

# FMC640 CAN adapters

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Easy steps to install and configure following CAN adapters on FMC640 device:

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

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## Installing CAN adapter with FMC640 device

### Installing LV-CAN200/ALL-CAN300/CAN-CONTROL

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/CAN-CONTROL](#)
- Connection scheme (Please contact Teltonika Sales Representative and provide information about **vehicle manufacturer, model** and **year**.)
- FMC640 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 FMC640:
  1. Connect CAN adapter's MINI USB to USB of FMC640.
4. Connect CAN adapter **CAN wires (CAN L, CAN H)** as specified in connection scheme.

 **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 FMC640 power wires.

 **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](#)



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



CAN-CONTROL 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.)
- FMC640 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/CAN-CONTROL 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 FMC640 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

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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

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Required conditions:

- CAN adapter properly connected to FMC640 device

CAN adapter program number can be set remotely, using SMS command. Send following **SMS command** to FMC640 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 FMC640 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

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Required conditions:

- CAN adapter properly connected to FMC640 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 FMC640.

Teltonika.Configurator v1.5.5.29406

Load from device

Save to device

Update firmware

Reset configuration

Load from file

Save to file

Reboot device

IMEI 358480081725162  
FW 00.03.74  
Configuration 4.31.3.0

Status  
Security  
System  
GPRS  
Data Acquisition  
SMS \ Call Settings  
SMS Events  
GSM Operators  
Features  
Accelerometer Features  
Auto Geofence  
Manual Geofence Settings  
Manual Geofence Zones  
Trip \ Odometer  
Bluetooth  
iButton List  
I/O  
LVCAN  
FMS IO  
Manual CAN IO  
Tachograph Data  
RS232 \ RS485

Device Info

Device Name  
FMB640

Last Start Time  
11/18/2015 2:00:07 AM

Power Voltage  
13247 mV.

External Storage  
Not Present [Format](#)

Battery Voltage  
0 mV.

Firmware Version  
00.03.74

RTC Time  
11/18/2015 2:01:25 AM

Device IMEI  
358480081725162

Device Uptime  
00:01:18

Internal Battery Status  
Not Charging 0%

GNSS Info

GSM Info

I/O Info

Tachograph

Maintenance

GNSS Status

Module Status  
ON

GNSS Packets  
248

Fix Status  
No fix

Fix Time  
00:00:00

Satellites

Visible:

GPS	GLONASS
0	0
BeiDou	Galileo
0	0
Total In View 0	

In Use:

GPS	GLONASS
0	0
BeiDou	Galileo
0	0
Total In Use 0	

Location

Latitude/Longitude	Altitude	HDOP
0, 0	0	0
Speed	Angle	PDOP
0 km/h	0°	0

## Entering manually

Required conditions:

- CAN adapter properly connected to FMC640 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



CAN-CONTROL back

<p>For ALL-CAN300 LV-CAN200 3 digit</p>	<p>For ALL-CAN300 LV-CAN200 4 digit</p>	<p>For LV-CAN200 CAN-CONTROL 5 digit</p>	<p>1. Hold SWITCH down until LED starts blinking.</p> <p>2. Release the SWITCH.</p> <p>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.</p> <p>4. Release the SWITCH, then LED starts blinking and counting second digit of program number. To stop counter, push SWITCH.</p> <p>5. Release the SWITCH, then LED starts blinking and counting third digit on program number. To stop counter, push SWITCH.</p> <p>6. Release the SWITCH, then LED starts blinking and counting fourth digit on program number. To stop counter, push SWITCH.</p> <p>7. Release the SWITCH, then LED starts blinking and counting fifth digit on program number. To stop counter, push SWITCH.</p>
<p>All Devices</p>			<p>8. Release SWITCH, if programming is successful LED will blink 10 times.</p>

Send data with 0, if ignition is off

Depending on CAN Adapter I/O parameters and ignition status, FMC640 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

<b>Accelerator pedal position</b>	reset
<b>Total fuel used</b>	lock
<b>Fuel level (liters)</b>	lock
<b>Engine RPM</b>	reset
<b>Total mileage</b>	lock
<b>Fuel level (%)</b>	lock
<b>Program number</b>	lock
<b>Module ID</b>	lock
<b>Engine Work Time</b>	lock
<b>Engine Work Time (counted)</b>	lock
<b>Total Mileage (counted)</b>	lock
<b>Fuel Consumed (counted)</b>	lock
<b>Fuel Rate</b>	reset
<b>Program number</b>	lock
<b>AdBlue Level (%)</b>	lock
<b>AdBlue Level (liters)</b>	lock
<b>Engine Load</b>	reset
<b>Engine Temperature</b>	active
<b>Axle 1 Load</b>	lock
<b>Axle 2 Load</b>	lock
<b>Axle 3 Load</b>	lock
<b>Axle 4 Load</b>	lock
<b>Axle 5 Load</b>	lock
<b>Control State Flags</b>	active
<b>Agricultural Machinery Flags</b>	active
<b>Harvesting Time</b>	lock
<b>Area of Harvest</b>	reset
<b>Mowing Efficiency</b>	active
<b>Grain Mown Volume</b>	active
<b>Grain Moisture</b>	active
<b>Harvesting Drum RPM</b>	reset
<b>Gap Under Harvesting Drum</b>	active
<b>Security State Flags</b>	active
<b>Tachograph Total Vehicle Distance</b>	lock
<b>Trip Distance</b>	reset
<b>Tachograph Vehicle Speed</b>	reset

<b>Tachograph Driver Card Presence</b>	active
<b>Driver1 States</b>	active
<b>Driver2 States</b>	active
<b>Driver1 Continuous Driving Time</b>	active
<b>Driver2 Continuous Driving Time</b>	active
<b>Driver1 Cumulative Break Time</b>	active
<b>Driver2 Cumulative Break Time</b>	active
<b>Driver1 Selected Activity Duration</b>	active
<b>Driver2 Selected Activity Duration</b>	active
<b>Driver1 Cumulative Driving Time</b>	active
<b>Driver2 Cumulative Driving Time</b>	active

## SMS Configuration

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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 FMC640. # - three digit number that identity vehicle.	Yes

lvcanimpletacho #	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 FMC640.	Yes
<a href="#">lvcangetinfo</a>	Get information about connected CAN Adapter	Yes
<a href="#">lvcanclear #</a>	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
<a href="#">lvcanfaultcodes</a>	Read DTC fault codes	Yes
<b>CAN-CONTROL specific commands</b>		
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

## CAN Adapter State Flags

CAN Adapters receive data about the states of various systems within the vehicle, and send them as flags to FMC640. FMC640 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](#)

Only **security state flags** are stored by:

- [CAN-CONTROL](#)

Property name	Size, bytes	Value bitmasks
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<b>Control state flags</b>	4	<p>Byte0 (LSB):</p> <ul style="list-style-type: none"> <li>0x01 - STOP</li> <li>0x02 - Oil pressure / level</li> <li>0x04 - Coolant liquid temperature / level</li> <li>0x08 - Handbrake system</li> <li>0x10 - Battery not charging</li> <li>0x20 - AIRBAG</li> <li>0x40 - EPS (Electric power steering)</li> <li>0x80 - ESP (Electronic Stability Program)</li> </ul> <p>Byte1:</p> <ul style="list-style-type: none"> <li>0x01 - CHECK ENGINE</li> <li>0x02 - Lights failure</li> <li>0x04 - Low tire pressure</li> <li>0x08 - Wear of brake pads</li> <li>0x10 - Warning</li> <li>0x20 - ABS</li> <li>0x40 - Low Fuel</li> <li>0x80 - Maintenance required</li> </ul> <p>Byte2:</p> <ul style="list-style-type: none"> <li>0x01 - ESP</li> <li>0x02 - Glow plug indicator</li> <li>0x04 - FAP</li> <li>0x08 - Electronics pressure control</li> <li>0x10 - Parking lights</li> <li>0x20 - Dipped headlights</li> <li>0x40 - Full beam headlights</li> <li>0x80 - Front foglights</li> </ul> <p>Byte3:</p> <ul style="list-style-type: none"> <li>0x01 - Ready to drive</li> <li>0x02 - Cruise control</li> <li>0x04 - Automatic Retarder</li> <li>0x08 - Manual retarder</li> <li>0x10 - Air Conditioning</li> <li>0x20 - Rear foglights</li> <li>0x40 - Passenger's seat belt</li> <li>0x80 - Driver's seat belt</li> </ul>
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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
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## 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

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0x00 - No driver card  
 0x01 - Driver1 card presence  
 0x02 - Driver2 card presence  
 0x03 - Driver1 and driver2 cards present

<b>Driver 1 states</b>	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
<b>Driver 2 states</b>	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:

