

Before using Enigma parts

ENIGMA parts are competitive racing components made for racing and circuit use only. They are not intended for use on public roads. The customer assumes all responsibility from installation to use. This company assumes no responsibility, for trouble, damage, accident or malfunction when using this product under any circumstances. Any claim will be declined. This company assumes no responsibility in the case of incidental damages arising from the failure or malfunction of this product.

※ **Agreement to these terms is assumed on installation of this product.**

These parts are intended for the use by those with intimate knowledge of motorcycle mechanics such as professional turners and specialized motorcycle shops. Beginners or those with limited understating of motorcycles or basic computing should not install or rewrite the data of this product. Doing so could result in serious problems and should not be undertaken.

After installation, configuring the Enigma differs from bike to bike. We cannot answer queries about basic setting, such as numbers or how to setup your bike. It is recommended that bikes are brought to specialized shops for installation and setup. This product has been manufactured for people who have a fundamental understanding of setting up bikes

Driver installation is required when connecting ENIGMA to a computer via USB for the first time driver (Required for first use only). It won't be possible to connect to the computer without performing this step.

※USB drivers for USB models can be downloaded for free from this company's homepage.

※Wireless Bluetooth connection requires a different dedicated setup to the USB setup.

For more information please read this manuals "Specific setup methods"

ENIGMA comes in vehicle specific models. Furthermore each vehicle there is a bluetooth specific android edition, an IOS edition and 3 types of USB connection editions. Please note that these respective products are not compatible with the each other. For example, data compiled with a smartphone using the Bluetooth/android edition cannot connect or share combustion map data with a computer using the Bluetooth/android edition. This is the same for the IOS edition. Please take care when downloading/operating the driver software

About the water resistance of this product

Structurally, this product is not completely waterproof. It is made to be water resistant for normal daily use. Normal daily use meaning that it can withstand being rained on/having droplets of water on it. It shouldn't be used in a place where it can be splashed with water at a pressure such as that of intermittent tap water. It is recommended that it should remain dry as much as possible (Such as when washing the vehicle). Complete submersion in water will result in malfunction.

Where there is a risk of this happening it is recommended that it is attached in a place where it is less likely to get wet, such as the inside/top of the cowl.

The main function of the ENIGMA

This product offers excellent performance by controlling injection via an interrupt connection to a motorbike's ECU. This has made it possible to change settings that until now were inaccessible. All controls can be used from a computer or a smartphone screen. (The USB version is computer only)

Specialty ENIGMA operating software is available for free download from this company's homepage. Dedicated Android smartphone software is available from Google Play and IOS smartphone versions can be downloaded from the App Store. (Please read descriptions on each screen carefully and take care to choose the right software) In addition, please note that there are PC, Android and IOS software versions available.

The Enigma will access a normal electronic controlled ECU's data and clear the engine speed limiter. This can be easily canceled/set from a PC or a smartphone

1. Fuel can be adjusted.

Fuel adjustment can be finely controlled through throttle position and engine speed. It can be increased/decreased within a range of up to 2500µs

2.Real search function

A smartphone or PC can be connected to the engine while running. Real-time information of the running engine will be displayed on the PC or smartphone screen. Current engine speed/throttle position are displayed in a box in the fuel map graph. These are individually illuminated so that areas for adjustment are easily identified. Making setting extremely easy.

3.Rev-limit function

It is possible to set the upper limit of engine speeds. This function is independent from the rev limiter, so it can be set even at low RPMs. This function can be used in situations where an engine speed increase is unwanted, such as during rev tuning measures or breaking in operations.

4.Digital accelerator pump

This product reads the TPS signal, monitoring the speed of the accelerator opening. Such as when the accelerator is opened quickly it determines that the rider wants quick acceleration. At the moment the accelerator is opened, fuel injection is increased asynchronously with acceleration enrichment, unlike that of the standard fuel injection settings. It can be set to work in the same way as a racing car's accelerator pump.

5.Real-time monitor

The dedicated PC / Smartphone software has a real-time monitor function.

The throttle opening graph display and tachometer display are very convenient for setting up. The TPS opening monitor and tachometer work in real time while the engine is running. A smartphone can be used as a Tachometer for vehicles without a tachometer.

6.TPS sensor signal correction function

The PS sensor output (usually between 0.8v ~ 4.2v) differs depending on the bike. This can be checked on a computer/smartphone screen so that the ENIGMA can be calibrated to the machine it is being used with. By correcting the input signal error the bikes accelerator position is accurately reflected by the bike. The numerical data of a custom fuel MAP is accurately reflected in the bike.

7.Data save

An infinite number of Fuel maps and acceleration pump data can be independently saved on a PC/smartphone. Because each is independent data, a variety of combinations can be easily made. In addition, fuel maps made on smart phones can be transferred to a computer and edited. (Vice versa is also possible)

8.Wireless Security

Because ENIGMA (Bluetooth version) transmits data wirelessly, the onboard safety device allows wireless data to be transmitted only when the "Full throttle" key is set to "ON". This is done in order to prevent malicious third party access. If started with the normal "ON" key, wireless data won't be transmitted and third parties won't be able to access your ENIGMA. **(The FI lamp will only flash when wireless data is being transmitted)** Also when the ENIGMA is transmitting wireless data it can only connect to one machine. Even when you transmit ENIGMA information wirelessly (Such as when using the tachometer function while riding) a third party cannot access this information. In the case that changes are made to normal data, if the key is turned OFF and then turned ON while holding the throttle, wireless transmission will cease. It is manufactured to safely secure your data. (This function is not available for the USB version because it is a wired connection.)

9.The digital output has a service line.

One revolution is one 5 volt pulse.

It will support most commercially available digital tachometers. Winding type ignition cords may display an incorrect number of rotations depending on how the cord is wound, but if our output line is used, the correct number of rotations will be displayed. This service line can transfer a variety of other information.

9.Waterproof casing

This unit is waterproof for normal daily use. (It can withstand moderate rainfall) Do not submerge or spray intermittently with water. It is supposed to be attached to the periphery of a normal ECU. Also, please do not drop or expose to strong shocks. This can result in major failures and/or cause problems.

In the case of USB versions, the driver must be installed after downloading the manual and specialized configuration software. These will be needed when connecting the ENIGMA to a PC via USB.

Please read the section "Installing the Driver" for details.

The Bluetooth version requires a dedicated PC configuration different from the USB version.

WARNING !! Be sure to read.

This product was manufactured for competition / racing use.

You assume all responsibility from installation to use. We do not assume any responsibility whatsoever. Serious damage to the engine can occur when used incorrectly. We take no responsibility whatsoever for damages arising from the actions of third party installations and the like, other accidents, or the customer's willful or accidental misuse or error. We do not take any responsibility whatsoever for the collateral damage resulting from the use or inability to use this product. One's ability to use a computer/windows, smartphone downloads and such have no relation to this product. The operation of smartphones or PC will vary depending on the model. Please ask the shop where you purchased our product or specialty stores for help in these matters. Please do not use this product if you do not know how to, or cannot do these things. (Please ask a specialty shop)

Our instructions are written assuming the reader has the required knowledge and understanding to use this product.

On understanding the explanations above, please read this manual carefully and use this product correctly.

Installing the PC software

The Dilts-Japan home page <http://www.dilts-japan.com> will be displayed in the browser. The screen will vary depending on the type and version of your browser, please adjust accordingly. When installing the Enigma software, the computer must be connected to the internet.



Select the Download button that matches the connection method of Enigma and corresponding model from the menu on the left. Example: If you have a personal computer and Android smartphone then choose A and B (Fuel maps, etc. can be shared.)



http://www.dilts-japan.com/download1.html

Google 翻訳 このページを 日本語 で表示 翻訳 英語では無効にする ログイン オプション

[System Requirements Windows PC]
OS Microsoft Windows XP,VISTA,7,8
The Enigma data editor installer package downloads and installs the .NET Framework 3.5 Client Profile components required to run on the target machine architecture and OS. An Internet connection is required during the installation.
[System Requirements Android]
OS Android 3.4.2 later

	YAMAHA CYGNUS-X (FI)	Operation Manual (japanese)		
		Android	SmartPhone	
			Windows PC	
		iOS	SmartPhone	
			Windows PC	
		USB	Windows PC	
Operation Manual (japanese)				
		SmartPhone		

dilts-japan.com から Enigma(CYGNUS)setup.exe (1.71 MB) を実行または保存しますか?
この種類のファイルは PC に問題を起こす可能性があります。

実行(R) 保存(S) キャンセル(C)

Click "Run"

http://www.dilts-japan.com/download1.html

Google 翻訳 このページを 日本語 で表示 翻訳 英語では無効にする ログイン オプション

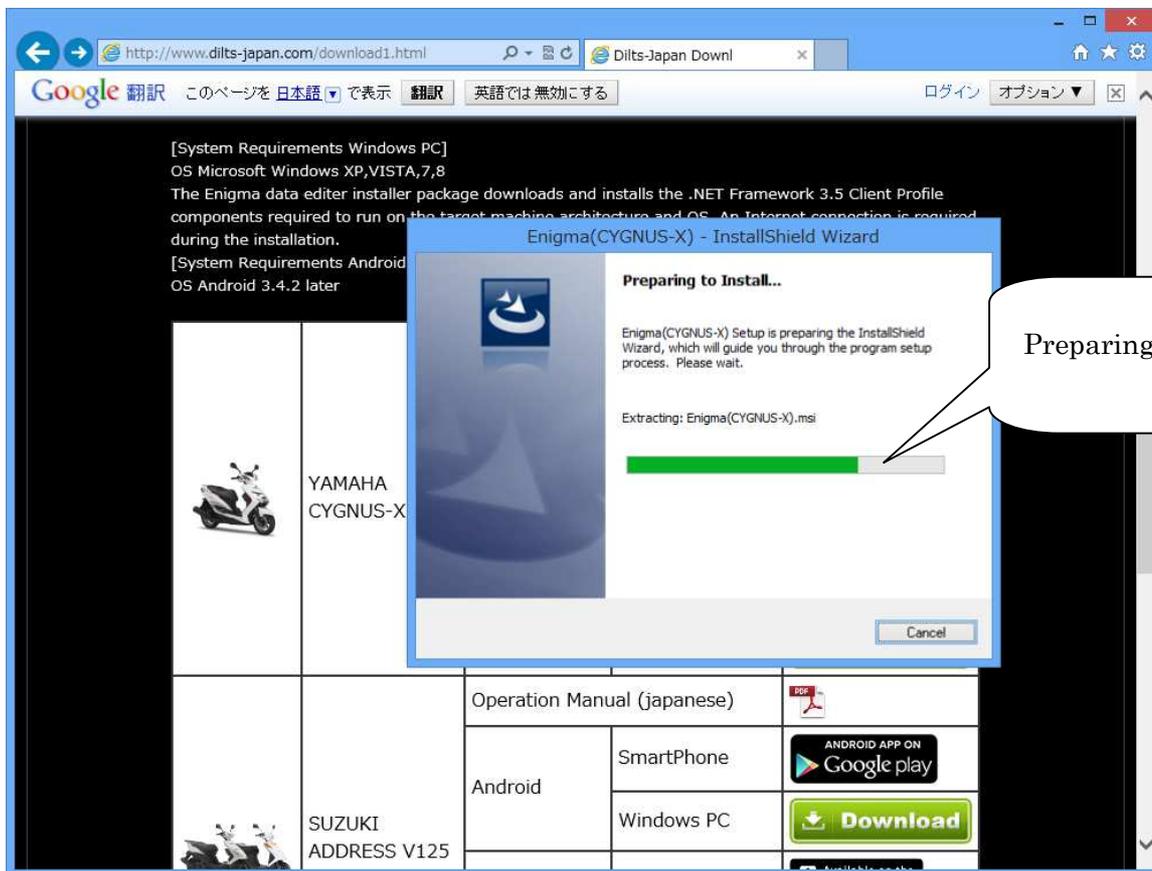
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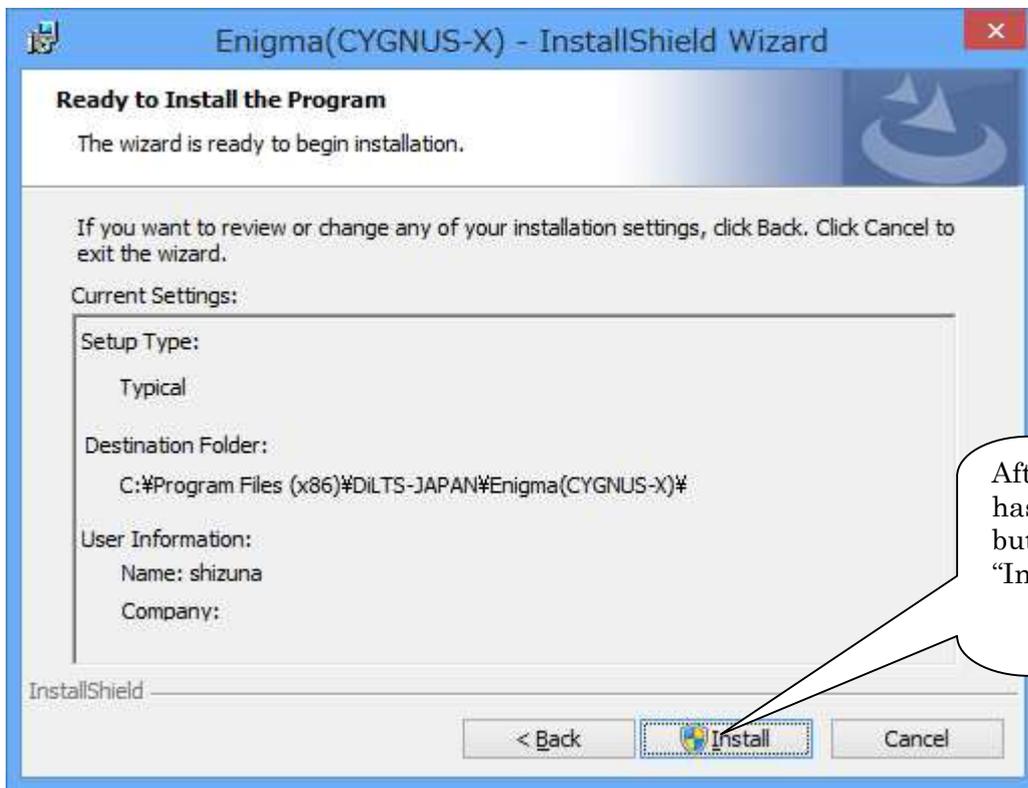
	YAMAHA CYGNUS-X (FI)	Operation Manual (japanese)		
		Android	SmartPhone	
			Windows PC	
		iOS	SmartPhone	
			Windows PC	
		USB	Windows PC	
Operation Manual (japanese)				
		SmartPhone		

