



EcoCAL

User Manual for EV

V1.7

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1	----	First Edition		V1.0
2	----	Second Edition		V1.1
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Introduction

EcoCAL is the calibration software of EV/Hybrid system from Ecotrons, you can use the EcoCAL 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. Our HCU/VCU is 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 the EcoCAL Software

1) Download the EcoCAL calibration software from the website:

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

Latest Software – Free Download ▼

- EcoCAL for EV – v1.8.6.2 
- EcoCAL for EFI – v1.8.6.2 
- Wideband ALM GUI software – v2.9.13 
- Ecotrons DroidCAL Phone App – v1.5 
- SimMotor GUI software – v1.4 
- Flash GUI Software – v2.8.3.8 
- EcotronsCAN Driver 

Click the “EcoCAL for EV”, and then download the software “EcoCAL-Setup.exe”

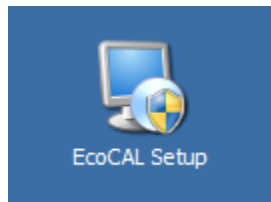
2) Maybe, you get the software through the E-mail. So you need to rename the installation file name that is attached in the Email:

"EcoCAL-setup.exe.remove".

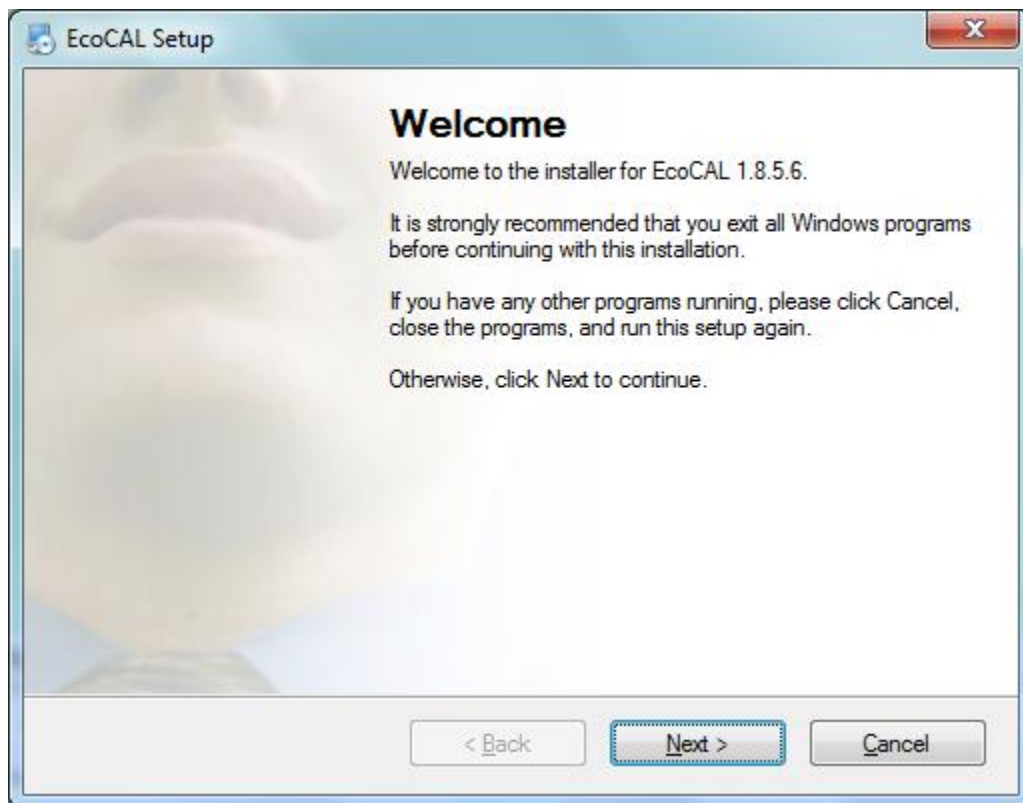
Please modify the attached file name extension, and remove the ".**remove**", then run the file: "EcoCAL-setup.exe" to install the tool software.

1.1.2 Install EcoCAL

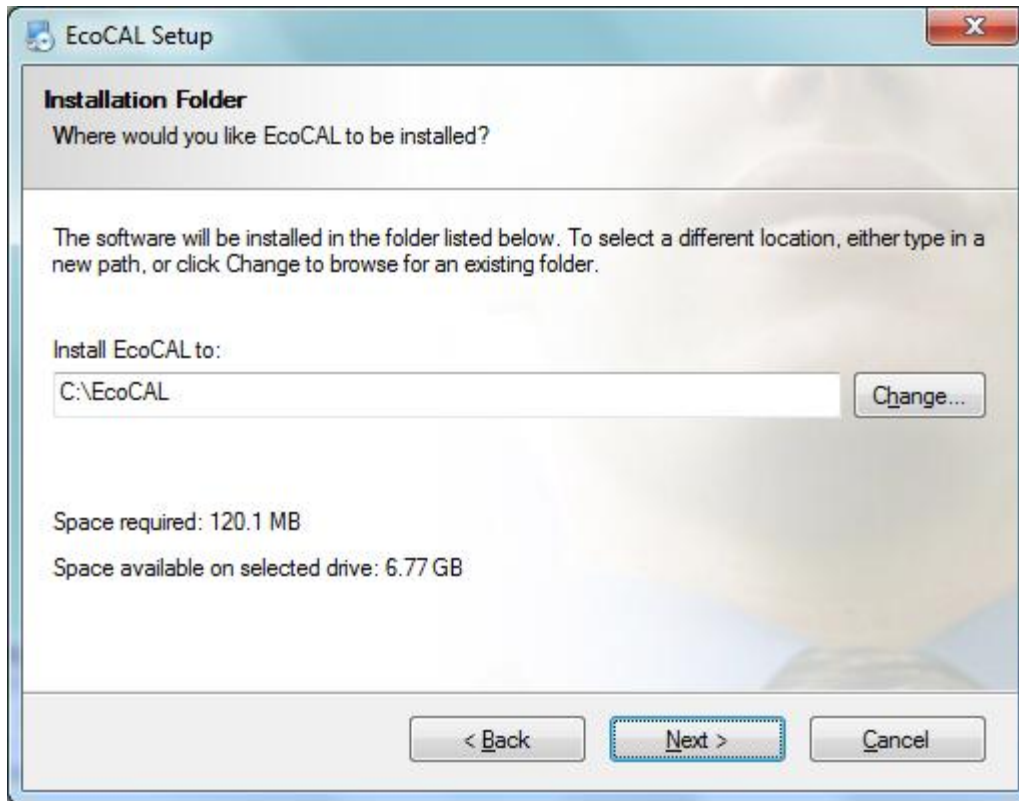
- 1) Double-click the ICON "**EcoCAL setup**" to install the EcoCAL;



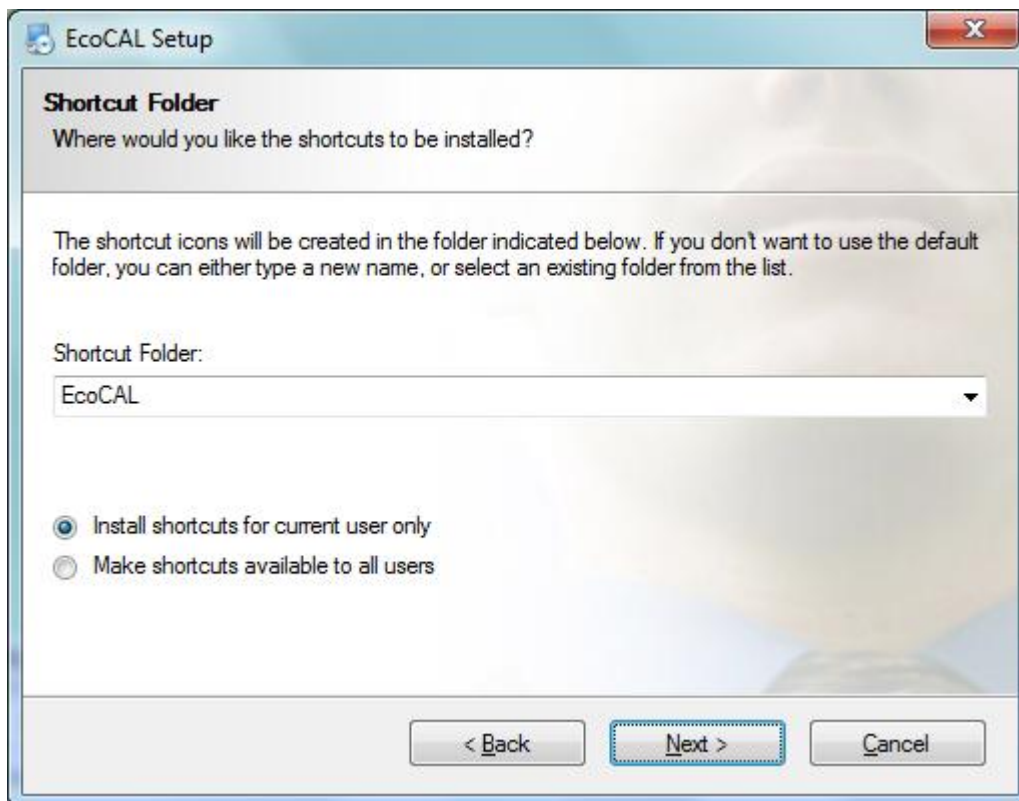
- 2) Click "Next";



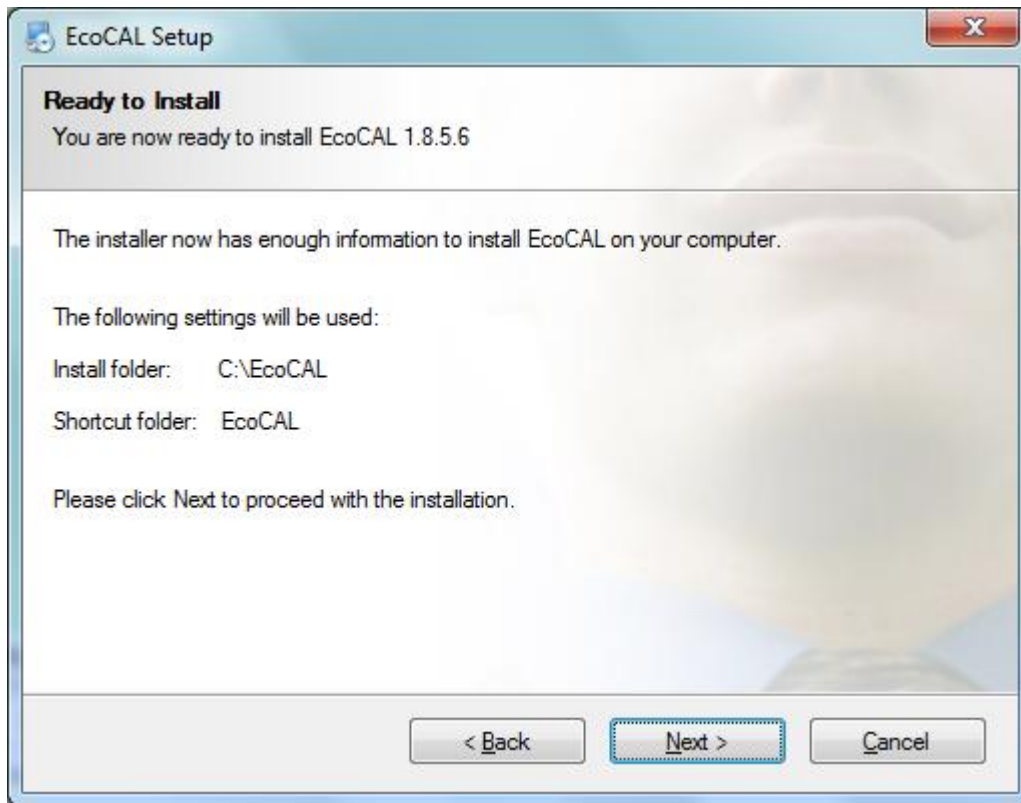
- 2) Click "Next" and choose the path to install EcoCAL;



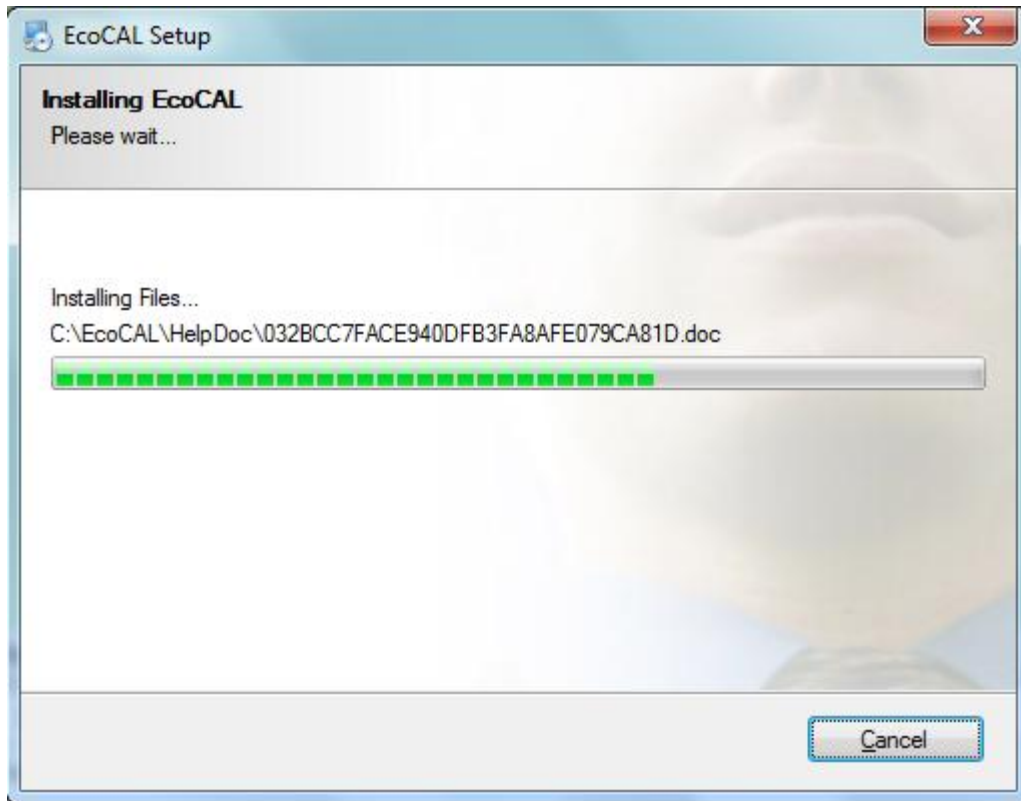
3) Click “Next”;



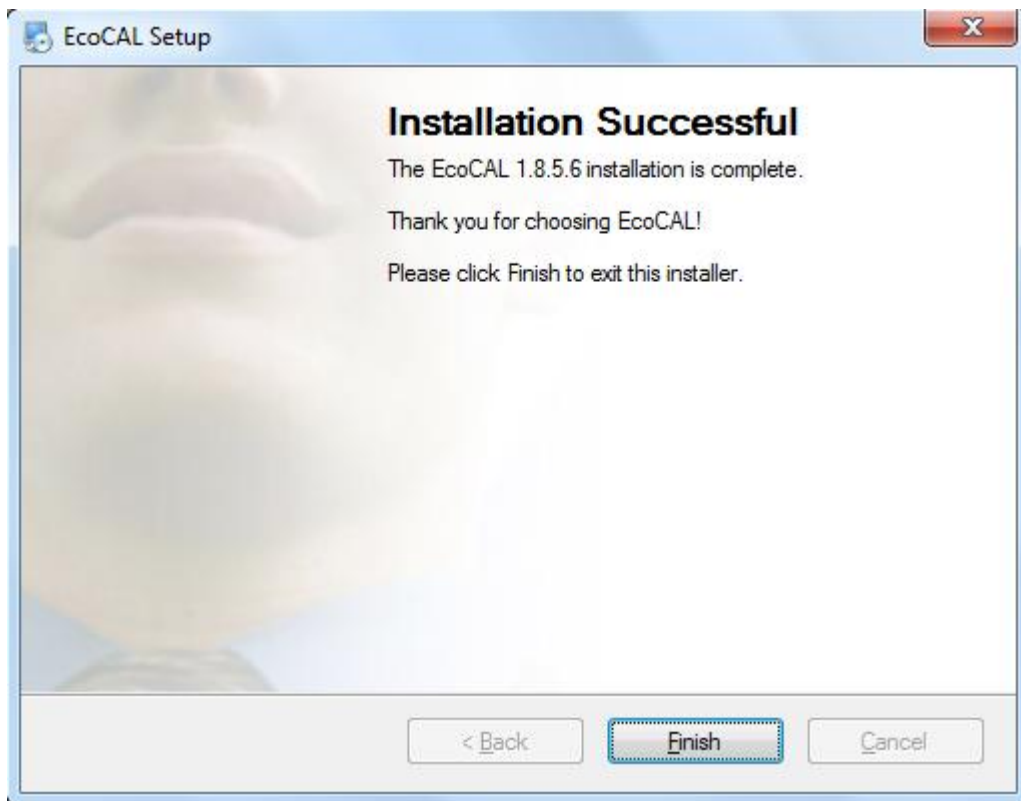
4) Click “Next”;



5) Click “Next” and wait for installing;



6) Click “Finish”;

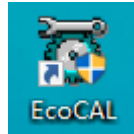


The installation of “EcoCAL” is successful.

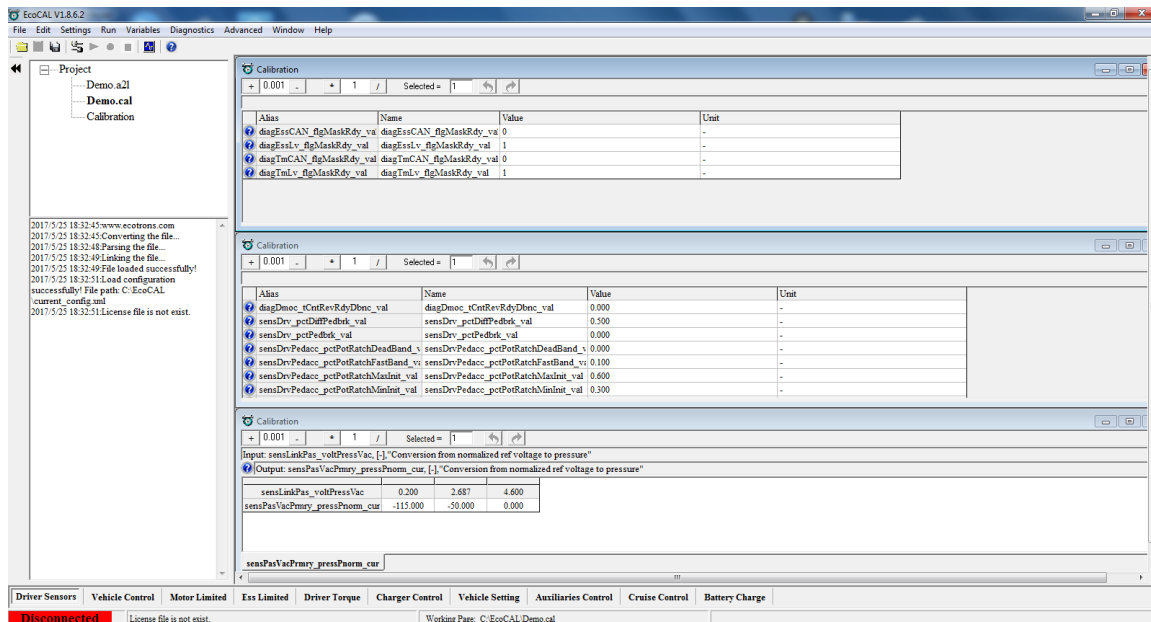
1.2 Start EcoCAL

1.2.1 Start EcoCAL software

(1) Double-click the icon "**EcoCAL**" on the desktop to start the EcoCAL software:



(2) When you start the EcoCAL at the first time after you finish installation, the EcoCAL 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**". Usually, the Demo files are not correct for user, you can find the correct A2L, CAL files in CD. You should copy and paste the necessary A2L file and CAL file into that folder, if the folder contains no such files, then Open the correct A2L file and CAL file in EcoCAL.

1.2.2 Load the Calibration files

1) File types and definitions

mot file: this is a Motorola format microprocessor executable file;

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).

Note: most users don't need the mot file; unless your VCU/HCU firmware update is necessary; it is enough to have the A2L file and CAL file to run EcoCAL and do the calibration work.

2) Load the correct A2L and CAL files

Note: If you have not got correct A2L file and CAL file in your CD or in the software package, please email us: info@ecotrons.com or support@ecotrons.com.

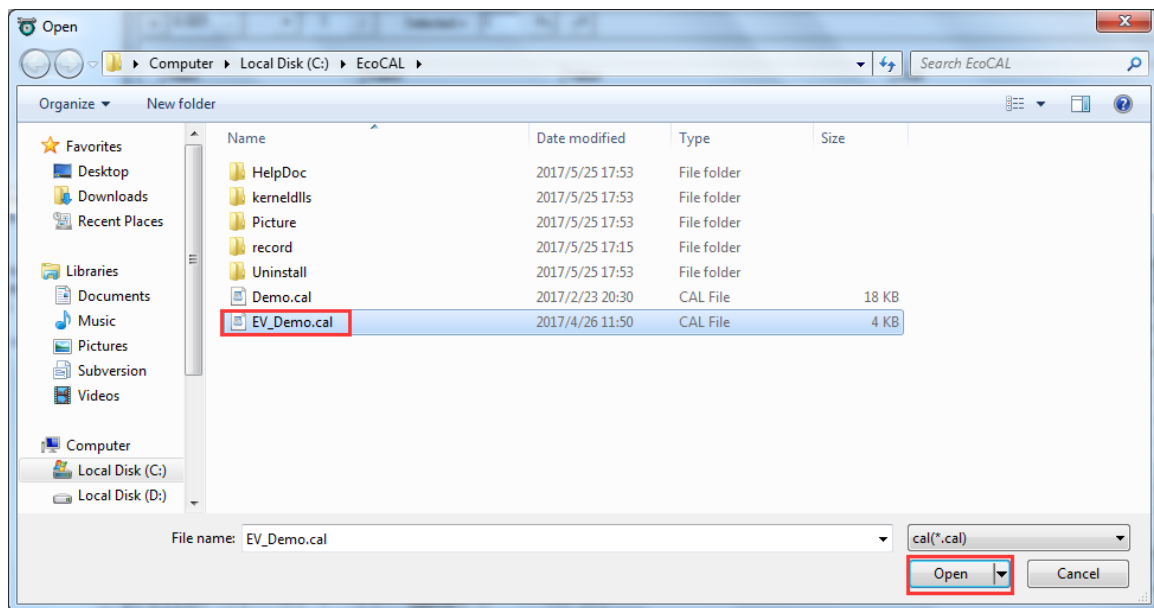
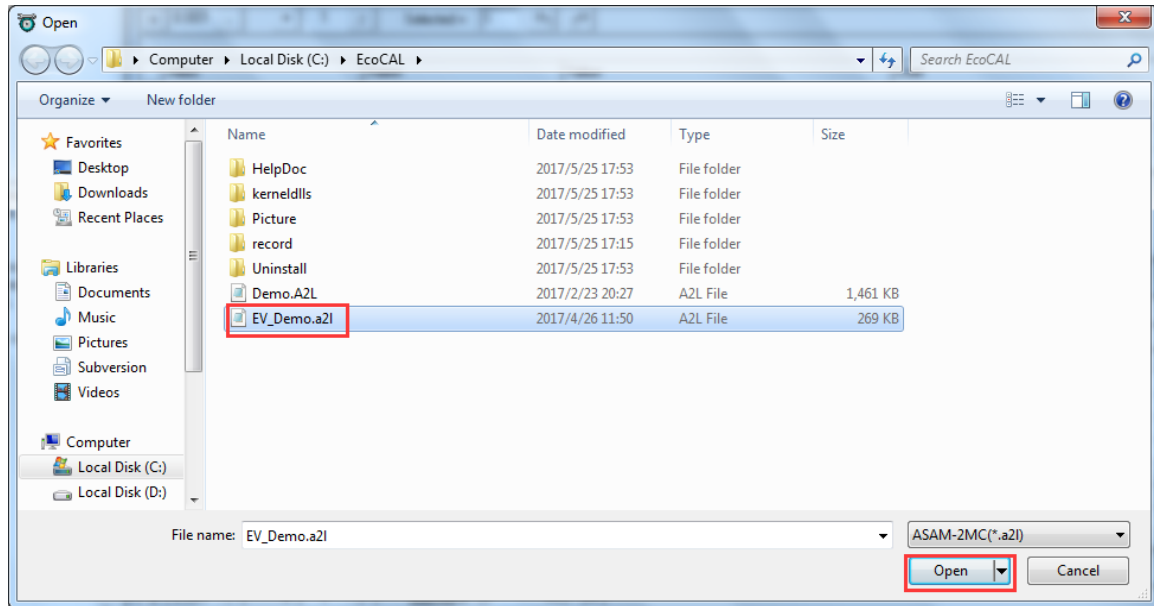
Often the user will need to load different A2L file and CAL file than the default ones coming with the EcoCAL.

For example, a VCU/HCU software update will give you a new A2L file and a new CAL file. Or new calibration release will give you just a new CAL file (A2L file stays same).

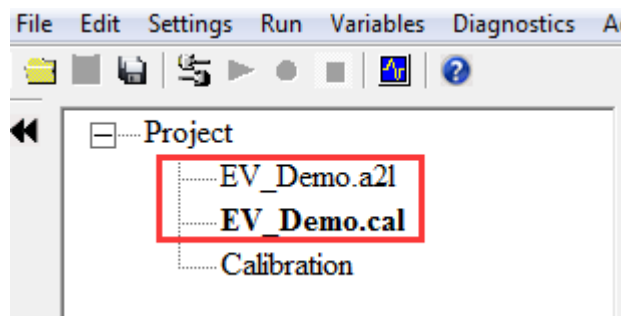
In EcoCAL, go to menu->File->Open

Find out the place that you put the A2L and CAL files, and then choose the correct files

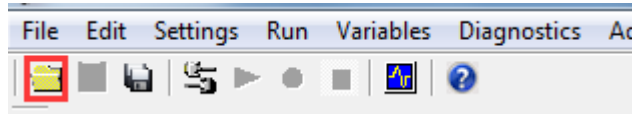
Note: EcoCAL always need to open 2 files, open A2L first, and then open CAL file next.



Click “Open”, and then load the A2L and CAL files successfully.



Note: You also can use the shortcut button of “Open” to open the files.



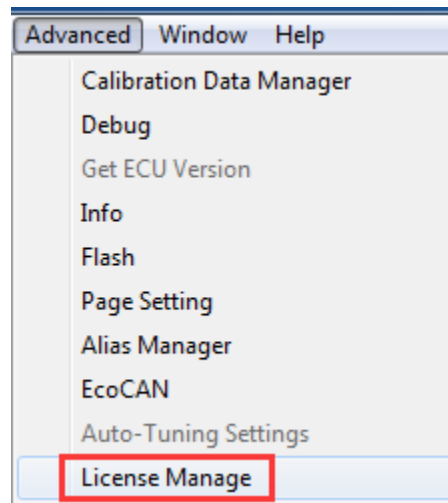
Note: The default Demo file is not correct for user. Please find the correct A2L, CAL files in CD.

1.3 Activate EcoCAL

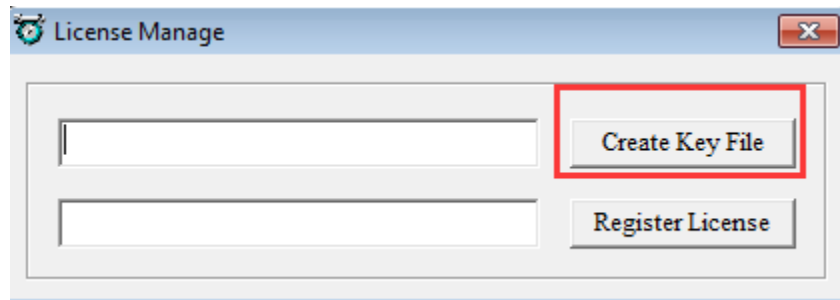
1.3.1 Get the key file

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

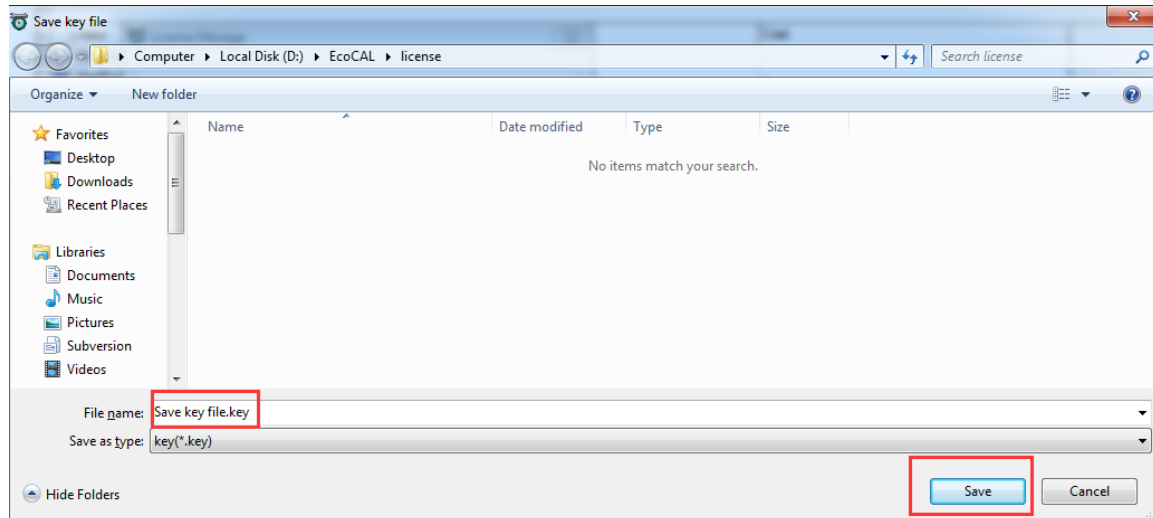
To generate related seed file, save it, then send the seed file to ECOTRONS



Click” Create Key File ”.



Save the key file, for example, choose "Save key file" as the file name, then click "Save".



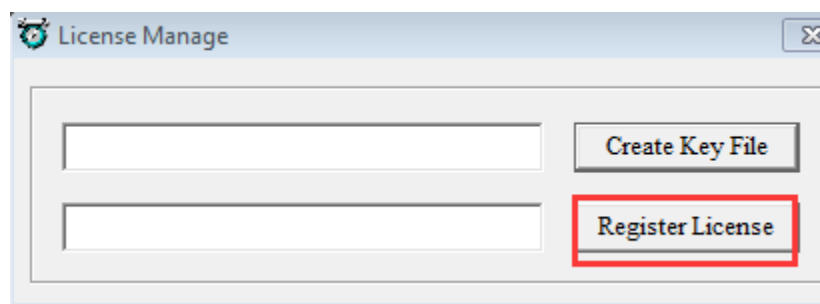
Please send the key file to ev-support@ecotrons.com for license file.

Note: After you send the key to us, please do not regenerate it.

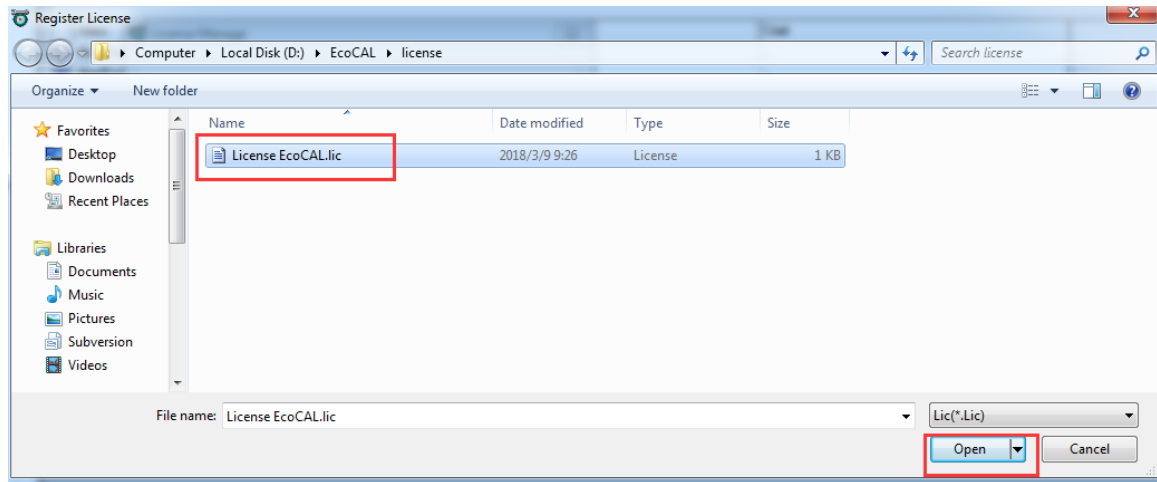
 Save key file.key	2018/3/9 9:22	KEY File	1 KB
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1.3.2 Activate EcoCAL by license file

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



For example, select "License EcoCAL.lic", then select "Open".



Click "OK". The activation is successful if the "Message" window is displayed as follows.



Chapter 2 Connect to VCU/HCU and Record data

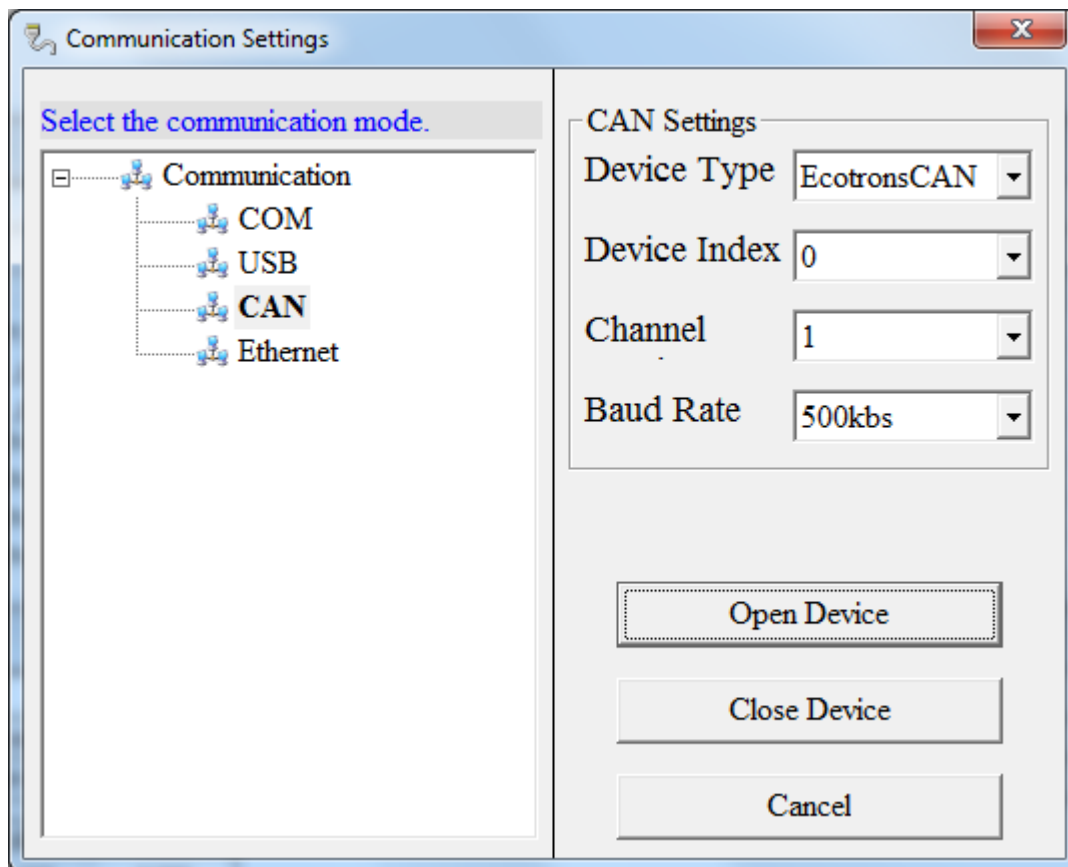
2.1 Connect VCU/HCU to laptop

Note: When you want to connect the VCU/HCU to laptop via EcoCAL, you must make sure you have powered on the VCU/HCU. When you power on the VCU/HCU, you can see the vehicle would be power on.

