STANDALONE ECU / DATALOGGER
TUNING PROGRAM MANUAL

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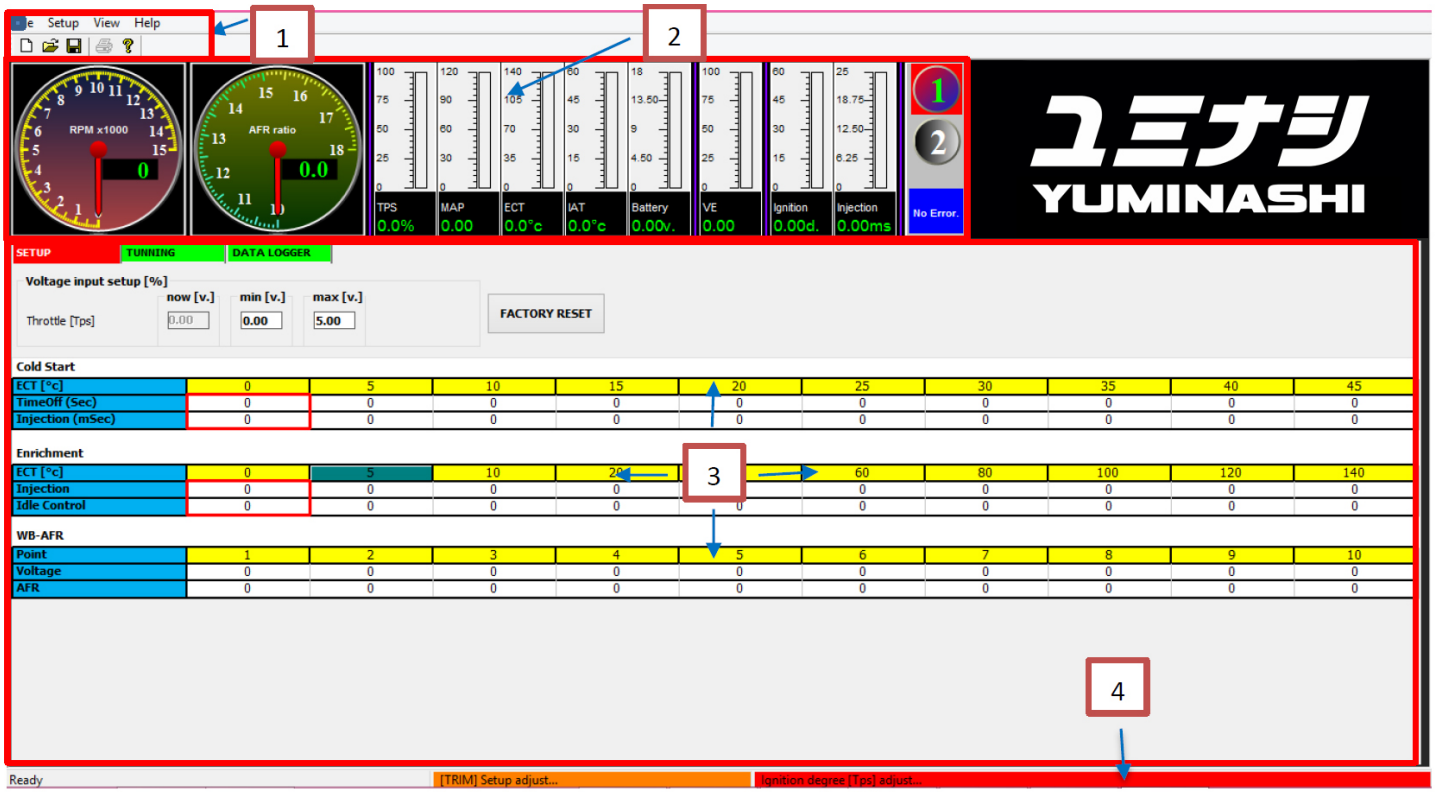
Specification

1. Injection Controllable : -30%+30% From STD Injection
2. Injection Interval : 0.01 mSec
3. Ignition Controllable : -5°BTDC +5°BTDC (Before Topdead Center)
4. Ignition Interval : 0.01 °
5. Record and Display : 10-20 AFR (Air Fuel Ratio)
6. Compatible with both Narrowband and Wideband Oxygen sensor
7. Data Logger recording speed : 50mSec-1Sec
8. Data Logger resolution : 5,000-50,000 Point
9. Automatic searching for communication port
10. Upgradable for the new update program
11. Compatible with ECM model Advance Standalone
12. Compatible with ECM model Mini Standalone

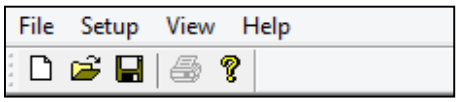
1. ECM STANDALONE TUNER tuning program structure

The tuning program comprises of 4 parts.

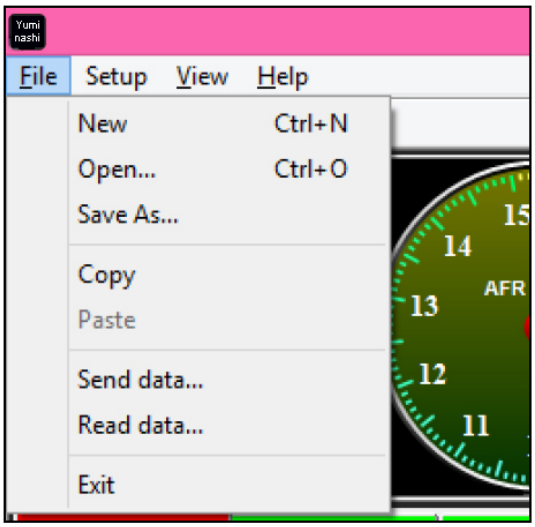


1: Tools Bar **2:** Real Time parameter monitor **3:** Tuning Table **4:** Interfacing status between computer and ECM

1.1 Tools Bar



1.1.1 File



1: New : Clear out all data of the opening,Tab back to new start

2: Open: Open the recorded file

3: Save As: Named the file which want to save

4: Copy: Duplicate the wanted data form mode 1 to mode 2 or vise versa. Form mode 2 to mode 1(Short cut: Ctrl+C)

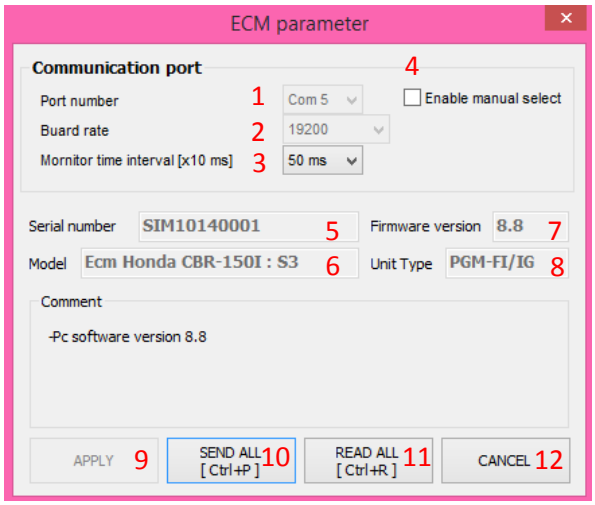
5: Paste: Transfer the duplicated data to the wanted mode(Short cut: Ctrl+V)

6: Send Data: Send data from opning tab to ECM.(Short cut: Enter)

7: Read Data: Read data from ECM to show on each opening tab(Short cut: R)

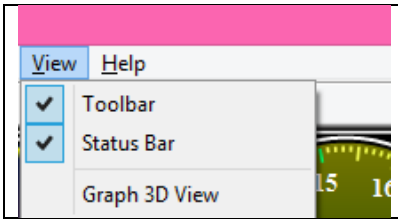
8: Exit: Exit from program

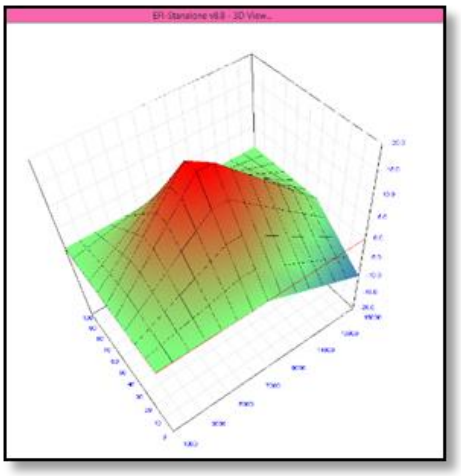
1.1.2 Communication-Serial Number

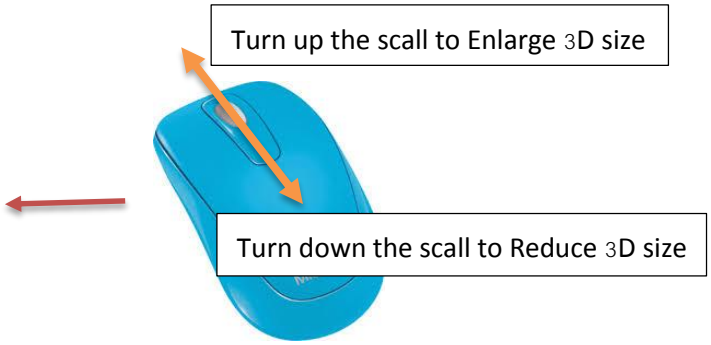


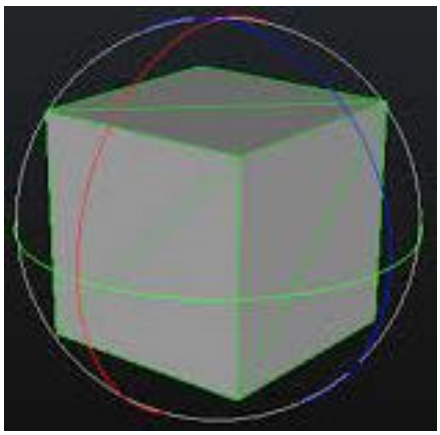
1. Port Number: Communication port number. Automatically searching for communication port number. If not then click at Enable manual select (No.4) and click at APPLY (No.8)
2. Board rate of communication for ECM STANDALONE: 19200
3. Speed of real time monitoring
4. Manual setting for Port Number
5. ECM Serial Number
6. ECM Model
7. ECM Firmware Version
8. ECM Type: PGM-FI
9. APPLY: Manual setting for port number (No.1) and board rate (No.2)
10. SEND ALL: Send all data of ever tabs from computer to ECM (Short cut: Ctrl+P)
11. READ ALL: Real all data of every tabs from ECM to show on computer (Short cut: Ctrl+R)
12. CANCEL: Cancel all unwanted data

