X100RM2C/4/1

Saipa X100

Bosch
M7.9.7 ECU

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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

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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

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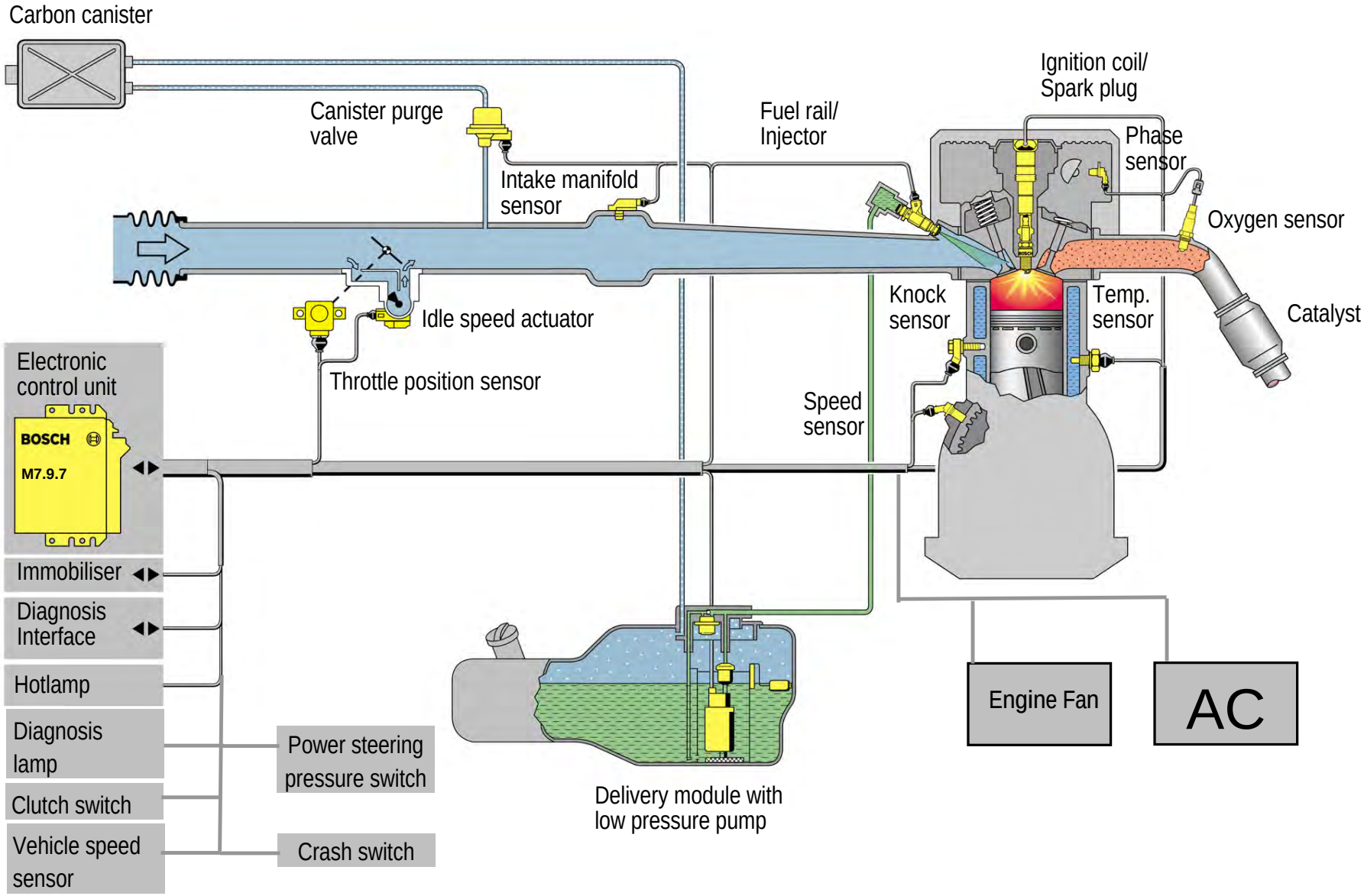

