Bosch Motorsport

Modas Displays F3 2008

Contents

1 Working with MODAS-DISPLAYS FIA F3

When MODAS has been started, the FIA-F3 display will be automatically loaded. The term display means measure and program boxes. These boxes provide easy monitoring and programming of all the important functions of the ECU (Engine Control Unit) and the Card-Memory, for the use in F3 race cars using the FIA F3 2008-2010 technology.

All important Motronic functions can be found in the option “Engine” and “Lifetime/Cons”. These functions include data-measuring-boxes for the various parameters, for example pressure, temperature and revolutions. There is also the possibility to read any errors, check Min/ Max measurements, these may also be reset (see also chapter 2).

The vehicle channels can be calibrated in the “Suspension“, “Acceleration Steering” and the “analogue” display. In this function the sensor characteristic curves are saved in the CardMemory, for example the suspension sensors (see also chapter 3).

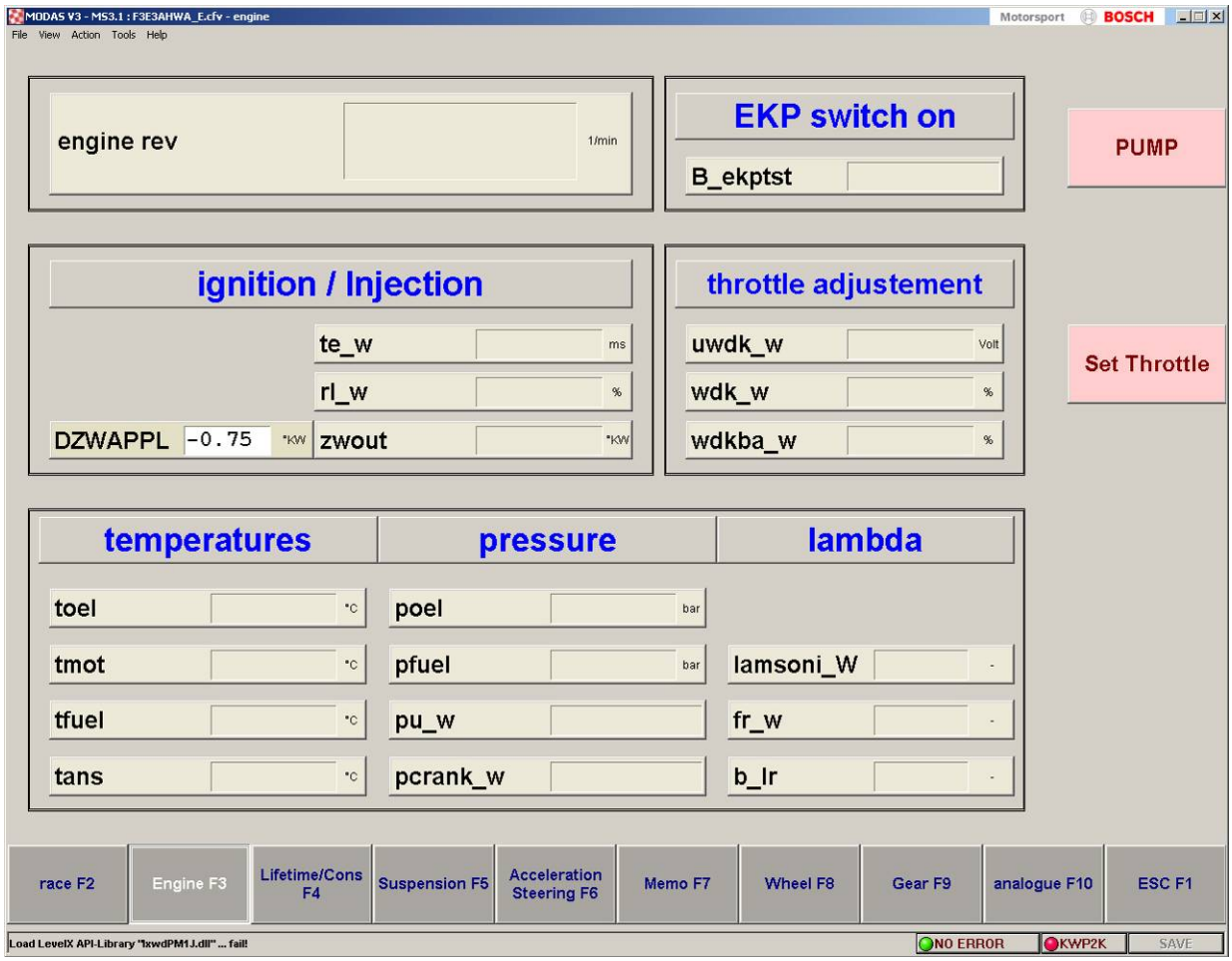
The option “Race“ contains measuring and programming boxes which offer the possibility to set the driver functions like for example pit speed limiter, and the possibility to program shift LEDs (see also chapter 4).

Note: Some functions may not be supported in certain program versions.

2 Motronic – Functions

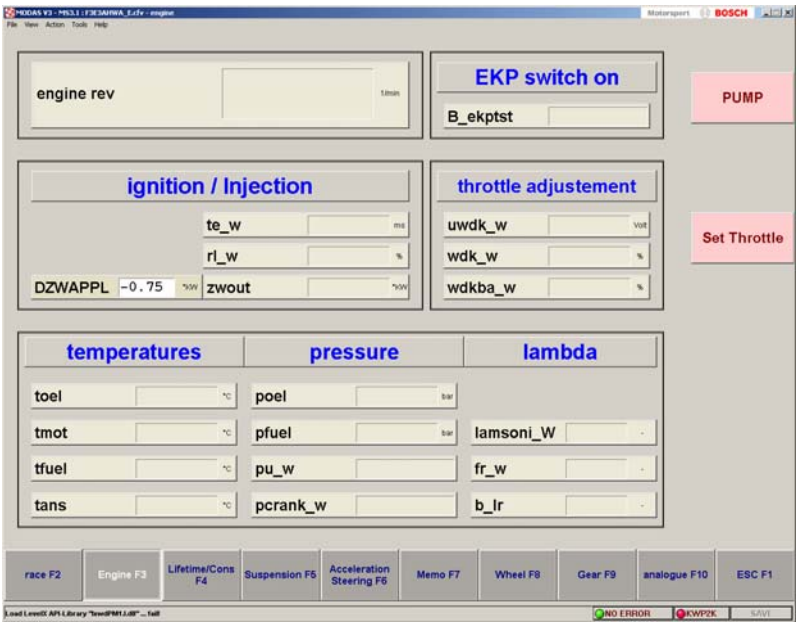
When the option Engine has been selected a list of Motronic functions will appear in the following window.

2.1 ENGINE – Display



The most important engine parameters will be shown in this display. This function contains for example engine revolutions, throttle valve angle, temperatures, pressures, ignition angle, injection time.

2.2 ENGINE – Throttle

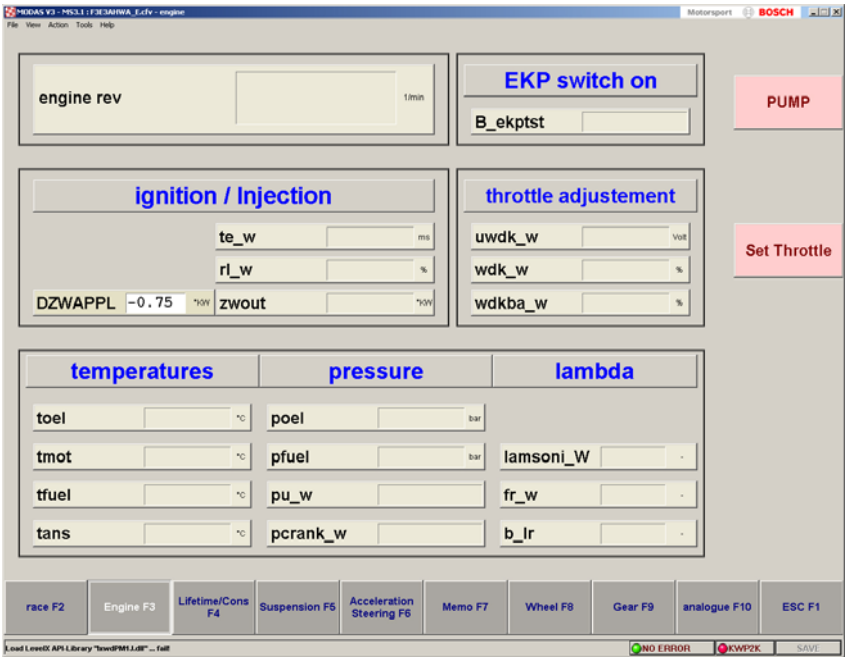


This function allows adjustment of the throttle potentiometer.
The throttle sensor can be calibrated (learning), when a new engine is installed in the car. The reference point for the calibration is the mechanical throttle-valve-stop.

Calibration of the throttle valve: Release the throttle pedal and idle stop and click the macro “set throttle“.
The calibration can only be carried out when the engine is stopped (B_nmot = FALSE) and there is no throttle-valve failure (E_dk = FALSE).

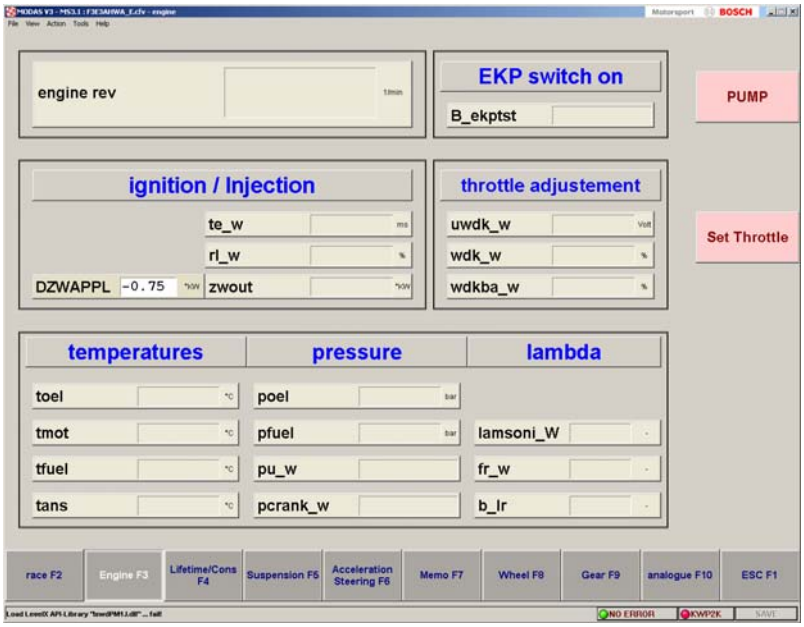
2.3 ENGINE – Fuel-Pump

This option contains the fuel pump function. The pump will be switched on for ten seconds when the “pump“ macro is selected. The engine must be stopped (B_nmot = FALSE) and communication between the PC and the ECU must be active. (B_klineok = TRUE).

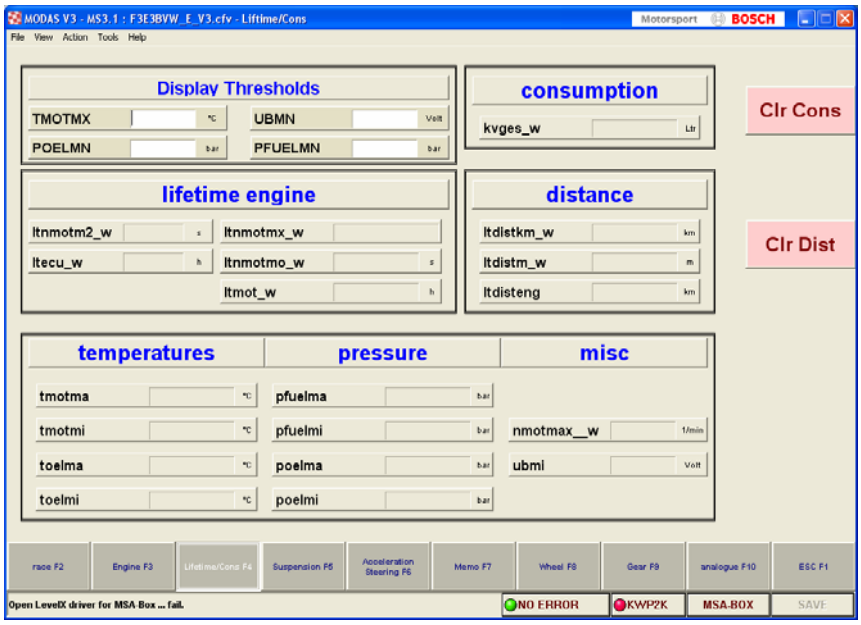


2.4 ENGINE – Ignition

This display shows the ignition angle offset from the application tool. Positive numbers indicate more advance and negative numbers a less ignition advance.