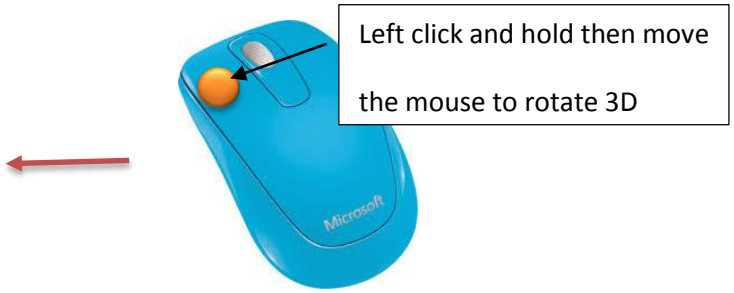
1.1.3 View

	Toolbar : Show/Hidden Tool Bar Status Bar : Show/Hidden Status Bar Graph 3D View : Show 3D(Short cut: Ctrl+D)

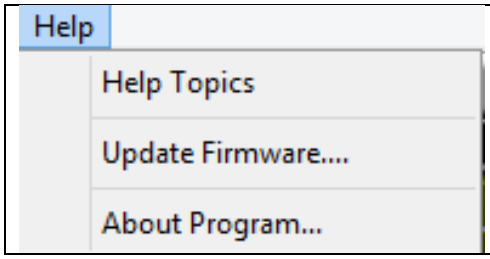




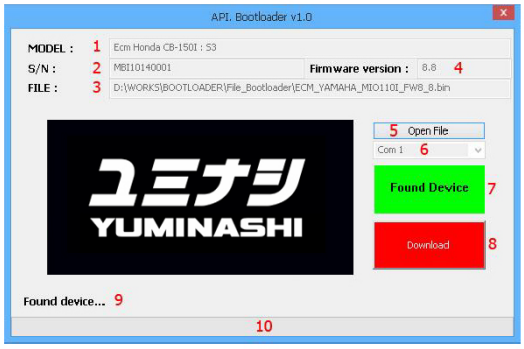




1.1.4 Help



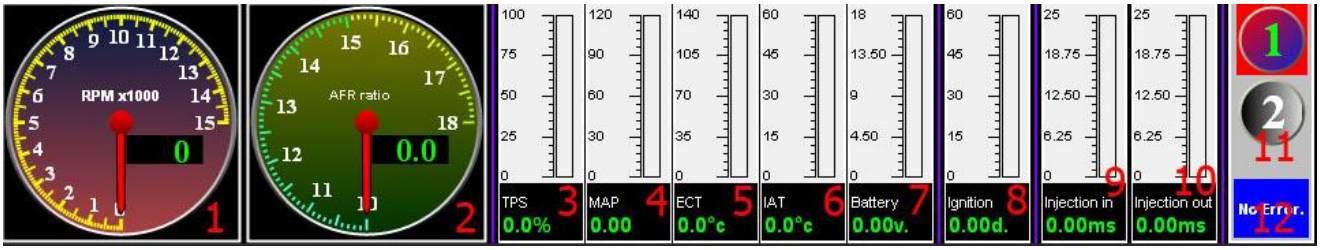
HelpbTopics : Software Manual
Update Firmware :Upgrading firmware
About Program : Show the program detail



Update Firmware

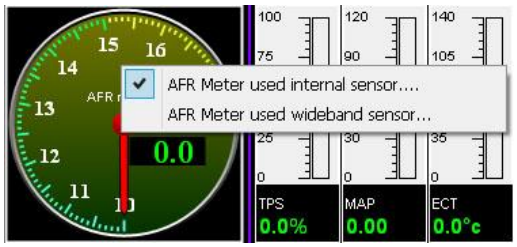
About Program

1.2 Display and Monitor



1. Engine Speed meter: RPM x1000
2. Air Fuel Ratio (AFR) meter

Note: AFR Sensor or Oxygen sensor which supplied by motorbike manufacturer is narrowband type. Wideband oxygen sensor is more accurate and more useful for tuning purpose.



3. Throttle Position Sensor(TPS): 0 – 100%
4. Manifold Absolut Pressure Sensor (MAP): 0-120Kpa
5. Engine Coolant Temperature Sensor(ECT): 0-140°C
6. Intake Air Temperature Sensor(IAT): 0-60°C
7. Battery Voltage: 0-18 volt.
8. Ignition Degree 0-60°BTDC
9. Injection In: Factory presetted injection time range 0-25mS
10. Injection Out: Injection time which modified by Tuning
11. ECM has 2 modes able to select mode by switch OFF/ON.
12. ECM Status

ECM has no ERROR

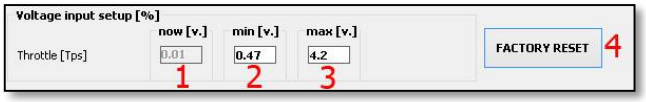
ECM has an ERROR

1.3 Data Setting and Data Logging

1. Data select tab
2. Injection and Ignition tuning tab
3. Data logger show the result and AFR

1.3.1 Setup: Engine Setup

1.3.1.1 Setup minimum and maximum Throttle Position Sensor (TPS) by Voltage input setup [%]

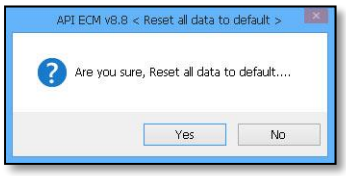


now [v.] : Current TPS : Voltage

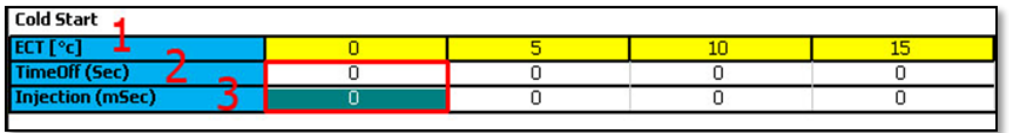
min [v.] : No turning hand grip. The figure show at now[v] is minimum TPS put this data at min[v.]

max [v.] : Maximum turning hand grip. The figure show at now[v] is maximum TPS put this data at max[v.]

Factory Reset: Clear out all data to reset. Click at "Yes"



1.3.1.2 Cold Start Setup

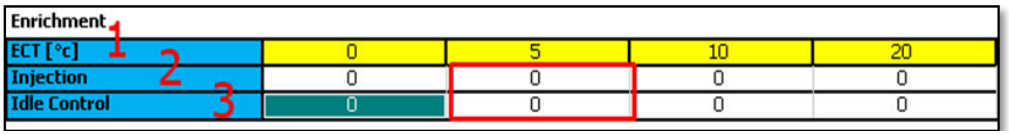


1: Engine Coolant Temperature(ECT): 0-140°C

2: Time off: ECM setup time for first start range 0-60 second

3: Injection: Setup injection time for first start range -5 to 5 mSec

1.3.1.3 Enrichment: Setup after engine start



1.Engine Coolant Temperature(ECT): 0-140°C

2.Injection: Injection time setup for first start range -10 to10 mSec

3. Idle Control: Setup the Idle status range -100 to100 %(min: -100%, Max: 100%)

1.3.1.4 Wide Band Oxygen Sensor Setup

Show the relationship between voltage and AFR

WB-AFR				
Point 1	1	2	3	4
Voltage 2	0	0	0	0
AFR 3	0	0	0	0

1. Setup number of point
2. Setup supplied voltage range 0-5 V
3. Setup AFR figure

1.3.2 Injection and Ignition setup

1.3.2.1 Injection Time Setup

% Injection (+- 30)								
%TPS	1000	2000	3000	4000	5000	6000	7000	8000
100	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
20	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

1. Vertical column (Y-axis): TPS % rang 0-100%
2. Horizontal raw (X-axis): RPM of Engine rang 0-16000 rpm.
3. % Injection: Increased or Decreased percentage of injection time from factory data rang +- 30%. Fill the figure in tuning table

1.3.2.2 Ignition Setup

Ignition degree (+- 5 deg)								
%TPS	1000	2000	3000	4000	5000	6000	7000	8000
100	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
20	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

1. Vertical column (Y-axis): TPS % rang 0-100%
2. Horizontal raw (X-axis): RPM of Engine rang 0-16000 rpm.
3. Ignition degree: more advance or less advance ignition degree setup rang +-5 °.Fill the figure in the tuning table

