EcoCAL User Manual

V1.1

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Induction

EcoCAL is the Calibration software of EFI system from Ecotrons, you can use the EcoCAL to tune the maps of ECU, start fuel/ ignition angle, warm-up fuel, idle ignition advanced angle, ignition timing MAP, fuel injection MAP, ... etc. Our ECU is programmable, so if you want to change the setting of EFI, you need connect ECU 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:



Click the "EcoCAL", and then download the software "EcoCAL-Setup.exe"

2) Maybe, you get the software through the E-mail. So you need 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.exe" to install the EcoCAL:



2) Click "Next"

Setup EcoCAL Setup		X
	Welcome	
	Welcome to the installer for EcoCAL 1.6.	
	It is strongly recommended that you exit all Windows programs before continuing with this installation.	5
	If you have any other programs running, please click Cancel, close the programs, and run this setup again.	
	Otherwise, click Next to continue.	
	< <u>B</u> ack <u>N</u> ext > <u>C</u> ancel	

3) Click "Next" and choose the path to install EcoCAL



4) Click "Next"

hortcut Folder Where would you like the shortcuts to be	installed?
The shortcut icons will be created in the f older, you can either type a new name, o	folder indicated below. If you don't want to use the default or select an existing folder from the list.
Shortcut Folder:	
EcoCAL	Y
 Install shortcuts for current user only Make shortcuts available to all users 	
 Install shortcuts for current user only Make shortcuts available to all users 	
 Install shortcuts for current user only Make shortcuts available to all users 	

5) Click "Next"

EcoCAL Setu		2
Ready to Insta		
You are now rea	dy to install EcoCAL 1.6	1
The installer nov	has enough information to install EcoCAL on you	r computer.
The following se	tings will be used:	
Install folder:	C:\EcoCAL	
Shortcut folder:	EcoCAL	
Please click Nex	t to proceed with the installation.	
	< <u>B</u> ack	<u>V</u> ext > <u>C</u> ancel

6) Click "Next" and wait for installing



7) 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 when you finish installation, the EcoCAL will load the Demo files automatically with the default page settings.

🗑 Eo	CAL V1.6													_ 8 ×
File I	dit Settin	gs Run Variables D	iagnostics Advanced Help											
	🗏 🖬 🛛	5 🕨 🛛 🔳 💆	0											
•	- Pro	ject												
		Demo.A2L												
		Demo.cal												
		Calibration												
				🧑 Convert P\			jnal					<u>- 0 ×</u>		
L.				+ 0.001 .	. + 1	/ Selected =	1							
F	RPM	0 Rpm												
		0 bDo		Alias		Name		Value		Unit				
		UKLA		VAL_uTp:	sFromServoOffset	VAL_uTpsFromS	ServoOffset	-5.24		V				
	PS	0 %		VAL_uTp:	sFromServoSlope	VAL_uTpsFromS	ServoSlope	0.36		V				
E	СТ	0 DegC		, ,										
	лт	0 DegC		Selected V	'ariables							<u>- 0 ×</u>	[
	*1	U DegC		Afire		Nama	Value	Turit	Pata					
0	02S	0 V		Throttle	Position Sensor	Tos	value	%	20ms					
	PARK	0 CrA		2 Battery v	oltage from ADC o	hannel UbAdc		V	20ms					
				TPS sen:	sor voltage	uTps		v	20ms					
	UELPV	v1 <u>0 ms</u>		🕜 Engine to	emperature	Tm		DegC	100ms					
F	UELPV	V2 0 ms		🕜 Intake ai	r temperature	Ta		DegC	100ms					
	amWO	2 0		Ambient	pressure	Pam		hPa	100ms					
		• <u> </u>												
	.oad config EcoCAL\c	guration successfully!	File path: D:											
	LCOUPILIO	urent_conig.in												
1														
Sen	o Motor	Desired idle speed	Global fuel enrichment	Start fuel	Start ignition	After-start fuel	Idle ignition	Warm	up fuel	Steady-State	Acceleration	Deceleration	Performance WOT	Altitude Calibr
Di	sconne	cted Load configu	ration successfully! File path	D:\EcoCAL\cum	ent config Workin	g Page: D:\EcoCAL\	Demo.cal							

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**". You should copy and paste the necessary A2L file and CAL file into that folder, if the folder contains no such files.

1.2.2 Load the Calibration files

1) File types and definitions

S19 file: this is a Motorola format microprocessor executable file;

A2L file: this is an ECU description file that contains variant ECU 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 S19 file; unless an ECU firmware update is necessary; it is enough to have the A2L file and CAL file to run EcoCAL and tune your engines.

2) Load the correct A2I and CAL files

Note: If you have not got A2L file and CAL file in your CD or in the software package via Email, please contact us: <u>info@ecotrons.com</u> or <u>support@ecotrons.com</u>.

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

For example, an ECU 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,

🖉 Open							×
	mputer 🝷 l	.ocal Disk (D:) ▼ SoftWare_LLD ▼ S	EA_b1_7_7_1 ▼	▼ [Search SEA_b1_	7_7_1	
Organize 👻 New fo	older					· T	
Documents	_	Name ^		Date modified	Туре	Size	
J Music		T10		2015/0/10 11:11	Tile felder		
Pictures							
Subversion		SEA_61771_412CCDA_C_1.0M_	[588_Cr11148_E3_v1	2015/6/16 11:04	A2L File	1,081	. KB
Videos Computer Local Disk (C:) Local Disk (D:) Local Disk (E:) Local Disk (F:) Network	Ţ						
	File nam	e: SEA_b1771_4T2CCDA_C_1.0M	L588_CrIII48_E3_v1	2	ASAM-2MC(*.az	2l) Cance	•

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🗑 Open								<u>×</u>	¢
💮 💮 📙 • Co	mputer 🝷 Lo	cal Disk (D:) 🔻 So	ftWare_LLD - SEA_b1_7_	_7_1 •	•	Searc	h SEA_b1_7_7_1		
Organize 👻 New fo	older							- 🗌 🕐	
🖳 Recent Places	A Na	ame ^			Date modified	Туре	Siz	e	
📇 Libraries		2T1C			2015/6/16 11:11	File folder			
Documents		NA_DLE60_SEA	_b1771_4T2CCDA-1.1M_L	.588_CrII148_E3_V1	2015/6/17 16:07	CAL File		17 KB	
J Music									
Pictures									
Videos									
Cault C									
Computer									
Local Disk (C:)									
Local Disk (D:)									
Local Disk (E:)	-								
						1/2	15		
	File name:	NA_DLE60_SEA	_b1//1_412CCDA-1.1M	_L588_Crll148_E3_V1			cal)		
						0	pen 👻	Cancel	
									11.

Click "Open", and then load the A2I and CAL files successfully.

File Edit Settings Run Variables Diagnostics Advanced Help					
Image: SEA_b1771_4T2CCDA_C_1.0M_L588_CrII148_E3_v1.a21 Image: NA_DLE60_SEA_b1771_4T2CCDA-1.1M_L588_CrII148_E3_V1.cal Image: Calibration					
	Convert PWM signal of servo control	to TPS signal			_02
RPM 0 Rpm	+ 0.001 - * 1 /	Selected = 1	Trat	77.5	
MAP <u>0 kPa</u>	Slope Parameter	VAL ServoPWM2VoltS	lope -6.1333	V/ms	
TPS 0 %	Offset Parameter	VAL_ServoPWM2VoltO	Offset 10.9338	v	
ECT 0 DegC	141 Cauras of come control DWM circuit	UAT Case a DUVA/Carua	· 10		
IAT 0 DegC	Selected Variables				-02
028 0 V	Alias	Name Value	Unit Rate		
	P Throttle Position Sensor	Tps	% 20ms	_	
SPARK U CrA	Battery voltage from ADC channel	UbAdc	V 20ms		
FUELPW1 0 ms	Engine temperature	Tm	DegC 100ms		
FUELPW2 0 ms	Intake air temperature	Ta	DegC 100ms		
	Ambient pressure	Pam	hPa 100ms		
File load configuration successfully! Load configuration successfully! File path: D:EcoCAL\current_config.ini	 				
Servo Motor Desired idle speed Global fuel enrichment Start fuel Start ignition After-sta	art fuel Idle ignition Warm up fuel Stead	y-State Acceleration	Deceleration Pe	rformance WOT Alt	titude Calibr 📕 🕨

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



Chapter 2 Connect to ECU and Record data

2.1 Connect ECU to laptop

Note: When you want to connect the ECU to laptop via EcoCAL, you must make sure you have powered on the ECU-when you power on the ECU, you can hear the noise of pump working about 5 seconds.

2.1.1 Communication Settings

You should select the communication mode first based on which way you use, COM or USB or CAN.

In default, we provide the COM RS232 cable and USB adapter, so you can use the COM or USB for communication.

Go to menu->Settings->Communication Settings:

🆏 Communication Settings	×
Communication Settings Select the communication mode. Communication COM COM COM COM CAN CAN	X Open Device
	Class Daries
	Cancel

Note: By default, EcoCAL uses USB communication mode (Note: insert the Ecotrons' USB adaptor into the laptop first for USB mode). This configuration is consistent with most of the computers.

1) COM communication mode

If the user is using the **COM** mode (**Note: for this mode, your laptop need to have a built-in COM port**). Select COM and set the COM port, the default COM port is **COM1**. (**Note:** To check the computer COM port availability, see Chapter 13.2 "Failed to connect to the ECU")



Built-in COM port (9-pin)

RS232 cable

The default baud rate is 115200, which the fastest of the serial comm. rate of the PC. It is not supposed to change.

🎝 Communication Settings	
Select the communication mode.	COM Settings Port Num COM1 Baud Rate 115200
	Open Device
	Close Device
	Cancel

2) USB communication mode

Most new computers do NOT have a built-in COM port any more. You should insert the USB adaptor (Ecotrons' USB Adaptor) to the laptop, and then select the **USB** in the communication settings window of EcoCAL.



Note: We do not support the 3rd party USB-RS232 adapters, even though they might work sometime. The problem is that those consumer electronics rated USB adapters only works in a noise-free environments. This means, once the engine is running, it

generates a lot of electronic magnetic noises. And those USB adapters, though looking pretty, will not stay working when you are driving. That's why we developed our own.

Note: Make sure the connection between laptop and USB adaptor (Serial communication cable) is **FULLY** plugged in.



Choose the USB first, and then click "Open Device".

3) CAN communication mode

Our custom ECU support the CAN communication, if the ECU of EFI system supports the CAN communication, you can use this communication mode to connect ECU.

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, you also need to click "**Close Device**" to close the CAN device.

Communication Settings	×
Select the communication mode.	CAN Settings Device Type ZLG • Device Index 0 • Channel 1 • Baud Rate 500kbs •
	Open Device
	Close Device
	Cancel

Note: 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 ECU.



2.1.2 Connect to ECU

After finishing communication setting, you can try to connect ECU to laptop.

Go to menu->Run->Connect



When you connect to ECU successfully, the left lower corner of window will show "Connect" in Green color.

"This calibration data set matches with the ECU's"

FUELPW2) ms			🕜 I
LamWO2)			() I
This calibration da ECU's	ata set matche	s with the		e F e F
EFI basic setting	Servo Motor	Desired idle speed	Global fuel enrichment	Start fuel
Connected	This calibrat	tion data set matches wit	h the ECU's	Workin

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 ECU, and you need connect 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 ECU in, you need to "Burn to ECU", burn the CAL files you use to ECU.

🗑 Message		2	<
Need to update the lo	cal .Cal file,burn to ECU or fetcl	h from ECU?	
Fetch from ECU	Burn to ECU	Cancel	

And if burn to ECU successfully, you will hear fuel pump running for a couple seconds. If not, please do again and check all of connection is right.

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.

🗑 Message	×						
Need to update the local .Cal file,burn to ECU or fetch from ECU?							
Fetch from ECU Burn to ECU	Cancel						

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

🗑 Save As					×
Computer	· • Local Disk (D:) • SoftWare_LLD • SEA_b1_7_7_1 •	•	Search SEA_b1_7	_7_1	2
Organize 🔻 New folder					0
Documents	Name *	Date modified	Туре	Size	
J Music	7 77 1C	2015/7/23 16:00	File folder		
Pictures		2013/7/23 10:00			
Subversion	NA_DLE60_SEA_b1771_4T2CCDA-1.1M_L588_CrII148_E3_V1	2015/6/17 16:07	CAL File	17 KB	
Videos Computer Local Disk (C:) Local Disk (D:) Local Disk (E:) Local Disk (F:) Local Disk (F:)					
File nan et Fetch	from ECU				-
save as type: [cal(caij	_			<u> </u>
Hide Folders			Save	Cancel	

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 the EFI 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



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2.1.4 Start Measuring

When you connect to ECU successfully, you can measure the data of sensors' and engine running, to see the running state of engine.

File Edit Settings Run Variables Diagnostics Advanced Help Connect F5 6 5 Ctrl+R Disconnect ------ Projec Fetch from ECU C 1 Burn to ECU 41 Start Measuring F8 Start Recording F9 Stop Measuring F11 Play Back

Go to menu->Run->Start Measuring

Then you can see the values of measured variables.

SEA_b1771_4T2CCDA_C_1 SEA_b1771_4T2CCDA_C_1 Sea_b1771_4T2CCDA_C_1 Sea_b1771_4T2CCDA_C_1 Sea_b1771_4T2CCDA_C_1 Sea_b1771_4T2CCDA_C_1 Sea_b1771_4T2CCDA_C_1 Sea_b1771_4T Sea_b1	Name Tps Nraw LamWO2	Value 0.00 0.00	Unit %	
Project SEA_b1771_4T2CCDA_C_1 NA_DLE60_SEA_b1771_41 Calibration Calibration Calibration Calibration Calibration Calibration	Name Tps Nraw LamWO2	Value 0.00 0.00	Unit %	
SEA_b1771_472CCDA_C_1 NA_DLE60_SEA_b1771_47 Calibration Alias Cali	Name Tps Nraw LamWO2	Value 0.00 0.00	Unit %	I
NA_DLE60_SEA_b1771_41 + 0.001 . + 1 / Selected = 1 Childration Calibration Imput-X: Pim, [hPa]_imput <map>, break point, manifold absolute pressure, for V: Raw engine speed Q [Output RAM_MARP V: Map N; Ly]Tactor Volumatics Efficiency, depende Lambda</map>	Tps Nraw LamWO2	0.00	%	
Calibration Input.X: Pim, [hPa], "input <map>, break point, manifold absolute pressure, for V. Output: RAM_MAP_TVe_Map_N.[-], "Factor Volumatric Efficiency, depende Lambda</map>	Nraw LamWO2	0.00		2
😧 Output: RAM_MAP_fVe_Map_N, [-], "Factor Volumatric Efficiency, depende	LamWO2		Rpm	2
	ant IbAda	0.70		2
Battery voltage from ADC chan	iei obride	13.01	V	2
X/Y 300.00 350.00 400.00 430.00 460.00 500.00 550.00 60C O 2 sensor voltage	uLsb	1.39	V	2
1200.00 0.46 0.47 0.51 0.55 0.57 0.58 0.63 0. @ Fuel factor closed-loop control	fLc	1.00	-	2
1400.00 0.46 0.47 0.51 0.55 0.57 0.58 0.63 0. @ dmFuel	dmFuel	0.00	g/min	2
RPM 0.00 Rpm 1650.00 0.47 0.48 0.51 0.55 0.57 0.58 0.64 0. 0 dmFuel_A	dmFuel_A	0.00	g/min	2
MAP 0.00 LTDc	mFuel	0.00	g	2
2500.00 + 0.001 + 1 / Sciented 1 @ HrsPerLit	HrsPerLit	0.00	Hrs/Lit	2
TPS 0.00 % 3000.00 F 121 F 201 F 200 F 201	HrsPerLit_A	. 0.00	Hrs/Lit	2
3800.00 Infput: N_b, [kpm], infput:N_b>, break points, engine speed	N_b	0	Rpm	1
4400.00 @Output: CUR_IpsUnIp_N, [%],"throttle position for 95 % o	Tm	25.00	DegC	1
IAT 26 DegC 5600.00 N b/(Rpm) 780 1020 1440 1980 2344 Intake air temperature	Ta	26.25	DegC	1
7000.00 CUR TosUnTp N/% 89.84 89.84 89.84 89.84 89.84 89.84 80.05	LamDsr	1.00	-	1
O28 1.39 V 8000.00 The last state is a last state in the last state is a last state in the last state is a las	Pam	992.34	hPa	1
SPARK 0.0 CrA	fAlt	1.00		1
Pre-control fuel factor	fPreCtl	1.00		1
FUELPW1 0.00 ms	mperature fTcmb	0.96	_	1
FUEL PW2 0.00 ms Volumetric Efficiency Table Q Load based on TPS	LdTp	-	%	2
Coad Coad	Ld	-	%	£
LamWO2 0.70	LdPrd	-	%	£
Start measuring 2012 10239313 1012394 199.1394 91.000 90.101 2012 Senter measuring 2012 100.1594 199.1394 91.000 90.101 10124	N	-	Rpm	£
Start measuring! 35.110 110409 110010 109.5111 100.544 107.54 10 Minute of intections	nIni	-		
0 22420 120.1041 115.1054 116.0161 117.1054 11.3.62				
00000 1077021 1077021 105000 140000 11231				
EFI basic setting Servo Motor Desired idle speed Global fuel enrichment Start fuel Start ignition After-start fuel Idle ignition Warm up fuel Stepper m	otor Steady-State	Acceleration	Decelera	tion I >
Connected Start measuring! Working Page: D:SoftWare LID/SEA h1 7 7 INA DIE60 SEA h1771 4TOCODA.1 IM 1585 (VIII148 E3 V1 cal			

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



Note: The "Start measuring" only works when connect to ECU successfully.

2.1.5 Stop Measuring

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

File Edit Settings Run Variables Diagnostics Advanced Help F5 Connect L) Disconnect Ctrl+R -- Projec Fetch from ECU C 1 Burn to ECU 141 Start Measuring F8 Start Recording F9 Stop Measuring F11 Play Back

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 of engine running to analyze for EFI 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.

\2015-7-25-9-31-35-9 -35-986.csv	986\A11Data-	2015-7-25-9-31		52.1927 58.7158 65.2420 78.2898
EFI basic setting Se	ervo Motor	Desired idle speed	Global fuel enrichme	nt St
Connected	Recorded fi	ile save path C:\EcoCAL\s	record/2015-7-25-9-31-35	-986\AI

For example, the record named "2015-7-25-9-31-35-986" is the record file in record.

✓ EcoCAL				
th 🔻 Burn New folder				
Name *	Date modified	Туре	Size	
Jui 2015-7-25-9-31-35-986	2015/7/25 9:31	File folder		
Error_Message	2015/6/30 8:24	Text Document	313 KB	
VariblesAlias	2015/4/29 17:20	XML Document	123 KB	

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 (**I**) 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** \rightarrow **Play Back**" or click the button for play back the data.



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



Open Data Files

Data Analyzer

In **Data Analyzer**, Go to "File \rightarrow 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".

			File E	TRON	<mark>S Data A</mark> n eln	alyzer \	/3.9							
			Ор	en	Plot	S	how Cur:	sor	Show	r.				
1 Open														×
	Computer	Local Disk (D:) • EcoCAL • r	ecord						-	Search record			-
Organize 🔻 N	lew folder												· 📶	(2)
Recent Pla	aces	Name -			Date m	ioainea	Туре	512	e					Ĩ
🚍 Libraries	-	💐 AliData-2	2015-7-7-10-1-48	8-78	2015/2	7/8 8:05	Microsoft Exce	l逗	4,296 KB					
Document	rs													
Music														
Subversio	n													
Videos														
Computer	((-)													
👝 Local Disk	(D:)													
👝 Local Disk	(E:)													
	File nam	e: AllData-2	2015-7-7-10-1-4	8-78						-	esv(*.esv)	_		•
											Open -	1	Cancel	
												<u> </u>		///
File Edit Help	/zer v3.9													
Open Plot	Show Cursor	Hide All Sign	al Show Full Ra	ige				Tim	ie 0 to	503.95	0 503.95 [s]	\Leftrightarrow	÷↓→	
46+03									Va	riables				
3.6E+09 -										Current_T Err Crank	Min Max imer 0.294967 Sensin: 0.6553	E+0 20ms 20ms	Units Di "c	escripti
2.25.09									V V	fLc LamBas	0 2	20ms 20ms	· "1	ambda basic la
3.22+03										LamW/02 Last_Fallir	0 16 ng_Edg 0.294967 ng_Edg 0.294967	20ms E+0 20ms E+0 20ms	12	Actual L LD tim
2.8E+09 -									V	Last_Risir Ld_b	ng_Edgi 0 .294967 0 .294967 0 .191.2	E+0 20ms 5 20ms	"L % "L	LD tim .oad. o
2.4E+09 -										N_b Nraw	0 1530 0 16383	0 20ms 75 20ms	Rpm "e Rpm "E	engine Ingine
iner									VVV	Pim StepPos	0 2559.5	61 20ms 20ms	hPa "ir	ntake r Actual p
Fi 2E+09 -										StepPosD Tps	sr 0 640	20ms 20ms	"[% "8	Desired hrottle
1.6E+09 -								Concernance of the second		Ub_b UbAdc	0 25.5	i 20ms 20ms 20ms	~ 0 V "E V "E	attery
1.2E+09 -					frankan					uLsb uMap	-1 4	20ms	V 1	/oltage /oltage
					<i>↓</i>					uTa uTm	0 5	20ms 20ms 20ms	V 74	ADC-vc
8E+08 -				Î Î Î	- Aller and -	Call & Grand & Control				uTps B_Afr	0 5	20ms 100ms	V "\	/oltage CU cc
4E+08 -					ufpixd					B_CrkErr B_fLamAc B_LamOv	i 0 1 r 0 1	100ms 100ms 100ms	"E "c	: nor cc :onditic ambda
										R Lobdo	n i	100mr	1 1%	
0.000 Active:	50.395	100.790	151.185	201.580	251.975 302	.370 352.76	5 403.160	453.555						

Show/Hide all signals

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

🕼 ECOTRONS Data Analyzer V3.9			
File Edit Help			
Open Plot Show Cursor	Hide All Signal	Show Full Range	
4E+U3 -	- - -		

Show/Hide Cursors

Click "show cursors / hide cursors", toggle the cursors. There are 2 cursors in the scope window. The values of all signals at the 2 cursor locations will be displayed on the right, in the variable list window:



You can move the either cursor by put your mouse on it, press the mouse button and drag it to your desired location. It will show the values of all the signals at the new cursor location.



Line/Step curve type

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.

🕂 EC	OTRONS Data Ana	lyzer V3.9			
File	Edit Help				
	Plot	Ctrl+R			
	Hide Signal List Hide Cursor	Ctrl+H Ctrl+T	Cursor	Hide All Signal	Show Full Rang
	Display Mode	Þ	Line	1	
	Sort Hide All Signal	▶.	✓ Step		
	Show Full Range	Ctrl+Z			
	ECU Version Adjust Resolution				

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

Show Full Range	Time 0 to 71.18	0 71.18[s]	$\longleftrightarrow \xleftarrow{\uparrow}{\downarrow}{\downarrow}{\rightarrow}$
	Variables Min/Max	Value Description	



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.

Vi	Col	Name	Min	Max	Rate	Units	[▲]
V		B_LcAdp	0	1	100ms		'
V		B_MapDrpErr	0	1	100ms		1
V		B_PamAdp	0	1	100ms		1
V		B_Pwf	0	1	100ms		1
V		B_StaEnd	0	1	100ms		1
V		Err_Fuel_Flag	0	255	100ms	-	1
V		fAst	0	16	100ms		1
V		fLcAd	0	2	100ms		1
V		FITrsCr	-1536	1536	100ms	%	1
V		fPreCtl	0	64	100ms		1
V		fWmp	0	2	100ms		1
V		LamDsr	0	16	100ms	-	1
V		N_61	0	15300	100ms	Rpm	1
1.1			700	707	100	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.

	Time 0	to	503.95 0	503.95 [s]	\leftrightarrow	¢ <u></u> ↑→		
	I I I I I I I I I I I I I I I I I I I	Varia	ables					
	Vi	i: Co	l Name	Cursor1	Cursor2	Diff	Min	2
	V		Current_Timer	0	359575696	59575700	0.	1
	V		Err_CrankSensing	0	512.0	512.0	0	1
	V		fLc	1.000	1.000	0	0	
	V		LamBas	1.000	1.000	0	0	
	V		LamW02	1.947	1.947	0	0	
	V		Last_Falling_Edg	0	359575696	59575700	0.	
	V		Last_Rising_Edg	0	359574729	59574700	0.	
	V		Last_Rising_Edg	0	359553725	59553700	0.	
	V		Ld_b	Save Confic	uration	-63.75	0	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	V		N_Ь -	Load Config	uration	2820	0	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	V		Nraw	Single Curer	or Show	2849	0	
	V		OnTime_Servo	Sart Carst	51 511077	09300	0	
	V		Pim	Channel off		-503.3	0	
	V		StepPos	Change ent	ecuve ngure	0	0	
- for a second s			StepPosDsr 📃	Show Basic	variables	7.000	0	
			Tps	5.488	20.22	14.73	0	
			TpsEqu	5.488	20.22	14.73	0	1
			Ub_b	12.50	12.20	-0.3000	0	

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

Chapter 3 Operation for tuning

3.1 Add and Delete Calibration Variables

There are two types of Calibration variables window,

One calibration window is for "VAL_XXX" and "CV_XX" variables, and another calibration window is for "CUR_XXX_XXX" and "MAP_XXX_XXX" variables.

- 3.1.1 Add Calibration variables
- 1) Go to menu->Variables-> Calibration Selection



2) Right click on the blank area of window, click "Calibration Selection"

Unit		
-		
		Measurements Selection
Value 6 1333	Unit V/ms	 Calibrations Selection Show All Selected Variables
10.9338	V	
lue Unit	Rate	

Then, the "Add Advanced Calibrations" window wills pop-up,

🗑 Add Advancd Calibrations			
All calibration datas		Selected calibration data	s
	Next		Next
CUR_Customer_Inf CUR_dIgaIdc_Tm CUR_dIgaIdc_Ub CUR_dIgaOpt_Lam CUR_dNRsm_Ng CUR_dPamPbtp_Maf CUR_dTaHotSta_TaOff CUR_dTexEstm_Tam CUR_dTmCr_dTmTa CUR_DutyPumpPrime_Tm CUR_fAst_TmSta CUR_fAstAlt_fAlt	•	Add>> << Delete	
Descriptions :			

Input the variable on the left side, then you can see the calibration variable, for example, "MAP_LdTp_Tps_N", then click "Add" button, add it to be right side, then Click "OK", you can see the calibration window.



🗑 Alpha-N Table													<u>_ ×</u>
+ 0.001	- *	1 /	Selec	ted = 1									
Input-X: NO	INPUT_QU	JANTITY, [Rpm],"brea	k point, eng	gine speed"	Input-Y: 1	[psEqu, [%]	,"input <tp< td=""><td>sEqu>, brea</td><td>ak points, th</td><td>rottle positi</td><td>ion "</td><td></td></tp<>	sEqu>, brea	ak points, th	rottle positi	ion "	
😯 Output: N	MAP_LdTp_	_Tps_N, [%],"character	ristic map, n	ormalized lo	ad based o	n TPS and e	engine spee	d (Alpha/N	model)"			
	1000.00	1500.00	1700.00	2000.00	2800.00	3600.00	4400.00	5000.00	6000.00	7000.00	8000.00	0000.00	
0.0000	40.95	30.68	30 10	38.41	37.80	33 50	31.66	31.43	31.43	31.43	31.43	31.43	
3 0130	41.65	40.03	38.79	37.92	36.68	35.77	34.55	33.49	32.55	31.69	30.91	30.30	
6 5262	41.65	40.45	39.75	38.88	37.01	36.56	35.77	35.11	34.59	33.56	33 30	32.55	
9.1324	42.66	41.81	40.95	40.03	38.04	37.59	35.88	34.83	34.15	33.16	31.59	30.75	
13.0478	43.41	42.26	41.70	40.22	38.60	36.77	36.73	35.79	35.20	35.65	34.83	34.41	
16.9632	47.70	46.64	46.15	45.07	39.91	38.98	37.85	36.89	36.12	34.92	33.75	32.86	
20.8786	53.13	51.56	50.25	49.17	48.52	46.90	45.59	44.37	43.95	42.75	40.76	39.66	
24.7925	55.95	53.81	53.55	52.99	58.45	54.82	51.91	49.92	47.98	46.85	46.15	43.10	
30.6168	61.52	60.87	60.89	59.91	59.86	59.58	59.16	57.75	55.83	54.61	52.29	49.85	1
38.1454	80.18	79.08	77.51	76.69	75.75	75.07	74.44	74.09	73.05	72.49	72.19	70.10	1
45.6711	93.07	91.64	90.00	88.80	87.26	85.99	84.98	84.26	83.63	82.99	82.15	81.87	
52.1927	102.94	101.27	199.73	97.50	95 .77	94.52	94.45	94.27	94.05	93.38	91.03	89.72	
58.7158	111.05	110.02	109.85	108.91	107.34	105.87	104.86	104.11	103.48	102.89	101.67	99 .77	
65.2420	120.16	119.11	118.08	117.07	115.83	114.09	113.55	112.59	111.49	110.18	109.38	107.44	
78.2898	126.19	124.92	123.87	122.58	121.13	119.93	118.10	117.09	116.06	114.28	111.30	109.76	
99.9939	147.70	146.60	145.50	144.00	142.31	140.20	139.92	155.04	153.94	152.11	144.98	139.88	
Alpha-N Ta	ble												

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.

🗑 Alpha-N 1	Table												
+ 0.001	- *	1,	/ Sele	cted = 1									
Input-X: NO	_INPUT_Q	UANTITY,	[Rpm],"bre	ak point, er	ngine speed	i" Input-Y	: TpsEqu, [%],"input<	TpsEqu>, t	oreak points	s, throttle p	osition "	
Output: N	MAP_LdTp	_Tps_N, [%	6],"charact	eristic map,	normalized	load based	l on TPS an	d engine sp	peed (Alpha	a/N mođel)'			
X/Y	1000.00	1500.00	1700.00	2000.00	2800.00	3600.00	4400.00	5000.00	6000.00	/000.00	8000.00	9000.00	
0.0000	40.95	39.68	39.19	38.41	37.80	33.59	31.66	31.43	31.43	31.43	31.43	31.43	
3.9139	41.65	40.03	38.79	37.92	36.68	35.77	34.55	33.49	32.55	31.69	30.91	30.30	
6.5262	41.65	40.45	39.75	38.88	37.01	36.56	35.77	35.11	34.59	33.56	33.30	32.55	
9.1324	42.66	41.81	40.95	40.03	38.04	37.59	35.88	34.83	34.15	33.16	31.59	30.75	
13.0478	43.41	42.26	41.70	40.22	38.60	36.77	36.73	35.79	35.20	35.65	34.83	34.41	
16.9632	47.70	46.64	46.15	45.07	Add		\$7.85	36.89	36.12	34.92	33.75	32.86	
20.8786	53.13	51.56	50.25	49.17	Delete		15.59	44.37	43.95	42.75	40.76	39.66	
24.7925	55.95	53.81	53.55	52.99	Import		51.91	49.92	47.98	46.85	46.15	43.10	
30.6168	61.52	60.87	60.89	59.91	Export		59.16	57.75	55.83	54.61	52.29	49.85	
38.1454	80.18	79.08	77.51	76.69	Copy		4.44	74.09	73.05	72.49	72.19	70.10	
45.6711	93.07	91.64	90.00	88.80	Change	Aliac	\$4.98	84.26	83.63	82.99	82.15	81.87	
52.1927	102.94	101.27	199.73	97.50	Decimal	ls Display	94.45	94.27	94.05	93.38	91.03	89.72	
58.7158	111.05	110.02	109.85	108.91	2D Viev	, ,	04.86	104.11	103.48	102.89	101.67	99 .77	
65.2420	120.16	119.11	118.08	117.07	3D Viev	v	13.55	112.59	111.49	110.18	109.38	107.44	
78.2898	126.19	124.92	123.87	122.58	Variable	Properties	18.10	117.09	116.06	114.28	111.30	109.76	•
Alpha-N Ta	ble				Windov	Properties							

Right click on the calibration window, and then click "Add",

Add Advancd Calibrations			
All calibration datas		Selected calibration datas	
	Next		Next
CUR_Customer_Inf CUR_dIgaIdc_Tm CUR_dIgaIdc_Ub CUR_dIgaOpt_Lam CUR_dNRsm_Ng CUR_dPamPbtp_Maf CUR_dTaHotSta_TaOff CUR_dTexEstm_Tam CUR_dTmCr_dTmTa CUR_DutyPumpPrime_Tm CUR_fAst_TmSta CUR_fAstAlt_fAlt	Add >> Delete<br OK	MAP_LdTp_Tps_N	
Descriptions :			

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

If you want to add the "VAL_XXX" and "CV_XX" variables, please right click on the corresponding window to add the calibration variables.

+ 0.001 _ * 1 / 9	Selected = 1			
Data: VAL_LamWot,[-],"driver desired lam	bda at Wide Oper	n Throttle"		
Alias	Name	Value	Unit	
🕜 Desired lambda at WOT	VAL_LamWot	0.85	-	
Wide Open throttle position threshold	VAL_Tr Add Delet Chan Decin Varia Wind	e ge Alias nals Display ble Properties ow Properties	%	

3.1.2 Delete Calibration variables

1) Right click on the current window; click "Add", pop-up the "Add Advanced Calibrations" window, to delete the calibration variables that you have added it once.

									•		
🗿 Idle igniton control cor	rection									_	미凶
+ 0.001 _ *	1 /	S	elected =	1							
Input: Tm, [DegC],"break points, engine temperature, for idle ignition angle"											
Output: CUR_dIgaIdc_Tm, [CrA], "Characteristic Curve, delta ignition angle of engine temperature effect"											
Tm/[DegC]	-30.00	-25.00	-15.00	-10.00	0.00	10.00	20.00	45.00	70.00	90.00	1
CUR_dIgaIdc_Tm/[CrA]	0.00	0.00	0.00	0.00	0.	Add		00	0.00	0.00	
						Delete					
						Import					
						Export					
J						Сору					_
Ignition angle correction b	ased on H	Engine te	emperatu	ire Igni	ition	Paste		ı ba	ttery vol	tage	
						Change A	lias				
						Decimals [Display				
						2D View					
						3D View					
						Variable P	roperties				
						Window P	roperties				

Click the calibration variable which one do you want to delete, then click"Delete" button, then click "OK"

정 Add Advancd Calibrations			_ 🗆 🗙
All calibration datas		Selected calibration datas	
	Next		Next
CUR_Customer_Inf CUR_dIgaIde_Tm CUR_dIgaIde_Ub CUR_dIgaOpt_Lam CUR_dNRsm_Ng CUR_dPamPbtp_Maf CUR_dTaHotSta_TaOff CUR_dTexEstm_Tam CUR_dTmCr_dTmTa CUR_DutyPumpPrime_Tm CUR_fAst_TmSta CUR_fAstAlt_fAlt	Add >> << Delete V OK Characteristic Curve, dent	CUR_dIgaIdc_Ub	age effect"

2) Choose the calibration variable that you want to delete, right click, then click "Delete", it will delete the variable directly.

3	🗑 Convert PWM signal of servo control to TP5 signal											
+	0.001 _ * 1 /	Selected = 1										
Data: VAL_ServoPWM2VoltOffset,[V],"Servo PWM ON time to 0-5v voltage conversion Offset "												
	Alias	Name	Value	Unit								
0	Slope Parameter	VAL_ServoPWM2VoltSlope	-6.1333	V/ms								
0	Offset Parameter	VAL_ServoPWM2VoltOffs	Add	V								
0	Source of servo control PWM signal	VAL_ServoPWMSource	Delete	-								
			Change Alias									
ľ			Decimals Display									
			Variable Properties									
		_	Window Properties									

3.2 Add and Delete Measured Variables

3.2.1 Add Measured variables

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



2) Right click on the blank area of window, click "Measurements Selection"

	DegC	100ms		
	DegC	100ms		
	hPa	100ms		
-Servo	PWM " Unit -			Measurements Selection New Oscilloscope window Calibrations Selection Show All Selected Variables
v vor	tage conversion Ons	et		
	Value	Unit		
ope	-6.1333	V/ms		

Then, the "Add Measurements" window wills pop-up,

🐼 Add Measurements						×
	Search		News		D-t-	Search
Accum_fLc_S32 Accumulator_SSTM2 AccumulatorEnable FIRSM		Add To Syn>>	Name		Kate	
Acl ALM_Lambda_FromCAN ALM_IsuDTC_FromCAN		Add To 20ms >>				
ALM_IsuHtDtcy_FromCAN ALM_IsuO2_FromCAN ALM_IsuTemp_FromCAN		Add To 100ms >>				
B_2ndFuelSw B_Acl B_AclEnr						
B_Afr B_AfrIni B_AfrStaEnd	•	<< Delete				
A11 :918		Syn :0	20ms :0	100ms :0	ОК	Cancel

Input the variable on the left side, then you can see the measured variable, for example, "UbAdc", 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.

Add Measurements						×
UbAde	Search					Search
UbAdc	_	Add To Syn >>	Name		Rate	
UhAdc_h			UbAdc		100ms	
UbAdcIni			Tps		20ms	
UD P PWPumpPrimaEn		Add To 20ms >>	TpsPrd		100ms	
UD B WmpEnd			TpsRaw		20ms	
UD Cnt 1s			TPS		100ms	
UD_CSIMM_Ld		Add To 100ms >>	uBaro		100ms	
UD_CSIMM_Ld1			B Idl		100ms	
UD_CSIMM_Ld2						
UD_CSIMM_Map2						
UD CSIMM Pmap						
UD CSLDP LdPrd		<< Delete				
UD_CSN_N	-					
All :918		Syn :0	20ms :2	100ms :5	ОК	Cancel

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 "Variable Selection",

Alias		Name		Value	Unit	Rate	
Throttle Position Ser	nsor	Tps			%	20ms	
Battery voltage from	ADC channel	UbAdc	Variable Select	ion	V	20ms	
3 TPS sensor voltage		uTps	Change Alias		V	20ms	
PWM pulse of serve	motor control	OnTime_	Variable prope	rties	ms	20ms	
2 Engine temperature		Tm	Window Proper	rties	DegC	100ms	
🕖 Intake air temperatur	e	Ta			DegC	100ms	
2 Ambient pressure		Pam			hPa	100ms	

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.

		Search
Add To Syn >>	Name	Rate
	Tps	20ms
	UbAdc	20ms
Add To 20ms >>	uTps	20ms
	OnTime_ServoPWM_In	20ms
	Tm	100ms
Add To 100ms >>	Та	100ms
	Pam	100ms
<< Delete		
	Add To Syn>> Add To 20ms>> Add To 100ms>>	Add To Syn >> Name Tps UbAdc uTps OnTime_ServoPWM_In Tm Ta Pam

3.2.2 Delete Measured variables

1) Right click on the Selected Variables, choose "Variable Selection", and then delete the variables those you want.

	Alias	Name		Value	Unit	Rate	
?	Throttle Position Sensor	Tps			%	20ms	
0	Battery voltage from ADC channel	UbAdc	Variable Select	ion	V	20ms	
0	TPS sensor voltage	uTps	Change Alias	as	V	20ms	
0	PWM pulse of servo motor control	OnTime_1	Variable properties	rties	ms	20ms	
8	Engine temperature	Tm	Window Proper	rties	DegC	100ms	
8	Intake air temperature	Ta			DegC	100ms	
0	Ambient pressure	Pam			hPa	100ms	
	Search			Search			
---	--------	--	---	--			
Accum_fLc_S32 Accumulator_SSTM2 AccumulatorEnable_FIRSM Acl ALM_Lambda_FromCAN ALM_IsuDTC_FromCAN ALM_IsuHtDtcy_FromCAN ALM_IsuTemp_FromCAN B_2ndFuelSw	1	Add To Syn >> Add To 20ms >> Add To 100ms >>	Name Tps UbAdc uTps OnTime_ServoPWM_In Tm Ta Pam	Rate 20ms 20ms 20ms 20ms 100ms 100ms 100ms			
B_Acl B_AclEnr B_Afr B_AfrIni B_AfrStaEnd		<->Delete	20ms :4 100ms :3	OK Cancel			

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



Or right click on the blank of window, 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.

		Search
Name	Rate	
fVe	Syn	Syn :20
Pim	Syn	
mFuel_L	Syn	20ms -21
Map	Syn	20113.21
nInj	Syn	
LdTp	Syn	100ms :21
tInj0	Syn	
F1	Syn	
Nraw	Syn	
IgaPre	Syn	Delete >>
UbAdc	Syn	
Nb	Sum	~

3.3 Change Calibrations (Tuning)

Calibration variables are 3 types: Values, Curves and Maps. The labels start with the prefix so you can tell immediately. VAL_ means it's a calibration value. CUR_ means it is a curve with one input. MAP_ means it is a map with 2 inputs.

3.3.1 Change the value directly

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

2	Engine parameter				
+	0.001 _ *	1 / Selec	ted = 1		
Dat	ta: VAL_vEng,[cc],"volum	e of engine displa	cement in cc or mL "		
	Alias	Name	Value	Unit	
0	# of cylinders	VAL_CylNum	1	-	
0	Cylinder displacement	VAL_vEng	60.01	cc	
0	MAX RPM	VAL_Nmax	8600.00	Rpm	

🗑 Start fuel													- I X
+ 0.001 _ *	1 /	Sele	cted = 1										
input: TmSta, [DegC], "break points, engine temperature at start "													
Output: CUR_fCldSta	_TmSta, [-]	,"start fuel	factor for	cold start,	depender	nt on engine	start temp	. "					
TmSta/[DegC]	-30.00	-20.00	-10.00	0.00	10.00	20.00	25.00	30.00	35.00	40.00	55.00	70.00	
CUR_fCldSta_TmSta	10.00	9.00	7.50	6.00	4.25	3.00	2.00	1.50	1.50	1.25	1.00	1.00	
						\smile							
Start fuel factor													
Start fuel factor							, 						

put-X: Pim,	[hPa],"inj	put <map< th=""><th>>, break</th><th>point, ma</th><th>mifold ab</th><th>solute pr</th><th>essure, f</th><th>or Volum</th><th>atric Effic</th><th>ciency fa</th><th>ctor" In</th><th>put-Y: N</th><th>, [Rpm],":</th><th>input<n></n></th><th>•, break p</th><th>oint, eng</th></map<>	>, break	point, ma	mifold ab	solute pr	essure, f	or Volum	atric Effic	ciency fa	ctor" In	put-Y: N	, [Rpm],":	input <n></n>	•, break p	oint, eng
Output: R.	AM_MA	P_fVe_M	[ap_N, [-],"Factor	Volumati	ric Efficie	ncy, dep	endent o	n pressu	re and en	gine spe	ed"				
X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00
1200.00	0.46	0.47	0.51	0.55	0.57	0.58	0.63	0.63	0.66	0.68	0.68	0.68	0.65	0.63	0.62	0.61
1400.00	0.46	0.47	0.51	0.55	0.57	0.58	0.63	0.65	0.67	0.69	0.69	0.68	0.66	0.64	0.62	0.61
1650.00	0.47	0.48	0.51	0.55	0.57	0.58	0.64	0.65	0.69	0.70	0.70	0.68	0.67	0.66	0.64	0.62
2000.00	0.48	0.49	0.51	0.55	0.38	0.59	0.65	0.66	0.69	0.72	0.72	0.69	0.68	0.67	0.65	0.63
2500.00	0.49	0.50	0.52	0.56	0.59	0.62	0.66	0.68	0.72	0.75	0.74	0.72	0.70	0.69	0.66	0.65
3000.00	0.50	0.51	0.53	0.56	0.69	0.63	0.67	0.70	0.75	0.78	0.77	0.75	0.73	0.72	0.71	0.69
3800.00	0.51	0.52	0.55	0.58	0.61	0.67	0.70	0.74	0.78	0.81	0.80	0.77	0.76	0.75	0.72	0.71
4400.00	0.52	0.53	0.57	0.60	0.67	0.73	0.74	0.76	0.82	0.85	0.83	0.82	0.81	0.80	0.76	0.75
5600.00	0.54	0.55	0.59	0.64	0.72	0.76	0.79	0.81	0.86	0.89	0.87	0.84	0.84	0.82	0.80	0.78
7000.00	0.55	0.56	0.61	0.66	0.73	0.78	0.82	0.85	0.89	0.91	0.89	0.87	0.87	0.86	0.84	0.83
8000.00	0.55	0.58	0.62	0.68	0.74	0.78	0.82	0.86	0.89	0.91	0.89	0.87	0.87	0.86	0.86	0.83
10000.00	0.56	0.58	0.63	0.68	0.74	0.78	0.82	0.86	0.89	0.91	0.89	0.87	0.87	0.86	0.86	0.83

2) Input the value that you want

2	Engine parameter				<u>_ 🗆 ×</u>
+	0.001 _ * 1	/ Select	ted = 1		
Dat	ta: VAL_vEng,[cc],"volum	e of engine displa	cement in cc or mL "		
	Alias	Name	Value	Unit	
0	# of cylinders	VAL_CylNum	1	-	
0	Cylinder displacement	VAL_vEng 🤇	128	cc	
0	MAX RPM	VAL_Nmax	8600.00	Rpm	

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

3	Engine parameter				
+	0.001 _ *	/ Select	ed = 1		
Dat	ta: VAL_vEng,[cc],"volum	e of engine displac	cement in cc or mL "		
	Alias	Name	Value	Unit	
0	# of cylinders	VAL_CylNum	1	-	
0	Cylinder displacement	VAL_vEng 🤇	128.00	сс	
0	MAX RPM	VAL_Nmax	8600.00	Rpm	

Note: This method applies to break points, too.

3.3.2 Change the value with Formula

EcoCAL supports to use Formula to modify the calibration data.



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 Puls or Minus button to change the value.

For example:

Input 0.1 in the box

🧃 V	/olumetr	ic Efficie	ncy Table	e				
+	0.1	-	* 1	1	Selecte	d = 1		
Inpu	ıt-X: Maj	p, [hPa],"	input <ma< td=""><td>ap>, brea</td><td>k point, n</td><td>nanifold a</td><td>ibsolute p</td><td>ore</td></ma<>	ap>, brea	k point, n	nanifold a	ibsolute p	ore
0	Dutput: R	AM_MA	AP_fVe_N	Map_N, [-],"Factor	Volumat	ric Efficie	nc
	X/Y	300.00	350.00	400.00	430.00	460.00	500.00	5
1	200.00	0.54	0.59	0.62	0.65	0.67	0.68	

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

🗑 Volumetr	ic Efficier	ncy Table	2														
+ 0.1	-	* 1	1	Selecte	d = 1												
Input-X: Map	o, [hPa],"i	input <ma< td=""><td>ap>, brea</td><td>k point, n</td><td>nanifold a</td><td>bsolute p</td><td>oressure,</td><td>for Volun</td><td>natric Effi</td><td>ciency fa</td><td>ctor" In</td><td>put-Y: N</td><td>, [Rpm],"i</td><td>nput<n></n></td><td>, break p</td><td>oint, engir</td><td>ne sp</td></ma<>	ap>, brea	k point, n	nanifold a	bsolute p	oressure,	for Volun	natric Effi	ciency fa	ctor" In	put-Y: N	, [Rpm],"i	nput <n></n>	, break p	oint, engir	ne sp
Output: R	AM_MA	P_fVe_N	Map_N, [],"Factor	Volumat	ric Efficie	ncy, dep	endent o	n pressur	e and eng	gine spee	d"					
																	_
X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00	
1200.00	0.54	0.59	0.62	0.65	0.67	0.68	0.71	0.72	0.72	0.71	0.70	0.70	0.68	0.67	0.67	0.66	
1400.00	0.58	0.63	0.69	0.72	0.74	0.75	0.78	0.79	0.79	0.78	0.76	0.76	0.74	0.73	0.71	0.70	
1650.00	0.61	0.65	0.71	0.74	0.76	0.77	0.80	0.80	0.81	0.80	0.78	0.77	0.77	0.76	0.75	0.74	
2000.00	0.64	0.67	0.73	0.76	0.78	0.79	0.82	0.83	0.85	0.85	0.84	0.82	0.82	0.80	0.80	0.79	
2500.00	0.67	0.71	0.75	0.78	0.80	0.82	0.86	0.88	0.90	0.89	0.87	0.86	0.85	0.85	0.83	0.81	
3000.00	0.70	0.73	0.77	0.80	0.83	0.86	0.88	0.91	0.92	0.91	0.89	0.89	0.87	0.86	0.86	0.84	
3500.00	0.73	0.74	0.80	0.82	0.85	0.89	0.92	0.93	0.94	0.93	0.91	0.89	0.88	0.88	0.86	0.85	
4000.00	0.74	0.76	0.83	0.85	0.89	0.92	0.94	0.95	0.96	0.96	0.94	0.92	0.90	0.89	0.87	0.86	
5000.00	0.77	0.78	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
6000.00	0.79	0.80	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
7000.00	0.79	0.82	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
8000.00	0.79	0.82	0.85	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
J																	_
Volumetric l	Efficiency	Table															

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

🗑 Volumetr	ic Efficie	ncy Table	2													<u>_ ×</u>
(+) 0.1	-	* 1	1	Selecte	d = 1											
Input-X: Mag	p, [hPa],"	input <ma< th=""><th>ap>, brea</th><th>k point, n</th><th>nanifold a</th><th>bsolute p</th><th>oressure,</th><th>for Volun</th><th>natric Effi</th><th>ciency fa</th><th>ctor" In</th><th>put-Y: N</th><th>, [Rpm],"i</th><th>input<n></n></th><th>, break p</th><th>oint, engine sp</th></ma<>	ap>, brea	k point, n	nanifold a	bsolute p	oressure,	for Volun	natric Effi	ciency fa	ctor" In	put-Y: N	, [Rpm],"i	input <n></n>	, break p	oint, engine sp
😯 Output: R	AM_MA	P_fVe_N	Иар_N, [·],"Factor	r Volumat	ric Efficie	ncy, dep	endent o	n pressu	e and eng	gine spee	d"				
N/W	200.00	250.00	400.00	420.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	000.00	070.00	1050.00
X/1 4200.00	300.00	330.00	400.00	430.00	400.00	500.00	550.00	000.00	000.00	/00.00	/30.00	800.00	830.00	900.00	970.00	1050.00
1200.00	0.54	0.59	0.62	0.65	0.67	0.68	0./1	0.72	0.72	0.71	0.70	0.70	0.68	0.67	0.67	0.66
1400.00	0.58	0.63	0.69	0.72	0.74	0.75	0.78	0.79	0.79	0.78	0.76	0.76	0.74	0.73	0.71	0.70
1650.00	0.61	0.75	0.71	0.74	0.76	0.77	0.80	0.80	0.81	0.80	0.78	0.77	0.77	0.76	0.75	0.74
2000.00	0.64	0.67	0.73	0.76	0.78	0.79	0.82	0.83	0.85	0.85	0.84	0.82	0.82	0.80	0.80	0.79
2500.00	0.67	0.71	0.75	0.78	0.80	0.82	0.86	0.88	0.90	0.89	0.87	0.86	0.85	0.85	0.83	0.81
3000.00	0.70	0.73	0.77	0.80	0.83	0.86	0.88	0.91	0.92	0.91	0.89	0.89	0.87	0.86	0.86	0.84
3500.00	0.73	0.74	0.80	0.82	0.85	0.89	0.92	0.93	0.94	0.93	0.91	0.89	0.88	0.88	0.86	0.85
4000.00	0.74	0.76	0.83	0.85	0.89	0.92	0.94	0.95	0.96	0.96	0.94	0.92	0.90	0.89	0.87	0.86
5000.00	0.77	0.78	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86
6000.00	0.79	0.80	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86
7000.00	0.79	0.82	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86
8000.00	0.79	0.82	0.85	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86
		F														
Volumetric	Efficiency	able														

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

👿 Volumetr	ic Efficie	ncy Table	2														'
+ 0.1	-)	* 1	1	Selecte	d = 1												
Input-X: Ma	p, [hPa],"	input <ma< td=""><td>ap>, brea</td><td>k point, n</td><td>nanifold a</td><td>bsolute p</td><td>oressure,</td><td>for Volur</td><td>natric Effi</td><td>ciency fa</td><td>ctor" Ir</td><td>iput-Y: N</td><td>, [Rpm],"</td><td>input<n></n></td><td>, break p</td><td>oint, engir</td><td>ie spe</td></ma<>	ap>, brea	k point, n	nanifold a	bsolute p	oressure,	for Volur	natric Effi	ciency fa	ctor" Ir	iput-Y: N	, [Rpm],"	input <n></n>	, break p	oint, engir	ie spe
😯 Output: R	AM_MA	AP_fVe_N	Map_N, [·	-],"Factor	Volumat	ric Efficie	ncy, dep	endent o	n pressur	e and eng	gine spee	d"					
X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00	
1200.00	0.54	0.59	0.62	0.65	0.67	0.68	0.71	0.72	0.72	0.71	0.70	0.70	0.68	0.67	0.67	0.66	
1400.00	0.58	0.63	0.69	0.72	0.74	0.75	0.78	0.79	0.79	0.78	0.76	0.76	0.74	0.73	0.71	0.70	
1650.00	0.61	0.55	0.71	0.74	0.76	0.77	0.80	0.80	0.81	0.80	0.78	0.77	0.77	0.76	0.75	0.74	
2000.00	0.64	0.67	0.73	0.76	0.78	0.79	0.82	0.83	0.85	0.85	0.84	0.82	0.82	0.80	0.80	0.79	
2500.00	0.67	0.71	0.75	0.78	0.80	0.82	0.86	0.88	0.90	0.89	0.87	0.86	0.85	0.85	0.83	0.81	
3000.00	0.70	0.73	0.77	0.80	0.83	0.86	0.88	0.91	0.92	0.91	0.89	0.89	0.87	0.86	0.86	0.84	
3500.00	0.73	0.74	0.80	0.82	0.85	0.89	0.92	0.93	0.94	0.93	0.91	0.89	0.88	0.88	0.86	0.85	
4000.00	0.74	0.76	0.83	0.85	0.89	0.92	0.94	0.95	0.96	0.96	0.94	0.92	0.90	0.89	0.87	0.86	
5000.00	0.77	0.78	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
6000.00	0.79	0.80	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
7000.00	0.79	0.82	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
8000.00	0.79	0.82	0.85	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
Volumetric	Efficiency	Table															

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

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

• 0.1 - ★ 1 / Selected = 1 put-X: Map, [hPa], "input <map>, break point, manifold absolute pressure, for Volumatric Efficiency factor" Input-Y: N, [Rpm], "input<n>, break point, engine spe Output: RAM_MAP_tVe_Map_N, [-], "Factor Volumatric Efficiency, dependent on pressure and engine speed" X/Y 300.00 350.00 400.00 460.00 500.00 600.00 650.00 700.00 750.00 800.00 850.00 900.00 970.00 1050.00 1200.00 0.54 0.59 0.62 0.65 0.67 0.68 0.71 0.72 0.71 0.70 0.70 0.68 0.67 0.66 1400.00 0.58 0.63 0.69 0.72 0.74 0.75 0.78 0.79 0.78 0.76 0.76 0.74 0.75 0.74 1650.00 0.61 0.55 0.71 0.74 0.76 0.77 0.80 0.81 0.80 0.82 0.82 0.81 0.89 0.87 0.85 0.85 0.81 0.80 0.</n></map>	🗑 Volumetr	ic Efficie	ncy Table	2														IX
Put-X: Map, [PPa],"input <map>, break point, manifold absolute pressure, for Volumatric Efficiency factor" Input-Y: N, [Rpm],"input<n>, break point, engine spe Output: RAM_MAP_fVe_Map_N, [-],"Factor Volumatric Efficiency, dependent on pressure and engine speed" X/Y 300.00 350.00 400.00 460.00 500.00 600.00 650.00 700.00 750.00 800.00 850.00 900.00 970.00 1050.00 1200.00 0.54 0.59 0.62 0.65 0.67 0.68 0.71 0.72 0.71 0.70 0.76 0.74 0.73 0.71 0.70 1200.00 0.54 0.59 0.62 0.65 0.67 0.68 0.71 0.72 0.71 0.70 0.76 0.74 0.73 0.71 0.70 1200.00 0.54 0.67 0.72 0.74 0.75 0.78 0.79 0.80 0.81 0.80 0.78 0.77 0.70 0.76 0.74 0.75 0.74 1200.00 0.64 0.67 0.73 0.76 0.77 0.80 0.82 0.85 0.85 0.85 0.85 0.85</n></map>	+ 0.1	-	* 1	1	Selecte	d = 1												
Output: RAM_MAP_fVe_Map_N, [-], "Factor Volumatric Efficiency, dependent on pressure and engine speed" X/Y 300.00 350.00 400.00 430.00 460.00 500.00 600.00 650.00 700.00 750.00 800.00 850.00 900.00 970.00 1050.00 1200.00 0.54 0.59 0.62 0.65 0.67 0.68 0.71 0.72 0.71 0.70 0.70 0.68 0.67 0.66 1400.00 0.58 0.63 0.69 0.72 0.74 0.75 0.78 0.79 0.78 0.76 0.76 0.74 0.75 0.74 1650.00 0.61 0.55 0.71 0.76 0.77 0.80 0.80 0.81 0.80 0.78 0.77 0.76 0.76 0.77 0.76 0.77 0.70 0.76 0.77 0.70 0.76 0.74 0.75 0.74 0.60 0.71 0.75 0.78 0.79 0.82 0.83 0.85 0.85 0.85	Input-X: Map	o, [hPa],"	input <ma< td=""><td>ap>, brea</td><td>k point, n</td><td>nanifold a</td><td>bsolute p</td><td>oressure,</td><td>for Volun</td><td>natric Effi</td><td>ciency fa</td><td>ctor" Ir</td><td>put-Y: N</td><td>, [Rpm],"i</td><td>input<n></n></td><td>, break p</td><td>oint, engin</td><td>le spe</td></ma<>	ap>, brea	k point, n	nanifold a	bsolute p	oressure,	for Volun	natric Effi	ciency fa	ctor" Ir	put-Y: N	, [Rpm],"i	input <n></n>	, break p	oint, engin	le spe
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Output: R	AM_MA	P_fVe_N	/lap_N, [·	-],"Factor	Volumat	ric Efficie	ncy, dep	endent of	n pressu	e and eng	gine spee	d''					
X/Y 300.00 350.00 400.00 430.00 460.00 500.00 650.00 600.00 650.00 700.00 750.00 800.00 \$50.00 900.00 970.00 1050.00 1200.00 0.54 0.59 0.62 0.65 0.67 0.68 0.71 0.72 0.71 0.70 0.68 0.67 0.66 1400.00 0.58 0.63 0.69 0.72 0.74 0.75 0.78 0.79 0.78 0.76 0.76 0.74 0.75 0.74 1650.00 0.61 0.55 0.71 0.76 0.77 0.80 0.80 0.81 0.80 0.78 0.77 0.76 0.75 0.74 2000.00 0.64 0.67 0.73 0.76 0.78 0.80 0.82 0.85 0.81 0.80 0.82 0.82 0.81 0.80 0.81 0.80 0.81 0.80 0.81 0.80 0.81 0.80 0.81 0.81 0.80																		
1200.00 0.54 0.59 0.62 0.65 0.67 0.68 0.71 0.72 0.71 0.70 0.70 0.68 0.67 0.66 1400.00 0.58 0.63 0.69 0.72 0.74 0.75 0.78 0.79 0.78 0.76 0.76 0.74 0.73 0.71 0.70 0.68 0.67 0.67 0.66 1400.00 0.58 0.63 0.69 0.72 0.74 0.75 0.78 0.79 0.78 0.76 0.76 0.77 0.70 0.76 0.77 0.70 0.76 0.77 0.77 0.70 0.76 0.75 0.74 0.64 0.67 0.73 0.76 0.78 0.79 0.82 0.83 0.85 0.84 0.82 0.82 0.83 0.85 0.84 0.82 0.82 0.80 0.87 0.86 0.85 0.83 0.81 0.89 0.87 0.86 0.85 0.83 0.81 0.89 0.87 0.86 0.85 0.83 0.81 0.89 0.87 0.86 0.85	X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00	
1400.00 0.58 0.63 0.69 0.72 0.74 0.75 0.78 0.79 0.78 0.76 0.76 0.74 0.73 0.71 0.70 1650.00 0.61 0.55 0.71 0.74 0.76 0.77 0.80 0.80 0.81 0.80 0.78 0.77 0.77 0.76 0.75 0.74 2000.00 0.64 0.67 0.73 0.76 0.78 0.79 0.82 0.83 0.85 0.84 0.82 0.82 0.83 0.85 0.84 0.82 0.82 0.83 0.85 0.84 0.82 0.82 0.83 0.85 0.84 0.82 0.85 0.84 0.82 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.81 0.81 0.80 0.82 0.85 0.85 0.85 0.85 0.85 0.85 0.83 0.81 0.84 0.82 0.85 0.85 0.85 0.85 0.81 0.81 0.81 0.81 0.81 0.85 0.85 0.83 0.81 0.81 <td>1200.00</td> <td>0.54</td> <td>0.59</td> <td>0.62</td> <td>0.65</td> <td>0.67</td> <td>0.68</td> <td>0.71</td> <td>0.72</td> <td>0.72</td> <td>0.71</td> <td>0.70</td> <td>0.70</td> <td>0.68</td> <td>0.67</td> <td>0.67</td> <td>0.66</td> <td></td>	1200.00	0.54	0.59	0.62	0.65	0.67	0.68	0.71	0.72	0.72	0.71	0.70	0.70	0.68	0.67	0.67	0.66	
1650.00 0.61 0.55 0.71 0.74 0.76 0.77 0.80 0.80 0.81 0.80 0.78 0.77 0.77 0.76 0.75 0.74 2000.00 0.64 0.67 0.73 0.76 0.78 0.79 0.82 0.83 0.85 0.85 0.84 0.82 0.82 0.80 0.79 2500.00 0.67 0.71 0.75 0.78 0.79 0.82 0.83 0.85 0.85 0.84 0.82 0.82 0.80 0.79 2500.00 0.67 0.71 0.75 0.78 0.80 0.82 0.86 0.88 0.90 0.89 0.87 0.86 0.85 0.81 0.80 0.81 0.90 0.89 0.87 0.86 0.85 0.81 0.81 0.80 0.81 0.91 0.92 0.91 0.89 0.87 0.86 0.85 0.81 0.81 0.81 0.80 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 0.81 </td <td>1400.00</td> <td>0.58</td> <td>0.63</td> <td>0.69</td> <td>0.72</td> <td>0.74</td> <td>0.75</td> <td>0.78</td> <td>0.79</td> <td>0.79</td> <td>0.78</td> <td>0.76</td> <td>0.76</td> <td>0.74</td> <td>0.73</td> <td>0.71</td> <td>0.70</td> <td></td>	1400.00	0.58	0.63	0.69	0.72	0.74	0.75	0.78	0.79	0.79	0.78	0.76	0.76	0.74	0.73	0.71	0.70	
2000.00 0.64 0.67 0.73 0.76 0.78 0.79 0.82 0.83 0.85 0.84 0.82 0.82 0.80 0.79 2500.00 0.67 0.71 0.73 0.78 0.80 0.82 0.83 0.85 0.84 0.82 0.82 0.80 0.79 2500.00 0.67 0.71 0.73 0.78 0.80 0.82 0.86 0.88 0.90 0.89 0.87 0.86 0.85 0.85 0.83 0.81 0.91 0.92 0.91 0.89 0.87 0.86 0.85 0.84 0.89 0.87 0.86 0.85 0.81 0.89 0.87 0.86 0.85 0.81 3000.00 0.73 0.74 0.80 0.82 0.85 0.89 0.92 0.93 0.91 0.89 0.88 0.86 0.85 4000.00 0.74 0.76 0.83 0.85 0.92 0.94 0.92 0.90 0.89	1650.00	0.61	0.55	0.71	0.74	0.76	0.77	0.80	0.80	0.81	0.80	0.78	0.77	0.77	0.76	0.75	0.74	
2500.00 0.67 0.71 0.75 0.78 0.80 0.82 0.86 0.88 0.90 0.89 0.87 0.86 0.85 0.83 0.81 3000.00 0.70 0.73 0.77 0.80 0.83 0.86 0.88 0.91 0.92 0.91 0.89 0.87 0.86 0.85 0.84 0.84 3000.00 0.73 0.74 0.80 0.82 0.85 0.89 0.91 0.92 0.91 0.89 0.89 0.87 0.86 0.86 0.84 3000.00 0.73 0.74 0.80 0.82 0.85 0.89 0.92 0.93 0.94 0.93 0.91 0.89 0.88 0.88 0.86 0.85 4000.00 0.74 0.76 0.83 0.85 0.89 0.92 0.94 0.95 0.94 0.92 0.90 0.89 0.87 0.86 0.85 5000.00 0.77 0.78 0.84 0.87	2000.00	0.64	0.67	0.73	0.76	0.78	0.79	0.82	0.83	0.85	0.85	0.84	0.82	0.82	0.80	0.80	0.79	
3000.00 0.73 0.77 0.80 0.83 0.86 0.88 0.91 0.92 0.91 0.89 0.87 0.86 0.86 0.84 3500.00 0.73 0.74 0.80 0.82 0.85 0.89 0.91 0.99 0.89 0.87 0.86 0.86 0.84 3500.00 0.73 0.74 0.80 0.82 0.85 0.89 0.92 0.93 0.94 0.93 0.91 0.89 0.89 0.88 0.88 0.86 0.85 4000.00 0.74 0.76 0.83 0.85 0.89 0.92 0.93 0.96 0.96 0.94 0.92 0.90 0.89 0.87 0.86 5000.00 0.77 0.78 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 6000.00 0.79 0.82 0.84 0.87 0.91 0.93 0.96 0.97	2500.00	0.67	0.71	0.75	0.78	0.80	0.82	0.86	0.88	0.90	0.89	0.87	0.86	0.85	0.85	0.83	0.81	
3500.00 0.73 0.74 0.80 0.82 0.85 0.89 0.92 0.93 0.94 0.93 0.91 0.89 0.88 0.86 0.85 4000.00 0.74 0.76 0.83 0.85 0.89 0.92 0.94 0.95 0.96 0.94 0.92 0.90 0.88 0.88 0.86 0.85 500.00 0.77 0.78 0.84 0.87 0.91 0.93 0.97 0.96 0.94 0.92 0.90 0.89 0.87 0.86 6000.00 0.77 0.78 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 0.86 6000.00 0.79 0.80 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 6000.00 0.79 0.82 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 7000	3000.00	0.70	0.73	0.77	0.80	0.83	0.86	0.88	0.91	0.92	0.91	0.89	0.89	0.87	0.86	0.86	0.84	
4000.00 0.74 0.76 0.83 0.85 0.89 0.92 0.94 0.95 0.96 0.94 0.92 0.90 0.89 0.87 0.86 5000.00 0.77 0.78 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86 6000.00 0.79 0.80 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 6000.00 0.79 0.80 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 7000.00 0.79 0.82 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 800.00 0.79 0.82 0.85 0.87 0.91 0.93 0.96 0.97 <	3500.00	0.73	0.74	0.80	0.82	0.85	0.89	0.92	0.93	0.94	0.93	0.91	0.89	0.88	0.88	0.86	0.85	
5000.00 0.77 0.78 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86 6000.00 0.79 0.80 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 6000.00 0.79 0.80 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 7000.00 0.79 0.82 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86 8000.00 0.79 0.82 0.85 0.87 0.91 0.93 0.96 0.97 0.97 0.95 0.93 0.90 0.88 0.86 8000.00 0.79 0.82 0.85 0.87 0.91 0.93 0.96	4000.00	0.74	0.76	0.83	0.85	0.89	0.92	0.94	0.95	0.96	0.96	0.94	0.92	0.90	0.89	0.87	0.86	
6000.00 0.79 0.80 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86 7000.00 0.79 0.82 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86 8000.00 0.79 0.82 0.85 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86 8000.00 0.79 0.82 0.85 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86	5000.00	0.77	0.78	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
7000.00 0.79 0.82 0.84 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86 8000.00 0.79 0.82 0.85 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86 8000.00 0.79 0.82 0.85 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.93 0.90 0.88 0.86	6000.00	0.79	0.80	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
8000.00 0.79 0.82 0.85 0.87 0.91 0.93 0.96 0.97 0.97 0.98 0.97 0.95 0.93 0.90 0.88 0.86	7000.00	0.79	0.82	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
	8000.00	0.79	0.82	0.85	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
			F															-
olumetric Efficiency Table J	Volumetric 1	Efficiency	Table															

