Template:FMU CAN adapters FMU126

Easy steps to install and configure following CAN adapters on FMU126 device:

- LV-CAN200
- ALL-CAN300
- CAN-CONTROL
- SIMPLE-CAN
- MINI-CAN

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Installing CAN adapter with FMU126 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**.
- FMU126 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 (may be different) according to connection scheme.
3. Connect CAN adapter with FMU126:
    1. Connect CAN adapter **PIN 6 (Rx)** to **INPUT 6** of FMU126.
    2. Connect CAN adapter **PIN 5 (Tx)** to **INPUT 5** of FMU126.
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 FMU126 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 + SIMPLE-CAN

You can watch LV-CAN200/ALL-CAN300 + SIMPLE-CAN 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**.
- SIMPLE-CAN (Used for contactless connection. If **two CAN lines** need to be connected, **two SIMPLE-CAN's** must be used.)
- FMU126 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 appropiate CAN bus pair of wires between CAN adapter and SIMPLE-CAN:

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

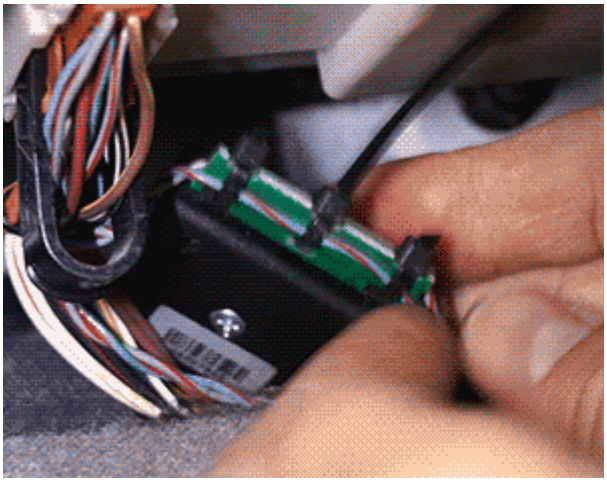
   1. Connect CAN adapter **CAN1 L** to **CAN L** of SIMPLE-CAN.
   2. Connect CAN adapter **CAN1 H** to **CAN H** of SIMPLE-CAN.

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

   1. Connect CAN adapter **CAN2 L** to **CAN L** of SIMPLE-CAN.
   2. Connect CAN adapter **CAN2 H** to **CAN H** of SIMPLE-CAN.

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

3. Fasten SIMPLE-CAN **between vehicle CAN bus wires** according to the connection scheme. **It doeasn't matter which wire is on which side.**



4. Connect CAN adapter **positive** and **ground** wires to the vehicle power supply lines or near FMU126 power wires.

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

5. Switch vehicle **ignition to ACC** position.
6. SIMPLE-CAN **LED will shine continously** so device awaits for **calibration**.
   - 
     Press the switch shortly and wait for the LED to start blinking **every one second**.



Automatic calibration process takes up to 10 seconds depending on the vehicle model. Device is calibrated properly then the LED is blinking **every 2 seconds**.

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. Configure CAN adapter to read CAN bus data by setting its **program number** - CAN Adapter configuration

LV-CAN200/ALL-CAN300 + SIMPLE-CAN connection example. This is not a connection diagram for your vehicle. Follow LV-CAN200/ALL-CAN300 connection scheme suitable for your vehicle.

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 FMU126 device

CAN adapter program number can be set remotely, using SMS command. Send following **SMS command** to FMU126 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 FMU126 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.
- Ultra Deep Sleep - Program No. will be set after device wake up.

Entering via Teltonika Configurator

Required conditions:

- CAN adapter properly connected to FMU126 device

CAN adapter program number can be set via **Teltonika Configurator** → **(1) CAN Adapter** → **(2) Program Number**. When program number is entered press **(3) Save to device** button that saves the entered program number into FMU126.

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Entering manually

Required conditions:

- CAN adapter properly connected to FMU126 device
- Vehicle ignition must be ON

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

Steps to set program number:

LV-CAN200, ALL-CAN300 back

CAN-CONTROL back

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

FMU126 CAN Adapter parameters configuration

Teltonika Configurator

CAN Adapter configuration can be performed using Teltonika Configurator via **Micro-USB cable** or

Bluetooth connection when CAN Adapter is connected to the vehicle.
When FMU126 is connected to the CAN Adapter, user can see all information that is received from the vehicle in Teltonika Configurator → **Status → CAN Adapter** tab or Teltonika Configurator → **CAN Adapter** section. In **Status → CAN Adapter** tab you can see information about CAN adapter and its readable parameters. In **CAN Adapter** section you can configure CAN Adapter and see incoming CAN bus data highlighted by **green** background color. Incoming data in both sections is automatically refreshed every 5 seconds. CAN bus data which should be readable from your vehicle is provided in "CAN Adapter supported vehicles list", which you can get from Teltonika Sales Representative.
The CAN Adapter I/O element can be configured like any other I/O element in Teltonika Configurator. All information about I/O element parameters description is in section I/O settings.



When using offline configuration method user can select which CAN data (according to vehicle) will be sent directly to the server without connection to adapter.

Send data with 0, if ignition is off

Depending on CAN Adapter I/O parameters and ignition status, FMU126 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 FMU126. # - 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 FMU126.	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
allcanmode	Turn on ALL-CAN300 mode.	Yes
lvcanmode	Turn on LV-CAN200 mode.	Yes
lvcanfaultcodes	Read DTC fault codes	Yes
CAN-CONTROL specific commands		
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 FMU126. FMU126 device stores these flags in hexadecimal format, as one variable. Bellow 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
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): 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. 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 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 program number: