wheel electronics (CAN drive) control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The steering wheel electronics control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored. Steering wheel electronics control module wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for steering wheel electronics control module
- Steering wheel electronics control module is incorrectly coded
- Short circuit or open circuit in the CAN drive
- Steering wheel electronics control module faulty (in most cases the cause is not the steering wheel electronics control module but incorrect coding!)

Fault effects

- Communication via the CAN drive is no longer possible.
- No other control modules are able to communicate with the steering wheel electronics control module.

Affected contacts on the steering wheel electronics control module connector
Connector A:

- 1 ground supply - terminal 31
- 2 power supply - terminal 30
- 8 CAN drive low
- 9 CAN drive high
- 13 power supply - terminal 15

Diagnosis information - CAN

POSIP triggering unit, communication

NOTE
Internal function test completed!

Diagnostic conditions
The POSIP triggering unit initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
POSIP triggering unit wake-up through:

- event-induced CAN message
- key contact (terminal S)

Possible fault causes

- No power supply for POSIP triggering unit
- POSIP triggering unit incorrectly coded
- Short circuit or open circuit in the CAN drive
- POSIP triggering unit faulty (in most cases the cause is not the POSIP triggering unit but incorrect coding!)

Fault effects

- Communication via the CAN drive is no longer possible.
- No other control modules are able to communicate with the POSIP triggering unit.

Affected contacts on the POSIP triggering unit connector
Connector A:

- 1 power supply - terminal S
- 26 ground supply - terminal 31
- 34 power supply - terminal S
- 40 ground supply - terminal 31
- 49 CAN comfort high
- 50 CAN comfort low

Diagnosis information - CAN

Communication, transmission control unit

NOTE
Internal function test completed.

Diagnostic conditions
The transmission control unit initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Transmission control unit wake-up through:

- Event-controlled CAN message
- Ignition on

Possible fault causes

- No power supply for transmission control unit
- Transmission control unit is incorrectly coded
- Short circuit or open circuit of CAN Drive
- Transmission control unit faulty (in most cases the cause is not the transmission control unit but incorrect coding!)
- DME control unit faulty

Fault effects

- No communication can take place via CAN Drive
- No other control units are able to communicate with the transmission control unit.

P1628

Diagnosis information - CAN

Communication, transmission control unit

NOTE
Internal function test completed.

Diagnostic conditions
The transmission control unit initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Transmission control unit wake-up through:

- Event-controlled CAN message
- Ignition on

Possible fault causes

- No power supply for transmission control unit
- Transmission control unit is incorrectly coded
- Short circuit or open circuit of CAN Drive
- Transmission control unit faulty (in most cases the cause is not the transmission control unit but incorrect coding!)
- DME control unit faulty

Fault effects

- No communication can take place via CAN Drive
- No other control units are able to communicate with the transmission control unit.

P1629

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1630

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1632

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1634

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1635

Diagnosis information - CAN

Rear control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The rear control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Rear control module wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for rear control module
- Rear control module is incorrectly coded
- Short circuit or open circuit in the CAN comfort
- Rear control module faulty (in most cases the cause is not the rear control module but incorrect coding!)

Fault effects

- Communication via the CAN comfort is no longer possible.
- No other control modules are able to communicate with the rear control module.

Affected contacts on the rear control module connector
Connector A:

- 8 power supply - terminal 15
- 23 power supply - terminal 30

Connector B:

- 2 CAN comfort high
- 8 CAN comfort low
- 11 ground supply - terminal 31

P1636

Diagnosis information - DME control unit

Boost pressure sensor

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 0.200 V (P0237)
or
♦ > 4.787 V (P0238)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P1636

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 500 hpa (P1638)
or
♦ > 2600 hpa (P1638)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P1636

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ [measured value + 30 hpa] < [ambient pressure - 400 hpa] (P1636)
or
♦ [measured value - 30 hpa] < [ambient pressure + 200 hpa] (P1637)

Diagnostic conditions

- Engine speed < 1000 rpm
- Throttle position < 5 %
- No fault entered for: ambient pressure sensor or throttle potentiometer

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Boost pressure sensor faulty
♦ Ambient pressure sensor faulty (DME control unit)

P1637

Diagnosis information - DME control unit

Boost pressure sensor

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 0.200 V (P0237)
or
♦ > 4.787 V (P0238)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P1637

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 500 hpa (P1638)
or
♦ > 2600 hpa (P1638)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P1637

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ [measured value + 30 hpa] < [ambient pressure - 400 hpa] (P1636)
or
♦ [measured value - 30 hpa] < [ambient pressure + 200 hpa] (P1637)

Diagnostic conditions

- Engine speed < 1000 rpm
- Throttle position < 5 %
- No fault entered for: ambient pressure sensor or throttle potentiometer

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Boost pressure sensor faulty
♦ Ambient pressure sensor faulty (DME control unit)

P1638

Diagnosis information - DME control unit

Boost pressure sensor

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 0.200 V (P0237)
or
♦ > 4.787 V (P0238)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P1638

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 500 hpa (P1638)
or
♦ > 2600 hpa (P1638)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

P1638

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ [measured value + 30 hpa] < [ambient pressure - 400 hpa] (P1636)
or
♦ [measured value - 30 hpa] < [ambient pressure + 200 hpa] (P1637)

Diagnostic conditions

- Engine speed < 1000 rpm
- Throttle position < 5 %
- No fault entered for: ambient pressure sensor or throttle potentiometer

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Boost pressure sensor faulty
♦ Ambient pressure sensor faulty (DME control unit)

P1639

Diagnosis information - DME control unit

Boost pressure sensor

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 0.200 V (P0237)
or
♦ > 4.787 V (P0238)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ < 500 hpa (P1638)
or
♦ > 2600 hpa (P1638)

Diagnostic conditions

- Engine speed > 80 rpm

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground/between lines or open circuit in the lines
♦ Boost pressure sensor faulty
♦ DME control unit faulty

Diagnosis information - DME control unit

Pressure sensor ahead of throttle (boost pressure sensor)

ⓘ **NOTE**
A fault is detected if the value of the sensor exceeds or falls below a threshold:
♦ [measured value + 30 hpa] < [ambient pressure - 400 hpa] (P1636)
or
♦ [measured value - 30 hpa] < [ambient pressure + 200 hpa] (P1637)

Diagnostic conditions

- Engine speed < 1000 rpm
- Throttle position < 5 %
- No fault entered for: ambient pressure sensor or throttle potentiometer

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Boost pressure sensor faulty
♦ Ambient pressure sensor faulty (DME control unit)

P1640

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1647

Diagnosis information - DME control unit

Auxiliary water pump output stage

Diagnostic conditions

- Engine running
- Auxiliary water pump activated

Possible fault causes

- Loose contact or corrosion on connectors or lines
- Short circuit to B+/ground/between lines or open circuit in the lines
- Auxiliary water pump faulty
- DME control unit faulty

P1649

Diagnosis information - DME control unit

Auxiliary water pump output stage

Diagnostic conditions

- Engine running
- Auxiliary water pump activated

Possible fault causes

- Loose contact or corrosion on connectors or lines
- Short circuit to B+/ground/between lines or open circuit in the lines
- Auxiliary water pump faulty
- DME control unit faulty

P1650

Diagnosis information - DME control unit

Auxiliary water pump output stage

Diagnostic conditions

- Engine running
- Auxiliary water pump activated

Possible fault causes

- Loose contact or corrosion on connectors or lines
- Short circuit to B+/ground/between lines or open circuit in the lines
- Auxiliary water pump faulty
- DME control unit faulty

P1654

Diagnosis information - DME

Coolant switch-over valve driver, below limit value

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve **not** activated (ATF cooler open)
- for **997** coolant temperature > 100 °C (212 °F) **or** ATF temperature > 90 °C (194 °F)
- for **987** coolant temperature > 90 °C (194 °F) **or** ATF temperature > 90 °C (194 °F)

Possible fault causes

- Short circuit to ground in control line
- DME control module faulty

P1654

Diagnosis information - DME

Coolant switch-over valve driver, above limit value

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve activated (ATF cooler closed)
- for **997** coolant temperature < 90 °C (194 °F) **and** ATF temperature < 83 °C (181 °F)
- for **987** coolant temperature < 80 °C (176 °F) **and** ATF temperature < 75 °C (167 °F)

Possible fault causes

- Short circuit to B+ in control line
- Coolant switch-over valve faulty
- DME control module faulty

P1654

Diagnosis information - DME

Coolant switch-over valve driver, open circuit

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve **not** activated (ATF cooler open)
- for **997** coolant temperature > 100 °C (212 °F) **or** ATF temperature > 90 °C (194 °F)
- for **987** coolant temperature > 90 °C (194 °F) **or** ATF temperature > 90 °C (194 °F)

Possible fault causes

- Open circuit in the control line
- Coolant switch-over valve faulty
- DME control module faulty

P1655

Diagnosis information - DME

Coolant switch-over valve driver, below limit value

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve **not** activated (ATF cooler open)
- for **997** coolant temperature > 100 °C (212 °F) **or** ATF temperature > 90 °C (194 °F)
- for **987** coolant temperature > 90 °C (194 °F) **or** ATF temperature > 90 °C (194 °F)

Possible fault causes

- Short circuit to ground in control line
- DME control module faulty

P1655

Diagnosis information - DME

Coolant switch-over valve driver, above limit value

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve activated (ATF cooler closed)
- for **997** coolant temperature < 90 °C (194 °F) **and** ATF temperature < 83 °C (181 °F)
- for **987** coolant temperature < 80 °C (176 °F) **and** ATF temperature < 75 °C (167 °F)

Possible fault causes

- Short circuit to B+ in control line
- Coolant switch-over valve faulty
- DME control module faulty

P1655

Diagnosis information - DME

Coolant switch-over valve driver, open circuit

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve **not** activated (ATF cooler open)
- for **997** coolant temperature > 100 °C (212 °F) **or** ATF temperature > 90 °C (194 °F)
- for **987** coolant temperature > 90 °C (194 °F) **or** ATF temperature > 90 °C (194 °F)

Possible fault causes

- Open circuit in the control line
- Coolant switch-over valve faulty
- DME control module faulty

P1656

Diagnosis information - DME

Coolant switch-over valve driver, below limit value

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve **not** activated (ATF cooler open)
- for **997** coolant temperature > 100 °C (212 °F) **or** ATF temperature > 90 °C (194 °F)
- for **987** coolant temperature > 90 °C (194 °F) **or** ATF temperature > 90 °C (194 °F)

Possible fault causes

- Short circuit to ground in control line
- DME control module faulty

P1656

Diagnosis information - DME

Coolant switch-over valve driver, above limit value

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve activated (ATF cooler closed)
- for **997** coolant temperature < 90 °C (194 °F) **and** ATF temperature < 83 °C (181 °F)
- for **987** coolant temperature < 80 °C (176 °F) **and** ATF temperature < 75 °C (167 °F)

Possible fault causes

- Short circuit to B+ in control line
- Coolant switch-over valve faulty
- DME control module faulty

P1656

Diagnosis information - DME

Coolant switch-over valve driver, open circuit

Diagnostic conditions

- Supply voltage > 7 V
- Engine running
- Coolant change-over valve **not** activated (ATF cooler open)
- for **997** coolant temperature > 100 °C (212 °F) **or** ATF temperature > 90 °C (194 °F)
- for **987** coolant temperature > 90 °C (194 °F) **or** ATF temperature > 90 °C (194 °F)

Possible fault causes

- Open circuit in the control line
- Coolant switch-over valve faulty
- DME control module faulty

P1657

Diagnosis information - DME control unit

Blow-off solenoid valve driver

Diagnostic conditions

- Engine running
- Blow-off solenoid valve activated

Possible fault causes

- Loose contact or corrosion on connectors or lines
- Short circuit to B+/ground/between lines or open circuit in the lines
- Blow-off solenoid valve faulty
- DME control unit faulty

P1658

Diagnosis information - DME control unit

Blow-off solenoid valve driver

Diagnostic conditions

- Engine running
- Blow-off solenoid valve activated

Possible fault causes

- Loose contact or corrosion on connectors or lines
- Short circuit to B+/ground/between lines or open circuit in the lines
- Blow-off solenoid valve faulty
- DME control unit faulty

P1659

Diagnosis information - DME control unit

Blow-off solenoid valve driver

Diagnostic conditions

- Engine running
- Blow-off solenoid valve activated

Possible fault causes

- Loose contact or corrosion on connectors or lines
- Short circuit to B+/ground/between lines or open circuit in the lines
- Blow-off solenoid valve faulty
- DME control unit faulty

P1674

Diagnosis information - DME

Engine compartment purge fan driver, below limit value

The control line from the DME control module to the relay of the engine-compartment blower in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Short circuit to ground in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1674

Diagnosis information - DME

Engine compartment purge fan driver, open circuit

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Open circuit in control line to engine compartment purge fan relay
- Open circuit in the power supply to the engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1674

Function description - DME

Engine compartment purge fan switch-on conditions 987

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005 and 2006:

  - Intake air temperature > 57° C (64°F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F))
  - **or** engine compartment temperature > 70° C (158 °F)
  - **or** cooling temperature > 105° C (221 °F)

P1674

Function description - DME

Engine compartment purge fan switch-on conditions 997 stage HIGH

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005 and 2006:

♦ Intake air temperature > 50° C (132 °F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F))
♦ **or** engine compartment temperature > 65° C (149 °F)
♦ **or** cooling temperature > 105° C (221 °F)

P1674

Diagnosis information - DME

Engine compartment purge fan driver, above limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Ignition on
- Engine cover closed (only 997)
- Engine compartment purge fan activated

Possible fault causes

- Short circuit to B+ in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1675

Diagnosis information - DME

Engine compartment purge fan

ⓘ **NOTE**
Diagnosis detects if the engine compartment temperature does not fall by min. 1.5 °C (34.7 °F) even though the purge fan should be running. This may also be the case, for example, if the vehicle is covered when the engine is warm (car cover).

Diagnostic conditions

- 911 only: Rear lid must have been closed for > 255 sec.
- Ignition on or engine running
- Engine compartment purge fan relay must have been activated for > 200 sec. (see function description)

Possible fault causes

- Air intake covered or blocked
- Engine compartment temperature sensor has fallen out of holder (sensor is lying on engine)
- Electrical fault in supply line(s) to engine compartment purge fan
- Mechanical fault in engine compartment purge fan relay
- Engine compartment purge fan faulty (mechanical or electrical fault, sluggish)
- Engine compartment temperature sensor faulty

P1676

Diagnosis information - DME

Engine compartment purge fan driver, below limit value

The control line from the DME control module to the relay of the engine-compartment blower in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Short circuit to ground in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1676

Diagnosis information - DME

Engine compartment purge fan driver, open circuit

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Open circuit in control line to engine compartment purge fan relay
- Open circuit in the power supply to the engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1676

Function description - DME

Engine compartment purge fan switch-on conditions 987

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005 and 2006:

  - Intake air temperature > 57° C (64°F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F))
  - **or** engine compartment temperature > 70° C (158 °F)
  - **or** cooling temperature > 105° C (221 °F)

P1676

Function description - DME

Engine compartment purge fan switch-on conditions 997 stage HIGH

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005 and 2006:

  - Intake air temperature > 50° C (132 °F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F))
  - **or** engine compartment temperature > 65° C (149 °F)
  - **or** cooling temperature > 105° C (221 °F)

P1676

Diagnosis information - DME

Engine compartment purge fan driver, above limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Ignition on
- Engine cover closed (only 997)
- Engine compartment purge fan activated

Possible fault causes

- Short circuit to B+ in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1677

Diagnosis information - DME

Engine compartment purge fan driver, below limit value

The control line from the DME control module to the relay of the engine-compartment blower in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Short circuit to ground in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1677

Diagnosis information - DME

Engine compartment purge fan driver, open circuit

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Open circuit in control line to engine compartment purge fan relay
- Open circuit in the power supply to the engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1677

Function description - DME

Engine compartment purge fan switch-on conditions 987

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005 and 2006:

  - Intake air temperature > 57° C (64°F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F))
  - **or** engine compartment temperature > 70° C (158 °F)
  - **or** cooling temperature > 105° C (221 °F)

P1677

Function description - DME

Engine compartment purge fan switch-on conditions 997 stage HIGH

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005 and 2006:

  - Intake air temperature > 50° C (132 °F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F))
  - **or** engine compartment temperature > 65° C (149 °F)
  - **or** cooling temperature > 105° C (221 °F)

P1677

Diagnosis information - DME

Engine compartment purge fan driver, above limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Ignition on
- Engine cover closed (only 997)
- Engine compartment purge fan activated

Possible fault causes

- Short circuit to B+ in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1680

Diagnosis information - DME

Electric exhaust flap

NOTE
Only for Carrera S increased performance (X51).

Diagnostic conditions

- Power supply voltage > 7 V
- Engine running
- Switch exhaust flap on and off with button

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to exhaust flap solenoid valve
- Exhaust flap solenoid valve faulty
- DME control module faulty

P1681

Diagnosis information - DME

Electric exhaust flap

NOTE
Only for Carrera S increased performance (X51).

Diagnostic conditions

- Power supply voltage > 7 V
- Engine running
- Switch exhaust flap on and off with button

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to exhaust flap solenoid valve
- Exhaust flap solenoid valve faulty
- DME control module faulty

P1682

Diagnosis information - DME

Electric exhaust flap

NOTE
Only for Carrera S increased performance (X51).