2.1.1 Communication Settings

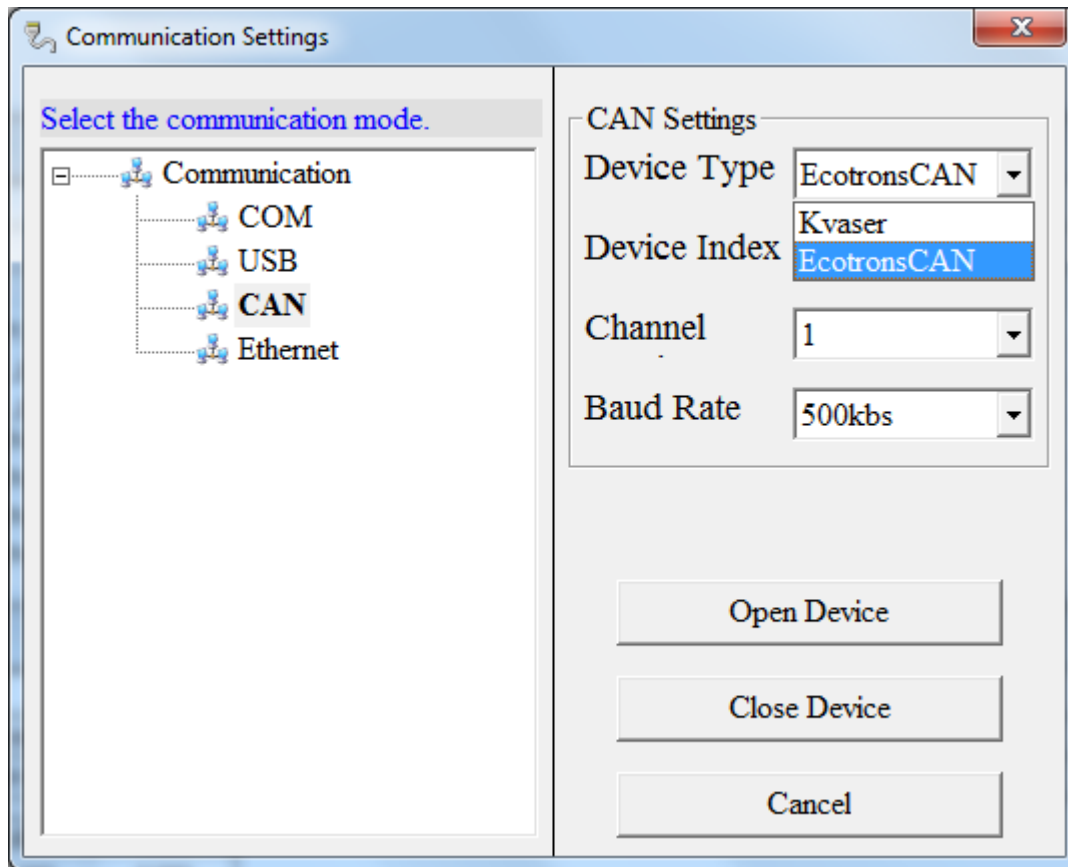
You should select the communication mode first

Go to menu->Settings->Communication Settings:



CAN communication mode

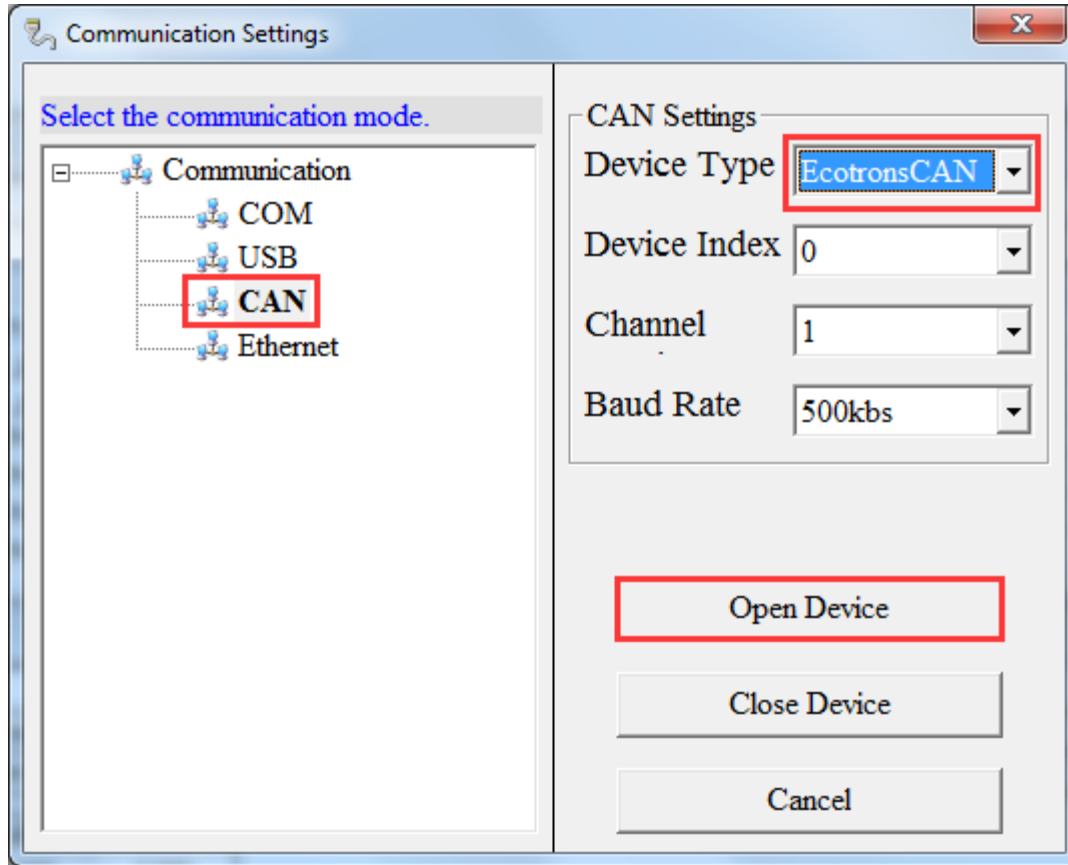
Our customized VCU/HCU supports the CAN communication.



Select the device you are using. There are two choices of Device Type in CAN Settings: EcotronsCAN and Kvaser. If you get the CAN device from Ecotrons, please choose the “EcotronsCAN”, and we send this CAN device to customer in default.

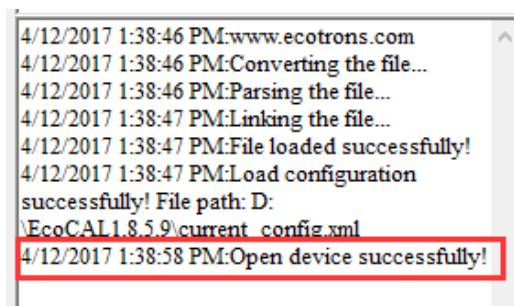
You also choose other Device Type if you have the corresponding CAN device. You need to choose the CAN device Type, Baud Rate, after finishing setting, then click “**Open Device**” to open the CAN device.

And if you don’t want to use the CAN device, you also need to click “**Close Device**” to close the CAN device.



Open device successfully

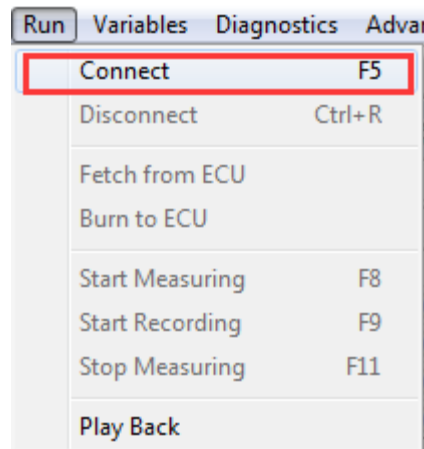
When you click the “Open Device”, if the equipment is existed and working, the message will pop up, “Open device successfully!” Then you can connect to VCU/HCU.




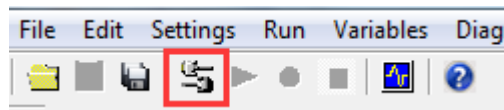
2.1.2 Connect to VCU/HCU

After finishing communication setting, you can try to connect VCU/HCU to laptop.

Go to menu->Run->Connect

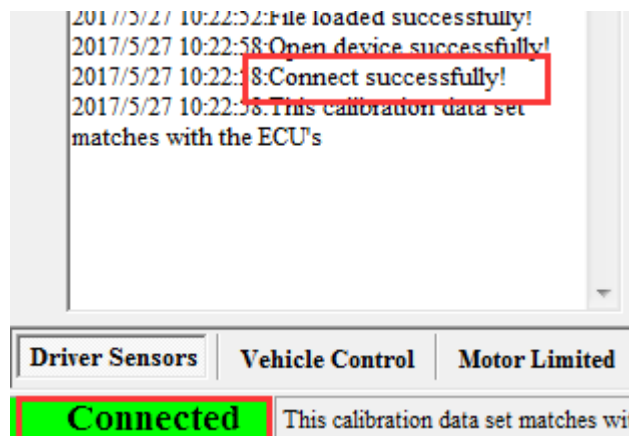


Note: You also can use the shortcut button () of “Connect” to Connect to VCU/HCU

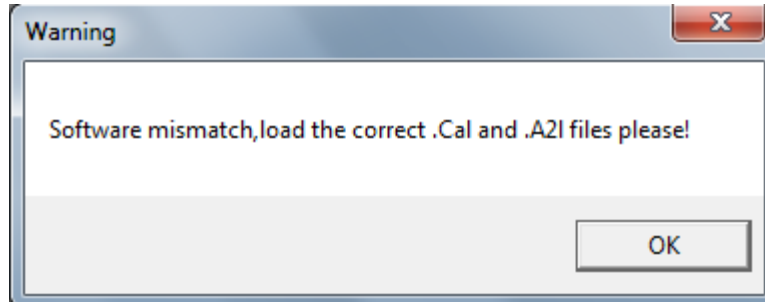


When you connect to VCU/HCU successfully, the left lower corner of window will show “Connect” in Green color.

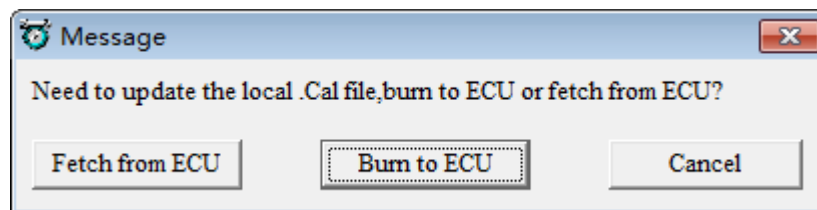
“This calibration data set matches with the ECU’s”



Note 1: If there is a warning window popped up as below, this means the software version of A2I and CAL files you loaded doesn't match the VCU/HCU, and you need contact us to get the right files.



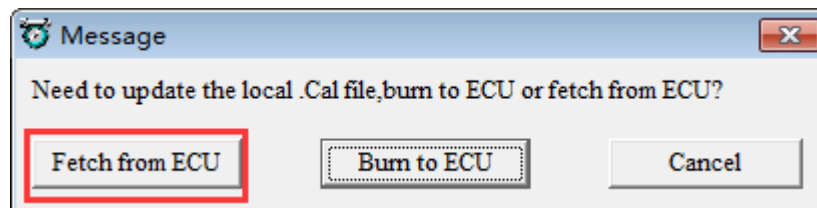
Note 2: If there is a message window popped up as below, it means the settings of Calibration data file (CAL file) is different from the VCU/HCU in, you need to "Burn to ECU", burn the CAL files you use to VCU/HCU.



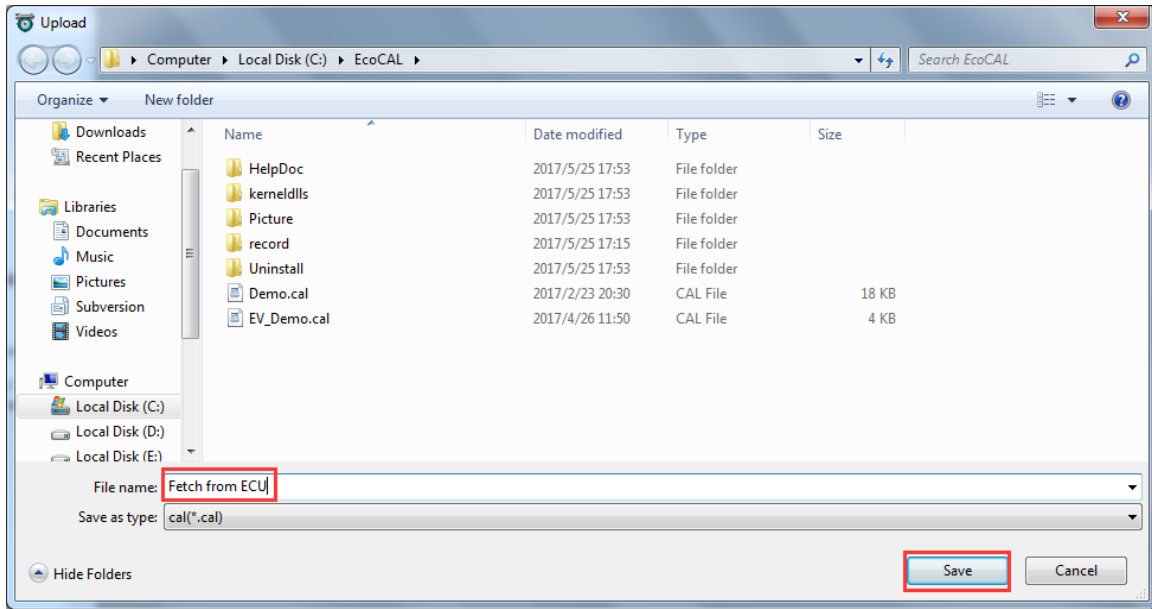
And if burn to ECU successfully, the VCU/HCU would be worked normally. If not, please do again and check all of connection is right.

And if you do not have other operations, you should click "Cancel".

Note 3: If you want to know the settings in ECU, you also can click "Fetch from ECU", this will save one new CAL file.



Save it as to be "Fetch from ECU.CAL" file



Then, the EcoCAL will load the CAL file automatically.

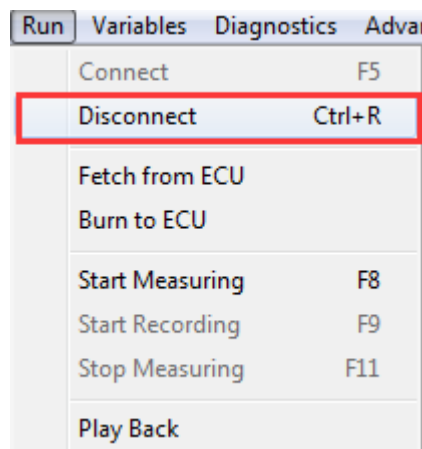
Note: make sure your 12V battery is healthy, before you do any "burn to ECU" or "fetch from ECU"!


During the upload or download, users are not allowed to do any operations to your system.

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

2.1.3 Disconnect to ECU

Go to menu->Run->Disconnect

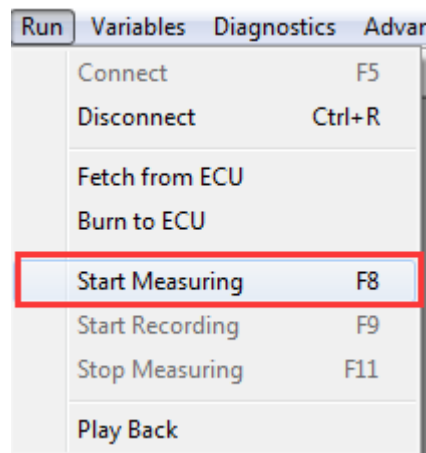


Note: You also can click the shortcut button () to disconnect to VCU/HCU.

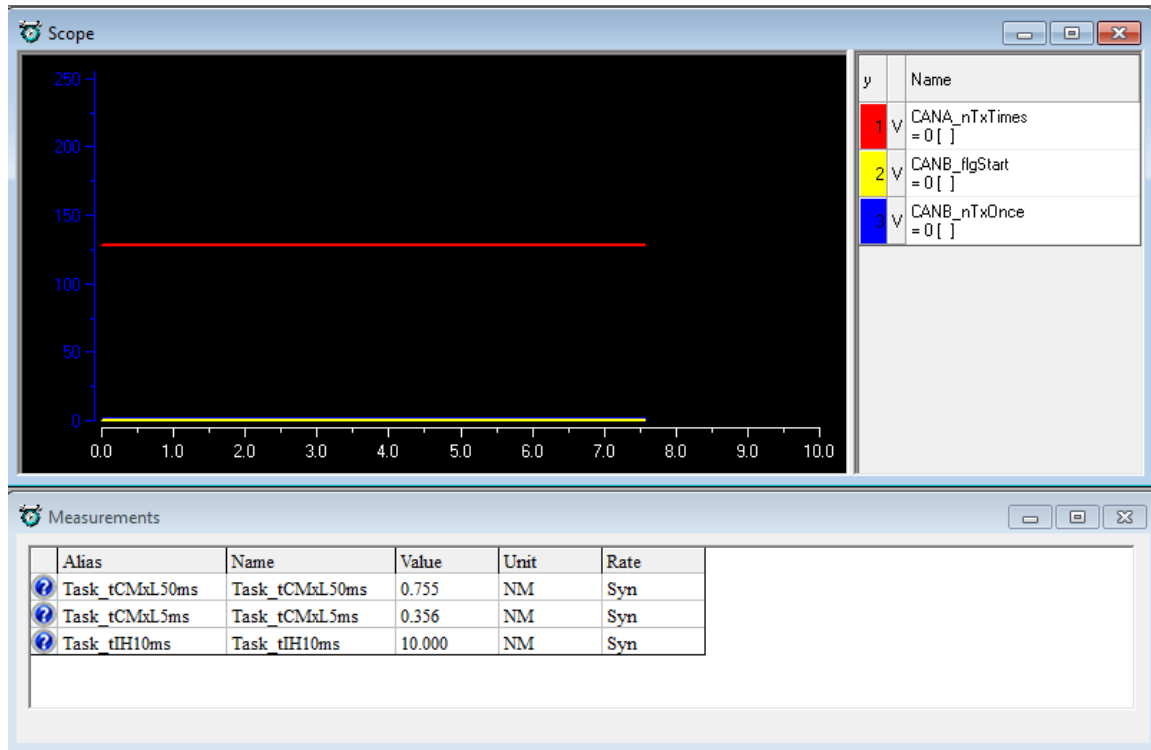
2.1.4 Start Measuring


When you connect to VCU/HCU successfully, you can measure the data of sensors' and do the calibration.

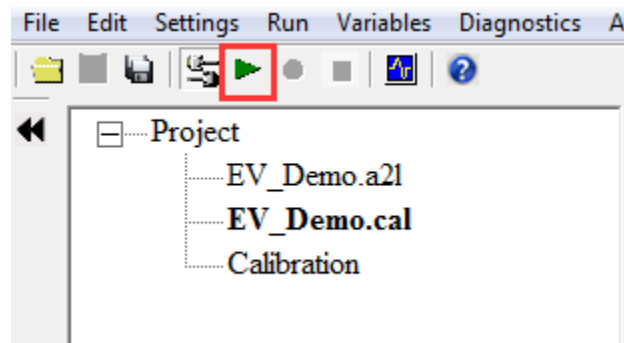
Go to menu->Run->Start Measuring



Then you can see the values of measured variables.



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

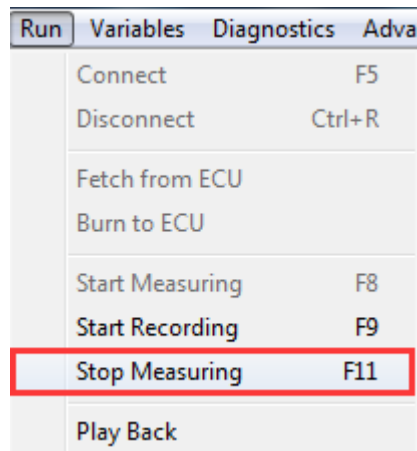


Note: The “Start measuring” only works when connect to VCU/HCU successfully.

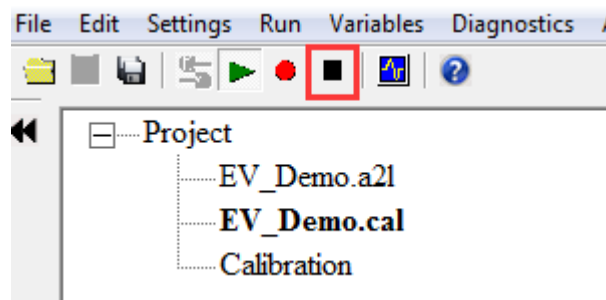
2.1.5 Stop Measuring

When you finish the test and want to do other operation, for example, **read the DTC, or add measurement variable, burn to /fetch from ECU**, you should stop measuring first.

Go to menu->Run->Stop Measuring



Note: You also can use the shortcut button (■) of “Stop Measuring” to stop measuring.



2.2 Record data and Play-back

2.2.1 Record data


Sometimes, you need to record the data to analyze for VCU/HCU tuning, or you need us to help you on tuning, so you need to log data while do test and send us.

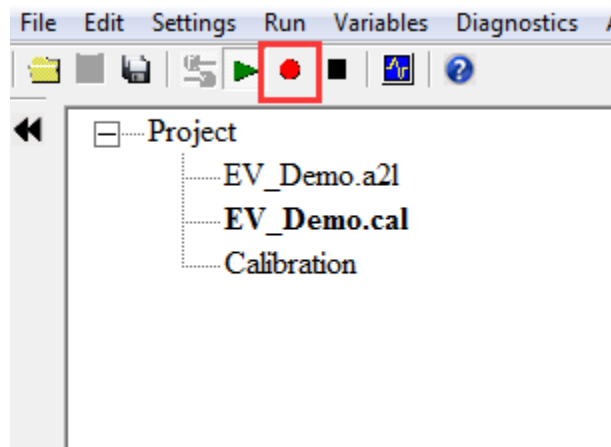
Start Recording

After successfully to connect ECU and start measuring, you can read the values of measured variables, then you can click the “Start recording” button to record the data.

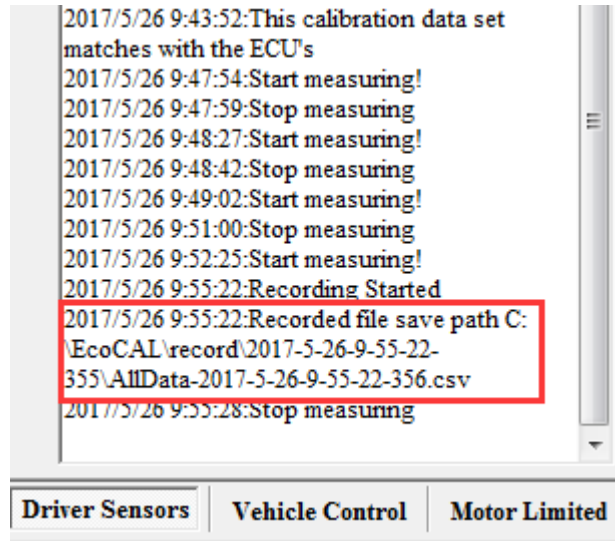
Go to menu->Run->Start Recording



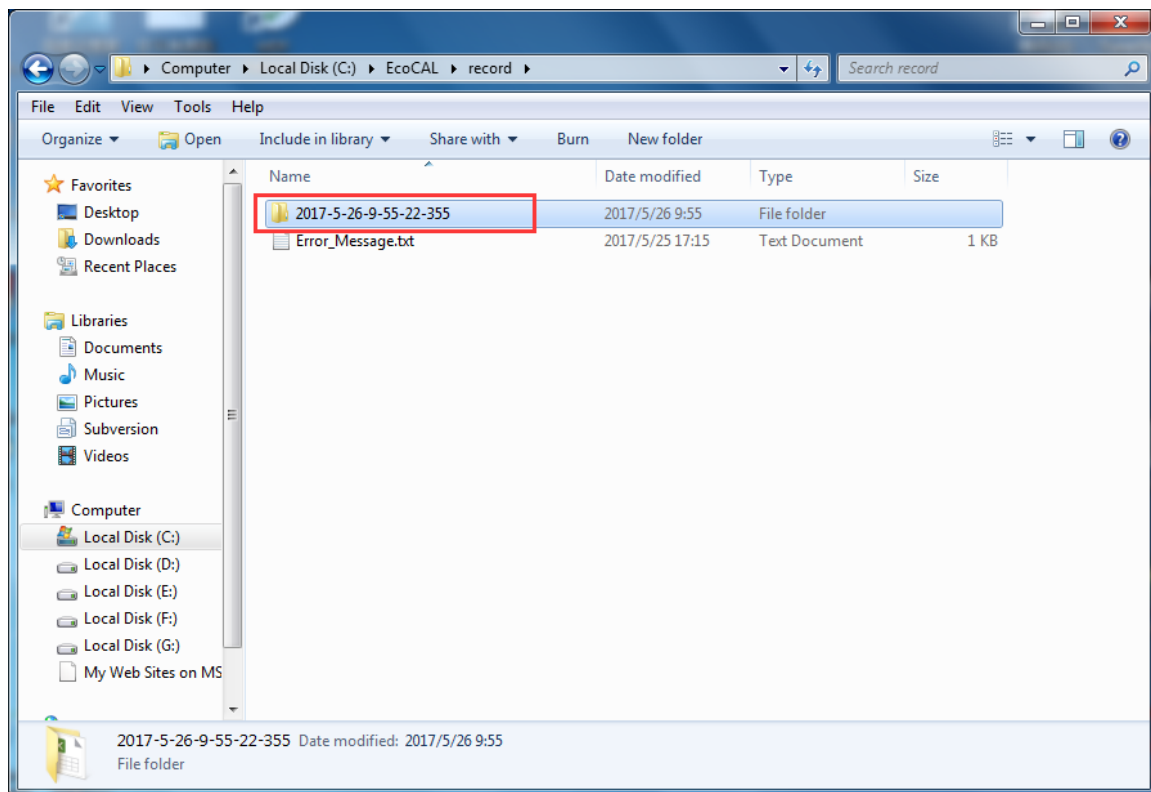
Note: You also can use the shortcut button () of “Start Recording” to record the data.



When you click down the button, EcoCAL will record the data automatically. And save the record file at the installation path of EcoCAL, “C:\EcoCAL\record”, and it is named with the time of recording.



For example, the record named “2017-5-26-9-55-22-355” is the record file in record.




Note: If you need us to help you on tuning, please send the recorded files to us.

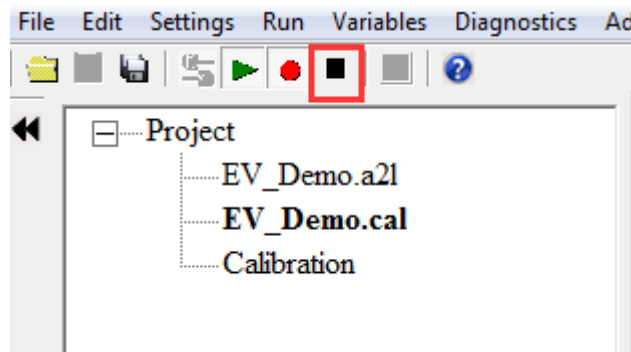
Stop Recording

When you finish the test and want to see the record file, please stop recording first.


Go to menu->Run->Stop Measuring

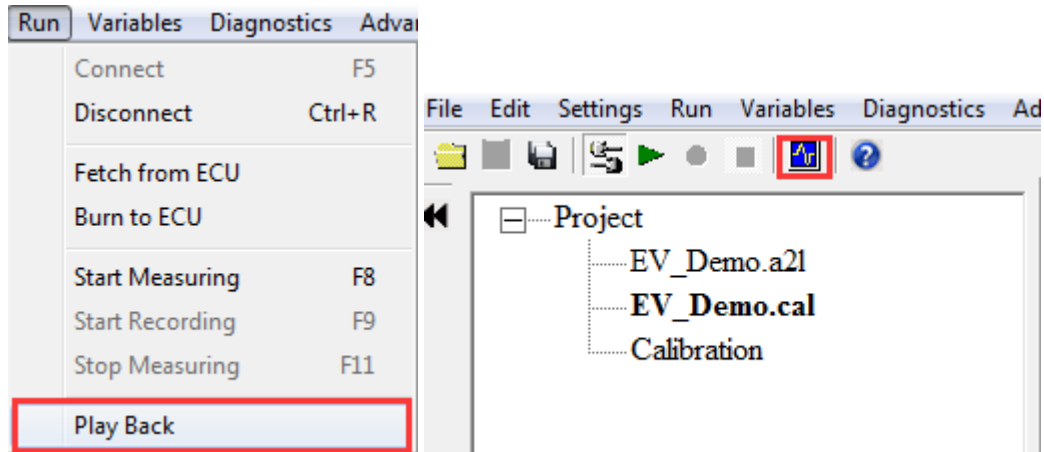


Note: You also can use the shortcut button () of "Stop Measuring" to stop recording.

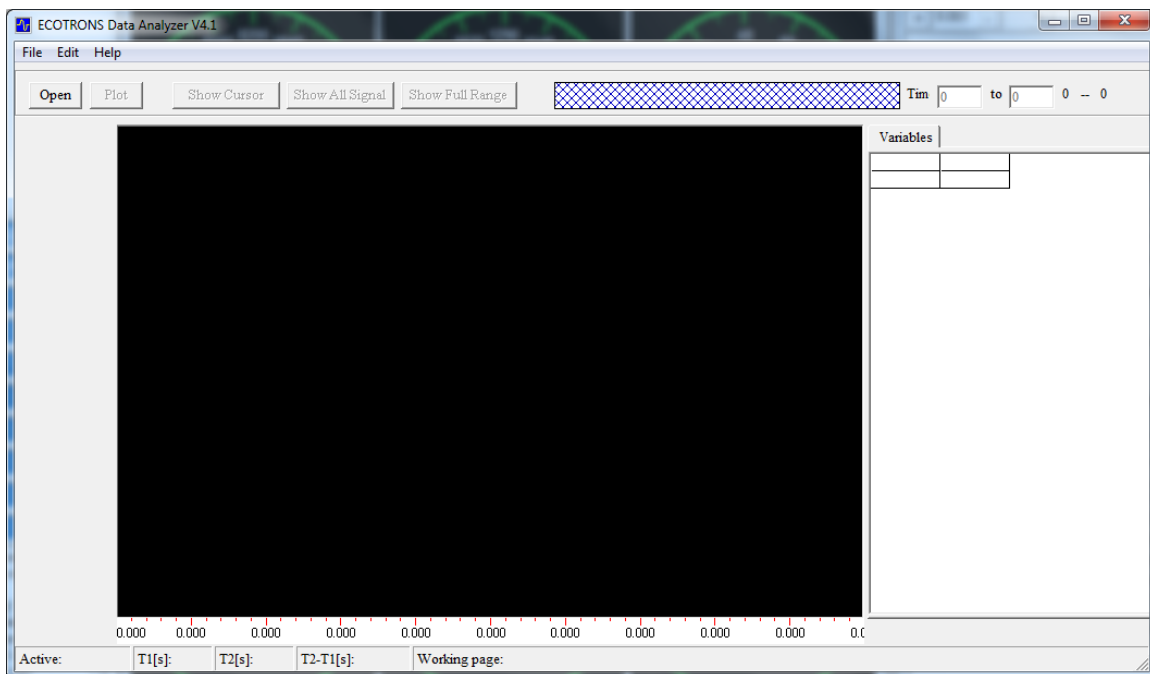


2.2.2 Play-back with data analyzer

After the data files are recorded, the user can select "Run ->Play Back" or click the button  to play back the data.



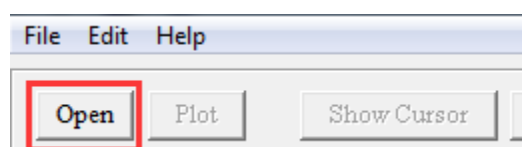
The play-back software, "Data Analyzer", can start as below:

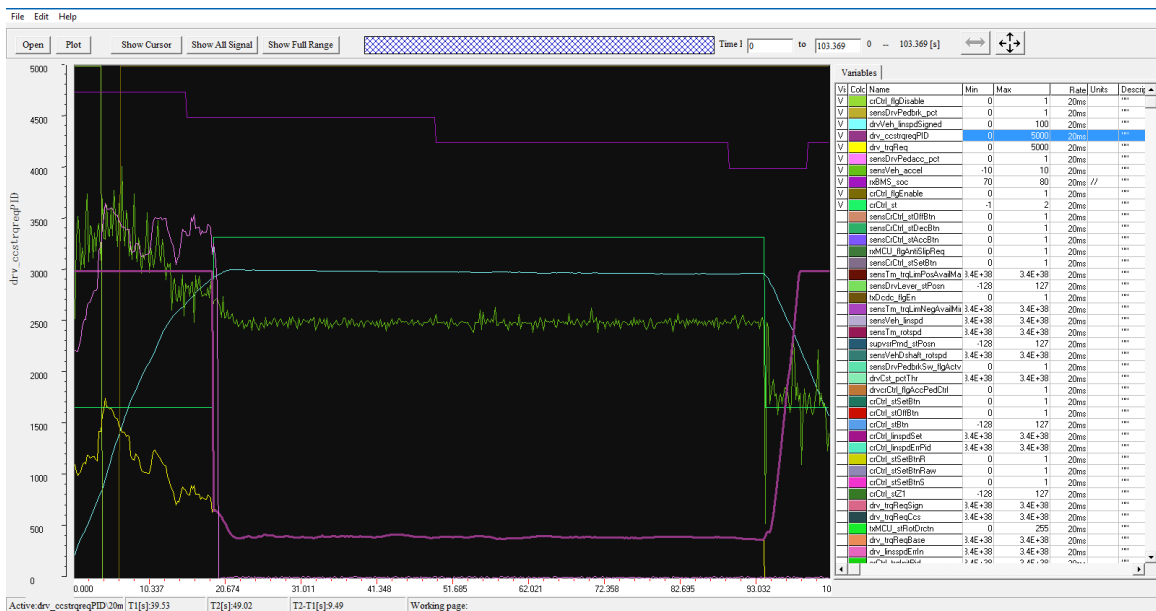
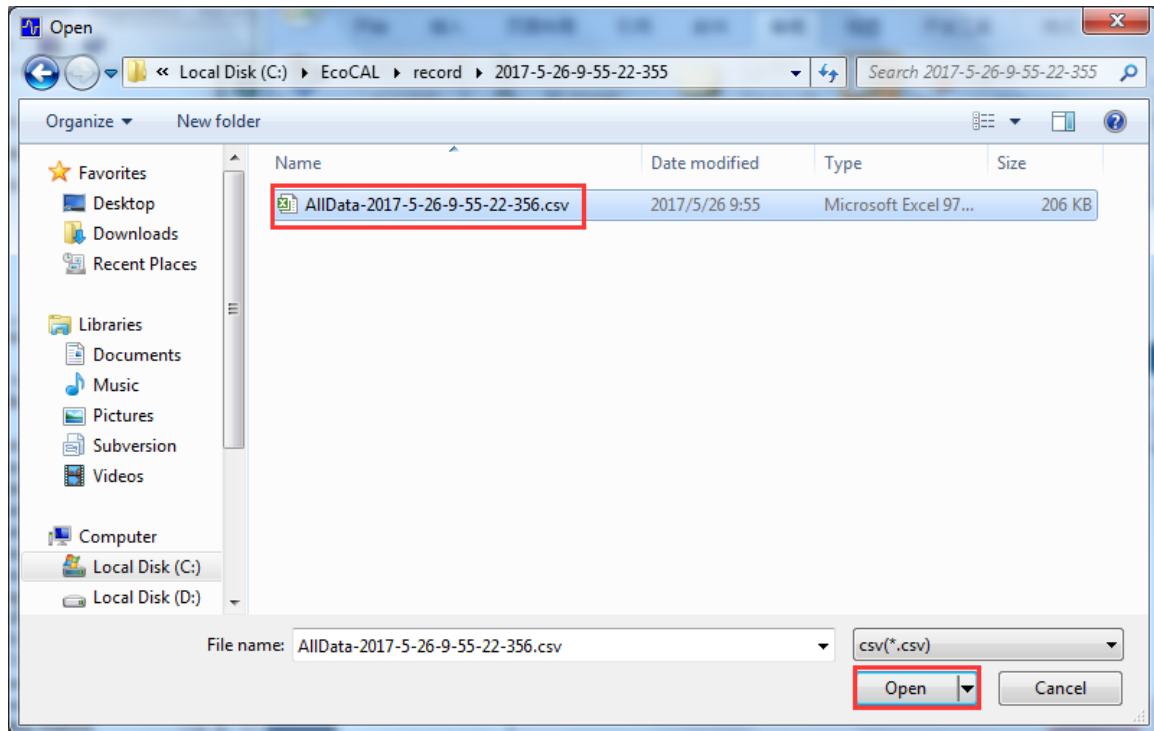


Open Data Files

In **Data Analyzer**, Go to "**File->open**", select the data file you want to analyze:

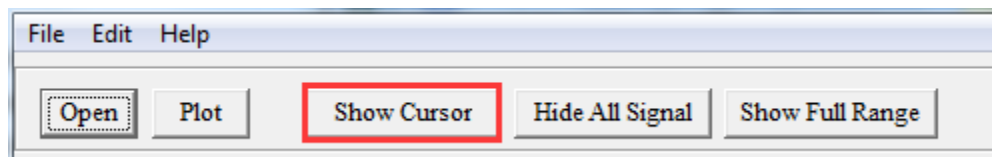
Again, by default, your saved files are under: "...\\EcoCAL\\record"; where "..." is your EcoCAL installation folder, usually it is "C:\\EcoCAL\\record".





Show/Hide all signals

Click "**show all signals / hide all signals**", toggle the signal displays.



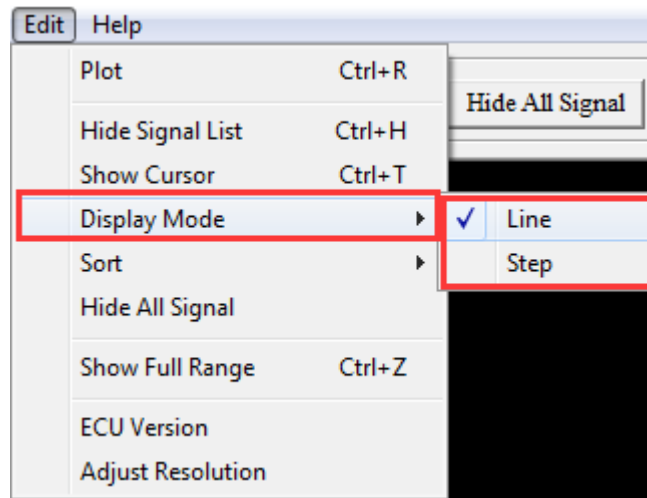
Show/Hide Cursors

[illegible][illegible]

Select curve type: Step / Line, to see the different curve effect.

"Line" means between 2 sample points the curve is connected by a straight line.

"Step" means between 2 sample points the curve is connected by a step change.

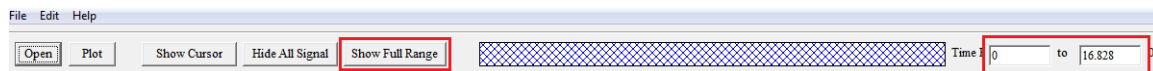


Zoom in/out X-axis

Input the "start time" value, and "end time" value, shown as below, to zoom in/zoom out the X-axis.

Click "show all time", to get the full time range of the data file.

You can also use the mouse to zoom in the X-axis direction. Just press, drag and release.



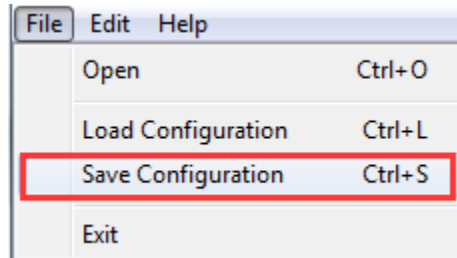
Zoom in/out Y-axis

Double click the "Max / Min" fields in the signal list, you can modify the max and min range of the signals, it 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

Save the Data Analyzer configuration

After you spend time to zoom in/out and/or select signals, you want to save these configurations. Just right click and choose "save configuration" and store it in a configuration file. Next time you run Data Analyzer; you can open that configuration file and load all your previous settings.



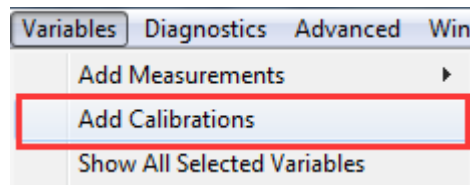
You also can click the "Load Configuration" that you have saved before.

