GAP Flasher

For all supported Vehicles

By

GAP Innovation

User manual, Version 6
Firmware V1.0

WARNING ***For your safety and that of others, please read this manual before using the GAP Flasher. Failure to follow instructions could result in serious consequences.***

WARNING ***The GAP Flasher is a device that allows updating the engine ECU firmware and provide the necessary information to the remap provider.***

Read this instruction manual carefully!

Disclaimers

Neither the distributors nor the manufacturer (GAP Innovation, Inc.) accept any responsibility or liability for damages incurred through use of the GAP Flasher. This includes all damages to the vehicle itself, vehicle systems or property. This also includes injuries to the user or other persons. The warranty is limited to the functionality of the GAP Flasher itself (for further warranty details, please consult the last page of this document). This includes especially:

- Damages incurred through improper use of the GAP Flasher
- Damages incurred through the use of the GAP Flasher to change vehicle configuration and / or settings, update the engine ECU, etc.
- Damages incurred through clearing faults without effecting proper repairs
- Damages incurred through usage of any third party products delivered by the GAP Flasher (remap etc).

WARNING ***The GAP Flasher is not designed to be left in place for long periods. Please unplug after use!***

Terms and conditions

Do not copy or reverse engineer

While considerable effort has been made to make the information provided in this section as complete and accurate as possible, it does not and cannot cover all possible situations. The authors cannot accept any responsibility for any damages which may occur from the use or misuse of these procedures, nor can the authors accept any responsibility for any damages which may result from personal injury or property damage which allegedly may be caused by the use or misuse of these procedures. No responsibility is accepted for missing or incorrect information. Those who use these procedures shall accept all responsibility for performing the work which may be described below.

Specifications are subject to change without prior notice.

Suggestions

For convenience and even security purposes, it is suggested that the user keeps an updated version of this manual in PDF format on his or her mobile devices. Thus, accessibility to procedures will be possible anywhere and anytime. By the same token, the computerized version facilitate searching for a particular topic.

You can proceed to download the User's Manual on the manufacturer's website.

The manual is updated regularly.

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1 Introduction

1.1 Objectives of the GAP Flasher

The GAP Flasher has been designed to achieve objectives that meet the demands of vehicle owners.

- Read and transmit the information required to modify the engine mapping by the supplier.
- Update the engine ECU with the custom version provided by a vendor or the original mapping.
- Reading and erasing fault codes.
- Live data viewing and recording (recording optional)
- Control or engine parameters (Anti-Lag...)

1.2 Connectors descriptions

Figure 1. Micro USB socket for USB cable used to connect the GAP Flasher to a computer.

Figure 2. OBDII connector which connects the GAP Flasher to the supplied wiring harness

Figure 3. Wiring harness to connect on the diagnostic port of the vehicle.

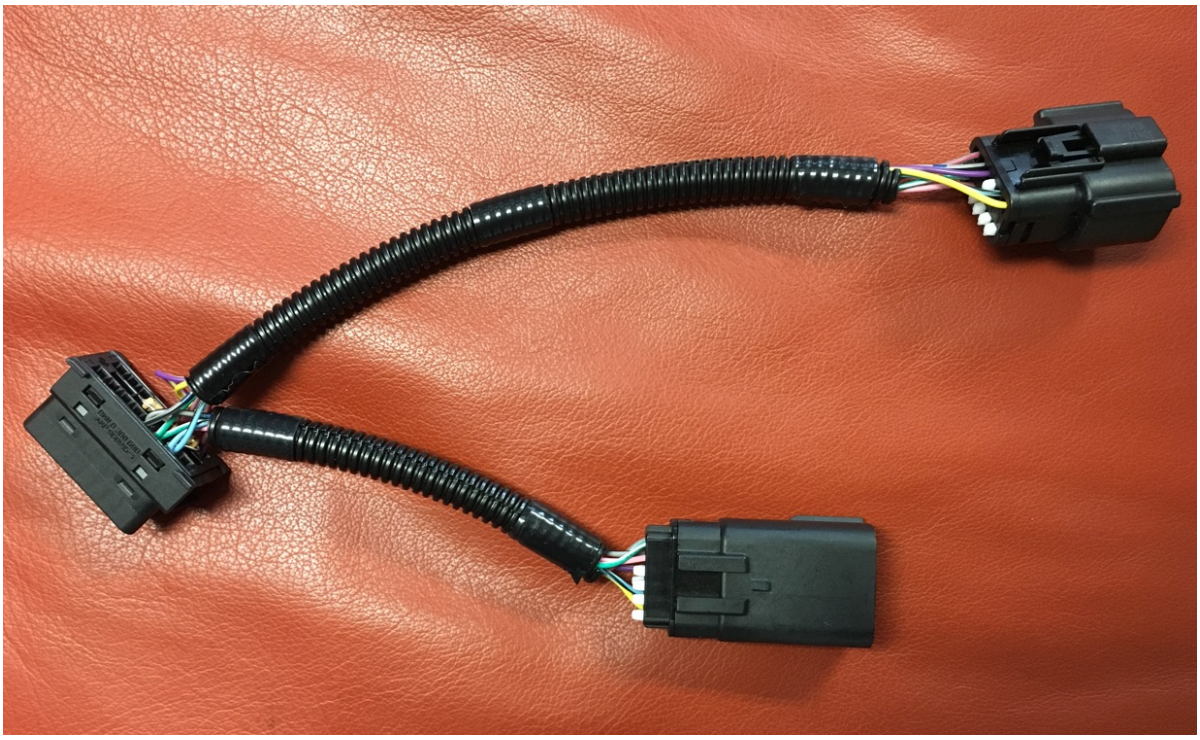


Figure 4. Optional Anti-Lag wiring harness to connect at the instrument cluster location.

1.3 Brief description of offered Functions

The functions offered by the GAP Flasher are categorized in the following table.

Faults	Dashboard	ECU Info	ECU Flash
Read and clear fault codes	Viewing engine live data. Optional data-logger with export capabilities*.	Reading of the current version of the firmware as well as the serial number of the computer (ECU)	Original software version or modified mapping**

Control	Calibration
Allows controlling engine parameters, Anti-Lag for example**	Speedometer and gearing calibration

Table 1. Functions offered

**Optional and sold by the GAP Flasher resellers.*

***Sold separately and transported by the GAP Flasher*

Note : *Some functions can help achieve more than one goal; this is particularly the case for the "Fault" function and "ECU Flash" after a repair.*

1.4 Supported vehicles

Covered vehicles are those for which the GAP Flasher tool can be used.

1.4.1 Model Year Identification

The Model Year is an approximate description of the production time of a vehicle in terms of its specifications or design revisions.

Note : *The Model Year does not coincide systematically with the calendar year at which the vehicle was manufactured.*

You can confirm the model year of a vehicle by checking the 10th character of the Vehicle Identification Number (VIN). It is located on the chassis and analyzed as follows:

	Model Year	
10th Character of the VIN	Years interval	Signification
Numbers,1 to 9	200**1**-200**9**	“1” for 2001 ... 9 for 2009
Letters	20**10** and up	“A” for 2010 “B” for 2011 ...

Table 2. Determining a vehicle Model Year using the VIN

4th and 5th VIN character	Model Year
4UF17SNW6HT000000	2017
4UF17SNW6IT000000	2018

Table 3. Model year as per the VIN example

* The letters “I”, “O” and “Q” are omitted.

1.4.2 Supported vehicles list

- Yamaha Sidewinder 2017 and up snowmobiles
- Arctic Cat 9000 series including Thundercat 2017 and up snowmobiles
- Yamaha XYZ 1000 side-by side 2016 and up

1.5 Interface

An interface is a connecting device which allows exchanges and interactions between the tool and the user.

1.5.1 Mobile App

The application developed for mobile devices (see below for compatibility) can be downloaded free of charge from the Apple App Store or Google Play Store under the name GAP Flasher (installation instructions are detailed in *section 2.3*).

1.5.2 Compatible mobile devices

The GAP Flasher is compatible with the following devices :

Apple mobile devices*	Android mobile devices
iPad 3rd gen onwards	Fitted with a Bluetooth V4.0 and up transceiver and running on OS 4.4 onwards**
iPad Mini	
iPod Touch 5 onwards	
iPhone 4S, 5, 6 onwards	

Table 4. Compatible mobile devices

*iOS 8 and up. Using the latest release (non Beta) version of iOS is strongly recommended.

**Despite compliance with these requirements, compatibility cannot be guaranteed because of the large variety of Android devices on the market. For example, a user has reported a device manufactured by Doogee cannot be used with the tool.

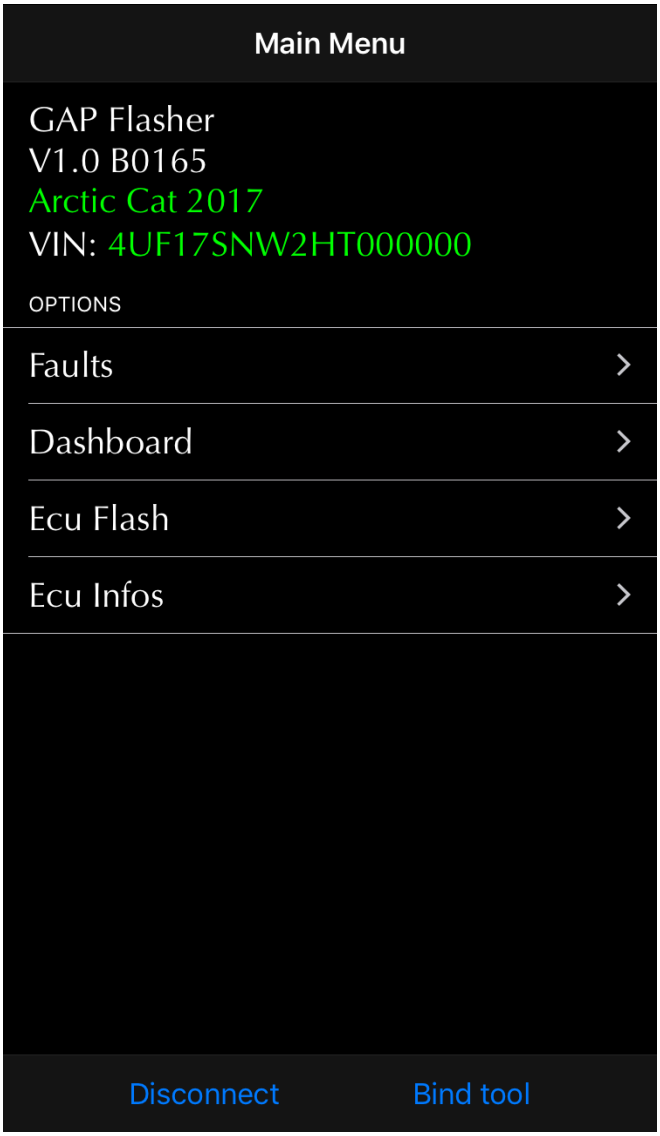


Figure 5. Menu overview

2 Getting started

2.1 Before first usage

Here is a compendium of operations to be performed before first usage. Each of these operations is described in detail in the referenced section of this manual. This table can serve as a fulfillment check list prior to using the tool.

√	Steps	Operation	Manuel section
	1st	**Installation of the updater software** on a computer	*section 2.2*
	2e	**Interface Installation** GAP Flasher mobile App	*section 2.3*
	3rd	**Updating** the GAP Flasher firmware	*section 2.4*
	4th	Synchronizing the Mobile Application	*section 2.5*

Table 5. Abstract of operations to complete before first usage

2.2 Installing the Updater Software

Purpose
Take full advantage of the GAP Flasher tool with updates.

Principle
Install the free software specifically dedicated to updating the tool, called «“Tuner name here” Updater» on a PC.

Note : *Installation of the updater software is required only once. If it turns out that an update is required, a message will pop up when launched with directions to follow.*

Prerequisites
- Having access to a PC type personal computer with Windows XP operating system or higher
- Have access to an internet service

Steps for Installing the updater software
1- Download the updater from the following location as per the Quick Guide
2- Once downloaded, click the file and follow instructions on the screen to complete the installation. **For computers running Windows, click the right mouse button and select “run as administrator”.**

The updater software is named GAP Flasher Updater.

2.3 GAP Flasher App installation

Purpose
Be able to interact with the GAP Flasher and control it.

Prerequisites
- Own at least one supported mobile device (see *section 1.5.2*).
- Have access to an internet service

Installing the mobile App
Download (free) the GAP Flasher App from Apple App Store or Google Play Store in each mobile device. Before using the App, the files will have to be synchronized with the current GAP Flasher firmware (see *section 2.5)*

Note : *Occasional updates are recommended. They will be announced by the Applications Manager. Please proceed with updating the GAP Flasher to the latest firmware when updating the mobile App section 2.4.*

2.4 Updating the GAP Flasher firmware

Purpose
Allow the evolution of the GAP Flasher, even after its manufacture.

Principle
Updates are made by reprogramming the firmware.

Benefits of updating the GAP Flasher

- Take advantage of bug fixes (if any)
- Take advantage of operational improvements such as execution speed... and more
- New additions in the tool and application

Prerequisites

- Having access to a PC type personal computer connected to an internet service
- Having completed installation of the updater software (*section 2.2*)
- Having completed the mobile App installation or update (*section 2.3*)

2.4.1 Steps for updating the GAP Flasher

1- Connect the tool to the USB port of the computer using the supplied USB cable
2- Start the updater software previously installed in the computer
3- Click on “FIND DEVICE” and wait until pairing of the tool with the updater software is completed. Once paired, the user information, vehicle information and current firmware version of the tool will be displayed.
4- Select the desired version of the firmware in the right combo or radio box (if available).
5- Click on “PROGRAM FIRMWARE”. The evolution of each data file is observable in succession on the progress bar.
6- A subsequent window will appear with “ACTION NEEDED”. The requested operation is synchronization of the mobile App with the tool. Keep the tool connected to the computer to complete this step described in section, *section 2.5*. **Note:** Performing synchronization immediately after updating the tool or before first usage will prevent prolong file loading when connected to the vehicle due to a poor internet connection.

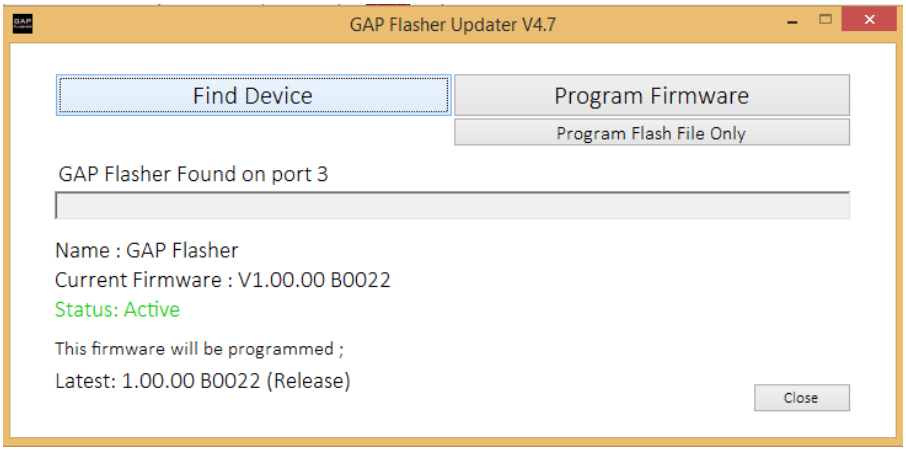


Figure 6. Updater software overview

Troubleshooting, updater software

Occasionally, some obstacles can arise when using the updater software. Here are tips to get around them.

Problems	Solutions
The updater software is not working properly or cannot connect to the internet.	Change software permission in Firewall Settings
The updater software is not working properly even after permission was granted in the firewall.	Momentarily disable the computer's firewall
Unable to perform the update (rare)	Try again with : Another USB Port or ; Another USB cable or; A different computer
The message "Device Not Found" is displayed after pressing "FIND DEVICE"	Check that the tool is recognized by Windows. The update can be done only when connected to a computer only. Do not connect the engine ECU at the same time or power the tool with an external source.

Table 6. Troubleshooting, updater software

If other difficulties arise during the firmware update, contact the manufacturer :
support@GAPInnovation.com

2.4.2 Language (coming soon)

You can choose between a firmware in French or English language in step 3, *section 2.4*)

App: The language of the application is the same as that used by the mobile device. The firmware and the mobile device must be in the same language.

2.5 Synchronizing the Mobile App, Registering and tool binding

Purpose

Refresh files in the Mobile Application GAP Flasher to achieve consistency with the firmware of the newly updated tool (*section 2.4*) or prior to first usage.

Registering the unit with your personal credentials is done at the same time. This allows usage of sharing functionalities and viewing online logs when not connected to the tool (see *section ....*)

Binding allows online functions to be used without the need to log in. You can also lock the tool which will prevent usage by another mobile device unless the password is entered.

Note: *Performing synchronization immediately after updating the tool or before first usage will prevent prolong file loading when connected to the vehicle due to a poor internet connection.*

Prerequisites

- Having access to a PC personal computer.
- Own a compatible mobile device (*section 1.5.2*) connected on the internet.
- The GAP Flasher App is installed and up-to-date (*section 2.3*)
- The GAP Flasher firmware was updated (*section 2.4*) or a new mobile device is used with the tool for the first time.

Steps

Initial steps

1- Connect the GAP Flasher on the USB port.
2- Launch the mobile Application GAP Flasher in the mobile device.
3- Click on “ Search for tool”.
4- Select the tool in “Bootloader”. For the first synchronization, fill the required fields.

Registering

5- Proceed with registering. This can also be done later if needed. Simply fill up the required field by clicking on Register.

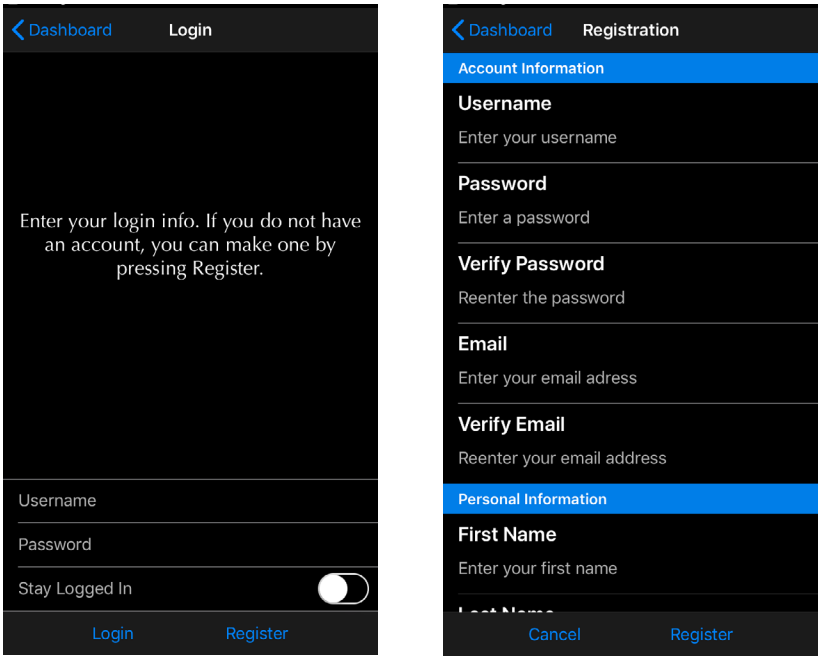


Figure 7. Registering

Binding

6- Binding the tool will allow usage of certain functions including Online Logs and Sharing when not connected to the tool without the need to log in.

