Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
Mass Air Flow Sensor (DHFM)	P0102 P0103	range check low range check high	value	see table KFMLDMN (0...156,4 kg/h) see table KFMLDMX (60...1181 kg/h)	• battery voltage • time after start • Errorflag throttle position sensor	> 11 V (UBHFM) > 0,3 s (TDMLST) not set	continuous	Two driving cycles
(DEGFE)	P0101	rationality check	difference between measured and calculated airmassflow gradient of above signal	see table < GRDSDMSS + DGRDSDMSS and (0,39...0,408) > GRDSGDMSS (2...4)	• difference between both throttle signals • throttle 1/ throttle 2 • pressure intakemanifold/ in front of throttle • wot • integrator stop	< 0,6% < 0,5 < 0,95 not set not set		
Intake Manifold Pressure Sensor (GGDSS)	P0107 P0108	range check low range check high	sensor signal voltage	< 0,14V (UADPSMN) > 4,88V (UADPSMX)	• time • engine	> 0.2 s (TDDSS) running	continuous	Two Driving Cycles
Intake Air Temperatur Sensor (GGTFA)	P0113 P0112	range check low range check high	temperature	<-42,75°C (TADMN) > 139,50°C (TADMX)	• time after start • time in idle • time	>180s (TDNSTA) >10 s (TDTAL) > 2s (TDTA)	continuous	Two driving cycles
Coolant Temperatur Sensor (GGTFM)	P0115 P0116 P0118 P0117	signal check plausibility check range check low range check high	temperature for closed loop control not reached after time temperature	timer depending on airflow < model temp. -12°K (DTMDMA) < -42,75°C (TMDMN) > 139,50 °C (TMDMX)	• time after engine start (timer depending on airflow) • engine speed • no • no	2 min - 5 min > 20 rpm	continuous	Two Driving cycles
Throttle Position Sensor (GGDVE)	P0121 P0122 P0123	plaus. check poti1 range check low poti 1 range check high	value voltage	> 12,94%(DWDK130) < 0,195 V (UDKP1U)	• battery voltage • time •	> 7 V > 140 ms	continuous	5 s

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
		poti 1		> 4,609 V (UDKP1O)				
	P0221	plaus. check poti 2	value	>12,94%(DWDK230				
	P0222	range check low poti 2	voltage	)				
	P0223	range check high poti 2		< 0,1563V (UDKP2U)				
				> 4,8047V (UDKP2O)				
O2 Sensors								
Front Bank 1 Front Bank 2 (DLSU)	P0130 P0150	circuit continuity	sensor signal voltage for time **or** sensor signal value for time **or** sensor signal value for time **or** sensor signal value for time	> 4,7V (SULSUMX) > 2s (TVCJLSU) 0,995 (LSUNAMN) <. .<1,005 (LSUNAMX) >2...16 s (TVPLMSA) > 1,2 (LAMMX) >2...16 s (TVPLMSA) < 0,8 (LAMMN) >2...16 s (TVPLMSA)	• none • either one errorflag: front sensorheater, rear sensor, rear sensor aging • indicator self adjust • rear sensor voltage • rear sensor voltage • errorflags: rear sensor, rear sensor aging • rear sensor voltage • erroflags: rear sensor, rear sensor aging	 not present not present > 0,85 V (USHKFT) or < 0,103 V (USHKMR) > 0,85 V not present < 0,103 V not present	continuous	Two driving cycles
Front Bank 1 Front Bank 2 (DLSU)	P0131 P0151	range check low	standardized dynamic value from sensor	< 0,60 (DYNLSUMX)	• load • engine speed • lambdavalue • either one errorflag: misfire, evapsystem, purge valve, fueltrim	23,25 <.... < 45 % (RLDYNU <..< RLDYNO) 1400<.... <2520 rpm (NMOTDYNU < ...< NMOTDYNO) 0,96 <... <1,04 (LAMDYNU<.....< LAMDYNO) not present	continuous	Two driving cycles

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
					• evapsystem • close loop control maximum • close loop control minimun	no high loading indicated not reached or exceeded not reached or exceeded		
Front Bank 1 Front Bank 2 (DLSU)	P0132 P0152	range check high	lambda offset	> 0,03 (SDLAOF)	• time • engine • either one errorflag: rear sensor, rear sensor aging • rear sensor aging diagnosis	< 2 s (TVLSUOF) running not present Q finished	continuous	Two driving cycles
Front Bank 1 Front Bank 2 (DLSU)	P0134 P0154	no activity detected	lambda value	> 0,1 (SDLAMX)	• eventcounter • timer • exhaust model temperatur • time after start • flag lambda amplitude • flag low loadchange • flag O2-sensor maxi-mum value exceeded	> 30 (ZEHK) > 0,5 s TVHKLSU) >460 °C (TALAMX) >25 s (TVLSUHK) present present not present	continuous	Two driving cycles
Rear Bank 1 Rear Bank 2 (DLSH)	P0136 P0156	circuit continuity	sensor signal voltage	< 0,04 V (USMIN)	• rear close loop either one errorflag: evapsystem, purge valve• • timer • timer • flag tank empty • engine • catalytic converter temperature • battery voltage • lambda target • time after dewpoint	established not present > 60 or 80 s > 600 s not present running < 940 °C (TABGMCSD) >11,03 V (UBDLS) =1 > 90 s (TTBMH)	continuous	Two driving cycles
Rear Bank 1 Rear Bank 2 (DLSH)	P0138 P0158	range check high	sensor signal voltage for time	> 1,5 V (USMAX) 5,1 s (TUSKS + TUSMAX)	• engine • catalytic converter temperature • battery voltage • lambda target value • time after dewpoint	running < 940 °C (TABGMCSD) > 11,03 V (UBDLS) =1 > 90 s (TTBMH)	continuous	Two driving cycles
Rear Bank 1 Rear Bank 2 (DLSAHK- sensor aging)	P0139 P0159	oscillation check high / low	sensor voltage	Stack below Reference value (KFUSRHK) or	• rear closed loop	active	continuous	Two driving cycles

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
				>0,200 V(USSCHUB) or stack above reference value	• fuel cut off • rear closed loop	active active		
Rear Bank 1 Rear Bank 2 (DLSH)	P0140 P0160	no activity detected	sensor signal voltage for time	0,421 <... < 0,479 V (USREMH<.....<USREFH) 60 s (TRSAFA) or 1150 s (TRSAH)	• engine • catalytic converter temperature • battery voltage • lambda target value • time after dewpoint	running < 940 °C (TABGMCSD) > 11,03 V (UBDLS) =1 > 90 s (TTBMH)	continuous	Two driving cycles
Heater Rear B. 1 Heater Rear B. 2 (DLSHK)	P0141 P0161	heater resistance	actuall heater resistance	> Map KFRINH * 5...12	• catalytic converter temperture • battery voltage • error flag heater output stage • dewpoint behind catalytic converter • timer	400 <... < 580°C (TADHMN<..<TADHMX) 11,03 <... < 14,98 V (UBDLS<..<UBDLSMX) not present reached > 15 s	continuous	Two driving cycles
Heater Rear Power Stage Check (DLSHKE) Bank 1 Bank 2 Bank 1 Bank 2 Bank 1 Bank 2	 P0036 P0056 P0037 P0057 P0038 P0058	 open circuit range check low range check high	 Voltage	 IC internal	 • engine speed • battery voltage • battery voltage • time • stage had to be	 > 40 rpm > 7,5V < 15 V 300ms .. 500 ms active	 continuos	 Two driving cycles
Heater Front B. 1 Heater Front B. 2 (DHLSU) Heater Front B.1 Heater Front B.2	P0030 P0050 P0031 P0051	signal check range check low	heater voltage heater voltage	>2,34V (UHEMN) and < 3,6V (UHEMX) < 2,43V (UHEMN)	• delaytime • battery voltage • heater outputstage • engine • delaytime • battery voltage	>0,04 s (TDFHS) 11,03 <... < 14,98 V (UBDLS <..< UBDLSMX) not active running >0,04 s (TDFHS) 11,03 <... < 14,98 V (UBDLS<..<UBDLSMX)	continuous	Two driving cycles

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
Heater Front B.1 Heater Front B.2	P0032 P0052	range check high	heater votage	> 3,6V (UHEMX)	• heater outputstage • engine	active running		
Heater Front B.1 Heater Front B.2	P0135 P0155	plausibility check	time after heater on	>20 s (TVLSUBM) and Sensor not active	• batterie voltage • heater outputstage • engine	11,03 <... < 14,98 V (UBDLS <..< UBDLSMX) active running		
Fuel System (DKVS) Bank 1	P0171	fuel trim limits exceeded	additional or multiplicational	>7,7 % or > 21 % (>RKATDX or >FRAODX,FRAUDX)	• fuel system status • fuel trim adaption	closed loop activ	continuous	Two driving cycles
Bank 1	P0172			< -7,7 % or < -24% (>RKATDN or >FRAODN,FRAUDN)				
Bank 2	P0174			>7,7 % or > 21 % (>RKATDX or >FRAODX,FRAUDX)				
Bank 2	P0175			< -7,7 % or < -24 % (>RKATDN or >FRAODN,FRAUDN)				
Injection Valves 1..6 (Power Stage Check - DEVE)	P0201 P0202 P0203 P0204 P0205 P0206	open circuit	voltage	IC Internal	• engine speed • battery voltage • battery voltage • time • stage had to be	> 40 rpm > 7,5 V < 15 V 300 ms ... 500 ms active	continuous	Two driving cycles
	P0261 P0264 P0267 P0270 P0273 P0276	range check low						
	P0262 P0265 P0268 P0271 P0274 P0277	range check high						

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
Fuel Pump Primary Circuit (DEKPE)	P0230 P0231 P0232	open circuit range check low range check high	voltage	IC Internal	• engine speed • battery voltage • battery voltage • time • stage had to be	> 40 rpm > 7,5 V < 15 V 300 ms ... 500 ms active	continuous	No
Misfire (DMD)	P0301 to P0306 P0300	crankshaft speed fluctuation cylinder 1 to cylinder 6 Multiple misfire	FTP emission threshold catalyst damage	> 1,0 % Misfire weighted with map rpm/load KFKSWF (40...183) > 3200 (AHEKS)	• engine speed • load • engine speed change • load change • intake air temp • time after start • rough road • traction control • evap-system check • either one errorflag: throttle position, crankshaft sensor, reference mark sensor	520 ... 6520 rpm > RLSALUN (13,5 ... 33 %) < 2500...5500 rpm/s < 120...750%/segment >-8,25°C > 5s not detected off off not set	1000 revs continuous 200 revs	Two driving cycles Im-mediate
Misfire With Low Fuel (DTANKL)	P0313	Fuel Level	Liter	< 11 l (FSTTAL)	• time or • Misfire detected or • fuel trim limits exceeded	30 s yes	continuous	No

Knock Sensor 1 (DKRS) Knock Sensor 2	P0327 P0328 P0332 P0333	range check low range check high range check low range check high	voltage	table UDKSNU table UDKSNO	• coolant temp. • engine speed	> 39,75°C > 2000 rpm	continuous	No
Crankshaft	P0335	malfunction	counter schedule of	> 8	• camshaft signal	Active	continuous	Two

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
Position Sensor (DDG)			phase signal and no signal from crankshaft position sensor					driving cycles
Camshaft Position Sensor (DPH)	P0342 P0343 P0341	check low check high rationality	bit pattern at crankshaft marker high or low marker not plausible	>= 5 times	• engine speed	> 20 rpm	continuous	Two driving cycles
EGR (DAGRFC)		flow-check: comparison betw. Modelled and measured intake pressure after charging EGR-rate			• engine speed • engine load • engine load gradient	1600<...>2200 rpm (NDAGRFMN<...> NDAGRFMX) 35<...>60 % (RLDAGRFN<...> RLDAGRFX) < 0,35% (DRLDAGMX)	<= 15s once per driving cycle	Two driving cycles
	P0401	flow-check low	Insufficient EGR-flow	< -0,70 (RFEAGRMN)	• EGR partial pressure	>= 25 hPa (PSAGRMN) >0,5 kg (IMLATDAG)		
	P0402	flow-check high	Excessive EGR-flow	>0,70 (RFEAGRMX)	• air mass since start • altitude	< 2750m		
EGR Power Stage (DAGRE)	P0403 P0405 P0406	open circuit range check low range check high	voltage	IC Internal	• engine speed • battery voltage • battery voltage • time • stage had to be	> 40 rpm > 7,5 V < 15 V 300 ms ... 500 ms active	Continuous	Two driving cycles
EGR Position Sensor (DAGRLS)	P0404	Open valve pintle error	Position sensor voltage	> 4,8242 V (UAGRPMX) for time > =1s (TWUAGERR)	• errorflag: battery voltage • engine	not present running	Continuous	Two Driving Cycles
	P1404	Closed valve pintle error		< 0,1367 V (UAGRPMN) for time >= 1s (TWUAGERR)				
	P1406	stocking valve	difference between set and actual position of EGR-valve	>20% (AGRDMX) for time >= 10s (TWAGRDI)	• EGR-System	Active		
Catalyst, Bank 1 Catalyst, Bank 2 (DKATLRS)	P0422 P0432	determining the oxygen storage capability by comparing the amlitude obtained from the downstream O2-sensor to a	catalyst qualtity factor	> 0,65 (AHKATMX)	• engine speed • load • fuel system status • modelled catalyst temp. • modelled signal amplitude • catalyst load value	>1000rpm; < 2000rpm > 20 .. 24 %; < 30 .. 45 % closed loop > 350 °C > 0.36 < 10 .. 30 /s	50 s, once per driving cycle, in case of a fault detection one repeated test possible	Two driving cycles