Chapter 3 Operation for tuning

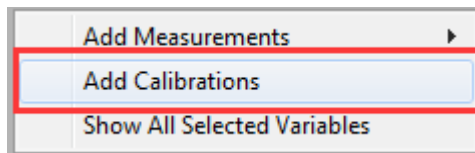
3.1 Add and Delete Calibration Variables

3.1.1 Add Calibration variables

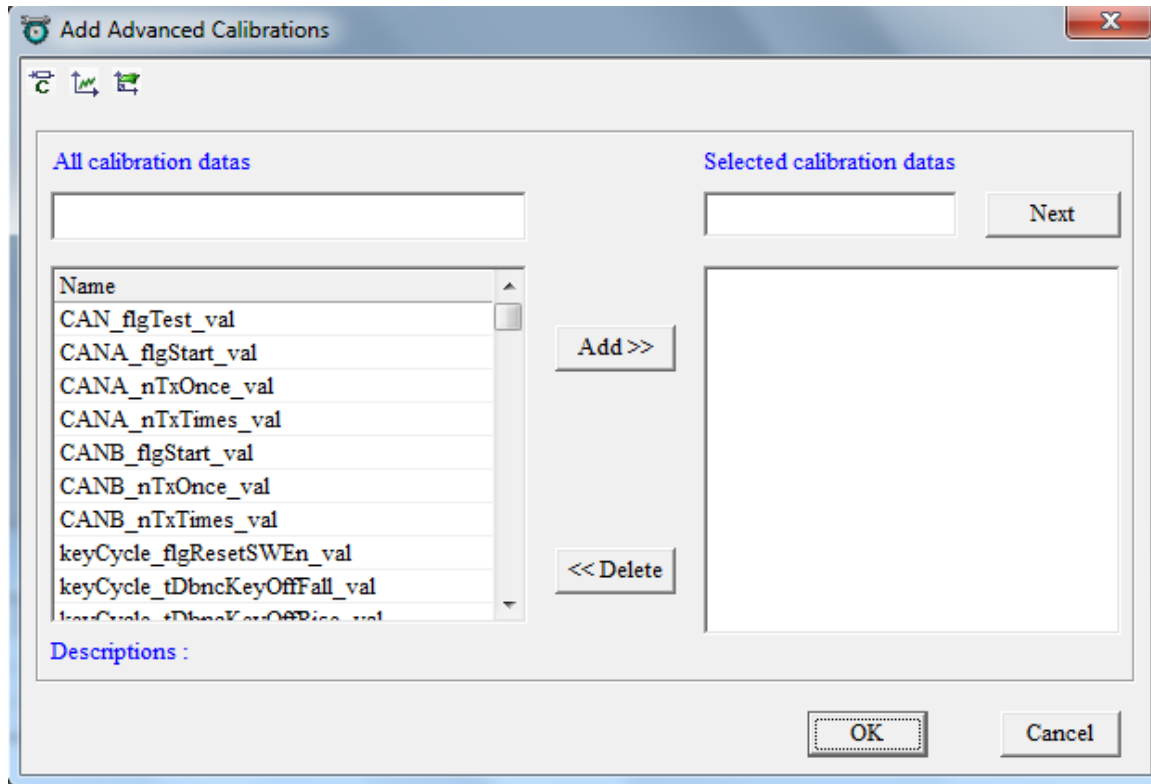
1) Go to menu->Variables->Add Calibrations



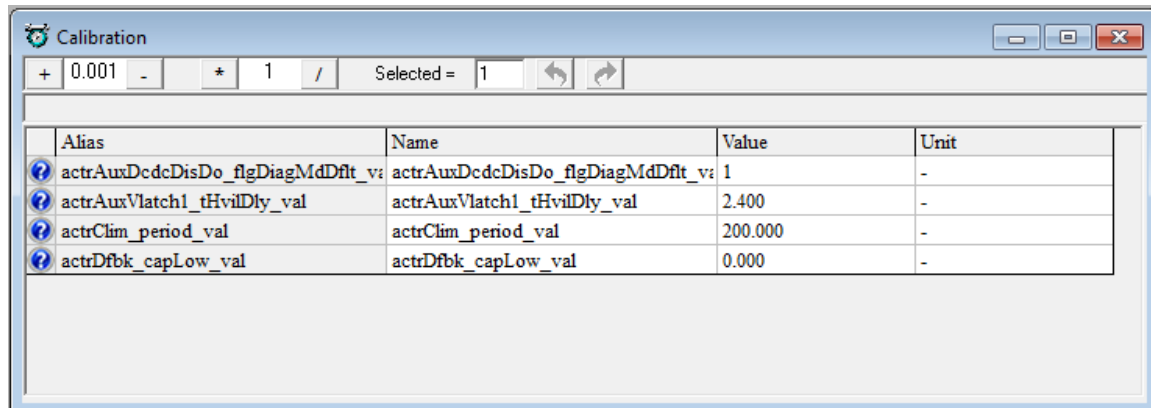
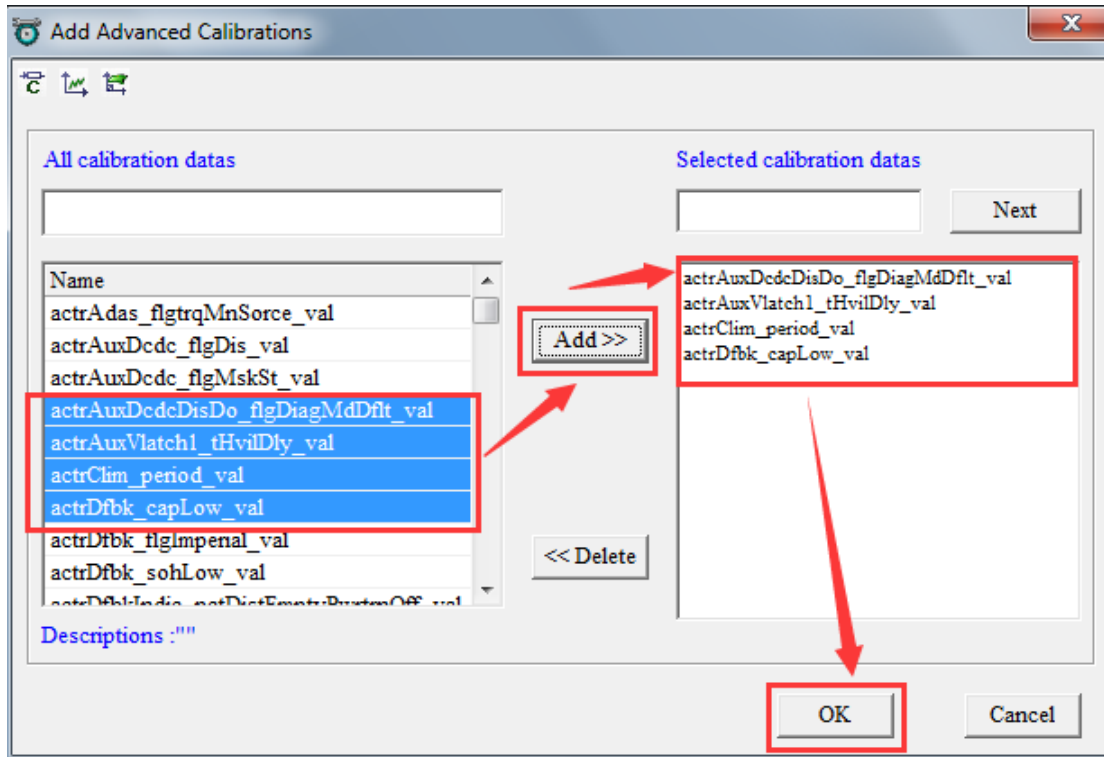
2) Right click on the blank area of window, click “Add Calibrations”



Then, the “Add Advanced Calibrations” window will pop-up,

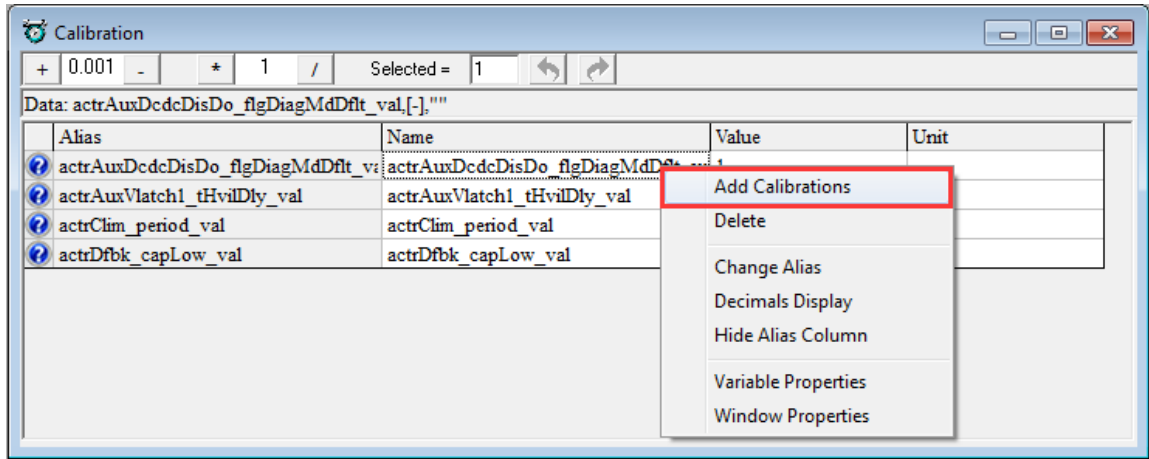


Input the variable on the left side, then you can see the calibration variable, select some variables, then click “Add” button, add it to be right side, then Click “OK”, you can see the calibration window.



Note: Above method is to add new calibration window, if you want to add the calibration variables at the current calibration window, please use following method.

Right click on the calibration window, and then click “Add Calibrations”

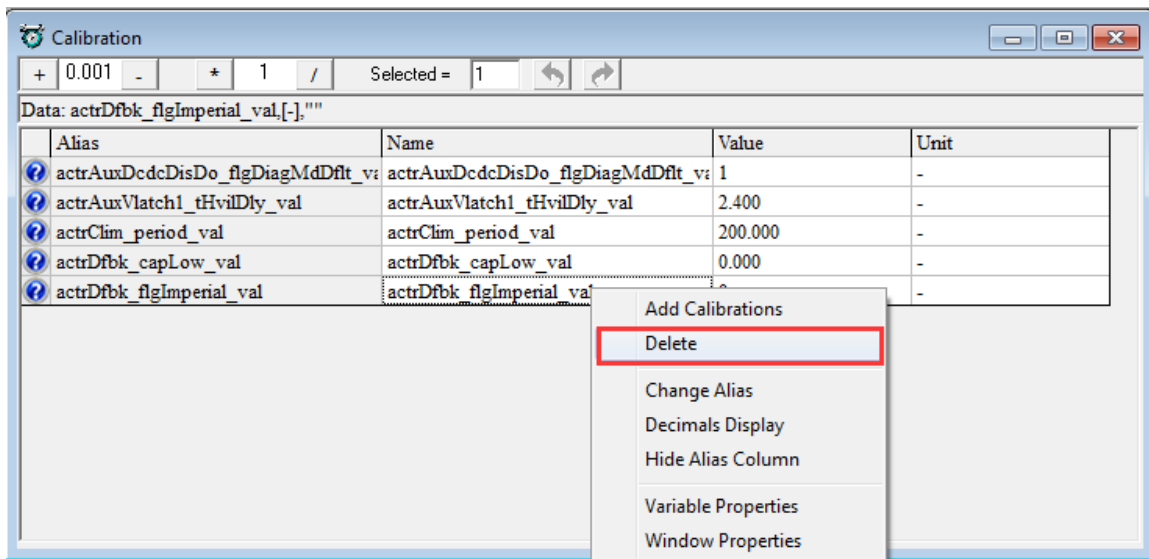


Then, use the same method to add the calibration variables.

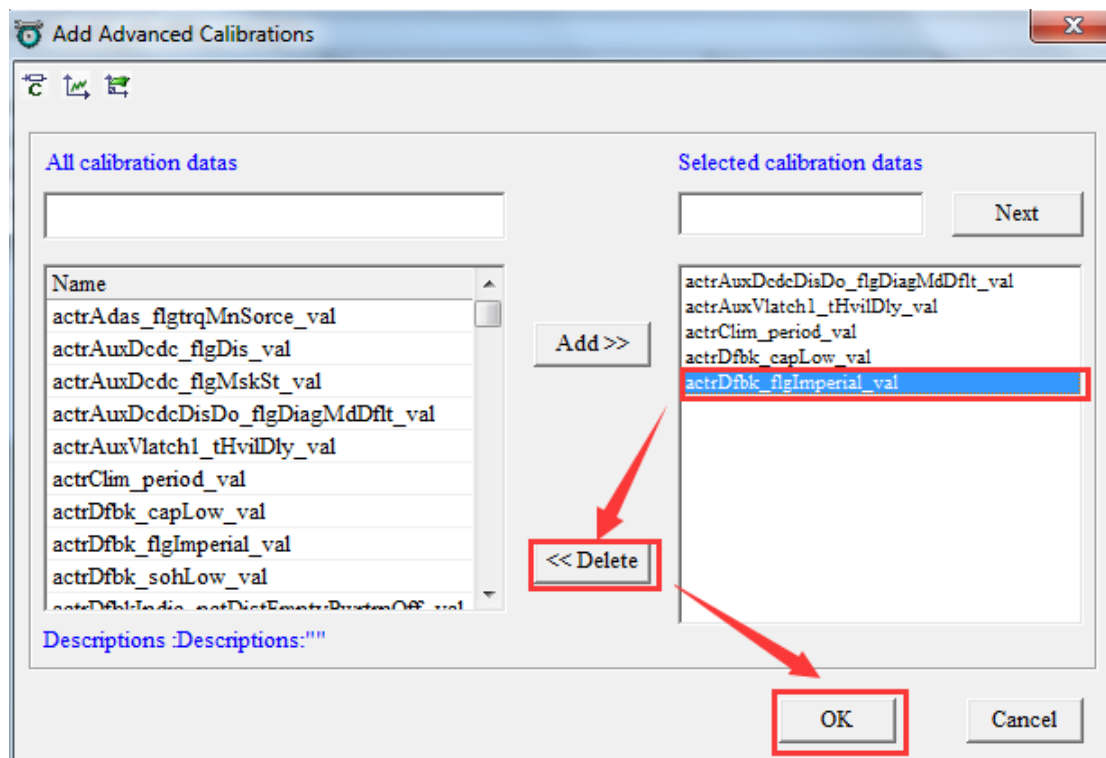
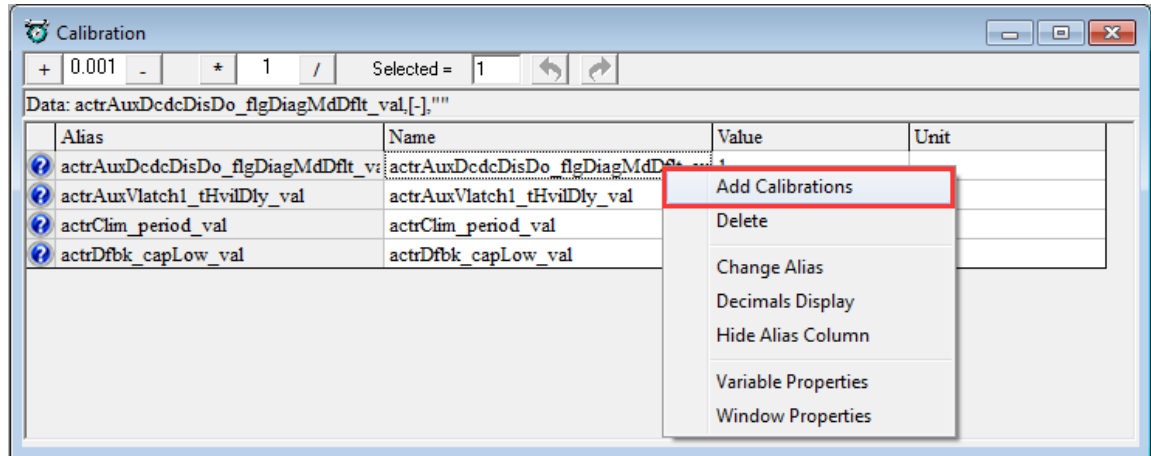
If you want to add the “MAP” and “CUR” variables, please right click on the corresponding window to add the calibration variables.

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.



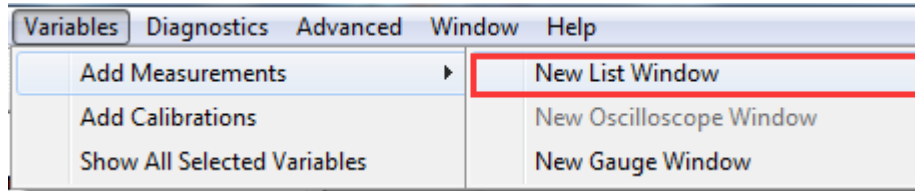
Or click “Add”, pop-up the “Add Calibrations” window, to delete the calibration variables that you have added it once. Click the calibration variable which one do you want to delete, then click ”Delete” button, then click “OK”



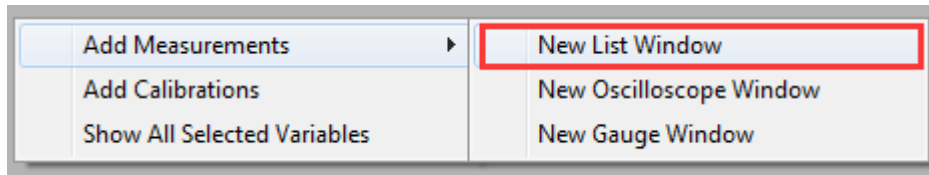
3.2 Add and Delete Measured Variables

3.2.1 Add Measured Variables

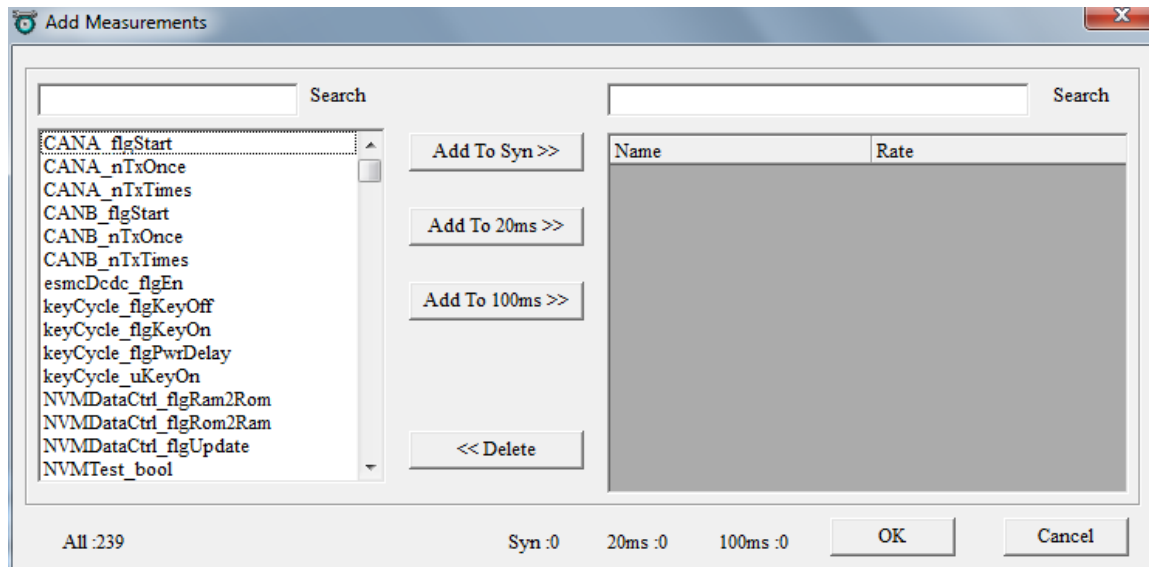
- 1) Go to menu->Variables->Add Measurements



2) Right click on the blank area of window, click “Add Measurements”



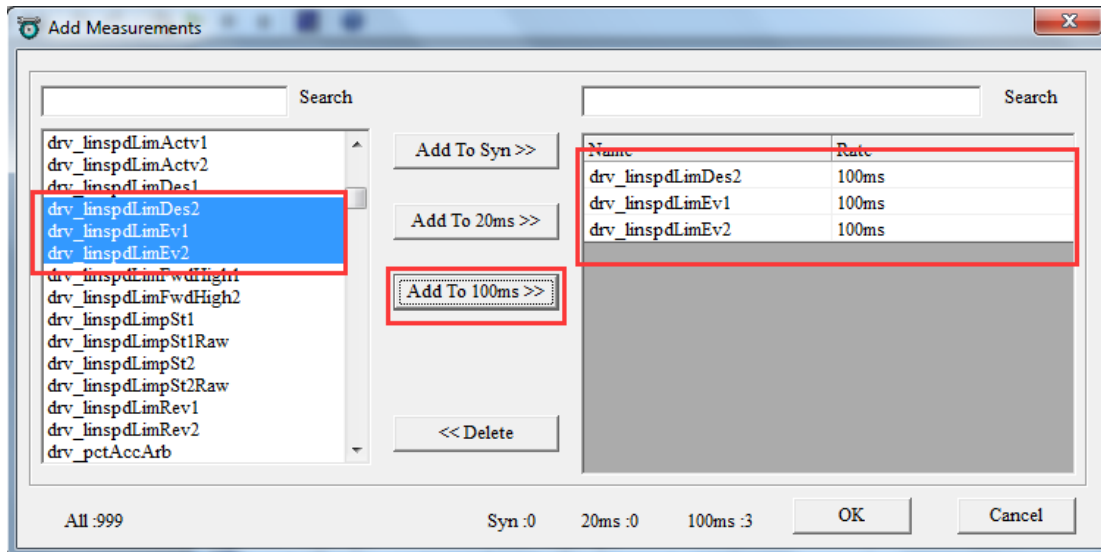
Then, the “Add Measurements” window will pop-up,



Input the variable on the left side, then you can see the measured variable, select some measured variables, then click “Add to 100ms” button, add it to be right side, and then click “OK”, you can see the measured window.

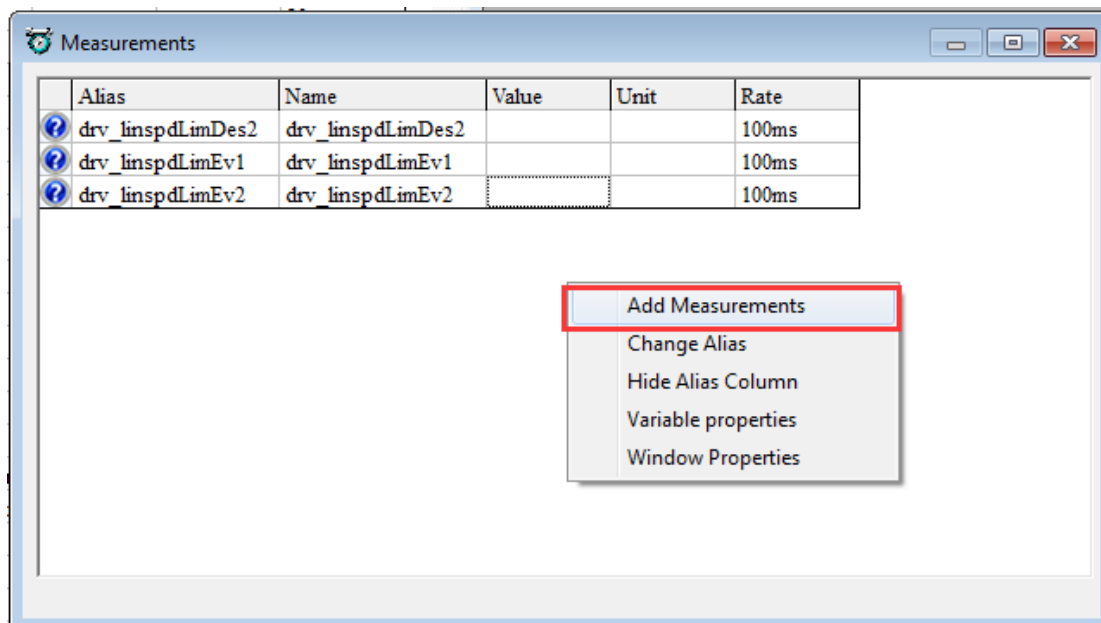
Note: You also can add the variables to be “Syn”, “20ms”, this means the display frequency.

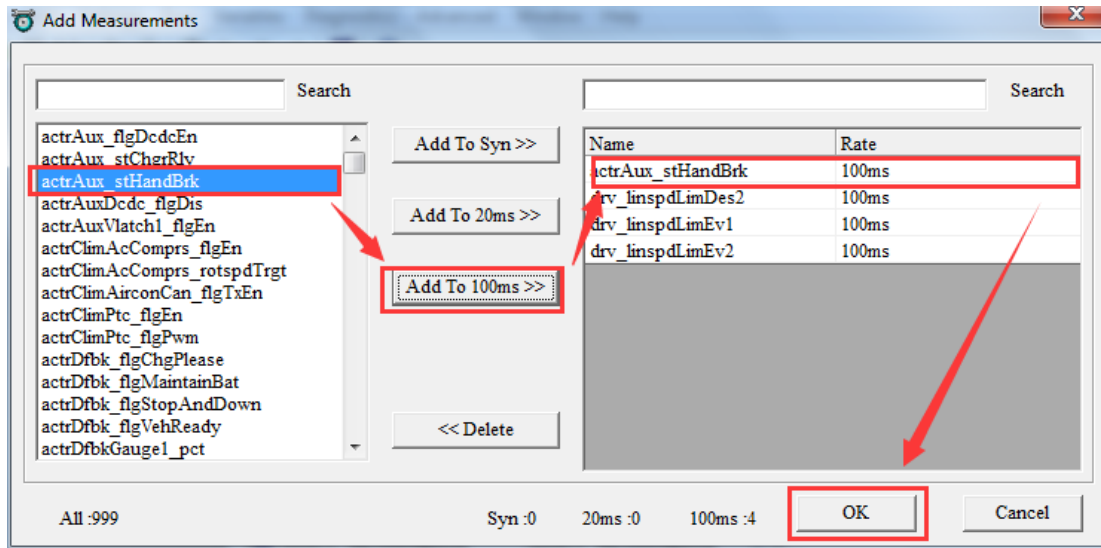
Here, we also add some other variables as example.



Note: Above method is to add new measured variables window, if you want to add the measured variables at the current Selected Variables window, please use following method.

Right click on the Selected Variables window, and then click “Add Measurements”.

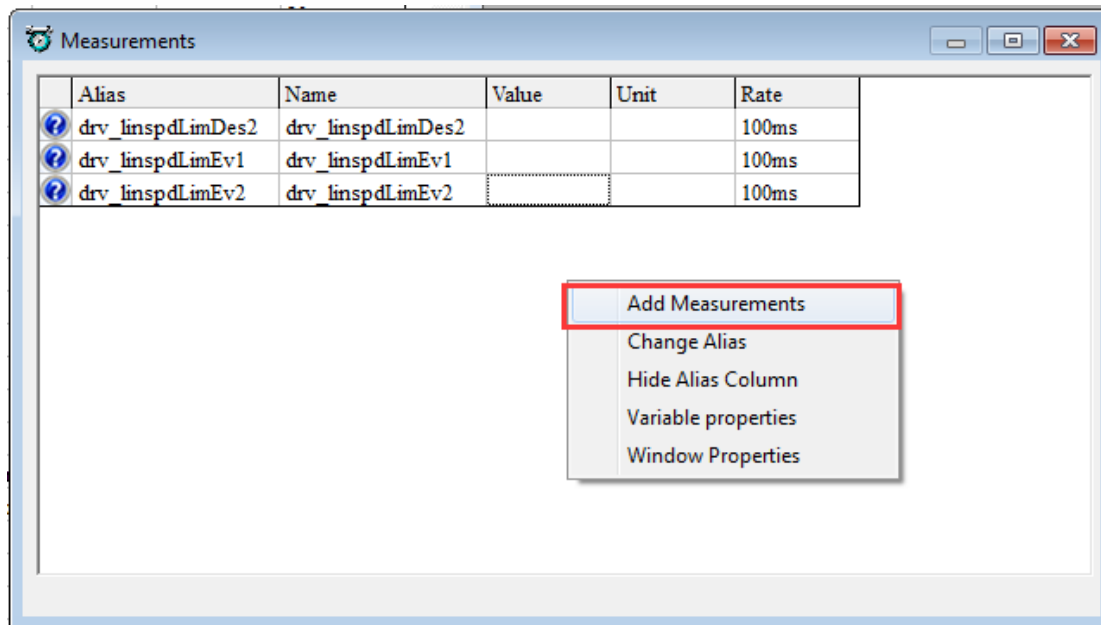


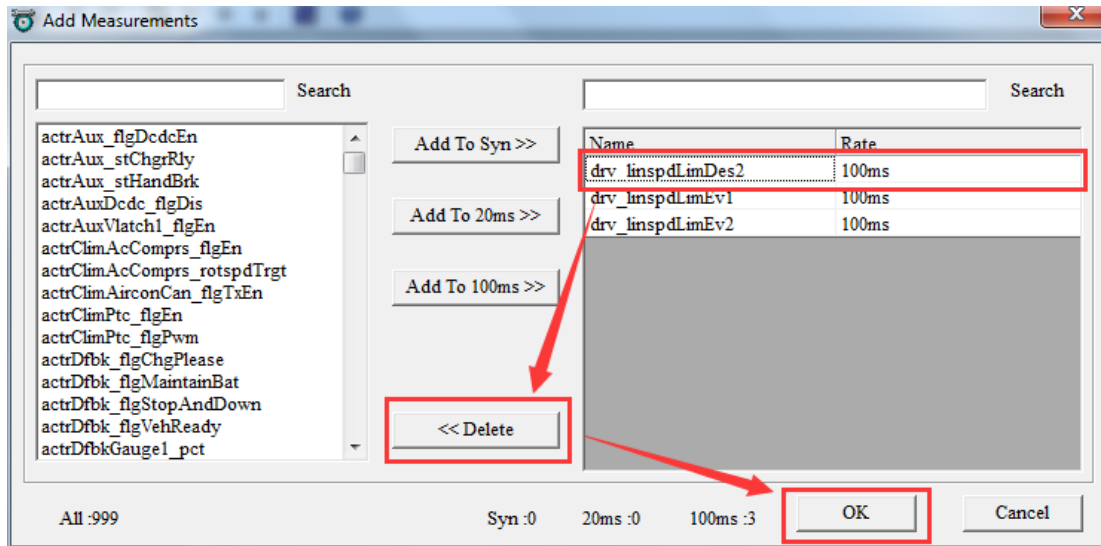


Then you can see all of the variables that you have chosen, and then you can add the new measure variables as you want by using the above method.

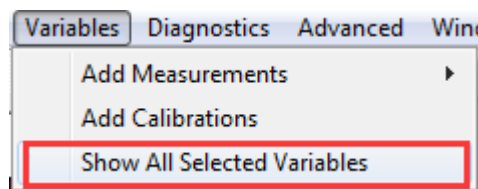
3.2.2 Delete Measured Variables

- 1) Right click on the Selected Variables, choose “**Add Measurements**”, and then delete the variables those you want.

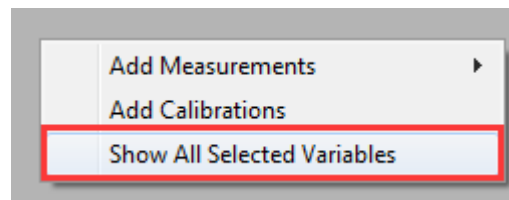




2) Go to menu->Variables-> Show All Selected Variables

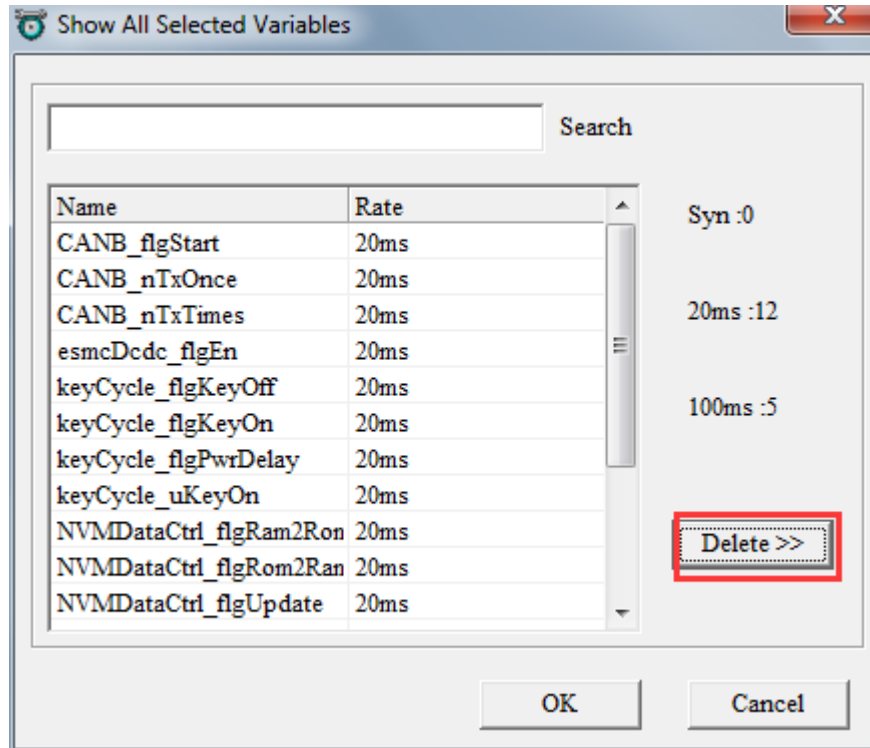


Or right click on the blank of window, and then choose “Show All Selected Variables”



A window will pop-up, all of the selected measured variables showing are there, then you can find out the variable that you want to delete, and then delete it.

Note: if you add one variable in all of the layers, this way will delete the measured variable in all layers.

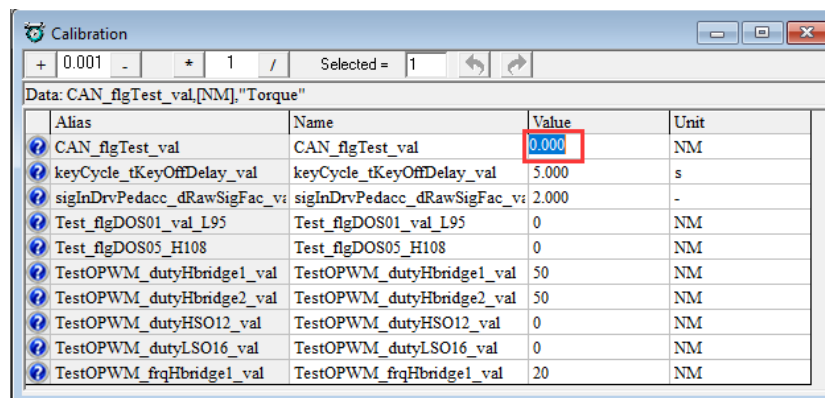


3.3 Change Calibration (Tuning)

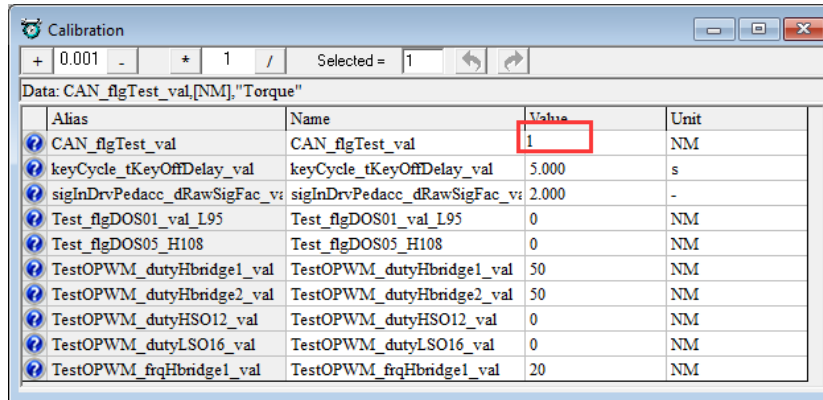
Calibration variables are 3 types: Values, Curves and Maps.

3.3.1 Change the value directly

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



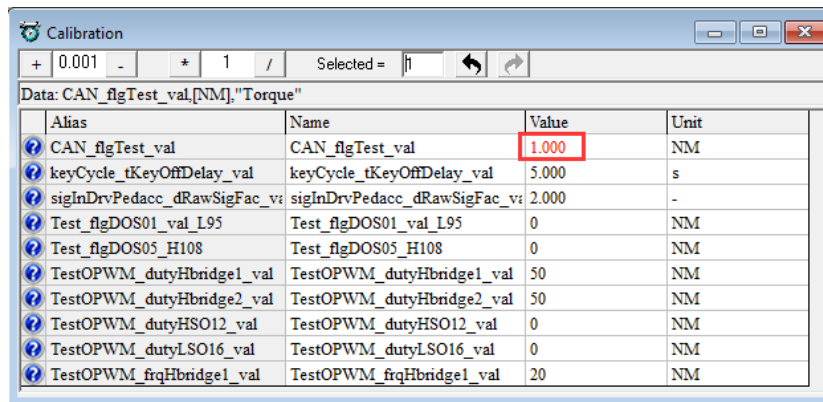
2) Input the value that you want



Calibration window showing a table of calibration data. The 'Value' column for 'CAN_flgTest_val' is highlighted in red.

Alias	Name	Value	Unit
CAN_flgTest_val	CAN_flgTest_val	1	NM
keyCycle_tKeyOffDelay_val	keyCycle_tKeyOffDelay_val	5.000	s
sigInDrvPedacc_dRawSigFac_val	sigInDrvPedacc_dRawSigFac_val	2.000	-
Test_flgDOS01_val_L95	Test_flgDOS01_val_L95	0	NM
Test_flgDOS05_H108	Test_flgDOS05_H108	0	NM
TestOPWM_dutyHbridge1_val	TestOPWM_dutyHbridge1_val	50	NM
TestOPWM_dutyHbridge2_val	TestOPWM_dutyHbridge2_val	50	NM
TestOPWM_dutyHSO12_val	TestOPWM_dutyHSO12_val	0	NM
TestOPWM_dutyLSO16_val	TestOPWM_dutyLSO16_val	0	NM
TestOPWM_frqHbridge1_val	TestOPWM_frqHbridge1_val	20	NM

Press Enter to finish it. The modified data will show as "red" color.

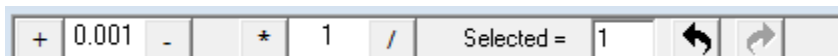


Calibration window showing the same table as before, but the 'Value' for 'CAN_flgTest_val' is now 1.000 and highlighted in red.

Alias	Name	Value	Unit
CAN_flgTest_val	CAN_flgTest_val	1.000	NM
keyCycle_tKeyOffDelay_val	keyCycle_tKeyOffDelay_val	5.000	s
sigInDrvPedacc_dRawSigFac_val	sigInDrvPedacc_dRawSigFac_val	2.000	-
Test_flgDOS01_val_L95	Test_flgDOS01_val_L95	0	NM
Test_flgDOS05_H108	Test_flgDOS05_H108	0	NM
TestOPWM_dutyHbridge1_val	TestOPWM_dutyHbridge1_val	50	NM
TestOPWM_dutyHbridge2_val	TestOPWM_dutyHbridge2_val	50	NM
TestOPWM_dutyHSO12_val	TestOPWM_dutyHSO12_val	0	NM
TestOPWM_dutyLSO16_val	TestOPWM_dutyLSO16_val	0	NM
TestOPWM_frqHbridge1_val	TestOPWM_frqHbridge1_val	20	NM

3.3.2 Change the value with Formula

EcoCAL supports to use Formula to modify the calibration data.



Note:



: Plus;



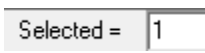
: Minus;



: multiply by;



: be divided by;



:be equal;

 : Undo;

 : Redo.

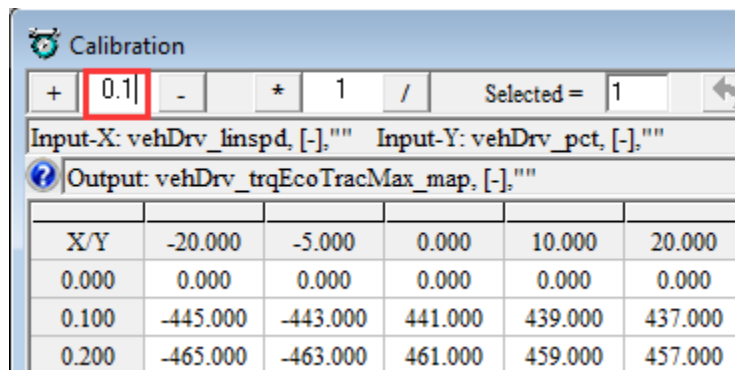
1) Plus and Minus

You can input the value that you want to increase or decrease, and then choose the cell or area of table you want to change.

Click the Plus or Minus button to change the value.

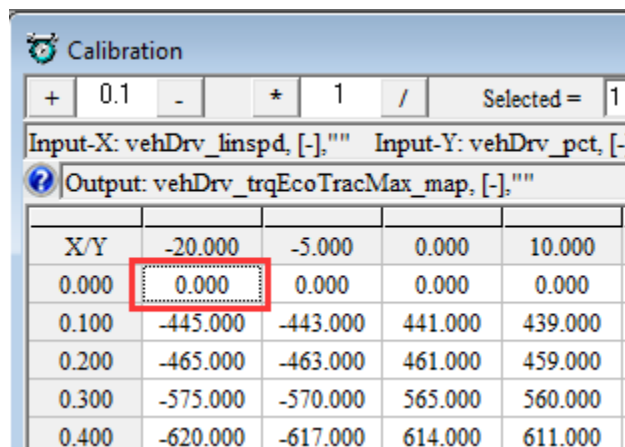
For example:

Input 0.1 in the box



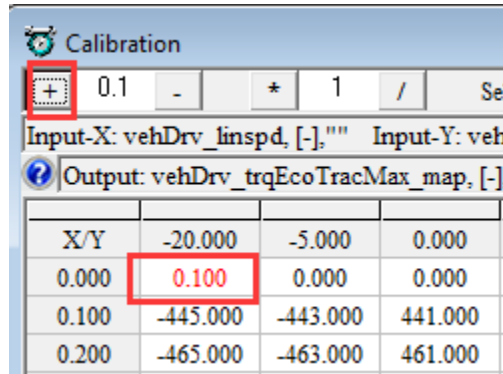
X/Y	-20.000	-5.000	0.000	10.000	20.000
0.000	0.000	0.000	0.000	0.000	0.000
0.100	-445.000	-443.000	441.000	439.000	437.000
0.200	-465.000	-463.000	461.000	459.000	457.000

If you want to change one cell, click cell to choose it.



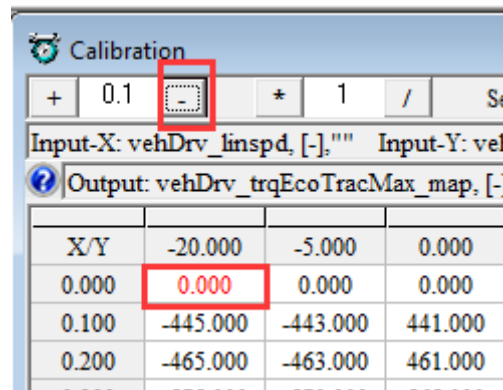
X/Y	-20.000	-5.000	0.000	10.000
0.000	0.000	0.000	0.000	0.000
0.100	-445.000	-443.000	441.000	439.000
0.200	-465.000	-463.000	461.000	459.000
0.300	-575.000	-570.000	565.000	560.000
0.400	-620.000	-617.000	614.000	611.000

If you want to increase value by 0.1 step based on the stock value, please click the “+” button.



X/Y	-20.000	-5.000	0.000
0.000	0.100	0.000	0.000
0.100	-445.000	-443.000	441.000
0.200	-465.000	-463.000	461.000

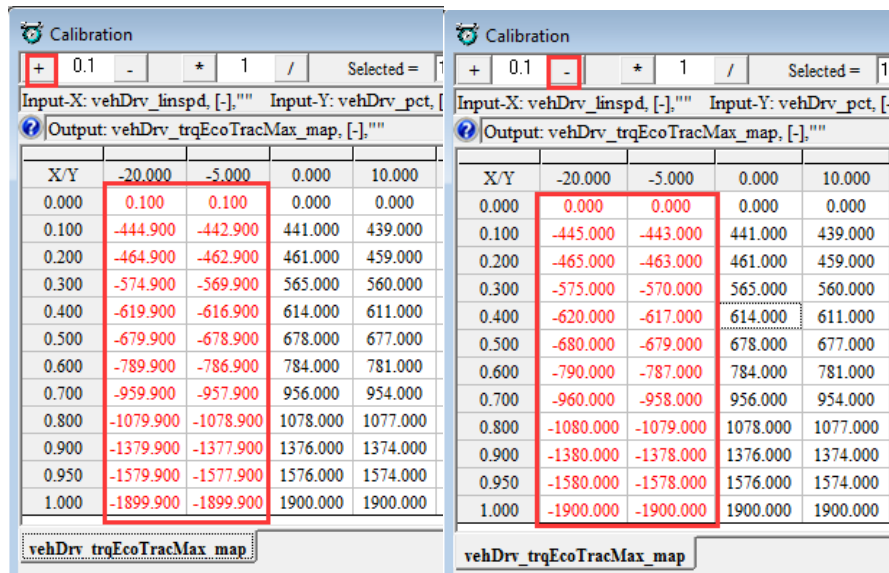
And if you want to decrease the value, click” - ” button



X/Y	-20.000	-5.000	0.000
0.000	0.000	0.000	0.000
0.100	-445.000	-443.000	441.000
0.200	-465.000	-463.000	461.000

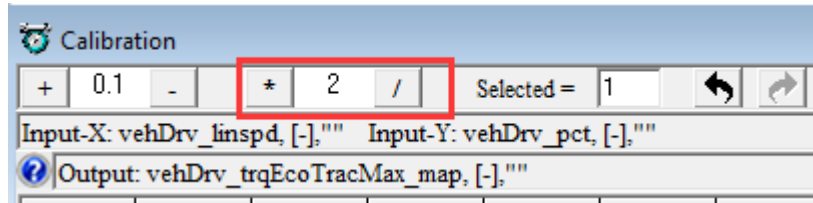
Note: You also can tune more than one cell together by using the buttons.

Choose the area of cells, then click “+” or “-” button.



X/Y	-20.000	-5.000	0.000	10.000
0.000	0.100	0.100	0.000	0.000
0.100	-444.900	-442.900	441.000	439.000
0.200	-464.900	-462.900	461.000	459.000
0.300	-574.900	-569.900	565.000	560.000
0.400	-619.900	-616.900	614.000	611.000
0.500	-679.900	-678.900	678.000	677.000
0.600	-789.900	-786.900	784.000	781.000
0.700	-959.900	-957.900	956.000	954.000
0.800	-1079.900	-1078.900	1078.000	1077.000
0.900	-1379.900	-1377.900	1376.000	1374.000
0.950	-1579.900	-1577.900	1576.000	1574.000
1.000	-1899.900	-1899.900	1900.000	1900.000

2) Multiply and divided by

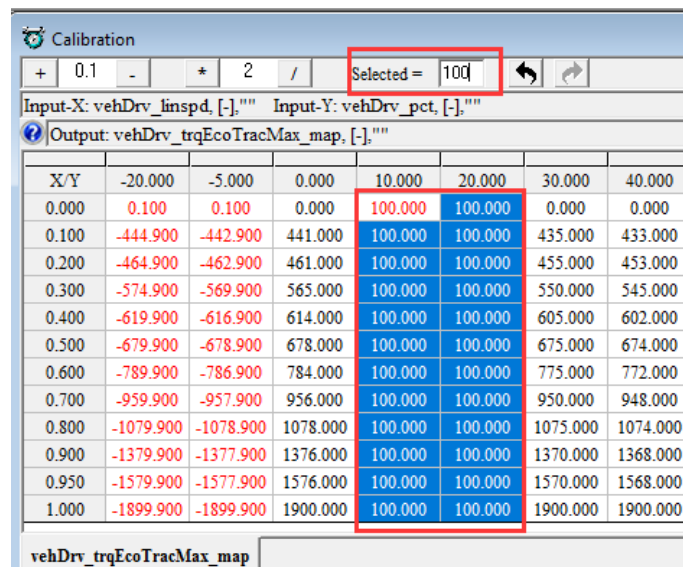


This is the same to the Plus or Minus function, it is to multiply or divided by the factor that you input.

3) Be equal

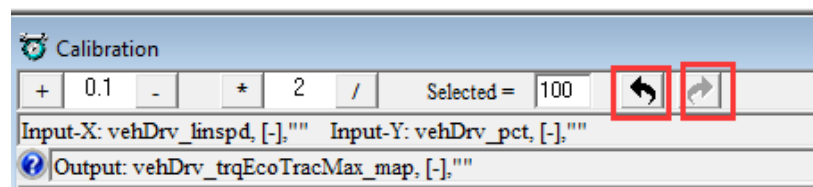
This is used to change the value of cell to be one constant value.

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



4) Undo / Redo

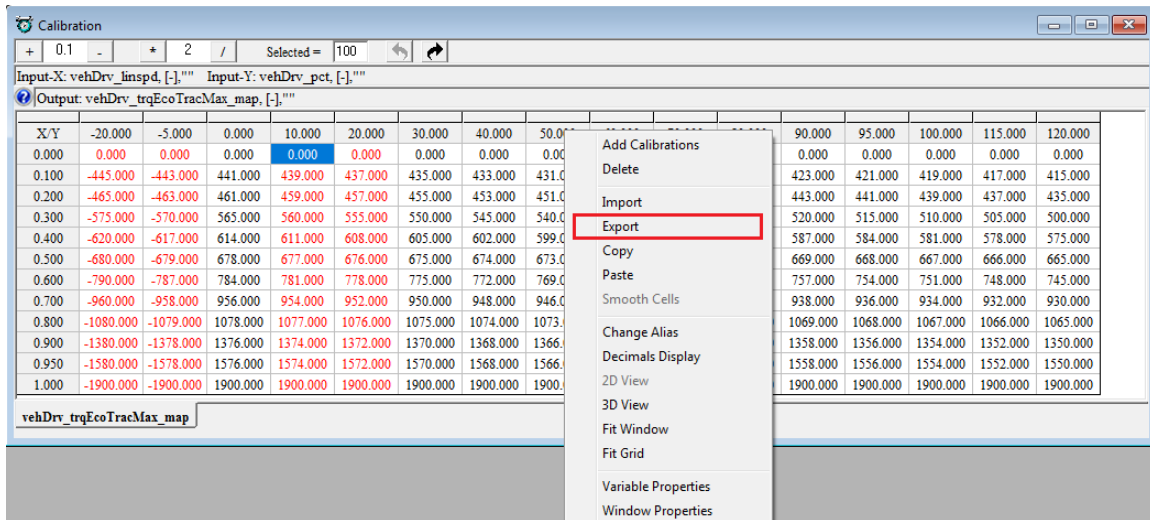
The user can click the button “ ” / “ ” to undo or redo the calibration as below.



3.3.3 Export / Import Calibration Data for tuning

You can also do data export to Excel sheet, and modified the data in Excel. After finishing the modification, you can import data back to EcoCAL. This is most 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.

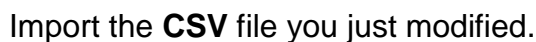
If you click **save**, the program will save **CSV** file and open it. The default name of the **CSV** file is the calibration label name.

And the **CSV** file will be opened automatically. You can choose to open the file by anyone method from your laptop, and the below showing opens 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 recommended to modify your curve and map tables in Excel, and smoothen them in Excel and then imported back to EcoCAL. And please save it after you finish tuning.

If you want to import just edited calibration tables, Right-Click the parameter window, select the **Import** option.



The modified cells will show as "red".

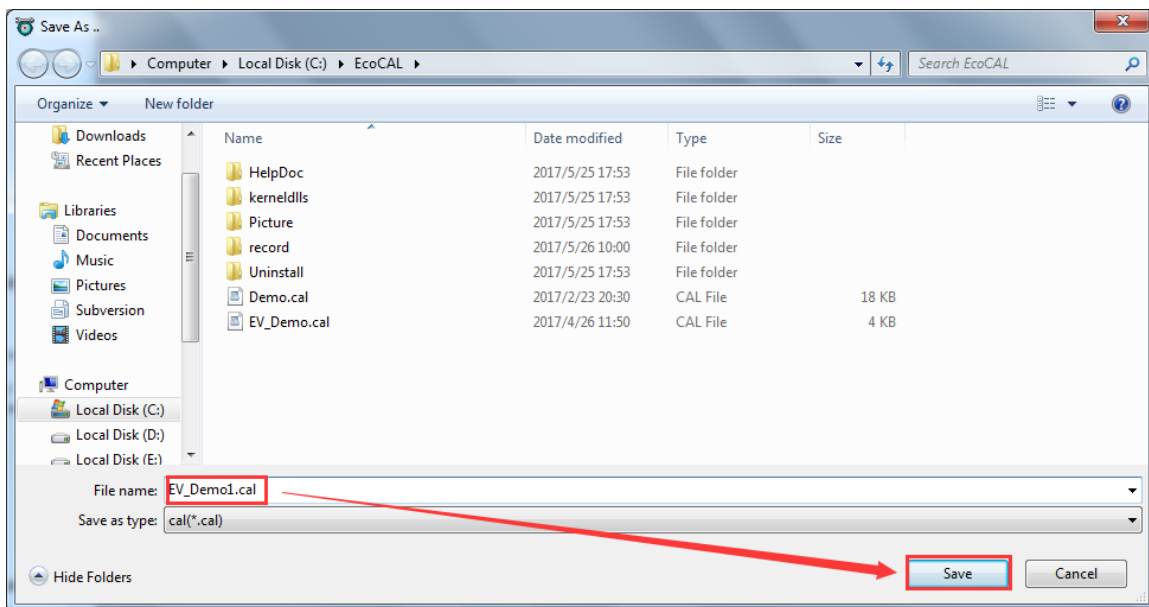
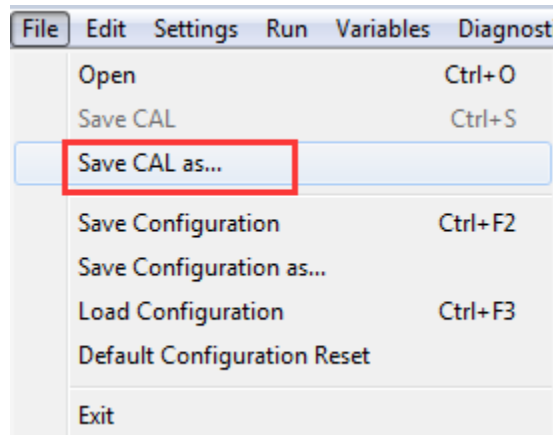
Note: when you finish the data changed, please save it as one new CAL file.

Please read the flowing chapter for how to save the new CAL files.

3.4 Save as calibration data file

When you finish VCU/HCU tuning or do some fine tuning, please save the tuning data before you exit the EcoCAL, otherwise, you will lose the tuning that you did.

Go to menu->File->Save CAL as



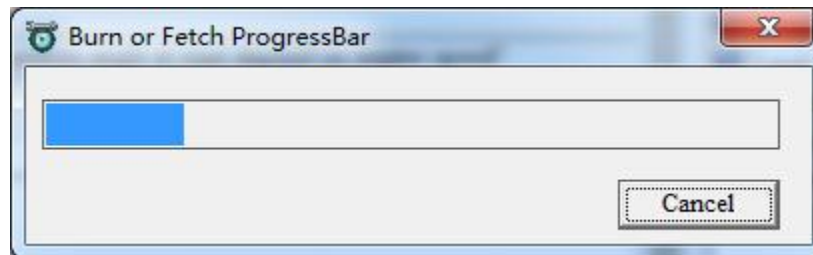
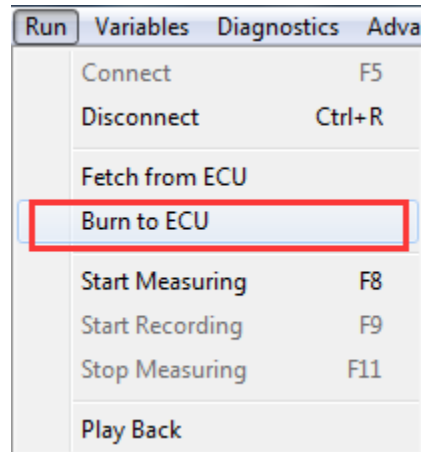
You can save it as the new calibration CAL file.

3.5 Burn to ECU and Fetch from ECU

3.5.1 Burn the CAL file to ECU

When you finish the data tuning, you want to see the performance of VCU/HCU, please burn the data to VCU/HCU, then VCU/HCU will use the data that you changed to control the vehicle.

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



When burn to ECU successfully, the vehicle will be power on.

Note: make sure your 12V battery is healthy, before you do any "burn to ECU" or "fetch from ECU"!

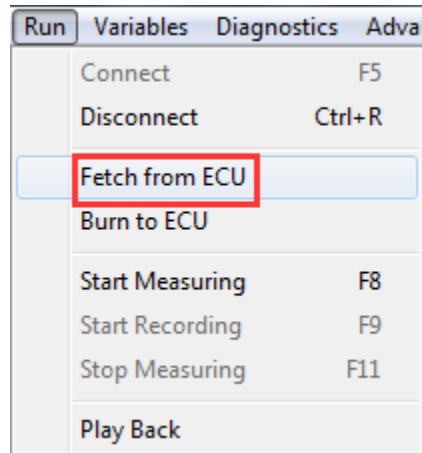
During the upload or download, users are not allowed to do any operations to the VCU/HCU system.

Do not turn off the VCU/HCU's power or disconnect the serial cable before the upload/download is finished

3.5.2 Fetch the CAL file from ECU

Sometimes, maybe you want to know which version of Calibration data is in VCU/HCU or you forgot the change that you did, you can fetch the data from VCU /HCU to compare.


Connect ECU only; Go to menu->Run->Fetch from ECU

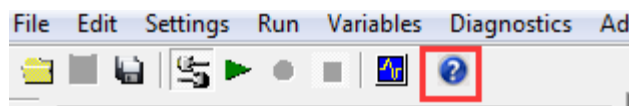


Save it as CAL file.

4.1 Pop-up the Help and support window

[illegible]

There is also help for each layer; you can click the main  in EcoCAL to get the layer help.

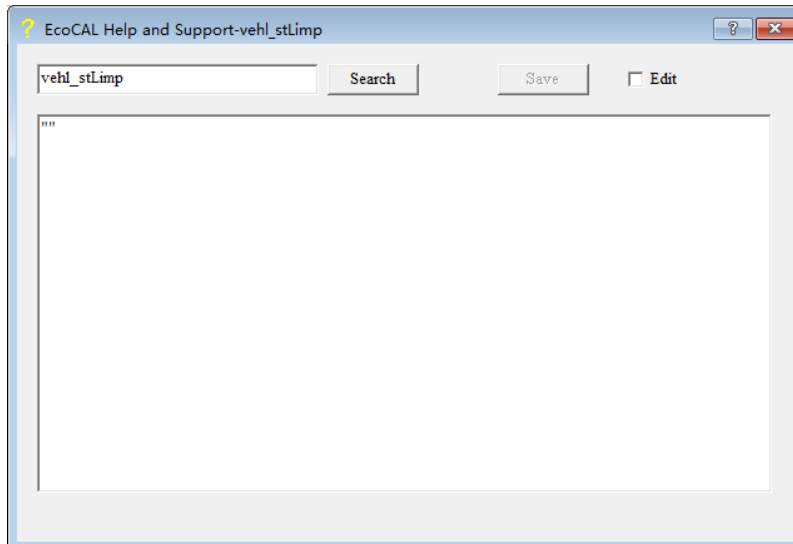




In different layer, the help document is also different.

4.2 Edit the Help and support window

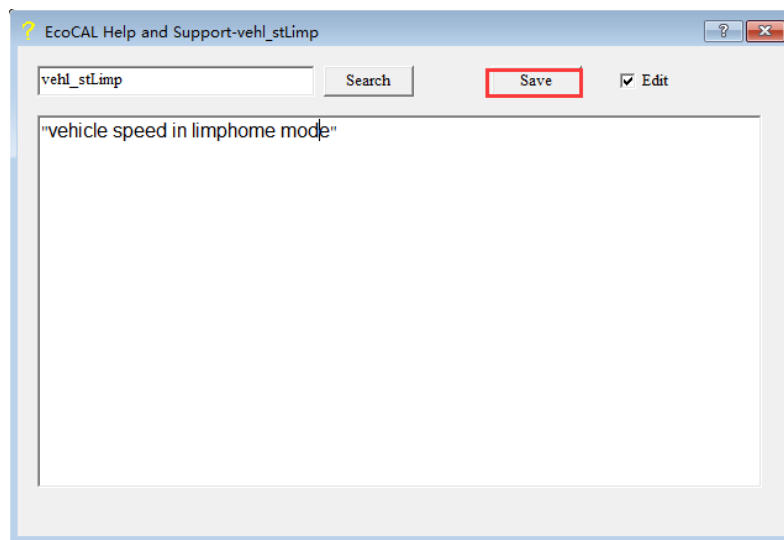
You also can edit the content by yourself for easy to read based on your own understand.

First, click the  button to open the Help and support window,



Then choose the Edit option, from  to , then you can edit the content by yourself.

For example, add the “vehicle speed in limphome mode” content.



After finishing, please click “Save” to save the change, otherwise, the change will be lost.

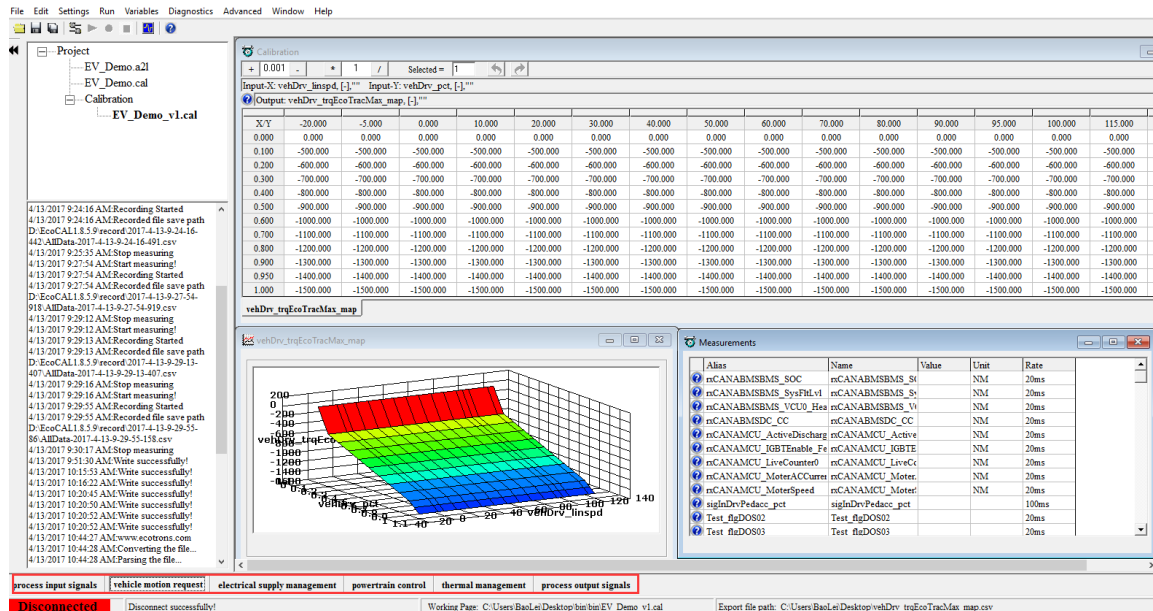
Chapter 5 Advanced operation of EcoCAL

5.1 EcoCAL setting in Customers' demand

EcoCAL supports custom design; you can set the window as your demand.

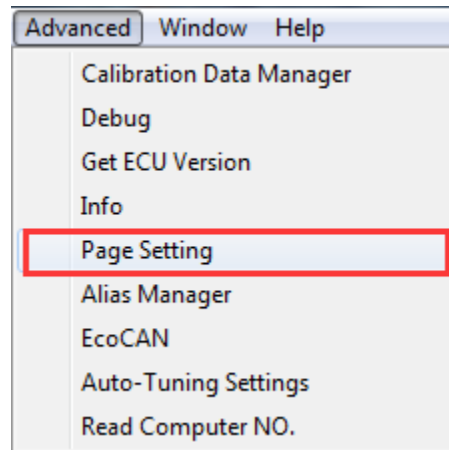
5.1.1 Page setting

In the default page setting of EcoCAL, you can see there are many pages, for example “process input signals”, “vehicle motion request”, “powertrain control”, ..., etc. , they are the named “layer”.

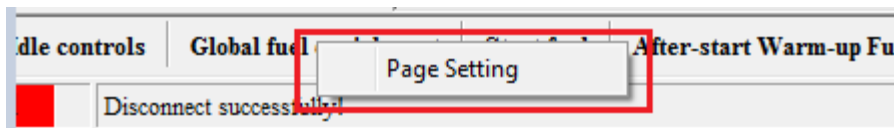


You can add or delete the layer as you want, for example, you don't want the “thermal management” layer, you can delete it, if you want to add the “Custom Calibration” layer, you can add the layer and re-set it as you want the calibration variables, measure variables, etc.

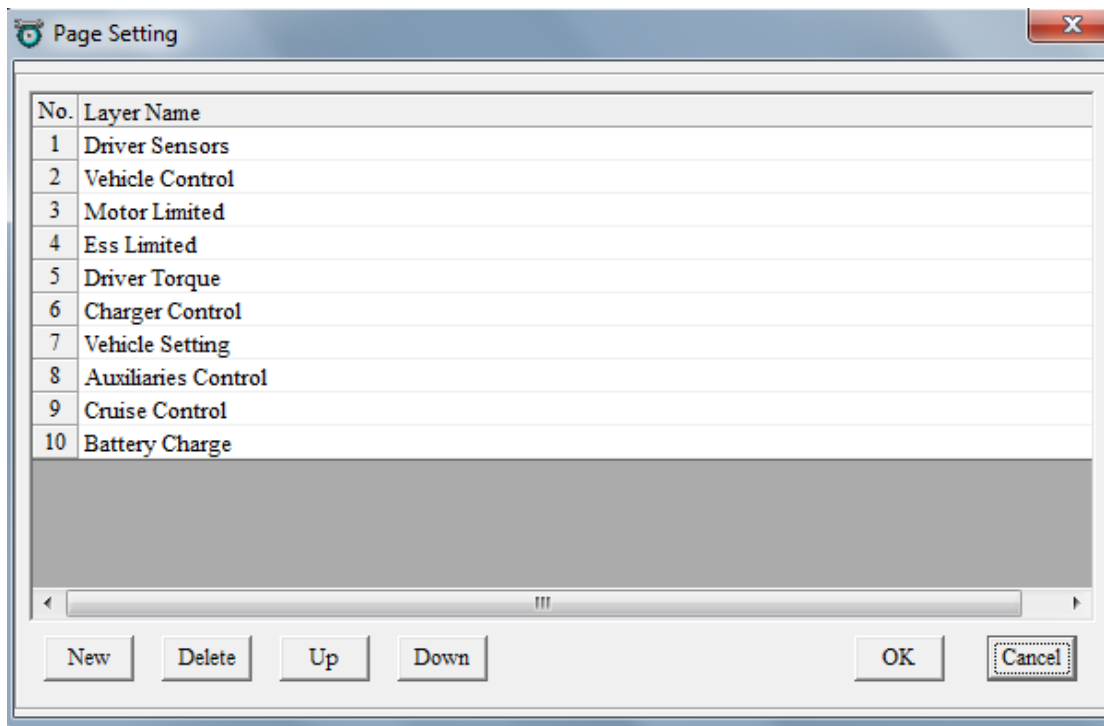
Go to menu->Advanced->Page setting, the page setting window will pop-up.



Note: you also can right click on the layer label, and then click the “Page setting”, the window will pop-up.

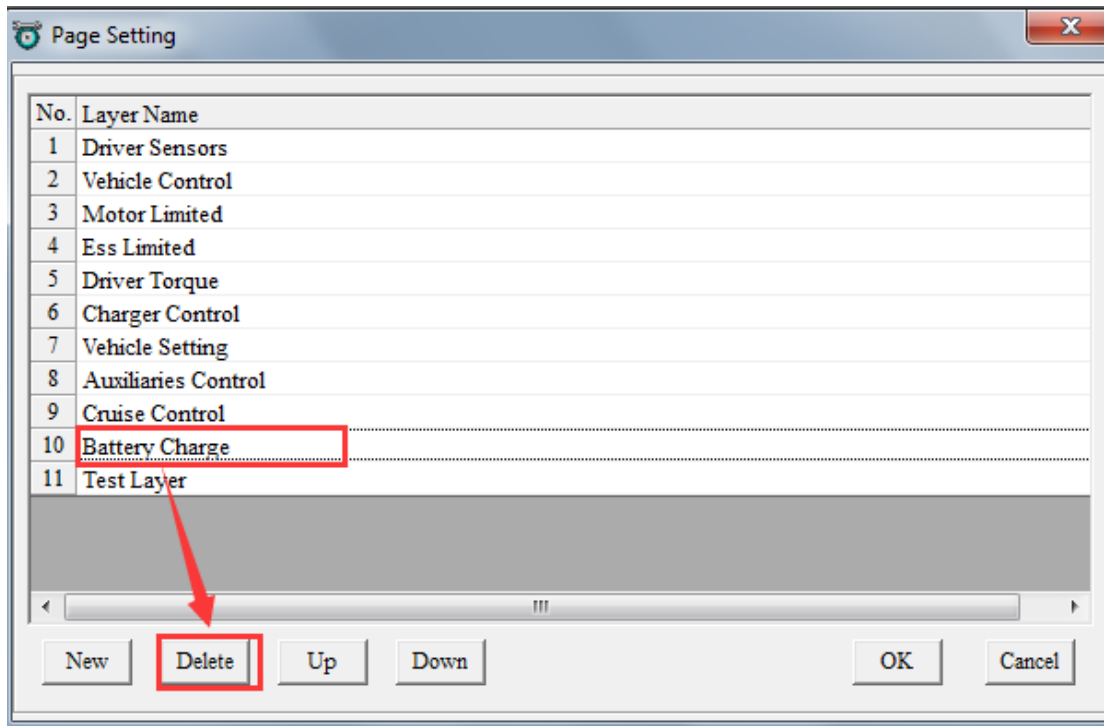


Page setting window:

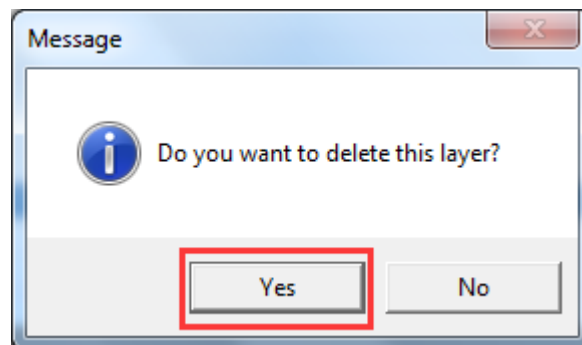


How to delete the layer?

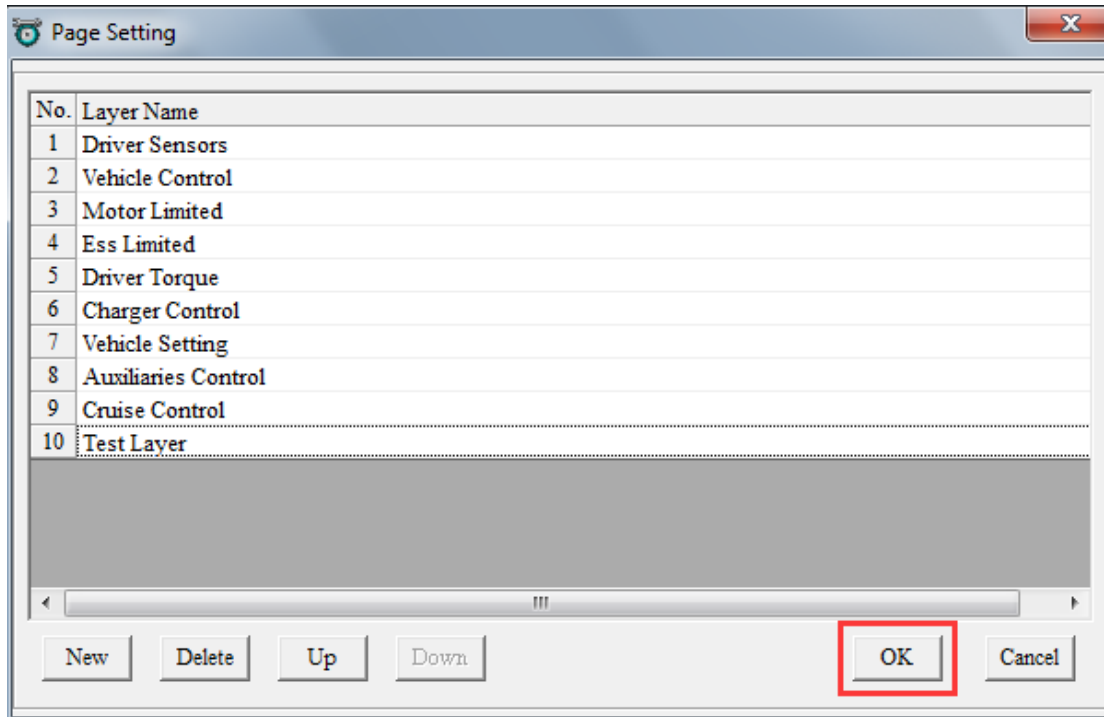
First, click the label to choose it, then click “Delete”, for example, delete the “Battery Charge” layer,



When you click the “Delete” button, there is one message window to ask you whether you want to delete the layer, choose “Yes”, the layer will be deleted.

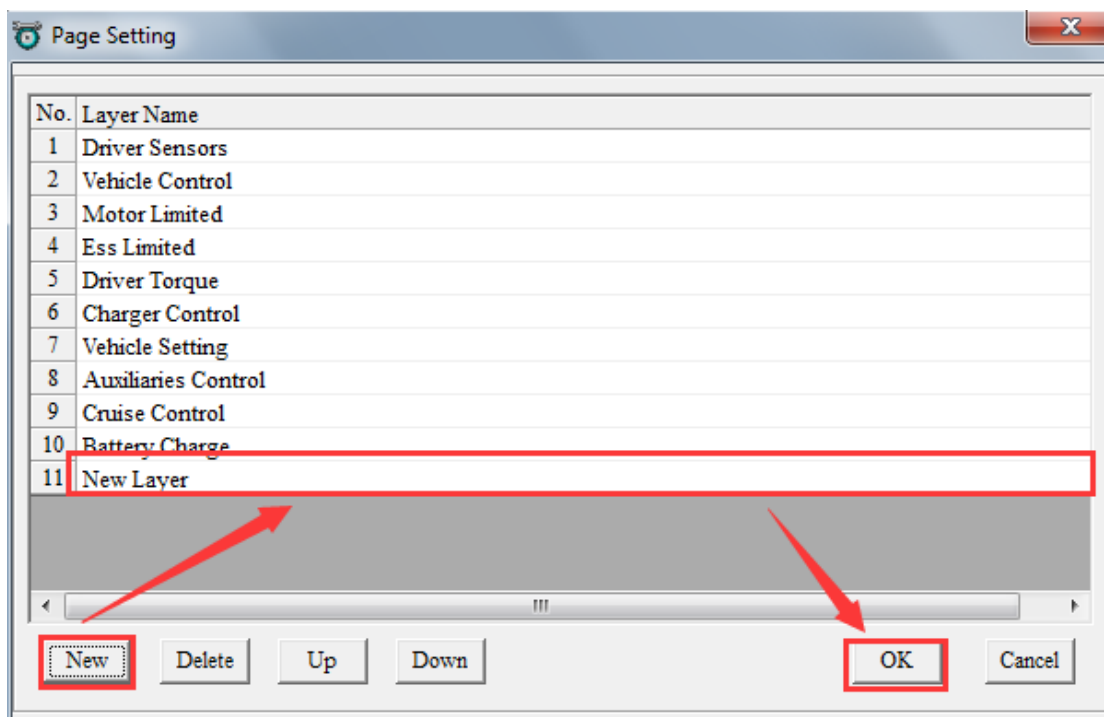


Then you can see there is no “Battery Charge” layer in display.

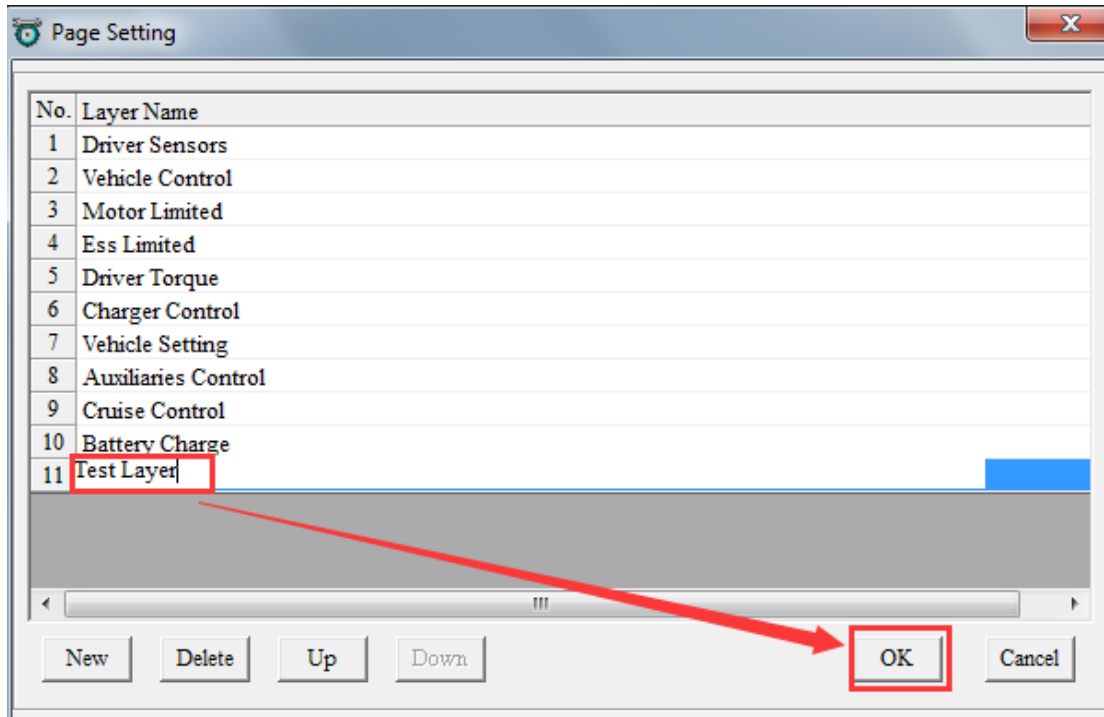


How to add one new layer?

Click the “New” button to set up one new layer.



Double click the “New Layer” words, input the word as you want to re-name it, there, we re-name it be “Test Layer”, then press the Enter button of keyboard to finish it.

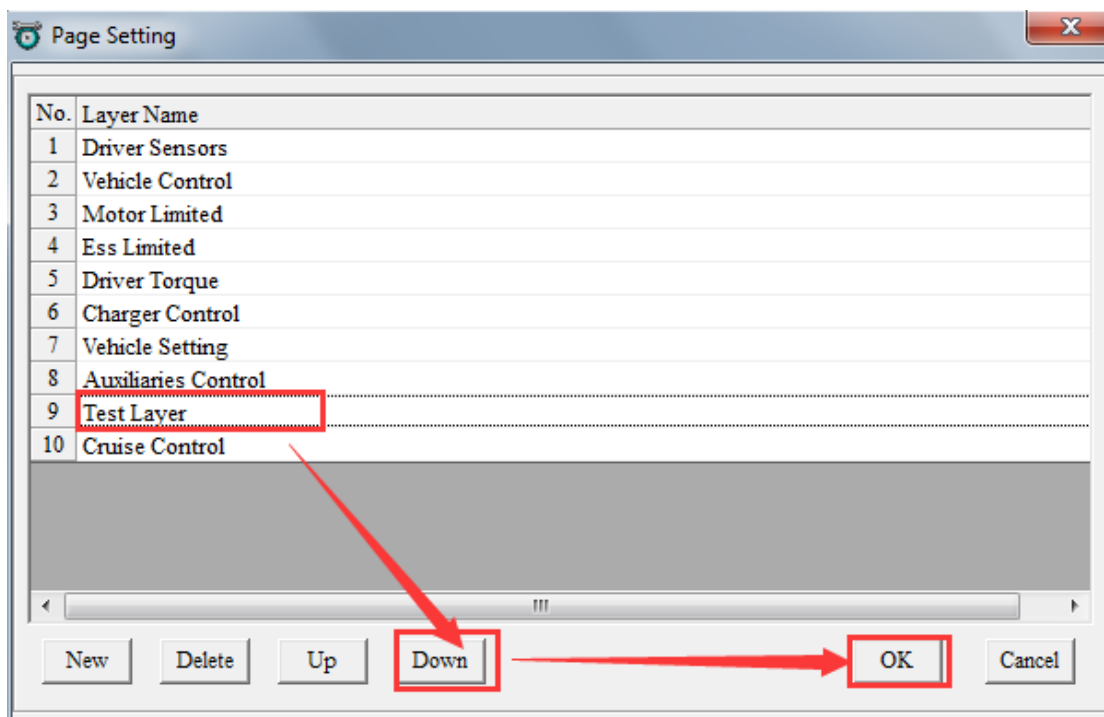
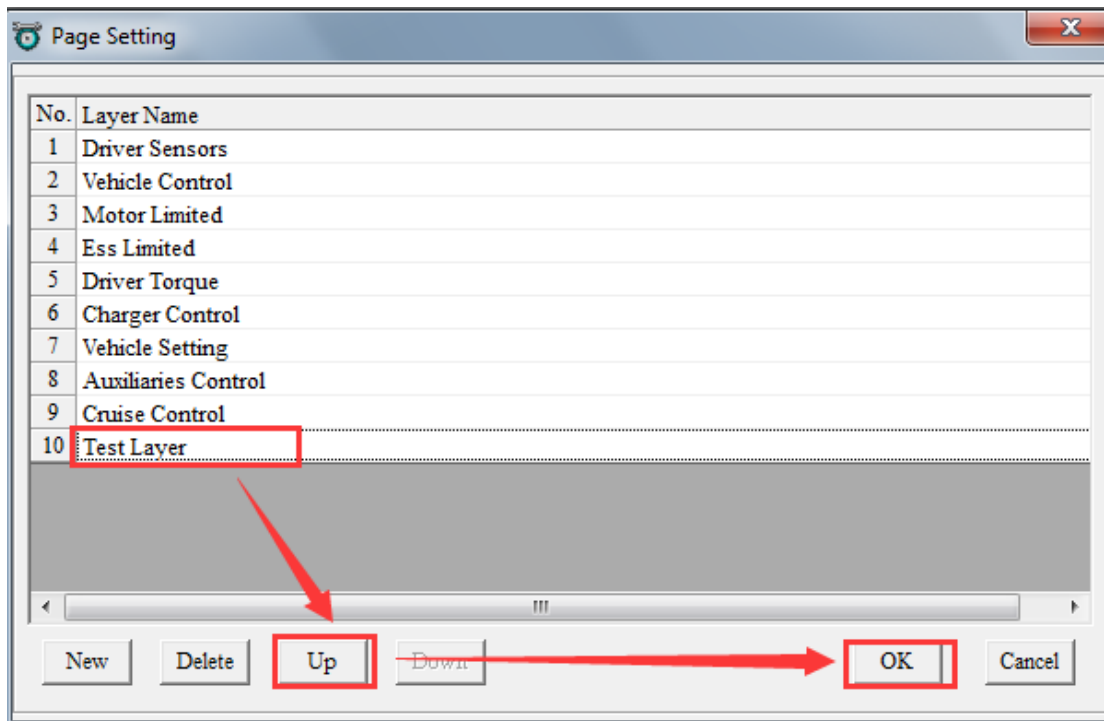


After finishing, click “OK”.

Then you can see there is the new “Test Layer” layer in the window.



You can use the “Up” and “Down” button to de change the display order of layers.



5.1.2 Layer setting

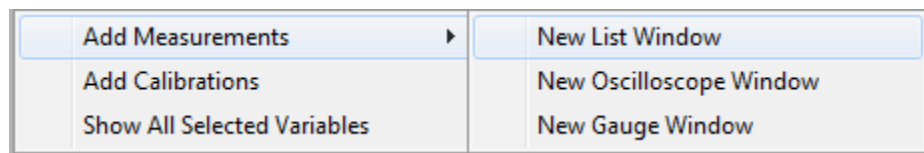
You can edit the Layer showing via adding calibration variables and measured variables.

First, click the layer that you want to edit, for example, “Test Layer” layer.



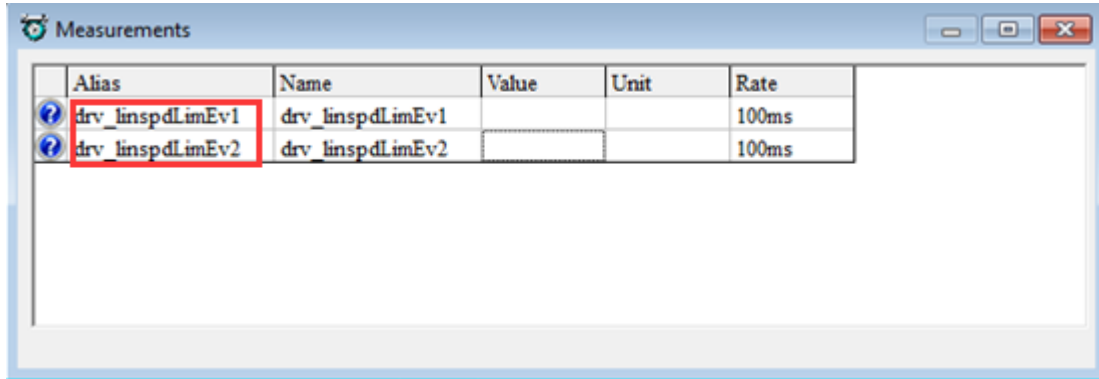
Right click on the window, there some menu you can choose, to set this layer.

About add Calibration variables and Measure variables, please read the chapter 3.1 and chapter 3.2. You also can **Right click on the blank area of window**, click “Add Measurements->New Oscilloscope Window”, more details, you can refer to the chapter 5.3.5



5.1.3 Alias setting

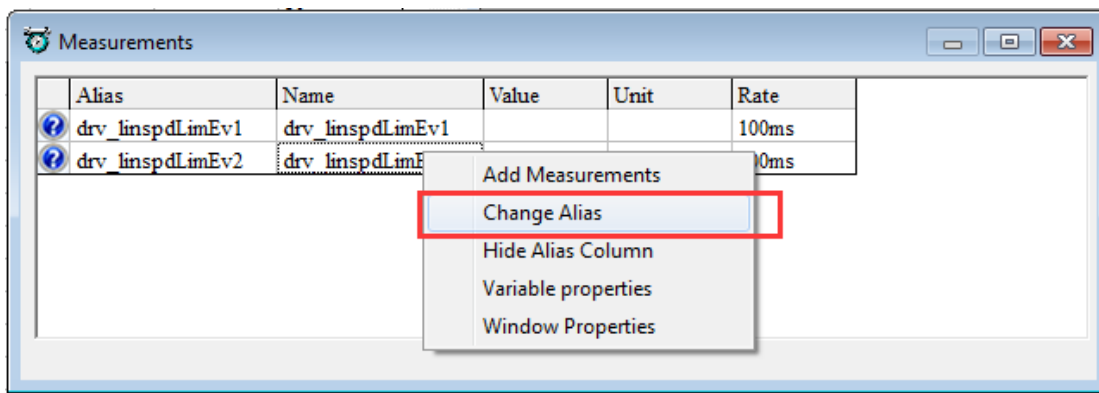
Maybe you don't know the meaning of calibration variables and measured variables, we have set the alias of variables in default, and you also can edit it for easy reading and remembering.



The words in red area are alias of variables, you can re-edit it or add new alias.

How do edit the alias?

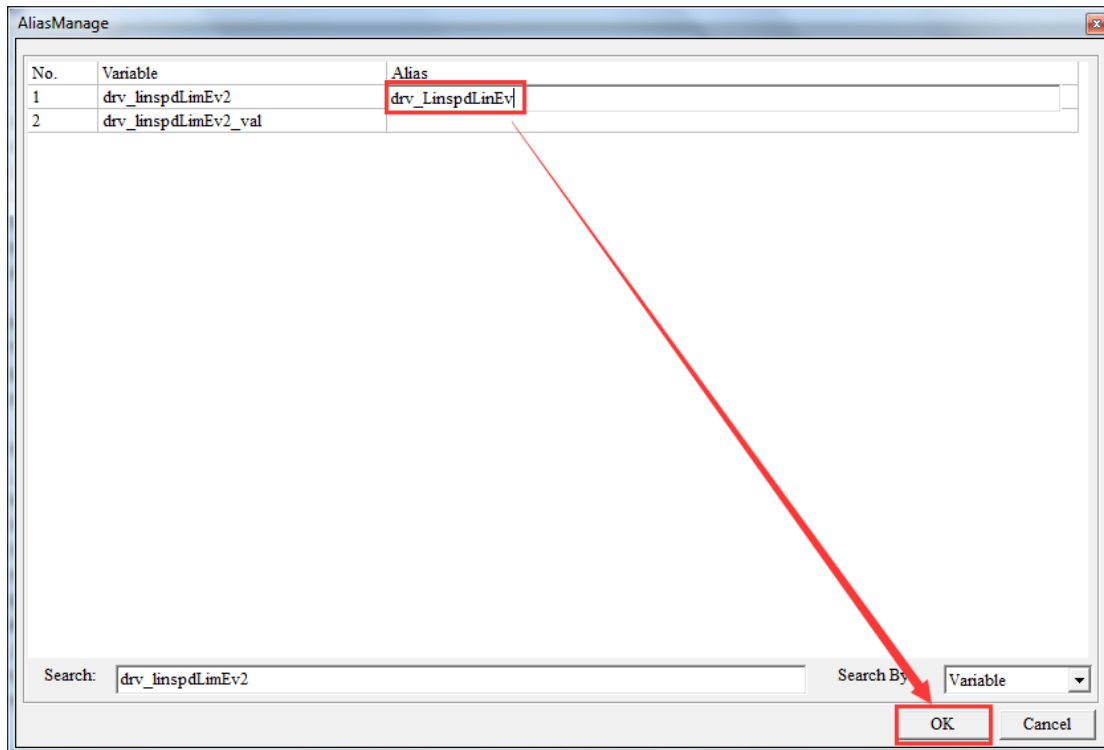
First, choose the variable name that you want to change, and then right click.



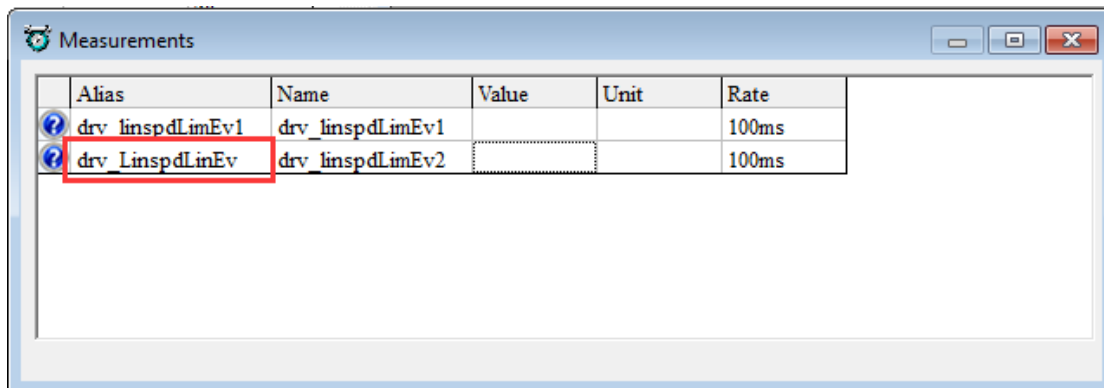
Here, we change the alias of drv_linspdLimEv2, the current Alias is "drv_linspdLimEv2" Then click "Change Alias", the window will pop-up,

Double click the Alias, then input the words that you want to change, for example, "drv_linspdLimEv", then press the Enter button of keyboard to finish it.

Then, click "OK"

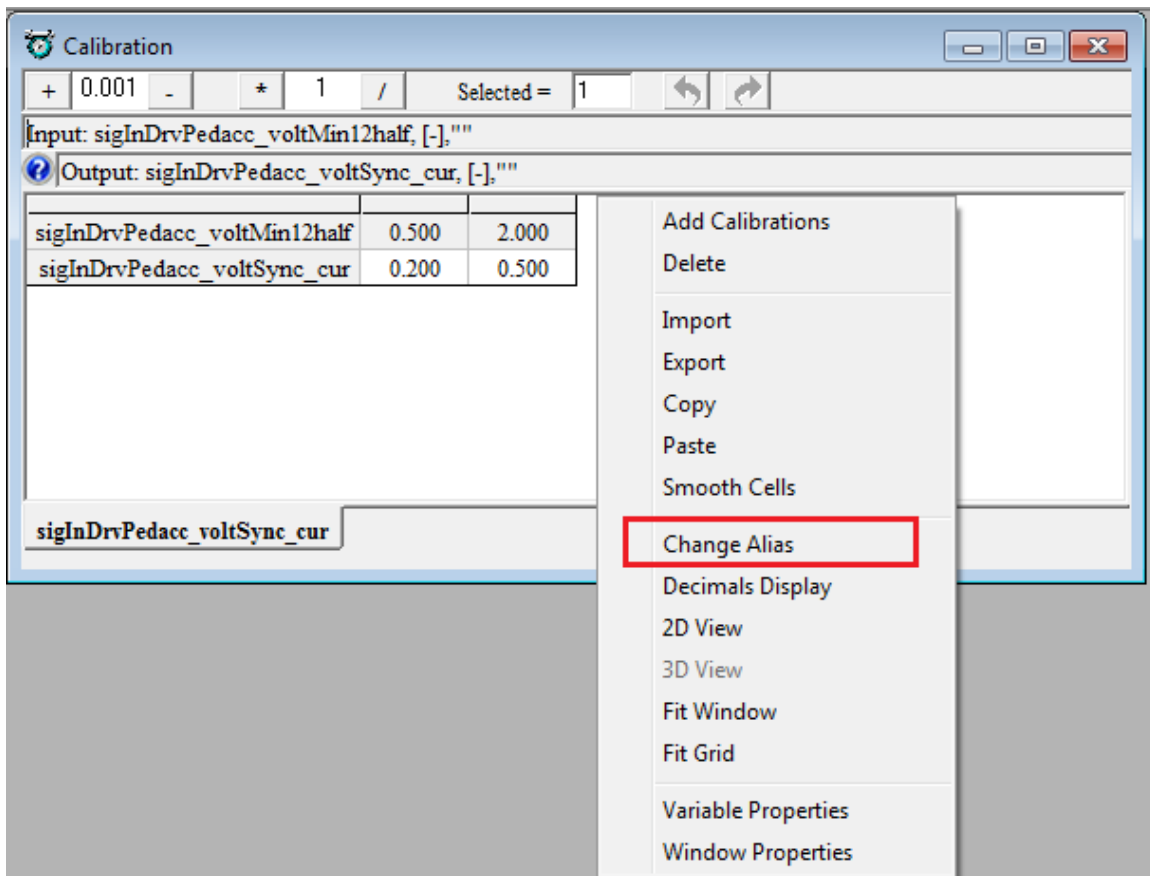
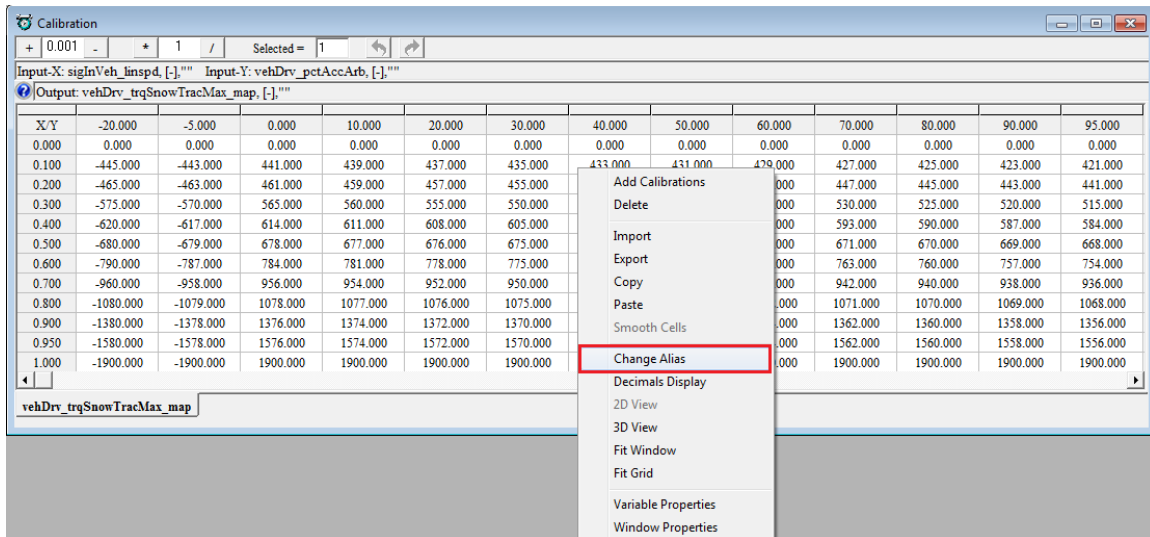


So, we can see the Alias of drv_linspdLimEv2 is changed.

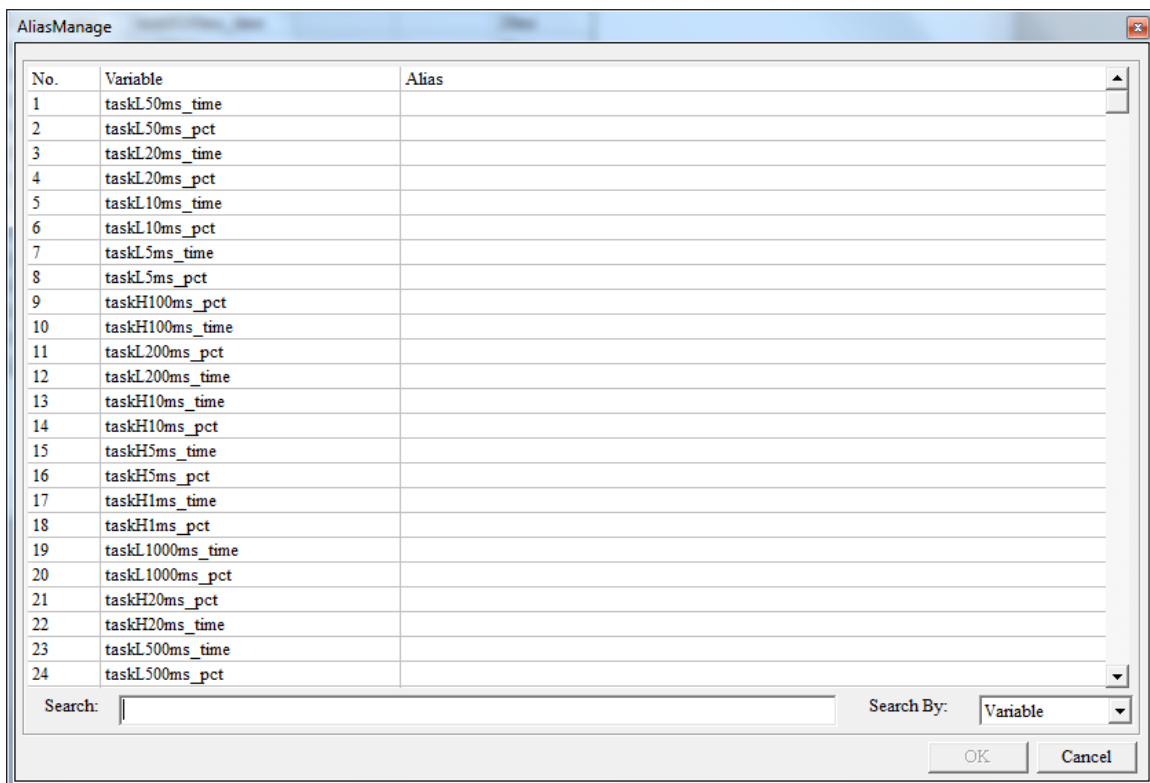
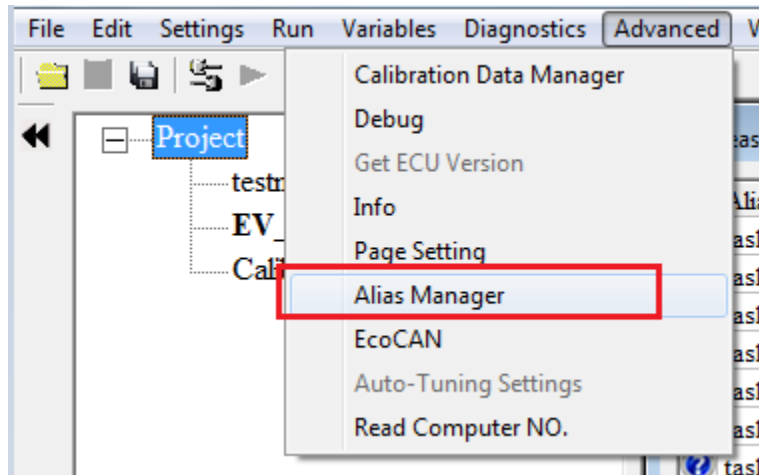


Note: when you change the Alias of variables, the Alias of same variable will be changed in all layers.

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

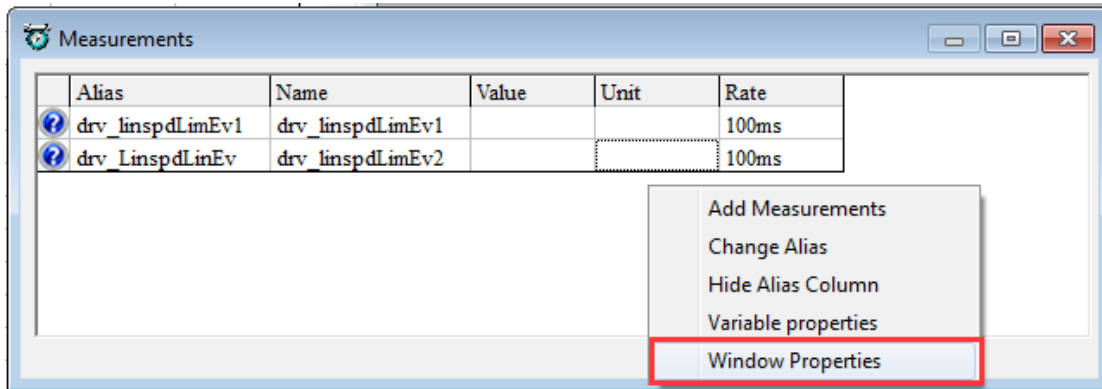


Note: You can change and manage the alias of all variables at the same time
Go to menu->Advanced->Alias Mange, when you finish it, please click “OK”.



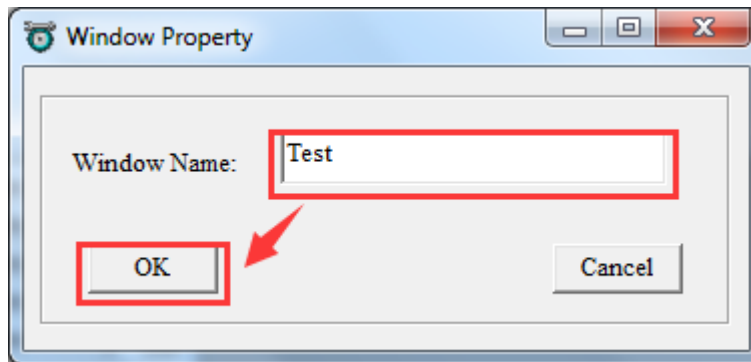
5.1.4 Window setting

You also can change the name of different window in different layers, for example, the name of following window is “Measurements”, now we change it to be “Test”

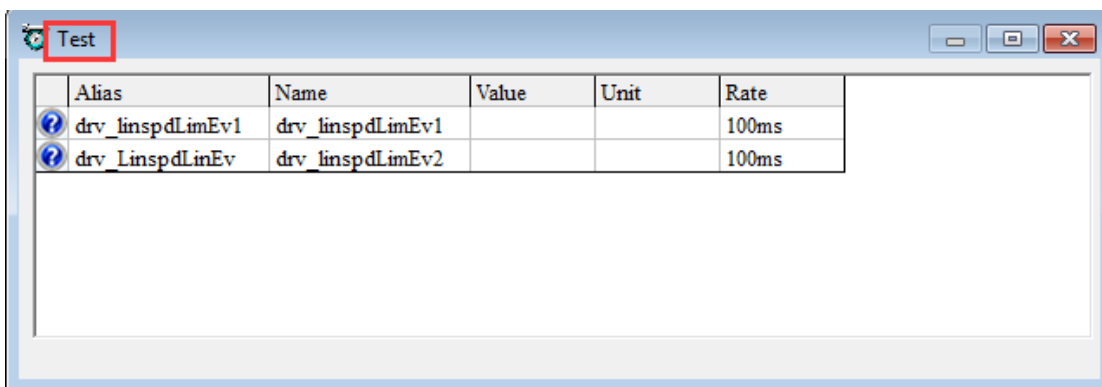


Right click on the window, and choose “Window Properties”

A little window pop-up, change the stock words to be Tests”, and then click “OK”.

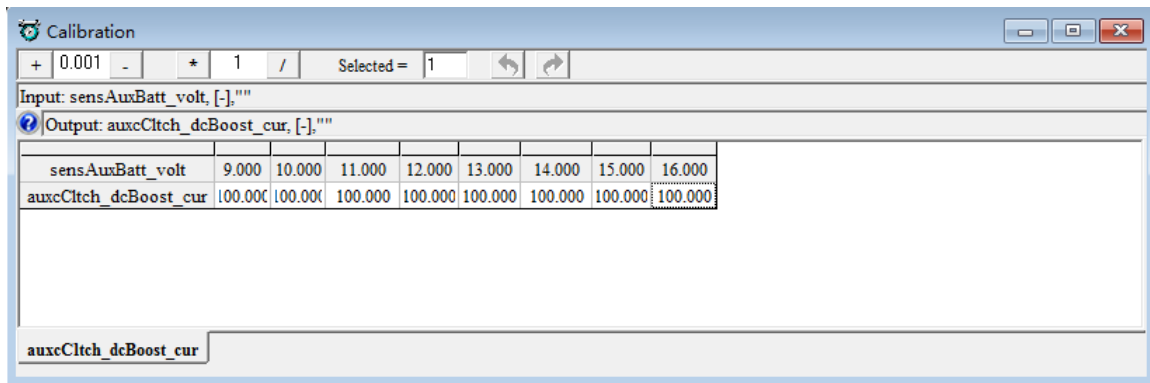


Then, the name of window is changed as you want.

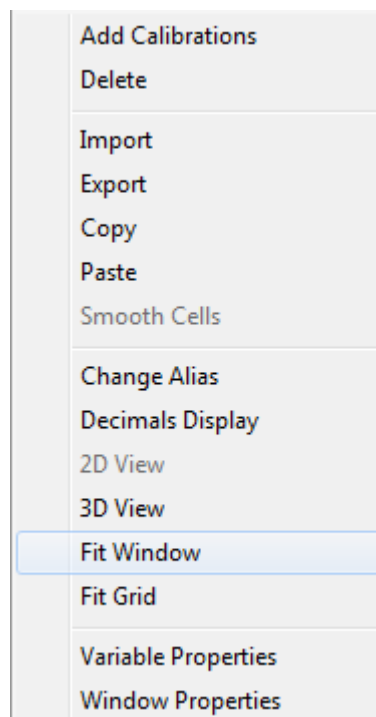


Note: the method to change other windows is the same.

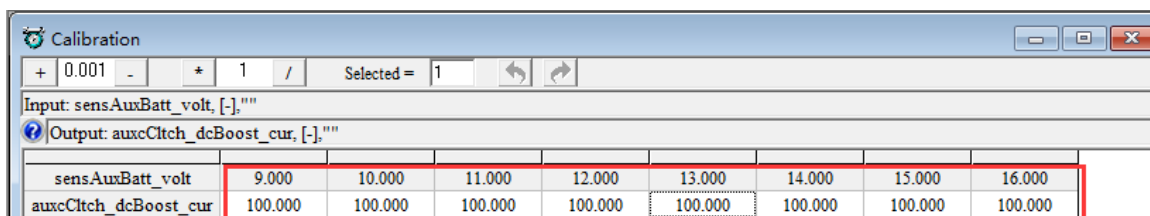
5.1.5 Fit window and grid



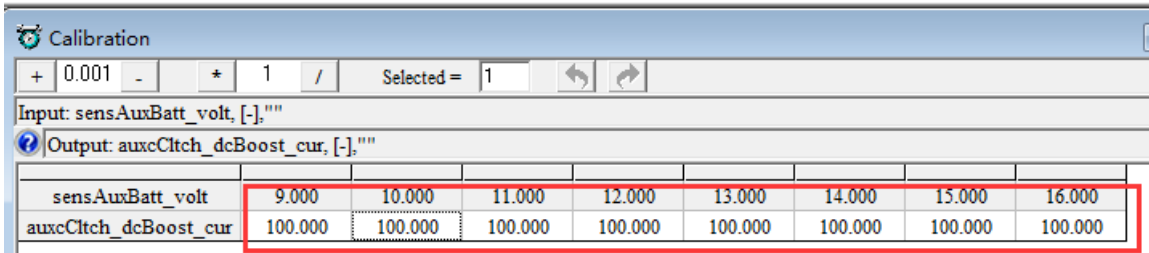
Right click on the window, click “Fit Window”,



Then the width of grid the can be adjusted, according to the width of window,



Right click on the window, click “Fit Grid”, the width of cells will be adjusted, according to the content-length.



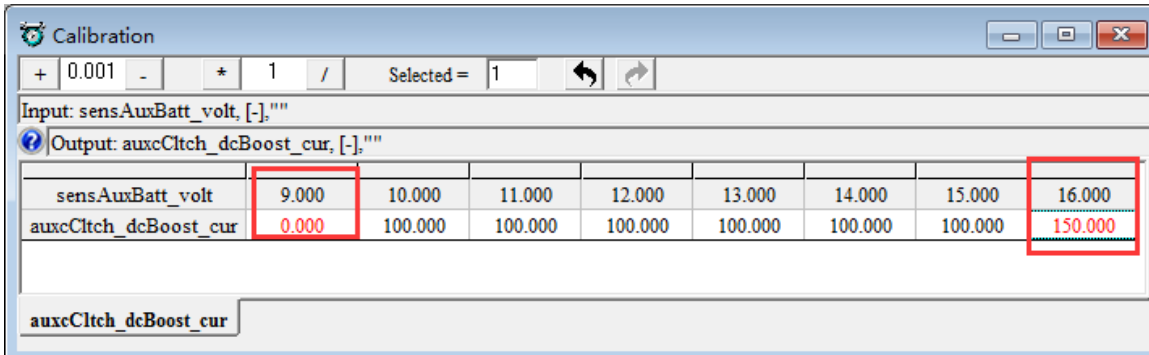
	9.000	10.000	11.000	12.000	13.000	14.000	15.000	16.000
sensAuxBatt_volt	9.000	10.000	11.000	12.000	13.000	14.000	15.000	16.000
auxcClitch_dcBoost_cur	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Then the width of grid the can be adjusted, according to the width of window,

5.1.6 Smooth Cells

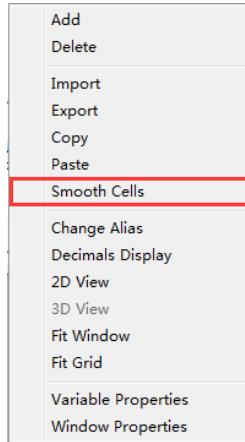
This function is designed just for curve type variable, the function do not support map type now. The function is that you can set a maximum valve and a minimum, and then make all other valves move into the section. The detail operation is like this:

Set a maximum and a minimum:

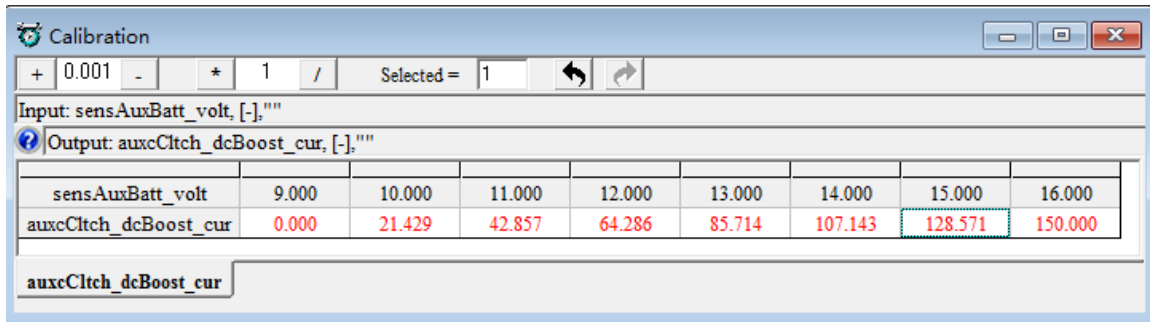


	9.000	10.000	11.000	12.000	13.000	14.000	15.000	16.000
auxcClitch_dcBoost_cur	0.000	100.000	100.000	100.000	100.000	100.000	100.000	150.000

Select this section, then right click on the window, select “Smooth Cells”:



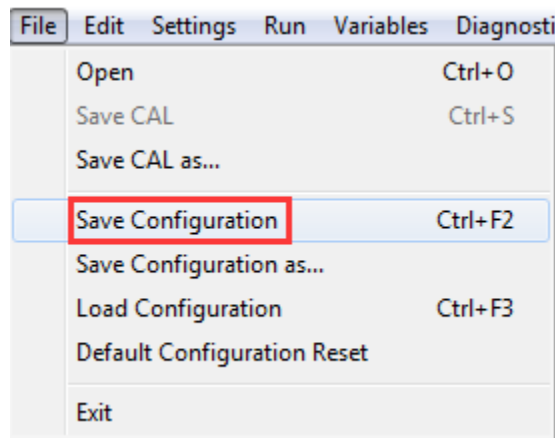
You can see the data which will be adjusted smoothly in this section, as below.



5.1.7 Save configuration

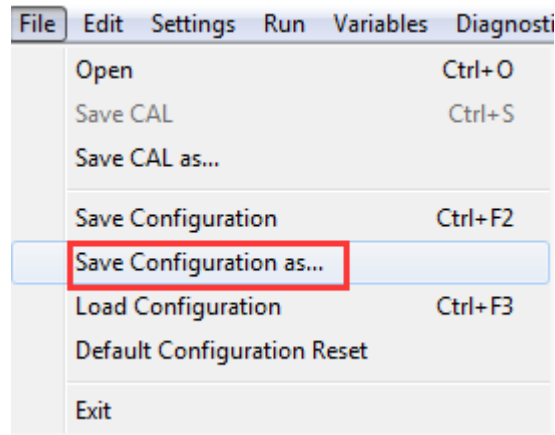
When you re-set the window by using above methods, you can save the settings as one new configuration, so you can save it, and use it when you want.

Go to menu->File->Save Configuration

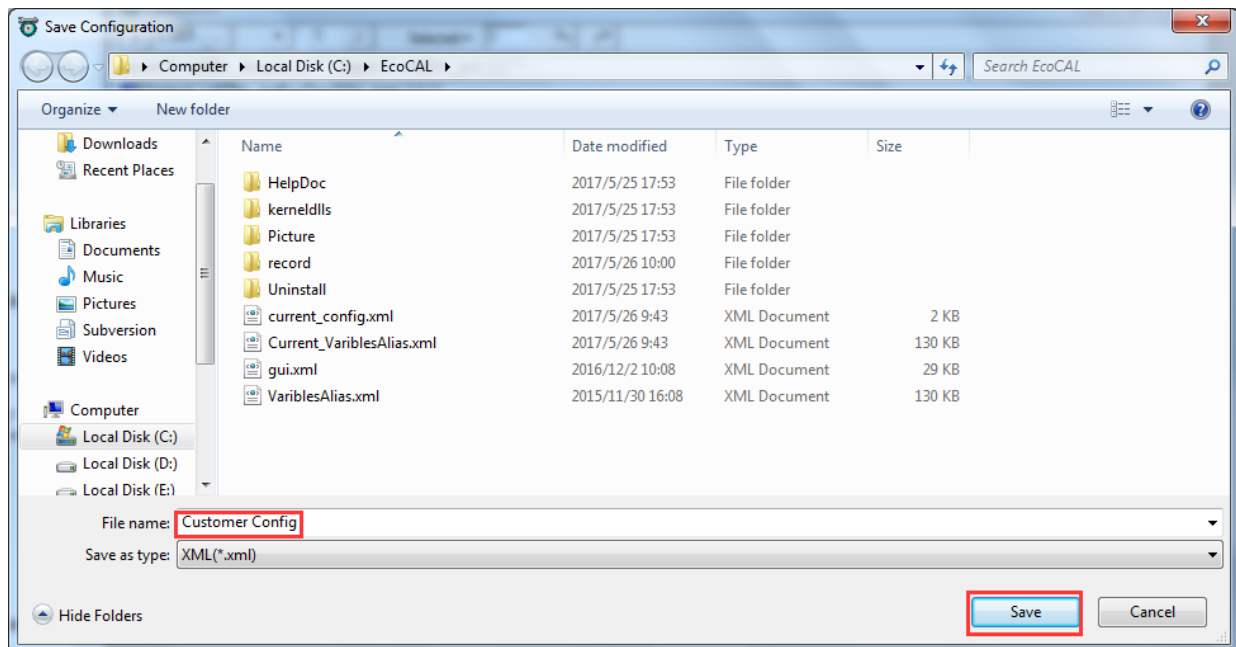


You also can save the setting based on the current loading configuration.

Go to menu->File->Save Configuration as



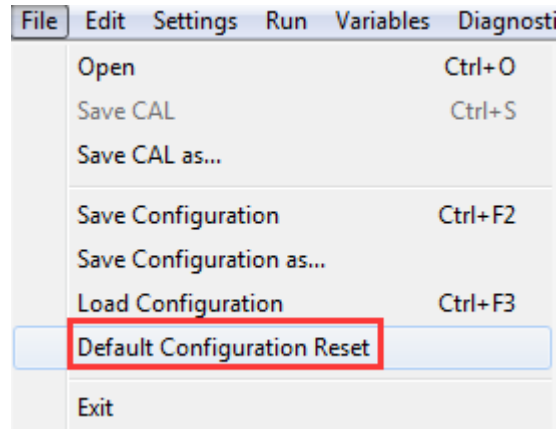
Then, name the new configuration file, "Customer Config", and then click "Save".



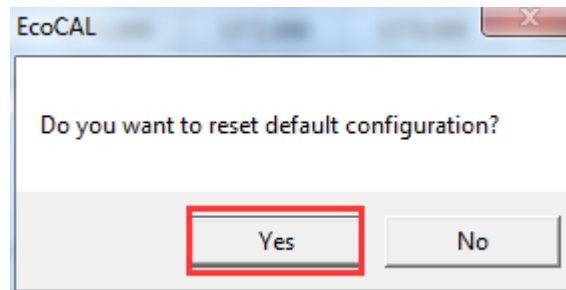
5.1.8 Reset default configuration

If you don't want to use the page configuration setting after you change much, you can use this to reset to be default configuration of EcoCAL.

Go to menu->File->Default configuration Reset



Then, click "Yes".



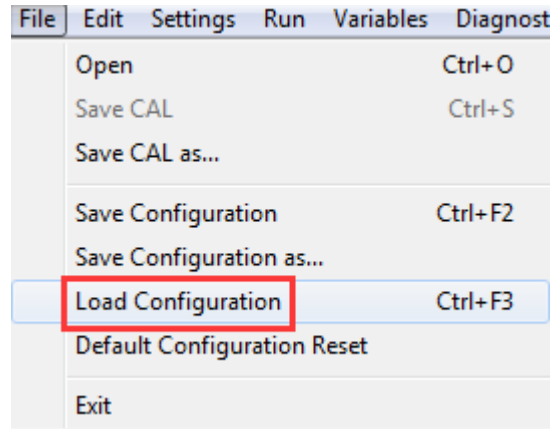
The current setting is the default configuration setting.

5.1.9 Load configuration

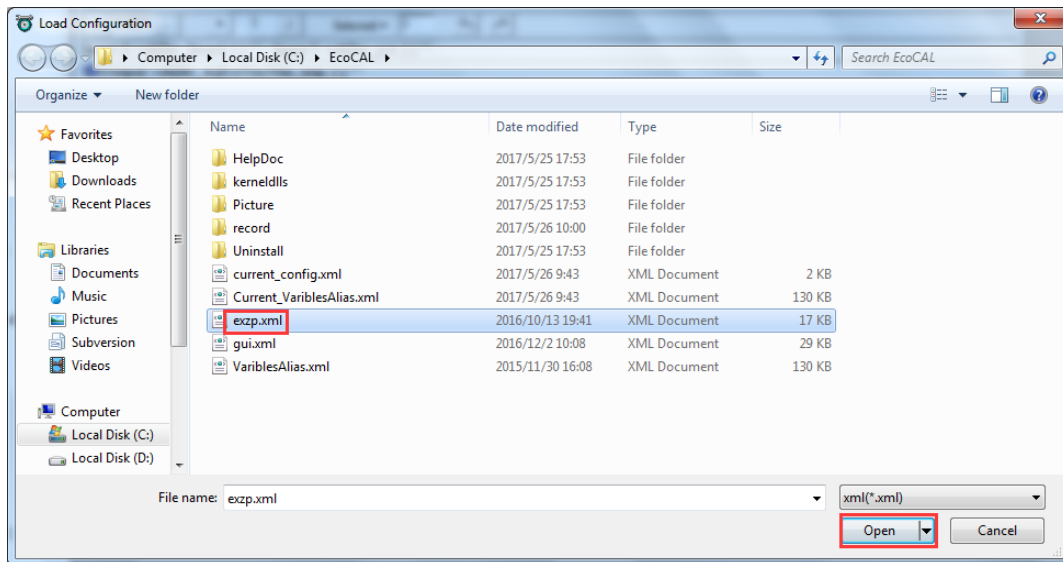
Sometimes, we will send the page configuration based on your system for your tuning purpose. So you can load the configuration.

You also can load the configuration that you saved.

Go to menu->File->Load configuration



Choose the configuration file then click “Open”.

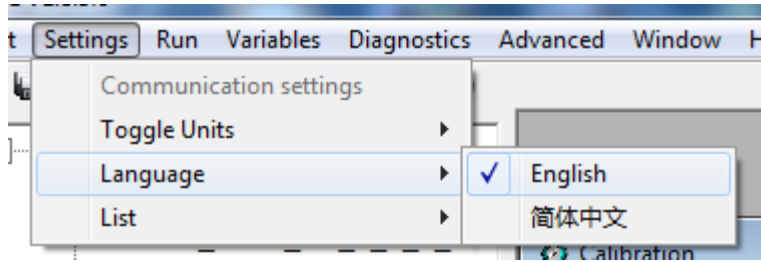


5.1.10 Language Setting

The user can select "**Settings → Language**", then select the language you want.

Note: click “English” to get the English interface;

Click “Chinese” to get the Chinese interface;

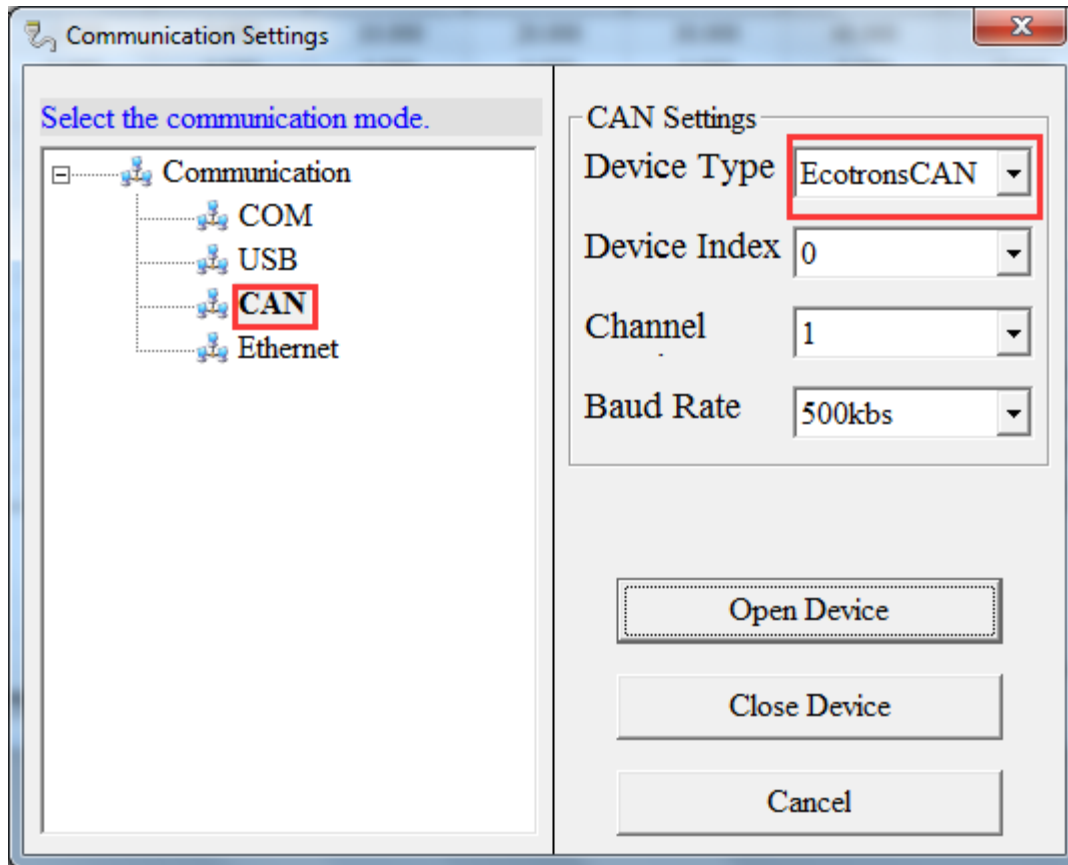


5.2 Diagnostics

5.2.1 Failed to connect to ECU

If you can't connect to ECU, please do following steps to fix it.

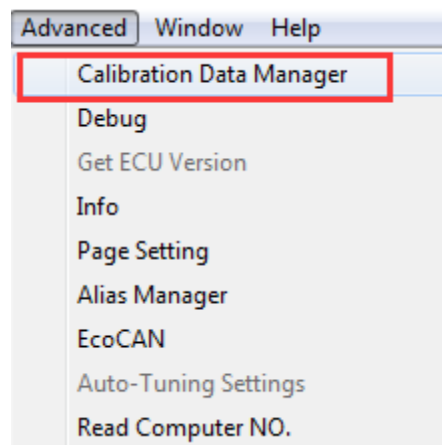
1. Is the VCU/HCU power is ON? (The fuel pump will run for a few seconds when you key-on).
2. Do you have the latest and greatest EcoCAL version?
3. If you are running EcoCAL in Win Vista, have you set EcoCAL in "Win XP compatibility" mode? (Refer to the manual on how to do that).
4. Are you connecting the computer to the VCU/HCU via CAN mode?

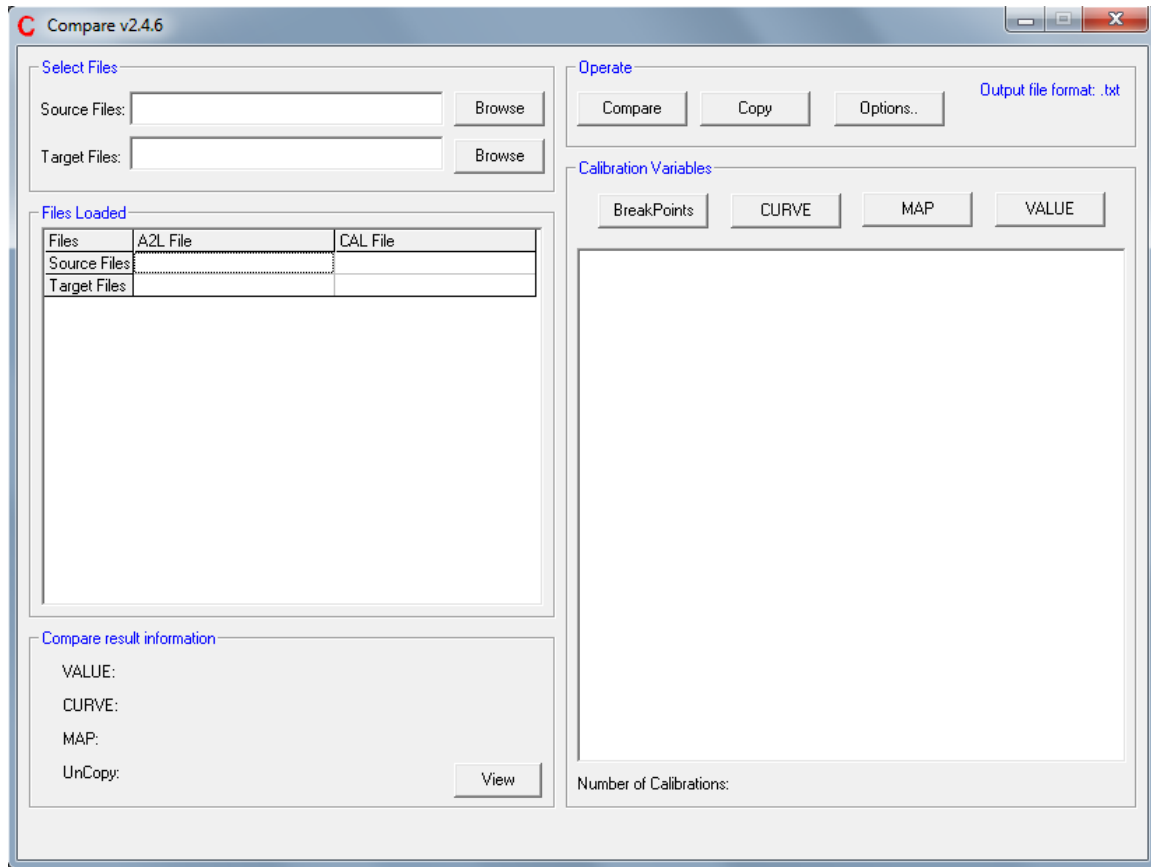


5.3 Advanced function of EcoCAL

5.3.1 Calibrations Data manger

Go to menu->Advanced->Calibration Data Manger





How to compare and copy files?

- 1) Open the software "Compare V2.4.6" first as above method.
- 2) Open the data file, to click "Browse" for opening file.

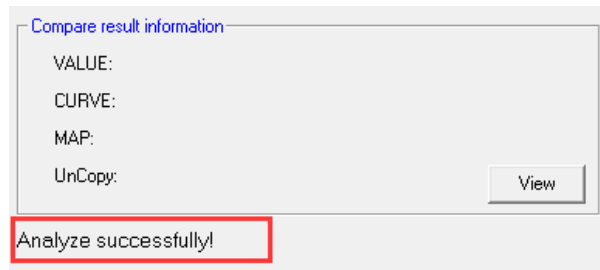
First, open the Source file (the file that you want to remain the same calibrated value by yourself)

Second, open the Target file (the file that replaced the some old variables value except your own calibrated value)



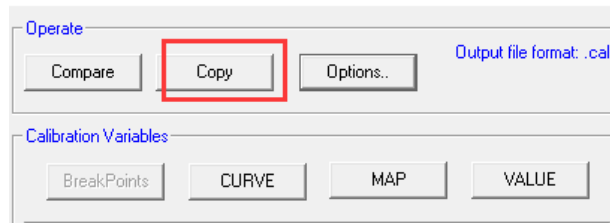
Wait for about ten seconds.

Note: If the file loaded successfully, lower left corner will pop up message
"Analyze Successfully"

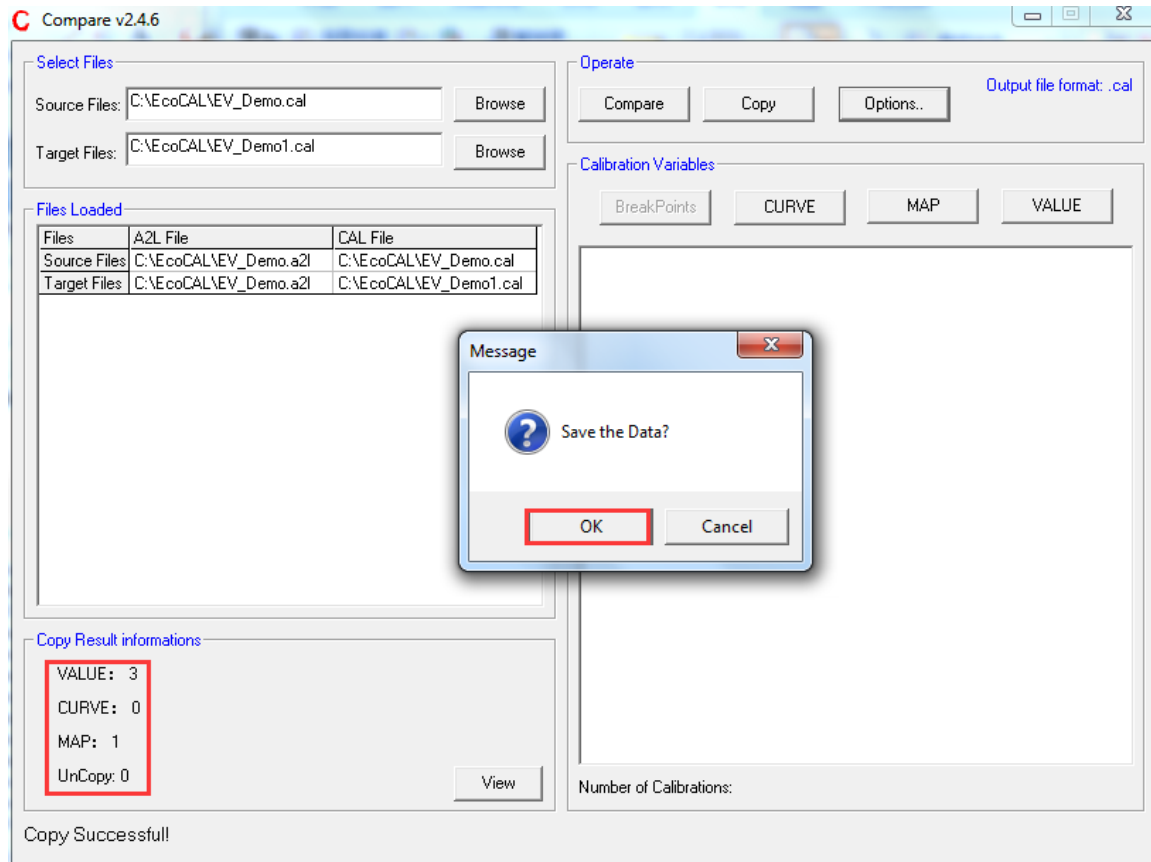


3) Copy the data file.

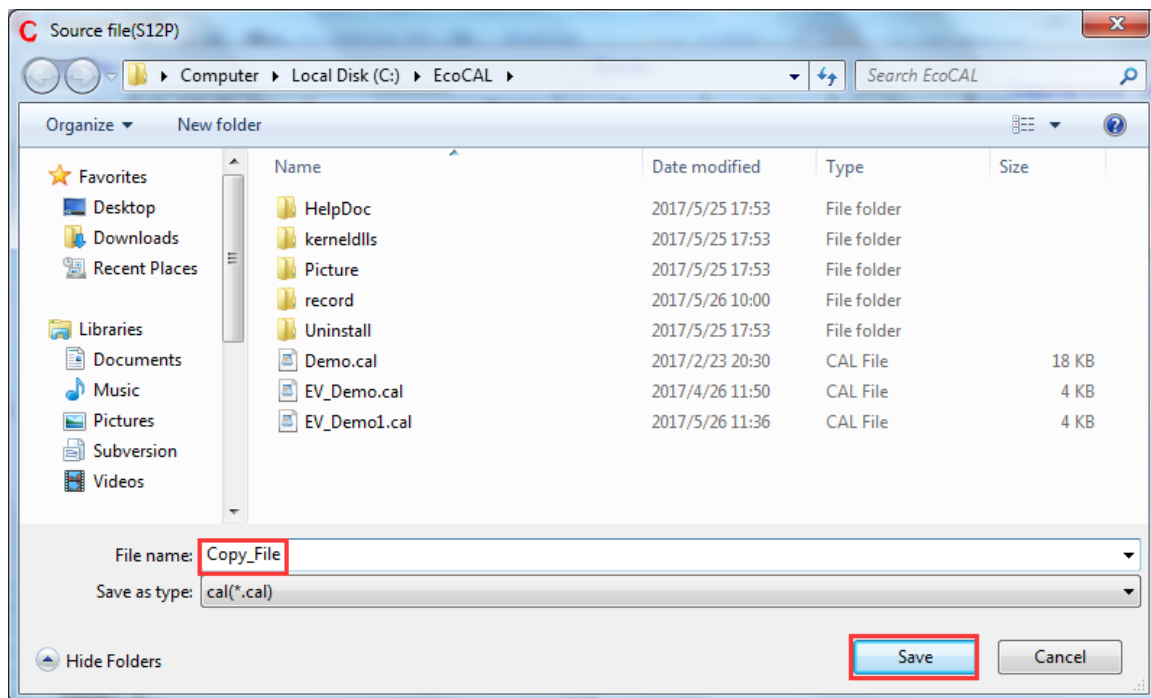
Click the "Copy" button, it will copy the file



Processing...



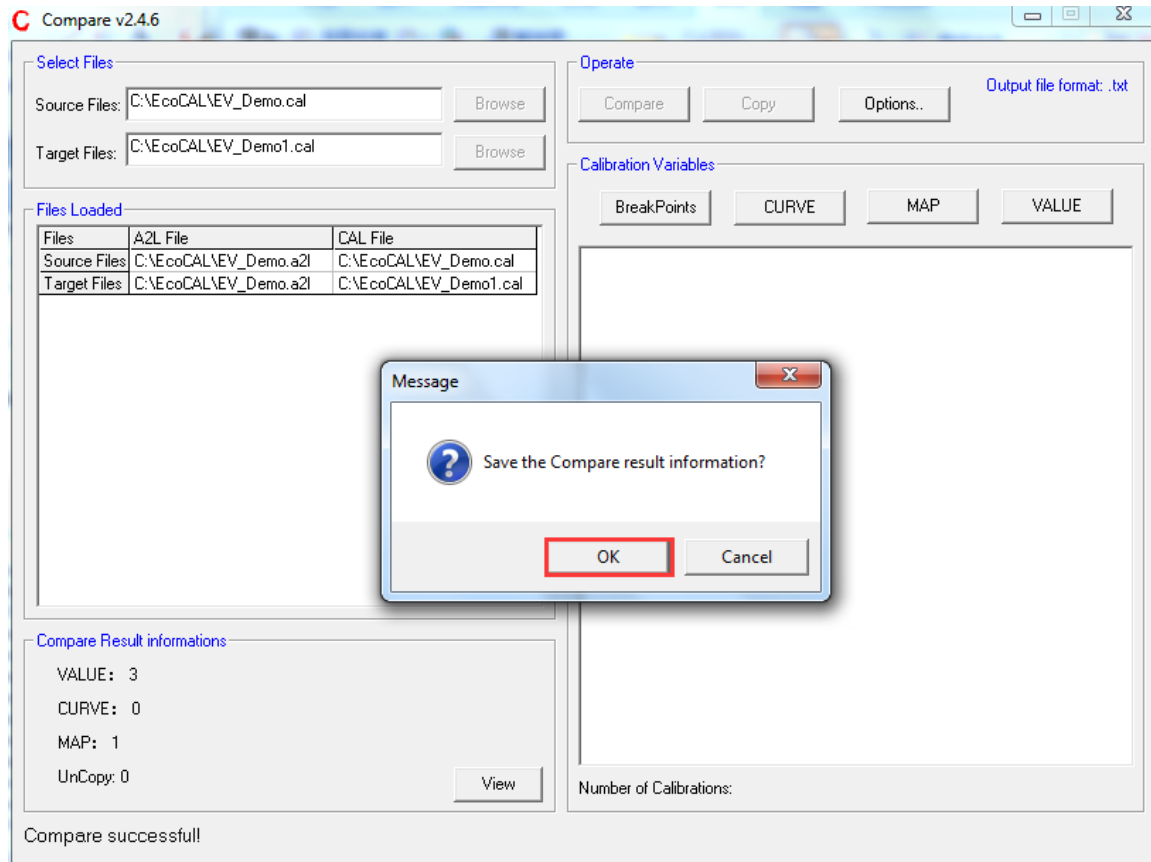
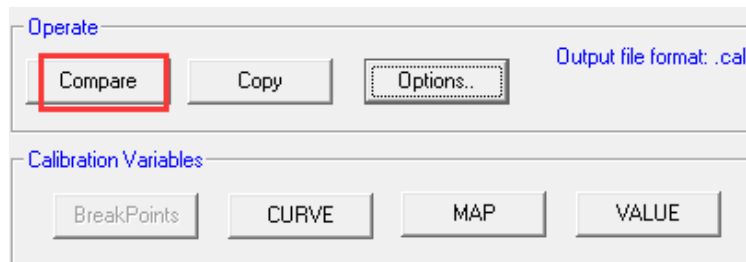
Click "OK" button and save the result (a new CAL file).

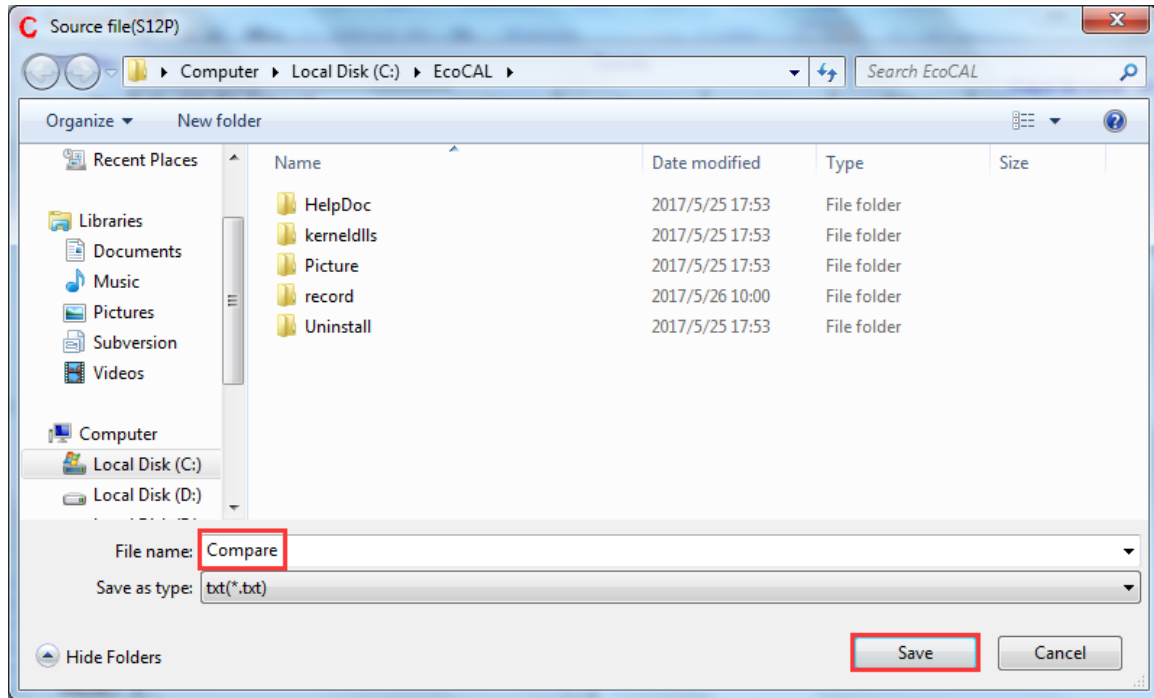


- 4) If you want to know whether the copy file is successfully you can compare the source file and the new saved file.

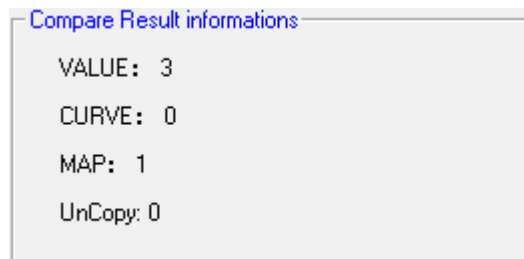
Using the above mentioned method to open the "Source file" that your own file and the "Target file" that the new saved file.

To click "Compare", button and save the compare result.



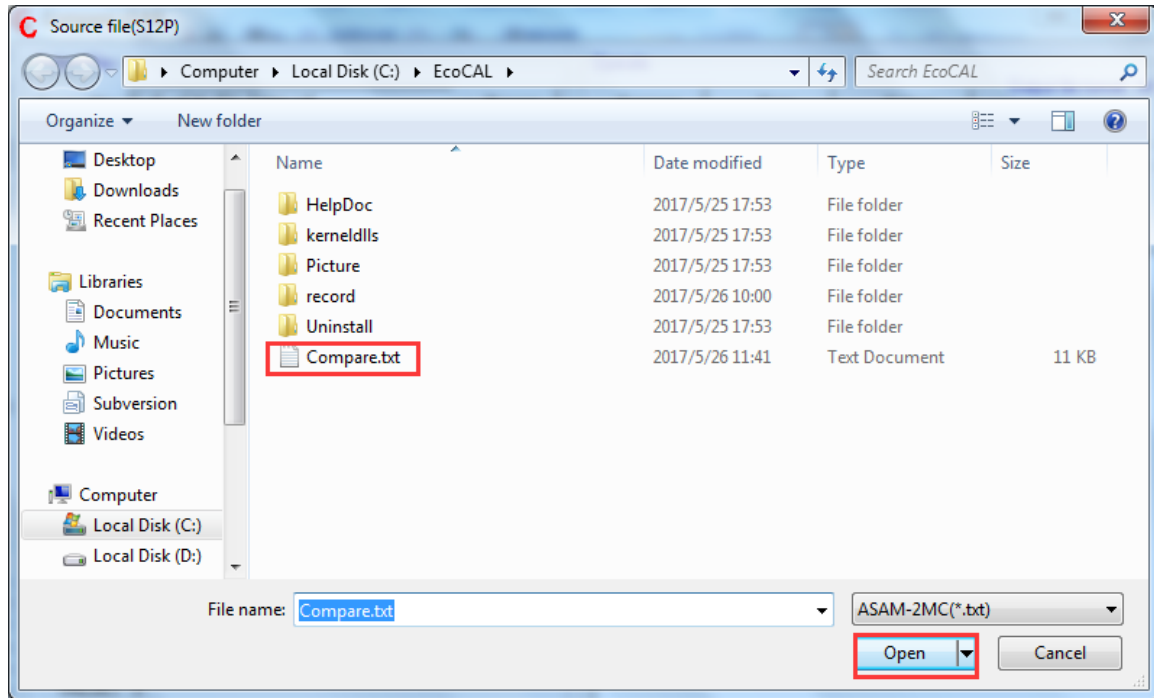


You can see the result through follow method.



Note: if the result is 0, it means cope file is successfully.

Click" View" button to open the .txt file that just saved



New Version Calibration Comparison Report

```
=====
Reference calibration data:      C:\EcoCAL\EV_Demo.cal
Comparison calibration data:    C:\EcoCAL\EV_Demo1.cal
Created by:                     Default User
Created on:                    2017/5/26 11:41:19
Number of Differences:          VAL=3, CURVE=0, MAP=1
Number of variables uncomared:  0
=====
```

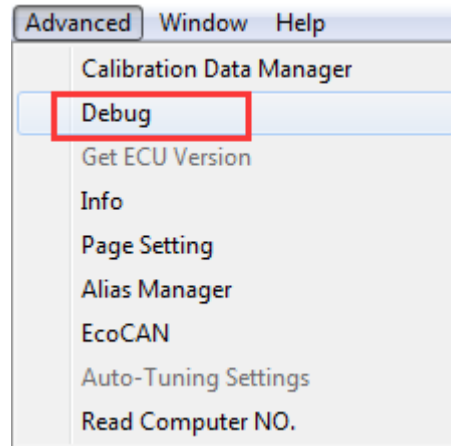
If the number is 0, it means copy file successfully, you can use the new saved file to run you bike.

Message: also, you can use above method to copy or compare other files.

5.3.2 Debug

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

Go to menu->Advanced->Debug



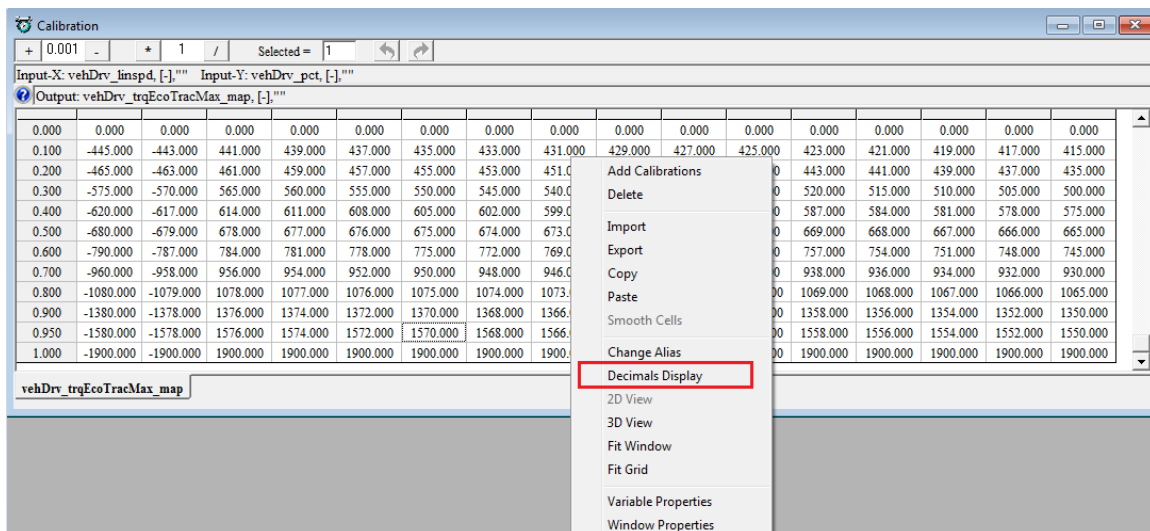
Time	Direction	ID	Message
4/13/2017 4:47:26 PM:884	Send	0x100	01 01 12 01 00 00 00 00
4/13/2017 4:47:27 PM:384	Send	0x100	01 01 12 01 00 00 00 00
4/13/2017 4:47:27 PM:886	Send	0x100	01 01 12 01 00 00 00 00

5.3.3 Decimals Display

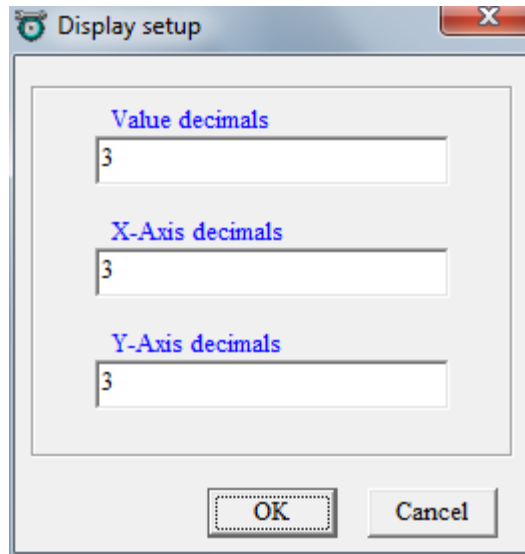
You can change the number of decimals of the values that are displayed in the variable window and calibration window.

For example:

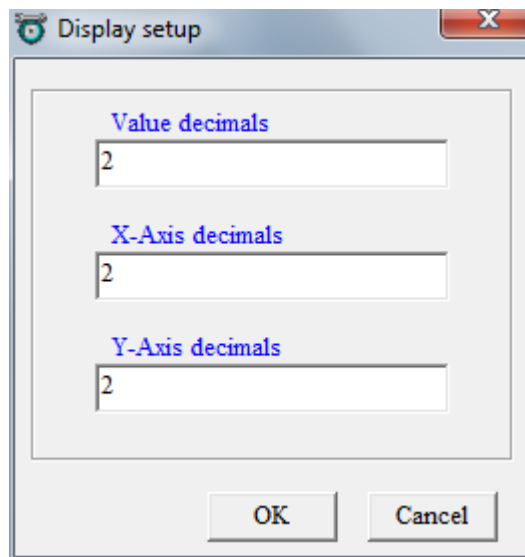
Right click on the window of calibration variables.



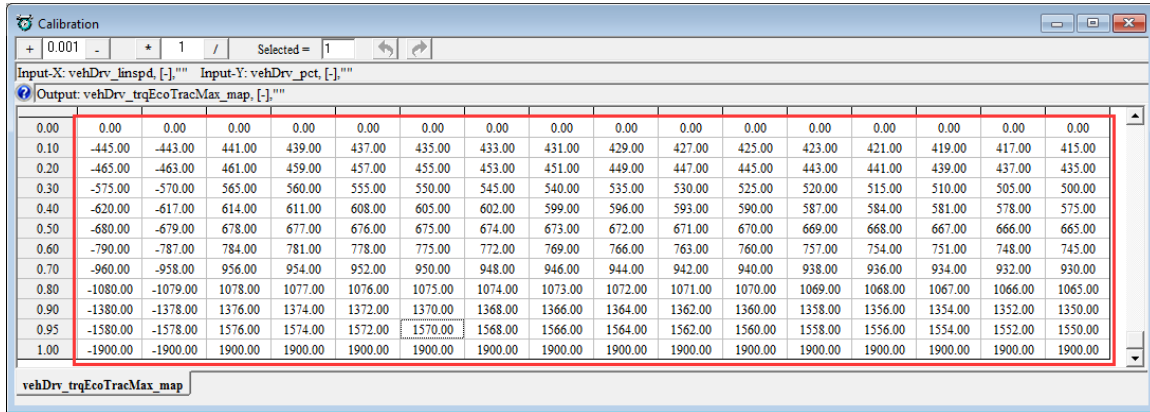
The “Display setup” window pops up,



You can set the decimals, then click OK,



Then, you can see the difference.

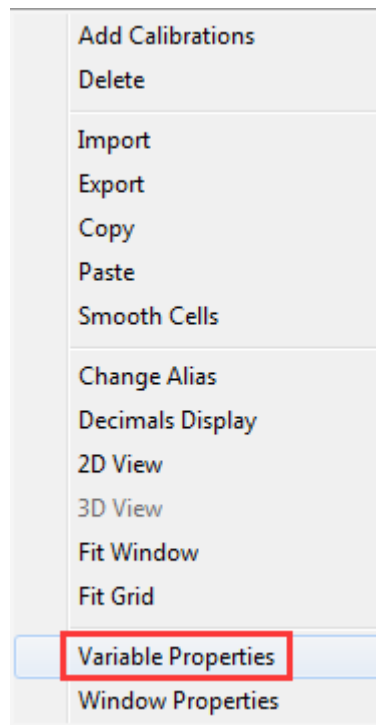


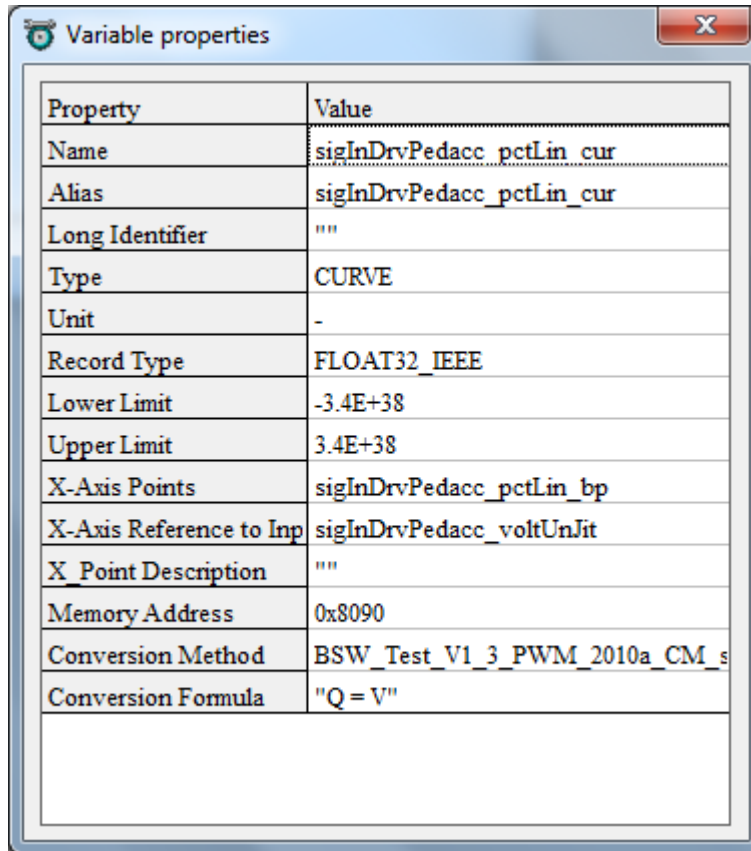
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	-445.00	-443.00	441.00	439.00	437.00	435.00	433.00	431.00	429.00	427.00	425.00	423.00	421.00	419.00	417.00	415.00	413.00
0.20	-465.00	-463.00	461.00	459.00	457.00	455.00	453.00	451.00	449.00	447.00	445.00	443.00	441.00	439.00	437.00	435.00	433.00
0.30	-575.00	-570.00	565.00	560.00	555.00	550.00	545.00	540.00	535.00	530.00	525.00	520.00	515.00	510.00	505.00	500.00	495.00
0.40	-620.00	-617.00	614.00	611.00	608.00	605.00	602.00	599.00	596.00	593.00	590.00	587.00	584.00	581.00	578.00	575.00	572.00
0.50	-680.00	-679.00	678.00	677.00	676.00	675.00	674.00	673.00	672.00	671.00	670.00	669.00	668.00	667.00	666.00	665.00	664.00
0.60	-790.00	-787.00	784.00	781.00	778.00	775.00	772.00	769.00	766.00	763.00	760.00	757.00	754.00	751.00	748.00	745.00	742.00
0.70	-960.00	-958.00	956.00	954.00	952.00	950.00	948.00	946.00	944.00	942.00	940.00	938.00	936.00	934.00	932.00	930.00	928.00
0.80	-1080.00	-1079.00	1078.00	1077.00	1076.00	1075.00	1074.00	1073.00	1072.00	1071.00	1070.00	1069.00	1068.00	1067.00	1066.00	1065.00	1064.00
0.90	-1380.00	-1378.00	1376.00	1374.00	1372.00	1370.00	1368.00	1366.00	1364.00	1362.00	1360.00	1358.00	1356.00	1354.00	1352.00	1350.00	1348.00
0.95	-1580.00	-1578.00	1576.00	1574.00	1572.00	1570.00	1568.00	1566.00	1564.00	1562.00	1560.00	1558.00	1556.00	1554.00	1552.00	1550.00	1548.00
1.00	-1900.00	-1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00	1900.00

5.3.4 Signal/Parameters properties

The detailed properties of the variables (signals and parameter calibrations), can be viewed in the variable property window.

Right click on the variable; choose “Variable Properties”, the properties window will pop up.

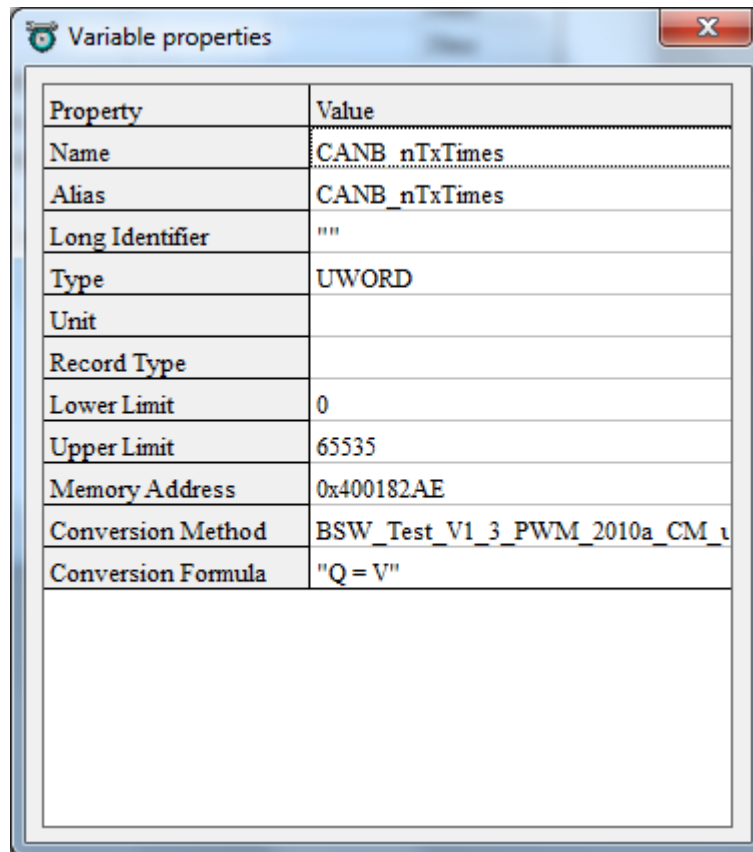
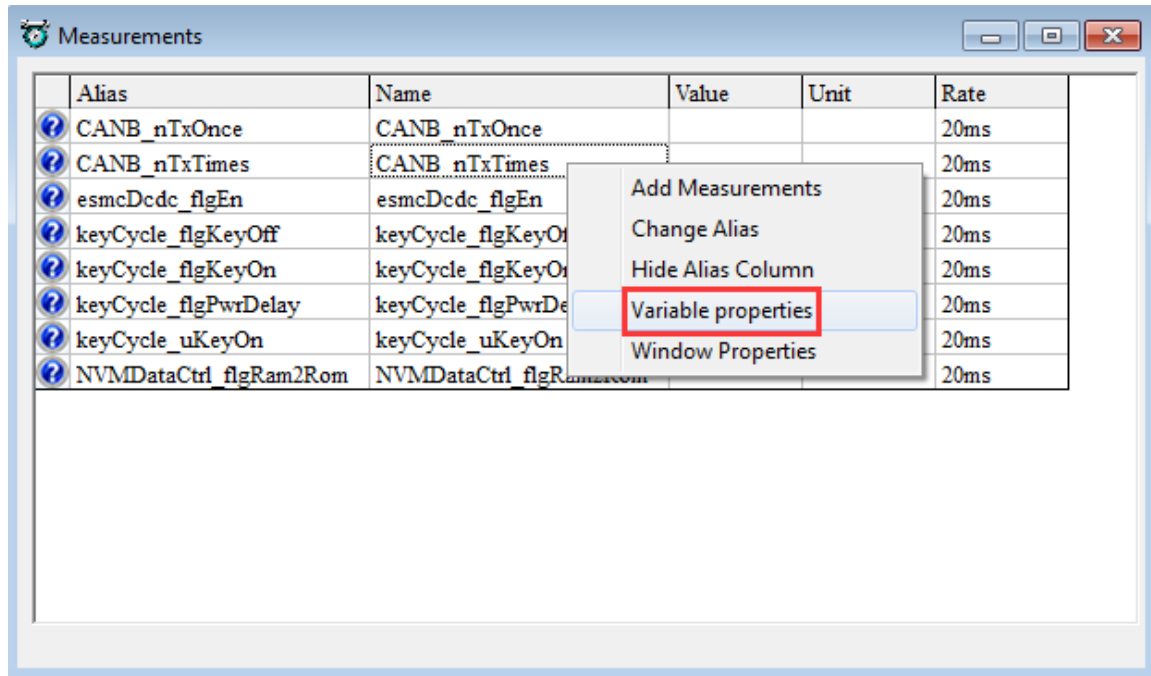




Property	Value
Name	sigInDrvPedacc_pctLin_cur
Alias	sigInDrvPedacc_pctLin_cur
Long Identifier	""
Type	CURVE
Unit	-
Record Type	FLOAT32_IEEE
Lower Limit	-3.4E+38
Upper Limit	3.4E+38
X-Axis Points	sigInDrvPedacc_pctLin_bp
X-Axis Reference to Inp	sigInDrvPedacc_voltUnJit
X Point Description	""
Memory Address	0x8090
Conversion Method	BSW_Test_V1_3_PWM_2010a_CM_s
Conversion Formula	"Q = V"

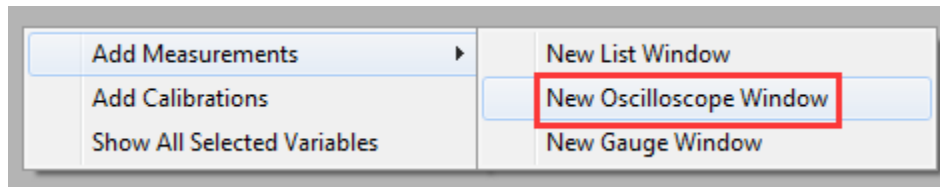
Measure variables' properties:

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

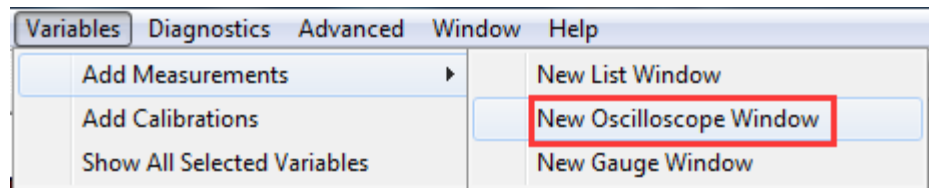


5.3.5 Virtual Oscilloscope

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

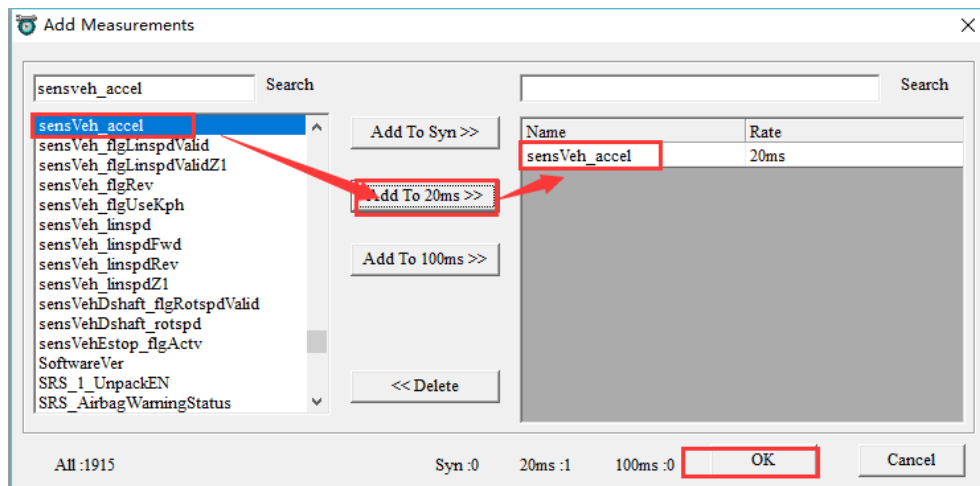


You also can go to menu->Variables->Add Measurements->New Oscilloscope Window”, to add the oscilloscope window.

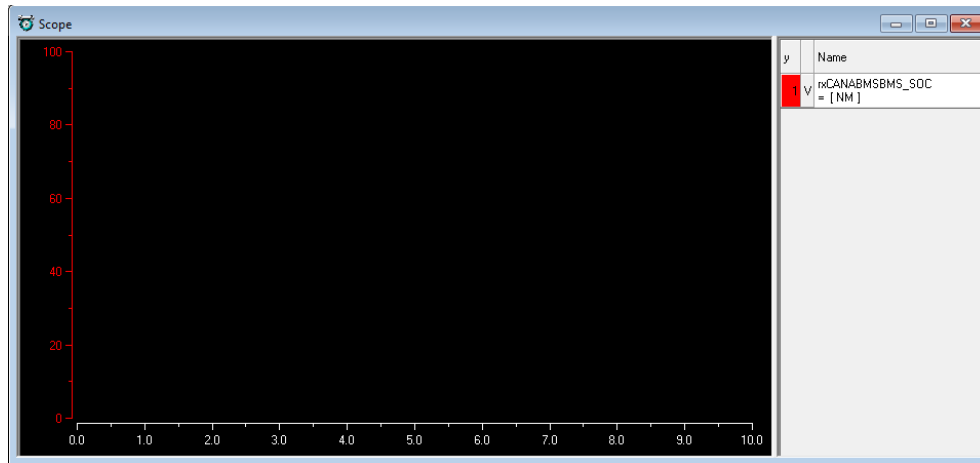


Note: You only can add one Oscilloscope in each layer.

- 2) Add the measured variables that you want to show in the Oscilloscope window, here, we as the “SensVeh_accel” variables as example.



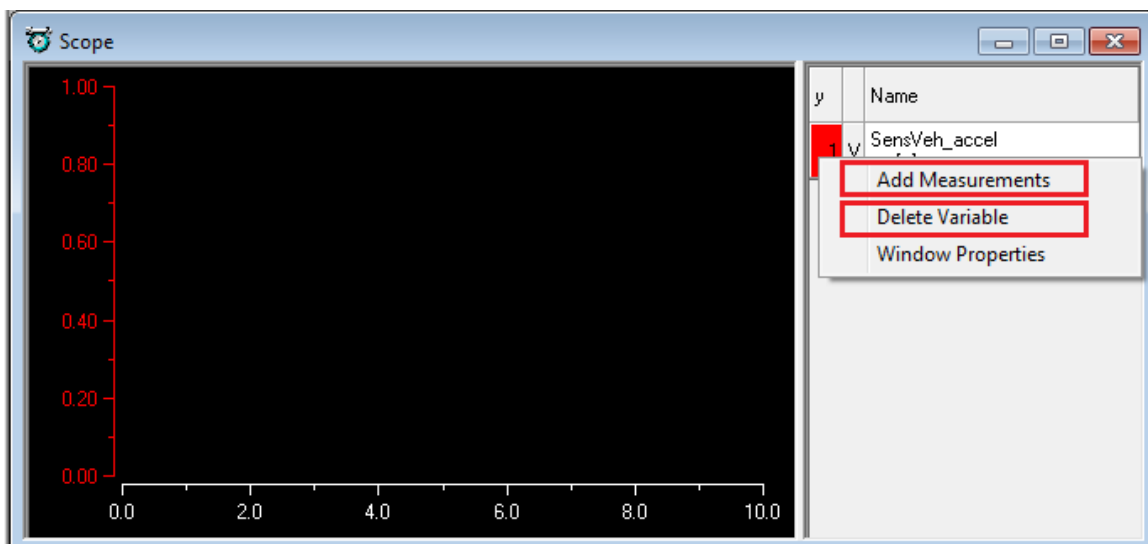
- 3) Click “OK”, the Scope will pop up.



4) Connect to ECU, and start measuring, you can see the signal of variables.

5) You can add or delete the variable that you choose

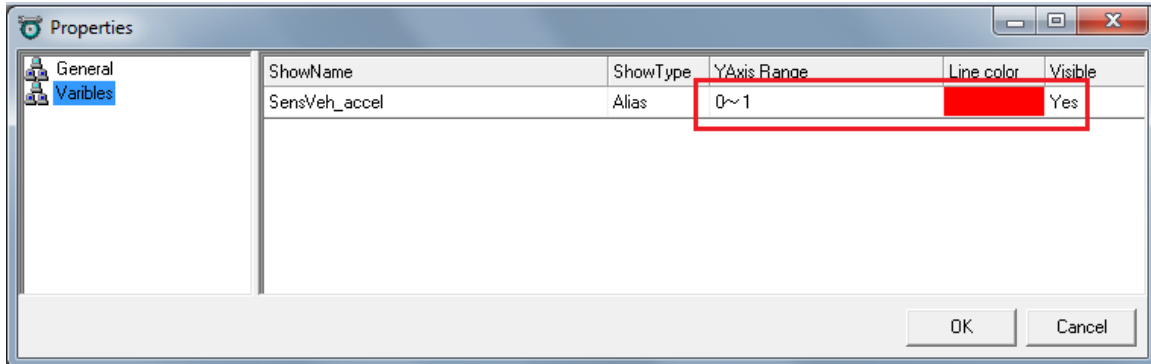
Right click on the scope window, and then add or delete the variables that you want.



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

6) You also can change the properties of scope window.

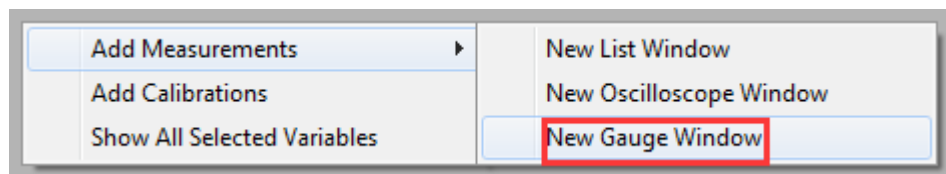
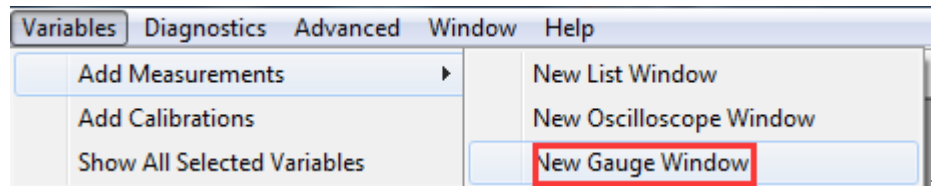
Right click on the scope window, and then click “Window Properties”. You can change the Max/ Min value of variable, the lines color, etc. Click “OK” when finished.



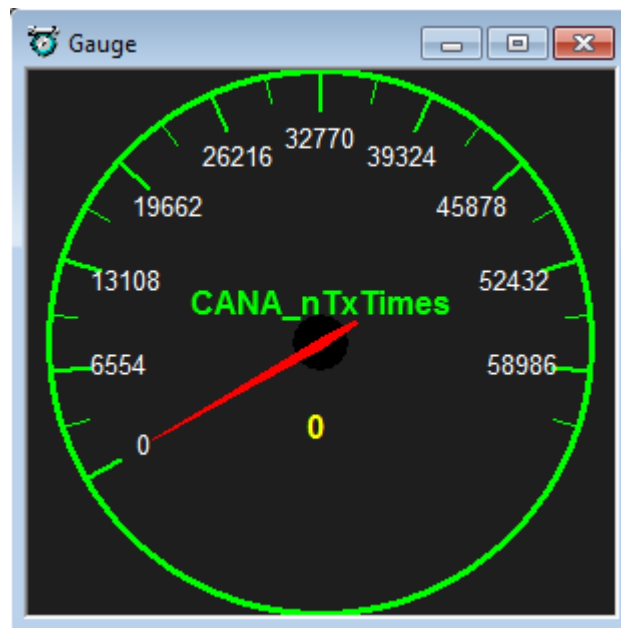
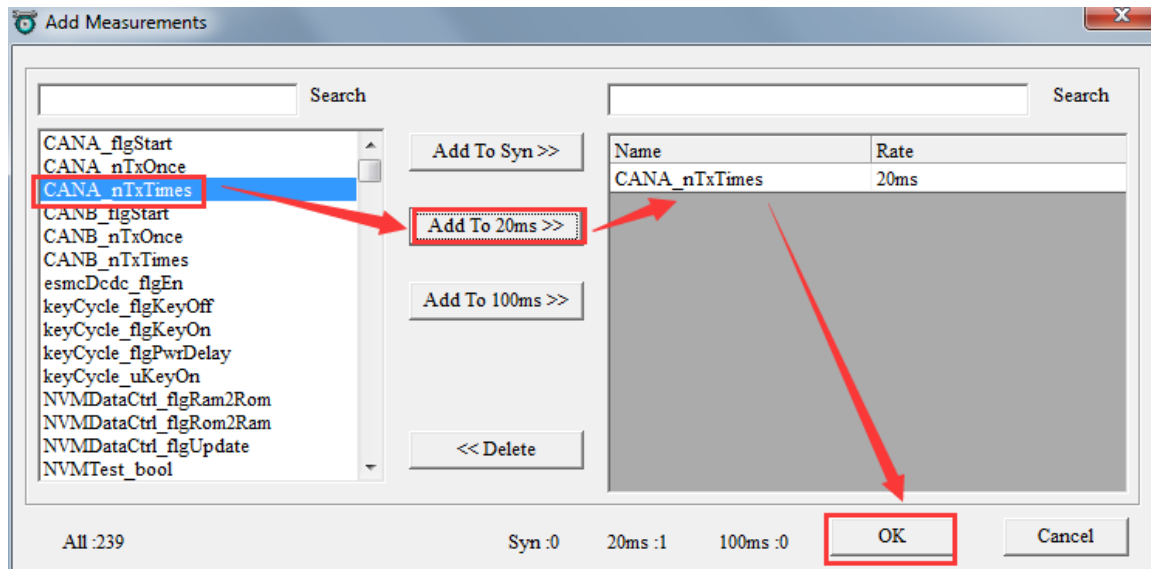
5.3.6 Gauge monitoring

You can use this function to monitor the Gauge window of calibration data.

You can select "**Variables->Add Measurements->New Gauge Window**" or right click on the table, then choose “**New Gauge Window**”, and then you can see the gauge window as below.

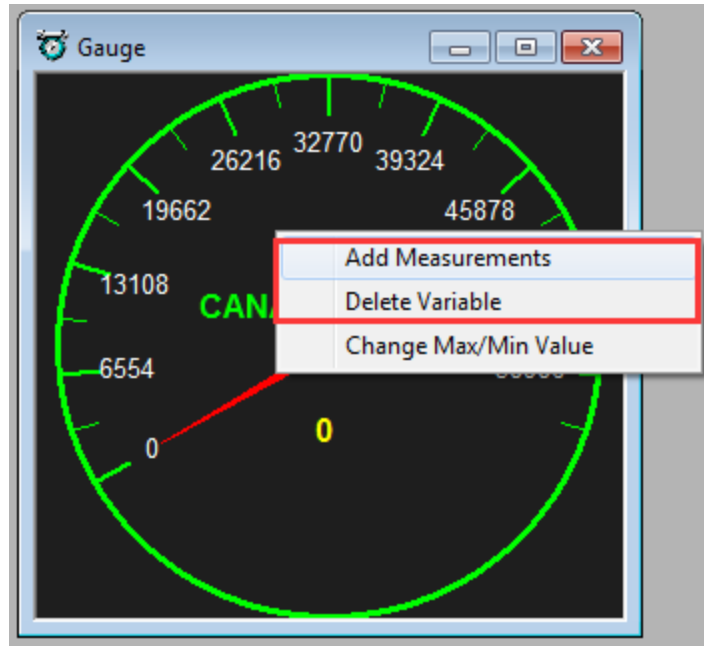


Add the measured variables that you want to show in the Gauge window, here, we select the “CANA_nTxTimes” variable as example.



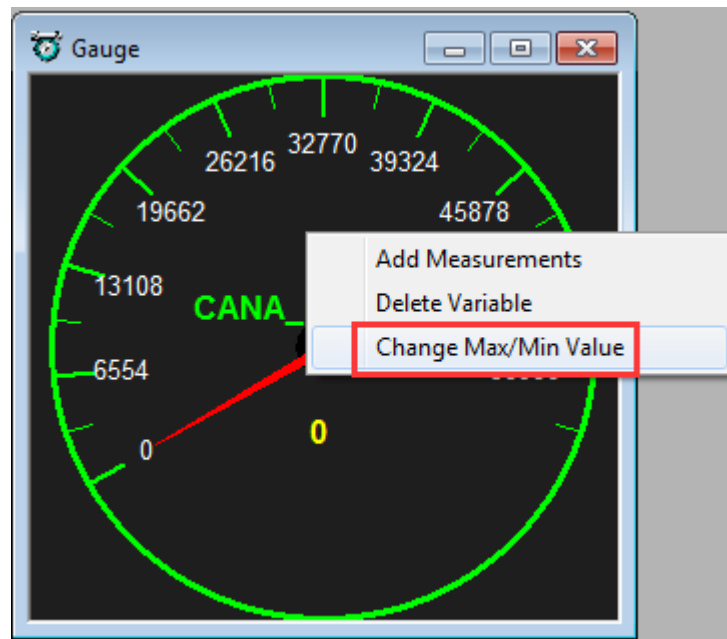
You can add or delete the variable that you choose

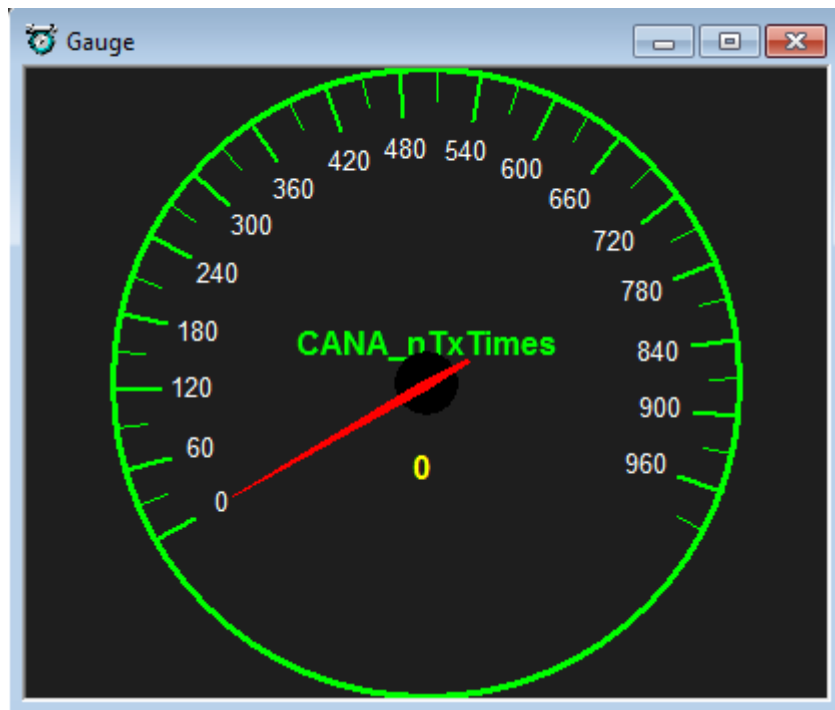
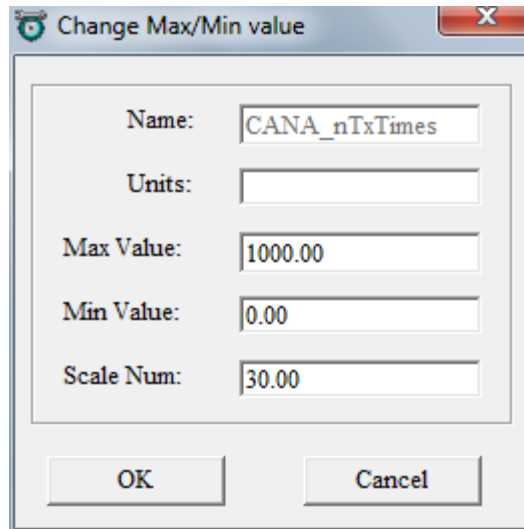
Right click on the Gauge window, and then add or delete the variables that you want.



You also can change the value of variable.

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. Click “OK” when finished.



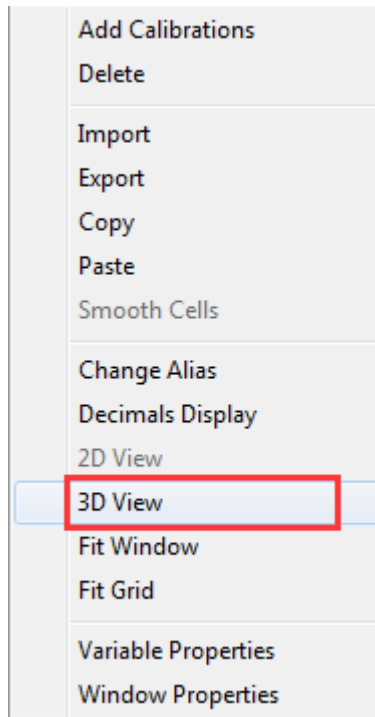


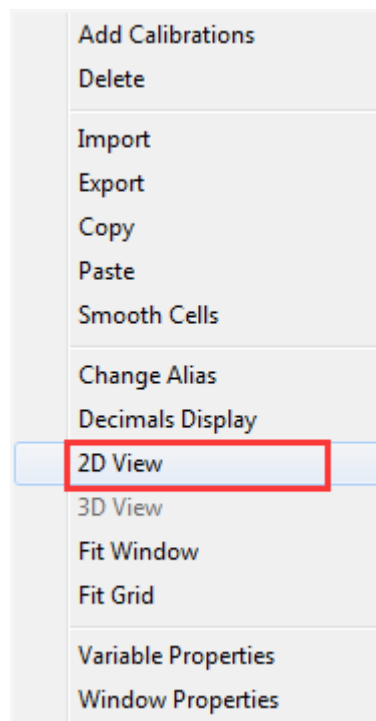
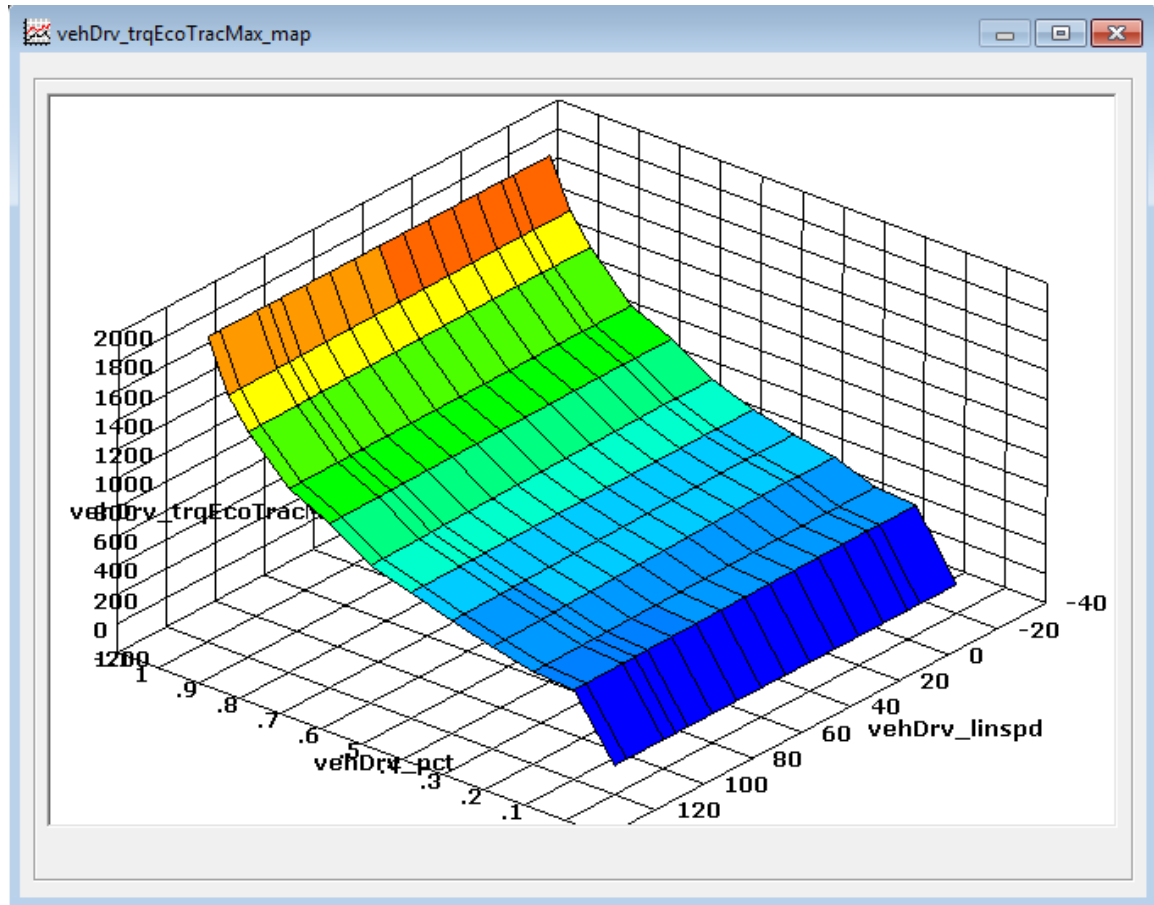
5.3.7 3D/2D view of maps

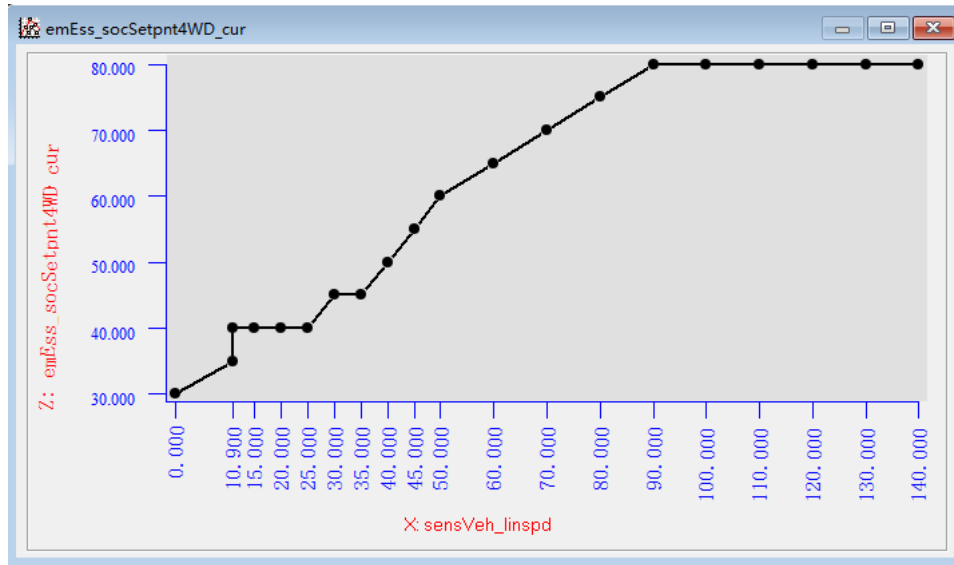
You can use this function to see the graph of calibration tables.

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

You can use this function to check the table whether is smooth. If it is not smooth, you need to smooth the value of table.

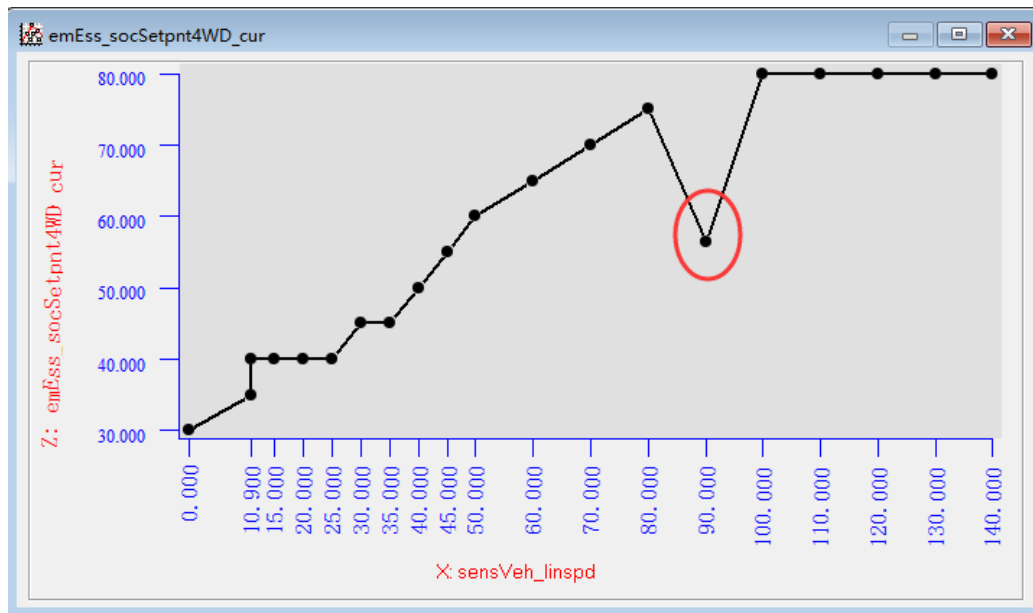






“2D View” window also support calibration-graph function. You can use mouse to drag one of the point to revise calibration value. You can operate it like the below steps:

Press the point you need without losing, then the mouse gets into the shape of the upper and lower arrow. And move the point to your target, then lose your mouse, as below.

