acts
advanced control testing systems

ALC-3.1

Advanced low-level controller

User Manual

ACTS Technologies Inc

Proprietary Software

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Content

1. Technical Support

Technical support

1.1 Start with your manual

The manual supplied by ACTS provide most of the information you need to use software.

1.2 Technical support methods

ACTS provides a full range of support services after your system is installed. If you have any questions, contact Technical Support in one of the following ways.

Type of Support	Details
Address	1090 West Georgia Street BC Canada V6E 3V7
E-mail	support@acts-techologies.com
Telephone	+1 604 674 6033

If you have any questions regarding this manual, please contact ACTS.

2. Preface

Preface

The purpose of this document is to familiarize the user with the operation of the ACTS Advanced Low-level Controller – ALC 3.1. As the version is updated, the interface may be slightly different.

1.1 Overview

ALC 3.1 is one of the ACTS software series. Its main function is real-time control, and completing the HSS hybrid simulation experiment by standard network interface with the ACTS HSS software. ALC provides users with a custom controller interface function.

1.2 Getting started

1.2.1 Launch ALC 3.1

Figure 1 shows the ACTS software. **By double clicking the icon**, ALC 3.1 will be launched.A copyright page is displayed when the system is launching and loading(Figure 2).

Figure 1 – ALC software icon

Figure 2 – ALC software copyright page

1.2.3 Main Window

After the system is started, the main interface will be displayed.Figure 3 shows the Main window. It includes three bars and one sub-window: Menu Bar, Shortcuts Bar, Control Window and Status Bar.This manual will detail how to operate the ALC 3.1 from three aspects of "**Menus**", "**Shortcuts**", "**Control Window**".

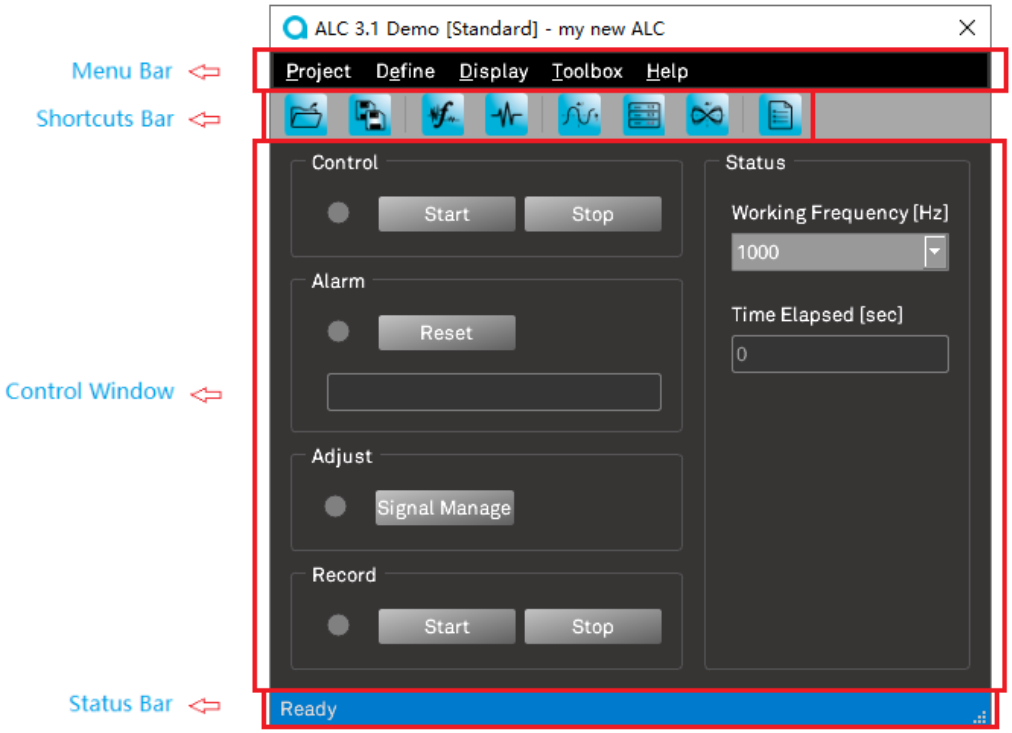

Figure 3 – Main window

When the main window is first opened, ALC will create a default database (./my new ALC.db) for the user in the current directory witch Same as the ALC executable . The database is the most basic configuration for real-time control, which contains input signal, signal operator, user define signal, various real-time control signal definitions, and the user can modify, expand and save the database as your own project database.

3. Menus

Menu

3.1 Project Menu

This section will describe options in the Project Menu shown in the table below.

Option	Description
New	Start with a blank project
Open 	Opens a previously save project
Save as 	Saves the current settings as a database file to another location or as another file name
Description	Identifies information regarding the project
Preferences 	Tool to modify font size, background color
Recent Projects	Displays recently opened projects
Exit 	Closes the program

3.1.1 New

By clicking “New”, ALC will start with a blank project. When you are running "my new ALC" project, if you click “New”, the system will reset all the changes that you have done.

3.1.2 Open

By clicking “Open”, open a project previously saved by the user.

3.1.3 Save as

By clicking “Save as”, allow the user to choose the file location and name to store the current settings.

> **NOTE**
>
> **If the current file is not saved as an alternate file, it will be replaced by a default file the next time ALC opens.**

3.1.4 Description

By clicking “Description”, a “Project Information” window will be opened to allow the users to identify information regarding the project, including project Name, Path, Frequency, the current version of ALC and Description.

Additionally, users can change the Frequency[Hz] by clicking “ ” to choose a suitable frequency, and a description box can be edited to document details of the project (Figure4).

> **NOTE**
>
> **The default frequency of the project is 1000Hz. When you change the frequency of the project, the new frequency will not take effect immediately. You need to close the project and reopen the it, the new frequency will be saved**

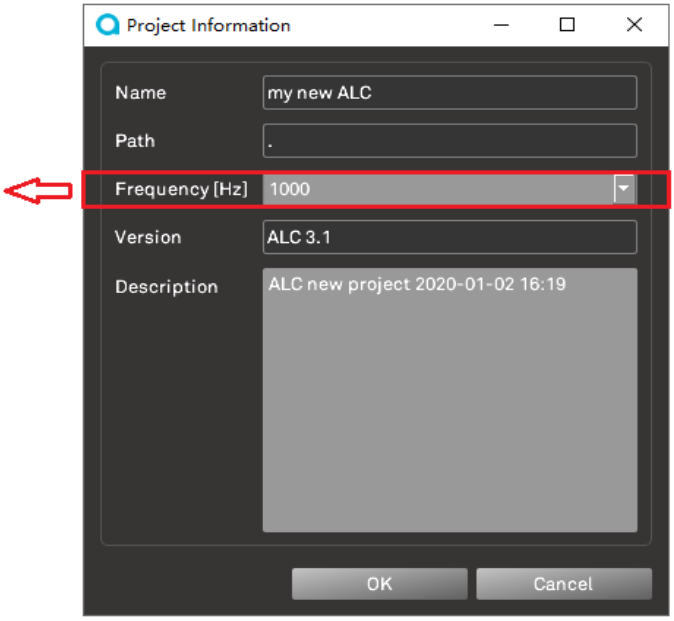

Figure 4 – Project information

3.1.5 Preferences

By clicking “Preferences”， a window as shown in Figure 5 will be opened to allow the user to modify font size, background color,Record Txt format and digital Meter format.

NOTE

Preference settings are not applied unless the user selects ‘OK’

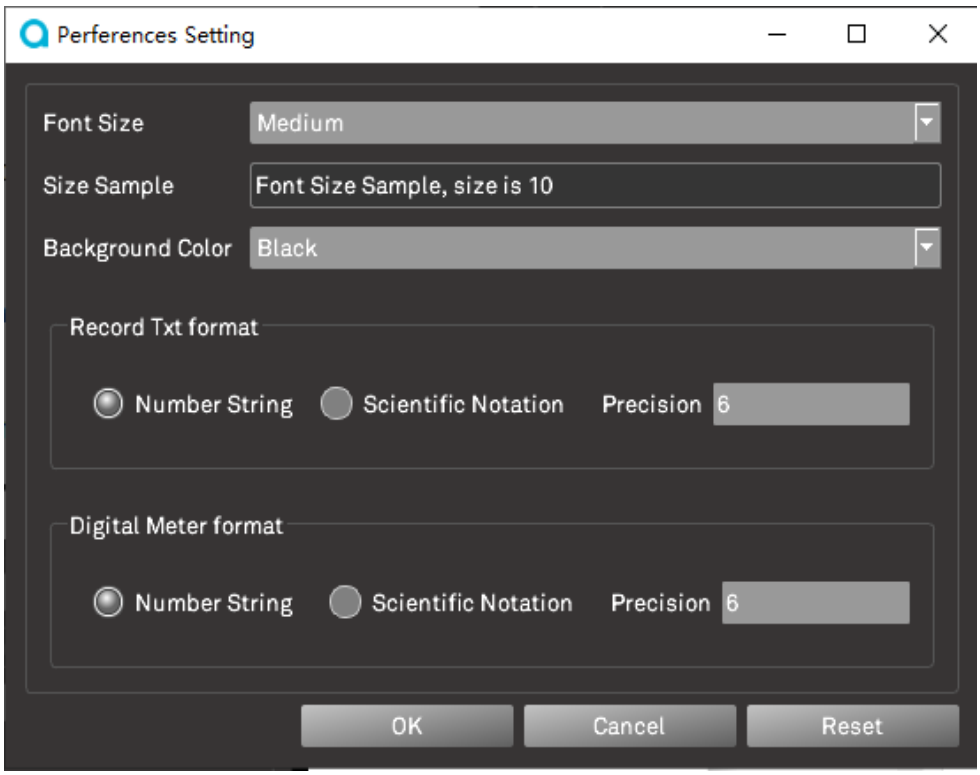

Figure 5 – Preferences setting window

3.1.6 Recent Projects

“Recent Projects” menu includes sub menu items which keep the recently opened project names， to click can open it directly.

3.1.7 Exit

By clicking “Exit”, ALC will be closed. When you make some changes in the "my new ALC" project, if clicking “Exit”, a dialog box will pop up to confirm whether to save the project.

NOTE

If users do not save the project, all the changes will be replaced by the new "my new ALC" project when you open the program next time

3.2 Define Menu

This section will describe options in the Define Menu shown in the table below.

Item	Description
Input Channel	Shows a summary of input signals and their relevant information
Operator 	Shows existing signal operators and options to create new operators
Signal 	Shows existing signals and options to create new signals
Output Channel	Assigns a defined signal to each output channel
Alarm Action 	Checks for signals and trigger the output of the output channel
Limit Detector 	Defines the upper and lower limits for each previously defined signal, and select one of the Alarm Action
Data Recorder 	Selects the previously defined signal for recording

3.2.1 Input Channel

By clicking "Input Channel", a window as shown in Figure 6 will be opened. All system pre-defined input signals which have the same quantity as the system input hardware channels will be listed. The user can click the "Enable" check boxes to enable them. Only enabled input signal(s) can be used in ALC system. Double clicking "Input Signal Name" can edit the input signal name.

This table is describe items in the Input Channel.

Column	Description
Input Channel	Shows all input signals available. The number of input signals listed is the same as the number of input channels in the ALC hardware.
Status	Enables or disables each channel. Only enabled input signals can be used in the ALC system. Enable each signal by clicking the "Enable" check boxes.
Input Signal Name	Double click entries under the "Input Channel" column to edit each input signal's name.
M (slope)	Calibrate the actuator's voltage output to the data what users need through a linear equation y=M*x + B
B(y-intercept)	
Unit	Annotate the unit of the signal.

NOTE

By clicking" Enable All " to open all channels and by clicking to" Disable All "close all channels. This is very useful when testing channels, but it is best to only open the channels that are actually used

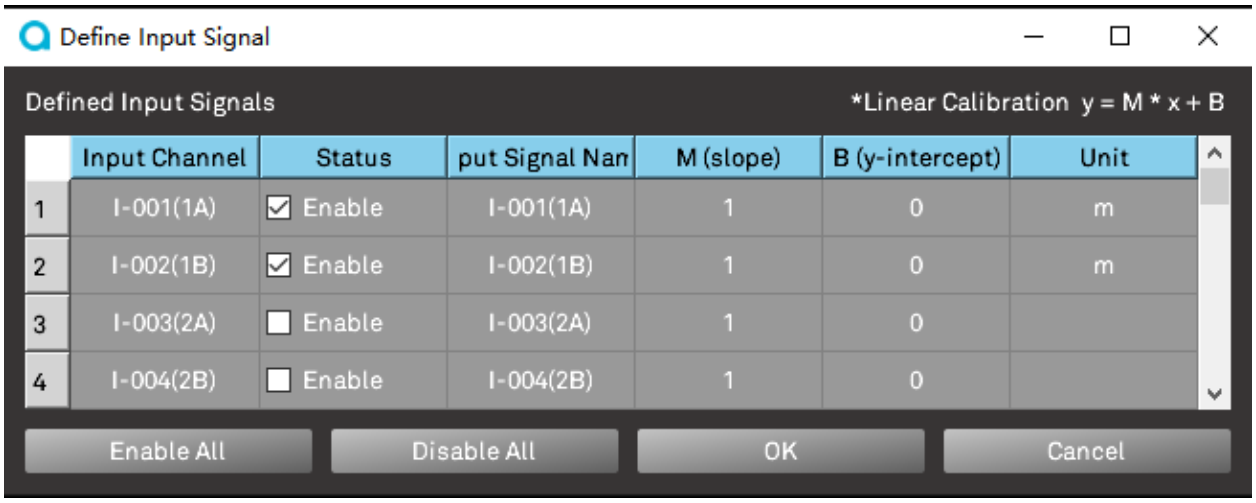

Figure 6 – Define Input Signal window

3.2.2 Operator

By clicking "Operator", a window as shown in Figure 7 will be opened.

The right side of the window lists all defined signal Operators, each of which can be enabled or disabled by checking the box next to the signal name. Clicking on existing Operators bring up a window on the left side with relevant options to change the Operators.

The left side of the window shows available options for defining new Operators. This function defines the Signal Operators, which include Name, Filer, Integration, Differential and User Define Signal Operator types.

Take "User Define" as an example.Enter "User_A" in the name field and select "User Define" in "Operator Type" .Before defining a User Define Signal Operator, a template must be provided according to ACTS to create a dynamic link library (DLL). The template contains upper limits of input parameters, input signals and output signals. By clicking "Browse" , Select a already created dynamic link library file with the "dll" extension from "Open dll file" window, then click "open" to complete the link(Figure 8).

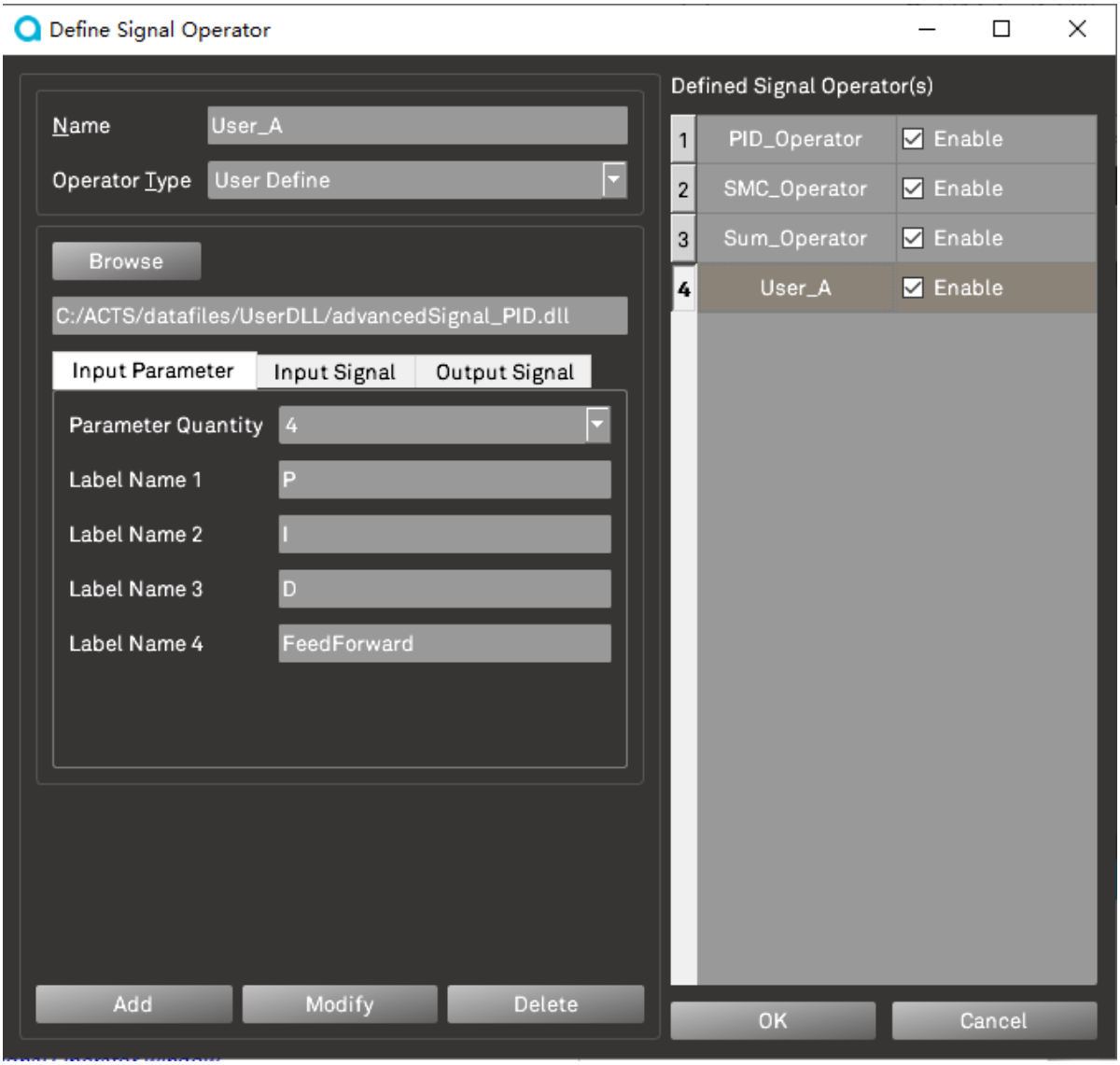

Figure 7– Operator window

Take “User Define” as an example.Enter “User_A” in the name field and select “User Define” in “Operator Type” .Before defining a User Define Signal Operator, a template must be provided according to ACTS to create a dynamic link library (DLL). The template contains upper limits of input parameters, input signals and output signals. By clicking “Browse” , Select a already created dynamic link library file with the “dll” extension from “Open dll file” window, then click “open” to complete the link(Figure 8).

