FMC130
Installation Guide
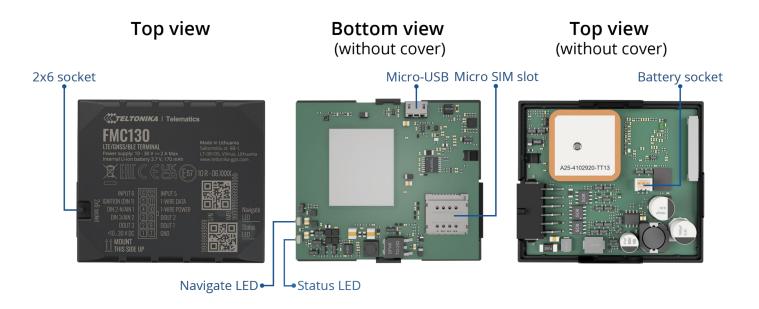

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KNOW YOUR **DEVICE**

Top view

Bottom view
(without cover)

Top view
(without cover)

2x6 socket

Micro-USB Micro SIM slot

Battery socket

Navigate LED

Status LED

Figure 1 Device View

KNOW YOUR **DEVICE**

PIN NUMBER	PIN NAME	DESCRIPTION
1	VCC (10-30) V DC (+)	Power supply (10-30 V DC).
2	DOUT 3	Digital output, channel 3. Open collector output. Max. 0,5 A DC.
3	DIN 3 / AIN 2	Analog input, channel 2. Input range: 0-30 V DC / Digital input, channel 3.
4	DIN 2-N / AIN 1	Digital input, channel 2, Negative input (ground sense), Analog input, channel 1, Input range: 0-30 VDC.
5	DIN 1	Digital input, channel 1.
6	INPUT 6	TX EXT (LVCAN – TX).
7	GND (-)	Ground pin. (10-30) V DC (—)
8	DOUT 1	Digital output, channel 1. Open collector output. Max. 0,5 A DC.
9	DOUT 2	Digital output, channel 2. Open collector output. Max. 0,5 A DC.
10	1WIRE POWER +	+3,8 V output for 1–Wire devices.
11	1WIRE DATA	Data for 1–Wire devices.
12	INPUT 5	RX EXT (LVCAN - RX).

Table 1 FMC130 2x6 socket pinout
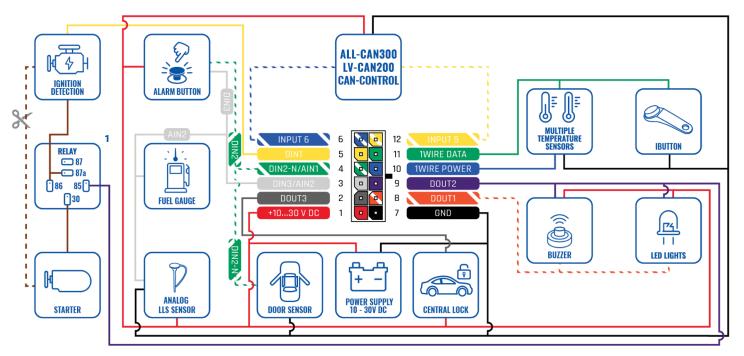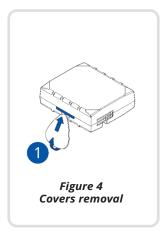
Figure 2 device 2x6 socket pinout

INPUT 6	6	12	INPUT 5
DIN1	5	11	1WIRE DATA
DIN2-N/AIN1	4	10	1WIRE POWER
DIN3/AIN2	3	9	DOUT2
DOUT3	2	8	DOUT1
+10...30 V DC	1	7	GND

WIRING SCHEME

Figure 3 Wiring scheme

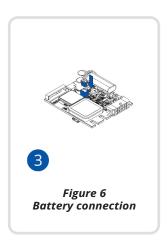[1] Automotive relay

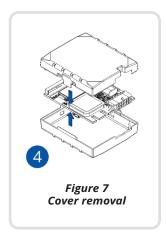mX | TELEMATICS
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HOW TO INSERT MICRO-SIM CARD AND CONNECT THE BATTERY

1. Gently remove FMC130 **bottom cover** using **plastic pry tool** from both sides. Then remove the top cover.

2. Insert **Micro-SIM** card as shown with **PIN request disabled** or read our **Wiki** how to enter it later in **Teltonika Configurator**. Make sure that Micro-SIM card **cut-off corner** is pointing forward to slot.

3. Connect **battery** as shown to device. Position the battery in place where it does not obstruct other components.

4. After **configuration**, see **"PC Connection (Windows)"**, attach device **top** and **bottom cover** back.

Figure 4
Covers removal

Figure 5
Micro-SIM card insert

Figure 6
Battery connection

Figure 7
Cover removal

PC CONNECTION (WINDOWS)

1. Power-up FMC130 with **DC voltage (10 – 30 V)** power supply using **supplied power cable**. LED's should start blinking, see "**LED indications**".

2. Connect device to computer using **Micro-USB cable** or **Bluetooth connection**:

• Using **Micro-USB cable**
  > You will need to install USB drivers, see "**How to install USB drivers (Windows)**"

• Using **Bluetooth**
  > FMC130 Bluetooth is enabled by default. Turn on **Bluetooth** on your PC, then select **Add Bluetooth or other device** > **Bluetooth**. Choose your device named – **"FMCxxx_last_7_imei_digits"**, without LE in the end. Enter default password **5555**, press **Connect** and then select **Done**.

• You are now ready to use the device on your computer.

HOW TO INSTALL USB DRIVERS (WINDOWS)

1. Please download COM port drivers from **here**.
2. Extract and run **TeltonikaCOMDriver.exe**.
3. Click **Next** in driver installation window.
4. In the following window click **Install** button.

Setup will continue installing the driver and eventually the confirmation window will appear. Click **Finish** to complete the setup.
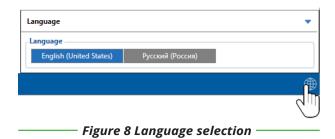
CONFIGURATION (WINDOWS)

At first FMC130 device will have default factory settings set. These settings should be changed according to the user's needs. Main configuration can be performed via **Teltonika Configurator** software.

Get the latest **Configurator** version from **here**. Configurator operates on **Microsoft Windows OS** and uses prerequisite **MS .NET Framework**. Make sure you have the correct version installed.

MS .NET REQUIREMENTS			
Operating system	MS .NET Framework version	Version	Links
Windows Vista Windows 7 Windows 8.1 Windows 10	MS .NET Framework 4.6.2	32 and 64 bit	www.microsoft.com

Table 2 MS .NET requirements

Downloaded **Configurator** will be in compressed archive. Extract it and launch **Configurator.exe**. After launch software language can be changed by clicking 🌐 in the right bottom corner (**Figure 8 Language selection**).

Figure 8 Language selection

Configuration process begins by pressing on connected device (**Figure 9 Device connected via USB**).

Figure 9 Device connected via USB

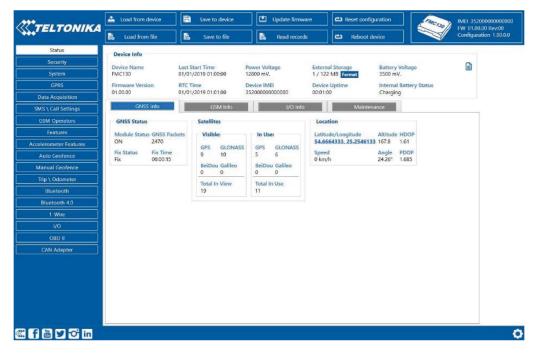After connection to Configurator **Status window** will be displayed (**Figure 10 Configurator Status window**).

