

GRIPONE TRACTION CONTROL SYSTEM

GRIPONE S3 - Software
(Eng)



Note

Before using the system GRIPONE read every page of this manual. The configuration of the device requires several non-trivial reflections, referred to only within this manual. Please note that you are installing a device on a vehicle can reach high speeds. The system GRIPONE is a professional power management system for racing use only.

The GRIPONE does not prevent crash caused by improper use of throttle or veichle. For that reason we suggest to test the system effect's step by step. We suggest to get used with the system and one parameter per time (by different step).

1.0 Introduction to GRIPONE S3

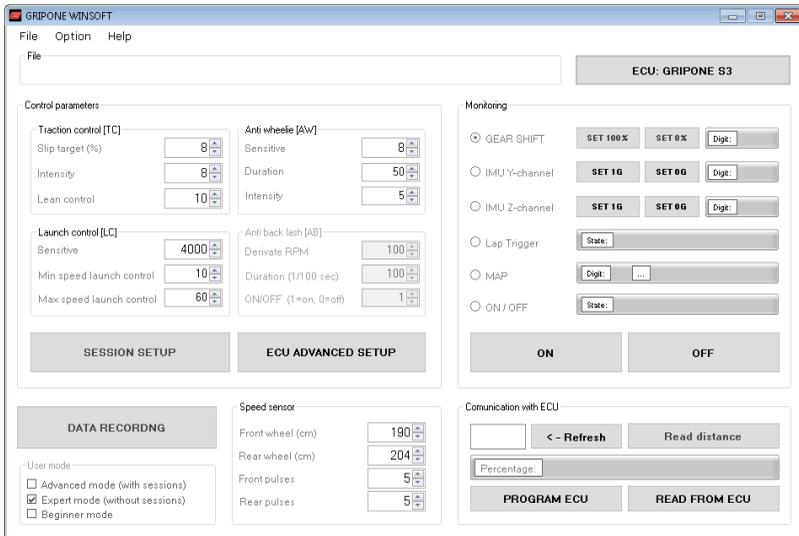
All the fuctions and strategies actuated by GRIPONE S3 are managed by the map that you load into the ECU. For that reason, before use GRIPONE S3, the user must install the software WINSOFT and have a "base map" to program the ECU. On the web site www.gripone.com are available the "base map" for all bikes which has the plug&play kit. All the "base map" are free of charge. Every user can download it. Visit <http://www.gripone.com/database.html>

With WINSOFT (the software included in the kit) the user can open, modify and create new maps. As well by the USB cable you can connect your computer to the ECU and program it.

In this manual the user can learn the meaning of every variable included in the maps. **Please do not change the value of variables without understad the effect on fuctioning.**

1.1 Open the map

First of all visit our website to download the specific map for your bike (or use the map available in the CD ROM included into the kit). Then run WINSOFT by double click on the icon.



Note: be sure that WINSOFT is set for GRIPONE S3 (by the red button on top right of main window).

ECU: GRIPONE S3

By the menu **File > Open** you can open the map (saved on your computer or CD ROM). All the parameters included into the map will be loaded in WINSOFT but the map is not uploaded into the ECU yet,

From the menu **File** you can also save or rename the map. Clicking on **Save** (or using a button combination CTRL+S) you can save the opened map. Clicking on **Save As** (or using a button combination CTRL+SHIFT+S) you can save a map with a different name or copy the map with another name.

1.2 Program the ECU

After you opened the base map (or the last used map) you have to program the ECU. Follow these steps:

1. Check if the dimension of front wheel is correct. The measure (in centimeters) refer to the circumference of tire.
2. Check if the dimension of rear wheel is correct. The measure (in centimeters) refer to the circumference of tire.
3. Check if the number of pulses of front wheel is correct. The speed sensor detect the bolts of front brake disk (or teeth of fly wheel). Insert the number of bolts of front brake (or teeth).
4. Check if the number of pulses of rear wheel is correct. The speed sensor detect the bolts of rear brake disk (or teeth of fly wheel). Insert the number of bolts of rear brake (or teeth).
5. Connect the USB cable to the ECU and press  button
6. Check the COM port and select it in the window
7. Press "PROGRAM ECU" button and wait the end of procedure

2.0 Change parameters in the map

GRIPONE S3 includes several strategies: traction control, anti wheelie control, quick shifter, launch control, pit limiter. For each strategy there are some parameters that you can change to adapt the system to your preference.