1.3.3 Data Logger

This tab has 2 main parts: AFR and Data Logger

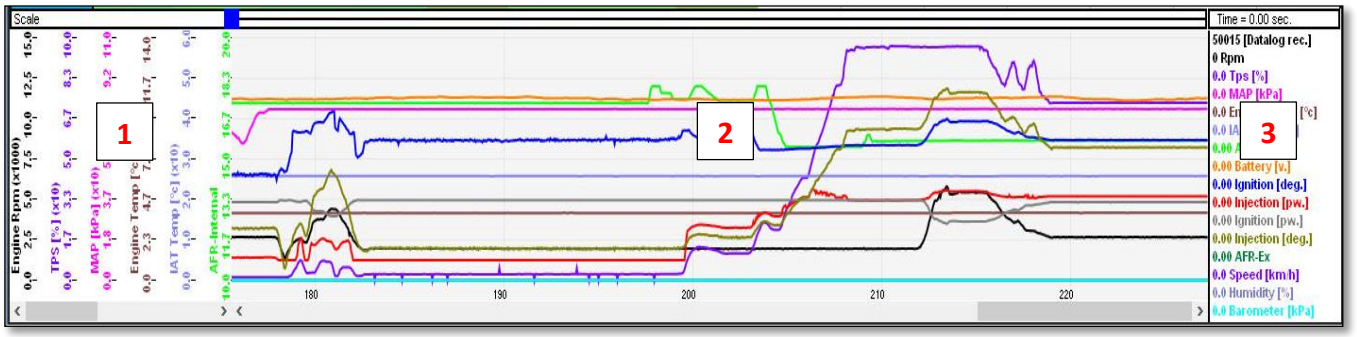
1.3.3.1 AFR: Table

The AFR data show on the table are the result of combustion

AFR datalogger

%TPS	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
100	0	11.50	11.50	11.51	11.52	11.52	12.84	12.85	12.85	0	0	0	0	0	0
90	0	11	11.52	11.52	11.52	12.85	12.85	12.85	12.84	12.84	0	0	0	0	0
80	0	11	11.52	11.52	11.52	12.85	12.84	12.84	12.85	12.84	0	0	0	0	0
70	0	11	11.51	12.85	12.85	12.84	12.85	12.84	12.85	12.85	0	0	0	0	0
60	0	11	12.85	12.85	11.77	12.85	12.84	12.84	12.85	12.85	0	0	0	0	0
50	0	11	12.82	11.75	11.76	13.06	13.07	13.06	12.85	12.84	13.06	13.06	0	0	0
40	0	11	11.77	11.76	11.75	14.86	14.32	13.06	12.85	0	0	0	0	0	0
30	0	11	11.75	14.85	14.85	14.85	16	16	16	0	0	0	0	0	0
20	14.85	11.43	11.77	12.32	13.53	15.40	15.40	15.40	16	0	0	0	0	0	0
10	14.86	15.22	14.61	14.61	16	15.39	15.40	15.39	16	0	0	0	0	0	0
0	14.61	14.94	14.61	14.61	16	15.39	15.39	16	0	0	0	0	0	0	0

1.3.3.2 Data Logger: Table



1. Part 1 (Left): Show the data size of each data set

2. Part 2 (Middle): Show the linear data in continous graph

3. Part 3 (Right): Show the code name

2. Using Software STANDALONE TUNER

Minimum personal computer specification as working platform

CPU: Intel Core Duo

RAM: 1 GB [HDD: 500 MB]

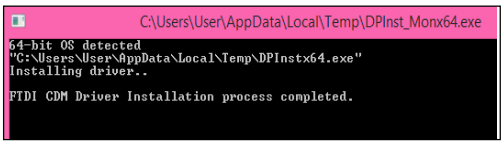
OS: Windows XP, Windows 7, Windows 8

2.1 Data Link Driver Program Installation

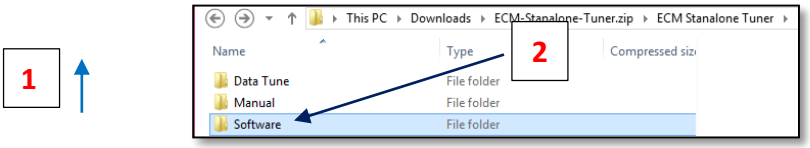
1. Download the Data Link Driver Program form http://www.yuminashi.eu/stand-alone-ecu-datalogger-msx125-grom125/

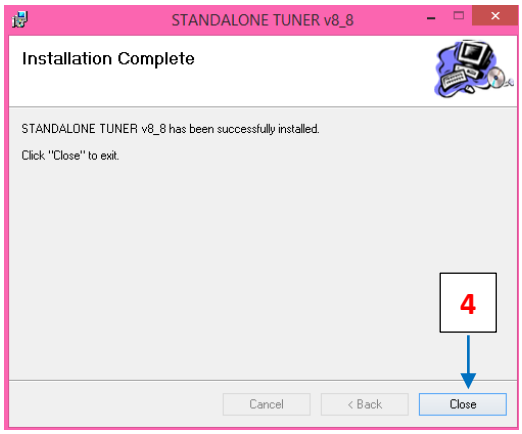
2. Open file and double click "USB-Serial.exe "

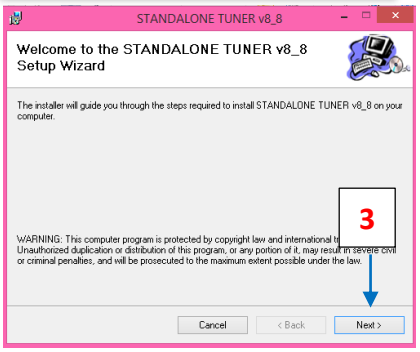
3. "FIDI CDM Driver Installation process completed." Show on the monitor if success.



2.2 STANDALONE TUNER Tuning Program Installation







1.Download the http://www.yuminashi.eu/stand-alone-ecu-datalogger-msx125-grom125/ Tuning Program

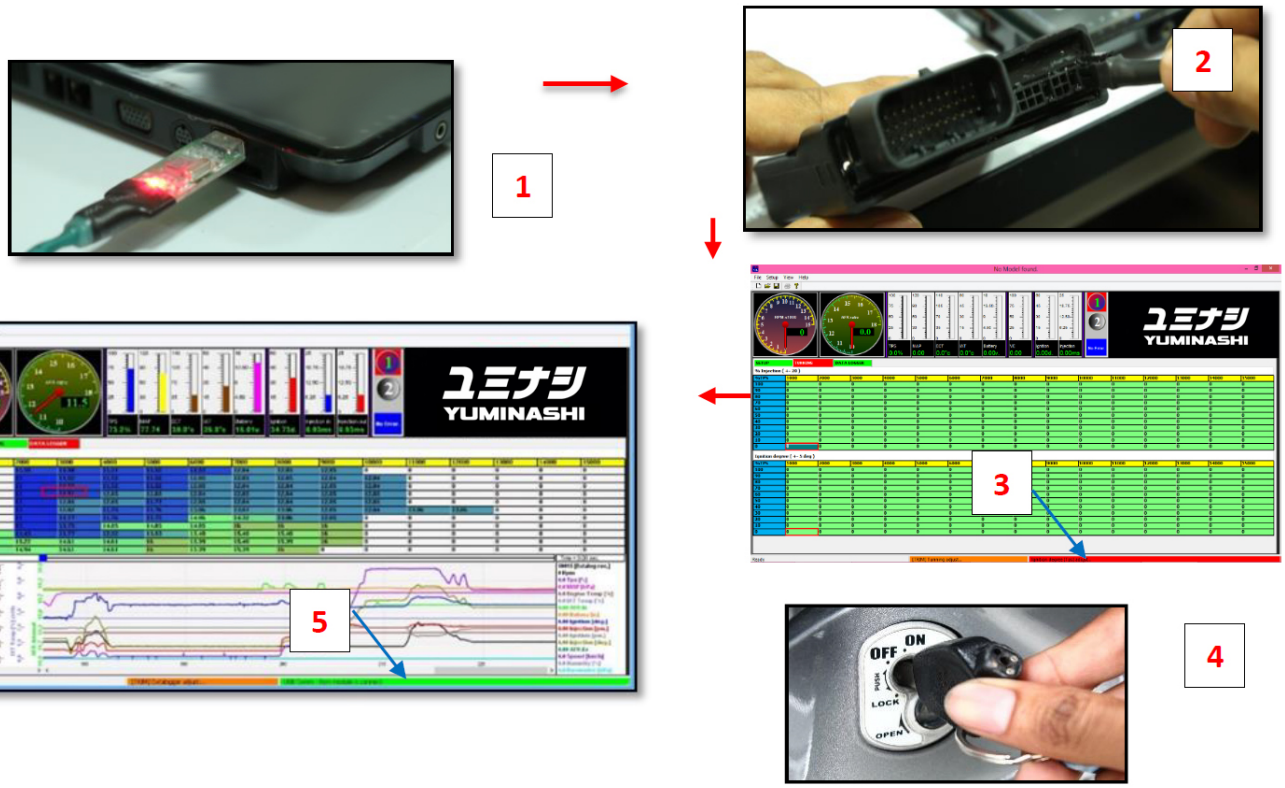
2. Open Folder Software select file STANDALONE TUNER v8_8.msi

3. Click "Next" till last

4. "Installation Complete" Show on the monitor if success then click "Close" to finish