🗑 Volumet	ric Efficie	ncy Table	2														'×
(+) 0.1	-	* 1	1	Selecte	d = 1												
Input-X: Ma	p, [hPa],"	input <ma< td=""><td>ap>, brea</td><td>k point, n</td><td>nanifold a</td><td>ibsolute p</td><td>pressure,</td><td>for Volur</td><td>natric Eff</td><td>iciency fa</td><td>ctor" Ir</td><td>iput-Y: N</td><td>, [Rpm],"i</td><td>input<n></n></td><td>, break p</td><td>oint, engir</td><td>ie spe</td></ma<>	ap>, brea	k point, n	nanifold a	ibsolute p	pressure,	for Volur	natric Eff	iciency fa	ctor" Ir	iput-Y: N	, [Rpm],"i	input <n></n>	, break p	oint, engir	ie spe
😯 Output: F	RAM_MA	AP_fVe_N	Map_N, [·	-],"Factor	Volumat	ric Efficie	ncy, dep	endent o	n pressu	e and eng	gine spee	d"					
	200.00	250.00	400.00	420.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	000.00	070.00	1050.00	
	300.00	330.00	400.00	430.00	400.00	500.00	550.00	000.00	030.00	/00.00	/30.00	800.00	830.00	900.00	970.00	1030.00	
1200.00	0.54	0.59	0.62	0.65	0.67	0.68	0.71	0.72	0.72	0.71	0.70	0.70	0.68	0.67	0.67	0.66	
1400.00	0.58	0.63	0.69	0.72	0.74	0.75	0.78	0.79	0.79	0.78	0.76	0.76	0.74	0.73	0.71	0.70	
1650.00	0.61	0.65	0.81	0.84	0.76	0.77	0.80	0.80	0.81	0.80	0.78	0.77	0.77	0.76	0.75	0.74	
2000.00	0.64	0.77	0.83	0.86	0.78	0.79	0.82	0.83	0.85	0.85	0.84	0.82	0.82	0.80	0.80	0.79	
2500.00	0.67	0.81	0.85	0.88	0.80	0.82	0.86	0.88	0.90	0.89	0.87	0.86	0.85	0.85	0.83	0.81	
3000.00	0.70	0.83	0.87	0.90	0.83	0.86	0.88	0.91	0.92	0.91	0.89	0.89	0.87	0.86	0.86	0.84	
3500.00	0.73	0.74	0.80	0.82	0.85	0.89	0.92	0.93	0.94	0.93	0.91	0.89	0.88	0.88	0.86	0.85	
4000.00	0.74	0.76	0.83	0.85	0.89	0.92	0.94	0.95	0.96	0.96	0.94	0.92	0.90	0.89	0.87	0.86	
5000.00	0.77	0.78	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
6000.00	0.79	0.80	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
7000.00	0.79	0.82	0.84	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
8000.00	0.79	0.82	0.85	0.87	0.91	0.93	0.96	0.97	0.97	0.98	0.97	0.95	0.93	0.90	0.88	0.86	
Volumetric	Efficiency	Table															_

2) Multiply and divided by

	🖉 Volumetr	ic Efficie	ncy Table	2														l ×
ſ	+ 0.1	-	* 1.2	1	Selecte	d = 1												
ſ	Input-X: Maj	put-X: Map, [hPa], "input <map>, break point, manifold absolute pressure, for Volumatric Efficiency factor" Input-Y: N, [Rpm], "input<n>, break point, engine spe</n></map>																
(🕜 Output: R	Output: RAM_MAP_fVe_Map_N, [-], "Factor Volumatric Efficiency, dependent on pressure and engine speed"																
ſ																		_
	X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00	

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.

👩 Volumetr	ic Efficiency	Table										
+ 0.1	- *	1.2 /	Selected	= 1								
nput-X: N, [Rpm],"break	point, engine	e speed" In	put-Y: Tps, [%],"input <t< td=""><td>psEqu>, brea</td><td>ak points, thr</td><td>ottle position</td><td>n "</td><td></td><td></td><td></td></t<>	psEqu>, brea	ak points, thr	ottle position	n "			
Output: N	MAP_LdTp_	Tps_N, [%],"	'characteristi	ic map, norma	alized load ba	ised on TPS	and engine s	peed (Alpha	/N model)"			
V/V	1400.00	2000.00	2600.00	2200.00	2800.00	4400.00	5000.00	5600.00	6200.00	6000.00	7400.00	8000.00
0.0000	0.00	2000.00	2000.00	0.00	0.00	4400.00	0.00	0.00	0.00	0.00	0.00	0.00
3 9139	35.04	30.12	26.11	20.11	18.94	18.80	17.63	16.76	15.26	14.81	14.81	14.81
6.5262	36.16	32.06	28.31	24.68	22.62	20.86	20.18	18.45	16.97	16.62	16.24	15.87
9.1324	40.31	36.28	32.30	30.28	26.11	25.55	24.05	22.69	20.30	20.30	20.30	19.29
13.0478	45.16	44.74	40.80	34.99	32.60	28.55	28.97	26.86	25.36	24.75	24.75	23.74
16.9632	54.54	50.53	46.24	42.47	38.93	34.29	32.63	30.68	30.73	28.85	26.86	26.18
20.8786	60.73	58.73	54.47	48.87	44.32	40.08	40.57	38.23	38.95	37.73	36.42	34.31
24.7925	65.30	63.35	58.17	54.05	50.46	46.99	44.74	43.59	42.68	42.54	41.81	40.83
32.6172	68.18	66.16	62.74	58.48	56.60	56.30	56.25	54.00	50.11	48.30	48.68	48.42
39.1449	70.73	68.72	64.41	62.60	60.68	58.69	58.69	56.37	56.18	57.89	58.88	58.55
45.6711	72.73	68.72	65.86	65.74	64.88	62.86	63.87	64.69	64.17	64.80	64.50	62.48
52.1927	73.29	70.29	69.87	68.74	68.91	66.91	64.90	65.67	66.19	66.80	68.48	68.74
58.7158	74.74	72.75	70.76	70.76	68.74	67.76	66.75	66.75	68.77	70.73	71.74	72.73
65.2420	76.73	74.74	73.73	72.73	72.73	71.74	70.73	71.74	72.73	74.77	75.73	76.76
78.2898	80.74	78.75	77.74	76.73	76.73	74.74	74.74	73.73	74.72	76.73	78.75	78.75
99.9939	84.75	84.75	84.75	82.76	82.76	82.73	82.73	82.73	82.73	84.75	84.73	85.76

0.1	- *	1.2 /	Selected	= 60								
put-X: N, [Rpm],"break	point, engine	e speed" In	put-Y: Tps, [%],"input <t< th=""><th>psEqu>, brea</th><th>ik points, thr</th><th>ottle position</th><th>ı "</th><th></th><th></th><th></th></t<>	psEqu>, brea	ik points, thr	ottle position	ı "			
Output: N	MAP_LdTp_	Tps_N, [%],"	characteristi	c map, norma	alized load ba	ised on TPS	and engine s	peed (Alpha	N model)"			
X/Y	1400.00	2000.00	2600.00	3200.00	3800.00	4400.00	5000.00	5600.00	6200.00	6800.00	7400.00	8000.00
0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.9139	35.04	30.12	26.11	20.11	18.94	18.80	17.63	16.76	15.26	14.81	14.81	14.81
6.5262	36.16	32.06	28.31	24.68	22.62	20.86	20.18	18.45	16.97	16.62	16.24	15.87
9.1324	40.31	36.28	32.30	60.00	60.00	60.00	24.05	22.69	20.30	20.30	20.30	19.29
13.0478	45.16	44.74	40.80	60.00	60.00	60.00	28.97	26.86	25.36	24.75	24.75	23.74
16.9632	54.54	50.53	46.24	60.00	60.00	60.00	32.63	30.68	30.73	28.85	26.86	26.18
20.8786	60.73	58.73	54.47	60.00	60.00	60.00	40.57	38.23	38.95	37.73	36.42	34.31
24.7925	65.30	63.35	58.17	60.00	60.00	60.00	44.74	43.59	42.68	42.54	41.81	40.83
32.6172	68.18	66.16	62.74	60.00	60.00	60.00	56.25	54.00	50.11	48.30	48.68	48.42
39.1449	70.73	68.72	64.41	62.60	60.68	58.69	58.69	56.37	56.18	57.89	58.88	58.55
45.6711	72.73	68.72	65.86	65.74	64.88	62.86	63.87	64.69	64.17	64.80	64.50	62.48
52.1927	73.29	70.29	69.87	68.74	68.91	66.91	64.90	65.67	66.19	66.80	68.48	68.74
58.7158	74.74	72.75	70.76	70.76	68.74	67.76	66.75	66.75	68.77	70.73	71.74	72.73
65.2420	76.73	74.74	73.73	72.73	72.73	71.74	70.73	71.74	72.73	74.77	75.73	76.76
78.2898	80.74	78.75	77.74	76.73	76.73	74.74	74.74	73.73	74.72	76.73	78.75	78.75
99.9939	84.75	84.75	84.75	82.76	82.76	82.73	82.73	82.73	82.73	84.75	84.73	85.76

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.

🗑 TPS base	d load ma	pping											
+ 0.001	- +	+ 1	/ S	elected =	1								
Input-X: N, [Rpm],"brea	ak point, ei	ngine spee	d" Input	Y: Tps	s, [%],"input<]	FpsEqu≥, t	break point	ts, throttle	position "			
Output: R	AM_MAI	P_LdTp_T	ps_N, [%]	"character	ristic m	ap, normalized	l load base	d on TPS a	and engine	speed (Ai	lpha/N mo	del)"	
X/Y	1000.00	1500.00	1700.00	2000.00	2800.	00 3600.00	4400.00	5000.00	6000.00	7000.00	8000.00	9000.00	
0.0000	40.9453	39.6797	39.1875	38.4141	37.80	47 33.5859	31.6641	31.4297	31.4297	31.4297	31.4297	31.4297	
3.9139	41.6484	40.0313	38.7891	37.9219	36.67	Add	21.6160	33.4922	32.5547	31.6875	30.9141	30.3047	
6.5262	41.6484	40.4531	39.7500	38.8828	37.0	Delete		35.1094	34.5938	33.5625	33.3047	32.5547	
9.1324	42.6563	41.8125	40.9453	40.0313	38.0	Import		34.8281	34.1484	33.1641	31.5938	30.7500	
13.0478	43.4063	42.2578	41.6953	40.2188	38.6	Export		35.7891	35.2031	35.6484	34.8281	34.4063	
16.9632	47.6953	46.6406	46.1484	45.0703	39.9	Сору	_	36.8906	36.1172	34.9219	33.7500	32.8594	
20.8786	53.1328	51.5625	50.2500	49.1719	48.5	Paste		44.3672	43.9453	42.7500	40.7578	39.6563	1
24.7925	55.9453	53.8125	53.5547	52.9922	58.4	Change Alias	-	49.9219	47.9766	46.8516	46.1484	43.1016	1
30.6168	61.5234	60.8672	60.8906	59.9063	59.8	Decimals Disp	olay	57.7500	55.8281	54.6094	52.2891	49.8516	1
38.1454	80.1797	79.0781	77.5078	76.6875	75.7	2D View		74.0859	73.0547	72.4922	72.1875	70.1016	1
45.6711	93.0703	91.6406	90.0000	88.8047	87.2	3D View Variable Drag	artice.	84.2578	83.6250	82.9922	82.1484	81.8672	1
52.1927	102.9375	101.2734	199.7344	97.5000	95.7	Window Prop	verties	94.2656	94.0547	93.3750	91.0313	89.7188	
50 7150	111.0460	110.0156	100.9516	102 01/11	107 2	window Prop	lei ues	104 1004	102 /766	102 0006	101 6710	00 7724	_
TPS based 1	oad mappir	ıg											

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

Toad Configuration						×
Comput	er ▼ Local Disk (D:) ▼ EcoCAL ▼ Config ▼ Common con	fig	- 🛃	Search Common co	nfig	2
Organize 🔻 New folder						(?)
★ Favorites	Name ^	Date modified	Туре	Size		
Desktop		No items match your se	arch.			
🗐 Recent Places						
🥽 Libraries 🦲						
Documents						
J Music						
Pictures						
Subversion						
Videos 💌	1					
File name: RAM	1_MAP_LdTp_Tps_N					•
Save as type: xls(*.xls)					-
Hide Folders			[Save	Cancel	

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

And the xls file will be opened automatically.

	S12	•		f _x											
	А	В	С	D	E	F	G	Н	I.	J	К	L	М	N	0
1	RAM_MAP	_LdTp_Tps	_N [Outpu	ut: RAM_M	AP_LdTp_1	Грs_N, [%],	"character	istic map,	normalize	d load base	ed on TPS a	nd engine	speed (Al	oha/N moo	del)"]
2	Input-X: N	, [Rpm],"b	reak point,	engine sp	eed" Inp	ut-Y: Tps, [%],"input<	TpsEqu>, b	reak point	ts, throttle	position "				
3															
4	X/Y	1000	1500	1700	2000	2800	3600	4400	5000	6000	7000	8000	9000		
5	0	40.9453	39.6797	39.1875	38.4141	37.8047	33.5859	31.6641	31.4297	31.4297	31.4297	31.4297	31.4297		
6	3.9139	41.6484	40.0313	38.7891	37.9219	36.6797	35.7656	34.5469	33.4922	32.5547	31.6875	30.9141	30.3047		
7	6.5262	41.6484	40.4531	39.75	38.8828	37.0078	36.5625	35.7656	35.1094	34.5938	33.5625	33.3047	32.5547		
8	9.1324	42.6563	41.8125	40.9453	40.0313	38.0391	37.5938	35.8828	34.8281	34.1484	33.1641	31.5938	30.75		
9	13.0478	43.4063	42.2578	41.6953	40.2188	38.6016	36.7734	36.7266	35.7891	35.2031	35.6484	34.8281	34.4063		
10	16.9632	47.6953	46.6406	46.1484	45.0703	39.9141	38.9766	37.8516	36.8906	36.1172	34.9219	33.75	32.8594		
11	20.8786	53.1328	51.5625	50.25	49.1719	48.5156	46.8984	45.5859	44.3672	43.9453	42.75	40.7578	39.6563		
12	24.7925	55.9453	53.8125	53.5547	52.9922	58.4531	54.8203	51.9141	49.9219	47.9766	46.8516	46.1484	43.1016		
13	30.6168	61.5234	60.8672	60.8906	59.9063	59.8594	59.5781	59.1563	57.75	55.8281	54.6094	52.2891	49.8516		
14	38.1454	80.1797	79.0781	77.5078	76.6875	75.75	75.0703	74.4375	74.0859	73.0547	72.4922	72.1875	70.1016		
15	45.6711	93.0703	91.6406	90	88.8047	87.2578	85.9922	84.9844	84.2578	83.625	82.9922	82.1484	81.8672		
16	52.1927	102.9375	101.2734	199.7344	97.5	95.7656	94.5234	94.4531	94.2656	94.0547	93.375	91.0313	89.7188		
17	58.7158	111.0469	110.0156	109.8516	108.9141	107.3438	105.8672	104.8594	104.1094	103.4766	102.8906	101.6719	99.7734		
18	65.242	120.1641	119.1094	118.0781	117.0703	115.8281	114.0938	113.5547	112.5938	111.4922	110.1797	109.3828	107.4375		
19	78.2898	126.1875	124.9219	123.8672	122.5781	121.125	119.9297	118.1016	117.0938	116.0625	114.2813	111.3047	109.7578		
20	99.9939	147.7031	146.6016	145.5	144	142.3125	140.2031	139.9219	155.0391	153.9375	152.1094	144.9844	139.875		
21															

It is recommended to modify your curve and map tables in Excel, and smoothen them in Excel and then imported back to EcoCAL. And when you finish tuning, please save it.

	А	В	С	D	E	F	G	Н	I.	J	K	L	М
1	RAM_MAP	_LdTp_Tps	_N [Outpu	ut: RAM_M	AP_LdTp_1	[ps_N, [%]	,"character	istic map,	normalize	d load base	ed on TPS a	nd engine	speed (Alpha
2	Input-X: N	, [Rpm],"bi	reak point,	engine sp	eed" Inp	ut-Y: Tps, [%],"input<	TpsEqu>, b	oreak point	ts, throttle	position "		
3													
4	X/Y	1000	1500	1700	2000	2800	3600	4400	5000	6000	7000	8000	9000
5	0	45	45	39.1875	38.4141	37.8047	33.5859	31.6641	31.4297	31.4297	31.4297	31.4297	31.4297
6	3.9139	47	47	38.7891	37.9219	36.6797	35.7656	34.5469	33.4922	32.5547	31.6875	30.9141	30.3047
7	6.5262	49	49	39.75	38.8828	37.0078	36.5625	35.7656	35.1094	34.5938	33.5625	33.3047	32.5547
8	9.1324	51	51	40.9453	40.0313	38.0391	37.5938	35.8828	34.8281	34.1484	33.1641	31.5938	30.75
9	13.0478	53	53	41.6953	40.2188	38.6016	36.7734	36.7266	35.7891	35.2031	35.6484	34.8281	34.4063
10	16.9632	55	55	46.1484	45.0703	39.9141	38.9766	37.8516	36.8906	36.1172	34.9219	33.75	32.8594
11	20.878 <mark>6</mark>	53.1328	51.5625	50.25	49.1719	48.5156	46.8984	45.5859	44.3672	43.9453	42.75	40.7578	39.6563
12	24.7925	55.9453	53.8125	53.5547	52.9922	58.4531	54.8203	51.9141	49.9219	47.9766	46.8516	46.1484	43.1016
13	30.6168	61.5234	60.8672	60.8906	59.9063	59.8594	59.5781	59.1563	57.75	55.8281	54.6094	52.2891	49.8516
14	38.1454	80.1797	79.0781	77.5078	76.6875	75.75	75.0703	74.4375	74.0859	73.0547	72.4922	72.1875	70.1016
15	45.6711	93.0703	91.6406	90	88.8047	87.2578	85.9922	84.9844	84.2578	83.625	82.9922	82.1484	81.8672
16	52.1927	102.9375	101.2734	199.7344	97.5	95.7656	94.5234	94.4531	94.2656	94.0547	93.375	91.0313	89.7188
17	58.7158	111.0469	110.0156	109.8516	108.9141	107.3438	105.8672	104.8594	104.1094	103.4766	102.8906	101.6719	99.7734
18	65.242	120.1641	119.1094	118.0781	117.0703	115.8281	114.0938	113.5547	112.5938	111.4922	110.1797	109.3828	107.4375
19	78.2898	126.1875	124.9219	123.8672	122.5781	121.125	119.9297	118.1016	117.0938	116.0625	114.2813	111.3047	109.7578
20	99.9939	147.7031	146.6016	145.5	144	142.3125	140.2031	139.9219	155.0391	153.9375	152.1094	144.9844	139.875
0.1													

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

🗑 TPS I	based loa	id maj	pping												
+ 0.0	01 _	*	1	/ S	elected =	1									
Input-X:	N, [Rpm]	,"brea	ik point, er	ngine spee	d" Input	-Y: Tps, [%	6],"input<]	ГрsЕ	lqu>, t	reak point	ts, throttle	position "			
🕜 Outp	ut: RAM	MAF	_LdTp_T	ps_N, [%]	"character	ristic map,	normalized	l loa	d base	d on TPS a	and engine	e speed (A	lpha/N moo	1e1)"	
X/Y	100	00.00	1500.00	1700.00	2000.00	2800.00	3600.00	44(00.00	5000.00	6000.00	7000.00	8000.00	9000.00	
0.000	0 40.	9453	39.6797	39.1875	38.4141	37.8047	33.5859	31	6641	31.4297	31.4297	31.4297	31.4297	31.4297	
3.913	9 41.	6484	40.0313	38.7891	37.9219	36.6797	35.7656	34	Add		7	31.6875	30.9141	30.3047	
6.526	2 41.	6484	40.4531	39.7500	38.8828	37.0078	36.5625	35	Dele	ete	8	33.5625	33.3047	32.5547	
9.132	4 42.	6563	41.8125	40.9453	40.0313	38.0391	37.5938	3:	Imp	ort	4	33.1641	31.5938	30.7500	
13.04	78 43.	4063	42.2578	41.6953	40.2188	38.6016	36.7734	36	Exp	ort	1	35.6484	34.8281	34.4063	
16.96	32 47.	6953	46.6406	46.1484	45.0703	39.9141	38.9766	37	Cop	y ha	2	34.9219	33.7500	32.8594	
20.87	86 53.	1328	51.5625	50.2500	49.1719	48.5156	46.8984	4:	Cha	nge Δlias	3	42.7500	40.7578	39.6563	
24.79	25 55.	9453	53.8125	53.5547	52.9922	58.4531	54.8203	51	Dec	imals Displa	v 6	46.8516	46.1484	43.1016	
30.61	68 61.	5234	60.8672	60.8906	59.9063	59.8594	59.5781	59	2D (/iew	í 1	54.6094	52.2891	49.8516	
38.14	54 80.	1797	79.0781	77.5078	76.6875	75.7500	75.0703	74	3D \	/iew	7	72.4922	72.1875	70.1016	
45.67	11 93.	0703	91.6406	90.0000	88.8047	87.2578	85.9922	84	Vari	able Proper	ties 0	82.9922	82.1484	81.8672	
52.19	27 102	.9375	101.2734	199.7344	97.5000	95.7656	94.5234	94	Win	dow Proper	ties 7	93.3750	91.0313	89.7188	
50 71	50 111	0460	110.0156	100.0516	100 01/11	107 2420	105 9673	104	0504	104 1004	102 4766	103 2006	101 6710	00 7724	_
TPS ba	sed load n	nappin	g												

Import the **CSV** file you just modified.

00 J - Cor	mputer -	Local Disk (D:) 🔻 EcoCAL 👻 Con	nfig 👻 Common config	l	🔻 🛃 S	earch Common con	fig 🙋
Organize 🔻 New fo	lder					8	- 🗌 🔞
🔚 Recent Places		Name *		Date modified	Туре	Size	
Libraries Documents Music Pictures Subversion Videos		RAM_MAP_LdTp_Tps_N		2015/7/24 17:07	Microsoft Excel 97	. 12 KB	
	File nar	me: RAM_MAP_LdTp_Tps_N			▼ xl	s(*.xls)	•
						Open 🔻	Cancel

The modified cells will show as "red".

🖉 TPS base	d load map	ping											[
+ 0.001	- *	1 /	/ Sele	cted = 1									
nput-X: N, [Rpm],"breal	k point, eng	ine speed"	Input-Y:	Tps, [%],"i	nput <tpse< td=""><td>qu>, break</td><td>points, thro</td><td>ottle positio</td><td>n "</td><td></td><td></td><td>_</td></tpse<>	qu>, break	points, thro	ottle positio	n "			_
Output: R	AM MAP	LdTp Tp	s N, [%],"c	haracteristi	c map, non	nalized load	l based on	TPS and en	gine speed	(Alpha/N	nodel)"		_
													_
X/Y	1000.00	1500.00	1700.00	2000.00	2800.00	3600.00	4400.00	5000.00	6000.00	7000.00	8000.00	9000.00	
0.0000	45.0000	45.0000	3.1875	38.4141	37.8047	33.5859	31.6641	31.4297	31.4297	31.4297	31.4297	31.4297	
3.9139	46.9922	46.9922	3.7891	37.9219	36.6797	35.7656	34.5469	33.4922	32.5547	31.6875	30.9141	30.3047	
6.5262	49.0078	49.0078	32.7500	38.8828	37.0078	36.5625	35.7656	35.1094	34.5938	33.5625	33.3047	32.5547	
9.1324	51.0000	51.0000	40.9453	40.0313	38.0391	37.5938	35.8828	34.8281	34.1484	33.1641	31.5938	30.7500	
13.0478	52.9922	52.9922	46953	40.2188	38.6016	36.7734	36.7266	35.7891	35.2031	35.6484	34.8281	34.4063	
16.9632	55.0078	55.0078	46.1484	45.0703	39.9141	38.9766	37.8516	36.8906	36.1172	34.9219	33.7500	32.8594	
20.8786	53.1328	51.5625	50.2500	49.1719	48.5156	46.8984	45.5859	44.3672	43.9453	42.7500	40.7578	39.6563	
24.7925	55.9453	53.8125	53.5547	52.9922	58.4531	54.8203	51.9141	49.9219	47.9766	46.8516	46.1484	43.1016	
30.6168	61.5234	60.8672	60.8906	59.9063	59.8594	59.5781	59.1563	57.7500	55.8281	54.6094	52.2891	49.8516	
38.1454	80.1797	79.0781	77.5078	76.6875	75.7500	75.0703	74.4375	74.0859	73.0547	72.4922	72.1875	70.1016	
45.6711	93.0703	91.6406	90.0000	88.8047	87.2578	85.9922	84.9844	84.2578	83.6250	82.9922	82.1484	81.8672	
52.1927	102.9375	101.2734	199.7344	97.5000	95.7656	94.5234	94.4531	94.2656	94.0547	93.3750	91.0313	89.7188	
58.7158	111.0469	110.0156	109.8516	108.9141	107.3438	105.8672	104.8594	104.1094	103.4766	102.8906	101.6719	99.7734	
65.2420	120.1641	119.1094	118.0781	117.0703	115.8281	114.0938	113.5547	112.5938	111.4922	110.1797	109.3828	107.4375	
78.2898	126.1875	124.9219	123.8672	122.5781	121.1250	119.9297	118.1016	117.0938	116.0625	114.2813	111.3047	109.7578	
99.9939	147.7031	146.6016	145.5000	144.0000	142.3125	140.2031	139.9219	155.0391	153.9375	152.1094	144.9844	139.8750	
													_
TPS based l	oad mapping	g											
		_											

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.

3.3.4 On-the-fly Calibration

On-the-fly calibrations are something must to have when tuning the engine on the dyno, so that you can make you calibration changes taking effect immediately by hit a "ENTER" key. No need to "Burn to ECU" or reprogram the ECU. Only by this way, you can keep the engine running without interrupted and at the same time find the sweet spots of the certain operating conditions. And you can tune your fuel / spark maps very quickly.

But the drawback of the "on-the-fly" calibrations is to use a lot of memory of ECU. Basically any calibration data you want to do "on-the-fly" changes, you must double or even triple the size of the memory for that set of data. That would significantly increase the ECU cost. We have a compromise to do this: only make certain critical calibration maps as "on-the-fly" capable. And most other non-critical calibrations, which are seldom changed by customers, stay the old way.

Mainly for most customers, the calibrations that need to be tuned for their engines are basic Fuel maps (VE table, TPS-load table), Spark maps, and some supplemental fuel/spark characteristic curves.

You can also use "**Save as**" feature at "File" menu to save your new calibrations to a new CAL file. And later on load it into ProCAL.

At this moment the below calibration maps, curves, and values are made "on-the-fly" capable:

RAM_MAP_LdTp_N_Tps; RAM_MAP_fVe_Map_N; RAM_MAP_Iga_N_Ld

RAM_CUR_fAst_TmSta; RAM_CUR_fWmp_Tm; RAM_VAL_fFIApp

You can add the calibration variables in EcoCAL.

3.4 Save as calibration data file

When you finish EFI tuning or do some fine tuning, please save the tuning data before you exit the EcoCAL, otherwise, you will lost the tuning that you did.

Go to menu->File->Save as



🗑 Save as					×
Computer	· → Local Disk (D:) → SoftWare_LLD → SEA_b1_7_7_1 →	•	Search SEA_b1_7	_7_1	2
Organize 🔻 New folder				-	?
★ Favorites	Name ^	Date modified	Туре	Size	
Desktop	J 2T 1C	2015/7/23 16:00	File folder		
Recent Places	NA_DLE60_SEA_b1771_4T2CCDA-1.1M_L588_CrII148_E3_V1	2015/6/17 16:07	CAL File	17 KB	
🔚 Libraries					
Documents					
Music Pictures					
Subversion					
Videos 🗾					
File name Data	tuning -7-2015				•
Save as type: cal(*.	cal)				•
Hide Folders			Save	Cancel	

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 engine, please burn the data to ECU, then ECU will use the data that you changed to control the engine.

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

File	Edit	Settings	Run Variables	Diagnostics	Advanced	Help
			Connect Disconnect	F5 Ctrl+R	L	
•		Projec	Fetch from EC Burn to ECU		_C_1	
			Start Measuri Start Recordi Stop Measurin	ng F8 ng F9 ng F11	1_41	
			Play Back			
7 B	Surn o	or Fetch P	ProgressBar			
						Cancel

When burn to ECU successfully, you will hear the noise of fuel pump working.

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 EFI system.

Do not turn off the ECU 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 ECU or you forget the change that you did, you can fetch the data from ECU to compare.

File	Edit Setti	ngs	Run	Variables	Diagn	ostics	Advance	d Help
		5	Co Dis	nnect connect	F5 Ctr	l+R		
•	- Pro	ojec	Fe Bur	tch from EC rn to ECU	:U		_C_1	
			Sta Sta Sto	art Measuri i art Recordir op Measurir	ng F8 ng F9 ng F1:	L	1_41	
			Pla	y Back				

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

Chapter 4 Tuning help and support

4.1 Pop-up the Help and support window

In EcoCAL, there are many or marks in the window, you can click this to get the details of calibration variables and measure variables, and you can get the method of tuning and the meaning of measure variables.

Save it as CAL file.

Volumetri	c Efficie	ency Ta	able	_		_						¢ کې	elected Variables				
+ 0.001	-	*	1	/	Select	ed =	1						Alias	Name	Value	Unit	I.
nput-X: Pim,	[hPa],"	input<	Map>,	break p	oint, n	nanifol	d absol	ute pre	ssure,	for Vol	umatri	2	Throttle Position Sensor	Tps		%	2
🗿 🛛 utput: R	AM_M	AP_fV	e_Mag	_N, [-]	,"Facto	or Volu	matric l	Efficier	icy, de	pender	nt on p	0	Raw engine speed	Nraw		Rpm	2
NW	200.00	250.00	100.00	120.00	160.00	500.00	550.00	c00.00	cs0.00	700.00	750.00	0	Lambda	LamWO2			2
A/ 1 1200.00	500.00	530.00	100.00	130.00	100.00	0.50	330.00	500.00	550.00	/00.00	/30.00	0	Battery voltage from ADC channel	UbAdc		V	2
1200.00	0.40	0.47	0.51	0.55	0.57	0.58	0.03	0.05	0.00	0.08	0.08	0	02 sensor voltage	uLsb		V	2
1400.00	0.46	0.47	0.51	0.55	0.57	0.58	0.63	0.65	0.67	0.69	0.69	0	Tuel factor closed-loop control	fLc		-	2
1650.00	0.47	0.48	0.51	0.55	0.57	0.58	0.64	0.65	0.69	0.70	0.70	0	cmFuel	dmFuel		g/min	2
2000.00	0.48	0.49	0.51	0.55	0.58	0.59	0.65	0.66	0.69	0.72	0.72	0	cmFuel_A	dmFuel_A		g/min	2
2500.00	0.49	0.50	0.52	0.56	0.59	0.62	0.66	0.68	0.72	0.75	0.74	0	n Fuel	mFuel		g	2
3000.00	0.50	0.51	0.53	0.56	0.60	0.63	0.67	0.70	0.75	0.78	0.77	0	HrsPerLit	HrsPerLit		Hrs/Lit	2
3800.00	0.51	0.52	0.55	0.58	0.61	0.67	0.70	0.74	0.78	0.81	0.80	0	HrsPerLit A	HrsPerLit A		Hrs/Lit	2
4400.00	0.52	0.53	0.57	0.60	0.67	0.73	0.74	0.76	0.82	0.85	0.83	0	Engine-speed of byte value	Nb		Rpm	1
< <u> </u>	0.51	0.55	0.50		0.11	1 12	0.30	A 01	N 02	A 90	A 0 1	0	Engine temperature	Tm		DegC	1
⇒								_	_			0	Intake air temperature	Ta		DegC	1
Throttle p	position	1 thres	hold to	o split t	he loa	d calc	ulation	betwe	en VE	and Al	pha-N	0	I esired Lambda	LamDsr		-	1
+ 0.001	-	*	1	1	Selec	ted =	1					0	Ambient pressure	Pam		hPa	1
nput: N_b, [l	Rpm],"i	nput </td <td>√_b>, t</td> <td>oreak p</td> <td>oints, e</td> <td>engine</td> <td>speed</td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td>Altitude factor</td> <td>fAlt</td> <td></td> <td></td> <td>1</td>	√_b>, t	oreak p	oints, e	engine	speed					0	Altitude factor	fAlt			1
Output: C	UR_Tp	sUnTr	_N, [%	6],"thro	ttle po	sition	for 95 %	6 of loa	id, dep	endent	on the	0	re-control fuel factor	fPreCt1			1
												0	correction factor based on air temperature	fTcmb			1
N_b/[Rpm]		780	1020	1440	0 19	80 2	340 :	2760	3300	3720	0	oad based on TPS	LdTp		%	5
CUR_TpsU	nTp_N	/[%]	89.84	89.84	89.8	4 89.	84 80	0.08 6	9.92	60.16	50.00	0	Load	Ld		%	5
Throttle pos	ition th	reshold	l to spli	it the lo	ad calo	ulatio	n betwe	en VE	and Al	pha-N		0	Predicted Load	LdPrd		%	5
												0	Engine Speed	N		Rpm	5
												1	ч	• •		1.	
													_				-

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

File	Edit	Settings	Run	Variables	Diagnostics	Advanced	Help
		<u>الا</u>			M (@)		
•		Proied	ct				😿 Volumetric Efficiency Table

In different layer, the help document is also different.

For example, in the "Steady-State" layer window, click the will button, the help and support window will pop-up.

ProCAL Help and Support-Steady-State	? ×
Steady-State Search Save Edit	
Using the wideband ALM, you can read the AFR or lambda directly, and also log the real-time lambda (lamWO2) in ProCAL. Then you can tune the mapping based the real-time lambda.	-
For details on how to integrate the wideband ALM to the ECU and enable the ALM based auto-tuning, please download our document of "ALM-ECU integration Manual" here: <u>www.ecotrons.com/suppport <http: suppport="" www.ecotrons.com=""></http:></u>	
Specific examples:	
Ok, you have read and known the above information, let's try to tune it.	
If your engine is running rich or lean in different throttle positions, you need do some advanced calibrations. There are two	
fuel mapping tables, one is "RAM_MAP_fVe_Map_N" which is based on pressure signal "Map" and RPM, the other table is "RAM_MAP_LdTp_Tps_N" which is based on Tps and RPM.	
For four-stroke engines, the default fuel mapping usually is volumetric efficiency table (MAP_fVe_Map_N), at least for all	
low RPM and mid-range RPM. For high RPM and WOT, it is based on "MAP_LdTp_Tps_N". The split between the 2 tables	
is defined in "CUR_TpsUnTp_N" :	T

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 low button to open the Help and support window,



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

For example, add the "Lambda reading from wideband controller ALM" 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 "Desired idle speed", "Start fuel", "Start ignition",..., etc, they are the named "layer".

File Edit Se	ettings Run Variables D	iagnostics Adva	nced Help											
😑 🔳 🖬	🔄 🕨 🗉 🧧	0												
•	Project SEA_b1771_47 NA_DLE60_SI Calibration	[2CCDA_C EA_b1771_	Desired idle spee + 0.001 Input: Tm, [DegC],"b Output: CUR_ND Tm/[DegC]	d * 1 / reak points, engine t sr_Tm, [Rpm],"nomi -30.00	Selected = 1 emperature , for de nal engine speed f -15.00	sired idle speed or idle, depender 0.00 2	t on engine to	emperature" 40.00	60.00	\$5.00	100.00	115.00		
			CUR_NDsr_Tm/[R]	pm] 2200	2000	1800	700	1700	1700	1700	1600	1600		
RPM	0 Rpm		Desired idle speed											
MAP	0 kPa			Selected Vari	ables					1				
TPS	0 %			Alias		Name	Value	Unit	Rate		_			
ECT	0 DegC			Battery volt	age from ADC cha	nnel UbAdc		V	20ms	_				
14.7	0. DC			Raw engine	speed	Nraw		Rpm	20ms					
IAT	0 DegC			Intake air te	mperature	Ta		DegC	20ms	_				
028	0 V			Engine temp	erature	Tm		DegC	100ms					
SPAR	K 0 CrA			😧 Engine temp	erature when start	TmSta		DegC	100ms					
				Ambient property of the second sec	essure	Pam		hPa	100ms					
FUEL	PW1 0 ms			C Engine Spe	b	N		Rpm	Syn	_				
FUEL	PW2 0 ms			C Load		Ld LaD-4		%	Syn	_				
LamV	VO2 0			Number of i	niections	nIni		70	Syn	_				
Parsing File loa Load co	the file ded successfully! onfiguration successfully!	File path:		intake mani	fold pressure	Map		hPa	Syn					
Servo Moto	r Desired idle speed	Global fuel er	nrichment Start fue	1 Start ignition	After-start fuel	Idle ignition	Warm up	fuel St	eady-State	Acceleration	Decelerati	ion Performa	nce WOT	Altitude Calibr

You can add or delete the layer as you want, for example, you don't want the "Servo motor" 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.

guration	successfully! File path:							
Desire	d idle speed Global fuel enrichmen	t Sta	Page Setting	tion	After-start fuel	Idle ignition	Warm up fuel	Steady-State
ected	Load configuration successfully! File pat	h: D:\Eco	CAL\current_config	Worki	ng Page: D:\SoftWare	_LLD\SEA_b1_7_	7_1\NA_DLE60_SE	A_b1771_4T20

Page setting window:

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1	🖗 Pa	ge Setting X
	_	
	No.	Layer Name 🔺
	1	Servo Motor
	2	Desired idle speed
	3	Global fuel enrichment
	4	Start fuel
	5	Start ignition
	6	After-start fuel
	7	Idle ignition
	8	Warm up fuel
	9	Steady-State
	10	Acceleration
	11	Deceleration
	12	Performance WOT
	13	Altitude Calibration
	14	Advanced Tuning for injection
	N	New Delete Up Down OK Cancel

How to delete the layer?