Figure 10 Configurator Status window

Various **Status window** tabs display information about **GNSS**, **GSM**, **I/O**, **Maintenance** and etc. FMC130 has one user editable profile, which can be loaded and saved to the device. After any modification of configuration, the changes need to be saved to device using **Save to device** button. Main buttons offer following functionality:

1. ⬆️ **Load from device** – loads configuration from device.
2. 💾 **Save to device** – saves configuration to device.
3. 📄 **Load from file** – loads configuration from file.
4. 📄 **Save to file** – saves configuration to file.
5. ⬇️ **Update firmware** – updates firmware on device.
6. 📄 **Read records** – reads records from the device.
7. 🔄 **Reboot device** – restarts device.
8. 🔄 **Reset configuration** – sets device configuration to default.

Most important configurator section is **GPRS** – where all your server and **GPRS settings** can be configured and **Data Acquisition** – where data acquiring parameters can be configured.

More details about FMC130 configuration using Configurator can be found in our **Wiki**.

QUICK SMS CONFIGURATION

Default configuration has optimal parameters present to ensure best performance of track quality and data usage.

Quickly set up your device by sending this SMS command to it:

```
"  setparam 2001:APN;2002:APN_username;2003:APN_password;2004:Domain;2005:Port;2006:0"
```

Note: Before SMS text, two space symbols should be inserted

GPRS settings:

2001 – APN

2002 – APN username (if there are no APN username, empty field should be left)
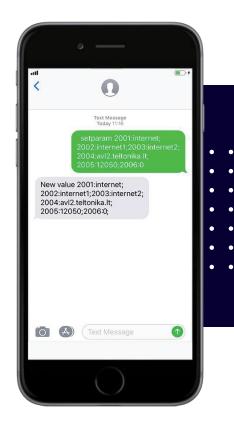
2003 – APN password (if there are no APN password, empty field should be left)

Server settings:

2004 – Domain

2005 – Port

2006 – Data sending protocol (0 - TCP, 1 - UDP)

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DEFAULT CONFIGURATION SETTINGS

Movement and ignition detection:

Vehicle movement will be detected by accelerometer

Ignition will be detected by vehicle power voltage between 13,2 – 30 V

Device makes a record **On Moving** if one of these events happen:

300 seconds passes

Vehicle turns 10 degrees

Vehicle drives 100 meters

Speed difference between last coordinate and current position is greater than 10 km/h

Device makes a record **On Stop** if:

1 hour passes while vehicle is stationary and ignition is off

Records sending to server:

If device has made a record it is sent to the server every 120 seconds

After successful SMS configuration, FMC130 device will **synchronize time** and **update records** to **configured server**. Time intervals and default I/O elements can be changed by using **Teltonika Configurator** or **SMS parameters**.

MOUNTING RECOMMENDATIONS

• **Connecting wires**
  > Wires should be connected while the module is not plugged in.
  > Wires should be fastened to stable wires or other non-moving parts. Any heat emitting and/or moving objects should be kept away from the wires.
  > There should be no exposed wires. If factory isolation was removed while connecting the wires, the isolation material should be applied.
  > If the wires are placed in the exterior or in places where they can be damaged or exposed to heat, humidity, dirt, etc., additional isolation should be applied and the wires should not be loose.
  > Wires cannot be connected to the board computers or control units.

• **Connecting power source**
  > Be sure that after the car computer goes to sleep mode, power might be still available on the power wires. Depending on the car model, this may happen in 5 to 30 minutes period.
  > When the module is connected, measure the voltage again to make sure it did not decrease.
  > It is recommended to connect to the main power cable in the fuse box.
  > 3 A, 125 V external fuse shall be used.

• **Connecting ignition wire**
  > Be sure to check if it is a real ignition wire i. e. power does not disappear after starting the engine.
  > Check if this is not an ACC wire (when key is in the first position, most of the vehicle electronics are available).
  > Check if power is still available when you turn off any of vehicles devices.
  > Ignition is connected to the ignition relay output. As alternative, any other relay, which has power output when ignition is on, may be chosen.

• **Connecting ground wire**
 > Ground wire is connected to the vehicle frame or metal parts that are fixed to the frame.
 > If the wire is fixed with the bolt, the loop must be connected to the end of the wire.
 > For better contact scrub paint from the spot where loop is going to be connected.

LED INDICATIONS

BEHAVIOUR	MEANING
Permanently switched on	GNSS signal is not received
Blinking every second	Normal mode, GNSS is working
Off	GNSS is turned off because: Device is not working or Device is in sleep mode
Blinking fast constantly	Device firmware is being flashed

Table 3 Navigation LED indications

BEHAVIOUR	MEANING
Blinking every second	Normal mode
Blinking every two seconds	Sleep mode
Blinking fast for a short time	Modem activity
Off	Device is not working or Device is in boot mode

Table 4 Status LED indications

CHARACTERISTICS

BASIC CHARACTERISTICS

MODULE

Name	MeiG SLM320-E, MeiG SLM320-LA, Quectel EC21- EC, Quectel EC21-AU, Quectel EC21-J, Quectel EC21-KL, Teltonika TM2500
Technology	LTE(CaT1)/3G(UMTS/HSPA)/2G(GSM/GPRS)/GNSS/BLUETOOTH

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GNSS

GNSS	GPS, GLONASS, GALILEO, BEIDOU, QZSS, AGPS
Receiver	Tracking: 33
Tracking sensitivity	-165 dBm
Accuracy	< 3 m
Hot start	< 1 s
Warm start	< 25 s
Cold start	< 35 s

CELLULAR

Technology	LTE Cat 1, UMTS, GSM
2G bands (SLM320)	FMC130-ME1: GSM: B2/B3/B5/B8 FMC130-ME3: GSM: B2/B3/B5/B8 FMC130-ML1: GSM: B2/B3/B5/B8
2G bands (EC21)	EC21-EC: GSM: B3/B8 EC21-AU: GSM: B2/B3/B5/B8
3G bands (EC21)	EC21-EC: WCDMA: B1/B8 EC21-AU: WCDMA: B1/B2/B5/B8
4G bands (SLM320)	FMC130-ME1: LTE FDD: B1/B3/B5/B7/B8/B20 LTE-TDD:B38/B40/B41 FMC130-ME3: LTE FDD: B1/B3/B7/B8/B20/B28 LTE-TDD:B38/B40/B41 FMC130-ML1: LTE FDD: B1/B2/B3/B4/B5/B7/B8/B20/B28 LTE-TDD:B40
4G bands (EC21)	EC21-EC: LTE FDD: B1/B3/B7/B8/B20/B28A EC21-AU: LTE FDD: B1/B2/B3/B4/B5/B7/B8/B28/ LTE TDD: B40 EC21-J: LTE FDD: B1/B3/B8/B18/B19/B26 EC21-KL: LTE FDD: B1/B3/B8/B18/B19/B26
Data transfer (SLM320)	LTE: LTE FDD: Max 10Mbps (DL)/Max 5Mbps (UL) LTE TDD: Max 8Mbps (DL)/Max 2Mbps (UL) GSM: GPRS: Max 85.6Kbps (DL)/Max 85.6Kbps (UL)
Data transfer (EC21)	LTE: LTE FDD: Max 10Mbps (DL)/Max 5Mbps (UL) LTE TDD: Max 8.96Mbps (DL)/Max 3.1Mbps (UL) UMTS: WCDMA: Max 384Kbps (DL)/Max 384Kbps (UL) GSM: GPRS: Max 107Kbps (DL)/Max 85.6Kbps (UL)
Transmit power	Class 4 for GSM850/900: 23±2dBm Class 1 for GSM1800/1900: 20±2dBm Class 3 for LTE-TDD: 23±2.7dBm Class 3 for LTE-FDD: 23±2.7dBm
Data support	SMS (text/data)

POWER

Input voltage range	10-30 V DC with overvoltage prote
Back-up battery	170 mAh Li-Ion battery 3.7 V (0.63 Wh)
Internal fuse	3 A, 125 V
Power consumption	At 12V < 3 mA (Ultra Deep Sleep) At 12V < 5 mA (Deep Sleep) At 12V < 16 mA (Online Deep Sleep) At 12V < 18 mA (GPS Sleep) At 12V < 33 mA (nominal with no load) At 12V < 2A Max. (with full Load / Peak)

BLUETOOTH

Specification	4.0 + LE
Supported peripherals	**Temperature and Humidity sensor**, **OBDII dongle**, Inateck Barcode Scanner, Universal BLE sensors support

PHYSICAL SPECIFICATION

Dimensions	65 x 56 x 20,6 mm (L x W x H)
Weight	55 g

INTERFACE

Digital Inputs	3
Negative Inputs	1 (Digital Input 2)
Impulse Inputs	2 (Digital Input 1, Digital Input 2)
Digital Outputs	3
Analog Inputs	2
CAN Adapter inputs	1
1-Wire	1
GNSS antenna	Internal High Gain

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Cellular antenna	Internal LTE High Gain
USB	2.0 Micro-USB
LED indication	2 status LED lights
SIM	Micro-SIM + e
Memory	128MB internal flash memory

OPERATING ENVIRONMENT

Operating temperature (without battery)	-20 °C to +85 °C
Storage temperature (without battery)	-20 °C to +85 °C
Operating temperature (with battery)	-20 °C to +40 °C
Storage temperature (with battery)	-20 °C to +45 °C
Operating humidity	5% to 95% non-condensing
Ingress Protection Rating	IP41
Battery charge temperature	0 °C to +45 °C
Battery discharge temperature	-20 °C to +60 °C
Battery storage temperature	-20 °C to +45 °C for 1 month -20 °C to +35 °C for 6 month

FEATURES

Sensors	Accelerometer
Scenarios	Green Driving, Over Speeding detection, GNSS Fuel Counter, DOUT Control Via Call, Excessive Idling detection, Immobilizer, iButton Read Notification, Unplug detection, Towing detection, Crash detection, Auto Geofence, Manual Geofence, Trip, Ground Sense
Sleep modes	GPS Sleep, Online Deep Sleep, Deep Sleep, Ultra Deep Sleep
Configuration and firmware update	FOTA Web, FOTA, Teltonika Configurator (USB, Bluetooth)
SMS	Configuration, Events, DOUT control, Debug

GPRS commands	Configuration, DOUT control, Debug
Time Synchronization	GPS, NITZ, NTP
Fuel monitoring	LLS (Analog), LV-CAN200, ALL-CAN300, OBDII dongle, CAN-CONTROL, OBDII dongle
Ignition detection	Digital Input 1, Accelerometer, External Power Voltage, Engine RPM (CAN Adapters, OBDII dongle)

Table 5 Basic characteristics

ELECTRICAL CHARACTERISTICS

CHARACTERISTIC DESCRIPTION	VALUE			
	MIN.	TYP.	MAX.	UNIT
SUPPLY VOLTAGE				
Supply Voltage (Recommended Operating Conditions)	+10		+30	V
DIGITAL OUTPUT (OPEN DRAIN GRADE)				
Drain current (Digital Output OFF)			120	µA
Drain current (Digital Output ON, Recommended Operating Conditions)		0.1	0.5	A
Static Drain-Source resistance (Digital Output ON)		400	600	mΩ
DIGITAL INPUT				
Input resistance (DIN1)	47			kΩ
Input resistance (DIN2)	38.45			kΩ
Input resistance (DIN3)	150			kΩ
Input voltage (Recommended Operating Conditions)	0		Supply Voltage	V
Input Voltage threshold (DIN1)		7.5		V
Input Voltage threshold (DIN2)		2.5		V
Input Voltage threshold (DIN3)		2.5		V

