

FM1100 with Light Vehicles Can adapter LV-CAN200
Manual
V1.10

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1 Legal Notice

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2 Safety Introductions

This chapter contains information on how to operate device safely. By following these requirements and recommendations, you will avoid dangerous situations. You must read these instructions carefully and follow them strictly before operating the device!

The device uses a 10 V...30 V DC power supply. The nominal voltage is 12 V DC. The allowed range of voltage is 10 V...30 V DC.

To avoid mechanical damage, it is advised to transport the device in an impact-proof package. Before usage, the device should be placed in position where all its LED indicators would be visible. LED indicators shows status of operation the device is in.

When connecting the connection cables to the vehicle, the appropriate jumpers of the vehicle power supply should be disconnected.

Before dismounting the device from the vehicle, the plug must be disconnected.

The device is designed to be mounted in a zone of limited access, which is inaccessible for the operator. All related devices must meet the requirements of standard EN 60950-1.

Teltonika is not responsible for vehicle damage caused by installation of adapter.

3 Purpose of Light Vehicles Can Adapter LV-CAN200

LV-CAN200 is used to listening data from light vehicles. With this adapter FM1100 device is able to collect and send vehicle data.

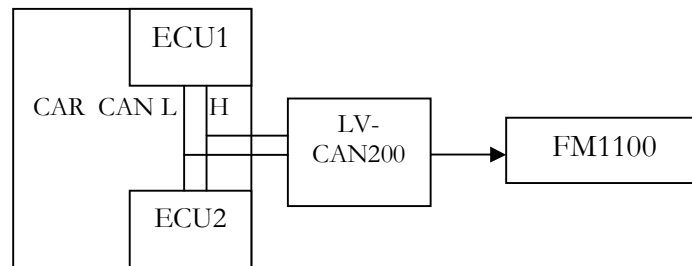


Figure 1 Connection block diagram

FM1100 shares the same USB port for connecting adapter and configuring device with PC.

LV-CAN200 Technical characteristics:

PARAMETER	VALUE
Supply voltage	10 to 30V
Power supply current	Average 10mA Max (peak) 100mA
Working temperature	-40..85 °C
Max working humidity	60 % (non condensate)

4 LV-CAN200 program number selection

LV-CAN200 must be set to program number which depends on vehicle model.

Needed program number is always written on LV-CAN200 mounting scheme.

4.1 LV-CAN200 program number configuration via SMS command

Since FM1100 firmware version 01.11.00 and later or 43.00.17 and later, LV-CAN200 program number can be set remotely, using SMS command:

setcanprog X

X is new program number value.

4.2 Selecting LV-CAN200 program number manually

Steps to set program number:

- Hold SWITCH down till LED starts blinking
- Release the SWITCH
- Then LED starts blinking and counting first digit of program number, (one blink means digit 1, two blink 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 SWITCH, if programming is succeeded LED will blink 10 times



Figure 2 Adapter signaling led

5 Connecting FM1100 with Light Vehicles Can adapter

Connect USB Plug to FM1100 device, connect Light Vehicles Can adapter to other end of the cable.

Connect Light Vehicles Can adapter Pin 1 and Pin 2 to cars CAN bus. CAN interface location of the supported light vehicle is described on mounting scheme.

Connect car power supply lines to Pin 3 positive, Pin 4 Negative.

Pins 9,10 connection is optional it depends on exact car model.

For exact pinout see sticker on Light Vehicles Can adapter.

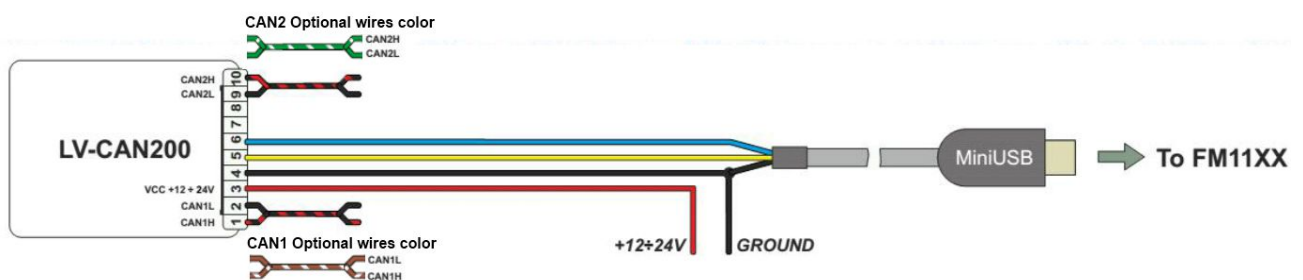


Figure 3. LV-CAN200 Adapter connection cable pinout



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.

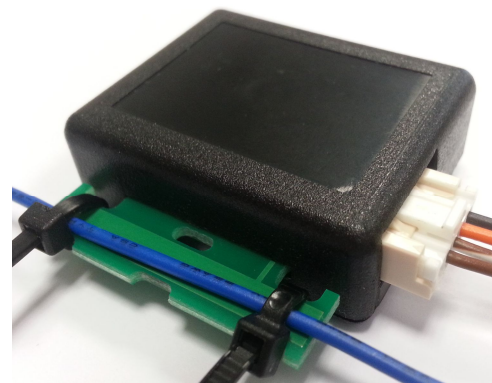
6 SIMPLE-CAN - contactless CAN-BUS reader

SIMPLE-CAN is contactless adapter used to read vehicle CAN data with LV-CAN200, ALL-CAN300. If LV-CAN200 or ALL-CAN300 connection requires two CAN lines to get all data, then you need two SIMPLE-CAN readers

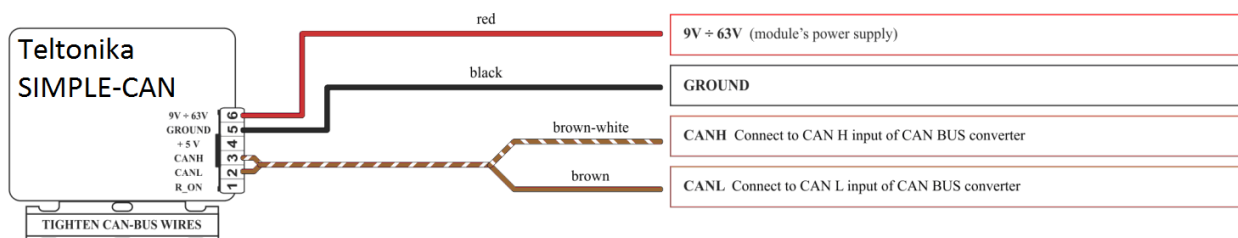
TECHNICAL DETAILS

- Power supply voltage 9-63 V
- Power supply current:

Mode	12V	24V
Active	8.3 mA	4.3 mA
Standby	1.6 mA	0.91 mA
- CAN-BUS speeds from 33,33 to 500 kb/s
- Automatically sets CAN Low, CAN High polarity
- Automatically adjusts signal level and speed



SIMPLE-CAN works in the **listening mode only**, so not all the data available on the CAN-BUS may be received using this solution. **The device automatically sets CAN L/H polarity**, but the calibration has to be always executed during installation process. Connection of previously calibrated unit to another car needs new calibration because the reader **automatically adjusts signal level and speed** to different CAN-BUSes. The device also **automatically adapts** to the found **noise level**.



After power supply connecting, LED shines continuously. It means that device awaits for calibration. Calibration process has to be carried out when CAN-BUS twisted pair is tightened on SIMPLE-CAN and when the ignition is ON. Please press the switch shortly and wait for the LED to start blinking every 1 second. Automatic calibration process takes up to 10 seconds depending on the vehicle's model. Correct calibration process is confirmed by LED's every 2 seconds blink (when the CAN-BUS is active). When the CAN-BUS enters sleep mode, SIMPLE-CAN device does it also and takes 1,6mA/12V. In the sleep mode LED does not shine. If after calibration process LED shines continuously, it means that device is not calibrated yet, CAN-BUS transmission has failed or ignition during calibration was not ON.

7 FM11 Configuration

To use LV-CAN200 adapter with FM1100 device you need to have:

- a.
 - FM11 firmware number 01.11.02 or higher
 - FM11 configurator version 01.01.11.16 or higher
- b.
 - FM11 firmware number 43.XX.XX
 - FM11 configurator version 01.43.XX.XX

For firmware and configurator please contact Teltonika sales manager.

FM1100 shares the same USB port for connecting LV-CAN200 adapter and configuring device with PC.

FM1100 can be configured using “SCAN” function or “Offline Configuration” (Figure 8)

SCAN function – is in use when FM1100 is connected to CAN adapter (Figure 6), then wait 10s (Note, that car engine must be started), disconnect adapter from FM1100, and connect PC USB cable to FM1100 Device (Figure 3). It is very important not to disconnect FM1100 from power source during this operation, because if FM1100 is reconnected all received CAN bus data will be lost. FM1100 remembers received data from LV-CAN200 and at the end of the procedure when “SCAN” button is pressed, user will see all CAN data which is sent by adapter. Enable CAN data which needs send to server and save configuration pressing “Save” button.

To configure CAN data:

1. In car, connect LV-CAN200 to CAN bus and to the FM1100 device (Figure 6), wait 10 seconds. Note, that car engine must be started.
2. Disconnect LV-CAN200 from FM1100, and connect PC USB cable to FM1100 Device (Figure 7). It is very important not to disconnect FM1100 from power source, because then all CAN data will be lost.

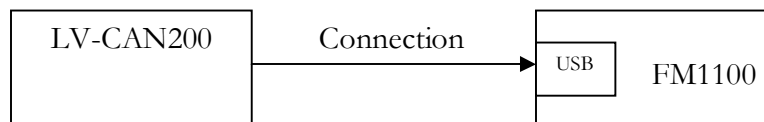


Figure 4 Connect adapter LV-CAN100 to FM1100

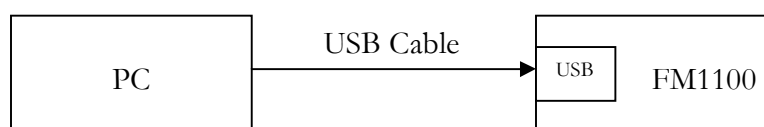


Figure 5 Connect FM1100 to PC and configure

CAN bus data which can be read from your car is shown in “Light Vehicles Can adapter supported cars” document.

Offline configuration – user can select which CAN data can be read from LV-CAN200 need to be sent to server without connection to adapter. Please note that parameters depend on vehicle manufacturer and vehicle model. Please for further information check “Light Vehicles Can adapter supported cars” document.

There are two types of operations with CAN data elements:

- Monitoring of CAN bus data
- CAN bus data event capturing

Monitoring method is used when user wants to receive CAN data on regular basis, for example every 20 seconds.

Event functionality is used to store additional AVL packet when state of CAN element is changing. For example Speed changes, low fuel level, engine temperate, etc.

Send data to server field – allows enabling CAN element so it is added to the AVL data packet and sent to the server. By default, all CAN elements are disabled and FM1100 records only GPS data.

It is possible to set CAN message priority: On Low Priority, On High Priority, and On Panic. Regular packets are sent as Low priority records. When low priority event is triggered, FM1100 makes additional record with indication what was the reason for that was CAN element change. When High priority is selected, module makes additional record with high priority flag and sends event packet immediately to the server by GPRS. Panic priority triggers same actions as high priority, but if GPRS fails, it sends AVL packet to server using SMS mode if SMS is enabled in SMS settings.

Data Acquisition Type – defines when to generate event – when value enters defined range, exits it or both, also is possible to select event which you want to generate then you change values, like crossing both values in high and low levels (Hysteresis).

High and Low levels – defines CAN value range. If CAN value enter or exits this range, FM1100 generates event by “Data Acquisition Type” settings. Figure 6 show example of FM1100 CAN configuration.