First, click the label to choose it, then click "Delete", for example, delete the "Servo motor" layer,

🦉 P	🖗 Page Setting 🔀 🔀							
_								
No	Layer Name							
1	Servo Motor							
2	Desired idle speed							
3	Global fuel enrichment							
4	Start fuel							
5	Start ignition							
6	After-start fuel							
7	Idle ignition							
8	Warm up fuel							
9	Steady-State							
10	Acceleration							
1	Deceleration							
12	Performance WOT							
13	Altitude Calibration							
14	Advanced Tuning for injection							
	New Delete Up Down OK Cancel							

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 "Servo motor" layer in display.

1	🖗 Pa	ge Setting	ĸ
Г			
	No.	Layer Name	
	1	Desired idle speed	
	2	Global fuel enrichment	
	3	Start fuel	
	4	Start ignition	
	5	After-start fuel	
	6	Idle ignition	
	7	Warm up fuel	
	8	Steady-State	
	9	Acceleration	
	10	Deceleration	
	11	Performance WOT	
	12	Altitude Calibration	
	13	Advanced Tuning for injection	
	14	Advanced Tuning for ignition	
	1	Tew Delete Up Down OK Cancel	

How to add one new layer?

Click the "New" button to set up one new layer.

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Ì	j Pa	ye Setting	X
Γ.			
	No.	Layer Name	
	2	Global fuel enrichment	
	3	Start fuel	
	4	Start ignition	
	5	After-start fuel	
	6	Idle ignition	
	7	Warm up fuel	
	8	Steady-State	
	9	Acceleration	
	10	Deceleration	
	11	Performance WOT	
	12	Altitude Calibration	
	13	Advanced Tuning for injection	
	14	Advanced Tuning for ignition	
	15	New Layer	Ţ
		ew Delete Up Down OK Cancel	

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

🍯 Pa	ge Setting
No.	Layer Name
2	Global fuel enrichment
3	Start fuel
4	Start ignition
5	After-start fuel
6	Idle ignition
7	Warm up fuel
8	Steady-State
9	Acceleration
10	Deceleration
11	Performance WOT
12	Altitude Calibration
13	Advanced Tuning for injection
14	Advanced Tuning for ignition
15	Customer Calibration
Ν	New Delete Up Down OK Cancel

After finishing, click "OK".

Then you can see there is the new "Customer Calibration" layer in the window.

Advanced Tuning for injection	Advanced Tuning for ignition	Customer Calibration			
7_1\NA_DLE60_SEA_b1771_4T2CCDA-1.1M_L588_CrII148_E3_V1.cal					

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

Ì	🖗 Pa	ge Setting
	No.	Layer Name
	1	Servo Motor
	2	Desired idle speed
	3	Global fuel enrichment
	4	Start fuel
	5	Start ignition
	6	After-start fuel
	7	Idle ignition
	8	Warm up fuel
	9	Steady-State
	10	Acceleration
	11	Deceleration
	12	Performance WOT
	13	Altitude Calibration
	14	Advanced Tuning for injection
	N	Vew Delete Up Down OK Cancel

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, "Customer Calibration" la	ayer.
--	-------

File Edit Setti	ngs Run Variables Diagnostics	Advanced Help							
😅 🔳 🖬	5 🕨 🗉 🖬 😧								
•	oject — SEA_b1771_4T2CCDA — NA_DLE60_SEA_b177 — Calibration	- C L_							
•									
RPM	0 Rpm								
MAP	0 kPa								
TPS	0 %								
ECT	0 DegC								
IAT	0 DegC								
028	0 V								
SPARK	0 CrA								
FUELP	W1 0 ms								
FUELP	W2 0 ms								
LamWC	2 0								
Parsing th File loaded Load conf	e file I successfully! Iguration successfully! File path:								
Idle ignition	Warm up fuel Steady-State	Acceleration	Deceleration	Performance WOT	Altitude Calibration	Advanced Tuning for injection	Advanced Tuning for ignition	Customer Calibration	• •
Disconn	Disconnected Load configuration successfully File path: D:EcoCAL current config Working Page: D:SoftWare_LLDSEA_b17_7_INA_DLE60_SEA_b17/1_472CCDA-1.1M_LS88_CAII48_E3_V1.cal								

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 5 and chapter 6.



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.

+ 0.001 _ * 1 / Selected = 1						Alias	Name	Value	Unit	F
						2 Lambda	LamWO2			2
Alias	Name	Value	Unit			Battery voltage from ADC channel	UbAdc		v	2
Min TPS changed	VAL_dTpsLdPrd	1.50	%			Instant fuel enabled	B_InsInj			2
Min load changed	VAL_dLdMn	4.99	%			7 TPS changed	dTps		%	2
-					_	2 Load changed	dLd		%	1
🕉 Wall film fuel depend	ing on the predicte	d load				2 Engine temperature	Tm		DegC	
+ 0.001 _ *	1 / Se	lected = 1				Engine-speed of byte value	N_b		Rpm	
nout LdPrd [%] "break	noints fuel wall film	dependent on l	oad predicted"			Intake air temperature	Ta		DegC	1
Output: CUR_Wf_Ld	n [%] "characteristi	c curve: fuel wall	film dependent on Loa	d predicte	d "	🕖 Desired Lambda	LamDsr		-	
Jourbar con_m_za	p, [70], enaracteristi			a preadete		2 Ambient pressure	Pam		hPa	
LdPrd/[%]	0.00 6.00 12	.00 18.00 24.0	0 30.00 36.00 42.00	0 48.00	54.00	Altitude factor	fAlt			
CUR_Wf_Ldp/[%]	0.00 4.69 12	.00 41.06 65.0	6 90.00 126.94 159.9	4 180.94	199.88	2 Engine is in idle	B_Idl			
						O Load prediction enabled	B_LdPrd			
Wall film fuel depending	g on the predicted los	ad				Pre-control fuel factor	fPreCtl			
						Puel relative quantity	F1		%	
Instant injection for s	udden throttle open	ning	VAL tInsIni pulse	10.00		🛿 Predicted Load	LdPrd		%	
Mnimum injection pul	lse	0	VAL tIniMin	1.20		🛿 Load based on TPS	LdTp		%	
Engine speed upper th	hreshold to enable t	he instant injectio	VAL NLowInsIni	3000.00		🕖 Load	Ld		%	
Enable instant injectio	on when leaving idle	,	CW CSLDP	13		2 Engine Speed	N		Rpm	
The smallest TPS cha	nged to enable the i	nstant injection	VAL dTpsInsIni	8.00		Number of injections	nInj			
The smallest Load ch	anged to enable the	instant injection	VAL dLdInsInj	10.01			-			
The allowed time to in	nject instant fuel	-	VAL td InsInj allow	0.50						
The break time betwee	en two times of insta	ant fuel	VAL td InsInj Brk	2.00						

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

How do edit the alias?

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	Selected Variables				_
	Alias	Name	Value	Unit	Rate
	😯 Lambda	LamWO2			20ms
	😯 Battery voltage from ADC channel	1 UbAdc	Variable Sele	ction	20ms
	😯 Instant fuel enabled	B_InsInj	Change Alias		20ms
	😯 TPS changed	dTps	Variable prop	erties	20ms
	😯 Load changed	dLd	Window Prop	erties	20ms
	😯 Engine temperature	Tm		DegC	100ms
	😯 Engine-speed of byte value	N_b		Rpm	100ms
	😯 Intake air temperature	Ta		DegC	100ms
Load pred	😯 Desired Lambda	LamDsr		-	100ms
Zoud pred	Ambient pressure	Pam		hPa	100ms
42.00 48.	Altitude factor	fAlt			100ms
59.94 180	😯 Engine is in idle	B_Id1			100ms
	O Load prediction enabled	B_LdPrd			100ms
	😯 Pre-control fuel factor	fPreCtl			Syn
	😯 Fuel relative quantity	F1		%	Syn
e 10.0	😯 Predicted Load	LdPrd		%	Syn

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

Here, we change the alias of UbAdc, the current Alias is "Battery voltage from ADC channel"

Then click "Change Alias", the window will pop-up,

Variable UbAdc UbAdcIni	Alias Battery voltage from ADC channel			
UbAdc UbAdcIni	Battery voltage from ADC channel			
UbAdcIni UbAdc Ini				
TTL A 4. 4.				
UDAdc_b				
UbAdc		Search By:	Variable]
			OK Cancel	1
	: UbAdc	: UbAdc	: UbAdc Search By:	C UbAdc Search By: Variable OK Cancel

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

Then, click "OK"

AliasMa	nage		<u>×</u>
No.	Variable	Alias	
1	UbAdc	Voltage of battery	
2	UbAdcIni		
3	UbAdc_b		
Searc	h: UbAdc		Search By: Variable
	p		
			OK Cancel

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

Selected Variables				
Alias	Name	Value	Unit	Rate
🕜 Lambda	LamWO2			20ms
Voltage of battery	UbAdc		V	20ms
🕖 Instant fuel enabled	B_InsInj			20ms
🕜 TPS changed	dTps		%	20ms
😯 Load changed	dLd		%	20ms
🕜 Engine temperature	Tm		DegC	100ms
Bengine-speed of byte value	N_b		Rpm	100ms
🕜 Intake air temperature	Ta		DegC	100ms
🕖 Desired Lambda	LamDsr		-	100ms
2 Ambient pressure	Pam		hPa	100ms
Altitude factor	fAlt			100ms
🕖 Engine is in idle	B_Idl			100ms
Output Load prediction enabled	B_LdPrd			100ms
Pre-control fuel factor	fPreCtl			Syn
Puel relative quantity	F1		%	Syn
😧 Predicted Load	LdPrd		%	Syn

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".

🗑 Volumetri	Volumetric Efficiency Table																
+ 0.001	-	*	1	S	elected =	: 1											
Input-X: Pim,	nput-X: Pim, [hPa], "input <map>, break point, manifold absolute pressure, for Volumatric Efficiency factor" Input-Y: N, [Rpm], "input<n>, bi</n></map>																
😢 Output: RAM_MAP_fVe_Map_N, [-], "Factor Volumatric Efficiency, dependent on pressure and engine speed"																	
X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00	
1200.00	0.46	0.47	0.51	0.55	0.57	0.58	0.63	0.63	0.66	0.68	0.68	0.68	0.65	0.63	0.62	0.61	
1400.00	0.46	0.47	0.51	0.55	0.57	0.58	0.63	0.65	0.67	0.69	0.69	0.68	0.66	0.64	0.62	0.61	
1650.00	0.47	0.48	0.51	0.55	0.57	0.58	0.64	0.65	0.69	0.70	0.70	0.68	0.67	0.66	0.64	0.62	
2000.00	0.48	0.49	0.51	0.55	0.58	0.59	0.65	0.66	0.69	0 72	0 72	0.69	0.68	0.67	0.65	0.63	
2500.00	0.49	0.50	0.52	0.56	0.59	0.62	0.66	0.68	0.72	(A	dd		þ	0.69	0.66	0.65	
3000.00	0.50	0.51	0.53	0.56	0.60	0.63	0.67	0.70	0.75	(D	elete		3	0.72	0.71	0.69	
3800.00	0.51	0.52	0.55	0.58	0.61	0.67	0.70	0.74	0.78	(In	nport		6	0.75	0.72	0.71	
4400.00	0.52	0.53	0.57	0.60	0.67	0.73	0.74	0.76	0.82		opy		1	0.80	0.76	0.75	
5600.00	0.54	0.55	0.59	0.64	0.72	0.76	0.79	0.81	0.86	(Pa	aste		4	0.82	0.80	0.78	
7000.00	0.55	0.56	0.61	0.66	0.73	0.78	0.82	0.85	0.89	C	hange A	ias		0.86	0.84	0.83	
8000.00	0.55	0.58	0.62	0.68	0.74	0.78	0.82	0.86	0.89	0	ecimalo D	Nicplay	7	0.86	0.86	0.83	
10000.00	0.56	0.58	0.63	0.68	0.74	0.78	0.82	0.86	0.89	(21	D View		7	0.86	0.86	0.83	
										- 30	D View						_
Volumetric F	fficienc	v Table								Va	ariable Pi	roperties	; [
	linene	2 2010	,							W	/indow Pi	roperties	;				

			1	Selected Variables		
Decel-Fuel-Cut-Off	🖉 Decel-Fuel-Cut-Off					
+ 0.001 _ *	1 / Sei	lected = 1				
Input: Tm, [DegC],"prelook	up break points, e	ngine temperature	•"			
Output: CUR_NRsm_Tr	n, [Rpm],"char. cu	rve, fuel resuming	speed, depende	ent on engine temp.		
Tm/[DegC]	-30.00	-10.00	25.00	50.00	90.00	
CUR_NRsm_Tm/[Rpm]	4020	Add		3000	3000	
Engine speed threshold to e	cut the fuel off	Delete Import Export				
		Сору		🥖 Ambient pressure	6	Pam
		Paste		🕽 Desired Lambda		LamDsr
		Change	Alias 🔮	Wall file correctio	n factor in altitude	fWfAlt
		Decimals	s Display	Pre-control fuel fa	actor	fPreCt1
		2D View	· · · · · · · · · · · · · · · · · · ·	Fuel relative quar	ntity	F1
		3D View		Predicted Load		LdPrd
		Variable	Properties	Load based on T	PS	LđTp
		Window	Properties) Load		Lđ

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, click "OK".



AliasMa	nage	<u>×</u>
No.	Variable	Alias
1	Nraw	Raw engine speed
2	uTps	TPS sensor voltage
3	uMap	MAP sensor voltage
4	UbAdc	Voltage of battery
5	uTa	Intake air temp sensor voltage
6	uTm	Engine temp sensor voltage
7	uLsb	O2 sensor voltage
8	uPot	Potentiometer voltage
9	uBaro	
10	uMapLđ	
11	tSeg_1	Segment time
12	B_Tester	
13	tEngOff	
14	B_Syn	
15	IsChaoBan	
Searc	ch:	Search By: Variable
		OK. Cancel

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 "Desired lambda /AFR", now we change it to be "Desired lambda from customer"

👰 Desired l	ambda / Al	R											_ 🗆 ×
+ 0.001	+ 0.001 / Selected = 1												
Input-X: N, [Rpm],"break point, engine speed" Input-Y: TpsPrd, [%],"input <tpsequ>, break points, throttle position "</tpsequ>													
Output: MAP_LamDrv_Tps_N, [-],"characteristic map, Driver desired lambda, dependent on TPS and N"													
X/Y	1000.00	1500.00	1700.00	2000.00	2800.00	3600.00	4400.00	5000.00	6000.00	7000.00	8000.00	9000.00	1
0.0000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1
3.9139	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
6.5262	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1
9.1324	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
13.0478	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
16.9632	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
20.8786	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
24.7925	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
30.6168	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
38.1454	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
45.6711	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
52.1927	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
58.7158	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
65.2420	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
78.2898	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
99.9939	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Driver desir	ed lambda												

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

🗑 Desired la	ambda / Af	R										
+ 0.001	- *	1)	/ Sele	cted = 1								
Input-X: N, [Rpm],"break point, engine speed" Input-Y: TpsPrd, [%],"input <tpsequ>, break points, throttle position "</tpsequ>												
Output: N	MAP_LamD	rv_Tps_N,	[-],"charac	teristic map	, Driver de	sired lambd	a, depende	nt on TPS a	and N"			
							_					
X/Y	1000.00	1500.00	1700.00	2000.00	2800.00	3600.00	4400.00	5000.00	6000.00	7000.00	8000.00	9000.00
0.0000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3.9139	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6.5262	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
9.1324	1.00	1.00	1.00	1.00	1.00	Add		1.00	1.00	1.00	1.00	1.00
13.0478	1.00	1.00	1.00	1.00	1.00	Delete		1.00	1.00	1.00	1.00	1.00
16.9632	1.00	1.00	1.00	1.00	1.00	Export		1.00	1.00	1.00	1.00	1.00
20.8786	1.00	1.00	1.00	1.00	1.00	Conv		1.00	1.00	1.00	1.00	1.00
24.7925	1.00	1.00	1.00	1.00	1.00	Paste		1.00	1.00	1.00	1.00	1.00
30.6168	1.00	1.00	1.00	1.00	1.00	Change Alia	as	1.00	1.00	1.00	1.00	1.00
38.1454	1.00	1.00	1.00	1.00	1.00	Decimals Di	splay	1.00	1.00	1.00	1.00	1.00
45.6711	1.00	1.00	1.00	1.00	1.00	2D View		1.00	1.00	1.00	1.00	1.00
52.1927	1.00	1.00	1.00	1.00	1.00	3D View		1.00	1.00	1.00	1.00	1.00
58,7158	1.00	1.00	1.00	1.00	1.00	Variable Pro	operties	1.00	1.00	1.00	1.00	1.00
65,2420	1.00	1.00	1.00	1.00	1.00	Window Pro	operties	1.00	1.00	1.00	1.00	1.00
78,2898	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
99,9939	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

A little window pop-up, change the stock words to be "Desired lambda from customer", and then click "OK".

Window Property	Ľ	👿 Window Property	
Window Name: Desired lambda / AFR OK Cancel		Window Name:	Desired lambda from customer Cancel

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

🖉 Desired la	ambda fror	n custome	r									[<u>- 0 ×</u>
+ 0.001	- *	1,	/ Sele	cted = 1									
Input-X: N, [Rpm],"break point, engine speed" Input-Y: TpsPrd, [%],"input <tpsequ>, break points, throttle position "</tpsequ>													
🕢 Output: MAP_LamDrv_Tps_N, [-]," characteristic map, Driver desired lambda, dependent on TPS and N"													
X/Y	1000.00	1500.00	1700.00	2000.00	2800.00	3600.00	4400.00	5000.00	6000.00	7000.00	8000.00	9000.00	
0.0000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
3.9139	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
6.5262	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
9.1324	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
13.0478	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
16.9632	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
20.8786	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
24.7925	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
30.6168	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
38.1454	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
45.6711	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
52.1927	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
58.7158	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

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

5.1.5 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 as



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

Save Configuration							×
Compu	ter 👻 Local Disk (D:)	▼ SoftWare_LLD ▼ SEA_b1_7_3	7_1 -	•	Search SEA_b1_7	_7_1	2
Organize 🔻 New folder						-	•
🕀 📑 Documents 🖉	Name ^			Date modified	Туре	Size	
	📕 2T1C			2015/7/23 16:00	File folder		
🗄 📄 Subversion							
🛨 🔣 Videos							
🖃 🌉 Computer							
🕀 🏭 Local Disk (C:)							
🕀 👝 Local Disk (D:)							
🕀 👝 Local Disk (E:)	-						
🕀 📻 Local Disk (F:)	•						
File <u>n</u> ame <mark>:</mark> Cu	stomer Config						•
Save as type: ini(*.ini)						•
Hide Folders					<u>S</u> ave	Cancel	

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

Go to menu->File->Save Configuration as

File	Edit	Settings	Run	Variables	Diag	nostics	Advance	ed
Op	en			Ctrl+O		0		
Sa	ve			Ctrl+S		-		
Sa	ve as							
Sa	ve Co	nfiguration	ı	Ctrl+F2	2	CCDA	_C_1	
Sa	ve Co	onfiguration	1 as			_b17	71_41	ļļ
Lo	ad Co	nfiguration	ı	Ctrl+F3	3	I ⁻		
De	fault	Configurat	ion Res	et				
Ex	it							

5.1.6 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.

5.1.7 Load configuration

Sometimes, we will send the page configuration based on your custom EFI 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

Fi	e Edit	Settings	Run	Variables	Diagnostics	Advanced	d Help
	Open			Ctrl+O	0		
	Save			Ctrl+S		— r	
	Save as						Destined tills a
1	Save Co	onfiguration	n	Ctrl+F	2 CCDA	_C_1	O Desired Idle S
I	Save Co	onfiguration	n as		b17	71 41	+ 0.001 -
	Load Co	nfiguratior	۱	Ctrl HF:	3	-	Input: Tm, [DegC
1	Default	Configurat	ion Re	set			Output: CUR_
	Exit						
-							Tm/[DegC
							CUR_NDsr_Tm

Choose the configuration file then click "Open".

o Load Configuration				×
Computer	· ← Local Disk (D:) ← SoftWare_LLD ← SEA_b1_7_7_1 ←	•	Search SEA_b1_7_	7_1
Organize 🔻 New folder				= - 🗌 😧
★ Favorites	Name *	Date modified	Туре	Size
📃 Desktop	1 2T1C	2015/7/23 16:00	File folder	
Downloads	🚰 Customer Conifg	2015/7/24 10:19	Configuration settings	9 KB
Libraries Documents Music Pictures Subversion Videos				
File n	name: Customer Conifg		▼ ini(*.ini)	•
	J		Open -	Cancel

5.2 Diagnostics

5.2.1 Read the DTC of EFI

When you connect ECU to laptop successfully, you can run the diagnostics window to read the DTC, if there is something wrong, you can see the message in the diagnostics window.

Note: The diagnostics window only wills pop-up when the ECU is connected. If the ECU is not connected, you can't click the button to pop-p the window.

Go to menu->Diagnostics->ECU Diagnostics



Click Read DTC, if all are right, the message will be "System is working properly!"



If there is something wrong in EFI, the fault message will be shown; you need to check the part of EFI.

Fault1: There is something wrong with the TPS sensor!	
	Read DTC
	Clear DTC
	Exit

If you have fixed the issue, you can click "Clear DTC" to clear DTC code.

Click "Exit" to exit the Diagnostic window.

5.2.2 Failed to connect to ECU

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

- 1. Is the ECU 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 ECU via a built-in COM port or USB adaptor?
- 5. If you use a built-in COM port of the computer, please go to "setting \rightarrow communication settings" and select COM port.
- If you use an USB adaptor, is it made by ECOTRONS? If yes, you need to go to "setting → communication settings" and select USB.
- 7. If you use an USB adaptor from a third party, you need to select COM port and manually set the COM port number.

Communication Settings	×
Select the communication mode.	
	Open Device Close Device Cancel

How to manually set the COM port:

1) Find out the virtual COM port # from USB to RS232 converter, by going to "My Computer", right click and select "Mange".



2) Then click "Device Manager" tab.



3) You will get the below window:


- 4) Find the virtual COM port #, and write it down. Then start the EcoCAL:
- 5) Go to menu->Settings->Communication settings"; you will get the below window, select the COM port # you wrote down. And "OK".

Communication Settings	×
Select the communication mode.	COM Settings Port Num Baud Rate 115200 V
	Open Device
	Close Device
	Cancel

5.3 Advanced function of EcoCAL

5.3.1 Calibrations Data manger

Go to menu->Advanced->Calibration Data Manger

File	Edit Settings Run Variables Diagnostics	Advanced Help
	■ ₩ \$5 ► ● ■ ₩ ❷	Input Password to burn and fetch Calibration Data Manager
•	-Project	Get ECU Version t facto
	SEA b1771 4T2CCDA	Page Setting
1	NA DIEGO SEA 117	Alias Manager
	NA_DLE00_SEA_017	
	Calibration	Alias
		Global fuel enrichment factor
C Con	ipare v2.3	
_ ⊂ Selec	t Files	Operate
Sourc	Browse	Compare Copy Output file format: .txt
Targe	t Files: Browse	Calibration Variables
- Files	Loaded	BreakPoints CURVE MAP VALUE
Files	A2L File CAL File	
Targ	jet Files	
Comp	pare result information	
V/	ALUE:	
C	JRVE:	
м	AP:	Number of Calibrations:

How to compare and copy files?

- 1) Open the software "Compare V2.3" 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)

C	Compare v2.3	
	Select Files	Operate
	Source Files: Browse	Compare Copy Output file format: .txt
	Target Files: Browse	Calibration Variables
	Files Loaded	BreakPoints CURVE MAP VALUE

Wait for about ten seconds.

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

Compare result information	·
CUBVE:	
MAP:	View
Analyze successful!	

3) Copy the date file.

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

- Operate		
Compare	Сору	Output file format: .txt
- Calibration Variables -		
BreakPoints	CURVE	MAP VALUE

Precessing...

Copy Result informations	
Number of variables: 87	
	View



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

C Target file(S12P)						X
🕞 🕞 🗸 🕹 🗸 Compu	iter 🔻 Local Disk	<(D:) ▼ SoftWare_LLD ▼ SEA_b1_7_7_1 ▼	•	Search SEA_b1_	7_7_1	2
Organize 🔻 New folder	,				•	?
-	Name ^		Date modified	Туре	Size	
Libraries	📕 2T1C		2015/7/23 16:00	File folder		
Music	NA_DI	LE60_SEA_b1771_4T2CCDA-1.1M_L588_CrII148_E3_V1	2015/6/17 16:07	CAL File	17 KB	
Pictures						
Subversion						
Computer						
Local Disk (C:)						
Local Disk (E:)						
Local Disk (F:)						
	•					
File name: Ne	w_copy_file					•
Save as type: cal	(*.cal)					•
Aide Folders				Save	Cancel	
					1	_ //

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.

Compare	Сору	Output file form	nat: .cal
Calibration Variables -		мар	VALUE
DicaM Onto			
Message	Save the Compare	e result information?	×
	Ok	Cance	1



You can see the result through follow method.

Compare Result informations	
VALUE: 0	
CURVE: 0	
MAP: 0	View
Compare successful!	

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

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

Compare Result informations	
VALUE: 0	
CURVE: 0	
MAP: 0	View
Compare successful!	



📕 compare - Notepad	
File Edit Format View Help	
New Version Calibration Comparison Rep	ort 📃
Reference calibration data: Comparison calibration data: Created by: Created on: Number of Differences:	D:\SoftWare_LLD\SEA_b1_7_4_2\4T1C\4T1CCD-IA3.0\CDI_4T_5 D:\SoftWare_LLD\SEA_b1_7_4_2\4T1C\4T1CCD-IA3.0\CDI_4T_5 Default User 2015/7/25_10:35:32 VAL=0, CURVE=0, MAP=0
	D:\SoftWare_LLD\SEA_b1_7_4_2\4T1C\4T1CCD-IA3.0\CDI_4T_
Name	Units Value
•	

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 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,

🗑 Volumetric	Volumetric Efficiency Table																
+ 0.001 .		* 1	1	Selected	i = 1												
Input-X: Pim, [hPa], "input <map>, break point, manifold absolute pressure, for Volumatric Efficiency factor" Input-Y: N, [Rpm], "input<n>, break point, engine spe</n></map>																	
Output: RAM_MAP_fVe_Map_N, [-],"Factor Volumatric Efficiency, dependent on pressure and engine speed"																	
X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00	
1200.00	0.46	0.47	0.51	0.55	0.57	0.58	0.63	0.63	0.66	0.68	0.68	0.68	0.65	0.63	0.62	0.61	
1400.00	0.46	0.47	0.51	0.55	0.57	0.58	Add			0.69	0.69	0.68	0.66	0.64	0.62	0.61	
1650.00	0.47	0.48	0.51	0.55	0.57	0.58	Delet	-		0.70	0.70	0.68	0.67	0.66	0.64	0.62	
2000.00	0.48	0.49	0.51	0.55	0.58	0.59	Impo	~ rt		0.72	0.72	0.69	0.68	0.67	0.65	0.63	
2500.00	0.49	0.50	0.52	0.56	0.59	0.62	Expo	rt		0.75	0.74	0.72	0.70	0.69	0.66	0.65	
3000.00	0.50	0.51	0.53	0.56	0.60	0.63	Сору			0.78	0.77	0.75	0.73	0.72	0.71	0.69	
3800.00	0.51	0.52	0.55	0.58	0.61	0.67	0.67 Paste			0.81	0.80	0.77	0.76	0.75	0.72	0.71	
4400.00	0.52	0.53	0.57	0.60	0.67	0.73	Chan	ae Alias		0.85	0.83	0.82	0.81	0.80	0.76	0.75	
5600.00	0.54	0.55	0.59	0.64	0.72	0.76	Decin	nals Displa	У	0.89	0.87	0.84	0.84	0.82	0.80	0.78	
7000.00	0.55	0.56	0.61	0.66	0.73	0.78	2D VI	ew		0.91	0.89	0.87	0.87	0.86	0.84	0.83	
8000.00	0.55	0.58	0.62	0.68	0.74	0.78	3D VI	ew ble Proper	ties	0.91	0.89	0.87	0.87	0.86	0.86	0.83	
10000.00	0.56	0.58	0.63	0.68	0.74	0.78	Wind	ow Proper	ties	0.91	0.89	0.87	0.87	0.86	0.86	0.83	
Volumetric Fi	fficiency	Table															
volumetric E	inciency	Table															

The "Display setup" window pops up,

🖉 Display setup	×
Value decimals	
2	
X-Axis decimals	
2	
Y-Axis decimals	
2	
OK Cancel	

You can set the decimals, then click OK,

ent o	n pressu		1	
		🐼 Display setup 🔀		
0.00	650.00		0	1050.
.63	0.66	Value decimals		0.61
.65	0.67	4		0.61
.65	0.69		Ŀ	0.62
.66	0.69	X-Axis decimals		0.63
.68	0.72	4		0.65
.70	0.75			0.69
.74	0.78	Y-Axis decimals		0.71
.76	0.82	4		0.75
.81	0.86			0.78
.85	0.89			0.83
.86	0.89	OV Const		0.83
.86	0.89	OK Cancel		0.83

Then, you can see the difference.

🕈 Volumetrie	c Efficienc	y Table															_ 🗆
+ 0.001 .	- *	1	/ S	elected =	1												
put-X: Pim,	[hPa],"inp	ut <map>,</map>	break poi	nt, manifol	d absolut	e pressure	, for Volur	natric Effic	iency fact	tor" Inpu	t-Y: N, [Rj	om],"input	t <n>, brea</n>	k point, er	ngine spee	ed, for Vol	ımatr
Output: RA	AM_MAP	_fVe_Ma	_N, [-],"F	actor Volu	umatric Eff	iciency, de	ependent	on pressu	re and eng	ine speed							
																	· · · ·
X/Y	300.0000	350.0000	400.0000	430.0000	460.0000	500.0000	550.0000	600.0000	650.0000	700.0000	750.0000	800.0000	850.0000	900.0000	970.0000	1050.0000	1
1200.0000	0.4627	0.4693	0.5119	0.5456	0.5662	0.5818	0.6253	0.6340	0.6634	0.6849	0.6841	0.6774	0.6546	0.6348	0.6159	0.6059	1
1400.0000	0.4637	0.4693	0.5119	0.5456	0.5662	0.5818	0.6253	0.6475	0.6707	0.6911	0.6941	0.6784	0.6562	0.6362	0.6180	0.6059	1
1650.0000	0.4737	0.4783	0.5119	0.5456	0.5662	0.5818	0.6353	0.6535	0.6889	0.6976	0.7043	0.6812	0.6661	0.6581	0.6359	0.6159	1
2000.0000	0.4837	0.4863	0.5119	0.5456	0.5762	0.5912	0.6453	0.6644	0.6937	0.7182	0.7161	0.6937	0.6758	0.6744	0.6491	0.6291	
2500.0000	0.4937	0.4963	0.5219	0.5556	0.5862	0.6218	0.6553	0.6773	0.7173	0.7484	0.7412	0.7204	0.7019	0.6888	0.6616	0.6480	
3000.0000	0.5039	0.5097	0.5341	0.5603	0.5962	0.6332	0.6732	0.6998	0.7474	0.7843	0.7742	0.7475	0.7350	0.7221	0.7069	0.6865	1
3800.0000	0.5098	0.5246	0.5473	0.5825	0.6117	0.6660	0.6985	0.7408	0.7839	0.8051	0.7964	0.7726	0.7602	0.7463	0.7218	0.7061	1
4400.0000	0.5241	0.5312	0.5657	0.6013	0.6658	0.7277	0.7447	0.7604	0.8223	0.8489	0.8293	0.8155	0.8052	0.7976	0.7607	0.7491	1
5600.0000	0.5404	0.5467	0.5851	0.6378	0.7195	0.7629	0.7886	0.8064	0.8623	0.8889	0.8693	0.8410	0.8356	0.8249	0.8015	0.7814	
7000.0000	0.5471	0.5641	0.6118	0.6627	0.7284	0.7828	0.8156	0.8484	0.8923	0.9089	0.8893	0.8710	0.8656	0.8649	0.8423	0.8297	
8000.0000	0.5522	0.5848	0.6247	0.6818	0.7369	0.7828	0.8156	0.8554	0.8923	0.9089	0.8893	0.8710	0.8656	0.8649	0.8591	0.8297	1
10000.0000	0.5573	0.5839	0.6258	0.6837	0.7369	0.7828	0.8156	0.8554	0.8923	0.9089	0.8893	0.8710	0.8656	0.8649	0.8591	0.8297	1
olumetric E	fficiency T	able															

5.3.3 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.

🗑 Start fuel													<u>- 🗆 ×</u>
+ 0.001 - *	1 /	Sele	cted = 1										
Input: TmSta, [DegC],"bre	eak points,	engine ten	perature a	t start "									
Output: CUR_fCldSta	_TmSta, [-]	,"start fuel	factor for	cold start,	dependent	t on engine	start temp). "					
TmSta/[DegC]	-30.00	-20.00	-10.00	0.00	10.00	20.00	25.00	30.00	35.00	40.00	55.00	70.00	
CUR_fCldSta_TmSta	10.00	9.00	7.50	6.00	4.25	2.00	2.00	1.50	1.50	1.25	1.00	1.00	
						Add							-
						Dele	ete						
1						Imp	ort						
Start fuel factor						Exp	ort	[
Start Inctor						Cop	y						
						Pas	te	L					
						Cha	nge Alias	[
						Dec	imals Displa	y I					
						2D \	/iew						
						3D V	/iew						
						Vari	able Proper	ties					
						Win	dow Proper	ties					

Variable properties		X
Property	Value	
Name	CUR fCldSta TmSta -	-
Alias	Start fuel factor	
Long Identifier	"start fuel factor for cold start, depe	
Туре	CURVE	
Lower Limit	0	
Upper Limit	64	
X-Axis Points	BP_fCldSta_TmSta	
X-Axis Reference to Inp	TmSta	
X_Point Description	"break points, engine temperature at	
Y-Axis Points		
Y-Axis Reference to Inp		
Y_Point Description		
Memory Address	0x41A9	
Conversion Method	COMPU_METHOD_43	
Conversion Formula	"O = V*4 000000"	·

Measure variables' properties:

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

<u> </u>	Selected Variables				<u>_ </u>
	Alias	Name	Value	Unit	I ▲
0	Throttle Position Sensor	Tps		%	2
0	Raw engine speed	Nraw Variab	e Selection	Rpm	2
0	Lambda	Lam\ Chang	e Alias		2
0	Battery voltage from ADC channel	UbA Window	e properties	v	2
0	O2 sensor voltage	uLsb	// Froperices	v	2
0	Fuel factor closed-loop control	fLc		-	2
0	dmEuel	dmEnal		a/min	1

Property	Value
Name	Tps
Alias	Throttle Position Sensor
Long Identifier	"throttle position with respect to lov
Туре	UWORD
Lower Limit	0
Upper Limit	100
X-Axis Points	
X-Axis Reference to Inp	
X_Point Description	
Y-Axis Points	
Y-Axis Reference to Inp	
Y_Point Description	
Memory Address	0x34A2
Conversion Method	COMPU_METHOD_10
Conversion Formula	"O = V*655 360000"

5.3.4 Virtual Oscilloscope



1) Right click on the blank area of window, click "Calibration Selection"

You also can go to menu->Variables->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 Oscillscope window, here, we ass the "Tps", "N", "uMap", "UbAda" variables as example.

🖉 Add Measurements						×
UbAdc	Search					Search
UbAdc UbAdc		Add To Syn >>	Name		Rate	
UbAdcIni			Ips N		20ms Svn	
uBaro		Add To 20ms >>	uMap		20ms	
UD_B_WmpEnd			UbAdc		20ms	
UD_Cnt_1s UD_CSIMM_Ld UD_CSIMM_Ld1 UD_CSIMM_Ld2 UD_CSIMM_Map2 UD_CSIMM_PimMod UD_CSIMM_Piman		Add To 100ms >>				
UD_CSLDP_LdPrd UD_CSN_N	.	<< Delete				
A11 :918		Syn :1	20ms :3	100ms :0	ОК	Cancel

3) Click "OK", the Scope will pop up.

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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.

Properties					- 🗆 🗵
🔏 General	ShowName	ShowType	YAxis Range	Line color	Visible
Varibles	Throttle Position Sensor	Alias	0~100		Yes
	MAP sensor voltage	Alias	0~5		Yes
	Battery voltage from ADC channel	Alias	0~25.6000003814697		Yes
	Engine Speed	Alias	0~16383		Yes
				ОК	Cancel

5.3.5 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.

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👿 Volumetrie	c Efficien	cy Table														_	
+ 0.001 .		* 1	1	Selecter	i = 1												
Input-X: Pim,	[hPa],"inj	put <map< td=""><td>>, break</td><td>point, ma</td><td>nifold ab</td><td>solute pr</td><td>essure,</td><td>for Volum</td><td>atric Effi</td><td>ciency fa</td><td>ctor" In</td><td>put-Y: N</td><td>, [Rpm],"</td><td>input<n></n></td><td>>, break p</td><td>ooint, eng</td><td>ine spee</td></map<>	>, break	point, ma	nifold ab	solute pr	essure,	for Volum	atric Effi	ciency fa	ctor" In	put-Y: N	, [Rpm],"	input <n></n>	>, break p	ooint, eng	ine spee
😯 Output: R.4	AM_MA	P_fVe_M	ſap_N, [-],"Factor	Volumat	ric Efficie	ncy, de	pendent o	n pressu	re and en	igine spe	ed"					
N/V	200.00	250.00	400.00	420.00	160.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	050.00	000.00	070.00	1050.00	
A/1	300.00	300.00	400.00	450.00	400.00	500.00	550.00	000.00	00.00	/00.00	/50.00	800.00	800.00	900.00	970.00	1050.00	
1200.00	0.46	0.47	0.51	0.55	0.57	0.58	0.63	0.63	0.66	0.68	0.68	0.68	0.65	0.63	0.62	0.61	
1400.00	0.46	0.47	0.51	0.55	0.57	0.58	0.63	0.65	0.67	0.69	0.69	0.68	0.66	0.64	0.62	0.61	
1650.00	0.47	0.48	0.51	0.55	0.57	0.58	0.64	0.65	0.69	0.70	0.70	0.68	0.67	0.66	0.64	0.62	
2000.00	0.48	0.49	0.51	0.55	0.58	0.59	0.65	0.66	0.69	0.72	0.72	0.69	0.68	0.67	0.65	0.63	
2500.00	0.49	0.50	0.52	0.56	0.59	0.62	0.**		0.70	ρ.75	0.74	0.72	0.70	0.69	0.66	0.65	
3000.00	0.50	0.51	0.53	0.56	0.60	0.63	0.	Add Delete		0.78	0.77	0.75	0.73	0.72	0.71	0.69	
3800.00	0.51	0.52	0.55	0.58	0.61	0.67	0.	Import		0.81	0.80	0.77	0.76	0.75	0.72	0.71	
4400.00	0.52	0.53	0.57	0.60	0.67	0.73	0.	Export		0.85	0.83	0.82	0.81	0.80	0.76	0.75	
5600.00	0.54	0.55	0.59	0.64	0.72	0.76	0.	Сору		0.89	0.87	0.84	0.84	0.82	0.80	0.78	
7000.00	0.55	0.56	0.61	0.66	0.73	0.78	0.	Paste		0.91	0.89	0.87	0.87	0.86	0.84	0.83	
8000.00	0.55	0.58	0.62	0.68	0.74	0.78	0.	Change Ali	as	0.91	0.89	0.87	0.87	0.86	0.86	0.83	
10000.00	0.56	0.58	0.63	0.68	0.74	0.78	0.	Decimals D	isplay	0.91	0.89	0.87	0.87	0.86	0.86	0.83	
								2D View									
								3D view									
									operties								
Volumetric E	fficiency	Table					_	window Pr	operties								



🗑 Start fuel													
+ 0.001 _ *	1 /	Sele	ected = 1										
Input: TmSta, [DegC],"bro	eak points,	engine ten	nperature a	t start "									
Output: CUR_fCldSta	TmSta, [-]	,"start fue	l factor for	cold start,	depender	nt on engine	start temp	o. "					
TmSta/[DegC]	-30.00	-20.00	-10.00	0.00	10.00	20.00	25.00	30.00	35.00	40.00	55.00	70.00	
CUR_fCldSta_TmSta	10.00	9.00	7.50	6.00	4.2	Add		1.50	1.50	1.25	1.00	1.00	
						Delete							
1						Import							
						Export							
Start fuel factor						Сору							
						Paste							
						Change Alias	;						
					_	Decimals Dis	olav						
						2D View							
						3D View							
						Variable Prop	perties						
						Window Prop	perties						



5.3.6 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",

🗑 Volumetr	ic Efficie	ncy Table	2													_0
+ 0.001	-	* 1	1	Selecte	d = 1											
Input-X: Map	o, [hPa],":	input <ma< td=""><td>ap>, brea</td><td>ak point, n</td><td>nanifold a</td><td>ibsolute p</td><td>pressure,</td><td>for Volur</td><td>natric Effi</td><td>iciency fa</td><td>ctor" Ir</td><td>put-Y: N</td><td>, [Rpm],":</td><td>input<n></n></td><td>, break p</td><td>oint, engine :</td></ma<>	ap>, brea	ak point, n	nanifold a	ibsolute p	pressure,	for Volur	natric Effi	iciency fa	ctor" Ir	put-Y: N	, [Rpm],":	input <n></n>	, break p	oint, engine :
🕜 Output: R	AM_MA	P_fVe_N	Map_N,	[-],"Factor	r V <mark>olu</mark> mat	ric Efficie	ency, dep	endent o	n pressu	re and en	gine spee	d"				
X/V	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00
1200.00	0.46	0.51	0.54	0.50	0.00	0.61	0.63	0.64	0.66	0.68	0.68	0.68	0.65	0.63	0.62	0.61
1400.00	0.48	0.53	0.56	0.59	0.60	0.62	0.65	0.67	0.68	0.69	0.69	0.68	0.66	0.64	0.62	0.61
1650.00	0.50	0.55	0.58	0.61	0.62	∩ ₁ 64	0.67	0.68	0.70	0.70	0.70	0.68	0.67	0.66	0.64	0.62
2000.00	0.52	0.57	0.60	Add		66	0.69	0.70	0.71	0.72	0.72	0.69	0.68	0.67	0.65	0.63
2500.00	0.54	0.59	0.62	Delete		68	0.71	0.73	0.74	0.75	0.74	0.72	0.70	0.69	0.66	0.65
3000.00	0.56	0.60	0.64	Export		70	0.72	0.75	0.77	0.78	0.77	0.75	0.73	0.72	0.71	0.69
3500.00	0.59	0.62	0.67	Сору		73	0.75	0.76	0.78	0.81	0.80	0.77	0.76	0.75	0.72	0.71
4000.00	0.60	0.64	0.69	Paste		.75	0.76	0.79	0.82	0.85	0.83	0.82	0.81	0.80	0.76	0.75
5000.00	0.62	0.67	0.71	Change /	Alias	76	0.79	0.83	0.86	0.89	0.87	0.84	0.84	0.82	0.80	0.78
6000.00	0.65	0.68	0.72	Decimals	Display	78	0.82	0.85	0.89	0.91	0.89	0.87	0.87	0.86	0.84	0.83
7000.00	0.64	0.68	0.72	2D View		78	0.82	0.86	0.89	0.91	0.89	0.87	0.87	0.86	0.86	0.83
8000.00	0.65	0.68	0.73	3D VIEW	Properties	78	0.82	0.86	0.89	0.91	0.89	0.87	0.87	0.86	0.86	0.83
				Window F	Properties											
Volumetric		Table	_													
· orantetrie																

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

🗑 Volumeti	Volumetric Efficiency Table																
+ 0.001	+ 0.001 _ * 1 / Selected = 1																
Input-X: Ma	put-X: Map, [hPa], "input <map>, break point, manifold absolute pressure, for Volumatric Efficiency factor" Input-Y: N, [Rpm], "input<n>, break point, engine spe</n></map>																
Output: F	Output: RAM_MAP_fVe_Map_N, [-], "Factor Volumatric Efficiency, dependent on pressure and engine speed"																
																	_
X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00	
1200.00	0.46	0.51	0.54	0.58	0.60	0.61	0.63	0.64	0.66	0.68	0.68	0.68	0.65	0.63	0.62	0.61	
1400.00	0.48	0.53	0.56	0.59	0.60	0.62	0.65	0.67	0.68	0.69	0.69	0.68	0.66	0.64	0.62	0.61	
1650.00	0.50	0.55	0.58	0.61	0.63	0.64	0.67	0.68	0.70	Add		B	0.67	0.66	0.64	0.62	
2000.00	0.52	0.57	0.60	0.63	0.65	0.66	0.69	0.70	0.71	Delete		P	0.68	0.67	0.65	0.63	
2500.00	0.54	0.59	0.62	0.65	0.67	0.68	0.71	0.73	0.74	Import		2	0.70	0.69	0.66	0.65	
3000.00	0.56	0.60	0.64	0.67	0.69	0.70	0.72	0.75	0.77	Export		5	0.73	0.72	0.71	0.69	
3500.00	0.59	0.62	0.67	0.68	0.70	0.73	0.75	0.76	0.78	Сору		7	0.76	0.75	0.72	0.71	
4000.00	0.60	0.64	0.69	0.70	0.73	0.75	0.76	0.79	0.82	Paste		2	0.81	0.80	0.76	0.75	
5000.00	0.62	0.67	0.71	0.73	0.75	0.76	0.79	0.83	0.86	Change	Alias	4	0.84	0.82	0.80	0.78	
6000.00	0.65	0.68	0.72	0.74	0.77	0.78	0.82	0.85	0.89	2D View	s Display	7	0.87	0.86	0.84	0.83	
7000.00	0.64	0.68	0.72	0.74	0.77	0.78	0.82	0.86	0.89	2D View 3D View	,	7	0.87	0.86	0.86	0.83	
8000.00	0.65	0.68	0.73	0.74	0.77	0.78	0.82	0.86	0.89	Variable	Propertie	s 7	0.87	0.86	0.86	0.83	
										Window	Propertie	s					
		T 11										_					_
Volumetric	Efficiency	Table															

You can see the values of cells are changed.

5											1.07	1.004				
Volumetr	ric Efficie	ncy Table	2													
+ 0.001	-	* 1	1	Selecte	d = 1											
Input-X: Ma	p, [hPa],"	input <ma< td=""><td>ap>, brea</td><td>k point, n</td><td>anifold a</td><td>bsolute p</td><td>oressure,</td><td>for Volun</td><td>natric Effi</td><td>ciency fa</td><td>ctor" Ir</td><td>put-Y: N</td><td>, [Rpm],"i</td><td>input<n></n></td><td>, break p</td><td>oint, engine s</td></ma<>	ap>, brea	k point, n	anifold a	bsolute p	oressure,	for Volun	natric Effi	ciency fa	ctor" Ir	put-Y: N	, [Rpm],"i	input <n></n>	, break p	oint, engine s
😯 Output: R	Output: RAM_MAP_fVe_Map_N, [-], "Factor Volumatric Efficiency, dependent on pressure and engine speed"															
X/Y	300.00	350.00	400.00	430.00	460.00	500.00	550.00	600.00	650.00	700.00	750.00	800.00	850.00	900.00	970.00	1050.00
1200.00	0.46	0.51	0.54	0.58	0.60	0.61	0.63	0.64	0.66	0.68	0.68	0.68	0.65	0.63	0.62	0.61
1400.00	0.48	0.53	0.56	0.59	0.60	0.62	0.65	0.67	0.68	0.69	0.69	0.68	0.66	0.64	0.62	0.61
1650.00	0.50	0.55	0.58	0.61	0.63	0.64	0.67	0.68	0.55	0.58	0.61	0.68	0.67	0.66	0.64	0.62
2000.00	0.52	0.57	0.60	0.63	0.65	0.66	0.69	0.70	0.57	0.60	0.63	0.69	0.68	0.67	0.65	0.63
2500.00	0.54	0.59	0.62	0.65	0.67	0.68	0.71	0.73	0.59	0.62	0.65	0.72	0.70	0.69	0.66	0.65
3000.00	0.56	0.60	0.64	0.67	0.69	0.70	0.72	0.75	0.60	0.64	0.67	0.75	0.73	0.72	0.71	0.69
3500.00	0.59	0.62	0.67	0.68	0.70	0.73	0.75	0.76	0.62	0.67	0.68	0.77	0.76	0.75	0.72	0.71
4000.00	0.60	0.64	0.69	0.70	0.73	0.75	0.76	0.79	0.64	0.69	0.70	0.82	0.81	0.80	0.76	0.75
5000.00	0.62	0.67	0.71	0.73	0.75	0.76	0.79	0.83	0.86	0.89	0.87	0.84	0.84	0.82	0.80	0.78
6000.00	0.65	0.68	0.72	0.74	0.77	0.78	0.82	0.85	0.89	0.91	0.89	0.87	0.87	0.86	0.84	0.83
7000.00	0.64	0.68	0.72	0.74	0.77	0.78	0.82	0.86	0.89	0.91	0.89	0.87	0.87	0.86	0.86	0.83
8000.00	0.65	0.68	0.73	0.74	0.77	0.78	0.82	0.86	0.89	0.91	0.89	0.87	0.87	0.86	0.86	0.83
		T 11														
volumetric.	Efficiency	able														

5.3.7 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.

Example #1:

RAM_MAP_LdTp_Tps, the Input-X is "N", and the Input_Y is "Tps", so we add the "N" and "Tps" variables in selected variables. When you start measuring, the "N" and "Tps" variables have value, and then the cell of table will be highlight.

									3	Selected \	/ariables					
TPS hase	ed load ma	nning and	Volumetr	ic Efficient	v table				-				Name	Value	Unit	Rate
0.001		pping and	(0	1	a de la composición de								LdPrd	20.86	%	Syn
+ 0.001			/ 5	elected =									LdTp	36.80	%	Syn
Input-X: N,	Rpm],"brea	ik point, er	ngine spee	d" Input	-Y: Tps, [%	6],"input<	ſpsEqu>, l	oreak point	ts, throttle	position "			N	4280.50	Rpm	Syn
Output: H	RAM_MAI	P_LdTp_T	ps_N, [%]	"characte	ristic map,	normalized	l load base	d on TPS :	and engine	e speed (A	lpha/N mo	del)"	tInj0	3.22	ms	Syn
V/V	1400.00	2000.00	2000.00	4000.00	5000.00	6000.00	7000.00	7500.00	8000.00	8500.00	0000.00	10000.00	fVe	0.86		Syn
0.0000	0.0000	0.0000	0.0000	4000.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	nInj	982		Syn
2 2005	25 1710	22 7813	22.0781	21 3084	21 3084	10 7578	18 1172	17 2060	16.4766	15 6328	14 8125	13 1719	Map	256.95	hPa	Syn
6 5811	28 8047	26 3438	25 5703	24 7060	24 7060	22 0453	21.0038	20 1563	10.4700	18 3047	17 3006	15 5301	Pim	256.95	hPa	Syn
0.2011	32 /375	28.0453	28 1250	27 3047	27 3047	25 3125	23 3/38	22,1305	21 3516	20.3672	10 3504	17 3906	uTps	1.94	V	20ms
13 1561	34 5703	32.0625	31 1710	30 3047	30 3047	25.5125	25.5458	25.0313	23.0766	20.3072	21 8906	19 7813	UbAdc	12.69	V	20ms
17 1051	36 2813	33 7734	32 8828	31 0022	31 0022	20.1999	27 7500	26.6053	25.6406	24 5625	23 5078	21 3084	LamWO2	1.00		20ms
21.0510	40.2801	36 7266	35 8125	34 8084	34 8084	32 6053	30.4022	20.0555	28 2801	27 1875	26.0850	23.8828	Task_Enable	1		20ms
24 9985	42 8203	39 2813	38 3439	37 4063	7 4063	35 1563	32 9063	31 7813	30,6563	29 5547	28.4297	26 1797	Nraw	4289.00	Rpm	20ms
32 8918	48 8203	46 2422	45 28 3	45 2813	43 9891	40.9688	38 6484	37 5000	36 3281	35 1563	34.0078	31.6875	Tps	28.94	%	20ms
39 4699	52,5000	48 9609	48 9609	48 0000	48 0000	45 6797	43 3594	42.1875	41 0156	39 8672	38 6953	36 3750	uLsb	0.45	V	20ms
46 0495	55 8984	52.3125	54 3516	3 2006	53 3906	51 0938	48 7969	47 6484	46 4766	45 3281	44 1797	41 8828	fLc	1.00	-	20ms
52,6276	60.6328	55.0781	58 1484	59 2031	59 2031	56 9531	54 7031	53 6016	52,4766	51 3516	50 2266	47 9766	Tm	29	DegC	100ms
59 2026	66 3516	60.7969	64.8750	66,9844	67,9922	66.8438	64.6875	63 6094	61.5234	59 4609	58.3828	56.2266	B_UnTp	0		100ms
65 7822	70 7109	65 1797	68 3438	73 5000	76 5000	75 4922	75 4688	73 4531	72,4453	70 4766	68 4609	66 4453	Ta	28	DegC	100ms
78,9398	78.3516	73.9688	77.3906	80,7188	84,7266	85.2891	85.8281	85.0313	85,2891	83.6484	82,9219	80.6016	LamDsr	1.00	-	100ms
99.9878	82,7344	77 7422	84 7500	86 7656	88 7578	88 7578	88 7813	88 7813	88 7578	86 7656	86 7656	88 7578	fAlt	0.96		100ms
		Valum	atula Effici	anan Tabl									fPreCtl	1.14		100ms
IPS based	load mappin	g_volum	etric Effici	lency 1 abl	<u> </u>								fTcmb	0.95		100ms

Example #2:

CUR_fWmp_Tm, the Input is "Tm", so we add the "Tm" variable in selected variables.

🤞 v	/arm up fuel fac	tor												<u>_ ×</u>
+	0.001 _	* 1	1	Selected =	1									
Inpu	t: Tm, DegC],"p	relookup b	reak point	ts, engine te	mperatur	e "								
0	utput: CUR_fW	mp_Tm, [-]	,"Char. Cı	urve, warm-u	ıp factor,	depender	nt on engin	e temp."						
~	Im/[DegC]	-30	-25	-20	-10	-10	0	12	20	30	45	00	/0	
CL	K_fwmp_1m	1.25	1.25	1.25	1.00	0.60	0.40	0.25	0.16	0.13	0.10	0.08	0.00	
Wa	m up fuel factor									\sim				
78	elected Variabl	es												
	1													
	Alias			Name	Valu	le 1	Unit	Rate						
	Throttle Positio	on Sensor		Tps	0.00		%	20ms						
	Raw engine sp	eed		Nraw	1563	.00 1	Rpm	20ms						
•	Lambda			LamWO2	1.00			20ms						
C	Battery voltage	e from ADO	channel	UbAdc	12.6	9 '	V	20ms						
C	Engine tempera	ature		Tm	29	1	DegC	100ms						
•	Intake air temp	erature		Ta	28]	DegC	100ms						
	Ambient press	ure		Pam	1010	0.00 1	hPa	100ms						
	Pre-control fue	l factor		fPreCt1	1.30			100ms						
	After-start fuel	factor		fAst	1.00			100ms						
	Warm-up fuel f	actor		fAstWmp	1.30			100ms						
	Engine-start en	ıd		B_StaEnd	1			100ms						
	Engine Speed			N	1567	.00 1	Rpm	Syn						
	Load			Ld	45.1	4	%	Syn						
	Predicted Load			LdPrd	45.1	4	%	Syn						
	Number of inio	ctions		nIni	307			Svn						

You can see the highlight cell in the table.

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

🗑 TPS base	TPS based load mapping and Volumetric Efficiency table											
+ 0.001 - * 1 / Selected = 1												
nput-X: N. [Rpm]."break point, engine speed" Input-Y: Tps, [%],"input <tpsequ>, break points, throttle position "</tpsequ>												
Output: RAM_MAP_LdTp_Tps_N [%],"characteristic map, normalized load based on TPS and engine speed (Alpha/N model)"												
X/Y	1000.00	2000.00	3000.00	4000.00	5000.00	6000.00	/000.00	/500.00	8000.00	8500.00	9000.00	10000.00
0.0000	24.1641	24.1641	24.1641	19.4766	19.4766	18.3750	17.5078	17.1563	16.2422	15.3281	14.4375	13.5469
2.2995	24.1641	24.1641	24.1641	24.1641	24.1641	22.1484	20.4375	20.1563	19.2656	18.3750	17.4609	15.7031
6.5796	28.0078	28.0078	28.0078	28.0078	28.0078	24.6797	22.8281	22.5938	21.6328	20.6953	19.7578	17.8594
9.2102	30.3984	28.4063	27.3984	27.4922	26.5078	23.7656	23.0859	22.8984	21.9844	21.0703	20.1563	18.3516
13.1607	32.2266	30.2344	29.2266	29.3672	29.4609	26.6016	25.3594	25.1953	24.2578	23.3203	22.3828	20.4844
17.1097	34.0078	32.0156	31.0078	30.0938	30.1875	29.4609	27.3750	27.2578	26.2734	25.3359	24.3750	22.4531
21.0495	40.7578	38.7422	36.7500	35.9531	34.0547	32.2969	31.1484	31.1484	31.1484	30.1406	29.1797	27.1641
25.0000	47.4844	44.4844	41.4844	39.7969	38.9531	36.0938	34.1719	34.1719	34.1719	34.1719	33.1875	31.1953
32.8903	52.2656	52.2656	52.2656	42.7500	40.8516	37.0547	38.8594	38.8594	38.8594	38.8594	37.8750	35.9063
39.4699	55.1016	55.1016	55.1016	46.6406	45.6563	43.8516	41.7891	41.7891	44.6484	44.0156	43.0547	41.1328
46.0495	58.8984	58.8984	58.8984	48.5391	47.5547	45.7266	44.6484	44.6484	49.4063	49.4063	49.4063	49.4063
52.6306	67.0313	61.5234	65.5547	60.2578	58.4531	57.4453	56.4141	55.4063	55.1016	55.1016	55.1016	55.1016
59.1995	67.9922	67.9922	67.9922	70.3828	69.3984	68.3906	64.0078	61.9922	59.8594	59.8594	59.8594	59.8594
65.7806	67.9922	67.9922	72.9844	75.0000	75.5156	71.5078	68.7422	66.7266	64.7344	61.7344	61.7344	61.7344
78.9398	74.9063	74.9063	77.9063	79.8984	80.1094	78.1172	76.2188	74.2031	72.2109	72.2109	72.2109	72.2109
99.9893	95.0156	95.0156	95.0156	95.0156	98.0156	98.0156	95.0156	95.0156	95.0156	95.0156	95.0156	95.0156
TDC 1 11		Volumet	ric Efficienc	v Table								
IPS based lo	oad mapping	vorumet	ric Enfcienc	y rable								

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

Fi	le Edit	Settings	Run	Variables	Diagnostics	Advanced	Help
	Open			Ctrl+O	0		
1	Save			Ctrl+S		— г	
	Save a	s					2
1	Save C	onfiguratio	n	Ctrl+F2	2 CCDA	_C_1	
	Save C	onfiguration	n as		b17	71 41	Ir
	Load C	onfiguration	n	Ctrl+F3	3 -	-	6
	Default	t Configurat	tion Re	set			Ē
	Exit						-

2) Close the EcoCAL directly on the upper right corner

Ø EcoCAL V1.6		
File Edit Settings Run Variables Diagnostics Advanced Help		
≅ ₩ % ▶ ●		\sim
🕊 📄 – Project 😺 Volumetric Efficiency Table 🐼 Selected Va	riables	
SEA_b1771_4T2CCDA_C_1 + 0.001 - + 1 / Selected = 1	Name	Value Unit F
NA_DLE60_SEA_b1771_41 Input-X: Pim, [hPa],"input <map>, break point, manifold absolute pressure, for Volumatri O Throttle F</map>	osition Sensor Tps	% 2
Calibration Output: RAM_MAP_fVe_Map_N, [-],"Factor Volumatric Efficiency, dependent on p	ne speed Nraw	Rpm 2
Cambda	LamWO2	2
X/Y 300.00 350.00 400.00 430.00 460.00 500.00 550.00 500.00 750.00 750.00	oltage from ADC channel UbAdc	V 2
1200.00 0.46 0.47 0.51 0.55 0.57 0.58 0.63 0.66 0.68 0.68 0 Q2 senso	voltage uLsb	V 2
1400.00 0.46 0.47 0.51 0.55 0.57 0.58 0.63 0.65 0.67 0.69 0.69 Puel factor	r closed-loop control fLc	- 2
1650.00 0.47 0.48 0.51 0.55 0.57 0.58 0.64 0.65 0.69 0.70 0.70 0 dmFuel	dmFuel	g/min 2
RPM 0 Rpm 2000.00 0.48 0.49 0.51 0.55 0.58 0.59 0.65 0.66 0.69 0.72 0.72 0 dmFuel A	dmFuel A	g/min 2
2500.00 0.49 0.50 0.52 0.56 0.59 0.62 0.68 0.72 0.75 0.74 @ mFuel	mFuel	g 2
MAP 0 kPa 3000.00 0.50 0.51 0.53 0.56 0.60 0.63 0.67 0.70 0.75 0.78 0.77 0 HrsPerLit	HrsPerLit	Hrs/Lit 2
TPS 0.96	A HrsPerLit A	Hrs/Lit 2
4400.00 0.52 0.53 0.57 0.60 0.67 0.73 0.74 0.76 0.82 0.83 0 Engine-sz	eed of byte value N b	Rpm 1
ECT 0 DegC	mperature Tm	DegC 1
IAT 0 DegC Volumetric Efficiency Table @ Intake air	temperature Ta	DegC 1
O Dege O Dege	ambda LamDsr	- 1
O2S 0 V O2Ambient	pressure Pam	hPa 1
SPARK 0. CHA	actor fAlt	1
OUTA	ol fuel factor fPreCtl	1
FUELPW1 0 ms	n factor based on air temperature fTcmb	1
N_b/(Rpm) / 80 1020 1440 1980 2340 2/00 3300 3/20 0 Load bas	ed on TPS LdTp	% 5
FUELPW2 0 ms	Ld	% 5
LamWO2 0 Throttle position threshold to split the load calculation between VE and Alpha-N @ Predicted	Load LdPrd	% 5
@ Engine Sp	eed N	Rpm 5
Invalid location	at the second	

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

Exit EcoCAL	×
Do you want to save the calibration data before exit EcoCAL? Note: If you click NO, exit EcoCAL directly !	
Yes No Cancel	

6.2 Uninstall the EcoCAL

If you want to uninstall the EcoCAL, please click:

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

