

CAN adapter CAN-CONTROL manual v0.1

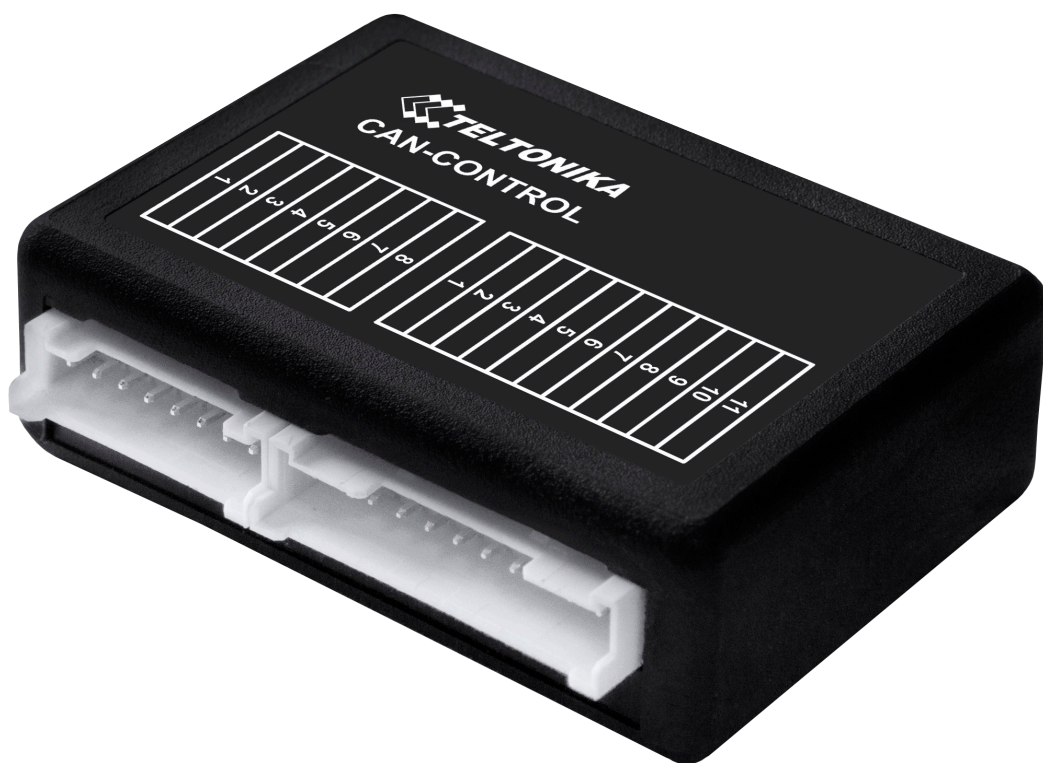


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1. Purpose of Can Adapter CAN-CONTROL

CAN-CONTROL is used to control various functions in light vehicles such as doors lock/unlock, windows open/close, turning lights and etc. With this adapter **FMB1YX, FMA1XY, FM11XY** devices is able to control certain functions as well as collect and send vehicle data.

Depending on what device CAN-CONTROL is used with the connection between CAN Adapter and FM devices can be either via dedicated contacts or USB plug.

Table 1 CAN-CONTROL Technical characteristics

CHARACTERISTIC DESCRIPTION	VALUE			
	MIN.	TYP.	MAX.	UNIT
SUPPLY VOLTAGE:				
Supply Voltage(Recommended Operating Conditions)	+9	12	+16	V
CURRENT CONSUMPTION				
Working mode(with 12V)		23,6		mA
Sleep mode(with 12V)		0,95		mA
After turning the ignition on		23,7		mA
WORKING TEMPERATURE				
Working Temperature	-40		80	°C

2. Connecting FM Device with CAN-CONTROL

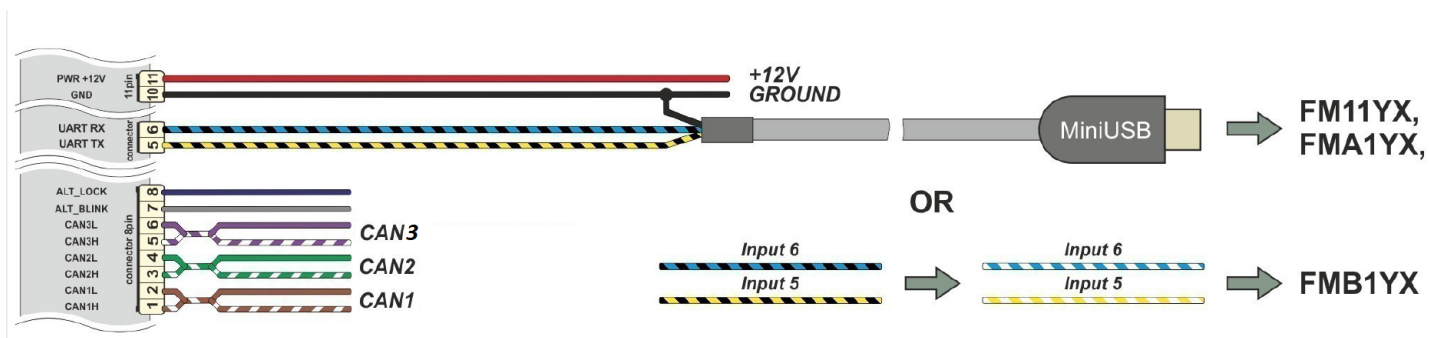


Figure 1 CAN CONTROL base connection scheme

FM11YX and **FMA1YX** share the same **USB** port for connecting adapter and configuring device with PC, while **FMB1YX** has dedicated pins for connection to CAN devices labeled **Input 5** and **Input 6**.

2.1. Connecting FMB1YX with CAN-CONTROL

- Connect **Pin 5** to **FMB1YX INPUT 5** pin and **Pin 6** to **INPUT 6** pin and connect CAN-CONTROL adapter to other end of the cable.
- Connect **Pins 1-8** as specified in wiring scheme.
- Connect car **power supply** lines to **Pin 11** positive, **Pin 10** negative.
- For numbered pinout see sticker on CAN adapter.

2.2. Connecting FMA1YX/FM11YX with CAN-CONTROL

- Connect **USB** Plug to **FMA1YX, FM11YX** device, connect CAN-CONTROL to other end of the cable.
- Connect **Pins 1-8** as specified in wiring scheme.
- Connect car power supply lines to **Pin 11** positive, **Pin 10** Negative.
- For numbered pinout see sticker on CAN adapter.



Attention! Ordered CAN-CONTROL packaging may vary: standard package for FMB1YX series devices and other package for FMA1YX, FM11YX series with Mini-USB cable.



Attention! For detailed connection diagram of adapter to light vehicle please contact Teltonika, LTD sales representative and provide CAR manufacturer, model and year information.



Attention! Do not swap CAN L and CAN H lines. Do not swap power supply lines. Make sure that voltage do not exceeds 30V. Power supply lines should be connected at the end of installation work.

3. CAN-CONTROL Configuration

3.1. CAN-CONTROL program number selection

CAN-CONTROL must be set to **program number** which depends on vehicle model. Needed program number is always written on **CAN-CONTROL mounting scheme**. Please contact Your **Teltonika sales manager** to get latest supported vehicle list and mounting scheme for your vehicle, please provide **CAR manufacturer, model** and **year** information.

3.1.1 CAN-CONTROL program number configuration via SMS command

CAN-CONTROL program number can be set remotely, using SMS command.

SMS command: ***lvcansetprog X*** or ***login pass lvcansetprog X***
X is new program number value.

Example: ***lvcansetprog 11434*** SMS response: ***LVCAN ProgNum: 11434***

3.1.2. CAN-CONTROL program number configuration via Configurator

CAN-CONTROL program number can be set via **Configurator**, see **Figure 2**. Go to **CAN Adapter** (1) → **Program Number** (2). Enter program number and press **Save to device** (3) button that saves the current configuration into **FMB1YX**.

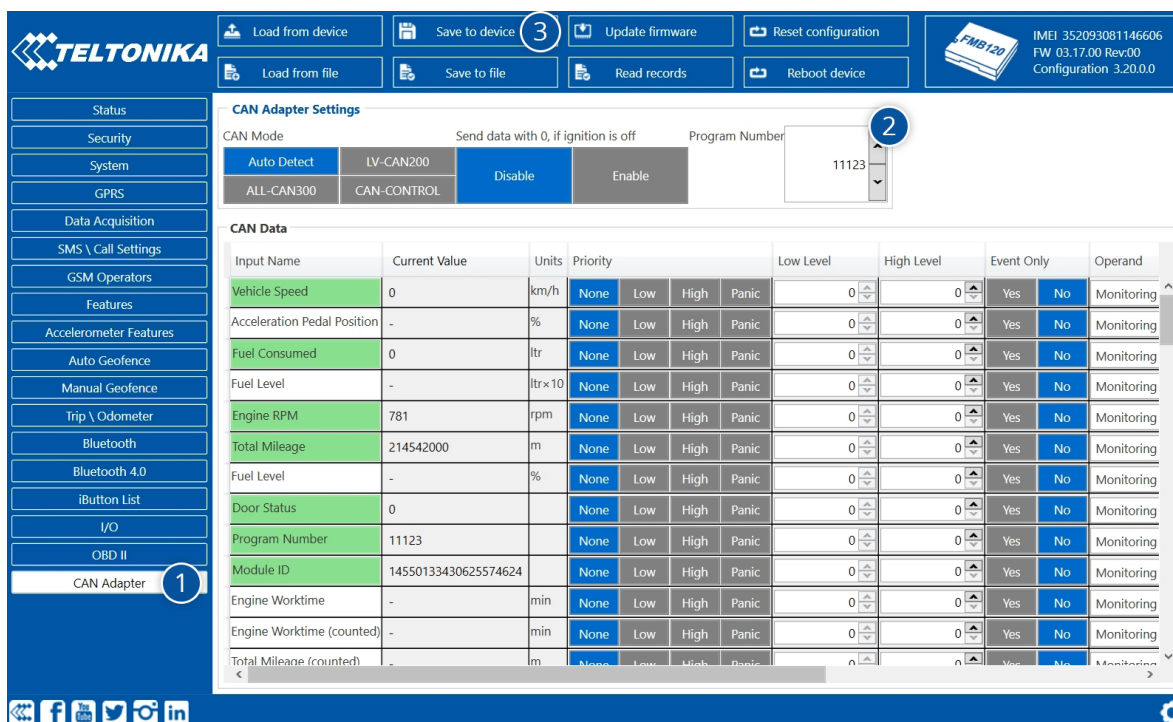


Figure 2 CAN Adapter Settings in Configurator, 1 - CAN Adapter settings, 3 - Save to device, 3 - Program number field

3.1.3 Selecting CAN-CONTROL program number manually

Steps to set program number:

- Hold SWITCH down until LED starts blinking.
- Release the SWITCH.
- Then LED starts blinking and counting first digit of program number (one blink means digit 1, two blinks mean digit 2 etc).
- To stop counter push SWITCH.
- Release the SWITCH, then LED starts blinking and counting second digit of program number.
- To stop counter push SWITCH.
- Release the SWITCH, then LED starts blinking and counting third digit on program number.
- To stop counter push SWITCH.
- Release the SWITCH, then LED starts blinking and counting fourth digit on program number.
- To stop counter push SWITCH.
- Release the SWITCH, then LED starts blinking and counting fifth digit on program number.
- To stop counter push SWITCH.
- Release SWITCH, if programming is successful LED will blink 10 times.

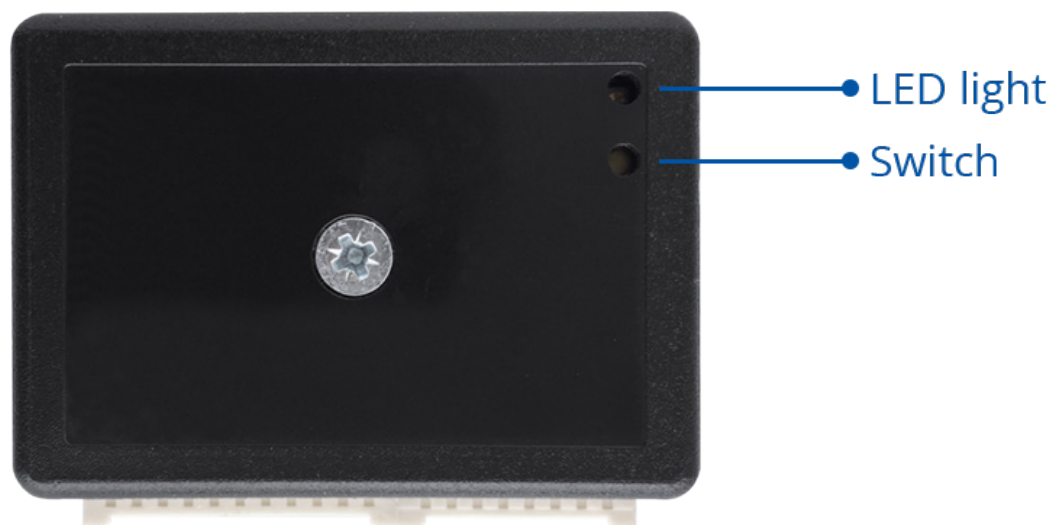


Figure 3 Can Adapter

3.2. FMB1YX CAN-CONTROL Configuration

Because FMB1YX have CAN-CONTROL RX and TX in its own pinout, device configuration can be performed via **Micro-USB** or **Blue-tooth** connection via [Configurator](#) when CAN adapter is connected to the vehicle.

When FMB1YX is connected to CAN-CONTROL, user can see all information that is received from the vehicle in [Configurator](#) → **CAN Adapter (Figure 2)**, all data are highlighted by **green background color**. Information in this section is automatically refreshed. CAN bus data which can be read from your car is provided in "**CAN-CONTROL supported vehicle list**" document. The CAN-CONTROL I/O element can be configured like any other I/O element in FMB1YX Configurator.

When using offline configuration method user can select which CAN data will be read from CAN-CONTROL and sent directly to the server without connection to adapter. Please note that parameters depend on vehicle manufacturer and vehicle model. For further information check "**CAN-CONTROL supported vehicle list**" document.

3.3. FM11YX/FMA1YX CAN-CONTROL Configuration

FM11YX/FMA1YX devices shares the same USB port for connecting CAN-CONTROL adapter and configuring device with PC. FM11YX/FMA1YX can be configured using "**SCAN**" function or "**Offline Configuration**". SCAN function – is in use when FM11YX/FMA1YX is connected to CAN adapter, see [\(Figure 4\)](#).