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
		modelled sensor-signal amplitude			• canister purge value • either one errorflag: O2-sensor upstream and downstream, misfire, air flow sensor, throttle pos. sensor, purge system, fuel system	< 6 not present		
					•			
Evaporative Emission Control System (DTESK)	P0440	pressure control or or or	tank pressure while compesation gradient measurement tank pressure after large leak detection tank pressure while opening purge solenoid tank pressure for time period	< - 1,61 hPa (DDPTEKU) < - 14,99 hPa (DDPTETV) < - 6 hPa (DDPTEAV) - 14,95 hPa (DPTEDUD) 15 s (TTEDWU)	• vehicle speed • engine status • fuel system status • canister load factor • tank pressure • engine load • intake low pressure • engine temperature at start • intake air temperature • tank pressure while compen-sation gradient measurement • battery voltage • time after start • altitude • tank pressure while driving cycle • fuel level • • either one errorflag: load-, electr. Throttle potentiometer-, coolanttemp.-, vehicle speed-, tank pressure-, oxygensensor, idle control, purge valve -, vent control output stage, battery voltage, misfire, egr output stage, egr flow	= 0 mph idle closed loop < 7 (SFTEDA) -15<...< 15 hPa (DPTEBU, DPTEBO) < 35 % (RLTEDMX) > 400 hPa (DPUSTED) - 8,25 °C < ... < 75 °C - 8,25 °C<...< 50,25 °C < 0,40 hPa (DDPTEKO) > 11,05 V (UBTEDU) > 1005 s or fuel mixture adaption OK (b_gae =1) < 3000 m < 15 hPa 5 l < ... < 48 l (FSTDMN, FSTDMX) not present	max.40 s if OK once per driving cycle max. 2 times per driving cycle	Two driving cycles
					•			
Evaporative Emission Control System Leak	P0442	pressure control	leak air flow volume	table VLTEDFH (...0,080) and time for vacuum	• vehicle speed • engine status • fuel system status	= 0 mph idle closed loop	max.40 s if OK once per driving cycle	Two driving cycles

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
Detected (small leak) (DTESK)				decay < 10,5 s (TTEDF)	• canister load factor • tank pressure • engine load • intake low pressure • engine temperature at start • intake air temperature • tank pressure while compensation gradient measurement • battery voltage • time after start • altitude • tank pressure while driving cycle • fuel level • either one errorflag: load-, electr. Throttle potentiometer-, coolanttemp.-, vehicle speed-, tank pressure-, oxygensensor, idle control, purge valve -, vent control output stage, battery voltage, misfire, egr output stage, egr flow	< 7 (SFTEDA) -15<...< 15 hPa (DPTEBU, DPTEBO) < 35 % (RLTEDMX) > 400 hPa (DPUSTED) - 8,25 °C < ... < 75 °C - 8,25 °C < ... < 50,25 °C < 0,40 hPa (DDPTEKO) > 11,05 V (UBTEDU) > 1005s or fuel mixture adaption OK (b_gae =1) < 3000 m < 15 hPa 5 l < ... < 48 l (FSTDMN, FSTDMX) • not present	max. 2 times per driving cycle	
Evaporative Emission Control System Purge Control Valve Circuit	P0445 P0443 P0444	range check high range check low open circuit	voltage	IC Internal	• engine speed • battery voltage • battery voltage • time • stage had to be	> 40 rpm > 7,5 V < 15 V 300 ms ... 500 ms • active	Continuous	Two driving cycles
Evaporative Emission Control System Vent	P0448 P0446 P0449	range check high range check low open circuit	voltage	IC Internal	• engine speed • battery voltage • battery voltage	> 40 rpm > 7,5 V < 15 V	continuous	Two driving cycles

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
Control Malfunction (DAAVE)					• time • stage had to be	300 ms ... 500 ms active		
Evaporative Emission Control System Pressure Sensor (DDST)	P0452 P0453 P0451	range check low range check high rationality	sensor signal value sensor signal value or sensor signal value	< - 28,125 hPa (DPTEMN) > 29,375 hPa (DPTEMX) >= 25 hPa (DPDSTO)	• time • time • time • engine status • engine temperature at start time after start	> 3 s (TDDSTO) > 3 s (TDDSTO) > 3 s (TDDST) idle <= 33 °C (TMDDST) 1 s < ... < 10 s (TTDSTP, TTDSST)	max. 10 s	Two driving cycles
Evaporative Control System Leak Detected (large leak) (DTESK)	P0455	pressure control or	evacuation time for large leak during evacuation no pressure change detected for a time	> 15 s (TDTEGR) > 4 s (TTEDST)	• vehicle speed • engine status • fuel system status • canister load factor • tank pressure • engine load • intake low pressure • engine temperature at start • intake air temperature • tank pressure while compen-sation gradient measurement • battery voltage • time after start • altitude • tank pressure while driving cycle • fuel level • either one errorflag: load-, electr. Throttle potentiometer-, coolanttemp.-, vehicle speed-, tank pressure-, oxygensensor, idle control, purge valve -, vent control output stage, battery voltage, misfire, egr output stage, egr flow	= 0 mph idle closed loop < 7 (SFTEDA) -15<...< 15 hPa (DPTEBU, DPTEBO) < 35 % (RLTEDMX) > 400 hPa (DPUSTED) - 8,25 °C < ... < 75 °C - 8,25 °C < ... < 50,25 °C < 0,40 hPa (DDPTEKO) > 11,05 V (UBTEDU) > 1005 s or fuel mixture adaption OK (b_gae =1) < 3000 m < 15 hPa 5 l < ... < 48 l (FSTDMN, FSTDMX) • not present	max.40 s if OK once per driving cycle max. 2 times per driving cycle	Two driving cycles

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
					•			
Fuel Level Sensor Circuit (DFSTT)	P0463 P0462 P0461	range check high range check low rationality	Voltage Liter Voltage	> 4,49 V (UFSTMX) < 0,35 V (UFSTMN) more than +/- 15l (DFSKVO/DFSKVU) difference between calculated and measured Fuel Level after calculating a fuel consume of 20l	• time	1 s	continuous	No
Cooling Fan Control Circuit (DMLSE)	P0480 (Fan A) P0481 (Fan B)	range check high range check low open circuit range check high range check low open circuit	voltage	IC Internal	• engine speed • battery voltage • battery voltage • time • stage had to be	> 40 rpm > 7,5 V < 15 V 300 ms ... 500 ms active	continuous	No
Vehicle Speed Sensor (DVFZ)	P0500	rationality	speed	< 20 km/h (VDMN)	• engaged gear • CAN:VALID_ACTUAL_ GEAR_TCM • engine coolant temperatur • engine speed • time	= 4 = 0 > 64,5 °C (TMDV) (NDV) (NDVO) 1800 <...< 10200 rpm > 1 s (TDV)	continuous	Two driving cycles
Idle Control (DLLR)	P0506 P0507	functional check	actual desired rpm or fuel cuts off during this idle	> 100 rpm (DNDLLRO) < -200 rpm (DNDLLRU) > 3 (DASA) only for: < -200 rpm	• coolant temp. • intake air temp • vehicle speed • evap (high canister load) • evap diagnostic • secondary air diagnostic • either one errorflag: throttle position, vehicle speed, coolant temp. sensor, intake air sen., evap system, evap valve • load	> 80,25°C (TMDLLR) > 34,5°C (TADLLR) = 0 km/h off off off not set < 50,25 % (RLDLLR)	continuous	Two driving cycles
A/C Refrigerant Pressure Sensor (GGDSAC)	P0532 P0533	range check low range check high	sensor signal voltage	< 0,1953 V (UADPACMN) > 4,8828 V (UADPACMX)	• engine	Running	continuous	No
System Voltage	P0563	range check high	voltage	> 16 V (UBDMX)	• time	200ms (TDUB)	continuous	No

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
(GGUB)	P0562 P0560	range check low rationality		< 9 V (UBDMN1) < 2,5 V (UBDMN2)	• vehicle speed • time after start	> 0 km/h 180 s (TDNSUB)		
Brake Switches (GGEGAS)	P0571	plausibility of brake light switch (BLS) and brake test switch (BTS)	several times BLS and BTS unplausible for a certain period	> 1 s (TVERBR) > 10 times (ZERBR)	• no	-	continuous	No
Calculator Monitoring (DUR, URROM)	P0601	ROM Check	check sum ROM error		• no		continuous	5 s
ECM	P0602	Programming Error	Security Access not armed		• no		at enginestart	No
Calculator Monitoring (DUR)	P0603	Calculator check	Calculator Check		• no		continuous	5 s
Calculator Monitoring (DUR, URRAM)	P0604	RAM check	Read- and write-Test		• no		continuous	5 s
Function Monitoring (DUF)	P0606	monitoring torque safety fuel cut off	torque out of range calculator error in function		• engine speed	> 1120 rpm (NMN_DUF)	continuous	Two driving cycles
Generator L Terminal Control Circuit	P0621 P1637	open circuit range check low	voltage	Generator Terminal Status	• engine speed • engine • ignition	> 40 rpm running active	continuous	No
Intake Plenum Switchover Valve	P1245	range check high range check low open circuit	voltage	IC Internal	• engine speed • battery voltage • battery voltage • time • stage had to be	> 40 rpm > 7,5 V < 15 V 300 ms ... 500 ms active	continuous	No
Accelerator Pedal Position Sensor 1 (GGPED) (Pedal Moving Detection)	P1278 P1277 P1271	range check high range check low plausibility to poti 2 or comparison of poti 1 and poti 2 when leavung idle range	voltage volt. Part. throttle range volt. Full throttle range	> 4,8242 V (UPWG1O) < 0,2930 V (UPWG1U) > 0,2734 V (DUPW12TG) > 0,9961 V (DUPW12VG) > 0,5273 V (UPW1LLMX) <0,6836 V (UPWGU)	• battery voltage • no substitute operation of accelerator pedal position sensor	> 7 V	continuous	5 s
Accelerator Pedal	P1283	range check high	voltage	> 4,8242 V	• battery voltage	> 7 V	continuous	5 s

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
Position Sensor 2 (GGPED)	P1282	range check low		(UPWG2O) < 0,0977 V (UPWG2U)				
DV-E Limp-Home Air Position (BGDVE)	P1511	check of limp-home air position	throttle position	< 3,734 % (WDKNLPMI) > 9,8405 % (WDKNLPMA)	• vehicle speed • engine speed • coolant temp. • intake air temp. • battery voltage • pedal position	= 0 km/h < 250 rpm (UANNMAX) 5°C <... < 100°C (UAN_U_MT, UAN_O_MT) > 5°C (UANUATS) > 10 V (UB_UANL) < 15 % (UANPEDMAX)	continuous	5 s
DV-E Position Throttle Blade (ADVE)	P1516	difference between set and actual position of throttle blade	difference value	> DWDKSBAMX for time > 0,5 s (DKLAGERT)	• status DVE-E adaption	not set	continuous	5 s
DV-E Spring Check (BGDVE)	P1523	check of DV-E return spring	active opening throttle blade, switch off power stage and monitoring the throttle blade return	> (angle limp-home + 3%) for time > 0,56 s (FPRTIM2_T)	• vehicle speed • engine speed • coolant temp. • intake air temp.	= 0 km/h < 250 rpm (FPRNMAX) 5°C <...< 100°C (FPRMT) > 5°C (FPRAT)	once per DV-E adap.	5 s
DV-E Lower Mechanical Stop Throttle Blade (BGDVE)	P1526	range check lower mechanical stop throttle blade	range check high range check low	< 0,24 V (UDKP1AMIN) > 0,820 V (UDKP1AMAX) < 4,20V (UDKP2AMIN) > 4,77V (UDKP2AMAX)	• vehicle speed • engine speed • coolant temp. • intake air temp. • battery voltage • pedal position	= 0 km/h < 250 rpm (UANNMAX) 5°C <...< 100°C (UAN_U_MT UAN_O_MT) > 5°C (UANUATS) > 10 V (UB_UANL) < 15 % (UANPEDMAX)	once per DV-E adap.	5 s
DV-E Power Stage Switch Off (ADVE)	P1519	output	state	not set for time > 5 s (DLRPID2T)	• status DVE-E adaption • duty cycle range check	not set > 80 % PWM	continuous	5 s
DV-E Amplifier Adjustment (BGDVE)	P1530	range check of amlified actual throttle blade position signal	amplification value offset value	< 4,00 V (UDKP1VVMI) > 4,32 V (UDKP1VVMA) < -0,1503 V (UDKP1VOMI) > 0,1503 V (UDKP1VOMA)	• vehicle speed • engine speed • coolant temp. • intake air temp. • battery voltage • pedal positionvehicle speed • engine speed • coolant temp. • intake air temp.	= 0 km/h < 250 rpm (UANNMAX) 5°C <...< 100°C (UAN_U_MT UAN_O_MT) > 5°C (UANUATS) > 10 V (UB_UANL) < 15 % (UANPEDMAX)= 0 km/h < 250 rpm 5°C <...< 100°C > 5°C > 10 V	once per DV-E adap.	5 s

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
					• battery voltage • pedal position	< 15 %		
A/C Clutch Relay Circuit (DKOSE)	P0647 P0646 P0645	range check high range check low open circuit	voltage	IC Internal	• engine speed • battery voltage • battery voltage • time • stage had to be	> 40 rpm > 7,5 V < 15 V 300 ms ... 500 ms active	continuous	No
Knock Control Module (DKRNT, DKRTP)	P1602	rationality	IC output voltage	>44,983 V/s (DKRISNT) > 0,2148 V (UDKRGOFS) < 3,6914 V (UDKRTP)	• coolant temp. (knock control active)	> 39,75°C (TMKR)	Continuous	No
Immobilizer (WFS)	P1630 P1631 P1632	rationality	not or wrong initialized wrong frequencycode received no frequencycode received		• at cranking			No
PWM Vehicles incooperating an ABS unit	P1669	rationality	Monitoring of PWM signal from MMR period duration or pulse duty factor	not within f = 100Hz +/- 5Hz < 8% (PCMDMN) for time > 0,1s (TPWMF)	• engine speed • delay time • variant coding	> 160 rpm 2 s car incooperates an ABS unit (eeprom byte FZVAR, bit 6)	Continuous	No
DV-E Control Range (ADVE)	P1510	range check high range check low	PWM /- PWM / time	> 80 % PWM (DLRPIDMAX) > 80 % PWM (DLRPIDMIN) for time > 0,6 s first threshold (DLRPID1T) or > 5 s (second threshold (DLRPID2T)	• battery voltage • status DVE-E adaption	> 7 V not set	Continuous	5 s
Transmission MIL Request (DMFB)	P1780	TCM	OBD2 failure				continuous	Two Driving Cycles
Torque Limiter	P1845	range check high	indexed torque	> maximum autorized idexed torque	• engine speed	> 40 rpm	continuous	Two driving cycles
CAN-BUS Communication Malfunction	U2100	CAN-BUS circuit	Common not identified bus error		• engine speed • time	> 25 U/min (B_nmot=t rue) > 25 sec	continuous	5 s

Component / System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumi-nation
(DCAN)								
CAN-BUS Fewer Controller On Bus Than Controlled (DCAN)	U2103	CAN-BUS circuit	Fewer systems on bus than programmed in the maximum configuration list	< 3	• engine speed • time	>25 U/min (B_nmot= true) > 25 sec	continuous	Two driving cycles
CAN-BUS Reset Counter Overrun (DCAN)	U2104	CAN-BUS circuit	Reset Counter	> 40	• engine speed • time	>25 U/min (B_nmot= true) > 25 sec	continuous	5 s
CAN-BUS Lost Communication With TCM (DCAN)	U2106	CAN-BUS circuit	No communication with TCM		• engine speed • time	> 25 U/min (B_nmot=t rue) > 25 sec	continuous	5 s
CAN-BUS Lost Communication With BCM (DCAN)ABS	U2107	CAN-BUS circuit	No communication with BCMABS		• engine speed • time	> 25 U/min (B_nmot= true) > 25 sec	continuous	No