Diagnostic conditions

- Power supply voltage > 7 V
- Engine running
- Switch exhaust flap on and off with button

Possible fault causes

- Short circuit to B+/ground or open circuit in the control line
- Open circuit of power supply to exhaust flap solenoid valve
- Exhaust flap solenoid valve faulty
- DME control module faulty

P1686

Diagnosis information - DME

Engine compartment purge fan driver, below limit value

The control line from the DME control module to the relay of the engine-compartment blower in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Short circuit to ground in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1686

Diagnosis information - DME

Engine compartment purge fan driver, open circuit

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Open circuit in control line to engine compartment purge fan relay
- Open circuit in the power supply to the engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1686

Function description - DME

Engine compartment purge fan switch-on conditions 997 stage LOW

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005:

  - Engine running
  - **and** step HIGH **not** activated, i.e.:
    - Intake air temperature < 25° C (77 °F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F)
    - **and** engine compartment temperature < 50° C (122 °F)
    - **and** coolant temperature < 102° C (216 °F)

- Model year 2006:

  - Intake air temperature < 30° C (86 °F)
  - **and** engine compartment temperature 25° C (77 °F)… 50° C (12 °F) (at ambient air temperature 10° C (50 °F)... 30° C (86 °F))
  - **and** coolant temperature < 100° C (212 °F)

P1686

Diagnosis information - DME

Engine compartment purge fan driver LOW, above limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in stage LOW in switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed
- Engine compartment purge fan stage LOW actuated

Possible fault causes

- Short circuit to B+ in control line to engine compartment purge fan relay LOW
- Engine compartment purge fan relay LOW faulty
- DME control module faulty

P1687

Diagnosis information - DME

Engine compartment purge fan driver, below limit value

The control line from the DME control module to the relay of the engine-compartment blower in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Short circuit to ground in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1687

Diagnosis information - DME

Engine compartment purge fan driver, open circuit

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Open circuit in control line to engine compartment purge fan relay
- Open circuit in the power supply to the engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

Function description - DME

Engine compartment purge fan switch-on conditions 997 stage LOW

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005:

  - Engine running
  - **and** step HIGH **not** activated, i.e.:
    - Intake air temperature < 25° C (77 °F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F)
    - **and** engine compartment temperature < 50° C (122 °F)
    - **and** coolant temperature < 102° C (216 °F)

- Model year 2006:

  - Intake air temperature < 30° C (86 °F)
  - **and** engine compartment temperature 25° C (77 °F)… 50° C (12 °F) (at ambient air temperature 10° C (50 °F)... 30° C (86 °F))
  - **and** coolant temperature < 100° C (212 °F)

P1687

Diagnosis information - DME

Engine compartment purge fan driver LOW, above limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in stage LOW in switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed
- Engine compartment purge fan stage LOW actuated

Possible fault causes

- Short circuit to B+ in control line to engine compartment purge fan relay LOW
- Engine compartment purge fan relay LOW faulty
- DME control module faulty

P1688

Diagnosis information - DME

Engine compartment purge fan driver, below limit value

The control line from the DME control module to the relay of the engine-compartment blower in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Short circuit to ground in control line to engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1688

Diagnosis information - DME

Engine compartment purge fan driver, open circuit

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in NOT switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed (only 997)
- Engine compartment purge fan NOT activated

Possible fault causes

- Open circuit in control line to engine compartment purge fan relay
- Open circuit in the power supply to the engine compartment purge fan relay
- Engine compartment purge fan relay faulty
- DME control module faulty

P1688

Function description - DME

Engine compartment purge fan switch-on conditions 997 stage LOW

Note
The switch-on conditions vary by vehicle type, model year, etc.

- Model year 2005:

  - Engine running
  - **and** step HIGH **not** activated, i.e.:
    - Intake air temperature < 25° C (77 °F) (at ambient air temperature 10° C (50 °F)... 40° C (104 °F)
    - **and** engine compartment temperature < 50° C (122 °F)
    - **and** coolant temperature < 102° C (216 °F)

- Model year 2006:

  - Intake air temperature < 30° C (86 °F)
  - **and** engine compartment temperature 25° C (77 °F)… 50° C (12 °F) (at ambient air temperature 10° C (50 °F)... 30° C (86 °F))
  - **and** coolant temperature < 100° C (212 °F)

P1688

Diagnosis information - DME

Engine compartment purge fan driver LOW, above limit value

NOTE
The control line from the DME control module to the relay of the engine compartment purge fan in stage LOW in switched-on state is monitored.
The switch-on conditions are dependent on the following temperatures:
- Engine compartment
- Coolant
- Ambient air
- Intake air

They vary by vehicle type, model year, engine version, etc. (see **function description**].

Diagnostic conditions

- Supply voltage > 7 V
- Engine start recognized
- Engine cover closed
- Engine compartment purge fan stage LOW actuated

Possible fault causes

- Short circuit to B+ in control line to engine compartment purge fan relay LOW
- Engine compartment purge fan relay LOW faulty
- DME control module faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P1689

Diagnosis information - Front axle lift system

Front axle lift system

Diagnostic conditions

- Engine running
- Doors closed

Fault setting condition(s)

- Fault in system Front axle lift system
- Pressure sensors provide implausible values
- System pressure cannot be built up or maintained (faulty compressor or leakage in Front axle lift system)
- No or faulty CAN communication (communication error stored in control units)

Fault effects

♦ No or restricted function Front axle lift system

P1689

Diagnosis information **- system**

Front axle lift system, limit not reached or exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

The front axle lift system is controlled by the rear control unit.
The DME control unit prevents the front axle of the vehicle from being raised as from a certain speed. The 'lift function deactivation' relay is picked up for this purpose.

The control circuit of the 'lift function deactivation' relay is monitored via the DME.

- Ignition on

Fault setting condition(s)

- Short circuit to ground/B+ or open circuit in the lines

Diagnosis information - DME control unit

Three-phase generator, electrical fault

ⓘ **NOTE**
The actual voltage supplied by the three-phase generator deviates from the required setpoint voltage (13.5 ... 15.5 V).

Diagnostic conditions

- Engine running

Possible fault causes

- Drive belt incorrectly adjusted / faulty
- Three-phase generator faulty

Affected contact on the DME control unit connector [A]:

- Contact 8 (terminal 87 - main relay)

P1694

Diagnosis information - DME control unit

Open circuit in line between three-phase generator and vehicle electrical system

Diagnostic conditions

- Engine running

Possible fault causes

♦ Charging line(s) / B+ - line open-circuit/short-circuit to ground
♦ Three-phase generator faulty

P1694

Diagnosis information - DME control unit

Three-phase generator, mechanical fault

ⓘ **NOTE**
The generator is not turning or hardly turning.

Diagnostic conditions

- Engine running

Possible fault causes

♦ V-belt heavily slipping (e.g. due to wetness)
♦ V-belt loose or faulty (torn)
♦ Foreign body in three-phase generator
♦ Three-phase generator faulty

P1694

Diagnosis information - DME control unit

Communication with generator interrupted

ⓘ **NOTE**
No or restricted communication between three-phase generator and DME control unit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground or open circuit in the line between the three-phase generator and DME control unit
♦ Three-phase generator faulty
♦ DME control unit faulty

Diagnosis information - DME control unit

Three-phase generator, electrical fault

ⓘ **NOTE**
The actual voltage supplied by the three-phase generator deviates from the required setpoint voltage (13.5 ... 15.5 V).

Diagnostic conditions

- Engine running

Possible fault causes

- ♦ Drive belt incorrectly adjusted / faulty
- ♦ Three-phase generator faulty

Affected contact on the DME control unit connector [A]:

- ♦ Contact 8 (terminal 87 - main relay)

P1695

Diagnosis information - DME control unit

Open circuit in line between three-phase generator and vehicle electrical system

Diagnostic conditions

- Engine running

Possible fault causes

♦ Charging line(s) / B+ - line open-circuit/short-circuit to ground
♦ Three-phase generator faulty

P1695

Diagnosis information - DME control unit

Three-phase generator, mechanical fault

ⓘ **NOTE**
The generator is not turning or hardly turning.

Diagnostic conditions

- Engine running

Possible fault causes

♦ V-belt heavily slipping (e.g. due to wetness)
♦ V-belt loose or faulty (torn)
♦ Foreign body in three-phase generator
♦ Three-phase generator faulty

P1695

Diagnosis information - DME control unit

Communication with generator interrupted

ⓘ **NOTE**
No or restricted communication between three-phase generator and DME control unit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground or open circuit in the line between the three-phase generator and DME control unit
♦ Three-phase generator faulty
♦ DME control unit faulty

Diagnosis information - DME control unit

Three-phase generator, electrical fault

ⓘ **NOTE**
The actual voltage supplied by the three-phase generator deviates from the required setpoint voltage (13.5 ... 15.5 V).

Diagnostic conditions

- Engine running

Possible fault causes

- ♦ Drive belt incorrectly adjusted / faulty
- ♦ Three-phase generator faulty

Affected contact on the DME control unit connector [A]:

- ♦ Contact 8 (terminal 87 - main relay)

P1696

Diagnosis information - DME control unit

Open circuit in line between three-phase generator and vehicle electrical system

Diagnostic conditions

- Engine running

Possible fault causes

♦ Charging line(s) / B+ - line open-circuit/short-circuit to ground
♦ Three-phase generator faulty

P1696

Diagnosis information - DME control unit

Three-phase generator, mechanical fault

ⓘ **NOTE**
The generator is not turning or hardly turning.

Diagnostic conditions

- Engine running

Possible fault causes

♦ V-belt heavily slipping (e.g. due to wetness)
♦ V-belt loose or faulty (torn)
♦ Foreign body in three-phase generator
♦ Three-phase generator faulty

P1696

Diagnosis information - DME control unit

Communication with generator interrupted

ⓘ **NOTE**
No or restricted communication between three-phase generator and DME control unit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground or open circuit in the line between the three-phase generator and DME control unit
♦ Three-phase generator faulty
♦ DME control unit faulty

Diagnosis information - DME control unit

Three-phase generator, electrical fault

ⓘ **NOTE**
The actual voltage supplied by the three-phase generator deviates from the required setpoint voltage (13.5 ... 15.5 V).

