EcoCAL Manual

V2.3

Date	Version	Note
	V1.0	
	V1.1	
Mar. 10, 2016	V1.2	
Mar. 17, 2017	V1.3	
May. 25, 2017	V1.4	
Jun. 30, 2017	V1.5	
Sep. 18, 2017	V1.6	
Mar.13, 2018	V1.7	
	V2.0	
Jul. 24, 2019	V2.1	
Nov. 04, 2019	V2.2	Section 3.5 update
May 11, 2020	V2.3	Contact info update

Contents

Introduction

EcoCAL is the calibration software of EV/Hybrid system from Ecotrons, which can be used to connect and control the battery/motor states, modify the maps of the driver torque, verify the threshold of the acceleration/brake pedals, control the auxiliaries etc.

Ecotrons HCU/VCU is fully programmable, so if you want to change the setting of VCU/HCU, you need to connect HCU/VCU to laptop via EcoCAL.

Chapter 1 Basic Operation of EcoCAL

1.1 Installation of EcoCAL

1.1.1 Download EcoCAL Software

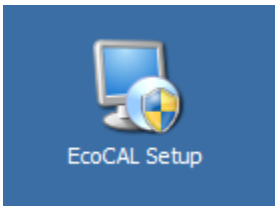
Download EcoCAL calibration software from Ecotrons website:

http://www.ecotrons.com/support/

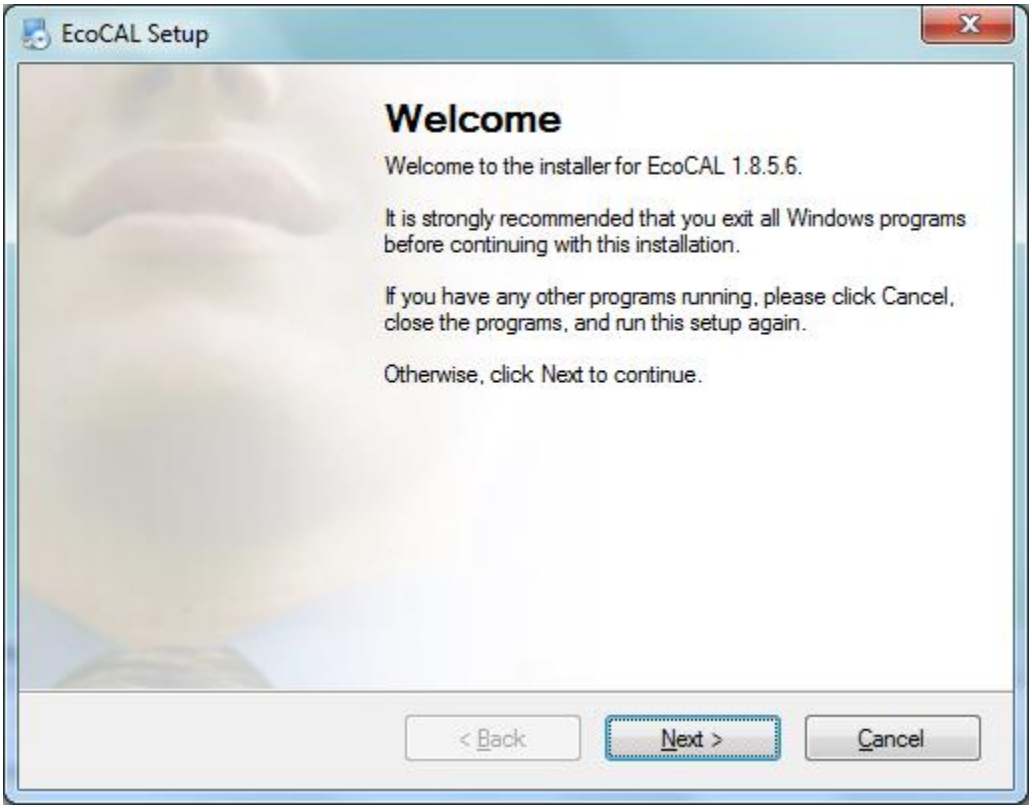
Click the ‘EcoCAL for EV’, and then download the software ‘EcoCAL-Setup.exe’

1.1.2 Install EcoCAL

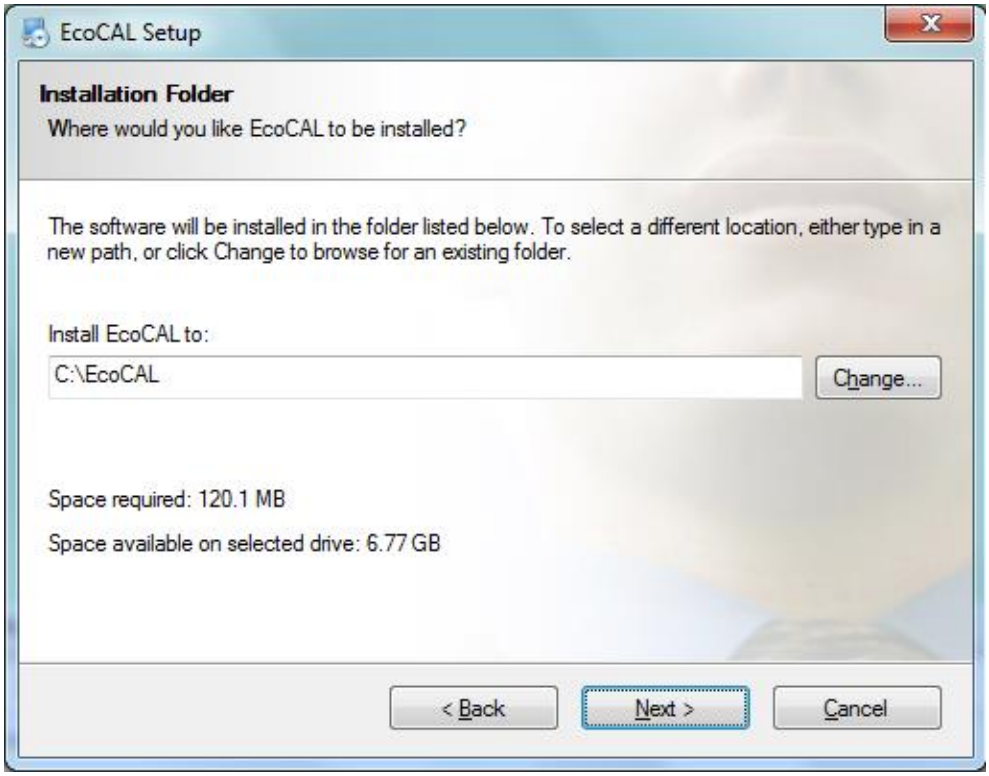
1) Double-click the icon '**EcoCAL setup'** to install EcoCAL



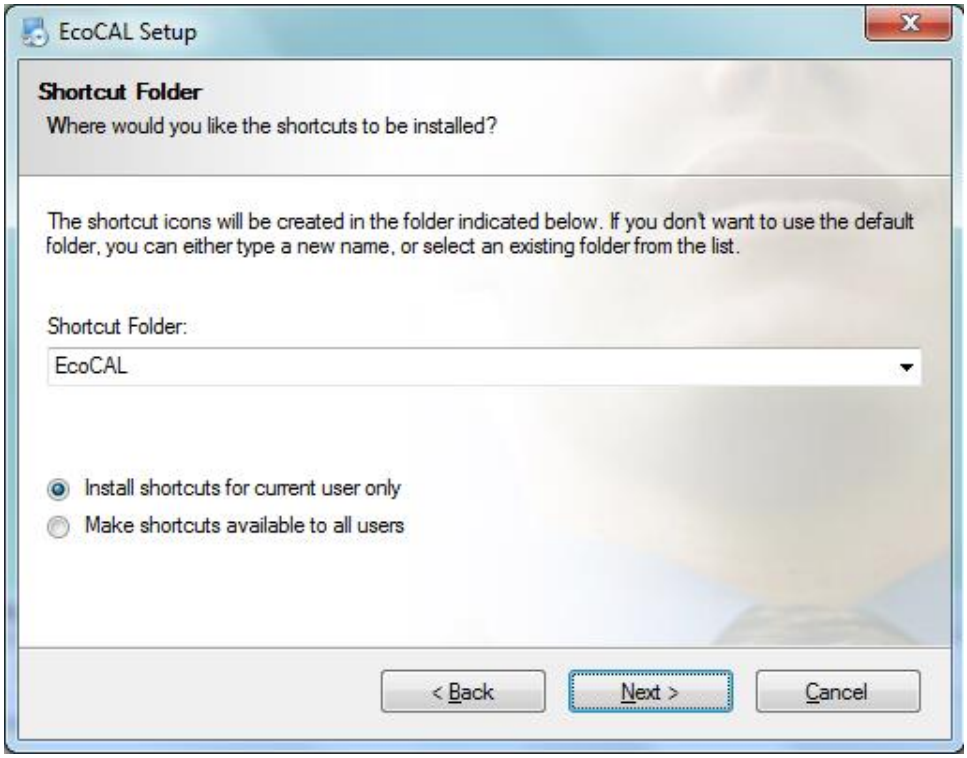
2) Click 'Next'



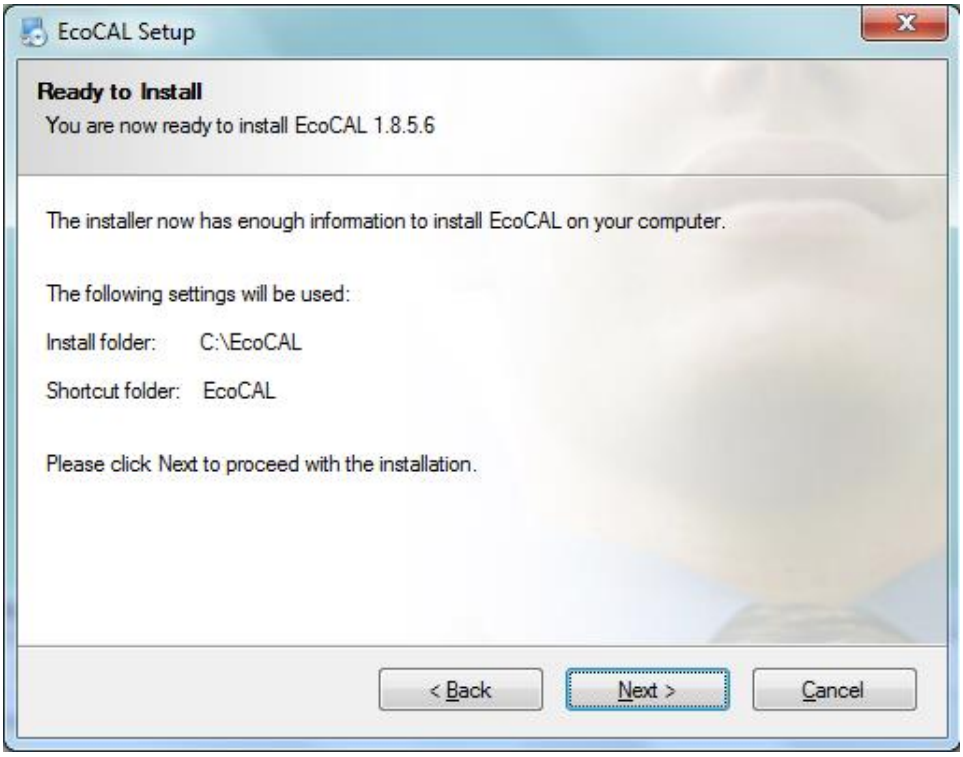
2) Click ‘Next’ and choose the path to install EcoCAL



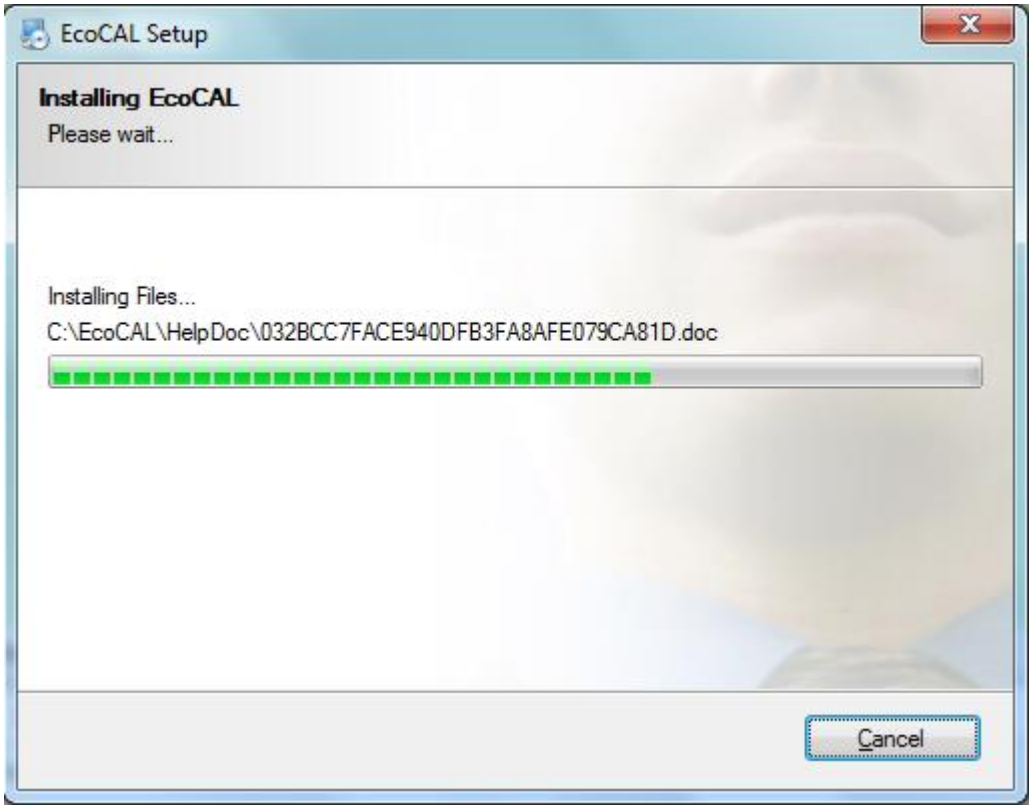
3) Click ‘Next’



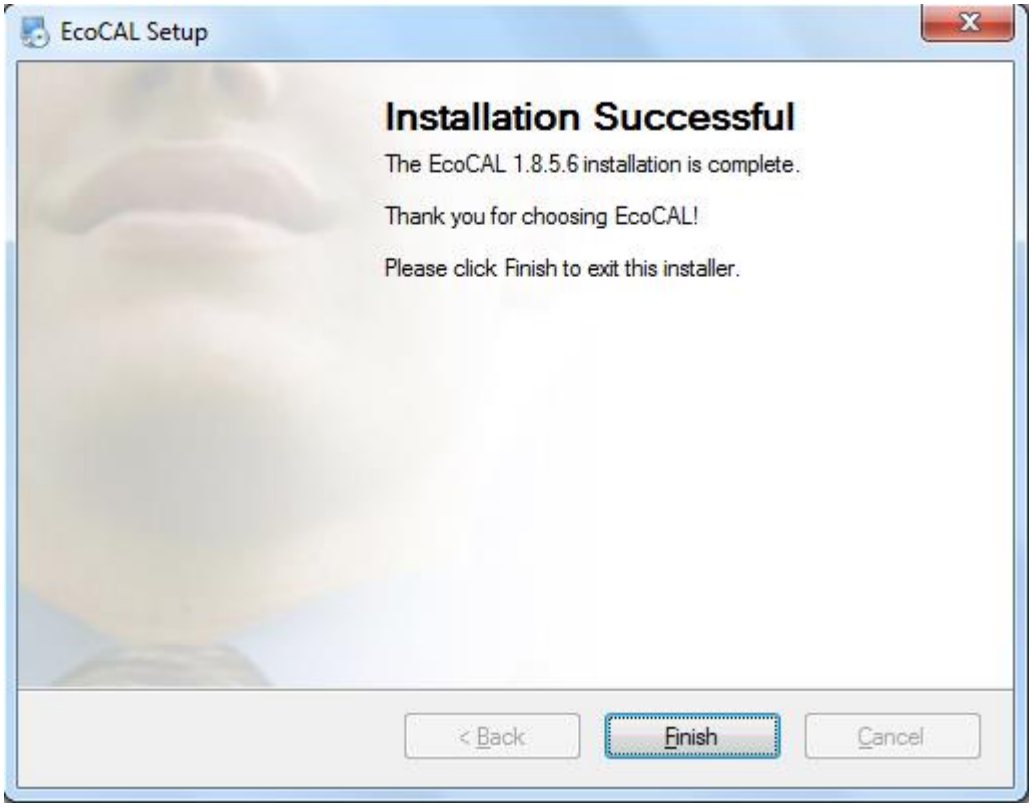
4) Click ‘Next’



5) Click ‘Next’ and wait



6) Click ‘Finish’



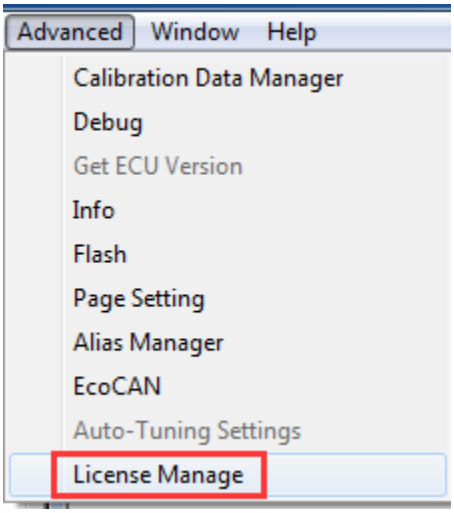
The installation of EcoCAL is complete.

1.2 Activate EcoCAL

1.2.1 Activate EcoCAL by Online License

1.2.1.1 Get the Key File

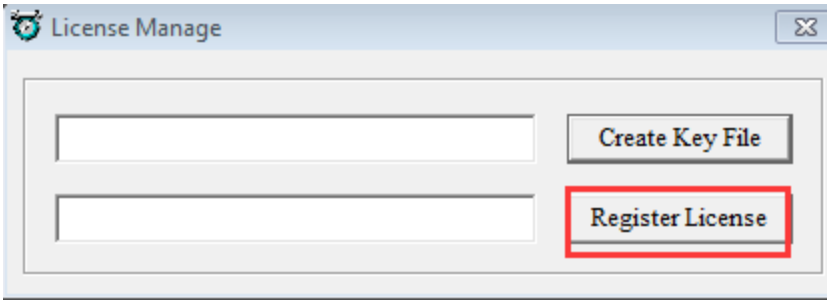
In EcoCAL: **Go to menu-> Advanced-> License Manage-> Create Key File**



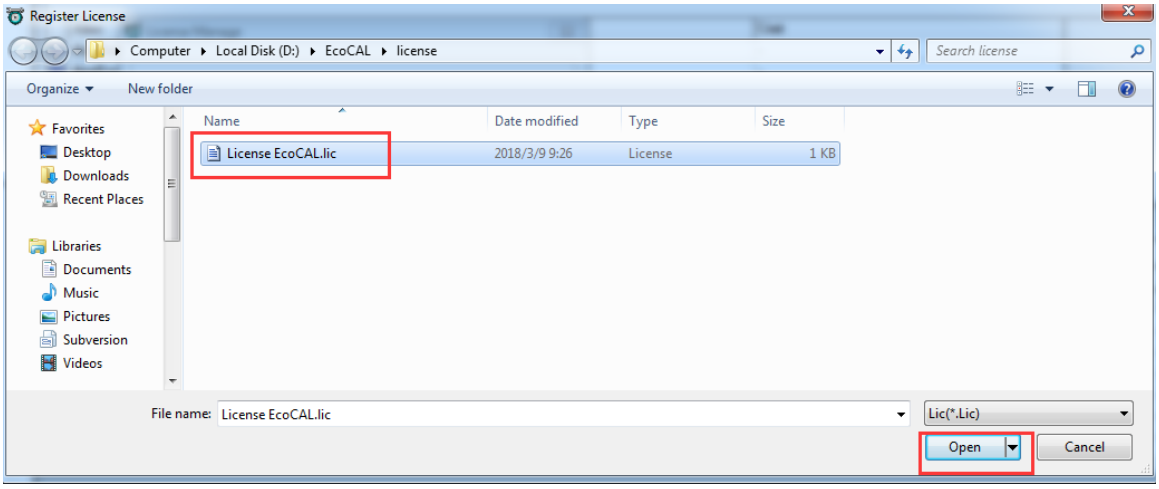
Please send the key file to ECOTRONS at *'ev-support@ecotrons.com'. (EV customers only, EcoCAL for EFI/UAV is fully free)*

1.2.1.2 Activate EcoCAL

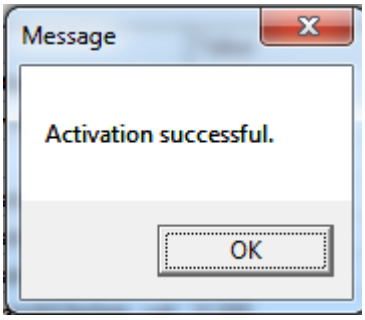
In EcoCAL: Go to menu-> Advanced-> License Manage-> Register License



Select lic file received from Ecotrons.



The activation is successful if 'Message' window is displayed as following picture.



1.2.2 Activate EcoCAL by Dongle

Plug the dongle into your pc, the software will be activated automatically.

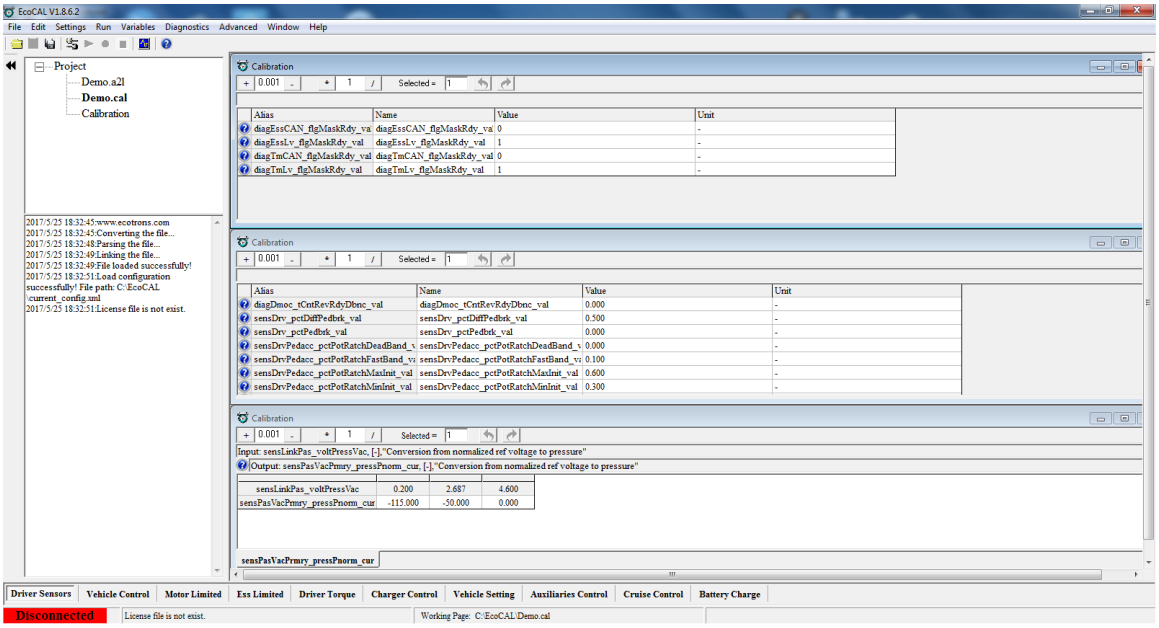
Note: Virtual machine is not supported, please make sure the USB port works properly first.

1.3 Start EcoCAL

1.3.1 Start EcoCAL Software

1) Double-click the icon '**EcoCAL'** on the desktop to start the EcoCAL software.

2) When EcoCAL is open for the first time after installation, it will load the Demo files automatically with the default page setting.



Note: If EcoCAL does not automatically load the default configuration, likely you do not have the necessary A2L file and CAL file in the installation folder of 'C:\EcoCAL'.

1.3.2 Load the Calibration Files

1) File types and definitions

MOT/HEX file: Executable file for VCU.

A2L file: this is a VCU/HCU description file that contains variant VCU/HCU info for EcoCAL to know where to get what, etc.

CAL file: this is a calibration data file that contains parameters users can tune.

Note: Ecotrons A2L file follows the ASAP2 standards (defined by the automotive standard association ASAM).

In EcoCoder 'Fixed CCP Slave Definition block', there are 2 options for CCP type, if users chose 'Configurable', then EcoCoder will only export MOT/HEX file and A2L file for EcoCAL (highly recommended)

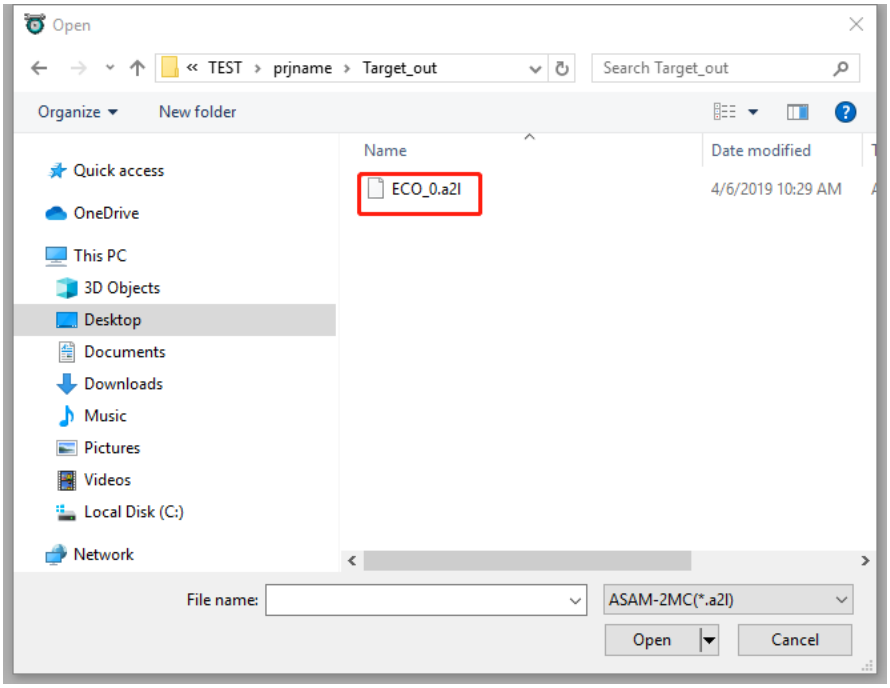
For some hardware which does not support this feature or users specially want to export CAL file, please chose 'Simple', then EcoCoder will export MOT file, A2L file and CAL file for EcoCAL.

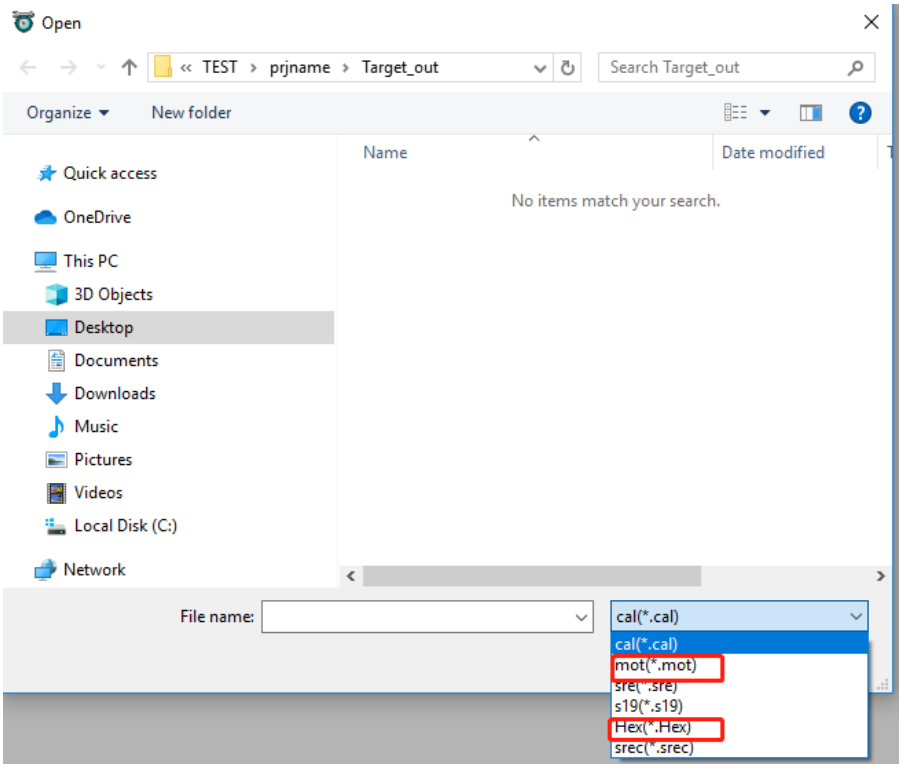
Note: MOT/HEX file could be provided by code generation of Simulink or by Ecotrons. The former one is common application software developed by customer, while the latter one is firmware update file provided by Ecotrons at some cost per request of customized function or feature from customer.

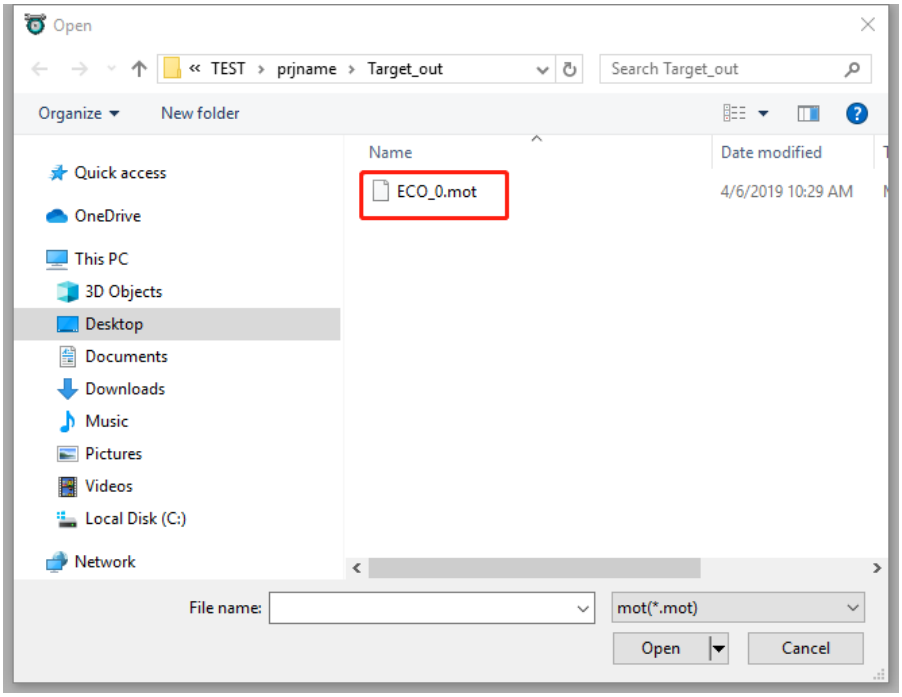
It is enough to have A2Lfile and MOT/HEX/CAL file to run EcoCAL and do the calibration work.

2) Load the correct A2l and MOT/HEX/CAL files

In EcoCAL, go to menu->File->Open, then choose the correct A2L and CAL file.







Note: You can also click file icon at quick command bar.

Chapter 2 Connect EcoCAL to VCU/HCU and Quick Measurement Trial

In this chapter, basic setup of both hardware and software is disclosed. Please follow tutorial of this chapter step by step by avoiding possible trap and get faster in debugging when get into trouble with EcoCAL.

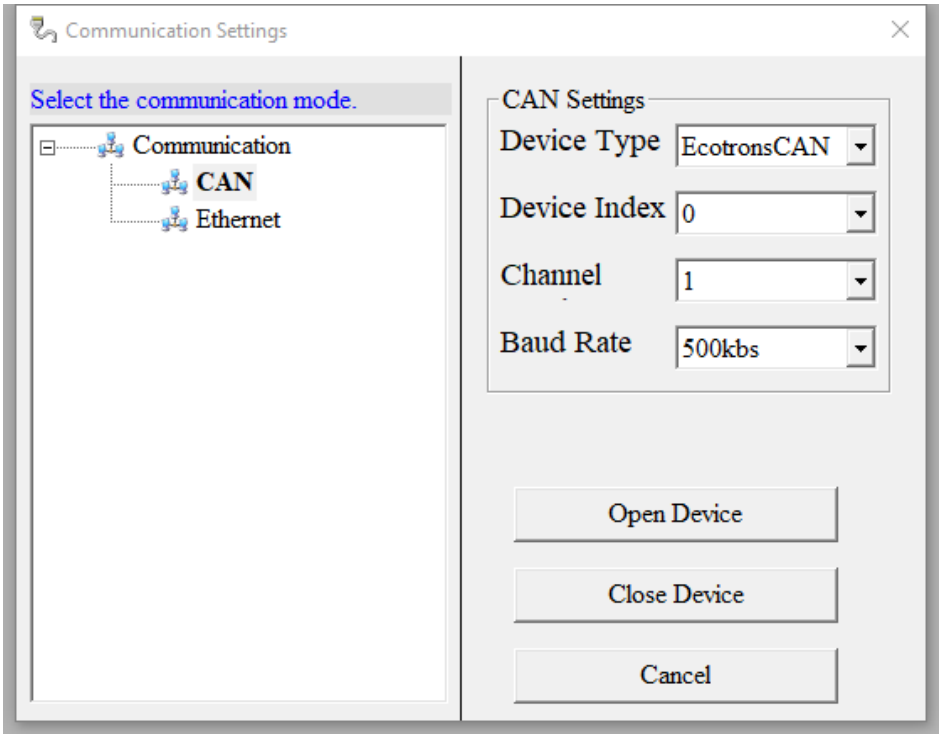
2.1 Connect VCU/HCU to Laptop

Note: Please make sure that VCU/HCU is powered on, which indicates vehicle is powered on. In addition, please connect USB CAN device to PC and make sure it is powered on correctly. Common device would have a power indicator lighting continuously.

2.1.1 Communication Setup

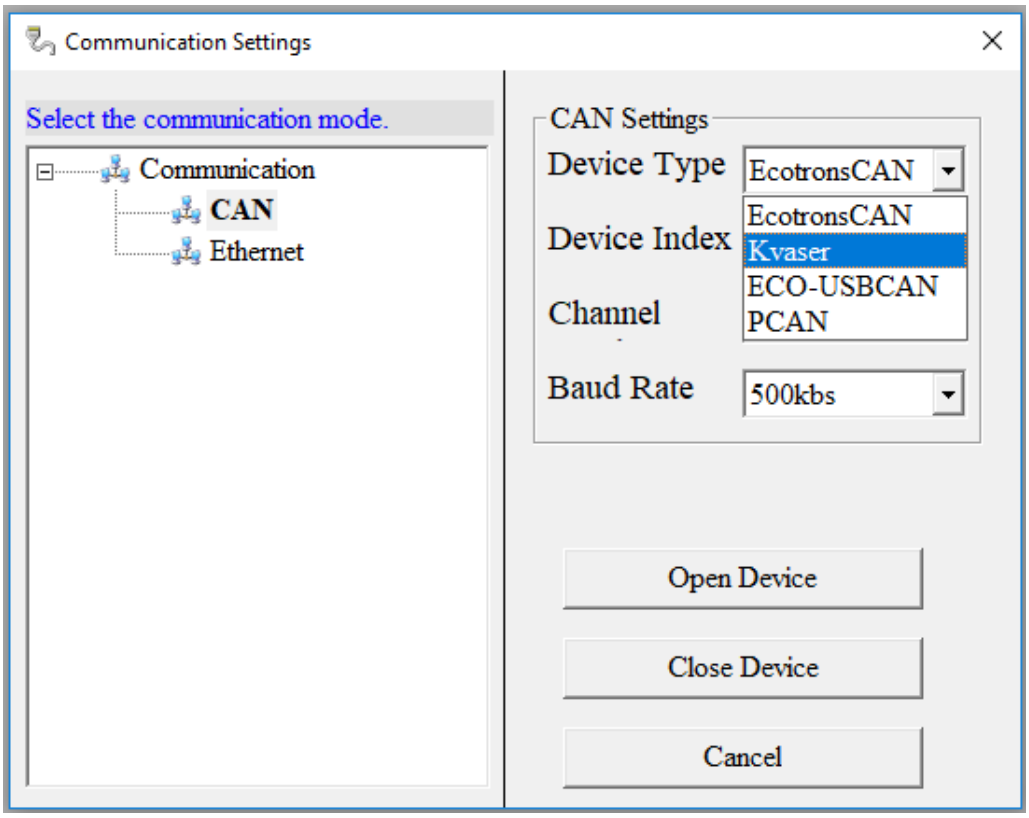
Please select the communication mode first

1) Go to menu->Settings->Communication Settings:



2) CAN communication mode

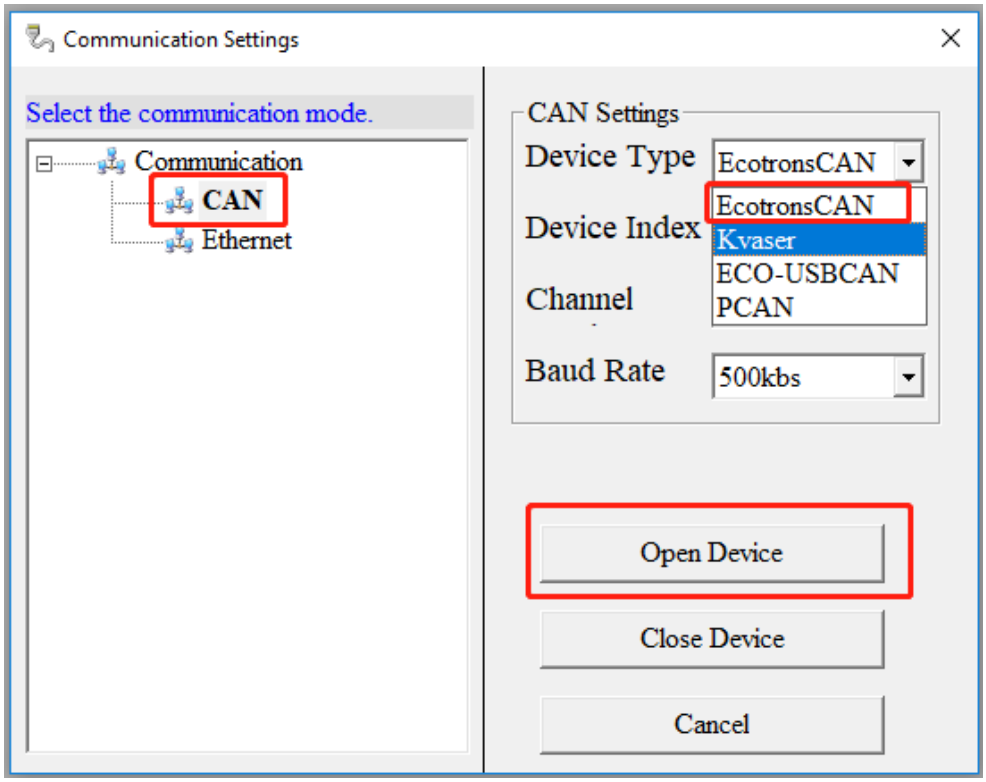
Ecotrons VCU/HCU supports the calibration/measurement through CCP.



Please select the USB CAN device you use. Kvaser, PeakCAN, EcotronsCAN, ECO-USB CAN are supported by EcoCAL. If you get the CAN device from Ecotrons, please choose the 'EcotronsCAN'.

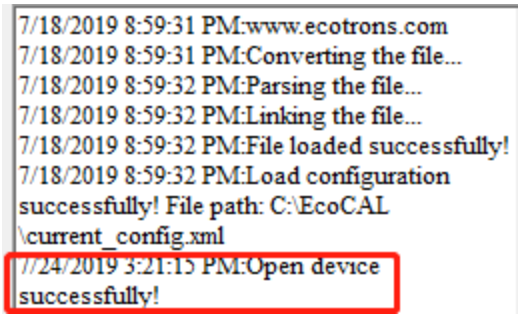
Please choose the CAN device Type and Baud Rate after finish setting. Then click '**Open Device**' to open the CAN device.

If you don't want to use the CAN device, please click '**Close Device**' to close the CAN device. Then the USB port connected to adaptor would be released from communication with EcoCAL.



3) 'Open device successfully' Message

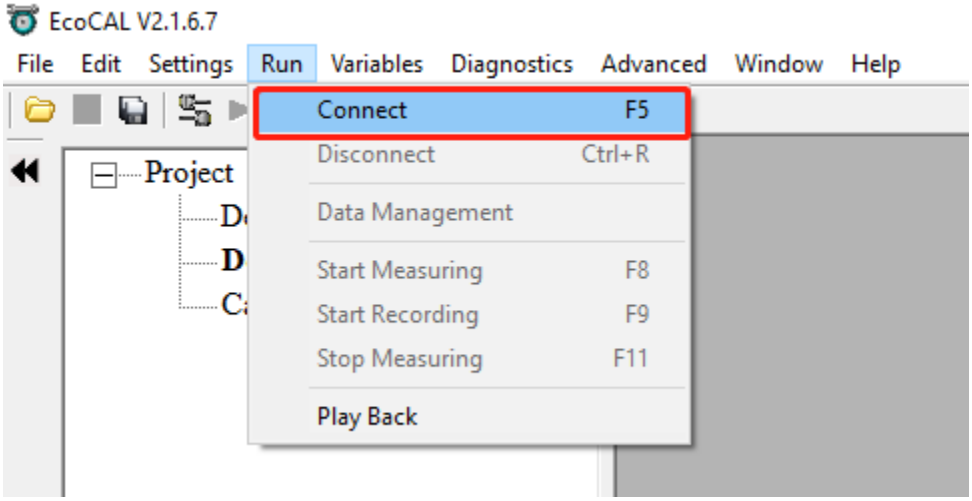
If message 'Open device successfully!' pops up after clicking 'Open Device', you are good to proceed to next step. If it fails, please check whether USB CAN device is powered on correctly.



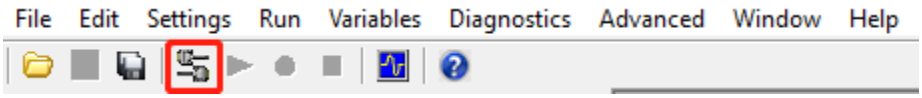
2.1.2 Connect USB CAN Device to VCU

1) Connect USB CAN device to VCU/HCU firstly.

2) Go to menu->Run->Connect

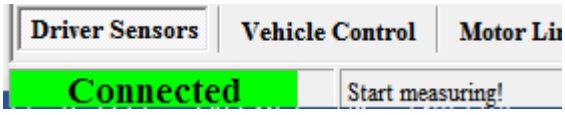


Note: You can also use the shortcut button ( ) by clicking the 'Connect' button under run menu to build up communication between PC and VCU/HCU.



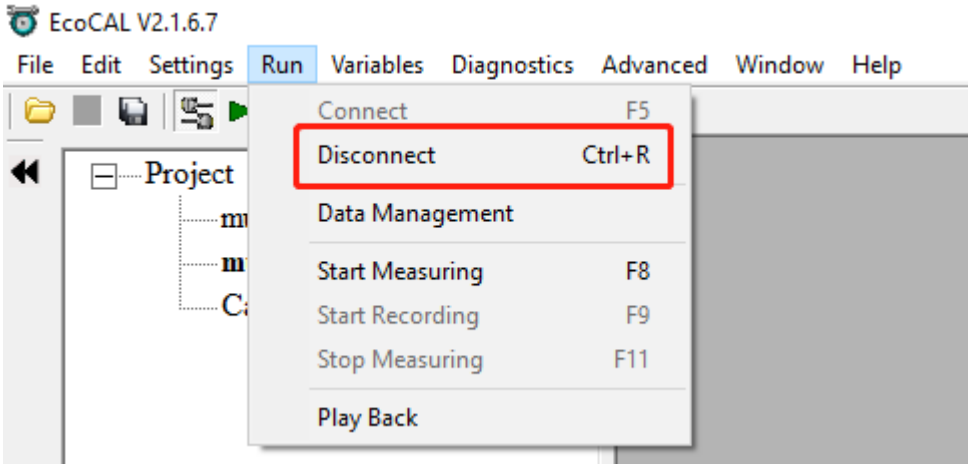
3) 'Connect successfully' Message

When communication between PC and VCU/HCU is built successfully, the left lower corner of window will show 'Connected' in green.



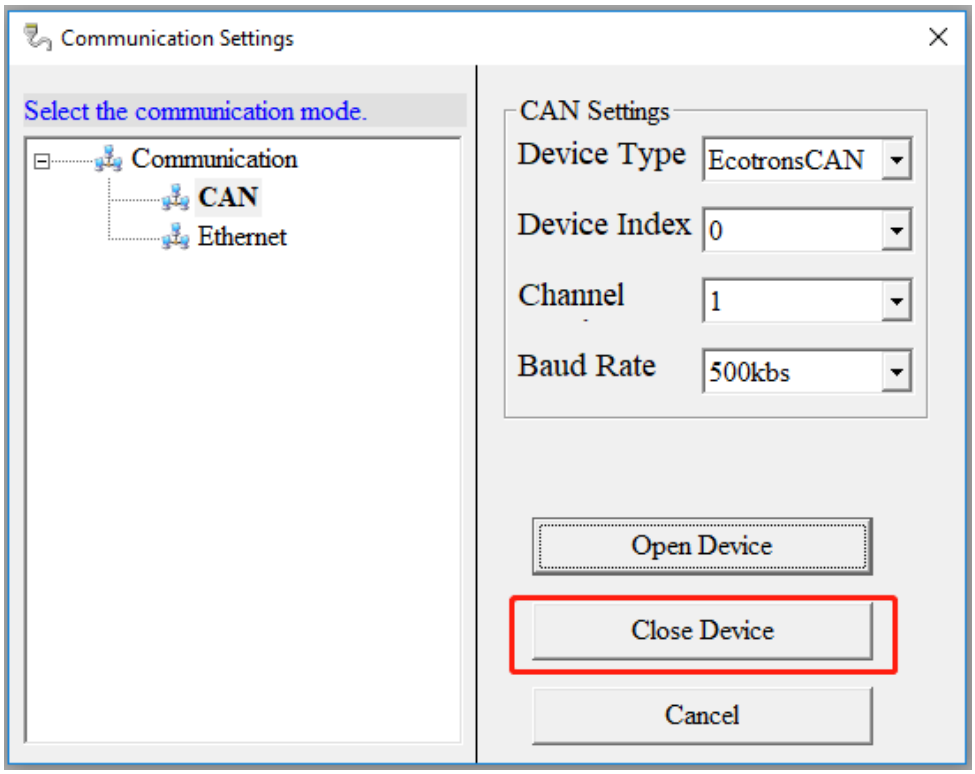
2.1.3 Disconnect EcoCAL from VCU/HCU

1) **Go to menu->Run->Disconnect**



Note: You can also click the shortcut button () to disconnect your PC from VCU/HCU.

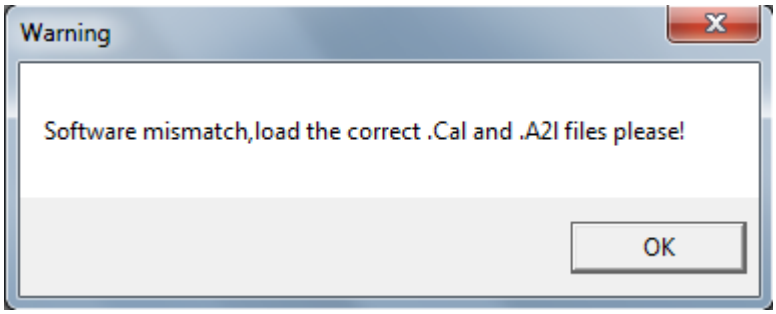
2) Go to menu->Settings->Communication Settings:



Click 'Close Device' to stop communication and set free the USB port for other use. **Now, you are free of any hardware concern!** Please redo steps of 2.1.1 and 2.1.2 for data recording preparation.

2.1.4 Common Error Message Diagnose

In this section, a basic error message is analyzed for diagnose. These messages are likely to pop up right after connection is built.



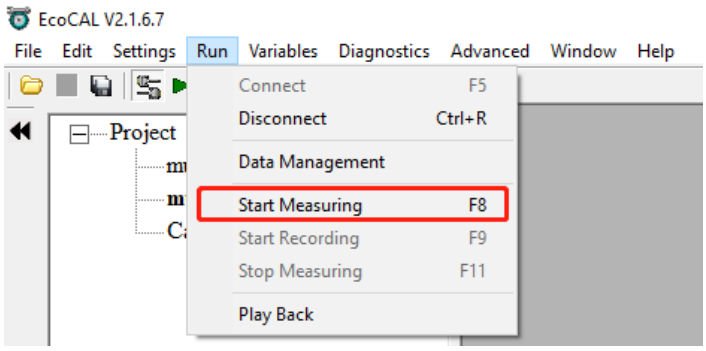
Please load the correct mot/cal files from the 'Target_out' folder (which will pop up automatically after successful compilation) under your project path.

2.1.5 Start Measuring

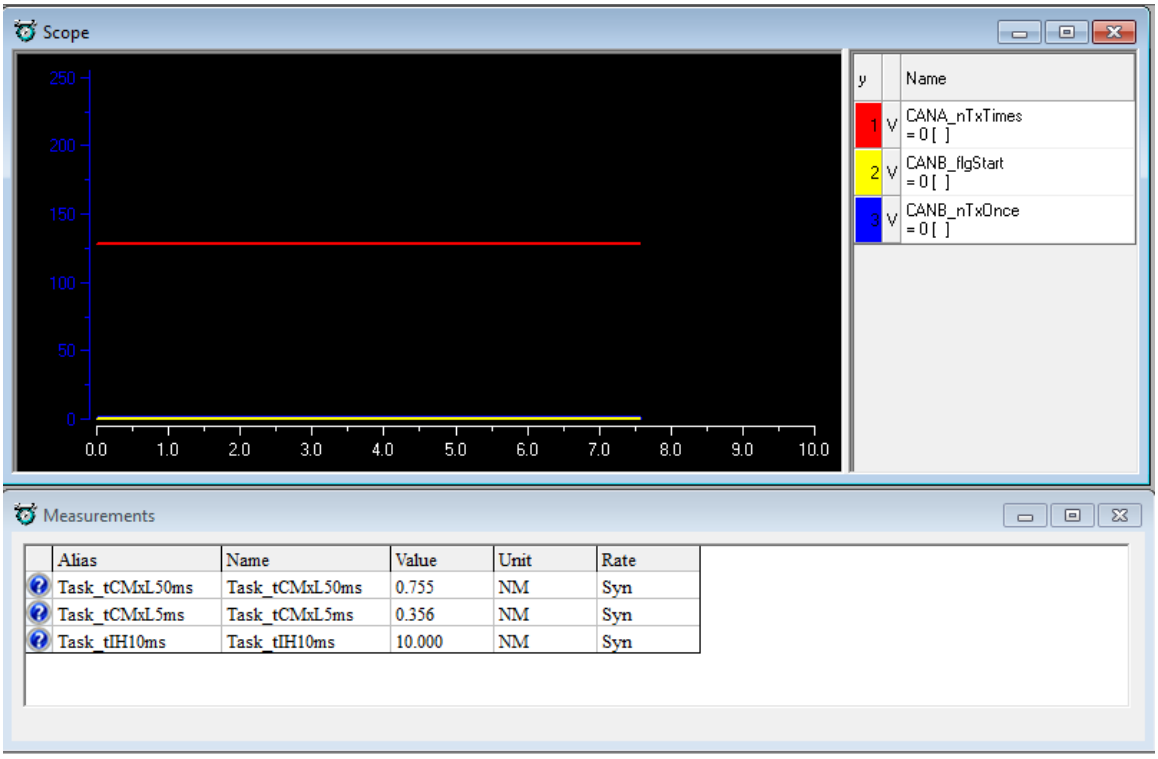
If previous sections of this chapter are well followed, EcoCAL will be friendly with you in the process of calibration/measurement.

Before doing first measurement with EcoCAL, please refer to section 3.2 and section 5.3.5 to add at least one measurement window or one oscilloscope window as shown in lower second picture.

1) **Go to menu->Run->Start Measuring**



Then you can see the values of measured variables.

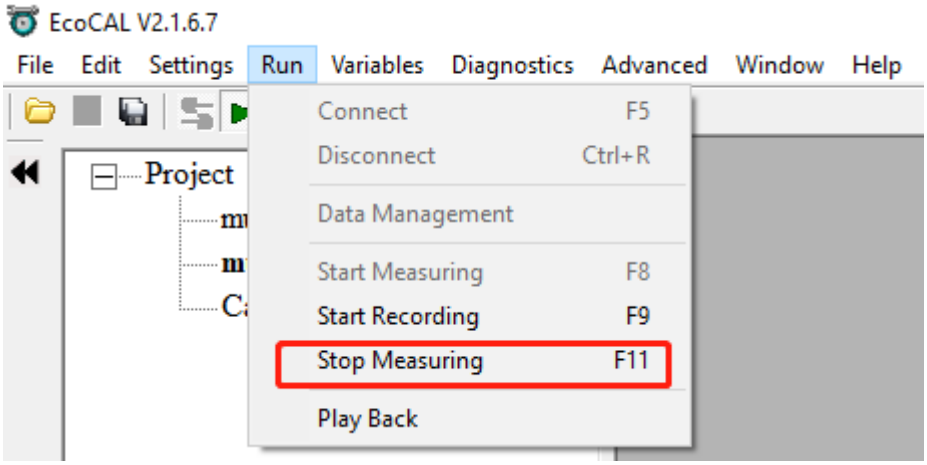


Note: You can also use the shortcut button () by clicking the 'Start Measuring' button to measure the value of measured variables.

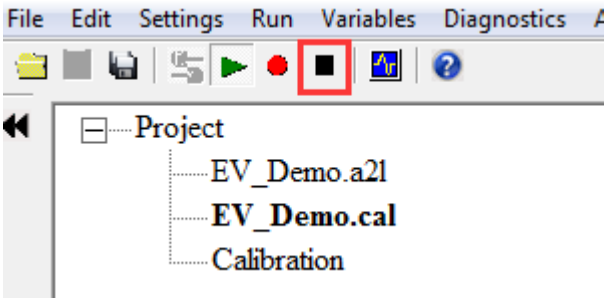
2.1.6 Stop Measuring

When you finish the test and want to do some other operation, like reading **the DTC, adding measurement variable or burn to /fetch from ECU**, you need to stop measuring first.

Go to menu->Run->Stop Measuring



Note: You can also use the shortcut button ( ) by clicking the 'Stop Measuring' button to stop measure the value of measured variables.

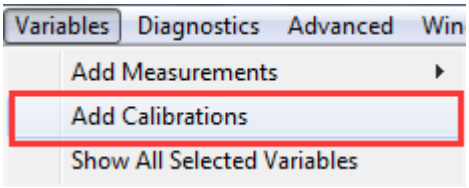


Chapter 3 Operation for Calibration/Measurement

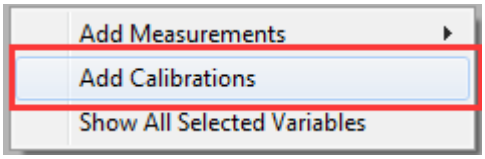
3.1 Add and Delete Calibration Variables

3.1.1 Add Calibration Variables

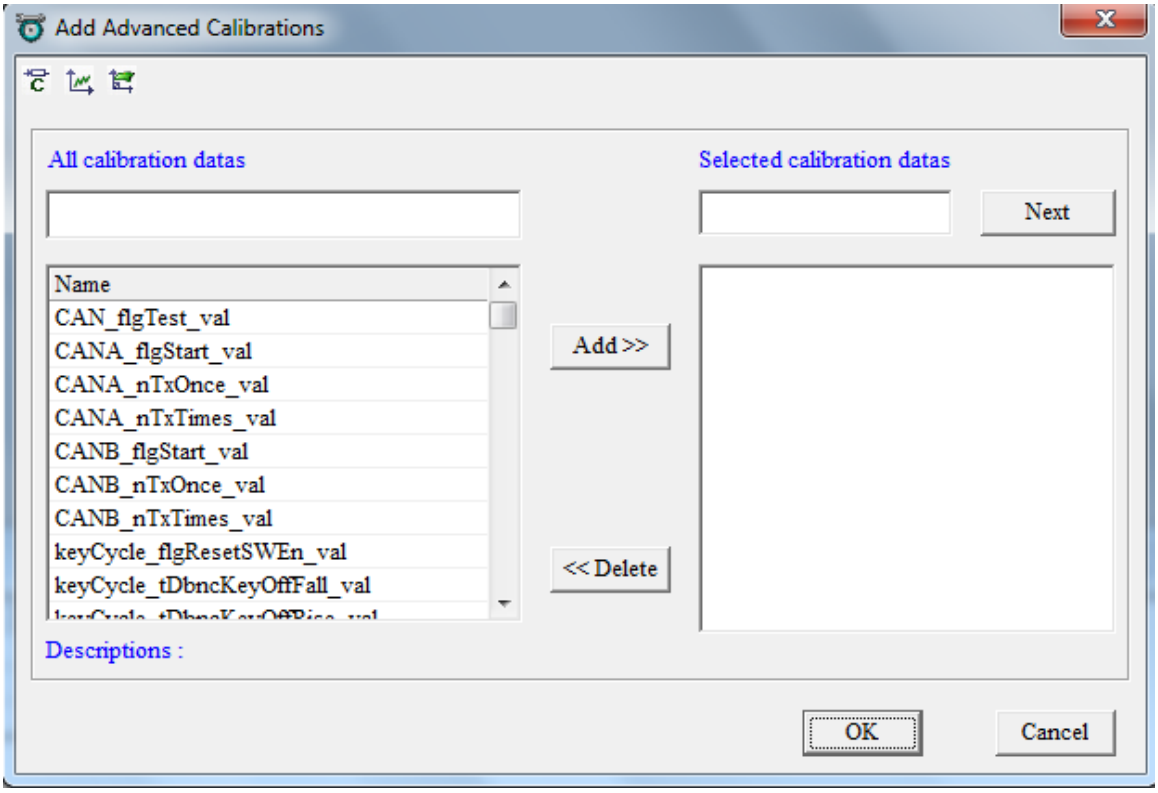
1) **Go to menu->Variables->Add Calibrations**



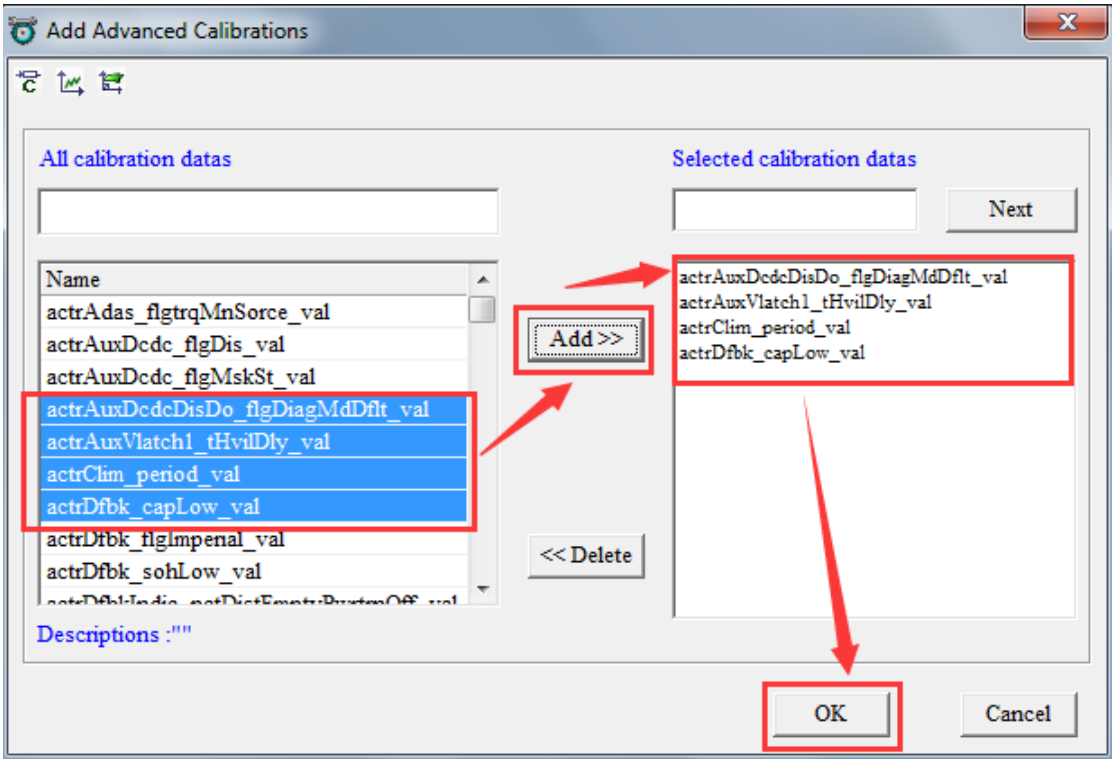
2) Right click on the blank area of the window, click 'Add Calibrations'

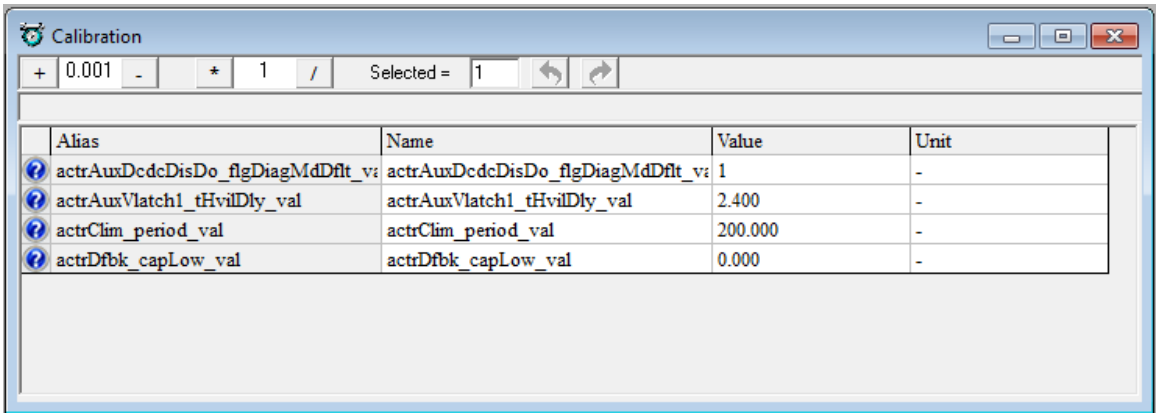


Then 'Add Advanced Calibrations' window will pop up.



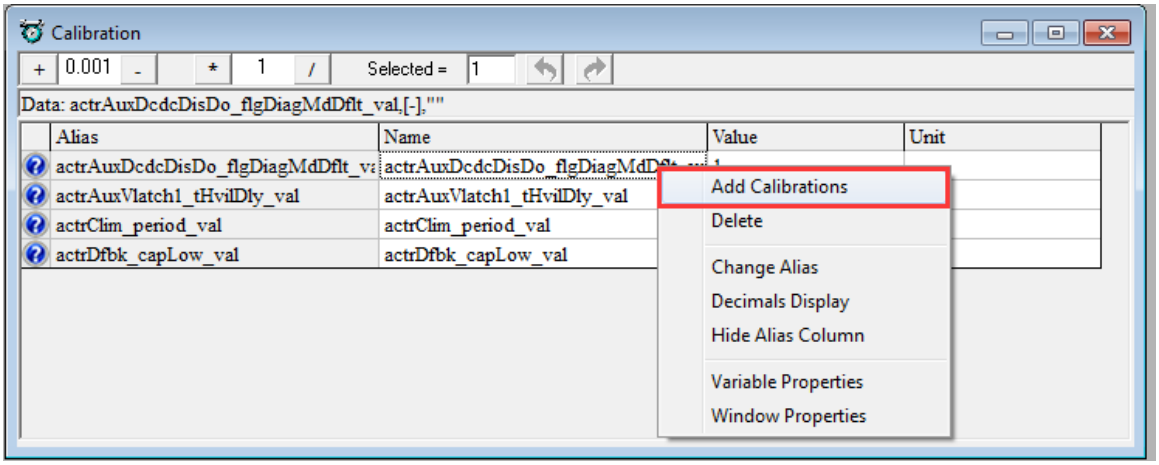
Select variables to be calibrated to right box.



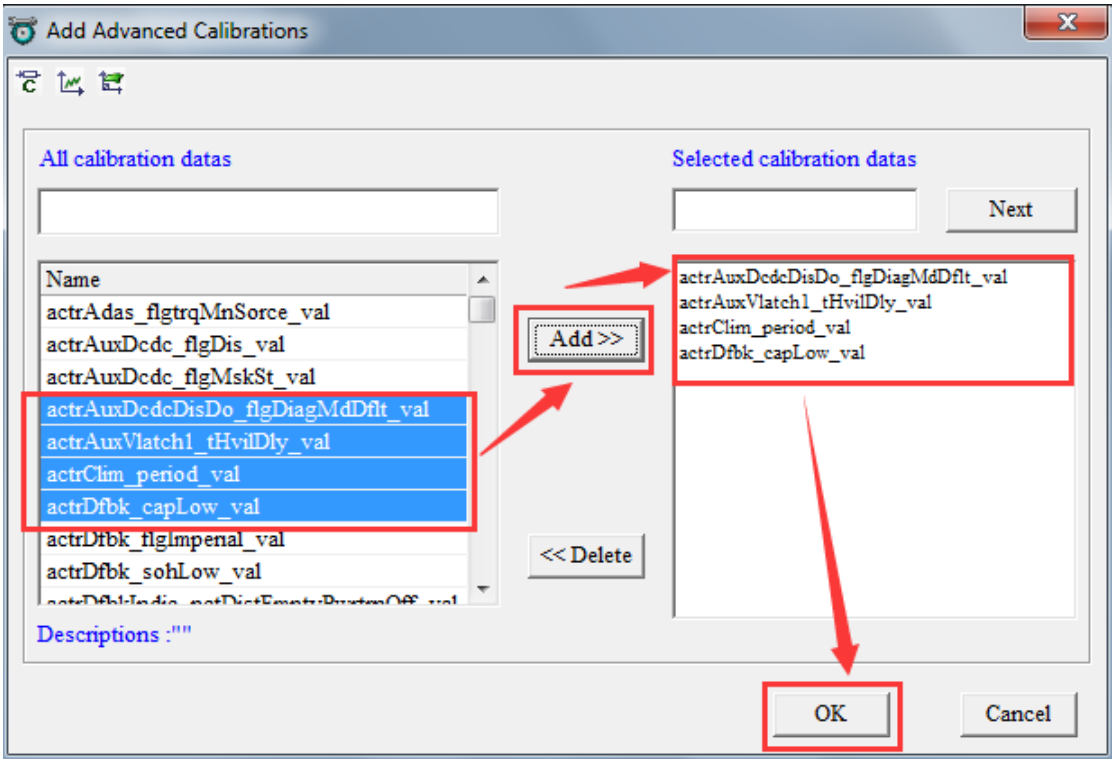


Note: Above method is to add new calibration window. If you want to add a calibration variable at an existed calibration window, please use following method:

1) Right click on the calibration window, then click 'Add Calibrations'



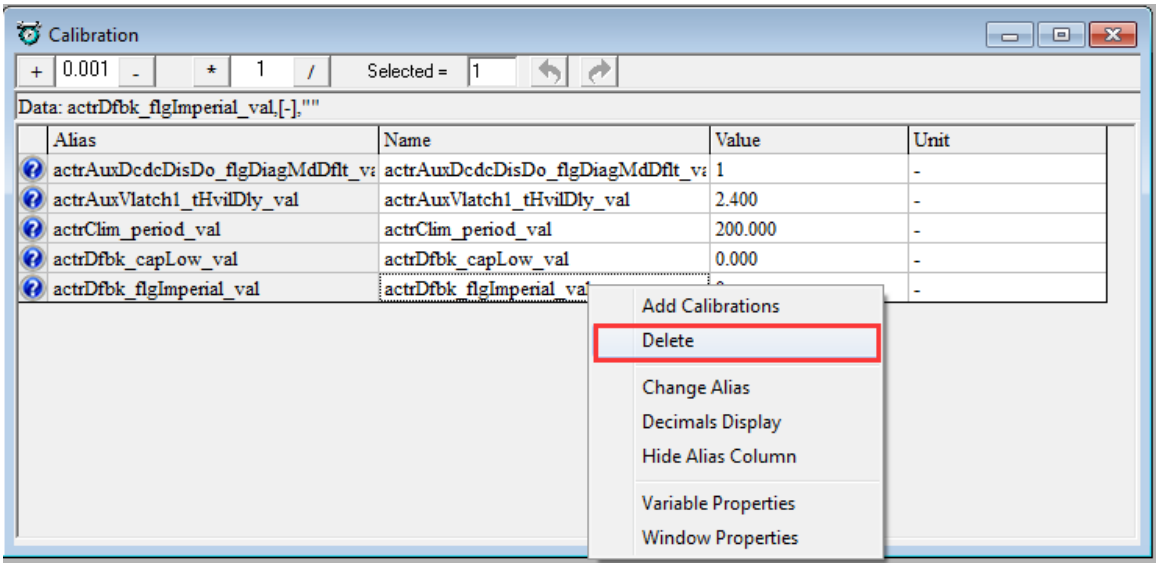
2) Use the same method to add the calibration variables.



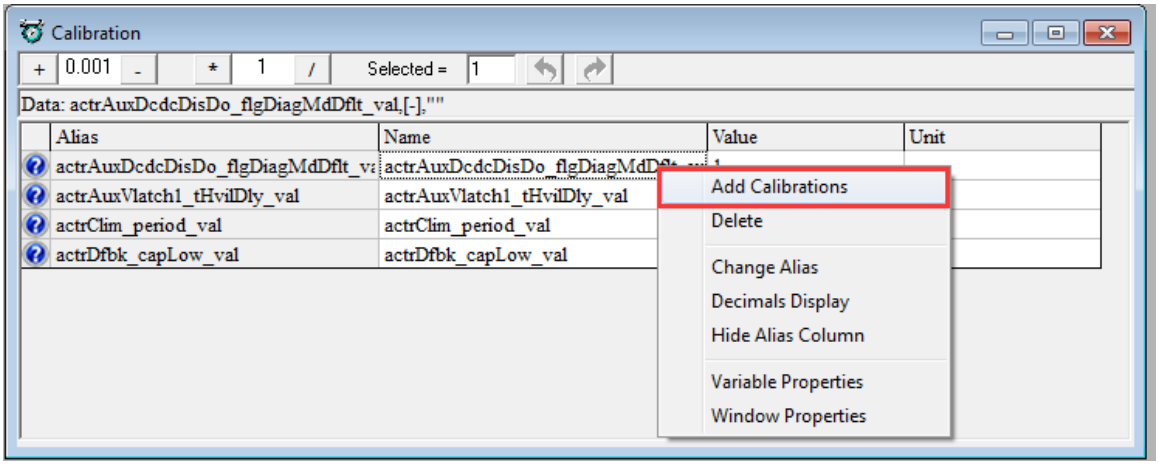
If you want to add the **'MAP'** and **'CUR'** variables, please right click on blank window to add the calibration variable. Please refer to section 3.3 for detail of MAP and CUR variables.

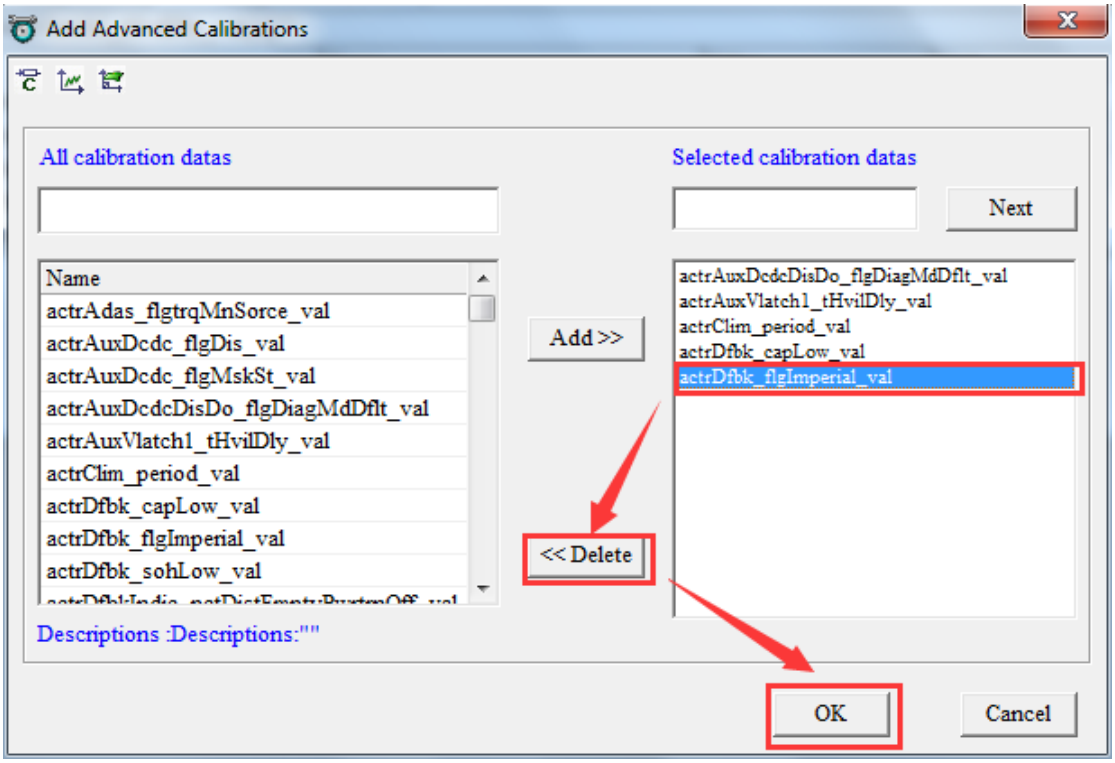
3.1.2 Delete Calibration Variables

1) Choose the calibration variable that you want to delete, right click, and then click 'Delete' to delete the calibration variables.



Or click 'Add', you can select all the calibration variables you want to delete on the right side. Click 'Delete' button, then click 'OK'. All the calibration variables you select will be deleted.

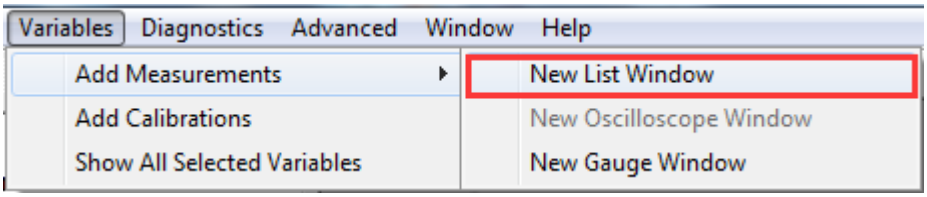




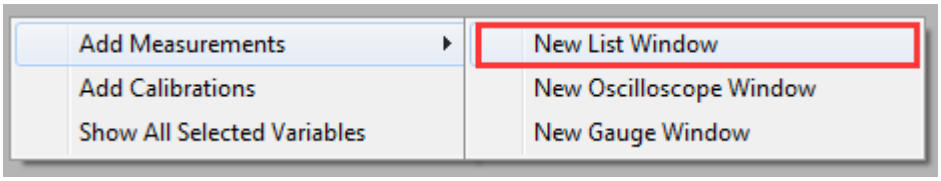
3.2 Add and Delete Measured Variables

3.2.1 Add Measured Variables

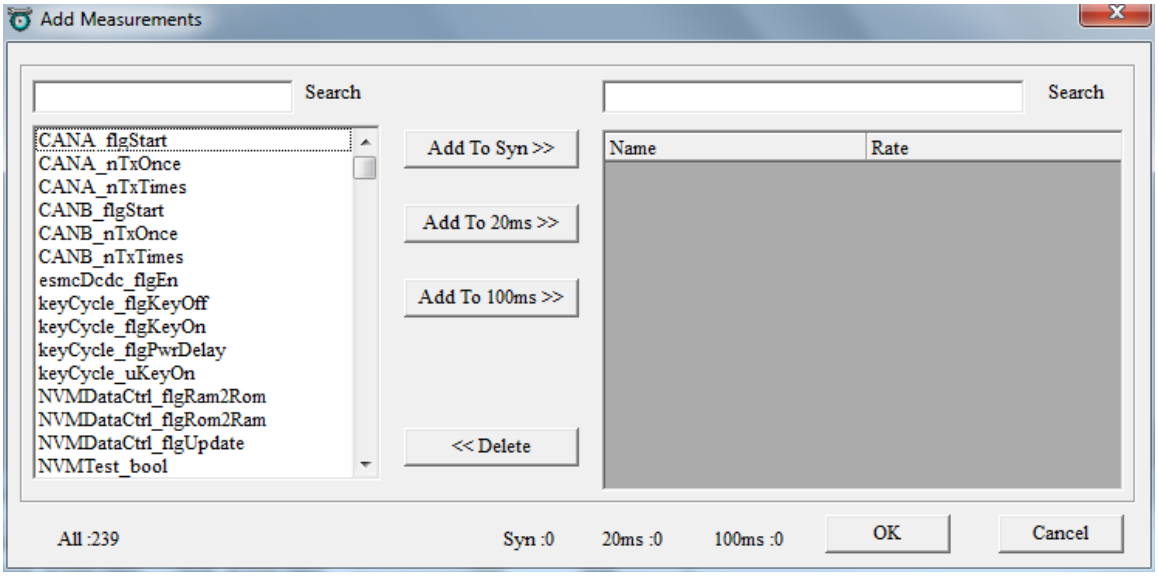
1) **Go to menu->Variables->Add Measurements**



2) Right click on the blank area of window, click ‘Add Measurements’



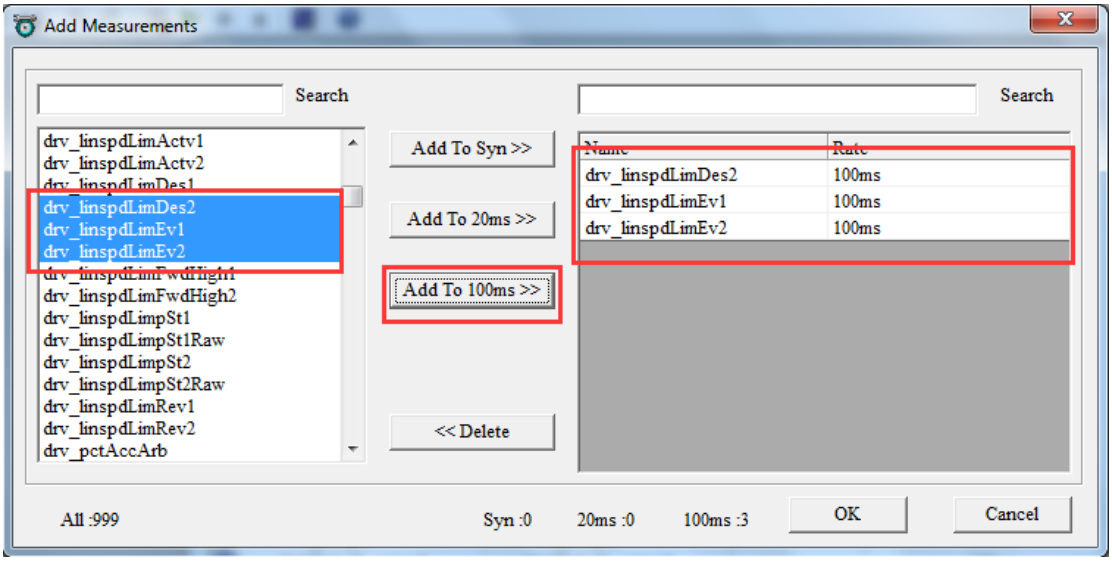
Then the ‘Add Measurements’ window will pop up



Select the measured variables you will need, then click ‘Add to 100ms’ button. And then click ‘OK’, the measured window will show up.

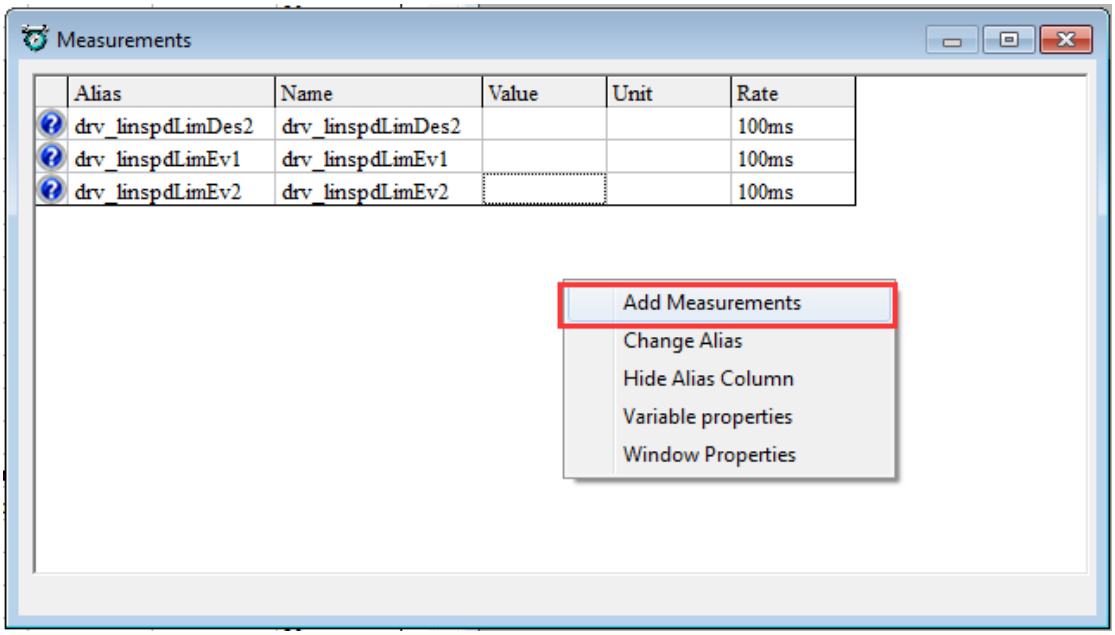
Note: Variables can also be added to be ‘Syn’,’20ms’, which is the display frequency.

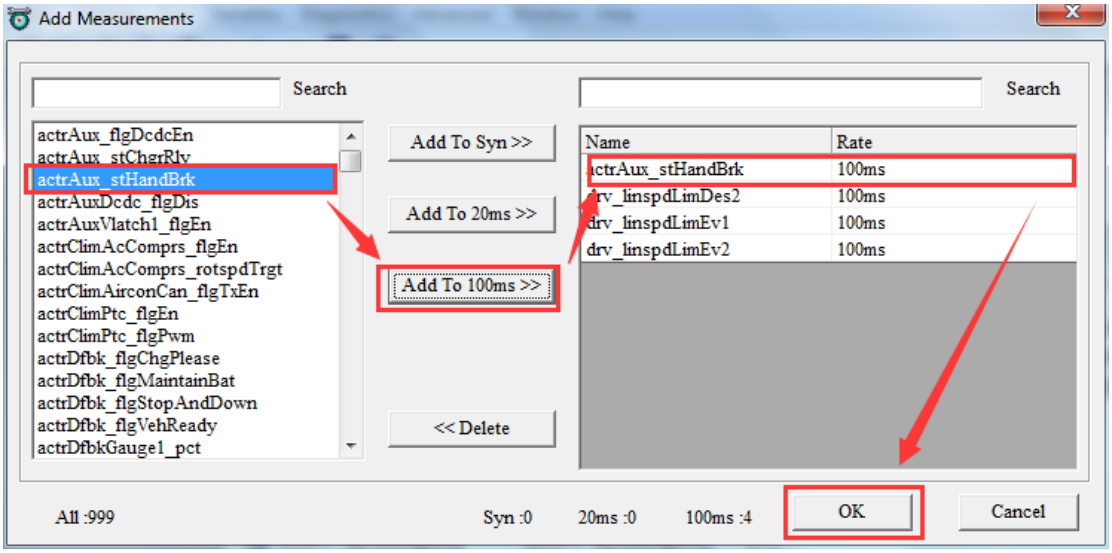
Here, we also add some other variables as example.



Note: Above method is a way to add new measured variables window. If you want to add the measured variables at existed window, please use the following method:

1) Right click on the Selected Variables window, and then click ‘Add Measurements’.

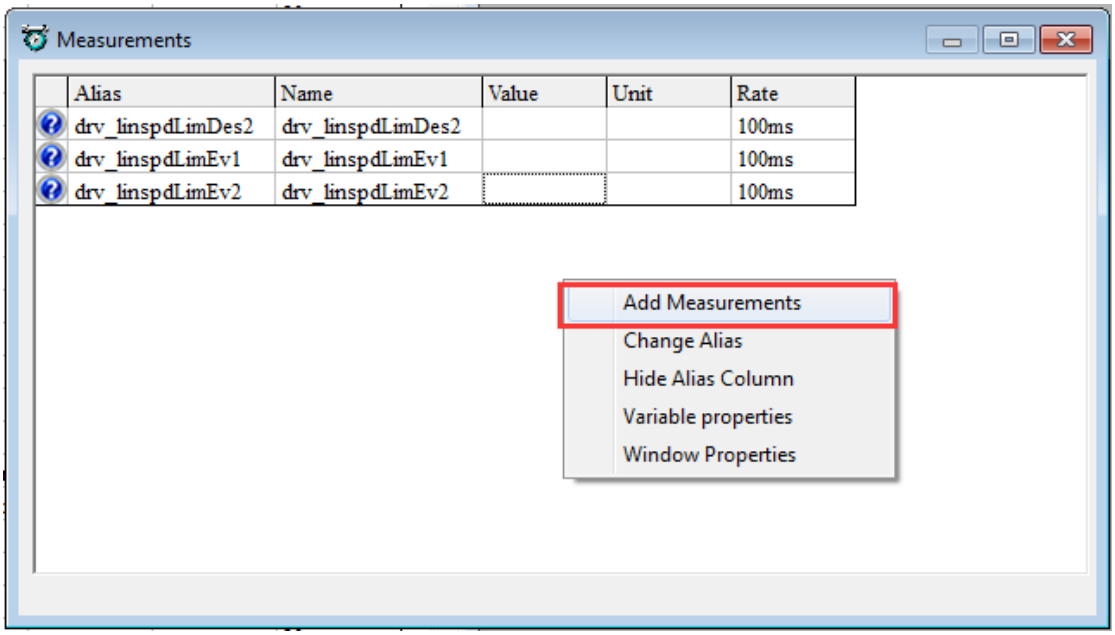


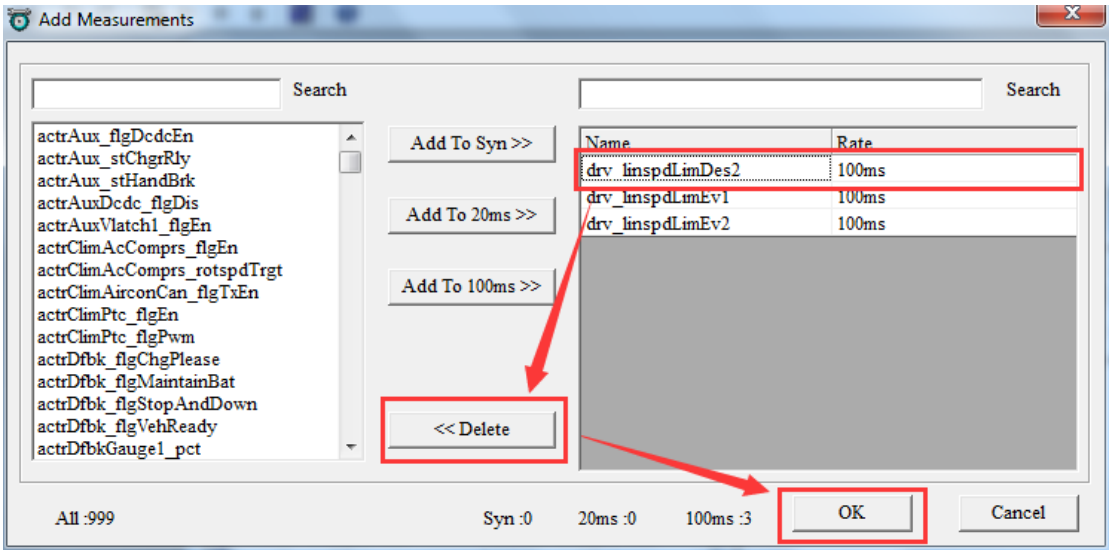


3.2.2 Delete Measured Variables

Method 1:

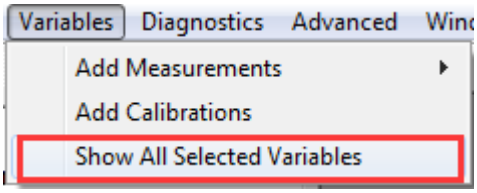
Right click on the Selected Variables, choose '**Add Measurements**', and then select the measured variables you want to delete.



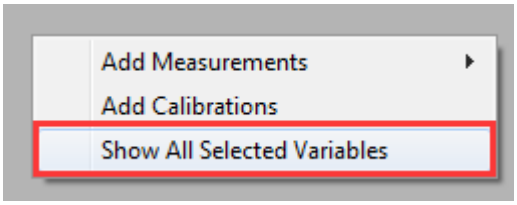


Method 2:

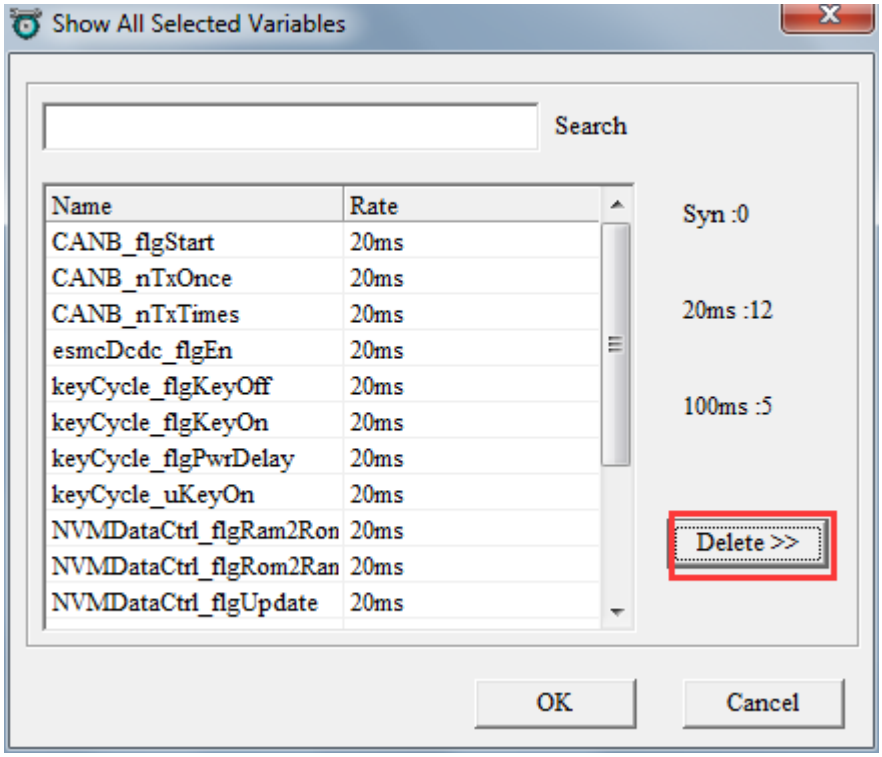
Go to menu->Variables-> Show All Selected Variables



Or right click on the blank of window, and then choose 'Show All Selected Variables'



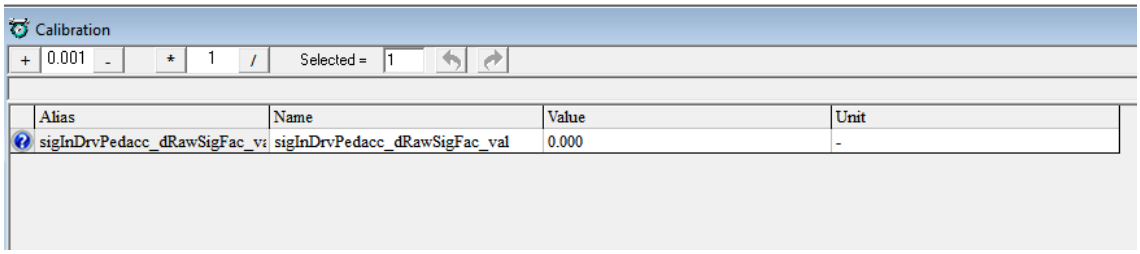
A window will pop-up, all the selected measured variables will be shown here.



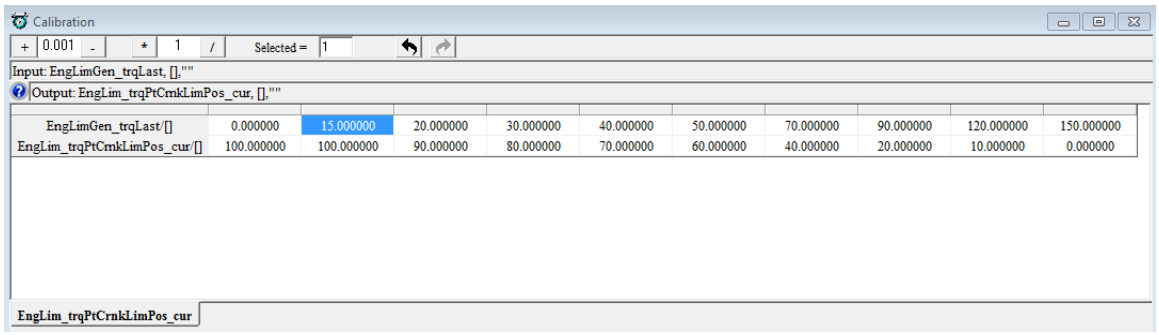
3.3 Calibration

There are three types of calibration variables: values, curves and maps.

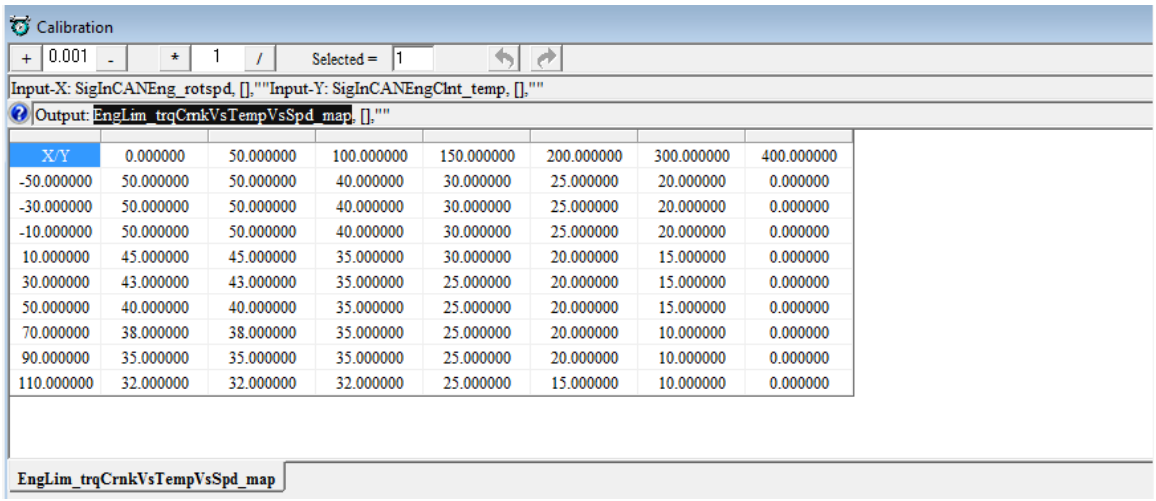
Value：



Curve：

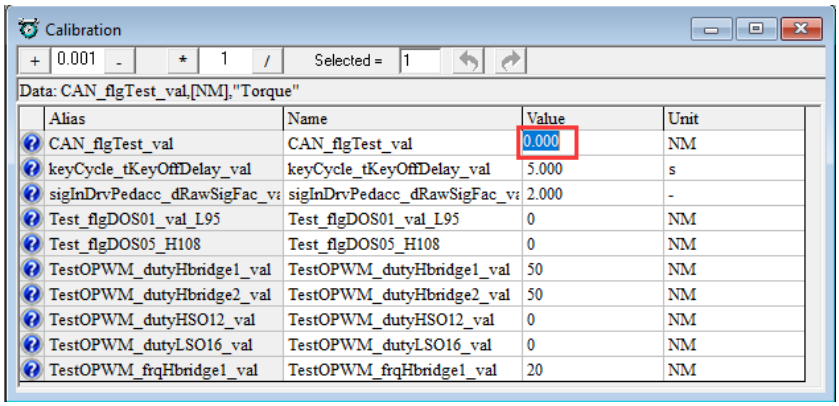


Maps：

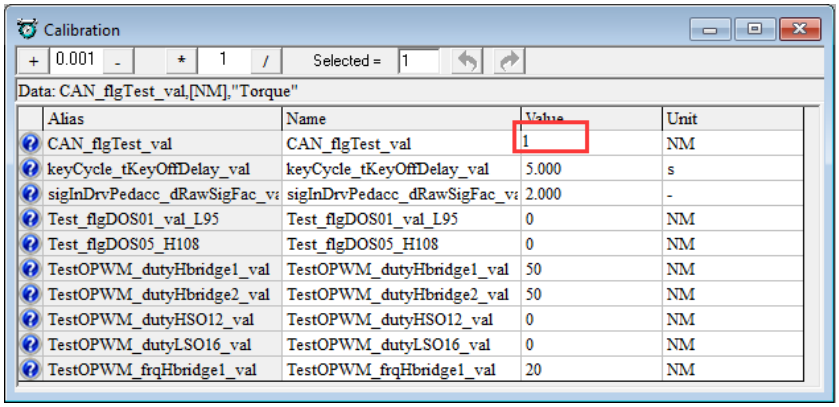


3.3.1 Change the Value with Direct Input

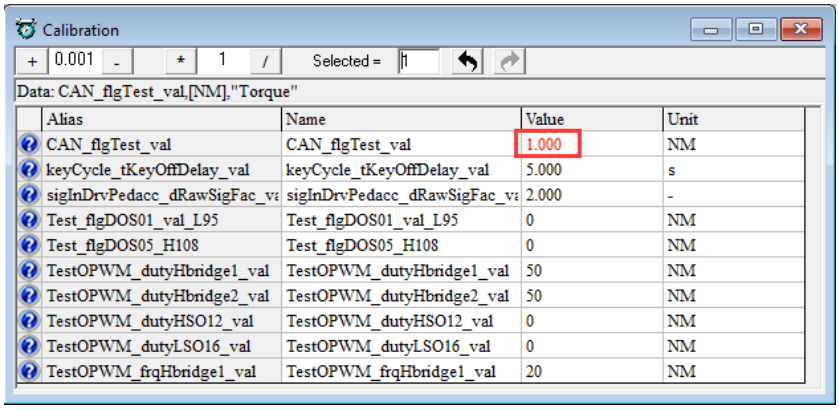
1) Double click the value cell that you want to modify



2) Input the desired value



Press click Enter to finish it. The modified data will be shown in red.



3.3.2 Change the Value with Formula

EcoCAL supports formula driven calibration.

1) Plus and Minus

a) Select the cell with the value you want to change

b) Input delta (difference) in the box after the Plus button 

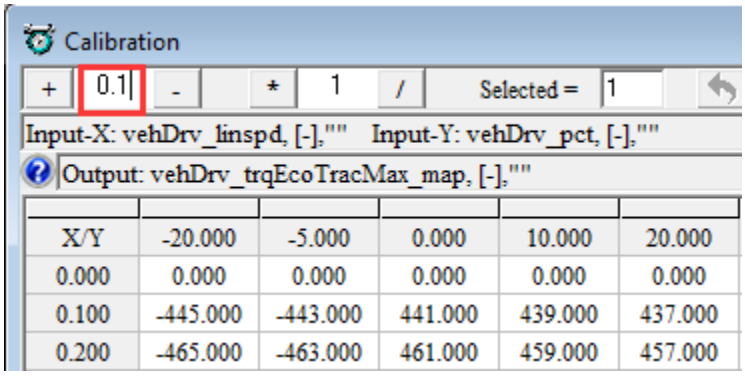
c) Click the Plus button 

or Minus button 

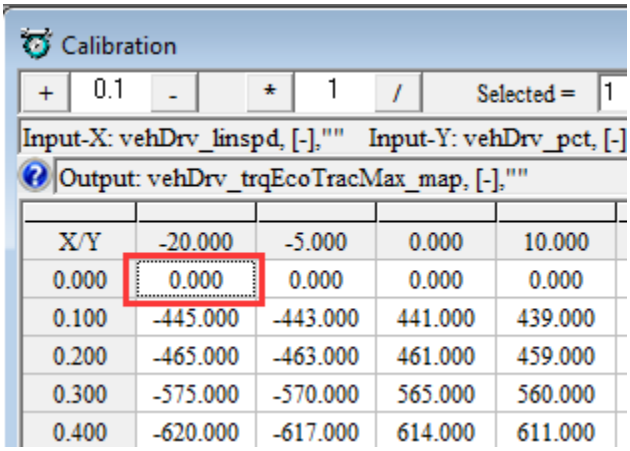
.

For example:

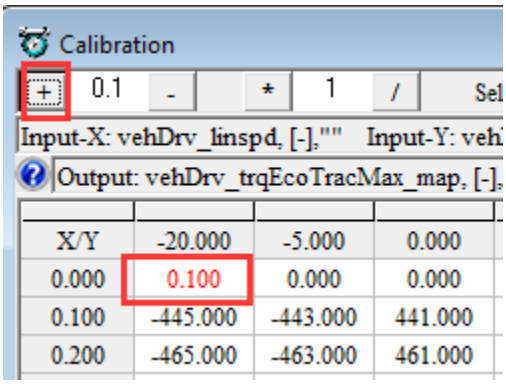
Input 0.1 in the box



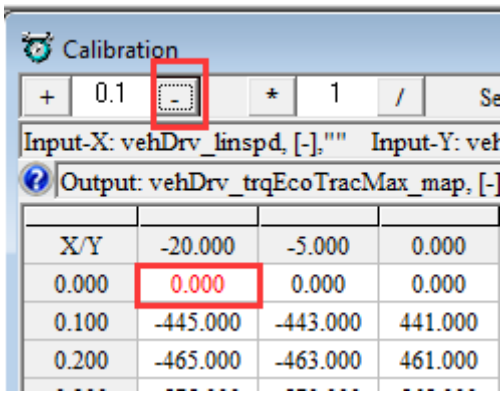
Click on the cell with the value you want to change



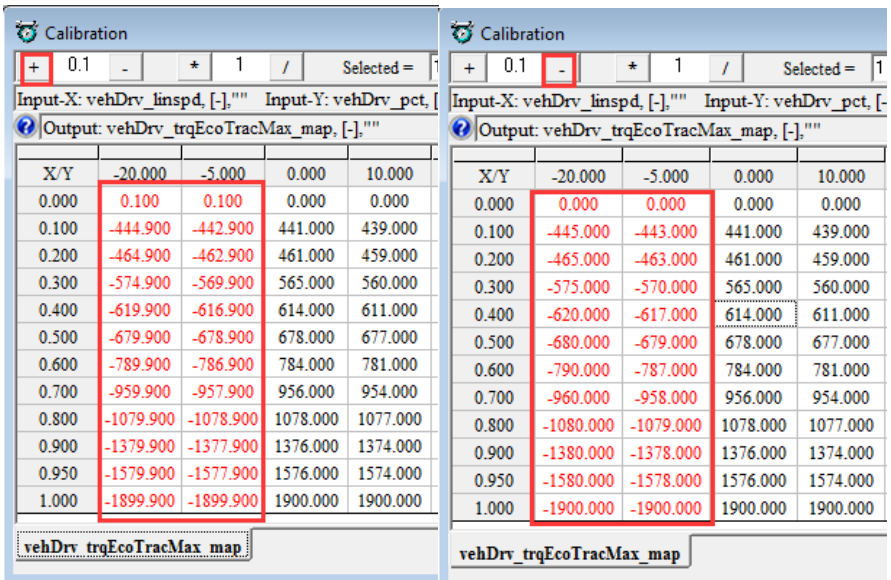
If you want to increase the stock value by 0.1 step, please click the Plus button [+].



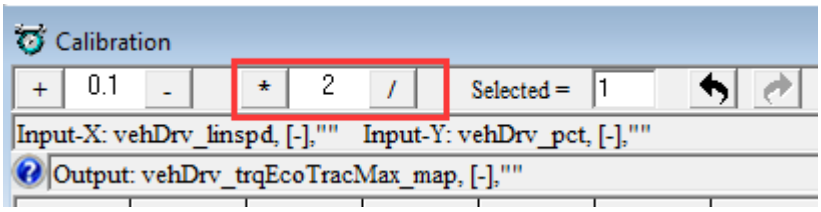
If you want to decrease the stock value by 0.1 step, please click Minus button [-].



Note: You can also change the value of multiple cells together by selecting them all.



2) Multiply and divided by

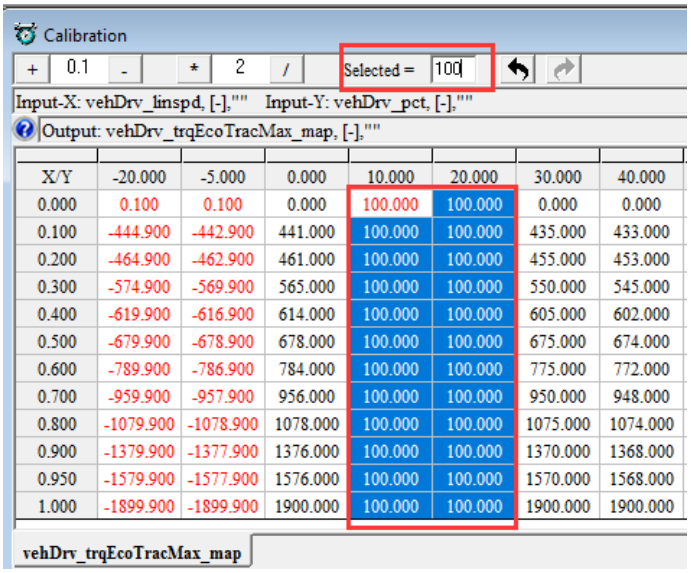


Same as Plus or Minus function, gain could be applied to cell to be changed.

3) Equal to

This function is used to change the value of a cell to a specified value.

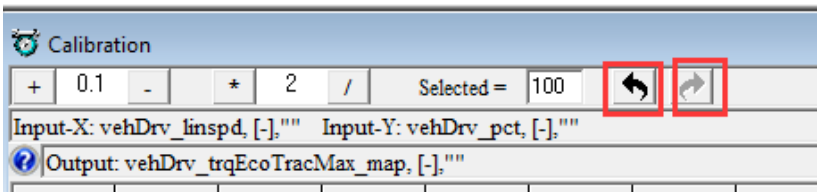
Choose the cell or area of cells you want to change, and then input the value which you want in the box. Press the Enter button on keyboard to input it.



X/Y	-20.000	-5.000	0.000	10.000	20.000	30.000	40.000
0.000	0.100	0.100	0.000	100.000	100.000	0.000	0.000
0.100	-444.900	-442.900	441.000	100.000	100.000	435.000	433.000
0.200	-464.900	-462.900	461.000	100.000	100.000	455.000	453.000
0.300	-574.900	-569.900	565.000	100.000	100.000	550.000	545.000
0.400	-619.900	-616.900	614.000	100.000	100.000	605.000	602.000
0.500	-679.900	-678.900	678.000	100.000	100.000	675.000	674.000
0.600	-789.900	-786.900	784.000	100.000	100.000	775.000	772.000
0.700	-959.900	-957.900	956.000	100.000	100.000	950.000	948.000
0.800	-1079.900	-1078.900	1078.000	100.000	100.000	1075.000	1074.000
0.900	-1379.900	-1377.900	1376.000	100.000	100.000	1370.000	1368.000
0.950	-1579.900	-1577.900	1576.000	100.000	100.000	1570.000	1568.000
1.000	-1899.900	-1899.900	1900.000	100.000	100.000	1900.000	1900.000

4) Undo / Redo

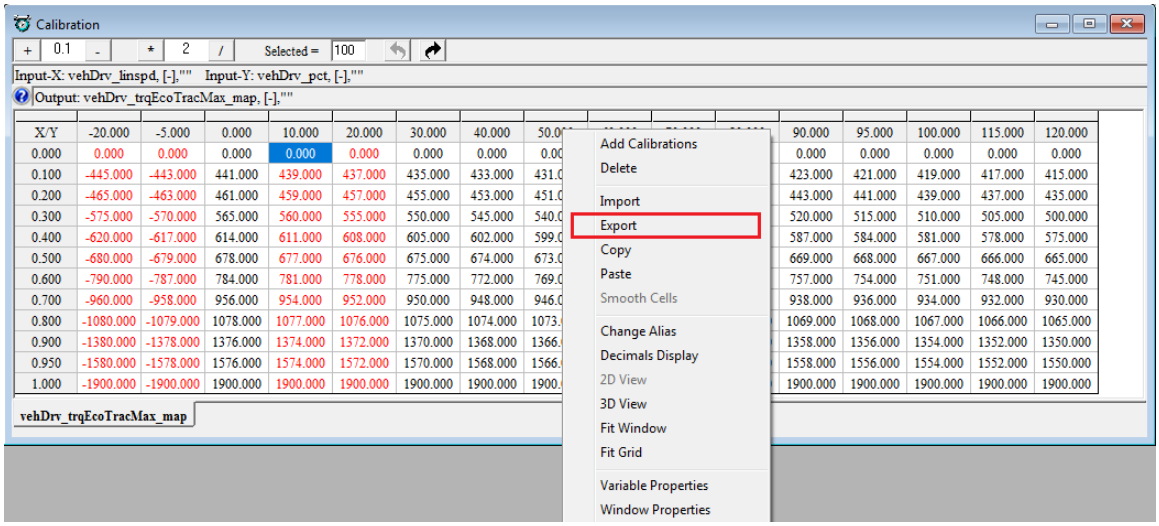
The user can click the button ‘ ’ /’ ’ to undo or redo the calibration as below.



3.3.3 Export/Import Calibration Data for Tuning

You can also export data export to Excel sheet from EcoCAL and do the further data modification in Excel. After finishing the modification, you can import data back to EcoCAL. This is very useful for Curve and Map tables.

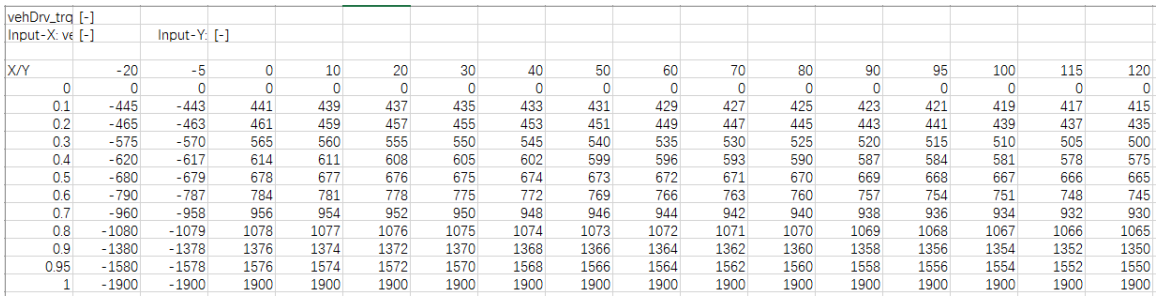
Right-Click the parameter window, select the **Export** option.



The program will pop-up a 'save as' dialog window.

If you click **save**, the program will save **CSV** file and open it. The default name of the **CSV** file is the calibration label name.

The **CSV** file will be opened automatically. You can choose to open the file by a selected application from your laptop. The picture below shows that the CSV file is opened as .**xls** file by Excel.



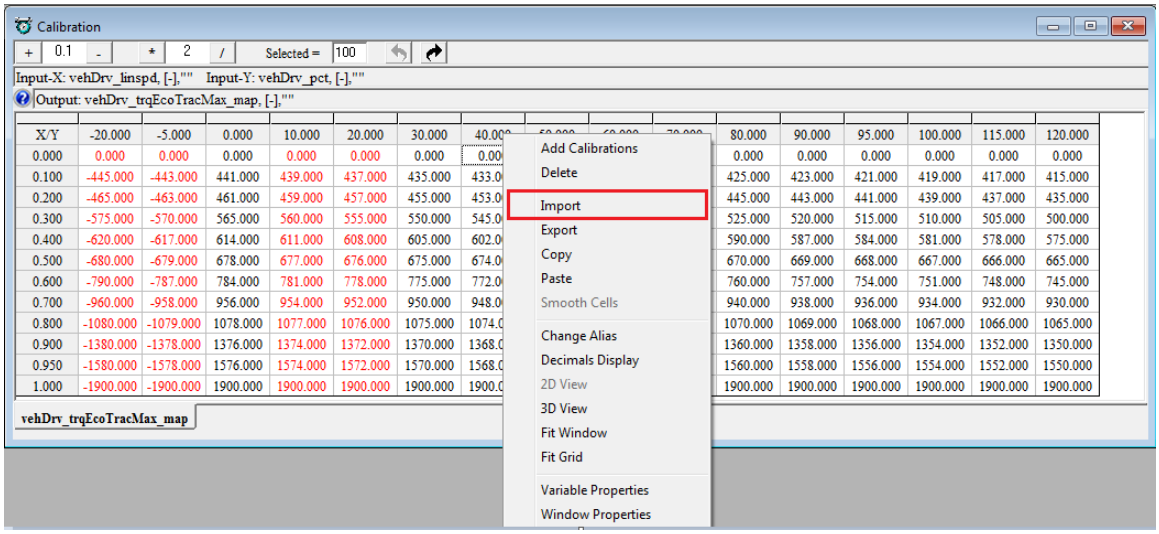
vehDrv_trq [-]																	
Input-X: ve [-]		Input-Y: [-]															
X/Y	-20	-5	0	10	20	30	40	50	60	70	80	90	95	100	115	120	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0.1	-445	-443	441	439	437	435	433	431	429	427	425	423	421	419	417	415	
0.2	-465	-463	461	459	457	455	453	451	449	447	445	443	441	439	437	435	
0.3	-575	-570	565	560	555	550	545	540	535	530	525	520	515	510	505	500	
0.4	-620	-617	614	611	608	605	602	599	596	593	590	587	584	581	578	575	
0.5	-680	-679	678	677	676	675	674	673	672	671	670	669	668	667	666	665	
0.6	-790	-787	784	781	778	775	772	769	766	763	760	757	754	751	748	745	
0.7	-960	-958	956	954	952	950	948	946	944	942	940	938	936	934	932	930	
0.8	-1080	-1079	1078	1077	1076	1075	1074	1073	1072	1071	1070	1069	1068	1067	1066	1065	
0.9	-1380	-1378	1376	1374	1372	1370	1368	1366	1364	1362	1360	1358	1356	1354	1352	1350	
0.95	-1580	-1578	1576	1574	1572	1570	1568	1566	1564	1562	1560	1558	1556	1554	1552	1550	
1	-1900	-1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	

It is highly recommended to modify your curve and map tables, revise the data in Excel and then import them back to EcoCAL. Please do not forget to save the tables after finish tuning.

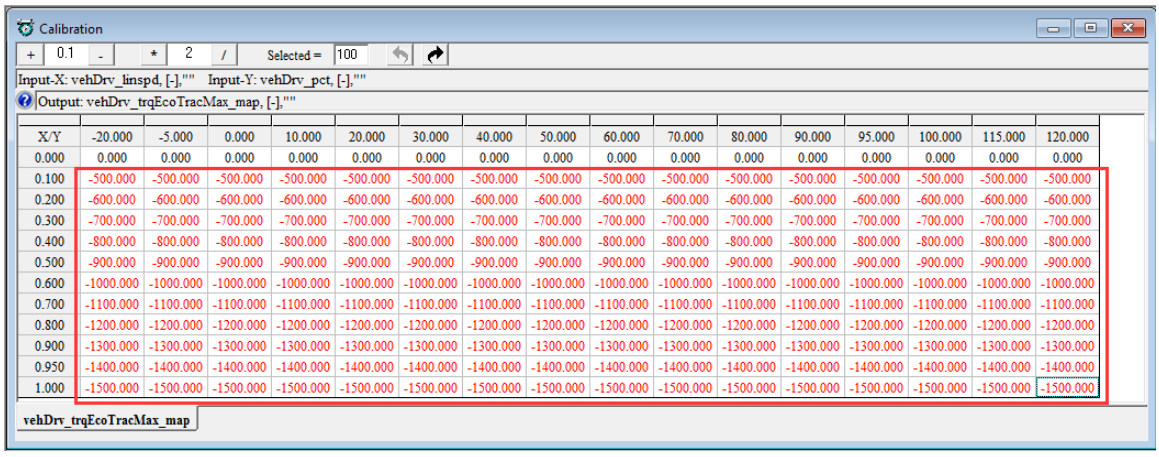
vehDrv_trq [-]
Input-X: ve [-] Input-Y: [-]

X/Y	-20	-5	0	10	20	30	40	50	60	70	80	90	95	100	115	120
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.1	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500	-500
0.2	-600	-600	-600	-600	-600	-600	-600	-600	-600	-600	-600	-600	-600	-600	-600	-600
0.3	-700	-700	-700	-700	-700	-700	-700	-700	-700	-700	-700	-700	-700	-700	-700	-700
0.4	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800	-800
0.5	-900	-900	-900	-900	-900	-900	-900	-900	-900	-900	-900	-900	-900	-900	-900	-900
0.6	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000	-1000
0.7	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100	-1100
0.8	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200	-1200
0.9	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300	-1300
0.95	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400	-1400
1	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500	-1500

If you want to import a saved calibration tables, right-Click the parameter window, select the **Import** option.



Import the **CSV** file you need. The modified cells will be shown in red.



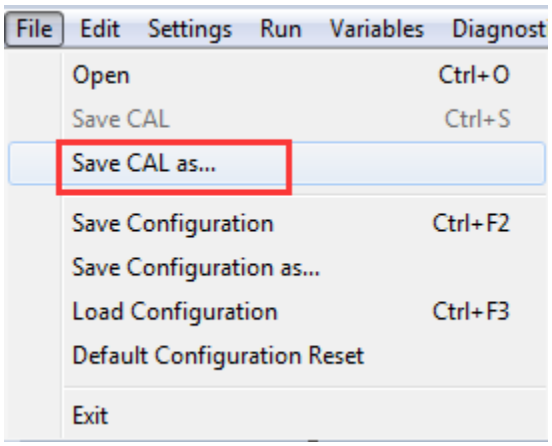
Note: after you change the data, please save the calibration as a new CAL file.

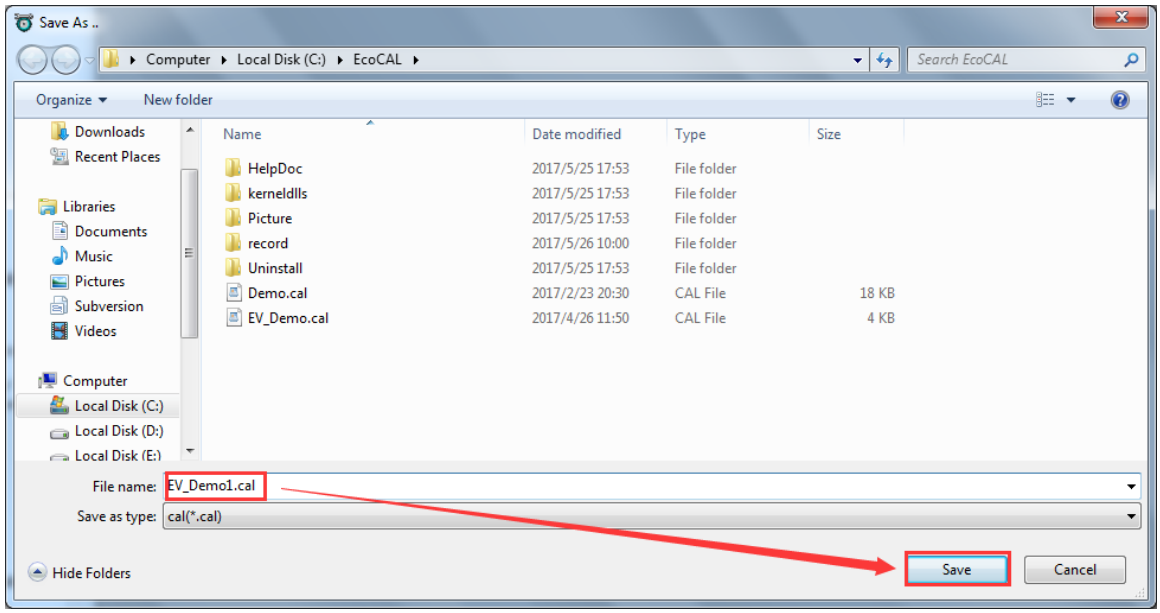
Please refer the following section on how to save the new CAL files.

3.4 Save as Calibration Data File

After you finish the tuning work for VCU/HCU, please save the tuning data before you exit the EcoCAL. EcoCAL could not save the tuning work automatically.

1) **Go to menu->File->Save CAL as**

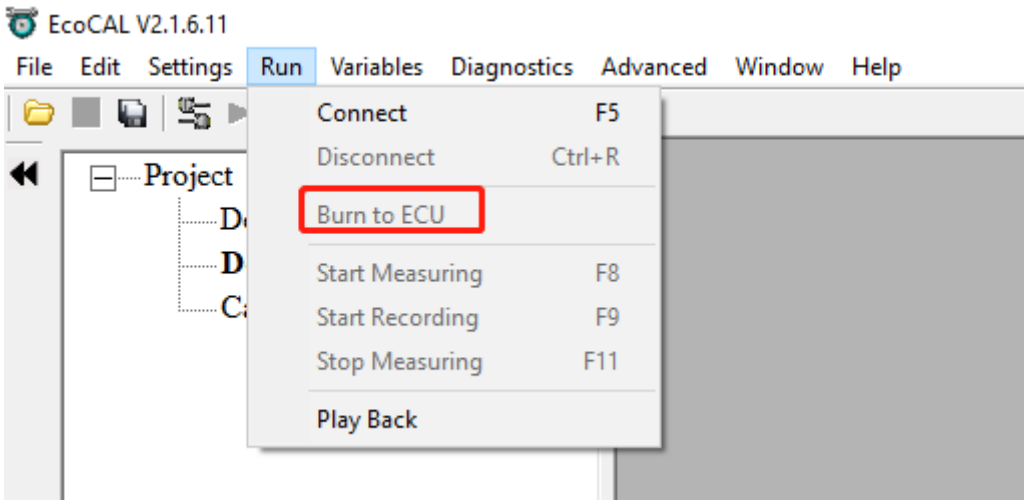


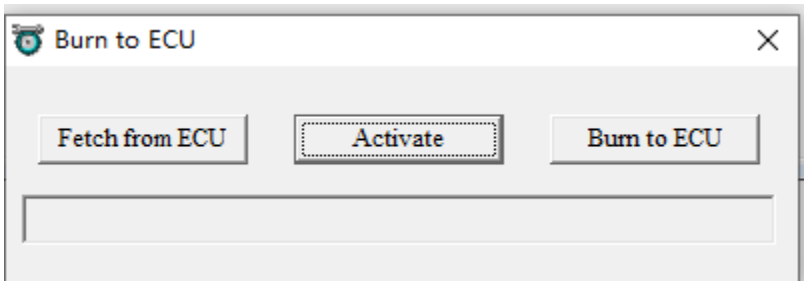


You can save it as a new calibration CAL file.

3.5 Burn to VCU and Fetch from VCU

In some cases, it is useful to be able to transfer calibration data between the PC and the control unit, such as downloading the data from PC to the unit or uploading the data from the unit to PC. The 'Burn to ECU' function enables user to do so.





Fetch from ECU: Export the calibration file from the control unit to the PC

Activate: Flash the calibration data to the control unit (RAM area)

Burn to ECU: Flash the calibration data to the control unit (ROM area)

3.5.1 Burn the CAL File to ECU (VCU)

After you finish the data tuning, you may be eager to see the performance of VCU/HCU. Please burn the data to VCU/HCU.

Connect to ECU first, and then click the 'burn to ECU 'button to burn the CAL file or data changed to ECU.

Warning: *make sure the 12V battery has enough energy before you do any 'burn to ECU' or 'fetch from ECU'!*

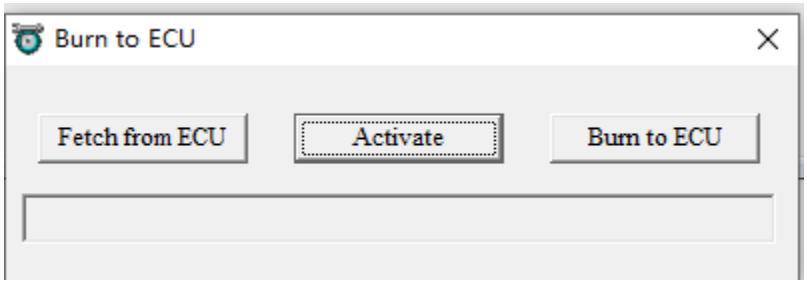
During the process of uploading or downloading, users are not allowed to interrupt the system.

Do not turn off the ECU power or disconnect the serial cable before finishing upload/download.

3.5.2 Fetch the CAL File from VCU

You can fetch the calibration data from the VCU/HCU if you need to study it or save for later use.

1) Go to menu->Run->Burn to ECU->Fetch from ECU

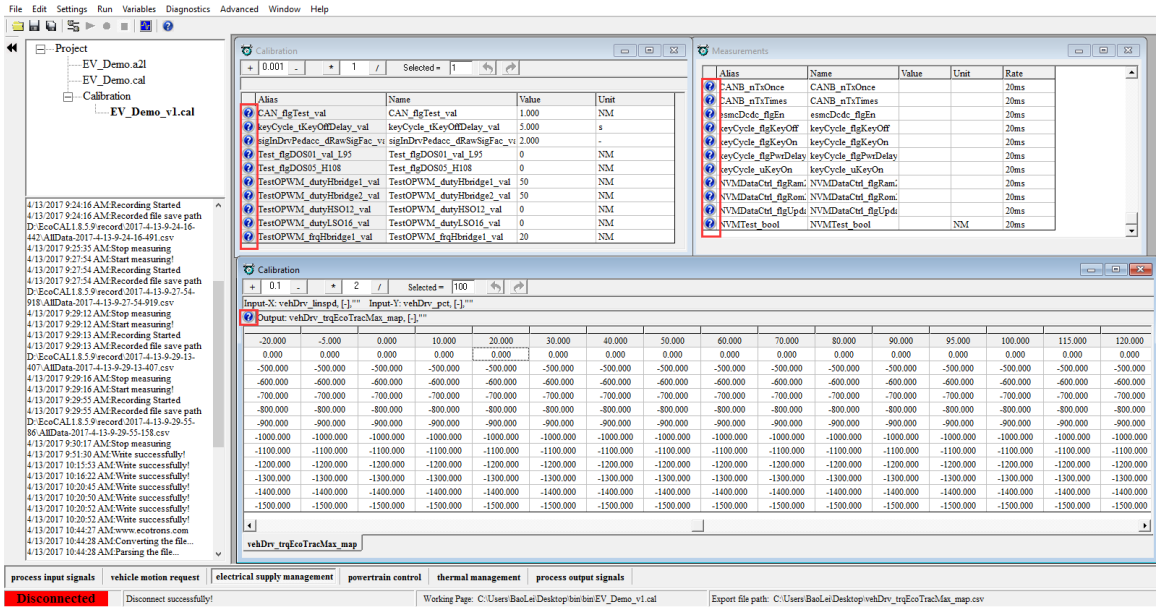


Save it as CAL file.

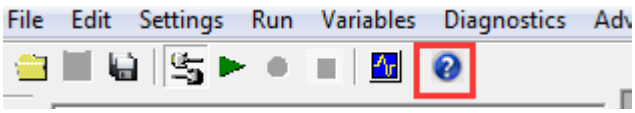
Chapter 4 Tuning Help and Support

4.1 Find the Help and Support Window

In EcoCAL, there are many questions like buttons  in the window, you can click on it to get the details about calibration variables and measure variables. Besides, you can also get tips of tuning through it.



There is also a help function for each page. Like the picture shown below, you can click the question mark button  in EcoCAL to get the page help.

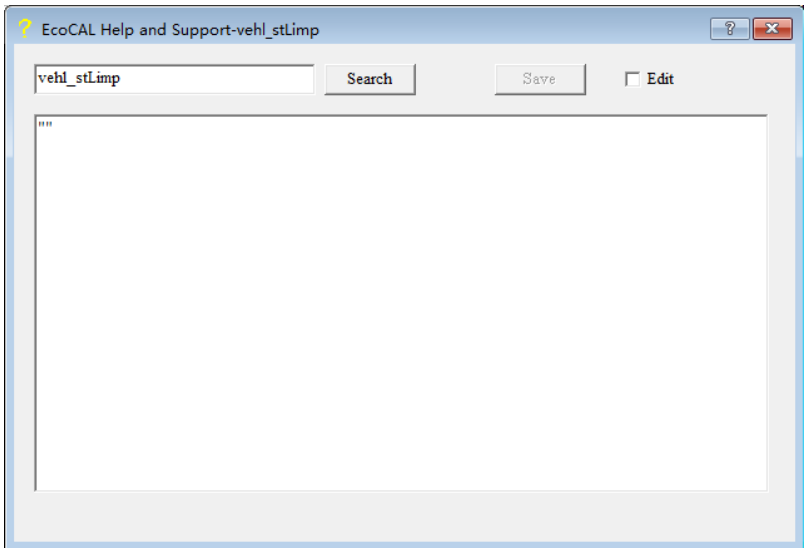


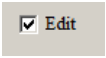
In different page, the help document is different.

4.2 Edit the Help and support Window

You can edit the blank box for logging.

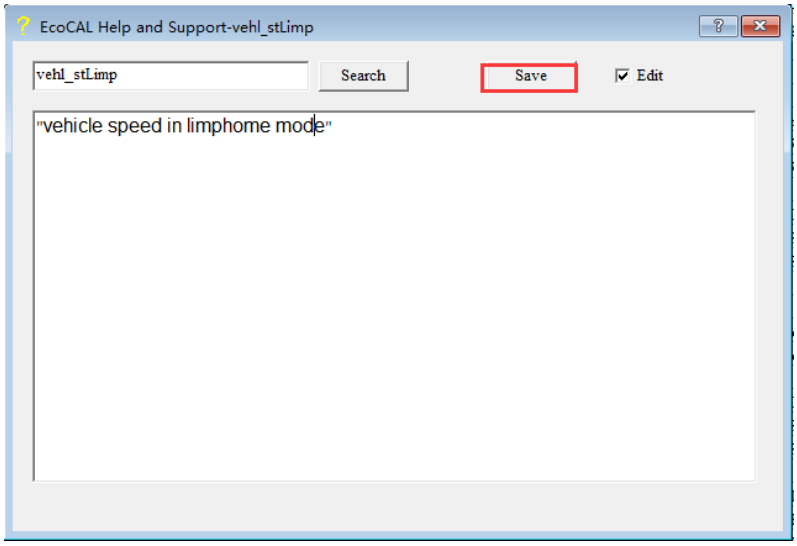
First, click the question mark button  to open the help and support window.



Then check edit box 

, then you will be able to edit the content by yourself.

For example, add the ‘vehicle speed in limp home mode’ content.



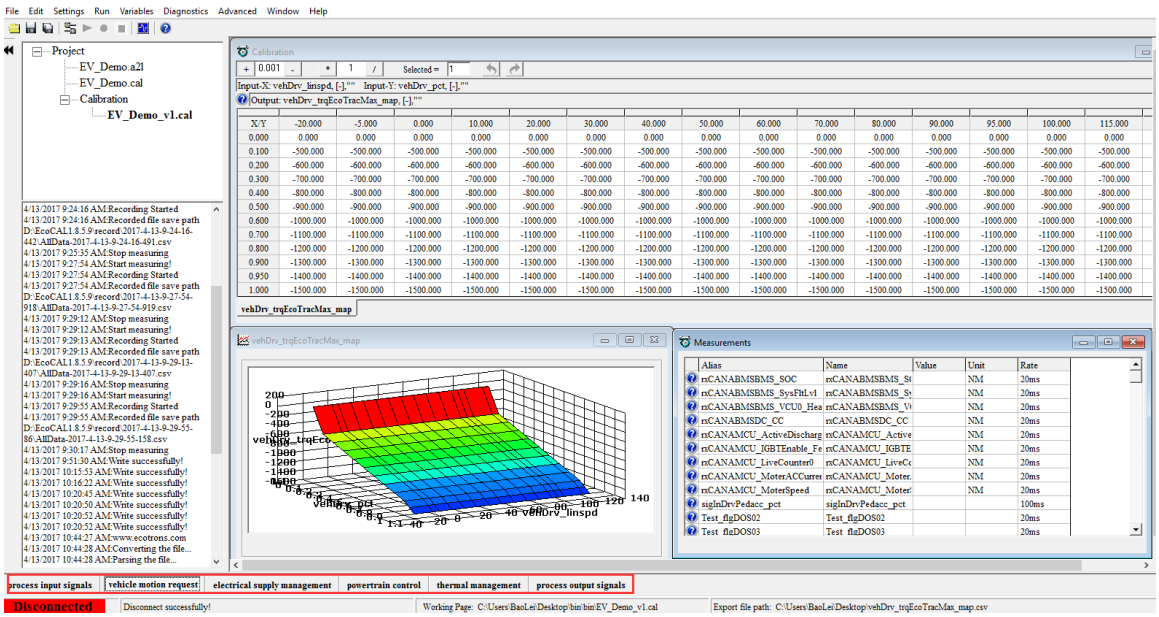
Please click ‘Save’ to save the change. EcoCAL could not save the customized help and support log automatically.

Chapter 5 Advanced Operation of EcoCAL

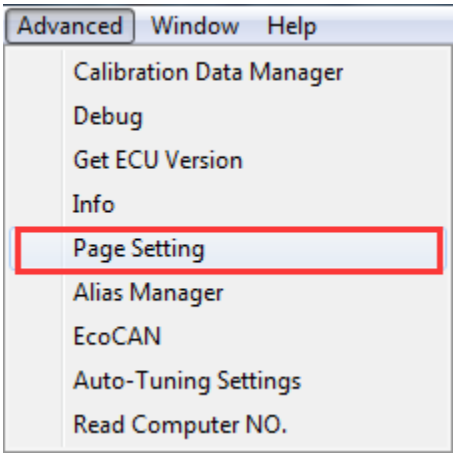
5.1 High Flexible and Customizable Setting for Operation

5.1.1 Page Setting

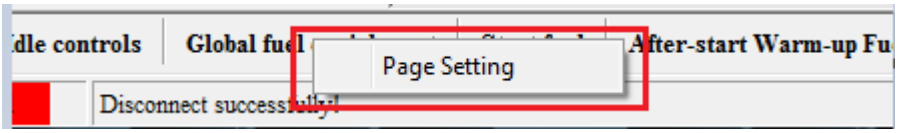
Multiple pages could be created to help organize all calibration/measurement by category. The name of page is placed on bottom of window shown in red box in picture below.



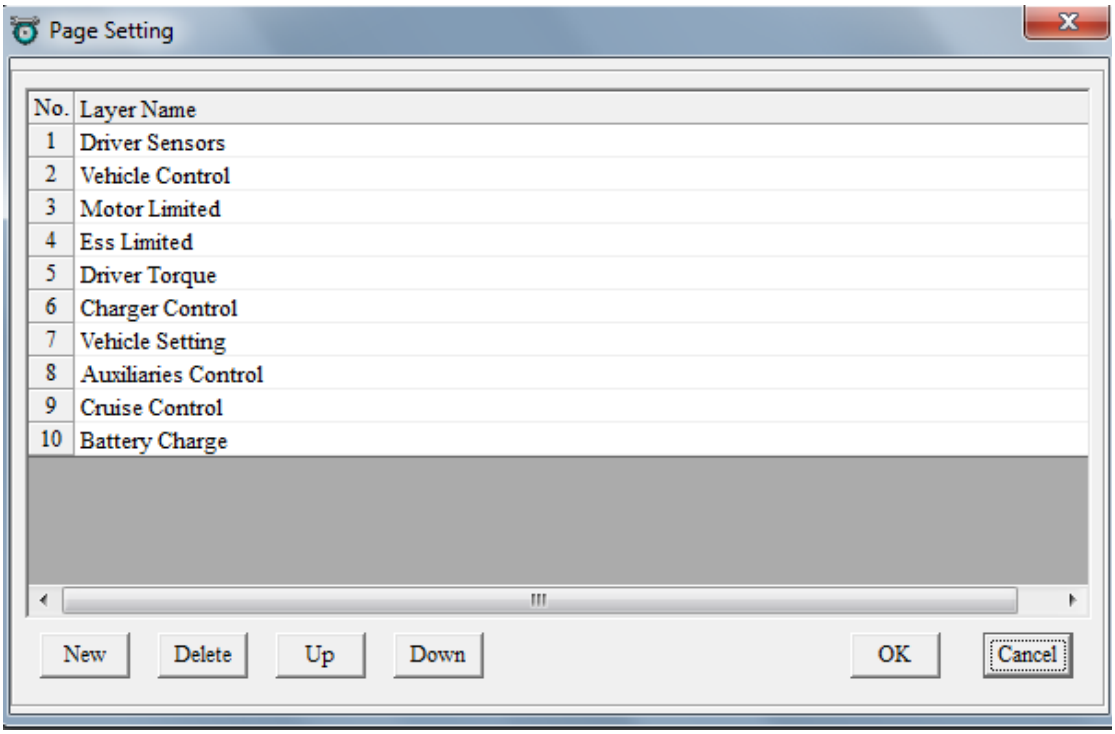
1) Go to menu->Advanced->Page setting, the page setting window will pop-up.



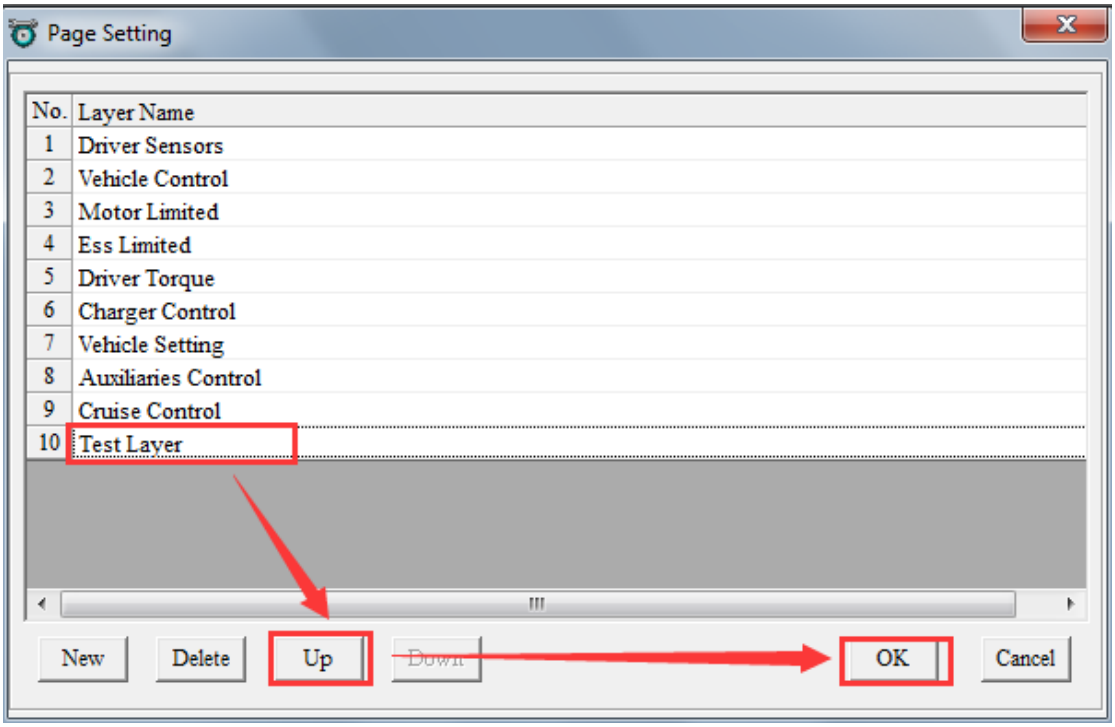
Note: you also can right click on page label, and then click the 'Page setting'.

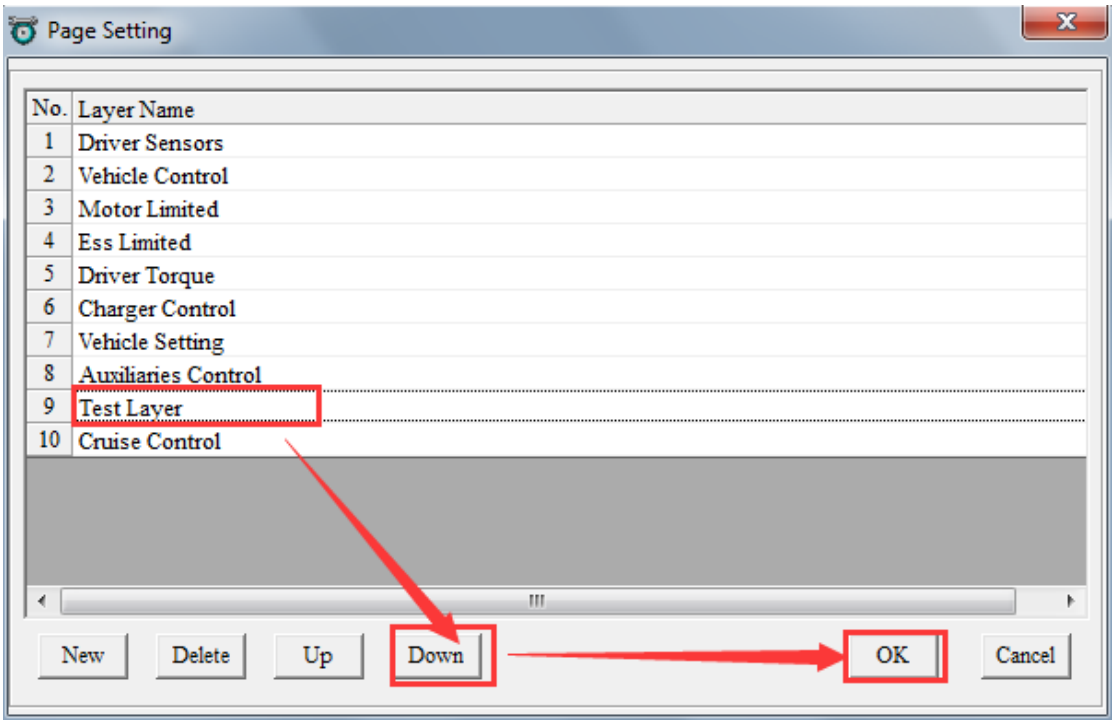


Page setting window:



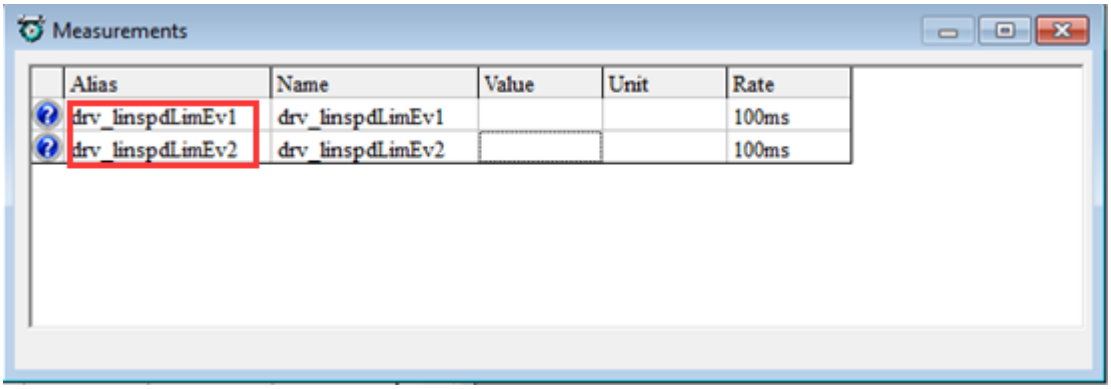
2) 'Up' and 'Down' can be used to change the display order of layers.





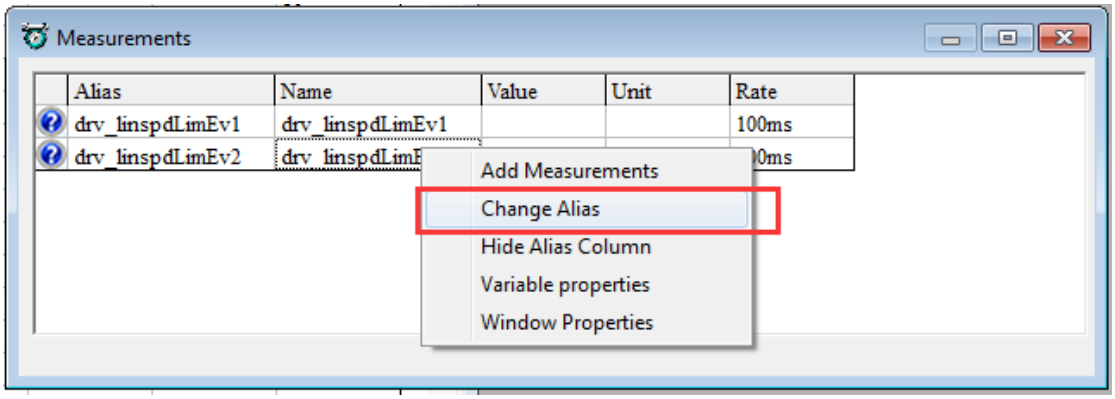
5.1.2 Alias Setting

Signal name might not be able to show meaning of calibration variables and measurement variables sometime. By default, alias name is the same as the variable name.



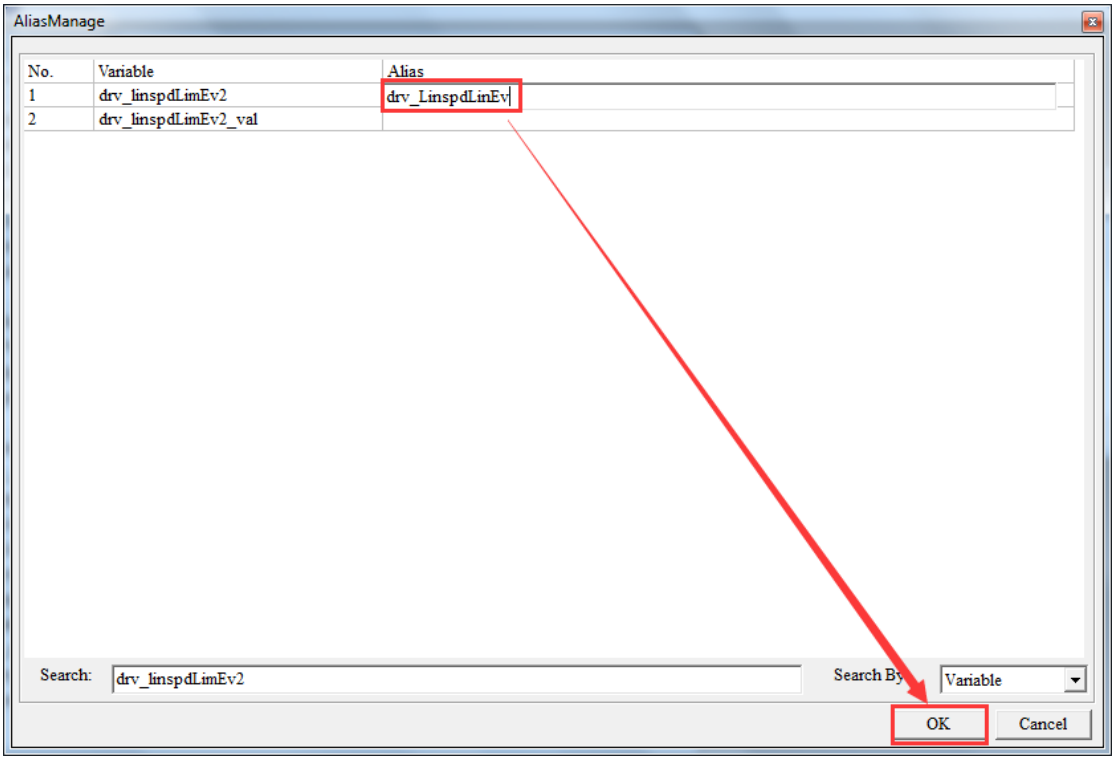
How to edit alias

1) Right click variable name.

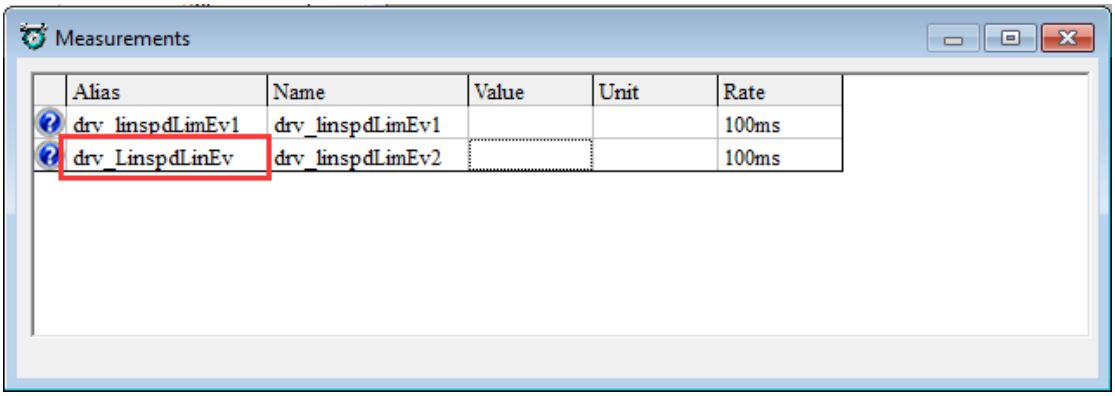


Window of 'AliasManage' will pop-up.

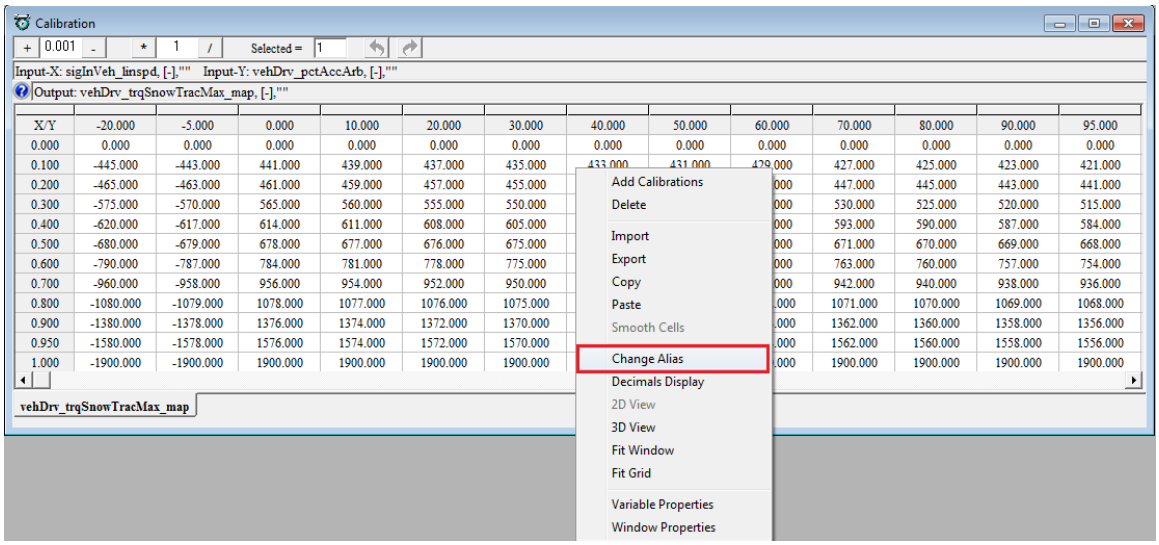
2) Input name of ideal alias to tab shown in red box below. Then, click 'OK'

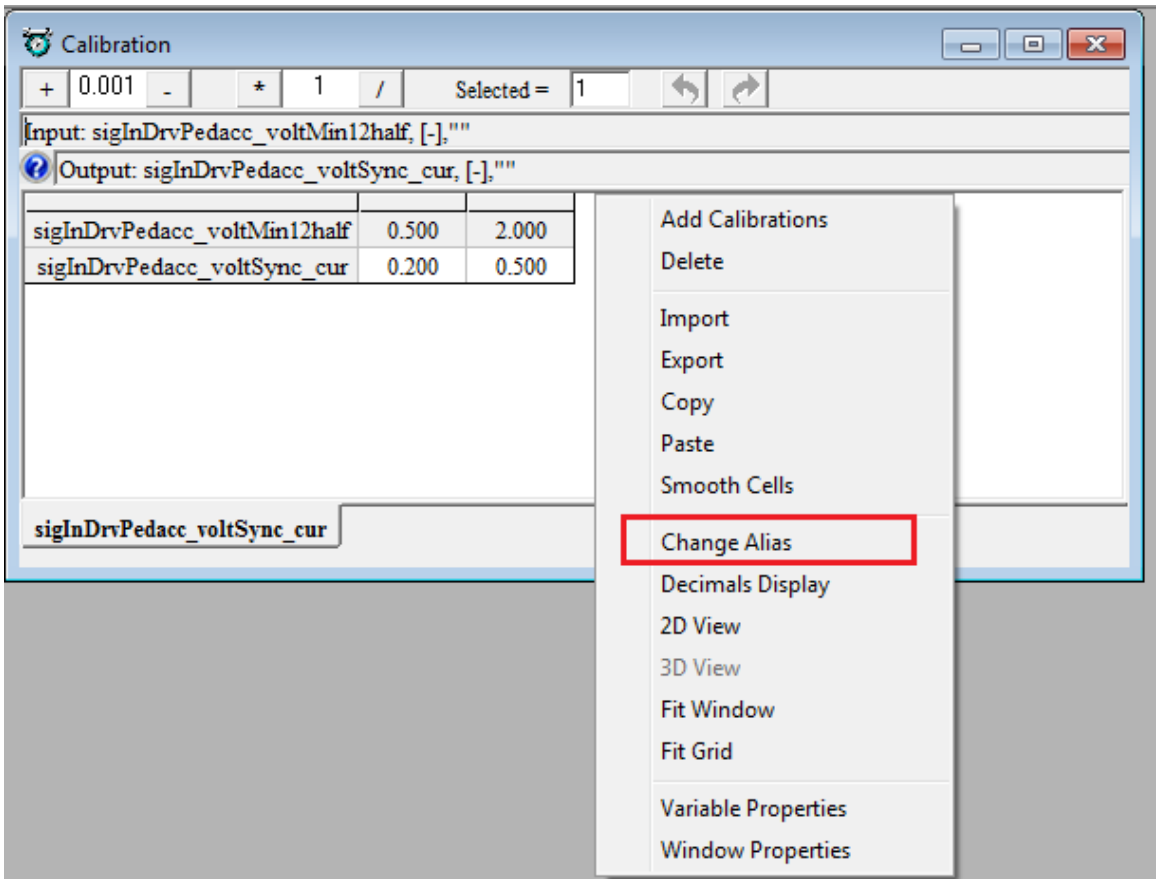


3) Alias of ‘drv_linspdLimEv2’ is replace by ‘drv_linspdLimEv’.



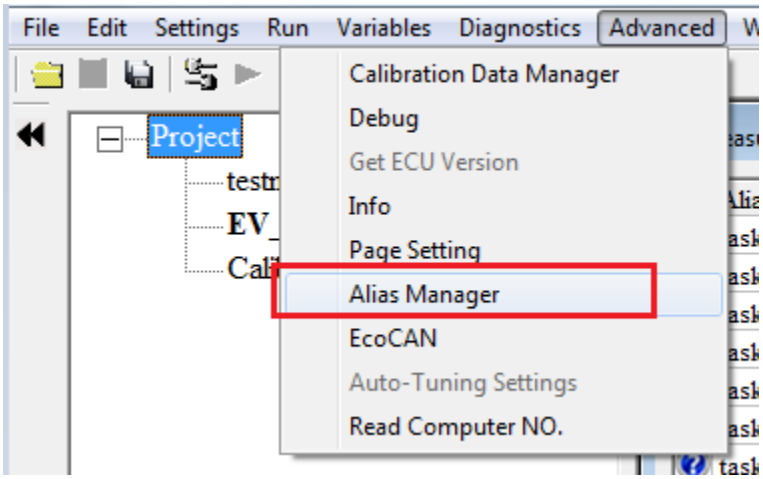
Note: If you want to change the Alias of MAP and CUR variables, you need right click on the table, then choose ‘Change Alias’.

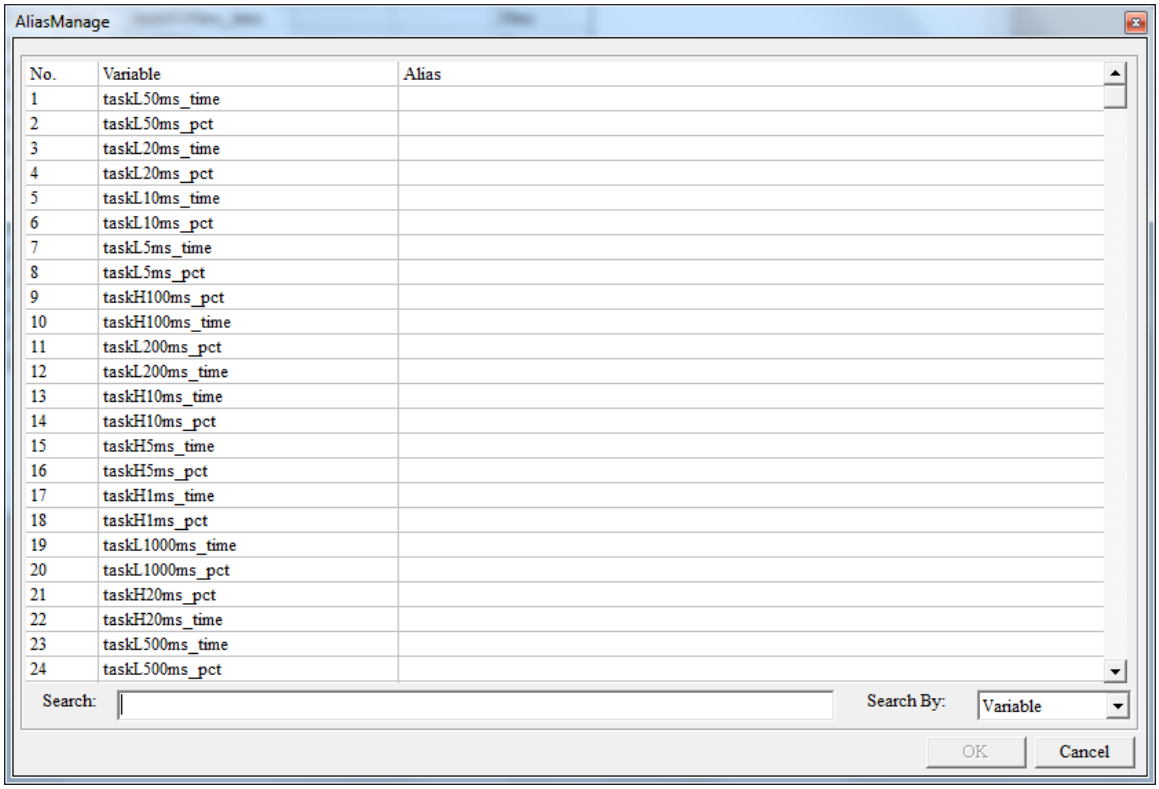




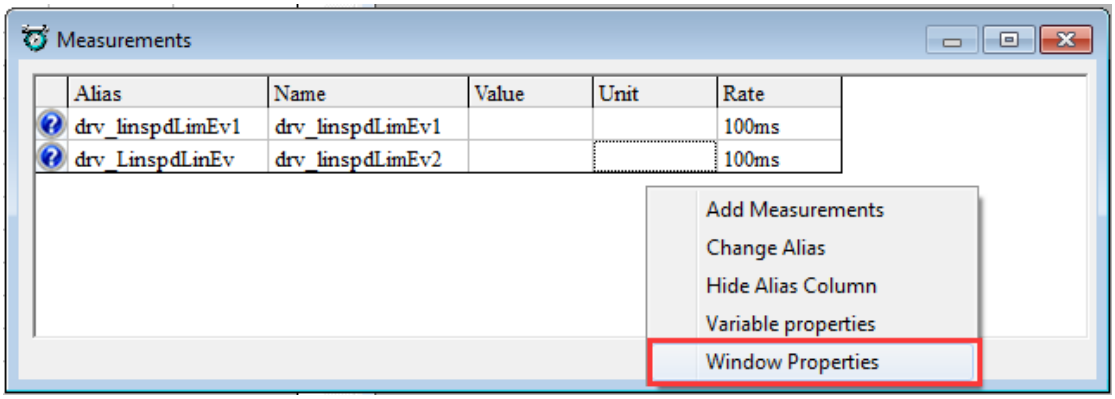
Note: It is supported to manage the alias of all variables at the same window.

1) Go to menu->Advanced->Alias Mange, when it finishes, please click 'OK'.



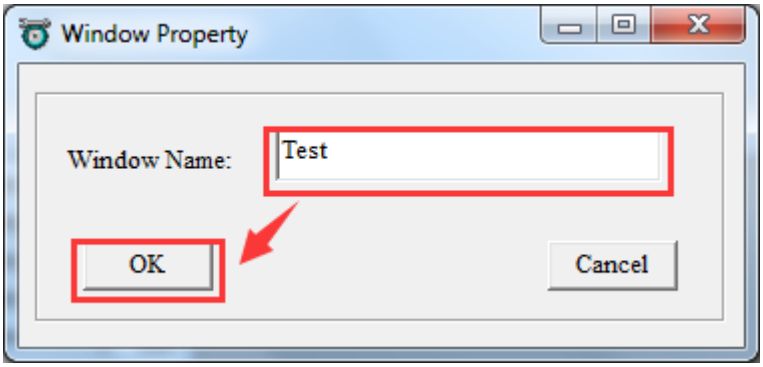


5.1.3 Window Name Configuration

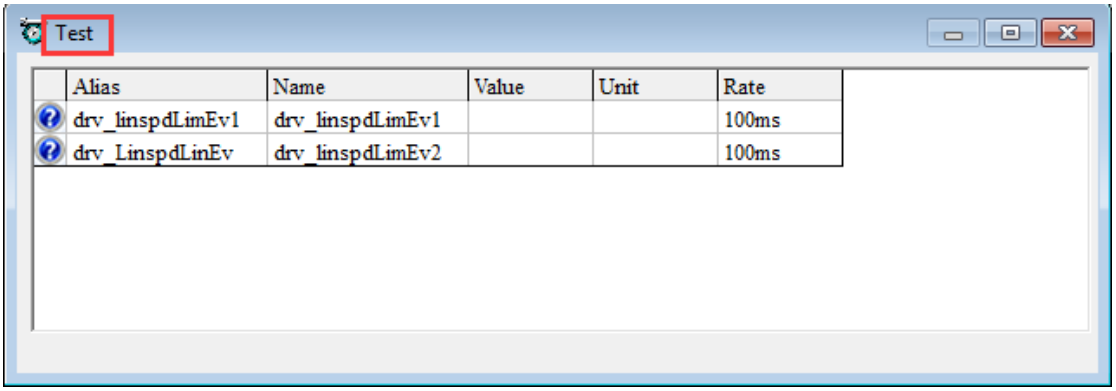


Right click on the window, and choose 'Window Properties'

'Window Properties' pops up, change the default 'Measurement' to 'Test', and then click 'OK'.

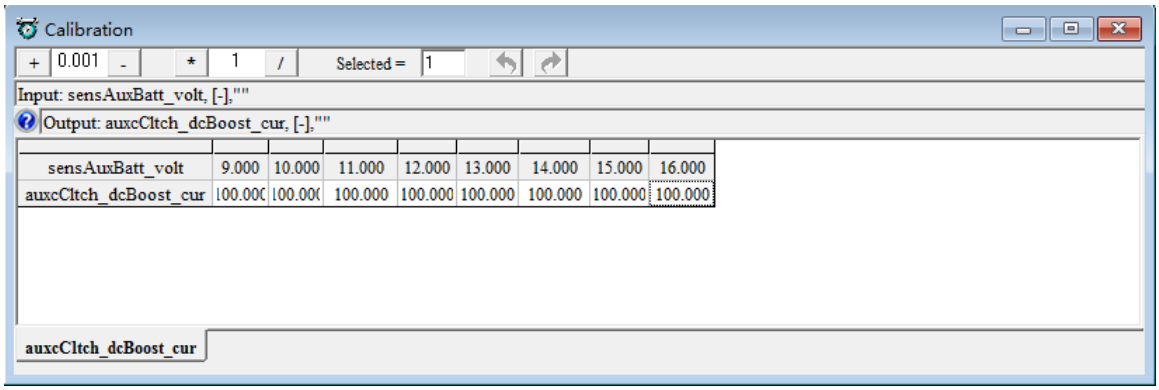


Then, the name of window is changed as shown in picture below.

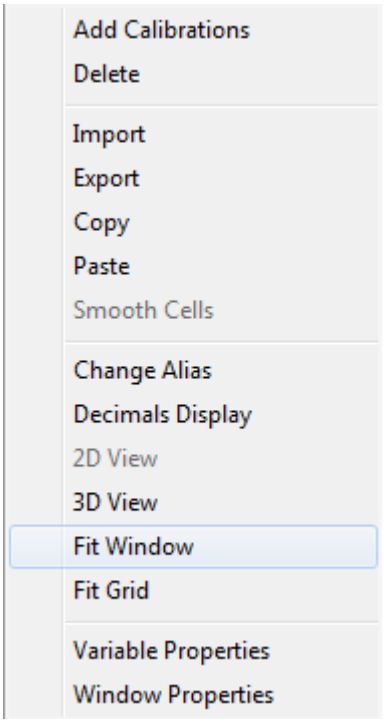


5.1.4 Fit Window/Grid

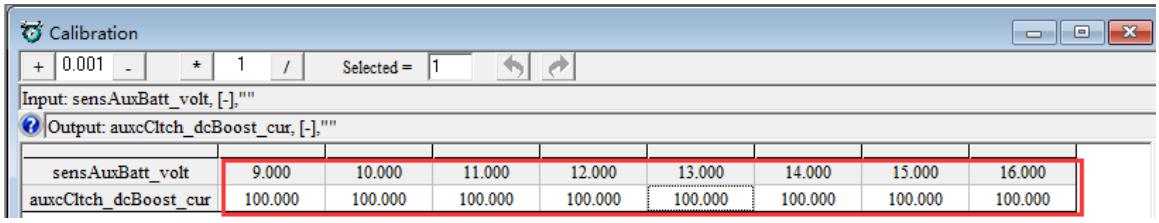
Fit Cell of table to Window or by Word Length



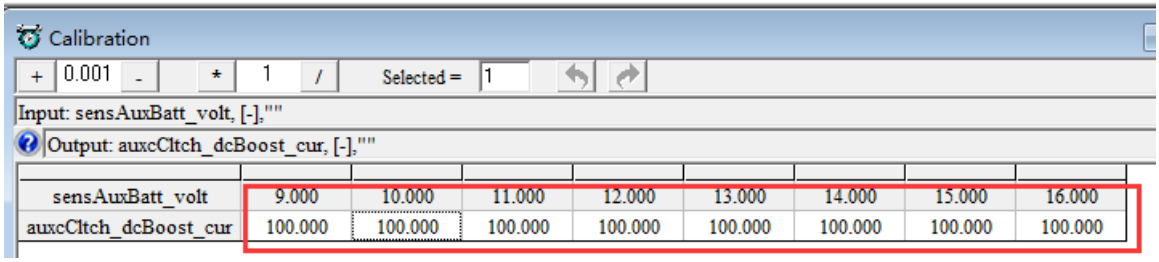
Right click on the cur/map calibration window, click 'Fit Window',



Then the width of cell would be adjusted according to width of window.



Right click on the cur/map calibration window, click ‘Fit Grid’, the width of cells will be adjusted according to the word length.



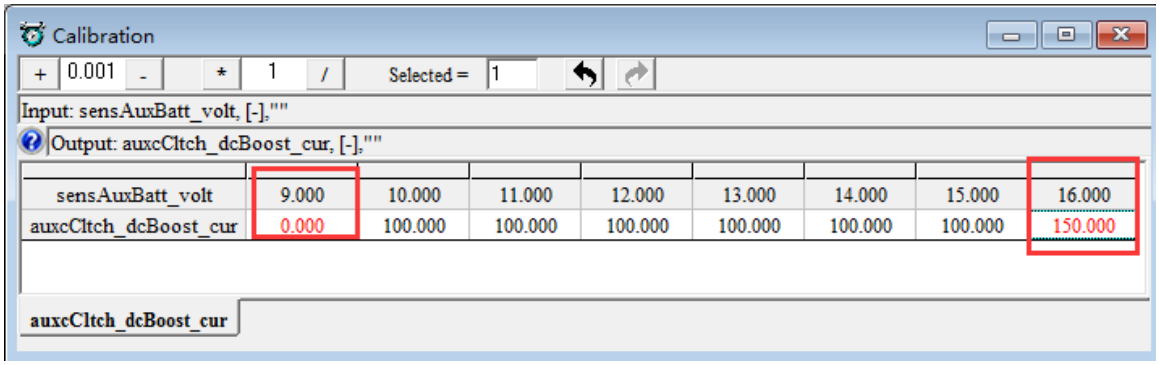
5.1.5 Smooth Cells

1-D linear interpolation could be implemented to quickly calibrate curve.

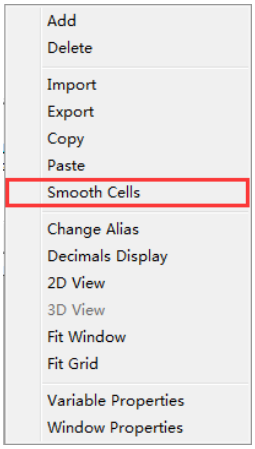
This function is open to curve type variable, it will cover map type in the future.

Steps are presented below.

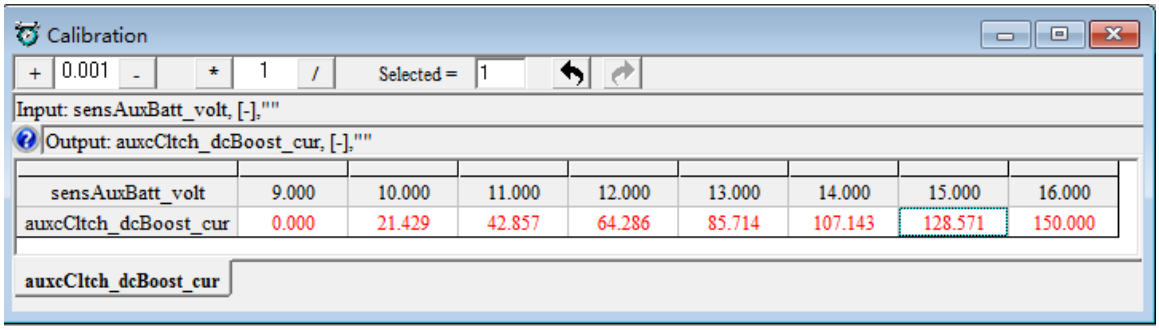
Set ideal calibration value at maximum and minimum index,



Then right click curve window, se**lect ‘Smooth Cells**’,



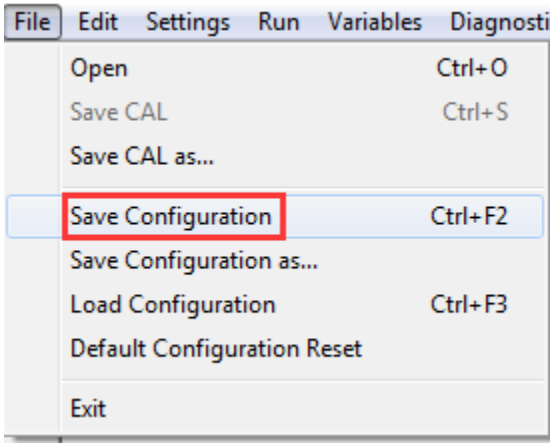
You can see the interpolated data as below.



5.1.6 Save Configuration

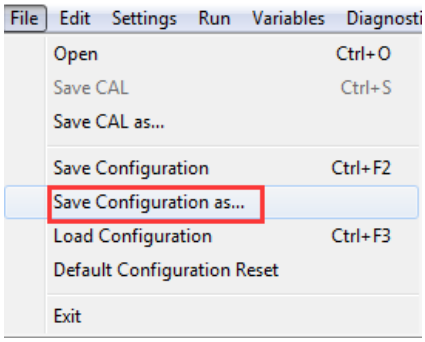
When windows are configured by aforementioned methods, it could be saved as a configuration to be used next time.

Go to menu->File->Save Configuration



You can also save the setting to a new configuration file.

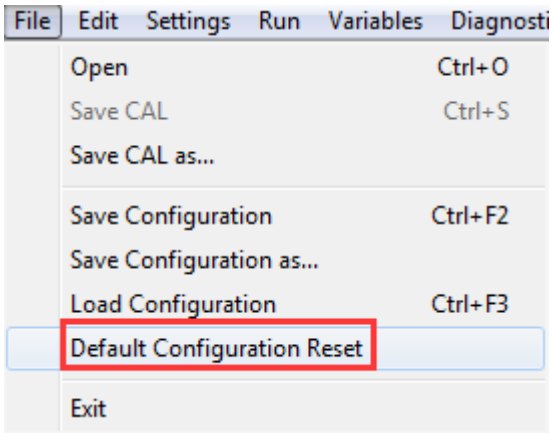
Go to menu->File->Save Configuration as



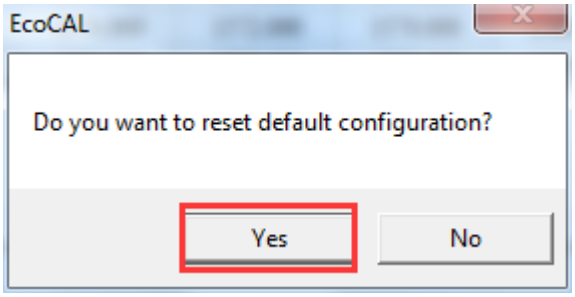
5.1.7 Reset to Default Configuration

This function can always take you back you to initial clean setting when you go too far.

Go to menu->File->Default configuration Reset



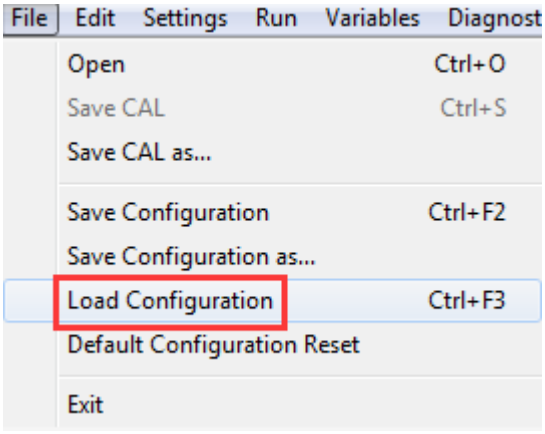
Then, click 'Yes'.



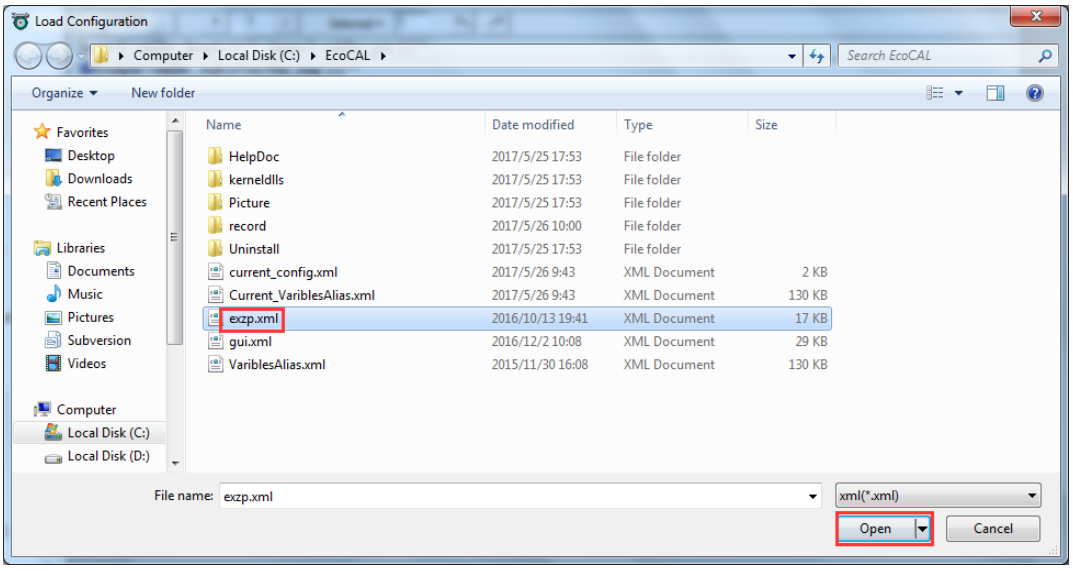
The current setting is the default configuration setting.

5.1.8 Load Configuration

Go to menu->File->Load configuration



Choose the configuration file then click 'Open'.



5.2 Advanced Function of EcoCAL

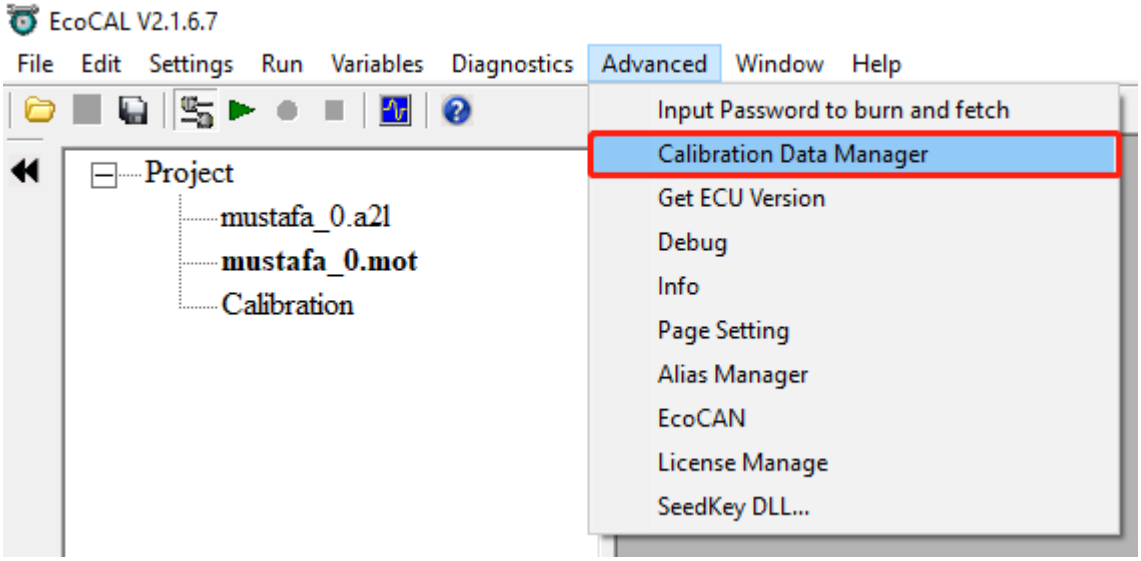
5.2.1 Calibrations Data Management

There are serval conditions that the user might want to use the Calibrations data management function:

a. The customer might need to update their calibration file to a new version in order to fit it in the new version of software.
b. Users want to compare two calibration files

In order to do so, please follow the steps below to compare and copy files,

1) Go to menu-> Advanced-> Calibration Data Manger

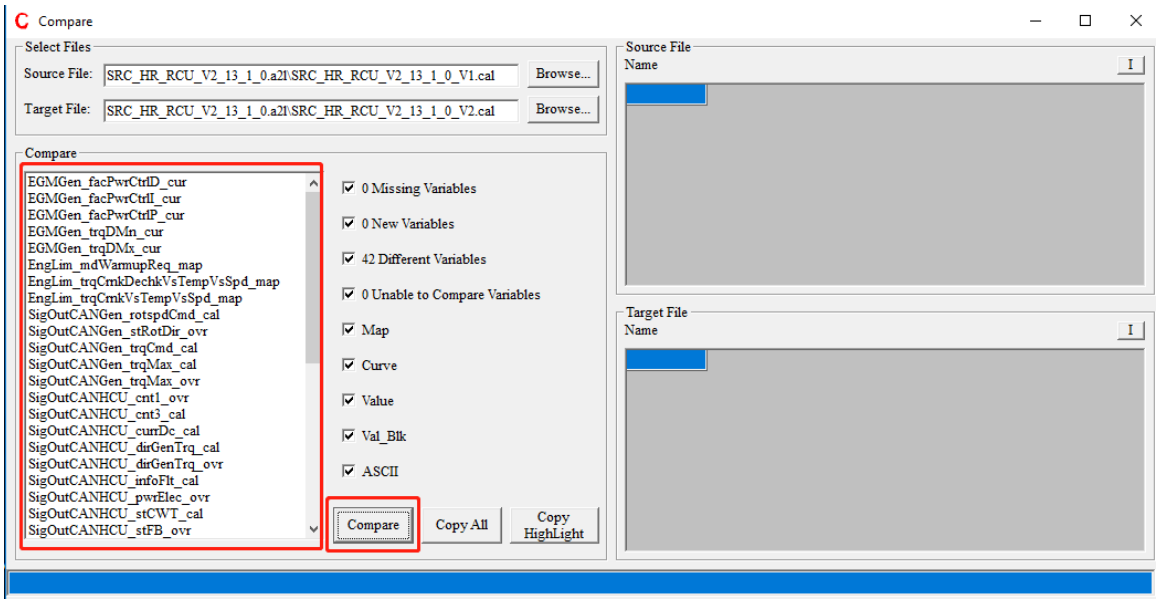


2) Click 'Browse' to open the. CAL/. HEX/.MOT and .A2L files

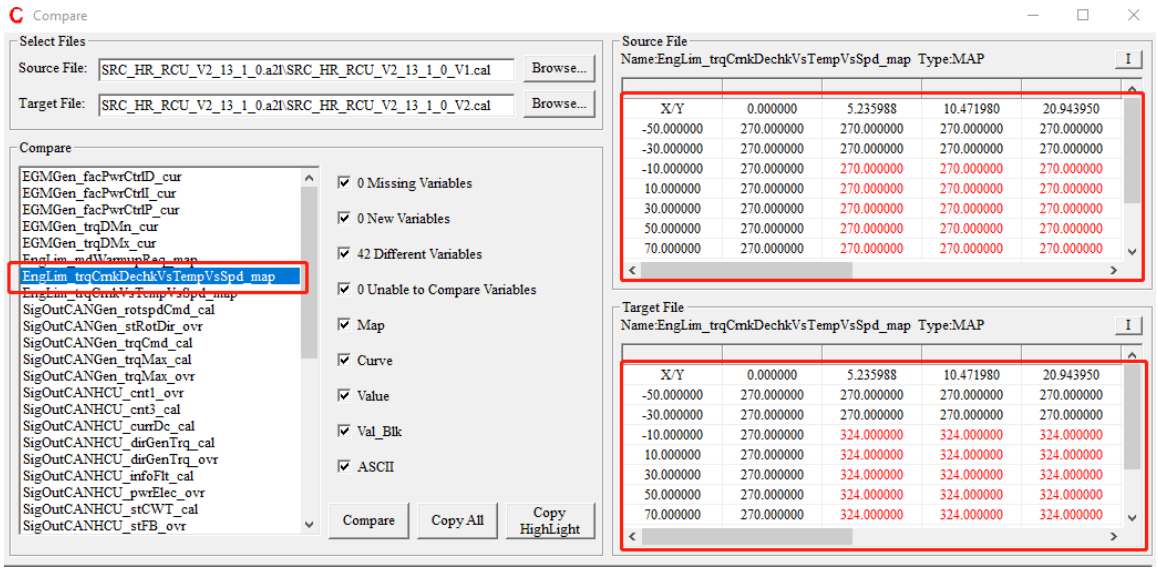
Source file is the new calibration file. Target file is the old file.

3) Click ‘Compare’ button

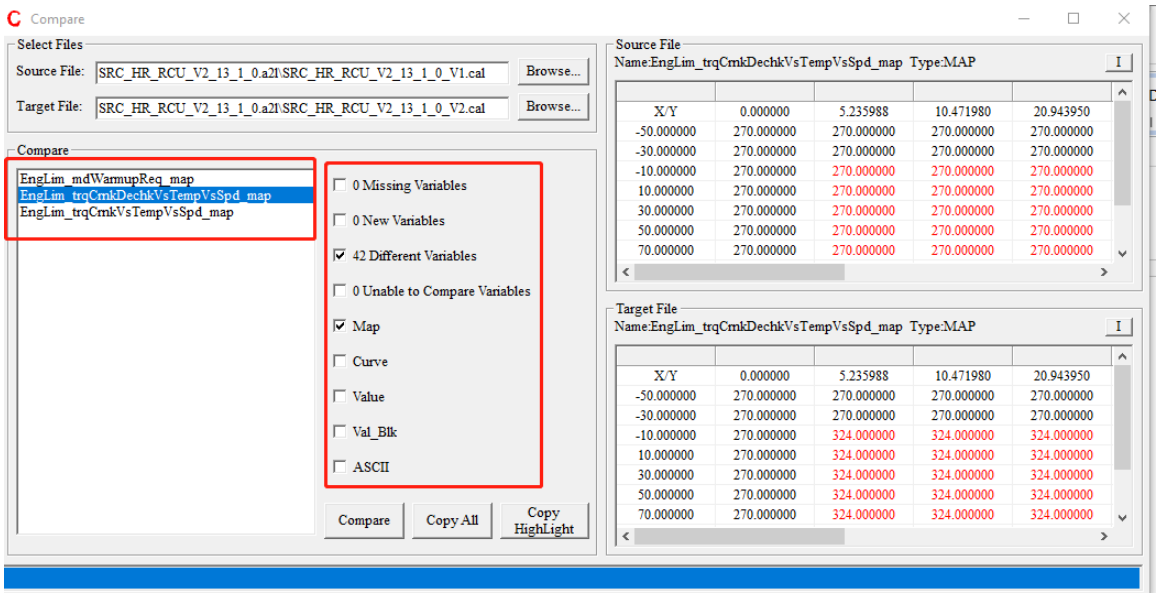
All the different variables between the source file and the target file will be shown in the left part.



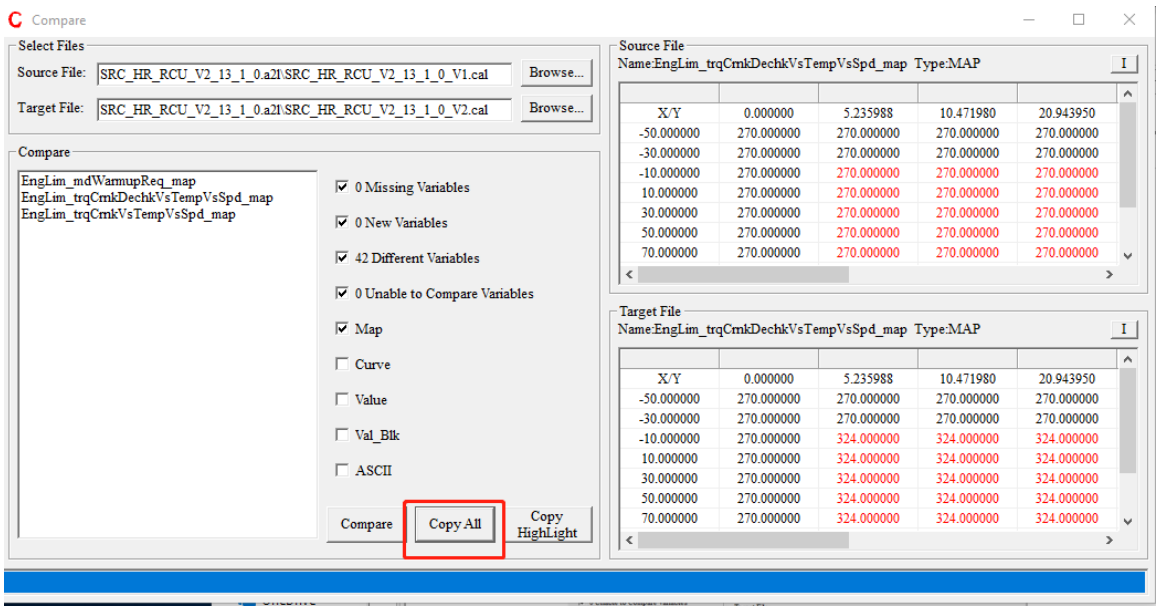
Click on the variables you want to know about the details, which will be shown in left with the different values in red.



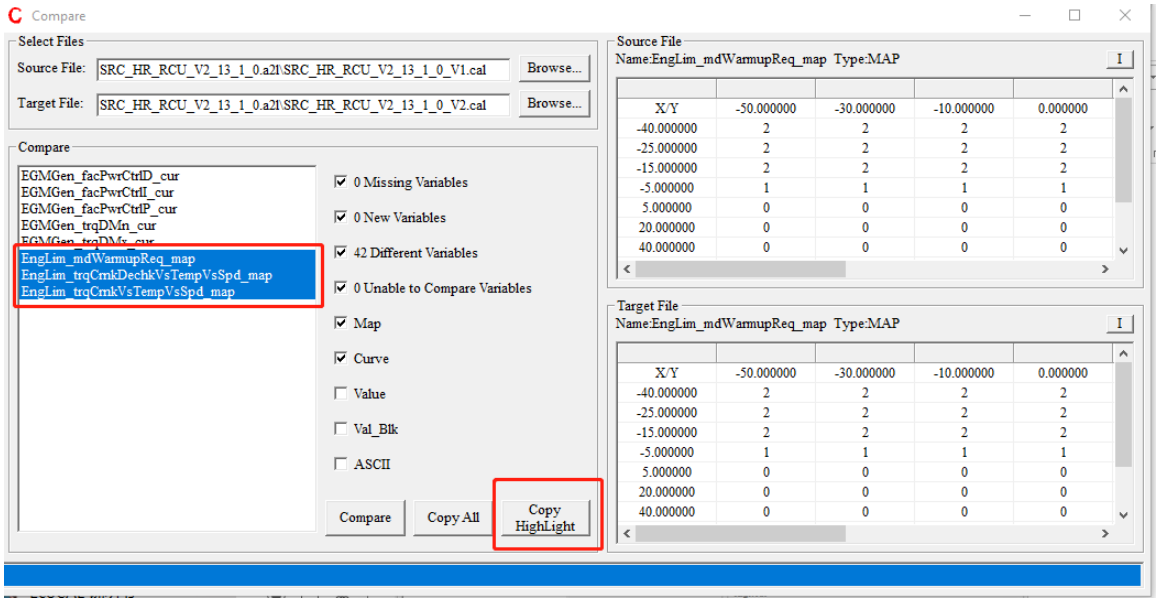
4) The left part will only show the name of the relevant variables you check in the middle. Please note, all the variables are checked by default.



5) After the comparison, the user could use “Copy All” to get a new file with the new value form the source file for all the different variables and keep the other values same as the target value.



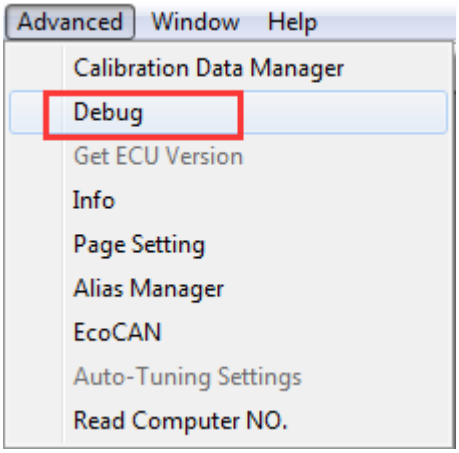
Or the user can click on the variables that he/she want to change in the right to highlight them and click the Copy Highlight to get a new file with all the highlighted variables same as the source file and keep the other values same as the target value.

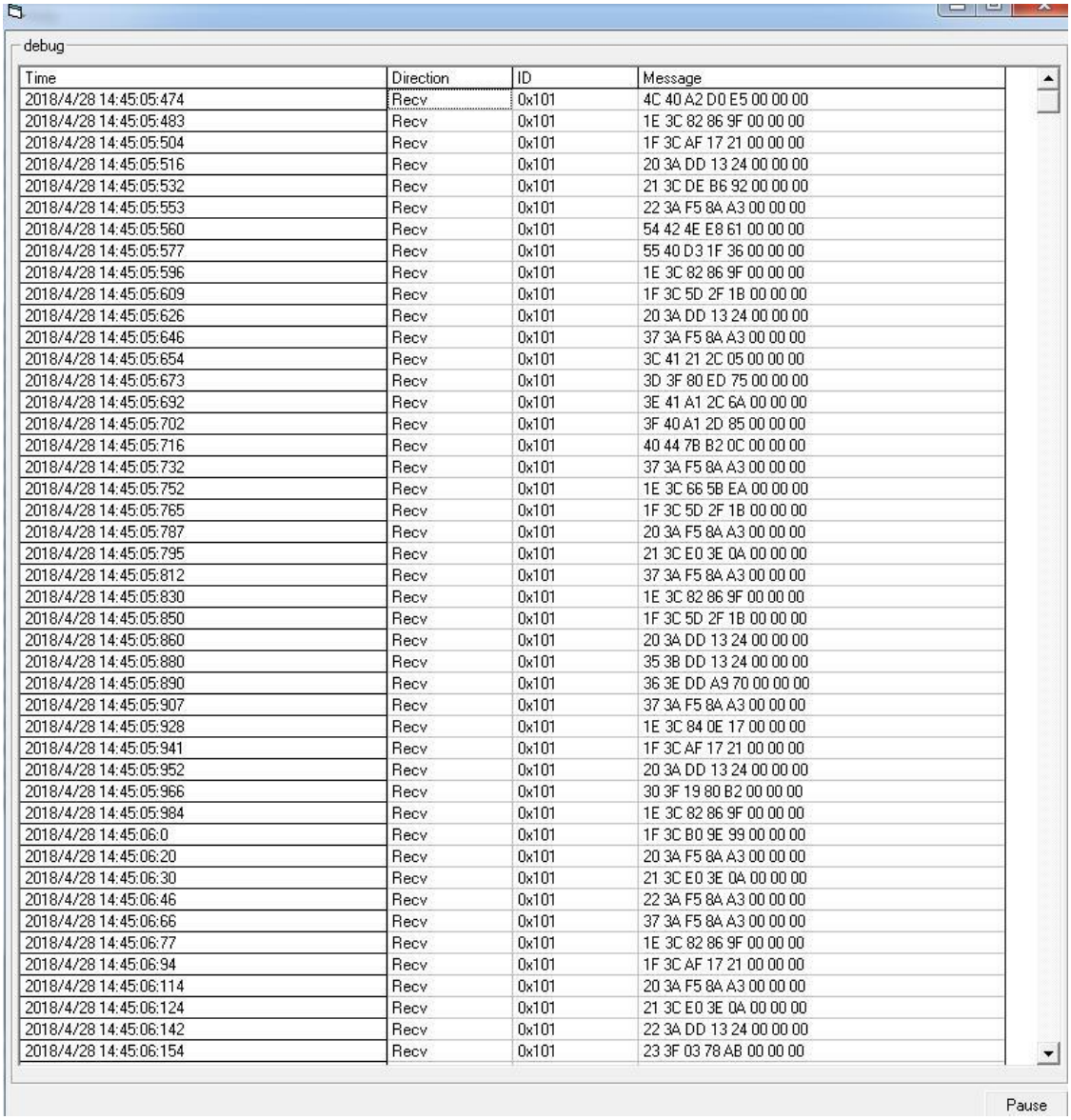


5.2.2 Debug

The Debug window reads the communication between VCU/HCU and EcoCAL.

Go to menu->Advanced->Debug





debug

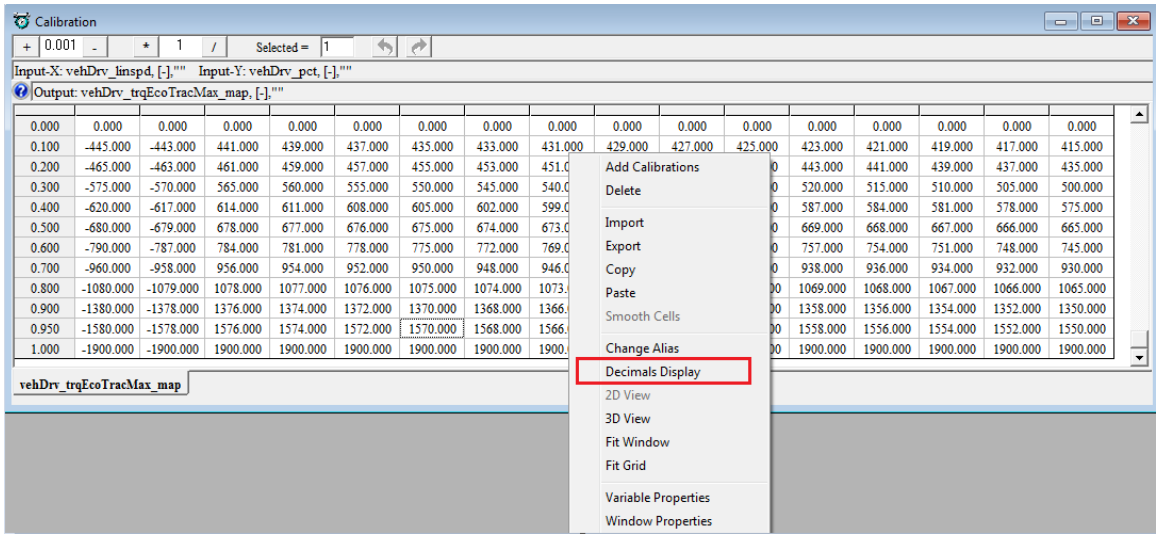
Time	Direction	ID	Message
2018/4/28 14:45:05:474	Recv	0x101	4C 40 A2 D0 E5 00 00 00
2018/4/28 14:45:05:483	Recv	0x101	1E 3C 82 86 9F 00 00 00
2018/4/28 14:45:05:504	Recv	0x101	1F 3C AF 17 21 00 00 00
2018/4/28 14:45:05:516	Recv	0x101	20 3A DD 13 24 00 00 00
2018/4/28 14:45:05:532	Recv	0x101	21 3C DE B6 92 00 00 00
2018/4/28 14:45:05:553	Recv	0x101	22 3A F5 8A A3 00 00 00
2018/4/28 14:45:05:560	Recv	0x101	54 42 4E E8 61 00 00 00
2018/4/28 14:45:05:577	Recv	0x101	55 40 D3 1F 36 00 00 00
2018/4/28 14:45:05:596	Recv	0x101	1E 3C 82 86 9F 00 00 00
2018/4/28 14:45:05:609	Recv	0x101	1F 3C 5D 2F 1B 00 00 00
2018/4/28 14:45:05:626	Recv	0x101	20 3A DD 13 24 00 00 00
2018/4/28 14:45:05:646	Recv	0x101	37 3A F5 8A A3 00 00 00
2018/4/28 14:45:05:654	Recv	0x101	3C 41 21 2C 05 00 00 00
2018/4/28 14:45:05:673	Recv	0x101	3D 3F 80 ED 75 00 00 00
2018/4/28 14:45:05:692	Recv	0x101	3E 41 A1 2C 6A 00 00 00
2018/4/28 14:45:05:702	Recv	0x101	3F 40 A1 2D 85 00 00 00
2018/4/28 14:45:05:716	Recv	0x101	40 44 7B B2 0C 00 00 00
2018/4/28 14:45:05:732	Recv	0x101	37 3A F5 8A A3 00 00 00
2018/4/28 14:45:05:752	Recv	0x101	1E 3C 66 5B EA 00 00 00
2018/4/28 14:45:05:765	Recv	0x101	1F 3C 5D 2F 1B 00 00 00
2018/4/28 14:45:05:787	Recv	0x101	20 3A F5 8A A3 00 00 00
2018/4/28 14:45:05:795	Recv	0x101	21 3C E0 3E 0A 00 00 00
2018/4/28 14:45:05:812	Recv	0x101	37 3A F5 8A A3 00 00 00
2018/4/28 14:45:05:830	Recv	0x101	1E 3C 82 86 9F 00 00 00
2018/4/28 14:45:05:850	Recv	0x101	1F 3C 5D 2F 1B 00 00 00
2018/4/28 14:45:05:860	Recv	0x101	20 3A DD 13 24 00 00 00
2018/4/28 14:45:05:880	Recv	0x101	35 3B DD 13 24 00 00 00
2018/4/28 14:45:05:890	Recv	0x101	36 3E DD A9 70 00 00 00
2018/4/28 14:45:05:907	Recv	0x101	37 3A F5 8A A3 00 00 00
2018/4/28 14:45:05:928	Recv	0x101	1E 3C 84 0E 17 00 00 00
2018/4/28 14:45:05:941	Recv	0x101	1F 3C AF 17 21 00 00 00
2018/4/28 14:45:05:952	Recv	0x101	20 3A DD 13 24 00 00 00
2018/4/28 14:45:05:966	Recv	0x101	30 3F 19 80 B2 00 00 00
2018/4/28 14:45:05:984	Recv	0x101	1E 3C 82 86 9F 00 00 00
2018/4/28 14:45:06:0	Recv	0x101	1F 3C B0 9E 99 00 00 00
2018/4/28 14:45:06:20	Recv	0x101	20 3A F5 8A A3 00 00 00
2018/4/28 14:45:06:30	Recv	0x101	21 3C E0 3E 0A 00 00 00
2018/4/28 14:45:06:46	Recv	0x101	22 3A F5 8A A3 00 00 00
2018/4/28 14:45:06:66	Recv	0x101	37 3A F5 8A A3 00 00 00
2018/4/28 14:45:06:77	Recv	0x101	1E 3C 82 86 9F 00 00 00
2018/4/28 14:45:06:94	Recv	0x101	1F 3C AF 17 21 00 00 00
2018/4/28 14:45:06:114	Recv	0x101	20 3A F5 8A A3 00 00 00
2018/4/28 14:45:06:124	Recv	0x101	21 3C E0 3E 0A 00 00 00
2018/4/28 14:45:06:142	Recv	0x101	22 3A DD 13 24 00 00 00
2018/4/28 14:45:06:154	Recv	0x101	23 3F 03 78 AB 00 00 00

Pause

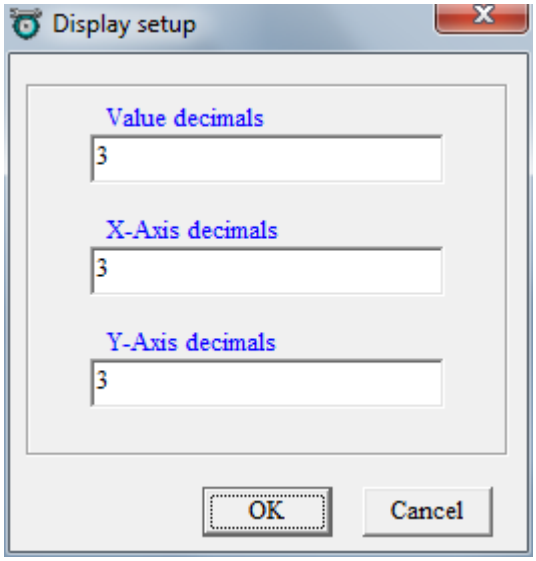
5.2.3 Decimals Display

You can change the number of decimal places of the values that are displayed in the variable window and calibration window.

Right click on the window of calibration variables.



The 'Display setup' window pops up



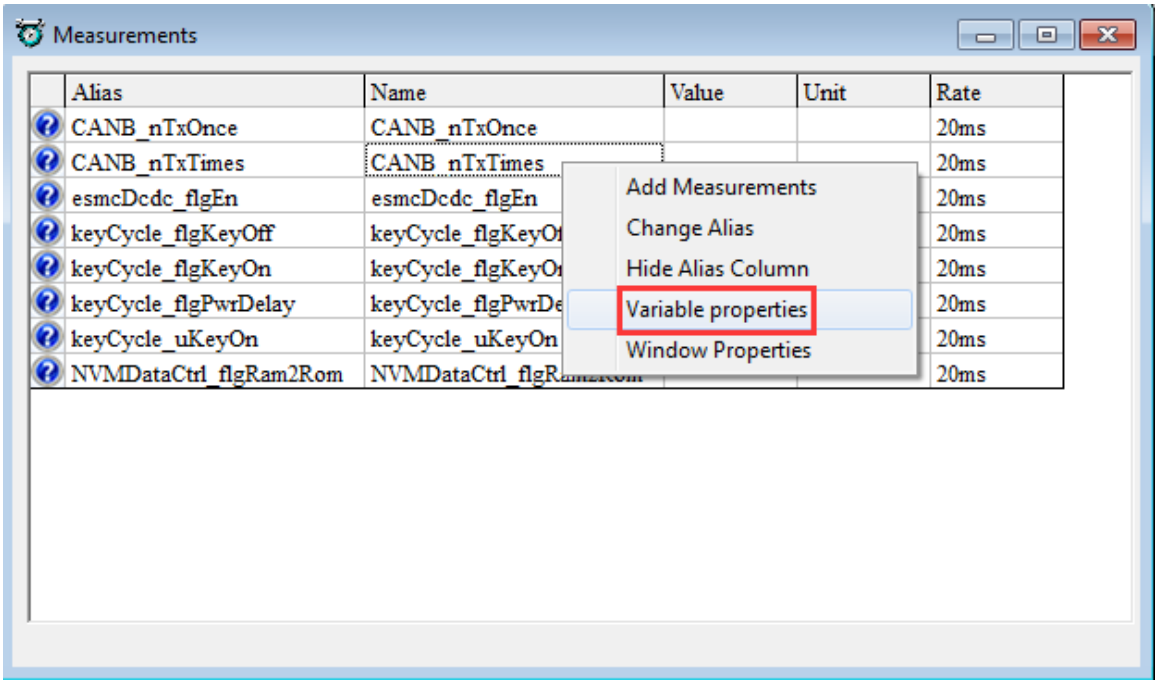
5.2.4 Variable Properties

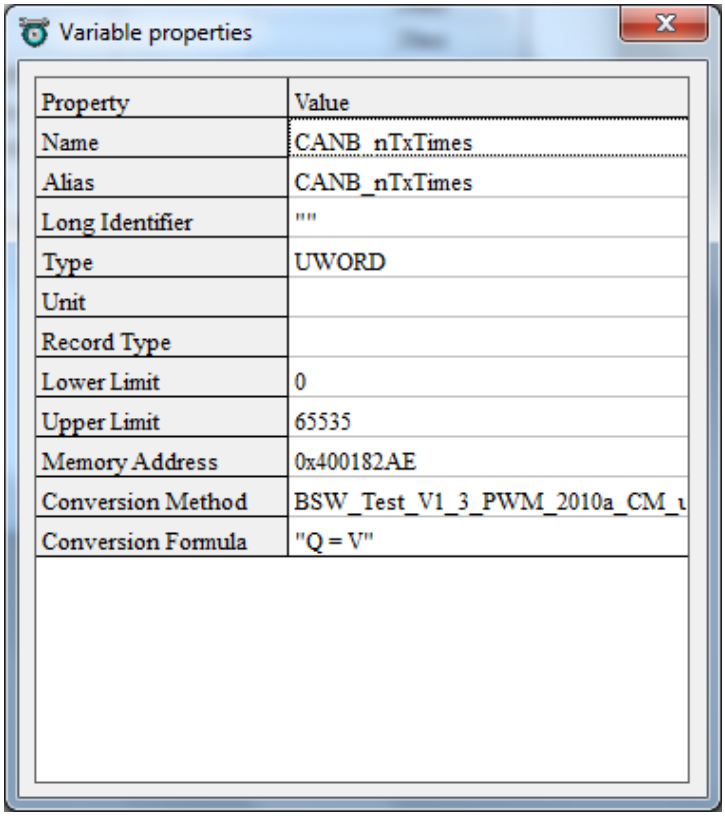
The detailed properties of the variables can be viewed in the variable property window.

Right click on the variable, choose ‘Variable Properties’, the properties window will pop up.

Measurement variable properties:

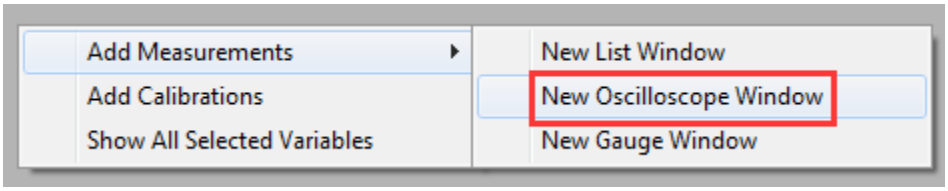
Choose the variable that you want to see, then right click, and choose ‘Variable Properties’



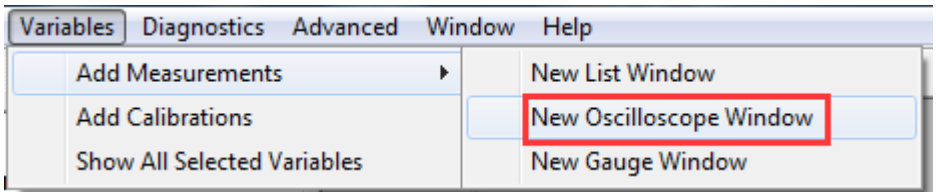


5.2.5 Virtual Oscilloscope

1) Right click on the blank area of window, click 'Add Measurements->New Oscilloscope Window'

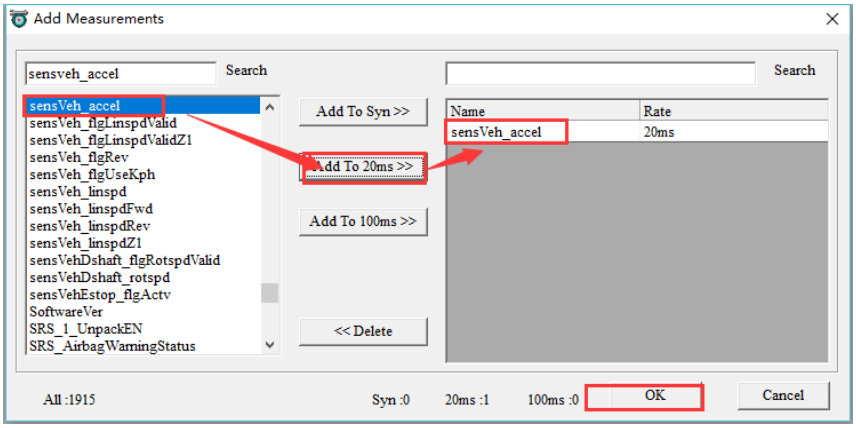


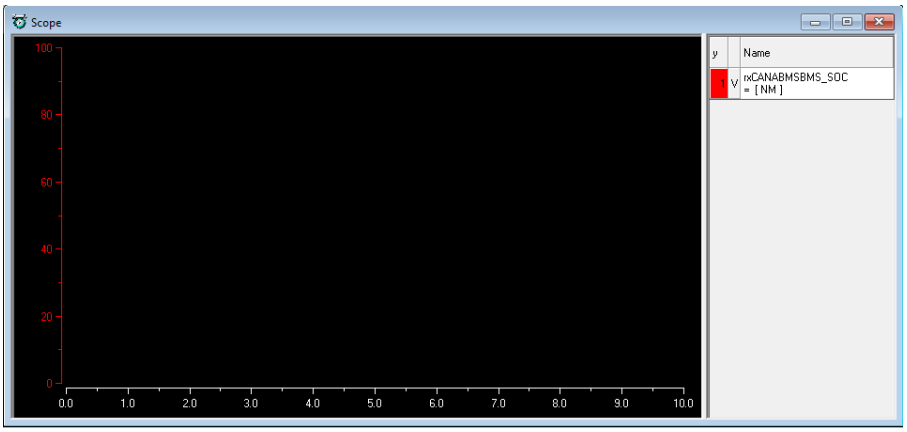
You can also 'go to menu->Variables->Add Measurements->New Oscilloscope Window', to add the oscilloscope window.



Note: You can only add one Oscilloscope in each page.

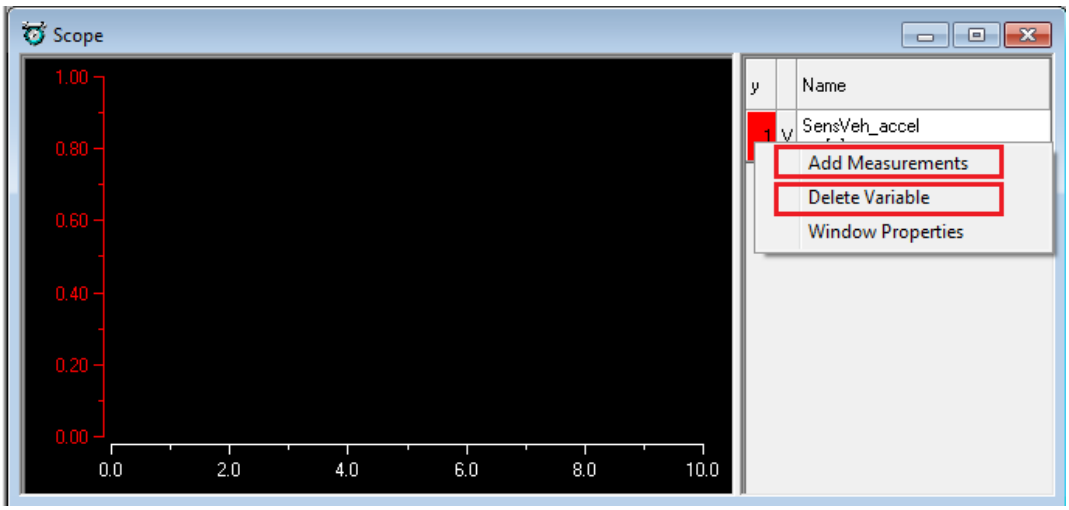
2) Add the measured variables that you want to show in the Oscilloscope window





3) Connect to ECU, then start measuring.

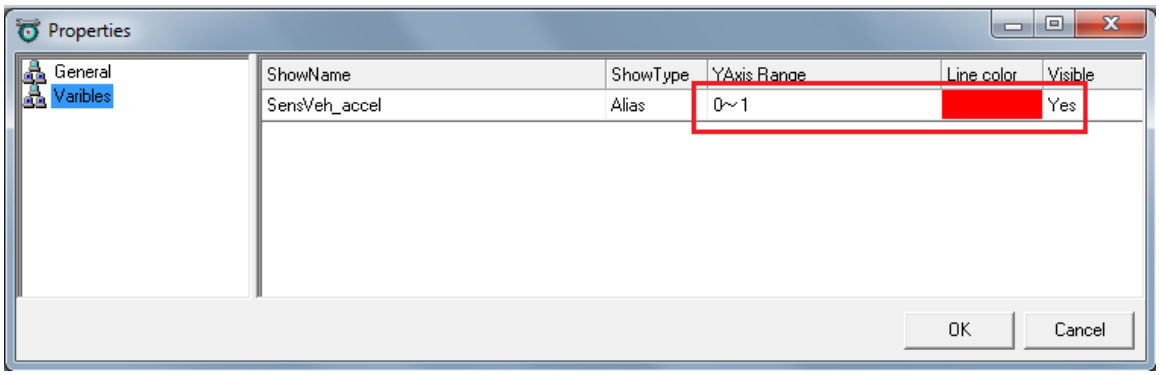
4) Right click on the scope window and then add or delete the variables that you want.



Note: when you add the variable, you should stop measuring first.

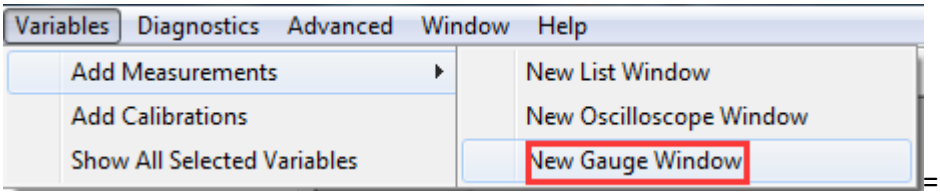
5) Change the properties of scope window.

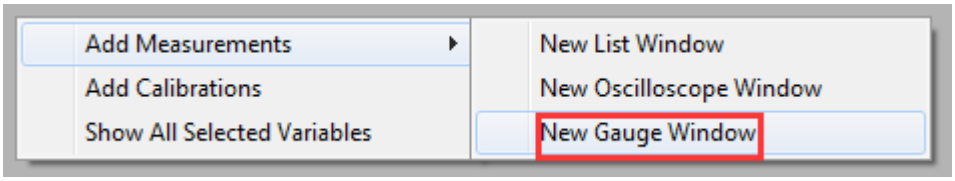
Right click on the scope window, then click 'Window Properties'. You can change the Max/ Min value of variable, the lines color etc. Click 'OK' when finished.



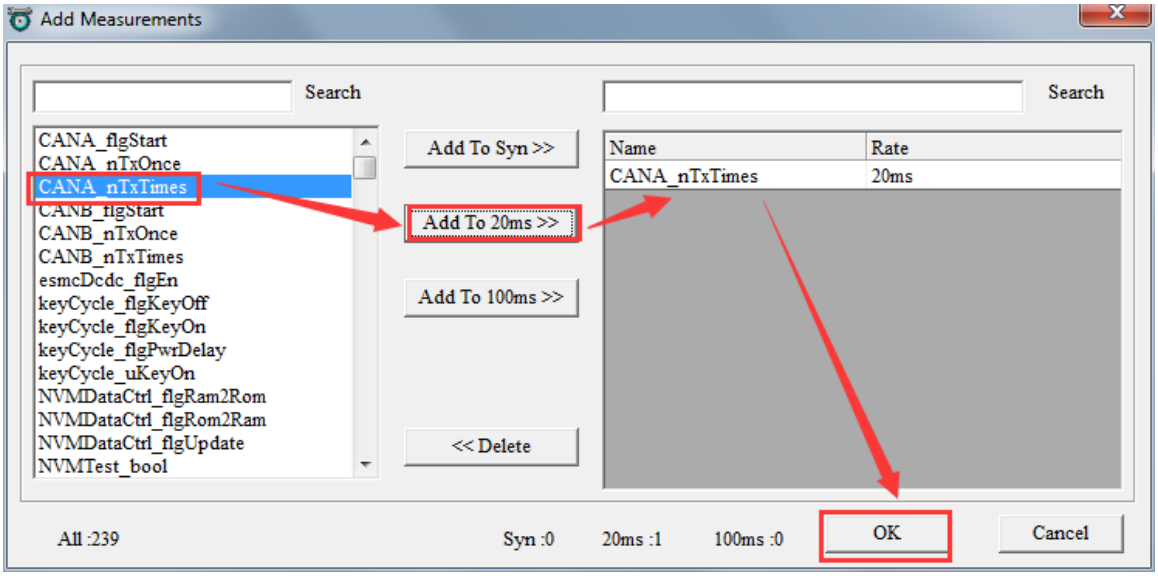
5.2.6 Gauge Monitoring

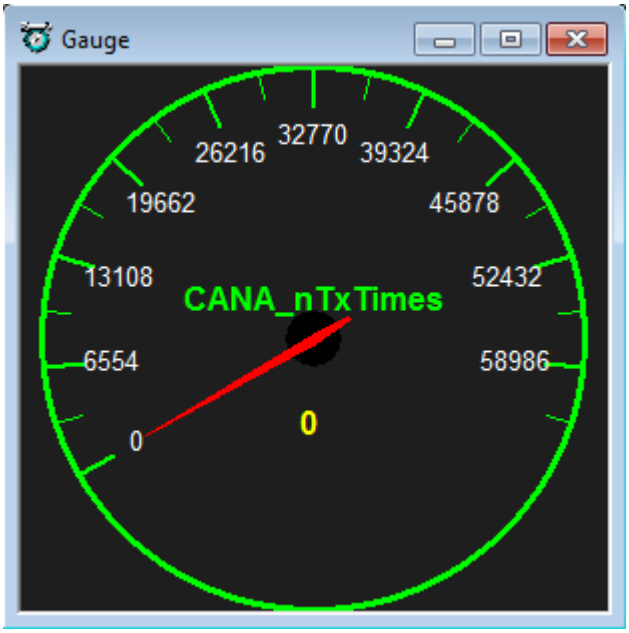
Select '**Variables->Add Measurements->New Gauge Window**' or right click on the table, then choose '**New Gauge Window**'.



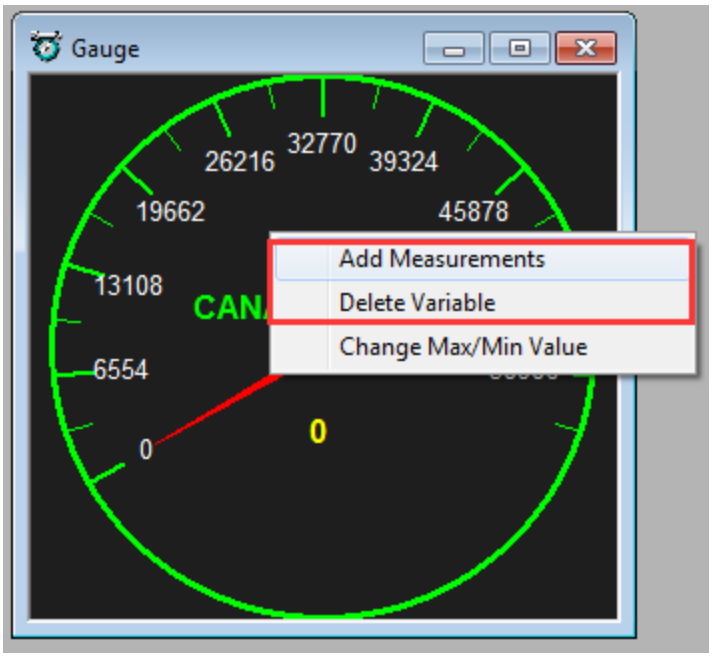


Add the measured variables that you want to show in the Gauge window, here, 'CANA_nTxTimes' is selected.



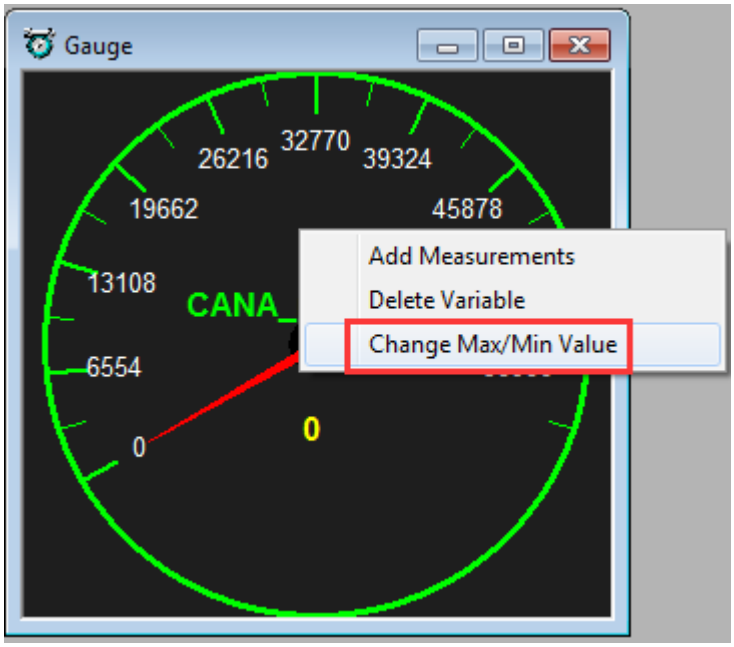


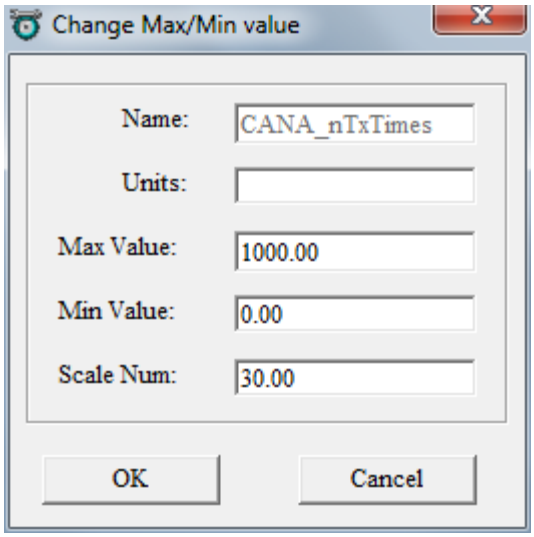
Right click on the Gauge window, and then add or delete the variables that you want.

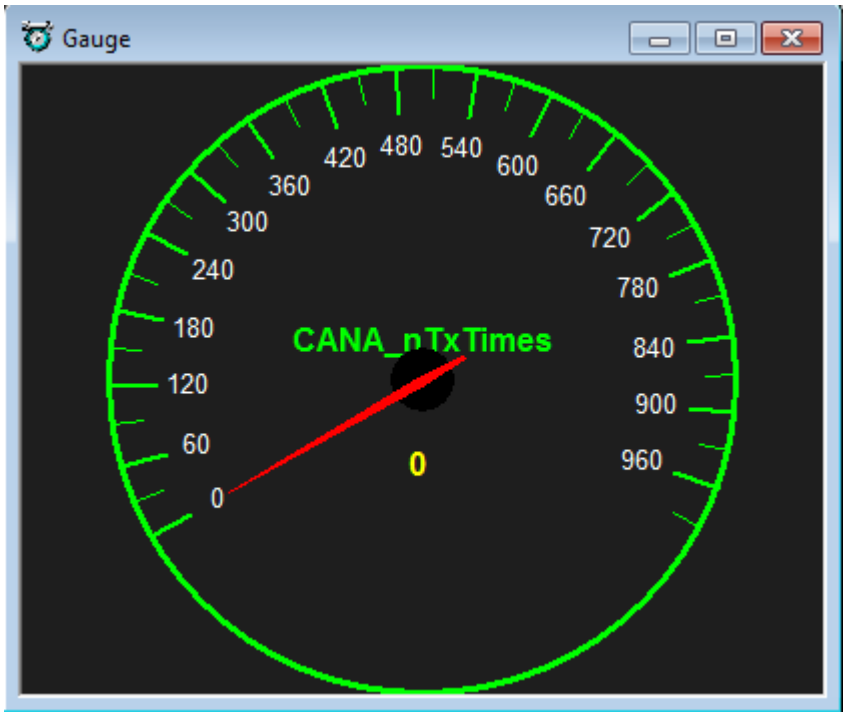


It is possible to change measuring range.

Right click on the Gauge window, and then click 'Change Max/Min Value'. You can change the Max/ Min value of variable, the Scale Numb, etc.



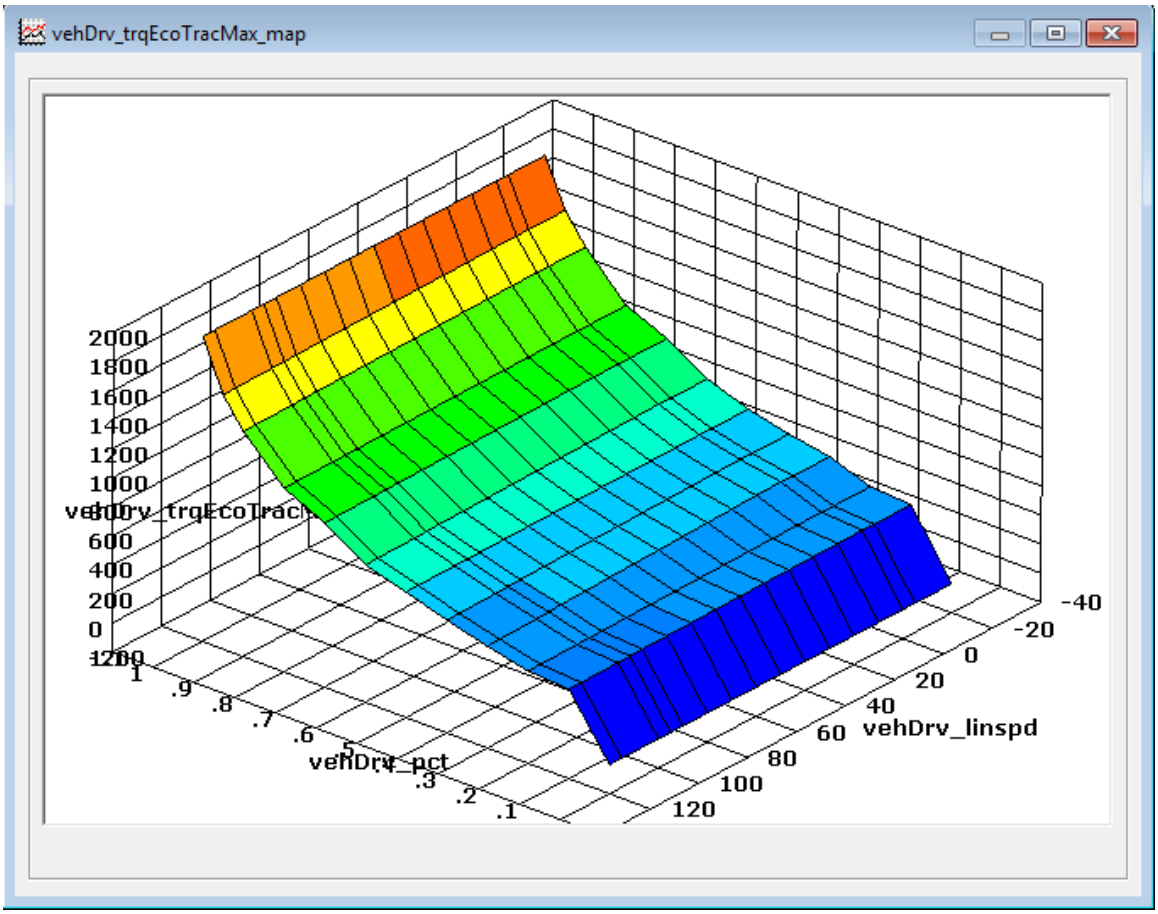


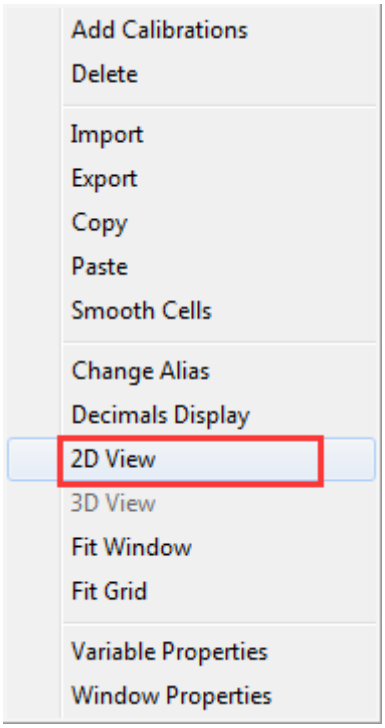


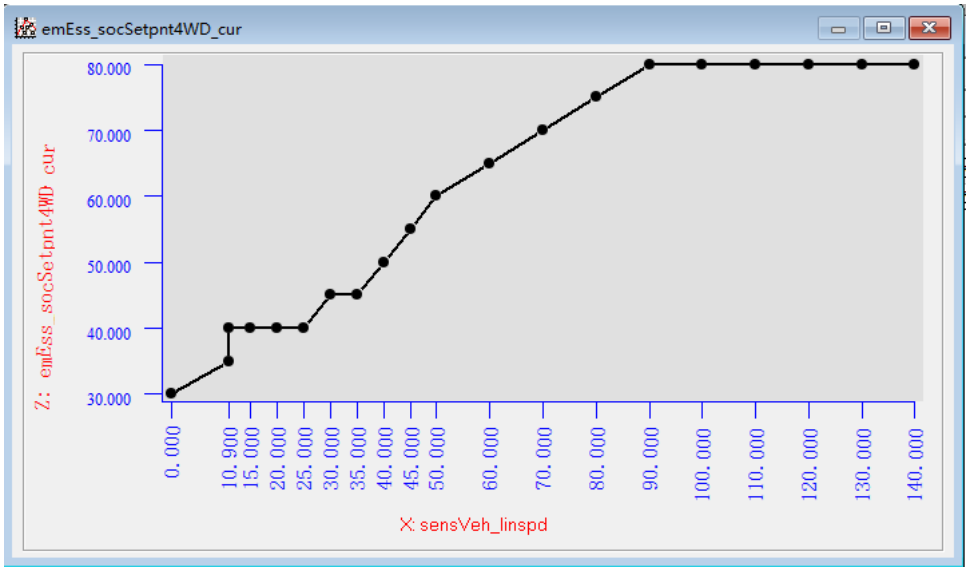
5.2.7 3D/2D View of Maps

This function could help visualize calibration tables.

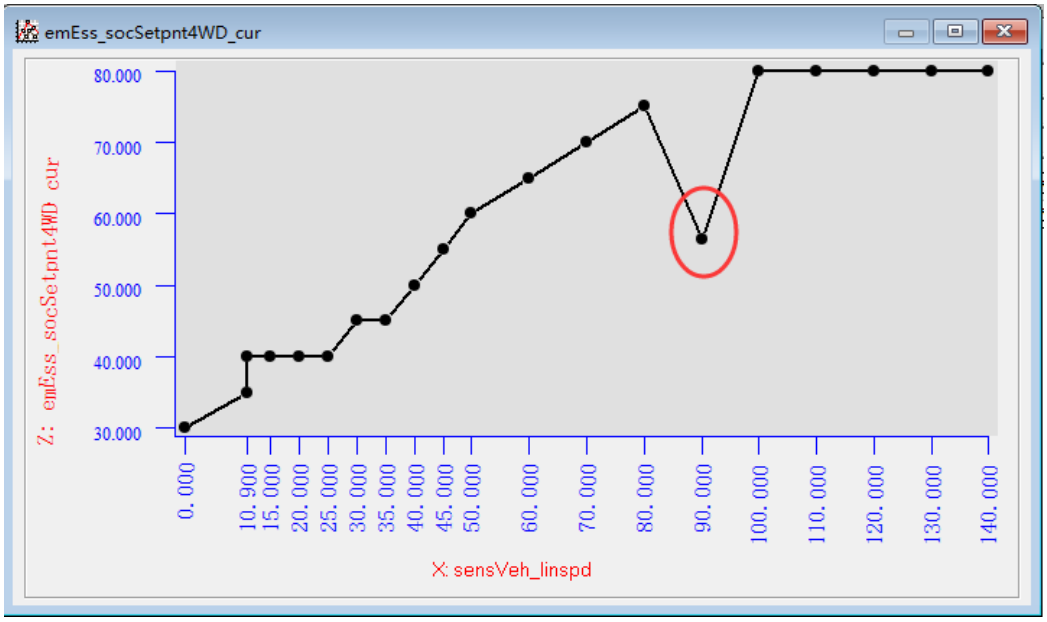
Right click on the table, then choose ‘3D View’ or ‘2D View’, then you can see the graph.







'2D View' window also support **graphical based calibration**. You can use mouse to drag one of the points to revise calibration value.

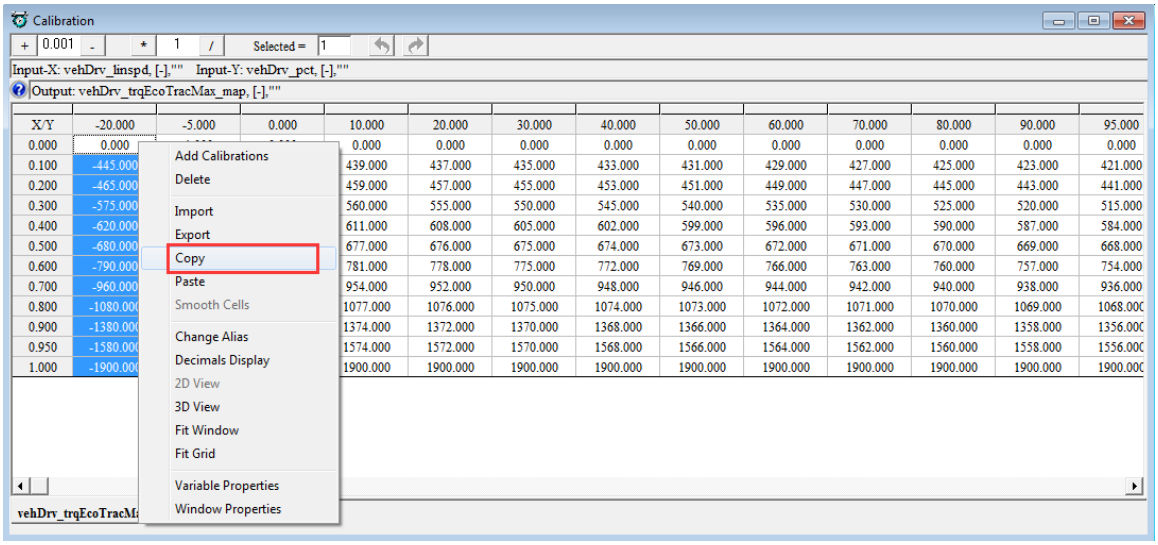


5.2.8 Copy / Paste in Table

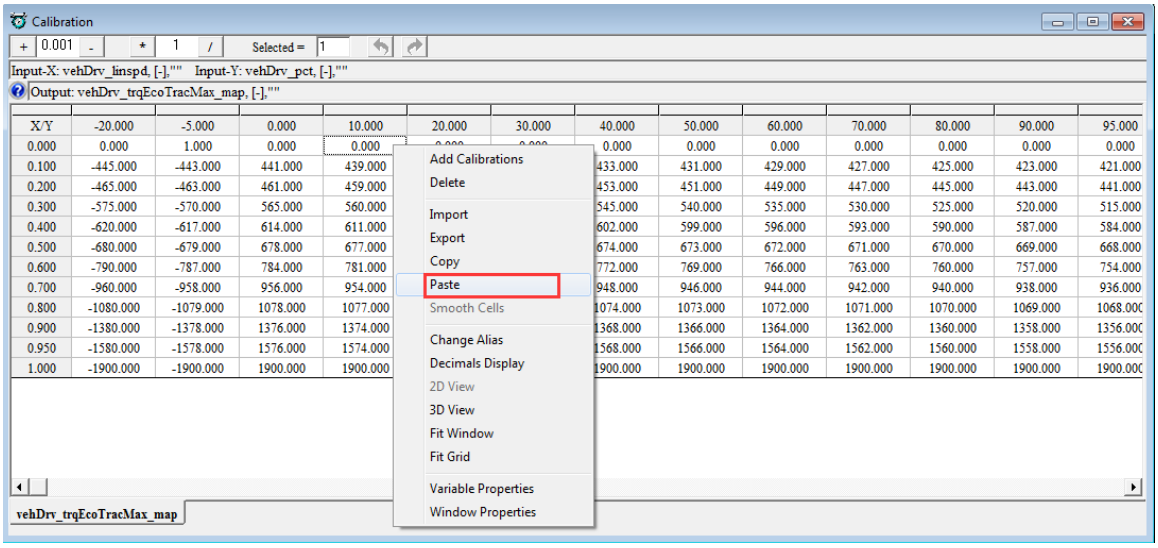
Copy and Paste function are supported in CUR and MAP tables, the function is similar to that to Excel.

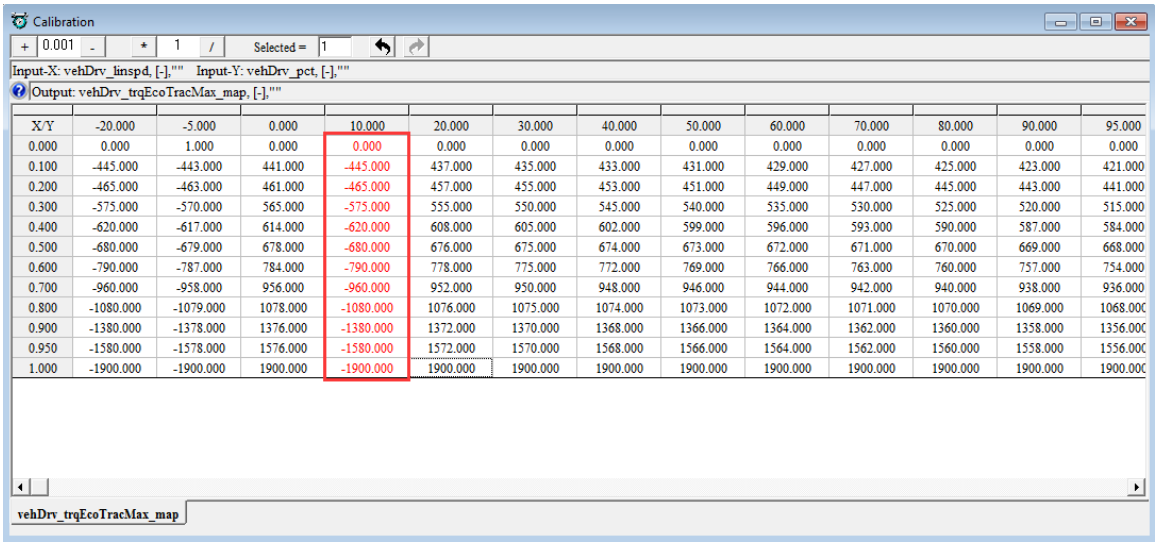
Example

Choose the area of cell you want to copy, then right click, and click 'Copy'.



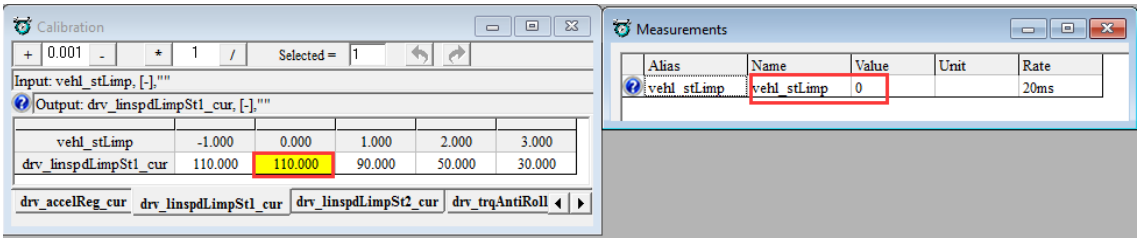
Click the first cell of area you want to paste, then right click and click ‘Paste’





5.2.9 Highlight of Table Cells

When calibrating curve or map, it is good to know the 1-D / 2-D calibration data identified with respect to the real time hardware operation point. EcoCAL supports this function by highlighting the cell of data identified. The measurement variable of curve/map shall be added to measurement window to enable this function.



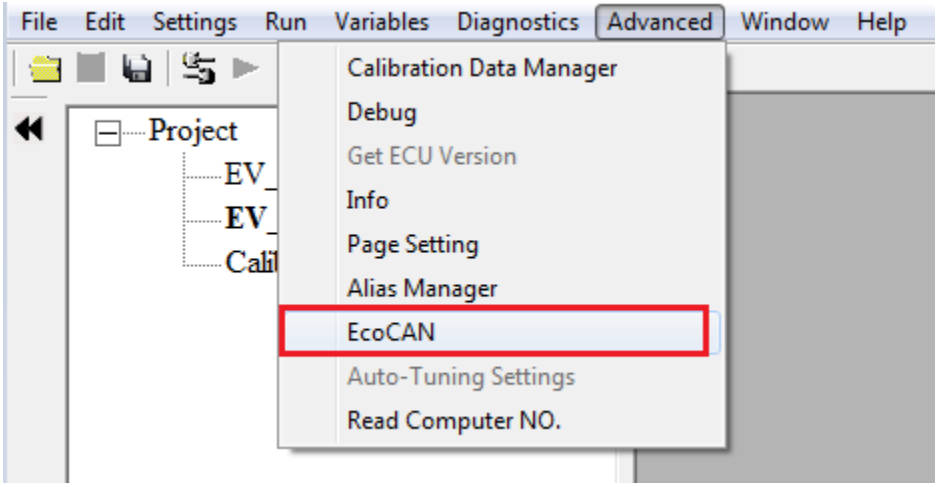
5.2.10 EcoCAN

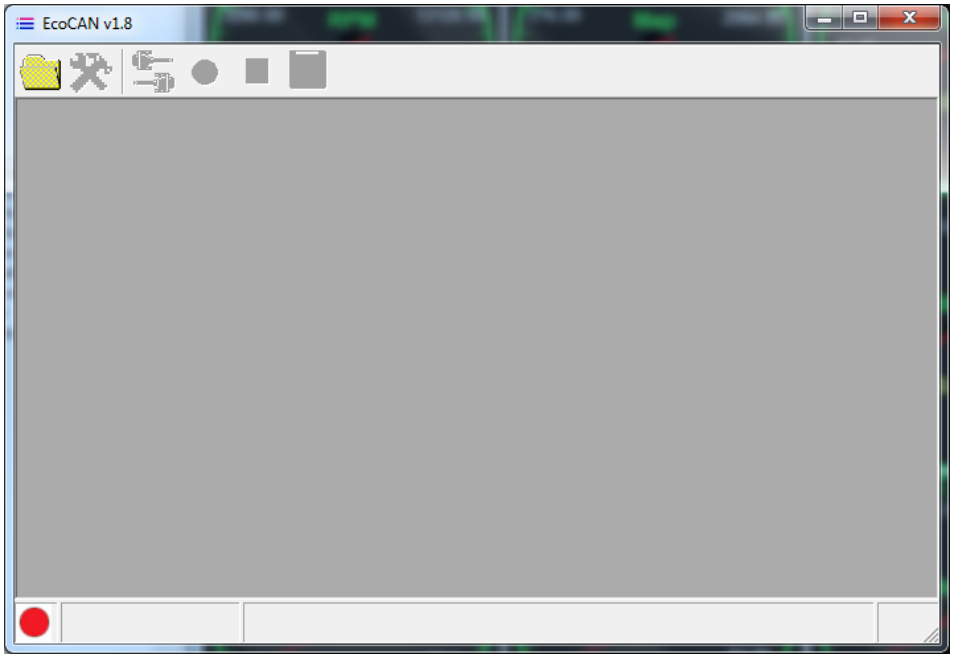
EcoCAN is used for CAN bus monitoring, CAN messages recording and M file generation (M file is used for EcoCoder CAN blocks definition).

5.2.10.1 Configuration

1) Open EcoCAN:

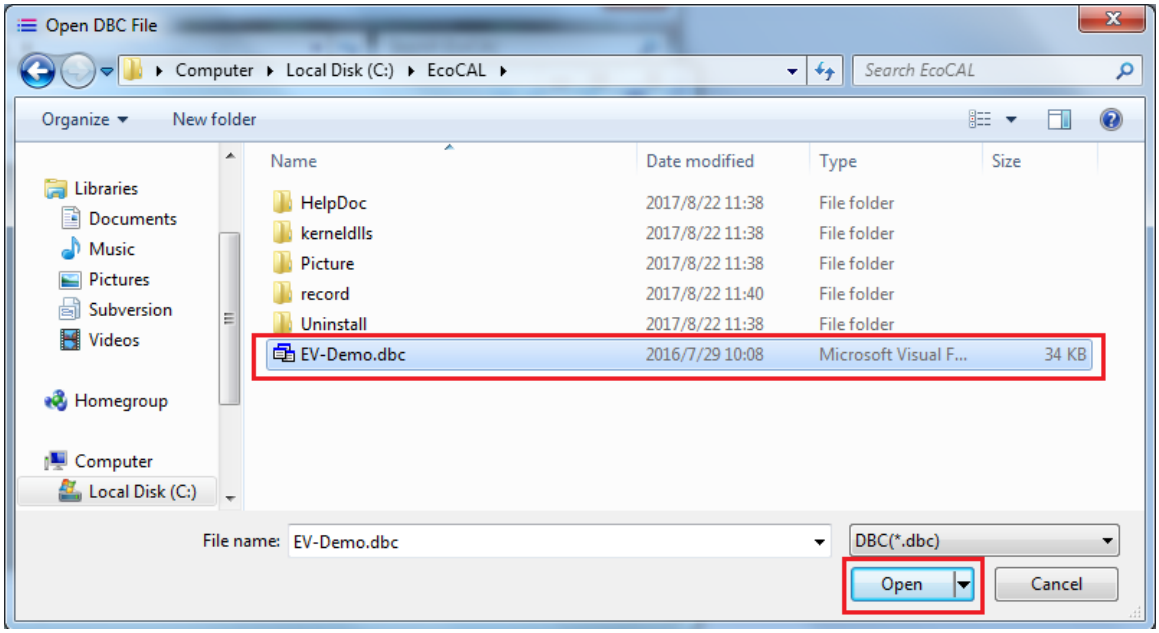
Go to menu->Advanced->EcoCAN



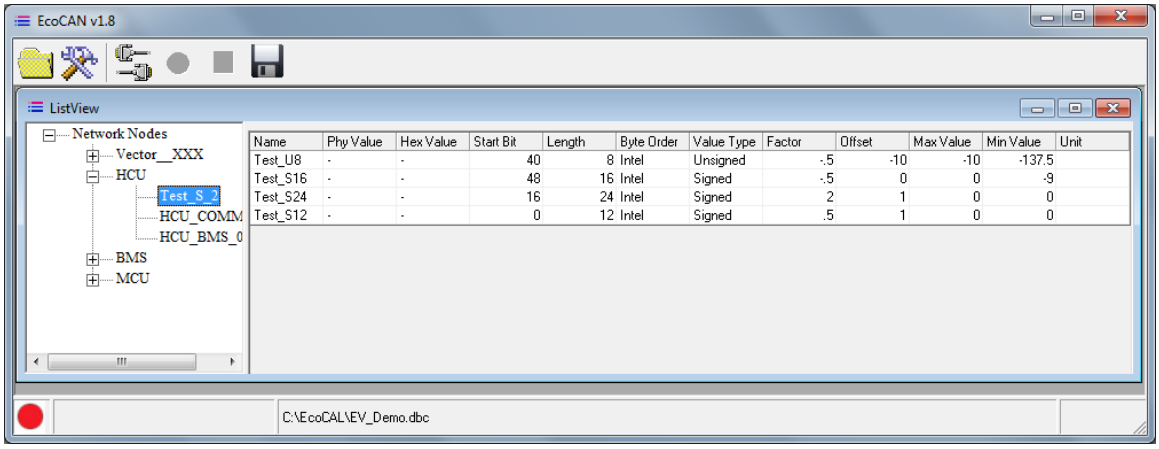


2) Open .dbc file:

Click the icon  to open a .dbc file.



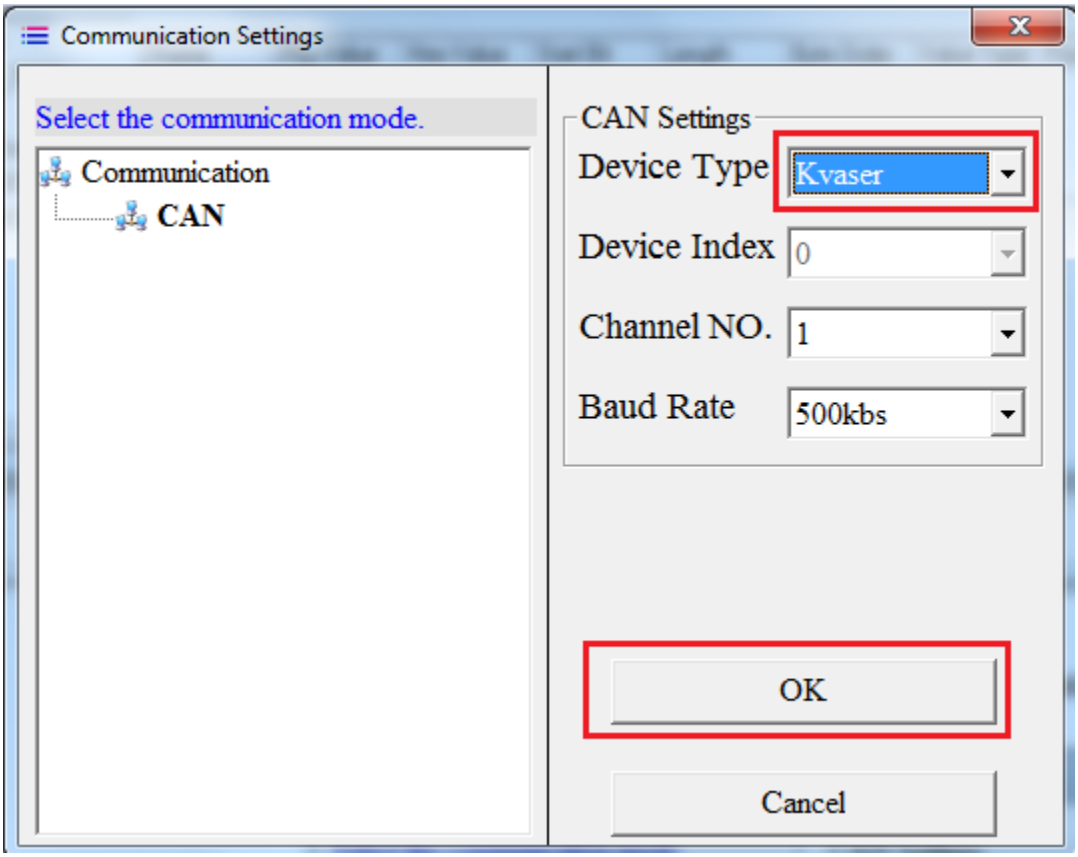
When the dbc file is loaded



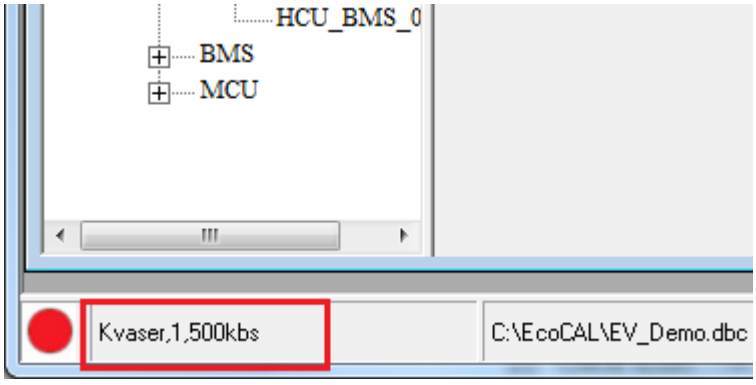
Set up communication

1) Click the icon  to open setting window.

2) Select a CAN device and configure the correct parameters then click the button ‘OK’. Shown as below:

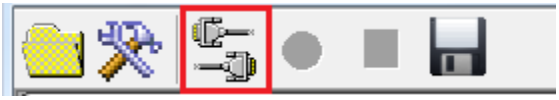


The EcoCAN window will show the device which you chose.

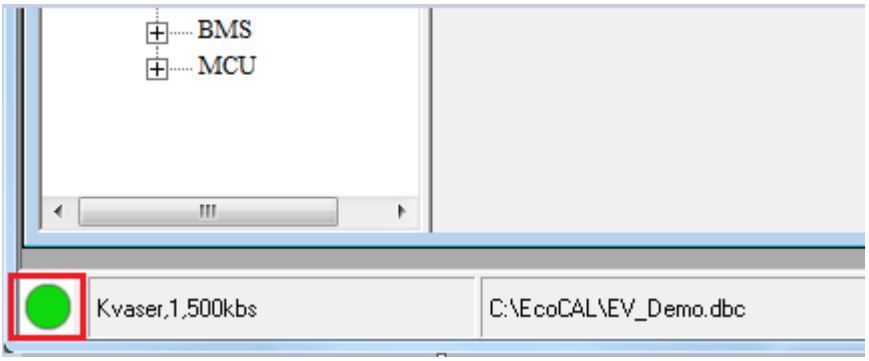


5.2.10.2 CAN Bus Monitoring

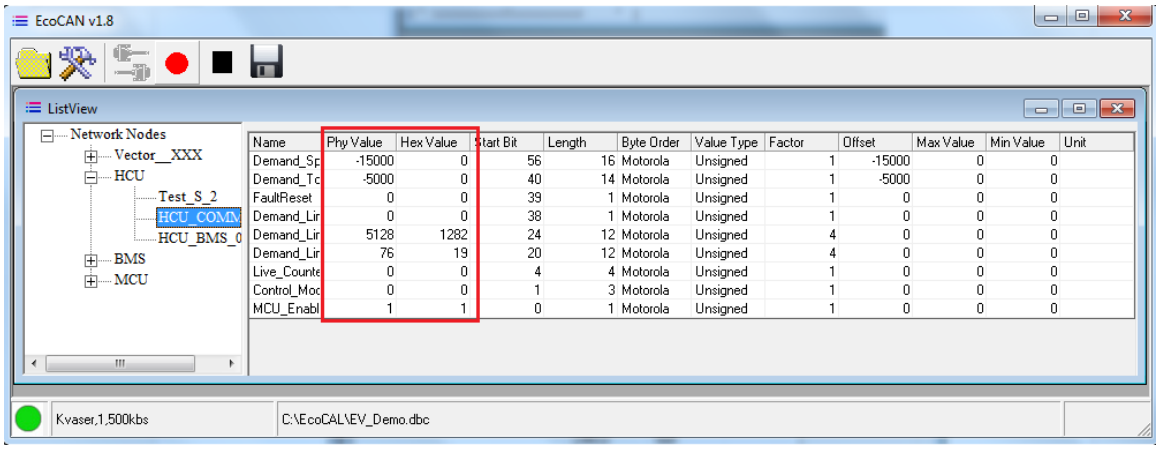
Click the icon  to open device.



If succeed, the status bar will show green light.

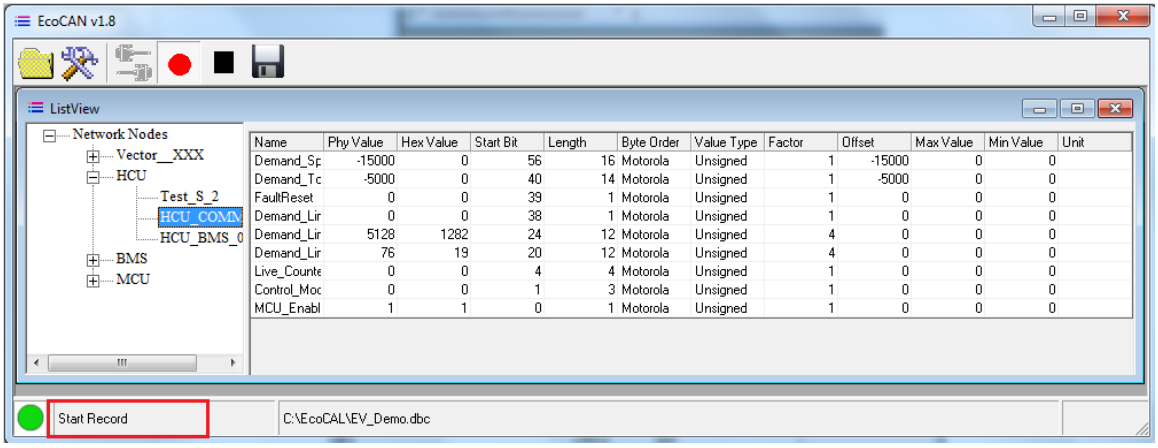


If CAN device receives data, the software interface will show the values of the variables.

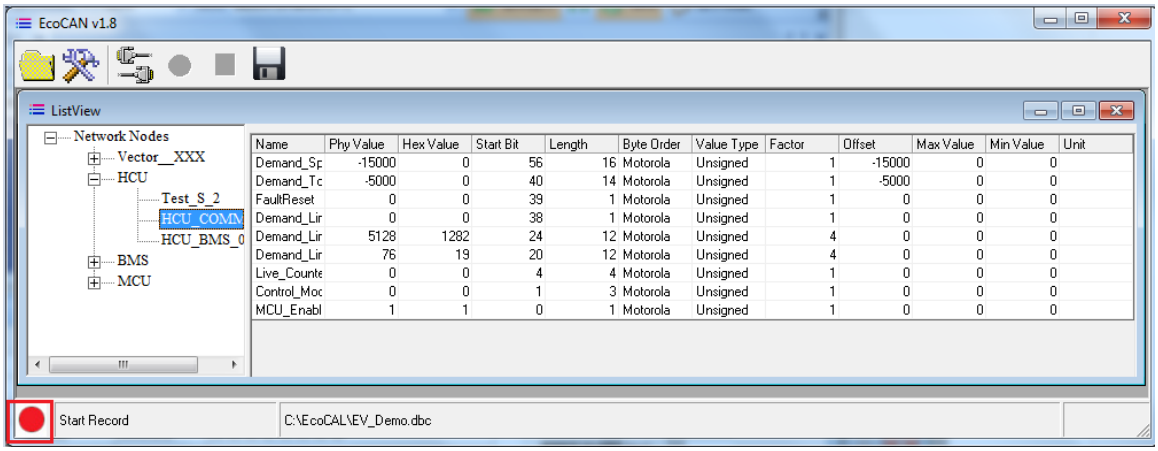


5.2.10.3 CAN Message Recording

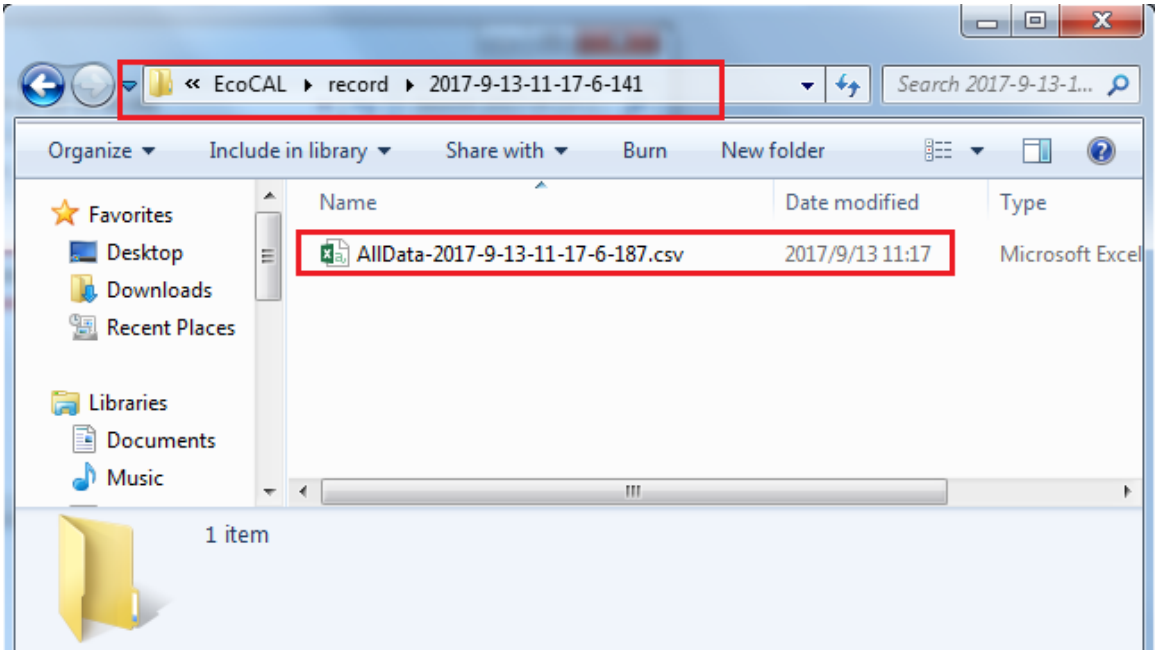
1) Click the icon  to start record



2) Click the icon  to stop record



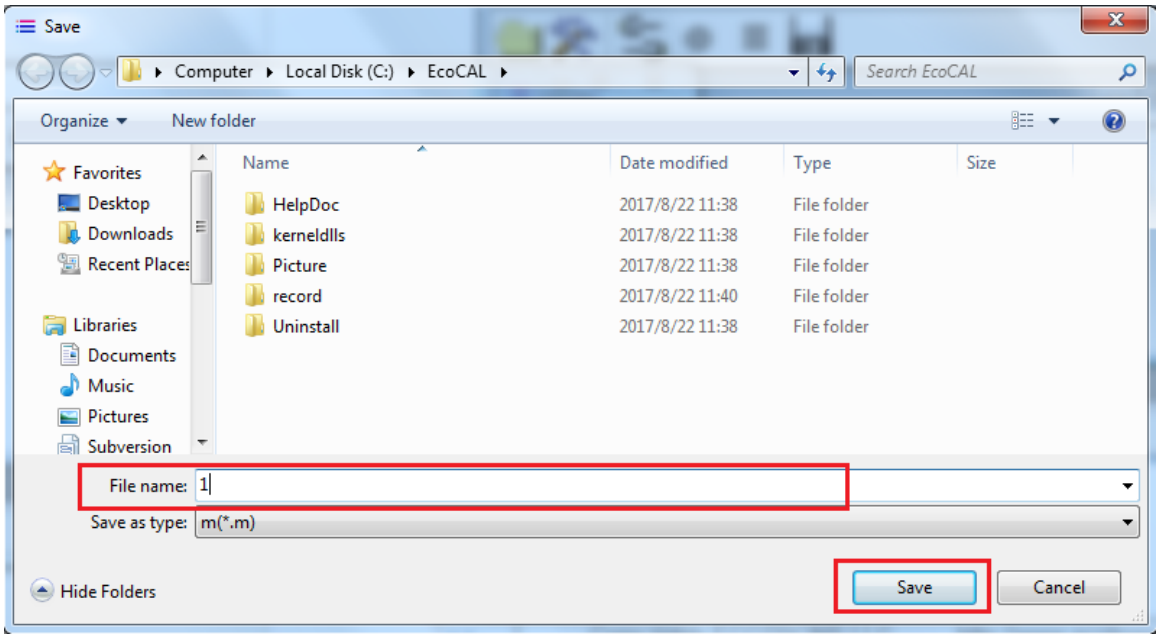
3) The record file is saved in the ‘record’ folder under EcoCAL installation folder



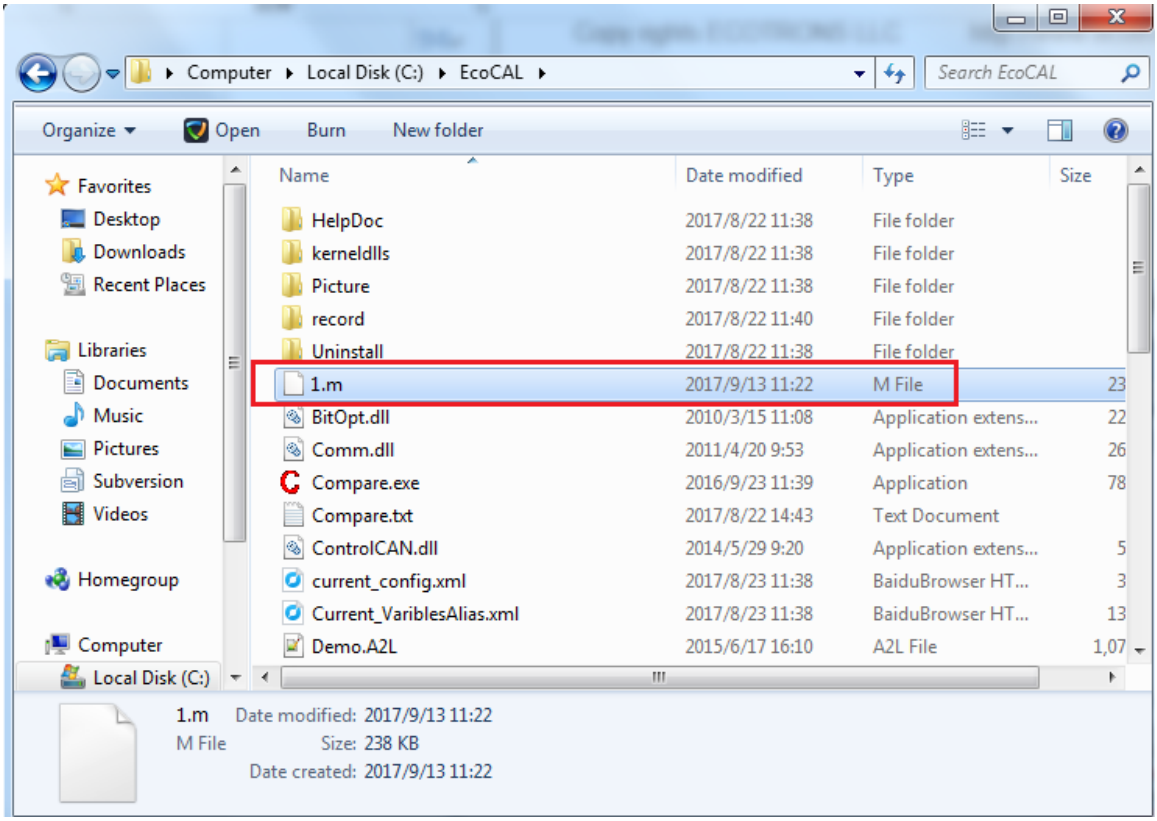
5.2.10.4 M File Conversion

1) Click the icon  to generate M file

2) In the opened window, put name.



3) You can find the M file in the EcoCAL folder.



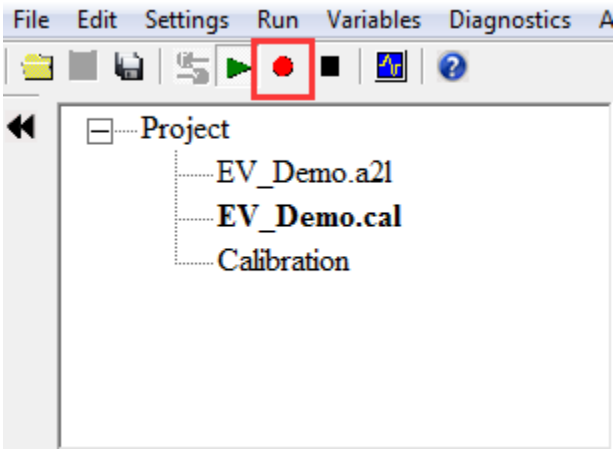
5.2.11 Record Data and Play-back

5.2.11.1 Record data

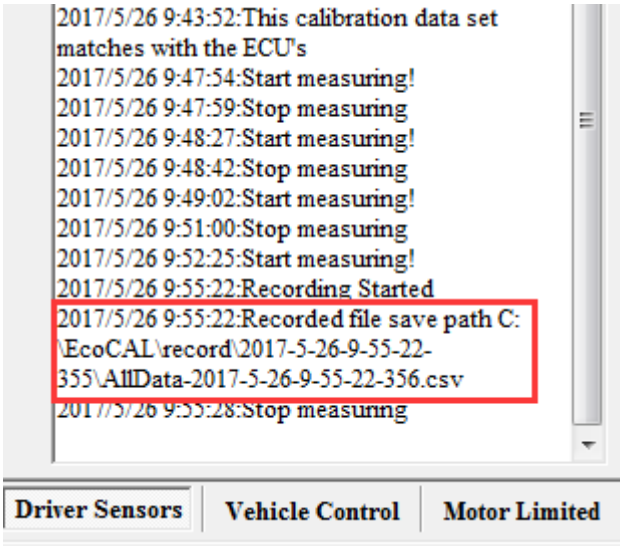
You might need to record the data to analyze.

1) Go to menu->Run->Start Recording

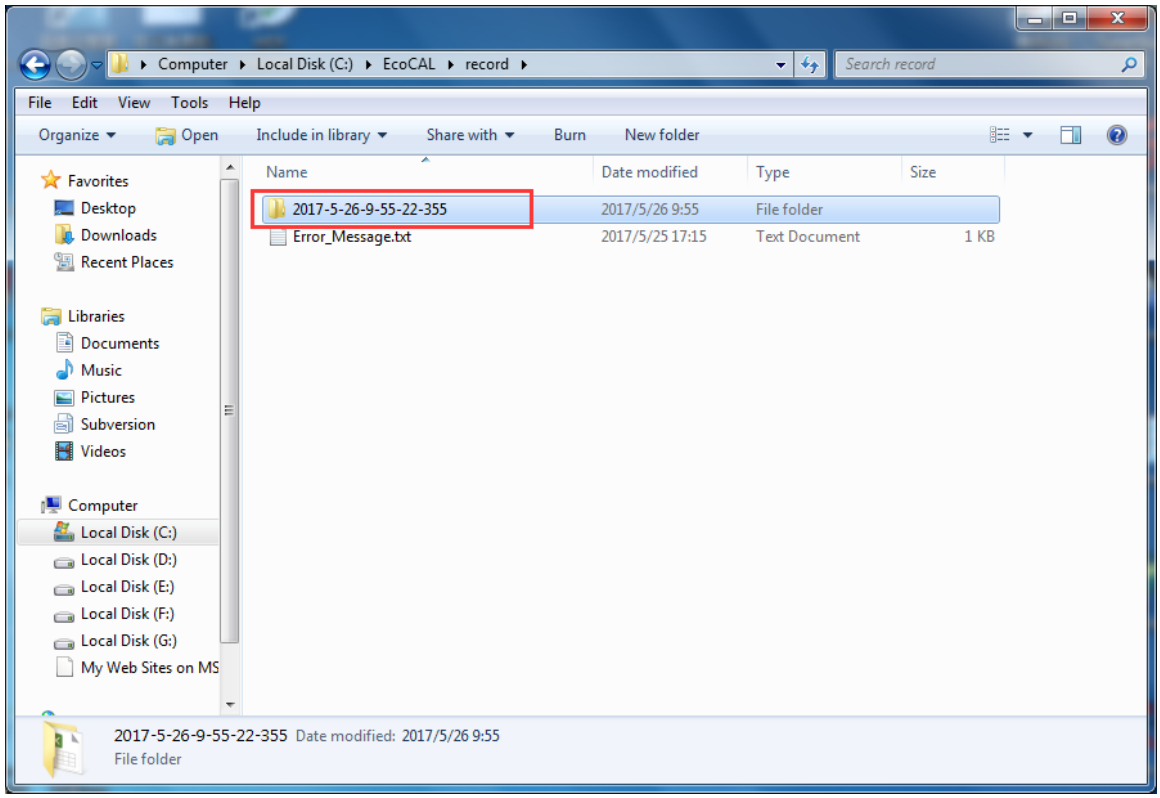
Note: You can also use the button () to record the data.



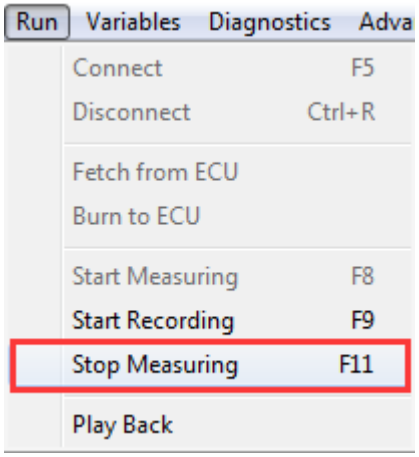
When you click the button, EcoCAL will record the data automatically. And save the recorded file at the installation path of EcoCAL, 'C:\EcoCAL\record'. The file would be named with the time of recording.



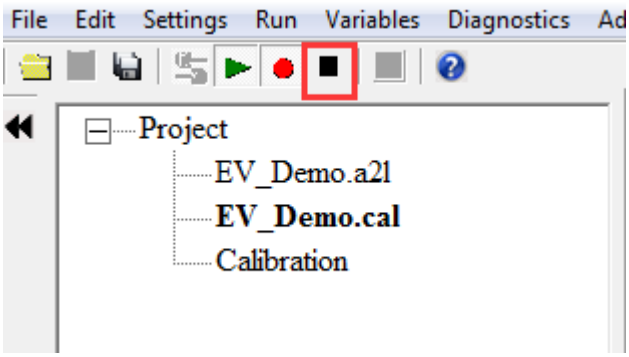
For example, the file named '2017-5-26-9-55-22-355' is the one recorded at 2017-5-26-9:55:22.



2) Go to menu->Run->Stop Measuring



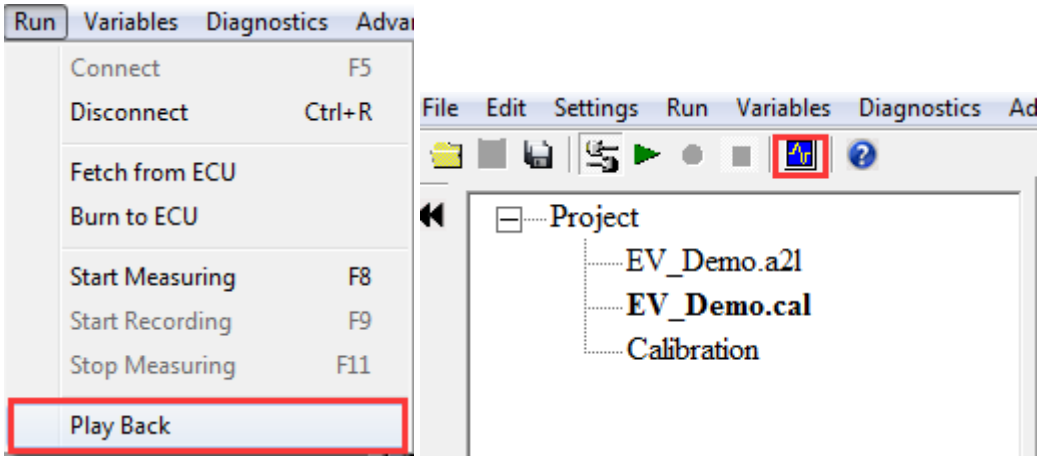
Note: You can also use the button ( ) to stop record the data.



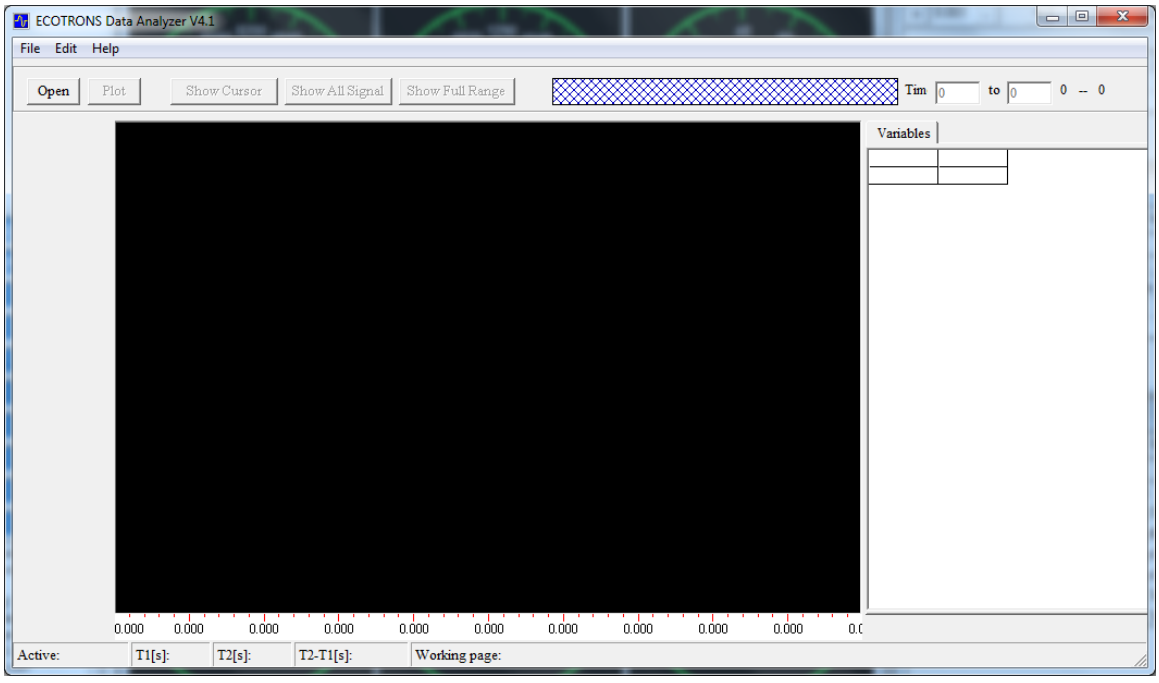
5.2.11.2 Play-back with Data Analyzer

After the data files are recorded, the user can study it in data analyzer.

1) Select '**Run ->Play Back**' or click the button  to play back the data.

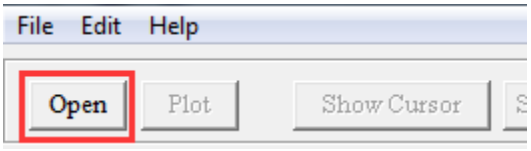


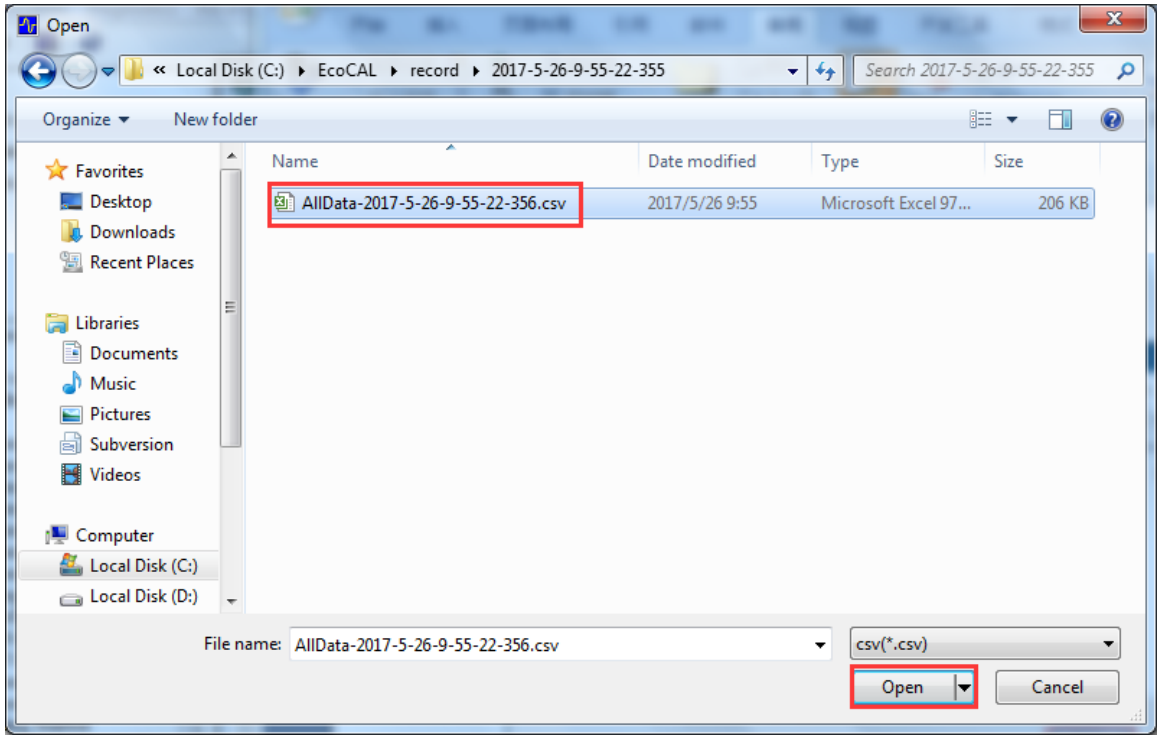
The play-back software, '**Data Analyzer**'.

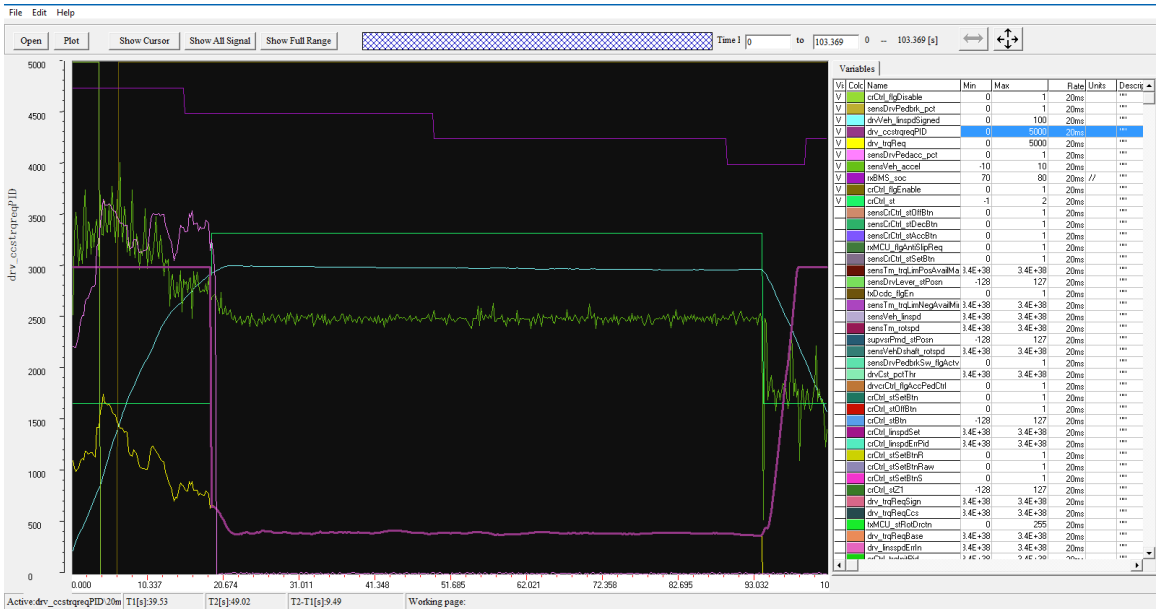


2) Open Data Files

In **Data Analyzer**, go to '**File->open**', select the data file you want to analyze.

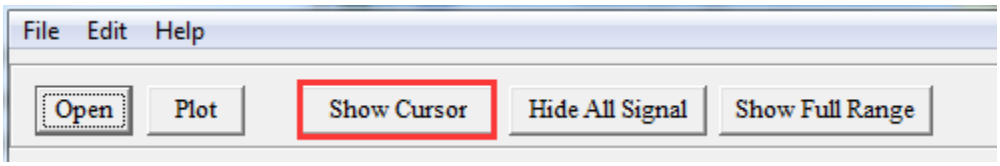






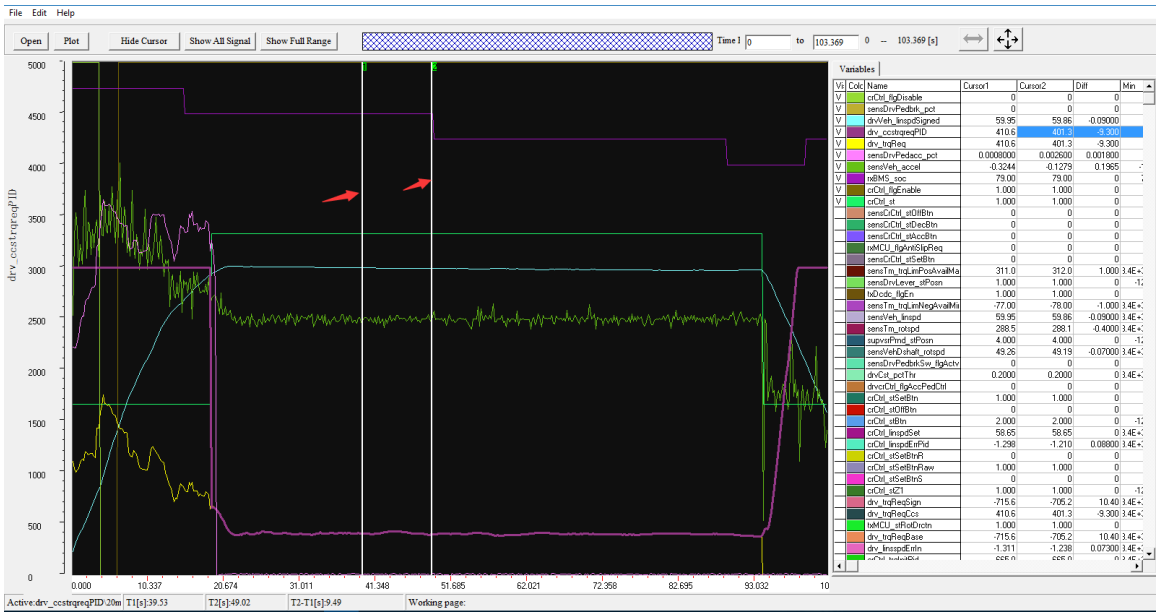
3) Show/Hide all signals

Click '**show all signals / hide all signals**' to switch between showing all signals and hiding all signals.

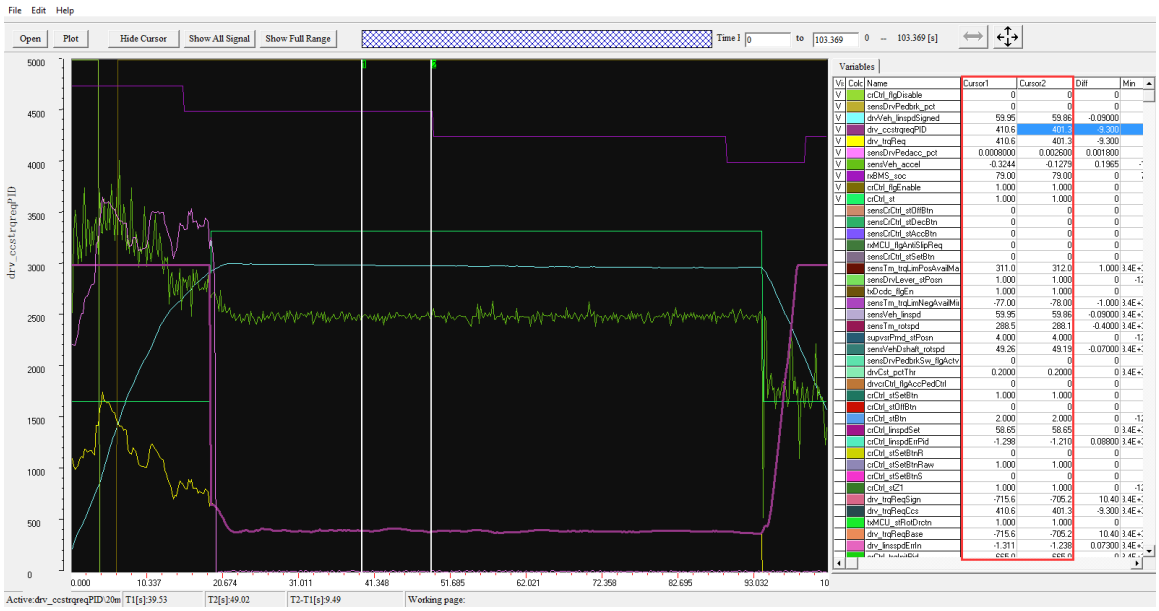


4) Show/Hide Cursors

Click 'show cursors / hide cursors' to switch between showing cursors and hiding cursors. There are 2 cursors in the scope window. The values of all signals at the 2 cursors will be displayed on the right. Moreover, there will be another variable at the third list to show the difference value between the two points on two cursors in real time.



The location of the cursor can be changed by dragging the cursor to the place you like.

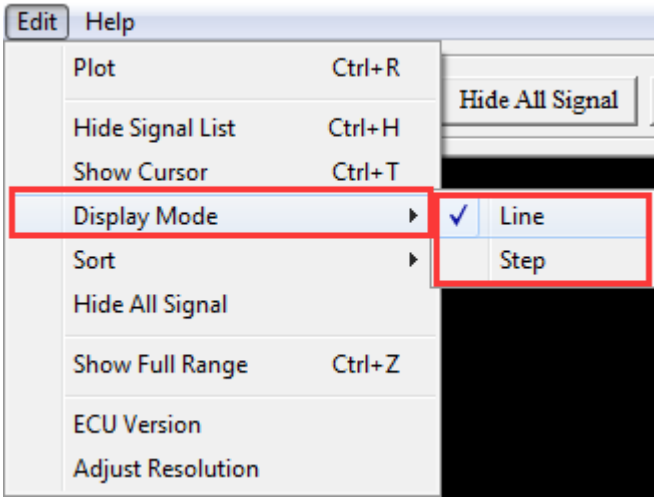


5) Line/Step Curve Type

The curve will be shown in different way if the user chooses it differently.

'Line' means there will be a straight line between 2 sample points.

'Step' means there will be a nonlinear segment between 2 sample points.



6) Zoom in/out X-axis

Users can zoom in/zoom out the X-axis by set the ‘start time’ value and ‘end time’ value.

.

The full time range of the data file can be shown by clicking ‘Show Full Range’.

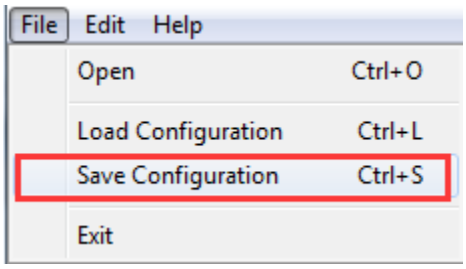
7) Zoom in/out Y-axis

Double click the ‘Max / Min’ fields in the signal list, the range of the signals can be modified, which will automatically zoom in/zoom out the Y-axis for the signals.

Colc	Name	Min	Max
	crCtrl_flgDisable	0	1
	sensDrvPedbrk_pct	0	1
	drvVeh_linspdSigned	0	100
	drv_ccstrqreqPID	0	5000
	drv_trqReq	0	5000
	sensDrvPedacc_pct	0	1
	sensVeh_accel	-10	10
	rxBMS_soc	70	80
	crCtrl_flgEnable	0	1

8) Save the Data Analyzer Configuration

After you spend time to zoom in/out and/or select signals, maybe you want to save these configurations. Please right click and choose ‘save configuration’ and store it in a configuration file. Next time you run Data Analyzer, the software will open the configuration file and load all your settings automatically.



You can click the ‘Load Configuration’ to load saved configuration.

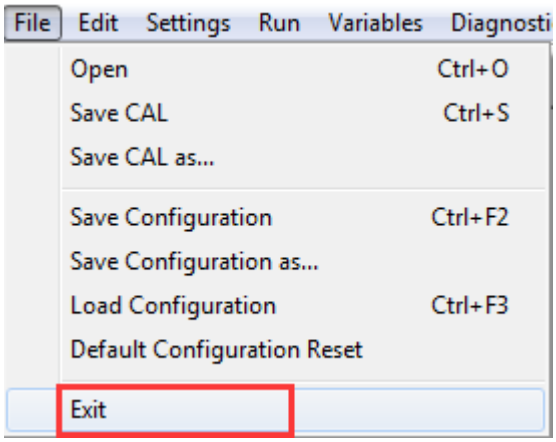
Chapter 6 Exit or Uninstall EcoCAL

6.1 Exit EcoCAL

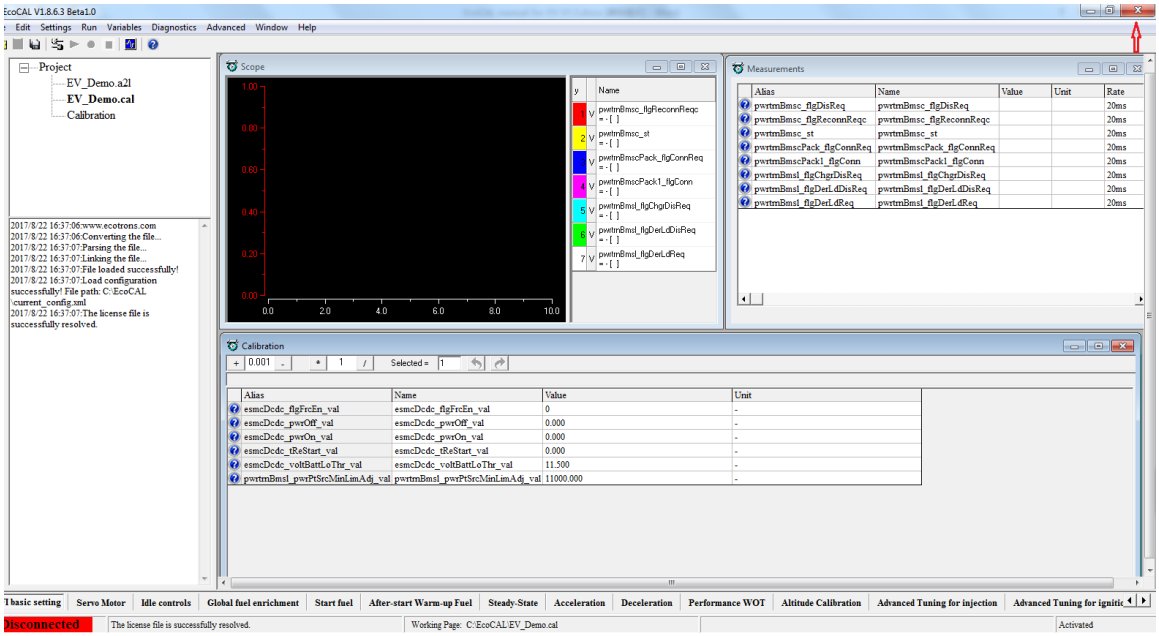
There are two ways to exit EcoCAL

1) Use the menu to exit the EcoCAL

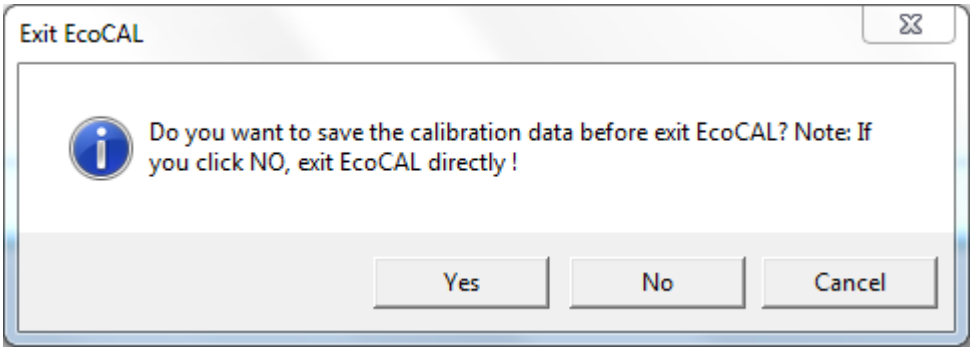
Go to menu->File->Exit



2) Close the EcoCAL directly on the upper right corner 



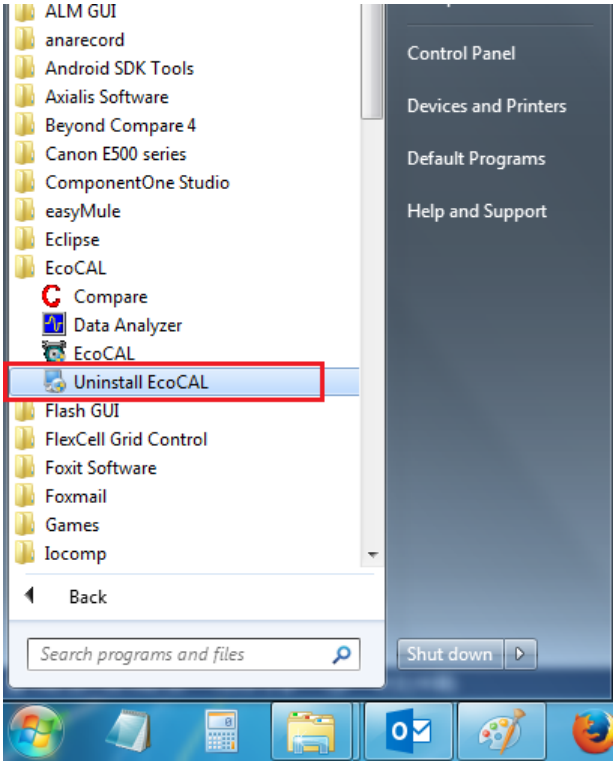
Note: Software would warn you when you try to exit with change on calibration unsaved.



6.2 Uninstall the EcoCAL

If you want to uninstall the EcoCAL, please click:

Start->All Programs->EcoCAL->Uninstall EcoCAL.



Chapter 7 Diagnose on Failure Connection between ECU and EcoCAL

Common failure reason:

1) VCU/HCU power.

2) Check EcoCAL version on your hand with the one on website.

3) Are you connecting the computer to the VCU/HCU via CAN mode?