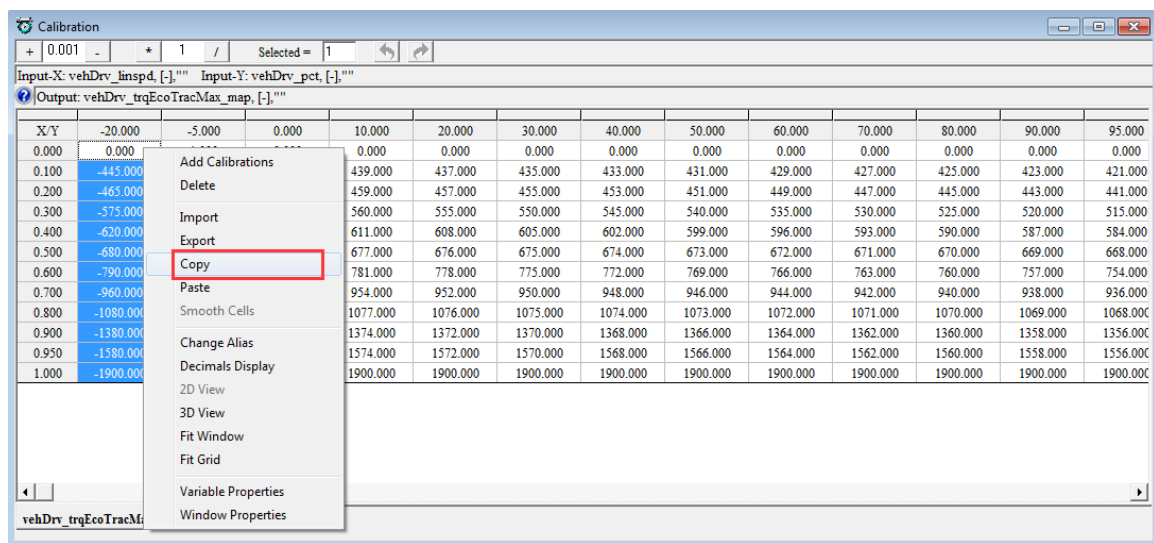


5.3.8 Cope/ Paste in tables

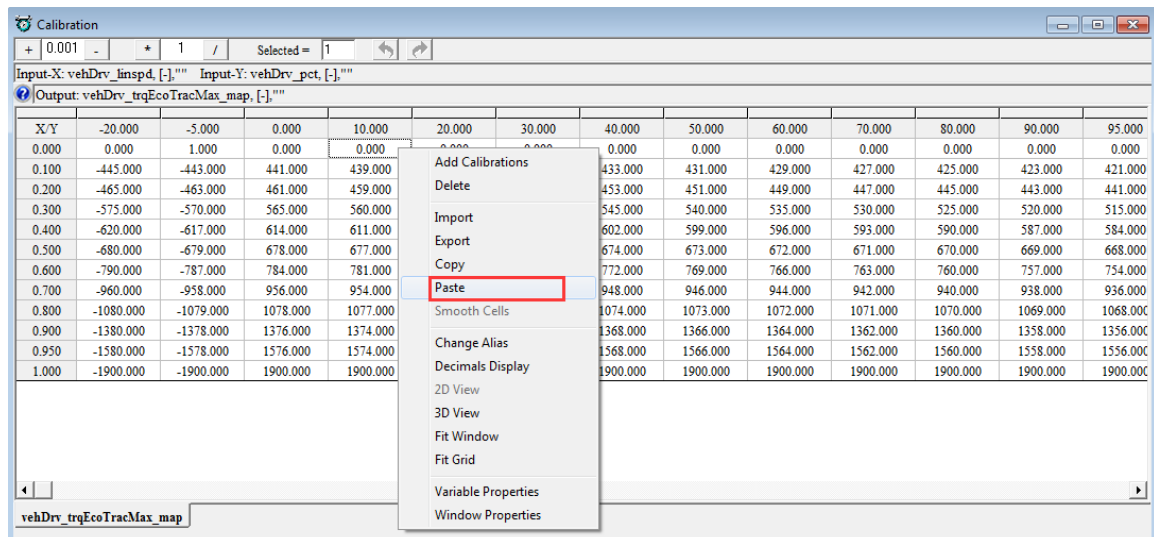
In EcoCAL, it supports the Copy and Paste function in CUR and MAP tables, the function is the same to Excel. You can copy the part of value then past it into the part of cells.

For example

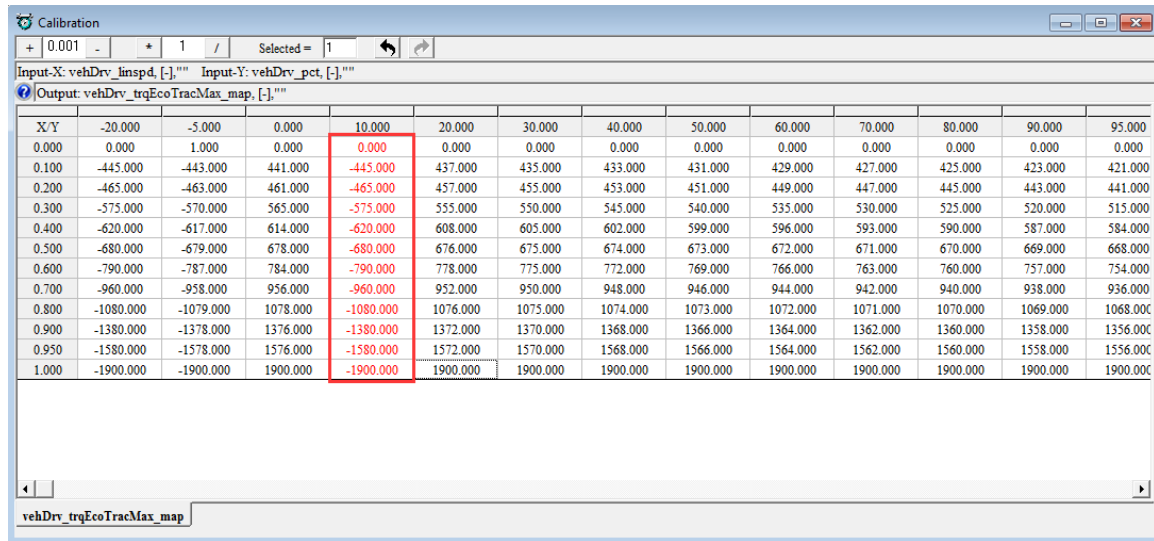
Move the mouse to choose the area of cell you want to copy, then right click, and click “Copy”,



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



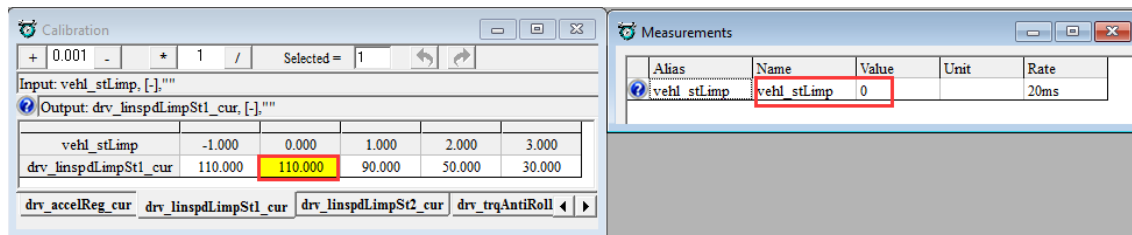
You can see the values of cells are changed.



X/Y	-20.000	-5.000	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	95.000
0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.100	-445.000	-443.000	441.000	-445.000	437.000	435.000	433.000	431.000	429.000	427.000	425.000	423.000	421.000
0.200	-465.000	-463.000	461.000	-465.000	457.000	455.000	453.000	451.000	449.000	447.000	445.000	443.000	441.000
0.300	-575.000	-570.000	565.000	-575.000	555.000	550.000	545.000	540.000	535.000	530.000	525.000	520.000	515.000
0.400	-620.000	-617.000	614.000	-620.000	608.000	605.000	602.000	599.000	596.000	593.000	590.000	587.000	584.000
0.500	-680.000	-679.000	678.000	-680.000	676.000	675.000	674.000	673.000	672.000	671.000	670.000	669.000	668.000
0.600	-790.000	-787.000	784.000	-790.000	778.000	775.000	772.000	769.000	766.000	763.000	760.000	757.000	754.000
0.700	-960.000	-958.000	956.000	-960.000	952.000	950.000	948.000	946.000	944.000	942.000	940.000	938.000	936.000
0.800	-1080.000	-1079.000	1078.000	-1080.000	1076.000	1075.000	1074.000	1073.000	1072.000	1071.000	1070.000	1069.000	1068.000
0.900	-1380.000	-1378.000	1376.000	-1380.000	1372.000	1370.000	1368.000	1366.000	1364.000	1362.000	1360.000	1358.000	1356.000
0.950	-1580.000	-1578.000	1576.000	-1580.000	1572.000	1570.000	1568.000	1566.000	1564.000	1562.000	1560.000	1558.000	1556.000
1.000	-1900.000	-1900.000	1900.000	-1900.000	1900.000	1900.000	1900.000	1900.000	1900.000	1900.000	1900.000	1900.000	1900.000

5.3.9 Highlight of table cells

When you tune the tables on the fly or you want to know which cell of tables is used, so we add the highlight function, when you add the Input-X and Input-Y variable in measured variables, the cell that used will be highlight.



Alias	Name	Value	Unit	Rate
vehl_stLimp	vehl_stLimp	0		20ms

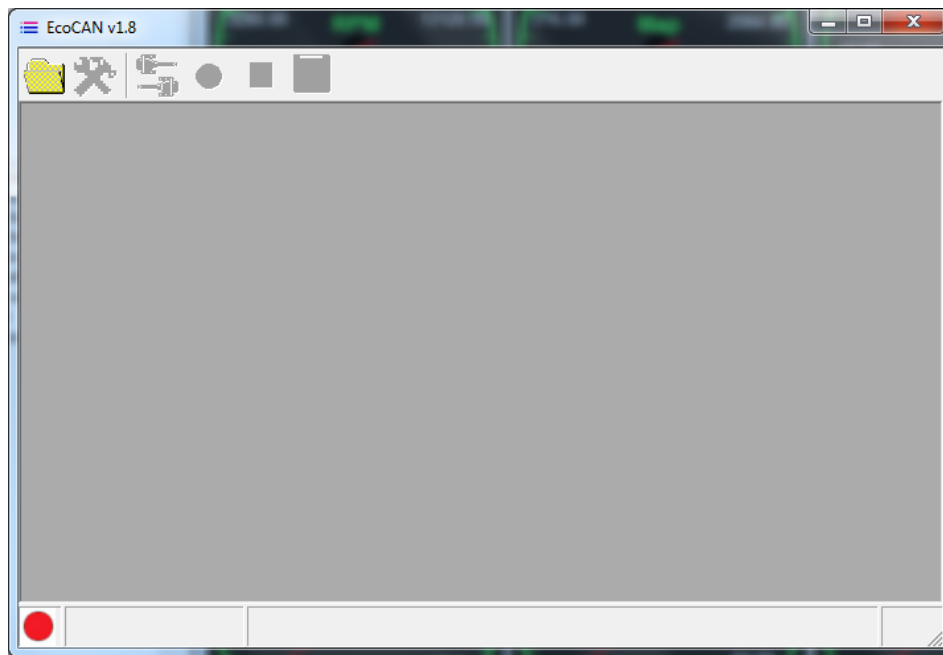
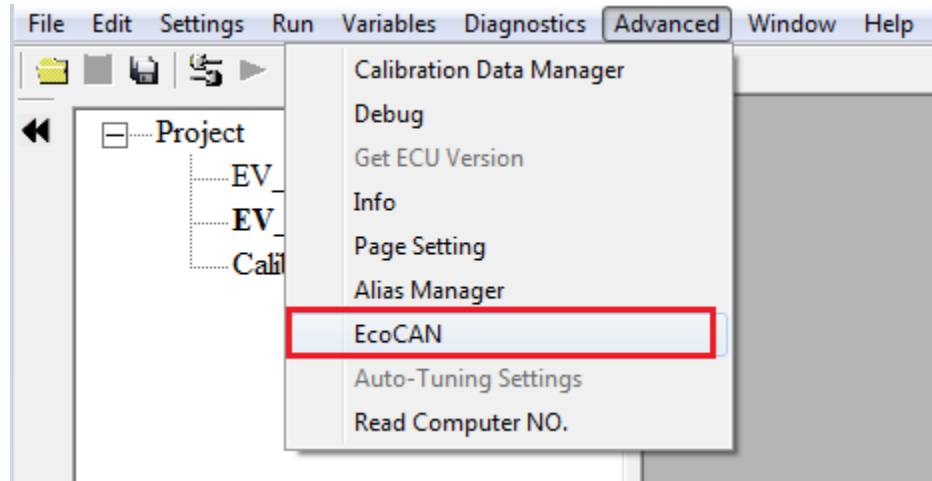
Note: If the Input variable of table is not measured, the highlight will be disabled.

5.3.10 EcoCAN


This software EcoCAN is used for CAN bus monitoring, recording CAN data and generating M file(The M file is used for ecocoder_sfun_can_readmsg block and ecocoder_sfun_can_sendmsg block in EcoCoder. If need, please refer to Chapter 4 in "EcoCoder Manual 2.5" for more details.).

Open EcoCAN:

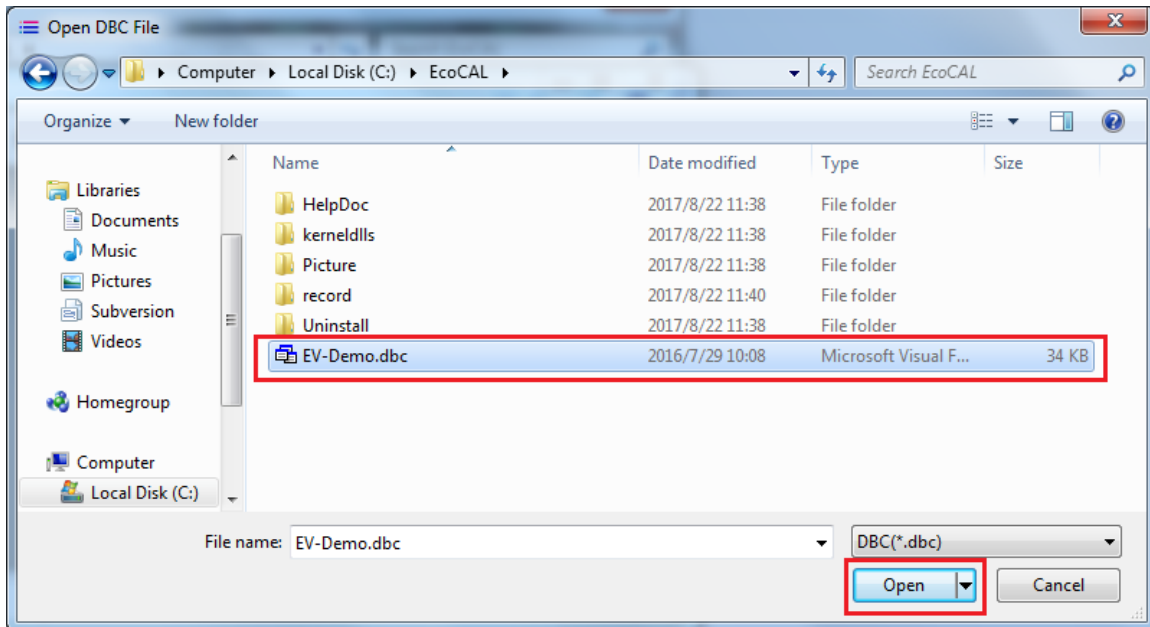
Go to menu->Advanced->EcoCAN



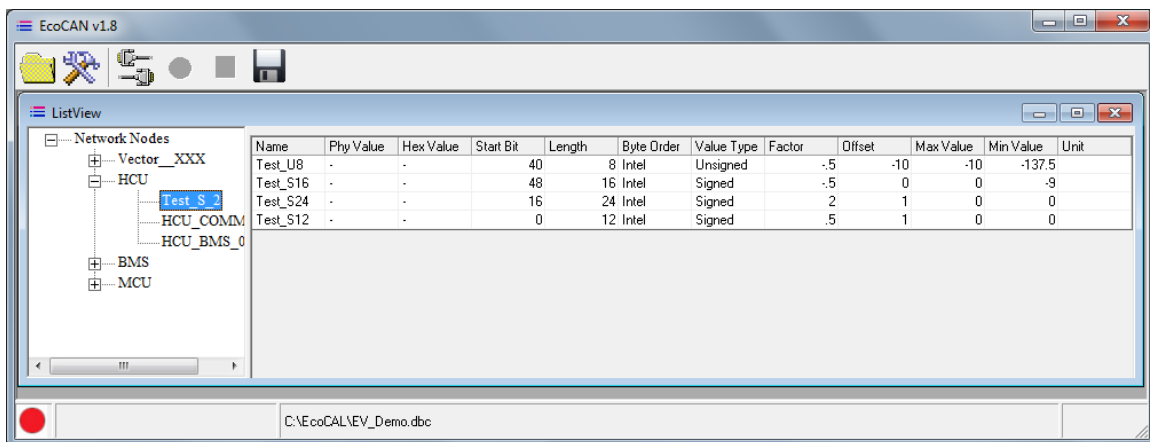
Open .dbc file:

Click the icon  to open a .dbc file. On the opened window, select a .dbc file, then click the button "Open". Shown as below:





When the EcoCAN has loaded a .dbc file, it will like this:

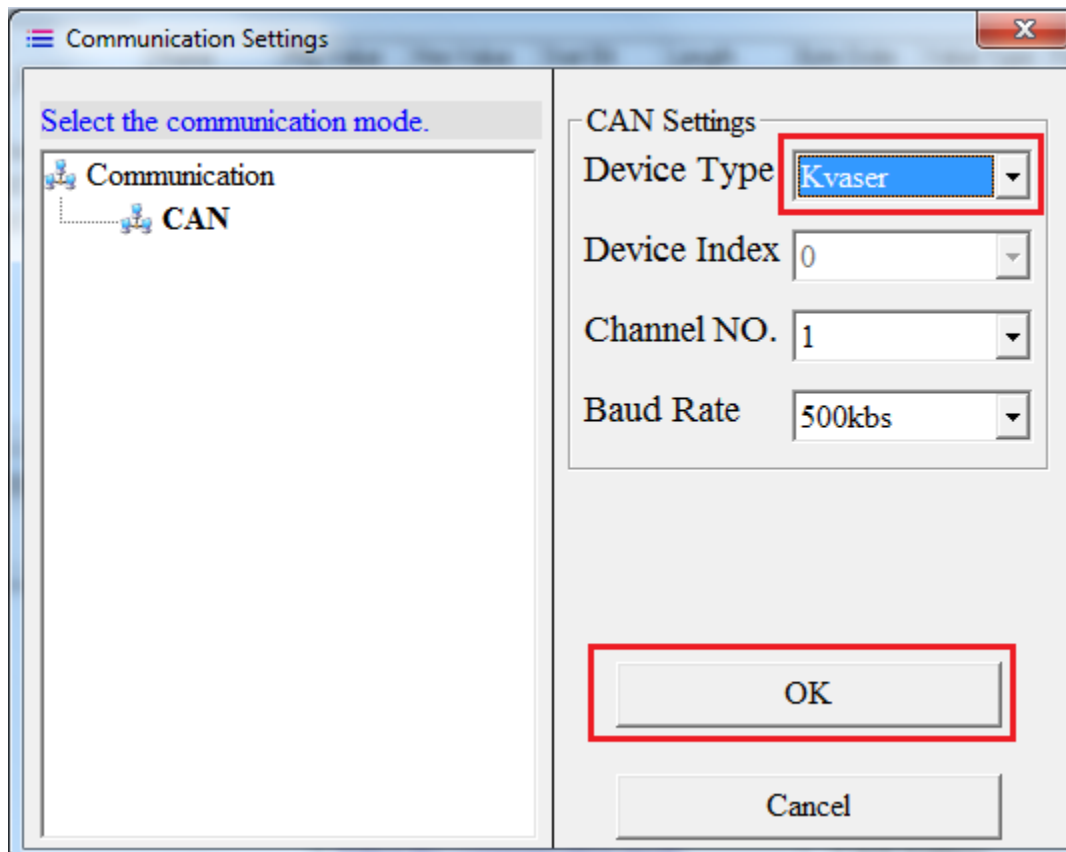


Set up device information:

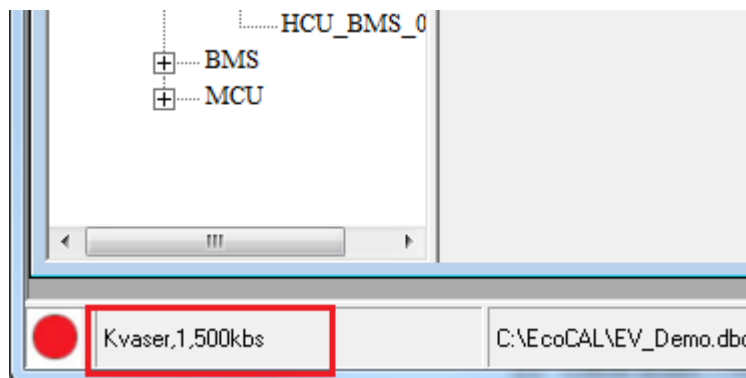
- 1) Click the icon  to open setting window.



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

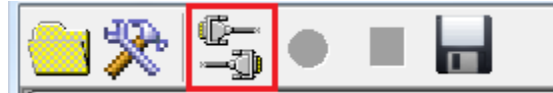


The EcoCAN window will show the device which you chose.

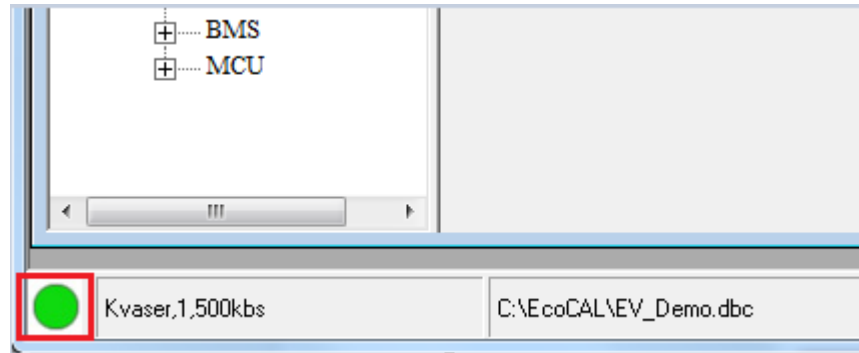


Open CAN device:

Click the icon  to open device.

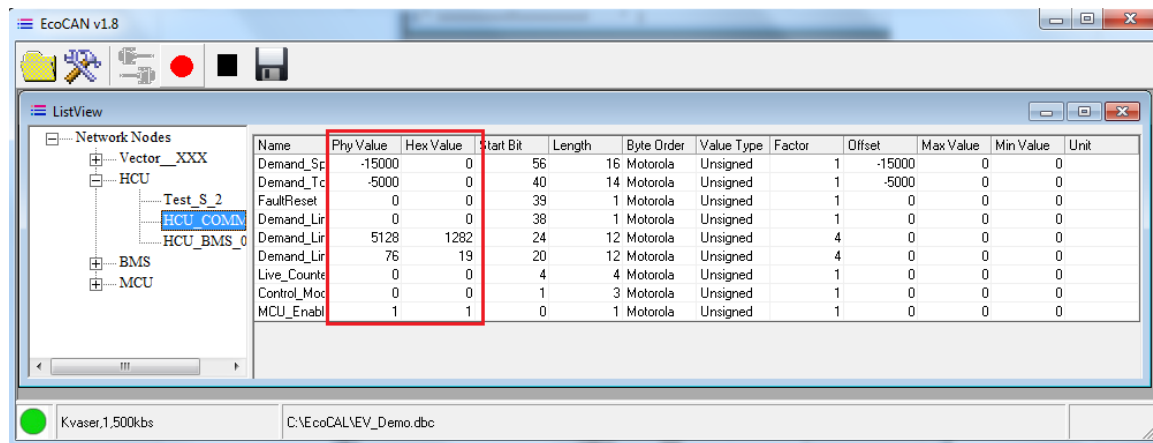


If open successfully, the status bar will show green light.



Monitor CAN bus:

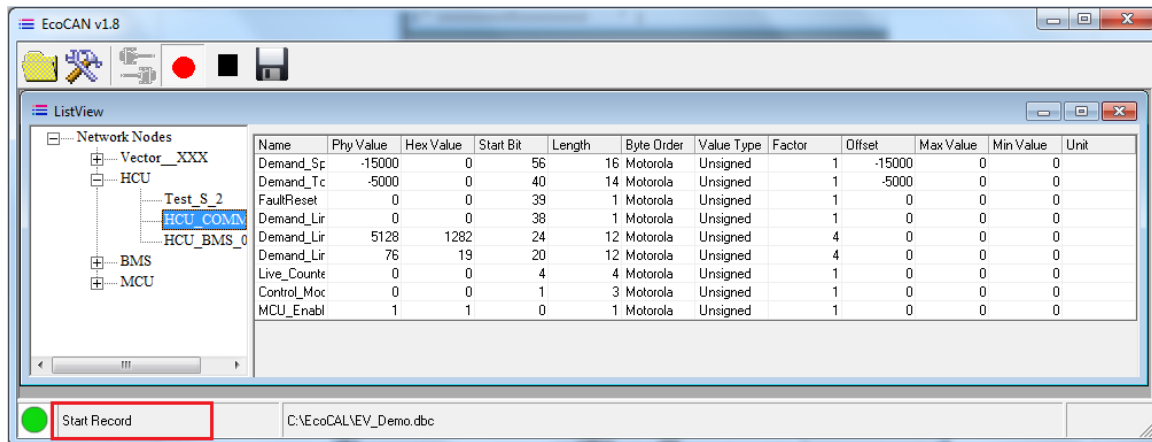
When connect successfully and the CAN device has received data, the software interface will show the values of the variables.



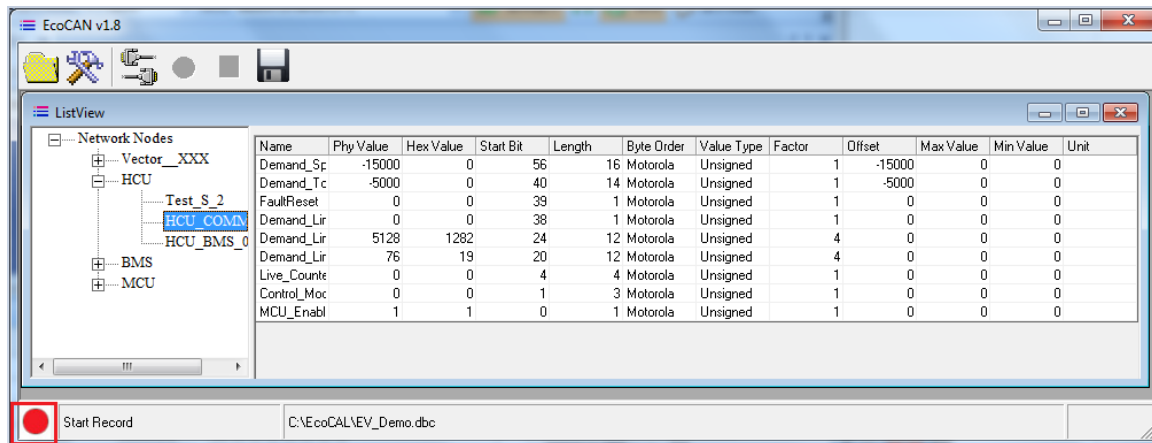
Record CAN data:

1) Click the icon  to start record.

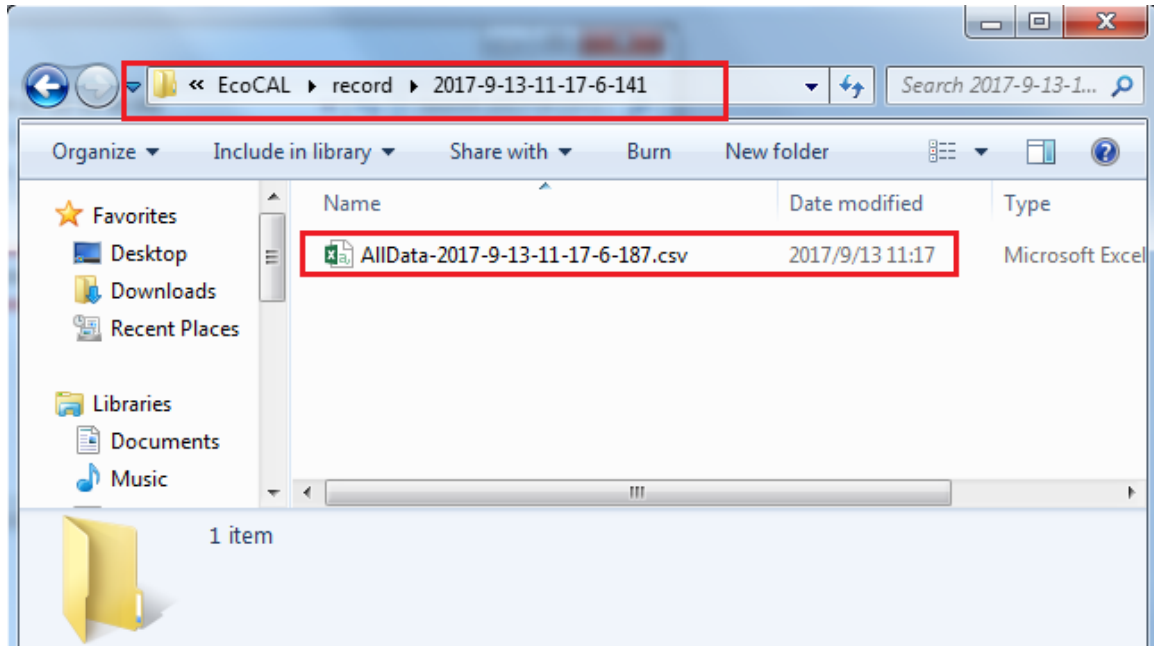




2) Click the icon  to stop record.



3) The record file is saved in the “record” folder.

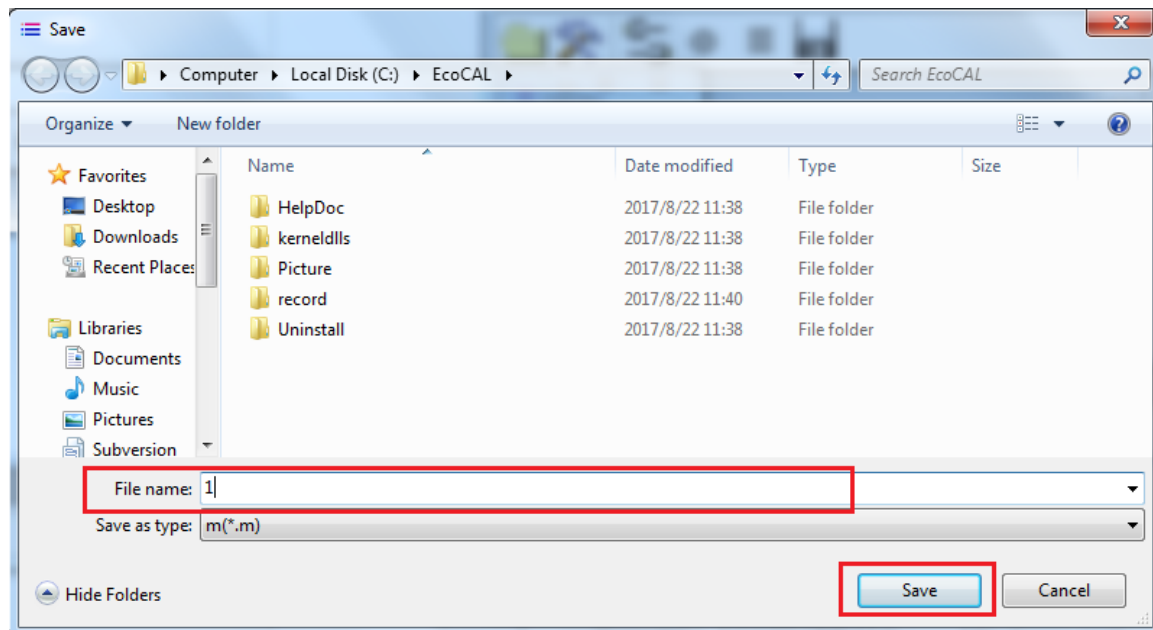


Generate M file:

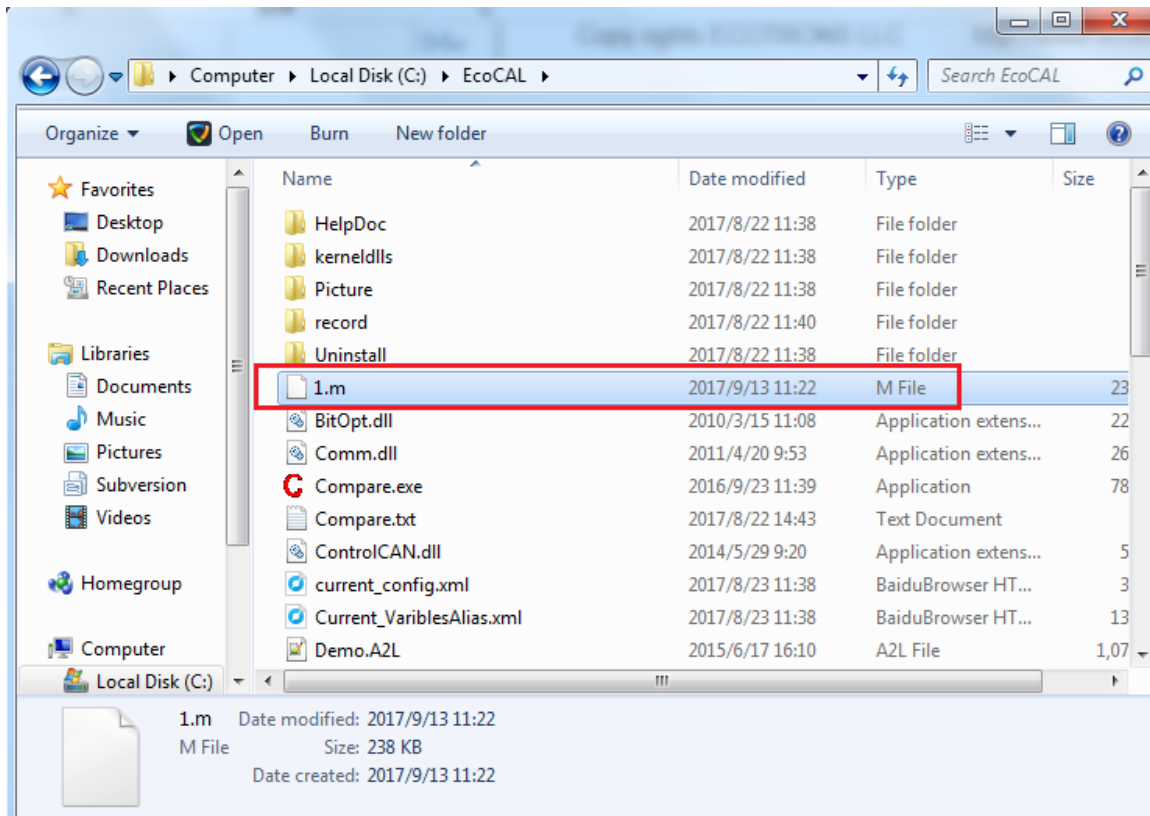
- 1) Click the icon  to generate M file.



- 2) In the opened window, give the M file a name, then click the button "Save".



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



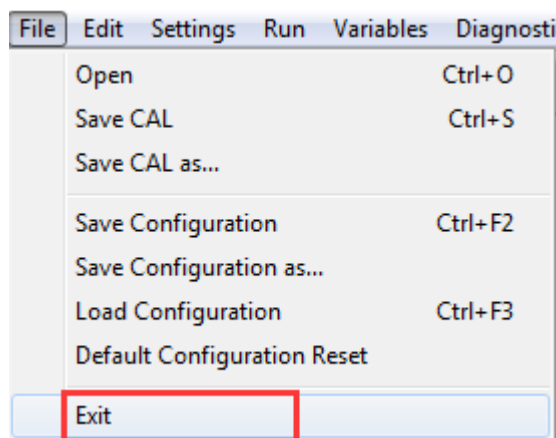
Chapter 6 Exit or Uninstall the EcoCAL

6.1 Exit EcoCAL

There are two ways to exit EcoCAL

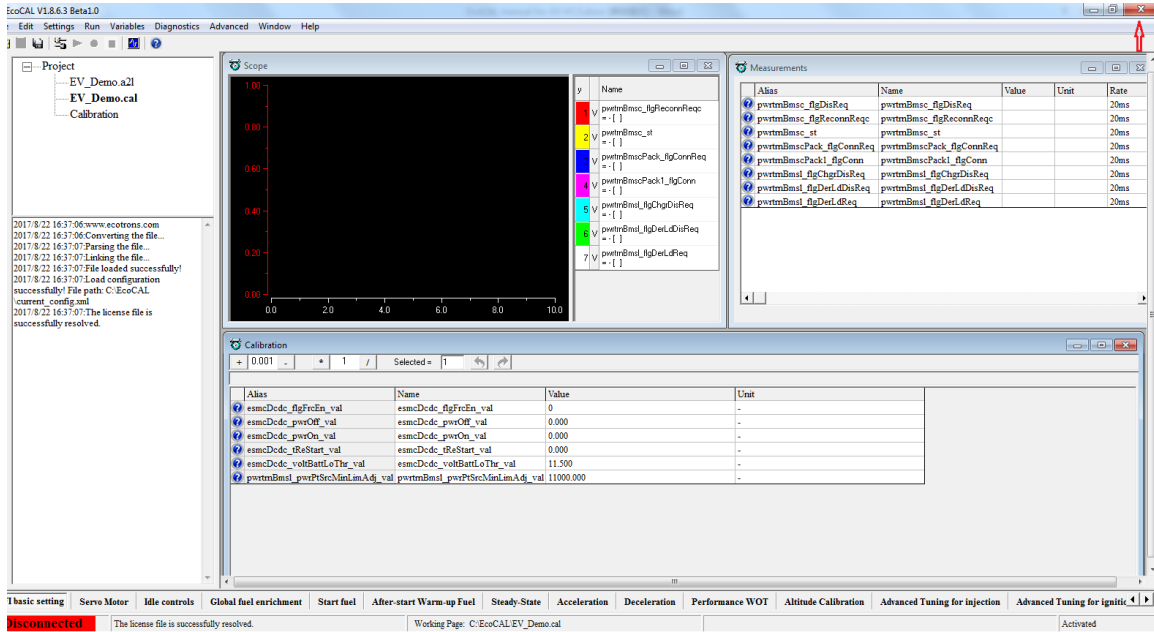
- 1) Use the menu to exit the EcoCAL

Go to menu->File->Exit

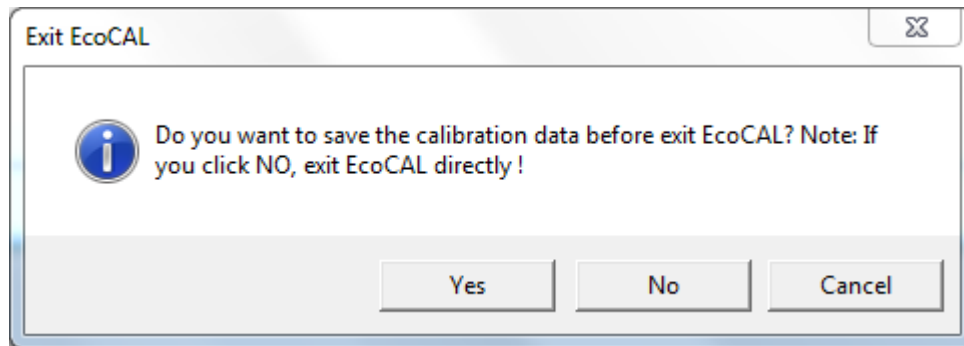


- 2) Close the EcoCAL directly on the upper right corner





Note: If you have done some tuning and change, and you don't save it, the "Exit EcoCAL" warning window will pop-up, please choose "Yes" or "No" or "Cancel" based on your demand.



6.2 Uninstall the EcoCAL

If you want to uninstall the EcoCAL, please click:

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