All the parameters are available in the **main** window (visible when you run WINSOFT) and in the "**ECU advanced setup**" window.

2.1 Traction control

Traction control strategy includes base parameters and advanced parameters. We suggest to keep the advanced parameters as they are in the base map and work only with base parameters.

Base parameters:

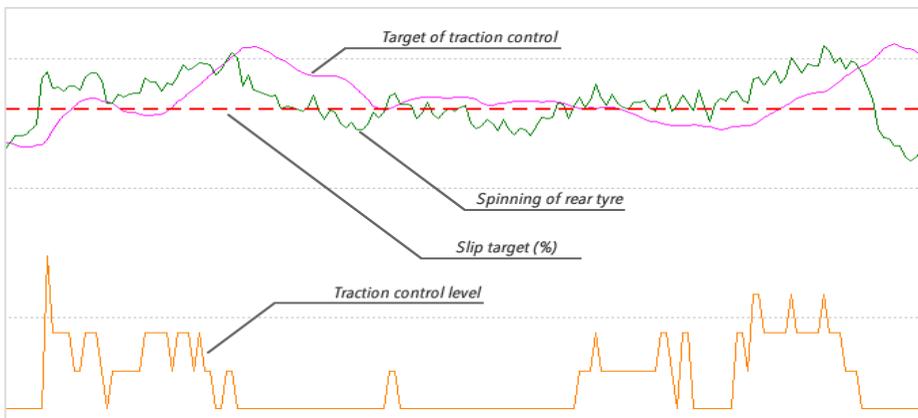
1. **Slip target (%)** – it change the target of traction control. The target of traction control is the percentage of allowed spinning of rear tire. If you fix **Slip target (%)** to 10, the traction control will be off until the spinning is less then 10% I will control when spinning goes over 10%. Bigger is the number of **Slip target (%)** and more the rear tire will spin. To increase the sensitive you must reduce the value of **Slip target (%)**.
2. **Reduction of power** – it control the progression of traction control. If you want to stop quickly the spinning (strong effect of traction control) use high values (12 to 20). If you want a soft effect of traction control use a small values (1 to 8).
3. **Edge control** – **This parameter is effective only if your system includes the IMU (inertial platform)**. By this parameter you can increase the sensitive of traction control by the lean angle. Use high values (12 to 20) if you want a high sensitive in the middle of corner. Use small values (1 to 8) if you want to reduce the sensitive in the middle of corner.

Traction control	
Slip target (%)	<input type="text" value="6"/>
Reduction of power	<input type="text" value="10"/>
Edge control	<input type="text" value="10"/>

We suggest: First of all start with the base map. Then try to change only the **Slip target (%)** to obtain a good compromise. GRIPONE S3 use a special traction control strategy that self adapt the sensitive by the tire load. It means that GRIPONE S3 is able to reconize the best sensitive in every condition (slow corner, fast corner, deep lean angle or middle angle). It needs just to fix a good base of **Slip target (%)**. When you find out a good base start to play with the others parameters.

Advanced parameters:

GRIPONE S3 include the 3D-INTELLIGENCE control strategy. The target of traction control (fixed by **Slip target (%)**) changes automatically 200 times per second and adapt itself to every condition. It become bigger or smaller by the condition of the bike.



When the spinning become bigger then target of traction control, the system will reduce the power to recover the traction. The advanced parameters permit you to change the shape of target of traction control

1. **K-TPS** – parameter not used anymore. Do not change it
2. **K-Longitudinal G** – This parameter increase the target of traction control when the bike accelerate. Increase it to obtain more acceleration. Decrease it if opening the throttle you feel to much spinning (without obtain a good acceleration).
3. **K-Vertical G** – This parameter reduce the target of traction control when the bike is leaned. Increase it to obtain more sensitive on maximum lean angle. Reduce it if the control is too much on maximum lean angle. This parameter is effective only with IMU connected.
4. **K-Speed** – This parameter permit you to reduce the control by the speed. In some condition, the system reduce the power on the straight (for example because there are some bumps) increase it.
5. **IMU** – fix it to 0 (zero) if the IMU is not connected. fix it to 1 if the IMU is connected.

Dynamic parameters (for Traction Control)

1 K - TPS

50 K - Longitudinal G

50 K - Vertical G

25 K - Speed

0 IMU (0 = not connected, 1 = connected)

Those parameters are used by the ECU to optimize the target of spinning. Please don't change them before ask to GRIPONE staff.

