Template:FMB640 CAN adapters

Easy steps to install and configure following CAN adapters on FMB640 device:

- [LV-CAN200](#)
- [ALL-CAN300](#)
- [ECAN02](#)

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Installing CAN adapter with FMB640 device

Installing LV-CAN200/ALL-CAN300

You can watch [LV-CAN200](#)/[ALL-CAN300](#) installation video in our YouTube channel **[here](#)** or follow connection instructions below.

Tools needed for installation

- [LV-CAN200](#)/[ALL-CAN300](#)
- Connection scheme (Please contact Teltonika Sales Representative and provide information about **vehicle manufacturer**, **model** and **year**.
- FMB640 device
- Pliers
- Quick splice connectors (If vehicle CAN bus wires are very thin CAN adapter wires should be

connected directly)
- Plastic pry tool
- Zip ties

Installation steps

1. Be ready with a vehicle **connection scheme** that you have received from a Teltonika Sales Representative.
2. **Check the scheme** for the current vehicle connection. Look for connectors matching **PINs numbers** and colors (maybe different) according to connection scheme.
3. Connect CAN adapter with FMB640:
    1. Connect CAN adapter's MINI USB to USB of FMB640.
4. Connect CAN adapter **CAN wires (CAN L, CAN H)** as specified in connection scheme.

   ![x] **Do not swap CAN L and CAN H lines.**
   Not all CAN adapter wires may be used in vehicle.

5. Connect CAN adapter **positive** and **ground** wires to the vehicle power supply lines or near FMB640 power wires.

   ![x] **Do not swap power supply lines.**
   Make sure that voltage does not exceed 30V.

6. Switch vehicle **ignition to ACC** position. CAN adapter **LED diode** on the back should start **blinking**.
7. Configure CAN adapter to read CAN bus data or control vehicle by setting its **program number** - [CAN Adapter configuration](#)

![x]
LV-CAN200/ALL-CAN300 connection example. This is not a connection diagram for your vehicle. Every vehicle has a specific scheme.

Installing LV-CAN200/ALL-CAN300 + ECAN02

Tools needed for installation

- [LV-CAN200](#)/[ALL-CAN300](#)
- Connection scheme (Please contact Teltonika Sales Representative and provide information about **vehicle manufacturer**, **model** and **year**.
- [ECAN02](#) (Used for contactless connection. If **two CAN lines** need to be connected, **ECAN02** must be used.)
- FMB640 device
- Pliers
- Quick splice connectors (If vehicle CAN bus wires are very thin CAN adapter wires should be connected directly)
- Plastic pry tool
- Zip ties

Installation steps

1. Follow the same **1, 2, 3** installation steps as with [LV-CAN200/ALL-CAN300 installation](#).
2. Connect the appropriate CAN bus pair of wires between the CAN adapter and [ECAN02](#):

   If **CAN1 line** need to be connected as specified in the connection scheme:

   1. Connect CAN adapter **CAN1 L** to **CAN L** of [ECAN02](#).
   2. Connect CAN adapter **CAN1 H** to **CAN H** of [ECAN02](#).

   If **CAN2 line** need to be connected as specified in the connection scheme:

   1. Connect CAN adapter **CAN2 L** to **CAN L** of [ECAN02](#).
   2. Connect CAN adapter **CAN2 H** to **CAN H** of [ECAN02](#).

    Do not swap CAN L and CAN H lines.
   Not all CAN adapter wires may be used in the vehicle.

3. Fasten [ECAN02](#) **on vehicle CAN bus wires** according to the connection scheme. **Make sure CAN H and CAN L of vehicle corresponds to CAN H, CAN L markings on [ECAN02](#) PCB.**

4. Connect CAN adapter **positive** and **ground** wires to the vehicle power supply lines or near FMB640 power wires.

    Do not swap power supply lines.
   Make sure that voltage does not exceed 30V.

5. Configure CAN adapter to read CAN bus data by setting its **program number** - [CAN Adapter configuration](#)

CAN Adapter Configuration

CAN Adapter program number selection

CAN Adapter must be set to program number which depends on the vehicle model. **Needed program number is always written on CAN Adapter mounting scheme.** In order to be able to enter program number in adapter **Software date of CAN adapter must be newer than connection scheme date**. CAN adapter Software date can be checked:

- Via [Teltonika Configurator→Status→CAN Adapter](#)
- Via SMS command - [lvcangetinfo](#)

The number of digits required to enter correct Program No. may vary depending on the Software

and manufacture date of your CAN Adapter:

- [LV-CAN200 adapter changes](#)
- [ALL-CAN300 adapter changes](#)

Entering via SMS command

Required conditions:

- CAN adapter properly connected to FMB640 device

CAN adapter program number can be set remotely, using SMS command. Send following **SMS command** to FMB640 device:

- If you have set SMS login and password: `login pass lvcansetprog X`
- If SMS login and password are not set leave two spaces before command: `  lvcansetprog X`

Command example: `  lvcansetprog 11434`
SMS response: `LVCAN ProgNum: 11434`

If during SMS command FMB640 was in following Sleep mode:

- [GPS Sleep](#) - Program No. will be set immediately.
- [Deep Sleep](#) - Program No. will be set after device wake up.
- [Online Deep Sleep](#) - Program No. will be set immediately.

Entering via Teltonika Configurator

Required conditions:

- CAN adapter properly connected to FMB640 device

CAN adapter program number can be set via **[Teltonika Configurator](#)** → **LVCAN** → **Program Number**. When program number is entered press **Save to device** button that saves the entered program number into FMB640.

Entering manually

Required conditions:

- CAN adapter properly connected to FMB640 device
- Vehicle ignition must be ON

Depending on the used CAN Adapter, the length of the setup sequence will vary.

Steps to set program number:

LV-CAN200, ALL-CAN300 back

|+ |- | rowspan="5" style="border: 1px solid #0054A6; background: white; color: #0054A6; text-align: center; width:10%;" | For
ALL-CAN300
LV-CAN200
3 digit | rowspan="6" style="border: 1px solid #0054A6; background: white; color: #0054A6; text-align: center; width:10%;" | For
ALL-CAN300
LV-CAN200
4 digit | rowspan="7" style="border: 1px solid #0054A6; background: white; color: #0054A6; text-align: center; width:11%;" | For
LV-CAN200
5 digit | style="border: 1px solid white; border-bottom: 2px solid #E8E8E8; text-align: left; vertical-

align: center; background: white; width:38%;" |1. Hold SWITCH down until LED stars blinking. |- | style="border: 1px solid white; border-bottom: 2px solid #E8E8E8; text-align: left; vertical-align: center; background: white;" |2. Release the SWITCH. |- | style="border: 1px solid white; border-bottom: 2px solid #E8E8E8; text-align: left; vertical-align: center; background: white;" |3. 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. |- | style="border: 1px solid white; border-bottom: 2px solid #E8E8E8; text-align: left; vertical-align: center; background: white;" |4. Release the SWITCH, then LED starts blinking and counting second digit of program number. To stop counter, push SWITCH. |- | style="border: 1px solid white; border-bottom: 2px solid #E8E8E8; text-align: left; vertical-align: center; background: white;" |5. Release the SWITCH, then LED starts blinking and counting third digit on program number. To stop counter, push SWITCH. |- | rowspan="2" style="border: 1px solid white; border-bottom: 1px solid #0054A6; background: white;" | | style="border: 1px solid white; border-bottom: 2px solid #E8E8E8; text-align: left; vertical-align: center; background: white;" |6. Release the SWITCH, then LED starts blinking and counting fourth digit on program number. To stop counter, push SWITCH. |- | style="border: 1px solid white; border-bottom: 1px solid #0054A6; background: white;" | | style="border: 1px solid white; border-bottom: 2px solid #E8E8E8; text-align: left; vertical-align: center; background: white;" |7. Release the SWITCH, then LED starts blinking and counting fifth digit on program number. To stop counter, push SWITCH. |- | colspan="3" style="border: 1px solid #0054A6; background: white; color: #0054A6; text-align: center;" | All Devices | style="border: 1px solid white; border-bottom: 2px solid #E8E8E8; text-align: left; vertical-align: center; background: white;" |8. Release SWITCH, if programming is successful LED will blink 10 times. |}

Send data with 0, if ignition is off

Depending on CAN Adapter I/O parameters and ignition status, FMB640 can send locked (last known) CAN Adapter I/O and active (real time) parameters values or reset values to 0. When ignition is off, CAN Adapter I/O parameters values sent to server are:

CAN Adapter I/O element	Status
Vehicle Speed	reset
Accelerator pedal position	reset
Total fuel used	lock
Fuel level (liters)	lock
Engine RPM	reset
Total mileage	lock
Fuel level (%)	lock
Program number	lock
Module ID	lock
Engine Work Time	lock
Engine Work Time (counted)	lock
Total Mileage (counted)	lock

Fuel Consumed (counted)	lock
Fuel Rate	reset
Program number	lock
AdBlue Level (%)	lock
AdBlue Level (liters)	lock
Engine Load	reset
Engine Temperature	active
Axle 1 Load	lock
Axle 2 Load	lock
Axle 3 Load	lock
Axle 4 Load	lock
Axle 5 Load	lock
Control State Flags	active
Agricultural Machinery Flags	active
Harvesting Time	lock
Area of Harvest	reset
Mowing Efficiency	active
Grain Mown Volume	active
Grain Moisture	active
Harvesting Drum RPM	reset
Gap Under Harvesting Drum	active
Security State Flags	active
Tachograph Total Vehicle Distance	lock
Trip Distance	reset
Tachograph Vehicle Speed	reset
Tachograph Driver Card Presence	active
Driver1 States	active
Driver2 States	active
Driver1 Continuous Driving Time	active
Driver2 Continuous Driving Time	active
Driver1 Cumulative Break Time	active
Driver2 Cumulative Break Time	active

Driver1 Selected Activity Duration	active
Driver2 Selected Activity Duration	active
Driver1 Cumulative Driving Time	active
Driver2 Cumulative Driving Time	active

SMS Configuration

All CAN Adapter IO elements can be configured remotely via SMS commands.

SMS/GPRS Commands

CAN Adapters have several dedicated SMS/GPRS commands.
SMS command structure:

`<SMS login><space><SMS password><space><command><space><value>`

SMS command lvcangetinfo example:

- If you have set SMS login and password: `login pass lvcangetinfo`
- If SMS login and password are not set leave two spaces before command: `  lvcangetinfo`

GPRS commands require Codec 12 protocol.

For more SMS commands please see SMS/GPRS command list

COMMAND	DESCRIPTION	RESPONSE
lvcansetprog #	Set program number to CAN Adapter that is connected to FMB640. # - three digit number that identity vehicle.	Yes
lvcansimpletacho #	Add or remove simpletacho start byte. # - 0 or 1 (0 – don't add start byte, 1 – add start byte).	No
lvcangetprog	Get program number from CAN Adapter that is connected to FMB640.	Yes
lvcangetinfo	Get information about connected CAN Adapter	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)).	Yes
lvcanfaultcodes	Read DTC fault codes	Yes

CAN Adapter State Flags

CAN Adapters receive data about the states of various systems within the vehicle, and send them as flags to FMB640. FMB640 device stores these flags in hexadecimal format, as one variable. Below is a list of kept flags and how to retrieve them.
The full list of state flags is stored only by:

- [ALL-CAN300](ALL-CAN300)

Property name	Size, bytes	Value bitmasks
Control state flags	4	Byte0 (LSB): 0x01 – STOP 0x02 – Oil pressure / level 0x04 – Coolant liquid temperature / level 0x08 – Handbrake system 0x10 – Battery not charging 0x20 – AIRBAG 0x40 – EPS (Electric power steering) 0x80 – ESP (Electronic Stability Program) Byte1: 0x01 – CHECK ENGINE 0x02 – Lights failure 0x04 – Low tire pressure 0x08 – Wear of brake pads 0x10 – Warning 0x20 – ABS 0x40 – Low Fuel 0x80 – Maintenance required Byte2: 0x01 – ESP 0x02 – Glow plug indicator 0x04 – FAP 0x08 – Electronics pressure control 0x10 – Parking lights 0x20 – Dipped headlights 0x40 – Full beam headlights 0x80 – Front foglights Byte3: 0x01 – Ready to drive 0x02 – Cruise control 0x04 – Automatic Retarder 0x08 – Manual retarder 0x10 – Air Conditioning 0x20 – Rear foglights 0x40 – Passenger's seat belt 0x80 – Driver's seat belt

Agricultural machinery flags	8	Byte0 (LSB):

Byte0 (LSB):
0x01 – Mowing
0x02 – Grain release from hopper
0x04 – First front hydraulic turned on
0x08 – Rear Power Take-Off turned on

Byte1:
0x01 – Excessive play under the threshing drum
0x02 – Grain tank is open
0x04 – 100% of Grain tank
0x08 – 70% of Grain tank
0x10 – Drain filter in hydraulic system of drive cylinders is plugged
0x20 – Pressure filter of drive cylinders hydraulic system is plugged
0x40 – Alarm oil level in oil tank
0x80 – Pressure filter of brakes hydraulic system is plugged

Byte2:
0x01 – Oil filter of engine is plugged
0x02 – Fuel filter is plugged
0x04 – Air filter is plugged
0x08 – Alarm oil temperature in hydraulic system of chassis
0x10 – Alarm oil temperature in hydraulic system of drive cylinders
0x20 – Alarm oil pressure in engine
0x40 – Alarm coolant level
0x80 – Overflow chamber of hydraulic unit

Byte3:
0x01 – Unloader drive is ON. Unloading tube pivot is in idle position
0x02 – No operator!
0x04 – Straw walker is plugged
0x08 – Water in fuel
0x10 – Cleaning fan RPM
0x20 – Trashing drum RPM
0x40 – Pouring chemicals turned on
0x80 – Conveyor belt turned on

Byte4:
0x01 – Salt spreaders drive wheel turned on
0x02 – Low water level in the tank
0x04 – First rear hydraulic turned on
0x08 – Standalone engine working
0x10 – Right joystick moved right
0x20 – Right joystick moved left
0x40 – Right joystick moved front
0x80 – Right joystick moved back

Byte5:
0x01 – Brushes turned on
0x02 – Water supply turned on
0x04 – Vacuum cleaner
0x08 – Unloading from the hopper
0x10 – High Pressure washer (Karcher)
0x20 – Salt (sand) disperser ON
0x40 – Low salt (sand) level

Byte6:
0x01 – Second front hydraulic turned on
0x02 – Third front hydraulic turned on
0x04 – Fourth front hydraulic turned on
0x08 – Second rear hydraulic turned on
0x10 – Third rear hydraulic turned on
0x20 – Fourth rear hydraulic turned on
0x40 – Front three-point Hitch turned on
0x80 – Rear three-point Hitch turned on

Byte7:
0x01 – Left joystick moved right
0x02 – Left joystick moved left
0x04 – Left joystick moved front
0x08 – Left joystick moved back
0x10 – Front Power Take-Off turned on
0x20 – Liquid pump turned on
0x40 – Light signal turned on

Security state flags	8	Byte0 (LSB): 0x01 – CAN1 not connected, require connection 0x02 – CAN1 not connected, require connection 0x03 – CAN1 connected 0x04 – CAN2 not connected, require connection 0x08 – CAN2 not connected, require connection 0x0C – CAN2 connected 0x10 – CAN3 not connected, require connection 0x20 – CAN3 not connected, require connection 0x30 – CAN3 connected Byte2: 0x04 – Battery charging 0x08 – Charging cable connected 0x10 – Vehicle working mode, 1- business mode, 0 - private mode 0x20 – Bit appears when any operate button in car was put. This bit is reset if the button is released 0x40 – Bit appears when immobilizer is in service mode 0x80 – Immobiliser, bit appears during introduction of a programmed sequence of keys in the car Byte3: 0x01 – The key is in ignition lock 0x02 – Ignition on 0x04 – Dynamic ignition on 0x08 – Webasto 0x10 – Car closed 0x20 – Car closed by factory's remote control 0x40 – Factory-installed alarm system is actuated (is in panic mode) 0x80 – Factory-installed alarm system is emulated by module Byte4: 0x01 – Parking activated (automatic gearbox) 0x10 – Handbrake is actuated (information available only with ignition on) 0x20 – Footbrake is actuated (information available only with ignition on) 0x40 – Engine is working (information available only when the ignition on) 0x80 – Reverse is on Byte5: 0x01 – Front left door opened 0x02 – Front right door opened 0x04 – Rear left door opened 0x08 – Rear right door opened 0x10 – Engine cover opened 0x20 – Trunk door opened Byte6: – Low nibble (mask 0x0F value) 0x01 – Car was closed by the factory's remote control 0x02 – Car was opened by the factory's remote control 0x03 – Trunk cover was opened by the factory's remote control 0x04 – Module has sent a rearming signal 0x05 – Car was closed three times by the factory's remote control – High nibble (mask 0xF0 bit) 0x80 – CAN module goes to sleep mode
Tachograph driver card presence	1	0x00 – No driver card 0x01 – Driver1 card presence 0x02 – Driver2 card presence 0x03 – Driver1 and driver2 cards present

Driver 1 states	1	0xX0 – Break/rest 0xX1 – Availability 0xX2 – Work 0xX3 – Driving 0x0X – No time-related warning detected 0x1X – Limit #1: 15 min before 4 1/2 h
Driver 2 states	1	0x2X – Limit #2: 4 1/2 h reached (continuous driving time exceeded) 0x3X – Limit #3: 15 minutes before optional warning 1 0x4X – Limit #4: optional warning 1 reached 0x5X – Limit #5: 15 min before optional warning 0x6X – Limit #6: optional warning 2 reached

LV-CAN200/ALL-CAN300 Important Information

Program Number logic change

Due to the growing number of supported cars, program numbers have exceeded "999". In order to maintain one number format, we are moving from 3-digit to 4-digit program numbers.
In new LV-CAN200/ALL-CAN300 firmware (from 2017-09-01) all program numbers that were up to 999 are changed to start from 1000. So that further program numbers would continue the counting with 4-digit numbers.
However, all existing program numbers stay the same, but "1" is added to the front. The device still understands the entered 3-digit program number (via SMS/GPRS), it will automatically add "1" before it. If you enter "247" - device number will turn into "1247". In Bootloader only 4-digit format is available, just add "1" to the front of the needed program number.

Example

When using older connection schemes where the program number displayed as 3-digit program number:

Using LV-CAN200/ALL-CAN300 Bootloader from soft version 2017-09-27 it is necessary to add "1" to the front of the program number: