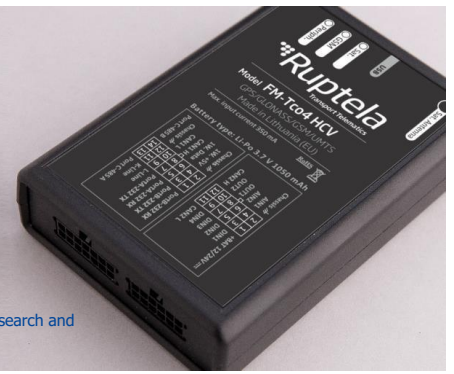


# FM-Tco4 HCV / HCV 3G / HCV BT

## Data Sheet v1.15

### 2018-03-08



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 717336

- Dual CAN
- Up to 10 LLS on RS485
- More 1-Wire accessories at same time
- Tachograph reading via 2nd CAN line
- Min. 30000 records on internal storage

#### Physical properties

Dimensions	111L x 75W x 25H (mm)
Weight	134g ± 10g
Connector	12 pin & 14 pin
Indication	3 LEDs
Housing	Plastic

#### Product family

- FM-Basic
- FM-Plug4 / 4+
- FM-Eco4 / 4+
- FM-Eco4 light / light+
- FM-Eco4 light 3G / light+ 3G
- FM-Pro4 / Pro4 3G / Pro4 BT
- FM-Tco4 LCV / LCV 3G / LCV BT
- **FM-Tco4 HCV / HCV 3G / HCV BT**

#### Contacts

T. +370 5 272 65 70  
 M. [info@ruptela.com](mailto:info@ruptela.com)  
 W. [ruptela.com](http://ruptela.com)

#### Electrical specification

<b>Power supply</b>				
12/24 V DC (range: 10 - 32 V DC supplied from SELV Limited Power Source)				
Absolute maximum ratings				
50 V @ 60 s				
72 V @ 0,1 s				
<sup>1</sup> Power consumption @ 12 V	FM-Tco4 HCV	FM-Tco4 HCV BT	FM-Tco4 HCV 3G	
Idle mode, mA	50	60	70	
Sending records, mA	180	210	150	
Deep sleep mode, mA	22	22	22	
Internal power supply	Li-Po 3,7 V 1050 mAh			
<b>Storage</b>				
Internal storage	4 MB (min. 30000 records)			
External SD card	Up to 32 GB			
<b>Protections</b>				
Short circuit protection				
Reverse polarity protection				
Electrostatic discharge protection on USB				
Electrostatic discharge protection on 1-wire data				
Over-current protection on 1-Wire power				
<sup>2</sup> ESD protection on SIM card slot				
<sup>3</sup> Charging protection				

#### Peripherals

<b>Available on 1 - Wire</b>	
4 x Temperature sensors DS18B20/DS18S20	
1 x iButton DS1990, DS1971 with passive socket	
<b>Available on digital outputs</b>	
1 x Buzzer\LED	
1 x Eco-Drive panel	
<b>Available on Ports A and/or B</b>	
Up to 2 LLS, RFID, Garmin, Tachograph reading, Transparent channel, Thermoking, Optitemp, Weighting system, Spreader, Alcohol sensor	
<b>Available on Ports C</b>	
Up to 10 LLS, J1708 interface, Transparent channel	
<b>Available on CAN interface</b>	
Vehicle CANbus (FMS) information reading, HCV CAN, DXP CAN, OBD parameters and DTC, Tachograph reading, MobilEye, Trailers	
<b>Available on K-line interface</b>	
TCO driver information reading, OBD parameters and DTC	

#### Environmental data, reliability

<b>Temperature range for device (without battery)</b>	
Storage temperature, °C	-40 ~ +70
Operating temperature, °C	-35 ~ +70
<b><sup>3</sup>Temperature range for battery</b>	
Charge, °C	0 ~ +45
Discharge (operating), °C	-20 ~ +60
Storage, °C	-20 ~ +70
<b>Humidity range</b>	
All cases	0 % ~ 95% Non-condensing

