

Speed Limiting Solution MSP500+ETC

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Introduction

Due to the accidents caused by over speeding, corporate fleet businesses and insurance companies suffer from huge losses in most of the countries globally. This can often lead to a loss in productivity, reduction in revenue, paying insurance costs (if it's the driver's fault), as well as medical and collateral damage costs. To help resolve this major concern, here at Teltonika Telematics we have developed and manufactured a unique GPS tracker with the speed limiter feature.

Solution description

Utilizing a modern and comprehensive GPS tracking method allows you to monitor driver (including novice) behaviour, improve safety, and reduce the fleet running costs and legal liability. And that is where Teltonika **MSP500** comes into the play.

Teltonika **MSP500** is a special tracking terminal with GNSS/GSM/Bluetooth® 4.0 connectivity, internal GNSS/GSM antennas, RS232 interface, internal Ni-Mh battery, and waterproof IP65 casing. The device has been specifically designed with the key feature – speed limiting control.

What you need for a solution?

- [MSP500](#) device.
- **Electronic Throttle Controller.**
- 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

MSP500 tracker can be connected in 3 different ways based on the speed limiting scenario that will be implemented. It's important to hide the tracker, so it would not be a simple task for the thieves to find and unplug it.

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 MSP500 device which are displayed below:



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

- Wires should be connected while the module is **not plugged in**.
- Be sure that after the car computer falls asleep, power is still available on the chosen wire. Depending on the car, this may happen in a 5 to 30 minutes period.
- 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.

ETC Connections

1. ETC connection between vehicle ECU and Accelerator Pedal:

- Test the connection between ECU and Accelerator Pedal to detect the +V and -V wires using Multimeter.
- Unplug vehicle battery cable before connecting ETC and MSP500.
- Connect wires as per the following sequence.

ETC cable color	Connection
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.

<https://wiki.teltonika-gps.com/view/File:ETC.mp4>

In this tested vehicle. Voltages of the connections between ECU and Accelerator Pedal are (+) 0.49V and (-) 0.25V.

2. ETC connection with MSP500:

- Use a cable extension (optional) to connect ETC with MSP500.
- Connect wires as per the following sequence.

ETC cable color	Connection
Red	+VDC (+10...32) (COM Relay of MSP500)
Black	Ground (Ground of MSP500)
Green	NC Relay of MSP500



ETC Calibration

- Plug vehicle battery cable.
- Start the vehicle engine for ETC calibration.
- Open ETC and press the calibration button for 3 seconds to store the IDLE voltage coming from the accelerator pedal.

https://wiki.teltonika-gps.com/view/File:Calibration_Button.mp4

Configuration

1. Prerequisites:

- 1.1. Read through [First start guide](#)
- 1.2. Understanding of possible [Sleep modes](#).

2. Speed limiting configuration:



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, MSP500 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

Scenario Settings

Disable	Low Priority
High Priority	Panic Priority

Max Speed (km/h)

Speed Source

GNSS	OBD
AIN1	

Overspeeding hysteresis (%)

Output Control

None	DOUT 1
------	---------------

DOUT ON Duration (ms)

DOUT OFF Duration (ms)

Send SMS To

SMS Text



Over speeding settings

- **11100** - Scenario settings (0 - Disable, 1 - Low Priority, 2 - **High Priority** (Default), 3 - Panic Priority)
- **11104** - Max Speed (Default value - 90 km/h), here we tested on **40 km/h**
- **13217** - Speed Source (0 - **GNSS** (Default), 1 - OBD, 2 - AIN1)

In case of **AIN1**, if you use only A2 - the formula would look like $Speed = A2 * Pulses$

- **13223** - Over speeding Hysteresis (Default value - **8%**), value that determines what would be the threshold speed level that would activate the speed limiting feature
- **11103** - Output Control (0 - None (Default), 1 - DOUT1), **DOUT1** needs to be enabled to use the speed limiting feature

