TID $05

Evaporative Emission (EVAP) System - Vehicles with 0.040" (1.0mm) Leak Detecton System

DATA 3 (TC6TESC): Bit 0 - 6: Number of the measuring path within the TID = CID.
Bit 7: Type of test limit:
0 = Test limit is maximum value. Test fails if test value > test limit
1 = Test limit is minimum value. Test fails if test value < test limit

DATA 4+ 5 (TC6TESW): 2- byte value of the measured value

DATA 6+ 7 (TC6TESS): 2- byte value of the threshold value

J1979 Mode $06 Data				
CID $ [h]	Fault Simulation	Test Value: Threshold	Indicated Fault	Display
22	TTEDST = 2.5s, TDTEGR = 1.0s	tdteab > TDTEGR	Large leak (timeout)	Pass/Fail
3	GFSTED (KL)	fldte > 1	Fine leak	Pass/Fail
24	DDPTEKU = -1.464hPa	pttrk < DDPTEKU	EVAP Canister Purge Valve leaking (seat)	Pass/Fail
25	DDPTEAV = -1.464hPa	pttr > DDPTEAV	EVAP Canister Vent Solenoid Valve blocked	Pass/Fail
11	TTEDWU = 20s	Tdteudw > TTEDWU	EVAP Canister Vent Solenoid Valve blocked (residual vacuum)	Pass/Fail
12	TTEDOZG = 20s	tdteozg > TTEDOZG	Fuel Tank Pressure Sensor	Pass/Fail
13	TTEDST = 2.5s	tdteab > TTEDST	Fuel Tank Pressure Sensor	Pass/Fail
26	DDPTETV = -15.62hPa	pttr < DDPTETV	EVAP Canister Purge Valve seat leakage	Pass/Fail
27	GGRTED = 0.305hPa/s	gudauf < GGRTED	Large leak (low vacuum build up)	Pass/Fail
23	DPTEAAV = -14.64hPa	pte < DPTEAAV	EVAP Canister Vent Solenoid Valve blocked	Pass/Fail

TID $05

EVAP System - Vehicles with 0.020" (0.5mm) Leak Detection System

EVAP Canister Purge Valve

DATA 3 (TC6TESC): Bit 0 - 6: Number of the measuring path within the TID = CID.
Bit 7: Type of test limit:
0 = Test limit is maximum value. Test fails if test value > test limit
1 = Test limit is minimum value. Test fails if test value < test limit

DATA 4+ 5 (TC6TESW): 2- byte value of the measured value

DATA 6+ 7 (TC6TESS): 2- byte value of the threshold value

J1979 Mode $06 Data				
CID $ [h]	Fault Simulation	Test Value: Threshold	Indicated Fault	Display
01	B_dteabbv 0 • •1	dfrdte < DFDTEF	EVAP Canister Purge Valve – Oxygen Sensor control rich threshold	Pass/Fail
01	B_dteabbv 0 • •1	dfrdte > DFDTEM	EVAP Canister Purge Valve – Oxygen Sensor control lean threshold	Pass/Fail
0F	B_minflr 0 • •1	dqsdte < DQSTED	Change of Idle Speed Control Actuator air not great enough	Pass/Fail

DMTL Module

DATA 3 (m6cddmtl): Bit 0 - 6: Number of the measuring path within the TID = CID.
Bit 7: Type of test limit:
0 = Test limit is maximum value. Test fails if test value > test limit
1 = Test limit is minimum value. Test fails if test value < test limit

DATA 4+ 5 (m6wddmtl_w): 2- byte value of the measured value

DATA 6+ 7 (m6sddmtl_w): 2- byte value of the threshold value

J1979 Mode $06 Data			
CID $ [h]	Test Value: Threshold	Indicated Fault	Display
12	iptref_w < IPTREFU	DMTL module failure – minimum	Pass/Fail
17	nkfl > NKLDIPFMX	Signal fault – Current fluctuations	Pass/Fail
13	iptref_w > IPTREFO	DMTL module failure – maximum	Pass/Fail
14	iptumv_w > iptsumv_w	DMTL valve not switched over	Pass/Fail
21	iptgl_w < iptsgl_w	Large leak detected	Pass/Fail
18	iptglv_w < iptsglv_w	Large leak detected after extended detection time	Pass/Fail
16	iptkl_w < iptref_w	Small leak detected	Pass/Fail