Diagnostic conditions

- Engine running

Possible fault causes

♦ Drive belt incorrectly adjusted / faulty
♦ Three-phase generator faulty

Affected contact on the DME control unit connector [A]:

♦ Contact 8 (terminal 87 - main relay)

P1697

Diagnosis information - DME control unit

Open circuit in line between three-phase generator and vehicle electrical system

Diagnostic conditions

- Engine running

Possible fault causes

♦ Charging line(s) / B+ - line open-circuit/short-circuit to ground
♦ Three-phase generator faulty

P1697

Diagnosis information - DME control unit

Three-phase generator, mechanical fault

ⓘ **NOTE**
The generator is not turning or hardly turning.

Diagnostic conditions

- Engine running

Possible fault causes

♦ V-belt heavily slipping (e.g. due to wetness)
♦ V-belt loose or faulty (torn)
♦ Foreign body in three-phase generator
♦ Three-phase generator faulty

P1697

Diagnosis information - DME control unit

Communication with generator interrupted

ⓘ **NOTE**
No or restricted communication between three-phase generator and DME control unit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground or open circuit in the line between the three-phase generator and DME control unit
♦ Three-phase generator faulty
♦ DME control unit faulty

Diagnosis information - DME control unit

Three-phase generator, electrical fault

ⓘ **NOTE**
The actual voltage supplied by the three-phase generator deviates from the required setpoint voltage (13.5 ... 15.5 V).

Diagnostic conditions

- Engine running

Possible fault causes

- ♦ Drive belt incorrectly adjusted / faulty
- ♦ Three-phase generator faulty

Affected contact on the DME control unit connector [A]:

- ♦ Contact 8 (terminal 87 - main relay)

P1698

Diagnosis information - DME control unit

Open circuit in line between three-phase generator and vehicle electrical system

Diagnostic conditions

- Engine running

Possible fault causes

♦ Charging line(s) / B+ - line open-circuit/short-circuit to ground
♦ Three-phase generator faulty

P1698

Diagnosis information - DME control unit

Three-phase generator, mechanical fault

ⓘ **NOTE**
The generator is not turning or hardly turning.

Diagnostic conditions

- Engine running

Possible fault causes

♦ V-belt heavily slipping (e.g. due to wetness)
♦ V-belt loose or faulty (torn)
♦ Foreign body in three-phase generator
♦ Three-phase generator faulty

P1698

Diagnosis information - DME control unit

Communication with generator interrupted

ⓘ **NOTE**
No or restricted communication between three-phase generator and DME control unit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground or open circuit in the line between the three-phase generator and DME control unit
♦ Three-phase generator faulty
♦ DME control unit faulty

Diagnosis information - DME control unit

Three-phase generator, electrical fault

ⓘ **NOTE**
The actual voltage supplied by the three-phase generator deviates from the required setpoint voltage (13.5 ... 15.5 V).

Diagnostic conditions

- Engine running

Possible fault causes

- ♦ Drive belt incorrectly adjusted / faulty
- ♦ Three-phase generator faulty

Affected contact on the DME control unit connector [A]:

- ♦ Contact 8 (terminal 87 - main relay)

P1699

Diagnosis information - DME control unit

Open circuit in line between three-phase generator and vehicle electrical system

Diagnostic conditions

- Engine running

Possible fault causes

♦ Charging line(s) / B+ - line open-circuit/short-circuit to ground
♦ Three-phase generator faulty

P1699

Diagnosis information - DME control unit

Three-phase generator, mechanical fault

ⓘ **NOTE**
The generator is not turning or hardly turning.

Diagnostic conditions

- Engine running

Possible fault causes

♦ V-belt heavily slipping (e.g. due to wetness)
♦ V-belt loose or faulty (torn)
♦ Foreign body in three-phase generator
♦ Three-phase generator faulty

P1699

Diagnosis information - DME control unit

Communication with generator interrupted

ⓘ **NOTE**
No or restricted communication between three-phase generator and DME control unit

Diagnostic conditions

- Engine running

Possible fault causes

♦ Loose contact or corrosion on connectors or lines
♦ Short circuit to B+/ground or open circuit in the line between the three-phase generator and DME control unit
♦ Three-phase generator faulty
♦ DME control unit faulty

P169A

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1701

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P1702

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

P2080

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ NOTE
The DME control unit detects an excessive deviation between the calculated exhaust temperature and that measured by the exhaust temperature sensor.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Exhaust temperature sensor not installed or incorrectly installed
♦ Exhaust temperature sensor faulty

P2080

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The exhaust temperature sensor control unit indicates that it or an exhaust temperature sensor is faulty.

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Exhaust temperature sensor faulty
♦ Exhaust temperature sensor control unit faulty

P2080

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The PWM signal from the exhaust temperature sensor control unit is above or below a limit threshold .

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Loose contact or corrosion on connectors or lines between the exhaust temperature sensor control unit and DME control unit
♦ Short circuit to B+/ground/between lines or open circuit in lines between exhaust temperature sensor control unit and DME control unit
♦ Power supply for exhaust temperature sensor control unit faulty
♦ Exhaust temperature sensor faulty
♦ DME control unit faulty

P2081

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The DME control unit detects an excessive deviation between the calculated exhaust temperature and that measured by the exhaust temperature sensor.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Exhaust temperature sensor not installed or incorrectly installed
♦ Exhaust temperature sensor faulty

P2081

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The exhaust temperature sensor control unit indicates that it or an exhaust temperature sensor is faulty.

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Exhaust temperature sensor faulty
♦ Exhaust temperature sensor control unit faulty

P2081

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The PWM signal from the exhaust temperature sensor control unit is above or below a limit threshold .

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Loose contact or corrosion on connectors or lines between the exhaust temperature sensor control unit and DME control unit
♦ Short circuit to B+/ground/between lines or open circuit in lines between exhaust temperature sensor control unit and DME control unit
♦ Power supply for exhaust temperature sensor control unit faulty
♦ Exhaust temperature sensor faulty
♦ DME control unit faulty

P2082

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The DME control unit detects an excessive deviation between the calculated exhaust temperature and that measured by the exhaust temperature sensor.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Exhaust temperature sensor not installed or incorrectly installed
♦ Exhaust temperature sensor faulty

P2082

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The exhaust temperature sensor control unit indicates that it or an exhaust temperature sensor is faulty.

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Exhaust temperature sensor faulty
♦ Exhaust temperature sensor control unit faulty

P2082

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The PWM signal from the exhaust temperature sensor control unit is above or below a limit threshold .

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Loose contact or corrosion on connectors or lines between the exhaust temperature sensor control unit and DME control unit
♦ Short circuit to B+/ground/between lines or open circuit in lines between exhaust temperature sensor control unit and DME control unit
♦ Power supply for exhaust temperature sensor control unit faulty
♦ Exhaust temperature sensor faulty
♦ DME control unit faulty

P2083

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The DME control unit detects an excessive deviation between the calculated exhaust temperature and that measured by the exhaust temperature sensor.

Diagnostic conditions

- Engine running

Possible fault causes

♦ Exhaust temperature sensor not installed or incorrectly installed
♦ Exhaust temperature sensor faulty

P2083

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The exhaust temperature sensor control unit indicates that it or an exhaust temperature sensor is faulty.

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Exhaust temperature sensor faulty
♦ Exhaust temperature sensor control unit faulty

P2083

Diagnosis information - DME control unit

Exhaust temperature sensor

ⓘ **NOTE**
The PWM signal from the exhaust temperature sensor control unit is above or below a limit threshold .

Diagnostic conditions

- Engine idle speed

Possible fault causes

♦ Loose contact or corrosion on connectors or lines between the exhaust temperature sensor control unit and DME control unit
♦ Short circuit to B+/ground/between lines or open circuit in lines between exhaust temperature sensor control unit and DME control unit
♦ Power supply for exhaust temperature sensor control unit faulty
♦ Exhaust temperature sensor faulty
♦ DME control unit faulty

P2088

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test run (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P2088

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P2088

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P2089

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test run (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P2089

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P2089

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P2090

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

♦ Solenoid hydraulic valve faulty (coil short circuit)
♦ Short circuit to B+ in control line to solenoid hydraulic valve
♦ DME control unit faulty

P2090

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery voltage 10 V …16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control unit faulty

P2090

Diagnostic information

Driver of solenoid hydraulic valve for camshaft adjustment

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (coil short circuit)
- Short circuit to B+ in circuit of solenoid hydraulic valve (P2091)
- Short circuit to ground in circuit of solenoid hydraulic valve (P2090)
- Open circuit in solenoid hydraulic valve circuit (P0013)
- DME control unit faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

ⓘ NOTE
The specified values apply only at an ambient temperature of approx. 20 °C (68 °F) (room temperature).

Setpoints, solenoid valve

♦ Internal resistance > 5 Ohm ⇒ < 15 Ohm

P2090

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery voltage 10 V …16 V
- Time after engine starts > 10 seconds

Possible fault causes

- ♦ Solenoid hydraulic valve for camshaft adjustment faulty (open circuit)
- ♦ Open circuit in the control line to solenoid hydraulic valve
- ♦ Open circuit in the power supply line to solenoid hydraulic valve
- ♦ DME control unit faulty

P2091

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

♦ Solenoid hydraulic valve faulty (coil short circuit)
♦ Short circuit to B+ in control line to solenoid hydraulic valve
♦ DME control unit faulty

P2091

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery voltage 10 V …16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control unit faulty

P2091

Diagnostic information

Driver of solenoid hydraulic valve for camshaft adjustment

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (coil short circuit)
- Short circuit to B+ in circuit of solenoid hydraulic valve (P2091)
- Short circuit to ground in circuit of solenoid hydraulic valve (P2090)
- Open circuit in solenoid hydraulic valve circuit (P0013)
- DME control unit faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

ⓘ NOTE
The specified values apply only at an ambient temperature of approx. 20 °C (68 °F) (room temperature).