Locking the tool will prevent other users from connecting to the tool using another mobile device unless they enter the defined password. This can also be done later if needed.

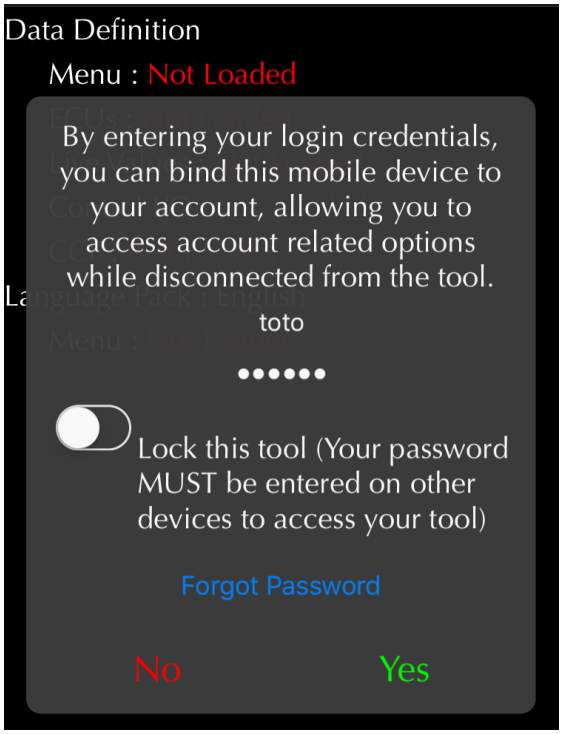


Figure 8. Tool Binding

7- Wait while all data files are downloaded : the word “Loaded” indicates completion.
8- Exit the application by pressing “Disconnect”.
9- Repeat previous steps for each mobile device that may be used with the tool.
10- Unplug the tool from the computer.

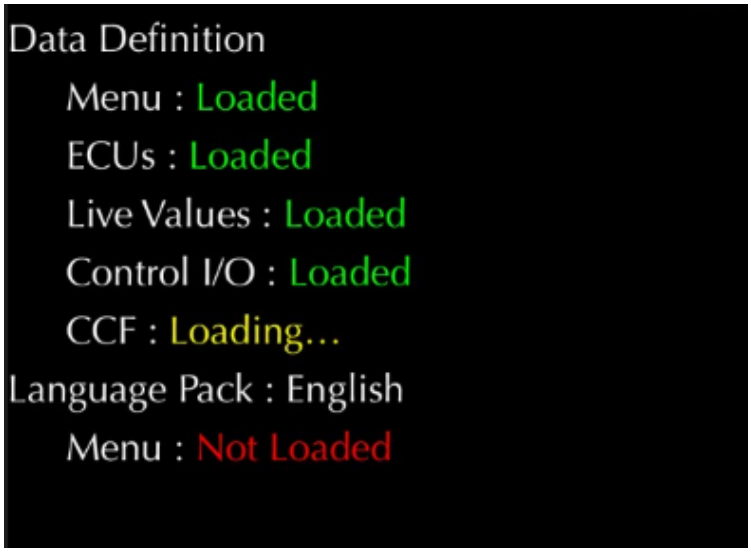


Figure 9. File download or synchronization

2.6 General operation of the GAP Flasher

This section explains how to connect the GAP Flasher to the vehicle, install accessories, interface commands to navigate through the various interface menus, and finally the proper disconnection of the tool.

2.6.1 Diagnostic port location

Arctic Cat 9000 series and Yamaha Sidewinder: Open the right side panel

The diagnostic port is located behind the chain case.

Figure 10. Diagnostic connector

2.6.2 Connecting the GAP Flasher on the vehicle

Once the diagnostic socket is located, it is possible to connect the tool to the vehicle.

Connecting steps

1- Remove the cap from the diagnostic connector.
2- Turn on the ignition.
3- Connect the tool on the vehicles diagnostic port and wait for about 5 seconds.
4- Launch the mobile App of the GAP Flasher and navigate as described in the next segment.

WARNING

Prior to GAP Flasher firmware build 245, it was not designed to be left in place for long periods. Please unplug after use!

Leaving the GAP Flasher connected for long periods without the engine running will drain the vehicle's battery.

Note: *From GAP Flasher firmware build 245, the tool can be permanently left connected without risk to the battery.*

2.6.3 Disconnecting the GAP Flasher

The GAP Flasher can be disconnected at any time except:

WARNING

Do not disconnect GAP Flasher during an ECU flash as a breakdown or serious consequences could arise (descriptions of these functions and recovery methods are found in the re-flash section.

2.6.4 Mobile Application, Navigation and Controls

Definition

The App was developed by the manufacturer with user friendliness in mind.

Prerequisites

- Own a GAP Flasher
- Have access to the vehicle on which the tool will be used
- Own a compatible mobile device (*section 1.5.2*) on which the Bluetooth module is "activated" or "ON"?
- GAP Flasher App installed in the mobile device (*section 2.3*) and having synchronized it with the tool (*section 2.5*)

Steps to navigate the Mobile Application

1- Proceed with connecting the GAP Flasher as per *section 2.6.2*
2- Lunch the GAP Flasher App
3- Click on "Search for tool" at the bottom of the screen
4- Select the desired tool available in the list ("available tools").

Mobile App representation

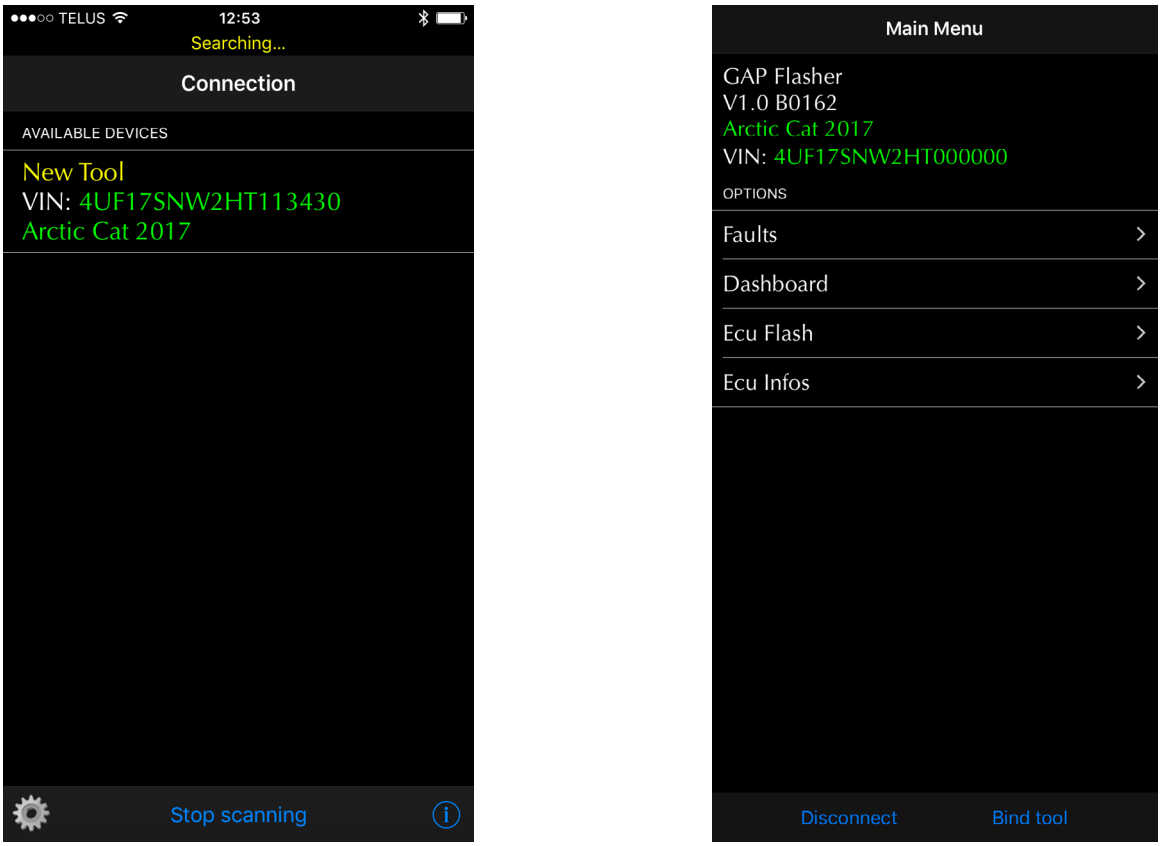


Figure 11. Mobile App representation

Important note: *It is not required to add the GAP Flasher to the Device List on the mobile device or to pair. The Application provides connectivity between the two. Disconnect from any other Bluetooth devices before using GAP Flasher.*

Language

The application is available in French and English. It automatically adjusts to the language of the mobile device.

2.6.5 App parameters

Access

The App Setting button is available on the top bar in the Dashboard function (*section 3.2*).

Available parameters and description

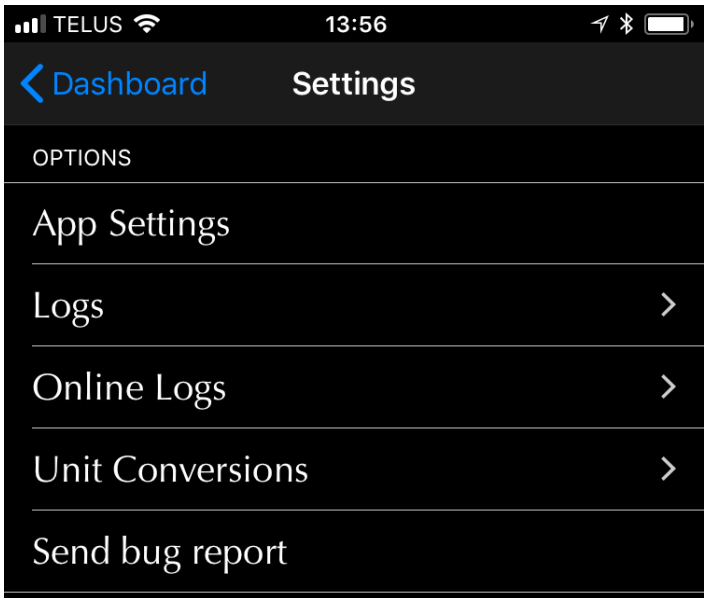


Figure 12. Parameters definition

- **App Settings:** This presents settings related to the general App functioning.
- **Logs:** This will allow access to data saved by the optional datalogger module.
- **Online Logs:** View records shared by Friends.
- **Send bug reports**: This should only be used when an issue is present and GAP Innovation requires additional data for analysis purposes.
- **Unit Conversion:** Allows selection or imperial or metric units. Some values will remain at their initial unit, boost pressure, for example, is only available in PSI.

Available settings and description

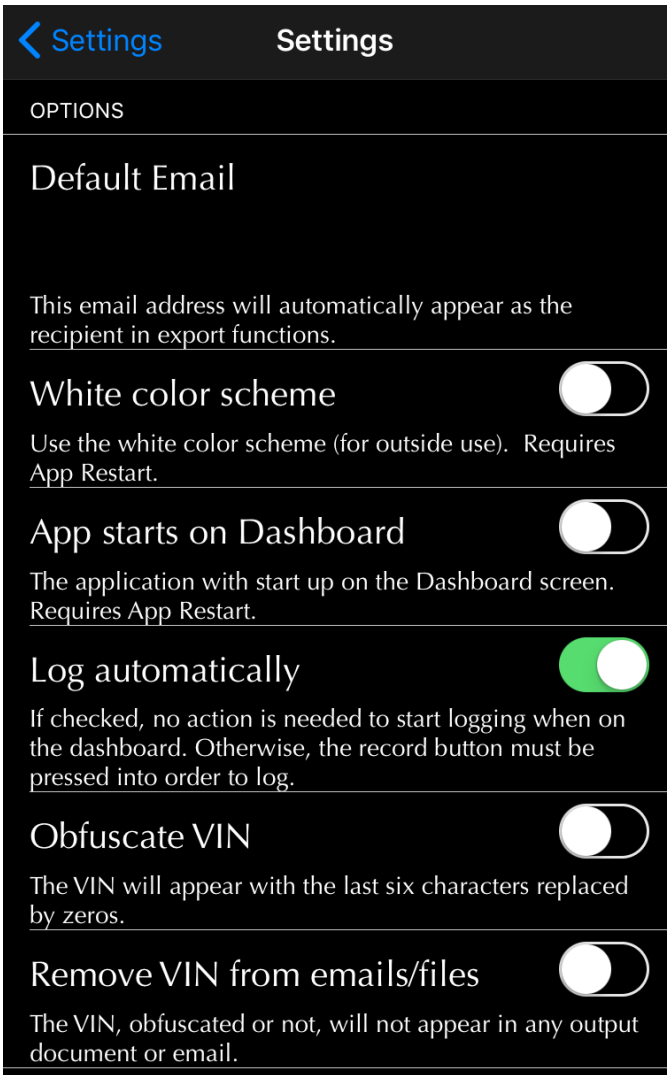


Figure 13. Settings definition

A description of each setting is defined under the setting name. Some settings, Log automatically for example, will only work when the optional datalogger module is available on the said vehicle.

2.6.6 LogIn

Definition

Login in allows the use of certain functions, including online records and sharing, when not connected to the tool.

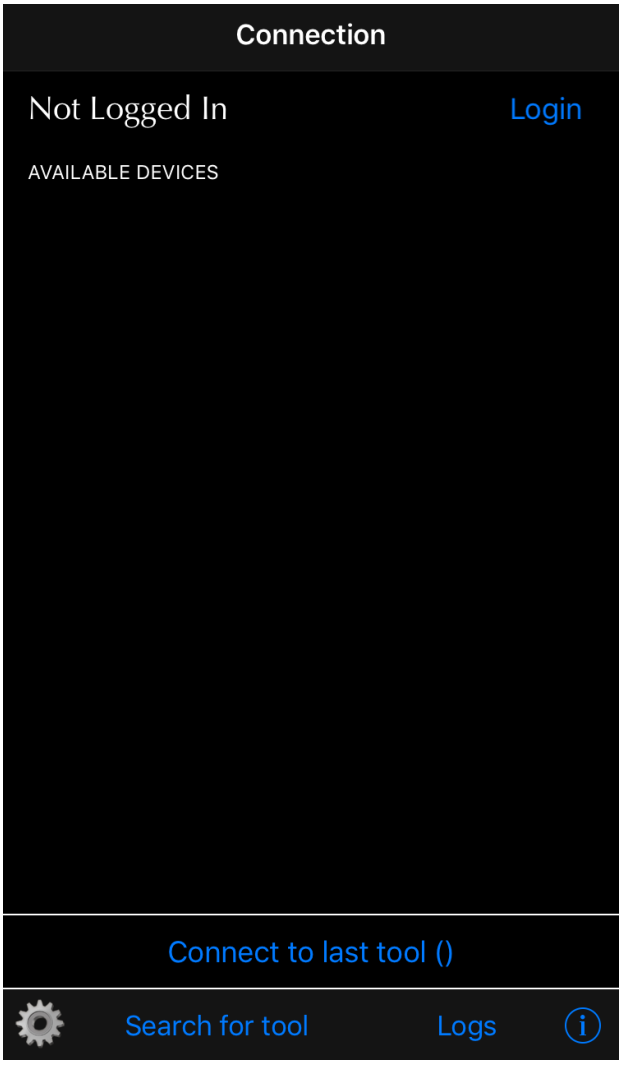


Figure 14. Login

2.6.7 Installing the optional AEM O2 Wideband sensor

WARNING

Frequent usage of the Anti-Lag function with a Wideband O2 sensor connected could damage the sensor.

Neither GAP Innovation nor the tuner shall be held responsible for damages incurred while using the GAP Flasher.

Preparation

Having installed the O2 sensor bong on the exhaust path.

1- Remove both side panels and the hood.
2- Locate the black diagnostic connector besides the chain case and remove the cover

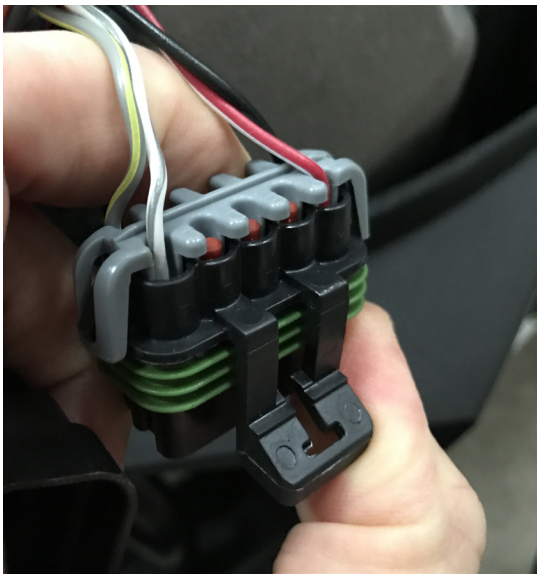


Figure 15. Diagnostic port, AEM installation

3- Locate the accessory connector at the same location and remove its cover (2 way trailer type connector).

Note: *Splitter for the accessory connection (power and ground) are available. Total current consumption should be considered when connecting multiple accessories on this connector.*

4- Connect both AEM connectors on the accessory and diagnostic connectors.

Figure 16. Connecting the AEM harness on the vehicles harness

5- Route all wires towards the top of the engine bay. Avoid routing close to the turbocharger, muffler or headers. Secure wires using zip ties

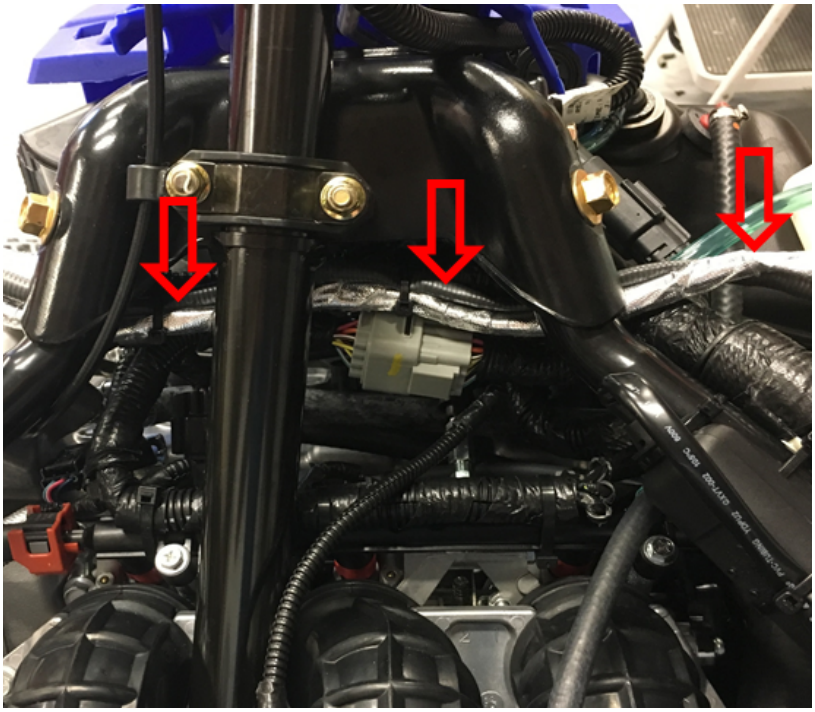


Figure 17. Routing the AEM harness

6- Connect the sensor connector to the AEM O2 Wideband module

Figure 18. Connecting O2 sensor on the AEM harness

7- Find a good location for the module and secure it using zip ties. Avoid the area in red since the hood will not close properly.

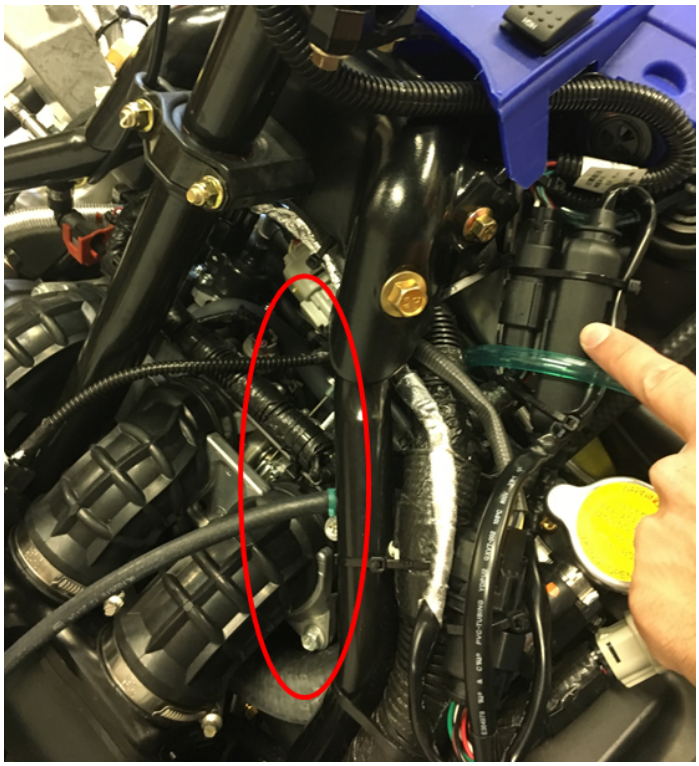


Figure 19. Fixing the AEM module

8- Install the hood and side panels. Make sure they fit properly and that the AEM module is not interfering.

2.6.8 Installing the optional Anti-Lag Harness

1- The cluster is held by tabs located on its rear housing. Insert your hand behind the cluster, press on two clips from one side and pull the cluster outwards with your other hand.

Figure 20. Instrument cluster removal

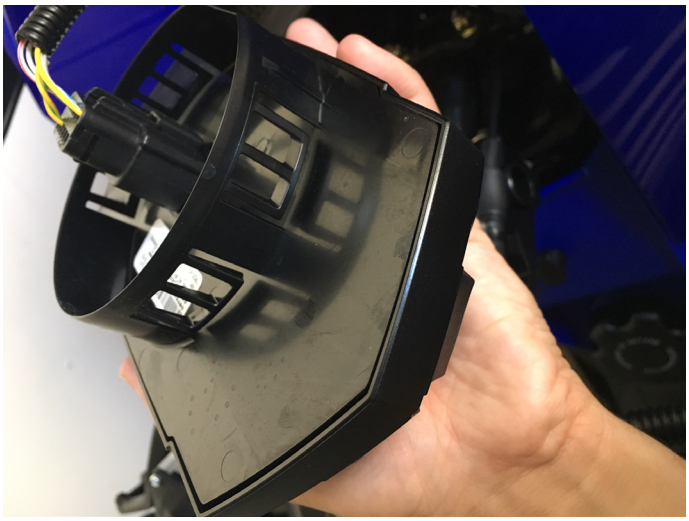


Figure 21. Instrument cluster locking tabs locations

2- Disconnect the instrument cluster wiring harness

3- The harness previously connected on the instrument cluster mates with the Anti-Lag wiring harness.

Figure 22. Connect Anti-Lag and instrument cluster harnesses

4- Locate the remaining connector from the wiring harness and connect it to the instrument cluster.

Figure 23. Instrument pack connection to the Anti-Lag harness

5- Install the instrument cluster to its original location.

2.6.9 Installing the optional iPad Mini 4 holding brackets

Removing the instrument cluster

1- Remove both side panels and pull the hood forward a few inches.

Figure 24. Hood pulled forward

2- Remove the goggle bag or grill. The grill is removed by pulling towards the rear of the vehicle.

3- The cluster is held by tabs located on its rear housing. Insert your hand behind the cluster, press on two clips from one side and pull the cluster outwards with your other hand.

Figure 25. Instrument cluster removal

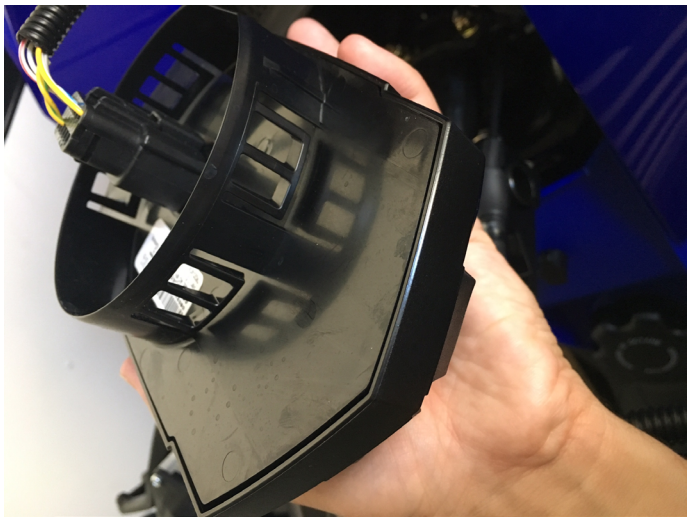


Figure 26. Instrument cluster locking tabs locations

4- Disconnect the instrument cluster wiring harness

Installing the iPad support

Simply place and push the iPad bracket assembly for proper fitting.

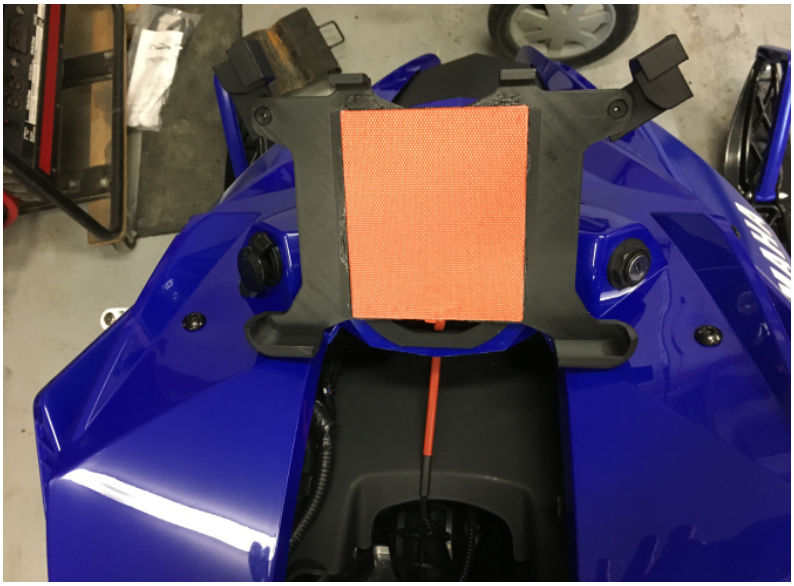


Figure 27. Installing the iPad support

Removal is achieved by pushing on the back of the round insert the same way the original instrument cluster is removed. Do not pull on the iPad holder.

Note: *The above picture shows a CoPiTrail bracket which is fitted with a heating pad. This is not available for GAP Flashers.*

Connecting the Anti-Lag harness

- The cable harness previously connected to the instrument cluster mates with the Anti-Lag wire harness.

Figure 28. Connection of the Anti-Lag cable harnesses and instrument cluster

Installing the instrument cluster relocating bracket

- Locate the tabs, one per side, on the instrument pannel on which the bracket will be held. The relocating bracket tabs (left picture) will be placed on top of the lower tabs of the instrument pannel (right picture).

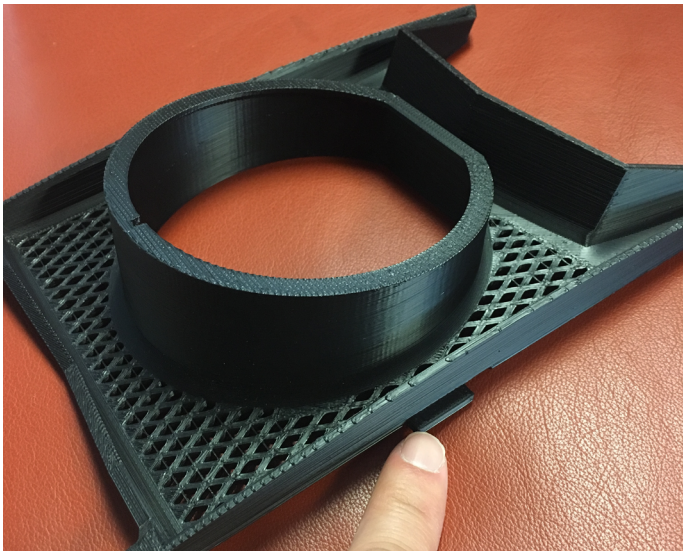


Figure 29. Relocating bracket tabs locations

Figure 30. Instrument pannel tabs locations

- Slide the bracket sideways and towards the rear of the vehicle

Figure 31. Relocating bracket initial steps 1

Figure 32. Relocating bracket initial steps 2

- Place your finger below the lower tab (figure X) and slide the bracket forward until it reaches the original cluster support (in red). Make sure the tab on the bracket is placed on top of the lower tab of the pannel.

Figure 33. Relocating bracket positioning

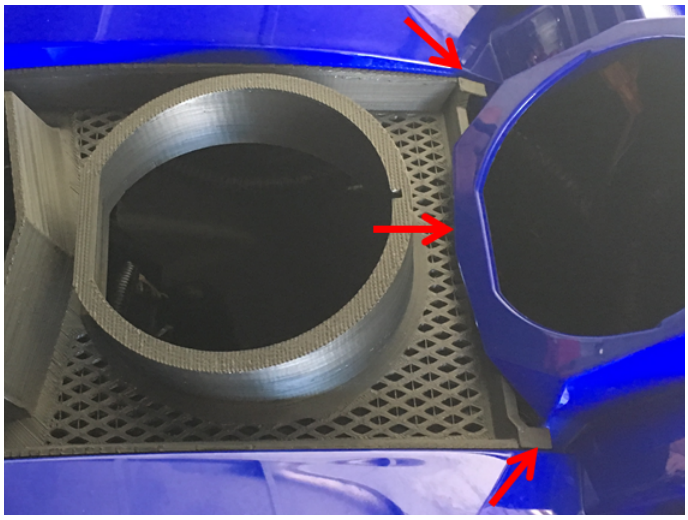


Figure 34. Relocating bracket final position

Notice the space between the top of the bracket and pannel. The photo on the right shows a correct installation while the one on the right is incorrect.

Figure 35. Relocating bracket correct position

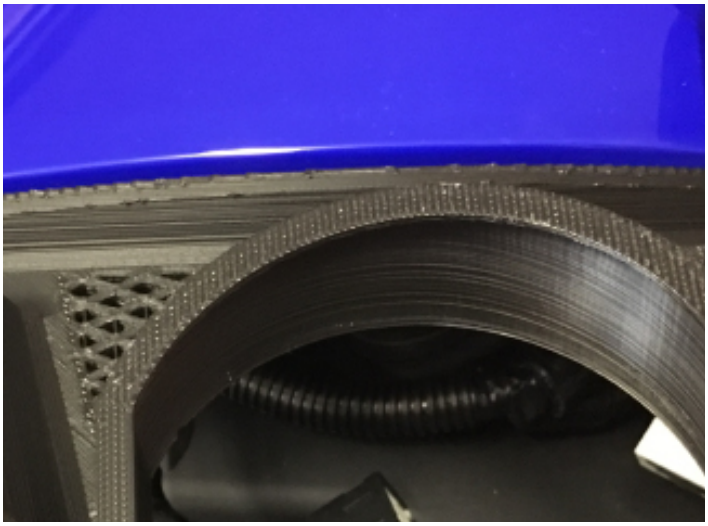


Figure 36. Relocation bracket incorrect position

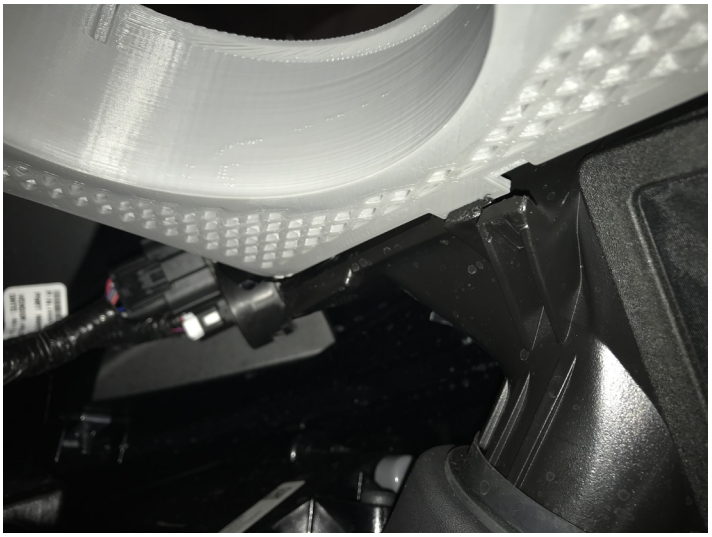


Figure 37. Relocating bracket incorrect position

Figure 38. Relocating bracket incorrect position

Installing the original instrument cluster

1- Locate the remaining connector from the wiring harness and connect it to the instrument cluster.

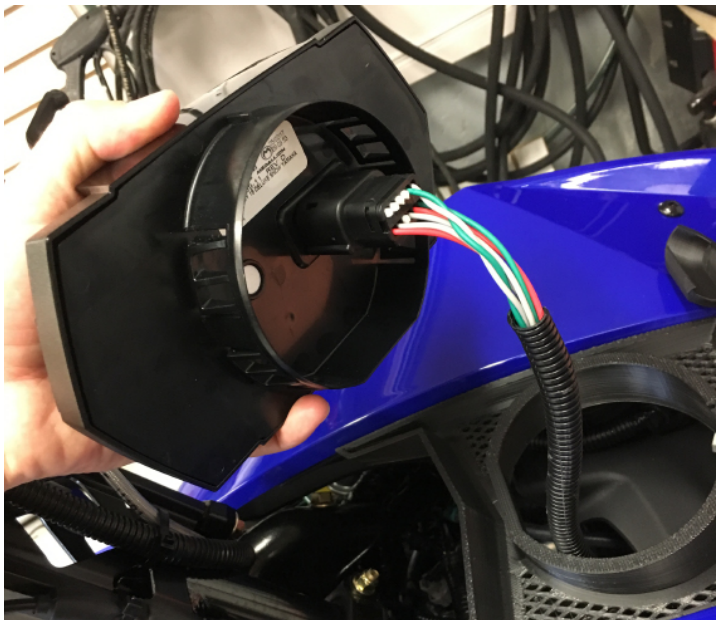


Figure 39. Instrument cluster installation harness connexion

2- Insert the instrument cluster into the relocating bracket. Be sure to align the tabs and the notch (red circle).

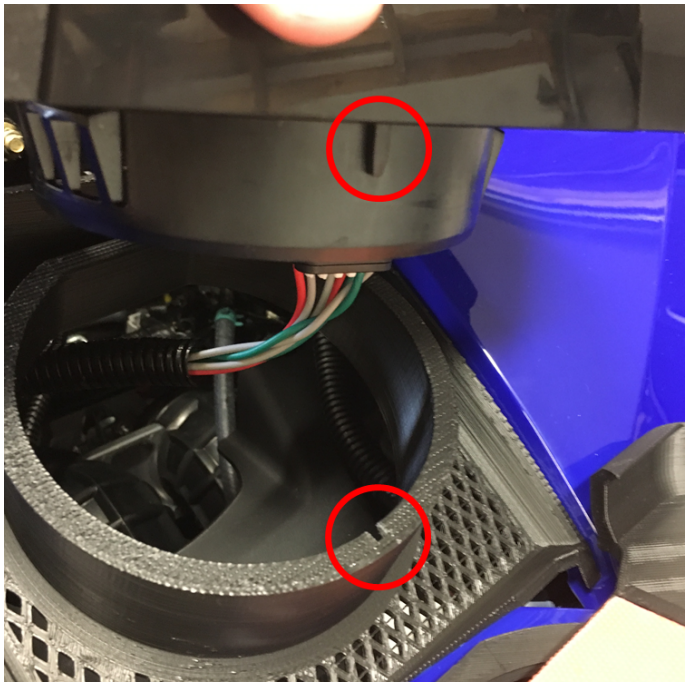


Figure 40. Instrument cluster installation

Removal is achieved by gently pulling on both sides of the instrument cluster.

Finalizing

Push the hood back into position and install side panels. Make sure that no wires or others come in contact with the steering post or down into the hole in front of it.

2.6.10 Installing the optional button

Harness connecting to the GAP Flasher connector

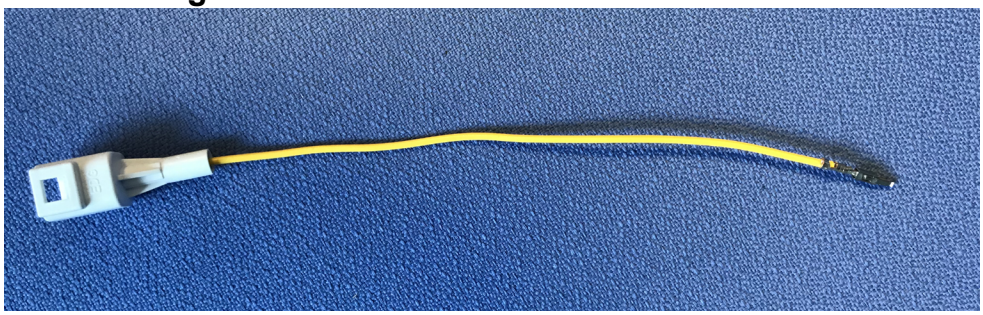


Figure 41. Optional button, harness connecting to the GAP Flasher connector

Two different OBD type connectors have been used for the manufacture of GAP Flasher harnesses. Only one of the two provided harness with a yellow wire is required and depends on the OBD connector.

Terminal and connector, type A

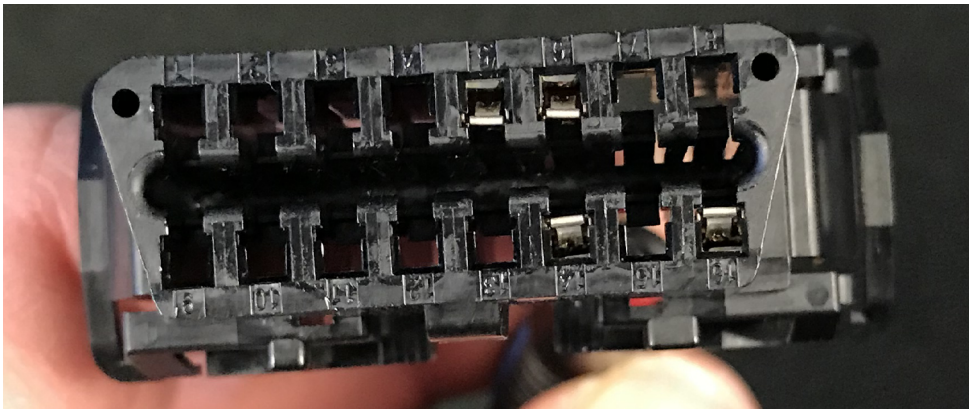
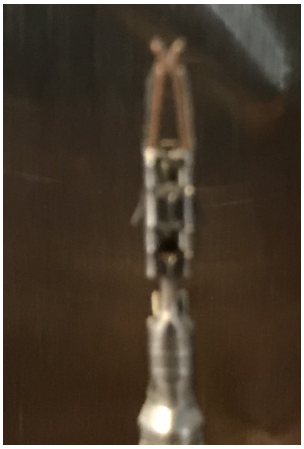


Figure 42. Optional button, type A harness

Simply insert the terminal in slot number 8.

Terminal and connector, type B



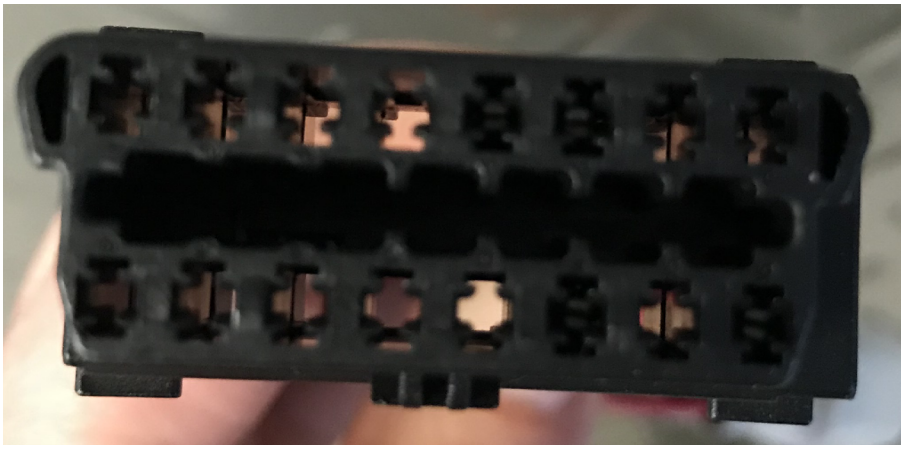


Figure 43. Optional button, type B harness

Unlock the connector pulling on the gray lock. It does not need to be removed from the connector.

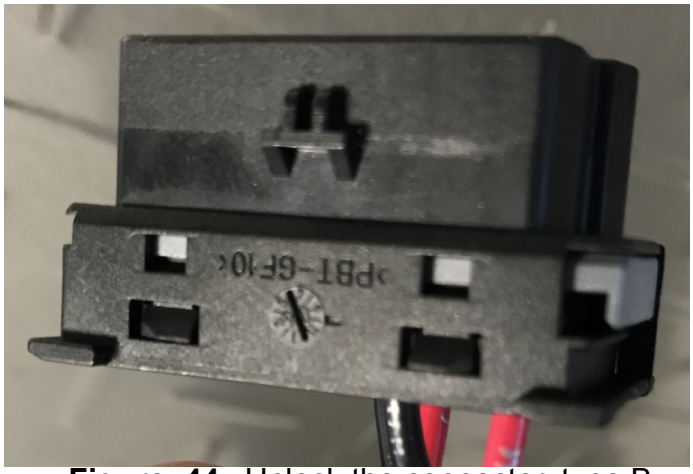


Figure 44. Unlock the connector, type B

Simply insert the terminal in slot number 8 and push on the grey lock.

The numbers are indicated on the OBD connector.

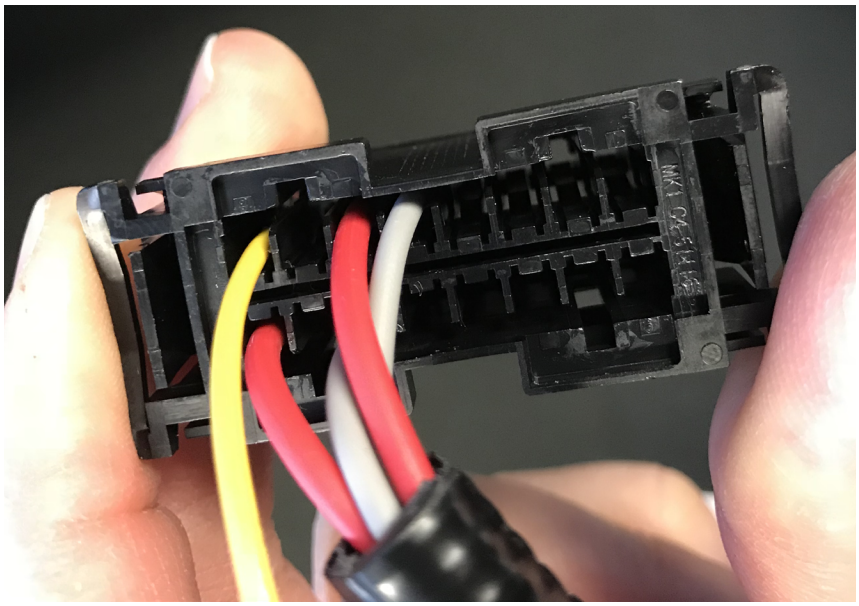


Figure 45. Yellow wire inserted

Open the protective corrugate and insert the yellow wire

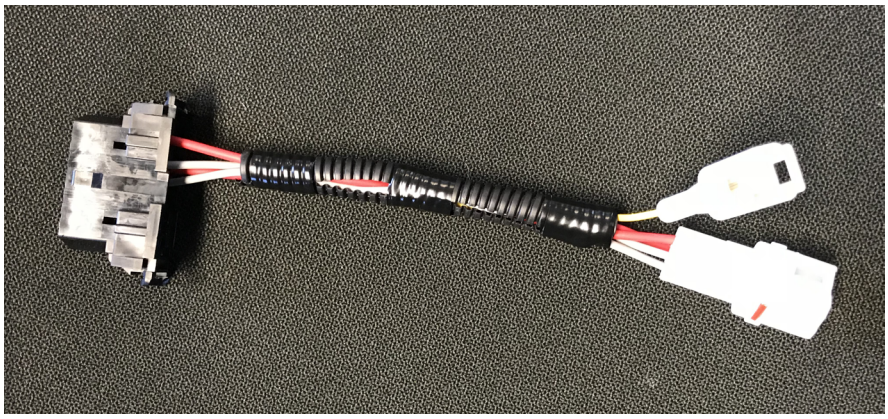


Figure 46. OBD harness installed

Harness connecting into the black diagnostic connector

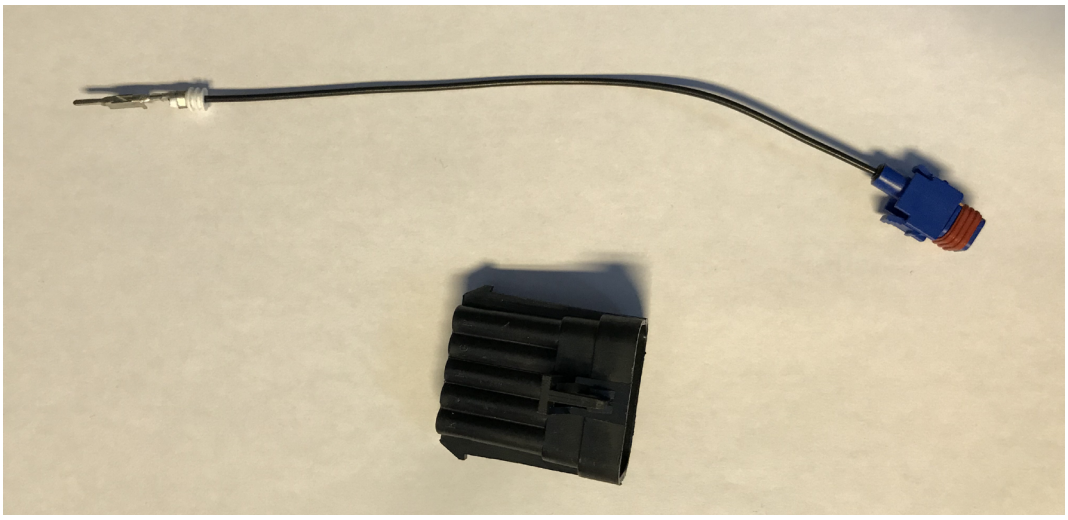


Figure 47. Optional button, black diagnostic connector harness

A connector is provided and will be used to connect this harness to the diagnostic port. If the vehicle is already equipped with an optional AEM O2 wideband sensor, the wire will be plugged into it.

Locate the A position of the connector and insert the terminal until it is in position. The wire will then be securely fixed.

Figure 48. Optional button, black diagnostic port harness connection

Chain case to handlebar connection harness

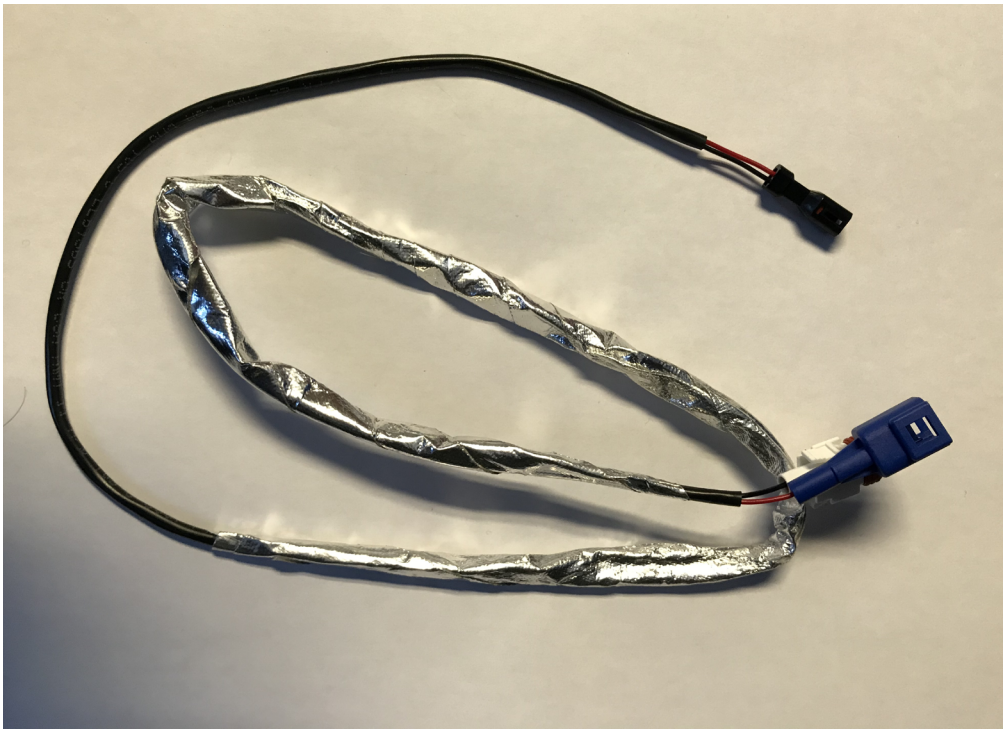


Figure 49. Chain case to handlebar connection harness

1- Connect the Blue and White connectors with those of the GAP Flasher harness and black diagnostic port harness.

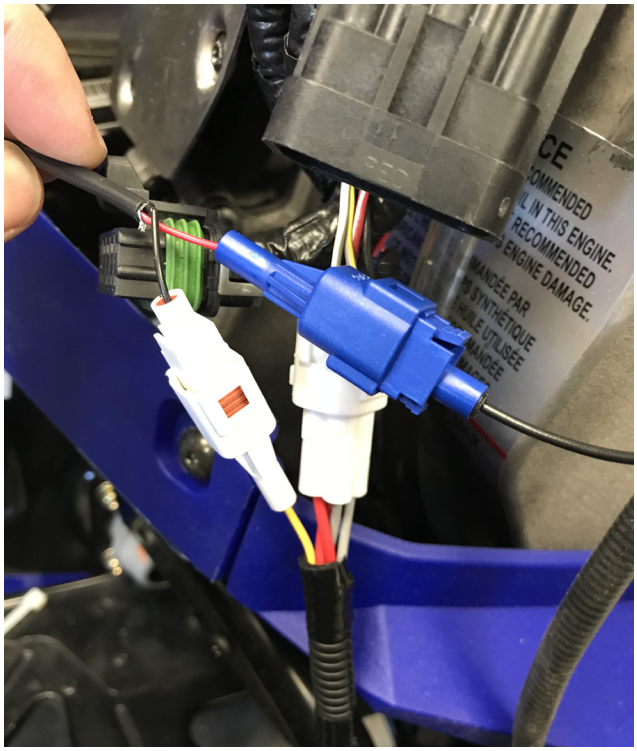


Figure 50. Chain case to handlebar connection harness at the chain case

2- Route all wires towards the top of the engine bay. Avoid routing close to the turbocharger, muffler or headers. Secure wires using zip ties

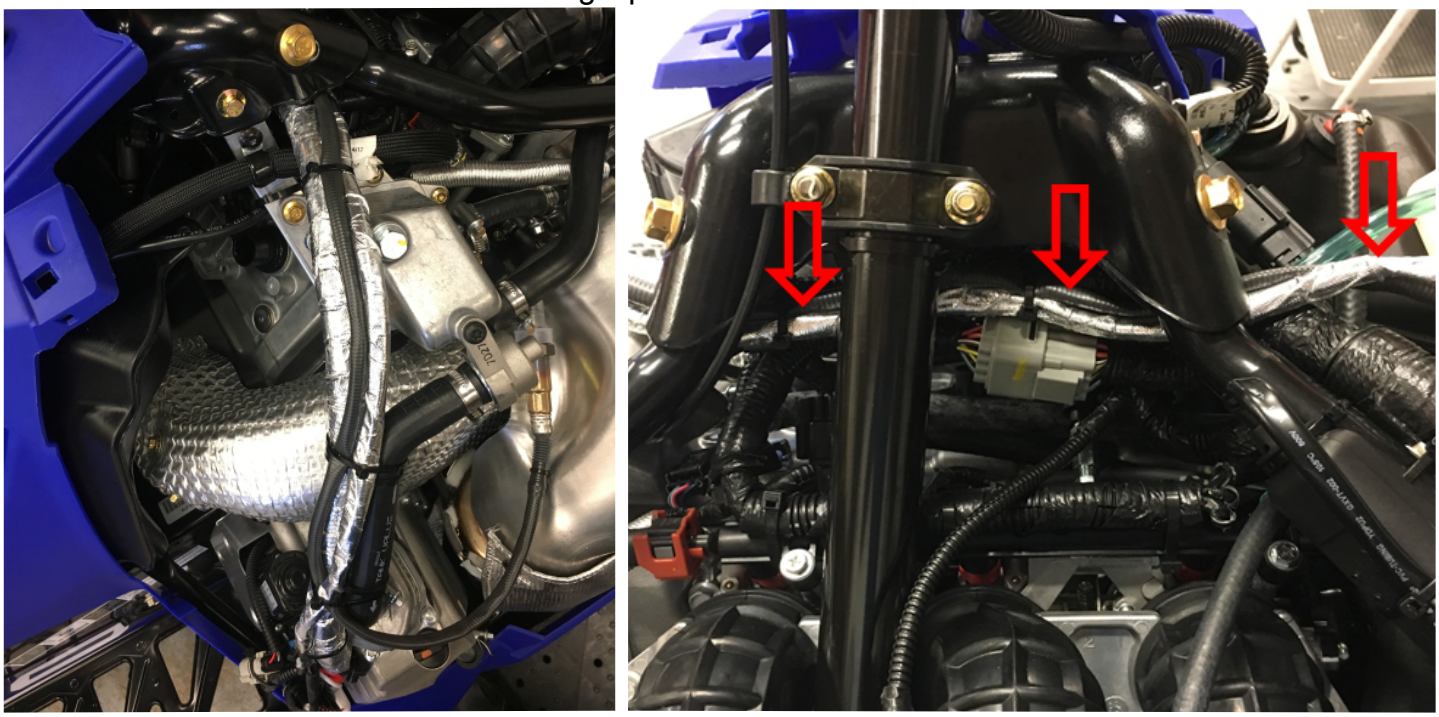


Figure 51. Routine of the chain case to handlebar connection harness

3- Locate the connector connecting the main harness to the snowmobile handlebar harness and place the black connector as follows.

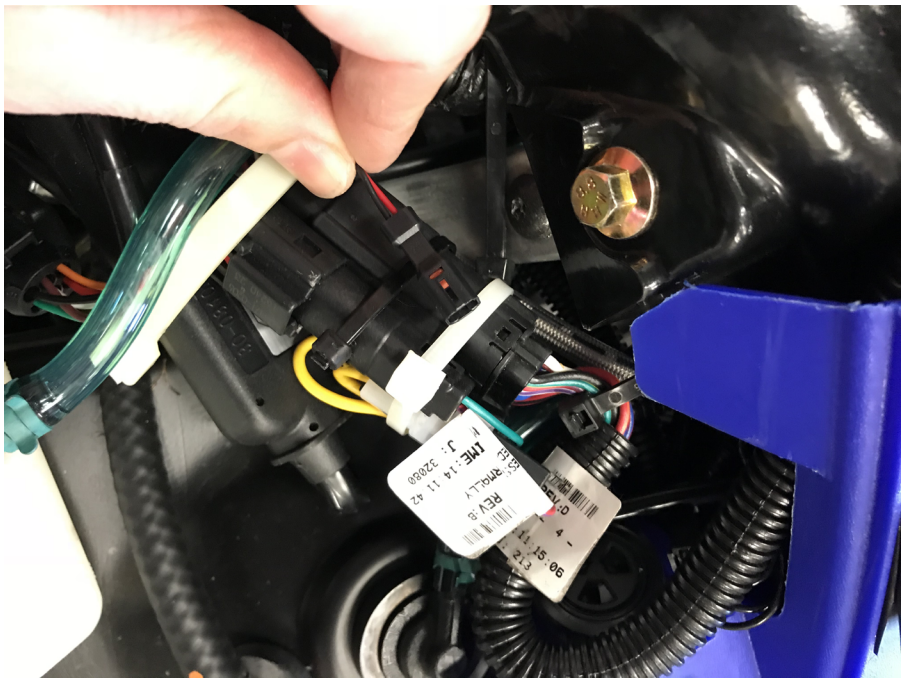


Figure 52. Handlebar connector location

Button Installation

1- Place the button as follows and position it so that it is straight. The support embarks on the handle has the notch provided for this purpose.

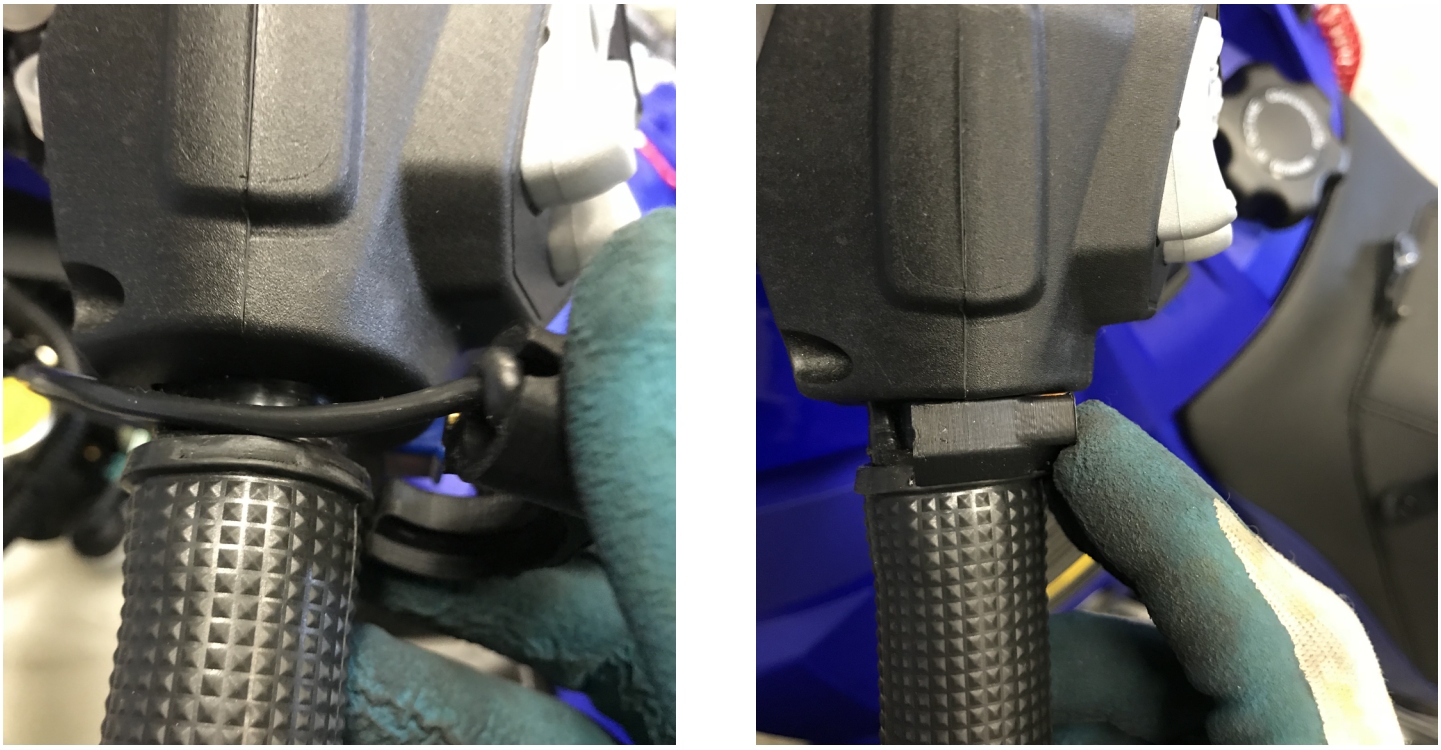


Figure 53. Button installation, button at the top (left) and bottom (right)

2- Assemble the back part of the button. Do not over tighten the screws.

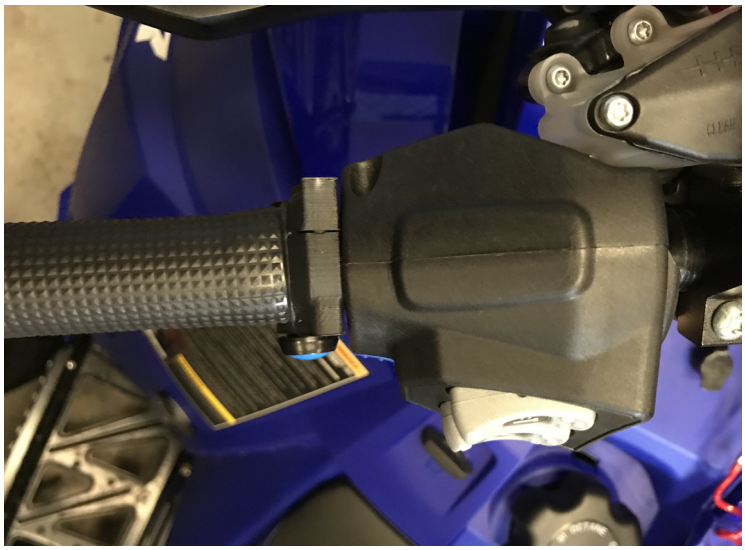


Figure 54. Button installation, back installation

3- Route the cable by following the handlebar harness.

Figure 55. Routing on handlebar

4- Connect the button harness with the one previously routed to the junction of the handlebar harness.

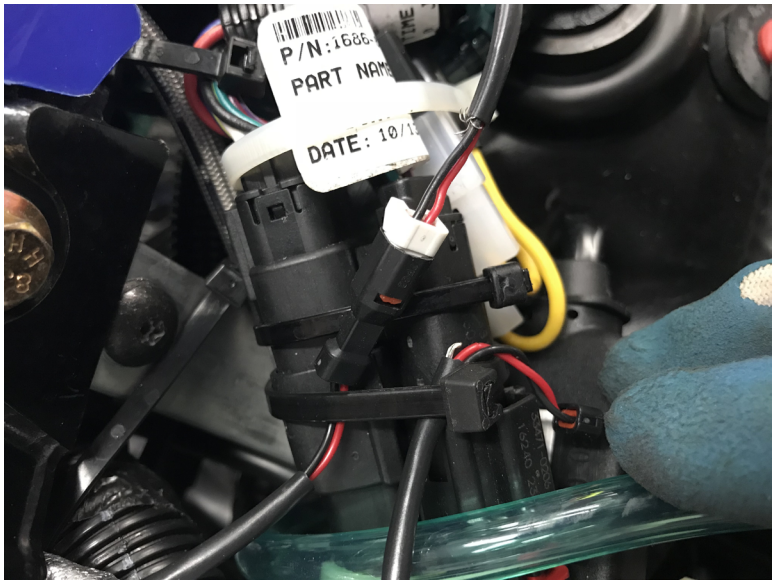


Figure 56. Connection at handlebar connector

3 Functions definition

3.1 «Faults» function

This function is subdivided into 2 sub-functions, that is; The «Fault Reading» and «Fault Clearing».

3.1.1 Definition

This diagnostic function gives access to the list of currently stored faults in covered ECUs. It helps, following the reading, to identify the source of the problem.

3.1.2 Access

Simply click on the Fault option. The GAP Flasher will automatically scan the engine ECU to detect the presence of faults.

Buttons :	**Definition :**
 or* 	This button will export the list of faults.
 or* 	When this button is pressed, the GAP Flasher will scan ECUs (“refresh”).
 *Apple or Android	This button clears all faults

3.2 «Dashboard» function

3.2.1 Definition

This function allows viewing engine and vehicle data. Recording is sold separately.

3.2.2 Access

Simply click on the Dashboard option. The GAP Flasher will automatically enter this screen by default if set in the App settings (*section 2.6.5*).

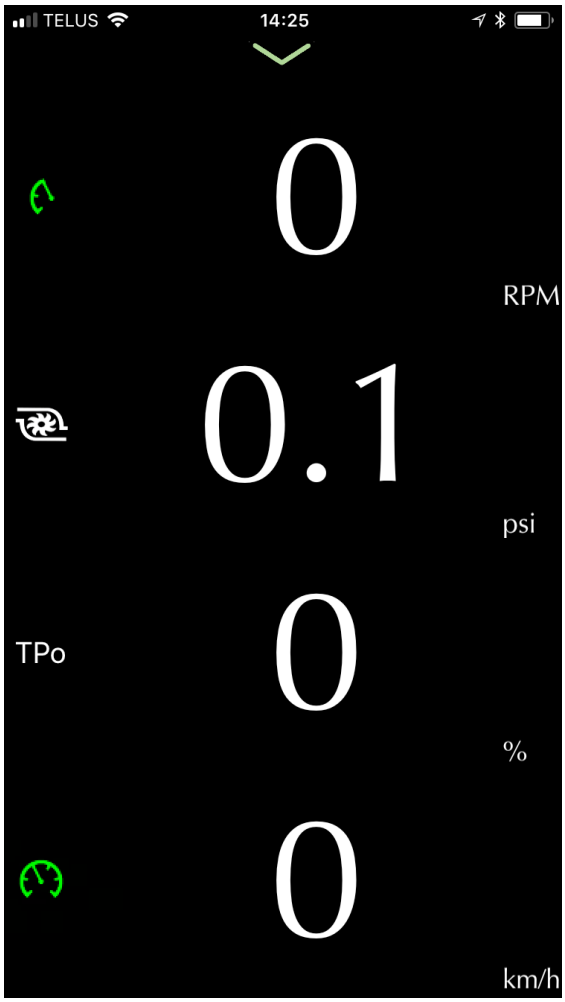


Figure 57. Dashboard Phone layout example

Figure 58. Dashboard iPad layout example

3.2.3 Top Bar

Click on the green arrow on top of the screen to make the top bar appear.

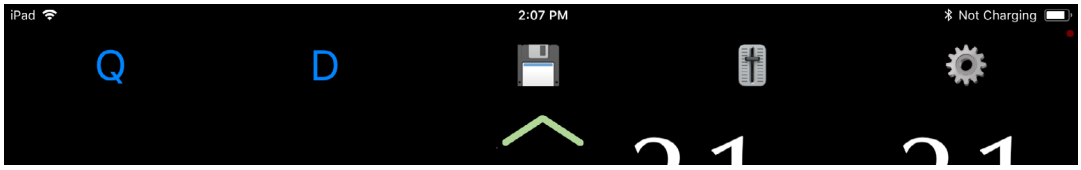


Figure 59. Dashboard Top Bar

Quit button

The Q button is to quit de dashboard and return to the main menu.

Disconnect button

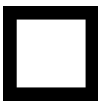
The D button is to disconnect from the GAP Flasher and return to the connection screen.

Record and Save buttons

These buttons will be visible when the optional datalogger was purchased for the vehicle on which the tool is connected.

Save button. This button will be visible when the Log automatically setting is activated (*section 2.6.5*) Pressing on this button will save the log and start a new recording.

Record button. This button will be visible when the Log automatically setting is not activated (*section 2.6.5*). Pressing this button will start the recording .



Stop button. This button will be visible when the Record button was pressed. Pressing this button will stop the recording.

Adjustments button

This button will be visible when the optional Anti-Lag function was purchased for the vehicle on which the tool is connected. See *section 3.6* for more details

App settings button

This button will show the setting screen. See *section 2.6.5* for more details

3.2.4 Live values selection

Click on any of the live data fields to prompt the selection box. Available live values will depend on the vehicle and options.

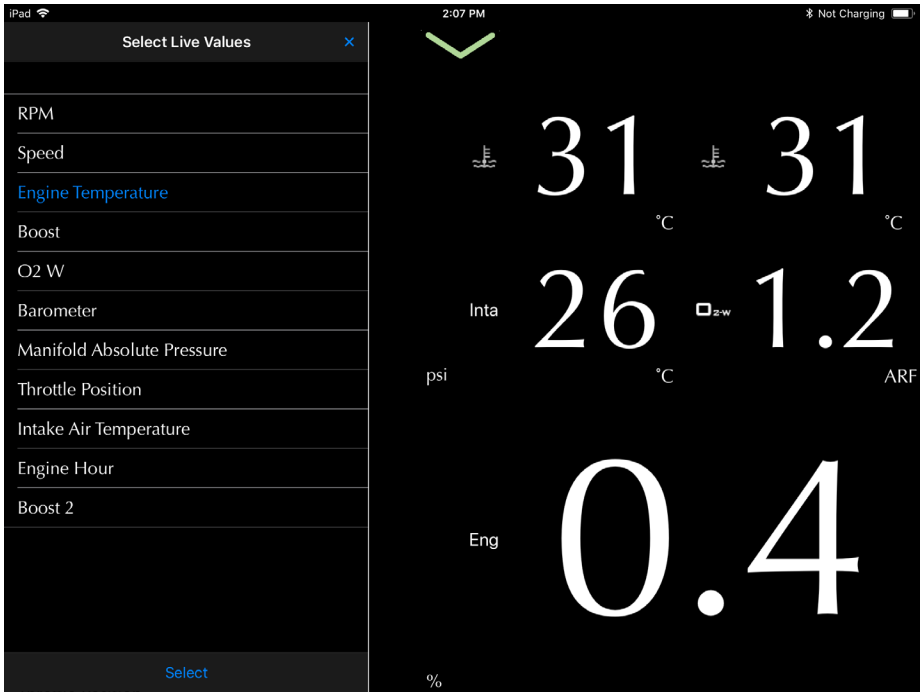


Figure 60. Live values selection

3.2.5 Layout of data fields

Press and hold on any of the four live data fields to prompt the layout selection box. The user can choose between one, two and four live values per field for up to 16 live values total.

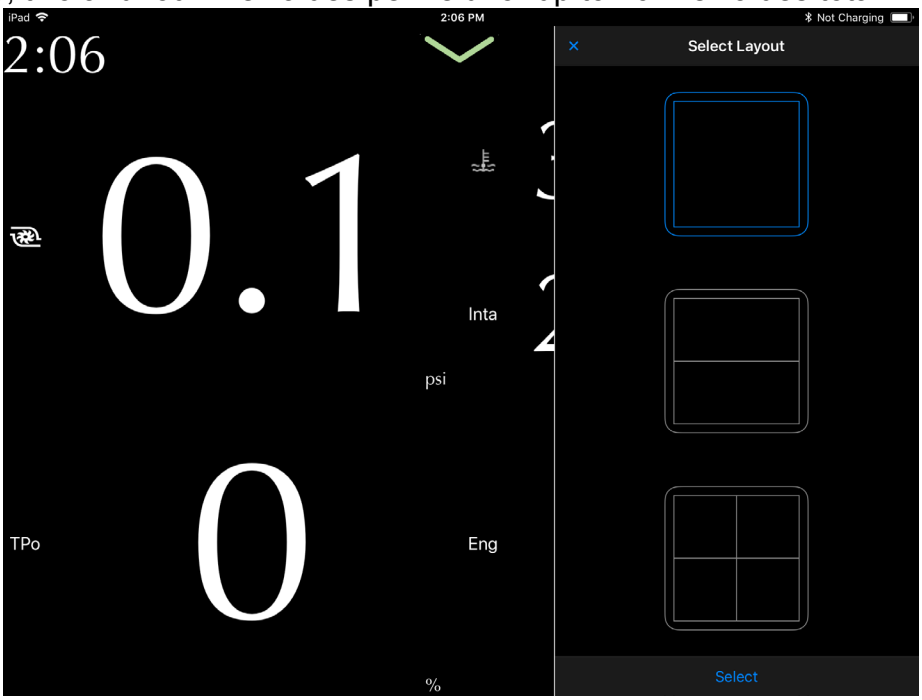


Figure 61. Layout of data fields

3.2.6 Exiting the dashbord

The dashboard can be exited at any time unless the engine is running. The tool will force return to the dashboard under this condition.

3.3 «Datalogger» function

3.3.1 Definition

The datalogger function allows recording and visualization of engine data. The datalogger is optional and purchased separately. Please contact your remap provider for more details.

You can select up to 8 live values in the graph display modes. The sampling rate for each value is 10 per seconds and 30 per seconds for the optional AEM Wideband O2 sensor(s).

Datalogging starts automatically when the engine is started. Logs of 30 seconds or more will be saved automatically when turning the engine off. All available live values are recorded. An optional wideband Air Fuel Ratio sensor is available.

3.3.2 Creating a log

Recording will start automatically or manually depending on the state of the associated setting (see *section 2.6.2*).

3.3.3 Viewing logs

Once a log has been made, click on the Logs button on the connection screen or go into the App Parameters (*section 2.6.5*) by clicking on the Cog wheel and select Logs.

