Speed Limiting Solution FMC130+ETC

Contents

- 1 Introduction
- 2 Solution description
- 3 What you need for a solution?
- 4 Installation
  - 4.1 **A. Installation - Electronic Throttle Controller**
  - 4.2 **B. Installation - Fuel Pump**
  - 4.3 **C. Installation - Solenoid Valve**
- 5 Wiring Scheme
  - 5.1 *Relay Wiring Scheme*
  - 5.2 *ETC Wiring Scheme*
- 6 Configuration
  - 6.1 **1. Prerequisites:**
    - 6.1.1 1.1. Read through First start guide
    - 6.1.2 1.2. Understanding of possible Sleep modes.
  - 6.2 **2. Configuration - Speed limiting:**
  - 6.3 **3. Configuration - Speed Limiting based on Geo-Fence**
- 7 Parsing information
  - 7.1 **1.Prerequisites:**
    - 7.1.1 1.1. Open TCP/UDP port
    - 7.1.2 1.2. Read Java parser first start guide
  - 7.2 **2. Parsing example:**
- 8 Demonstration in Wialon platform
- 9 Conclusion

Introduction

The loss incurred globally by corporate fleet and insurance businesses due to accidents caused by over speeding is significant. This can often lead to the loss in productivity and multiple other evident collateral damage costs. We at Teltonika Telematics have developed a unique solution to help tackle over speeding in the fleet.

Solution description

Using the combination of Teltonika FM device with the Automotive relay and the Electronic throttle controller to achieve speed limiter feature.

What you need for a solution?

- **FMC130** device
- **Electronic Throttle Controller**
- **Automotive Relay**
- The **SIM card** in order to get data to your server
- **FOTA WEB** to remotely send the configuration to the device.
- ***Solenoid Valve**

***Solenoid Valve** is optional for one of the wiring schemes shown below

Installation

This solution can be implemented in 3 different ways based on the speed limiting scenario. It’s important to install the device and the relay in an hidden place inside dashboard.

Although devices have high gain antennas it’s important to mount devices with stickers on top and in metal-free space. The device should be firmly fixed to the surface or cables. Please make sure, that device is not fixed to heat emitting or moving parts.

To have a working solution it’s important to properly wire the devices. In the picture below it's shown how to correctly wire the device when implementing electronic throttle controller solution.

There are 3 ways of connecting the FM device which are displayed below:

A. Installation - Electronic Throttle Controller

B. Installation - Fuel Pump

C. Installation - Solenoid Valve

Wiring Scheme

Relay Wiring Scheme

Relay PIN	Relay cable color	Connection
30	**Blue**	+VDC (Common connection to NO & NC terminals)
85	**Black**	DOUT of FM Device
86	**White**	+VDC (Coil)
87	**Yellow**	Not Required to connect (Normally Open (NO))
87a	**Red**	Green Wire from ETC **or** Wire to Fuel Pump **or** Wire to Solenoid Valve

ETC Wiring Scheme

ETC cable color	Connection
Red	+VDC (+10...32)
Black	Ground
Green	PIN 87a (NC of Relay)
White	V-/0.40V from Accelerator pedal
Brown	V+/0.70V from Accelerator Pedal
Yellow	S+/0.70V from ECU
Grey	S-/0.40V from ECU

Note: Voltage may vary depending on vehicle model.

During installation please follow recommendations in order to **avoid damaging** device and vehicle:

- while the connecting the wires, please ensure the module is **not plugged** IN.
- Ensure the car ECU falls asleep, measure voltage on the chosen wire if it is still available. It usually takes 5 to 30 minutes period for the ECU to completely shutdown depending on the model of the vehicle.
- When the module is connected, be sure to measure the voltage again if it did not decrease.
- The ground wire is connected to the vehicle frame or metal parts that are fixed to the frame.

Configuration

1. Prerequisites:

1.1. Read through First start guide

1.2. Understanding of possible Sleep modes.

2. Configuration - Speed limiting:

Parameter ID – Parameter name 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)

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

Sleep settings:

- 102 – Sleep settings(0 – Disable, 1 – Gps sleep, 2 – Deep sleep, 3 – Online Deep sleep, 4 – Ultra sleep)

Note: This scenario will not work with Deep Sleep and Ultra Sleep modes, since they disable the device's GSM module to save power.

To setup the speed limiting feature in the configurator we should navigate to **Features → Over Speeding** where we would set a priority for the event, speed source and DOUT 1 for the relay to work properly.

Over speeding settings

- 11100 – Scenario settings(0 – Disable, 1 – Low Priority, 2 – High Priority, 3 – Panic Priority)
- 11104 - Max Speed (Default value - 90 km/h)
- 11103 - Output Control (0 - None (Default), 1 - DOUT1), DOUT1 needs to be enabled to use the speed limiting feature

Note: Detected speed has to be greater than (configured max speed +3% of configured max speed) for Over speed start event; detected speed has to be lower than(configured max

speed -3% of configured max speed) for Over speed end event.

Quickstart: From default configuration to Speed Limiting solution in one SMS:

```
"  setparam
2001:APN;2002:APN_user;2003:APN_password;2004:Domain;2005:Port;2006:0;102:3;1
1100:2;11104:90;13217:0;13223:8;11103:1;11101:5000;11102:0"
```

This SMS will set up your device to report the Speed Limiting scenario to the server.

