

ALM GUI User Manual

V1.4

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Note: ALM GUI software instructions are based on ALM GUI v2.9.20, If you are not sure about any specific details, please contact us at Info@ecotrons.com.

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Chapter 1 Install ALM GUI

1) Setup

You can find the software installation folder on the CD, or download the latest software installation package from our website: <u>http://www.ecotrons.com/support/</u>

2) Welcome Window

ALM GUI Setup	
	Welcome Welcome to the installer for ALM GUI 2.9.20.
	It is strongly recommended that you exit all Windows programs before continuing with this installation.
	If you have any other programs running, please click Cancel, close the programs, and run this setup again.
	Otherwise, click Next to continue.

3) Change Directory

1

nstallation Folder Where would you like ALM GVI to be installed?	
The software will be installed in the folder listed below. lifferent location, either type in a new path, or click C an existing folder. install ALM GUI to:	To select a hange to browse for
C:\ALM GUI	C <u>h</u> ange
Space required: 12.3 MB Space available on selected drive: 72.17 GB	

Note: Do not install it into Windows "Program Files" folder. Windows does not allow unknown software to change the content below the "Program Files" folder.

You can change the destination directory if you don't want to install it into the default directory. Then click the "Next" button to continue.



4) Shortcut Folder

ALM GUI Setup	×
Shortcut Folder Where would you like the shortcuts to be installed?	
The shortcut icons will be created in the folder indicated below. If don't want to use the default folder, you can either type a new name, select an existing folder from the list.	you or
Shortcut Folder:	
Ecotrons\ALM GUI	~
 ● Install shortouts for ourrent user only ○ Make shortouts available to all users 	
< <u>B</u> ack <u>N</u> ext > <u>C</u> a	ancel

Note: The shortcut icons will be created in the folder indicated below. If you don't want to use the default folder, you can either type a new name, or select an existing folder from the list.

If you want to install shortcuts for the current user of this computer, select: Install shortcuts for current user only.

If you want to install shortcuts for all users of this computer, select: Make shortcuts available to all users.

Then click the "Next" button to continue.

5) Ready to Install

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Check your installation path and shortcut to store folders correctly. If there is an error, click the 'Back' button to go back to the previous step for modification. If there are no problems, click the 'Next' button to proceed to the next step.



6) Installation Successful



When you see "Installation Successful", click the 'Finish' button to complete the installation.

Chapter 2 Use ALM GUI

Click 'ALM GUI' Shortcut on Computer Desktop to Run ALM GUI Software: A typical ALM GUI running display state will be like this:

Settings	UI v2.9.20 Run Display	Diagnostic Advanced Help								- 0 ×
Sens	sor 1	Lambda	Sensor 1	AFR	Sensor 1	O2%		Sensor 1	Tem	р
	0		0		0.0	0	%	0)	DegC
	RPN	M								
		rpm								
Oscill	loscope			Communication Settings	-	×				8
	2.5					hus	Visible Color	Name	Unit Min	a Max
	2.25	-		USD	COM CAN	ous	V	Lambda-1		0 2.5
				Device Type Ecotrons	CAN Channel NO. 1	-	v	AFR-1 02%-1	%	200
	2			Device Index 0	→ Baud Rate 250	kbs •	V	Temp-1	DegC	0 1000
_	1.75	-		1.			··· V	RPM	rpm	0 15000
5				Show settings at startup	Close Device Open	Device				
pq	1.5									
E,	1.25	-								
-										
	1									
	0.75									
	0.5									
	0.25									
		1 manufacture and the second								
		0 1 2 3 4	5 6 7 8	9 10 11 12	13 14 15 16	17 18 19				

2.1 Select communication mode

If ALM uses serial communication, you can choose USB (via an adaptor) or COM for logging or programming. We recommend using the USB, because most of the computer no COM.

₹ Communication Settings						
Communication	1 Settings					
• USB	COM	• CAN bus				
Comm Num	COM1 -					
Baud Rate	115200 -					
I Show settings at	startup	OK				

CAN bus method is used to communicate with ALM with CAN bus. If you are using CAN communication, select the CAN bus Device Type. ALM GUI currently supports the EcotronsCAN, Kvaser and PeakCAN device; the future will support more manufacturers.

If there are multiple CAN devices connected to your PC, for example 2 CAN adapters, the Device Index are used to distinguish the different CAN devices. If only one CAN device on your PC, Device Index should be set to 0, otherwise, increment it in the order of: 0, 1, 2.....7.

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Channel Number is used to select the channel of the CAN device. Most CAN device has two CAN channels. You can use different channels to connect the ALM, by selecting the correct channel number.

The ALM default baud rate is 250kbs. Click "Open device" to open the CAN device.

Communication Settings		×
Communication Setti	ngs	
• USB	○ COM	• CAN bus
Device Type kvaser	- Channel Nu	umber 1 -
Device Index 0	Baud Rate	250kbs 💌
Show settings at startup	Close Device	Open Device

2.2 Run the software

After the ALM GUI software startup, these buttons will be displayed.

- Solick it, connect the ALM to PC
- Click it to run the software Click it to stop recording data
- Click it to start recording data
- Click it to start the data analysis software
- 1) Before using the software online, make sure the communication lines between the ALM and the computer has been connected.
- 2) Click the icon 🔄 to connect the computer and ALM, The 🕨 turns green, indicating that online success.
- 3) Then click the ▶, the screen displays began to change, then you can perform other operations.



2.3 Graph Window

Once connected to the ALM, the Graph Window will draw the curves based on the real-time data. Left side is the axis info. Bottom side is the legends.



The signals that can be displayed in the graph window include:

- Lambda-1
- AFR-1
- Oxygen concentration (O2%-1)
- Temp-1 (LSU sensor temperature)
- RPM (optional, only applies to COM or USB communication)

If you use a dual-channel ALM, including the below:

- Lambda-2
- AFR-2

6

- Oxygen concentration (O2%-2)
- Temp-2 (LSU sensor temperature)
- Analog input 1 (Vin1) (optional, only applies to COM or USB communication)
- Analog input 2 (Vin2) (optional, only applies to COM or USB communication)

Different means of communication, ALM GUI with different functions. The following will introduce ALM GUI functions with using COM (including USB) and CAN communication.

2.4 ALM GUI using COM or USB communication

2.4.1 ALM Parameters Settings

This function is used to set the ALM analog output range, gauge range, fuel type, etc. Click Settings \rightarrow ALM Parameters, open ALM Parameters window.

🐉 ALM GUI v2.9.20						
Settin	gs	Run	Display	Diagnostic	Advanced	Hel
Communication					Ctrl+F	F3
ALM Parameters					Ctrl+F	F2
Change Gauge Update Frequency					/ Ctrl+	۰F
LED Display						
L	.ang	uage				>

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If the ALM has an analog output port, users can configure the ALM linear analog output. This analog output from ALM is linear to the actual Lambda/AFR/O2% measured. By setting the lower point and upper point of voltage vs. Lambda/AFR/O2% linear relation, the scaling between the voltage and Lambda/AFR/O2% is determined. Default is: Vol1=0.00, Vol2=5.00.

🖓 ALM Parameters Settings	×
O2 Sensor 1 Linear Relation	Fuel Type
○ Current(mA)	O2 Sensor 1 Gasoline -
0.00 V at Lambda 1 0.50	O2 Sensor 2 Gasoline
 S.00 ∨ at Lamoda 2 2.00 ✓ Lambda □ AFR □ O2% □ Enable diagnostics of Linearized analog output 	ALM Hardware Version Number of Sensors 1
O2 Sensor 2 Linear Relation	Hardware Version ALM-Gauge
0.00 V at AFR 2 7.35	Stroke Number of Strokes 4
5.00 V at AFR 1 29.40	-Select Voltage Input
🗖 Lambda 🔽 AFR 🗖 O2%	🔽 Vin1 🗖 MAP
Enable diagnostics of Linearized analog output	🔽 Vin2 🗖 EGT
Gauge Settings	MAP Sensors
1.00 Vol 1 AFR(Min) 10.00	□ 1 Bar 🕅 2.5 Bar
0.00 Vol 2 AFR(Max) 20.00	Burn To ALM

Lambda mode, ANOUT used to indicate changes in lambda, the default setting:

0.00 Volt at Lambda 0.50

5.00 Volt at Lambda 2.00

Then Lambda = Volt * (2.00-0.50)/(5.00-0.00) + 0.50, which is: Lambda = Volt * 0.30 + 0.50;

Volt: ANOUT voltage.

As an example, with this setting, at lambda = 1, Volt = 1.667V. After the settings, you need to click the "Burn To ALM" button to activate it.

Note:

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ALM uses a 10-bit DAC conversion chip to convert the measured lambda to an analog voltage. By default, the resolution of the DAC chip is 0.005V. This error is negligible, when you convert a lambda value to a 0-5v analog signal, because the sensor accuracy error is much bigger than this error. When outputting lambda analog signal to the ECU, ALM does not use PWM to analog converting circuit, which can add large errors on top of sensor accuracy error.

Three different settings see the following figure, if you use a dual-channel ALM, Channel2 and channel1 are the same setting method.

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🙀 ALM Par rs Setting

🖥 ALM Parameters Settings	>
O2 Sensor 1 Linear Relation Current(mA) © Voltage(V)	Fuel Type O2 Sensor 1 Gasoline
5.00 V at Lambda 1 0.50	O2 Sensor 2 Gasoline
 ✓ Lambda AFR O2% ✓ Enable diagnostics of Linearized analog output 	ALM Hardware Version Number of Sensors 1
C Current(mA) C Voltage(V)	Hardware Version ALM-Gauge
0.00 V at AFR 2 7.35	Stroke Number of Strokes 4
5.00 V at AFR 1 29.40	Select Voltage Input
🗖 Lambda 🔽 AFR 🗖 O2%	☑ Vin1 □ MAP
$\hfill \square$ Enable diagnostics of Linearized analog output	☑ Vm2
Gauge Settings	- MAP Sensors
1.00 Vol 1 AFR(Min) 10.00	□ 1 Bar
0.00 Vol 2 AFR(Max) 20.00	Burn To ALM

Analog output is used to indicate lambda



Analog output is used to indicate AFR

🗱 ALM Parameters Settings	×
O2 Sensor 1 Linear Relation	
Current(mA) Voltage(V)	O2 Sensor 1 Gasoline •
0.00 V at Oxygen 1 -20.99 %	O2 Sensor 2 Gasoline 👻
□ Lambda □ AFR	ALM Hardware Version Number of Sensors 1
O2 Sensor 2 Linear Relation	Hardware Version ALM-Gauge
0.00 V at AFR 2 7.35	Stroke Number of Strokes 4
5.00 V at AFR 1 29.40	Select Voltage Input
🗖 Lambda 🛛 AFR 🗖 O2%	🔽 Vin1 🗖 MAP
Enable diagnostics of Linearized analog output	☑ Vin2
Gauge Settings 1.00 Vol 1 AFR(Min) 10.00	MAP Sensors □ 1 Bar 🔽 2.5 Bar
0.00 Vol 2 AFR(Max) 20.00	Burn To ALM

Analog output is used to indicate O2%



Gauge Settings: which is used to set the Gauge input signal range, only apply to ALM-Gauge.

User can select the fuel type, by select fuel type, the conversion between lambda and the AFR will change correspondingly.

Fuel Type	
O2 Sensor 1	Gasoline 💌
	Gasoline
O2 Sancar 2	LPG
O2 Selisor 2	Methanol
	Ethanol
ALM Hardware V	CNG
	Diesel
Number of Sensors	Biogas
	Custom
Hardware Version	ALM-Gauge



2.4.2 Analog output diagnosis capability

The analog output of ALM has a fault diagnostic capability. By default, it is disabled. You can choose Enable diagnostics of Linearized analog output to enable it.

After the diagnosis capability is enabled, linear output voltage range must be changed to 0.5v to 4.5v. This means:

1) The analog output will be in the range of 0.5v to 4.5v when the O2 sensor is normal working.

2) It will be <0.5v for a group of errors. (Approximately equal to 0v)

3) It will be > 4.5v for another group for errors. (Approximately equal to 5v)

4) Fault code E1, E2, E4, E6, E8, E9, E12, analog output is 0v, other fault code output 5v.

When the error occurred, the specific fault code can query diagnostic functions. (See 2.4.5 Diagnostic Trouble Code)

Fault codes means, see DTC table.



2.4.3 ALM-LED LED Display selection

User can select lambda, AFR or O2% on the ALM-LED LED display, if not ALM-LED, this setting is invalid. Click "Settings→LED display", open "LED Display Settings" window.

🐌 ALM	GUI v2.	9.20				
Settings	Run	Display	Diagnostic	Advanced	Hel	
Co	mmunic	ation		Ctrl+F	-3	
AL	ALM Parameters				Ctrl+F2	
Change Gauge Update Frequency			Ctrl+	F		
LED Display						
Lar	nguage				>	

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After the selection of the display, click the button "Burn To ALM" to activate the change. By default, it displays the lambda.

🚺 LED Display Settings	\times
LED Settings	
Lambda 🔹 Burn To ALM	

2.4.4 ALM-II LCD Display selection

User can select lambda or AFR on the ALM-II LCD display. Click "Settings→LCD display", open "LCD Display Settings" window.

User can also choose whether show VIN1/VIN2/O2% or not on the LCD display.

After the selection of the display, click the button "Burn To ALM" to activate the change. By default, it displays the lambda.

🐞 LCD Display Se	ttings						
LCD Settings	LCD Settings						
□ Vin1	□ RPM Lambda -						
□ Vin2	1						
▼ O2%	Burn To ALM						

2.4.5 Diagnostic Trouble Code



Read DTC, click 'Diagnostic→Get The DTC', open 'Get The DTC' window.



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Click "Read DTC" button, ALM GUI will read the active DTCs from ALM memory, example as in the above window. Refer to chapter 3 DTC table for all DTCs ALM supported.

2.4.6 Change the serial communication baud rate

ALM supports change serial communication baud rate, in order to apply to the user's specific needs (ALM-II does not support).

ALM default serial communication baud rate is 115200. If you want to change the serial communication baud rate, click "Advanced→Modify COM Bard Rate "; open the "Modify COM Baud Rate" window.

🚺 Modify COM Baud Rate	×
Select the Baud Rate	
Baud Rate 115200	•
Burn To	ALM
When you changed the COM need to re-set the COM baud re-open the COM port in Con Settings window, and power of and then power on!	baud rate, rate and mmunication off the ALM

Select the baud rate you want, and then click the "Burn To ALM". If the changed successfully, ALM GUI will display a message at the bottom.

You need to reset the COM baud rate and reopen the COM port in Communication Settings window, and power off the AML and the power on.

2.4.7 Data recording and playback

All real-time data sent from ALM to ALM GUI can be recorded in the CSV file format; recorded data can be played back by the Data Analyzer.

Recorded data is stored in record folder in the ALM installation directory.

🚹 Open					×
\leftarrow \rightarrow \checkmark \uparrow \square \flat Thi	is PC \rightarrow Software (D:) \rightarrow ALM GUI \rightarrow record \rightarrow	~ č	Search record		٩
Organize 👻 New folde	er		- - -	= • 🔟	?
This PC	Name	Date modified	Туре	Size	
3D Objects	2019-4-8-16-38-17	4/8/2019 4:38 PM	File folder		
E. Desktop	2019-4-8-16-41-12	4/8/2019 4:41 PM	File folder		
A Documents					

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Procedures to log and view data are as follows:

🚺 ALM G	iUI v2	.9.20			
Settings	Run	Display D	Diagnostic	Advance	d Help
		Connect Disconnect	С	F5 trl+R	
Sens		Start Measu Stop Measu	ring ring	F8 F11	
		Start Record	ling	F9	
		PlayBack			
		Test Mode	C	trl+T	

ALM GUI Data Analyzer can also run stand-alone. Users can load the previously logged file into it and do the data analysis in the graphical view.



Steps:

- 1. Click File ->Open, select the CSV data files, Click "Open" Load files.
- 2. For every signal, users can manually adjust the "Min/Max" value, and the Y-axis of the signals in the Graph Window will change correspondingly. This can be used to as "zoom in" function for the Y-axis.

Min	Max
0	100

3. User can also manually type in the "Time Form" and "to" for the X-axis. This can be used as "zoom in/out" of the X-axis.



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4. Click "Show/Hide Cursor", users can turn on/off the curser in the Graph Window. All signal values at the cursor place will show up at the right signal column. Use your PC mouse, and move the cursor, the signal values will change as the cursor moves.



2.4.8 Oxygen Sensor Type Setting

ALM supports change oxygen sensor type, in order to apply that user can use the different two type sensor, LSU 4.9 or LSU ADV, without re-flashing a new software.

Note: Currently only supports serial communication single channel ALM-LED, ALM-Inline and ALM-Board.

For example, if you want to change the type of sensor to LSU ADV, there are steps:

1. Click "Advanced" and choose "Oxygen Sensor Type"





2. There is an interface, the default sensor type is LSU 4.9. You can change it by yourself. Then click "Burn to ALM".

B Sensor Type	
Oxygen Sensor Type	Setting
LSU4.9	Burn To ALM
LSU4.9 LSU ADV	

Then there is a note "The Oxygen Sensor type setting is successful".

🗈 Sensor Type	—
Oxygen Sensor Type Set	ting
LSU ADV -	Burn To ALM

3. After you have changed the sensor type successfully, click "Disconnect" and power off the ALM, change the LSU ADV sensor replacing the former LSU 4.9.

ALM GUI v2.9.20 Settings Run Display Diagnostic Ar	dvanced Help								- 0	×
Sensor 1 Lamb	da	Sensor 1	AFR	Sensor 1	O2%		Sensor 1	Temp		
15.990		235.	.05	0.0	0	%	Heat	ing	,	
RPM										
0	rpm									

Then power on the ALM, click "connect" and choose "Start Measuring". You will find the related data have been changed, which match LSU ADV.

Sensor 1 Lambda	Sensor 1 AFR	Sensor 1 O2%	Sensor 1 Temp
15.989	235.04	21.00 %	785 DegC
RPM			
O rpm			

You can also check the current sensor type. Repeat the second step:

rn To ALM

You will see the interface showing "LSU ADV", this is the current type. Of course, if you

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changed to LSU ADV before and you want to change to 4.9 again, the steps of choosing LSU 4.9 are same.

Note: Whenever you change the sensor type, you must power off and power on the ALM.

2.5 ALM GUI using CAN communication

2.5.1 Connecting and Troubleshooting

Step1: Open "Communication Settings" window and choose "CAN bus", and set Device Type and Baud Rate, etc.

🆏 Communication Setting	s	×
Communication S	Settings	
○ USB	० сом	• CAN bus
Device Type Ec	otronsCAN - Char	nnel NO. 1
Device Index 0	- Bau	d Rate 500kbs 🗸
☐ Show settings at sta	Close Devie	ce Open Device

Step2: Click the button "connect" to connecting ALM to computer. It will point out "Connect successful!" in the lower left corner of the main window if all the options on Communication Settings window are correct and devices connecting errorless. But when you choose EcotronsCAN, if the following prompt windows pop up:

Error		\times
Connection failed, no da	ata received!	
	OK	

This shows that the setting parameters have a mistake. You should use "Test Equipment" window to detect problem. Method as shown in the following steps 3 to 11. Note: Kvaser and PeaKCAN need to add terminating resistors during use.



1

Step3: Open "Test Equipment" window under "Advanced".

3 ALM GUI v2.9.20	
Settings Run Display Diagnostic	Advanced Help
	ANout Calibrations Shift+Ctrl+F1
	Pressure Correction
	Modify COM Baud Rate
Sensor 1 Lam	Get ALM Version
	Set ALM Channel 1 ID
	Set ALM Channel 2 ID
	Select Broadcast Frame
	Reset ALM CAN bus Configuration
DDM	Oxygen Sensor Type
	Test Equipment
	Debug

Step4: Click button "Detect" to find the baud rate and CAN ID automatically.

Test Equipent		
CAN BaudRate CAN BaudRate		Open Frame
Set CAN ID(Hex) Channel 1 Framel ID: None Frame2 ID: None	Channel 2 Frame1 ID : None 💌 Frame2 ID : None 💌	Update
- Detected ID		Detect
No. CAN ID(Hex)	Frame Type(S:Standard	EExtend)

Step5: If the prompt window shows "Can not detect device", you should check for the cause of the error. There are several reasons lead to this situation, maybe the connection between the CAN device and ALM is reversed or the ALM is not power on. Please power on the ALM and correct wiring first.

Set CAN ID(H	ex)			
Channel 1		Channel 2		
Frame1 ID :	None 💌	Frame1 ID : None	• Update	ALM 2
Frame2 ID :	None 💌	Frame2 ID : None	•	
				Can not detect
			Detect	
Detected ID				
	N ID/Har)	Frame Ty	pe(S:Standard E:Extend)	
No. CA	TA ID(LIEY)			

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Step6: The correct baud rate and channel ID are displayed when the test is completed

	uuuu	te: 25	0kbs	Ŧ					Open Fran
et CAN	ID(H	[ex) —							
Channel	1				Chann	el 2 —			
Frame1 I	D:	None	•]	Frame	1 ID :	None	•	Update
Frame2 I	D:	None	-]	Frame	2 ID :	None	•	I
									-
									Detect
Detected 1	D								Detect
Detected I	D–	AN ID/F	Hex)				Frame Tx	me(S:Star	Detect
Detected I	ID	AN ID(F	Hex)				Frame Ty	rpe(S:Star	Detect

Step7: Fill in the correct ID by selecting it into the Set CAN ID and click the "Update button".

CANBR	udRate 2501-ba	_		Open	ı Fran
0.11.0					
Set CAN I	ID(Hex)	~			
-Channel	1	Chanr	iel 2		
Frame1 I	D: CFF0001E	▼ Frame	1 ID : None	-	
				Up	date
Frame2 I	D: 18F00E01E	. ▼ Frame	2 ID : None	-	
				De	etect
				De	tect
Detected 1	D-			De	tect
Detected I	D CAN D(Hex)		Frame Type	(S:Standard E:Exte	etect nd)
Detected I	ID CAN ID(Hex) 1 CFF0001		Frame Type E	(S:Standard E:Exter	etect nd)
Detected I	ID CAN ID(Hex) 1 CFF0001 18F00E01		Frame Type E E	De (S:Standard E:Exter	etect

Step8: Please click "Update button", and "The ID shown to The main window has been updated" will appear on The desktop.

Warning	×
The ID shown to the main window has been u	pdated!
	ОК



Detecting both the correct ID and baud rate will fill the ALM GUI software

1	ALM Channel 1 CAN E	Bus Configuration	23
	Select Frame	Set and Show ALM ID	
	• FRAME1 ?	Baud Rate 250kbs New ID (Hex) CFF0001	Burn to
	© FRAME2	Frame Type Extend Broadcast Rate 10ms	ALM

Step9: Then click "OK" button and start measuring button. ALM GUI software communicates with ALM successfully and shows that ALM is working normally.

ALM G	UI v2.9.20 Run Display	Diagnostic Adva	inced Help														-	- ø >
Sens	sor 1	Lamb	da	S	ensor 1	AFR			Sen	sor 1	0	2%			Sensor 1	Te	mp	
1	5.9	90			235	5.05				21.	00)	%		78	80		DegC
Duty	y Cycl 45	le Of He .5	eater %	А	$\frac{1 \text{ M ID}}{0 \text{ x C}}$	C <mark>FF(</mark>	001				LM Channe lect Frame FRAME	11 CAN Bus C B 2 F	Configuration et and Show A laud Rate rame Type	LM ID 250kbs Extend	New ID (Hex) Broadcast Rate	CFF0001 10ms 💌	Burn to ALM	
🛃 Oscill	loscope																	23
	2.5												Visible	e Color	Name	Unit	Min 1	Max
	2.25	-											···· V		Lambda-1 AFR-1		0	2.5
	,	1											···· V		02%-1	%	-20	30
	-												V		Temp-1	DegC	0	1000
7	1.75																	
da	1.5																	
fill (1																
1	1.25																	
	1					1 1 1												
	0.75																	
	0.5																	
	0.25	-																
		1 month									-							
		0 1	2 3	4 5	6 7	8 9 1	D 11 1:	2 13	14	5 16	17	18 19						
Start m	easuring su	iccessful!																

2.5.2 Enable or disable broadcast Frame

ALM CAN communication default broadcast two Frame data: Frame65280 (Frame1) and Frame61454 (Frame2), they have different ID. Frame1 (65280), the default ID is 0x0CFF0001, is an ECOTRONS pre-defined protocol based on SAE J1939, compatible with the original ALM. Frame2 (61454), the default ID is 0x18F00E01; is the standard SAE J1939 protocol, adapted to receive the Frame is Frame61454 device. You can set each Frame is enabled or disabled via ALM GUI.

They are supported change the Baud Rate, CAN ID and Frame Type, just different formats of data broadcast.

For dual-channel ALM-CAN-II, each channel broadcast 2 Frame, two channels totaling 4 Frame. They have different ID. Channel1 Frame1 (65280) the default ID is 0x0CFF0001, channel1 Frame2 (61454) the default ID is 0x18F00E0; channel2 Frame1 (65281) the default ID is 0x0CFF0002, channel 2 Frame2 (61455) the default ID is 0x18F00E02. Different versions of the ALM, the operation mode are the same. If ALM has only one channel, channel 2 set is invalid.

About CAN communication description, refer to the ALM Communication Protocol – CAN.

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You can set each Frame is enabled or disabled via ALM GUI.

1) Click "Advanced→Select Broadcast Frame", open "Select Broadcast Frame" window.

🐞 Select Broadcast Frame		×
Select channel 1 broa	dcast Frame	
⊽ Frame1	I Frame2	
Select channel 2 broa	dcast Frame	
I Frame1	Frame2	
Continue Descriptions		1.
1 This window is used	to set enabled or	î
disabled ALM CAN co	mmunication.	
2. This version of the A	LM GUI supports	
dual-channel CAN con	nmunication.	
3. Each channel broadd	cast 2 Frame, two	
channels totaling 4 Frai	me. They have	
		Ţ
Exit	OK	

- 2) Frame1 and Frame2 are selected by default; ALM default broadcast two Frame data. If you do not want to broadcast any one of Frame, removals Frame selected state, and then click "OK" to update ALM settings.
- 3) For example, just broadcast Frame1, select Frame1, and remove the selected Frame2, and then click "OK" to update ALM settings.

Select channel 1 bro	oadcast Frame
▼ Frame1	Frame2
Select channel 2 bro	oadcast Frame
Frame1	✓ Frame2
disabled ALM CAN	ed to set enabled or
disabled ALM CAN of 2. This version of the dual-channel CAN co 3. Each channel broad channels totaling 4 Fra	a to set enabled or communication. ALM GUI supports ommunication. dcast 2 Frame, two ame. They have

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2.5.3 Set CAN Number

Click "Advanced \rightarrow Set CAN Number", open "Set CAN Number" window.

🖪, Set CAN Number	×
⊓Number of CAN cha	nnels
• One	C Two
 Number of CAN characteristic conditions of CAN characteristic conditions of the settings. Select the number of the n	annels is only changed s not change the ALM f CAN channels.
Exit	OK

Note: The number of CAN channels can be changed and displayed by the ALM GUI via "Set CAN Number", but the ALM settings are not changed.

2.5.4 Set and Show ALM ID, Baud Rate and Frame Type

ALM default Baud Rate is 250kbs, and default Frame Type is extended. The ALM ID is the 29 bit identifier; ALM supports custom ALM ID, Baud Rate and Frame Type.

Before setting the ALM ID, make sure the ALM has been connected to the CAN bus. If there are multiple ALM on the CAN bus, which all have the same default CAN ID, then you can only power on one ALM at a time. After one ALM setup is done, power it off, then you can power on another ALM and set it with a different CAN ID, and so on.

Before modify ALM ID, Baud Rate or Frame Type, must make sure ALM GUI has been communicating with the ALM. (Click Connect→ Start Measuring, ALM GUI receives data uploaded by ALM. If no data is received, check whether the "Set and Show ALM ID" is correct.)

In "ALM Channel1 CAN Bus Configuration" window, there are two parts need to set: "Select Frame" and "Set and Show ALM ID".

"Select Frame" control the user to operate which Frame, before the user to set the baud rate and ALM ID, Should first select which Frame you want to change: FRAME1 or FRAME2.

"Set and Show ALM ID" has two functions, set ALM baud rate, frame type, ALM ID and control which ALM to be displayed. If you just choose FRAME1 ALM data to display, do not need to modify the parameters only need to click "Burn to ALM", if you need to set the ALM parameters of FRAME1 or FRAME2, select the correct option and then click "Burn to



ALM" update ALM settings.

Note1: In the ALM GUI, when user set the parameters of FRAME2 (Frame61454) and burn to ALM, the screen display will not be changed from FRAME1 to FRAME2. You can see the modify result in the "debug" window and the "Test Equipment" window.

Note2: If the ID and frame type of Frame1 is the same to Frame2, the curve will look like the following. In this case, you need to set the two ID to different values.

Note3:ALM CAN version supports 11-bit standard frame and 29-bit extend frame.

ALM GUI v2.9.20 Settings Run Display Diagnostic Advanced Help						-	o ×
Sensor 1 Lambda	Sensor 1 AFR	Sensor 1 O2%		Sensor 1	Ten	np	
15.990	235.05	21.00	%	78)	Ι	DegC
Duty Cycle Of Heater	ALM ID	ALM Channel 1 CAN Bus C	Configuration et and Show ALM ID				
45.7 %	0x01		aud Rate 250kbs rame Type Extend	New ID (Hex) Broadcast Rate 10m	01 s •	Burn to ALM	
Oscilloscope							8
2.5			Visible Color	Name	Unit N	din M	ax
2.25	de la factoria de la factoria de la composición de la composición de la composición de la composición de la com		V	Lambda-1 AFR-1		0	2.5
	an an the second se	a siya sa kata kata kata kata kata kata kata 	V	02%-1	%	-20	30
			V	Temp-1	DegC	0	1000

Example 1: modify the Frame2 ALM ID of channel 1 to 0x02.

1) Open "Set ALM Channel 1 ID" window, and select FRAME2.

Settings Run Display Diagnostic	Advanced Help	
	ANout Calibrations Shift+Ctrl+F1	
	Pressure Correction	
A 1 T	Modify COM Baud Rate	
Sensor I Lan	Get ALM Version	
	Set ALM Channel 1 ID	
	Set CAN Number	
5.990	Select Broadcast Frame	
	Reset ALM CAN bus Configuration	
Duty Cycle Of	Oxygen Sensor Type	
Duty Cycle Of	Test Equipment	
	Debug	
M ALM Channel 1 CAN Bus Configuration	on 📃	×
Select Frame Set and Show	wALMID	
○ FRAME1 ? Baud Rate	250kbs Vew ID (Hex) 01 Burn	0
• FRAME2 Frame Type	e Extend V Broadcast Rate 10ms V ALM	

🐌 ALM GUI v2.9.20



2) Enter 02 in the New ID text box.

🗿 ALM Channel 1 CAN E	Bus Configuration	— ×
Select Frame	Set and Show ALM ID	
○ FRAME1 ?	Baud Rate 250kbs v New ID (Hex) 02	Burn to
• FRAME2	Frame Type Extend Broadcast Rate 10ms	ALM

3) Click "burn to ALM".



4) The "Test Equipment" window shows ID "0xCFF0001" and "0x02".

	Rate: 250kbs	~	Open Fr
-Channel 1-	(Hex)	- Channal 2	
Channel 1		Chamiler 2	
Frame1 ID	None 🔻	Frame1 ID: None	•
Frame? ID		Eromo 2 ID + DI	Updat
France ID	• None	I Tamez ID . None	
L			
			Detec
Detected ID			
No	CAN ID(Har)	Ecomo Tranci	(C.Stondard E.Ertond)
110.	CEE0001	F F	(5.5tandard E.Extend)
1	CITOUUI	L	
1	2	F	

5) Click "Debug" under "Advanced", the window shows ID "0x02" and "0xCFF0001".



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Example 2: modify the Frame1 ALM ID of channel 1 to 0x01.

1) Select FRAME1.

🗿 ALM Channel 1 CAN B	us Configuration	- ×
Select Frame	Set and Show ALM ID	1
• FRAME1 ?	Baud Rate 250kbs New ID (Hex) CFF0001	Burn to
© FRAME2	Frame Type Extend Broadcast Rate 10ms	ALM

2) Enter 1 in the New ID text box.

🗿 ALM Channel 1 CAN I	Bus Configuration	×
Select Frame	Set and Show ALM ID	
• FRAME1 ?	Baud Rate 250kbs Vew ID (Hex) 1	Burn to
© FRAME2	Frame Type Extend Broadcast Rate 10ms	ALM

3) Click Burn to ALM. If the ALM ID is modified successfully, bottom of the window will pop up message.

Í	🙀 ALM Channel 1 CAN E	Bus Configuration	X
I	Select Frame	Set and Show ALM ID	[
	• FRAME1 ?	Baud Rate 250kbs Vew ID (Hex) 1	Burn to
	C FRAME2	Frame Type Extend Broadcast Rate 10ms	ALM

4) You can see ALM ID has changed via ALM GUI.



ALM GUI v2.9.20 Settings Run Display Diagnostic Advanced Help			- a ×
Sensor 1 Lambda	Sensor 1 AFR	Sensor 1 O2%	Sensor 1 Temp
15.990	235.05	21.00 %	780 DegC
Duty Cycle Of Heater	ALM ID	Select Frame Select Frame	
44.7 %	0x01	© FRAME1 ? Baud Rate 250kbs • New III © FRAME2 Frame Type Extend • Broadce	(Hex) 1 Burn to Ast Rate 10ms

Example 3: change FRAME1 of channel 1 baud rate to 500kbs.

1) Select FRAME1.

🗿 ALM Channel 1 CAN B	us Configuration	X
Select Frame	Set and Show ALM ID	1
• FRAME1 ?	Baud Rate 250kbs Vew ID (Hex) CFF0001	Burn to
C FRAME2	Frame Type Extend Broadcast Rate 10ms	ALM

2) Baud rate selection 500kbs.

🗿 ALM Channel 1 CAN I	Bus Configuration	
C Select Frame	Set and Show ALM ID	1
• FRAME1 ?	Baud Rate 500kbs Vew ID (Hex) CFF0001	Burn to
C FRAME2	Frame Type Extend Broadcast Rate 10ms	ALM

3) Click Burn to ALM. If the baud rate is modified successfully, will pop up a message box, need to change the Baud Rate settings in Communication Settings window and reopen CAN device, and the closure of ALM Power and reopen reset ALM.

ALM_2	×
Detected you changed the ALM Baud Rate, you need to re-open the USB-CAN Device and power off the ALM and then power on!	
ОК	

4) After reopen ALM, ALM will use the 500kbs baud rate communication.

Note:

1) FRAME1 and FRAME2 baud rate is the same, change any one FRAME baud rate other FRAME baud rate also changed.

2) Users can while changing the baud rate, frame type, and ALM ID.

If there is multiple ALM on the CAN bus, you can choose which ALM on the CAN bus you want to display:

1) Click Settings→Communication, open Communication Settings window.

🚺 ALM GUI v2.9.20					
Settings	Run	Display	Diagnostic	Advanced	Help
Communication			Ctrl+F	3	
ALM Parameters			Ctrl+F	2	
Change Gauge Update Frequency			Ctrl+	F	
Language				>	

2) Select "CAN bus" mode, select Device Type, Device Index, Channel Number and Baud Rate, click "Open device" to open the CAN device.

🆏 Communication Settings		×	
Communication Settings			
• USB	° COM	• CAN bus	
Device Type kvaser	Channel Nu	mber 1 -	
Device Index 0	▪ Baud Rate	250kbs •	
Show settings at startup	Close Device	Open Device	

3) Click Connect→ Start Measuring, select FRAME1 or FRAME2, in the "New ID" box; enter the Desired ALM ID to display, for example 0x10. If there is CAN ID is 0x10's ALM connected to the CAN bus, in "ALM ID" label shows the corresponding ALM ID.

M ALM GUI v2.9.20			- o ×
Settings Run Display Diagnostic Advanced Help			
Sensor 1 Lambda	Sensor 1 AFR	Sensor 1 O2%	Sensor 1 Temp
0	0	0.00 %	DegC
Duty Cycle Of Heater	ALM ID	ALM Channel 1 CAN Bus Configuration	
0 %	0	☞ FRAME1 ? Baud Rate 250kbs ▼ New ID (i ○ FRAME2 Frame Type Extend ▼ Broadcast	Hex) 10 Burn to Rate 10ms

4) ALM GUI will only display data corresponding to the selected ALM ID.

2.5.5 Reset ALM CAN bus Communication Settings

If you forget the ALM ID and baud rate settings, can be restore the initial settings of ALM via reset function.

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1) Select CAN bus communication, click Connect→Advanced→Reset ALM CAN bus Configuration.



2) Click "Reset ALM CAN bus" button.

8	Reset ALM CAN bus Configuration	×
	This function is used to reset the ALM CAN Bus configuration. Before using this function, please make sure that: 1. One of ALM can only be connected on the CAN Bus. 2. ALM has been power on.	^
	ALM reset settings: USB-CAN device Channel Number: 1 ALM Baud Rute: 250kbs ALM Frame Type: Extend Channel1 Frame1 ID: 0x0CFF0001 Channel1 Frame2 ID: 0x18F00E01	~
	Reset ALM CAN bus Exit	

3) Wait for some time, and if successful reset, the text box will print out after reset CAN bus information.

ALM_2	\times
Detected you changed the ALM Baud Rate, you need to power off the ALM and then power on!	
ОК	

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CAN communication also supports data recording and playback; refer to 2.4.7 Data recording and playback.

1) If the unit is pre-programmed for LSU ADV sensor only. So use the ADV sensor with it only for now. If you need to try 4.9 or 4.2 sensors, let me know. We'll do that later.

2) If the unit is pre-programmed for SAE J1939 protocols, meaning the CAN bus configuration is default as in our manual. Try to make the default setting working before you change any CAN ID, baud rate, or frame type.

3) The first time you start the ALM-GUI, you do need to change the GUI setting to match with the ALM-CAN controller, as in the following pictures.

Settings Run Display Diagnostic Advanced Help			
Sensor 1 Lambda	Sensor 1 AFR	Sensor 1 O2%	Sensor 1 Temp
15.990	235.05	21.00 %	780 DegC
Duty Cycle Of Heater	ALM ID	ALM Channel 1 CAN Bus Configuration Select Frame Set and Show ALM ID	
47.6 %	0xCFF0001	© FRAME1 ? Baud Rate 250kbs New ID (H © FRAME2 Frame Type Extend Broadcast	ex) CFF0001 Burn to ALM

Please click the button "Burn to ALM" if any of the parameters are not matching.

Please try to click the button "close device" first and then click "open device" if the connectin has the problem.

🆏 Communication Settings 🛛 🗙				
Communication Settings				
○ USB	० СОМ	• CAN bus		
Device Type	EcotronsCAN - Channel	1 NO. 1		
Device Index	0 - Baud R	ate 250kbs -		
✓ Show settings a	at startup Close Device	Open Device		

try to "Close Device" first and then "Open Device" if the connection has the problem



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Below is the Diagnostic Trouble Code table. ALM has on-board-diagnostics capability to detect most common errors. The first thing user should do when ALM is not working appropriately is to read DTCs.

Trouble Code	Description		Solutions		
E1	Internal communication error		Contact the manufacturer		
E2	Internal register error	Сс	ontact the manufacturer		
	LSU yellow wire (VM) short to	1.	Check the harness for		
E3			short-to-power		
	power		Change the LSU		
		1.	Check the harness for		
E4	LSU yellow wire (VM) short to GND		short-to-ground		
			Change the LSU		
		1.	Check the harness for		
E5	LSU black wire (UN) short to power		short-to-power		
			Change the LSU		
		1.	Check the harness for		
E6	LSU black wire (UN) short to GND		short-to-ground		
		2.	Change the LSU		
		1.	Check the harness for		
E7	LSU green wire (IA) short to power		short-to-power		
		2. Change the LSU			
		1.	Check the harness for		
E8	LSU green wire (IA) short to GND		short-to-ground		
			Change the LSU		
EO	Operating voltage too low		neck the power supply to the ALM		
L9			ec.		
E10	Heater circuit damaged	Contact the manufacturer			
E11	Heater circuit short to power	Contact the manufacturer			
		1.	Check the harness for		
E12	Heater aircuit abort to CND		short-to-ground		
	Heater circuit short to GND		change LSU		
			3. Contact the manufacturer		