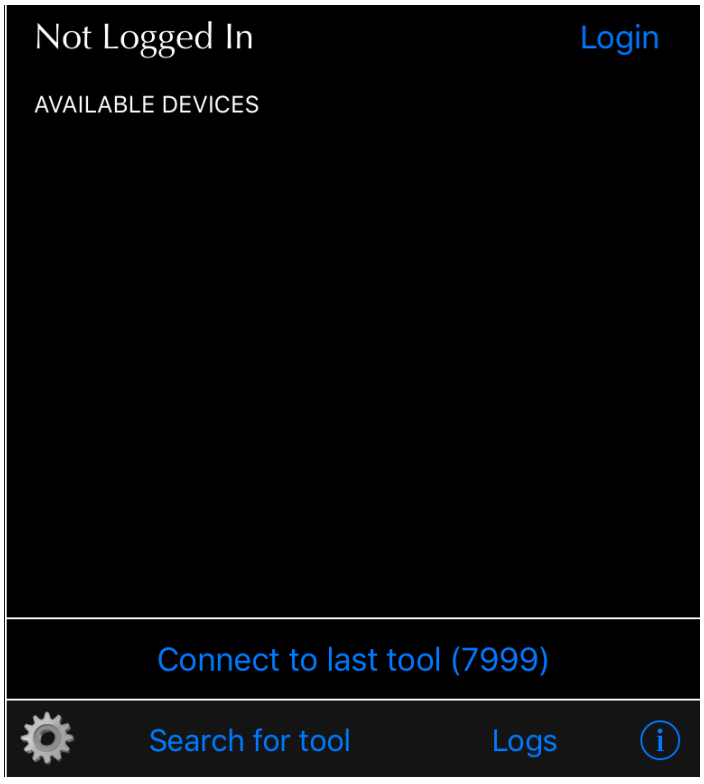


Figure 62. DL : Log Access

Select a log and click on View

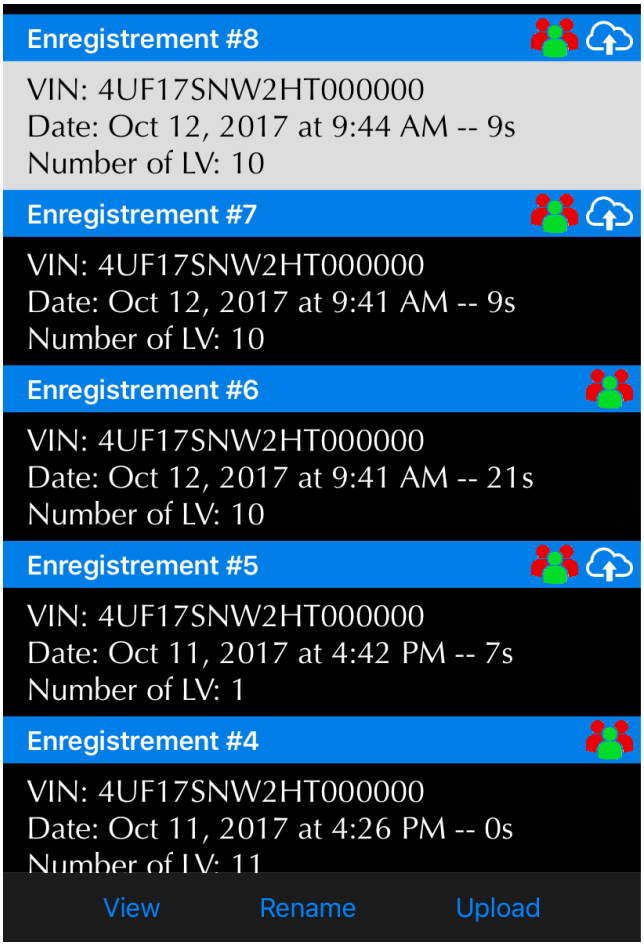


Figure 63. DL : Viewing log selection

Basic control

Click on the yellow area to show the top bar

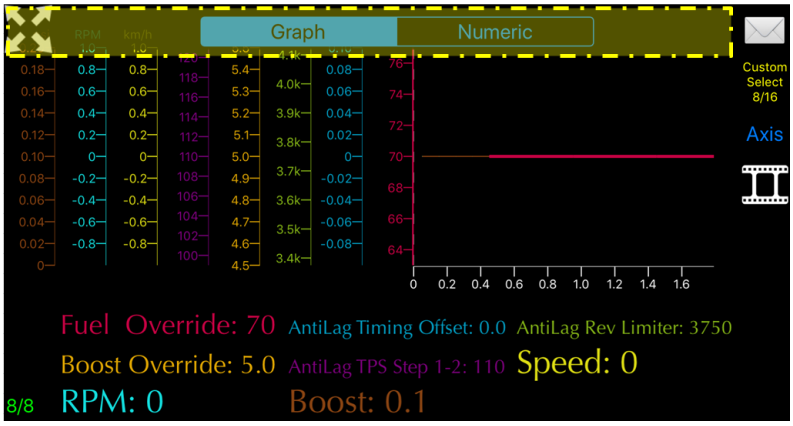


Figure 64. DL : Top bar

Full screen / split screen button

Toggle between Graph or Numeric views. The numeric view shows all value at a defined point (cursor, see next page)

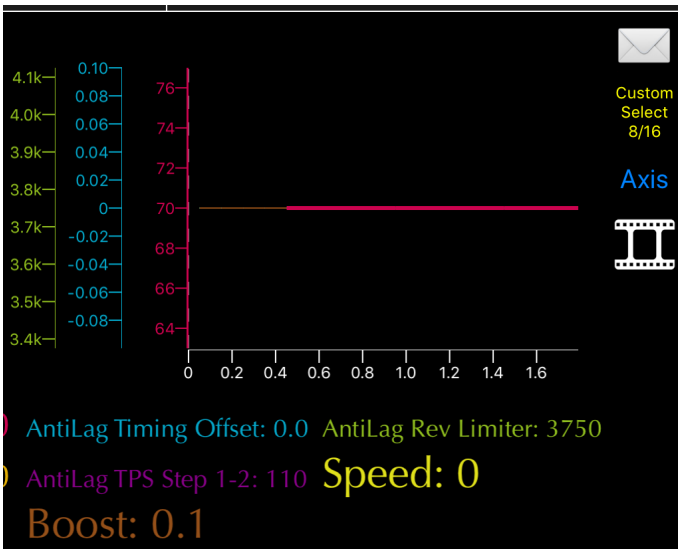
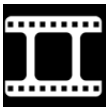


Figure 65. DL : Right bar controls

Export button, csv, PDF or Air Print

This button allows selecting the values to display and export.

Press the Axis button to select how many live values Y axis and names are displayed. All the data will remain visible on the graph. This was implemented to maximize available graph area.



This button is for linking data to a Go Pro made video. This will be implemented shortly.

Graph view options

Click on the screen to place the cursor at the desired location. The numeric values at the bottom and in the Numeric view will match those at the cursor location.

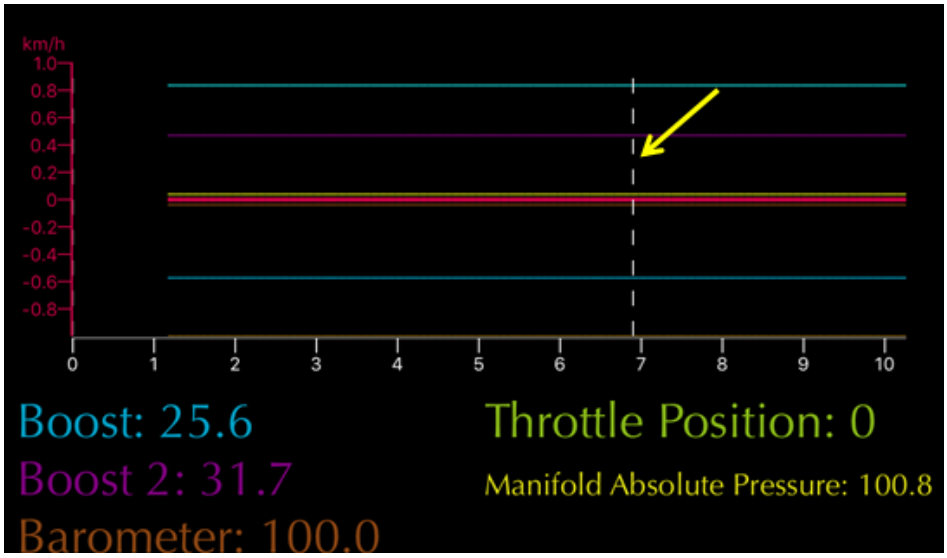


Figure 66. DL : Cursor

Press in the yellow area to select how many live values Y axis and names are displayed. All the data will remain visible on the graph. This was implemented to maximize available graph area.

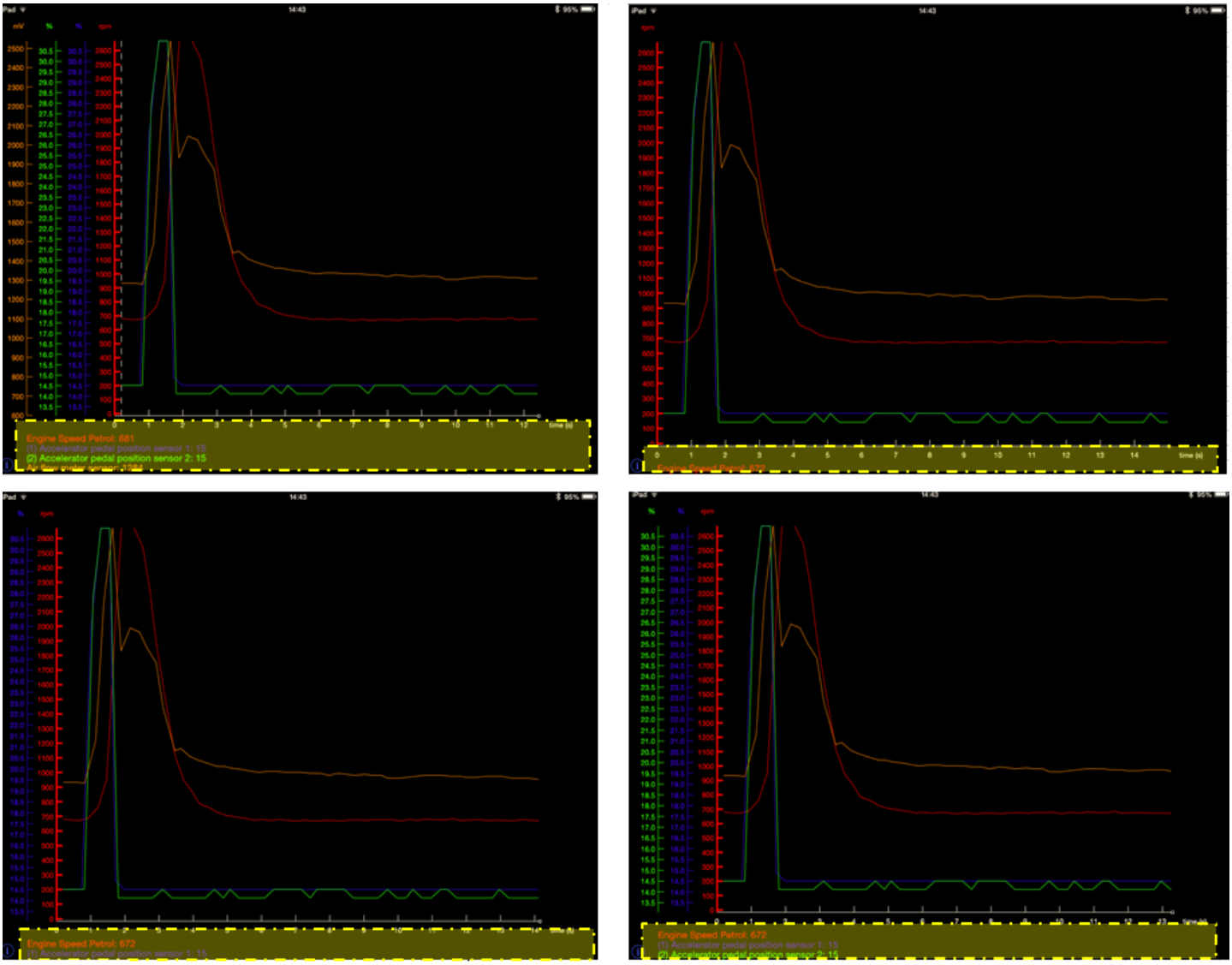


Figure 67. DL : Axis displayed

User can interchange any Y axis position. Press and hold on the desired axis and move it to the new position.

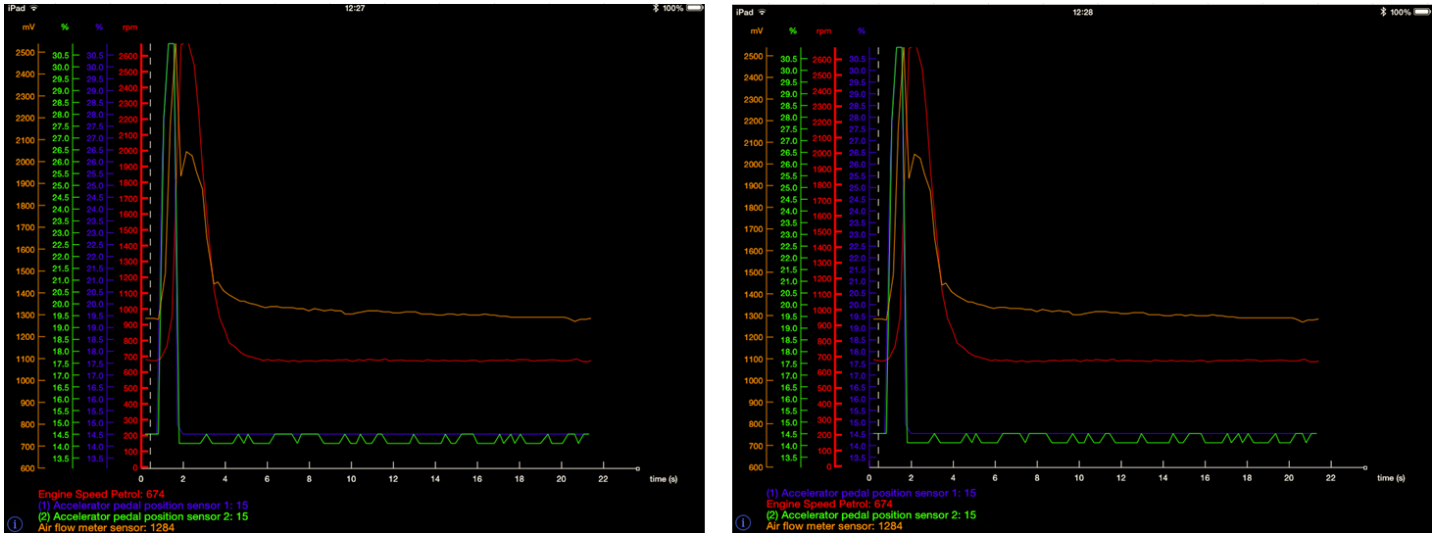
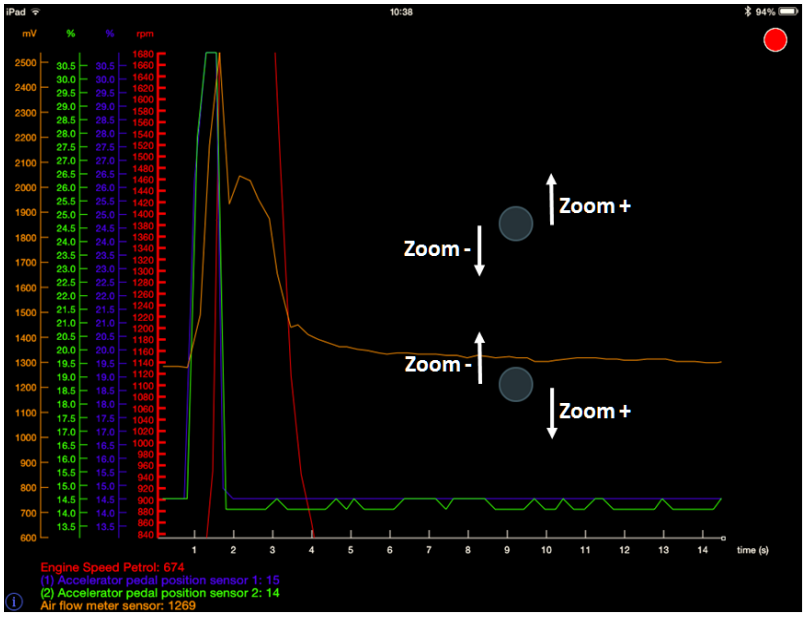


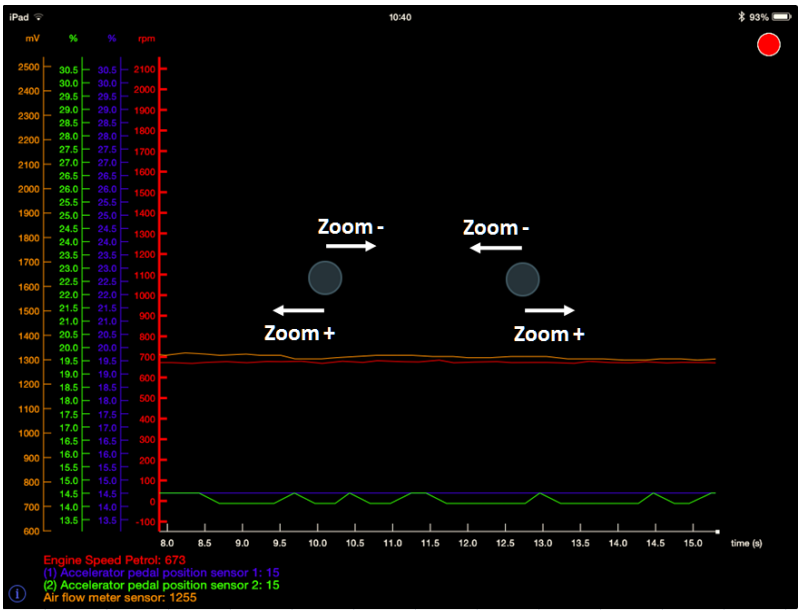
Figure 68. DL : Y axis displacement



Vertical zooming is done on each Y axis separately.

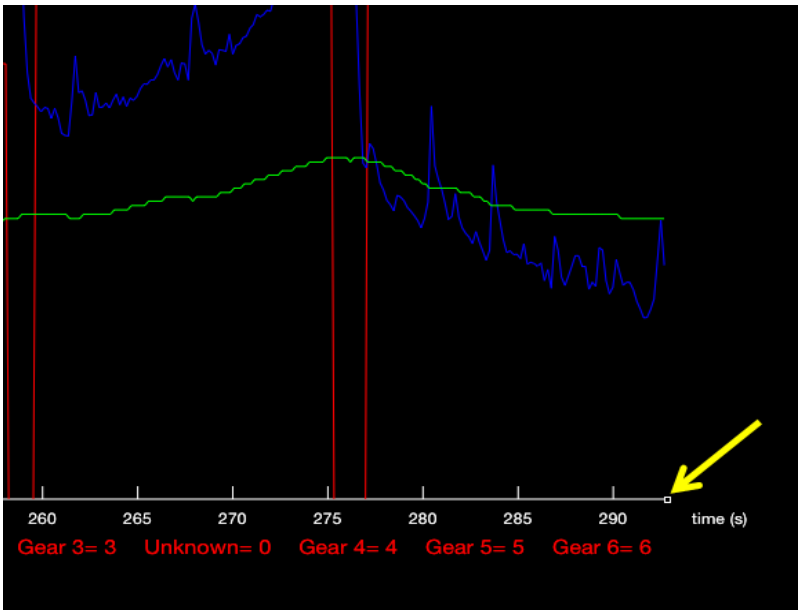
- Select the desired Y axis / live value
- Touch and hold anywhere on the screen with 2 fingers and swipe vertically in opposite directions.

Figure 69. DL : Vertical zooming



To zoom horizontally, press the screen with 2 fingers and swipe horizontally in opposite directions.

Figure 70. DL : Horizontal zooming



To return to the current time after zooming or panning horizontally on the X axis, simply press on the white square on the edge of the axis.

Figure 71. DL : Return to the current time

The Pan function for both axis is done using only one finger and sliding it in the desired direction.

To re-initialize the graph view, touch the screen twice at one of the following locations:

- On the currently selected Y axis to reinitialize this live value axis only.
- On the X axis to reinitialize the time axis only.
- In the middle of the graph screen to reinitialize all axis simultaneously.