#### Certification

	FM-Tco4 HCV	FM-Tco4 HCV BT	FM-Tco4 HCV 3G
E-mark	✓		✓
CE 1304	✓		✓
RoHS	✓	✓	✓
FCC Part 15			✓

#### Telecommunication, Positioning

GPS\GLONASS module	Ublox EVA-M8M
<b>Internal</b>	
72 channel	
Sensitivity	-163 dBm (GPS) -164 dBm (GLONASS&GPS)
Cold start	30 s
Aided start	3 s
GPS antenna	External
Frequency	1575,42 ± 3 MHz
GSM modem	Quectel M95
<b>Internal</b>	
850/900/1800/1900 MHz @ GSM	
GSM antenna	Internal, Quad band
<sup>4</sup> GSM/UMTS modem	Quectel UG96
<b>Internal</b>	
800/850/900/1900/2100 MHz @ UMTS	
850/900/1800/1900 MHz @ GSM	
GSM/UMTS antenna	Internal, Quad band
Accelerometer	3-axis; Up to 4g
Gyroscope	On demand
<sup>5</sup> Bluetooth	
Bluetooth LOW Energy 4.0	

<sup>1</sup> Firmware dependent; given values are valid when there are no peripheral devices attached. If battery is in charging mode, then power consumption in each mode will be higher within 170 mA.

<sup>2</sup> Not soldered in standard version. Can be ordered.

<sup>3</sup> If temp is >45C, charging is disabled, if >60C battery is disconnected from the system at all.

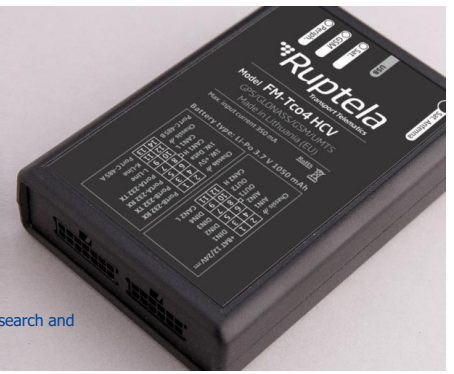
<sup>4</sup> Only for FM-Tco4 HCV 3G device.

<sup>5</sup> Only for FM-Tco4 HCV BT device. Feature is currently under development.

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I\O Characteristics		Pin out - IO 12pin	
4 x DIN	Digital inputs	Red	Power supply
Threshold	4V	Black	Ground
2 x DOUT	Digital outputs	Purple	DOUT1
Max. output	Open collector 32 V, 1 A max	Orange	DOUT2
2 x AIN	Analog inputs	White and red stripe	CAN2 H
Range	0 – 30 V	Blue and red stripe	CAN2 L
Resolution	12 bit	Gray	AIN1
1 – Wire	1-Wire peripherals	Green	AIN2
5 V power output	200 mA @ 5 V	Yellow	DIN4
2 x RS232		Pink	DIN1
PortA	PortA-232 RX; PortA-232 TX	White	DIN3
PortB	PortB-232 RX; PortB-232 TX	Blue	DIN2
1 x RS485		Pin out - IO 14pin	
PortC	PortC-485 A; PortC-485 B	Yellow	PortB-232 RX
2 x CAN interfaces		Black	Ground
CAN1	CAN1 L; CAN1 H	Orange	PortB-232 TX
CAN2	CAN2 L; CAN2 H	Red	1-Wire power +5 V
<b>3,5 mm TRRS</b>	Microphone connection	Purple	PortA-232 RX
Mini USB	Configuration interface	Green with yellow stripe	1-Wire data
		Pink	PortA-232 TX
		White	CAN1 H
		Green	L line
		Blue	CAN1 L
		Brown	K line
		Black	Ground
		White with red stripe	PortA-485 A
		Yellow with brown stripe	PortA-485 B

### Optional features

Gyroscope and Bluetooth are optional features. For inquiry please contact manufacturer (Ruptela) or your manager directly.

