# FMM130 General description



FMM130 is a tracking terminal with GNSS and GSM connectivity, which is able to collect device coordinates and transfer them via GSM network to a server. This device is perfectly suitable for applications, which require the location acquirement of remote objects.

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## Package contents

The FMM130 device is supplied to the customer in a cardboard box containing all the equipment that is necessary for operation. The package contains:

- FMM130 device;
- Input and output power supply cable with 2x6 connection pins;
- Micro USB cable;
- 3.7 V 170 mAh rechargeable Li-ion battery;

## Basic characteristics

GSM / GPRS / GNSS features:

- Quectel BG96, Quectel BG95-M3, TM2500
- SMS (text, data);
- Technology LTE CAT M1/NB-IoT/GSM/GPRS/GNSS/BLUETOOTH;
- Integrated GNSS receiver;
- Up to -165 dBm GNSS receiver sensitivity.

CELLULAR:

| Technology | Supported bands |
|---|---|
| 2G bands | FMM130-BG95: B2/B3/B5/B8<br>FMM130-BG96: B2/B3/B5/B8 |

| | |
|---|---|
| 4G bands | FMM130-BG95: LTE-FDD: (CAT M1)<br>B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B27/B28/B66/B85<br>FMM130-BG95: LTE-FDD: (CAT NB2)<br>B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85 GSM: 850/900/1800/1900<br>FMM130-BG96: LTE FDD:<br>B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B26/B28<br>FMM130-BG96 LTE-TDD<br>B39 (for CAT M1 only) |
| Data transfer (Quectel) | BG95:<br>LTE: Max. 588Kbps (DL)/Max.1119Kbps (UL)<br>GPRS: Max. 107Kbps (DL)/Max. 85.6Kbps (UL)<br>BG96:<br>LTE: Max. 375Kbps (DL)/Max.375Kbps (UL)<br>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

Hardware features:

- Built-in movement sensor;
- Built-in Bluetooth 4.0 LE;
- Internal High Gain GNSS antenna;
- Internal High Gain GSM antenna;
- Internal flash memory 128MB (422 400 Records);
- 170 mAh Li-ion rechargeable 3.7 V battery.

Interface features:

- Power supply: +10...+30 V;
- 3 digital inputs;
- 1 negative inputs (DIN2);
- 2 impulse inputs (DIN1, DIN2);
- 2 analog input;
- 3 digital outputs (connecting external relays, LED, buzzers etc);
- 1-Wire temperature sensor;
- 1-Wire iButton;
- LVCAN RX (INPUT 5);
- LVCAN TX (INPUT 6);
- 2 LEDs indicating device status.

Special features:

- Fast position fix;
- High Quality track even in high density urban canyon;
- Ultra small case;
- Ready for harsh environment;
- Easy to mount in limited access areas;

- Firmly fasten;
- 2 LED status indication;
- Real time tracking;
- Smart data acquisition based on:
    - Time;
    - Speed;
    - Angle;
    - Distance;
    - Ignition or any other I/O event;
- Sending acquired data via GPRS;
- GPRS and SMS I/O events;
- Virtual odometer;
- Configurable using Secured SMS Commands;
- 1x micro SIM card; 1x eSIM;
- Overvoltage protection;

| Description | Voltage | Duration |
|---|---|---|
| Normal operation | +10 ... +30 V | Unlimited |
| Protection turns on, device turns off | 34 V | Unlimited |
| Maximum voltage | < 70 V | Unlimited |
| Maximum voltage impulse | 90 V | 5 ms |

# Technical features

| Part name | Physical specification |
|---|---|
| Navigation indication | LED |
| Modem indication | LED |
| Socket | Soldered inner socket |
| USB | Micro USB socket |
| GNSS | Internal GNSS antenna |
| GSM | Internal GSM antenna |

**Technical details**

| | |
|---|---|
| 2 W max.<br>Current consumption at 12 V (Power supply 6...30 V DC) | • At 12V < 3 mA (Ultra Deep Sleep)<br>• At 12V < 5 mA (Deep Sleep)<br>• At 12V < 11 mA (Online Deep Sleep)<br>• At 12V < 18 mA (GPS Sleep)<br>• At 12V < 34 mA (nominal with no load)<br>• At 12V < 2A Max. (with full Load / Peak) |
| Battery charge current | Average 140 mA |
| Operating temperature (without battery) | -20..+85 °C |
| Storage temperature (without battery) | -20..+85 °C |
| Operating temperature (with battery) | -20..+40 °C |
| Storage temperature (with battery) | 0..+45 °C |
| Operating humidity | 5..95% (no condensation) |
| Ingress Protection Rating | IP41 |
| Battery charge temperature | 0..+45 °C |
| Battery discharge temperature | -20..+60 °C |
| Internal fuse | 3 A, 125 V |
| Device + case + battery weight | 55 g |

Dimension drawing:

# Technical information about internal battery

| Internal back-up battery | Battery voltage (V) | Nominal capacity (mAh) | Power (Wh) | Charge temperature (°C) | Discharge temperature (°C) | Storage temperature (°C) |
|---|---|---|---|---|---|---|
| Li-ion rechargeable battery | 3.75□3.90 | 170 | 0.64 – 0.66 | 0 to +45 | -20 to +60 | -20 to +45 for 1 month<br>-20 to +35 for 6 months |

Batteries are covered by 6 month warranty support.

CAUTION: 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 into general household waste.
Bring damaged or worn-out batteries to your local recycling center or dispose them into a battery recycle bin commonly found in supermarkets.

# 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 voltage (Recommended Operating Conditions) | 0 | | Supply voltage | V |
| Input Voltage threshold (DIN1) | | 7.5 | | V |
| Analog Input: | | | | |
| Input voltage (Recommended Operating Conditions), Range 1 | 0 | | +10 | V |
| Input resistance, Range 1 | | 150 | | kΩ |
| Measurement error on 12V, Range 1 | | 3 | | % |
| Additional error on 12 V, Range 1 | | 360 | | mV |
| Measurement error on 30 V, Range 1 | | 3 | | % |
| Additional error on 30 V, Range 1 | | 900 | | mV |
| Input Voltage (Recommended Operating Conditions), Range 2 | 0 | | +30 | V |
| Input resistance, Range 2 | | 150 | | kΩ |
| Measurement error on 12V, Range 2 | | 3 | | % |
| Additional error on 12 V, Range 2 | | 360 | | mV |
| Measurement error on 30 V, Range 2 | | 3 | | % |
| Additional error on 30 V, Range 2 | | 900 | | mV |
| Output Supply Voltage 1-Wire: | | | | |
| Supply voltage | +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 |

**Analog Input error margin can increase if temperature varies.**

# Absolute maximum ratings

| Characteristic description | Value | | | |
|---|---|---|---|---|
| | Min. | **Typ.** | **Max.** | **Unit** |
| Supply Voltage<br>(Absolute Maximum Ratings) | -32 | | +32 | V |
| Drain-Source clamp threshold voltage<br>(Absolute Maximum Ratings), ($I_{drain}$ = 2 mA) | | | +36 | V |
| Digital Input Voltage<br>(Absolute Maximum Ratings) | -32 | | +32 | V |
| Analog Input Voltage<br>(Absolute Maximum Ratings) | -32 | | +32 | V |