ALM GUI User Manual

V1.4

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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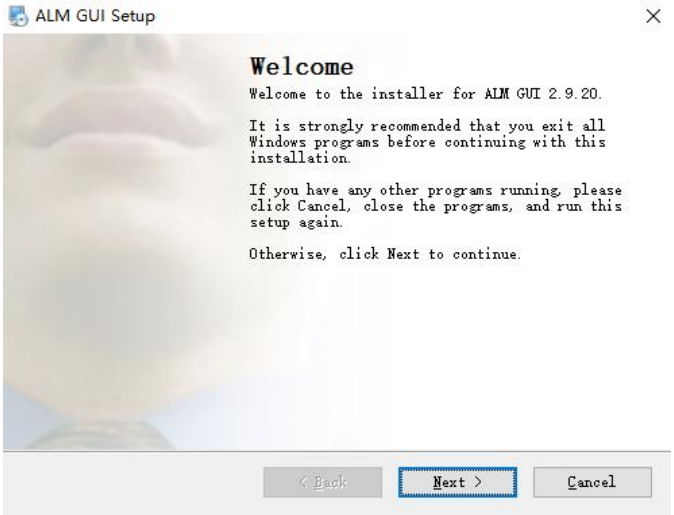
Chapter 1 Install ALM GUI

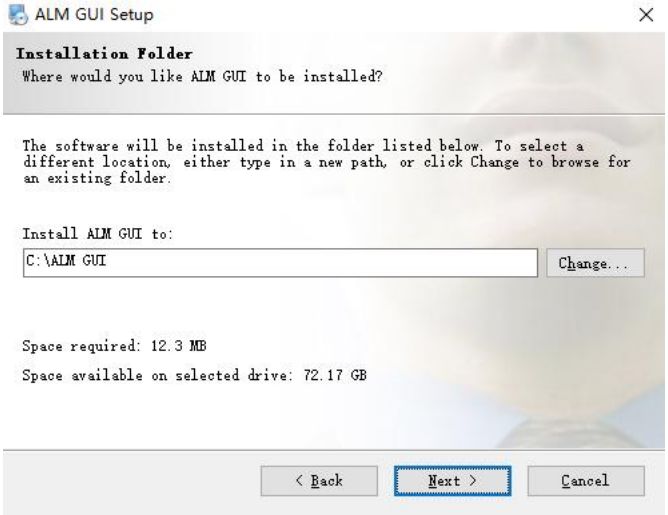
1) Setup

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

2) Welcome Window



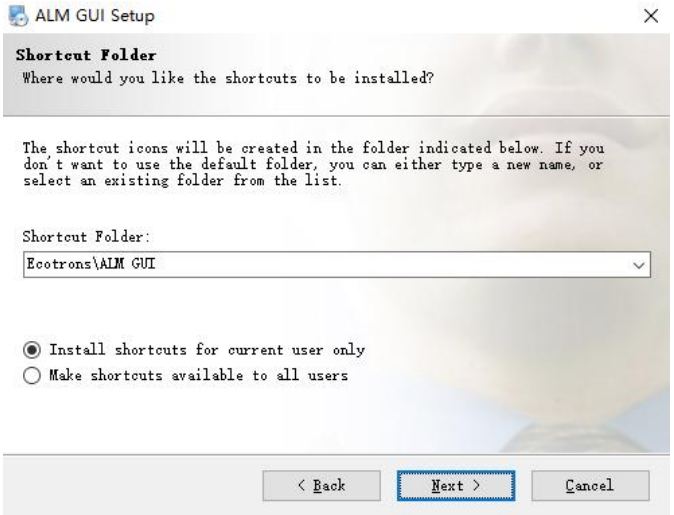
3) Change Directory



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



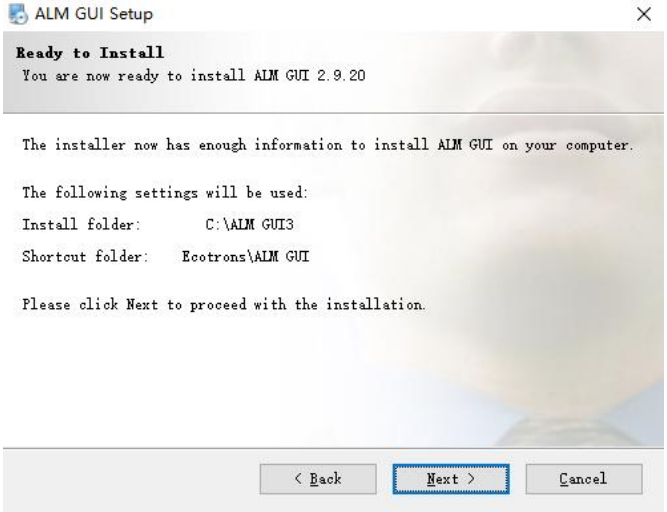
Note: The shortcut icons will be created in the folder indicated below. If you don't want to use the default folder, you can either type a new name, or select an existing folder from the list.

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.

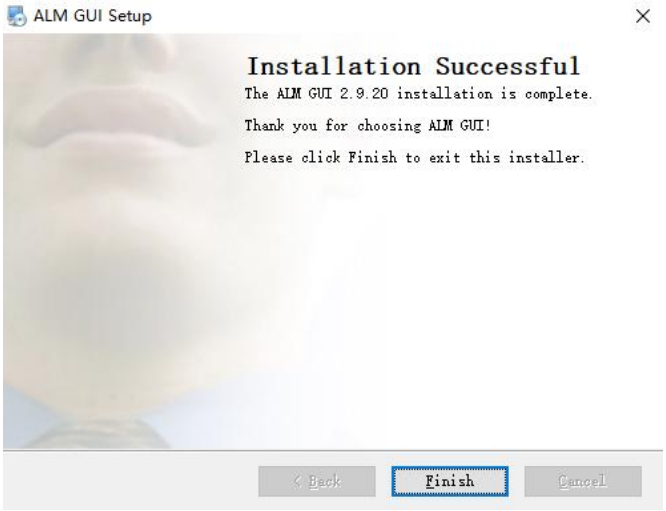
Then click the "Next" button to continue.

5) Ready to Install



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.

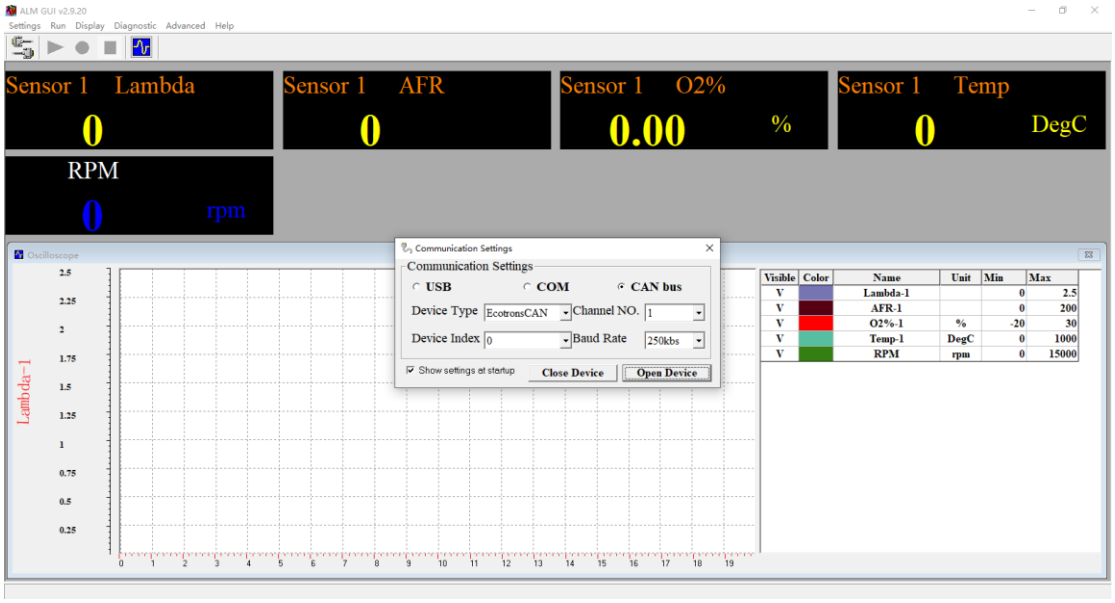
6) Installation Successful



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

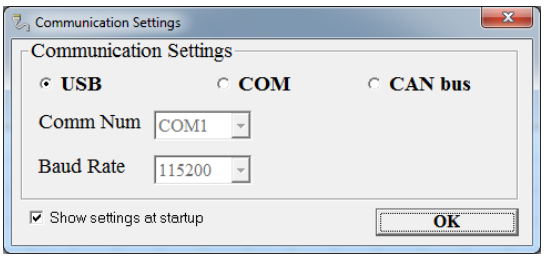
Chapter 2 Use ALM GUI

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



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.

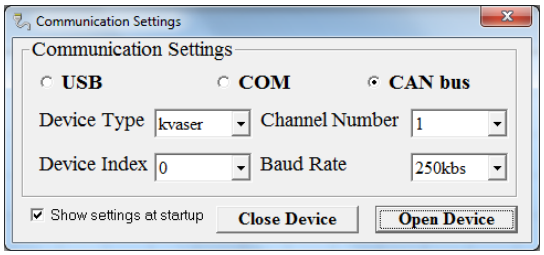


CAN bus method is used to communicate with ALM with CAN bus. If you are using CAN communication, select the CAN bus Device Type. ALM GUI currently supports the EcotronsCAN, Kvaser and PeakCAN device; the future will support more manufacturers.

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.

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.



2.2 Run the software

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

Click it, connect the ALM to PC

Click it to run the software

Click it to start recording data

Click it to stop recording data

Click it to start the data analysis software

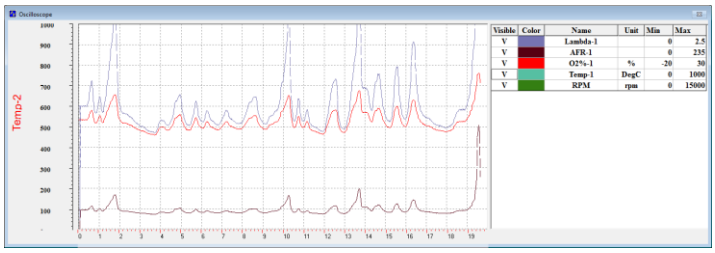
1) Before using the software online, make sure the communication lines between the ALM and the computer has been connected.

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:

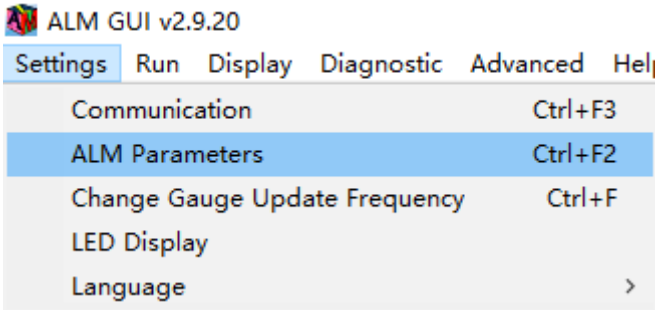
- Lambda-2
- AFR-2
- Oxygen concentration (O2%-2)
- Temp-2 (LSU sensor temperature)
- Analog input 1 (Vin1) (optional, only applies to COM or USB communication)
- Analog input 2 (Vin2) (optional, only applies to COM or USB communication)

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

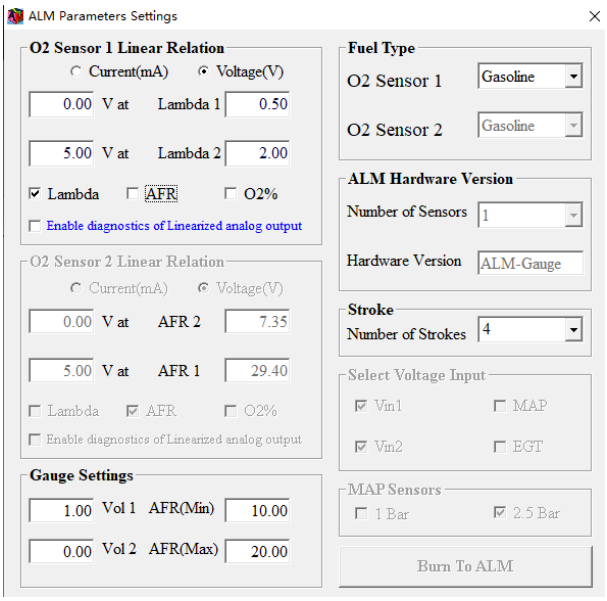
2.4 ALM GUI using COM or USB communication

2.4.1 ALM Parameters Settings

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



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.



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.

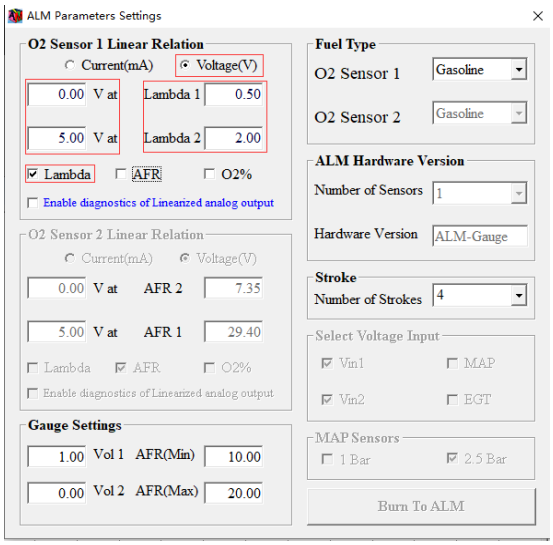
As an example, with this setting, at lambda = 1, Volt = 1.667V.

After the settings, you need to click the "Burn To ALM" button to activate it.

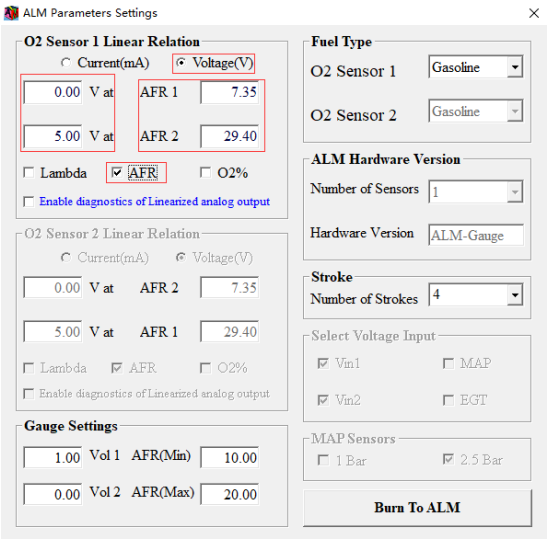
Note:

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.

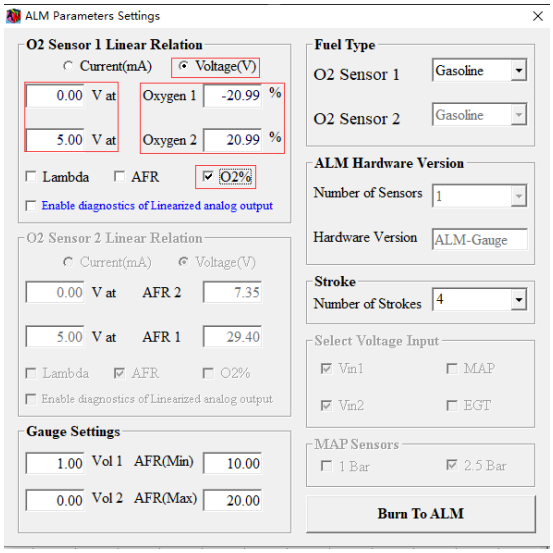
Three different settings see the following figure, if you use a dual-channel ALM, Channel2 and channel1 are the same setting method.



Analog output is used to indicate lambda



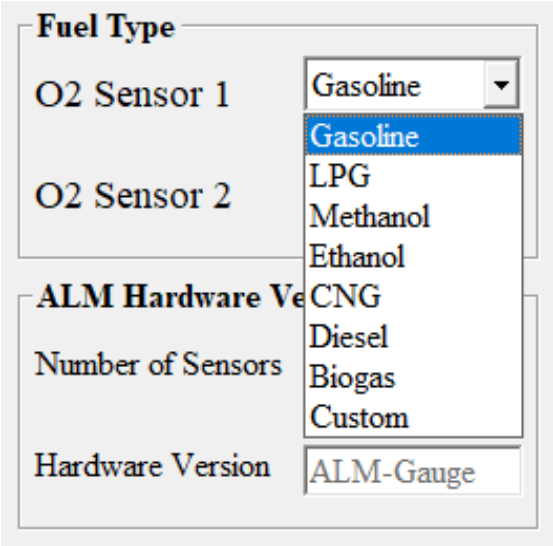
Analog output is used to indicate AFR



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.



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.

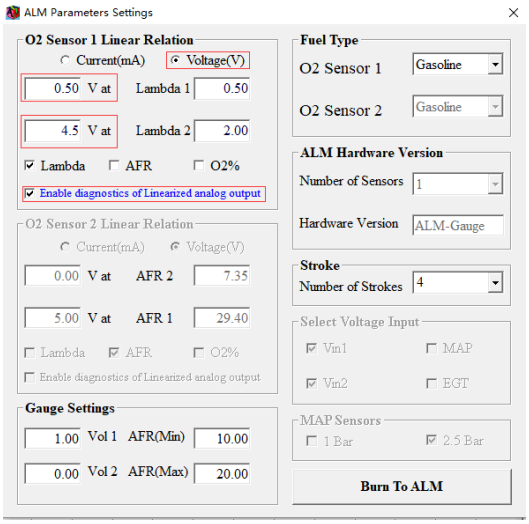
2) It will be <0.5v for a group of errors. (Approximately equal to 0v)

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.

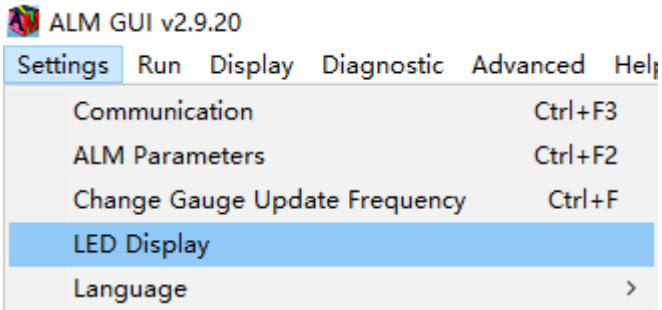
When the error occurred, the specific fault code can query diagnostic functions. (See 2.4.5 Diagnostic Trouble Code)

Fault codes means, see DTC table.

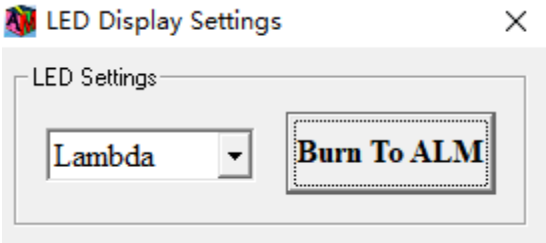


2.4.3 ALM-LED LED Display selection

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.



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

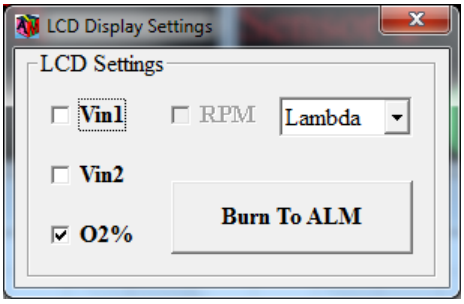


2.4.4 ALM-II LCD Display selection

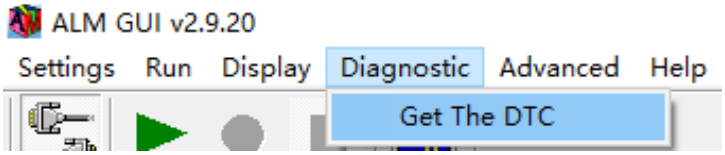
User can select lambda or AFR on the ALM-II LCD display. Click "Settings→LCD display", open "LCD Display Settings" window.

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

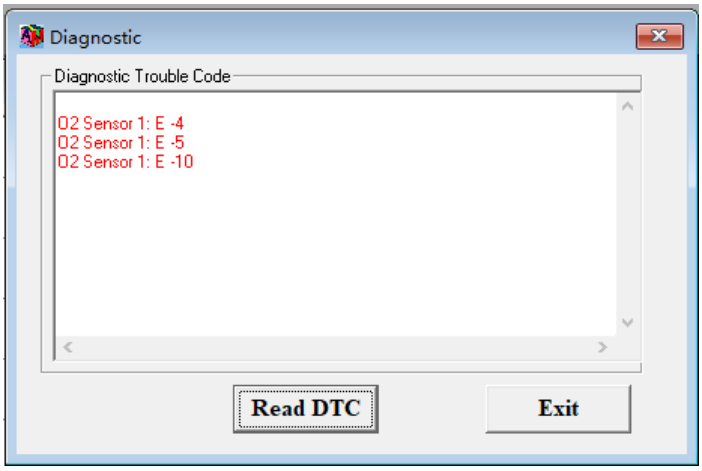
After the selection of the display, click the button "Burn To ALM" to activate the change. By default, it displays the lambda.



2.4.5 Diagnostic Trouble Code



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

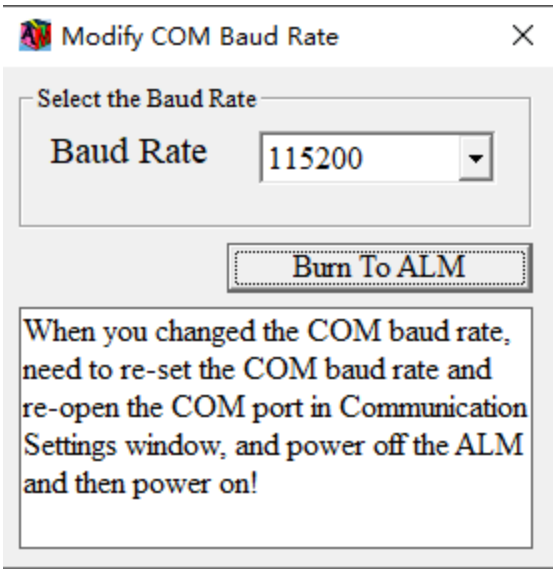


Click "Read DTC" button, ALM GUI will read the active DTCs from ALM memory, example as in the above window. Refer to chapter 3 DTC table for all DTCs ALM supported.

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.



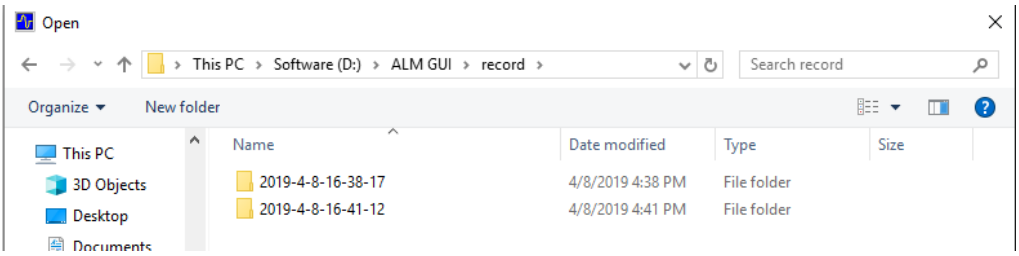
Select the baud rate you want, and then click the "Burn To ALM". If the changed successfully, ALM GUI will display a message at the bottom.

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.

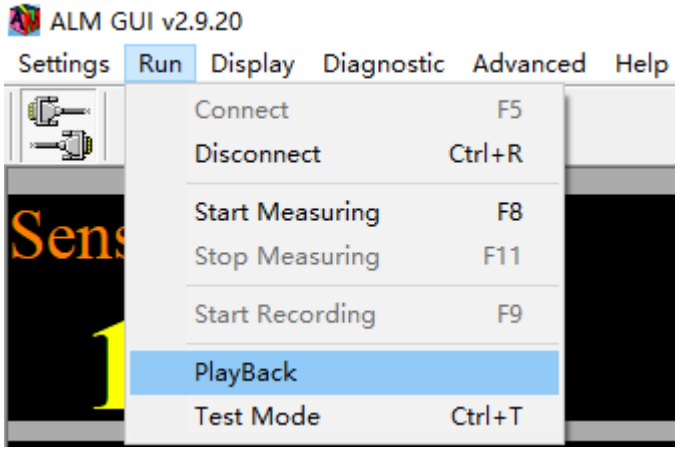
2.4.7 Data recording and playback

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.



Procedures to log and view data are as follows:



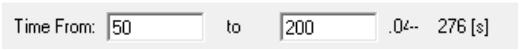
ALM GUI Data Analyzer can also run stand-alone. Users can load the previously logged file into it and do the data analysis in the graphical view.

Steps:

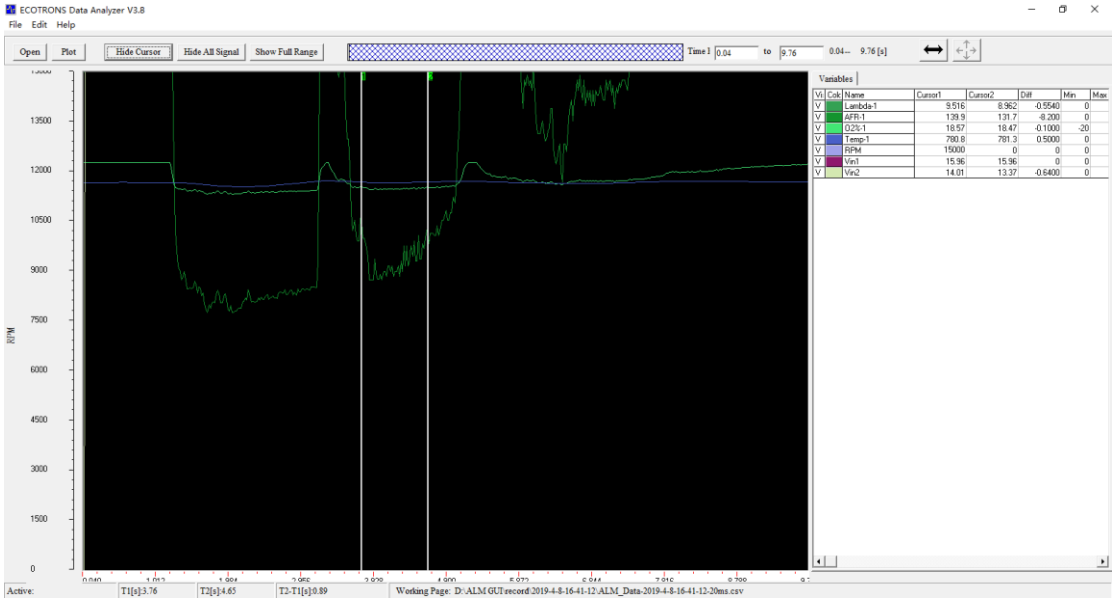
1. Click File ->Open，select the CSV data files，Click "Open" Load files.
2. For every signal, users can manually adjust the "Min/Max" value, and the Y-axis of the signals in the Graph Window will change correspondingly. This can be used to as "zoom in" function for the Y-axis.

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.



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.



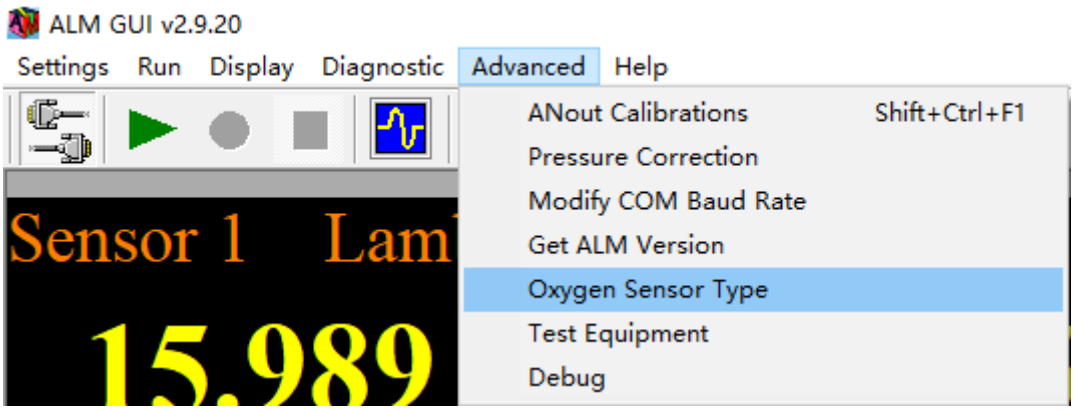
2.4.8 Oxygen Sensor Type Setting

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.

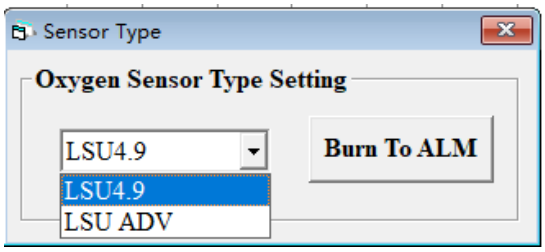
Note: Currently only supports serial communication single channel ALM-LED, ALM-Inline and ALM-Board.

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

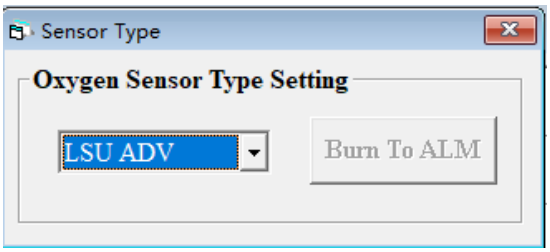
1. Click “Advanced” and choose “Oxygen Sensor Type”



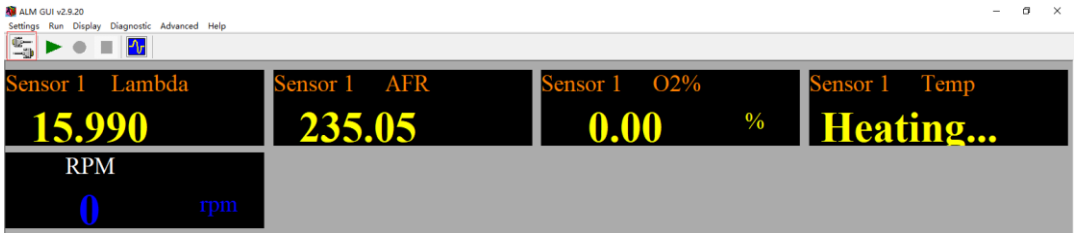
2. There is an interface, the default sensor type is LSU 4.9. You can change it by yourself. Then click “Burn to ALM”.



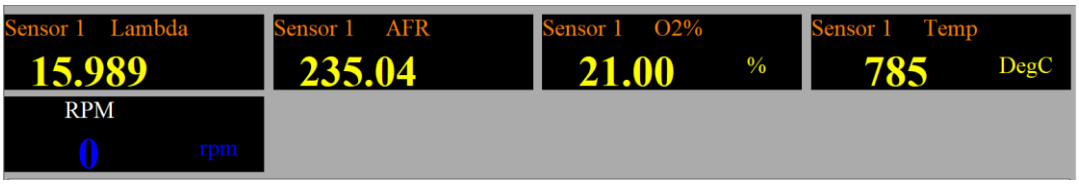
Then there is a note “The Oxygen Sensor type setting is successful”.



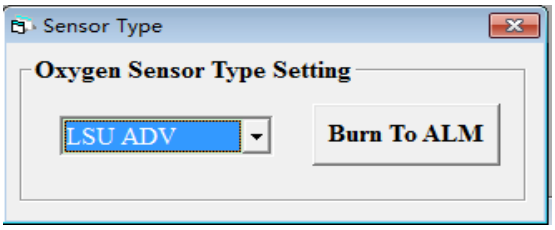
3. After you have changed the sensor type successfully, click “Disconnect” and power off the ALM, change the LSU ADV sensor replacing the former LSU 4.9.



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



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



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

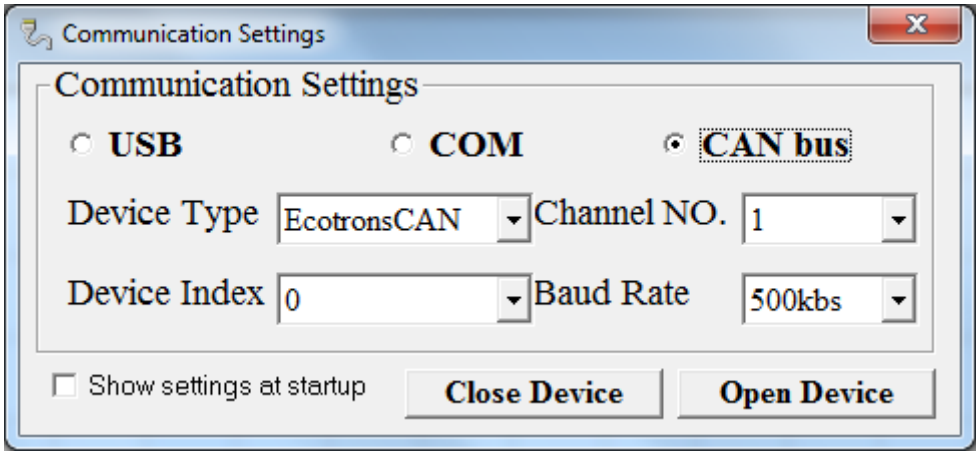
changed to LSU ADV before and you want to change to 4.9 again, the steps of choosing LSU 4.9 are same.

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

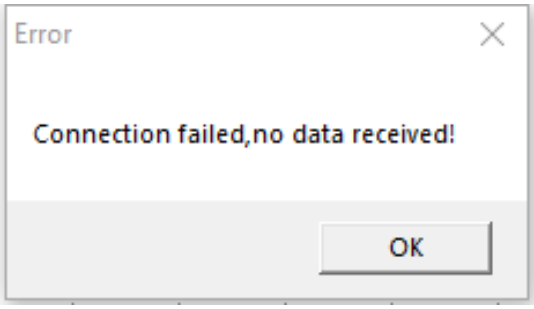
2.5 ALM GUI using CAN communication

2.5.1 Connecting and Troubleshooting

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



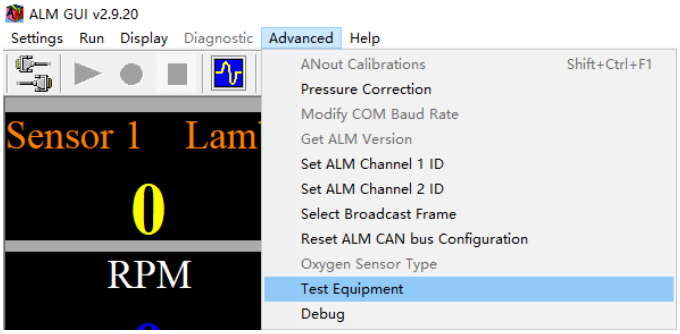
Step2: Click the button “connect”  to connecting ALM to computer. It will point out “Connect successful!” in the lower left corner of the main window if all the options on Communication Settings window are correct and devices connecting errorless. But when you choose EcotronsCAN, if the following prompt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



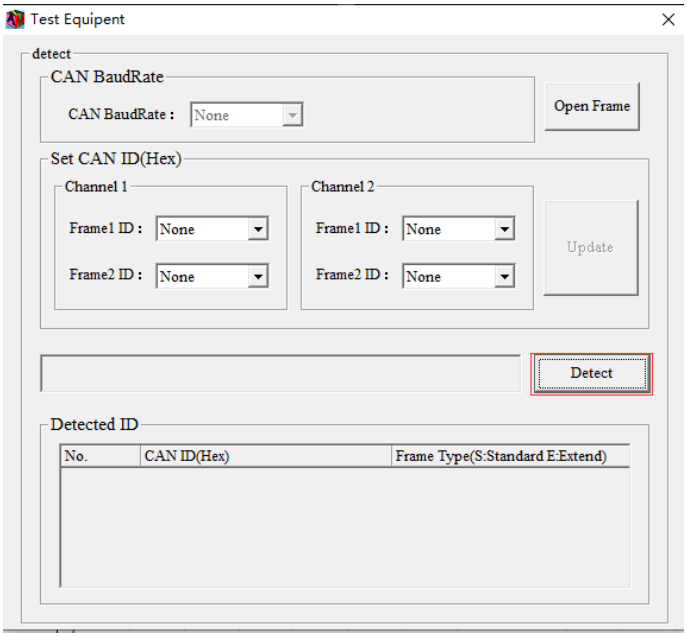
This shows that the setting parameters have a mistake. You should use “Test Equipment” window to detect problem. Method as shown in the following steps 3 to 11.

Note: Kvaser and PeaKCAN need to add terminating resistors during use.

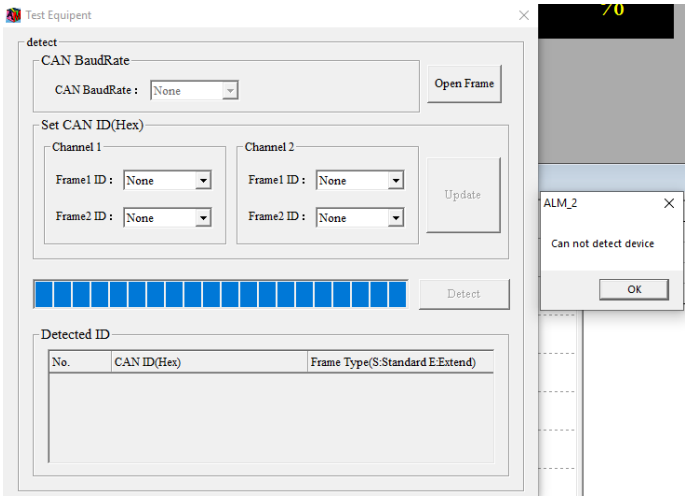
Step3: Open “Test Equipment” window under “Advanced”.



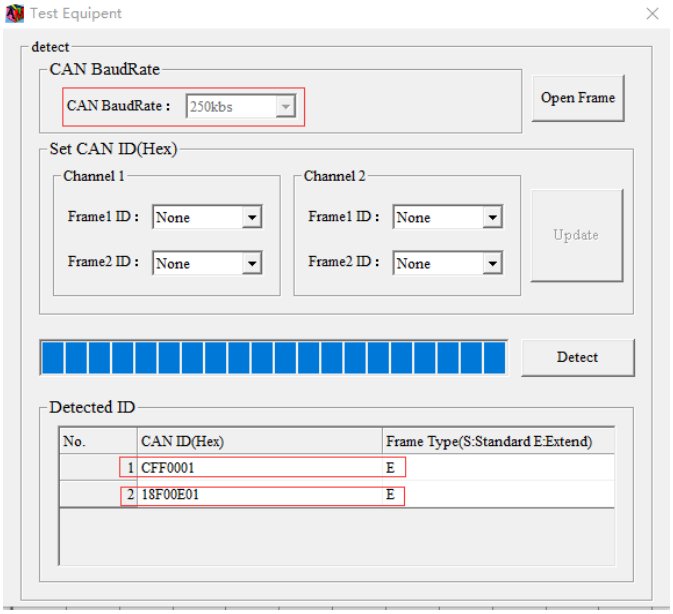
Step4: Click button “Detect” to find the baud rate and CAN ID automatically.



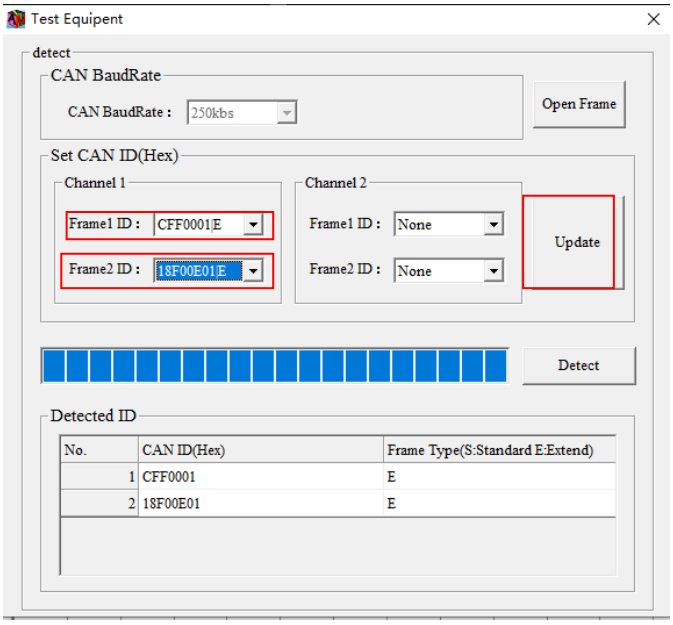
Step5: If the prompt window shows “Can not detect device”, you should check for the cause of the error. There are several reasons lead to this situation, maybe the connection between the CAN device and ALM is reversed or the ALM is not power on. Please power on the ALM and correct wiring first.



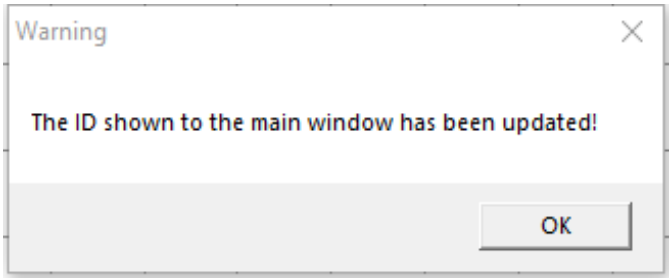
Step6: The correct baud rate and channel ID are displayed when the test is completed



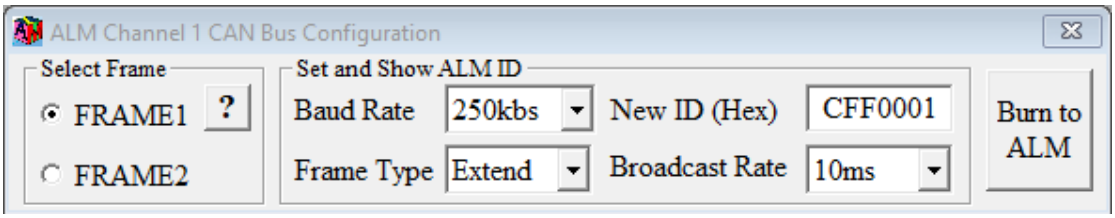
Step7: Fill in the correct ID by selecting it into the Set CAN ID and click the “Update button”.



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



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



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

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.

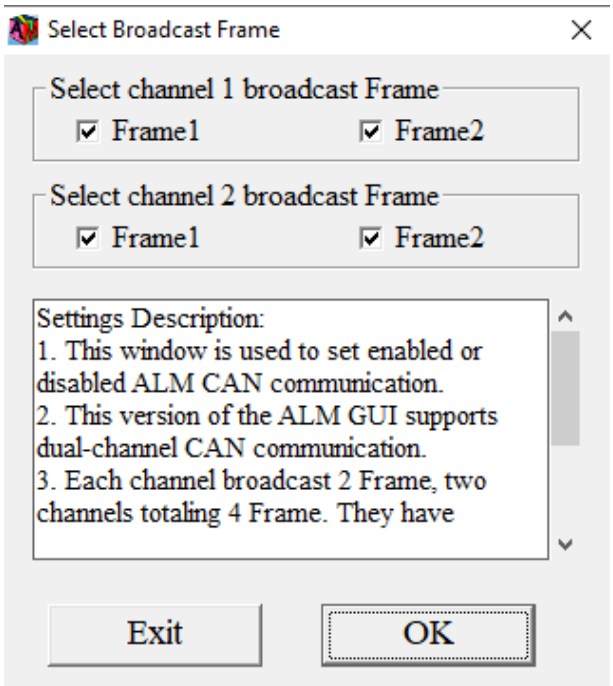
They are supported change the Baud Rate, CAN ID and Frame Type, just different formats of data broadcast.

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.

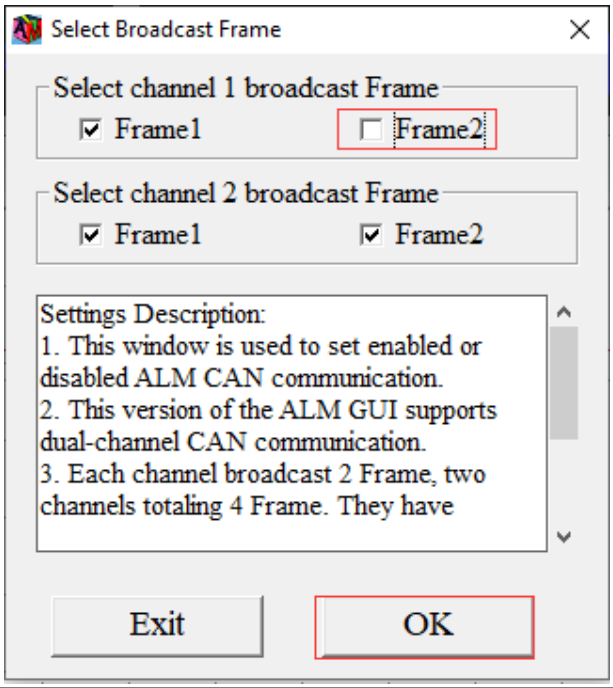
You can set each Frame is enabled or disabled via ALM GUI.

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



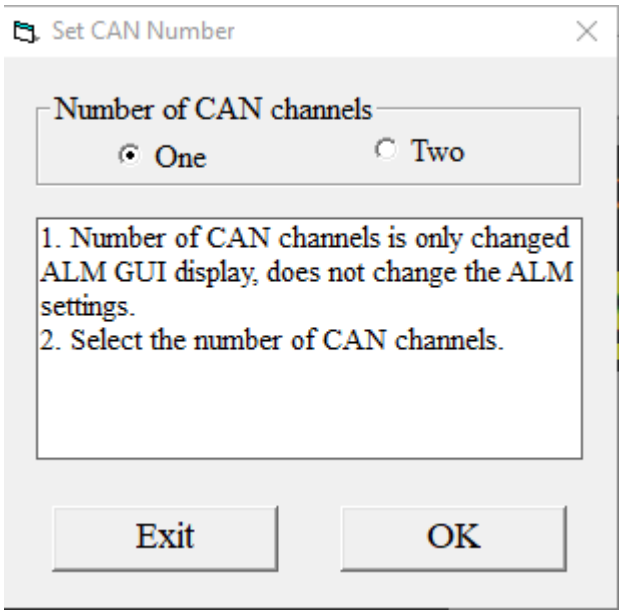
2) Frame1 and Frame2 are selected by default; ALM default broadcast two Frame data. If you do not want to broadcast any one of Frame, removals Frame selected state, and then click "OK" to update ALM settings.

3) For example, just broadcast Frame1, select Frame1, and remove the selected Frame2, and then click "OK" to update ALM settings.



2.5.3 Set CAN Number

Click "Advanced→ Set CAN Number", open " Set CAN Number" window.



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.

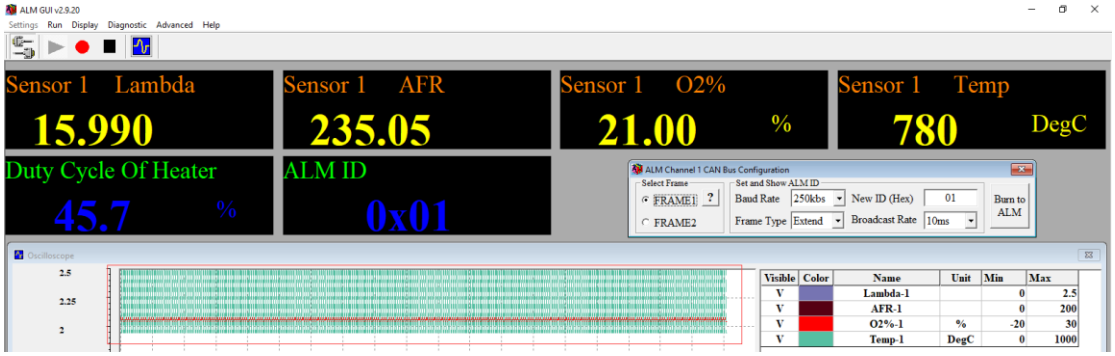
"Set and Show ALM ID" has two functions, set ALM baud rate, frame type, ALM ID and control which ALM to be displayed. If you just choose FRAME1 ALM data to display, do not need to modify the parameters only need to click "Burn to ALM", if you need to set the ALM parameters of FRAME1 or FRAME2, select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

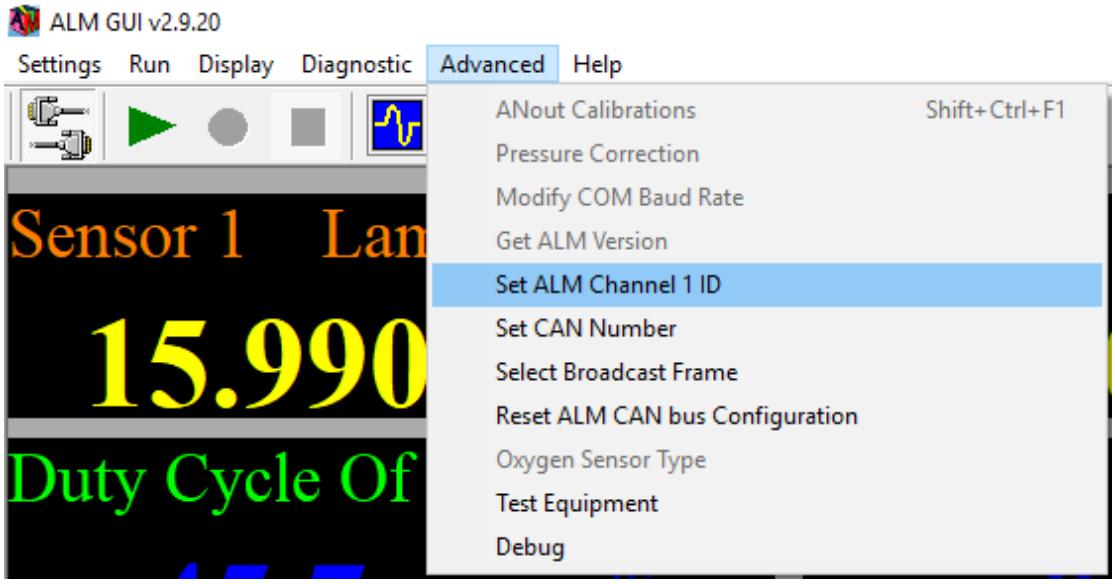
Note2: If the ID and frame type of Frame1 is the same to Frame2, the curve will look like the following. In this case, you need to set the two ID to different values.

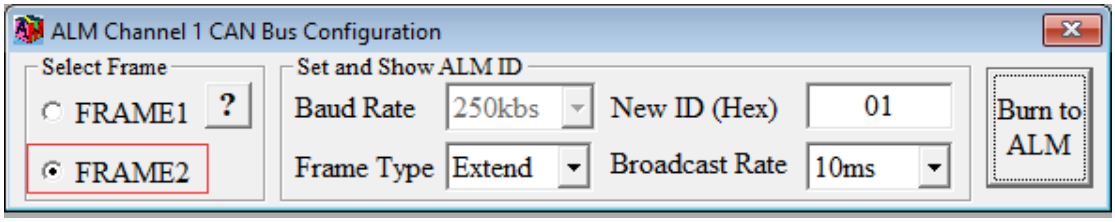
Note3:ALM CAN version supports 11-bit standard frame and 29-bit extend frame.



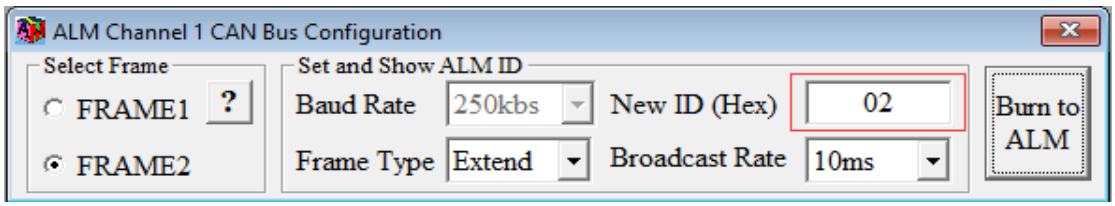
Example 1: modify the Frame2 ALM ID of channel 1 to 0x02.

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

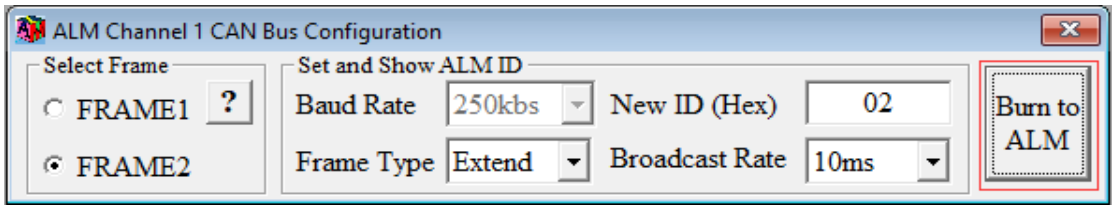




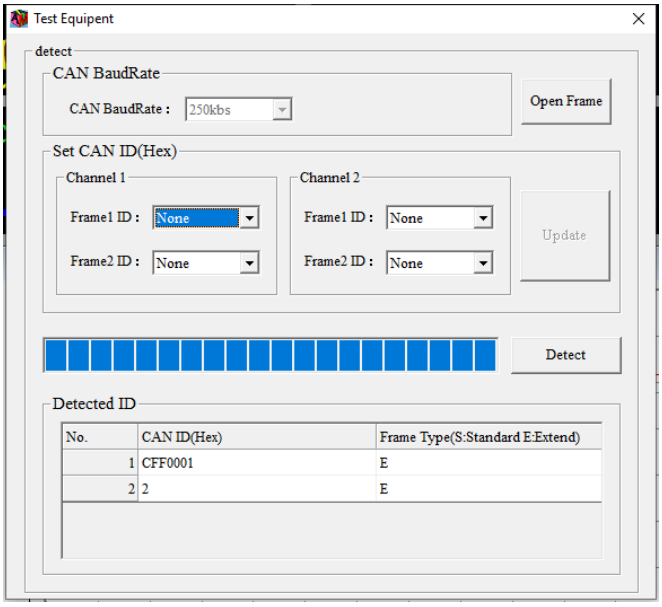
2) Enter 02 in the New ID text box.



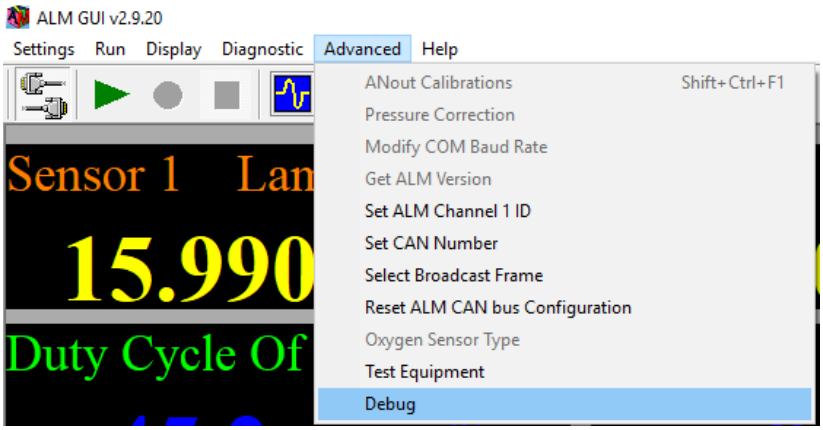
3) Click “burn to ALM”.

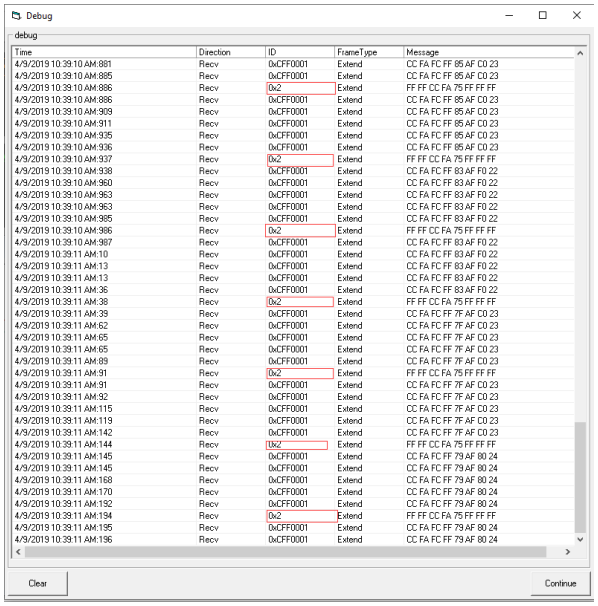


4) The “Test Equipment” window shows ID “0xCFF0001” and “0x02”.



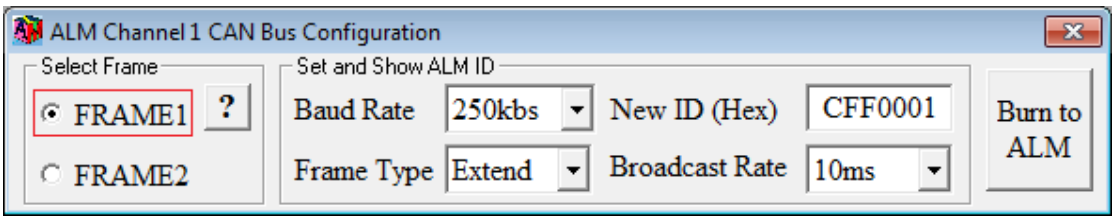
5) Click “Debug” under “Advanced”, the window shows ID “0x02” and “0xCFF0001”.



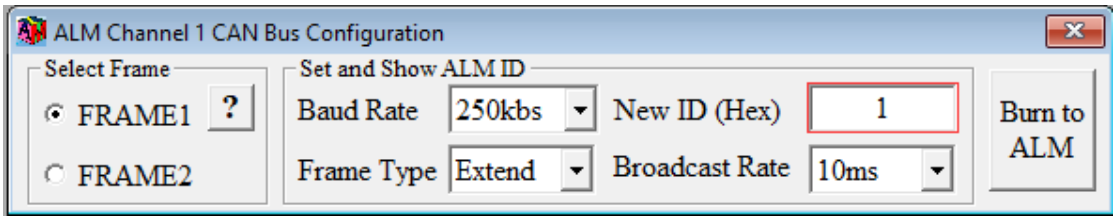


Example 2: modify the Frame1 ALM ID of channel 1 to 0x01.

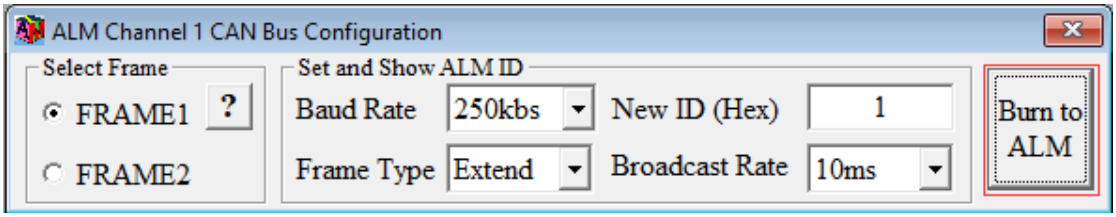
1) Select FRAME1.



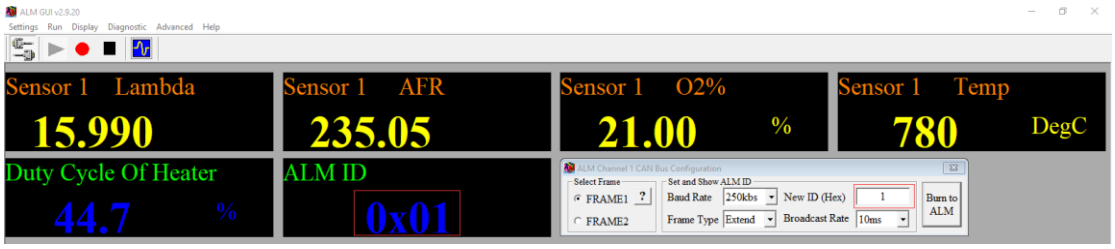
2) Enter 1 in the New ID text box.



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

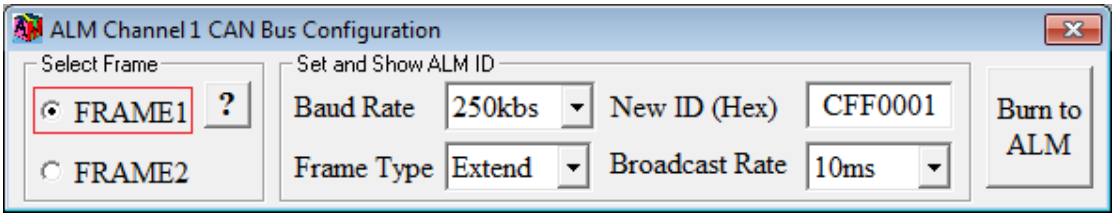


4) You can see ALM ID has changed via ALM GUI.

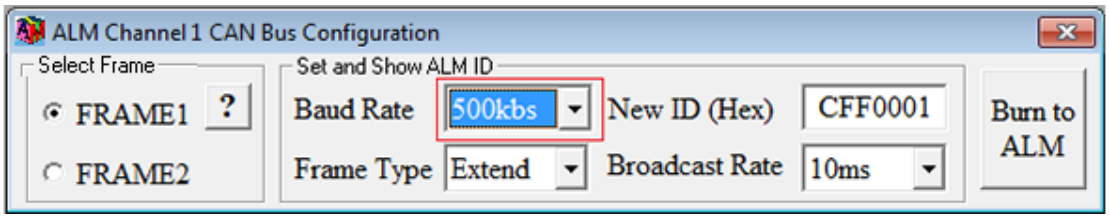


Example 3: change FRAME1 of channel 1 baud rate to 500kbs.

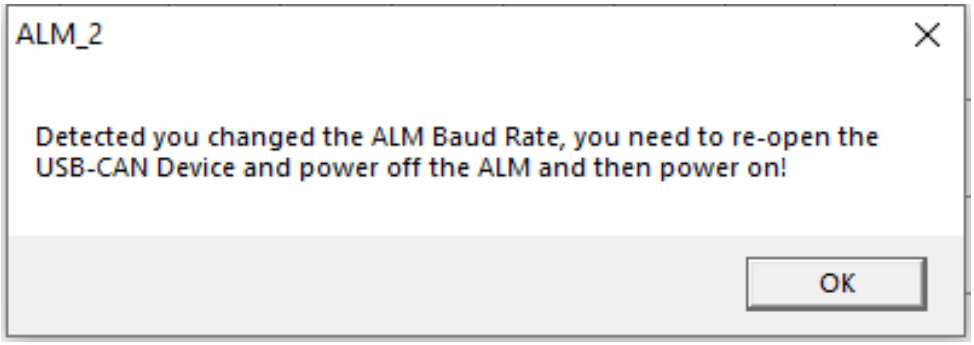
1) Select FRAME1.



2) Baud rate selection 500kbs.



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.



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

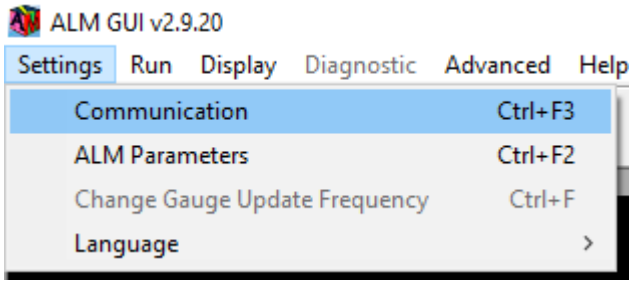
Note:

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

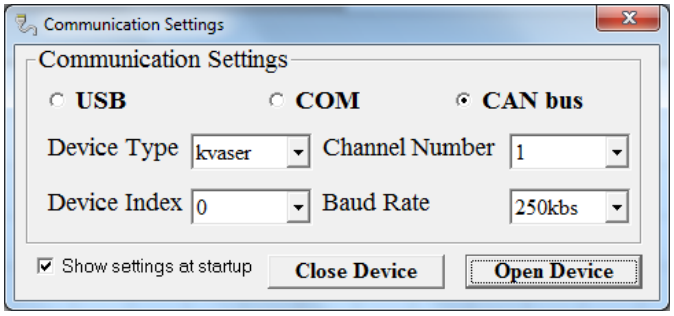
2) Users can while changing the baud rate, frame type, and ALM ID.

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

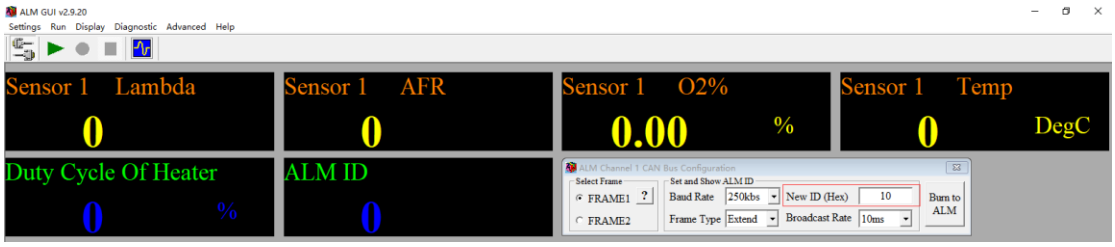
1) Click Settings→Communication, open Communication Settings window.



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

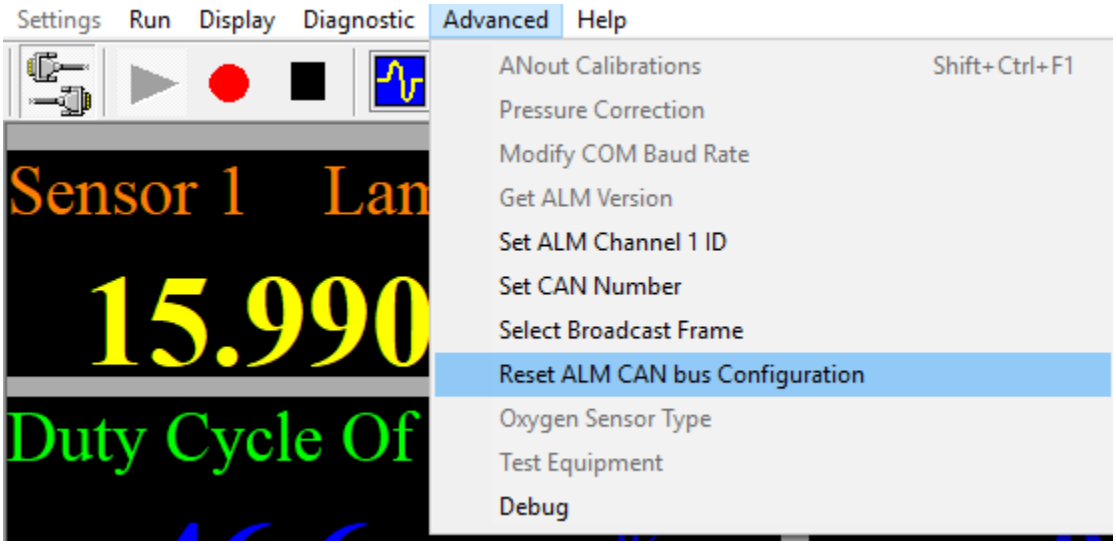


4) ALM GUI will only display data corresponding to the selected ALM ID.

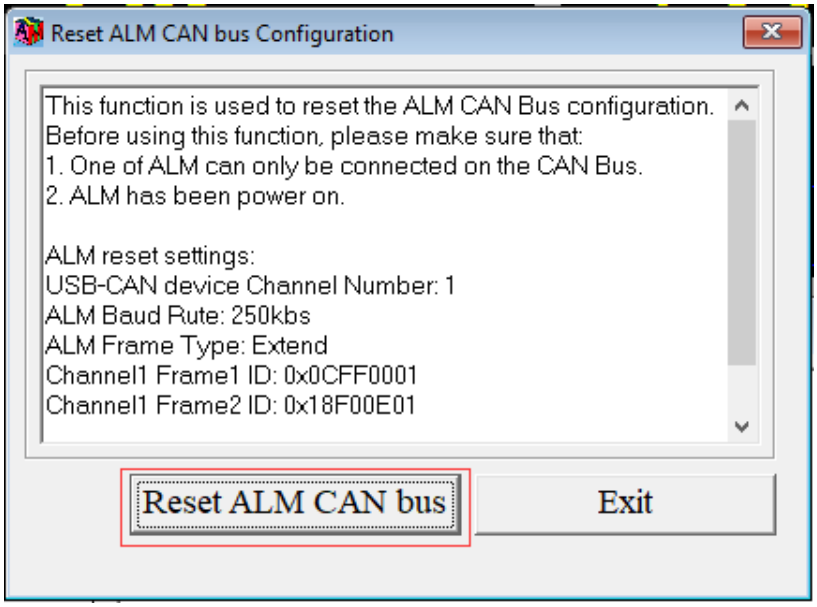
2.5.5 Reset ALM CAN bus Communication Settings

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

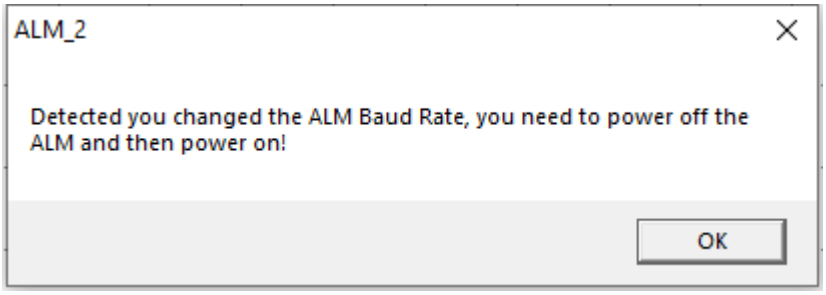
1) Select CAN bus communication, click Connect→Advanced→Reset ALM CAN bus Configuration.



2) Click "Reset ALM CAN bus" button.



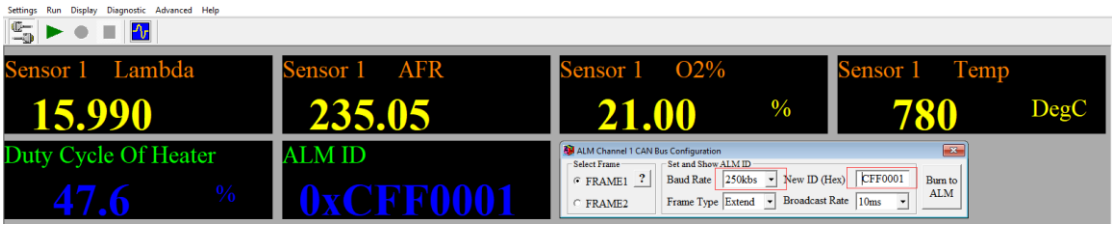
3) Wait for some time, and if successful reset, the text box will print out after reset CAN bus information.



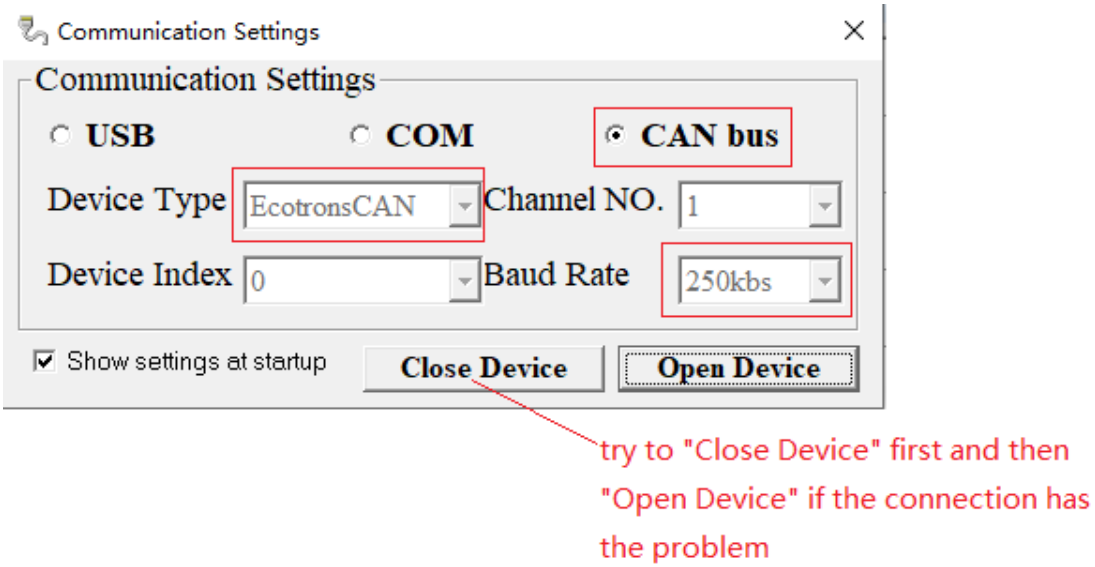
CAN communication also supports data recording and playback; refer to 2.4.7 Data recording and playback.

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.

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.



Chapter 3 DTC table

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	Contact the manufacturer
E3	LSU yellow wire (VM) short to power	1. Check the harness for short-to-power 2. Change the LSU
E4	LSU yellow wire (VM) short to GND	1. Check the harness for short-to-ground 2. Change the LSU
E5	LSU black wire (UN) short to power	1. Check the harness for short-to-power 2. Change the LSU
E6	LSU black wire (UN) short to GND	1. Check the harness for short-to-ground 2. Change the LSU
E7	LSU green wire (IA) short to power	1. Check the harness for short-to-power 2. Change the LSU
E8	LSU green wire (IA) short to GND	1. Check the harness for short-to-ground 2. Change the LSU
E9	Operating voltage too low	Check the power supply to the ALM spec.
E10	Heater circuit damaged	Contact the manufacturer
E11	Heater circuit short to power	Contact the manufacturer
E12	Heater circuit short to GND	1. Check the harness for short-to-ground 2. change LSU 3. Contact the manufacturer