### Explanations

Deep sleep mode – Power saving mode when GNSS and GSM modules and all peripheral devices are disabled, except DINs and DOUTs. Device wakes up on state change of any Digital Input (DIN).

Device can be installed within 45° angle in any axis, but its top surface must be facing up. Device should be installed tightly, it should not move or shake.

### Warning!

All internal components including battery must be replaced only by manufacturer! Any self-willed attempt to open device cases will void any warranty.



Caution! Devices are shipped to the users with partially charged batteries. After the first power up, the device must not be left to operate from the battery. It must be connected to an external power source, until the battery is fully charged. Once charging is complete, the device can begin its normal operation.



Caution! There is a risk of explosion if the battery is replaced by an incorrect type. Dispose used batteries according to the environmental requirements.

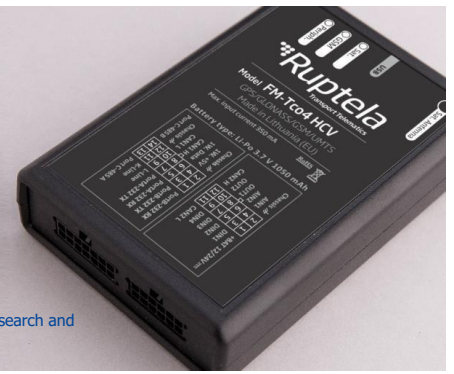


This crossed-out wheeled bin symbol means that waste equipment should not be disposed of with your other household waste. The product must be taken to separate collection points at the product's end-of life.

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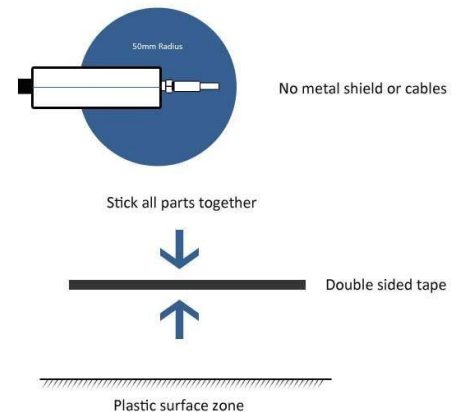


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### Device installation

When installing device into vehicle please obey these instructions otherwise your device may not work properly.

- Device should not be seen or easily reached. It must be installed in service access area (e.g. under dashboard, behind fuse box).
- Device should be firmly fixed to a flat surface. Please avoid mounting it near metal surfaces or cables (*see the picture on the right*).
- Device cannot be fixed to heat emitting or moving parts.
- Device has built in accelerometer, therefore it is sensitive to movement. It is recommended to choose a stable installation position, where it is not subjected to vibrations and/or oscillations.
- Device can be fitted with double sided stick tape or zip-ties.
- Wrong device mounting may cause malfunction.
- SIM card should be inserted in the device while the connector is plugged off (while device has no power).



### FM-Tco4 HCV BT device

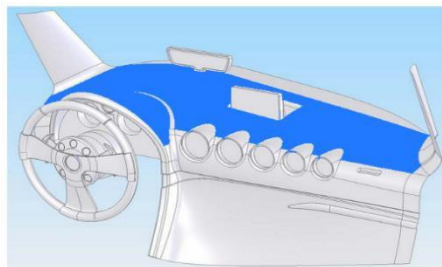
FM-Tco4 HCV BT device contains Bluetooth module. Choose installation location carefully. Approximate Bluetooth module position within the device is marked in the picture on the right. To ensure the best possible connectivity between Bluetooth devices follow these steps:

- FM-Tco4 HCV BT device with Bluetooth module should be installed facing up.
- Please avoid mounting it near metal surfaces or cables.

### Antenna installation

It is recommended to place GPS/GLONASS antenna behind the dashboard as close to the window as possible. It must be uncovered, installed heads up (*see picture*).

Best place for GPS/GLONASS antenna is marked in blue (*see picture*).



### Document application

Given parameter values and various characteristics contained within this document applies only to the most recent device hardware version.

### Legal information

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