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;11104:40;13217:0;13223:8;11103:1"
```

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.

Testing

1. Relay test:

- Go to Maintenance.
- Switch DOUT 1 option to ON when pressing the accelerator pedal.
- RPM should be decreased to idle when the relay is ON.



2. Road test:

- We tested the over speed scenario on **40 km/h** using **GNSS** as a speed source.
- The AVL ID of over speeding scenario is **io_255**.
- In this scenario we monitored the speed change from 39 km/h to 41 km/h
- A record has been sent with the over speeding event io_255 when the speed exceed/fall behind

40 km/h.

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

0000000000000005E8E010000017DE72C308A012100F6F60EF8A0FE0000008F0A002900FF0010000700EF0100F00100150200C80000450101F60000FF29000500B500F00B60008004238D500431F5000440027000200F10000A5A200100000BF7B000000000100006D90

AVL Data Packet Part

HEX Code Part

Zero Bytes

00 00 00 00

Data Field Length

00 00 00 5E

Codec ID

8E (Codec 8 Extended)

Number of Data 1 (Number of Total Records)

01

Timestamp

00 00 01 7D E7 2C 30 8A (Thursday, December
23, 2021 12:02:52 PM GMT+04:00)

Priority

01

Longitude

21 00 F6 F6

Latitude

0E F8 A0 FE

Altitude

00 00

Angle

00 8F

Satellites

0A

Speed

00 29

Event IO ID

00 FF (Over Speeding)

N of Total ID

00 0E

N1 of One Byte IO

00 07

1'st IO ID

00 EF (AVL ID: 239, Name: Ignition)

1'st IO Value

01

2'nd IO ID

00 F0 (AVL ID: 240, Name: Movement)

2'nd IO Value

01

3'rd IO ID

00 15 (AVL ID: 21, Name: GSM Signal)

3'rd IO Value

02

4'th IO ID

00 C8 (AVL ID: 200, Name: Sleep Mode)

4'th IO Value

00

5'th IO ID

00 45 (AVL ID: 69, Name: GNSS Status)

5'th IO Value

01

6'th IO ID

01 F6 (AVL ID: 502, Name: MSP500 Speed
Sensor Status)

6'th IO Value

00

7'th IO ID

00 FF (AVL ID: 255, Name: Over Speeding)

7'th IO Value

29 (Speed is 41 km/h)

N2 of Two Byte IO	00 05
1'st IO ID	00 B5 (AVL ID: 181, Name: GNSS PDOP)
1'st IO Value	00 0F
2'nd IO ID	00 B6 (AVL ID: 182, Name: GNSS HDOP)
2'nd IO Value	00 08
3'rd IO ID	00 42 (AVL ID: 66, Name: External Voltage)
3'rd IO Value	38 D5
4'th IO ID	00 43 (AVL ID: 67, Battery Voltage)
4'th IO Value	1F 50
5'th IO ID	00 44 (AVL ID: 68, Battery Current)
5'th IO Value	00 27
N4 of Four Byte IO	00 02
1'st IO ID	00 F1 (AVL ID: 241, Name: Active GSM Operator)
1'st IO Value	00 00 A5 A2
2'nd IO ID	00 10 (AVL ID: 16, Name: Total Odometer)
2'nd IO Value	00 00 BF 7B
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 6D 90

Demonstration in Wialon platform

Wialon: Open Wialon application → Select Messages → Select Unit → Select the date interval → Select Chart → Select io_255.



Demonstration in Flespi platform

Flespi: Open Flespi application → Select Device → Select Logs & Messages → Select the record interval → Tap to see all information.

<https://wiki.teltonika-gps.com/view/File:Flespi.mp4>

Demonstration in TAVL platform

TAVL: Open TAVL application → Select Client → Select Device → Select the date interval → Select Track → Select Advanced → Chose Show button see in left down corner all the information.



Speed limiting is activated when max speed is exceeded. Relay is activated on DOUT1 which can either disable the acceleration pedal, turn off the fuel pump or close the solenoid valve. Only one scenario can be used per MSP500 device.