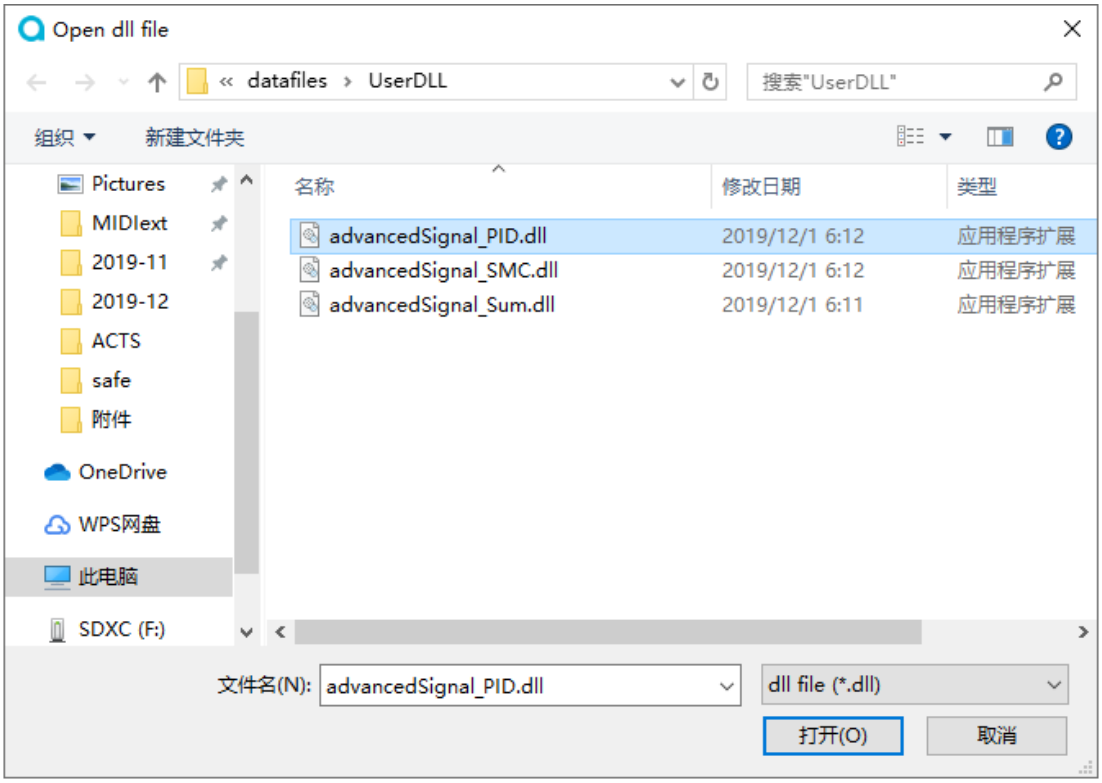

Figure 8– Open dll file window

When the link is complete, the window is shown in Figure 7, then users can define the quantity and name of Input parameter/Input Signal/Output signal. By clicking “Add” , the new operator witch name is “User_A” is added in the right list of Defined Signal Operator(s). When users make any changes in operator, by clicking “Modify” to save the changes and keep the window, by

clicking "OK" to save all the changes after "Modify" and close the window, ,by clicking "Delete" to delete the operator what user selected, by clicking "Cancel" to cancel all the changes and close the window.

After defining appropriate Signal Operator, they can be used to modify signals, which is described in the "Signal" section.

NOTE

When a "Defined Operator(s)" is being used by a "Defined Signal(s)", users can not save any changes in it.

After defining appropriate Signal Operator, they can be used to modify signals, which is described in the "Signal" section.

3.2.3 Signal

By clicking "Signal", a window as shown in Figure 9 will be opened. This function defines the Signals, including the following:

Non-Sourced Signal: System generated, no other signals required as input. Including Const, File, and Sine signal.

Sourced Signal: Relying on other signals as input signals, the signals generated by the system are reprocessed. Including Linear Conversion, Filter Processing, Integration, Differential, and User Define Signal.