TID $06

O2 Sensor heating
Not supported – continuous monitor

TID $07

Catalyst heater
Not fitted

TID $08

Camshaft shift
Not fitted

TID $09

Thermostat Diagnosis

DATA 3 (m6cthm): Bit 0 - 6:Number of the measuring path within the TID = CID.
Bit 7: Type of test limit:
0 = Test limit is maximum value. Test fails if test value > test limit
1 = Test limit is minimum value. Test fails if test value < test limit

DATA 4 + 5 (m6wthm): 2- byte value of the measured value

DATA 6 + 7 (m6sthm): 2- byte value of the threshold value

J1979 Mode $06 Data			
CID $ [h]	Test Value: Threshold	Indicated Fault	Display
0A	dthmtmka < DTHMDTKA	Temperature difference too small	Pass/Fail

J1979 Mode $06 Data – Parameter Descriptions

Parameter	Description
AHKAT	Mean value of the amplitude sensor signal post catalyst corrected by KB, Bank A
AHKAT2	Mean value of the amplitude sensor signal post catalyst corrected by KB, Bank B
AHKATMX	Threshold value catalyst defect, AHKAT >AHKATMX
AHKATS	Threshold value for sum AHKAT, AHKAT2 (stereo)
AHKATSB	Threshold value for error of adding range (stereo)
AHKTMXT	Threshold value catalyst defect at tester's request
AIOSLS	Number of correct measurements at Secondary Air Injection diagnosis, Bank A
AIOSLS2	Number of correct measurements at Secondary Air Injection diagnosis, Bank B
B_FAKAT	Condition function request catalyst monitoring, Bank A
B_FAKAT2	Condition function request catalyst monitoring, Bank B
B_SZKAT	Cycle time and error bank A run out
B_SZKAT2	Cycle time and error bank B run out
CDSLS	Code word secondary air system in OBDII mode (inv: Europe mode)
DDPTEAV	Pressure difference for detection of clogged EVAP Canister/Shut-off Valve
DDPTEKU	Maximum pressure decrease for compensation gradient
DDPTETV	Pressure difference for detection of open EVAP Canister Purge Valve
DFDTEF	Delta Fr threshold 'rich correction' for check OK
DFDTEM	Delta Fr threshold 'lean correction' for check OK
DFRDTE	Delta factor lambda control for EVAP Canister load test
DFRMFC	Threshold control factor change for flow check at Secondary Air Injection diagnosis
DFRMSLA	Delta of Lambda control factor and Reference value for diagnosis Secondary Air Injection, Bank A
DFRMSLA2	Delta of Lambda control factor and Reference value for diagnosis Secondary Air Injection, Bank B
DFRMSLV	Threshold for control factor change for valve check at Secondary Air Injection diagnosis
DPTEAAV	Pressure threshold for EVAP Canister Vent Solenoid Valve failure detection
DQSDTE	Change of Idle Speed Control Actuator air during EVAP Canister Purge Valve opening
DQSTED	Delta air for TE diagnosis o.k. (Idle Speed Control Actuator air test)
DTHMDTKA	Threshold temperature difference TMOT to TKA for detection of faulty thermostat
DTHMTMKA	Delta between Engine Coolant and Radiator Outlet water temperature in diagnosis thermostat
FLDTE	Leakage factor of leak diagnosis
GGRTED	Gradient threshold for detection of DMTL rough leak
GUDAUF	Vacuum built-up gradient
IPTGL_W	DMTL Pump motor current at the end of rough leak detection
IPTGLV_W	DMTL Pump motor current at the end of extended rough leak detection

J1979 Mode $06 Data – Parameter Descriptions

Parameter	Description
IPTKL_W	DMTL Pump motor current at the end of smallest leak detection
IPTREF_W	DMTL Pump motor current with reference leak
IPTREFO	Upper limit of DMTL pump current during reference measurement
IPTREFU	Lower limit of DMTL pump current during reference measurement
IPTSGL_W	DMTL Pump motor current threshold at rough leak detection
IPTSGLV_W	DMTL Pump motor current threshold at extended rough leak detection
IPTSUMV_W	DMTL Pump motor current threshold at DMTL valve check
IPTUMV_W	DMTL Pump motor current at DMTL valve check
M6CDDMTL	Mode 6 – Memory: Component ID for DMTL tank leakage detection
M6CTHM	Mode 6 – Memory: Component ID for thermostat monitoring
M6SDDMTL_W	Mode 6 – Memory: Threshold value for DMTL tank leakage detection
M6STHM	Mode 6 – Memory: Threshold value for thermostat monitoring
M6WDDMTL_W	Mode 6 – Memory: Measured value for DMTL tank leakage detection
M6WTHM	Mode 6 – Memory: Measured value for thermostat monitoring
NKLDIPFMX	Upper limit of stop DMTL smallest leak detection in case of motor current fluctuation
PTE	Fuel Tank pressure (from ADC)
PTTR	Reference value of differential Fuel Tank pressure
PTTRK	Fuel Tank pressure for measurement of compensation gradient
TC6KATC	Output code SCAN-tool mode 6 from catalyst diagnosis
TC6KATS	Output threshold SCAN-tool mode 6 from catalyst diagnosis
TC6KATW	Output test threshold SCAN-tool mode 6 from catalyst diagnosis
TC6MTLC	Output code SCAN tool mode 6 from DMTL diagnosis
TC6MTLS	Output threshold SCAN-Tool mode 6 from DMTL diagnosis
TC6MTLW	Output check value SCAN tool mode 6 from DMTL diagnosis
TC6SLSC	Output code SCAN-Tool mode 6 from Secondary Air Injection diagnosis, Bank A
TC6SLSC2	Output code SCAN-tool mode 6 from Secondary Air Injection diagnosis, Bank B
TC6SLSS_W	Output threshold value SCAN-Tool mode 6 from Secondary Air Injection diagnosis, Bank A
TC6SLSS2	Output threshold SCAN-tool mode 6 from Secondary Air Injection diagnosis, Bank B
TC6SLSW_W	Output check value SCAN-Tool mode 6 from Secondary Air Injection diagnosis, Bank A
TC6SLSW2_W	Output check value SCAN-tool mode 6 from Secondary Air Injection diagnosis, Bank B
TC6TESC	Output code SCAN tool mode 6 from EVAP Canister Purge control diagnosis
TC6TESS	Output threshold SCAN tool mode 6 from EVAP Canister Purge control diagnosis
TC6TESW	Output check value SCAN tool mode 6 from EVAP Canister Purge control diagnosis
TDTEAB	Time for detection of "broken hose"

J1979 Mode $06 Data – Parameter Descriptions

Parameter	Description
TDTEGR	Maximum time for detection of DMTL rough leak
TDTEOZG	Timer for rationality check of Fuel Tank Pressure Sensor
TDTEUDW	Time for Fuel Tank pressure signal at lowest value
TKA	Radiator Outlet Temperature
TMOT	ECT
TTEDOZG	Overall test time for rationality check of Fuel Tank Pressure Sensor
TTEDST	Time for monitoring of Fuel Tank Pressure Sensor
TTEDWU	Waiting time if Fuel Tank Pressure Sensor at lower limit
ZIOSLS	Counter for good diagnosis tests of Secondary Air Injection System
ZIOSLS2	Counter for good diagnosis tests of Secondary Air Injection System

4 Onboard Monitoring

4.1 Catalyst Monitoring

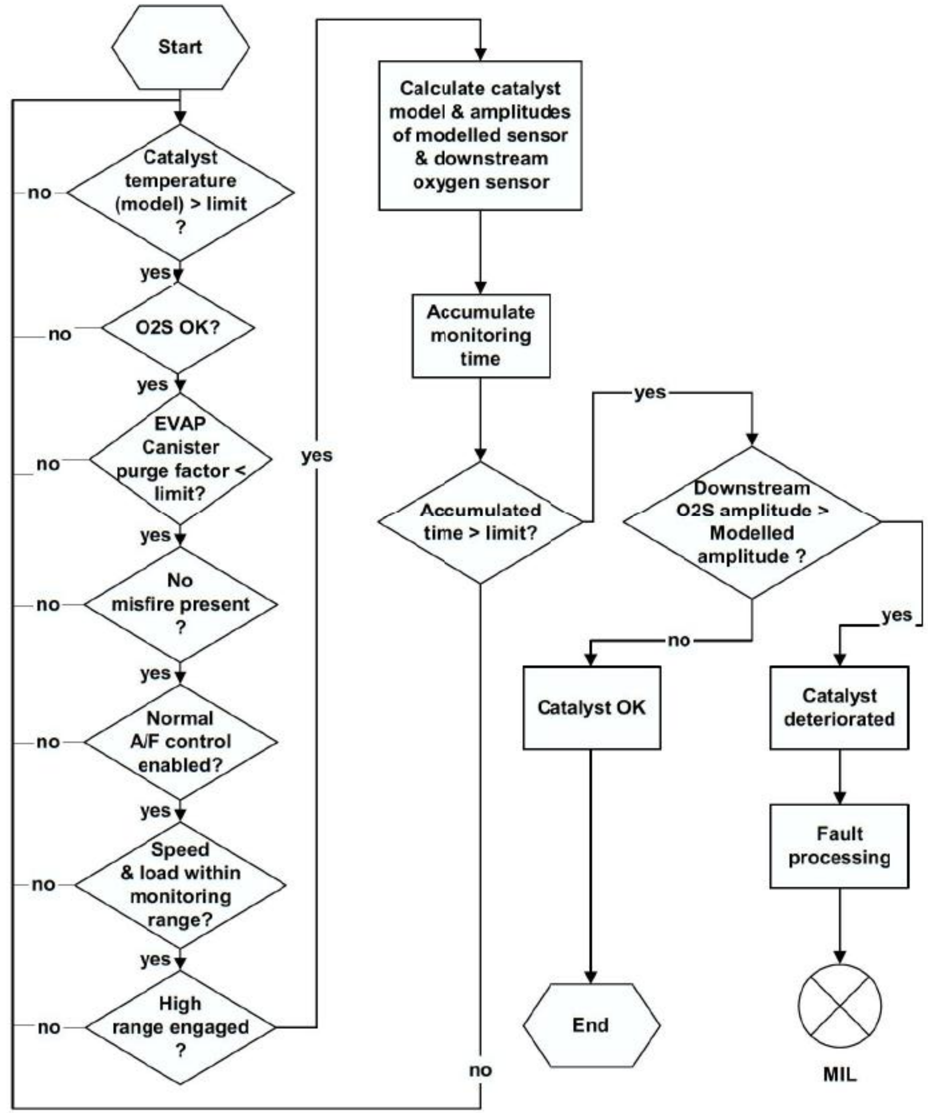
4.1.1 Description

Catalyst monitoring is based on the monitoring of oxygen storage capability. The engine closed loop feedback control generates Lambda* (air fuel ratio) oscillations in the exhaust gas. These oscillations are damped by the oxygen storage activity of the catalyst. The amplitude of the remaining Lambda oscillations downstream of the catalyst indicates the storage capability.

In order to determine catalyst efficiency, the amplitude ratio of the signal oscillations of the upstream and downstream Lambda sensors is determined. This information is evaluated separately in different engine load and speed ranges. If there is an indication of low storage capability in a certain number of operating ranges, a defective catalyst is diagnosed.

*Definition of Lambda: The stoichiometric air fuel ratio is the mass ratio of 14.7 kg of air to 1kg of gasoline theoretically necessary for complete combustion. The excess air ratio • •(Lambda) indicates the deviation of the actual air fuel ratio from the theoretical air fuel ratio. Thus • •= actual inducted air mass/ theoretical air requirement

4.1.2 Monitoring Structure



Computation of the Amplitude Ratio

The first step is the computation of the amplitude of the signal oscillations of the oxygen sensors upstream and downstream of the catalyst. This is accomplished by extracting the oscillating signal component, computing the absolute value and averaging over time. The result of dividing the downstream amplitude value by the upstream amplitude value is called the Amplitude Ratio (AV). This AV value is the basic information necessary for catalyst monitoring. It is computed continuously over a certain engine load and speed range. The signal paths for both sensor signals are identical, so that variations, like an increase in the control frequency, affect both signal paths in the same way and are compensated for by the division.

Post Processing

The actual amplitude ratio is compared with a limit value according to the load and speed range the engine is operating in. The result of this comparison, which is the difference of the two values, is accumulated separately for each range. Thus, even short time periods of driving in a certain range yield additional information.

By using separate load and speed ranges in combination with the accumulation of information a monitoring result can be obtained during a Federal Test Procedure (FTP) cycle.

Fault Evaluation

The accumulated information about the amplitude ratio becomes more and more reliable as different load and speed ranges are used during a driving cycle. If the amplitude ratio is greater than fixed map values a fault is detected and an internal fault flag will be set. If the fault is detected again in the next driving cycle the MIL will be illuminated.

Since the monitored engine has a catalyst for each of two cylinder banks, two evaluations are made with differing fault thresholds, one test is for deterioration in one of the catalysts and the second is at a reduced threshold to check for deterioration in both catalysts.

Check of Monitoring Conditions

The monitoring principle is based on the detection of relevant oscillations of the downstream oxygen sensor signal during regular Lambda control. It is necessary to check the driving conditions to ensure that regular lambda control is possible, e.g. fuel cut off not present. For a certain time after enabling Lambda control, the computation of the amplitude values and their post processing is halted, in order to avoid a distortion of the monitoring information.