Derivative parameters (for Traction Control)

25 Derivative level MIN (%/sec.) (<0)

25 Derivative level MAX (%/sec.)

30 K derivative

The derivative parameters control the fast loose of grip. If the spinning increase quickly the derivative control will be added to the normal power reduction

Derivative parameters

When tire loose grip it can happen slowly or quickly. Based on how much fast the tire loose grip (or traction) GRIPONE S3 can react quickly or slowly. If the spinning of tire increase itself quickly, GRIPONE S3 apply an additional control to stop quickly the loosing of grip. This part of strategy of traction control is designed to avoid highside of bike.

6. **Derivative level MIN** – this parameter fix the threshold of negative speed of loosing grip
7. **Derivative level MAX** – this parameter fix the threshold of positive speed of loosing grip

Reduce this parameters (please always same) if you want more quick reaction from the system.

8. **K-Derivative** – this parameter fix ammount of additional control when the spinning increase quickly. Increase it if you want to have a strong and quick reaction of traction control.

Control parameters include a collection of very important variables that can be modified to obtain different operation from the traction control system (as a different sensitive or a different amount of control on the engine).

Auto correction of traction control:

GRIPONE S3 include (since the firmware version 037) a new strategy to adapt the sensitive of

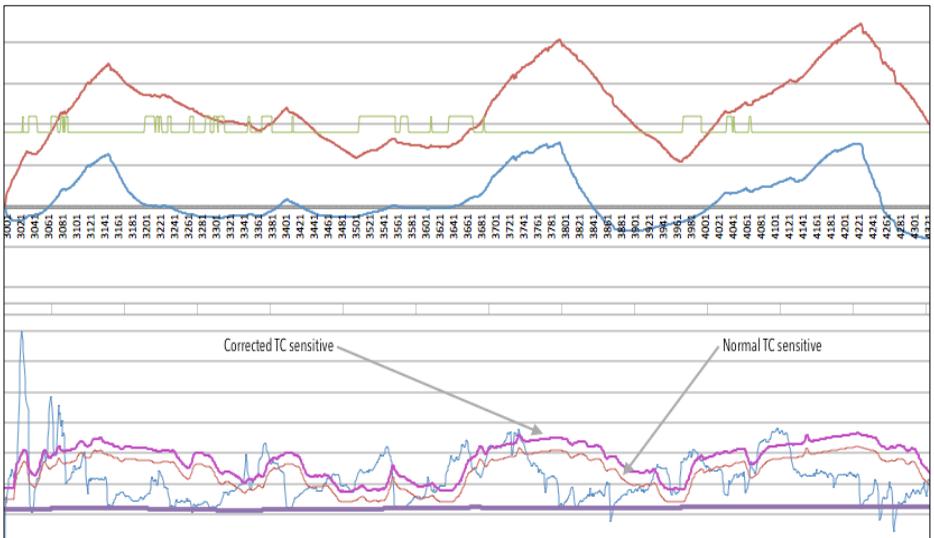
traction control even if the user use a wrong map. The system try to follow the riding style of the rider and adapt itself the sensitive of traction control. If the traction control works too much, it reduce the sensitive. If th traction control does not work enough, it increase the sensitive. "Auto correction TC [AC]" use three parameters: CORRECTION RATE, OFFSET and ON-OFF.

Auto correction TC [AC]	
Upward rate	100
Downward rate	100
ON/OFF (1=On, 0=Off)	1

ON-OFF: simply enable or disable the strategy

CORRECTION RATE: When the traction control is too much (because the user load a wrong map or because the rear tyre is very used and the spinning grows up a lot) or not enough (because the user load a wrong map or because the rear tyre is new and the spinning is almost nothing) this strategy automatically change the sensitive of traction control. The speed (or rate) of changes is fixed by CORRECTION RATE. CORRECTION RATE = 1 make the auto correction very slow (it takes 5-6 laps to have some adjustments). CORRECTION RATE = 100 make the auto correction very fast (it takes 1-2 laps to have some adjustments).

OFFSET: When the auto correction of traction control is working, the system stop to use the **slip target%**. **Slip target%** is used only to create the starting point of new target (calculated by the auto correction strategy). The system naturally create a new target to cross the spinning. This mean that for some user the auto correction could be too invasive. If the new target brings too much (or not enough) traction control, you can use OFFSET to adjust the level of traction control. **We recommend to start from 65.** 50 is the natural (neutral) value of auto correction strategy. Offset=100 will reduce a lot the traction control. Offset=1 will increase a lot the traction control.

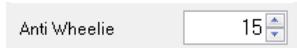


2.2 Anti wheelie control

GRIPONE S3 is able to understand when the front tire lift from the ground and reduce this tendency. This control is separate from the "traction control" and it works even without IMU. Even for the anti wheelie control there are base parameters and advanced parameters .

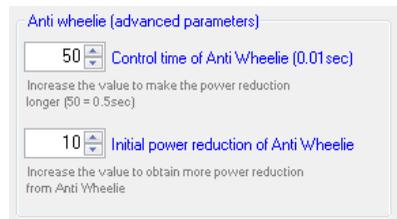
Base parameters:

Anti Wheelie – This parameter fix the level of anti wheelie control. Increase this value if you want to reduce the power as soon the tire is lifted from the ground. Reduce this value if you want to permit a bit of wheelie after the tire is lifted from the ground.



Advanced parameters:

Control time of anti wheelie – Because the strategy of anti wheelie create negative pulses on the engine power, this parameter fix the duration of pulses. Bigger is the value and longer is the pulse.

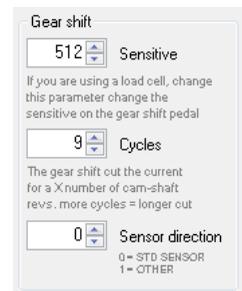


Initial power reduction of anti wheelie – This parameter fix the amplitude of pulses. Every pulse cut out a part of power so bigger is the value and bigger is the reduction of power. Increase this value if the wheelie control does not stop the wheelie.

2.3 Quick shift control

GRIPONE S3 is able to be a quick shifter just adding a gear shift sensor. GRIPONE S3 can use full load cell or gear shift sensor "switch-type". GRIPONE gear sensor is a "switch-type" and it does not require initialization.

Sensitive – This parameter fix the sensitive of the gear shift sensor. Leave it to 512 in case you use a GRIPONE gear shift sensor. Try with 90 in case you are using a full load cell.



Cycles – GRIPONE strategy for quick shifti is calculate by firing cycle.

This way make the system self adaptive by the RPM. Normally use value between 8 and 12. Lower values mean shorter time cut. Bigger values mean longer time cut.

Sensor direction – Keep it 0 (zero) with GRIPONE gear shift sensor. Change it by the direction of load cell (in case you are using a different sensor).

2.4 Launch control

This strategy is made to limit the engine power when you start. Every time the bike slow down and stop for 4 seconds, the



launch control switch on automatically. Until the bike does not exceed a certain speed (Max speed launch control) the strategy will keep the power under a specified value. When the bike exceed this speed, the power will be free to increase normally.

Launch control – it fix the level of the control on power. It will reduce power when there is wheelie. If you fix this value to 20000, the strategy will be off.

Min speed launch control – please do not touch

Max speed launch control – it fix the maximum speed over which the rev limiter will switch off.

2.4 Pit limiter

GRIPONE S3 has a strategy to control the speed of bike into the pit lane.



Max speed – it fix the maximum speed for the pit lane over which the system will reduce the power of engine.

3.0 All the rest

This paragraph explain the meaning of all other parameters included into the map.

3.1 Sensor linearization

These variables are used by the ECU for linearization of the external sensors such as TPS, the vertical accelerometer, the longitudinal accelerometer. All other sensors do not need to be linearized because they use the internal dynamics of the ECU to linearize themselves.

3.2 Other parameters

The variables included in this group are used to filter the calculations on the speed and the signals coming from the sensors. Do not changes the value of this variables.

RPM pulses for firing - Number of pulses detected for each burst of motor. Fix it to 1 to less than special cases.

Number of cylinder - Indicate the number of cylinders of the bike. This variable is used to calculate the right power reduction.