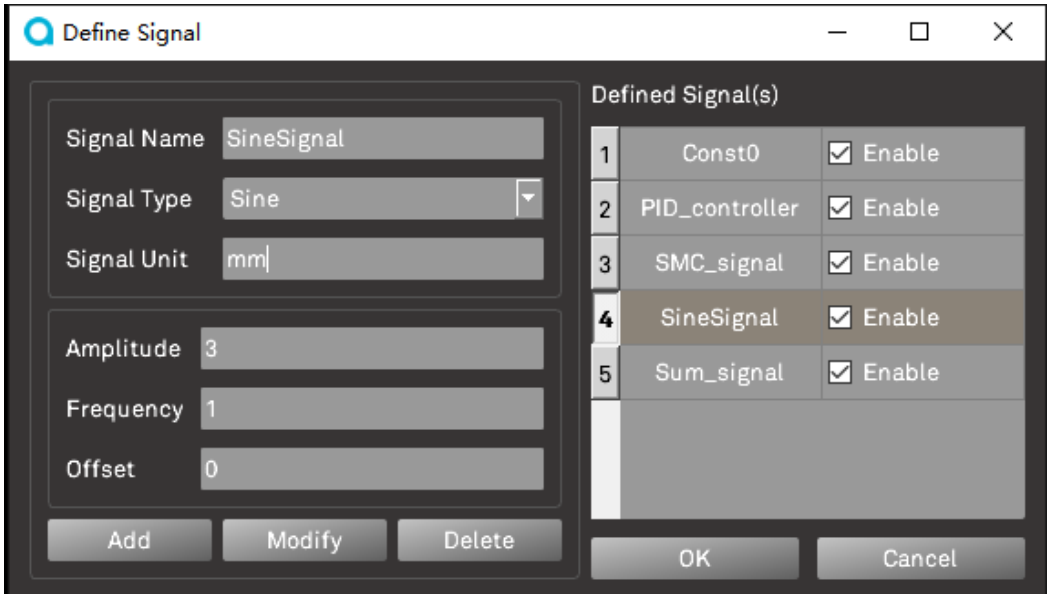

Figure 9 – Define Signal window

ALC has established two User Define Signal samples (PID controller and signal synthesizer) in the system for user reference. (For details, refer to Section 6.4 How to define a PID controller)

NOTE

The defined signal can be used as an input signal (signal source) for other post-defined signals.You can see the interdependencies of signals in the workspace.

3.2.4 Output Channel

By clicking "Output Channel", a window as shown in Figure 10 will be opened. This function assigns a defined signal to each output channel. The number of output channels and the limit of output values are determined by the system hardware. By selecting "Signal Name" combo box, choose the output signal for this output channel. After enabling the "Enable" check box, the signal will be sent out.