Note: Before SMS text, two space symbols should be inserted if no SMS username or password was set in SMS \ Call settings.

3. Configuration - Speed Limiting based on Geo-Fence

Manual Geofence settings

- 20100 – Scenario settings(0 – Disable, 1 – Low Priority, 2 – High Priority, 3 – Panic Priority)
- 20101 - Generate Event(0 - Disable, 1 - Low Priority, 2 - High Priority, 3 - Panic Priority)
- 20104 - Shape Type(0 - Circle,1 - Rectangle)
- 20105 - Radius in Metres
- 20106 - X1 Coordinate
- 20107 - Y1 Coordinate
- 20108 - X2 Coordinate
- 20109 - Y2 Coordinate
- 20110 - Overspeeding(0 - Disable, 1- Enable) should be enabled for speed limiting functionality.
- 2005 - Max allowed speed km/h.

Note: Detected speed has to be greater than (configured max speed +3% of configured max speed) for Over speed start event; detected speed has to be lower than(configured max speed -3% of configured max speed) for Over speed end event.

Parsing information

1.Prerequisites:

1.1. Open TCP/UDP port

1.2. Read Java parser first start guide

2. Parsing example:

Unparsed received data in hexadecimal stream

00000000000000758E010000018494E2DAFA000F0E53AE209AB86A007F00110D0000**00FF**0015000800EF0100F00100500100150300C800**009B**0300010000B301000A00B5000A00B6000600423FC900180000004300000044000000110022001 2FFBA0013FC34000F0000000200F10000601A0010002D97E00000000000100002136

AVL Data Packet Part	HEX Code Part
Zero Bytes	00 00 00 00
Data Field Length	00 00 00 75
Codec ID	8E (Codec 8 Extended)
Number of Data 1 (Number of Total Records)	01
Timestamp	00 00 01 7C B7 A5 73 70 00 (Monday, October 25, 2021 4:30:46 PM GMT+03:00)
Priority	00
Longitude	0F 0E 53 AE
Latitude	20 9A B8 6A
Altitude	00 7F
Angle	00 11
Satellites	0D
Speed	00 00
Event IO ID	00 FF (Over Speeding)
N of Total ID	00 15
N1 of One Byte IO	00 08
1’st IO ID	EF (AVL ID: 239, Name: Ignition)
1’st IO Value	01
2’nd IO ID	F0 (AVL ID: 240, Name: Movement)
2’nd IO Value	01

3’rd IO ID	50 (AVL ID: 80, Name: Data Mode)
3’rd IO Value	01
4'th IO ID	15 (AVL ID: 21, Name: GSM Signal)
4'th IO Value	01
5'th IO ID	C8 (AVL ID: 200, Name: Sleep Mode)
5'th IO Value	00
6'th IO ID	009B (AVL ID: 155, Name: Geofence zone 01)
6'th IO Value	00
7'th IO ID	01 (AVL ID: 1, Name: Digital Input 1)
7'th IO Value	01
8'th IO ID	B3 (AVL ID: 179, Name: Digital Output 1)
8'th IO Value	01
N2 of Two Byte IO	0A
1’st IO ID	B5 (AVL ID: 181, Name: GNSS PDOP)
1’st IO Value	00 0A
2’nd IO ID	B6 (AVL ID: 182, Name: GNSS HDOP)
2’nd IO Value	00 06
3’rd IO ID	42 (AVL ID: 66, Name: External Voltage)
3’rd IO Value	3F C9
4'th IO ID	18 (AVL ID: 24, Speed)
4'th IO Value	5F
5'th IO ID	43 (AVL ID: 67, Battery Voltage)
5'th IO Value	00 07
6'th IO ID	44 (AVL ID: 68, Battery Current)
6'th IO Value	00 C8
7'th IO ID	11 (AVL ID:17, Axis X)
7’th IO Value	00 22
8'th IO ID	12 (AVL ID:18, Axis Y)
8’th IO Value	FF BA
9'th IO ID	13 (AVL ID:19, Axis Z)
9'th IO Value	FC 34
10'th IO ID	0F (AVL ID: 15, ECO Score)
10'th IO Value	00 00
N4 of Four Byte IO	00 02
1'st IO ID	F1 (AVL ID: 241, Name: Active GSM Operator)
1’st IO Value	00 00 00 10
2’nd IO ID	10 (AVL ID: 16, Name: Total Odometer)
2’nd IO Value	00 2D 97 E0
N8 of Eight Byte IO	00 00
NX of X Byte IO	00 00
Number of Data 2 (Number of Total Records)	01
CRC-16	00 00 7F CF

Demonstration in Wialon platform

Wialon: Open Wialon application → Select unit→ Select Device → Select the date interval → Select Track→ to access all the information.

Graphical Representation:

Conclusion

Speed limiting is achieved when max speed is exceeded. Relay is activated on DOUT1 which will disable the acceleration pedal, turn off the fuel pump or close the solenoid valve.

Note: Detected speed has to be greater than (configured max speed +3% of configured max speed) for Over speed start event; detected speed has to be lower than(configured max speed -3% of configured max speed) for Over speed end event.