Setpoints, solenoid valve

♦ Internal resistance > 5 Ohm ⇒ < 15 Ohm

P2091

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery voltage 10 V …16 V
- Time after engine starts > 10 seconds

Possible fault causes

- ♦ Solenoid hydraulic valve for camshaft adjustment faulty (open circuit)
- ♦ Open circuit in the control line to solenoid hydraulic valve
- ♦ Open circuit in the power supply line to solenoid hydraulic valve
- ♦ DME control unit faulty

P2092

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P2092

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P2092

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test run (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

P2093

Diagnostic information

Solenoid hydraulic valve driver, below limit value

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit to housing)
- Short circuit to ground in control line to solenoid hydraulic valve
- DME control module faulty

P2093

Diagnostic information

Solenoid hydraulic valve driver, open circuit

Diagnostic conditions

- Battery positive voltage 10 V ... 16 V
- Time after engine starts > 10 seconds

Possible fault causes

- Solenoid hydraulic valve faulty (open circuit)
- Open circuit in the activation line to the solenoid hydraulic valve
- Open circuit in the power supply line to the solenoid hydraulic valve
- DME control module faulty

P2093

Diagnostic information

Solenoid hydraulic valve driver, above limit value

Diagnostic conditions

- Short test run (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (short circuit of coil)
- Short circuit to B+ in control line to solenoid hydraulic valve
- DME control module faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

ⓘ NOTE
The specified values apply only at an ambient temperature of approx. 20 °C (68 °F) (room temperature).

Setpoints, solenoid valve

♦ Internal resistance > 5 Ohm ⇒ < 15 Ohm

P2094

Diagnostic information

Driver of solenoid hydraulic valve for camshaft adjustment

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (coil short circuit)
- Short circuit to B+ in circuit of solenoid hydraulic valve (P2095)
- Short circuit to ground in circuit of solenoid hydraulic valve (P2094)
- Open circuit in solenoid hydraulic valve circuit (P0023)
- DME control unit faulty

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

ⓘ NOTE
The specified values apply only at an ambient temperature of approx. 20 °C (68 °F) (room temperature).

Setpoints, solenoid valve

♦ Internal resistance > 5 Ohm ⇒ < 15 Ohm

P2095

Diagnostic information

Driver of solenoid hydraulic valve for camshaft adjustment

Diagnostic conditions

- Short test drive (solenoid hydraulic valve activation)

Possible fault causes

- Solenoid hydraulic valve faulty (coil short circuit)
- Short circuit to B+ in circuit of solenoid hydraulic valve (P2095)
- Short circuit to ground in circuit of solenoid hydraulic valve (P2094)
- Open circuit in solenoid hydraulic valve circuit (P0023)
- DME control unit faulty

P2096

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2096

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2096

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2096

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2096

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2096

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2096

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2097

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2097

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2097

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2097

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2097

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2097

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2097

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2098

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2098

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2098

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2098

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2098

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2098

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2098

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2099

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2099

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2099

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2099

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2099

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2099

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2099

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2100

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2100

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2100

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2100

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2100

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2101

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2101

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2101

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2101

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2101

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2102

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2102

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2102

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2102

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2102

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2103

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2103

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2103

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2103

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2103

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2108

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2108

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2108

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2108

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2108

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2119

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2119

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2119

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2119

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2119

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2121

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2121

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2121

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2121

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2121

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2122

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2122

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2122

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2122

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2122

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2123

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2123

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2123

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2123

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2123

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2126

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2126

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2126

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2126

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2126

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2127

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2127

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2127

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2127

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2127

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2128

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2128

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2128

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2128

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2128

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2176

Diagnosis information - DME

Throttle valve adjusting unit - position deviation/control range

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Throttle valve adjusting unit faulty

P2176

Diagnosis information - DME

Throttle valve adjusting unit - potentiometer

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground in the sensor line to potentiometer 1 or 2 of the throttle valve adjusting unit
- Throttle valve adjusting unit faulty
- DME control module faulty

P2176

Diagnosis information - DME

Throttle valve adjusting unit faulty

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- Throttle valve adjusting unit faulty

P2176

Diagnosis information - DME

Throttle valve adjusting unit - output stage

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of activation line for throttle valve adjusting unit positioning motor
- Power supply of positioning motor for throttle valve adjusting unit interrupted
- Throttle valve adjusting unit faulty
- DME control module faulty

P2176

Diagnosis information - DME

Throttle valve adjusting unit not adapted

NOTE
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- There are no, or no valid, adaptation values stored in the DME control module (after replacment of throttle valve adjusting unit and/or DME) because:
  - adaptation has not been performed.
  - adaptation was not performed successfully.
  - adaptation was aborted.

- Throttle valve adjusting unit faulty

P2177

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

P2177

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

P2177

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P2178

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

P2178

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P2179

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

P2179

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

P2179

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

P2179

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P2180

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

P2180

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P2181

Diagnosis information - DME

Thermostat stuck open

Diagnostic conditions

- Vehicle speed > 15 km/h (9 mph)
- Engine speed 1,000 ... 5,000 rpm
- Air mass throughput under the aforementioned conditions: 3.0 kg
- Coolant temperature when engine starts < 60 °C (140 °F)
- Ambient temperature -6.8 °C …(19.8 °F) … 60 °C (140 °F)

NOTE

- In this context, please also observe the function description.

Possible fault causes

- Thermostat faulty (stuck open)
- Coolant temperature sensor faulty
- Tiptronic vehicles only: coolant shutoff valve open (mechanical fault, lack of vacuum…)

Function description - DME

Thermostat stuck open

Note
- The diagnostic conditions can best be established on a (roller-type) dynamometer.

Start of diagnosis after engine starting under the following conditions:
- Engine not hot
- Ambient temperature in a suitable range
- Normal driving
- Adequate air mass throughput

Diagnosis procedure:
- The air throughput is used to estimate the amount of heat liberated during combustion of the fuel mixture.
- If, under the conditions described above, the coolant temperature does not reach a certain value after a certain amount of fuel mixture has passed through the engine, it is assumed that the thermostat is stuck in open position.
- Since a stuck temperature signal also produces a similar fault symptom, the fault "engine temperature sensor" might also be entered. The sensor must be checked in this case.
- In Tiptronic vehicles, an open coolant shutoff valve can also lead to this fault entry, as the engine heat is transferred to the transmission via the transmission cooling.

P2187

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

P2187

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P2187

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
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● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

P2187

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

P2187

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P2188

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
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♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

P2188

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

P2188

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P2188

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
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Diagnostic conditions

● Mass air flow < 32 kg/h
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● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

P2188

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

P2188

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

P2189

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

P2189

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.

● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

P2192

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

P2193

Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed)
- below limit value

NOTE
● Diagnosis should indicate a negative deviation of more than 6% (weakening) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Mechanical fault of fuel injector (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Lambda control adaptation RKAT (range near idle speed) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 6% (enrichment) of the lambda control adaptation in the range near idle speed.
● Opposed adaptation values in connection with misfires indicate that the timing is out of adjustment.

Diagnostic conditions

● Mass air flow < 32 kg/h
● Engine speed < 960 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
  (setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
  ► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
  + for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Oil filler cap leaking (secondary air)
♦ Intake system leaking (secondary air)
♦ Positive crankcase ventilation leaking (secondary air)
♦ Crankcase leaking (secondary air, e.g. through sealing ring fitted skew)
♦ Leak in exhaust system
♦ Tank vent faulty (does not close completely)

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - above limit value

NOTE

● Diagnosis should indicate a positive deviation of more than 30% (enrichment) of the lambda control adaptation in the partial load range (FRAU > 1.3).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
  ⇒ USA: Time after engine starts 250 … 350 seconds
  ⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Intake system leaking (secondary air)
♦ Leak in exhaust system
♦ Fuel pressure too low
♦ Fuel injector faulty (stuck)
♦ Fuel pump delivery too low

Diagnosis information - DME

Lambda control adaptation FRAU (lower load range) - below limit value

NOTE

● Diagnosis should indicate a negative deviation of more than 30% (weakening) of the lambda control adaptation in the partial load range (FRAU > 0.7).