3.3.4 Sharing Logs

Logs can be shared between users. Logs can only be shared with someone who bought a GAP Flasher from the same tune provider. Logs from different tuners cannot be shared.

Access

In the log section, select one or multiple logs and click on Share or Upload. Once completed, a copy of the log will be available online for consulting on another mobile device or by your friends using the Online Log function *section 3.3.5*

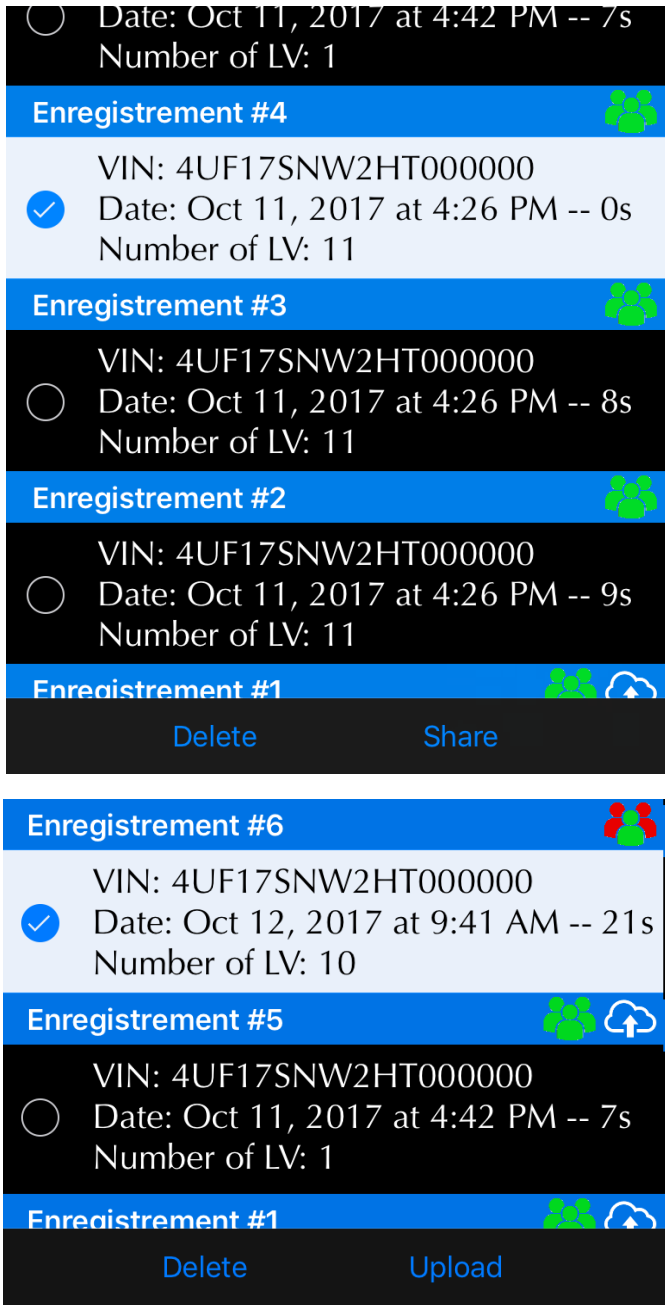


Figure 72. DL : Log sharing

This symbol indicates that you are the owner of this log therefore it can be shared at will with friends.

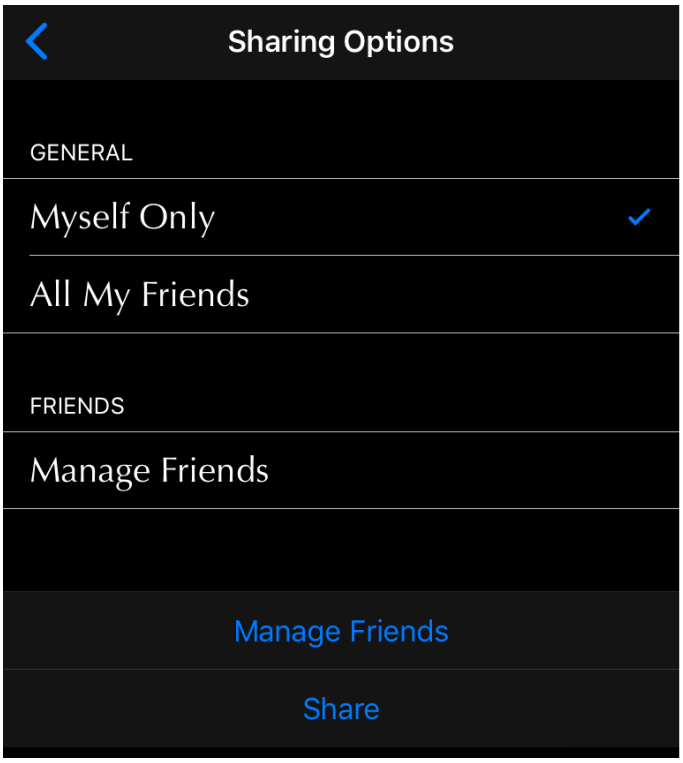
This symbol indicates that it is already on the server.

The Share button will prompt the sharing screen.

This symbol indicates that you are not the owner of this log therefore it can only be uploaded on the server and then viewed by the owner only.

The upload button will upload the log which will be available only to the owner.

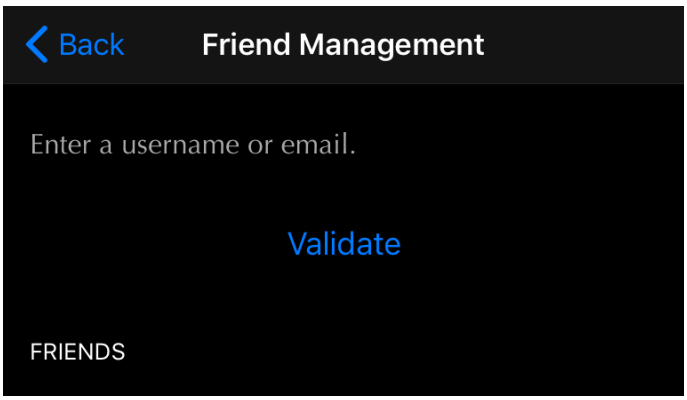
Sharing to friends



Select the friends you wish to share the log with and click on share.

Click on Manage Friends to add or remove friends from your list. See below.

Figure 73. DL : Log Sharing screen



Enter a user name, same as the one used to register the tool, or e-mail and click on Validate. If a match is found, it will be added to the list.

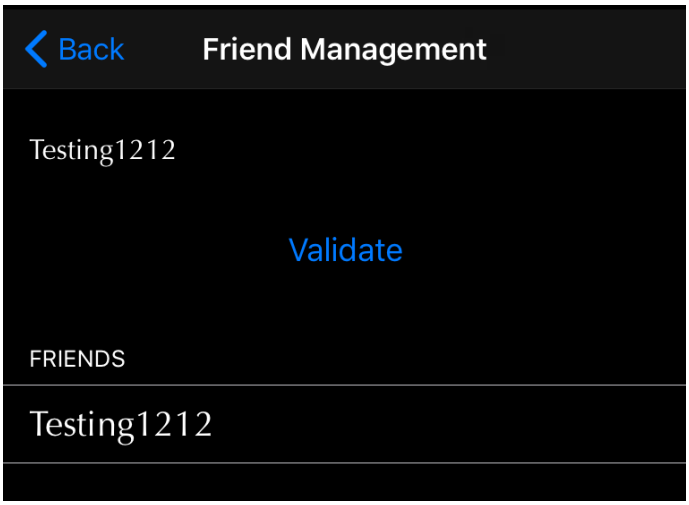


Figure 74. DL : Log Sharing screen

3.3.5 Online Logs

The Online Log function allows visualization of logs stored on the server. Logs from the owner and friends which were shared will be visible even when not connected on the GAP Flasher.

Viewing logs

The online logs function is part of the App Parameter menu, *section 2.6.5*. User must either be connected on the GAP Flasher or logged in (*section 2.6.6*).

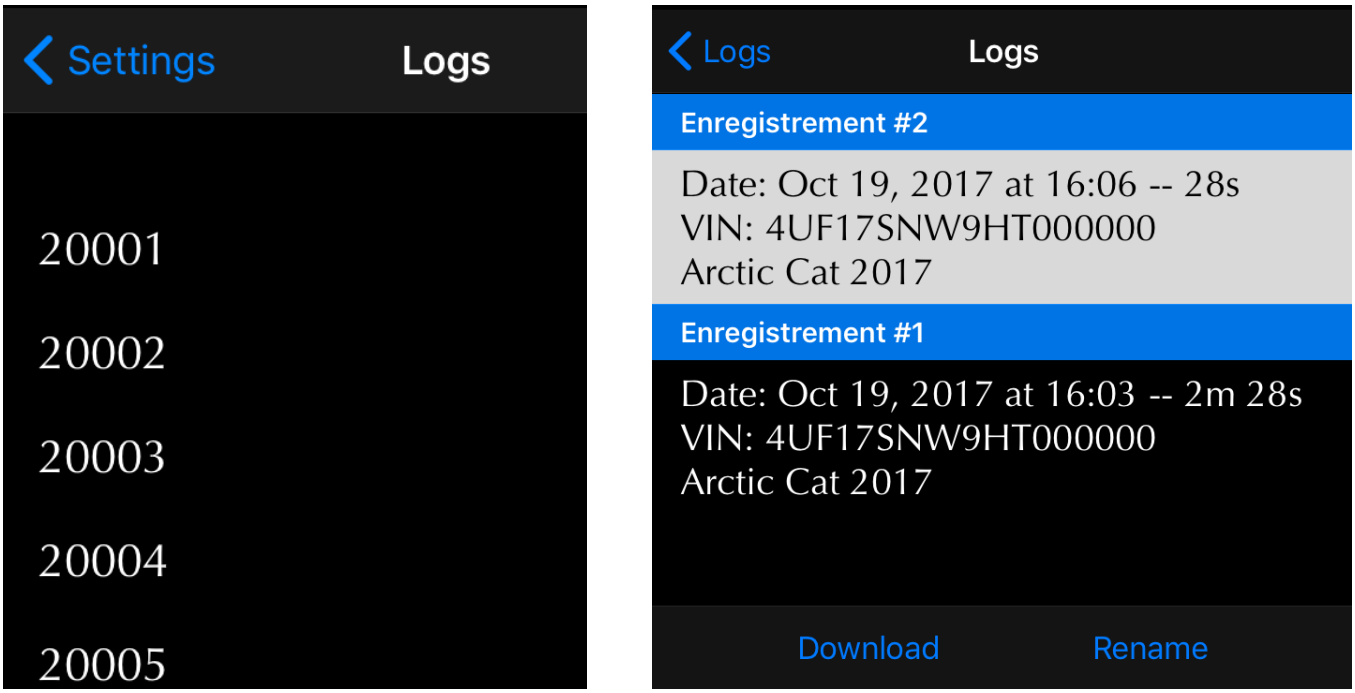


Figure 75. DL : Viewing online logs

Click on Download to view the Log and Rename to change the log name. The name will be changed on the server thus for all other people who can view it.

3.4 « ECU Info » function

Definition

This function allows viewing the following information of the selected ECU:

- Strategy
- Calibration
- ECU Serial number
- VIN
- Others

Access

1- Perform the initial stages of access (*section 2.6.2*)
2- Select the “ECU Info” function
3- Wait until the GAP Flasher finishes with interrogating the ECU
4- The resulting list will be displayed and can be sent by e-mail.

Figure 76. ECU Info example

3.5 « ECU Flash » function

CAUTION

As with any diagnostic tool, there is always a risk of failure when re-flashing an ECU. It should only be done when the vehicle is not needed immediately afterwards. Access to the internet is highly recommended in case support is needed. GAP Innovation assumes no liability for damages or injuries incurred during or resulting from the use of the GAP Flasher. Do not do anything to the vehicle or disconnect the flasher until the firmware update is finished. Read the recovery instructions prior to updating an ECU.

When using the Flasher, it is considered good practice to connect a power supply (Midtronic's PSC-550, CTEK MXS 25 or equivalent) to the battery. This will ensure that the battery voltage is sufficient.
Note: Battery chargers are not suitable due to poor line regulation.

3.5.1 Definition

This function allows updating the engine ECU firmware to the latest available version or with a modified mapping.

Access

1- Perform the initial stages of access (*section 2.6.2)*
2- Select the "ECU Flash" function
3- Choose the required file
4- If connected to the internet and a new engine firmware version is available, choose Online ECU Flash. The file will automatically be downloaded from the server in the mobile device and flashed to the engine ECU. The GAP Flasher does not need to be updated in this scenario.

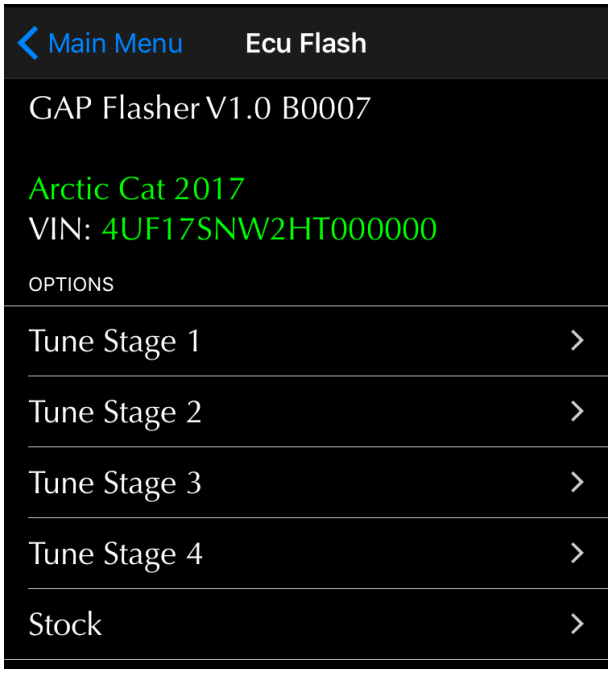


Figure 77. ECU Flash fonction

Note: *Please see section 4 for the engine upgrade steps (ECU).*

When finished, disconnect the tool from the vehicle and turn off the ignition. The engine ECU is now updated.

3.5.2 Recovery method

The firmware of the GAP Flasher has an algorithm to recover an ECU following a failed update. This is particularly useful when the ECU no longer answers diagnostic commands. In such cases, the GAP Flasher detects this condition and will activate the recovery method. Just follow the instructions on screen and when the message “Toggle Fuse” is displayed, disconnect and reconnect the fuse that powers the ECU. The tool detects the fuse insertion and starts the update automatically.

3.6 Control

3.6.1 Anti-Lag

This menu will allow controlling parameters of the Anti-Lag function. Only the first Anti-Lag step can be adjusted. If needed, it can be aggressive enough so that step two is not required. Step two is not adjustable and it's parameters have been set by the tuner. Step two is very aggressive and shall be used with caution.

WARNING

Anti-Lag is for racing purposes only! Neither GAP Innovation nor the tuner shall be held responsible for damages incurred while using the GAP Flasher.

Frequent usage of the Anti-Lag function with a Wideband O2 sensor connected could damage the sensor.

Prerequisites

- Having purchased a remap with Anti-Lag and updated the engine ECU
- Engine is running

Access

1- Perform the initial stages of access (*section 2.6.2)*
2- Click on the ''Adjustments'' button in the top bar while in the Dashbord. See *section* for more details.

Parameters list

- Fuel Override: The amount of fuel in %. 100% is equal to no change, 101 is equal to 1% more fuel.
- Boost Override: The boost target to be used for Anti-Lag
- Rev Limiter: The engine speed at which it will stay when Anti-Lag is in function and throttle applied sufficiently.
- Anti-Lag Timing Offset: Timing offset in degrees. 0 is no change.
- Anti-Lag TPS Step 1-2: The throttle position at which step 2 will be engaged. Not adjustable. Select 110% to disable step two.

Controls

The parameters are adjusted by the following sliders.

Figure 78. Anti-Lag

Changes are applied instantly.

 This button is to revert changes back to the default values.

Save as Default

This button will set the current values as default.

Using the Anti-Lag

Prerequisites

- Having purchased a remap with Anti-Lag and updated the engine ECU
- Having a GAP Flasher installed on the machine
- Having studied why Anti-Lag is used, the risks and necessary precautions
- Engine is running
- Anti-Lag parameters have been set
- Vehicle is on a race course
- Vehicle (track) Speed is below 5 kph
- Mobile App does not need to be connected to the GAP Flasher

Usage

- Press on the high beam switch to activate Anti-Lag
- Give throttle to spool the Turbo
- If set and required, proceed with Anti-Lag step 2 by positioning the throttle accordingly.
- Press on the high beam switch to launch

3.7 Tune Jukebox

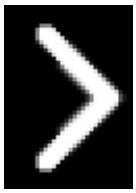
The Tune Jukebox function makes it possible to change the engine map when the engine ECU has been updated with this function. Contact your Tune provider for further details.

The Tune currently selected and visible at the top left of the screen:

Figure 79. Tune Jukebox

Click on the icon to choose another Tune. The Covers give details on the cartography:

Figure 80. Tune Jukebox, covers and selection



Click on the arrows to see the different covers.

Click on the X to Cancel

Click on the check mark to Apply

Click on the Cog Wheel to choose which covers will be part of the JukeBox

Save as Default

This button is used to save the Tune that will be applied by default when starting the engine. This will only be applied when the GAP Flasher is connected on the snowmobile.

Note: ***The engine ECU will automatically set the lowest power tune when the GAP Flasher is not connected on the snowmobile. This is a safety mechanism in case bad fuel is present and the user cannot select the proper tune.***

Using the optional button

Press the button to call up the Jukebox and see the currently selected cover (map). Press again to see the other covers. The selection is automatically applied when the button is not pressed for two (2) seconds.

Fine Tuning (coming soon)

3.8 Active knock protection

The active knock protection consists of a knock-warning system and a knock protection algorithm which acts on engine control parameters to stop the engine from knocking. The GAP Flasher does not need to be connected on the vehicle in order for these items to work.

WARNING

The active knock protection is not a substitute for usage of proper fuel quality and other requirements for the tune being used.

Neither GAP Innovation nor the tuner shall be held responsible for damages incurred while using the GAP Flasher, the protection algorithms or a tune.

Warning system

When knock is detected, the warning system will be visible on both the mobile devices (phone or tablet) and the original instrument cluster.

- The mobile device screen will flash and the words ‘‘knock detected’’ will be shown on screen.
- The low oil and temperature warning lamps of the original instrument cluster will flash indicating knock detection

Knock protection

The knock protection algorithm will control both the timing and boost variables in order to eliminate the knock thus protecting the engine from damage.

A restart of the engine is required in order to eliminate the applied changes (boost reduction and timing) made by the knock protection algorithm. Make sure the condition(s) creating knock is (are) eliminated before holding throttle wide open or change to a lower power tune to prevent further knock events.

Knock system enabled confirmation

On tunes with Active knock protection, upon turning ON the ignition, the engine ECU will confirm that the Active knock protection is enabled.