ANALOG INPUT

Input voltage (Recommended Operating Conditions), Range 1	0		+10	V
Input resistance, Range 1		38.45		kΩ
Measurement error on 12V, Range 1		0.9		%
Additional error on 12 V, Range 1		108		mV
Measurement error on 30 V, Range 1		0.33		%
Additional error on 30 V, Range 1		88		mV
Input Voltage (Recommended Operating Conditions), Range 2	0		+30	V
Input resistance, Range 2		150		kΩ
Measurement error on 12 V, Range 2		0.9		%
Additional error on 12 V, Range 2		108		mV
Measurement error on 30 V, Range 2		0.33		%
Additional error on 30 V, Range 2		88		mV

OUTPUT SUPPLY VOLTAGE 1-WIRE

Supply voltage1	+4.5		+4.7	V
Output inner resistance		7		Ω
Output current (U_{out} > 3.0 V)		30		mA
Short circuit current (U_{out} = 0)		75		mA

NEGATIVE INPUT

Input resistance	38.45			kΩ
Input voltage (Recommended Operating Conditions)	0		Supply Voltage	Ω
Input voltage threshold		0.5		V
Sink current			180	nA

Table 6 Electrical characteristics

SAFETY INFORMATION

This message contains information on how to operate FMC130 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 SELV limited power source. The nominal voltage is +12 V DC. The allowed voltage range is +10..+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 so that its LED indicators are visible. They show the status of device operation.
• When connecting the 2x6 connector wires to the vehicle, the appropriate jumpers of the vehicle power supply should be disconnected.
• Before unmounting the device from the vehicle, the 2x6 connector must be disconnected. The device is designed to be mounted in a zone of limited access, which is inaccessible to the operator. All related devices must meet the requirements of EN 62368-1 standard. The device FMC130 is not designed as a navigational device for boats.

> ⚠ Do not disassemble the device. If the device is damaged, the power supply cables are not isolated or the isolation is damaged, DO NOT touch the device before unplugging the power supply.

⚠ All wireless data transferring devices produce interference that may affect other devices which are placed nearby.

🔧 The device must be connected only by qualified personnel.

✓ The device must be firmly fastened in a predefined location.

✓ The programming must be performed using a PC with autonomic power supply.

⚡ Installation and/or handling during a lightning storm is prohibited.

☔ The device is susceptible to water and humidity.

⚠ Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

🗑 Battery should not be disposed of with general household waste. Bring damaged or worn-out batteries to your local recycling center or dispose them to battery recycle bin found in stores.

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WARRANTY

TELTONIKA guarantees its products to be free of any manufacturing defects for a period of **24 months**. With additional agreement we can agree on a different warranty period, for more detailed information please contact our sales manager.

Contact us teltonika-gps.com/about-us/contacts/

All batteries carry a reduced <u>6 month</u> warranty period.

If a product should fail within this specific warranty time, the product can be:

- Repaired
- Replaced with a new product
- Replaced with an equivalent repaired product fulfilling the same functionality
- TELTONIKA can also repair products that are out of warranty at an agreed cost.

WARRANTY **DISCLAIMER**

TELTONIKA PRODUCTS ARE INTENDED TO BE USED BY PERSONS WITH TRAINING AND EXPERIENCE. ANY OTHER USE RENDERS THE LIMITED WARRANTIES EXPRESSED HEREIN AND ALL IMPLIED WARRANTIES NULL AND VOID AND SAME ARE HEREBY EXCLUDED. ALSO EXCLUDED FROM THIS LIMITED WARRANTY ARE ANY AND ALL INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO, LOSS OF USE OR REVENUE, LOSS OF TIME, INCONVENIENCE OR ANY OTHER ECONOMIC LOSS.

More information can be found at teltonika-gps.com/warrantyrepair/