

FMM230 General description

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FMM230 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 FMM230 device is supplied to the customer in a cardboard box containing all the equipment that is necessary for operation. The package contains:

- FMM230 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 BG95-M3, Teltonika 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	BG95-M3: B2/B3/B5/B8

BG95-M3: LTE-FDD (CAT M1):
B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B27/B28/B66/B85

4G bands LTE-FDD (CAT NB2):
B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85 GSM:
850/900/1800/1900

Data transfer LTE: Max. 588Kbps (DL)/Max.1119Kbps (UL)
GPRS: Max. 107Kbps (DL)/Max. 85.6Kbps (UL)

Transmit power:

Class 4 for GSM850/900: 23 ± 2 dBm

Class 1 for GSM1800/1900: 20 ± 2 dBm

Class 3 for LTE-TDD: 23 ± 2.7 dBm

Class 3 for LTE-FDD: 23 ± 2.7 dBm

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.
Current consumption at 12 V (Power supply 6...30 V DC)

- At 12V < 3 mA (Ultra Deep Sleep)
- At 12V < 5 mA (Deep Sleep)
- At 12V < 11 mA (Online Deep Sleep)
- At 12V < 18 mA (GPS Sleep)
- At 12V < 34 mA (nominal with no load)
- 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	IP67
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 -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			Unit
	Min.	Typ.	Max.	
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 (Absolute Maximum Ratings)	-32		+32 V
Drain-Source clamp threshold voltage (Absolute Maximum Ratings), ($I_{\text{drain}} = 2 \text{ mA}$)			+36 V
Digital Input Voltage (Absolute Maximum Ratings)	-32		+32 V
Analog Input Voltage (Absolute Maximum Ratings)	-32		+32 V