- The mobile device screen will flash and the words ‘‘knock protection enabled’ will be shown on screen.
- The low oil and temperature warning lamps of the original instrument cluster will flash twice.

WARNING

User should depress the throttle upon being warned of the presence of knock. Failure to do so, even with protections, could result in engine damage.

Neither GAP Innovation nor the tuner shall be held responsible for damages incurred while using the GAP Flasher or a tune.

3.9 «Calibration» of the speedometer and gearing function (under development)

This function will allow setting vehicle specific parameters which will be the base for proper track speedometer calibration and clutch ratio calculations on stock and more importantly on modified snowmobiles. Both values, track speed (simply called speed) and clutch ratio are available on the dashboard and datalogger.

CAUTION ***Clutch ratio calculation will include belt slip thus is not a guarantee of the exact physical ratio. When clutches are properly set, it is, however, a very good approximation.***

Parameters list

Parameters that will affect the clutch ratio calculation

- Top chain case gear, number of teeth is engraved on the gear.
- Bottom chain case gear, number of teeth is engraved on the gear.

Parameters that will affect both the speedometer reading and clutch ratio

- Sprocket pitch. This is the distance between each of the drive sprocket teeth. It is also the distance between each track window. Simply consult the track manufacturer to verify its pitch.
- Sprocket number of teeth.

Parameters that will affect the speedometer reading

- Speedometer offset.

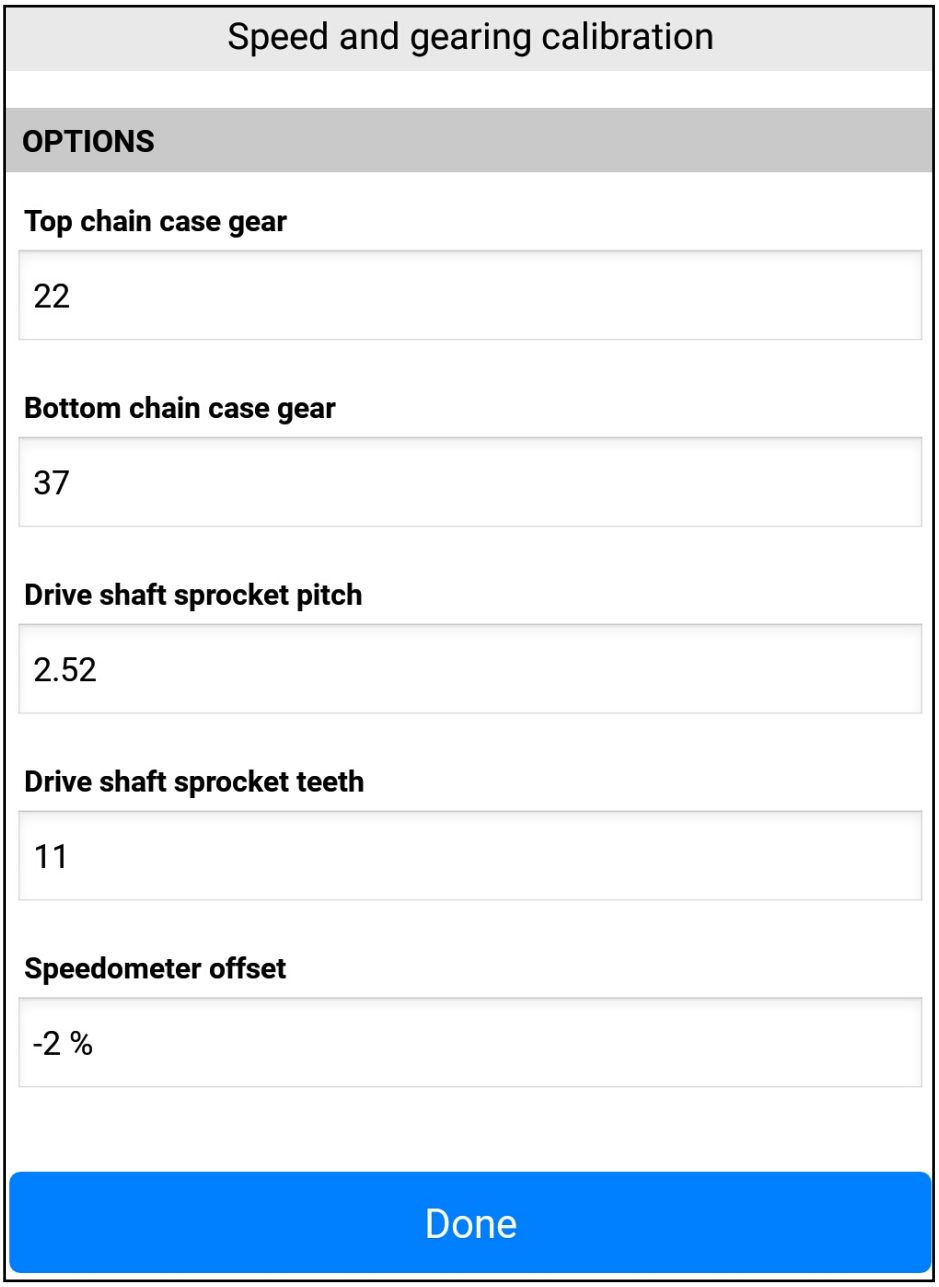


Figure 81. Calibration of the speedometer and gearing function

3.10 Displaying values on the original instrument cluster

This function will display boost pressure or air fuel ratio (AFR) from the optional AEM O2 wideband real-time sensor to the original instrument cluster.

Prerequisites

- Use the latest firmware version of GAP Flasher and latest tune version
- That the GAP Flasher is connected to the vehicle. It is not necessary to connect the mobile device to GAP Flasher
- For air fuel ratio, that the optional sensor is installed

Viewing

Simply select the hour counter using the button at the bottom right of the instrument cluster.

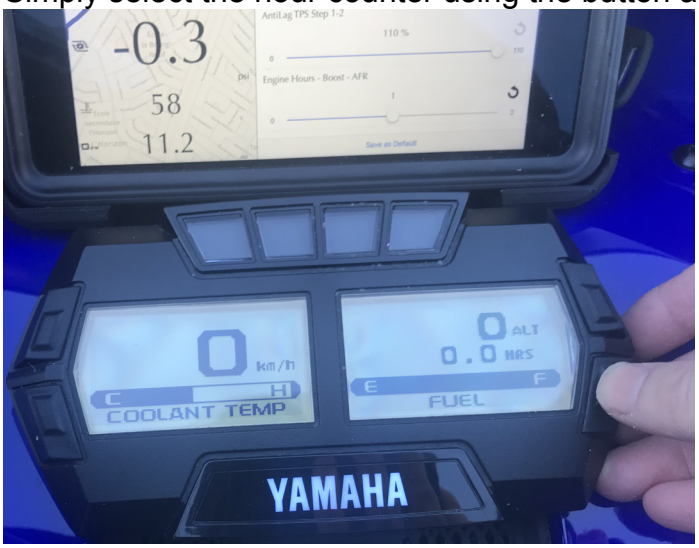


Figure 82. Display, hour counter

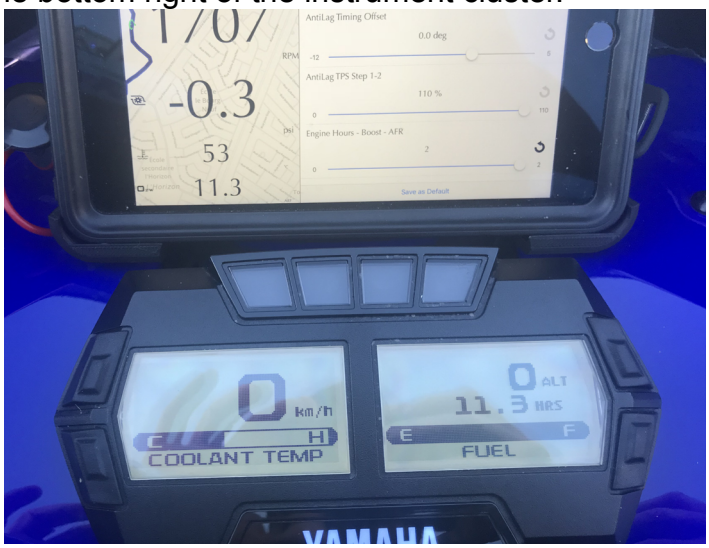


Figure 83. Optional AEM O2 broadband sensor, 11.3 AFR in this example

Selection

Selection of the displayed value is done via the Control button,  located on the top bar, *section 3.2.3* and *section 3.6*

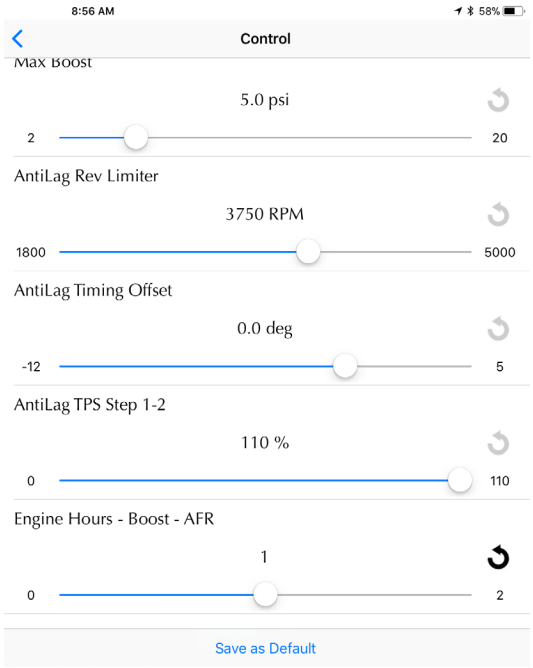


Figure 84. Value selection, hour counter

Click on Save As Default to make this choice appear when the engine is started.

4 Steps to update the engine ECU, modified mapping

WARNING

Modified mapping is for use on a race course only! Neither GAP Innovation nor the tuner shall be held responsible for damages incurred while using the GAP Flasher.

As with any diagnostic tool, there is always a risk of failure when re-flashing an ECU. It should only be done when the vehicle is not needed immediately afterwards. Access to the internet is highly recommended in case support is needed. GAP Innovation assumes no liability for damages or injuries incurred during or resulting from the use of the GAP Flasher. Do not do anything to the vehicle or disconnect the flasher until the firmware update is finished. Read the recovery instructions prior to updating an ECU.

When using the Flasher, it is considered good practice to connect a power supply (Midtronic's PSC-550, CTEK MXS 25 or equivalent) to the battery. This will ensure that the battery voltage is sufficient.
Note: Battery chargers are not suitable due to poor line regulation.

Here is a compendium of operations to be performed in order to update the ECU with a modified mapping. Each of these operations is described in detail in the referenced section of this manual.

√	Steps	Operations	Manual section
	1st	**Provide** the required information to the modified mapping provider.	*section 4.1*
Mobile device connected on the internet in presence of the vehicle			
	2e	**Update** the engine ECU	*section 4.2*
Mobile device not connected on the internet when in presence of the vehicle			
	2e	**Update** the GAP Flasher and mobile App synchronization.	*section 4.3.1*
	3rd	**Updating** the engine ECU	*section 4.3.2*

Table 7. Steps to update the engine ECU, modified mapping

4.1 Provide information to the mapping provider

In order to build a customized file, the supplier will need to know the current version of the ECU engine as well as the Vehicle Identification Number (VIN). Depending on the initial contact, retrieve the infor-

mation (ECU Info function) and send it to the provider. Please consult *section 3.4* for additional details.

4.2 Mobile device connected on the internet

This method allows the application, the GAP Flasher and the engine ECU to be updated in a single operation. The file will be downloaded from the server to the mobile device and the engine ECU update will start automatically. The GAP Flasher does not need to be updated using a computer in this scenario.

Access

Connect the tool to the vehicle and proceed with accessing the ECU Flash function *section 3.5*. Enter the **Online ECU Flash** submenu and select the desired file.

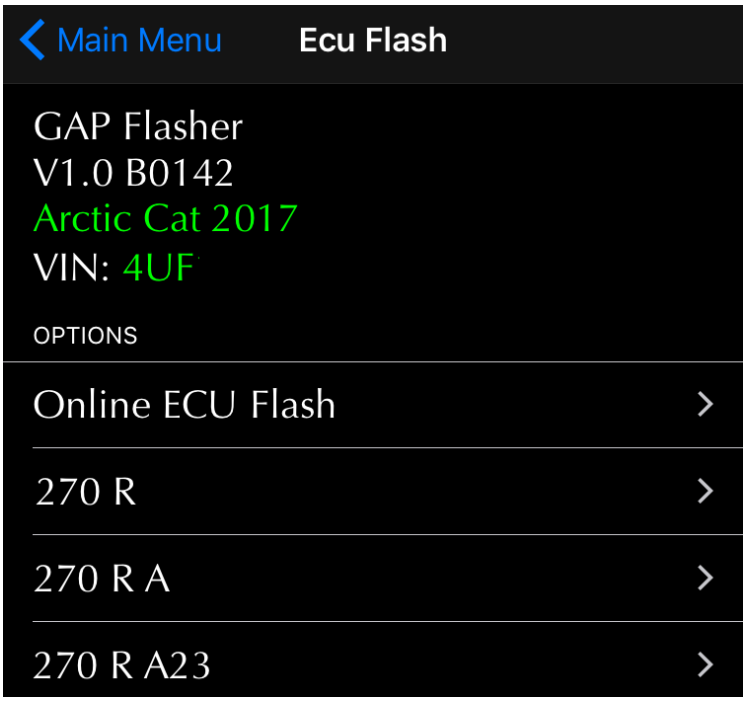


Figure 85. ECU Flash submenu

4.3 Mobile device NOT connected on the internet

4.3.1 Updating the GAP Flasher with the modified file

Once the provider confirms that a custom file is ready, proceed as follows:

1- Connect the tool to the USB port of the computer using the USB cable
2- Start the updater software previously installed in the computer (*section 2.2*).
3- Click on “FIND DEVICE” and wait for pairing of the tool with the updater software. Once paired, the user information, vehicle information and current firmware version of the tool will be displayed.
4- Click on “PROGRAM FLASH FILES ONLY”. The evolution of each data file is observable in succession on the progress bar.
5 A subsequent window will appear with “ACTION NEEDED”. The requested operation is syn-

chronization of the mobile App with the tool. Keep the tool connected to the computer to complete this step described in *section 2.5.* **Note:** Performing synchronization immediately after updating the tool or before first usage will prevent prolong file loading when connected to the vehicle due to a poor internet connection.

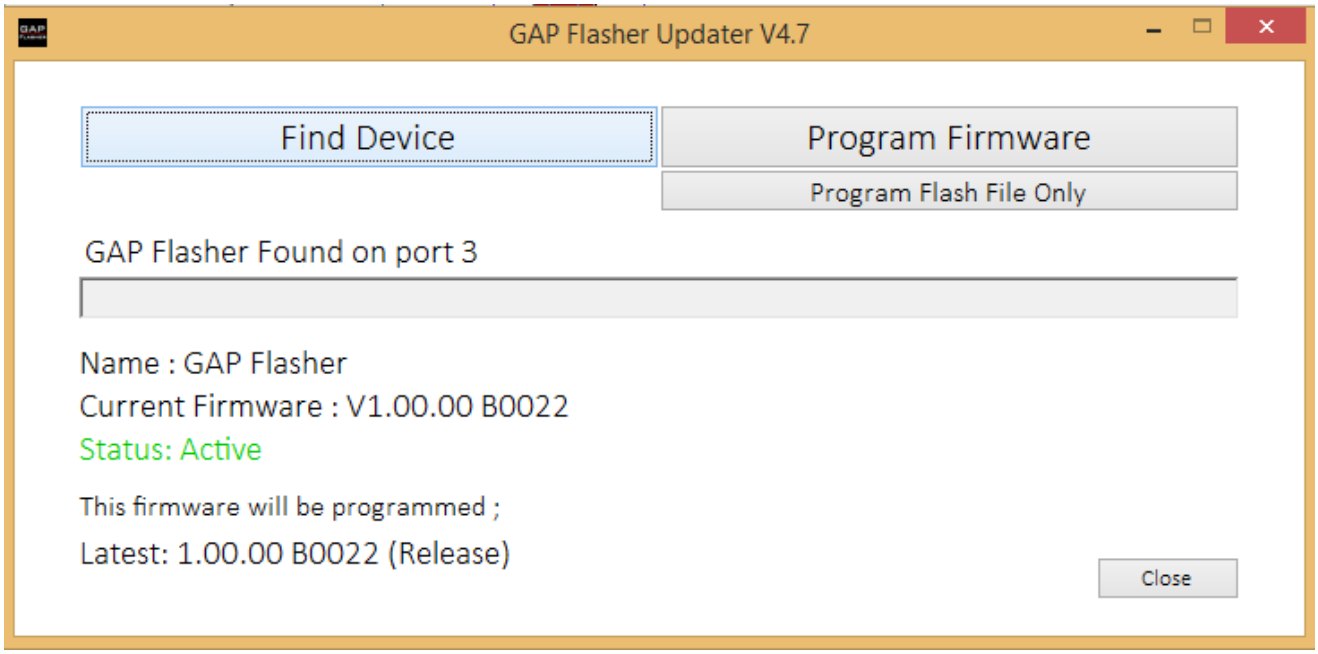


Figure 86. Updater software overview

4.3.2 Updating the engine ECU

Connect the tool to the vehicle and proceed with using the ECU Flash function *section 3.4*.

Disconnect the tool from the vehicle and start the engine. The Engine ECU is now updated.

Limited Warranty

GAP Innovation warranties this product for 2 full years after the date of purchase. The warranty covers only the GAP Flasher of the original purchaser (non-transferable). It covers manufacturing and workmanship defects for the duration defined above. The warranty is limited to the functionality of the system and the system itself. It is the user's responsibility to use the GAP Flasher safely.

The user must return the GAP Flasher to GAP Innovation to have the warranty honoured. The user must provide a proof of purchase.

The warranty is void if:

- The product has been damaged or altered in any way
- The product is damaged by water, fire, accident or other condition beyond the control of GAP Innovation
- The product has been improperly installed or misused

The warranty does not cover:

- Shipping and handling.
- Any material damages other than the GAP Flasher itself.

Under no circumstances will GAP Innovation be liable whatsoever for incidental or consequential damages. The warranty is limited to the value of the product.

Contact:
GAP Innovation
support@GAPInnovation.com

Glossary

ECU : Electronic Control Unit. An ECU is an embedded system that controls one or more systems or subsystems present in a motor vehicle.

CAN : For Controller Area Network, is a communication protocol which connects ECU's via a two wires interface.

Vehicle control module software updates (Re-Flashing) : The action of programming an ECU firmware. The term flashing comes from the fact that microcontrollers used in ECU's are made with flash memory.

VIN : Vehicle Identification Number. It's a unique code which includes information about the vehicle's configuration and its serial number.

DTC : For Diagnostic Trouble Code or fault code.