System	I/O									
Records	SCAN Parameters		CAN Mode: LV-CAN200		Send data with 0, if ignition is off: Disable					
GSM	Property Input	Value	<input type="checkbox"/> Enabled	Priority	Low Level	High Level	Units	Generate Event	Averaging Constant	
DataAcquisitionModes	Vehicle speed		<input type="checkbox"/>	Disabled	0	0	km/h	Monitoring	10	
Features	Accelerator pedal position		<input type="checkbox"/>	Disabled	0	0	%	Monitoring	2	
IO	Fuel Consumed		<input type="checkbox"/>	Disabled	0	0	ltr	Monitoring		
LVCAN	Fuel level		<input type="checkbox"/>	Disabled	0	0	ltr	Monitoring	10	
RS232 / RS485	Engine RPM		<input type="checkbox"/>	Disabled	0	0		Monitoring	10	
	Total mileage		<input type="checkbox"/>	Disabled	0	0	m	Monitoring		
	Fuel level		<input type="checkbox"/>	Disabled	0	0	%	Monitoring	10	
	Program number		<input type="checkbox"/>	Disabled	0	0		Monitoring		
	Engine temperature		<input type="checkbox"/>	Disabled	0	0	°C	Monitoring	10	
	Door Status		<input type="checkbox"/>	Disabled	0	0		Monitoring		
	CNG Status		<input type="checkbox"/>	Disabled	0	0		Monitoring		
	CNG Used		<input type="checkbox"/>	Disabled	0	0		Monitoring		
	CNG Level		<input type="checkbox"/>	Disabled	0	0		Monitoring		
	Oil Level		<input type="checkbox"/>	Disabled	0	0		Monitoring		

Figure 4 LVCAN settings in FM11YX/FMA1YX Configurator

To configure CAN data connect CAN-CONTROL to CAN bus and to the FM11YX/FMA1YX device (**Figure 5**) **wait 10 seconds**. Car engine must be started.

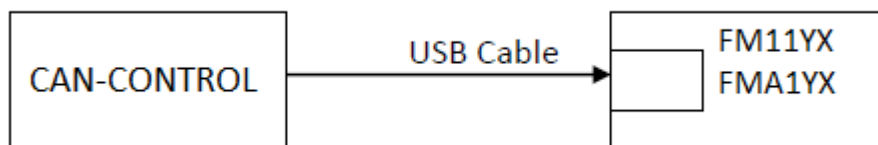


Figure 5 CAN-CONTROL basic connection scheme

Disconnect CAN-CONTROL from FM11YX/FMA1YX, and connect PC USB cable to FM11YX/FMA1YX device (**Figure 6**). It is very important not to disconnect from power source, because then all CAN data will be lost.

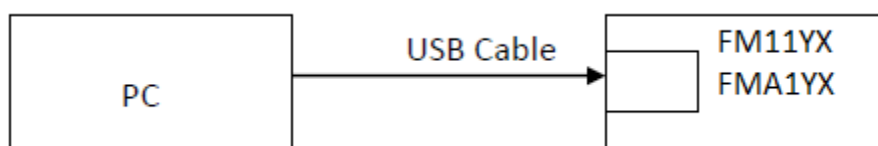


Figure 6 FM connection to PC

Readable CAN data are highlighted by **green background color**. CAN bus data which can be read from your car is shown in "**CAN-CONTROL supported vehicle list**" document.

Available CAN Bus IO parameters and configuration can be found in Configurators CAN tab (**Figure 4**).

3.4. SMS Configuration

All CAN-CONTROL IO elements can be configured remotely via SMS command

3.4.1. SMS/GPRS Commands¹

CAN-CONTROL has several dedicated SMS/GPRS commands. All commands are case sensitive. Essential fields in 'SMS' part is 'Login' and 'Password'. The login and password are used with every SMS sent to FM device. If login and password are not set, in every SMS sent to FM device two spaces before command have to be used (<space><space><command>).

Command structure with set login and password:

<login><space><password><space><command>, example: *asd 123 lvcagnetinfo*

¹GPRS commands require Codec 12 Protocol

3.4.2. SMS/GPRS Command List

Table 2 Command List

COMMAND	DESCRIPTION	RESPONSE
lvcansetprog #	Set program number to LV-CAN200/ ALL-CAN300/CAN-CONTROL that is connected to FMB1YX. # three digit number that identity vehicle.	Yes
lvcangetprog	Get program number from LV-CAN200/ ALL-CAN300 that is connected to FMB1YX.	Yes
lvcangetinfo	Get information about connected LV-CAN200/ALL-CAN300.	Yes
lvcanclear #	Clear Total Mileage (counted), Engine Work Time (counted), Fuel Consumed (counted) parameters values. # - parameter (0 - Engine work time (counted), 1 - Fuel Consumed (counted), 2 - Vehicle Mileage (counted)).	
lvcanopenalldoors	Open [unlock] all doors	Yes
lvcanclosealldoors	Close [lock] all doors	Yes
lvcanopentrunk	Open [unlock] trunk	Yes
lvcanturninglights	One flash of all turn lights ordered trough accidental / blinking turn light switch	Yes
lvcanwindowsopen:#	open windows xx sec. (one sending of command will cause the windows to continue opening for xx seconds). xx: [1,3,5...25,27,29]	Yes
lvcanwindowsclose:#	close windows xx sec. (one sending of command will cause the windows to continue closing for xx seconds). xx: [1,3,5...25,27,29]	Yes

3.4.3 FMA1YX/FM11YX IO Elements

For FMA1YX/FM11YX devices first ID number is always “2”, second and third ID numbers refers to specific CAN-CONTROL IO element ([Table 3](#)). And the last ID number refers to sections – **Property; Generation Type; Low level, High level** and **Averaging Constant** ([Table 4](#)).

Here’s example: *ID 2013 – configures Accelerator Pedal position parameter “High Level”*

Table 3 CAN-CONTROL IO elements SMS configuration Ids range

CAN-CONTROL IO ELEMENT	PARAMETER ID RANGE
Speed	2000-2004
Accelerator pedal position	2010-2014
Total fuel used	2020-2023
Fuel level (liters)	2030-2034
Engine RPM	2040-2044
Total mileage	2050-2053
Fuel level (percent)	2060-2064
Program number	2070-2073
Module ID	2080-2083
Total Mileage (counted)	2110-2113
Fuel Consumed (counted)	2120-2123
Engine Temperature	2170-2174
Control State Flags	2230-2233
Security State Flags	2320-2323

Table 4 CAN-CONTROL IO parameters configuration

PARAMETER ID	PARAMETER NAME	AVAILABLE VALUES
2xx0	Priority	0 – IO element disabled 1 – Low priority 2 – High priority 3 – Panic priority
2xx1	Generation type	0 – Event on exit 1 – Event on entrance 2 – Event on both 3 – Monitoring 4 – Hysteresis 5 – On change
2xx2	Low level	
2xx3	High Level	
2xx4	Averaging Constant	From 0 to 2 ³²

3.4.4 FMB1YX IO Elements

3.4.4.1 CAN Adapter Mode

Sets LVCAN mode: **0 – Auto Detect, 1 – LV-CAN200, 2 – ALL-CAN300, 3 – CAN-CONTROL.**

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	2	0	Send data with 0, if ignition is off (ID = 45001) Program Number (ID = 45002)	Uint8

3.4.4.2 Send data with 0, if ignition is off (ID = 45001)

This parameter enables/disables data sending with 0 value, if ignition is off. **0 – Disable, 1 – Enable.**

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	1	0	LVCAN Mode (ID = 45000) Program Number (ID = 45002)	Uint8

3.4.4.3 Program Number (ID = 45002)

Sets LVCAN Program number.

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	999	0	LVCAN Mode (ID = 45000) Send data with 0, if ignition is off (ID = 45001)	Uint16

3.4.4.4 1st LVCAN property parameter priority (ID=45100)

Parameter defines LVCAN property type of priority: **0 is disabled, 1 – low, 2 – high, 3 – panic.**

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	1	0	LVCAN Mode (ID = 45000) Program Number (ID = 45002)	Uint8

3.4.4.5 1st LVCAN property parameter operand (ID=45101)

Parameter defines when event is sent: **0 - on range exit, 1 - on range entrance, 2 - both, 3 - monitoring, 4 - hysteresis, 5 - on changes, 6 - on delta change.**

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	3	0	1st LVCAN property parameter operand (ID=45101) 1st LVCAN property parameter High level (ID=45102) 1st LVCAN property parameter Low level (ID=45103) 1st LVCAN property parameter Event only (ID=45104) 1st LVCAN property parameter averaging constant (ID=45105) 1st LVCAN property parameters Send SMS to (ID=7141) 1st LVCAN property parameters SMS Text (ID=8141)	Uint8

3.4.4.6 1st LVCAN property parameter High level (ID=45102)

Parameter defines high value of triggered LVCAN property. This parameter is used to set thresholds for LVCAN properties to generate events.

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	255	0	1st LVCAN property parameter priority (ID=45100) 1st LVCAN property parameter operand (ID=45101) 1st LVCAN property parameter Low level (ID=45103) 1st LVCAN property parameter Event only (ID=45104) 1st LVCAN property parameter averaging constant (ID=45105) 1st LVCAN property parameters Send SMS to (ID=7141) 1st LVCAN property parameters SMS Text (ID=8141)	Uint8

3.4.4.7 1st LVCAN property parameter Low level (ID=45103)

Parameter defines low value of triggered LVCAN property. This parameter is used to set thresholds for LVCAN properties to generate events.

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	255	0	1st LVCAN property parameter priority (ID=45100) 1st LVCAN property parameter operand (ID=45101) 1st LVCAN property parameter High level (ID=45102) 1st LVCAN property parameter Event only (ID=45104) 1st LVCAN property parameter averaging constant (ID=45105) 1st LVCAN property parameters Send SMS to (ID=7141) 1st LVCAN property parameters SMS Text (ID=8141)	Uin8

3.4.4.8 1st LVCAN property parameter Event only (ID=45104)

Parameter defines when LVCAN element value is sent: **0 – with every AVL packet, 1 – on event only**. On event means that LVCAN element value is included to AVL packet only when this particular event happens. With regular, periodic records such LVCAN element value is not included.

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	1	0	1st LVCAN property parameter priority (ID=45100) 1st LVCAN property parameter operand (ID=45101) 1st LVCAN property parameter High level (ID=45102) 1st LVCAN property parameter Low level (ID=45103) 1st LVCAN property parameter averaging constant (ID=45105) 1st LVCAN property parameters Send SMS to (ID=7141) 1st LVCAN property parameters SMS Text (ID=8141)	Uin8

3.4.4.9 1st LVCAN property parameter averaging constant (ID=45105)

Parameter defines LVCAN property sample length to average.

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	65535	10	1st LVCAN property parameter priority (ID=45100) 1st LVCAN property parameter operand (ID=45101) 1st LVCAN property parameter High level (ID=45102) 1st LVCAN property parameter Low level (ID=45103) 1st LVCAN property parameter Event only (ID=45104) 1st LVCAN property parameters Send SMS to (ID=7141) 1st LVCAN property parameters SMS Text (ID=8141)	Uint16

3.4.4.10 1st LVCAN property parameters Send SMS to (ID=7141)

Enable/Disable SMS event sending. **0 - Disable**, **1-10 SMS** will be sent to configured GSM number.

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	10	0	1st LVCAN property parameter priority (ID=45100) 1st LVCAN property parameter operand (ID=45101) 1st LVCAN property parameter High level (ID=45102) 1st LVCAN property parameter Low level (ID=45103) 1st LVCAN property parameter Event only (ID=45104) 1st LVCAN property parameter averaging constant (ID=45105) 1st LVCAN property parameters SMS Text (ID=8141)	Uint8

3.4.4.11 1st LVCAN property parameters SMS Text (ID=8141)

Configure LVCAN property parameter SMS event text here.

MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	GOES WITH (DEPENDS ON PARAMETERS)	VALUE TYPE
0	160	LVC Vehicle speed	1st LVCAN property parameter priority (ID=45100) 1st LVCAN property parameter operand (ID=45101) 1st LVCAN property parameter High level (ID=45102) 1st LVCAN property parameter Low level (ID=45103) 1st LVCAN property parameter Event only (ID=45104) 1st LVCAN property parameter averaging constant (ID=45105) 1st LVCAN property parameters Send SMS to (ID=7141)	String

3.4.4.12 All CAN I/O elements parameters property ID

PARAMETERNAME	PRIORITY	OPERAND	HIGH LEVEL	LOW LEVEL	EVENT ONLY	AVG CONST	SEND SMSTO	SMS TEXT
Vehicle Speed	45100	45101	45102	45103	45104	45105	7141	8141
Acceleration Pedal Position (percent)	45110	45111	45112	45113	45114	45115	7142	8142
Fuel Consumed (liters)	45120	45121	45122	45123	45124	-	7143	8143
Fuel Level (liters)	45130	45131	45132	45133	45134	45135	7144	8144
Engine RPM	45140	45141	45142	45143	45144	45145	7145	8145
Total Mileage	45150	45151	45152	45153	45154	-	7146	8146
Fuel Level (percent)	45160	45161	45162	45163	45164	45165	7147	8147
Program Number	45180	45181	45182	45183	45184	-	7149	8149
Module ID	45190	45191	45192	45193	45194	-	7150	8150
Total Mileage (counted)	45220	45221	45222	45223	45224	-	7153	8153
Fuel Consumed (counted)	45230	45231	45232	45233	45234	-	7154	8154
Engine Temperature	45280	45281	45282	45283	45284	45285	7159	8159
Control State Flags	45340	45341	45342	45343	45344	-	7165	8165
Security State Flags	45430	45431	45432	45433	45434	-	7174	8174
Battery Voltage	45720	45721	45722	45723	45724	-	7203	8203
CNG Used	45900	45901	45902	45903	45904	-	7237	8237
CNG Level	45910	45911	45912	45913	45914	-	7238	8238

4. AVL Parameters ID

When no I/O element is enabled, AVL packet comes with GNSS information only. After enabling I/O element(s) AVL packet along with GPS information contains current value(s) of enabled I/O element. List of available CAN data, parameter size, ID and value range you can find in **Table 5**.

Table 5 ACQUIRED PARAMETERS IO IDs

PROPERTY INPUT	PARAM INDEX	SIZE (BYTES)	PARAM IOID	MEASUREMENT UNITS	A1	REMARKS
CAN-CONTROL Program number	29	4	100	-	-	
Module ID	30	8	101	-	-	
Total Mileage	33	4	87	meters	1	
Total Mileage (counted) *	34	4	105	meters	1	
Fuel Consumed	35	4	83	Ltr * 10	0.1	
Fuel Consumed (counted) *	36	4	107	Ltr * 10	0.1	
Fuel Level [%]	37	1	89	%	1	
Fuel Level [liters]	38	2	84	Ltrs * 10	0.1	
Engine RPM	42	2	85	-	1	
Engine Temperature	44	1	115	°C x 10	0.1	signed
Accelerator Pedal Position	45	1	82	%	1	
Vehicle Speed	46	1	81	km/h	1	
Control State Flags	52	4	123	-	-	
Security State Flags	61	8	132	-		
Battery Level (percent)	81	1	152	%	1	

NOTE:

„**Total Fuel Used**“ is sent to server **multiplied by 10**.

Example: if value was **150.5 liters**, „**1505**“ will be sent to server.

* - Fuel consumed (counted), Total mileage (counted), Engine Work Time (counted) are parameters, which are counted after CAN-CONTROL is connected to CAN bus.