Enigma(CYGNUS)setup.exe の発行元を検証できませんでした。このプログラムを実行しますか?
詳細情報(L)

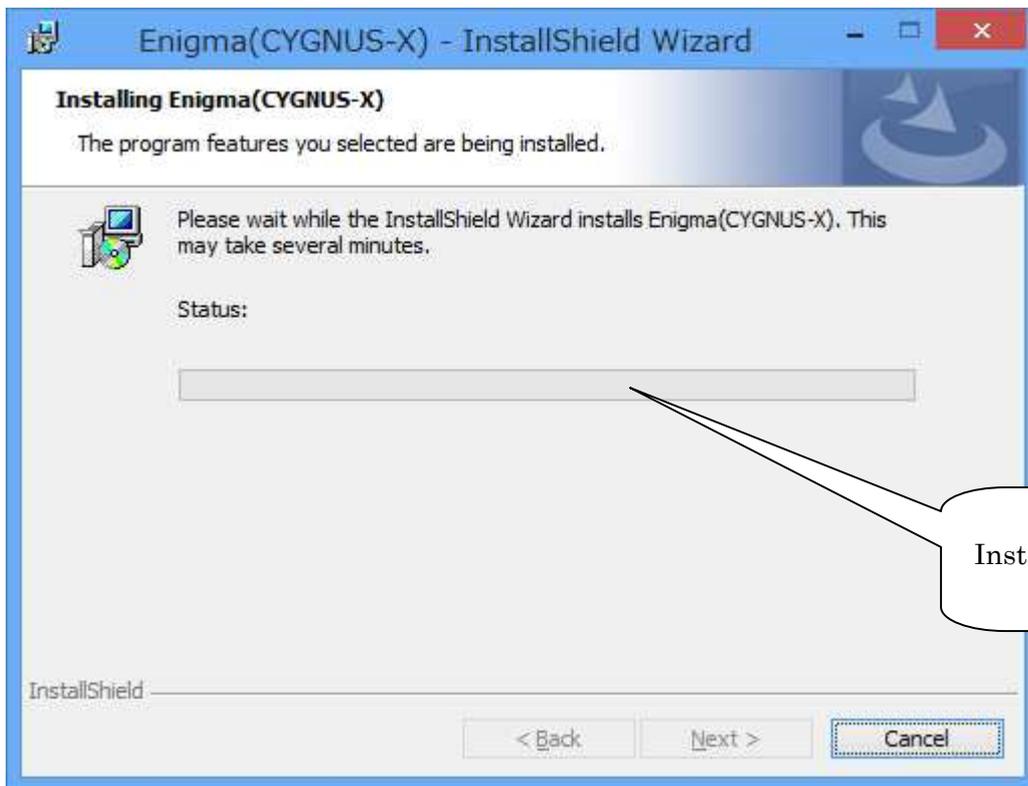
実行(R)

A security warning will pop up after the download has finished. Please run as is.

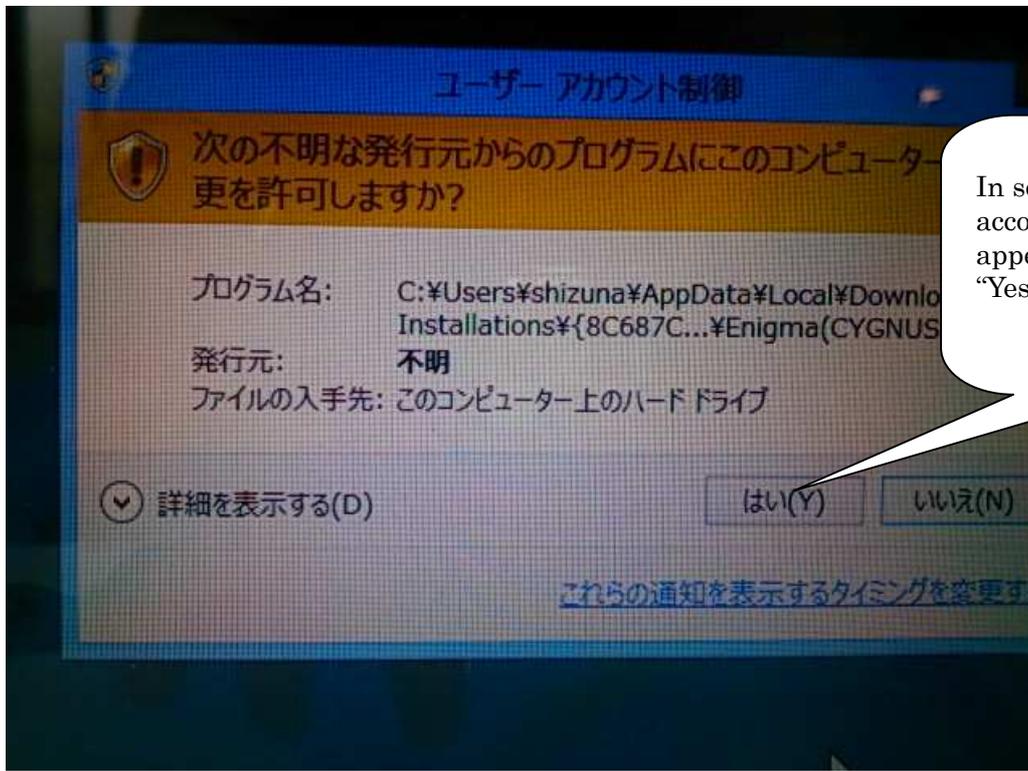




After prepare for install has finished, an install button will appear. Click "Install"



Install has begun

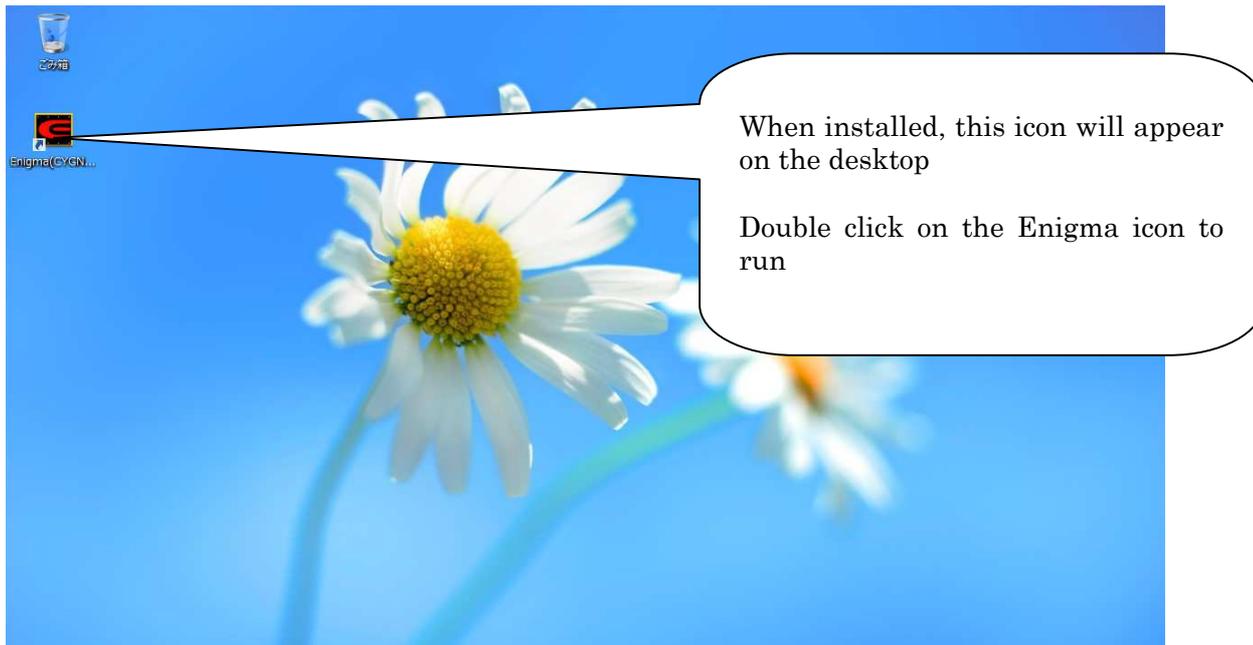


In some cases a "User account" warning will appear, but please click "Yes"

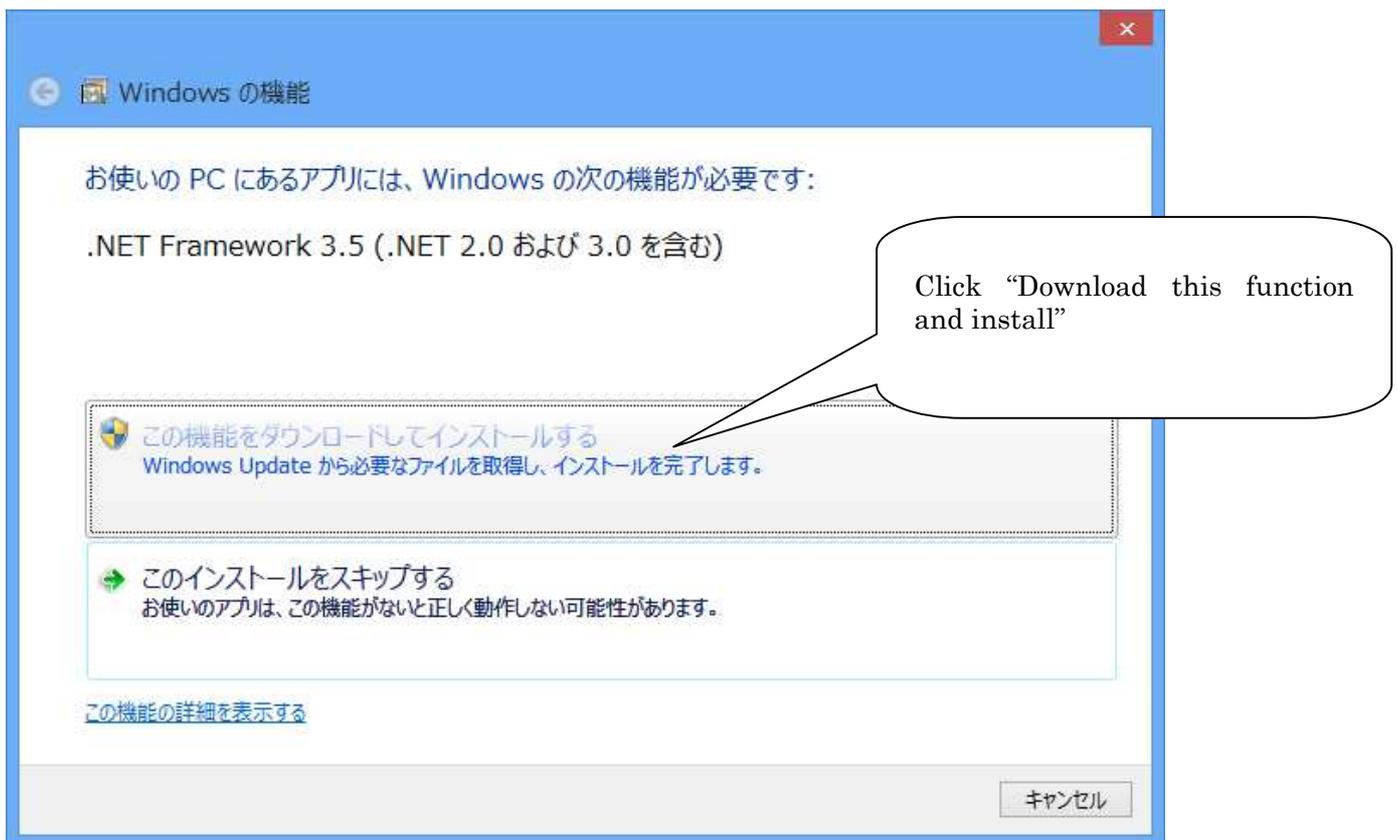


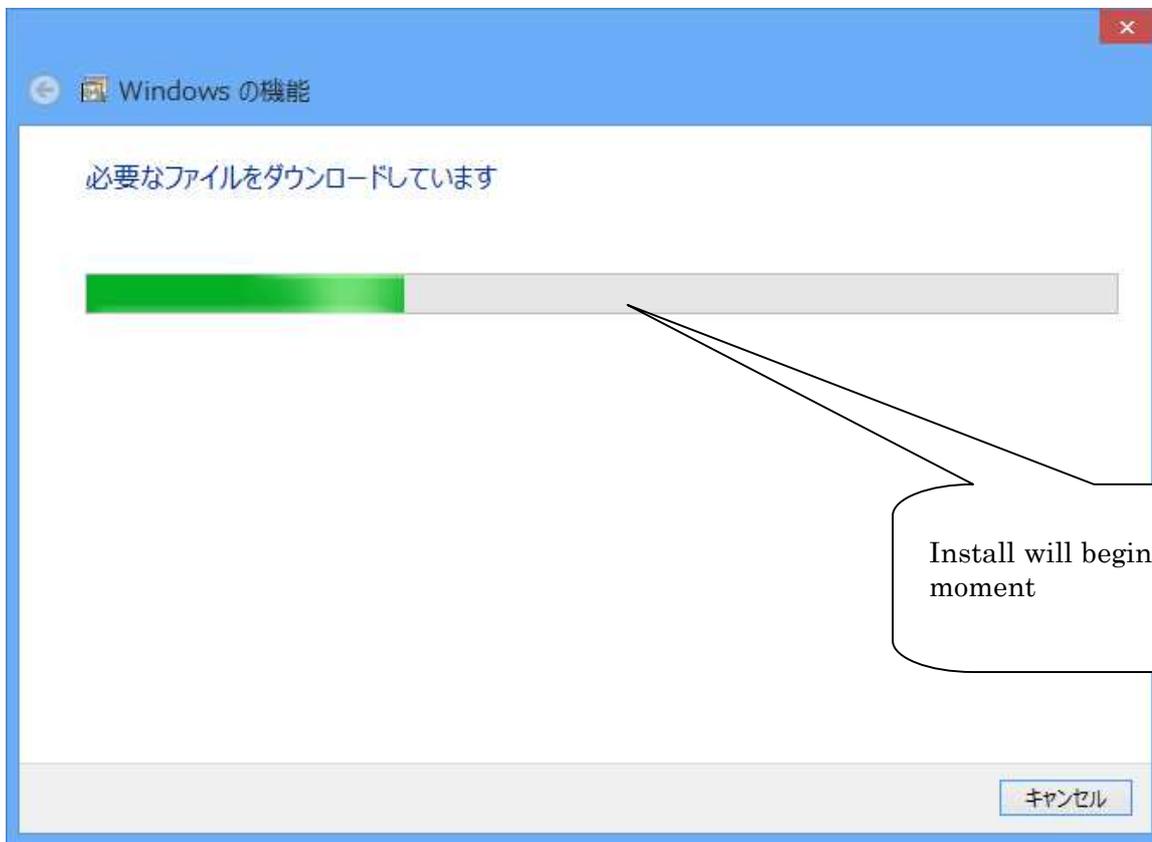
When install has finished, this screen will appear. Click "Finish" and the installation is complete

NET FrameWork 3.5, available free from Microsoft, must be installed to run the Enigma software. If NET FrameWork 3.5 isn't installed, an install screen will appear the first time that the Enigma software is run.

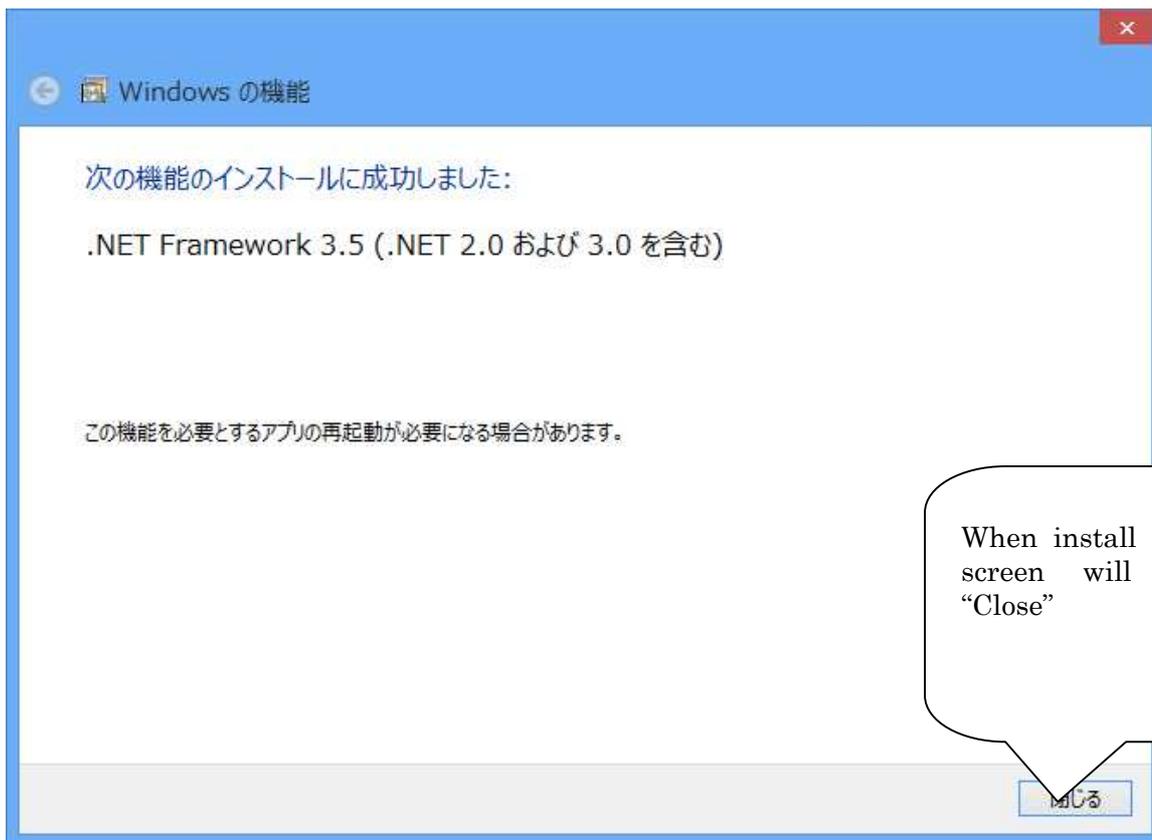


If .NET FrameWork3.5 is not installed, the following will be displayed





Install will begin. It will take a moment



When install is complete this screen will appear. Click "Close"



When you click the Enigma icon again, the software will start.

Enigma データエディタ for V125(K9L0)

ファイル(E) 編集(E) 表示(V) Enigma(Alt) ウィンドウ(W) ヘルプ(H)

新規MAP - 燃料調整マップ

TPS/rpm	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	800
100%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

新規MAP - 燃料調整グラフ

燃料増量値(μs)

メーター

加速ポンプ設定

回転数補正

エンジン回転中
レブリミット

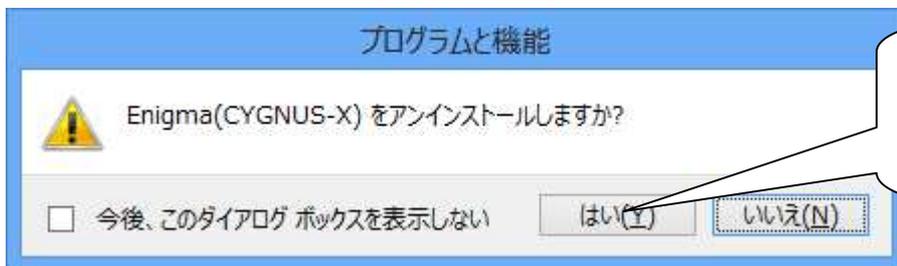
未接続 ファイル名: 新規MAP 保存日: タイトル: 新規MAP コメント:

The Enigma software starting up

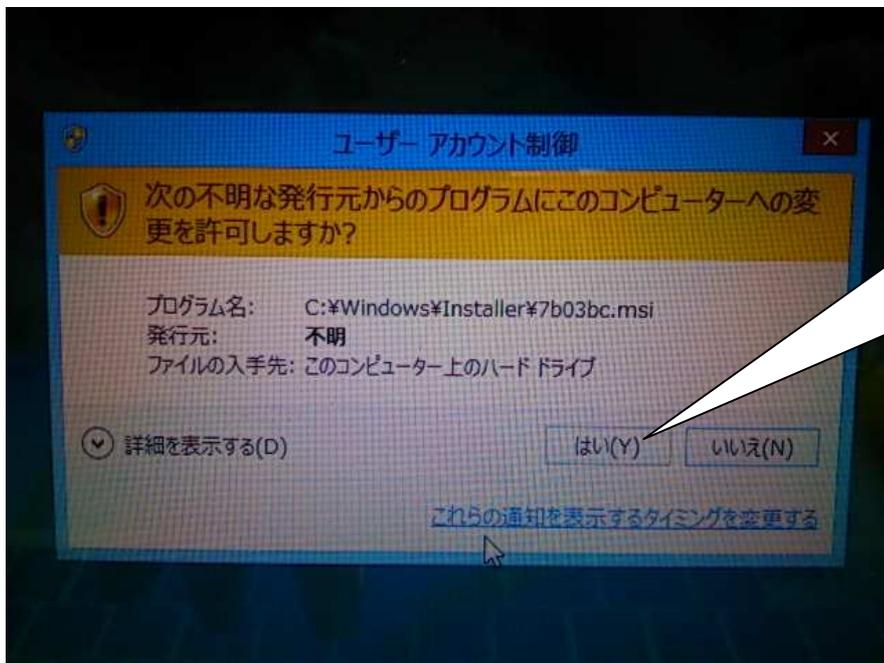
Uninstalling the software

When uninstalling is necessary, such as when upgrading or reinstalling the software, it can be performed in the following way.



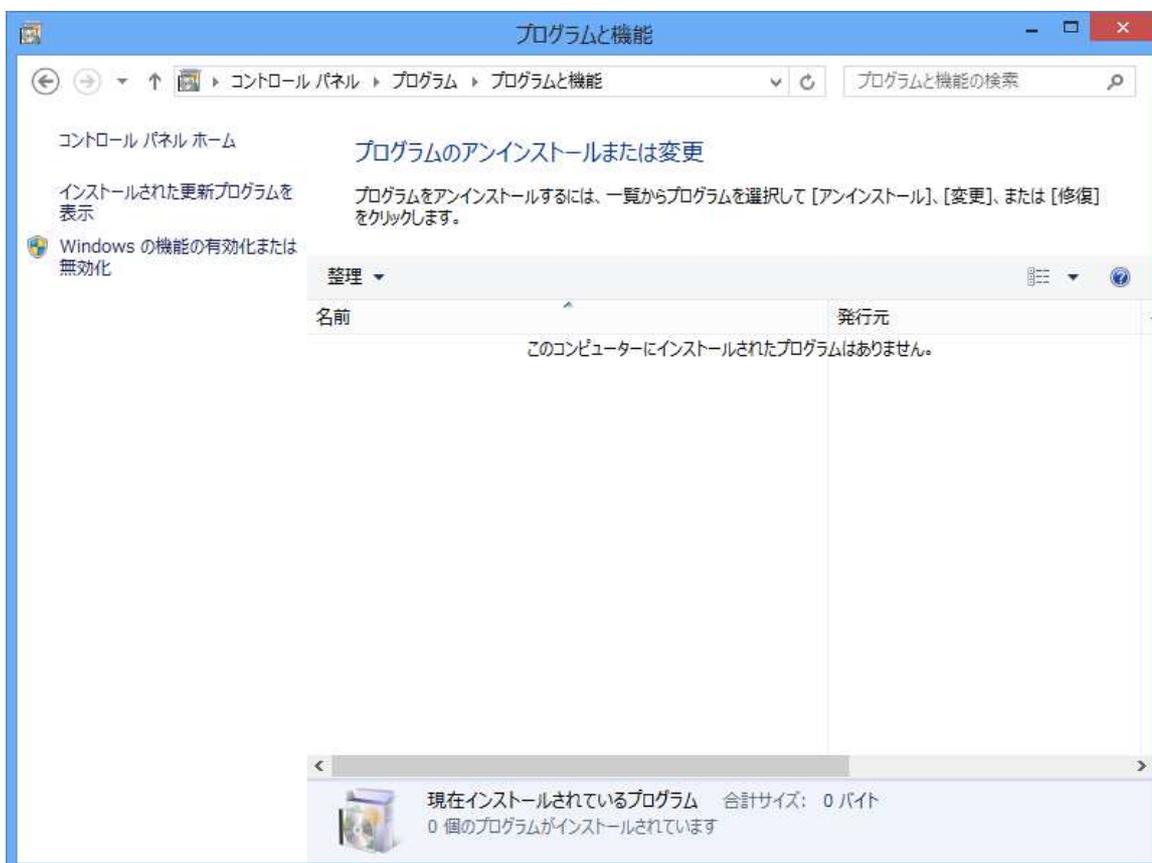


You will be ask to reconfirm, click "Yes"



In some cases a "User account" warning will appear, but please click "Yes"

Uninstall is complete



Bluetooth configuration

The following will explain how to make the ENIGMA communicate with a computer get using standard Bluetooth.

It is written assuming that your PC has Bluetooth. (For computers without Bluetooth, please buy and install a retail Bluetooth adapter)

ENIGMA can only be connected to the Windows standard Bluetooth driver.

Please do not install the driver included in the supplied CD into the Bluetooth adapter. For example, CSR drivers, etc. It does not work with CSR driver.

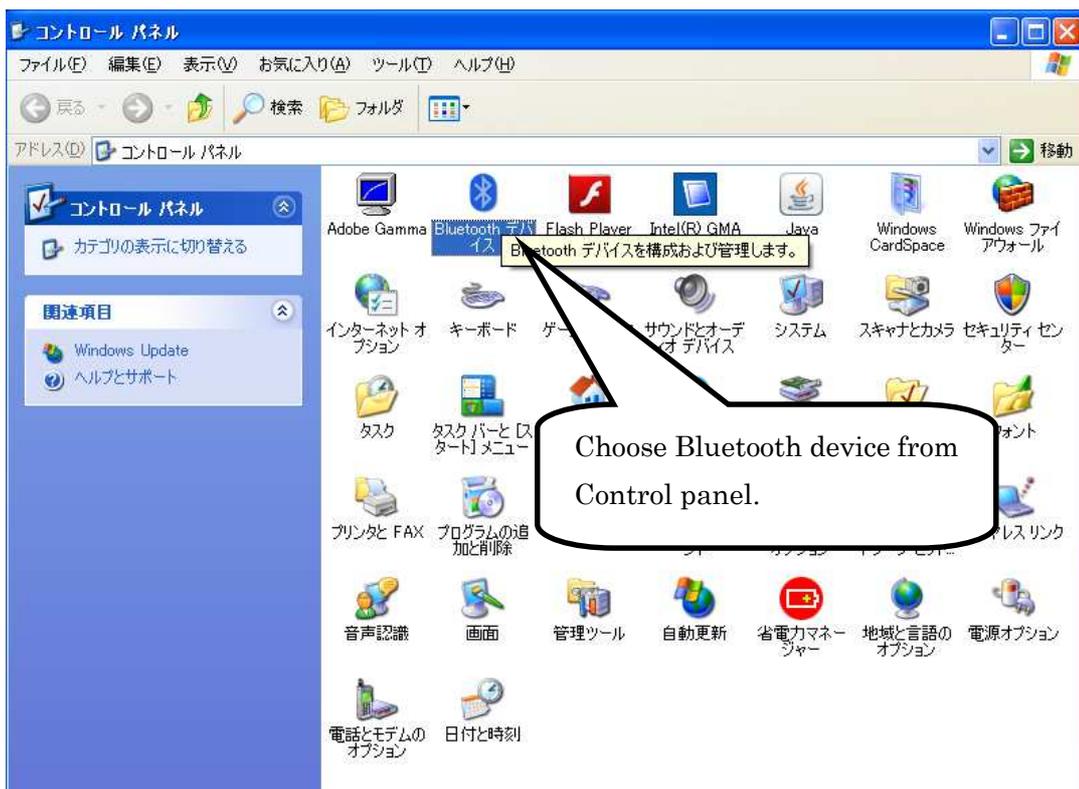
The driver installation is Bluetooth adapter can not be used necessary.

It should be noted that there may be display differences, and such, depending on the type of OS. This is written assuming the user has a basic understanding of computers. (We cannot explain the setting for individual PCs. Please ask a shop)

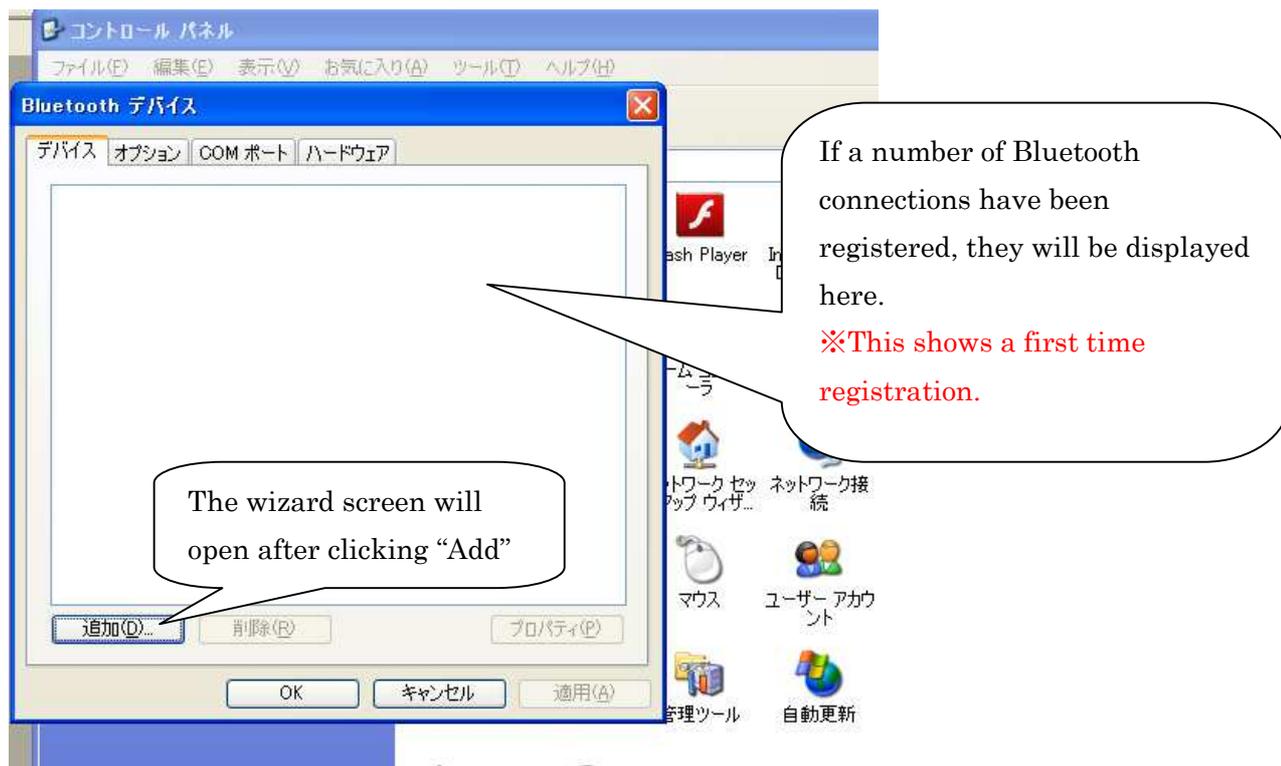
First **Turn ON the key while holding full throttle** to test whether the bike is within the ENIGMA's transmission range. If the ENIGMA is correctly installed, the bikes "FI lamp" will begin to flash.

Because ENIGMA (Bluetooth version) transmits data wirelessly, it is equipped with a safety device that only allows wireless data to be transmitted when the Key is turned to "ON" while holding full throttle. This is done in order to prevent malicious third party access. If started with the normally, wireless data won't be transmitted and third parties won't be able to access your ENIGMA. (The FI lamp will only flash when wireless data is being transmitted) Also when the ENIGMA is transmitting wireless data, it can only connect to one machine. Even when you transmit ENIGMA information wirelessly (Such as when using the tachometer function will riding) a third party cannot access this information. In the case that changes are made to normal data, if the key is turned OFF and then ON while holding the throttle, wireless transmission will cease. It is manufactured to safely secure transmitted data.

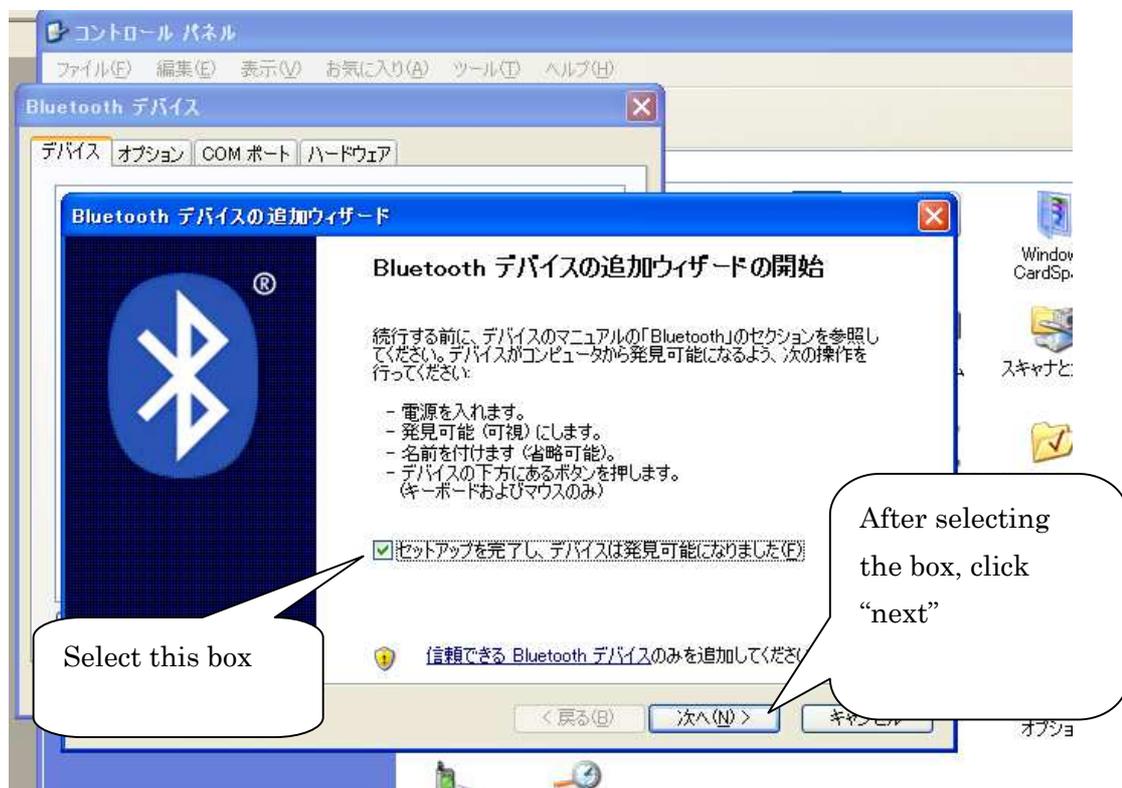
Choose Bluetooth device from Control panel.



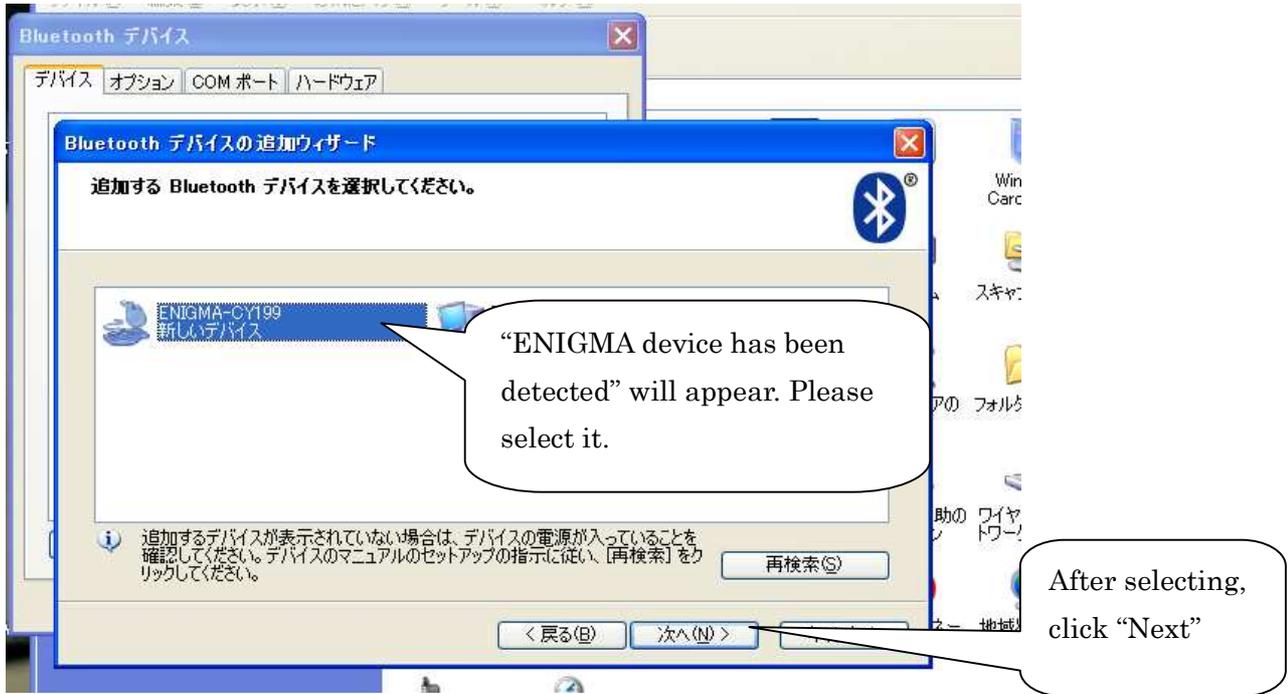
The following screen will appear if you select. If already there are several Bluetooth of registration will be displayed on the screen.



When the wizard display opens, select "Device is now discoverable to complete setup" and click "next".



Select When new ENIGMA devices are search and press Next



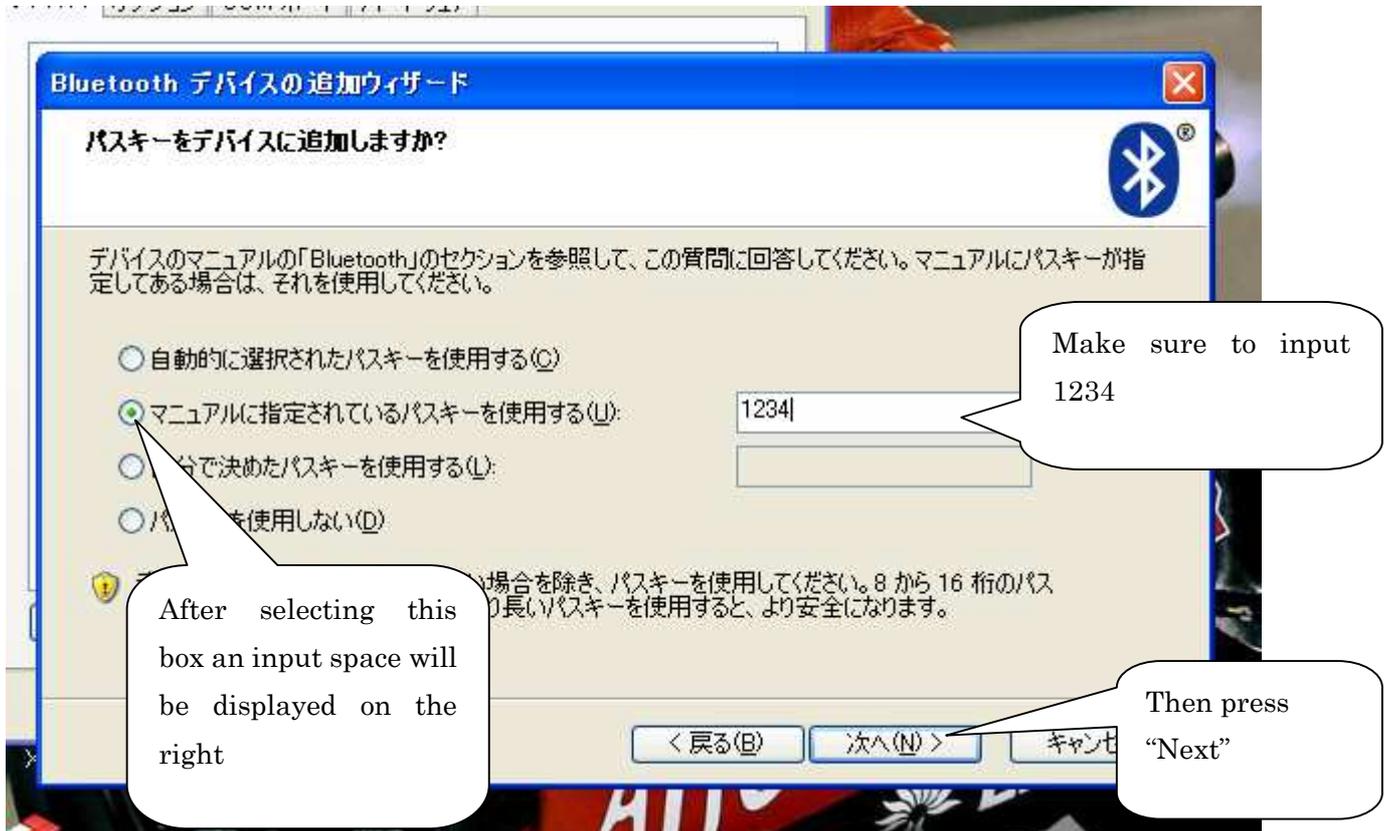
※ If a number of Bluetooth connections have been set up and they are in close vicinity, they will also be detected. So a number of devices will appear. In this case, always select "ENIGMA".

The Bluetooth device Add Wizard screen will open.

Please select "Use the passkey specified in the manual."

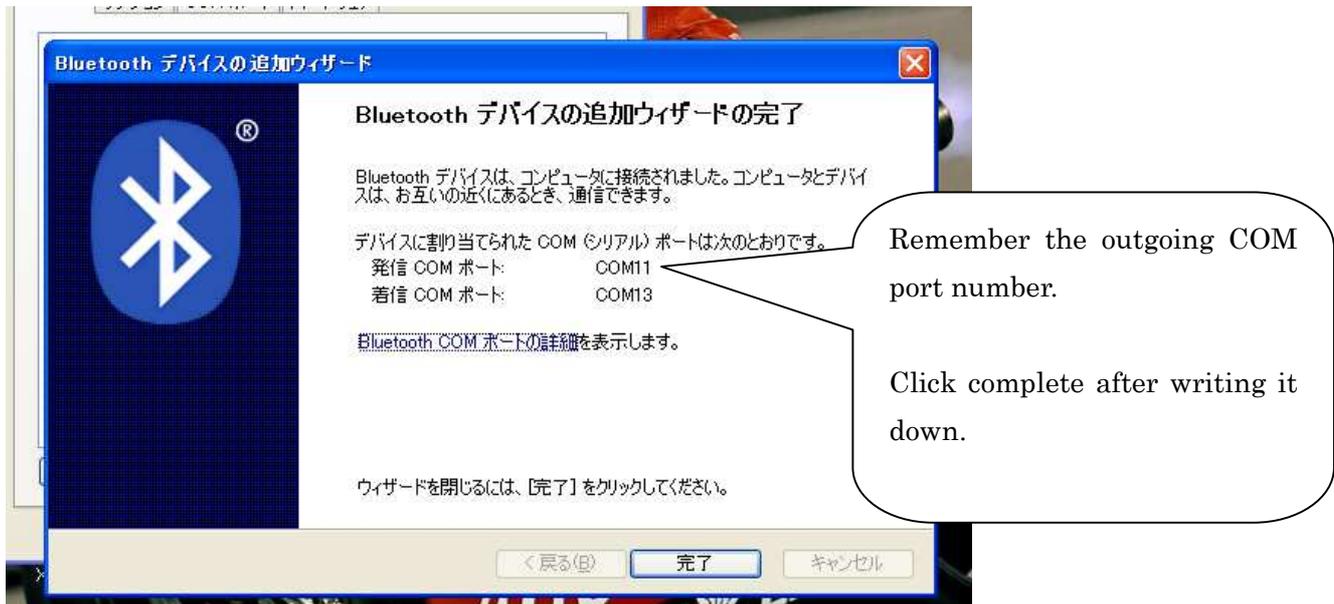
An input space will appear on the right side of the screen. Please enter the number "1234".

Press "Next".



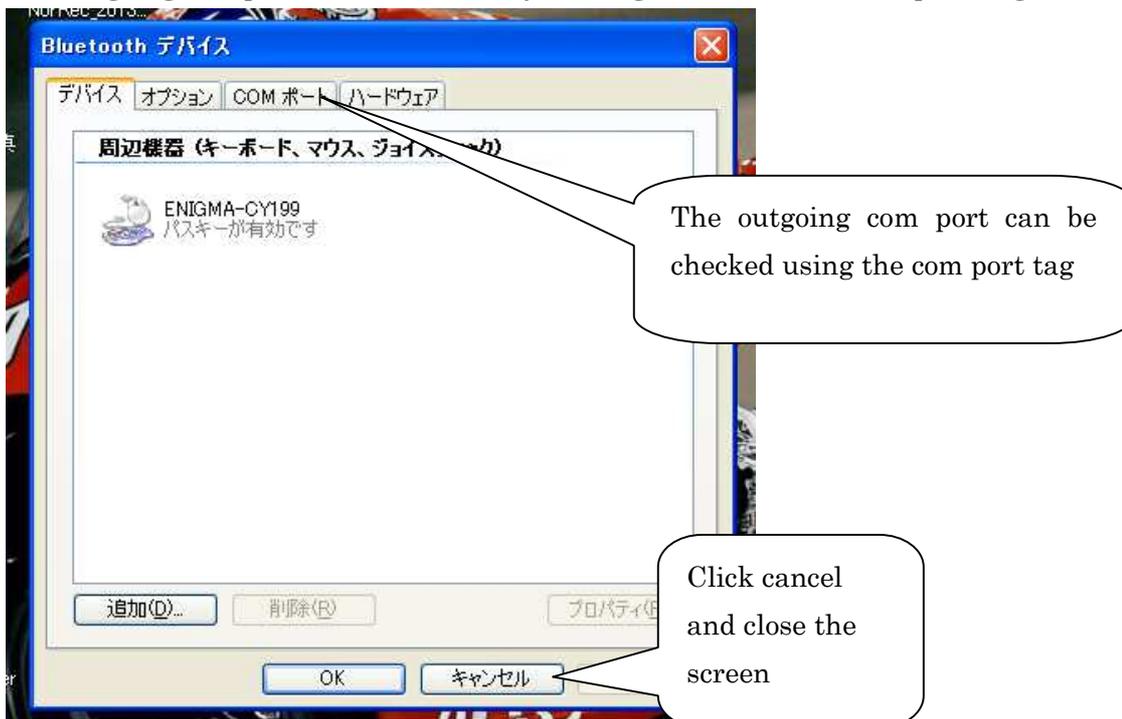
As additional device ends the following screen appears. I will remember the "outgoing COM port" of the screen.

In this case, I will be "COM11". I press the Finish button



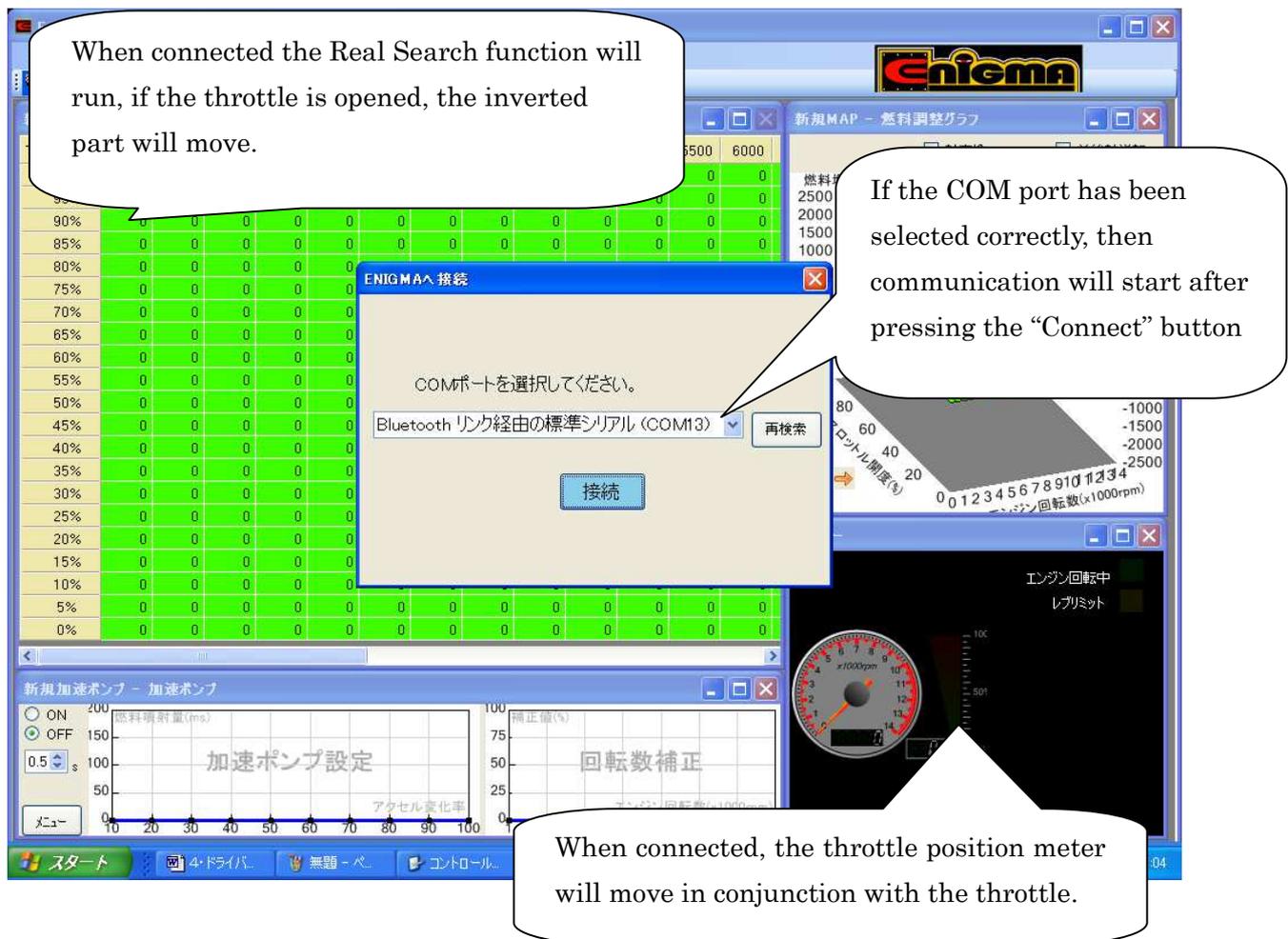
Once completed the screen below will appear.

The outgoing com port can be checked by clicking on the above "COM port" tag. Please make a note of it.



Bluetooth setup is now complete.

Next run the ENIGMA software and select "Connect" from the "ENIGMA" menu in the upper screen. If the noted "COM port" isn't selected, please choose it from the drop down box. The Real Search function will run when communication begins, even if the engine isn't running, the throttle position display will show throttle movement.



- ※ When the engine is started, the tachometer and other functions will begin to operate.
- ※ From the second time, as long the "key is turned to ON while holding full throttle" it will connect even during start up.
- ※ Please turn the key to OFF and start from the beginning in the case of unexpected disconnections, such as with electromagnetic interference.
(This is because the security features of ENIGMA may prevent reconnection)
- ※ Please be careful to safely connect or rewrite data while the engine is running, and do so at your own risk.
- ※ If you have a computer that does not a built-in BlueTooth, and works only with Windows standard Bluetooth function and the driver when it is used in with a Bluetooth adapter of market goods to the USB connector. Those of various manufacturers of goods outside the company, in order to work with different drivers of the sale manufacturers, respectively, and can not respond to all.
 - ※ If you are using a USB Bluetooth adapter, always, without installing the software manufacturer supplied, please use the Bluetooth device and a Bluetooth driver in the Control Panel on Windows standard.
- ※ always SP2 If you are using Windows VISTA is to (Service Pack2) please do the updates from Microsoft's page. In unmarked and Service Pack1 it does not work.
- ※ There is no direct linkage function of smartphone version and data. Please migrate the data through the Enigma.
- ※ by the Bluetooth adapter specifications, there is a limit to the number of total in the pairing can partner (Android terminal or PC). If you exceed the pairing possible number you will not be able to Bluetooth communication. There is also the case at this time that looks like pairing was possible, but it is not able to communicate. Although our in factory can rest about 8-9 units and pairing, if in the case where it was placed in the hands, such as auction, there is a possibility that can not be pairing and communication Please note. If in case you can not Bluetooth communication, please contact to us it will be paid refresh work in our company.

Smart phone Bluetooth device configuration

The device settings for smartphones will happen in the order shown below.

Please keep in mind that screen placement may vary depending on make or model

(It cannot be assumed that all devices will have the same screen as the following)

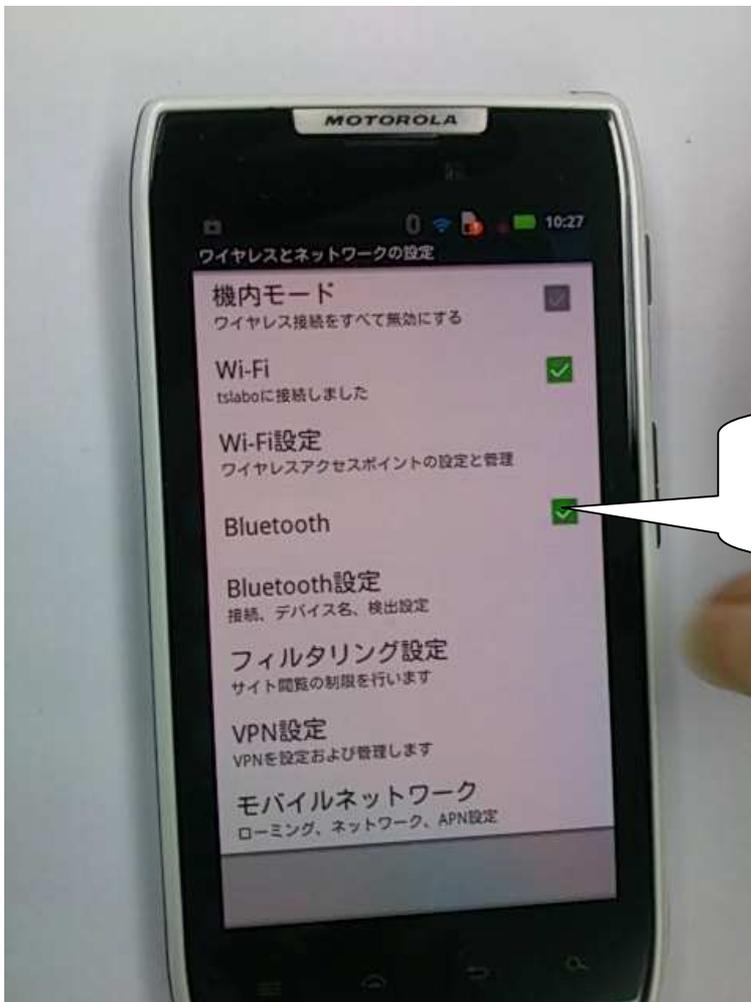
※ **Compatible with Android version 2.3 or IOS6 and above.**

First, turn the key to ON while holding full throttle (the F1 lamp will on or flash) and set the ENIGMA to transmit Bluetooth signals.

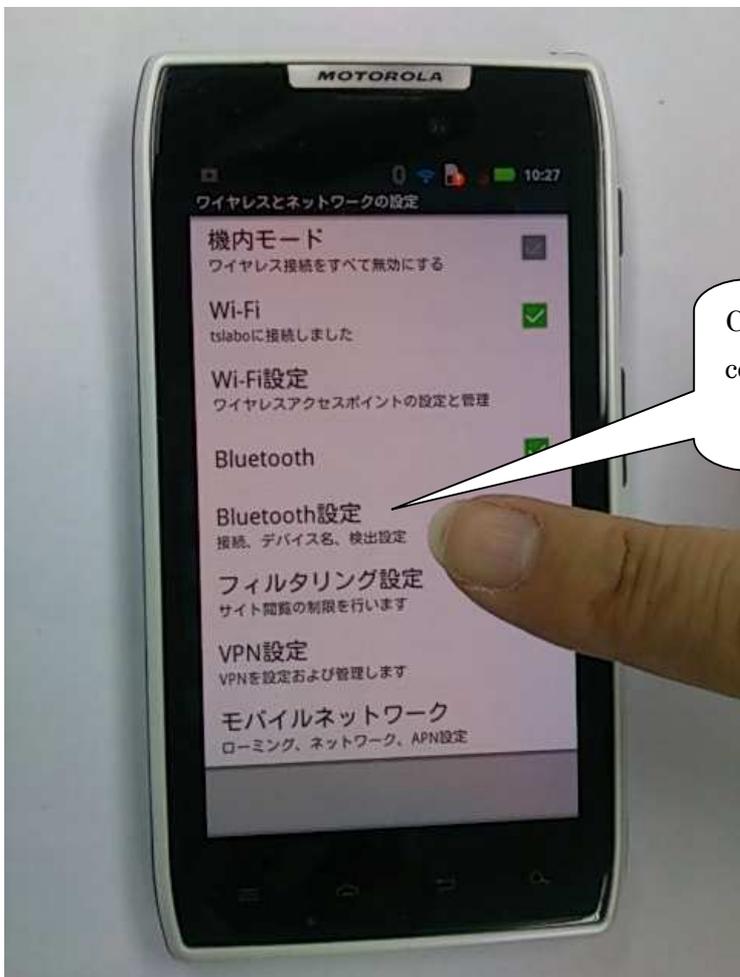
● **This is written assuming the ENIGMA app has been downloaded to the smartphone.**



Choose “wireless network” from the smartphone’s setting screen



Make sure the box beside Bluetooth has been checked

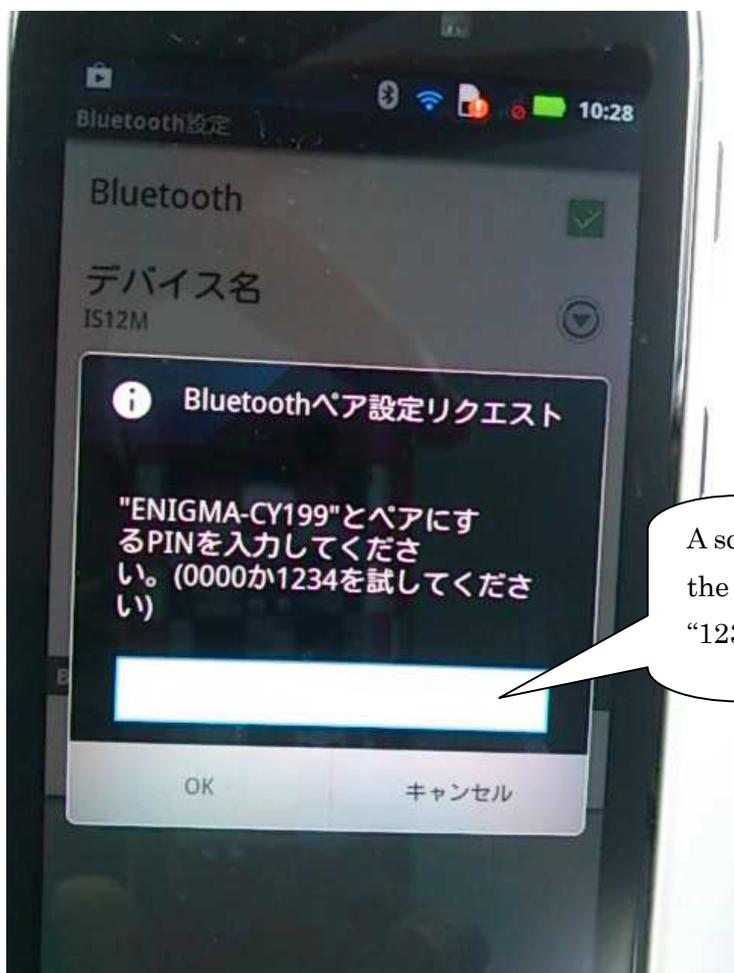


Choose Bluetooth configuration

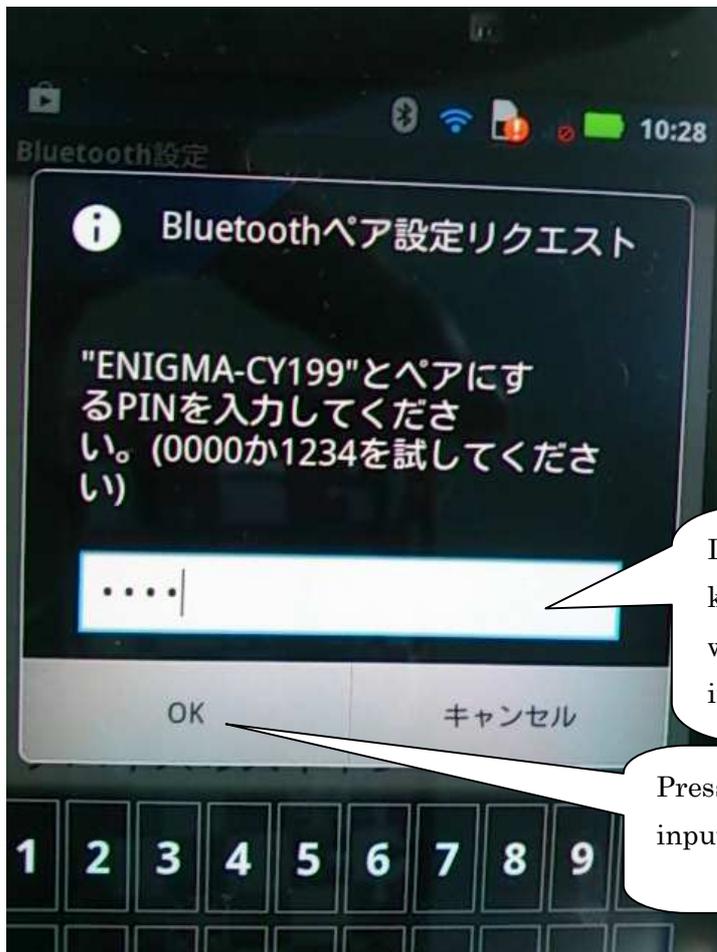


If the Bluetooth device has yet to be scanned for, this can be done from “device scan” at the bottom of the screen

If the ENIGMA device has been detected, it will appear at the bottom of the screen



A screen like this will appear. Follow the instructions. Be sure to input “1234”



If you tap the screen, the 10 key will appear. The screen will look like this when inputting “1234”

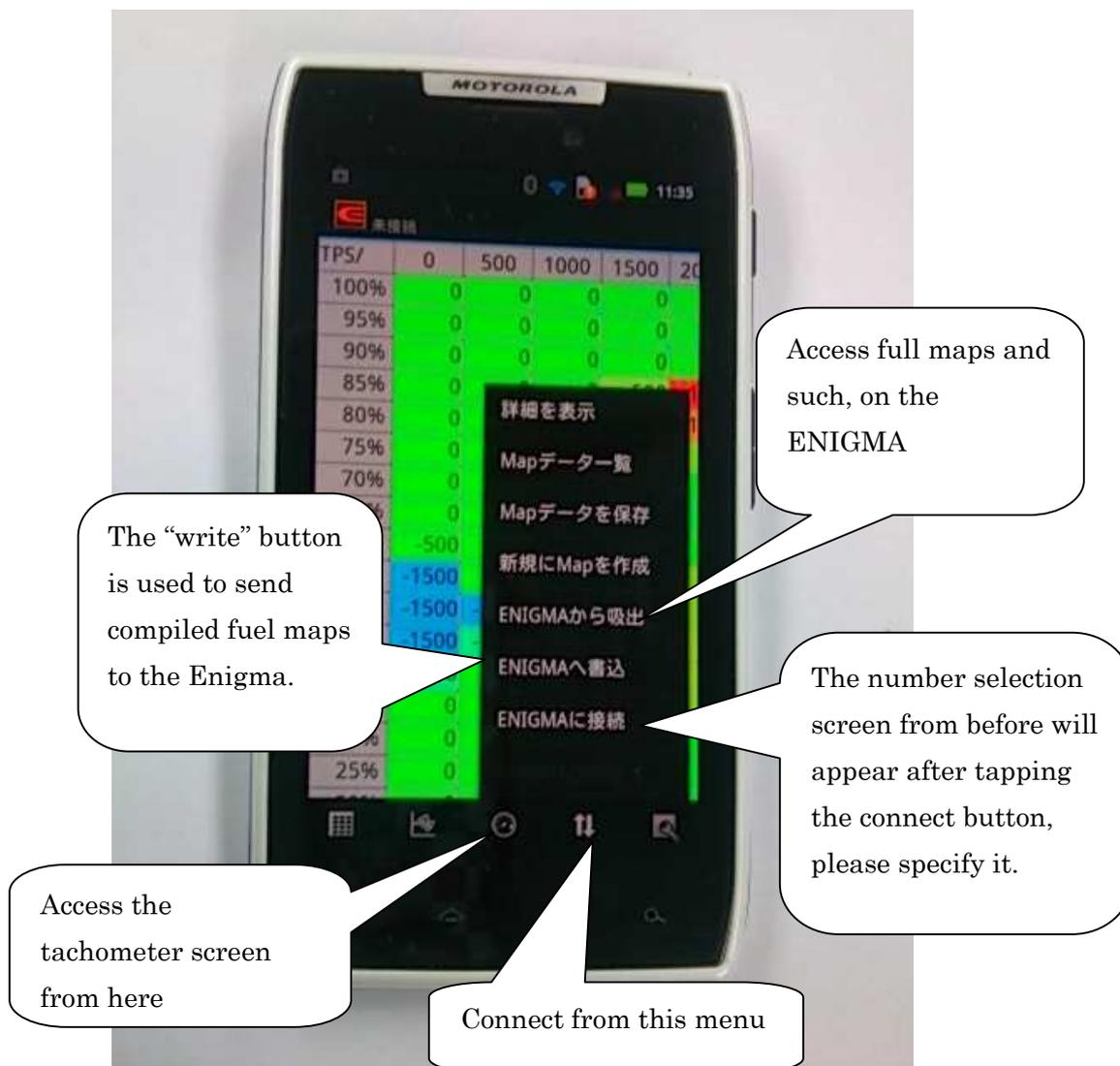
Press “OK” after inputting the numbers



It is complete when “pair configuration” is displayed. Remember this number



Run the ENIGMA application from the icon on your home screen.



- ※ The tachometer will be bright white when communication is started, it begins running at engine start-up.
- ※ Even if the engine isn't running, the connection can be checked with TPS monitor next to the tachometer screen. It will move in conjunction with the throttle position.
- ※ This is just one example, all smartphones and devices do not share the same screen. Please refer to the manual of your device for more details. Also, please understand that because device configurations vary from person to person, it is impossible for this explanation to cover all examples.
- ※ During pairing and, at the time of the first connection after pairing please close the distance between the Enigma within 30cm.
 - ※ If you disconnect, you will be able to connect from other PC or other smartphone.
- If you leave it and can not connect to the Enigma is, once you exit the app, after releasing the pairing, is carried out to restart the body, please connect by pairing again.
- ※ There is no direct linkage function of the PC version and data. Please migrate the data through the Enigma.
- ※ The Bluetooth adapter specifications, there is a limit to the number of total in the pairing can partner (Android terminal or PC). If you exceed the pairing possible number you will not be able to Bluetooth communication. There is also the case at this time that looks like pairing was possible, but it is not able to communicate. Although our in factory can rest about 8-9 units and pairing, if in the case where it was placed in the hands, such as auction, there is a possibility that can not be pairing and communication Please note. If in case you can not Bluetooth communication, please contact to us it will be paid refresh work in our company.

connection in iOS smartphone

connection with the iOS smartphone I will proceed as follows. OS version or tablet, depending on the difference of the smartphone, the screen there are some different place.

※I will fit in iOS6.0.1 more. iPhone 4s before, because the iPad third generation or earlier are not supported the BluetoothLE, OS can not connect also be upgraded.

●ENIGMA app, you have one that is installed from the APP STORE to your smartphone.

1. Please skip to Section 2 If the ON already Bluetooth of Bluetooth feature is turned ON.
First I open the iOS settings.



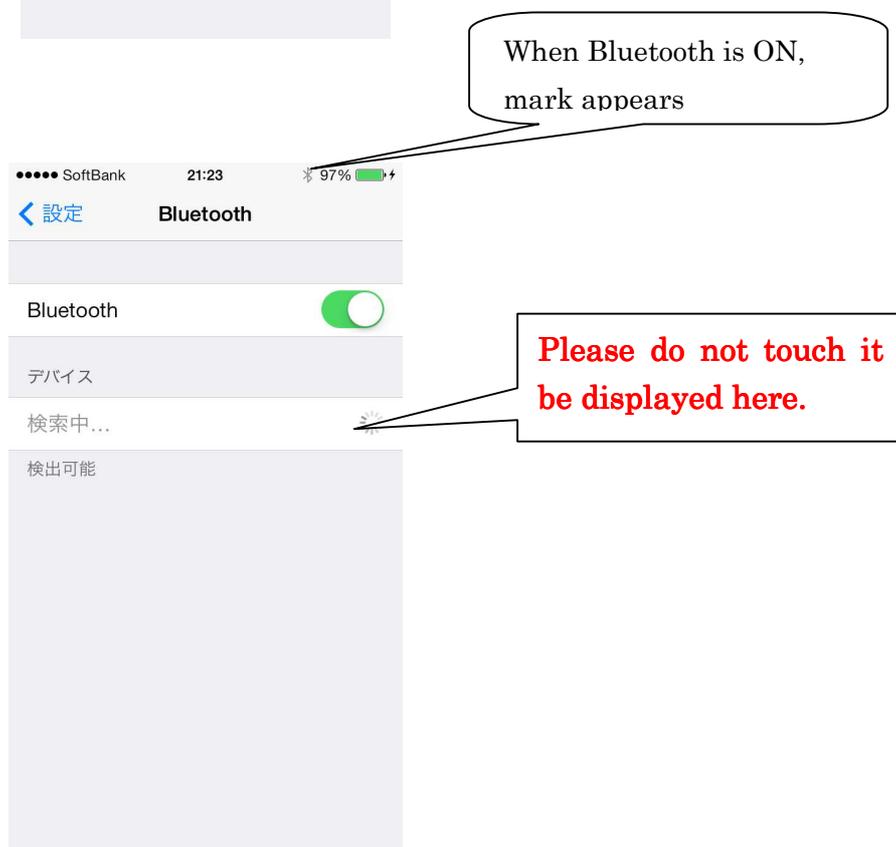
Open the Bluetooth settings.



Turn on Bluetooth function.



Bluetooth turn on.



Bluetooth is turned ON. Please to display the menu by pressing the Home button.

※In the case of IOS version is not performed pairing work.

2. Connection with the ENIGMA

The key in full open throttle to the ON (FI lamp on or blinks), Bluetooth radio is out of the ENIGMA.

Starting the application (in this case it has a PCX as an example, but please read as each model.)



Start by touching the models dedicated app. Different models of the app can not be used.

I press the app menu button of.

	0	500	1000	1500	2000
100%	0	0	0	0	0
95%	0	0	0	0	0
90%	0	0	0	0	0
85%	0	0	0	0	0
80%	0	0	0	0	0
75%	0	0	0	0	0
70%	0	0	0	0	0
65%	0	0	0	0	0
60%	0	0	0	0	0
55%	0	0	0	0	0
50%	0	0	0	0	0
45%	0	0	0	0	0
40%	0	0	0	0	0
35%	0	0	0	0	0
30%	0	0	0	0	0
25%	0	0	0	0	0
20%	0	0	0	0	0

Press here menu appears.

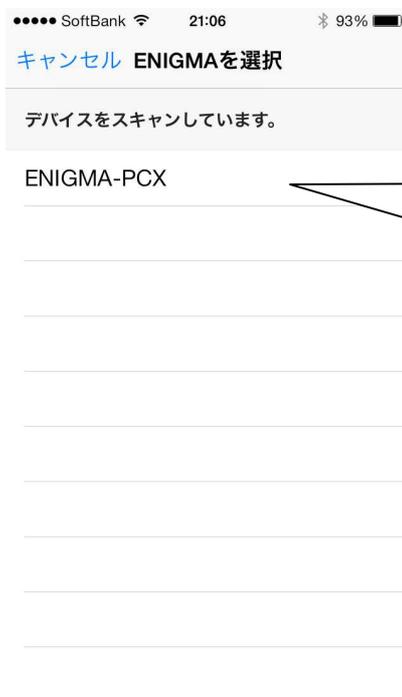
Injection quantity input, operating conditions, this operation is possible in accelerator pump. Other limiter setting, TPS setting will try at the same time automatically connected to the menu selection.

Since the menu is displayed, I will touch the connection to ENIGMA.



touch here."connect to ENIGMA"

Selection of screen appears the ENIGMA. After a while, you can display the detected ENIGMA. If it does not appear, please check whether the bike FI light is blinking. If you are not flashing, once the bike key to OFF, in a state in which to fully open the bike of the throttle again, please key to ON.



Found ENIGMA appears. Please Touch here.

Note though there is only one ENIGMA, but there are two if you leave, if so, please touch either. If it is connected for the first time, you might ENIGMA-PCxxx (PC on the model, xxx is a number) is displayed as.

3. Confirmation of connection

Once connected part of the following will be black.

Bluetooth mark will be black to be able to connect.

You will see the current position in real search function to be able to connect.

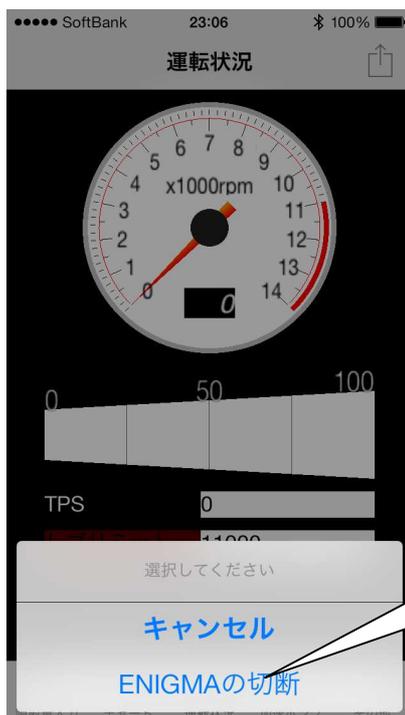
When you are not connected

In connection

Operation screen background of tachometer turns white, you will see the current situation.

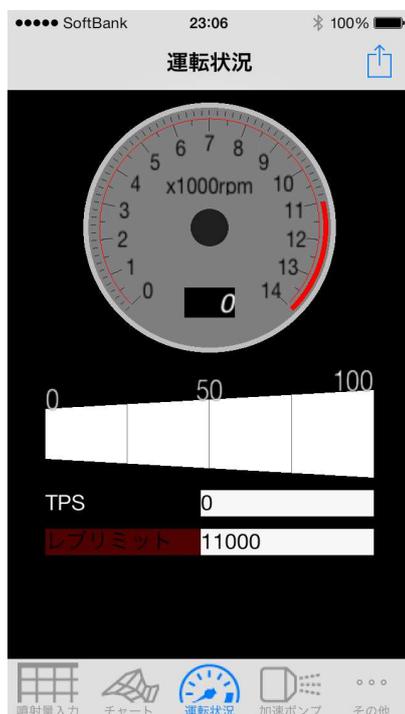
4. Disconnecting of ENIGMA

Appears to be disconnect menu press the menu button. Please press the disconnecting of ENIGMA.



Here it will be disconnected when you touch.

Once cut, the background of the tachometer will be gray.



※If you disconnect, you will be able to connect from other PC or other smartphone.

※There is no direct linkage data function of the PC version and data. Please migrate the data through the Enigma.

※If you exit and can not be connected to the Enigma is, once you exit the app, turn off the power of the body, please reconnect and restart.

Communication to Enigma

First download the Enigma operating software from the homepage and install on your computer.

The following instructions assume that the ENIGMA operation software has already been installed on your PC (smartphone)

The flow of the Enigma communication connection

The following describes the general flow of the communication connection to the fuel cut limiter, fuel map and so on. It assumes that ENIGMA has been correctly attached to the bike.

Because ENIGMA (Bluetooth version) transmits data wirelessly, **it is equipped with a safety device that only allows wireless data to be transmitted only when the key is ON and the throttle fully open.** This prevents malicious third party access.

If started with the throttle in a normal position, wireless data won't be transmitted and third parties won't be able to access your ENIGMA. **(The FI lamp will only flash when wireless data is being transmitted)**

Also, when the ENIGMA is transmitting wireless data, it can only connect to one machine. Even when you transmit ENIGMA information wirelessly (Such as when using the tachometer function while riding) a third party cannot access this information. In the case that changes are made to normal data, turn the key to OFF and then ON again while leaving the throttle as is, wireless transmission will cease to be transmitted. The ENIGMA has been designed to safely secure all transmitted data. **(This function is not available for the USB version because it is a wired connection.)**

Even when not connected to the Enigma, data, such as fuel maps, can be created on a smartphone or computer. Any number of them can be saved. It is useful to create multiple maps that suit the conditions of your bike.

This is a general description of the flow of communication transitions to the Enigma. Please refer carefully to each function's separate instructions for more detail.

When using Bluetooth connection (Android / iOS)

Turn the bike key to ON at full throttle → The FI lamp will flash in the meter → Operation software connection button → listen for com port → COM port designation → connection → if the engine is left running as is, the tachometer and such can be checked, as they will move → needed MAP edits and limiter cuts, etc. are performed → the data is sent to ENIGMA → this will be received by the bike → disconnect → turn key to OFF so the connection will be cut.

- ※ **COM port has been described in detail in the section on the configuration of the Bluetooth device.**
- ※ **It is basically the same with a smartphone.**
- ※ **It is standard to send the data that appears on the editing software screen to ENIGMA.**

Synchronize with the ENIGMA by modifying the error of the TPS throttle position sensor

ENIGMA reads the engine speed / TPS value and signal speed from the various sensors.

However, the output signal from a commercial bike's TPS varies slightly by bike. (There are individual differences in the signal of a fully open or fully closed throttle.) Because of this, when for example, adjusting the fuel in response to the TPS, depending on the bike, the fully open throttle signal may be read at a different position than that of fully open. So when you connect to a computer or smartphone, the actual throttle position of 0 ~ 100% output voltage will be synchronized with the correct throttle position data of the Enigma. The data made by the software of this function will perfectly reflect the bike. This only needs to be done once with a computer or smartphone, as the correct TPS value is stored in the Enigma. (It will match the value of a fully open and fully closed throttle)

When there is a problem with the wiring connection, the Enigma software's check function will warn the user. Please see details below.

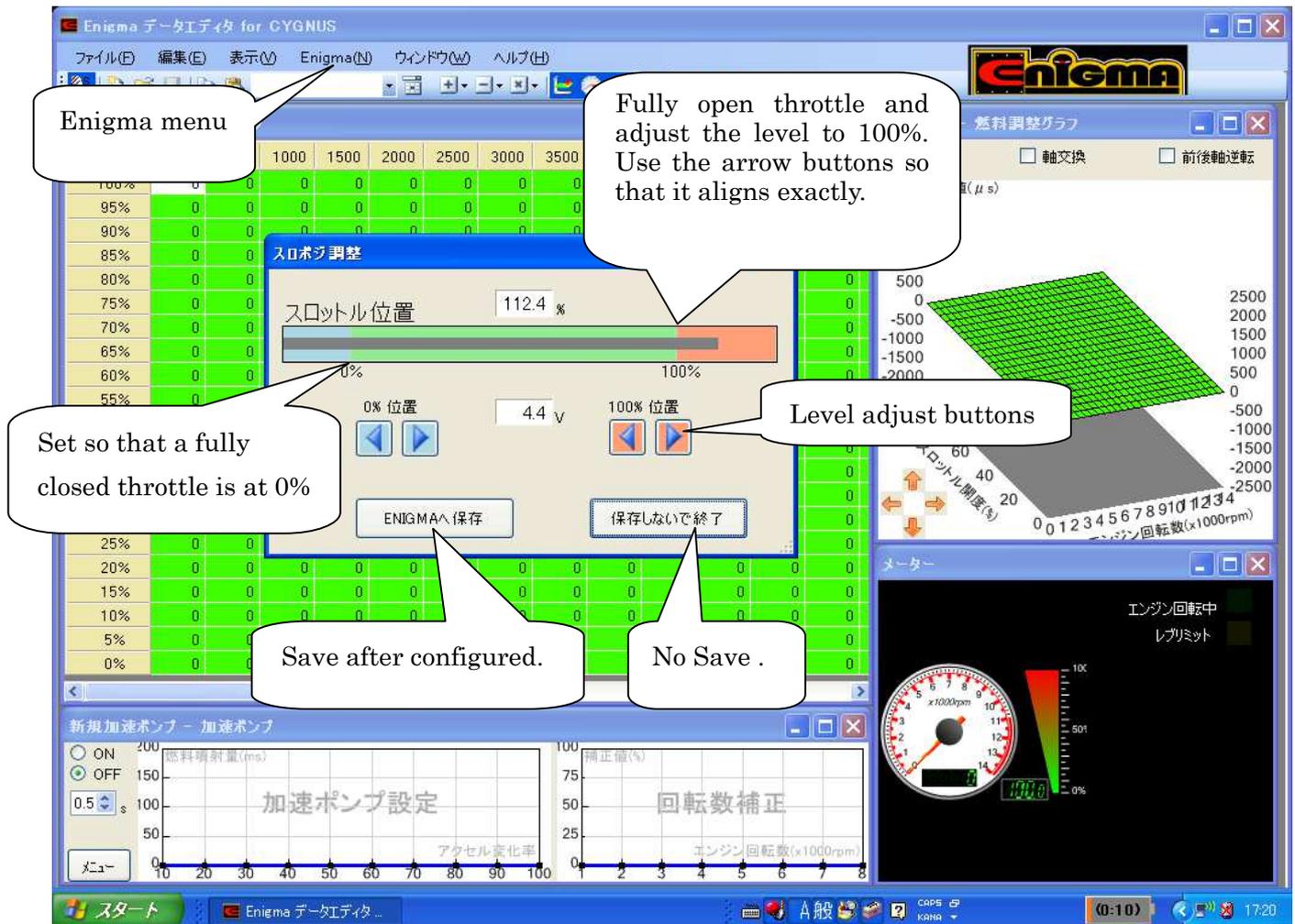
Launch the software from a smartphone or PC, then connect to the ENIGMA.

※ Make the connection by connecting the USB cable to the PC for the USB version.

Then select the ENIGMA menu in at the top of the screen. With smartphones, choose setting in the bottom right.

Select "TPS Settings". The screen below will appear (The smartphone screen is slightly different but the basics are the same).

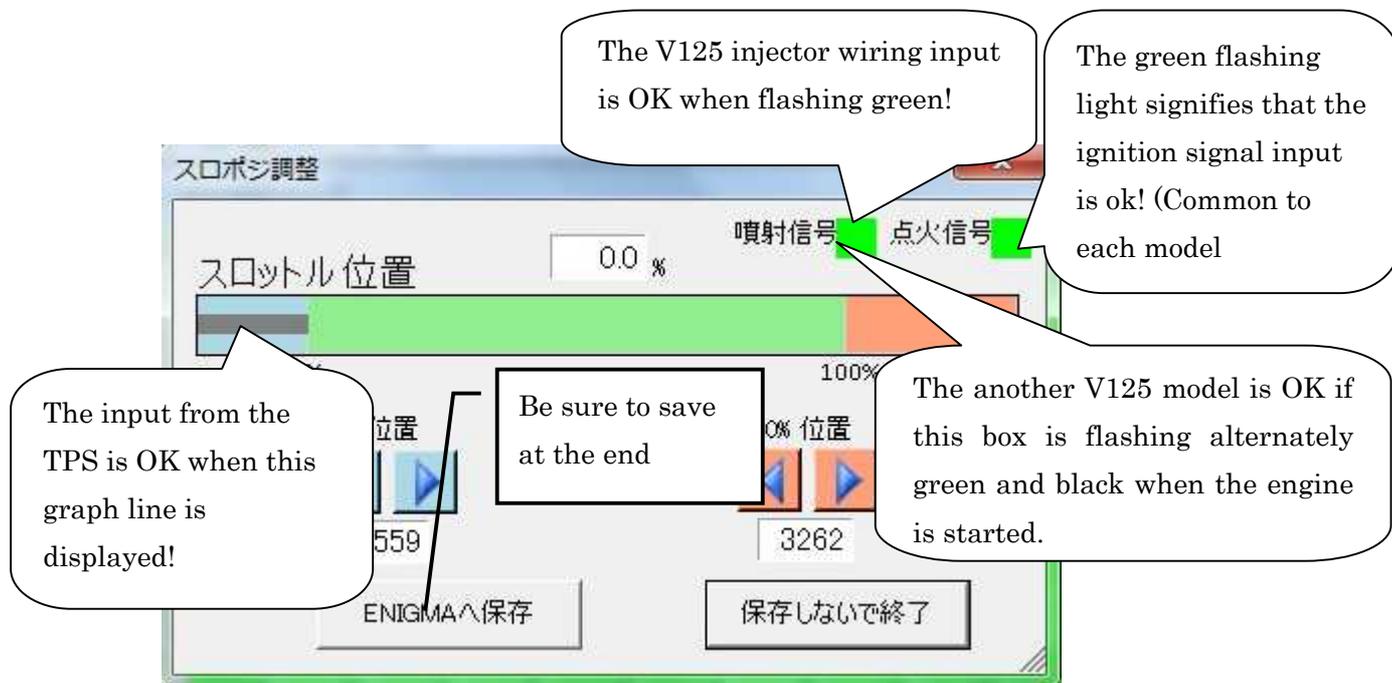
It is very dangerous to do this with the engine running at full throttle! Do it with the engine OFF. (The Bluetooth connection instructions are in a separate section)



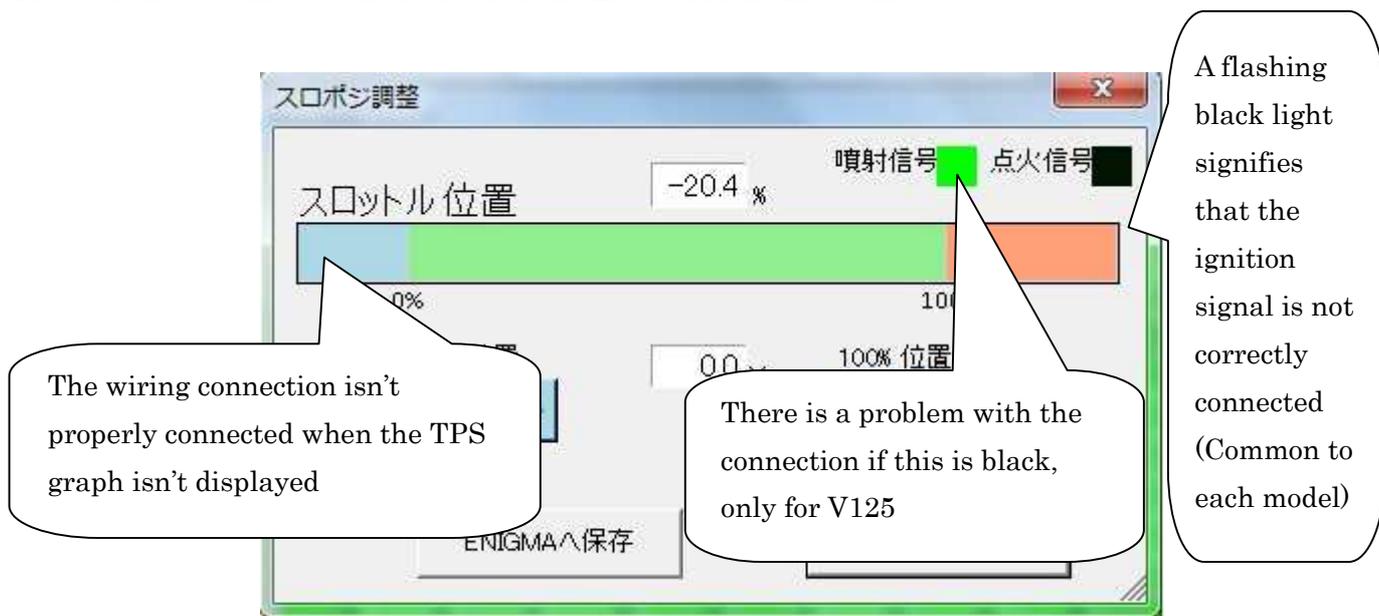
Fully close and open the throttle while looking at the throttle position graph on the screen (The graph will move). Please use the level adjustment switch so that each is aligned to 0% and 100%.

Make sure to press the "Save to ENIGMA" button at the end. It won't use these setting unless they are saved.

Important When the ENIGNA is not properly wired to the bike, the following screen will appear and the software will warn the user. Make sure to check it. (The screen design may vary slightly depending on the model.)



※ The tachometer of the software screen is white when in a connected state.
 If there aren't any problems with the rotary signal, the tachometer will move when the engine is started.
The tachometer will be dark black when the ENIGMA isn't in a connected state.



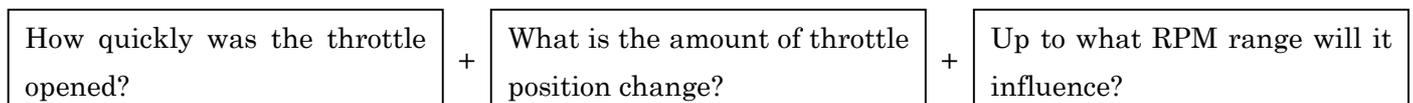
※ Because with the another V125 model the "normal injector line" is disconnected and subjected to an interrupt connection, it is not possible to determine if the wiring connection is correct when the key is turned to ON. There is a high possibility that there is a problem with the connection of the "injector line" if the engine doesn't start after finishing the TPS set up.

※ If input from the rotation signal (crankshaft position sensor) is not correct, then the tachometer won't run after connecting to a pc/smartphone and starting the engine.

Change the settings again from the beginning after redoing a connection. Be sure to press the "Save to ENIGMA" button. It won't use these setting unless they are saved.

Setting the digital accelerator pump

The Enigma is equipped with a digital accelerator pump that functions like a racing carburetor accelerator pump. The rider wants more acceleration (power) when the throttle is opened rapidly. The ENIGMA separately monitors input values from the TPS sensor, such as speed (time). It determines when a rider is in such a situation, then in response, initiates asynchronous accelerator injection. Mechanical carburetor are sometimes hard to use because the throttle reacts erratically, unless opened up very slowly. However, a digital accelerator pump allows for finite settings of accelerator injection, meaning that it reacts to the rate of change of the throttle positions and number of rotations it is set to. The digital accelerator pump has three basic settings for asynchronous acceleration injection. It is not necessarily effective for all engines. In some cases, such as with engines that don't need it (standard/ un-tuned) or when badly configured, it can have a detrimental effect of the engine's condition. Please consider your own engines specifications in order to avoid any problems.



Any number of compiled data can be saved with a name.

※ In communication mode, turn the key to ON, or connect the ENIGMA while in communication mode to the operating software (or smartphone) while the engine is running. (It is OK to create data in advance, then connect and transfer)

The “Accelerator pump graph”, located at the bottom of the software screen can be dragged to a desired size. The graph is controlled by placing the cursor directly over and area and right clicking.

Setting the timing of rapid throttle opening

This setting is to make the Enigma recognize when the throttle has been opened in a single rapid motion, such as when a rider jumps on the throttle wanting lots of acceleration. The momentum (speed) of jumping on the throttle varies by rider. The Enigma sets this by the numeric conversion of the throttle opening speed. The general time for rapid acceleration movement is between 0.4~0.5 seconds. Set the value in consideration to whether you turn the throttle faster or slower than most people. Because the set time is very short, this function will only work when the throttle is turn very quickly. Conversely, if it were set to work every time the throttle is opened, the accelerator injection would use too much fuel and be detrimental to the condition of the bike.

Set this by inputting a value in the upper right-hand corner of the operating software.

Set the injection amount to the amount the throttle has been opened

The fuel amount is set for asynchronous acceleration fuel injection by determining how much the throttle is turned in one motion. It is said that fully opening a throttle in one motion occurs often and that opening it to 50% in one motion occurs less than that. In situations where the throttle is rapidly opened slightly from a partially open state, it is assumed the change rate is about 20 to 30 %. The fuel injection amount is set to this.

It is calculated by the throttle change rate; for example, it would be 50% when going from half throttle to full throttle. The throttle opening position's "change rate" are set for each value. In general 10% is too little and 100 % is too much.

Configure the settings by moving the number graph in the left of the operating software screen. Put the [cursor](#) directly on graph and [right](#) click.

Setting the rotation range and how much influence it has

When jumping on the throttle from a stationary state the performance of the accelerator pump is demonstrated. In this case, the throttle opening rate of change is set to when the throttle is opened to 100 percent in one rapid motion, acceleration injection is set to that amount. However, in a situation when the vehicle is running at high rpm / high speed and the throttle is temporarily closed on approach to a corner and soon fully opened again, the throttle opening change rate will be at 100%. In a case such as this, the bike is already in the power band because the engine is already at high rotations. At the same time, if acceleration fuel injection is set to 100 percent of throttle opening change rate, the amount of fuel will be too much and too rich, resulting in largely warped setting. Because there is a large increase in rotation speed from a low rpm, if a determined injection amount is injected, the momentary combustion energy helps increase rotation speed. However, when at high rpm, further injecting more than the set amount of fuel will have an opposite effect because the engine cannot burn anymore fuel, making the fuel too rich. Because of this, it is necessary to decide whether it is beneficial to also add acceleration injection to each rotation number, as well as the throttle acceleration rate change. For each rotation number, it is standard to set the injections amounts to 100% and gradually make them smaller as the rotations increase. At high rotations, such as 8000 rpm, the accelerator pump has almost no effect. The settings are made by %. For example, if it is set to 50 % at 5000 rpm, and the accelerator pump is operating at 5000 rotations, then only half the set acceleration injection amount will be used.

Configure the settings by moving the number graph in left of the operating software screen. Put the [cursor](#) directly on graph and [right](#) click.

Turn **ON** the "digital accelerator pump function" switch after all the settings have done, then click "[write](#)" from the bottom left [menu](#) and transfer the settings to the Enigma. The bike won't reflect the changes unless they have been transferred. In addition, the function can be stopped at any time if transferred with the switch to **OFF**.

The screenshot shows the 'Enigma データエディタ for CYGNUS' application. The main window displays a table of TPS/rpm data and a graph of engine speed correction. A '新規MAP - 燃料' window is open, showing an 'ON/OFF switch' set to 'OFF' and a value of '0.4'. A '加速ポンプメニュー' (Acceleration Pump Menu) is also visible with options like '新規作成', '吸出し', '開く', '書き込み', '保存', '照合', and '別名で保存'. The graph shows a blue line representing the relationship between engine speed and injection amount, with a callout explaining that the injection amount increases as the throttle is jumped more frequently. Another callout notes that the per-rotation influence rate decreases as rotations increase.

ON/OFF switch

Use a small value if you open full throttle rapidly

Drag to a desired size. It can also be set to full screen by clicking the upper right button.

Make sure to write and send data after completing configuration

The injection amount will increase the more frequently you jump on the

The per-rotation influence rate will get smaller the higher the rotations

The menu button is here

※ The Map shown above is for explanation. The actual map may not look different to this.

※ Compiled data can be save with a name.

※ Any number of data can be stored. If a number of data are compiled in advance, then you can also be switch data when needed.

Tips for setting fuel

This summary provides useful hints for configuring the ENIGMA. Even those with a solid understanding of engines will find reading it helpful.

The basic function of the fuel settings is to decide injection quantity (increase/decrease amounts) needed for a specific engine speed and throttle position. In the case of Carburetor bikes and such, when engines rotations increase, the main jet sucks out fuel through negative pressure, it enters the combustion chamber in the as a blown mist. However, with injector bikes, fuel is injected from injectors under determined conditions. Basically, this can be changed by inputting values in the fuel map. When on the throttle rapidly, the ENIGMA can use asynchronous injection in addition to the main injection for rapid injection acceleration, even at the same rotation. When used well, this function can have a large effect, especially when going from close to idling speed to full throttle.

The air- fuel ratio (using the air- fuel ratio measuring device) is calculated by measuring the exhaust gas exiting of a specific quantity of fuel that has been combusted. Fuel amounts are adjusted using these measurements. Unlike carburetor bikes, injection adjustments can be done quickly with injection bikes by looking at the values on the measuring instrument and configuring immediately. In general the air-fuel ratio is the fuel air mix that is calculated by dividing the air mass flow rate by the fuel mass. Furthermore, it is said that there is an ideal air-fuel ratio. It is calculated with a ratio of approximately 14.7 (air): 1 (fuel), this is said to result in complete combustion. Even though setting all rpm and throttle positions to this ratio sounds ideal, in reality, the configuration values must take into account each specific engine's rpm /throttle position, rpm ranges that require higher combustion energy and controlling the heat generated by the engine. Thus the air fuel ration input values will vary. This is done by using, for example, air-fuel ratio loggers or air-fuel ratio meter measurements. Fuel will burn even if it is not at the ideal air fuel ratio. Fuel will combust within the ratios of 8:1 to 20:1. However, if the fuel is rich, it will misfire, too thin, and it will lack power. Moreover, there is a high chance of breakage or malfunction occurring. Please think of this only as a theoretical value for combustion limit. Having the air-fuel ratio meter (wideband air-fuel ratio meter) for configuring a bike is very convenient. The bike's genuine O2 sensor is not intended to accurately measure narrow type air fuel ratios. There are many cheap products that measure narrowband ratios (two or four wires coming from the sensor), however these are not necessarily accurate.

Since there is no fuel condition map for bikes that have larger exhausts installed, using the torque curve graphs of service manuals or the like, set the maximum fuel supply in the neighborhood of the maximum torque of the bike (engine).

You do not need to increase / decrease the amount of fuel on a new standard engine bike. However, standard production bikes generally use somewhat richer fuel to protect the engine or thin fuel to increase efficiency and burn cleaner. By increasing/reducing fuel amount settings it is possible to optimize performance and ride. However, extreme fuel decreases will result in a reduced safety margin, and increased fuel amounts can lead to deteriorated fuel consumption. Identifying the ideal margin is essential.

If the reference exhaust amount for a bike is around 150~ 160cc, then the maximum increase would be about 1000 μ s ~ 1500 μ s. It is standard to judge this by referring to the air-fuel ratio value.

In such cases as when starting a cold engine, the fuel injected by the injectors isn't finely atomized, causing it stick to the suction passage (intake manifold inner wall) and such. The specified fuel amount does not reach the combustion chamber and combustion efficiency decreases. In situations like this, a richer fuel should be set. Of course this will vary depending on engine condition and temperature. Reference data says that a 5:1 air-fuel ratio be used when starting a completely cold engine.

The power of the exhaust is weak when idling after starting or when driving slowly because the amount of air sucked in by the throttle is low. At that time, residual exhaust gas is left in the combustion chamber, even if a fresh air-fuel mixture enters, it will be thin and the combustion power reduced. In this case, a rich air-fuel ratio of 12:1 makes the engine rapidly suck up fuel, making it an effective way to overcome these issues. However, because this is on the rich side of air-fuel ratio, large changes will tend to result in misfires and deteriorated fuel consumption.

- The remaining condition of the residual exhaust gas will vary, such as when a bike is built with big valves or a straight high efficiency muffler . Of course, the above method does not necessarily always increase performance
- When using large injectors, the injection from a stock ECU will be automatically rich, many find the best fuel ratios for settings using statistics.

When riding normally or at medium speeds the load on the engine is relatively light, to improve fuel economy, it is the norm to set the air-fuel ratio to 14-15. Of course, the desired air-fuel ratio value will vary depending on the load (heavy or light). However, when taking into account the various needs of bike, without thinking too much fuel economy, for individual settings, an ideal air-fuel ratio is one not exceeding (14.7:1). Some people believe that the bike will run safely at (13.5-14).

During rapid acceleration, when the throttle is fully open the amount of air taken in will increase immediately but, because the mass of the injected fuel is large there will be a slight delay. At these moments, due to a thin air-fuel mixture, it is difficult to attain desired combustion conditions. These issues can be eliminated by setting the fuel pump function to discharge a rich air-fuel mix for only those moments.

This is intended to improve the air-fuel ratio at the moment the throttle is wide open and improve acceleration performance. In these situations the air fuel ratio is momentarily around 10:1. This product has a digital accelerator pump function that makes this possible. The accelerator pump function may be detrimental to engine conditions depending on the engine state, tuning and especially when used with engines that don't need it.

The engine requires a lot of power when riding at full throttle, such as when circuit racing or riding at top speeds. At times like these, it is necessary to use an air-fuel ratio of 12.9 to 13:1. It is said to produce the maximum amount of power. With race bikes and such, these values are set in most areas of a fuel map. More power is possible with settings like these. Allow the normal combustion chamber to cool by releasing heat from the cylinders / head / valve seats. There are, however, cases where running at high rpm/load causes engine problems, such as melted pistons/valves, due to an excessive rise in temperature. In such high load situations, running a rich air-fuel ratio at high loads may cause the speed of combustion to accelerate and lower the temperature in the combustion chamber, however when the power air-fuel ratio value is too rich (less than 12.9) it will conversely result in impaired combustion efficiency and power loss.

Rich is not necessarily good when pursuing a power air-fuel ratio.

This was written to provide general knowledge and configuration hints. Please refer to the descriptions above and enjoy tuning with the ENIGMA settings.