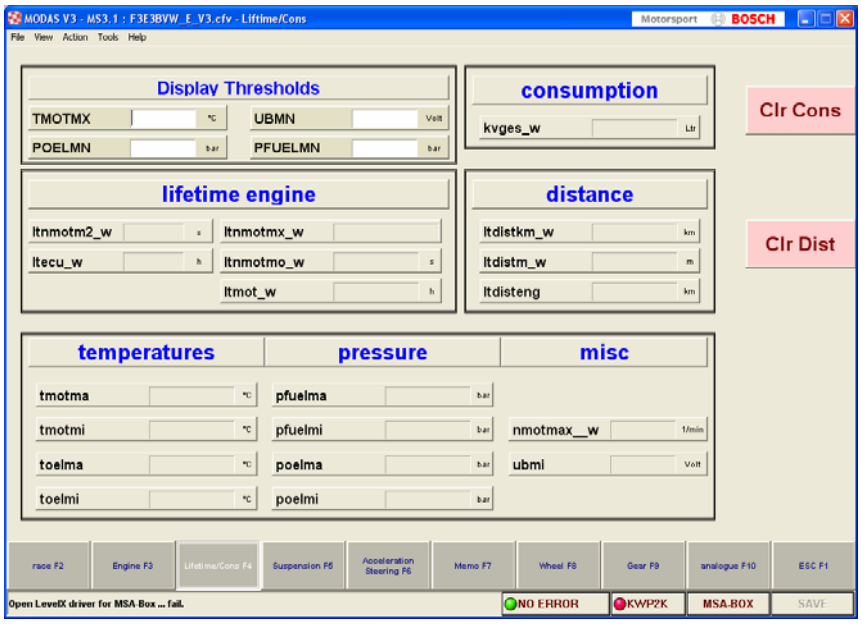


2.5 Lifetime/Cons – Min/Max and display thresholds



This display shows all the Min/ Max data. It includes: engine revolution (max), fuel pressure (min/ max), oil pressure (min), engine temperature (max), oil temperature (min/max), battery-voltage (min). The alarm thresholds can be set in the box "Display Thresholds": TMOTMX for maximum engine temperature, UBMN for minimum battery voltage, POELMN for minimum oil pressure and PFUELMN for minimum fuel pressure.

2.6 Lifetime/Cons – Lifetime engine



In its lifetime, the MS3.1 saves specific lifetime MIN/MAX data. This includes the operational time of the ECU (ltecu) in its life, the driven distance in km (ltdistkm_w), the driven distance in m (ltdistm_w), the engine operating time (ltmot_w), the engine distance (ltdisteng), the time spent above a preset RPM limit ltnmotmo_w), max engine revolution limit data (ltnmotmx_w) and the fuel consumption.

The distance counter can be reset with the macro “Clr Dist“.

The fuel consumption can be reset with the macro “Clr Cons“.

Only the engine manufacturer can reset all the other macros.

3 ESC – Escape button

- At any time, a move backwards through the programme can be done with the “ESC“ button.

4 CHASSIS – Functions

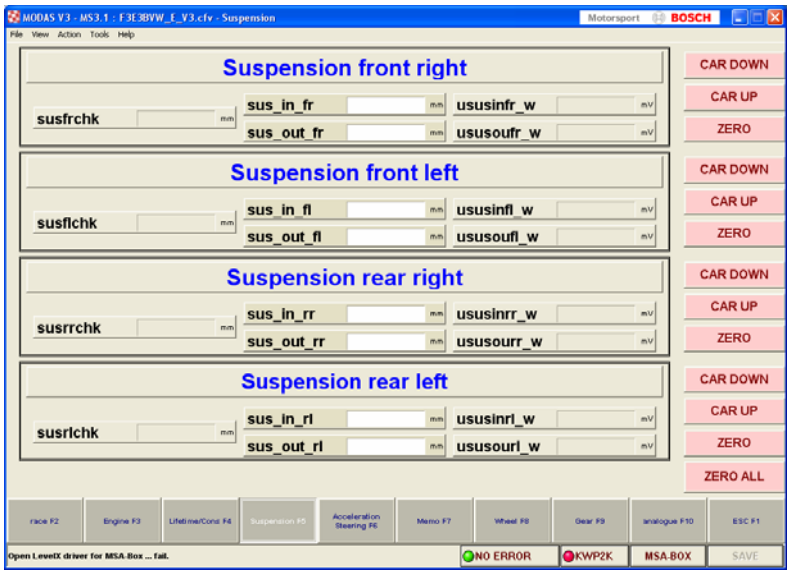
MODAS is used to calibrate the vehicle chassis channels. There is an adjustment facility using the button “Chassis“. The characteristic curves made with the macro are saved in the CardMemory and have to be adjusted when there is a change of sensors or the CardMemory.

The option “Chassis“ consists of several chassis functions:

- Suspension,
- Steering,
- Acceleration Long,
- Acceleration Trans,
- All Chassis Channels.

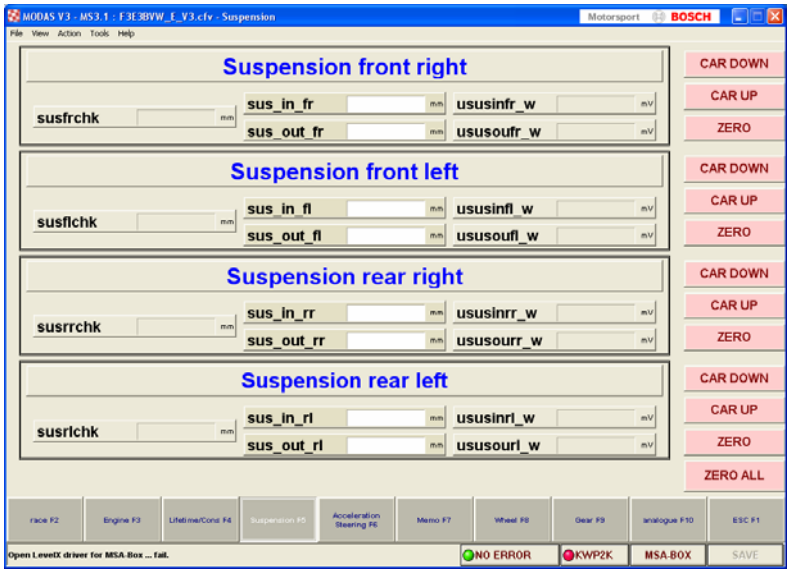
4.1 CHASSIS – Suspension

The first of the suspension functions allows calibrating single suspension sensor. All the suspension sensors can be reset (“ZERO ALL“) together.



4.1.1 CHASSIS – Suspension Front Left

To carry out adjustment:



- The sensor which is to be calibrated is moved to any position (for example the mechanical stop: Position1). For this position the input in “SUS_IN_FL“ is the physical data 0.
- Position 1 can be saved in the CardMemory with the “*Car down*“ button. The measured voltage can be checked with the “ususinfl“ label.
- The sensor is then moved to a second position (for example the opposite mechanical stop: Position 2). The difference between position 1 and 2 is the input for the label “SUS_OUT_FL“ (here: 10 mm).

- Position 2 can be saved with the “car up“ button. The measured voltage can be checked with the label “ususoufl”.
- At this point the characteristic curve of the sensor is defined. The physical data can be checked with the label “susflchk“.
- The button “ZERO“ resets the sensor, with the sensor in the desired zero reference position.

4.1.2 CHASSIS – Suspension Front Right

The adjustment of this function is the same as the “Suspension Front Left“.

4.1.3 CHASSIS – Suspension Rear Left

The adjustment of this function is the same as the “Suspension Front Left “.

4.1.4 CHASSIS – Suspension Rear Right

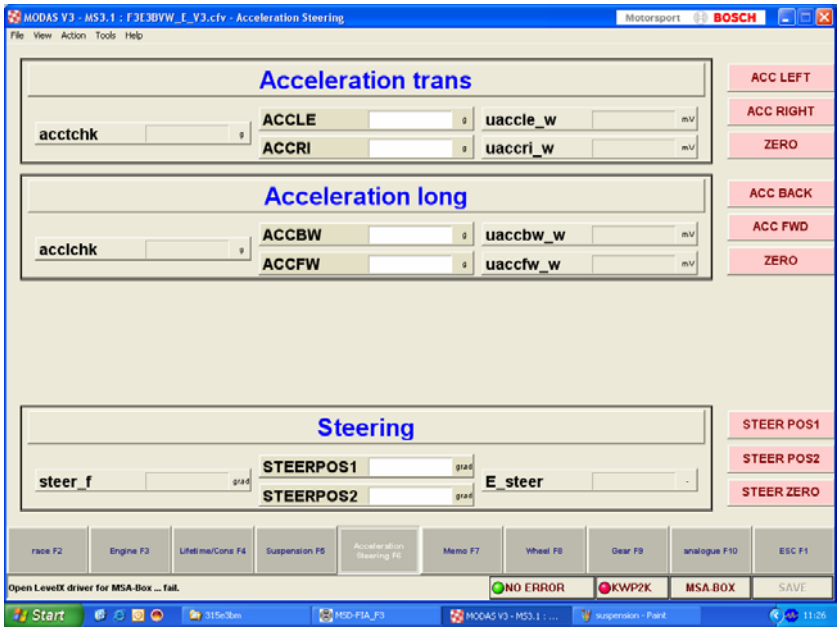
The adjustment of this function is the same as the “Suspension Front Left “.

4.2 CHASSIS – Steering

The steering angle can be adjusted with the “Steering“ button.

The adjustment of this function is similar the adjustment of the “Suspension Front Left “ function. Instead of the suspension position the input is the steer angle sensor (“STEERPOS1“ und “STEERPOS2).

4.3 CHASSIS – Acceleration Long



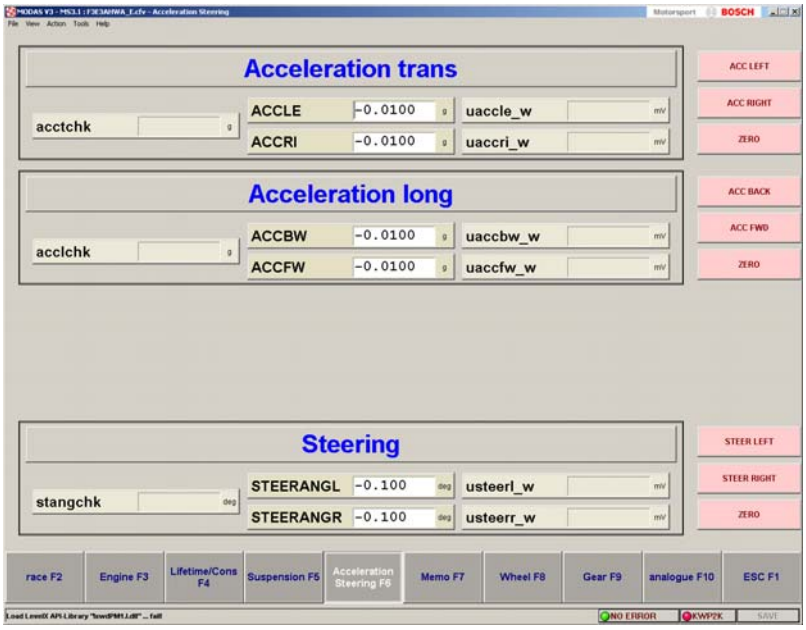
The longitudinal acceleration sensor can be calibrated with the “Acceleration Long“ box.

The calibration proceeds as follows:

- The sensor which has to be calibrated has to be removed from its mounting and turned 90 degrees backwards. The calibration input („ACC_BW“) for this position is +1g.
- Clicking the button “*Acc back*“(and sensor turned 90 degrees backwards) this position is saved in the CardMemory. The measured voltage can be checked with the label “uaccbw_w“
- The next calibration position of the sensor is 90 degrees turned forwards. The physical input for this position is –1 g.
- Clicking the button “*Acc fwd* (and sensor turned 90 degrees backwards) this position is saved in the CardMemory. The measured voltage can be checked in the macro “uaccfw_w“.

- The characteristic curve has now been defined for the sensor. The physical data can be checked with the label “acclchk“.
- For “ZERO“-point adjustment of the sensor, its position has to be horizontal (mounted in the car).

4.4 CHASSIS – Acceleration Trans



The transversal acceleration sensor can be calibrated with the “Acceleration Trans“ box.

This sensor has the same calibration as the longitudinal Acceleration sensor (see chapter 3.3).

The input +1g is when the sensor has been turned 90 degrees to the left (car cornering right) and can be edited by the label “ACCLE“.
The input -1g is when the sensor has been turned 90 degrees to the right (car cornering left) and can be edit by the label “ACCRI“

4.5 CHASSIS – Analogue

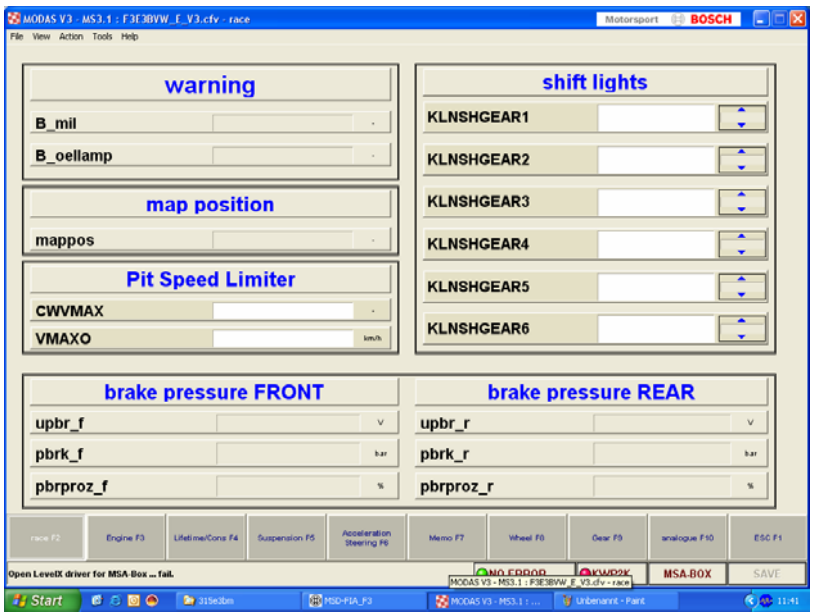
Selecting the option *All Chassis Channel* provides a display of all the voltages of the CardMemory.

5 RACE – Function

The function “RACE“ provides quick access to all of the lap information. This function contains for example the gear setup, the programming of gear ratios, lap- and segment distances.

5.1 RACE – Dash

This function controls the map switch and the LEDs (oil- and diagnostic LEDs).



The display left, shows the map position conditions one and two, the active diagnostic LED (B_mil = true), and the oil warning LED (B_oellamp = true). mappos is showing the current map position.

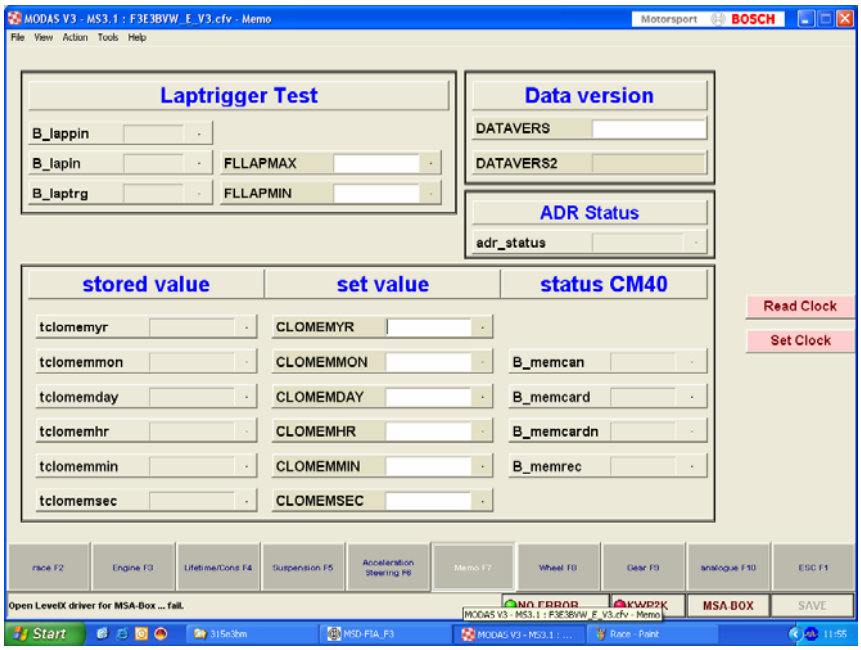
Further more you see the brake balance in procent (pbrproz_f /_r) and the absolute Pressure front (pbrk_f) and rear (pbrk_r).

The revs for the shift LEDs can also be set there. This is dependent on the gear engaged, that is why the 5 LEDs have to be set up for each gear in the maps KLNSHGEAR1…6.

The pit speed limiter can also be set up: the target speed should be set in VMAXO. The codeword CWVMAX allows turning off the speed limiter by setting it to 0. In order to turn on the limiter this codeword has to be set to 1.

5.2 RACE – Memo

The clock in the CardMemory contains the real time and has a battery backup. This real time is saved with each data file and shown in WinDarab. The clock in the system has to be reset when the battery has been changed.



It is possible to read in the active memory time by clicking “Read Clock.“ The time is shown in the labels “tclomemyr, tclomemmon ...“. The new time can be defined in the labels “CLOME-MYR, CLOMEMMON ...“. This can be set in the CardMemory by clicking “Set Clock“.

Different operational conditions of the memory can be checked with the bits B_memcan, -card, -cardn, and -rec.
B_memcan means that a CM 40 is connected to the chassis loom
B_memcard means that a initalized card is in the slot
B_memcardn means that a new initalized (without data) card is in the slot
B:memrec means that the CM 40 is recording data, and so definitly must be some Data on the card !

This page also displays the status of the Accident Data Recorder (ADR). For further information, please contact the ADR manufacturer.

Note: when putting the beacon transmitter in front of the receiver, the bits B_lappin and B_lapin should get true. If not, there is a problem.
The parameters FLLAPMIN and FLLAPMAX allow avoiding wrong beacon impulses.

After getting a laptrigger, the ECU will wait till a distance equal to LLAP * FLLAPMIN has been driven before recognising a beacon impulse as a laptrigger.
In the same way, if no laptrigger has been detected after a distance equal to LLAP * FLLAPMAX has been driven, the ECU will set a laptrigger. (it is possible to switch this function off by setting this parameter to 4).
Typical values for these parameters are thus: FLLAPMIN = 0.6 and FLLAPMAX = 2.

5.3 RACE – Memo, Datavers

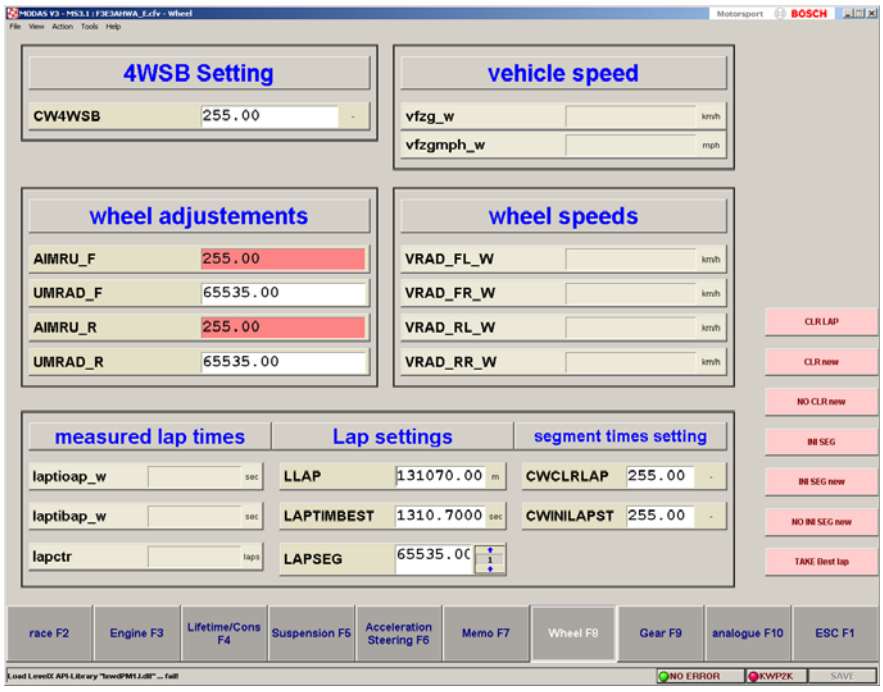
The name of the data version is shown in the label DATAVERS, a note may also be added. WinDARAB will show this name.

The data is shown “default-mode“ as decimal numbers. By “right-clicking“ with the mouse pointer at the displayed data, and selecting the “ASCII-character“ option, the data can be changed to an ASCII-expression.

Each character can be edited with the decimal number mode. An ASCII-table is shown in chapter 6.

5.4 RACE – Wheel

For the correct calculation of the car speed, the following data is needed:



1) Impulses for each wheel revolution “AIMRU“
2) Wheel diameter “UMRAD“

The speed (signal) can be read in the macro boxes vfzg_w and vfzgmph_w.

Each values must be filled in for the front (_F)

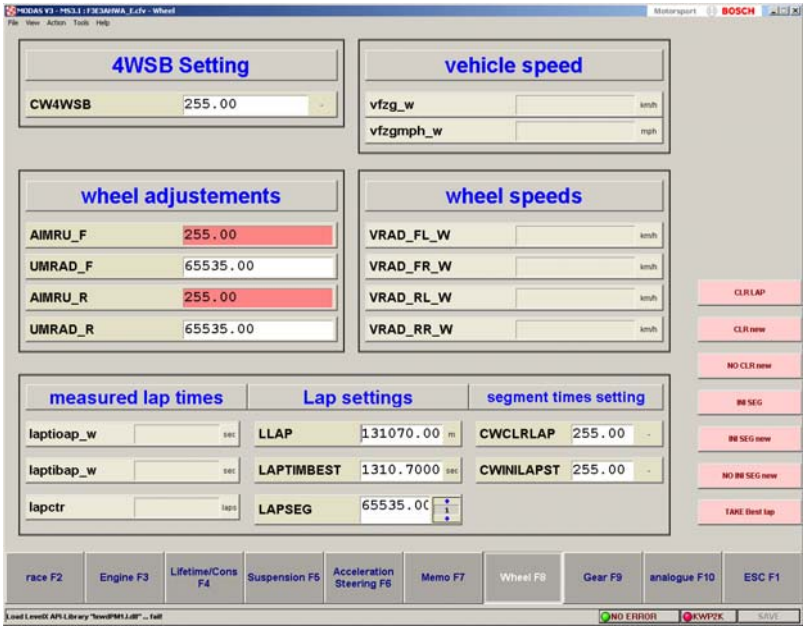
and rear (_R) axel.

The codeword CW4WSB indicates weather you use a 4 wheel speed box (=1)

Or not (=0)

5.5 RACE – Wheel, Lap parameters

All functions relating to laps are programmed with this function, for example:



Laptioap_w, Laptibap_w and lapctr are calculated Lap-time-data of the last lap (laptioap_w), the best Lap-time (laptibap_w), and the lap counter (lapctr).

Description of the macros:

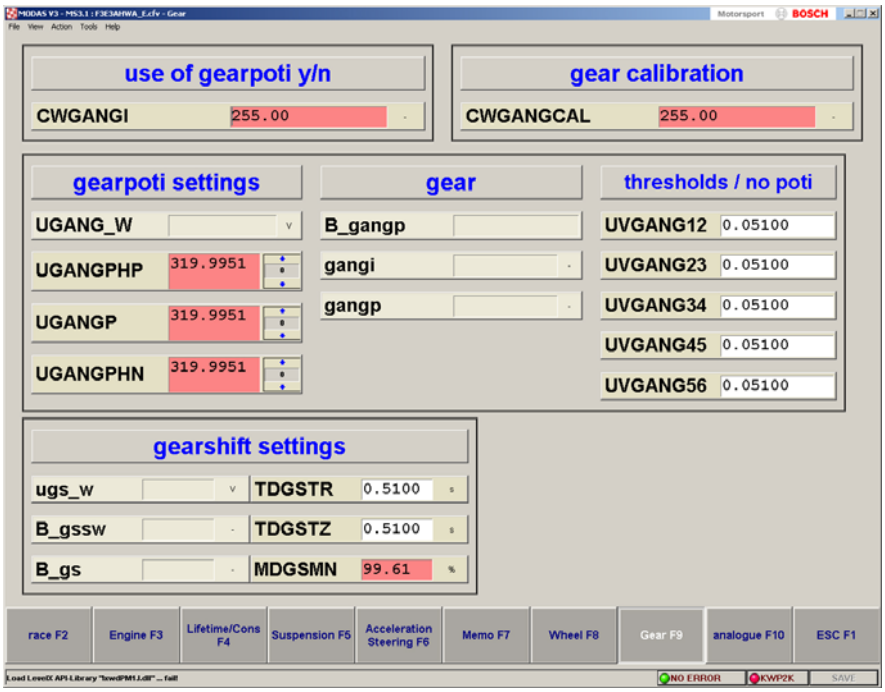
- LAPTIMBEST: The fastest lap possible. This prevents the saving of a shortened lap.
- LLAP: Lap distance (To calculate the lap trigger)
- LAPSEG: Distance input of the start of a lap segment from the beginning of a lap in m. For the input of less than 9 segments enter higher values than LLAP in the unused segments. The segments can be selected with the mouse pointer. The segment may also be selected by the input of the segment number.
- CWCLRLAP: reset of the lap counter at the recognition from a new initialised FlashCard = 1; otherwise 0.
- CWINILAPST: Initialising of the lap segment saving: New initialisation = 0 – 1 – 0. New initialisation recognising a new initialised Flashcard = 4; Input from the best lap time from BLAPTIME = 0 – 2 – 0.

The following macros can be used in the program:

- CLRLAP: The active lap counter can be reset
- CLR new: The lap counter will automatically be erased (CWCLRLAP = 1), when a new flash-card is recognised. Confirm the macro procedure by pressing the SAVE-button.
- NO CLR new: The lap counter won't be erased automatically (CWCLRLAP = 0) when a new flash-card is initialised Confirm the macro procedure by pressing the SAVE-button.
- INI SEG: The best lap time will be erased (lap segment savings).
- INI SEG new: The best lap time will automatically be erased (lap segment saving) (CWINILAPST = 4) with the recognition of a new flash-card. Confirm the macro procedure by pressing the SAVE-button.
- NO INI SEG new: The lap time won't be erased automatically (CWINILAPST = 0) when a new flash-card is initialised. Confirm the macro procedure by pressing the SAVE-button.
- TAKE Best Lap: Take the best lap time (BLAPTIME) in laptibap_w.

5.6 RACE – Gear, Gearshift settings

This function can monitor the “GearCut“ signal, program the gear ratios or the gear potentiometer.



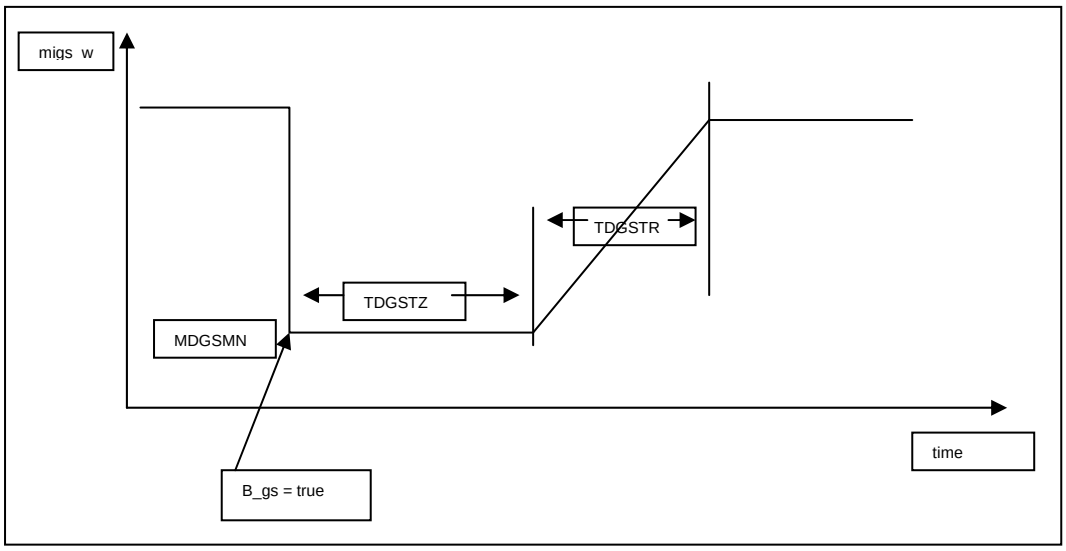
Note:
While pressing the gear cut button the voltage ugs_w is 5 V. The macro B_gssw (gear switch signal) is only shown when the engine is running. B_gs; Active ECU, can only be checked with a running engine, passing the relative load limit (rl >70%) and an engine RPM > 5000.

A torque reduction for gearshift can be controlled by the parameters MDGSMN,TDGSTR and TDGSTZ.

MDGSMN is the minimum torque during gear shift.

TDGSTZ indicates how long the minimum torque is active

TDGSTR indicates the time for a ramp from minimum torque to the normal torque



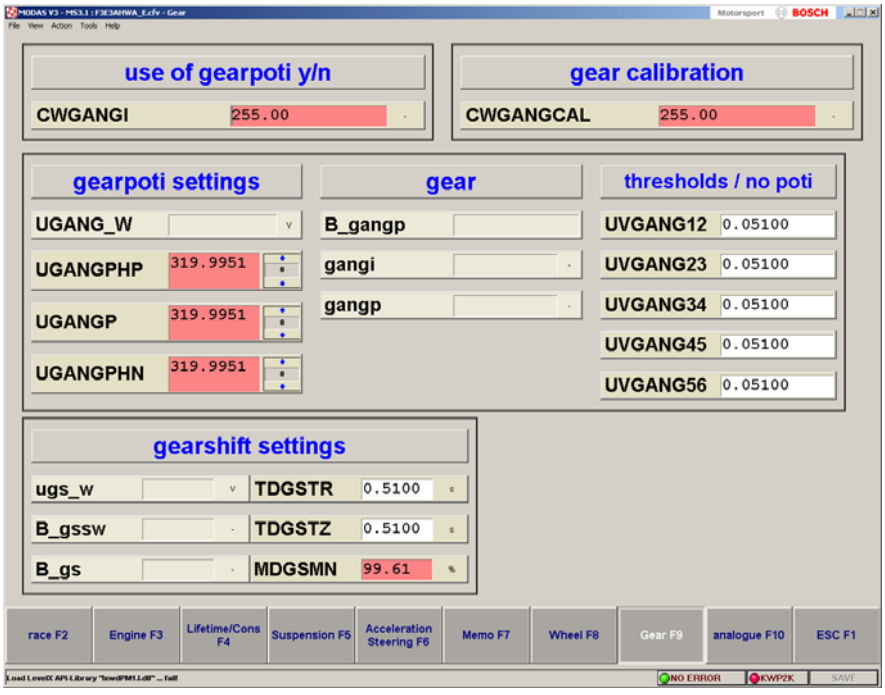
That means that KLNSHGEAR1 is responsible for gear 1. First value is for the first light , 2. Value for the second.....

5.7 RACE – Gear

In this display the gear ratios are calculated and the gear poti can be tuned. These features are used for the gear switch function. The thresholds are calculated as a function of: vfzg/nmot.

Example: 5 speed gear box.

Gear		1	2	3	4	5
Vehicle speed at 6000rpm [km/h]		80	120	160	200	240
Calculated gear ratio (vfzg/nmot)		0,013	0,02	0,026	0,033	0,04
Programmed shift ratio:	UVGANG12 =	0,0166				
	UVGANG23 =		0,0234			
	UVGANG34 =			0,03		
	UVGANG45 =				0,0366	



The codeword CWGANGI is used to tune whether a gear poti is attached or if the gear position is calculated via gear ratios. (=1 gear poti attached, =0 gear pos. calculated by gear ratios). UGANGMX and UGANGMN are thresholds used for diagnostics of the gear poti.

UGANGP is used to tune the gear poti itself. This is done by moving the gear leaver into the gear position that should be detected and reading the voltage (ugang_w) for this gear. This value needs to be written in UGANGP.

UGANGPHP and UGANGPHN are tuneable thresholds and indicate the min. and max. voltage within a gear is detected. These thresholds can be tuned for each gear individually.

To adjust a new gearposition (after the gearbox was open), it is just necessary to switch the codeword CWGANGCAL from 0 to 1 and back to 0 again. During the adjustment it is absolutely necessary that you are in the 1. Gear !!!!!!

6 ASCII – Decimal – Table

Dec	ASCII		Dec	ASCII		Dec	ASCII		Dec	ASCII
0	NUL		32	SP		64	@		96	'
1	SOH		33	!		65	A		97	a
2	STX		34	„		66	B		98	b
3	ETX		35	#		67	C		99	c
4	EOT		36	$		68	D		100	d
5	ENQ		37	%		69	E		101	e
6	ACK		38	&		70	F		102	f
7	BEL		39	'		71	G		103	g
8	BS		40	(		72	H		104	h
9	HT		41	)		73	I		105	i
10	LF		42	*		74	J		106	j
11	VT		43	+		75	K		107	k
12	FF		44	,		76	L		108	l
13	CR		45	-		77	M		109	m
14	SO		46	.		78	N		110	n
15	SI		47	/		79	O		111	o
16	DLE		48	0		80	P		112	p
17	DC1		49	1		81	Q		113	q
18	DC2		50	2		82	R		114	r
19	DC3		51	3		83	S		115	s
20	DC4		52	4		84	T		116	t
21	NAK		53	5		85	U		117	u
22	SYN		54	6		86	V		118	v
23	ETB		55	7		87	W		119	w
24	CAN		56	8		88	X		120	x
25	EM		57	9		89	Y		121	y
26	SUB		58	:		90	Z		122	z
27	ESC		59	;		91	[		123	{
28	FS		60	<		92	\		124	|
29	GS		61	=		93	]		125	}
30	RS		62	>		94	^		126	~
31	US		63	?		95	_		127	DEL

7 CDT – error list

Failure path Identifier-Nr	Label	codeword
1	CDTATS	codeword tester exhaust temperature sensor
2	CDTATS2	codeword tester exhaust temperature sensor bank 2
3	CDTBM	code word tester: reference mark sensor
4	CDTDK	code word tester: throttle position potentiometer
5	CDTDK1P	code word tester: Throttle Position Poti 1
6	CDTDK2P	code word tester: Throttle Position Poti 2
7	CDTDSCNK	code word tester: crankcase pressure sensor
8	CDTDSFUE	code word tester: fuel pressure sensor
9	CDTDSL	code word tester: pressure sensor charging pressure
10	CDTDSOE	code word tester: oil pressure sensor
11	CDTDSS	code word tester: Manifold absolute pressure
12	CDTDSU	code word tester: Pressure Sensor Ambient
13	CDTDSVLU	code word tester: pressure sensor comparison (load/ ambient pressure)
14	CDTEV1	code word tester: injection valve of cyl. 1
15	CDTEV2	code word tester: injection valve of cyl. 2
16	CDTEV3	code word tester: injection valve of cyl. 3
17	CDTEV4	code word tester: injection valve of cyl. 4
18	CDTEV5	code word tester: injection valve of cyl. 5
19	CDTEV6	code word tester: injection valve of cyl. 6
20	CDTGSH	code word tester: request of gear shift function
21	CDTHSV	code word tester: oxygen sensor heater upstream catalyst
22	CDTKPE	code word tester: fuel pump relay power stage
23	CDTKRNT	code word tester: knock control zero test pulse [220]
24	CDTKROF	code word tester: knock control offset
25	CDTKRTP	code word tester: knock control test pulse
26	CDTKS1	code word tester: knock sensor 1
27	CDTKS2	code word tester: knock sensor 2
28	CDTKS3	code word tester: knock sensor 3

29	CDTKS4	code word tester: knock sensor 4
30	CDTLAP	code word tester: lap trigger signal
31	CDTLM	code word tester: air-flow sensor/hot-wire air-flow meter
32	CDTLSV	code word tester: lambda sensor upstream catalyst [010]
33	CDTMILE	code word tester: MIL power stage
34	CDTN	code word tester: speed pick up
35	CDTOLLAE	code word tester: oil warning lamp powerstage
36	CDTPH	code word tester: phase sensor
37	CDTSHLAE	code word tester: shift lamp powerstage
38	CDTTA	code word tester: intake-air temperature
39	CDTTFUEL	code word tester: fuel temperature
40	CDTTM	code word tester: engine temperature
41	CDTTOL	code word tester: oil temperature
42	CDTTUM	code word tester: ambient (-air) temperature
43	CDTUB	code word tester: power supply voltage UB
44	CDTVFZ	code word tester: vehicle speed signal

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