AVG windows (speed) - To validate the value of the speed the ECU calculates the average on the last "n" values recorded (where "n" is expressed by the variable). n=10means signal filtered, n=1 means not filtered

AVG windows (RPM) - To validate the value of the engine speed, the ECU calculates the average on the last "n" values recorded (where "n" is expressed by the variable). n=10means signal filtered, n=1 means not filtered

AVG windows (G and TPS) - To validate the value of the accelerometers and TPS, the ECU calculates the average on the last "n" values recorded (where "n" is expressed by the variable). n=10 means signal filtered, n=1 means not filtered

AVG windows (wheelie) - To validate the value of the wheelie state, the ECU calculates the average on the last "n" values recorded (where "n" is expressed by the variable). n=10 means that anti wheelie switch off slowly, n=1 means that anti wheelie switch off quickly

Pull up resistor for speed sensor (4.7K) - GRIPONE S3 uses speed sensors NPN open collector type. With the supplied sensors leave this variable to 1. If you use PNP sensors change the value of this variable to 0.

3.3 Remote control parameters

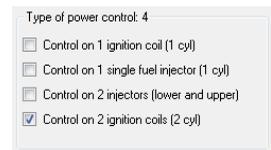
In this group there is only one parameter available: **Step of sensitive**. With GRIPONE S3 you can change the traction control sensitivity by the remote buttons (on the handle bar). You have 3 positions available: mapTC1, mapTC 2 and mapTC 3. In the position mapTC1 the sensitivity actuated is the value fixed by **slip target (%)**. In the position mapTC2 the sensitivity actuated is the value fixed by **slip target (%) + Step of sensitive**. In the position mapTC3 the sensitivity actuated is the value fixed by **slip target (%) + (2 X Step of sensitive)**. Example:

slip target (%) = 10
Step of sensitive = 2

active map: Map1 -> "target of traction control" = 10
active map: Map2 -> "target of traction control" = 12
active map: Map3 -> "target of traction control" = 14

3.4 Type of power control

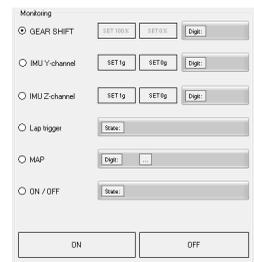
With GRIPONE S3 does not matter which kind of control is selected. It is always reduce the power by a combination of injectors cutting.



3.5 Monitoring

GEAR SHIFT – signal read from the input of gear shift sensor. Use it to check the gear shift sensor.

IMU-Y - While monitoring the IMU, the signal can be linearized using the button "0g" and button "1g" (note 4). Pressing the button "0g" the value (expressed in digits) shown to the right of the bar IMU-Y is stored in the variable "Digit for g = 0 (Min longitudinal G)" in the group "Sensors linearization" in the "ECU advanced setup".



Pressing the "1g" the value (expressed in digits) shown to the right of the bar IMU-Y is stored in the variable "Digit for g = 1 (Max longitudinal G)" in the group "Sensors linearization" in the "ECU advanced setup".

IMU-Z - While monitoring the IMU, the signal of IMU-Z can be linearized using the button "0g" and button "1g" (note 4).

Pressing the button "0g" the value (expressed in digits) shown to the right of the bar IMU-Z is stored in the variable "Digit for g = 0 (Min longitudinal G)" in the group "Sensors linearization" in the "ECU advanced setup".

Pressing the "1g" the value (expressed in digits) shown to the right of the bar IMU-Z is stored in the variable "Digit for g = 1 (Max longitudinal G)" in the group "Sensors linearization" in the "ECU advanced setup".

Note. The linearization of the IMU is required every time you change its position on the bike. To perform the reset, follow these steps:

- Open WINSOFT and open your last map.
- Place the IMU on the bike as shown in the installation manual hardware
- Connect the IMU to the ECU using the predefined connector ("IM")
- Connect the USB cable to the ECU. If you have not the last map press "READ FROM ECU" to download the map from ECU to PC.
- Select IMU-Y into the group "Monitoring"
- Press the button "ON" to activate the function "monitoring" and wait the signal is stabilized
- Press the button "OFF" to freeze the signal
- Press the button "set 0g" (of IMU-Y) to capture the value of IMU-Y at 0g
- Select IMU-Z into the group "Monitoring"
- Press the button "ON" to activate the function "monitoring" and wait the signal is stabilized
- Press the button "OFF" to freeze the signal
- Press the button "set 1g" (of IMU-Z) to capture the value of IMU-Z at 1g
- Press the button "OFF" to switch off the function "monitoring"
- Disconnect the USB cable
- Save the map by menu "File" > "Save"

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GUBELLINI di Diego Gubellini
Via Fiorentina 3508/H
40059 Medicina (BO) Italy