

X100RM2C/4/1

Saipa X100

Bosch

M7.9.7 ECU

Bosch components:

- **M7.9.7** Engine Control Unit
- **EV6** Gasoline injector
- **ZS-K-2x2V** Ignition coil
- **DS-S3-TF** Intake manifold pressure and temperature sensor
- **DG-6-K** Engine speed sensor (Crankshaft)
- **PG-3-8** Phase detection sensor (Camshaft)
- **TEV 5** Canister purge valve
- **LSF 4.21** Oxygen sensor
- **KS-4-S** knock sensor
- **TF-W** Engine coolant temperature sensor
- **SMARTRA 5** Immobiliser

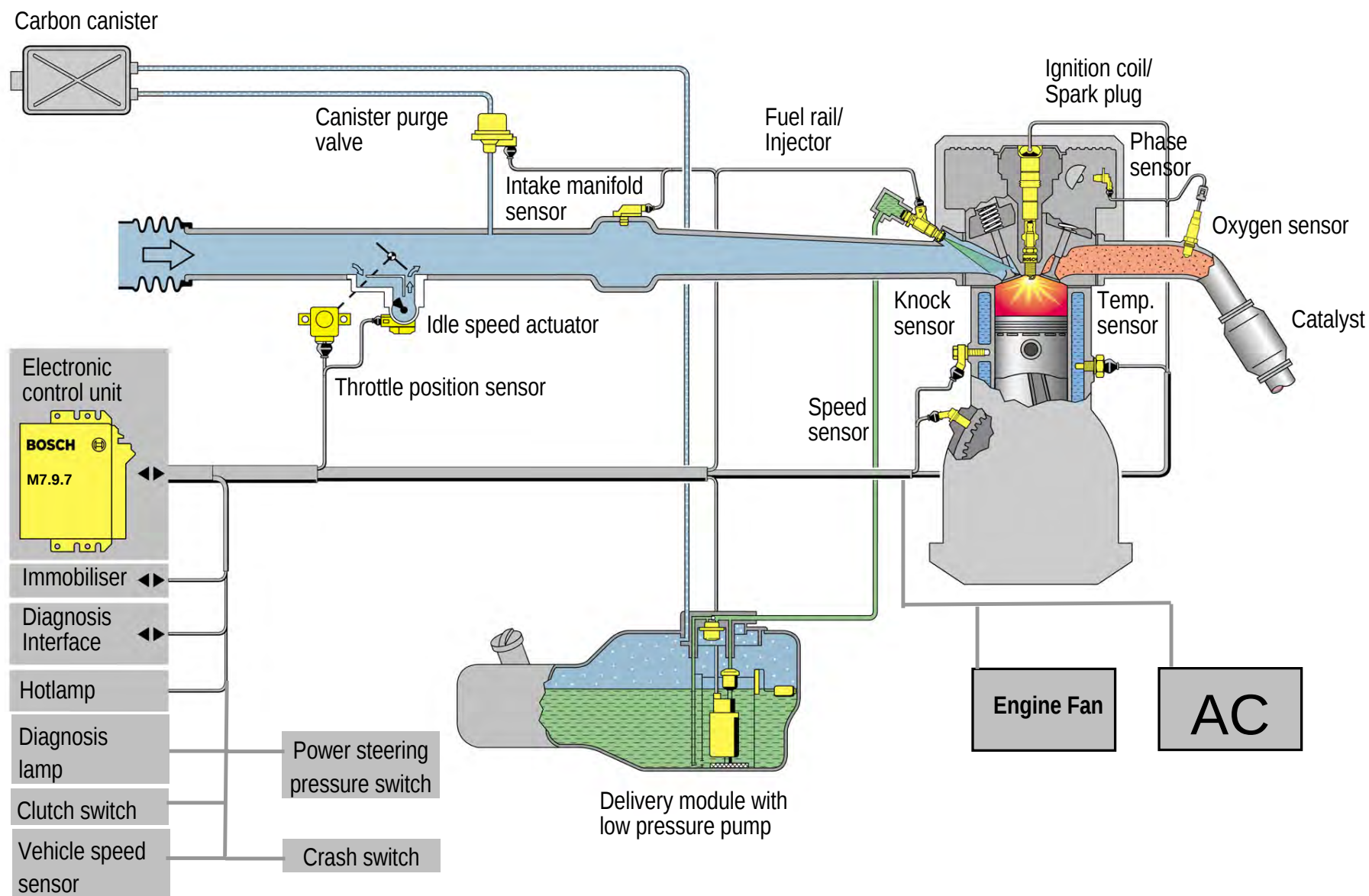
MegaMotor components (monitored by M797 ECU):

- Throttle position sensor
- Idle speed actuator (Steppermotor)
- Dashboard lamps (Hotlamp and MIL-Lamp)
- Engine Fan (relays)
- AC compressor (relay)
- Clutch switch
- Vehicle speed sensor
- Battery (for ECU power supply)
- Fuel pump (relay)

Additional inputs (not monitored by M797 ECU):

- Power steering pressure switch
- Crash switch
- AC switch
- AC compressor switch

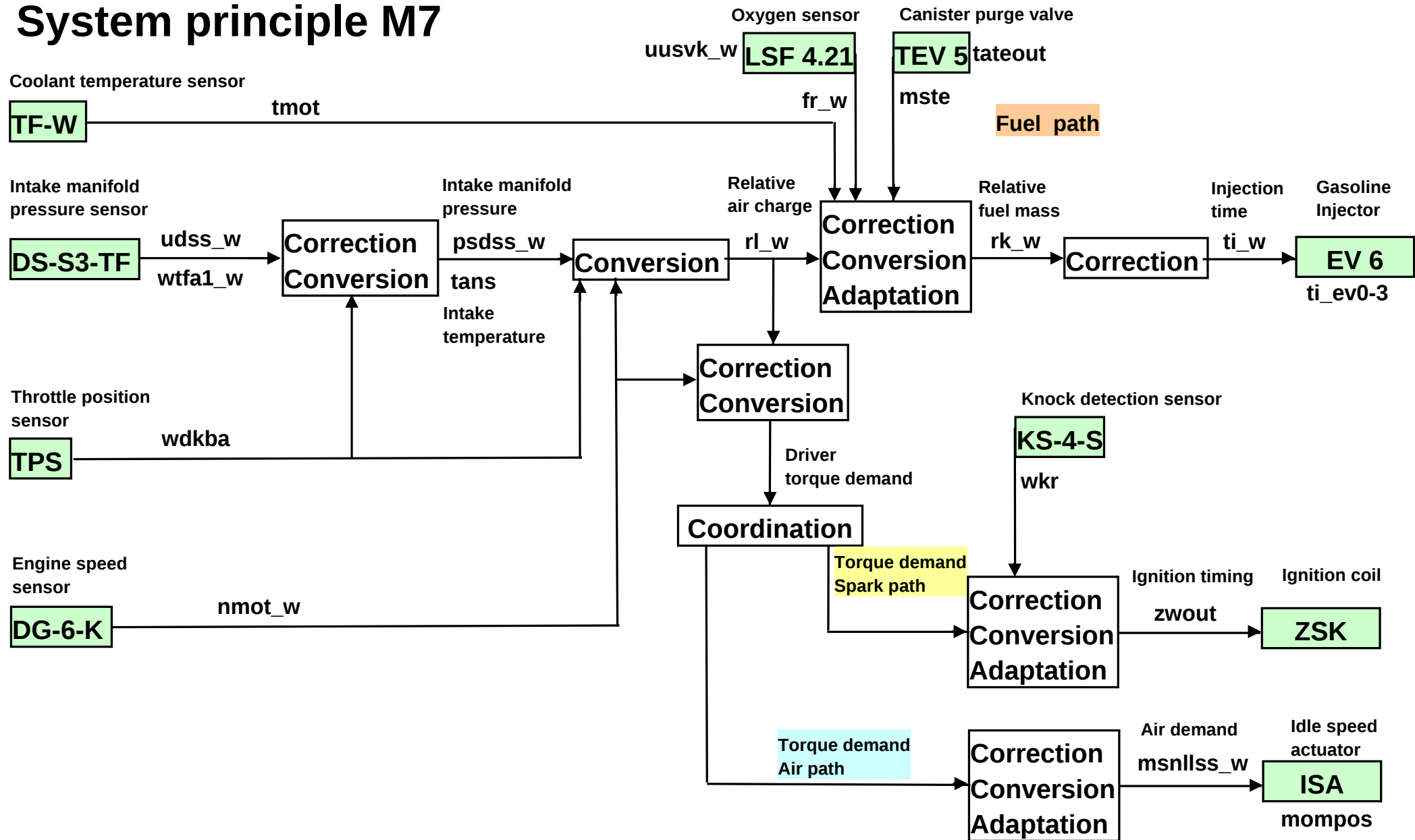
Saipa X100 workshop training



Gasoline Systems

Saipa X100 workshop training

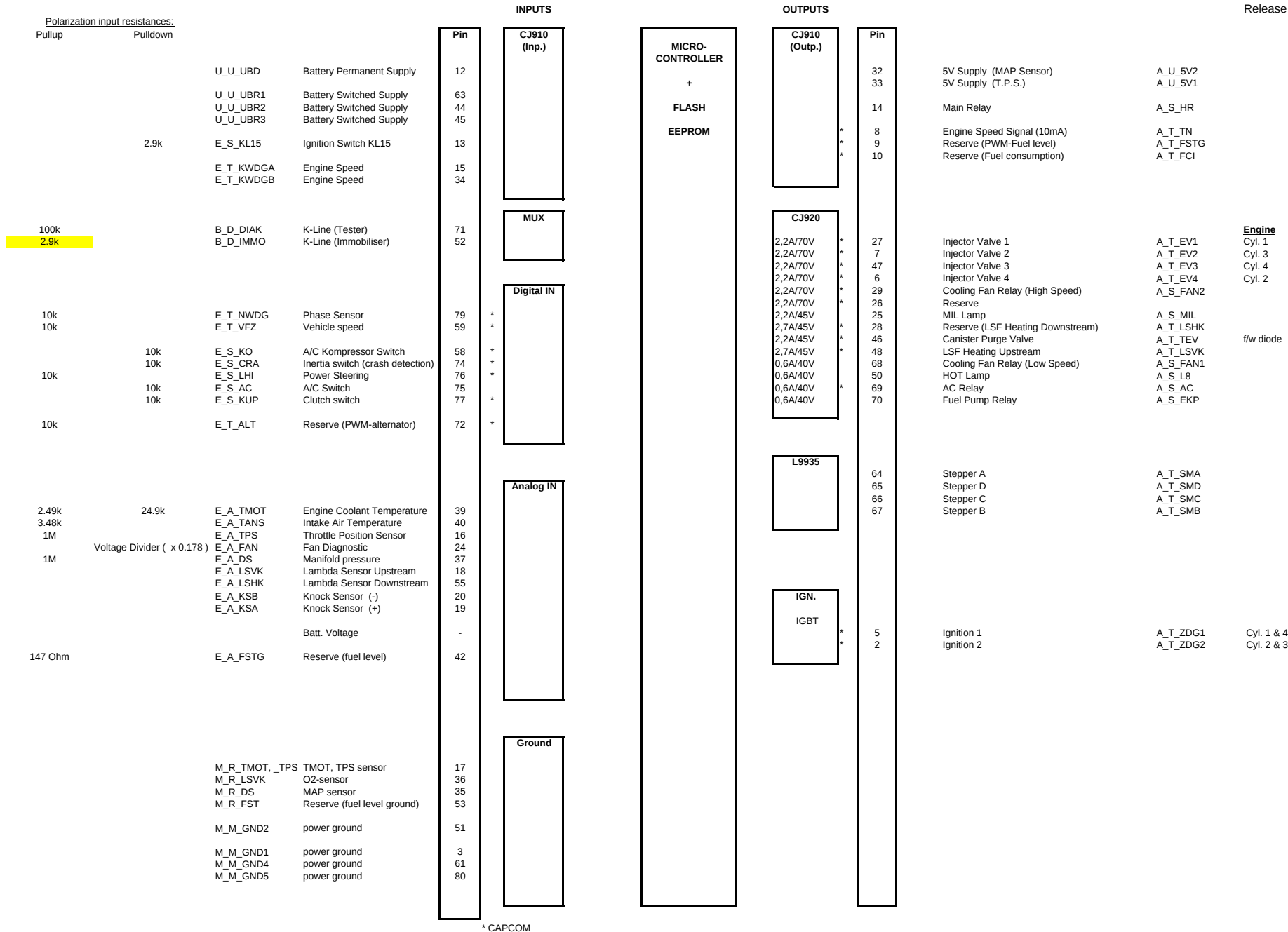
System principle M7



Gasoline Systems

Order No. 0261B13919 / 0261S06634

Changed



Restrictions for testing ECU Inputs and Outputs:

- **Battery Pin's 12, 13, 44, 45, 63** shortcut to ground not allowed
- **Ground Pin's 3,17,35,36,51,53,61,80** shortcut to Battery not allowed
- **Ignition Pin's 2 ,5** shortcut generally not allowed

Ignoring these limitations will damage the ECU!

Mega Motors 1,3L - M7.9.7 P-Code List (X100-stage3)

Last edit by: Riekehr DGS-EC/ECJ3

24.11.2010

BASIS: M797S3C

CDC-Code	max		min		signal		plausible		CLA	Codewort [MIL]	Description	related to ECU PIN	Fault path	Function
CDCBM	P0335		P0335		P0335	X	P0335	X	CLABM	37	Reference mark (crankshaft sensor) misalignment	pin 15, 34	dfp_bm	%DDG
CDCDK	P0121	X	P0121	X	P0121	X	P0121		CLADK	37	Error throttle potentiometer signal	pin 16 (5V_pin 33, ground_pin17)	dfp_dk	%DDKG
CDCEFAN	P0483	X	P0483		P0483	X	P0483		CLAEFAN	37	Engine fan relay 'OUT' malfunction (feedback voltage)	pin 24	dfp_efan	%DMLS
CDCEV1	P0262	X	P0261	X	P0201	X	P0201		CLAEV1	37	Gasoline injector 1 (cylinder 1)	pin 27 (12V_by main relay)	dfp_ev1	%DEVE
CDCEV2	P0265	X	P0264	X	P0202	X	P0202		CLAEV2	37	Gasoline injector 2 (cylinder 3)	pin 7 (12V_by main relay)	dfp_ev2	%DEVE
CDCEV3	P0268	X	P0267	X	P0203	X	P0203		CLAEV3	37	Gasoline injector 3 (cylinder 4)	pin 47 (12V_by main relay)	dfp_ev3	%DEVE
CDCEV4	P0271	X	P0270	X	P0204	X	P0204		CLAEV4	37	Gasoline injector 4 (cylinder 2)	pin 6 (12V_by main relay)	dfp_ev4	%DEVE
CDCFRA	P2177	X	P2178	X	P2178		P2178		CLAFRA	37	multiplicative mixture adaptation factor		dfp_fra	%DKVSDFP
CDCFST	P0463		P0462	X	P0461		P0461		CLAFST	0	Gasoline Tank level sensor signal	pin 42 (ground_pin 53)	dfp_fst	%DFSTT
CDCHSVE	P0032	X	P0031	X	P0031	X	P0031		CLAHSVE	37	O2-sensor heater upstream, Circuit malfunction	pin 48 (12V_by main relay)	dfp_hsve	%DHLSVKE
CDCMILE	P0650		P0650		P0650	X	P0650		CLAMILE	37	MIL lamp	pin 25 (12V_by IG)	dfp_mile	%DMILE
CDCSTPE	P0509	X	P0508	X	P0511	X	P0511		CLASTPE	37	Idle Air Control System (stepper)	pin 64, 65, 66, 67	dfp_lir	%DLLRRM
CDCTMWLE	P0655		P0655		P0655	X	P0655		CLATMWLE	37	Hot lamp	pin 50	dfp_tmwle	%DEKON
CDCKOSE	P2521	X	P2520	X	P2519	X	P2519		CLAKOSE	37	A/C compressor relay	pin 69 (12V_by main relay)	dfp_kose	%DKOSE
CDCKPE	P0629	X	P0628	X	P0627	X	P0627		CLAKPE	37	Circuit malfunction of Gasoline fuel pump relay	pin 70 (12V_by main relay)	dfp_kpe	%DEKPE
CDCKRNT	P032A		P032A		P032A		P032A	X	CLAKRNT	37	ECU internal circuit knock control zero test		dfp_krnt	%DKRNT
CDCKROF	P032B		P032B		P032B		P032B	X	CLAKROF	37	ECU internal circuit knock control offset		dfp_krof	%DKRNT
CDCKRTP	P032C		P032C		P032C		P032C	X	CLAKRTP	37	ECU internal circuit knock control test pulse		dfp_krtp	%DKRTP
CDCKS1	P0328	X	P0327	X	P0327	X	P0325		CLAKS1	37	Knock sensor signal (range check only active in part load)	pin 19 and pin 20	dfp_ks1	%DKRS
CDCKUPPL	P0704		P0704		P0704		P0704	X	CLAKUPPL	37	clutch pedal signal not plausible	pin 77 (12V_by main relay)	dfp_kuppl	%DKUPPL
CDCLM	P0103	X	P0102	X	P0101		P0101	X	CLALM	37	Engine main-load sensor (MAP)	pin 37 (5V_pin 32, ground_pin 35)	dfp_lm	%DDSS
CDCLSV	P1176	X	P0133	X	P2231	X	P0134	X	CLALSV	37	O2-sensor signal upstream cat.	pin 18 (ground_pin 36)	dfp_lsv	%DLSV
CDCLUEA	P0480	X	P0480	X	P0480	X	P0480		CLALUEA	37	Circuit malfunction fan control low speed	pin 68 (12V_by main relay)	dfp_luea	%DMLSE
CDCLUEB	P0481	X	P0481	X	P0481	X	P0481		CLALUEB	37	Circuit malfunction fan control high speed	pin 29 (12V_by main relay)	dfp_lueb	%DMLSE
CDCMD	P0300		P0300		P0300	X	P0300	X	CLAMD	37	Misfire detection cumulative	pin 2 and pin 5 (12V by IG)	dfp_md	%DMDFOF
CDCMD00	P0301		P0301		P0301	X	P0301	X	CLAMD00	37	Misfire ignition 1, cyl 1	pin 5 (12V by IG)	dfp_md01	%DMDFOF
CDCMD01	P0302		P0302		P0302	X	P0302	X	CLAMD01	37	Misfire ignition 2, cyl 2	pin 2 (12V by IG)	dfp_md02	%DMDFOF
CDCMD02	P0303		P0303		P0303	X	P0303	X	CLAMD02	37	Misfire ignition 3, cyl 3	pin 2 (12V by IG)	dfp_md03	%DMDFOF
CDCMD03	P0304		P0304		P0304	X	P0304	X	CLAMD03	37	Misfire ignition 4, cyl 4	pin 5 (12V by IG)	dfp_md04	%DMDFOF
CDCN	P0335	X	P0335	X	P0335	X	P0335	X	CLAN	37	Signal engine speed sensor	pin 15, 34	dfp_n	%DDG
CDCNX	P0219	X	P0219		P0219		P0219		CLANX	6	critical engine speed detected, Nmax.		dfp_nx	%DNMAX
CDCORA	P2187	X	P2188	X	P2188		P2188		CLAORA	37	additive mixture adaptation factor		dfp_ora	%DKVSDFP
CDCPH	P0340		P0340		P0340		P0340	X	CLAPH	37	phase sensor signal general fault	pin 79 (12Vby main relay, chassis ground)	dfp_ph	%DPH
CDCPHE	P0343	X	P0342	X	P0341	X	P0341		CLAPHE	37	phase sensor signal electrical fault	pin 79 (12Vby main relay, chassis ground)	dfp_phe	%EPH2LC
CDCTA	P0110		P0110		P0110		P0114	X	CLATA	37	intake air temperature circuit malfunction	pin 40 (ground_pin 35)	dfp_ta	%DCTFA
CDCTAE	P0112	X	P0113	X	P0114	X	P0114		CLATAE	37	intake air temperature sensor electrical fault	pin 40 (ground_pin 35)	dfp_tae	%DCTFA
CDCTEVE	P0459	X	P0458	X	P0444	X	P0444		CLATEVE	37	Circuit malfunction purge control valve	pin 46 (12V by main relay)	dfp_teve	%DTEVE
CDCTM	P0117	X	P0118	X	P0116		P0116	X	CLATM	37	engine temperature sensor circuit malfunction	pin 39 (ground_pin 17)	dfp_tm	%DCTCW
CDCTME	P0117	X	P0118	X	P0116		P0116		CLATME	37	engine temperature sensor electrical fault	pin 39 (ground_pin 17)	dfp_tme	%DCTCW
CDCUB	P0563	X	P0562		P0560		P0560	X	CLAUB	37	battery voltage permanent supply	pin 12	dfp_ub	%GGUB
CDCVFZ	P0501		P0501		P0501	X	P0501	X	CLAVFZ	37	vehicle speed signal malfunction	pin 59 (12Vby main relay, chassis ground)	dfp_vfz	%DVFZ

Immobilizer IMMO P-Codes not related to min, max, sig, plausible

CDCWFS	P1621	X	P1622	X	P1623	X	P1624	X	CLAWFS	6	Immobiliser not learned			
CDCSGEEW	P1625	X	P1626	X	P1626	P1626			CLASGEEW	37	ECU EEPROM - Immobiliser Data			
CDCSMARTRA	P1636	X	P1637	X	P1638	X	P1639	X	CLASMARTRA	37	Smartra not connected			
CDCSMMSG	P1627	X	P1628	X	P1628	P1629	X		CLASMSG	37	Immobiliser communication errors			
CDCSMTP	P1630	X	P1631	X	P1632	X	P1630		CLASMTTP	37	Key communication errors			
CDCWFSE2	P1633	X	P1633	X	P1634	X	P1635	X	CLAWFSE2	37	Immo related tester diag errors			

Detailed description of Immobiliser fault codes

P1621	Immobiliser: unknown Key
P1622	Immobiliser: Auth. NOK, Key Learning process NOK
P1623	Immobiliser: EMS virgin/Neutral
P1624	Immobiliser
P1625	EEP: inconsistent immobiliser data
P1626	EEP: invalid write operation immobiliser data
P1627	Immobiliser communication: antenna error
P1628	Immobiliser communication: wrong CS, invalid request/response
P1629	Immobiliser communication: timeout
P1630	Key communication: wrong TP mode/programming
P1631	Key communication: No TP
P1632	Key communication: ELP not OK
P1633	Immo tester diagnosis: Wrong CS, Invalid tester command
P1634	Immo tester diagnosis: Tester wrong access code
P1635	Immo tester diagnosis: Tester authentication failed
P1636	Other Smartra5 errors (A. LED Control Command Fail)
P1637	Smartra5 Teach/Neutralize command fail and smartra is locked
P1638	Virgin/neutral Smartra5 at learnt EMS
P1639	Authentication fail - ICU learnt different VSD (vehicle specific data / access code)

Component/ Function	Fault code	Monitor strategy description	Condition for error detection and threshold value(s)	Enable conditions	Time of detection	MIL TYPE
Engine speed sensor %DDG	P0335	Frequent correction by minus one Frequent correction by plus one Lost of reference mark (new) Fault of engine speed Loss of reference mark No signal of engine speed sensor Disconnection of engine speed sensor during running will lead to engine stall. Engine start is possible with longer start time (limp home) if B_phad=1.	If the counter reference gap correction at a missing tooth tmcorctr_w ≠ the saved value from last rate and the frequency counter of the gap correction (minus one tooth) sbmcorrm >= 265 If the counter reference gap correction at a additional tooth tmcorctr_w ≠ the saved value from last rate frequency counter of the gap correction (plus one tooth) sbmcorp >= 265 New synchronization due to a loss of reference mark and the frequency counter of a lost reference gap sbmlos_w exceeds 1200. Engine speed is too low and the counter for low speed or engine speed disturbance snerror_w > 700. Reference mark is not found and frequency counter of not detected reference gaps while starting snobm > 6 Counter tooth interrupt znbm_w > 5 and condition underspeed B_nmin = true (nmot < 25 rpm)	Engine is not back rotating 1 km/h > vtzg_w > 25 km/h No error in vehicle speed E_VFZ = false Filtered engine speed > stationary reference engine speed - 50 rpm Engine speed changes to low engine speed (nmot < 25 rpm) B_nmin changes from false to true. No error in camshaft signal E_ph = false, counter schedule of phase signal zrph > 6 (Camshaft signal is available). After power fail or camshaft is not adapted (B_phad = 0), engine start is not possible.	9 CRS- 9 CRS- 6 CRS- 14 CRS- 3 CRS- 12 CRS-	MIL ON
Throttle position %DDKG	P0121	Minimum Error Maximum Error Signal Error	short circiut to ground Sensor voltage uwdk_w < 0,176 V short circiut to battery Sensor voltage uwdk_w > 4,883 V. open circuit	Engine speed nmot_w > 720 rpm for time > 0,1 s B_pwf = false	0,5 s	MIL ON
Injector power stage %DEVE	Gasoline: P0261 = Active for Cyl. 1 P0264 = Active for Cyl. 2 P0267 = Active for Cyl. 3 P0270 = Active for Cyl. 4 P0262 = Active for Cyl. 1 P0265 = Active for Cyl. 2 P0268 = Active for Cyl. 3 P0271 = Active for Cyl. 4 P0201 = Active for Cyl. 1 P0202 = Active for Cyl. 2 P0203 = Active for Cyl. 3 P0204 = Active for Cyl. 4	Minimum Error Maximum Error Signal Error	Short circuit to ground Short circuit to battery, engine run Open circuit	Ignition ON 8,44 V < battery voltage < 17,86 V	0,5 s	MIL ON
Plausibility test fuel supply system %DKVSDFP	P2178 P2177 P2188 P2187	Below min. threshold Above max. threshold Below min. threshold Above max. threshold	multiplicative mixture adaptation of lambda control frai_w < 0,76 multiplicative mixture adaptation of lambda control frai_w > 1,23 additive mixture adaption of lambda control orai_w < -7% additive mixture adaption of lambda control orai_w > 7%	1. Lambda control active 2. Warm engine tmot > 70 °C 3. Intake air temperature < 90 °C 4. Cat heating is finished 5. fra adaptation stabilized 6. part load 1. Lambda control active 2. Warm engine tmot > 70 °C 3. Intake air temperature < 90 °C 4. Cat heating is finished 5. ora adaptation stabilized 6. idle	0,5 s	MIL ON

Component/ Function	Fault code	Monitor strategy description	Condition for error detection and threshold value(s)	Enable conditions	Time of detection	MIL TYPE
Lambda sensor heater %DHLSVKE	P0031 P0032 P0031	Minimum Error Maximum Error Signal Error:	short circuit to ground short circuit to battery open circuit	Engine speed > 40 rpm, 8,44 V < battery voltage < 17,86 V Condition for Lambda sensor heating upstream catalyst ready for operating Condition temperature upstream catalyst exceeds dew-point for a time longer 10 s.	0,5 s	MIL ON
Climate compressor %DKOSE	P2520 P2521 P2519	Minimum Error Maximum Error Signal Error	short circuit to ground short circuit to battery open circuit	Time since start > 5 s. Engine speed > 40 rpm 8,44 V < battery voltage < 17,86 V	0,5 s	MIL ON
Fuel pump relay power stage %DEKPE	P0628 P0629 P0627	Minimum Error Maximum Error Signal Error	short circuit to ground short circuit to battery open circuit.	Engine speed > 40 rpm, 8,44 V < battery voltage < 17,86 V	0,5 s	MIL ON
Knock sensor Knock control %DKRS	P0327 P0328	Minimum Error or Signal Error Maximum Error	Normalized reference level of knock control rkrn_w is permanently < reference voltage threshold from UDKSNU (depended from engine speed 2800 rpm to nmax from 0, 4883 V to 1,0742 V) rkrn_w is permanently > reference voltage threshold from UDKSNO (depended from engine speed 2400 rpm to nmax from 24,73 V to 71,5 V)	No error from knock control zero test, offset test, test pulse, engine speed sensor Engine speed nmot_w > 2800 rpm Knock control is active: rel. air charge > reference level of knock control (LKRN 35 % at 800 rpm to 50% at 5200 rpm) Engine temperature tmot > 42 °C see above engine speed nmot_w > 2400 rpm	4 s 4 s	MIL ON
%DKRNT	P032A P032B	Non Plausible Error - Zero test NPL Error – Offset test	Integrator value at start of measurement window, knock control -0,722 > ikrma_w > 0,215 V for 600 combustions (Integrator gradient for zero test diagnosis knock control igod_w < threshold depended on the duration of the measurement window during zero test tmfln_w)	Knock control is active: rel. air charge > reference level of knock control (LKRN 35 % at 800 rpm to 50% at 5200 rpm) see above	600 combustions	
%DKRTP	P032C	NPL Error test pulse	(integrator value at end of measurement window, knock control test pulse ikrmet_w - integrator value at end of measurement window, knock control test pulse ikrma_w) < 3,7 V after 5 tests pulse, consecutive error check	see above		
Clutch pedal signal %DKUPPL	P0704	No clutch pedal signal, open circuit. circuit.	Number of detected gear changes anzgangw > 20 and number of clutch activation anzkupplb < 2	At least 5 s between gear changes only gear changes by one are valid Vehicle speed vfzg > 30 km/h , No breaking during gear change	0,5 s	MIL ON

Component/ Function	Fault code	Monitor strategy description	Condition for error detection and threshold value(s)	Enable conditions	Time of detection	MIL TYPE	
Pressure sensor Intake manifold %DDSS	P0102	Minimum Error	intake manifold pressure sensor voltage < 0,2 V	IGN ON Engine speed =< 75 1/min or time after engine	0,5 s	MIL ON	
	P0103	Maximum Error	intake manifold pressure sensor voltage > 4,88 V				
	P0101	non plausible Error	Filterd. manifold pressure psdssf_w < output value of characteristic map for minimum plausible pressure value psdmn_w from KFPSDMN* or: Filterd. manifold pressure psdssf_w > output value of characteristic map for maximum plausible pressure value psdmx_w from KFPSDMX* *: Appendix 1 (Intake manifold pressure from model by throttle angle and engine speed is compared with measured signal. Big deviations set the error.)	Time after engine start > 1 s No error in throttle valve	4 s		
Lambda sensor upstream catalyst %DLSV	P0133	Minimum Error	The output voltage of cold lambda sensor upstream catalyst usvk_w < 0,06 V for a time delay > 0,1 s	Battery voltage ubsq >11 V B_nmot = true Exhaust gas temperature at lambda sensor	0,5 s	MIL ON	
	P1176	Maximum Error	The output voltage of cold lambda sensor upstream catalyst usvk_w > 1,5 V for a time > 5,1s	Condition fault in injector is not set Condetion for lambda sensor heating-switch upstream catalyst on B_hsve = true for a time > 15 s. Flag lambda sensor setpoint for sensor equal to 1 B_lasostc = true 0,99976 <= lamsons_w <= 1,00024	5,1 s		
	P2231	Signal Error	Actual value of internal resistance of lambda sensor upstream catalyst rinv_w > 20 kOhm and exhaust gas temperature upstream cat > 600 °C or 0,4 V < sensor voltage < 0,6 V for a time delay > 5 s	Dew point upstream cat is exceeded	5,1 s		
	P0134	non plausible Error	Dew point upstream cat is exceeded for a time > 10 s and the sensor voltage usvk_w > 2 V and heater switches from on to off and the counter for fault measurements of heater coupling upstream catalyst zhkv > 4	Exhaust gas temperature upstream cat > 600 °C	0,5 s		
Fan control power stage %DMLSE	P0480	Minimum Error	short circuit to ground	Engine temperature tmot_w > 91°C for a time > 0,4	0,5 s	MIL on	
		Maximum Error	short circuit to battery	Engine speed > 40 rpm B_stend = true for a time > 0,4 s			
		Signal Error	open circuit	Condition ignition switch on 8,44 V < battery voltage < 17,86 V			
	P0481	Minimum Error	short circuit to ground	Engine temperature tmot_w > 96°C for a time > 0,4 s			
		Maximum Error	short circuit to battery	Engine speed > 40 rpm B_stend = true for a time > 2 s			
		Signal Error	open circuit	Condition ignition switch on 8,44 V < battery voltage < 17,86 V			
Fan control %DMLS	P0483	Minimum Error	Fan low speed circuit 6V Error: 85% ubfan_w < bttery voltage ubsq_w/2 < 115% ubfan_w è ubatt/2 detected at pin 106	Engine temperature tmot_w > 91°C for a time > 0,4 Engine speed > 40 rpm B_stend = true for a time > 0,4 s IGN ON	1 s		
	P0483	Maximum Error	Fan high speed circuit 12V Error: 85% ubfan_w < bttery voltage ubsq_w/2 < 115% ubfan_w è ubatt/2 detected at pin 106	Engine temperature tmot_w > 96°C for a time > 0,4 Engine speed > 40 rpm B_stend = true for a time > 0,4 s IGN ON	1 s		
	P0483	Signal Error	open circuit	Fan 1 or fan 2 is on			

Component/ Function	Fault code	Monitor strategy description	Condition for error detection and threshold value(s)	Enable conditions	Time of detection	MIL TYPE
Diagnosis max. engine speed %DNMAX	P0219	Maximum Error	Engine speed $nmot_w > 6500$ rpm	Engine is running	0,5 s	MIL OFF
AC pressure sensor %GGPAC	P0532	Minimum Error	Sensor voltage of pressure sensor $udsac_w < 0,2$ V	Ambient temperature $tum > -10^{\circ}C$ Engine is running	0,5 s	MIL ON
Camshaft sensor %DPH	P0533	Maximum Error	Signal voltage of AC pressure sensor $udsac_w > 4,65$ V	Signal voltage of AC pressure sensor		
	P0342	Minimum Error	The current level of the PG in the shift register $phpw = 00000000$ and no phase edges.	Engine is running	24 CRS-Rev.	MIL ON
	P0343	Maximum Error	The current level of the PG in the shift register $phpw = 11111111$ and no phase edges.			
	P0341	Signal Error	The current level of the PG in the shift register $phpw = 11111111$ or 00000000			
	P0340	non plausible Error	wrong mounted PG The current level of the PG in the shift register $phpw = 0101010101$ or 10101010 intermitted contact			
Intake air temperature sensor %GGTFA	P0113	Minimum Error	The sensor voltage $wtfa1_w < 0,16$ V	Engine temperature $tmot > 60^{\circ}C$ Air Mass flow $ml_w \leq 24$ kg/h Vehicle speed $vfg \leq VFZGTFA$ for a time longer than 10 s	1 s	MIL ON
	P0112	Maximum Error	The sensor voltage $wtfa1_w > 4,5$ V			
	P0114	non plausible Error	check for fast signal change ($wtfa1_w - wtfa > 1V$) jitter check			
Canister purge valve power stage %DTEVE	P0458	Minimum Error	short circuit to ground	Engine speed > 40 rpm, $8,44 V < \text{battery voltage} < 17,86 V$ Actual duty cycle of the PCV $tateist_w$ is inside the range [2%, 80%]	0,5 s	MIL on
	P0459	Maximum Error	short circuit to battery			
	P0444	Signal Error	open circuit			
Cooling water temperature sensor %DCTCW %DPLTCW (engine temp.)	P0118	Minimum Error	Sensor voltage $utcw_w < 0,1$ V for a time > 2 s	IGN ON	2 s	MIL ON
	P0117	Maximum Error	Sensor voltage $utcw_w > 4,8V$ for time > 2 s		2 s	
	P0116	non plausible Error	Low side check If the coolant temperature $tmotlin_w$ constantly lies outside the model temperature intervals $[(tmrw - 13^{\circ}C, tmrw + 191^{\circ}C)$ jitter check signal shall not change too fast ($utcw - utcwf > 1$ V	Engine is running No error on components, which have deactivation authorisation	0,5 s	
Battery voltage %GGUB	P0562	Minimum Error	Battery voltage read directly from the ADC wub_w between 2,52 V and 7,45 V for time longer than 5 s.	The time after engine start > 180 s		MIL ON
	P0563	Maximum Error	Battery voltage read directly from the ADC $wub_w > 17$ V for longer than 5 s.	The time after engine start > 180 s. Vehicle speed > 25 km/h		
	P0560	non plausible Error	Battery voltage read directly from the ADC $wub_w < 2,52$ V for a time > 5 s			
Vehicle speed sensor %DVFZ	P0501	non plausible Error and signal Error.	No changes in vehicle speed signal and vehicle speed inside a range (0 km/h $< vroh_w < 200$ km/h)	Vehicle is running. Load $> 50\%$. Engine temperature $> 40^{\circ}C$. Milage for detection > 5 km. 1520 rpm $< nmot_w < 3500$ rpm.		MIL ON
Idle air control system actuator (stepper) % DLLR	P0511	Signal Error	all errors (P0511, P0508, P0509) are set for: Stepper phase A, pin 64	Engine is running	1 s	Mil ON
	P0508	Minimum Error	Stepper phase D, pin 65			
	P0509	Maximum Error	Stepper phase C, pin 66			
	P0509	Max. Error	Stepper phase B, pin 67 connector at stepper disconnected (pin 64,65,66,67 together)			

Component/ Function	Fault code	Monitor strategy description	Condition for error detection and threshold value(s)	Enable conditions	Time of detection	MIL TYPE
Misfire detection % DMDFOF	P0300	Signal. Plausible Error.	Cumulative fault. It depends on engine speed, load, error heaviness and adaption status: after detection of misfire the MIL is blinking, 30 seconds later the injection is cutted OFF and the MIL illuminated continuously. This valid for all cylinders.	Engine is running. Time for detection > 180 s at signal error. Plausible error is checked during calibration.		Mil ON
	P0301	Signal and Plausible-Error	Ignition 1, cyl.1 (PIN 5)			
	P0302	Signal and Plausible-Error	Ignition 2, cyl.2 (PIN 2)			
	P0303	Signal and Plausible-Error	Ignition 3, cyl.3 (PIN 2)			
	P0304	Signal and Plausible-Error	Ignition 4, cyl.4 (PIN 5)			
Mil lamp detection %DMILE	P0650	Signal-, Minimum and Maximum Error.	ECU memory shows "Mil ON" in case of MIL control line is faulty	Ignition ON		Mil ON
Engine hotlamp %DEKON	P0655	Signal-, Minimum and Maximum Error.	Engine hotlamp control line is faulty	Engine running		Mil ON

Relation of components to signals in M7.9.7 ECU on tester output (T2LID)

Component		Monitoring method	related signal name(s) in tester	to add to T2LID
short name	long name			
RB EV6 ZS-K-2x2V DS-S3-TF DG-6-K PG-3-8 TEV 5 LSF 4.21 KS-4-S TF-W SMARTRA 5	Gasoline injector Ignition coil Intake manifold pressure and temperature sensor Engine speed sensor Phase detection sensor Canister purge valve Oxygen sensor Knock sensor engine coolant temperature sensor Immobiliser	electrical plaus electrical and plaus plaus plaus electrical electrical and plaus plaus electrical and plaus electrical	ti_ev0-3 zwout psdss_w, tans nmot_w B_phad tateout_w, B_te uusvk_w, fr_w, fra_w, rka_w wkr, uadki_w tmot --	 B_kr B_eculock
MM TPS ISA Fan1 Fan2 AC compressor VSS EKP	Throttle position sensor Idle speed actuator Hotlamp MIL engine Fan relay1 engine Fan relay2 AC relay Clutch switch vehicle speed sensor ECU power supply Fuelpump	electrical electrical electrical electrical electrical electrical plaus plaus electrical and plaus electrical	wdkba B_ll, mompos, solpos -- B_mil B_lf1s B_lf2s B_koe -- vfzg_w ub B_ekp	 B_kshtlpe B_kuppl
additional	Power steering pressure switch crash switch AC switch AC compressor switch	not monitored not monitored not monitored not monitored	B_sl B_airbag S_ac b_ko	

Function

Extent shown: T2LID 50.50.2
Blocks chosen: ABK, APP, FB, FDEF, FW
System:
Project:
Project code:

Responsible: Rohit Nayak
Department: C/PJ-GC(RBEI)
Phone: +49(711)811-0
Date of issue: 22.NOV.2010



FU T2LID 50.50.2 KWP2000: Read/write Data by Local Identifier

FDEF T2LID 50.50.2 Function definition

Please refer to % T2RDBLID for service description.

Standard Service Data Set 1 ,RecordLocalIdentifier = 0x01

Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
0	Byte	Support Info byte 0 LID 1	SUPINFO1	-	-	-	-	-
1	Byte	Support Info byte 1 LID 1	SUPINFO2	-	-	-	-	-
2	Byte	Support Info byte 2 LID 1	SUPINFO3	-	-	-	-	-
3	Byte	Support Info byte 3 LID 1	SUPINFO4	-	-	-	-	-
4	Byte	Coolant Temperature	PID 1	tmot	Grad C	0.75 Grad C, offset = -48	-48.0000	143.2500
5	Byte	Intake Air Temperature	PID 2	tans	Grad C	0.75 Grad C, offset = -48	-48.0000	143.2500
6	Word	Intake Air pressure (low Byte)	PID 3	If SY_DSS > 0 psdss_w else 00	hPa	0.039 hPa ,offset = 0	0.0000	2559.9609
7		Intake Air pressure (High Byte)						
8	Word	Knock Value (low Byte)	PID 4	uadki_w	V	0.00008 V,offset = 0	0.0000	4.9999
9		Knock Value (High Byte)						
10	Word	GAS Pedal Module (P1 & P2) (low Byte)	PID 5	wped_w	%PED	0.00153 %PED ,offset = 0	0.0000	100.0000
11		GAS Pedal Module (P1 & P2) (High Byte)						
12	Word	Engine speed (low Byte)	PID 6	nmot_w	1/min	0.25 1/min ,offset = 0	0.0000	16383.7500
13		Engine speed (High Byte)						
14	Word	vehicle speed (low Byte)	PID 7	vfzg_w	km/h	0.00781 km/h	0.0000	511.9922
15		vehicle speed (High Byte)						
16	Word	Downstream O2 (low Byte)	PID 8	uushk_w	V	0.00488 V,offset=0	0.0000	319.9951
17		Downstream O2 (High Byte)						
18	Word	Ambient Temperature (low Byte)	PID 9	tumgk_w	Grad C	0.02344 Grad C, offset = -273.15	-273.15	1262.827
19		Ambient Temperature (High Byte)						
20	Word	Ambient pressure (low Byte)	PID 10	pu_w	hPa	0.03906 hPa,offset=0	0.0000	2559.9609
21		Ambient pressure (High Byte)						
22	Word	CNG Regulator Pressure (low Byte)	PID 11	If SY_NG > 0 ptng_w else 00	Bar	0.00391 Bar,offset=0 Bar	0.0000	255.9961
23		CNG Regulator Pressure (High Byte)						
24	Byte	CNG Rail Temperature	PID 12	If SY_NG > 0 tngf else 00	Grad C	0.75 Grad C, offset = -48	-48.0000	143.2500
25	Word	CNG Rail Pressure (low Byte)	PID 13	If SY_NG > 0 png_w else 00	hPa	0.22888 hPa,offset=0	0.0000	14999.7711
26		CNG Rail Pressure(High Byte)						

Standard Service Data Set 2 ,RecordLocalIdentifier = 0x02

Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
0	Byte	Support Info byte 0 LID 2	SUPINFO1	-	-	-	-	-
1	Byte	Support Info byte 1 LID 2	SUPINFO2	-	-	-	-	-
2	Byte	Support Info byte 2 LID 2	SUPINFO3	-	-	-	-	-
3	Byte	Support Info byte 3 LID 2	SUPINFO4	-	-	-	-	-
4	Word	Injection time valve Gasoline injector 1 (low Byte)	PID 1	ti_ev0	ms	0.0032 ms	0.0000	209.7120
5		Injection time valve Gasoline injector 1 (HighByte)						
6	Word	Injection time valve Gasoline injector 2 (low Byte)	PID 2	ti_ev1	ms	0.0032 ms	0.0000	209.7120
7		Injection time valve Gasoline injector 2 (HighByte)						
8	Word	Injection time valve Gasoline injector 3 (low Byte)	PID 3	ti_ev2	ms	0.0032 ms	0.0000	209.7120
9		Injection time valve Gasoline injector 3 (High Byte)						
10	Word	Injection time valve Gasoline injector 4 (low Byte)	PID 4	ti_ev3	ms	0.0032 ms	0.0000	209.7120
11		Injection time valve Gasoline injector 4 (High Byte)						
12	Word	Injection time valve CNG injector 1 (low Byte)	PID 5	If SY_NG > 0 ti_ev4 else 00	ms	0.0032 ms	0.0000	209.7120



Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
13		Injection time valve CNG injector 1 (High Byte)						
14	Word	Injection time valve CNG injector 2 (low Byte)	PID 6	If SY_NG > 0 ti_ev5 else 00	ms	0.0032 ms	0.0000	209.7120
15		Injection time valve CNG injector 2 (High Byte)						
16	Word	Injection time valve CNG injector 3 (low Byte)	PID 7	If SY_NG > 0 ti_ev6 else 00	ms	0.0032 ms	0.0000	209.7120
17		Injection time valve CNG injector 3 (High Byte)						
18	Word	Injection time valve CNG injector 4 (low Byte)	PID 8	If SY_NG > 0 ti_ev7 else 00	ms	0.0032 ms	0.0000	209.7120
19		Injection time valve CNG injector 4 (High Byte)						
20	Byte	throttle angle referred to lower limit	PID 9	wdkba	%DK	0.39216 Grad KW,offset=0	0.0000	100.0000
21	Word	output duty cycle for canister purge valve(low Byte)	PID 10	tateout_w	%	0.00153 %,offset=0	0.0000	99.99847
22		output duty cycle for canister purge valve(High Byte)						
23	Byte	Resulting crankshaft angle for end of injection	PID 11	weer	°KW	2.81255 °KW,offset=0	0.0000	717.2
24	Byte	Resulting crankshaft angle for end of injection in CNG	PID 12	If SY_NG > 0 weerng else 00	°KW	2.81255 °KW,offset=0	0.0000	717.2
25	Word	Ignition coils charging time (low Byte)	PID 13	sztcac_w	ms	0.0008 ms	0.0000	52.42800
26		Ignition coils charging time (High Byte)						
27	Byte	Ignition angle output value	PID 14	zwout	Grad KW	0.75 Grad KW,offset=0	-96.0	95.25
28	Byte	cylinder individual ignition retardation value for knock control for cylinder 1	PID 15	wkr[0]	Grad KW	-0.75 Grad KW,offset=0	-191.3	0
29	Byte	cylinder individual ignition retardation value for knock control for cylinder 2	PID 16	wkr[1]	Grad KW	-0.75 Grad KW,offset=0	-191.3	0
30	Byte	cylinder individual ignition retardation value for knock control for cylinder 3	PID 17	wkr[2]	Grad KW	-0.75 Grad KW,offset=0	-191.3	0
31	Byte	cylinder individual ignition retardation value for knock control for cylinder 4	PID 18	wkr[3]	Grad KW	-0.75 Grad KW,offset=0	-191.3	0
32	Status Byte 0	Bit 0 : -canister purge active Bit 1 : - Bit 2 : - Bit 3 : - Bit 4 : - Bit 5 : - Bit 6 : - Bit 7 : -	PID 19	B_te unused unused unused unused unused unused unused		Bit Bit Bit Bit Bit Bit Bit Bit	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
33	Status Byte 1	Bit 0 : - CNG Shutoff Valve Bit 1 : - CNG Tank Valve Bit 2 : - CNG Tank Valve 2 Bit 3 : - Bit 4 : - Bit 5 : - Bit 6 : - Bit 7 : -	PID 20	If SY_NG > 0 B_ngvdrn else 00 If SY_NG > 0 B_ngvtank1 else 00 If SY_NG > 0 B_ngvtank2 else 00 unused unused unused unused unused		Bit Bit Bit Bit Bit Bit Bit Bit Bit	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000

Standard Service Data Set 3 ,RecordLocalIdentifier = 0x03

Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
0	Byte	Support Info byte 0 LID 3	SUPINFO1		-	-	-	-
1	Byte	Support Info byte 1 LID 3	SUPINFO2		-	-	-	-



Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
2	Byte	Support Info byte 2 LID 3	SUPINFO3		-	-	-	-
3	Byte	Support Info byte 3 LID 3	SUPINFO4		-	-	-	-
SY_STEPPER=0 (If stepper motor is not present)								
4	Byte	Battery voltage	PID 1	ub	V	0.10957 V	0.0000	27.94
SY_STEPPER=1 (If stepper motor is present)								
4	Byte	Battery voltage	PID 1	ub	V	0.073675V	0.0000	18.787125
5	Status Byte 0	Bit 0 : - Power Steering Switch Bit 1 : Main Relay Bit 2 : Fuel Pump Relay Bit 3 : AC Request Bit 4: A/C Relay active/deactive Bit 5: -Inertia Switch Bit 6: -MIL Lamp Bit 7: -	PID 2	B_sl B_hr B_ekp S_ac S_ko B_airbag B_mil unused		Bit Bit Bit Bit Bit Bit Bit Bit	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
6	StatusByte 1	Bit 0: - No FAN output Bit 1 : -FAN stage 1 ON Bit 2 : - FAN Stage 2 ON Bit 3 : -FAN Stage 1 and Stage 2 ON Bit 4 : - Bit 5 : - Bit 6 : - Bit 7 : -	PID 3	B_lf1s = 0 and B_lf2s = 0 B_lf1s = 1 and B_lf2s = 0 B_lf1s = 0 and B_lf2s = 1 B_lf1s = 1 and B_lf2s = 1 unused unused unused unused		Bit Bit Bit Bit Bit Bit Bit	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
7	StatusByte 2	Bit 0: -CNG / Gasoline Select Switch Bit 1: -CNG / Gasoline Mode Bit 2 : - Bit 3 : - Bit 4 : - Bit 5 : - Bit 6 : - Bit 7 : -	PID 4	If SY_NG > 0 B_gum else 00 ¹⁾ If SY_NG > 0 B_gas else 00 ²⁾ unused unused unused unused unused		Bit Bit Bit Bit Bit Bit Bit	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000

Instruction: 1) 1- B_gum - Request for Fuel change

2) B_gas - CNG mode operation (B_gas = 1) and Gasoline mode operation (B_gas = 0)

Standard Service Data Set 4 ,RecordLocalIdentifier = 0x04

Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
0	Byte	Support Info byte 0 LID 4	SUPINFO1		-	-	-	-
1	Byte	Support Info byte 1 LID 4	SUPINFO2		-	-	-	-
2	Byte	Support Info byte 2 LID 4	SUPINFO3		-	-	-	-
3	Byte	Support Info byte 3 LID 4	SUPINFO4		-	-	-	-
4	Byte	CNG Tank Temperature model	PID 1	If SY_NG > 0 ttngaus else 00	Grad C	0.75 Grad C, offset = -48	-48.0000	143.9971
5	Word	Relative air charge (low Byte)	PID 2	rl_w	%	0.02344 %,offset = 0	0.0000	1535.9766
6	Word	Relative air charge (High Byte)	PID 2	rl_w	%	0.02344 %,offset = 0	0.0000	1535.9766
7	Word	Indicated real engine Torque (Low Byte)	PID 3	miist_w	%	0.00153 %,offset = 0	0.0000	99.9985
8	Word	Indicated real engine Torque (High Byte)	PID 3	miist_w	%	0.00153 %,offset = 0	0.0000	99.9985
9	Word	Short term fuel Trim(Bank1)(low Byte)	PID 4	fr_w	-	0.00003	0.0000	1.999969
10	Word	Short term fuel Trim(Bank1)(High Byte)	PID 4	fr_w	-	0.00003	0.0000	1.999969
11	Word	"Long Term Fuel Trim (Bank 1) multiplicative correction of the mixture adaptation" (low Byte)	PID 5	fra_w	-	0.00003	0.0000	1.999969
12	Word	"Long Term Fuel Trim (Bank 1) multiplicative correction of the mixture adaptation" (High Byte)	PID 5	fra_w	-	0.00003	0.0000	1.999969
13	Word	"Long Term Fuel Trim (Bank 1) additive correction of the relative fuel amount" (low Byte)	PID 6	rka_w	%	0.04688 %,offset = 0	-1536.000	1535.953
14	Word	"Long Term Fuel Trim (Bank 1) additive correction of the relative fuel amount" (High Byte)	PID 6	rka_w	%	0.04688 %,offset = 0	-1536.000	1535.953



Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
15 16	Word	Gasoline Tank level (low Byte) Gasoline Tank level (High Byte)	PID 7	fstt_w	L	0.1 ,offset = 0	0.0000	6553.5000
17	Byte	Actual PWM value used to drive the Gasoline level indicator signal in Combi	PID 8	pwmfst	%	1,offset = 0	0.0000	255.0
18 19	Word	CNG Tank level (low Byte) CNG Tank level (High Byte)	PID 9	If SY_NG > 0 mntng_w else 00	Kg	0.00109 kg,offset = 0	0.0000	71.67891
20	Byte	Actual PWM value used to drive the CNG level indicator signal in Combi	PID 10	If SY_NG > 0 mntngnpwm else 00	%	1,offset = 0	0.0000	255.0
21	Byte	Alternator PWM input to ECU indicating Alternator load	PID 11	kldfpwmf	%	0.39063 m/(s ³),offset = 0	0.0000	99.61
22	Byte	Ignition Advance for cylinder 1	PID 12	zwoutar[0]	Grad KW	0.75Grad KW,offset=0	-96	95.25
23	Byte	Ignition Advance for cylinder 2	PID 13	zwoutar[1]	Grad KW	0.75Grad KW,offset=0	-96	95.25
24	Byte	Ignition Advance for cylinder 3	PID 14	zwoutar[2]	Grad KW	0.75Grad KW,offset=0	-96	95.25
25	Byte	Ignition Advance for cylinder 4	PID 15	zwoutar[3]	Grad KW	0.75Grad KW,offset=0	-96	95.25
26	Byte	current gear	PID 16	gangi	-	1,offset = 0	0.0000	255.0
27	Byte	Injection cutoff pattern total	PID 17	evz_austot	-	1,offset = 0	0.0000	255.0
28 29	Word	relative fuel mass (low Byte) relative fuel mass (High Byte)	PID 18	rk_w	%	0.04688%	0.0000	3071.953
30 31	Word	relative CNG mass (low Byte) relative CNG mass (High Byte)	PID 19	If SY_NG > 0 rkng_w else 00	%	0.04688%	0.0000	3071.953
32 33	Word	Mileage of the car with speed signal(Low Byte) Mileage of the car with speed signal(High Byte)	PID 20	kmp6km_w/ kmstmil_w based on B_mil ¹⁾	[km]/ [km]	[6 km ,offset = 0]/ [0.1 km ,offset = 0]	0.0000/ 0.0000	393210[FFFF]/ 6553.500[FFFF]
34	Status Byte 0	Bit 0 : condition engine stalled Bit 1 :Cranking Start Bit 2 : Idle speed from driver's sight Bit 3 : -Full load Bit 4 : -condition ignition switch on Bit 5 : - Engine speed status Bit 6 : - Fuel cut off Bit 7 : -Condition for Lambda closed loop control upstream catalyst active,Bank 1	PID 21	B_abw B_st B_ll B_vl B_kl15 B_nmot B_sa B_lr	Bit Bit Bit Bit Bit Bit Bit Bit	Bit Bit Bit Bit Bit Bit Bit Bit	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
35	Status Byte 1	Bit 0 : O2 Sensor (LSF) (Condition lambda control downstream active) Bit 1 :Error flag engine speed sensor Bit 2 :Error flag reference mark sensor Bit 3 :Reference mark found Adaption inlet Bit 4:Adaption for camshaft to crankshaft finished (inlet) Bit 5: Adaption for camshaft to crankshaft finished Bit 6 : Bit 7 : -	PID 22	B_lrhk E_n E_bm B_bm B_phade B_phad unused unused	Bit Bit Bit Bit Bit Bit Bit	Bit Bit Bit Bit Bit Bit Bit	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000

Instruction: 1)Byte location 26 and 27= kmp6km_w when B_mil is SET
Byte location 26 and 27 = kmstmil_w when B_mil is RESET

Standard Service Data Set 5 ,RecordLocalIdentifier = 0x05

Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
0	Byte	Support Info byte 0 LID 4	SUPINFO1	-	-	-	-	-
1	Byte	Support Info byte 1 LID 4	SUPINFO2	-	-	-	-	-
2	Byte	Support Info byte 2 LID 4	SUPINFO3	-	-	-	-	-
3	Byte	Support Info byte 3 LID 4	SUPINFO4	-	-	-	-	-
4	LWord	Total kilometre travelled in both gasoline and CNG mode (low byte of low word)	PID 1	kmst_l	KM	0.1 KM, offset = 0	0.0000	429496729.500

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Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
5		Total kilometre travelled in both gasoline and CNG mode (high byte of low word)						
6		Total kilometre travelled in both gasoline and CNG mode (low byte of high word)						
7		Total kilometre travelled in both gasoline and CNG mode (high byte of high word)						
8	LWord	Total kilometre travelled in Gasoline mode after error in vehicle speed (low byte of low word)	PID 2	kmstf_l	KM	0.1 KM, offset = 0	0.0000	429496729.500
9		Total kilometre travelled in Gasoline mode after error in vehicle speed (high byte of low word)						
10		Total kilometre travelled in Gasoline mode after error in vehicle speed (low byte of high word)						
11		Total kilometre travelled in Gasoline mode after error in vehicle speed (high byte of high word)						
12	LWord	Total kilometre travelled in gasoline mode in both with OR without error (low byte of low word)	PID 3	kmstt_l	KM	0.1 KM, offset = 0	0.0000	429496729.500
13		Total kilometre travelled in gasoline mode in both with OR without error (high byte of low word)						
14		Total kilometre travelled in gasoline mode in both with OR without error (low byte of high word)						
15		Total kilometre travelled in gasoline mode in both with OR without error (high byte of high word)						
16	LWord	Total kilometre travelled in CNG mode after error in vehicle speed (low byte of low word)	PID 4	kmstfng_l	KM	0.1 KM, offset = 0	0.0000	429496729.500
17		Total kilometre travelled in CNG mode after error in vehicle speed (high byte of low word)						
18		Total kilometre travelled in CNG mode after error in vehicle speed (low byte of high word)						
19		Total kilometre travelled in CNG mode after error in vehicle speed (high byte of high word)						
20	LWord	Total kilometre travelled in CNG mode in both with OR without error (low byte of low word)	PID 5	kmstng_l	KM	0.1 KM, offset = 0	0.0000	429496729.500
21		Total kilometre travelled in CNG mode in both with OR without error (high byte of low word)						
22		Total kilometre travelled in CNG mode in both with OR without error (low byte of high word)						
23		Total kilometre travelled in CNG mode in both with OR without error (high byte of high word)						
24	LWord	Total kilometre travelled without fault in Gasoline mode (low byte of low word)	PID 6	kmstnf_l	KM	0.1 KM, offset = 0	0.0000	429496729.500
25		Total kilometre travelled without fault in Gasoline mode (high byte of low word)						
26		Total kilometre travelled without fault in Gasoline mode (low byte of high word)						
27		Total kilometre travelled without fault in Gasoline mode (high byte of high word)						
28	LWord	Total kilometre travelled without fault in CNG mode (low byte of low word)	PID 7	kmstnfg_l	KM	0.1 KM, offset = 0	0.0000	429496729.500
29		Total kilometre travelled without fault in CNG mode (high byte of low word)						
30		Total kilometre travelled without fault in CNG mode (low byte of high word)						

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Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
31		Total kilometre travelled without fault in CNG mode (high byte of high word)						
32	Byte	Tyre type	PID 8	tyreType	-	-	0.0000	255.0000

Standard Service Data Set 6,RecordLocalIdentifier = 0x06

Byte	Data Type	Description Text	PIDs	Variable	Unit	Conversion	MinValue	MaxValue
0	Byte	Support Info 0 for LID 6	SUPINFO0		-	-	-	-
1	Byte	Support Info 1 for LID 6	SUPINFO1		-	-	-	-
2	Byte	Support Info 2 for LID 6	SUPINFO2		-	-	-	-
3	Byte	Support Info 3 for LID 6	SUPINFO3		-	-	-	-
4	Byte	number of errors in DFPM	PID 1	fcmEnd	-	-	0	255
5	Byte	number of valid error entries in FCM in present driving cycle	PID 2	fcmActvNbr	-	-	0	255
6	Byte	Motor start temperature	PID 3	tmst	degC	0.75,offset = -48	-48	143.25
7	Word	Throttle position angle signal 16 bits(Low Byte)	PID 4	wdk_w	deg	0.00152	0	100
8		Throttle position angle signal 16 bits(High Byte)						
9	Word	air-mass flow, defined in BGSRM(Low Byte)	PID 5	ml_w	kg/h	0.1	0	6553.5
10		air-mass flow, defined in BGSRM(High Byte)						
11	Word	relative air charge predicted for injection calculation (Low Byte)	PID 6	rlp_w	%	.02344	0	1536
12		relative air charge predicted for injection calculation (High Byte)						
13	Word	correction factor: altitude(Low Byte)	PID 7	rfo_w	M	.000061	0	4
14		correction factor: altitude(High Byte)						
15	Byte	Idle reference speed	PID 8	nsol	rpm	10	0	2550
16	Word	desired standardised air mass flow through ISA(Low Byte)	PID 9	msnllss_w	kg/h	.00156	0	102.4
17		desired standardised air mass flow through ISA(High Byte)						
18	Word	ADC voltage for lambda sensor upstream of catalyzer (Low Byte)	PID10	if(SY_STETLR=1) uusvk_w else 0000	V	.00488	0	319.9951
19		ADC voltage for lambda sensor upstream of catalyzer (High Byte)						
20	Word	desired torque change from the idle speed control(Low Byte)	PID 11	dmlri_w	%	.0030	-100	100
21		desired torque change from the idle speed control(High Byte)						
22	Word	Delta-Resistive torque from resistive torque adaption(Low Byte)	PID 12	dmvad_w	%	.0030	-100	100
23		Delta-Delta-Resistive torque from resistive torque adaption(High Byte)						
24	Word	PD controller of ISC (Low Byte)	PID 13	dmlr_w	%	.0030	-100	99.996
25		PD controller of ISC(High Byte)						
26	Byte	Vehicle Speed Sensor Error Counter	PID 14	vfzerrctr		1	0	255
27	Word	Consumed fuel, only CNG (Low Byte)	PID 15	if(SY_NG>0) kvng_w else 0000	kg	.003906	0	255.996
28		Consumed fuel, only CNG (High Byte)						
29	Word	Volumetric flow of fuel in ml/s (Low Byte)	PID 16	vsks_w	L/s	.000000596	0	0.0390619
30		Volumetric flow of fuel in ml/s (High Byte)						
SY_STEPPER=0 (If stepper motor is not present)								
31	Word	limited desired duty cycle for ISA(Low Byte)	PID 17	tallss_w	%	.00152	0	100
32		limited desired duty cycle for ISA(High Byte)						
33	Word	limited desired duty cycle for ISA when B_ells TRUE(Low Byte)	PID 18	tallsse_w	%	.00152	0	100
34		limited desired duty cycle for ISA when B_ells TRUE(High Byte)						
35	Status Byte0	Bit0-Condition for AC-compressor ON	PID 19	B_koe		Bit	0.0000	1.0000
	Bit1			unused		Bit	0.0000	1.0000

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		Bit2		unused		Bit	0.0000	1.0000
		Bit3		unused		Bit	0.0000	1.0000
		Bit4		unused		Bit	0.0000	1.0000
		Bit5		unused		Bit	0.0000	1.0000
		Bit6		unused		Bit	0.0000	1.0000
		Bit7		unused		Bit	0.0000	1.0000
SY_STEPPER=1 (If stepper motor is present)								
31	Byte	Actual position of stepper motor	PID17	mompas	-	1	0	255
32	Byte	Desired position of stepper motor	PID18	solpos	-	1	0	255
33	Status	Bit0-Condition for AC-compressor ON	PID 19	B_koe		Bit	0.0000	1.0000
	Byte0	Bit1		unused		Bit	0.0000	1.0000
		Bit2		unused		Bit	0.0000	1.0000
		Bit3		unused		Bit	0.0000	1.0000
		Bit4		unused		Bit	0.0000	1.0000
		Bit5		unused		Bit	0.0000	1.0000
		Bit6		unused		Bit	0.0000	1.0000
		Bit7		unused		Bit	0.0000	1.0000

Data Organisation in the support info :-

SUPPORT INFORMATION	BITS IN SUPPORT INFORMATION	CORRESPONDING PIDs	BIT VALUES
SUPINFO1	BIT 0	1	1 = PID SUPPORTED 0 = PID NOTSUPPORTED
	BIT 1	2	
	BIT 2	3	
	BIT 3	4	
	BIT 4	5	
	BIT 5	6	
	BIT 6	7	
	BIT 7	8	
SUPINFO2	BIT 0	9	1 = PID SUPPORTED 0 = PID NOTSUPPORTED
	BIT 1	10	
	BIT 2	11	
	BIT 3	12	
	BIT 4	13	
	BIT 5	14	
	BIT 6	15	
	BIT 7	16	
SUPINFO3	BIT 0	17	1 = PID SUPPORTED 0 = PID NOTSUPPORTED
	BIT 1	18	
	BIT 2	19	
	BIT 3	20	
	BIT 4	21	
	BIT 5	22	
	BIT 6	23	
	BIT 7	24	
SUPINFO4	BIT 0	25	1 = PID SUPPORTED 0 = PID NOTSUPPORTED
	BIT 1	26	
	BIT 2	27	
	BIT 3	28	
	BIT 4	29	
	BIT 5	30	
	BIT 6	31	
	BIT 7	32	

ABK T2LID 50.50.2 Abbreviations**System constant**

Variable	Source	Used by	Type	Description
SY_DSS			SYS (REF)	System constant manifold air pressure sensor installed
SY_NG			SYS (REF)	CNG system configuration
SY_STEPPER			SYS (REF)	system constant: condition stepper motor used
SY_STETLR			SYS (REF)	System constant condition continuous Lambda control present

Variable	Source	Used by	Type	Description
B_abw			EIN	condition engine stalled
B_airbag			EIN	condition airbag activated
B_bm			EIN	condition reference mark detected
B_ekp			EIN	Release of EKP-supply
B_gas			EIN	Bit for natural gas/liquid gas work
B_gum			EIN	switch over fuel / natural gas
B_hr			EIN	condition main relay on
B_kl			EIN	condition for knocking
B_kl15			EIN	condition ignition switch on
B_koe			EIN	Condition for AC-compressor ON
B_lf1s			EIN	fan 1 on condition
B_lf2s			EIN	fan 2 on condition
B_ll			EIN	Idle speed from driver's view
B_lr			EIN	LREB: condition for Lambda closed loop control upstream catalyst; bank 1
B_lrhk			EIN	condition for lambda closed loop control downstream cat
B_mil			EIN	MIL turn-on



Variable	Source	Used by	Type	Description
B_ngvdrn			EIN	CNG stop valve at pressure regulator turned on
B_ngvtank1			EIN	Condition CNG stop valve of tank1(High pressure) turned on
B_ngvtank2			EIN	Condition CNG stop valve of tank2(High pressure) turned on
B_nmot			EIN	condition engine speed: n > NMIN
B_phad			EIN	adaptation crankshaft/camshaft performed
B_phade			EIN	adaptation of camshaft(inlet) performed.
B_sa			EIN	Fuel cut-off
B_sl			EIN	Condition power steering
B_st			EIN	condition for start
B_te			EIN	Condition canister purge active
B_vl			EIN	Condition for wide open throttle
dmlr_w			EIN	desired torque change from the idle speed control (PD-part)
dmlri_w			EIN	desired torque change from the idle speed control (I-)
dmvad_w			EIN	Delta resistant torque from resistant torque adaptation
E_bm			EIN	error flag: reference mark sensor
E_n			EIN	error flag: engine speed sensor
evz_austot			EIN	injection cut off pattern total 8 bit only used if (SY_ZYLZA <= 8)
fcmActvNbr			EIN	Number of active entries inside fault code memory
fcmend			EIN	Number of entries inside fault code memory
fho_w			EIN	correction factor: altitude
fr_w			EIN	Lambda controller output (word)
fra_w			EIN	multiplicative correction of the mixture adaptation (word)
fstt_w			EIN	fuel level
gangi			EIN	Engaged gear
kldfpwmf			EIN	generator signal as PWM-signale filtrated by low-pass filter
kmp6km_w			EIN	Driving distance since powerfail (6km/inc.)
kmst_l			EIN	Kilometers covered by vehicle (Odometer) 100m/Inc as 32bit-longword
kmstf_l			EIN	
kmstfng_l			EIN	
kmstmil_w			EIN	Drive distance with MIL on
kmstnf_l			EIN	
kmstnfg_l			EIN	
kmstt_l			EIN	total mileage of vehicle
kmsttng_l			EIN	
kvng_w			EIN	Consumed fuel, only CNG or sum of all fuels (calibration)
miist_w			EIN	indicated real engine torque
ml_w			EIN	air mass flow filtered (Word)
mompos			EIN	Actual position of stepper motor
msnlss_w			EIN	desired standardised air mass flow through ISA (word)
mtng_w			EIN	CNG mass in the tank
mtngnpwm			EIN	Actual PWM value used to drive the CNG level indicator signal in Combi
nmot_w			EIN	Engine speed
nsol			EIN	idle reference speed
png_w			EIN	Natural gas rail pressure
psdss_w			EIN	Intake manifold pressure measured with pressure sensor at manifold (DS-S)
ptng_w			EIN	Natural gas tank pressure, word
pu_w			EIN	Ambient pressure
pwmfst			EIN	Actual PWM value used to drive the Gasoline level indicator signal in Combi
rk_w			EIN	Relative fuel mass
rka_w			EIN	additive adaptive correction of the relative fuel amount
rkng_w			EIN	relative fuel mass, CNG
rl_w			EIN	Relative air charge (Word)
rlp_w			EIN	rel. air charge predicted for injection calculation (Word)
S_ac			EIN	A/C stand-by position
S_ko			EIN	A/C compressor active
solpos			EIN	Desired position of stepper motor
sztcalc_w			EIN	Dwell period in timer 1 increments
tallss_w			EIN	desired duty cycle for idle speed actuator (word)
tallse_w			EIN	desired duty cycle for idle speed actuator (word) for limphome
tans			EIN	intake air temperature
tateout_w			EIN	output duty cycle for canister purge valve (16 bit)
ti_ev0			EIN	injection time 1. cylinder in firing sequence
ti_ev1			EIN	injection time 2. cylinder in firing sequence
ti_ev2			EIN	injection time 3rd cylinder in firing sequence
ti_ev3			EIN	injection time 4th cylinder in firing sequence
ti_ev4			EIN	injection time 5th cylinder in firing sequence
ti_ev5			EIN	injection time 6th cylinder in firing sequence
ti_ev6			EIN	injection time 7th cylinder in firing sequence
ti_ev7			EIN	injection time 8th cylinder in firing sequence
tmot			EIN	engine temperature
tmst			EIN	engine temperature at start
tngf			EIN	Natural gas temperature - sensor value
ttngaus			EIN	Final tank temperature value used for mass calculation
tumgk_w			EIN	Ambient air temperature, output in Grad C, calc. in Kelvin
tyreType			EIN	Tyre Type
uadki_w			EIN	current integrator value
ub			EIN	Battery voltage
uushk_w			EIN	ADC-voltage lambda sensor downstream catalyst (word)
uusvk_w			EIN	ADC voltage for lambda sensor upstream of catalyzer (Word)
vfzerrctr			EIN	Vehicle Speed Sensor Error Counter
vfzg_w			EIN	vehicle speed
vsks_w			EIN	Volumetric flow of fuel in L/s

BOSCH



Function

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Variable	Source	Used by	Type	Description
wdk_w			EIN	Throttle position angle signal 16 bits
wdkba			EIN	throttle angle referred to lower limit
weer			EIN	resulting crankshaft angle for end of injection
weerng			EIN	resulting crankshaft angle for end of injection in CNG mode
wkr			EIN	cylinderindividual ignition retarding value knock control
wped_w			EIN	normalized angle acceleration pedal
zwout			EIN	Ignition angle output value
zwoutar			EIN	Ignition angle output array

FB T2LID 50.50.2 Function description

APP T2LID 50.50.2 Application hints