System	I/O							
	SCAN Parameters							
Records	Property Input	Value	<input type="checkbox"/> Enabled	Priority	Low Level	High Level	Generate Event	Averaging Constant
GSM	Vehicle speed (km/h)		<input checked="" type="checkbox"/>	Low	0	0	Monitoring	10
	Accelerator pedal position (%)		<input checked="" type="checkbox"/>	Low	0	0	Monitoring	2
DataAcquisitionModes	Fuel Consumed (liters)		<input checked="" type="checkbox"/>	Low	0	0	Monitoring	
	Fuel level (liters)		<input checked="" type="checkbox"/>	Low	0	0	Monitoring	10
Features	Engine RPM		<input checked="" type="checkbox"/>	Low	0	0	Monitoring	10
	Total mileage (m)		<input checked="" type="checkbox"/>	Low	0	0	Monitoring	
IO	Fuel level (%)		<input checked="" type="checkbox"/>	Low	0	0	Monitoring	10
	Program number		<input checked="" type="checkbox"/>	Low	0	0	Monitoring	
LVCAN								

Figure 6 Configurator example

Available CAN Bus IO parameters and configuration can be found in Configurators CAN tab (Figure 8) and in next chapter “Parameters ID”.

8 Parameters ID

When no I/O element is enabled, AVL packet comes with GPS information only. After enabling I/O element(s) AVL packet along with GPS information contains current value(s) of enabled I/O element. AVL packet decoding is described in “FMXXXX Protocols” document. List of available CAN bus data, parameter size, ID and value range you can find in table 1.

Table 1 ACQUIRED PARAMETERS IO ID

Category name	Param index	(signal) name	Size (Bytes)	Param IO ID	Value range
65265 – Cruise Control/Vehicle Speed	0	Vehicle Speed	1	81	0-250 km/h
61443 – Electronic Engine Controller #2	1	Accelerator Pedal Position	1	82	0-100 %
65257 – Fuel Consumption	2	Total Fuel Used	4	83	0-99999999 liters*
65276 – Dash Display	3	Fuel Level [liters]	2	84	0-100 liters
61444 – Electronic Engine Controller #1	4	Engine RPM	2	85	0-8200 rpm
65217 – High Resolution Vehicle Distance	5	Vehicle Distance	4	87	0-2145000000 meters
65276 – Dash Display	6	Fuel Level [%]	1	89	0-100 %
Program number	7	LV-CAN200 Program number	4	100	0-999

NOTE:

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

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

9 SMS Configuration

Note:

Parameter index is second digit from the right.

For parameters name and ID refer to Picture 1 “**Param Index**” column.

Parameters ID range: 2000 – 2060.

1st CAN per is represented as ID 2000

2nd per is represented as ID 2010

3rd per is represented as ID 2020

... And so on....

The mean of the last ID digit:

Example: ID 2013 – **configures 2nd parameters “Low Level”**

0 – “Send Data to Server”

Range: [0 – 3]

1 – “Unused”

2 – “High Level”

Range: [0 – 2147483647]

3 – “Low Level”

Range: [0 - -2147483647]

4 – “Data acquisition Type”

Range: [0 – 5]

10 CAN Program Number request by SMS

CAN program number can be obtained via SMS:

SMS Text: “ **setcanprog**”

Response: “CAN Program Nr: XXXX”

11 Get CAN Packets Count by SMS

Total CAN packets count request via SMS:

SMS Text: “ **getcanpackets**”

Response: “Total LVCAN200 packets: XXXXXXXX”

12 Get LV-CAN info by SMS

Full LV-CAN information via SMS:

SMS Text: "getlvcaninfo"

Response: "

Per0Nr:276;Per1Nr:276;SWDate:130405;SWRevision:91;KernVer:21;KernVar:0;MdIID:0;"

13 References

1. Light Vehicles Can adapter LV-CAN200 Supported cars
2. Cars mounting scheme
3. FM1100 User Manual

14 Changelog

Version	Date	Changes
0.1	2012 December 14	Initial release
1.2	2013 September 4	SMS configuration added
1.3	2014 February 4	Add LV-CAN info SMS
1.4	2014 February 18	Picture fixed
1.5	2014 March 7	Picture fixed
1.6	2014 April 8	Table 2 ACQUIRED PARAMETERS IO ID updated
1.7	2014 June 20	Table 1 Param Index added
1.8	2014 October 14	Added new available LV-CAN200 cable wires color; Added LV-CAN200 program number configuration via SMS
1.9	2016 June 3	Changed FW version and sms commands for lvcn program number. Picture fixed
1.11	2017.01.05	Added SIMPLE-CAN documentation