POWERED by YOSHIMURA

Instruction Manual

- English -

GSX-R

Racing ECU
Engine Management Professional

Ver.2.1

Before using the product:

For safe operation, make sure to read this manual carefully and become thoroughly familiar with the contents before start using the Racing ECU.
It is designed for closed-race circuit or competition use only. Using this product in public roads or highways is strictly prohibited.
As it allows to adjust the setting in a wide range, an extreme attention must be paid.

DANGER! : Indicates a potential hazard that could result in death, injury or engine breakdown.	
CAUTION! : Indicates a potential hazard that could result in motorcycle damage.	
NOTE : Indicates special information for simplified installation.	

Important information :

The Racing ECU set (Part No. 490-40A-3000) is not compatible with the previous software.
Engine Management Professional Ver.2.0 (hereafter previous software)

To use the Racing ECU set (Part No. 490-40A-3000) or Control unit, FI (Part No. 490-40A-1001), it is required to install the software.
Engine Management Professional Ver.2.1 (hereafter software)
Previous ECU/Control unit. FI and old model of racing ECU for GSX-R1000/750/600 (2005-2016) are also compatible with Ver.2.1. However, it is not possible to use updated functions listed below.

Updated functions – Engine Management Professional Ver.2.1:

* Change over timing from T-Map to D-Table

* Additional function to adjust ETV ratio

* Map grid assignment

Updated functions – Racing ECU :

* Fuel injection control base map

* Traction control base map

* Bug fix

Setting and data logger:

To make the setting, use data logger system, record the data and adjust each parameter.
Followings are recommended logging menu to use Racing ECU and software.
A/F, APS, TPS, Engine rpm, F/R wheel speed, Gear position, Lean angle
It is also recommended to add oil and water temperatures to monitor engine condition.

Follow [Racing ECU Setting Manual] for further details.

Use [TC conversion ver2.1] to analyze traction control action in details.

To adjust ETV ratio compensation map is available. Refer [+5% ETV compensation map ver2.1] to make the adjustment.

Recommended data logger system: AIM Data logger

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☐ Introduction of Racing ECU set

Racing ECU set is the engine setting tool with following features.

Fuel injection control	Ignition timing control	Engine brake control	Ignition cut timing
ETV Ratio Adjustment	Speed limiting	Over rev limit *1	Engine condition monitoring
Traction control	Ram air compensation	Blipping control	Anti wheelie control
Launch control			

*1: Require 210-50A-0001 ST-R Camshaft set

☐ Set contents

[Part No. 490-50A-3000] Racing ECU set GSX-R1000/R L7-

Control unit, FI   I/F cable

No.	Part No.	Description	Qty
1	490-50A-1001	Control unit, FI	1
2	490-50A-2000	I/F (Interface) cable	1
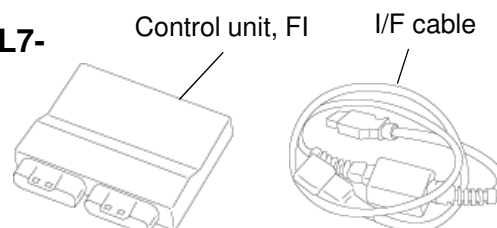
☐ Necessary item

・[Part No. 406-50A-1000] Wiring Harness Set /L7-L8   or   [Part No. 406-50A-2000] Wiring Harness Set / L9

・[Part No. 764-50A-0000] Second air blind set

・[Part No. 764-50A-1000] Evaporation purge line plug set

☐ Installation procedure (on vehicle)

・Remove battery terminals and genuine ECU.

・Remove genuine wiring harness.

・Install necessary items according to the instruction manuals.

*In case installing the Wiring Harness for L7-L8 model to L9 model, it is required to change right side handle switch.

・Install Racing ECU (Control unit, FI) and reconnect battery terminals.

☐ Installation procedure (in computer)

NOTE : The views of computer screen in this manual may differ from actual ones.

In order to change the Racing ECU setting, the software must be installed on the computer.
To use I/F cable for data transfer, it is required to install USB driver on the computer.

● Operating system

Applicable OS type	Windows	
	10	7
Engine Management Professional Ver.2.1	◯	◯

Followings are required to use 3D View dialog.

- Graphic card : More than VRAM 8MB (Compatible with Direct X 9.0b or later, and the driver.)
- Monitor   : More than 800 x 600 dots, High Color (more than 16-bit)
- Direct X   : Later than Direct X 9.0b

NOTE : Even if 3D View dialog is not possible to use, it does not affect operating the Racing ECU.

● Installation of software

Download【Engine Management Professional_Ver.2.1.exe】from Yoshimura Japan website.

Click【Engine Management Professional_Ver.2.1.exe】, follow instructions of the setup wizard and install the software.
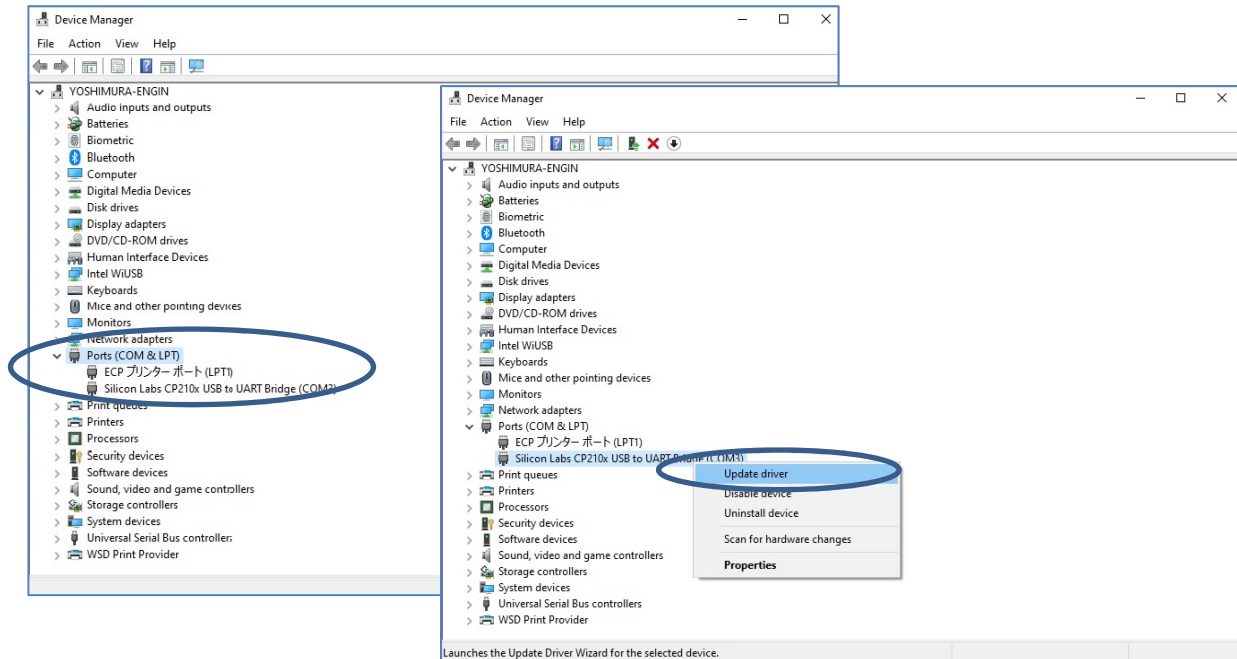
● Installation of USB driver

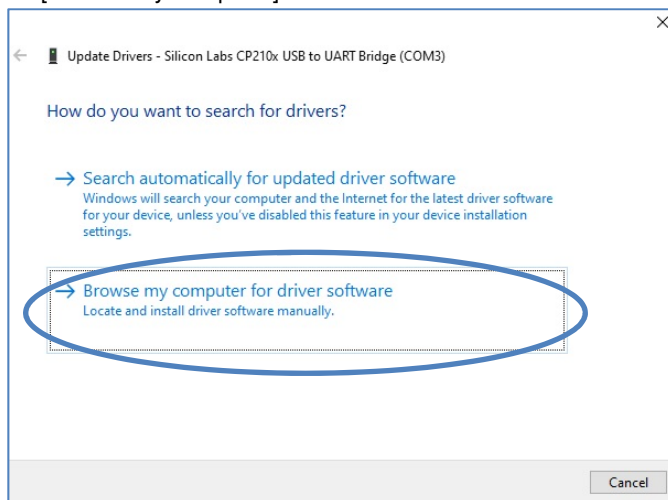Install USB driver [CP2102 USB to UART Bridge Controller].

Download [CP210x_VCP_Windows] folder from Yoshimura Japan website and place it in the arbitrary place.

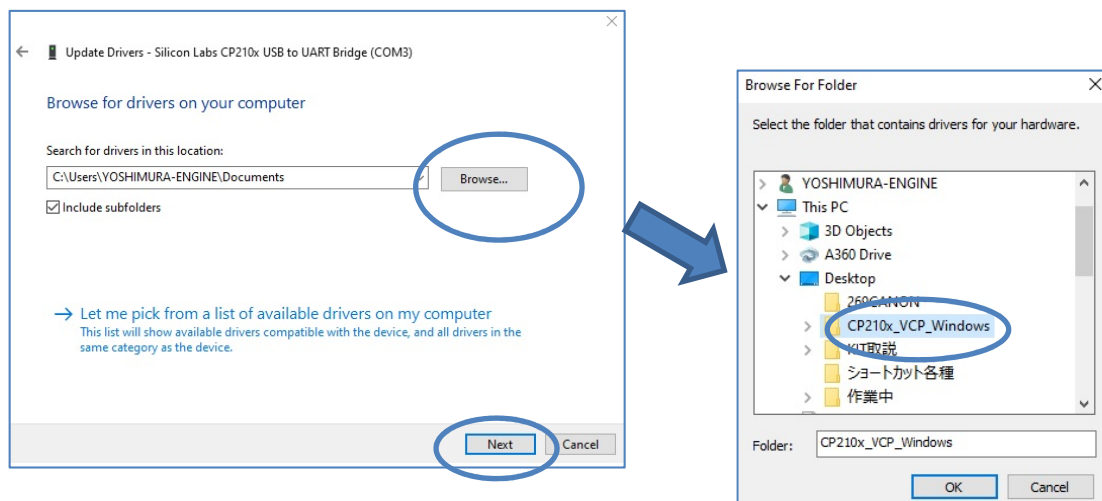**Connect I/F cable to computer and open the Device Manager.**

Right-click [CP210x USB to UART Bridge] of [Ports] and select Update Driver.
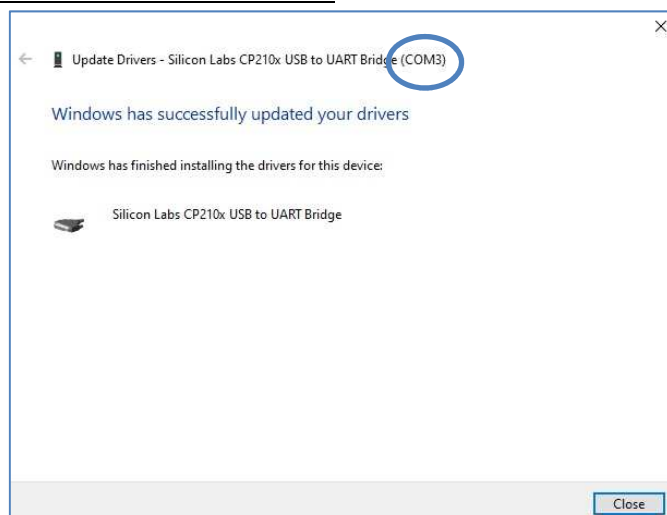

Select [Browse my computer].

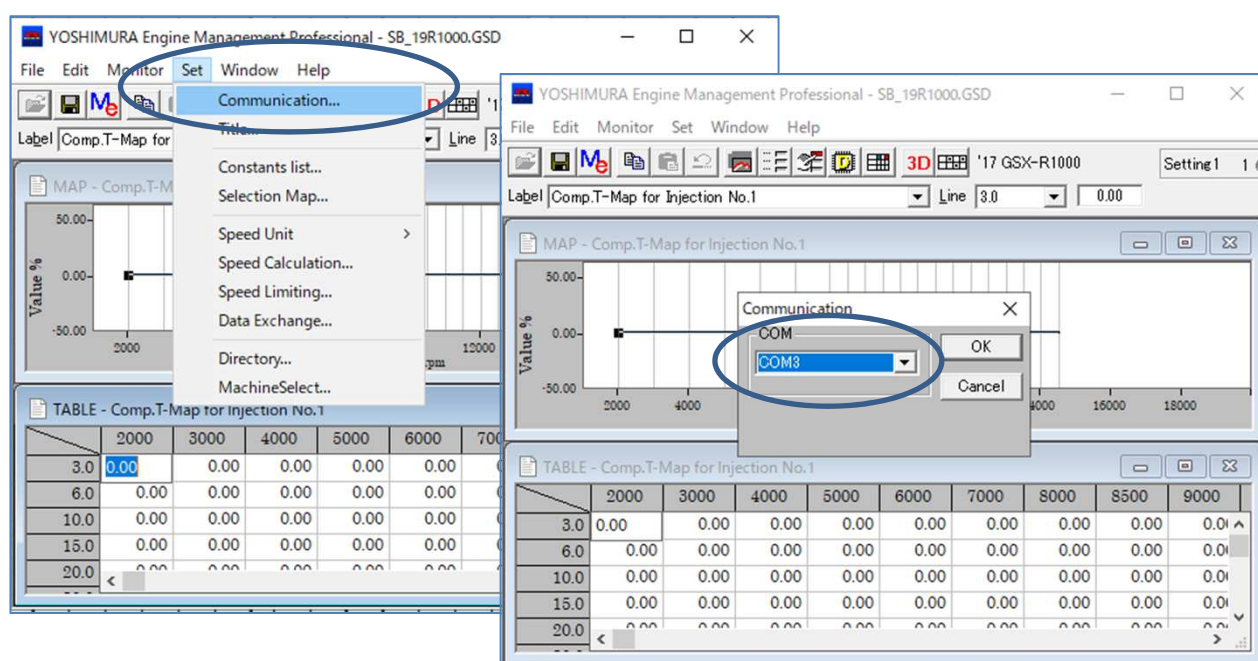Click Browse, select [CP210x_VCP_Windows] folder and click Next.

USB driver installation is completed.

Note and record COM number.

In the software, select Communication from Set pulldown menu, specify the COM number and click OK.

NOTE : Wrong COM number leads to communication with ECU.
        Refer [Communication with ECU] on page 26.

● 3D View and operating system

3D View shows editing map data in 3-dimention graph. To use the 3D View, **Direct X 9.0b or later** system is required.

Check the version if 3D View is not shown. If 3D View dialog is not possible to use, it does not affect operating the Racing ECU.

In case 3D View does not work with Direct X 9.0b or later system, check the display adapter and/or diver is correctly supporting the system.

In case insufficient graphic memory, reducing size or number of colors on [Display Properties] may solve the problem.

NOTE : - How to check the Direct X version -
        ・Select [Start], enter [dxdiag] in the search box and Enter.
        ・In the Direct X Diagnostic tool, select [System] tab and check the version.

☐ Operation and Function

● ECU data (original) and recommended engine spec

There are 2 of map prepared for the Engine Management Professional Ver.2.1 .
 - Base map of SB-JSB_19R 1000.GSD (0% value) is ready for SB/JSB race use.
 - ST_19R 1000.GSD is adjusted for ST race use.

> CAUTION! :   Engine setting would be changed according to weather or engine conditions.
> Analyze data with data logger or similar tool, and optimize engine setting.

< Recommended engine spec and compensation map details >

	Compensation map file name	SB_19R1000.GSD	ST_19R1000.GSD
Recommended engine spec	Applicable regulation	SB1000/JSB1000	ST1000
	Fuel	100 octane unleaded fuel	
	Camshaft	Yoshimura ST-R *1	Standard / Original
	Exhaust system	Yoshimura Racing Exhaust system*2	
	Head gasket thickness	T=0.45mm *3	
	Cylinder head grinding	0.5mm	Standard / No modification
	Clutch	Adjustable BTL Clutch Set *4	Standard / Original
	Air funnel	#1/#4 Short funnel *5	Standard / Original
	Throttle tube	Throttle set (Quick throttle true circle type) *6	
Compensation map details	Fuel injection and ignition timing	0% map ready for SB/JSB race use (Possible to make further adjustment.)	Preprogrammed map ready for ST1000 race use (Possible to make further adjustment.)
	Maximum rpm	15,000rpm *7	14,700rpm

*1 : 210-50A-0001 ST-R Camshaft set
*2 : 150-50A-A1*G* / 150-50A-C1*G* Racing exhaust system R-11Sq
*3 : A-F110-14S Cylinder head gasket
*4 : 310-50A-0000 Adjustable BTL clutch set
*5 : Modification of standard air funnel is required.
*6 : Recommended item: 671-50A-1000 Throttle set (Quick throttle true circle type)
*7 : To raise the engine rpm, 210-50A-0001 ST-R Camshaft set is required.

> DANGER! : If the engine rpm exceeds 14,700 without ST-R Camshaft, the engine gets serious damage.

● Operating method and each function

NOTE : The views of computer screen in this manual may differ from actual ones.

・Activation method

Double-click the shortcut of the software.
The model selection screen will be displayed only at the first time after the use permission.

NOTE : Use [Machine Select] of [Set] pulldown menu from second time.

NOTE : When using the software, open a GSD file and use one of the maps open on the editing screen.

・Pulldown menu

File : Pulldown menu

Close : Close file

Save : Save file

Menu : Display menu dialog

Exit : Close software

Open : Open file

Exit : Close software

CAUTION! : Close, Save & Menu : Will not be appeared in the pulldown menu until data file reading is completed.

Open : Will not be appeared in the pulldown menu after data file reading is completed.

Two files can not be open at the same time.

Edit : Pulldown menu

Undo : Restore

Copy : Copy data

Paste : Paste data

Multi Map Edit : Show Multi Map Edit dialog

Individual Edit : Close Multi Map Edit
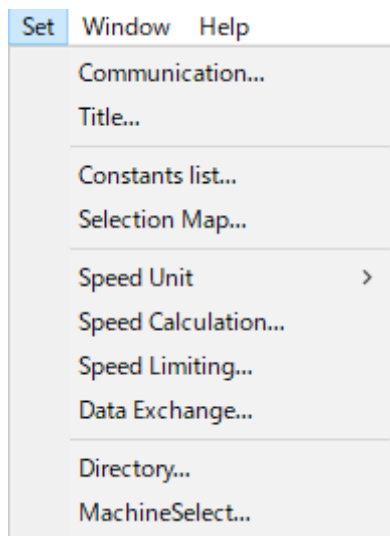
Monitor : Pulldown menu
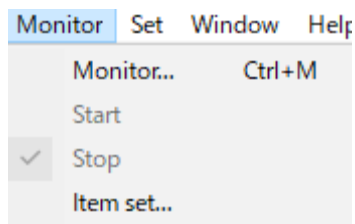
Monitor : Show Monitor dialog

Start : Start Monitor communication

Stop : Stop Monitor communication

Item set : Show Monitor Item set dialog

Set : Pulldown menu

Communication : Show COM port dialog

Title : Show Title Editor dialog

Constants list : Show Edit Constants list dialog

Selection Map : Show Selection Map dialog

Speed Unit : Switch km/h and mph

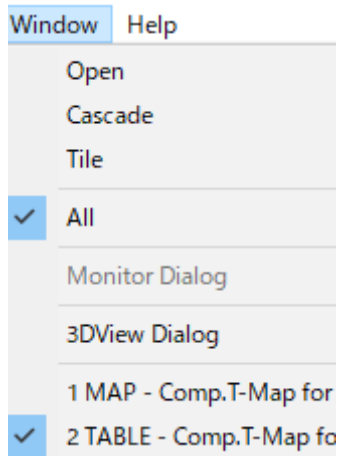Speed Calculation : Show Speed Calculation dialog

Speed Limiting : Show Speed Limiting dialog

Data Exchange : Show Data Exchange dialog

Directory : Show Directory dialog

Machine Select : Show Machine Select dialog

Window : Pulldown menu

Open : Open Map and Table windows

Cascade : Show windows in a cascade

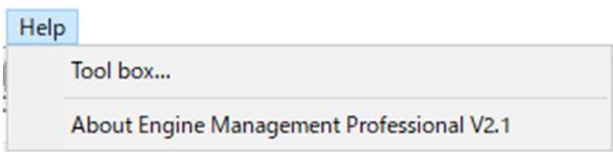Tile : Show windows to be next to each other

All : Switch graph between "All" and "Single" in Map window

Monitor Dialog : Move cursor to Monitor dialog

3D View Dialog : Show 3D View graphic

---------- : Show list of windows currently open

Help : Pulldown menu
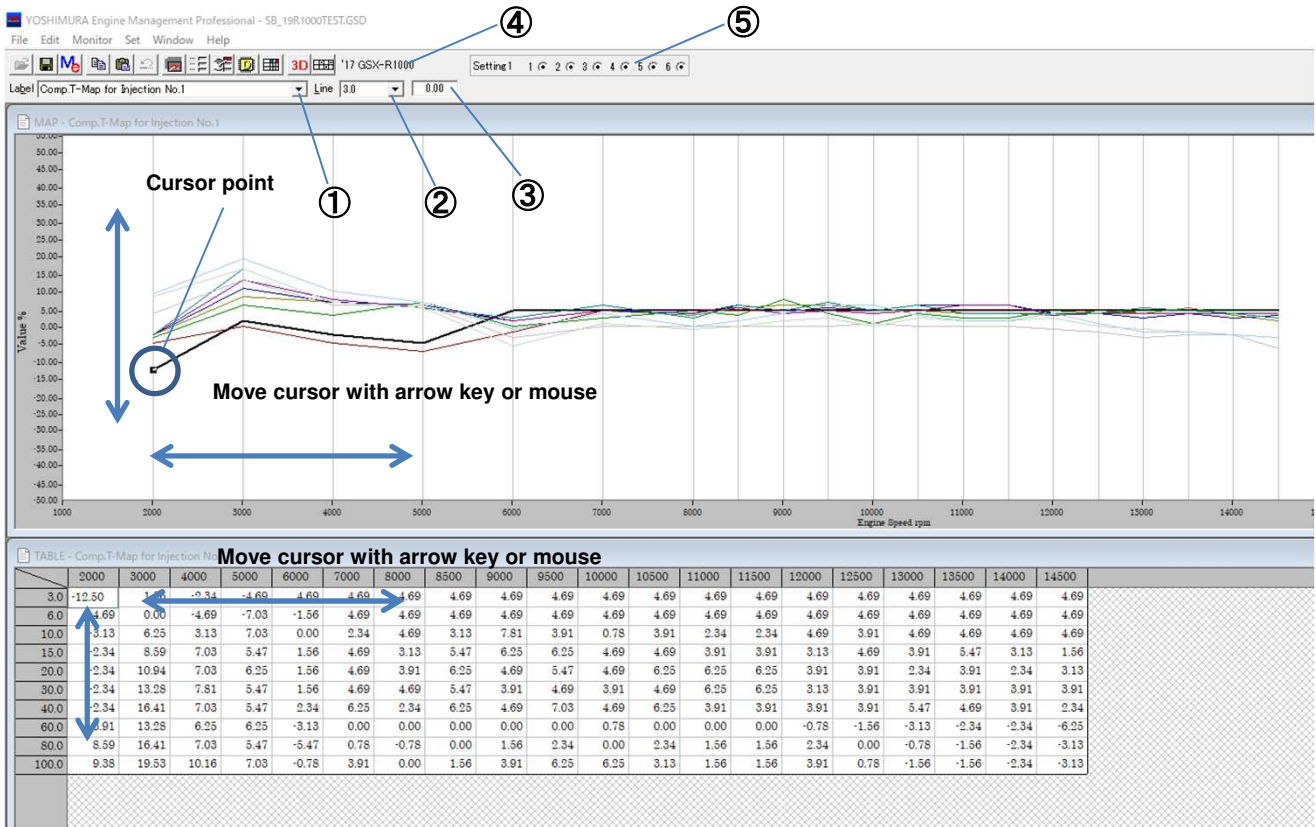
Tool box : Show tool button description

About ----- : Show version information of software

▪ Edit window   -Basic operation-

Select map (Label) in Menu dialog to display map edit window

NOTE :	The two dimensional graph and table on the display are shown from same data.
	They are linked each other, and edit with the one that is easier to operate.

① Map change button (Label display)

    Specify the label to edit.

② Throttle position change button (Throttle opening display)

    Display selected throttle opening graph. The throttle opening is displayed from 0% to 100%.

③ Differential value

    The differential value is shown from original (saved data at GSD file) to current one.

④ Machine name display

   Show selected machine name from Machine Select dialog.

⑤ Selection Map display

   Show which gears are using editing map at Selection Map.

・ **Map edit   -Basic operation-**

> NOTE : The vertical axis is the adjustment amount and the horizontal axis is engine rpm.

Use throttle opening selector button to select the throttle opening to edit. The line color of the selected opening will change.
Same operation is possible with key allocation.
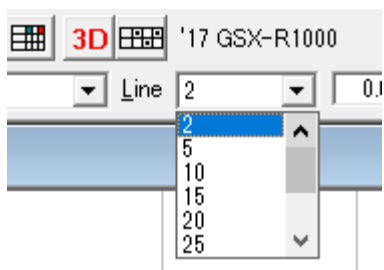
Click the point to edit and move cursor point up or down.
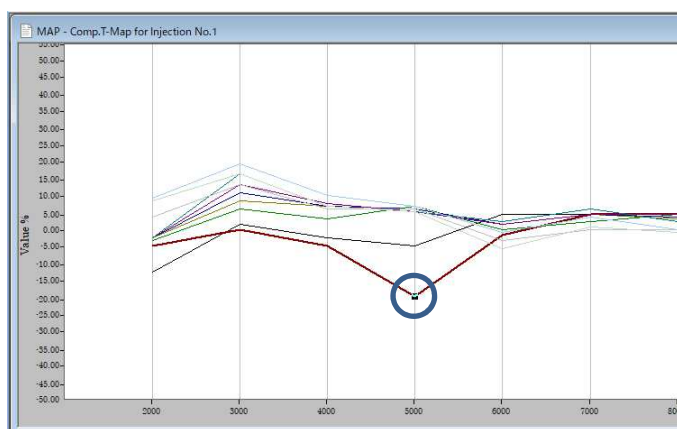
Key allocation	
→ or ⇧ Shift + →	**Move to right**
← or ⇧ Shift + ←	**Move to left**
F2 or ⇧ Shift + ↑	**Move to smaller throttle opening**
F3 or ⇧ Shift + ↓	**Move to lager throttle opening**
↑ or Page Up	**Increase data**
↓ or Page Down	**Decrease data**
F4 or Alt + A	**Switch graph display (1 or all)**

・ Table edit　-Basic operation-

NOTE : Directly edit by key input after cell selection by mouse or key operation.

Select the cell to edit and enter value.

TABLE - Comp.T-Map for Injection No.1

	2000	3000	4000	5000	6000	700(
3.0	-12.50	1.56	-2.34	-4.69	4.69	4
6.0	-4.69	0.00	-4.69	-7.03	-1.56	4
10.0	-3.13	6.25	3.13	7.03	0.00	2
15.0	-2.34	8.59	7.03	5.47	1.56	4
20.0	-2.34	10.94	7.03	6.25	1.56	4
30.0	-2.34	13.28	7.81	5.47	1.56	4
40.0	-2.34	16.41	7.03	5.47	2.34	6
60.0	3.91	13.28	6.25	6.25	-3.13	0
80.0	8.59	16.41	7.03	5.47	-5.47	0
100.0	9.38	19.53	10.16	7.03	-0.78	3

NOTE : If value out of range is input, warning message dialog appears and either **maximum or minimum value will be automatically set**.

The edited values will be shown blue letters until file is closed. When edited cell is selected, the cell on the top shows difference from the previous data.

Key allocation	
→　or　⇧ Shift ＋ →	**Move to right cell**
←　or　⇧ Shift ＋ ←	**Move to left cell**
F2　or　⇧ Shift ＋ ↑	**Move to upper cell**
F3　or　⇧ Shift ＋ ↓	**Move to lower cell**
Page Up	**Increase cell data**
Page Down	**Decrease cell data**
Enter ↵	**Determine data**
F4　or　Alt ＋ A	**Switch graph display (1 or all)**

▪ Selecting cells   -Basic operation-

Multiple cells can be selected when cursor on any cell is moved to another cell by using [Shift] + mouse or when cells are selected using [Shift] + [Ctrl] + arrow key. Selected cell are shown with blue thick frame. Selection of multiple cell is canceled when cell is clicked without using [Shift] or sell is moved using [Shift] + arrow key.

TABLE - Comp.T-Map for Injection No.1								
	2000	3000	4000	5000	6000	7000	8000	8500
3.0	-12.50	1.56	-2.34	-4.69	4.69	4.69	4.69	4.6
6.0	-4.69	0.00	-4.69	-7.03	-1.56	4.69	4.69	4.6
10.0	-3.13	6.25	3.13	7.03	0.00	2.34	4.69	3.1
15.0	-2.34	8.59	7.03	5.47	1.56	4.69	3.13	5.4
20.0	-2.34	10.94	7.03	6.25	1.56	4.69	3.91	6.2
30.0	-2.34	13.28	7.81	5.47	1.56	4.69	4.69	5.4
40.0	-2.34	16.41	7.03	5.47	2.34	6.25	2.34	6.2
60.0	3.91	13.28	6.25	6.25	-3.13	0.00	0.00	0.0
80.0	8.59	16.41	7.03	5.47	-5.47	0.78	-0.78	0.0
100.0	9.38	19.53	10.16	7.03	-0.78	3.91	0.00	1.5

NOTE : **Copying data from Excel is possible.**
With the multiple cells selected, paste data [Ctrl] [V] is ineffective. When pasting data, select left top cell. If the value is out of range, it is automatically changed within the set data.

Key allocation for multiple cells	
Page Up or ⇧Shift + Ctrl + Page Up	**Increase data of selected cells**
Page Down or ⇧Shift + Ctrl + Page Down	**Decrease data of selected cells**
Enter ↵	**Determine data**
⇧Shift + Ctrl + ↑ ↓ ← →	**Move selected cursor cells**
⇧Shift + ↑ ↓ ← →	**Cancel selection of cells and move**
Ctrl + C	**Copy data**
Ctrl + V	**Paste data**

· 3D View dialog   -Basic operation-

Click 3D button on the tool bar.
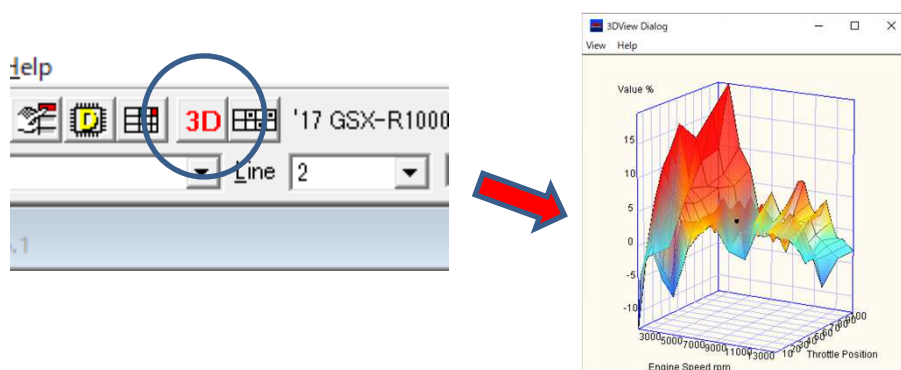
NOTE : 3D View dialog displays map data being edited in a 3-dimension graph. Map edit operation can not be done on this dialog.
It is effective to find editing error or to level the value.

3D View Key allocation	
Alt + Page Up	**Zoom in**
Alt + Page Down	**Zoom out**
Ctrl + Page Up	**Roll graph clockwise**
Ctrl + Page Down	**Roll graph counterclockwise**
Ctrl + ↑ ↓ ← →	**Roll graph to arrowed direction**
Home	**Display graph as viewed from home position**
X	**Display graph as viewed from square to X-axis**
Z	**Display graph as viewed from square to Z-axis**

3D View pulldown menu
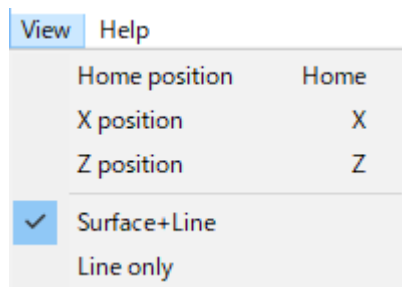
Home position : Display graph as viewed from home position

X position : Display graph as viewed from position square to X-axis

Z position : Display graph as viewed from position square to Z-axis

Surface + Line : Change display in contour

Line only : Change display with line only
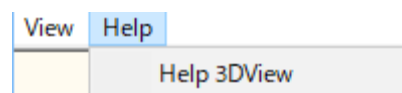
Help 3D View : Show following key allocation

・Machine Select

Open "Machine Select" dialog from "Set" pulldown menu and select the model.

・Speed Unit

Select speed unit from "Speed Unit" pulldown menu.

・Speed Calculation

Open "Speed Calculation" dialog from "Set" pulldown menu. Enter numbers of transmission teeth and outside diameter of tires.

NOTE : Enter the outside diameter of tires from **tire manufacturers' official data**.

If the information is not available calculate as follows.

[Measure tire outside diameter and calculate the outer diameter.]

CAUTION! : Default data is from standard vehicle.

Make sure to check the numbers of teeth and outside diameter of tires from the vehicle and write them in the ECU.

DANGER! : **Write outside diameter of tires in the correct place. (Top: Rear / Bottom: Front)**

If neglected, **it may cause serious accident from wrong traction control or wrong engine brake control.**

***Make sure to put the data in correct place
Top: Rear / Bottom: Front**

● Functions

・Ram air compensation

It corrects lean air-fuel mixture by ram air system at high speed range.

Comp. Fuel for RAM effect in 4th, 5th & 6th

It corrects air-fuel mixture at 4th, 5th & 6th gears.
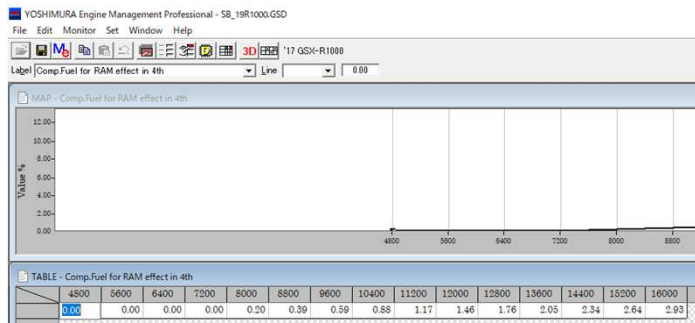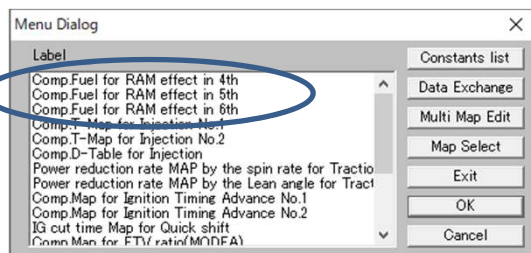
Horizontal axis : Engine rpm

NOTE： Ram air compensation can be used only from 4th to 6th gears.

Increasing value increases fuel supply and decreasing value decreases fuel volume.

・Fuel injection control

Fuel volume can be adjusted at throttle opening (valve opening of throttle body / TPS) and at engine rpm.

DANGER! : Too lean fuel supply may causes engine brake down.

Comp. D-Table for Injection

The map to adjust fuel supply at throttle opening less than 3% in each engine rpm.
The adjustment at idle is also effective.

Comp. T-Map for Injection No.1 & No.2

The map to adjust fuel supply at throttle opening more than 3% in each engine rpm.
The adjustment for running is effective.
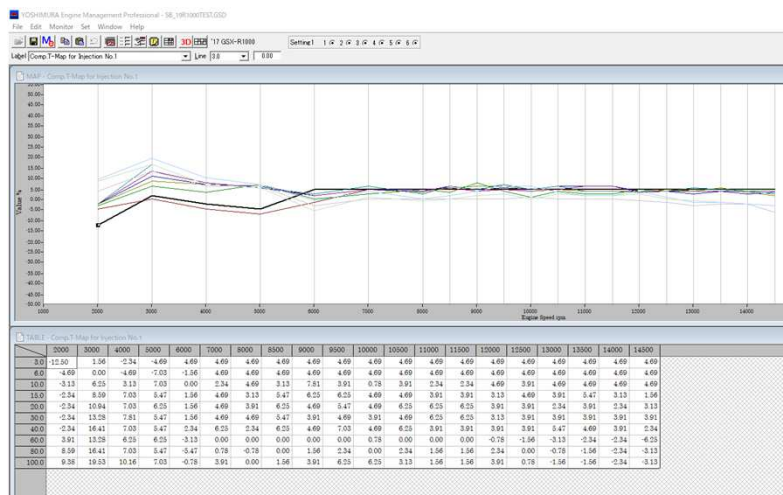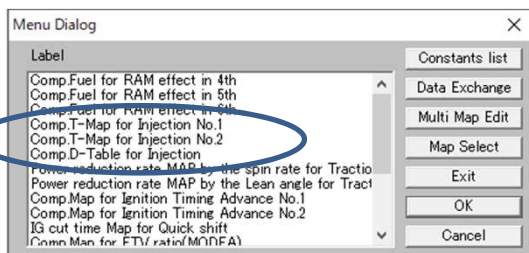
Vertical axis : Throttle opening（TPS）   Horizontal axis : Engine rpm

NOTE： **Increasing value increases fuel supply.**

Select map at [Map Select] in each gear.

Use D-table less than throttle opening 3% and use T-map more than throttle opening 3%.

Check the logging data from each run, refer the A/F ratio and adjust the fuel volume from the condition.

Recommended A/F ratio is between 12.8 and 13.2.

Use 14,500 table over 14,500rpm.

・Traction control (TC)

Detect front and rear wheels rotation gap and suppress the engine power output to prevent from sudden rear tire slip or wheeling when acceleration.

The adjustment of traction control with lean angle is possible.

DANGER! : **This function does not work correctly without entering data at Speed Calculation.**
To prevent accident by malfunction, make sure to set data at Speed Calculation.

Traction control does not stop rear tire grip out completely. Spend enough time to test and confirm how the function is effective.

When wheel is remove and reinstalled, it is required to confirm front and rear wheel speed sensor is working correctly.

Lift up both wheels, make them run and check TC light at dashboard turns off. If it keeps on, TC function may not work correctly and it is required to solve by adjusting speed sensor angle, distance, direction or wiring.

Front wheel speed would be shown at dashboard while rear wheel speed has to be checked at Vehicle Speed in Monitor.

To make the TC light off, minimum 10km/h speed is required.

Edit Constants list

(no group)

Contents	VALUE	Unit
All Area Fuel Compensation Value	0	%
Selection of Traction Control(0=STD 1=Custom Setup)	1	-
Selection of Throttle Angle Compensation(0=STD 1=Custom Setup)	1	-
OverRev Limit for Ignition	15000	rpm

NOTE : **At the Selection of Traction Control, it is possible to change the map.**
0 is default map which is already set in the ECU and 1 is reprogrammed map.

TC functioning image is shown below.

Recommended TC level is TC5.

<TC functioning image>

1	←	TC level	→	10
Less	←	**TC volume**	→	**More**

*TC does not function when TC is OFF.

Power reduction rate Map by the Spin rate for Traction control

This is the map to set engine power output reduction by each spin rate. (front and rear wheels rotation gap)
The horizontal axis is the differential of exceeding the threshold and it shows the excess of actual F/R wheel spin rate until traction control to be effective.
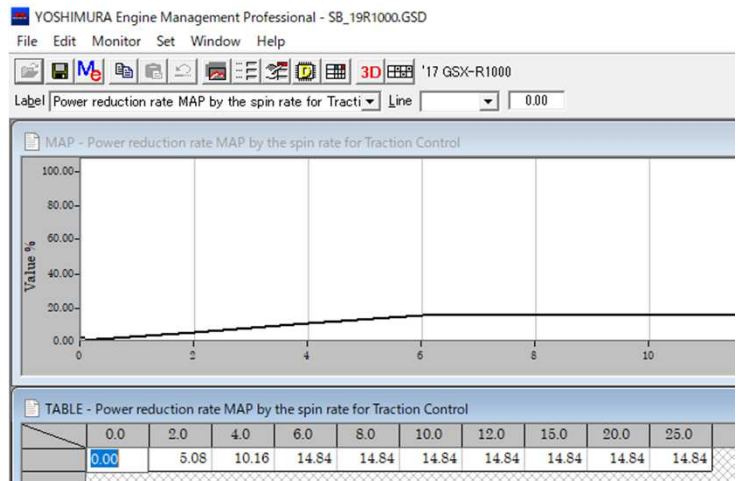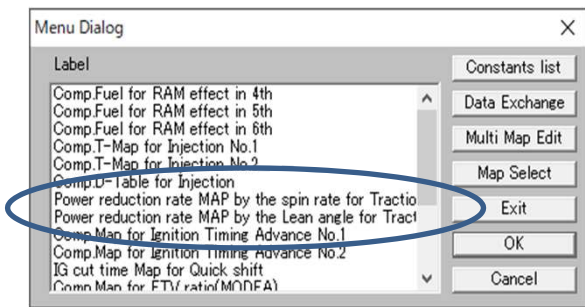
Horizontal axis : Threshold differential

	0.0	2.0	4.0	6.0	8.0	10.0	12.0	15.0	20.0	25.0
0.00	5.08	10.16	14.84	14.84	14.84	14.84	14.84	14.84	14.84	14.84

NOTE : The value makes reduction of engine power output (%) for differential of exceeding the threshold.

The map shows 10.16% of power reduction is made when threshold differential is 4.0.

Before set up TC, make sure ETV ratio adjustment (P20-21) is done.

When adjusting ETV ratio, TC must turn off at the beginning. If ETV ratio is adjusted but rear tire keeps slipping, set TC5 and make adjustment.

In case there is no improvement is felt after additional 3-4 levels, check the data at [TC conversion ver2.1] and reset TC level.

The **TC level affects where TC starts effective (TC target)** and **Power reduction rate Map by the Spin rate for Traction control changes value of TC control.**

＜TC functioning image＞

| SpinRate[%] | TCTarget | Power reduction rate MAP by spinrate for TC - SpinRate [%] |
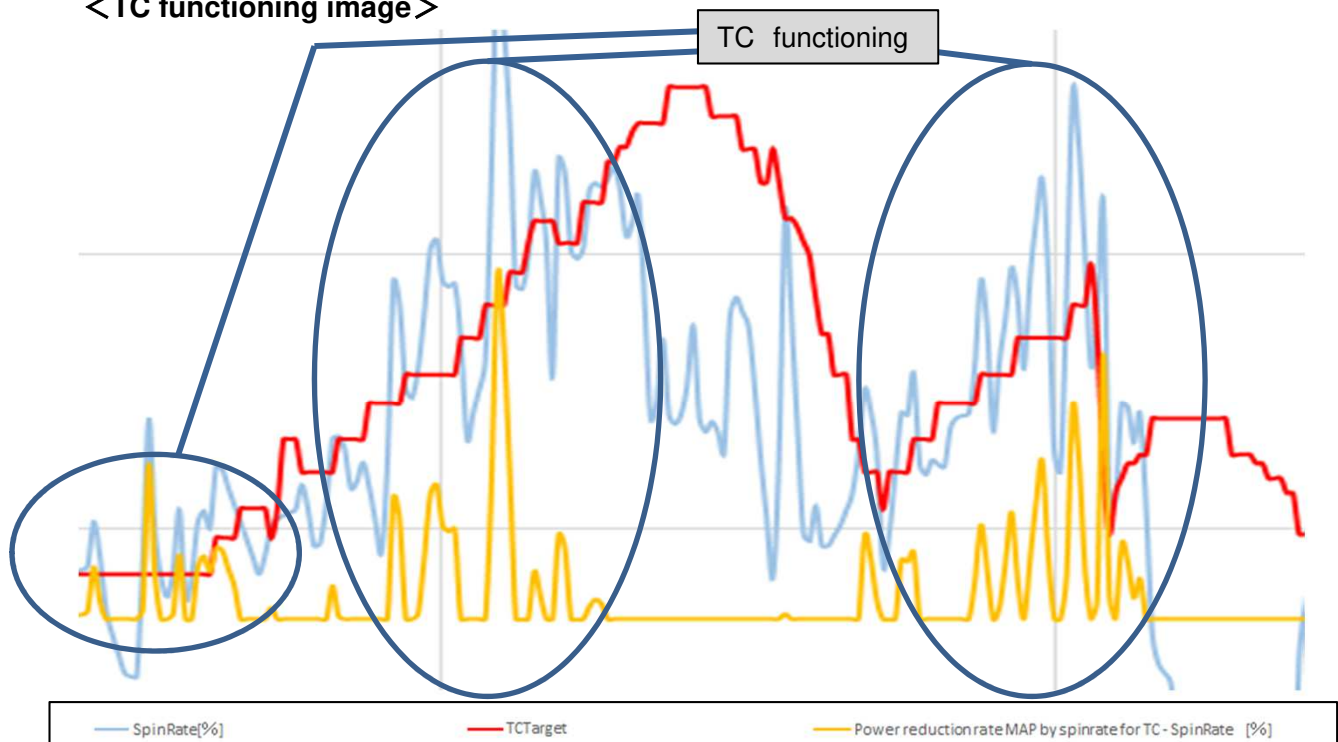
NOTE : In the blue circles show spin rate (pale blue line: SpinRate) goes over TC target（red line: TCTarget）and engine power output is adjusted by traction control.

For further details are available at [TC conversion ver2.1]

Power reduction rate Map by the Lean angle for Traction control

This is the map to set traction control effectiveness in different lean angle.
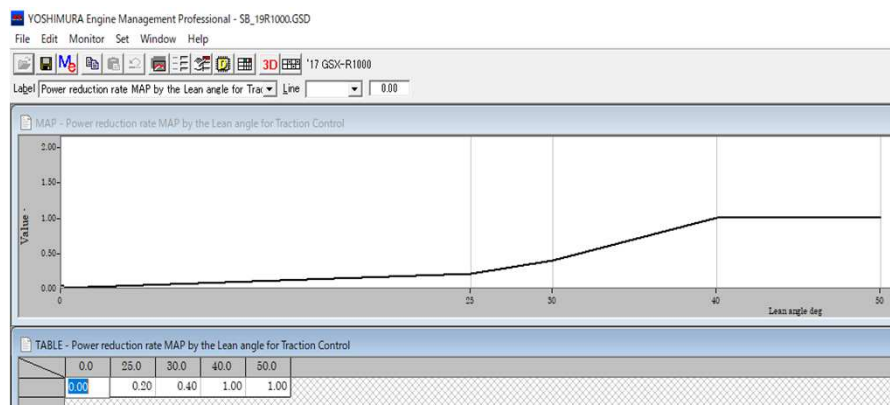
Horizontal axis : Lean angle

NOTE : Increasing value makes traction control more effective.

It is multiplier compensation for Power reduction rate Map by the Spin rate for Traction control.

It compensate the applicable cell by multiplier per lean angle.

The lean angle 0.0 means the machine is completely stands straight and putting 0 value to cut un necessary

traction control.

· Ignition timing control

Ignition timing can be adjusted at throttle opening (valve opening of throttle body / TPS) and at engine rpm.

DANGER! : Proper experience is required to set the ignition timing. Make the adjustment on chassis dynamometer is
also required. Excessive adjustment may cause the engine breakdown.
The ignition timing can be adjusted at both advanced and retard. Change setting to regard can be possible
but excessive adjustment causes engine power loss or engine/machine brake down.

The recommended value is **from 0 to - 15degrees** from default value on each engine spec.

Comp. Map for Ignition Timing Advance No.1 & No.2

This is the map to set ignition timing for each throttle opening and engine rpm.
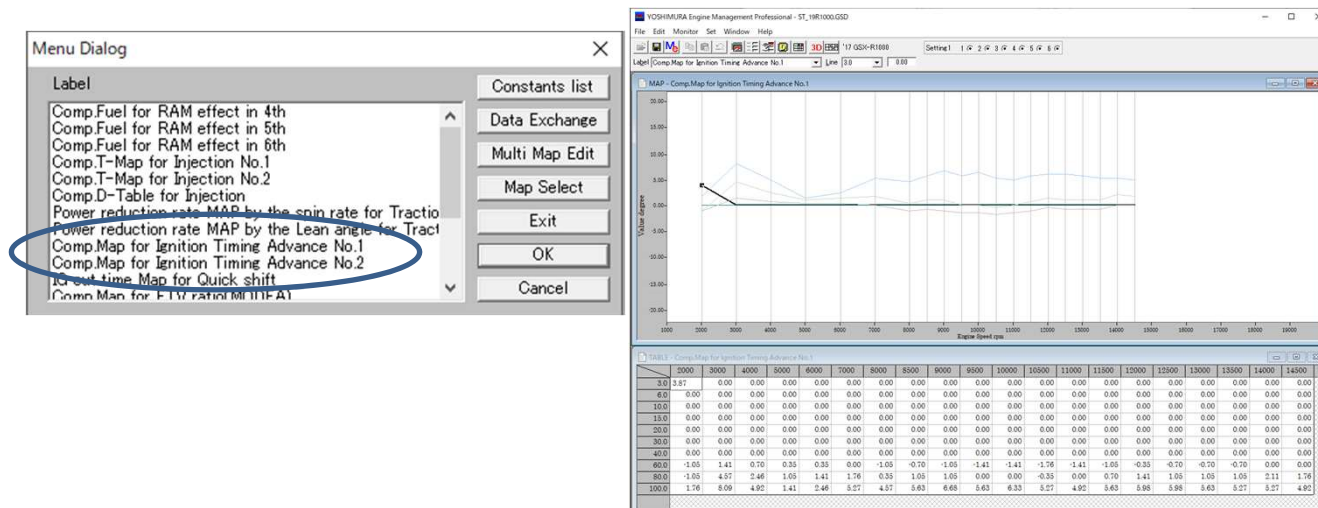
Vertical axis : Throttle opening（TPS）   Horizontal axis : Engine rpm

NOTE : Increasing value makes the ignition timing advanced and decreasing value makes it retard.

Select Map No. 1 or No. 2 in each gear at Selection Map.

DANGER! : **Make sure not to enter wrong value. (the way ignition timing to advance and to retard.)**

It causes engine brake down.

・ **Ignition cut time for Quick shifter**

Ignition cut time on each gear is able to set to reduce the shifting friction loss.
Confirm each race regulation when using.

IG cut time Map for Quick shift

Set the ignition cut time for quick shifter in each gear position and engine rpm.

Vertical axis : Gear position   Horizontal axis : Engine rpm
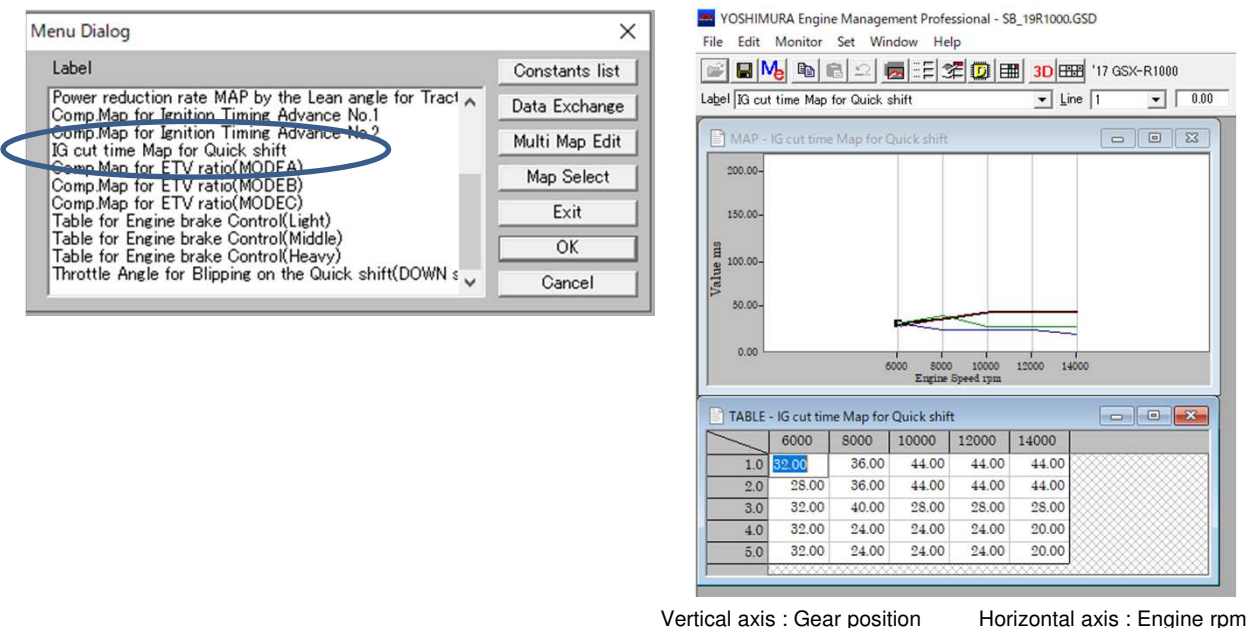
NOTE : Reducing value makes shorten the ignition cut timing and it reduces the time loss due to gear shift, however it makes difficult gear to enter.
On the other hand increasing the value makes ignition cut timing longer and it makes gear entering easier, however it gets more time loss due to gear shift. In addition, it may increase shifting shock and greatly damage the drive system.

It is recommended to make the adjustment in each 4-8ms.

The sensitivity (threshold) of shifter switch with Quick Shift Adjustment in the Edit Constants list can be adjusted for both pull side and push side.

NOTE : Sensitivity (threshold) of shifter switch:
Pull : 5V – VALUE = Threshold / Push : 0V + VALUE = Threshold
Entering VALUE 2 at Pull makes threshold 3V.

The equal level of the 0V (default) at Ver.2.0 is Pull - 3.3V / Push -3.81V (VALUE)

The default is set with original Suzuki sensor and it is required to readjustment when using other sensor.

At the Selection of Quickshift, enter either 0 or 1.
0 is default map which is already set in the ECU and 1 is reprogrammed map.

・ETV ratio adjustment

The adjustment of throttle opening (valve opening of throttle body / TPS) per throttle grip opening by rider (APS) is possible in each S-DMS (Suzuki Drive Mode Selector) mode.
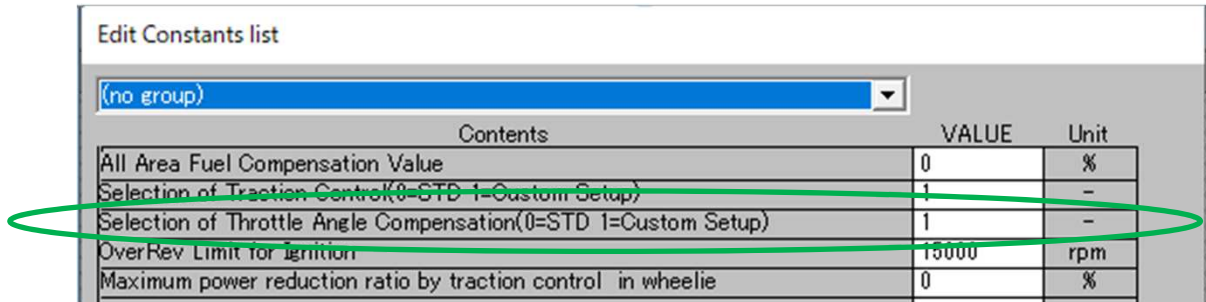
ETV ratio settles basic engine power characteristic per throttle work and it makes change by selecting S-DMS mode.

Mode A is without compensation (full power) in all the gears while Mode B and Mode C reduces engine power output at low gears to control wheeling or sliding.

To make the setup, turn off the traction control, fix ETV ratio and make setup of traction control in order.

Edit Constants list

(no group)		
Contents	VALUE	Unit
All Area Fuel Compensation Value	0	%
Selection of Traction Control(0=STD 1=Custom Setup)	1	–
Selection of Throttle Angle Compensation(0=STD 1=Custom Setup)	1	–
OverRev Limit for Ignition	15000	rpm
Maximum power reduction ratio by traction control in wheelie	0	%

NOTE : **To use this function enter 1 at Selection of Throttle Angle Compensation of Edit Constants list.**

<ETV ratio image in S-DMS mode>

	1st	2nd	3rd	4-6th
Mode A	100%	100%	100%	100%
Mode B	85%	90%	100%	100%
Mode C	80%	80%	90%	100%

* Full power throttle map shows as 100%   Vertical axis : S-DMS mode   Horizontal axis : Gear position

NOTE : Engine torque is adjusted even in the full power throttle map for better controllability.

DANGER! : **Do not make any adjustment at Mode A as it is full power mode at every gears.**

<ETV ratio image with +5% compensation map in S-DMS mode>

	1st	2nd	3rd	4-6th
Mode A	100%	100%	100%	100%
Mode B+5%	90%	95%	100%	100%
Mode C+5%	85%	85%	95%	100%

Vertical axis : S-DMS mode   Horizontal axis : Gear position

* [+5% ETV compensation map ver2.1] is supplied tool in excel file.

NOTE : Engine torque is adjusted even in the full power throttle map for better controllability.

DANGER! : **Do not enter the value directly** and use [+5% ETV compensation map ver2.1] by pasting the map. It is necessary to keep the map within safe area and to avoid unexpected throttle opening.
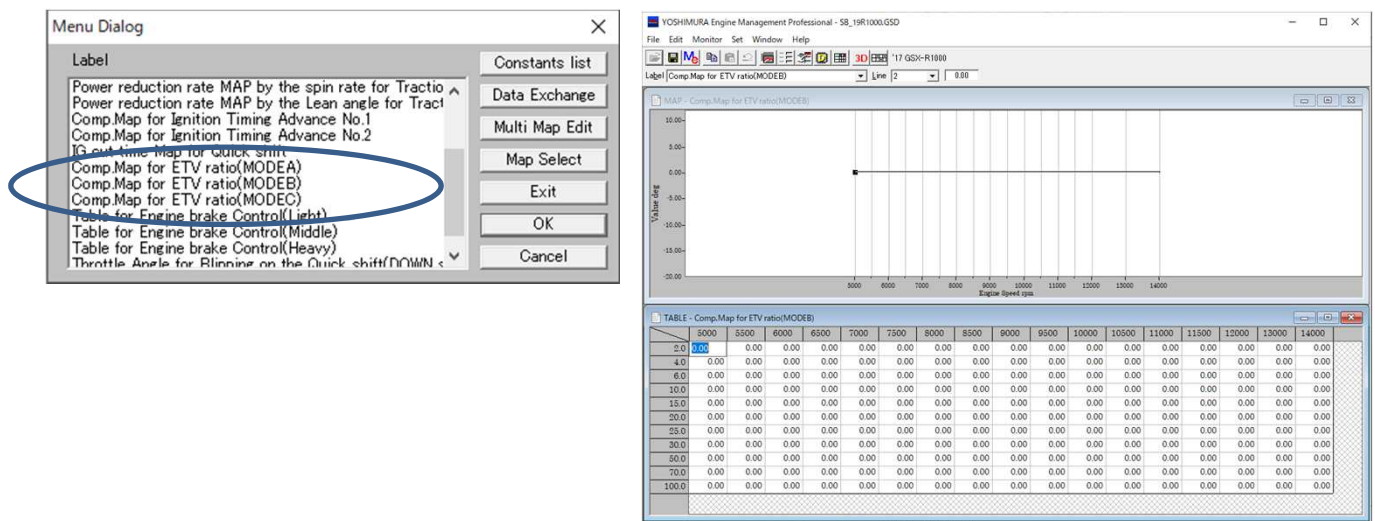
NOTE : Using [+5% ETV compensation map ver2.1] makes possible to use Mode B+5% and Mode C+5%.

Comp. Map for ETV ratio (MODE A, B & C）

Make adjustment of ETV ratio in S-DMS mode.
The adjustment should be done only by pasting data in [+5% ETV compensation map ver2.1].

* [+5% ETV compensation map ver2.1] is supplied tool in excel file.

Vertical axis : Throttle grip opening（APS） Horizontal axis : Engine rpm

> NOTE : **The value is throttle valve angle (deg) of throttle body** and it is **additionally adjusted** on the base throttle
>
> opening map.
>
> The compensation map is **effective at all gears** and adjustment per gear is not possible.

・ Engine brake control

The adjustment of engine brake is possible.

> DANGER! : **Do not exceed the value in each rpm when making the engine brake control adjustment.**

4800	5200	5600	6000	6400	6800	7200	7600	8000	9000	10000	11000	12000	14000	16000
4.01	4.24	4.59	4.94	5.29	5.64	5.98	6.33	6.68	7.61	8.54	9.59	10.98	13.77	14.24

Table for Engine brake Control

This is the map to adjust engine brake when throttle is closed.
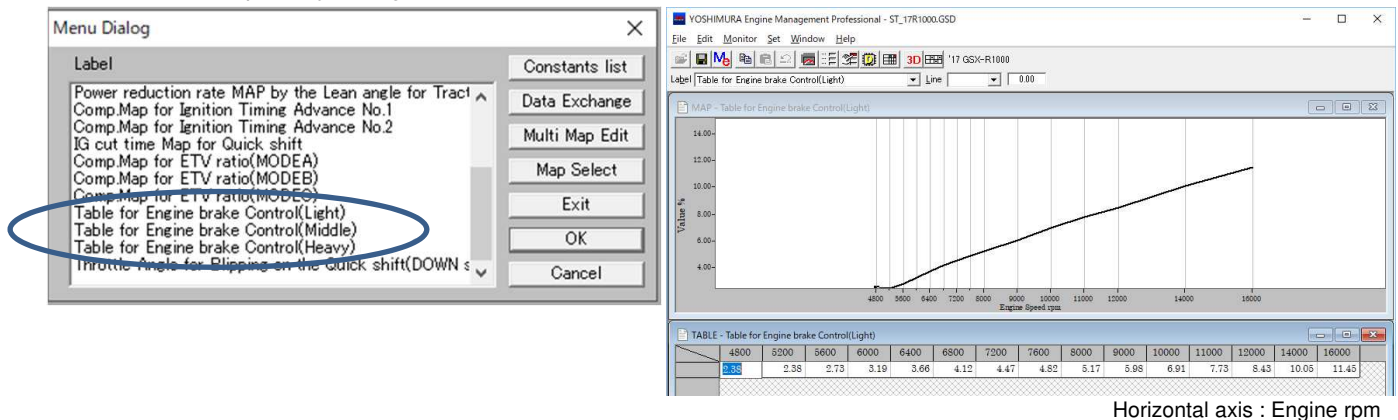
Horizontal axis : Engine rpm

> NOTE : Increasing value makes less engine brake by keep opening the throttle valve.
>
> The engine rpm at horizontal axis is calculated value from front wheel speed.
> **It does not work properly if wrong gear teeth numbers or tire outside diameter are entered.**
>
> The numbers in the table is actual throttle valve opening value.
>
> **Readjustment of blip control may be required after setup the engine brake control due to the change of engine rpm at down shifting.**
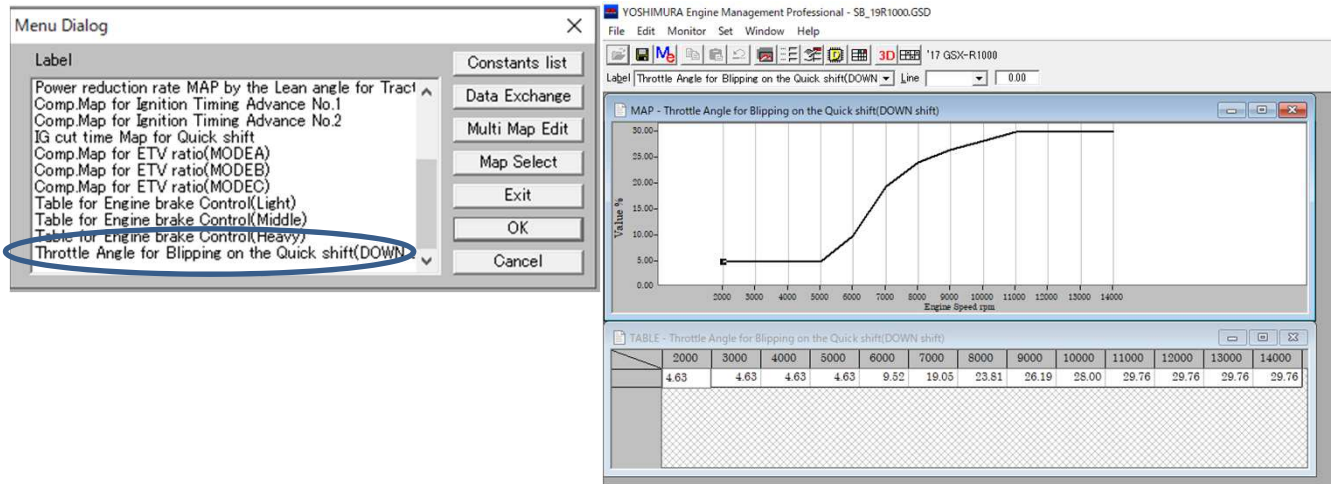>
> Select map Light, Middle or Heavy in each gear at Selection Map.

・ Blipping control

Setup throttle opening of auto-blipping function when shifting down.

Throttle Angle for Blipping on the Quick shift (DOWN shift)
- It is a map to set the auto-blipping rpm range (throttle opening) in each rpm.

Horizontal axis : Engine rpm

NOTE : Increasing value makes more rpm raise when auto-blipping works.
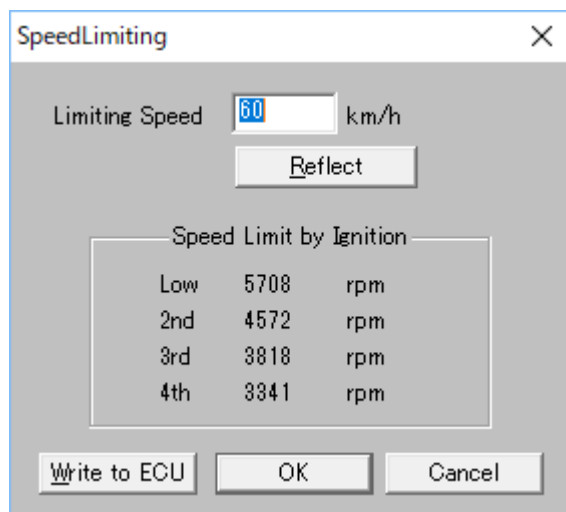
Test and find adequate rpm raising value for smooth shifting down.

Changing engine brake control setup may require readjustment of blipping control setup.

When 0 is put at Selection of Quick shift from Edit Constants list, blipping control will be set to default value.

⋅ Speed limiting

Setup maximum speed to run the pit lane by the maximum rpm on each gear.
Enter gear teeth numbers, tire outside diameter and speed limit, and press Reflect to make the calculation.
Write the data to ECU.

To switch on the speed limiter, turn on the turn signal switch to either right or left.
Push turn signal switch to turn off the pit lane speed limiter.
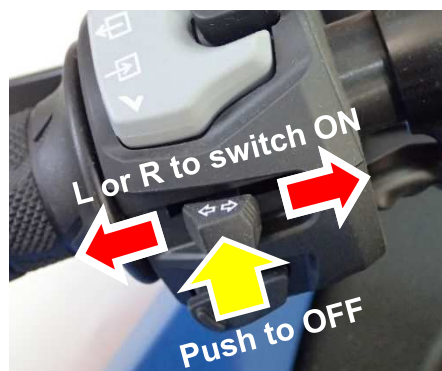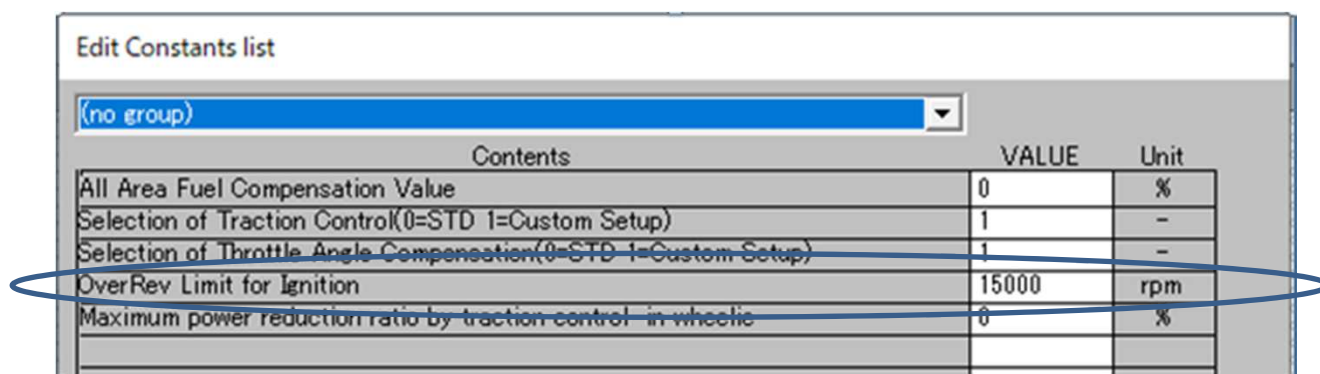
NOTE : Speed limiting is effective from 1st to 4th gears only.

CAUTION! : Tire outside diameter changes due to the tire deformation or other condition.
Make sure to check the speed prior with the speed gun and confirm the setup is correct.

⋅ Over rev limit

Setup of rev limiter is possible with extra rpm when required camshafts are correctly installed.

Required item: Part No. 210-50A-0001 ST-R Camshaft set

DANGER! : To raise the engine rpm, 210-50A-0001 ST-R Camshaft set is required.
If neglected, the engine would be severely damaged.

・ Engine condition monitoring

While engine is running the engine condition can be shown on the computer.

CAUTION! : While using monitoring function, writing data to ECU is not possible.

Select "Monitor" from "Monitor" pull down menu and "Monitor" dialog is shown. The communication between ECU and computer is enabled with "START" (The wiring harness and I/F cable are connected when the ignition switch is in ON), and the value executed is displayed.
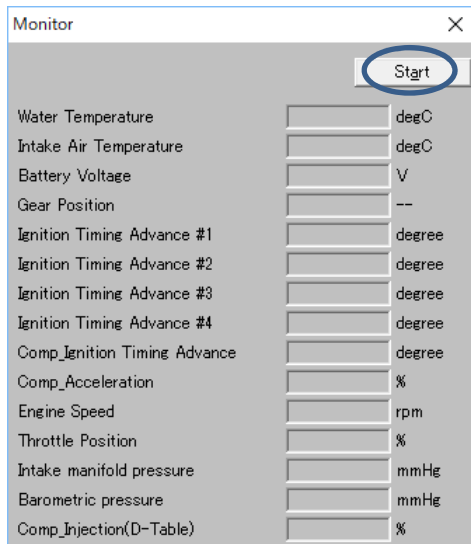
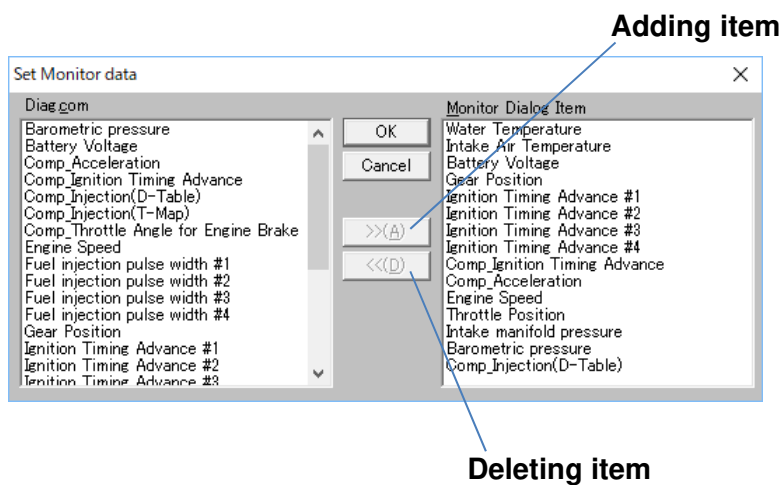| Monitor			
		Start	
Water Temperature			degC
Intake Air Temperature			degC
Battery Voltage			V
Gear Position			--
Ignition Timing Advance #1			degree
Ignition Timing Advance #2			degree
Ignition Timing Advance #3			degree
Ignition Timing Advance #4			degree
Comp_Ignition Timing Advance			degree
Comp_Acceleration			%
Engine Speed			rpm
Throttle Position			%
Intake manifold pressure			mmHg
Barometric pressure			mmHg
Comp_Injection(D-Table)			%

NOTE : This window can be shown all the time. Using [Enter] key, from Monitor dialog to the main window is possible with cursor movement.
Selecting Move (M) from Alt + Space makes Monitor dialog to any desired position on the screen.

Items to be monitored can be selected and changed from the "Set Monitor data" dialog up to 15 items.
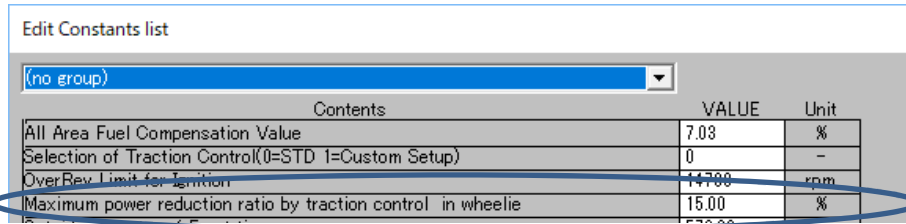**Adding and deleting item is possible on your needs.**

Adding item

Set Monitor data				✕
Diag com		OK	Monitor Dialog Item	
Barometric pressure			Water Temperature	
Battery Voltage		Cancel	Intake Air Temperature	
Comp_Acceleration			Battery Voltage	
Comp_Ignition Timing Advance			Gear Position	
Comp_Injection(D-Table)			Ignition Timing Advance #1	
Comp_Injection(T-Map)			Ignition Timing Advance #2	
Comp_Throttle Angle for Engine Brake		>>(A)	Ignition Timing Advance #3	
Engine Speed			Ignition Timing Advance #4	
Fuel injection pulse width #1		<<(D)	Comp_Ignition Timing Advance	
Fuel injection pulse width #2			Comp_Acceleration	
Fuel injection pulse width #3			Engine Speed	
Fuel injection pulse width #4			Throttle Position	
Gear Position			Intake manifold pressure	
Ignition Timing Advance #1			Barometric pressure	
Ignition Timing Advance #2			Comp_Injection(D-Table)	
Ignition Timing Advance #3				

Deleting item

・Anti wheelie control

Detecting a wheelie and suppress the engine power output to prevent from wheeling when acceleration.

Maximum power reduction ratio by traction control in wheelie

- Set maximum reduction of the engine power output when detecting a wheelie.

NOTE : Increasing value makes reduction of engine power output to increase.
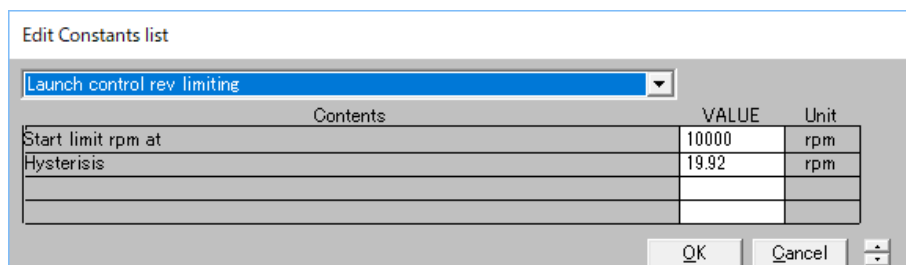
・Launch control

By setting engine rev limit, it prevents from rapidly acceleration and assists smooth start at the start of the race.

Start limit rpm at

- Set maximum rpm of engine when starting.

Hysteresis

- Set drop amount of rpm when limiter is effective.

NOTE : Increasing value of hysteresis makes reduction of engine rpm to increase when limiter is effective.

The power characteristic is applied with selected S-DMS mode.

To make launch control to be ON, press and hold the starter switch button while engine is on and the vehicle is stopped.

When it is effective [L] is shown on the dashboard.

The starter will idle but there is no problem. After starting decelerate or shift up to 4th gear, launch control will be OFF.

・Selection Map

To set the map for fuel adjustment (T-Map for Injection No.1 or No.2), ignition timing adjustment (Map for Ignition Timing Advance No.1 or No.2), engine brake control (Map for Engine Brake Control Light or Middle or Heavy) in each gear.
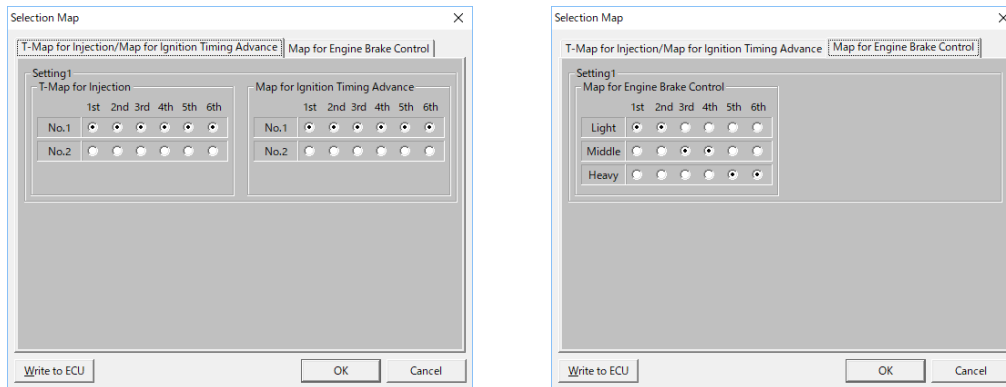
NOTE : Communication with ECU is enable using I/F cable. **When the ignition switch is ON, this function is effective** whether the engine is running or not. **When writing data to ECU, it is conditional to stop the engine.** The transfer is possible even though the ECU file and the file being edited are not the same. When the files are not the same, it is recommended to write the data in a file.
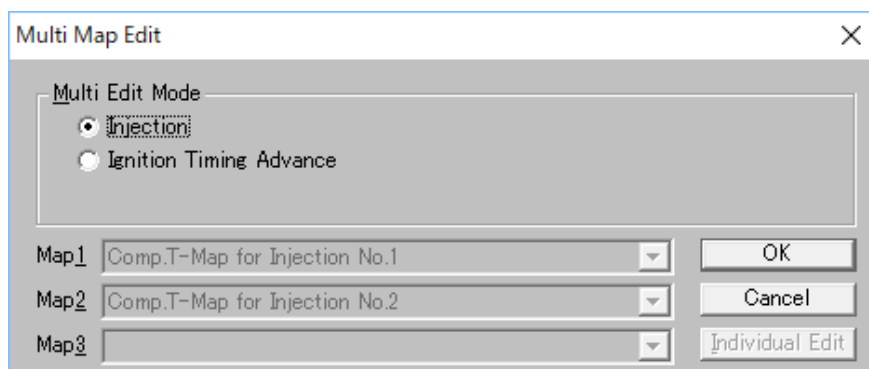
・All Area Fuel Compensation value

For all Injection Maps, the fuel supply is increased or decreased uniformly. (Increasing or decreasing is performed in percent in all grid lines.)
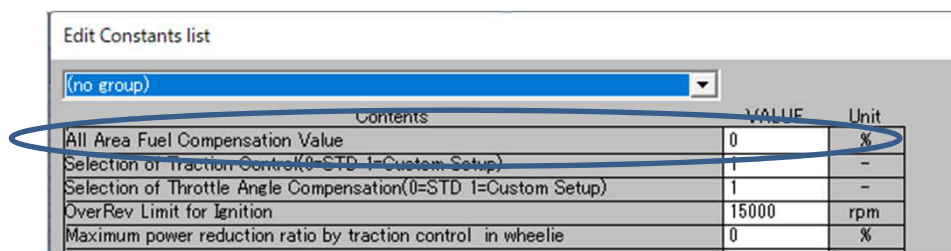
NOTE : Increasing value to make increase the fuel supply.

・Multi Map Edit

To edit No.1 and No.2 map of "Comp. T-Map for Injection" and "Comp. Map for Ignition Timing Advance" at the same time.

CAUTION! : Simultaneous edit is not possible between different files.

With the Multi Map Edit function, Map 2 data is overwritten with Map 1 data.
To save the Map 2 data, make a copy file and edit it.

NOTE : Map3 is not used.

□ Communication with ECU

● Setting of communication port

・Connecting I/F cable to computer and open "Device Manager".

・Confirm COM number at the end of CP210x USB to UART Bridge.

・Click "Communication" from "Set" pulldown menu and select COM number.
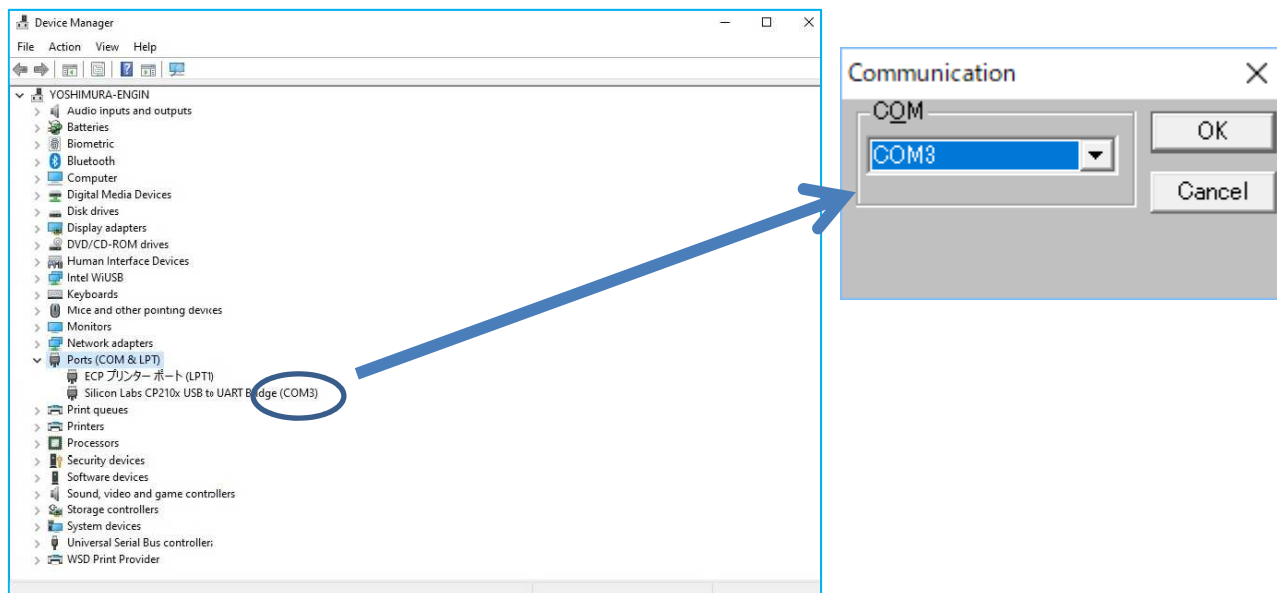
● Write to and read from ECU

・Data transfer of edit value to ECU

The data of selected cell during map editing or data updated at Constants list can be written into the ECU **temporary**.
This is possible either for one or multiple selected cells. No cell value is transferred if it is not selected. Neither other map nor setting data will be transferred.

Key Allocation	
⇧ Shift + Enter ↵	**Write data of selected cell into the ECU**

NOTE : Communication with ECU is enable using I/F cable. **When the ignition switch is ON, this function is effective** whether the engine is running or not. **When writing data to ECU, it is conditional to stop the engine.** The transfer is possible even though the ECU file and the file being edited are not the same. When the files are not the same, it is recommended to write the data in a file.

CAUTION! : **If the ignition switch is turned OFF, the changed value will become invalid.** (ECU data reverts to what it was before change.) **To save the data in the ECU, write the file into the ECU by Data Exchange.**

∙ Data Exchange

"Data Exchange" is a window to exchange all file data collectively for three files; file in the ECU (ECU data), file being edited on the screen (Edit data) and the file saved in the computer (File data).The data writing into the ECU is executed in this window. This can be confirmed if the data in two files are identical.

**Basic way to write data to ECU**
  1. Select Edit Data or File Data with Read button and read map on the Data Exchange.
  2. Confirm the data is transmissible between ECU and computer, write data to ECU with
     Write button.

Basic way to write data to computer
  1. Confirm the data is transmissible between ECU and computer, select ECU with Read
     button and read map from ECU on the Data Exchange.
  2. Write data to Edit with Write button.

NOTE : When reading from or writing to ECU, the communication is enabled using I/F cable.
       The engine should be stop but the ignition switch must be ON.

Selecting "Data Exchange" button of "Menu" dialog or "Data Exchange" of "Set" pull down menu, "Data Exchange" dialog is shown as below.
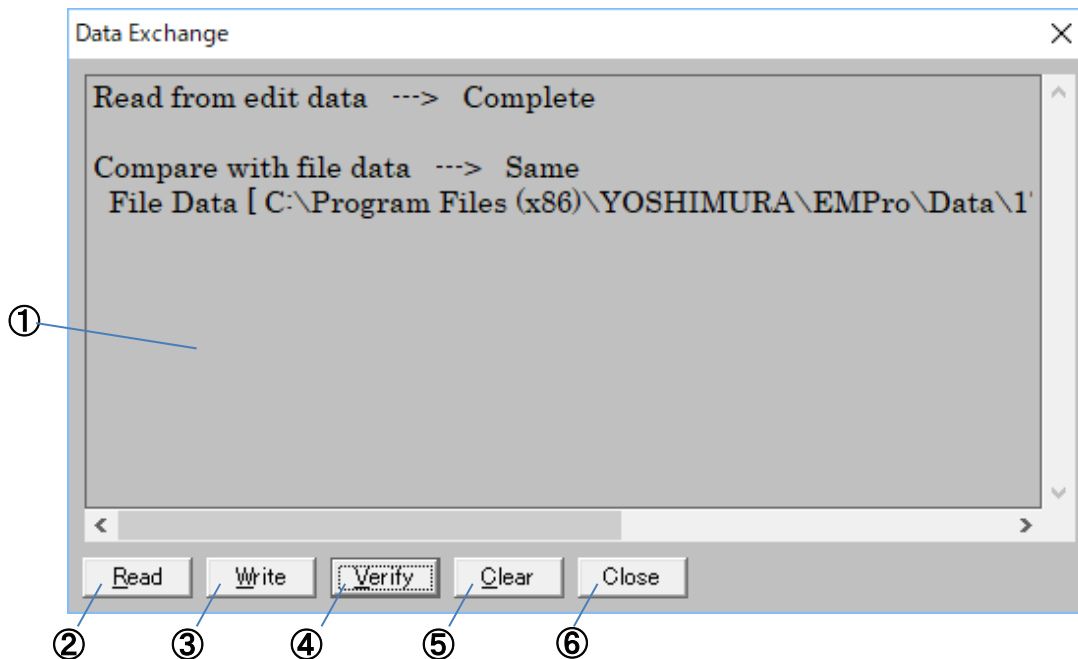

① Status display section

   The results of executing Read button, Write button and Verify button are displayed in the order.

② Read

   Open data Read dialog. In Data Exchange area, any of ECU Data, Edit Data and File Data is read. The word "Complete" is shown in the status display area if the data reading is successfully completed. If failed, "Fail" is shown. After Read is done, the status display area indicates a new history.
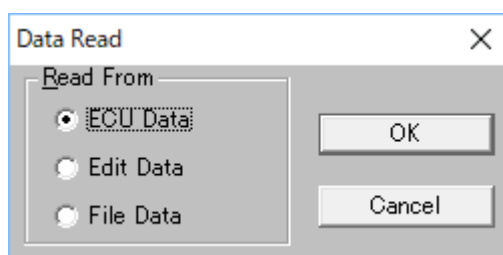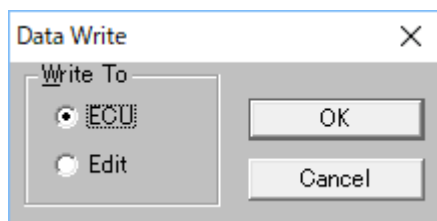

ECU Data : To read the data from ECU

Edit Data : To read the data being edited

File Data : To read saved file from computer

       (GSD file from different model can not be read.)

③ Write

Open Data Write dialog. Until data is read, the button is grayed out. The data read in Data Exchange area is written either into ECU or Edit. The word "Complete" is shown in the status display area when data reading is successfully completed. If failed, "Fail" is shown.

> CAUTION! : While using monitoring function, writing data to ECU is not possible.

ECU : To write data to ECU

Edit : To write da to editing area

④ Verify

Open Data Verify dialog. The button is grayed out until data is read. The data read in Data Exchange area is compared between ECU Data, Edit Data and File Data. When the data matches, "Same" is shown in the status display area and "Not same" is shown when it does not match in the status display area.
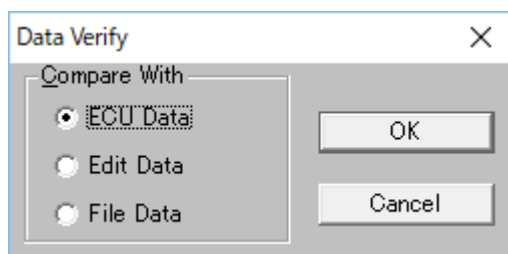
ECU Data : To make comparison with ECU data

Edit Data : To make comparison with data being edited

File Data : To make comparison with data in computer

(GSD file from different model can not be read.)

⑤ Clear

Clear the data in Data Exchange area. The status is also clear the display area.

⑥ Close

Close dialog. When closing the Data Exchange dialog, the data in the Data Exchange area is cleared.

□File

● Save data

It is recommended to save edit data in a new file every time.
Click "Save" of "File" pull down menu and save the file with a new name.

● File management

Using "Title Editor" dialog, information of each file can be stored with memo. When select "Title" from "Set" pull down menu, "Title Editor" dialog is shown. The title can be increased without limit.

Title Editor	✕
Title	
Model	19 GSX-R1000
Program	Ver.2.1.0
Data	SB
Place	–
Date	25.04.2019

| Edit | Delete | Add | OK | Cancel |

Edit : To edit title and data

Delete : To delete title

Add : To add title

● File setting

It is possible to set opening folder as default.
When select "Directory" from "Set" pull down menu, "Directory" dialog is shown and the setting is written in "EMPro.ini".
Even if opening file from different folder, the folder specified is open by default with the File Save execution,

These race parts have been developed in accordance with FIM regulation.

Follow each race regulation to use these race parts.

Racing Kit Prats are intended for closed-course riding or competition only and are not intended to be used on public roads.

Racing Kit Prats might alter the vehicle's emission or noise related components, which could violate laws and can result in fines and penalties if used on public roads.

Racing Kit Parts are not covered by warranty. Installation of Racing Kit Parts may void the original manufacturer's vehicle warranty.

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