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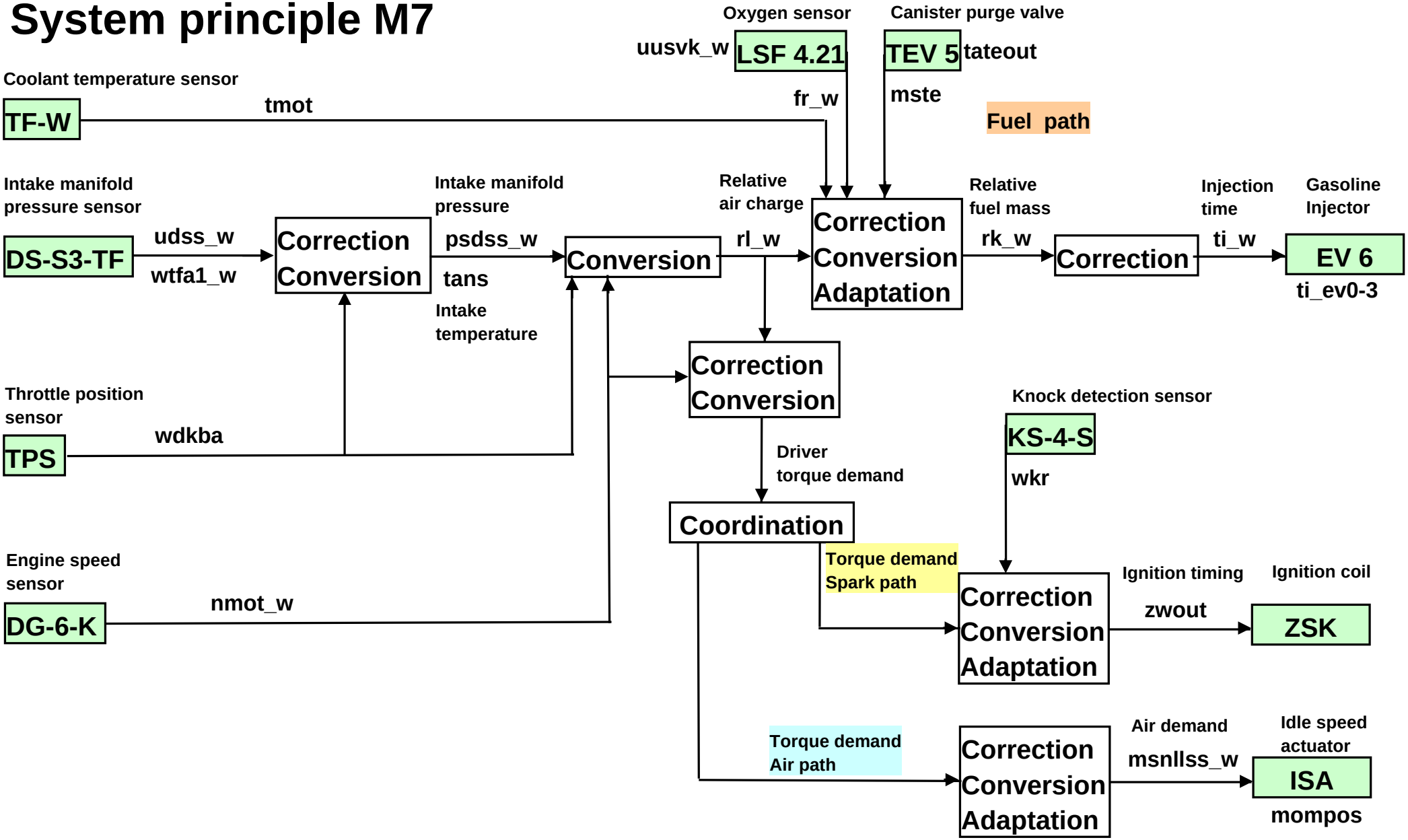
System principle M7



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M7.9.7 Block Diagram

Order No. 0261B13919 / 0261S06634

Release date: November 29, 2010

Polarization input resistances:

Pullup	Pulldown			Pin		CJ910 (Inp.)
		U_U_UBD	Battery Permanent Supply	12		
		U_U_UBR1	Battery Switched Supply	63		
		U_U_UBR2	Battery Switched Supply	44		
		U_U_UBR3	Battery Switched Supply	45		
	2.9k	E_S_KL15	Ignition Switch KL15	13		
		E_T_KWDGA	Engine Speed	15		
		E_T_KWDGB	Engine Speed	34		
						MUX
100k		B_D_DIAK	K-Line (Tester)	71		
2.9k		B_D_IMMO	K-Line (Immobiliser)	52		
						Digital IN
10k		E_T_NWDG	Phase Sensor	79	*	
10k		E_T_VFZ	Vehicle speed	59	*	
	10k	E_S_KO	A/C Kompressor Switch	58	*	
	10k	E_S_CRA	Inertia switch (crash detection)	74	*	
10k		E_S_LHI	Power Steering	76	*	
	10k	E_S_AC	A/C Switch	75		
	10k	E_S_KUP	Clutch switch	77	*	
10k		E_T_ALT	Reserve (PWM-alternator)	72	*	
						Analog IN
2.49k	24.9k	E_A_TMOT	Engine Coolant Temperature	39		
3.48k		E_A_TANS	Intake Air Temperature	40		
1M		E_A_TPS	Throttle Position Sensor	16		
	Voltage Divider (x 0.178)	E_A_FAN	Fan Diagnostic	24		
1M		E_A_DS	Manifold pressure	37		
		E_A_LSVK	Lambda Sensor Upstream	18		
		E_A_LSHK	Lambda Sensor Downstream	55		
		E_A_KSB	Knock Sensor (-)	20		
		E_A_KSA	Knock Sensor (+)	19		
			Batt. Voltage	-		
147 Ohm		E_A_FSTG	Reserve (fuel level)	42		
						Ground
		M_R_TMOT, _TPS	TMOT, TPS sensor	17		
		M_R_LSVK	O2-sensor	36		
		M_R_DS	MAP sensor	35		
		M_R_FST	Reserve (fuel level ground)	53		
		M_M_GND2	power ground	51		
		M_M_GND1	power ground	3		
		M_M_GND4	power ground	61		
		M_M_GND5	power ground	80		

INPUTS

MICRO-CONTROLLER

+

FLASH

EEPROM

OUTPUTS

CJ910 (Outp.)		Pin			
		32	5V Supply (MAP Sensor)	A_U_5V2	
		33	5V Supply (T.P.S.)	A_U_5V1	
		14	Main Relay	A_S_HR	
	*	8	Engine Speed Signal (10mA)	A_T_TN	
	*	9	Reserve (PWM-Fuel level)	A_T_FSTG	
	*	10	Reserve (Fuel consumption)	A_T_FCI	
CJ920					
2,2A/70V	*	27	Injector Valve 1	A_T_EV1	Cyl. 1
2,2A/70V	*	7	Injector Valve 2	A_T_EV2	Cyl. 3
2,2A/70V	*	47	Injector Valve 3	A_T_EV3	Cyl. 4
2,2A/70V	*	6	Injector Valve 4	A_T_EV4	Cyl. 2
2,2A/70V	*	29	Cooling Fan Relay (High Speed)	A_S_FAN2	
2,2A/70V	*	26	Reserve		
2,2A/45V		25	MIL Lamp	A_S_MIL	
2,7A/45V	*	28	Reserve (LSF Heating Downstream)	A_T_LSHK	
2,2A/45V	*	46	Canister Purge Valve	A_T_TEV	f/w diode
2,7A/45V	*	48	LSF Heating Upstream	A_T_LSVK	
0,6A/40V		68	Cooling Fan Relay (Low Speed)	A_S_FAN1	
0,6A/40V		50	HOT Lamp	A_S_L8	
0,6A/40V	*	69	AC Relay	A_S_AC	
0,6A/40V		70	Fuel Pump Relay	A_S_EKP	
L9935					
		64	Stepper A	A_T_SMA	
		65	Stepper D	A_T_SMD	
		66	Stepper C	A_T_SMC	
		67	Stepper B	A_T_SMB	
IGN.					
IGBT					
	*	5	Ignition 1	A_T_ZDG1	Cyl. 1 & 4
	*	2	Ignition 2	A_T_ZDG2	Cyl. 2 & 3

Engine

* CAPCOM

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!

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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	releated 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_llr	%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, plaus

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			
CDCSMSG	P1627	X	P1628	X	P1628		P1629	X	CLASMSG	37	Immobiliser communication errors			
CDCSMTP	P1630	X	P1631	X	P1632	X	P1630		CLASMTP	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 describtion	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	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) **sbmcorm** >= 265	Engine is not back rotating 1 km/h > vfzg_w > 25 km/h No error in vehicle speed E_VFZ = false Filtered engine speed > stationary reference engine speed - 50 rpm	9 CRS-	MIL ON
		Frequent correction by plus one	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		9 CRS-	
		Lost of reference mark (new	New synchronization due to a loss of reference mark and the frequency counter of a lost reference gap **sbmlos_w** exceeds 1200.		6 CRS-	
		Fault of engine speed	Engine speed is too low and the counter for low speed or engine speed disturbance **snerror_w** > 700.	Engine speed changes to low engine speed (**nmot** < 25 rpm) **B_nmin** changes from false to true.	14 CRS-	
		Loss of reference mark	Reference mark is not found and frequency counter of not detected reference gaps while starting **snobm** > 6		3 CRS-	
		No signal of engine speed sensor	Counter tooth interrupt **znbm_w** > 5 and condition underspeed **B_nmin** = true (**nmot** < 25 rpm)	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.	12 CRS-	
	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					
Throttle position %DDKG	P0121	Minimum Error	short circiut to ground Sensor voltage **uwdk_w** < 0,176 V	Engine speed **nmot_w** > 720 rpm for time > 0,1 s	0,5 s	MIL ON
		Maximum Error	short circiut to battery Sensor voltage **uwdk**_w > 4,883 V.	B_pwf = false		
		Signal Error	open circuit			
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	Minimum Error	Short circuit to ground	Ignition ON 8,44 V < battery voltage < 17,86 V	0,5 s	MIL ON
	P0262 = Active for Cyl. 1 P0265 = Active for Cyl. 2 P0268 = Active for Cyl. 3 P0271 = Active for Cyl. 4	Maximum Error	Short circuit to battery, engine run			
	P0201 = Active for Cyl. 1 P0202 = Active for Cyl. 2 P0203 = Active for Cyl. 3 P0204 = Active for Cyl. 4	Signal Error	Open circuit			
Plausibility test fuel supply system %DKVSDFP	P2178	Below min. threshold	multiplicative mixture adaptation of lambda control frai_w < 0,76	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	0,5 s	MIL ON
	P2177	Above max. threshold	multiplicative mixture adaptation of lambda control frai_w > 1,23			
	P2188	Below min. threshold	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. ora adaptation stabilized 6. idle		
	P2187	Above max. threshold	additive mixture adaption of lambda control orai_w > 7%			

Component/ Function	Fault code	Monitor strategy describtion	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 %DKRTP	P032A P032B P032C	Non Plausible Error - Zero test NPL Error – Offset test NPL Error test pulse	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 (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	Knock control is active: rel. air charge > reference level of knock control (**LKRN** 35 % at 800 rpm to 50% at 5200 rpm) see above see above	600 combustions	
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