Diagnostic conditions

● Engine load 15 .. 80%
● Mass air flow via hot-film mass air flow sensor 40 ... 220 kg/h
● Engine speed 1,040 ... 4,760 rpm
● Lambda control ahead of catalytic converter active
● Engine temperature > 55.5 ° C (132 °F)
● No tank ventilation
⇒ USA: Time after engine starts 250 … 350 seconds
⇒ RoW: Time after engine starts 302 … 402 seconds
● No faults detected for oxygen sensor
● No faults detected for tank vent
● No faults detected for hot-film mass air flow sensor

Possible fault causes

♦ Hot-film mass air flow sensor faulty (displaced characteristic/soiled, e.g. due to faulty air cleaner/unfiltered air)
(setpoint voltage with stopped engine and ignition on = 0.9 ... 1.1 V
► see Actual values, Filter >Mass air flow<, >Mass air flow sensor 1 (sensor)<
+ for Turbo >Mass air flow sensor 2 (sensor)<)
♦ Fuel pressure too high
♦ Fuel injector faulty (dripping)
♦ Tank vent faulty (does not close completely)

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Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

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Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

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Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

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Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

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Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2195

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

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Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

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Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2196

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2196

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2196

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2196

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

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Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

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Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

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Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

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Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

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Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

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Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

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Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2197

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

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Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

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Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

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Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2198

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2198

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2198

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2198

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2198

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2227

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P2227

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P2227

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P2227

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P2227

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P2227

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P2227

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- ♦ Ambient pressure sensor (DME control unit) faulty

P2227

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P2228

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P2228

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P2228

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P2228

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P2228

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

- DME control module faulty

P2228

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P2228

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P2228

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P2229

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P2229

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P2229

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P2229

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P2229

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P2229

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P2229

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P2229

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P2230

Diagnosis information - DME

Function monitoring

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ DME control module faulty

P2230

Diagnosis information - DME

Throttle valve adjusting unit - amplifier calibration

NOTE
The fault is stored during the adaptation phase.
When a fault is detected, the system is in stand-by operation mode in pedal sensor, i.e.:
- Maximum pedal value is limited to 30 %.
- Dynamism is limited.

Diagnostic conditions

- Supply voltage > 10 V
- Time after ignition on > 30 s
- Engine not running
- Vehicle is stationary
- Engine temperature 5 °C ... 100 °C
- Intake air temperature > 5 °C
- Pedal value < 0.8 %

Possible fault causes

- DME control module faulty

P2230

Diagnosis information - DME

Power supply, implausible signal

NOTE
The fault is detected if the measured voltage is lower than the operating voltage of the control module.
If a fault is detected, a substitute value of 14.05 V is used.

Diagnostic conditions

- Time after engine starts > 240 s

Possible fault causes

- DME control module faulty

P2230

Diagnosis information - DME

Function monitoring of torque comparison

Diagnostic conditions

- Engine speed > 1120 rpm

Possible fault causes

♦ Hot-film mass air flow meter faulty
♦ DME control module faulty

P2230

Diagnosis information - DME

Knock control (zero test/offset/test pulse)

NOTE
If a fault is detected, the timing angle is set behind the nominal ignition timing angle for all cylinders in the active knock control range.

Diagnostic conditions

- Engine speed < 5600 rpm
- Engine load > 45 %
- Knock control active

Possible fault causes

♦ DME control module faulty

P2230

Diagnosis information - DME

Control unit faulty (EEPROM/RAM/ROM)

Diagnostic conditions

- Ignition on

Possible fault causes

♦ DME control module faulty

P2230

Diagnosis information - DME control unit

Ambient pressure implausible

Diagnostic conditions

- Ignition on

Possible fault causes

- Ambient pressure sensor (DME control unit) faulty

P2230

Diagnosis information - DME

Torque limit: nominal torque - permanently limited

Diagnostic conditions

- Driving

Possible fault causes

♦ DME control module faulty

P2231

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2231

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2231

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2231

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2231

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2231

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2231

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2232

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P2232

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2232

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2232

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2232

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P2234

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2234

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2234

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2234

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2234

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2234

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2234

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2235

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P2235

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P2235

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2243

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2243

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2243

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2243

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2243

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2243

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2243

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2247

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2247

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2247

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2247

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2247

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2247

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2247

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2251

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2251

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2251

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2251

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2251

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2251

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2251

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2254

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2254

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2254

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2254

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2254

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2254

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2254

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2257

Diagnosis information - DME

Driver of secondary air pump relay

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of control line to secondary-air pump relay
- Open circuit in the power supply to the secondary-air pump relay
- Secondary-air pump relay faulty
- DME control module faulty

P2258

Diagnosis information - DME

Driver of secondary air pump relay

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- Open circuit, short circuit to B+ or short circuit to ground of control line to secondary-air pump relay
- Open circuit in the power supply to the secondary-air pump relay
- Secondary-air pump relay faulty
- DME control module faulty

P2270

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P2270

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2270

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2270

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2270

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P2271

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P2271

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2271

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too rich

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2271

Diagnosis information - DME

Oxygen sensor signal after catalytic converter, too lean

Diagnostic conditions

- Mass air flow throughput 25 kg/h ... 120 kg/h
- Oxygen sensing behind catalytic converter active
- Basic adaptation stabilized
- No secondary air system diagnosis
- No tank ventilation diagnosis
- No high loading of carbon filter
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2271

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P2272

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P2272

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- Short circuit to B+ in signal wire
- Oxygen sensor faulty
- DME control module faulty

P2272

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2273

Diagnosis information - DME

Oxygen sensor behind catalytic converter, open circuit

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Time after engine starts > 200 s
- Oxygen sensor heater > 80% for > 60s
- Exhaust temperature 200 °C ... 800 °C

Possible fault causes

- Fault in oxygen sensor heater, if this is present, it must be rectified first
- Loose contact or corrosion in the connector
- Open circuit in the signal leads
- Open circuit in ground lead
- Oxygen sensor faulty
- DME control module faulty

P2273

Diagnosis information - DME

Oxygen sensor after catalytic converter, over limit value

Diagnostic conditions

- DME control module supply voltage 10 V ... 16 V
- Exhaust temperature < 800 °C

Possible fault causes

- ♦ Short circuit to B+ in signal wire
- ♦ Oxygen sensor faulty
- ♦ DME control module faulty

P2273

Diagnosis information - DME

Oxygen sensor after catalytic converter, below limit value

Diagnostic conditions

- Exhaust temperature < 800 °C
- Oxygen sensor behind the catalytic converter ready
- DME control module supply voltage 10 V ... 16 V
- No other oxygen-sensor faults
- No secondary air
- No secondary air system diagnosis
- No tank ventilation
- No tank ventilation diagnosis

Possible fault causes

- Short circuit to ground in signal wire
- Oxygen sensor faulty
- DME control module faulty

Diagnosis information - DME

Oxygen sensor behind catalytic converter, dynamism

NOTE
During the t hrust phase, the catalytic converter is saturated with oxygen, the oxygen sensor behind catalytic converter must detect a lean mixture. If this does not happen in an appropriate amount of time, the oxygen sensor will be detected as sluggish.

Diagnostic conditions

- Thrust phase for at least 5 seconds
- Oxygen sensors behind the catalytic converter ready
- Basic adaptation stabilized
- No other oxygen-sensor faults

Possible fault causes

♦ Oxygen sensor faulty (dynamically inert)

P2279

Diagnosis information - DME control unit

Boost pressure control deviation

NOTE
The boost pressure is judged to be too small and increased through the boost-pressure control.
The fault is detected if the boost pressure control cannot adjust the boost pressure correctly within a control limit.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

♦ Charge-air cooler or charge-air line(s) (pressure-side) leaks between turbocharger and engine
♦ Charge air cooler or Charge air line(s) (pressure-side) between Turbocharger and Engine Narrowed / Blocked

♦ Diverter valve does not close (sufficiently)
♦ Wrong value from boost pressure sensor on DME control unit
♦ Boost pressure adjuster fails to adjust (sufficiently)
♦ 1 Turbocharger blocked / Faulty

Fault effects

♦ Boost pressure control switched off (Boost pressure low)
♦ Reduction Engine torque

P2279

Diagnosis information - DME control unit

Intake air system leak

NOTE
A leak is detected upstream of the throttle valve (hose reduction detection) in suction and charging mode through comparison of various measured variables and characteristic maps.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

♦ Charge-air cooler or charge-air line(s) (pressure-side) leaks between turbocharger and engine

Fault effects

♦ Boost pressure control switched off (Boost pressure low)
♦ Reduction Engine torque

P2279

Diagnosis information - DME control unit

Boost pressure control limit exceeded

NOTE
The boost pressure is judged to be too large and reduced through the boost-pressure control. The fault is detected if the boost pressure control cannot adjust the boost pressure correctly within a control limit.

Diagnostic conditions

- Full-load acceleration

Possible fault causes

- Boost pressure adjuster fails to adjust (sufficiently)
- Wrong value from boost pressure sensor on DME control unit
- Diverter valve does not open (sufficiently)

Fault effects

- Boost pressure control switched off (Boost pressure low)
- Reduction Engine torque

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P2301

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P2303

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P2306

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P2310

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P2312

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

P2313

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

Diagnosis information - DME

Bar ignition modules

ⓘ NOTE

The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
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- Engine temperature > -30 °C (-22 °F)

Possible fault causes

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- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

Diagnosis information - DME

Bar ignition modules

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The bar ignition module cannot be tested as it is an active component.
If a faulty bar ignition module is diagnosed, the connection to the engine ground must be checked before replacing the module as otherwise a faulty engine ground connection will damage the new bar ignition module.

Diagnostic conditions

- Battery voltage between 10 V and 16 V
- Time after engine starts > 2 seconds
- Engine temperature > -30 °C (-22 °F)

Possible fault causes

- Short circuit to B+
- Short circuit to ground
- Open circuit
- Fuse D7 faulty
- Bar ignition module faulty

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, heater driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in heater control line for DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, pump driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground of control line to pump motor of DTML module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, valve driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in control line to change-over valve of DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P2401

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, heater driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in heater control line for DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P2401

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, pump driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground of control line to pump motor of DTML module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P2401

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, valve driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in control line to change-over valve of DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P2402

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, heater driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in heater control line for DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P2402

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, pump driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine start

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground of control line to pump motor of DTML module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

P2402

Diagnosis information - DME (DFI)

DMTL - Tank leakage diagnosis module, valve driver

Diagnostic conditions

- Supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in control line to change-over valve of DMTL module
♦ Open circuit in the power supply to the DMTL module
♦ DMTL - tank leakage diagnosis module faulty

Function description - DME

Tank leakage test / DMTL - tank leakage diagnosis module

NOTE
The tank leakage test is performed only for USA vehicles.

Design of the tank leakage diagnosis module:
♦The diagnosis module consists of an electric motor with a small air pump, change-over valves and a reference nozzle.
♦The module is also heated to prevent formation of condensation and ice.

Function sequence:
♦ The pump is driven by an electric motor and pumps air through the reference leak . The current consumption is measured during this operation.
♦ The change-over valve then switches and directs the air flow into the tank. The current consumption is measured here as well. After a wait time depending on the tank level and with a leak-tight tank system, this value must be as least as high as the current consumption for the reference leak test.
♦ The system is detected as having a leak if the current consumption for the actual leak test is lower than for the reference leak test.
♦ Faults in the tank leakage diagnosis module can be detected by evaluation of the current consumption during start-up of the pump motor and after valve switch-over (e.g. pump stuck, motor turns without load, valve does not switch, etc.)
♦ Diagnosis of the heating, motor and change-over valve takes place via the driver in the DME control unit.

P2440

Diagnosis information **- system**

Secondary air valve leak

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

The secondary air pump continues pumping after the secondary air valve is closed. The lambda control detects whether the secondary air valve closes completely.

- Engine cold start
- No lambda control fault

Fault setting condition(s)

- Leaking secondary air valve
- If only one fault code is set (bank 1 or bank 2), it is necessary to check the connection from the secondary air valve to the bank which is not faulty, since the excessively high air amount was not detected here

P2440

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to B+ in control line to secondary air valve

P2440

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Open circuit in secondary air valve circuit

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P2440

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to ground in the secondary air valve circuit
- Secondary air valve fuse faulty

P2442

Diagnosis information **- system**

Secondary air valve leak

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

The secondary air pump continues pumping after the secondary air valve is closed. The lambda control detects whether the secondary air valve closes completely.

- Engine cold start
- No lambda control fault

Fault setting condition(s)

- Leaking secondary air valve
- If only one fault code is set (bank 1 or bank 2), it is necessary to check the connection from the secondary air valve to the bank which is not faulty, since the excessively high air amount was not detected here

P2442

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to B+ in control line to secondary air valve

P2442

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Open circuit in secondary air valve circuit

Setpoint definitions

ⓘ NOTE
The specified values and value ranges correspond to the OK state in each case.

Line test setpoints

Short circuit to B+:
♦ Setpoint voltage - 0.5 V ⇒ + 0.5 V

Short circuit to ground:
♦ Setpoint resistance > 0.9 MOhm

Open circuit:
♦ Setpoint resistance < 2 Ohm

P2442

Diagnosis information **- system**

Secondary air valve, limit value exceeded

Diagnostic conditions
The control unit must be active in order to be able to test internal function sequences and diagnosable inputs/outputs.

In the event of a fault, check to ensure that the diagnosis object is faulty. Check whether the fault is permanently >present<, erase the fault memory, satisfy diagnosis conditions and read out the fault memory again.

On this vehicle, the secondary air is switched via an electrically monitored valve.

- Ignition on

Fault setting condition(s)

- Short circuit to ground in the secondary air valve circuit
- Secondary air valve fuse faulty

P2626

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2626

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2626

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2626

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2626

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2626

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2626

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2629

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor temperature < 685 °C (1,265 °F)
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- Oxygen sensor only connected electrically (not installed in exhaust flow)
- Oxygen sensor faulty
- DME control module faulty

P2629

Diagnosis information - DME

Lambda correction behind cat. converter, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor ahead of the cat. converter and the value measured by the oxygen sensor behind the cat. converter.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor behind the catalytic converter measuring more residual oxygen in the exhaust than the sensor ahead of the catalytic converter.

Diagnostic conditions

- Engine running
- Lambda control in front of catalytic converter active
- No faults detected for oxygen sensor behind cat. converter

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **in front** of catalytic converter faulty (contaminated/aged)

P2629

Diagnosis information - DME

Oxygen sensor in front of catalytic converter, dynamism

Diagnostic conditions

- Exhaust temperature > 350°C
- Oxygen sensing active
- Engine speed 1000 ... 3000 rpm
- Engine load 14 .. 69%
- No high loading of activated charcoal filter
- No other oxygen-sensor faults stored

Possible fault causes

♦ Oxygen sensor in front of catalytic converter faulty (dynamically inert)
♦ Leak in exhaust system

P2629

Diagnosis information - DME

Lambda correction downstream, bank 1 - rich/lean control limit exceeded

NOTE

- Diagnosis detects a deviation between the lambda value measured by the oxygen sensor upstream and the value measured by the oxygen sensor downstream.
- The deviation is eliminated through adaptation, a fault is only set once the adaptation limits are exceeded.
- The most common fault cause is a leakage between the two oxygen sensors, resulting in the sensor downstream measuring more residual oxygen in the exhaust than the sensor upstream.

Diagnostic conditions

- Engine running
- Oxygen sensing upstream active
- No faults detected for oxygen sensor or oxygen sensor heater up and downstream
- No fault for secondary air injection, catalytic converter or tank vent entered

Possible fault causes

- Leakage in exhaust system between the two oxygen sensors
- Oxygen sensor **upstream** faulty (contaminated/aged)

P2629

Diagnosis information - DME

Oxygen sensor upstream

NOTE
The fault "Over limit value" is detected if the oxygen sensor voltage is > 1.5 V for an uninterrupted period of more than 5 s.

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Oxygen sensor heater switched on for > 70 s
- Oxygen sensing active
- Exhaust temperature 600 °C (1,112 °F)... 750 °C (1,382 °F)
- min. 3 s overrun
- No secondary air injection or diagnosis of secondary air system active
- No tank ventilation or diagnosis of tank ventilation system active
- No other oxygen-sensor faults stored

Possible fault causes

- Fault in oxygen sensor heater ⇒ If this exists, is to be taken care of first
- Loose contact or corrosion in the connector
- Short circuit to B+/ground/between wires or open circuit in the wiring
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2629

Diagnosis information - DME

O2 sensor upstream, dynamic response

Diagnostic conditions

- Oxygen sensor temperature < 570 °C (1,058 °F)
- Oxygen sensing active
- Engine speed 1120 ... 4000 rpm
- Engine load 11 .. 60%
- Secondary air injection off
- No excessive loading of activated charcoal filter
- No other oxygen-sensor faults stored
- No tank leakage or tank vent fault stored

Possible fault causes

- Oxygen sensor upstream faulty (dynamically inert)
- Leak in exhaust system

P2629

Diagnosis information - DME

Oxygen sensor upstream

Diagnostic conditions

- DME control module power supply 10.5 V … 16 V
- Exhaust temperature < 800 °C (1,472 °F)
- Oxygen sensor temperature > 685 °C (1,265 °F)
- Catalytic converter heating not active
- Secondary air injection not active
- No other oxygen-sensor faults upstream stored

Possible fault causes

- High resistance short circuit to B+ in signal wire
- Heater injection
- Oxygen sensor faulty
- DME control module faulty

P2A00

Diagnosis information - DME

Oxygen sensing interrupted (open loop)

NOTE
- The DME has detected an implausible temperature range for the oxygen sensor
- or a vehicle voltage > 16 V.
- Because oxygen sensing is interrupted when this happens, the DME stores this fault as information.
- The exact fault cause is stored as an additional P code if necessary.

Diagnostic conditions

- Engine running

Possible fault causes

- Vehicle voltage > 16 V
- Other electric faults of the oxygen sensor ahead of catalytic converter

P2A03

Diagnosis information - DME

Oxygen sensing interrupted (open loop)

NOTE
- The DME has detected an implausible temperature range for the oxygen sensor
- or a vehicle voltage > 16 V.
- Because oxygen sensing is interrupted when this happens, the DME stores this fault as information.
- The exact fault cause is stored as an additional P code if necessary.

Diagnostic conditions

- Engine running

Possible fault causes

- Vehicle voltage > 16 V
- Other electric faults of the oxygen sensor ahead of catalytic converter

P3081

Diagnosis information - DME

Coolant temperature sensor function

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

♦ Open circuit, short circuit to B+ or short circuit to ground in sensor line to coolant temperature sensor
♦ Open circuit in ground supply to coolant temperature sensor
♦ Coolant temperature sensor faulty
♦ Thermostat faulty (stuck open)
♦ Tiptronic vehicles only: coolant shutoff valve open (mechanical fault, lack of vacuum…)
♦ DME control module faulty

P3081

Diagnosis information - DME

Electric coolant temperature sensor

Diagnostic conditions

- Power supply voltage 10 V ... 16 V
- Engine running

Possible fault causes

- ♦ Short circuit to B+/ground or open circuit in the sensor line
- ♦ Open circuit in ground supply to coolant temperature sensor
- ♦ Coolant temperature sensor faulty
- ♦ DME control module faulty

Diagnosis information - DME (DFI)

Coolant temperature stuck

NOTE

The fault is detected if the coolant temperature at engine start was > 35 °C (95 °F)... > 75 °C (167 °F) (depending on time since engine was switched off).
(e.g. off period 6 h ⇒ Coolant temperature when engine starts > 75 °C (167 °F)

Diagnostic conditions

- Time since engine off > 6 h
- Intake air temperature when engine starts < 55 °C (131 °F)
- When the engine starts, the ambient temperature may differ from the intake air temperature by a maximum of 10 °C (18 °F)
- Engine running > 30 s

Possible fault causes

- Loose contact or corrosion on connectors or lines
- Coolant temperature sensor faulty
- Thermostat faulty
- Influence by engine-block heater

U0073

Diagnosis information - CAN

DME control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The DME control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
DME control module wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for DME control module
- DME control module incorrectly coded
- Short circuit or open circuit in the CAN drive
- DME control module faulty (in most cases the cause is not the DME control module but incorrect coding!)

Fault effects

- Communication via the CAN drive is no longer possible.
- No other control modules are able to communicate with the DME control module.

Affected contacts on the DME control module connector
Connector A:

- 1 power supply - terminal 30
- 2 power supply - terminal 15
- 4 ground supply - terminal 31
- 5 ground supply - terminal 31
- 6 ground supply - terminal 31

Connector D:

- 36 CAN drive high
- 37 CAN drive low

U0073

Diagnosis information - CAN

DME control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The DME control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
DME control module wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for DME control module
- DME control module incorrectly coded
- Short circuit or open circuit in the CAN drive
- DME control module faulty (in most cases the cause is not the DME control module but incorrect coding!)

Fault effects

- Communication via the CAN drive is no longer possible.
- No other control modules are able to communicate with the DME control module.

Affected contacts on the DME control module connector
Connector A:

- 1 power supply - terminal 30
- 2 power supply - terminal 15
- 4 ground supply - terminal 31
- 5 ground supply - terminal 31
- 6 ground supply - terminal 31

Connector D:

- 36 CAN drive high
- 37 CAN drive low

Diagnosis information - CAN

Communication, transmission control unit

NOTE
Internal function test completed.

Diagnostic conditions
The transmission control unit initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Transmission control unit wake-up through:

- Event-controlled CAN message
- Ignition on

Possible fault causes

- No power supply for transmission control unit
- Transmission control unit is incorrectly coded
- Short circuit or open circuit of CAN Drive
- Transmission control unit faulty (in most cases the cause is not the transmission control unit but incorrect coding!)
- DME control unit faulty

Fault effects

- No communication can take place via CAN Drive
- No other control units are able to communicate with the transmission control unit.

U0103

Diagnosis information - CAN

Communication, transmission control unit

NOTE
Internal function test completed.

Diagnostic conditions
The transmission control unit initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Transmission control unit wake-up through:

- Event-controlled CAN message
- Ignition on

Possible fault causes

- No power supply for transmission control unit
- Transmission control unit is incorrectly coded
- Short circuit or open circuit of CAN Drive
- Transmission control unit faulty (in most cases the cause is not the transmission control unit but incorrect coding!)
- DME control unit faulty

Fault effects

- No communication can take place via CAN Drive
- No other control units are able to communicate with the transmission control unit.

U0103

Diagnosis information - CAN

Communication, transmission control unit

NOTE
Internal function test completed.

Diagnostic conditions
The transmission control unit initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Transmission control unit wake-up through:

- Event-controlled CAN message
- Ignition on

Possible fault causes

- No power supply for transmission control unit
- Transmission control unit is incorrectly coded
- Short circuit or open circuit of CAN Drive
- Transmission control unit faulty (in most cases the cause is not the transmission control unit but incorrect coding!)
- DME control unit faulty

Fault effects

- No communication can take place via CAN Drive
- No other control units are able to communicate with the transmission control unit.

U0104

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

U0129

Diagnosis information - CAN

PSM control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The PSM control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
PSM control module wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for PSM control module
- PSM control module incorrectly coded
- Short circuit or open circuit in the CAN drive
- PSM control module faulty (in most cases the cause is not the PSM control module but incorrect coding!)

Fault effects

- Communication via the CAN drive is no longer possible.
- No other control modules are able to communicate with the PSM control module.

Affected contacts on the PSM control module connector
Connector A:

- 4 ground supply - terminal 31
- 14 CAN drive low
- 28 power supply - terminal 15
- 35 CAN drive high

U0140

Diagnosis information - CAN

Front control module, communication

NOTE
Internal function test completed!

Diagnostic conditions
The front control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Front control module wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for front control module
- Front control module is incorrectly coded
- Short circuit or open circuit in the CAN comfort
- Front control module faulty (in most cases the cause is not the front control module but incorrect coding!)

Fault effects

- Communication via the CAN comfort is no longer possible.
- No other control modules are able to communicate with the front control module.

Affected contacts on the front control module connector
Connector A:

- 1 power supply - terminal 30
- 7 CAN comfort low
- 15 CAN comfort high
- 21 power supply - terminal 15
- 35 power supply - terminal 15 (redundant)

Connector B:

- 20 power supply - terminal 31 (redundant)
- 40 ground supply - terminal 31

U0146

Diagnosis information - CAN

Gateway control unit communication

ⓘ **NOTE**
Internal function text completed!

Diagnostic conditions
The Gateway control unit first tests internal function sequences upon wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Gateway control unit wake-up takes place after:

♦ event-controlled CAN message
♦ >Ignition on<

Possible fault causes

♦ No power supply for Gateway control unit
♦ Incorrect coding of Gateway control unit
♦ Short circuit or open circuit of CAN Drive
♦ Gateway control unit faulty (in most cases the cause is incorrect coding and not the Gateway control unit!)

Fault effects

♦ No communication can take place via CAN Drive
♦ No other control units are able to communicate with the Gateway control unit

Affected contacts on the Gateway control unit connector

♦ 1 Power supply - term. 30
♦ 6 CAN Drive low
♦ 11 Power supply - term. 31
♦ 13 Wake-up
♦ 14 Ground supply - term. 15
♦ 16 CAN Drive high

U0155

Diagnosis information - CAN

Instrument cluster, communication

NOTE
Internal function test completed!

Diagnostic conditions
The instrument cluster initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Instrument cluster wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- "Ignition on"

Possible fault causes

- No power supply for instrument cluster
- Instrument cluster incorrectly coded
- Short circuit or open circuit in the CAN display
- Instrument cluster faulty (in most cases the cause is not the instrument cluster but incorrect coding!)

Fault effects

- Communication via the CAN display is no longer possible.
- No other control modules are able to communicate with the instrument cluster.

Affected contacts on the instrument cluster connector
Connector A:

- 1 ground supply - terminal 31
- 2 power supply - terminal 30
- 17 ground supply - terminal 31
- 18 power supply - terminal 30
- 30 wake-up
- 31 CAN display high
- 32 CAN display low

U0164

Diagnosis information - CAN

Air-conditioning system regulator, communication

NOTE
Internal function test completed!

Diagnostic conditions
The air-conditioning system regulator initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Air-conditioning system regulator wake-up through:

- event-induced CAN message
- "Ignition on"

Possible fault causes

- No power supply for air-conditioning system regulator
- Air-conditioning system regulator incorrectly coded
- Short circuit or open circuit in the CAN comfort
- Air-conditioning system regulator faulty (in most cases the cause is not the air-conditioning system regulator but incorrect coding!)

Fault effects

- Communication via the CAN comfort is no longer possible.
- No other control modules are able to communicate with the air-conditioning system regulator.

Affected contacts on the air-conditioning system regulator connector
Connector A:

- 1 ground supply - terminal 31
- 2 power supply - terminal 30
- 8 CAN comfort low
- 9 CAN comfort high
- 13 power supply - terminal 15

Diagnosis information - CAN

PAS control module (CAN drive), communication

NOTE
Internal function test completed!

Diagnostic conditions
The PAS control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
PAS control module wake-up through:

- event-induced CAN message
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- No power supply for PAS control module
- PAS control module incorrectly coded
- Short circuit or open circuit in the CAN drive
- PAS control module faulty (in most cases the cause is not the PAS control module but incorrect coding!)

Fault effects

- Communication via the CAN drive is no longer possible.
- No other control modules are able to communicate with the PAS control module.

Affected contacts on the PAS control module connector
Connector A:

- 1 power supply - terminal 30
- 5 ground supply - terminal 31
- 10 power supply - terminal S
- 13 power supply - terminal 15
- 39 CAN comfort high
- 40 CAN comfort low

U0402

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

U0404

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

U0418

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.

U0423

Diagnosis information - CAN

Fault entry in specified control module

NOTE
Internal function test completed!

Diagnostic conditions

The control module initially tests internal function sequences after wake-up. If they are OK, all diagnosable outputs are then tested and any faults are stored.
Control module wake-up through:

- event-induced CAN message
- wake-up signal via wake-up line
- key contact (terminal S)
- "Ignition on"

Possible fault causes

- Control module is incorrectly coded
- Periphery connected to specified control module is incorrect
- Control module faulty (in most cases the cause is not the control module but incorrect coding!)

Fault effects

- The specified control module sends only substitute values via the CAN.
- Other control modules detect these substitute values and set this fault code.