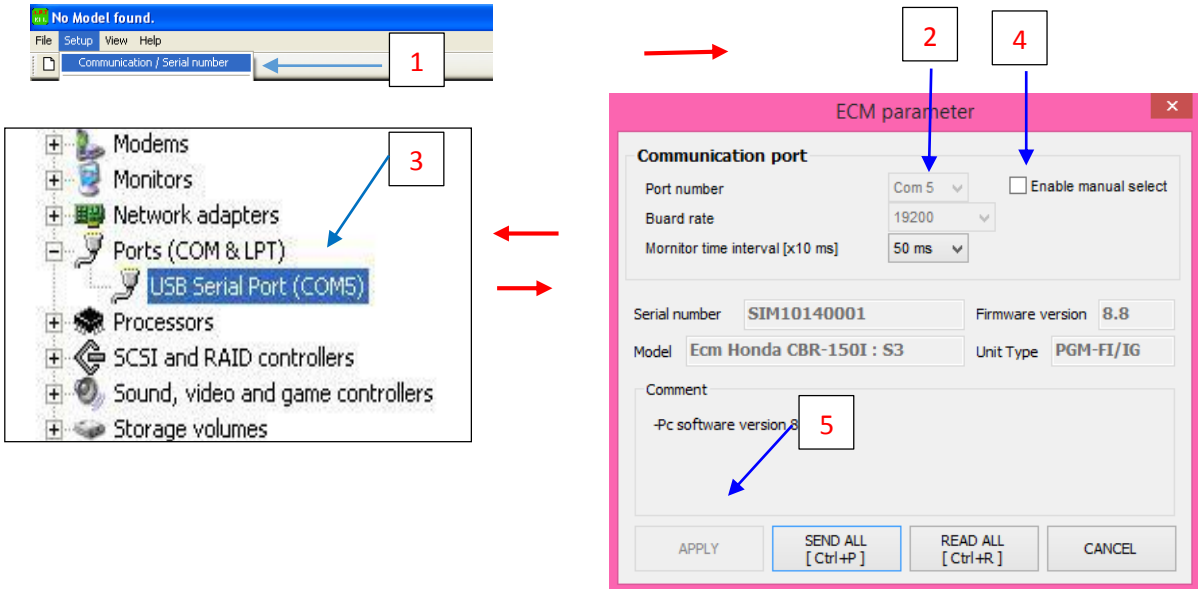
2.3 Interfacing the STANDALONE TUNER Tuning Program to ECM

2.3.1 Automatic Interfacing



1. Connect Data Link Cable at USB side to USB port at personal
2. Connect the other side of Data Link Cable to ECM
3. Open the program STANDALONE TUNER on the computer
4. Turn on the ignition key
5. Automatic interfacing will be operated please notice the interfacing status bar at down left of the monitor
   - Green Status Bar: Interfacing success
   - Red Status Bar: Interfacing not success
6. If interfacing not success, turn the ignition key off and turn on again. If not success please try with manual procedure.

2.4 Manual Interfacing



1: Click “Setup” at Tool Bar and “General Parameter Setup”

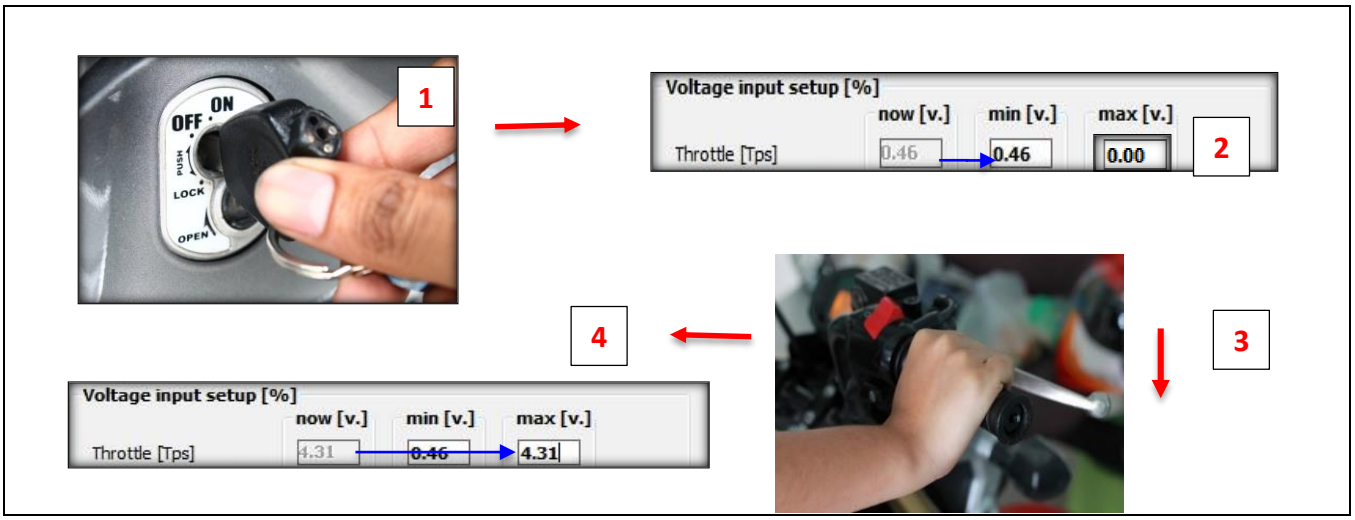
2: Click “Communication Port”

3: Mouse’s Right click at “My Computer” Then click “Properties” and “Device Manager” will show “USB Serial Port (COM xx) “

4: Click” Enable Manual Select” then select Port Number same as USB Serial Port (COM xx)

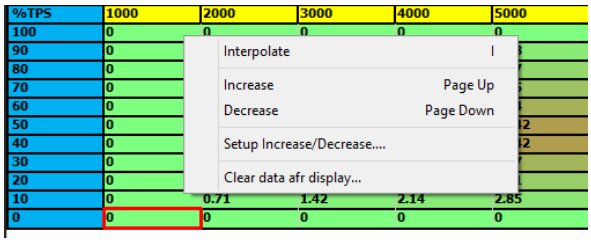
5: Click” APPLY” to interfacing

2.5 TPS Setting



1. Turn on ignition key
2. No turning hand grip. The figure show at now[v] is minimum TPS put this data at min[v.]
3. Maximum turning hand grip. The figure show at now[v] is maximum TPS put this data at max[v.]

2.6 Using Popup Memu for Tuning



Interpolate: calculation the values between the first value (first value at highest left side) and the last value (last value at lowest right side)

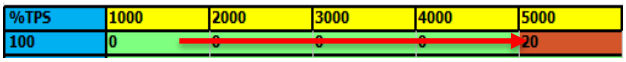
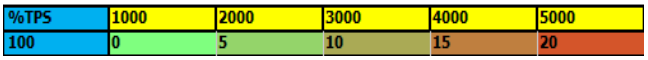
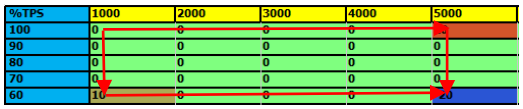
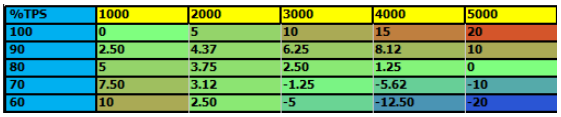
Befor	After
A B  Fig. A	 Fig. B
A B  C D Fig. C	 Fig. D

Fig. A Click mouse and hold on then drag from A -> B and then press" I" on key board, Fig. B will be show

Fig. C Click mouse and hold on then drag from A -> B->C->D and cover all this area then press "I" on keyboard,Fig.D will show

Increase: Increasing the value in the table, Incremental value can Setup Increase/Decrease (Short cut: Page up)

Decrease: decreasing the value in the table, incremental value can Setup Increase/Decrease (Short cut: Page down)

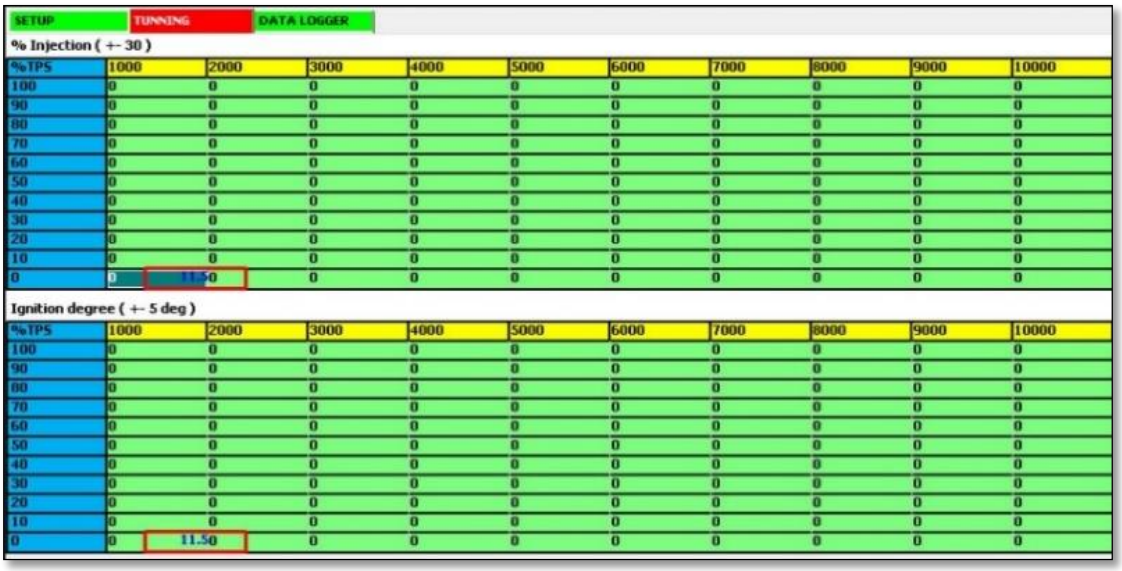
Setup Increase/Decrease: Minimum incremental: 0.01

Clear Data AFR Display: Clear out the AFR data from the tuning table

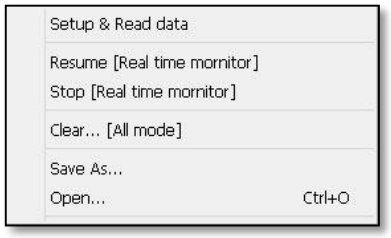
Example: Clearing the AFR data from the table

Before

After

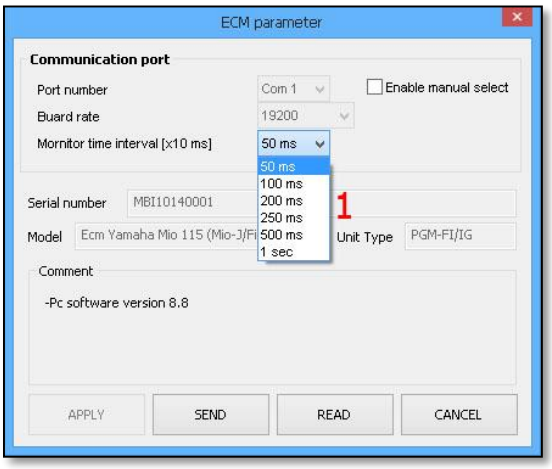


2.7 Using the Data Logger

	**Setup & Read Data:** Setup and load data from ECM **Resume:** Continue collecting data in real time monitor mode **Stop:** Stop collecting data in real time monitor mode **Clear:** Clear out all data in real time monitor mode **Save As:** Save the data as **Open:** Open the saved file from computer

2.7.1 Real Time Monitor

This real time monitor mode will automatically operate every time when open the tuning program event if move to another page. Graph show the current status will change all the time setup each data logging time by setup Communication & serial number

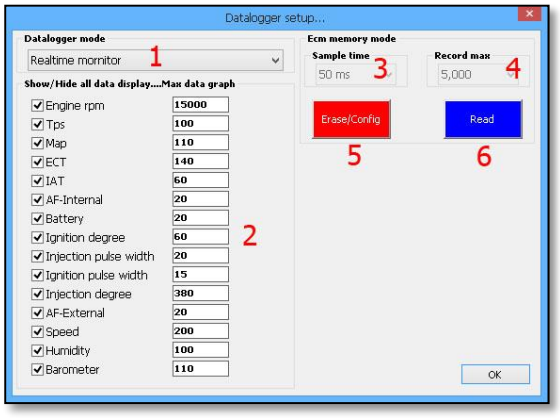


1 : Sampling time setup mode: Real time monitor

2.7.2 ECM Memory

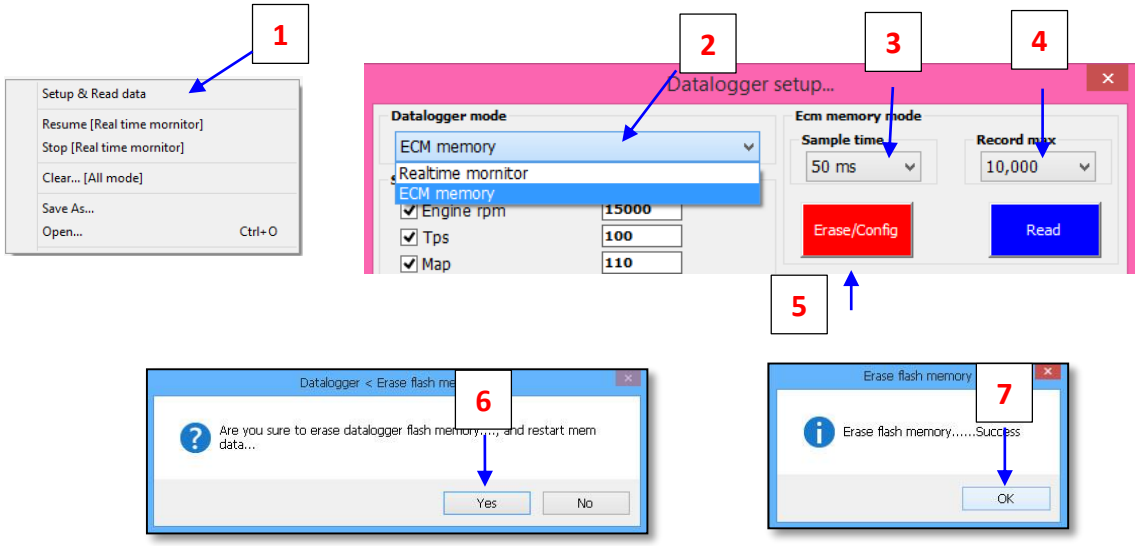
This ECM Memory mode will record the data till maximum memory then stop. Can down load the recorded data to analyses. Delete the old data to start new recording

2.7.2.1 Setup Data Logger



1. Select Mode: Real time monitor mode or ECM Memory mode
2. To show the proper Graph size, All the left data can be hidden
3. Select Recording Time in each time for ECM Memory mode
4. Select Max. Recording Memory
5. Delete all recording data and setup record mode
6. Read all record data

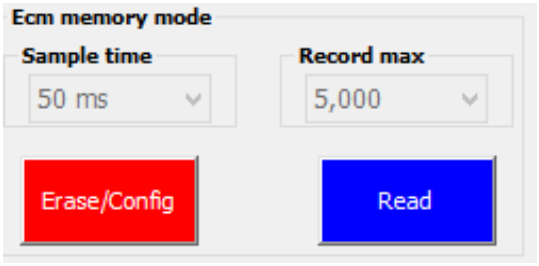
How to use ECM Memory Mode



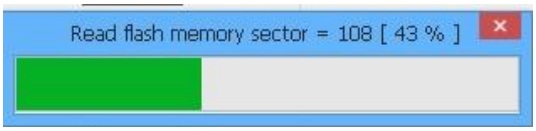
1. Move the mouse to “Data Logger” then right click at the mouse, Pop up menu will be show then click at “ Setup & Read data”
2. Click at” ECM Memory on data logger mode”
3. Select speed of Sampling time
4. Select Maximum amount of recording data
5. Click at “Erase/Config ”
6. Click at : Yes” to delete all data in Data Logger Flash Memory
7. When delete all data success. Click at :” OK ”to restart new recording data

2.7.2.2 Read data from ECM to Display

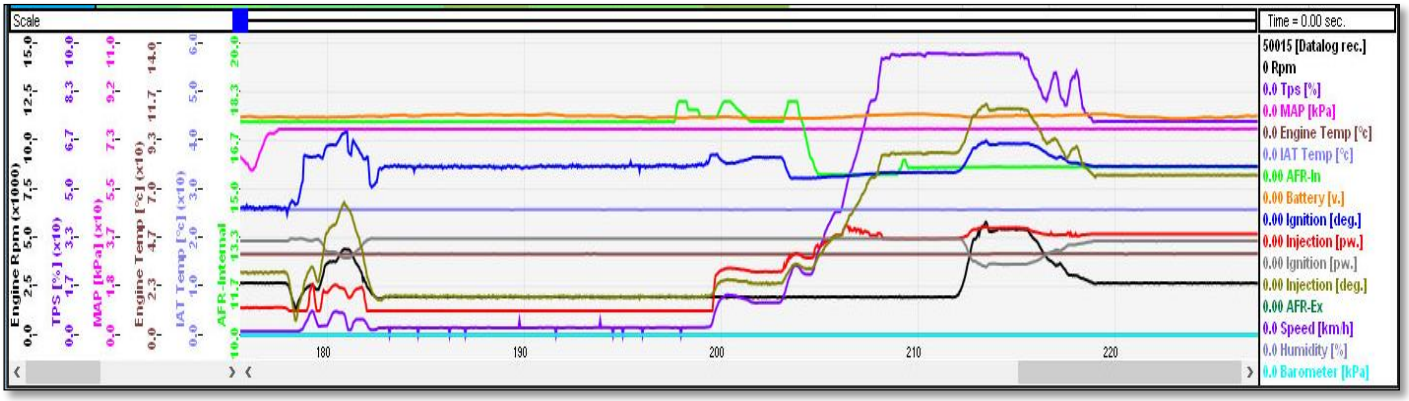
1. Move the mouse to “Data Logger” then right click at the mouse, Pop up menu will be show then click at Setup & Read Data



2. Click at Read

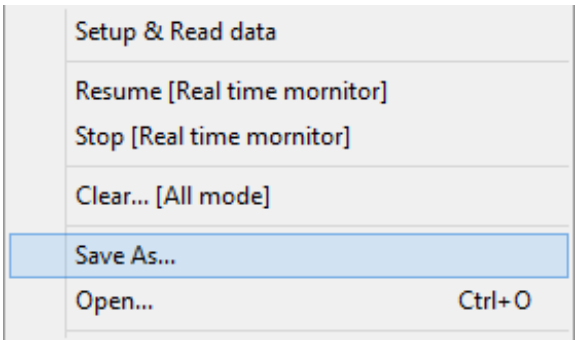


3.When read data finish at Data Logger Table will show as below

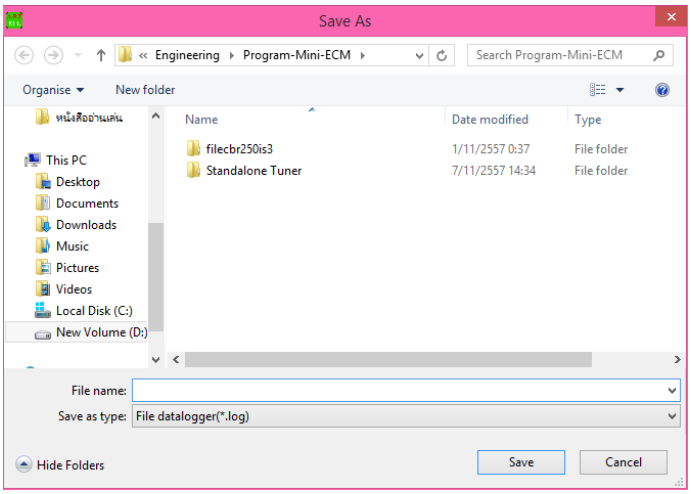


2.7.2.3 Save data from ECM to Computer Record

1. Move the mouse to “Data Logger” then right click at the mouse, pop up menu will be show then click at “Save As...”

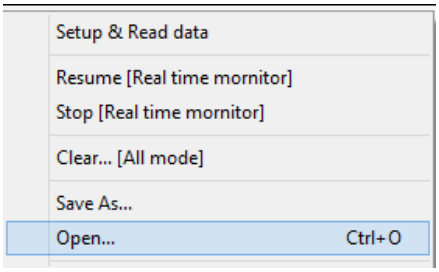


2. Select folder to Save DATA

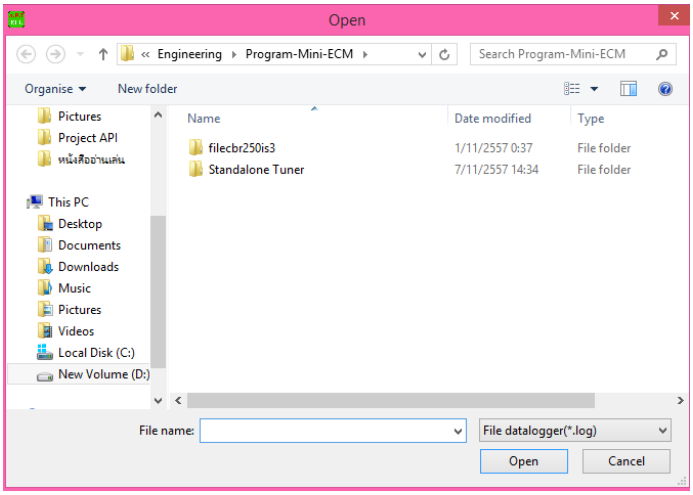


2.7.2.4 Open the saved file from computer

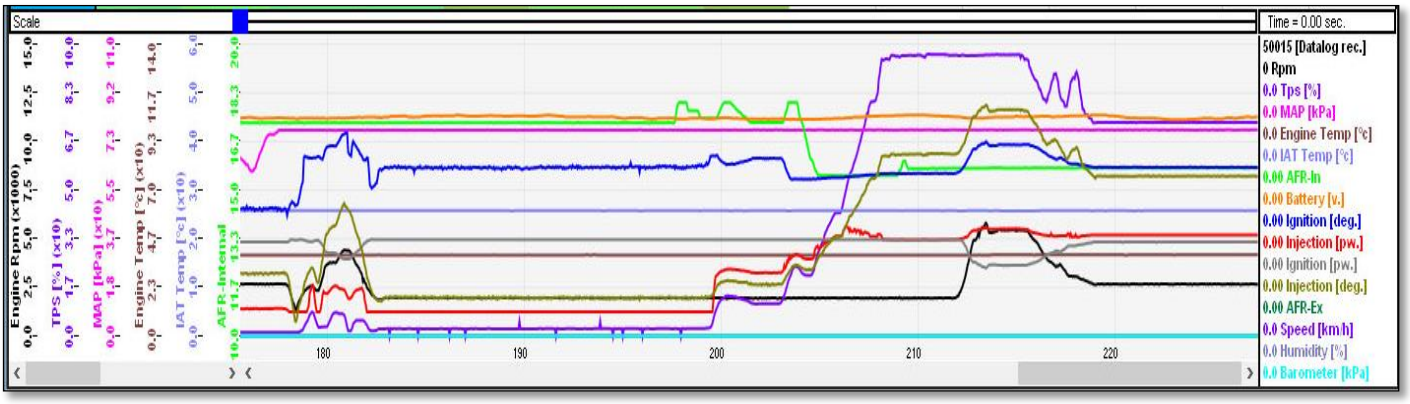
1. Move the mouse to “Data Logger” then right click at the mouse, pop up menu will be show then click at “Open...”



3. Select file in the folder for display



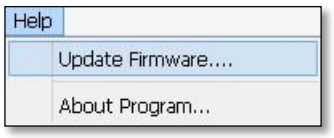
3. Click “Open”



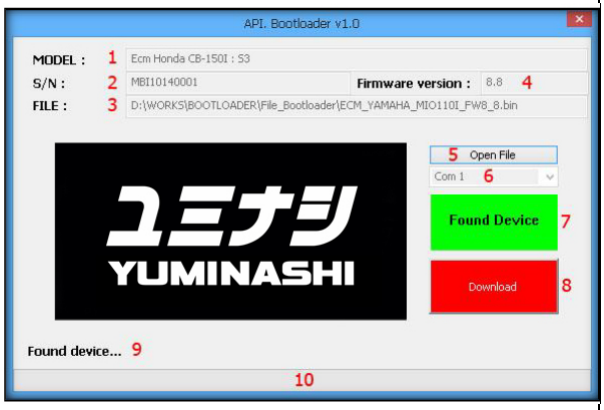
3. Upgrading the capacity of the program.

Boot loader is sub program helping for upgrading the capacity of the firmware of the ECM through the STANDALONE TUNER Tuning Program

1. Open help menu then click at update firmware

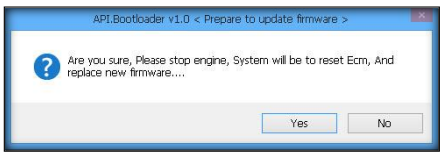


2. API boot loader V1.0 will be show



1. ECM model
2. ECM Serial number
3. Boot loader filename for upgrading
4. Firmware version number
5. Open boot loader file
6. Automatic searching port number
7. Interfacing status success
8. Startup download upgrading firmware
9. Operating status show
10. Progressive operation status show

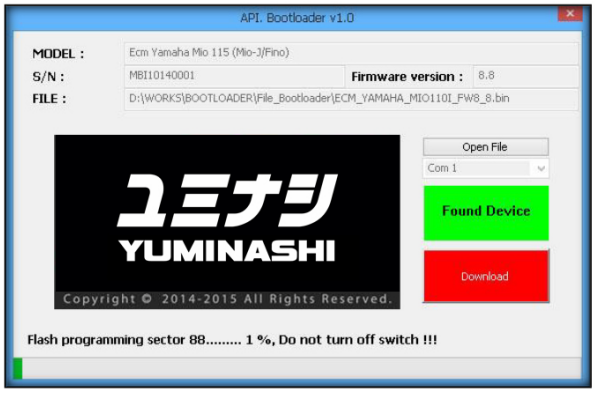
3. Select the file which want to upgrade. Click at “Open file(5) then select boot loader file
4. Start upgrade firmware .Click at “Download(8)”



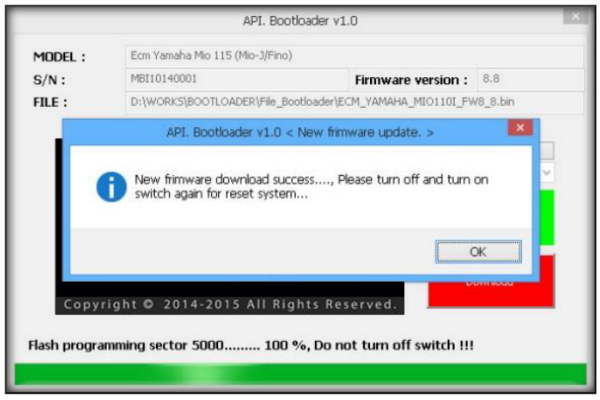
Click at “Yes” to confirm upgrade firmware

Click at “To cancel upgrade firmware”

5. The system will delete the old data and install new data from flash memory .want until **100%** completed.



6. "New firmware download success" will pop up. Click at"OK" please turn the motorbike key to "Turn Off" position and then turn to "Turn On "position for new reset again. Finish the process



Note: Do not start the engine just turn the key to "Turn On" position only when upgrade firmware

Trouble and Trouble Shooting

1. When firmware upgrading process is interrupted not **100%** success or lick at "Firmware upgrade **(8)** before select the file which want to upgrade or select the wrong and to upgrade. All the data in main memory will be deleted and unreteiveable. But sub program in boot loader still working then must be interface with right firmware or restart process form step **1** till finish

4 Guide Line for Tuning

4.1 Comparison Between Fuel Injection(FI) System and Caburetor System

The advantages of Fuel Injection(FI) System

1. More precise than the caburetor because of the injection control
2. Faster response
3. Reduce the air polution more than the carburetor system
4. If the climate changes, the FI system will be adjusted automatically
5. Save the Fuel
6. More efficiency

The disadvantages of Fuel Injection(FI) System

1. More complicated
2. It is needed the special tools for tuning
3. More cost for maintaniance

4.2 Differences between FI System and Carburetor System

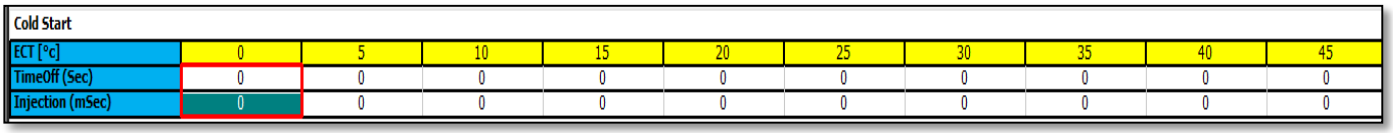
	FI System	**Carburetor System**
Fuel Volume	Fuel volume programed into MAP Table	Determined by negative pressure generate in the engine
Feature	Control and set the amount of fuel	Fuel setting will effect to other operational zones.
Changed Climate	Automatic adjust	Must be setting compatible with climate

4.3 Data Tuning in the changed climate

4.3.1 Cold Start

Setting the first starting the engine, to set in this part is to make more easy for starting.The standard bike needs no tuning because the system is already set from the factory(compare with the carburetor choke in the low temperature degree).

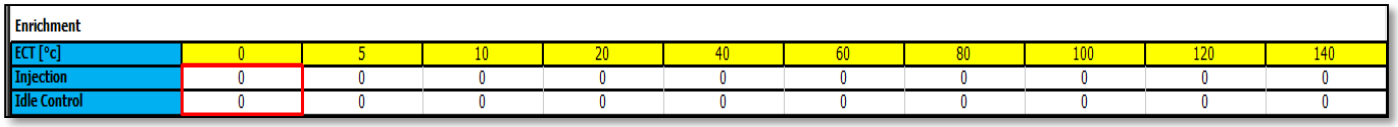
FI System	Caburetor System
TimeOff(Sec)	Duration of choke close(on)
Injection(mSec)	Amount of fuel that been sucked with the ventury system



Cold Start										
ECT [°c]	0	5	10	15	20	25	30	35	40	45
TimeOff (Sec)	0	0	0	0	0	0	0	0	0	0
Injection (mSec)	0	0	0	0	0	0	0	0	0	0

4.3.2 Enrichment

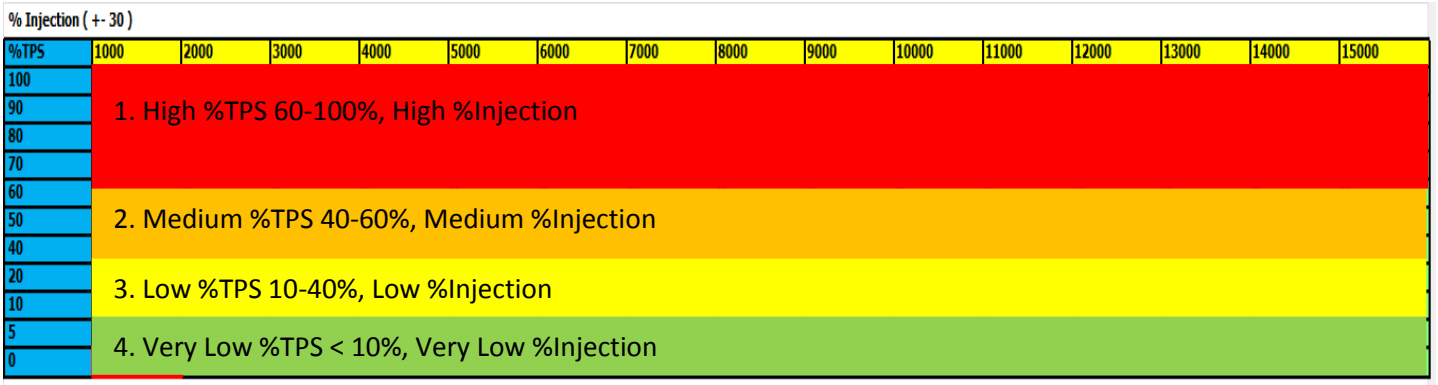
The engine will work efficiency at temperature range 75-90°C. When the engine is cold or very low temperature the FI System will inject more fuel first then will decrease the fuel injection slowly step by step to normal rate till the engine temperature meets at the preseted temperature.Some FI System bike has the Idle Control System to control the intake air which da the same function of Choke System in Caburetor System.The standard bike has already set from the factory.



Enrichment										
ECT [°c]	0	5	10	20	40	60	80	100	120	140
Injection	0	0	0	0	0	0	0	0	0	0
Idle Control	0	0	0	0	0	0	0	0	0	0

4.4 Tuning the Fuel Injection and Ignition Timing Tuning

4.4.1 Image of carburetor setting in The FI Volume

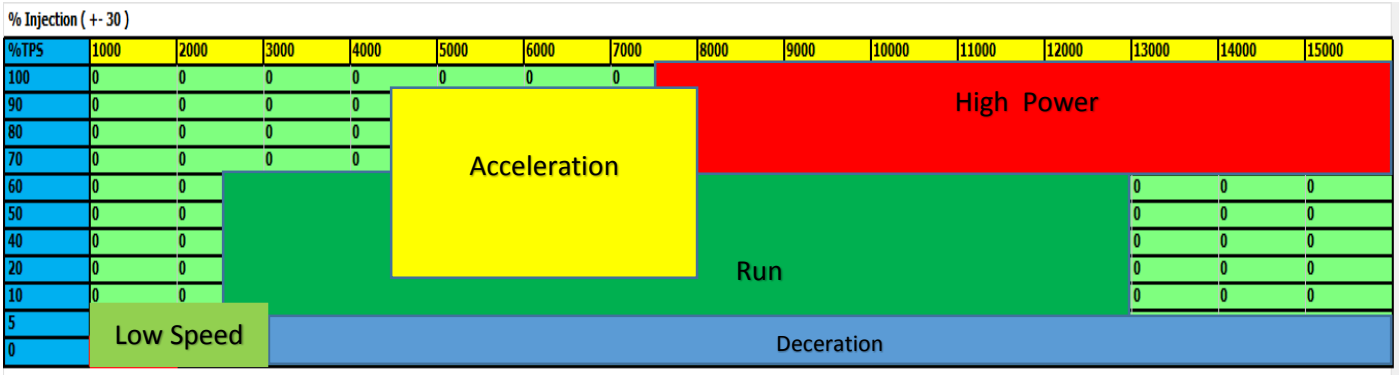


FI System	Caburetor System
1.	Main Jet
2.	Jet neddle clip position
3.	Jet needle staight section
4.	Pilot screw/slow jet section

4.4.2 Tuning the Fuel Injection Volume Tuning

The high or low fuel injection can use the Air Fuel Ratio (AFR) as a guide line as the table below.

Dynamism of the Engine	Air Fuel Ratio(AFR)
High Power	12.6 -13.0
Acceleration	11.5 -12.5
Run	13.8 -14.7
Low Speed	14.5 -15.0
Deceration	18.0 – 20.0

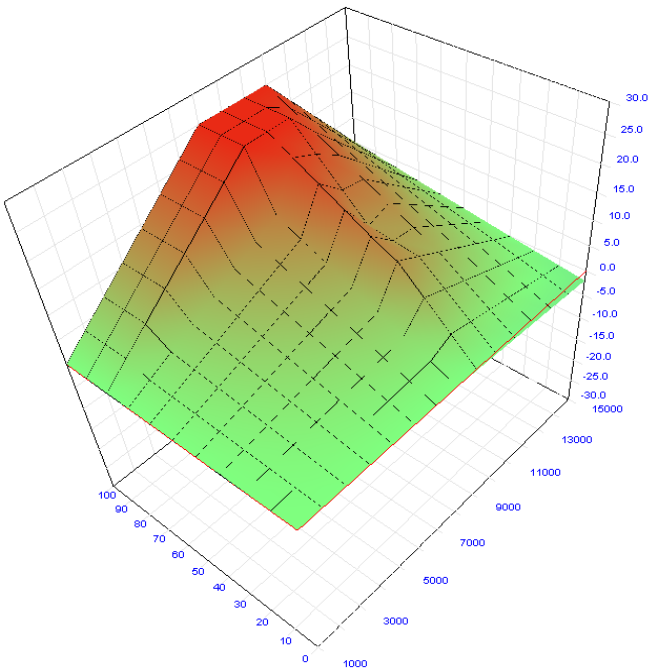


Example: Fuel Injection MAP

% Injection (+- 30)

%TPS	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
100	0	3.57	7.14	10.71	14.28	17.85	21.42	25	25	25	25	20	15	10	5
90	0	3.57	7.14	10.71	14.28	17.85	21.42	25	25	25	22.65	18.05	13.46	8.87	4.28
80	0	3.57	7.14	10.71	14.28	17.85	21.42	25	25	25	20.30	16.11	11.93	7.75	3.57
70	0	2.14	4.28	6.42	8.57	10.71	12.85	15	22.50	20.62	17.95	14.17	10.40	6.62	2.85
60	0	1.83	3.67	5.50	7.34	9.17	11.01	12.85	20	16.25	15.61	12.24	8.87	5.50	2.14
50	0	1.53	3.06	4.59	6.12	7.65	9.18	10.71	17.50	11.87	13.26	10.30	7.34	4.38	1.42
40	0	1.22	2.44	3.67	4.89	6.12	7.34	8.57	15	11.29	10.91	8.36	5.81	3.26	0.71
30	0	0.91	1.83	2.75	3.66	4.58	5.50	6.42	12.85	10.71	8.57	6.42	4.28	2.14	0
20	0	0.61	1.22	1.83	2.44	3.05	3.66	4.28	8.47	6.95	5.43	3.90	2.38	0.86	-0.66
10	0	0.30	0.61	0.91	1.22	1.52	1.83	2.14	4.09	3.19	2.28	1.38	0.47	-0.42	-1.33
0	0	0	0	0	0	0	0	0	-0.28	-0.57	-0.85	-1.14	-1.42	-1.71	-2

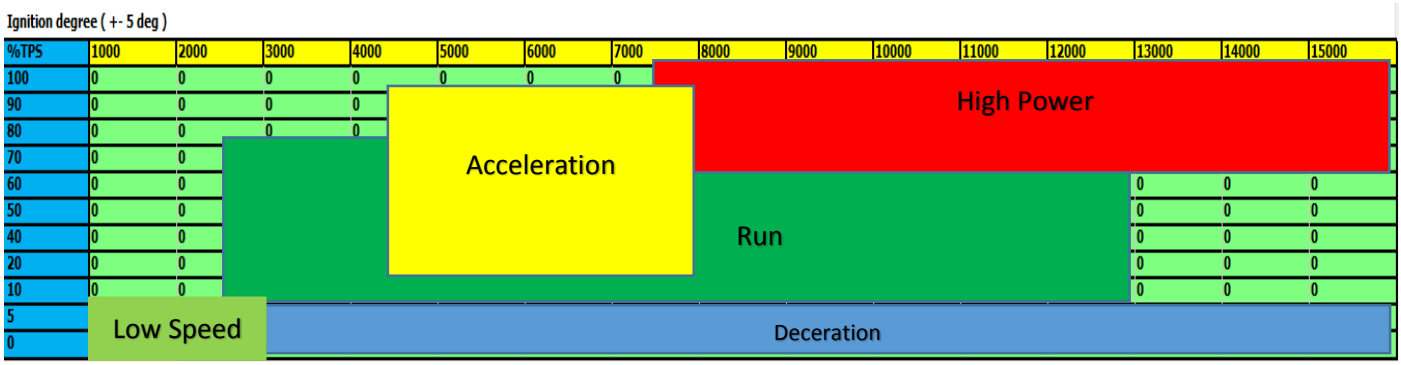
MAP Table



3D Graph

4.4.3 Tuning the Ignition Timing

Ignition Timing is very important and it can effect to the Torque and HP. Before setting the Ignition Timing, the Fuel Injection must be in the proper setting.Then, consider which area that needs to be set. For example, if the user want the bike to get more acceleration,it mean to add more in the Ignition timing MAP(+ value) at Acceleration Zone.If the user need to reduce the acceleration,It must be reduce(- value) at the same Zone.

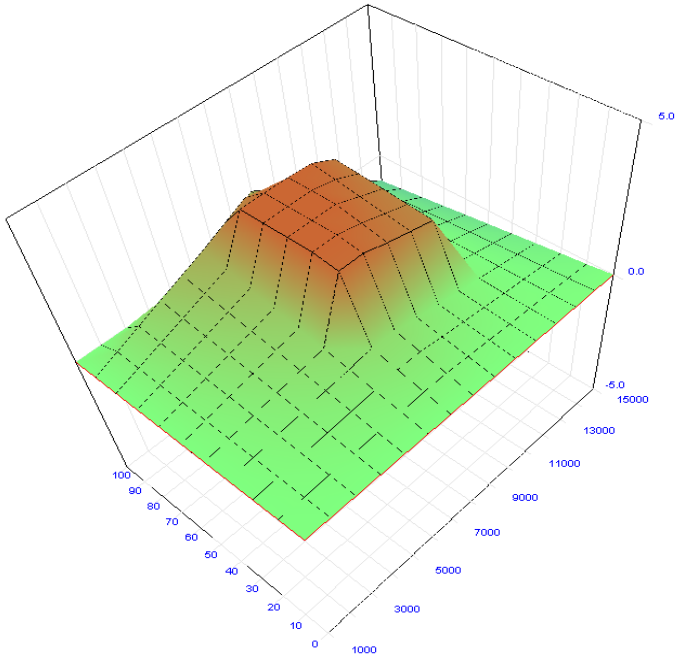


Example: Ignition Timing MAP

Ignition degree (+- 5 deg)

%TPS	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
100	0	0	0	0	0	0	0.55	1.11	1.66	1.21	0.77	0.33	-0.11	-0.55	-1
90	0	0.33	0.66	1	1.33	1.66	2.03	2.40	1.49	1.09	0.69	0.29	-0.10	-0.50	-0.90
80	0	0.29	0.59	0.88	1.18	1.47	2.98	2.98	2.98	2.94	2.59	0.26	-0.09	-0.44	-0.80
70	0	0.25	0.51	0.77	1.03	1.29	2.98	2.98	2.98	2.83	2.52	0.23	-0.08	-0.39	-0.70
60	0	0.22	0.44	0.66	0.88	1.10	2.98	2.98	2.97	2.70	2.44	0.19	-0.07	-0.33	-0.60
50	0	0.18	0.37	0.55	0.74	0.92	2.98	2.98	2.81	2.58	2.36	0.16	-0.05	-0.27	-0.50
40	0	0.14	0.29	0.44	0.58	0.73	2.86	2.86	2.64	2.46	2.28	0.13	-0.04	-0.22	-0.40
30	0	0.11	0.22	0.33	0.44	0.55	0.66	0.66	0.50	0.36	0.23	0.10	-0.03	-0.16	-0.30
20	0	0.07	0.14	0.22	0.29	0.36	0.44	0.44	0.33	0.24	0.15	0.06	-0.02	-0.11	-0.20
10	0	0.03	0.07	0.11	0.14	0.18	0.22	0.22	0.17	0.12	0.07	0.03	-0.01	-0.06	-0.11
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MAP Table



3D Graph

5.Trouble Shooting

ECM Sensors

Caused of Problem	Problem Analysis	Problem Shown
1. Crank Shaft Sensor	1. Connector sensor is not connected properly 2. Short-circuit at the wiring 3. Sensor is damaged	Engine can't be started up
2. Fuel Injector	1. Fuel Filter is dirty 2. Injector is damaged	Engine can't be started up
3. ECM	ECM is damaged	Engine can't be started up
4. No Electricity supplied to the ECM	1.Fuse is damaged 2.Ignition key is damaged	Engine can't be started up
5. Sensor Modules in Thorttle Body	1. Sensor module connector is not connected properly 2. Short-circuit at the wiring 3. Sensor module is damaged	Engine is difficult to get started up and the engine doesn't run smoothly
6.MAP(Manifold Absolute Pressure) Sensor	MAP Sensor is damaged	Engine is difficult to get started up
7.ECT(Engine Coolant temperature) Sensor	1.The sensor is not connected properly 2. Short-circuit at the wiring 3. ECT Sensor is damaged	Engine is difficult to get started up at the cold temperature
8.TP(Throttle Position) Sensor	1. The sensor is not connected properly 2. Short-circuit at the wiring 3. The TP Sensor is damaged	The response when accelerate is not completed
9.IAT(Intake Ambience Temperatur) Sensor	1.The sensor is not connected properly 2. Short-circuit at the wiring 3. IAT Sensor is damaged	The engine is started up normally but, the engine working not smooth because the injection and the ignition doesn't work properly

10. Ignition Coil	1. The connector is not connected properly 2. Short-circuit at the wiring 3. The Ignition coil is damaged	The engine can't be started up
11. Air filter	**1.**The dirty at the air filter	The acceleration can't work fully because the intake air is not enough
12. Battery	1. Battery connector is not connected **2.** Charging system does't work **3.** Battery is damaged	The engine can't be started up

Problems from Tunning

Caused of Problem	Problem Analysis	Problem Shown
1. TPS	No setting	The engine is diificult to get started up and the engine is not work properly at the low RPM
2. Low Speed	1.The AFR number (Air&Fuel Ratio) is not proper(should be between 14.5-14.8) **2.** Idle control needs setting(at the "Enrichment Table" in the program)	The engine is diificult to get started up and the engine is not work properly at the low RPM
3. General Using	1.The AFR number (Air&Fuel Ratio) is not proper(should be between 14-14.5) **2.**The Ignition degree is too high	The temperature at the engine is too high
4.Acceleration	1.The AFR number (Air&Fuel Ratio) is not proper(should be between 11.5-12.5)	The response from the engine is not good
5. Deceleration	**1.** The injector still injects the fuel **2.** The ignition degree is too low	The back fire at the muffler
6. High Power	1. The AFR should be between 12.6-13 **2.** The ignition degree is not proper	The engine has no power

6. Short Cut Menu/Short Key

1. Ctrl+N : Clear out all data of the opening Tab back to new start
2. Ctrl+O : Open the recorded file
3. Ctrl+C : Duplicate the waned data form mode 1 to mode 2 or vise vesa. Form mode 2 to mode 1
4. Ctrl+V : Transfer the duplicated data to the wanted mode
5. Enter : Send data from opening tab to ECM
6. R : Read data from ECM to show on each opening tab
7. I : Interpolate
8. Ctrl+P : Send all data of ever tabs from computer to ECM
9. Ctrl+R : Real all data of every tabs from ECM to show on computer
10. Ctrl+D : Display 3 D
11. Page up : Increase
12. Page down: Decrease