ECU internal

Component/ Function	Fault code	Monitor strategy describtion	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 zhzkv > 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 ingnition 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 ingnition switch on 8,44 V < battery voltage < 17,86 V		
Fan control %DMLS	P0483	Minimum Error	Fan low speed ciruit 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 describtion	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	P0532	Minimum Error	Sensor voltage of pressure sensor **udsac_w** < 0,2 V	Ambient temperature tum > -10°C Engine is running	0,5 s	MIL ON
%GGPAC	P0533	Maximum Error	Signal voltage of AC pressure sensor **udsac_w** > 4,65 V	Signal voltage of AC pressure sensor		
Camshaft sensor %DPH	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 wrong mounted PG			
	P0340	non plausible Error	The current level of the PG in the shift register phpw = 0101010101 or 10101010 intermitted contact			
Intake air temperature sensor	P0113	Minimum Error	The sensor voltage wtfa1_w < 0,16 V	Engine temperature **tmot** > 60 °C Air Mass flow **ml_w** <= 24 kg/h	1 s	MIL ON
%GGTFA	P0112	Maximum Error	The sensor voltage wtfa1_w > 4,5 V	Vehicle speed vfzg <= VFZGTFA for a time longer than 10 s		
	P0114	non plausible Error	check for fast signal change (wtfa1_w - wtfaf > 1V) jitter check			
Canister purge valve power stage	P0458	Minimum Error	short circuit to ground	Engine speed > 40 rpm, 8,44 V < battery voltage < 17,86 V	0,5 s	MIL on
%DTEVE	P0459	Maximum Error	short circuit to battery	Actual duty cycle of the PCV **tateist_w** is inside the range [2%, 80%]		
	P0444	Signal Error	open circuit			
Cooling water temperature sensor	P0118	Minimum Error	Sensor voltage utcw_w < 0,1 V for a time > 2 s	IGN ON	2 s	MIL ON
%DCTCW	P0117	Maximum Error	Sensor voltage utcw_w > 4,8V for time > 2 s		2 s	
%DPLTCW (engine temp.)	P0116	non plausible Error	Low side check	Engine is running	0,5 s	
			If the coolant temperature **tmotlin_w** constantly lies outside the model temperature intervalls [(**tmrw – 13 °C, tmrw + 191 °C**)	No error on components, which have deactivation authorisation		
			jitter check signal shall not change too fast (utcw - utcwf) > 1 V			
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 °C. Milage for detection > 5 km. 1520 rpm < nmot_w < 3500 rpm.		MIL ON
Idle air control system actuator	P0511	Signal Error	all errors (P0511, P0508, P0509) are set for: Stepper phase A, pin 64	Engine is running	1 s	Mil ON
(stepper)	P0508	Minimum Error	Stepper phase D, pin 65			
% DLLR	P0509	Maximum Error	Stepper phase C, pin 66			
			Stepper phase B, pin 67			
	P0509	Max. Error	connector at stepper disconnected (pin 64,65,66,67 together)			

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

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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 7	Word	Intake Air pressure (low Byte) Intake Air pressure (High Byte)	PID 3	If SY_DSS > 0 psdss_w else 00	hPa	0.039 hPa ,offset = 0	0.0000	2559.9609
8 9	Word	Knock Value (low Byte) Knock Value (High Byte)	PID 4	uadki_w	V	0.00008 V,offset = 0	0.0000	4.9999
10 11	Word	GAS Pedal Module (P1 & P2) (low Byte) GAS Pedal Module (P1 & P2) (High Byte)	PID 5	wped_w	%PED	0.00153 %PED ,offset = 0	0.0000	100.0000
12 13	Word	Engine speed (low Byte) Engine speed (High Byte)	PID 6	nmot_w	1/min	0.25 1/min ,offset = 0	0.0000	16383.7500
14 15	Word	vehicle speed (low Byte) vehicle speed (High Byte)	PID 7	vfzg_w	km/h	0.00781 km/h	0.0000	511.9922
16 17	Word	Downstream O2 (low Byte) Downstream O2 (High Byte)	PID 8	uushk_w	V	0.00488 V,offset=0	0.0000	319.9951
18 19	Word	Ambient Temperature (low Byte) Ambient Temperature (High Byte)	PID 9	tumgk_w	Grad C	0.02344 Grad C, offset = -273.15	–273.15	1262.827
20 21	Word	Ambient pressure (low Byte) Ambient pressure (High Byte)	PID 10	pu_w	hPa	0.03906 hPa,offset=0	0.0000	2559.9609
22 23	Word	CNG Regulator Pressure (low Byte) CNG Regulator Pressure (High Byte)	PID 11	If SY_NG > 0 ptng_w else 00	Bar	0.00391 Bar,offset=0 Bar	0.0000	255.9961
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 26	Word	CNG Rail Pressure (low Byte) CNG Rail Pressure(High Byte)	PID 13	If SY_NG > 0 png_w else 00	hPa	0.22888 hPa,offset=0	0.0000	14999.7711

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 5	Word	injection time valve Gasoline injector 1 (low Byte) Injection time valve Gasoline injector 1 (HighByte)	PID 1	ti_ev0	ms	0.0032 ms	0.0000	209.7120
6 7	Word	injection time valve Gasoline injector 2 (low Byte) Injection time valve Gasoline injector 2 (HighByte)	PID 2	ti_ev1	ms	0.0032 ms	0.0000	209.7120
8 9	Word	Injection time valve Gasoline injector 3 (low Byte) Injection time valve Gasoline injector 3 (High Byte)	PID 3	ti_ev2	ms	0.0032 ms	0.0000	209.7120
10 11	Word	Injection time valve Gasoline injector 4 (low Byte) Injection time valve Gasoline injector 4 (High Byte)	PID 4	ti_ev3	ms	0.0032 ms	0.0000	209.7120
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

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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	sztcalc_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	PID 19	B_te		Bit	0.0000	1.0000
		Bit 1 : -		unused		Bit	0.0000	1.0000
		Bit 2 : -		unused		Bit	0.0000	1.0000
		Bit 3 : -		unused		Bit	0.0000	1.0000
		Bit 4 : -		unused		Bit	0.0000	1.0000
		Bit 5 : -		unused		Bit	0.0000	1.0000
		Bit 6 : -		unused		Bit	0.0000	1.0000
		Bit 7 : -		unused		Bit	0.0000	1.0000
33	Status Byte 1	Bit 0 : - CNG Shutoff Valve	PID 20	If SY_NG > 0 B_ngvdrm else 00		Bit	0.0000	1.0000
		Bit 1 : - CNG Tank Valve		If SY_NG > 0 B_ngvtank1 else 00		Bit	0.0000	1.0000
		Bit 2 : - CNG Tank Valve 2		If SY_NG > 0 B_ngvtank2 else 00		Bit	0.0000	1.0000
		Bit 3 : -		unused		Bit	0.0000	1.0000
		Bit 4 : -		unused		Bit	0.0000	1.0000
		Bit 5 : -		unused		Bit	0.0000	1.0000
		Bit 6 : -		unused		Bit	0.0000	1.0000
		Bit 7 : -		unused		Bit	0.0000	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		-	-	-	-

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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	PID 2	B_sl		Bit	0.0000	1.0000
		Bit 1 : Main Relay		B_hr		Bit	0.0000	1.0000
		Bit 2 : Fuel Pump Relay		B_ekp		Bit	0.0000	1.0000
		Bit 3 : AC Request		S_ac		Bit	0.0000	1.0000
		Bit 4: A/C Relay active/deactive		S_ko		Bit	0.0000	1.0000
		Bit 5: -Inertia Switch		B_airbag		Bit	0.0000	1.0000
		Bit 6: -MIL Lamp		B_mil		Bit	0.0000	1.0000
		Bit 7: -		unused		Bit	0.0000	1.0000
6	StatusByte 1	Bit 0: - No FAN output	PID 3	B_lf1s = 0 and B_lf2s = 0		Bit	0.0000	1.0000
		Bit 1 : -FAN stage 1 ON		B_lf1s = 1 and B_lf2s = 0		Bit	0.0000	1.0000
		Bit 2 : - FAN Stage 2 ON		B_lf1s = 0 and B_lf2s = 1		Bit	0.0000	1.0000
		Bit 3 : -FAN Stage 1 and Stage 2 ON		B_lf1s = 1 and B_lf2s = 1		Bit	0.0000	1.0000
		Bit 4 : -		unused		Bit	0.0000	1.0000
		Bit 5 : -		unused		Bit	0.0000	1.0000
		Bit 6 : -		unused		Bit	0.0000	1.0000
		Bit 7 : -		unused		Bit	0.0000	1.0000
7	StatusByte 2	Bit 0: -CNG / Gasoline Select Switch	PID 4	If SY_NG > 0 B_gum else 00[1)]		Bit	0.0000	1.0000
		Bit 1: -CNG / Gasoline Mode		If SY_NG > 0 B_gas else 00[2)]		Bit	0.0000	1.0000
		Bit 2 : -		unused		Bit	0.0000	1.0000
		Bit 3 : -		unused		Bit	0.0000	1.0000
		Bit 4 : -		unused		Bit	0.0000	1.0000
		Bit 5 : -		unused		Bit	0.0000	1.0000
		Bit 6 : -		unused		Bit	0.0000	1.0000
		Bit 7 : -		unused		Bit	0.0000	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 6	Word	Relative air charge (low Byte) Relative air charge (High Byte)	PID 2	rl_w	%	0.02344 % ,offset = 0	0.0000	1535.9766
7 8	Word	Indicated real engine Torque (Low Byte) Indicated real engine Torque (High Byte)	PID 3	miist_w	%	0.00153 % ,offset = 0	0.0000	99.9985
9 10	Word	Short term fuel Trim(Bank1)(low Byte) Short term fuel Trim(Bank1)(High Byte)	PID 4	fr_w	-	0.00003	0.0000	1.999969
11 12	Word	"Long Term Fuel Trim (Bank 1) multiplicative correction of the mixture adaptation" (low Byte) "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 14	Word	"Long Term Fuel Trim (Bank 1) additive correction of the relative fuel amount" (low Byte) "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

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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 mtng_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 mtngnpwm 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	PID 21	B_abw		Bit	0.0000	1.0000
		Bit 1 :Cranking Start		B_st		Bit	0.0000	1.0000
		Bit 2 : Idle speed from driver's sight		B_ll		Bit	0.0000	1.0000
		Bit 3 : -Full load		B_vl		Bit	0.0000	1.0000
		Bit 4 : -condition ignition switch on		B_kl15		Bit	0.0000	1.0000
		Bit 5 : - Engine speed status		B_nmot		Bit	0.0000	1.0000
		Bit 6 : - Fuel cut off		B_sa		Bit	0.0000	1.0000
		Bit 7 : -Condition for Lambda closed loop control upstream catalyst active,Bank 1		B_lr		Bit	0.0000	1.0000
35	Status Byte 1	Bit 0 : O2 Sensor (LSF) (Condition lambda control downstream active)	PID 22	B_lrhk		Bit	0.0000	1.0000
		Bit 1 :Error flag engine speed sensor		E_n		Bit	0.0000	1.0000
		Bit 2 :Error flag reference mark sensor		E_bm		Bit	0.0000	1.0000
		Bit 3 :Reference mark found Adaption inlet		B_bm		Bit	0.0000	1.0000
		Bit 4:Adaption for camshaft to crankshaft finished (inlet)		B_phade		Bit	0.0000	1.0000
		Bit 5: Adaption for camshaft to crankshaft finished		B_phad		Bit	0.0000	1.0000
		Bit 6 :		unused		Bit	0.0000	1.0000
		Bit 7 : -		unused		Bit	0.0000	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 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	kmsttng_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 8	Word	Throttle position angle signal 16 bits(Low Byte) Throttle position angle signal 16 bits(High Byte)	PID 4	wdk_w	deg	0.00152	0	100
9 10	Word	air-mass flow, defined in BGSRM(Low Byte) air-mass flow, defined in BGSRM(High Byte)	PID 5	ml_w	kg/h	0.1	0	6553.5
11 12	Word	relative air charge predicted for injection calculation (Low Byte) relative air charge predicted for injection calculation (High Byte)	PID 6	rlp_w	%	.02344	0	1536
13 14	Word	correction factor: altitude(Low Byte) correction factor: altitude(High Byte)	PID 7	fho_w	M	.000061	0	4
15	Byte	Idle reference speed	PID 8	nsol	rpm	10	0	2550
16 17	Word	desired standardised air mass flow through ISA(Low Byte) desired standardised air mass flow through ISA(High Byte)	PID 9	msnllss_w	kg/h	.00156	0	102.4

18
 	
19
	Word	ADC voltage for lambda sensor upstream of catalyzer (Low Byte)
		
		ADC voltage for lambda sensor upstream of catalyzer (High Byte)
			PID10	if(SY_STETLR=1)
				uusvk_w
				else
				0000
					V	.00488	0	319.9951

20 21	Word	desired torque change from the idle speed control(Low Byte) desired torque change from the idle speed control(High Byte)	PID 11	dmllri_w	%	.0030	-100	100
22 23	Word	Delta-Resistive torque from resistive torque adaption(Low Byte) Delta-Delta-Resistive torque from resistive torque adaption(High Byte)	PID 12	dmvad_w	%	.0030	-100	100
24 25	Word	PD controller of ISC (Low Byte) PD controller of ISC(High Byte)	PID 13	dmllr_w	%	.0030	-100	99.996
26	Byte	Vehicle Speed Sensor Error Counter	PID 14	vfzerrctr		1	0	255
27 28	Word	Consumed fuel, only CNG (Low Byte) Consumed fuel, only CNG (High Byte)	PID 15	if(SY_NG>0) kvng_w else 0000	kg	.003906	0	255.996
29 30	Word	Volumetric flow of fuel in ml/s (Low Byte) Volumetric flow of fuel in ml/s (High Byte)	PID 16	vsks_w	L/s	.000000596	0	0.0390619
SY_STEPPER=0 (If stepper motor is not present)								
31 32	Word	limited desired duty cycle for ISA(Low Byte) limited desired duty cycle for ISA(High Byte)	PID 17	tallss_w	%	.00152	0	100
33 34	Word	limited desired duty cycle for ISA when B_ells TRUE(Low Byte) limited desired duty cycle for ISA when B_ells TRUE(High Byte)	PID 18	tallsse_w	%	.00152	0	100
35	Status Byte0	Bit0-Condition for AC-compressor ON Bit1	PID 19	B_koe unused		Bit Bit	0.0000 0.0000	1.0000 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	mompos	-	1	0	255
32	Byte	Desired position of stepper motor	PID18	solpos	-	1	0	255
33	Status Byte0	Bit0-Condition for AC-compressor ON	PID 19	B_koe		Bit	0.0000	1.0000
		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	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

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Variable	Source	Used by	Type	Description
B_ngvdrm			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
dmllr_w			EIN	desired torque change from the idle speed control (PD-part)
dmllri_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
msnllss_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)
tallsse_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

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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

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