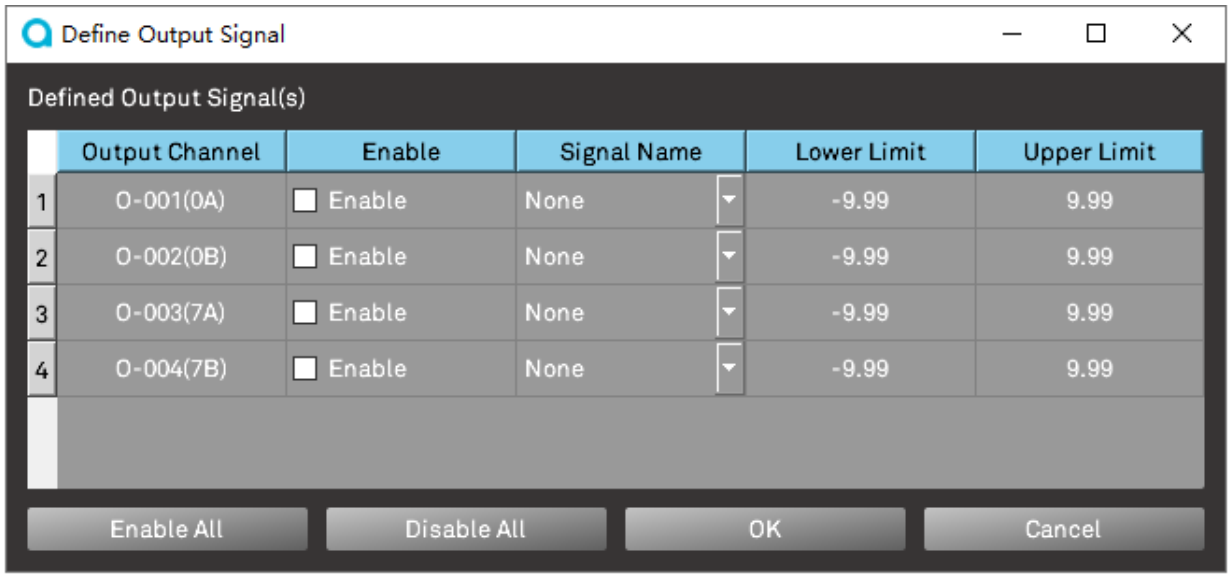

Figure 10 – Define Output Channel window

3.2.6 Alarm Action

ALC 3.1 has the ability to check for signals and trigger the output of the output channel.

For example, the signal value of the servo valve can be defined in the Alarm Action, and the safety signal value range is set in the "Define Limit Detector". When the displacement meter signal value exceeds the set value, the Alarm Action is started, that is, the servo valve signal is 0 (specific value), and the effect of stopping the actuator should be achieved in the open loop state.

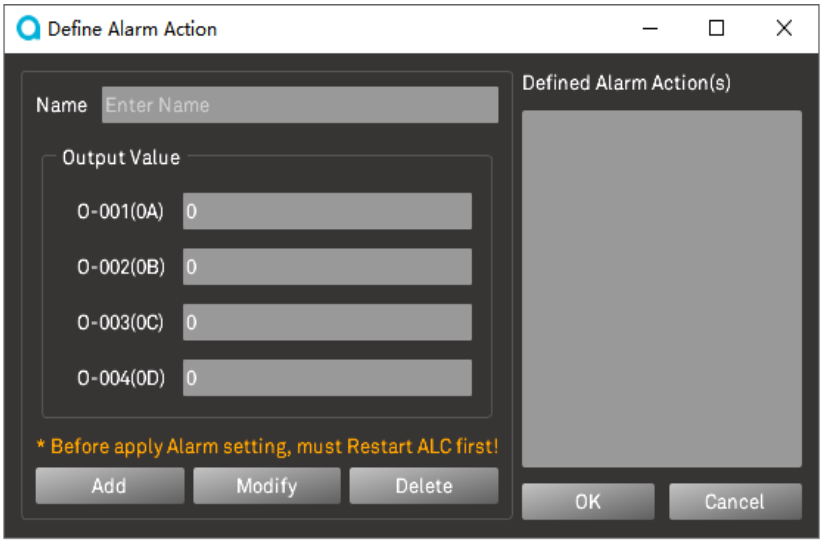

Figure 11– Alarm Action window

3.2.7 Limit Detector

By clicking "Limit Detector", a window as shown in Figure 12 will be opened. The user can define the upper and lower limits for each previously defined signal, and select one of the "Warning", "Pause ALC", "Stop ALC" and User Define Actions four types of actions when the signal exceeds the limit during a test. After checked, the signal will be detected. Click "OK" to save the settings and effective immediately while the control thread is running; otherwise, click "Cancel".The actual test should be performed each time the lab is actually using the feature. Due to the inevitable noise interference during the experiment, it may happen that the signal value exceeds the limit when the equipment is operating normally. It can be avoided by defining the Trigger threshold. The alarm will not be issued immediately when the limit is exceeded. Only when it exceeds the limit and accumulates a predefined number of times, it will alarm.

After the correct configuration, the departure limit alarm, and then there will be an actual output display on the signal display panel of the DAQ, and the active response of the actuator.

NOTE

1. "Define Limit Detector" can be modified and effective in real time, but the "Alarm" Action needs to be defined in advance.

2. If you need to be alerted immediately, set the Trigger threshold to 1.

3.The timing of the Trigger threshold decision depends on the "Working Frequency[Hz]".

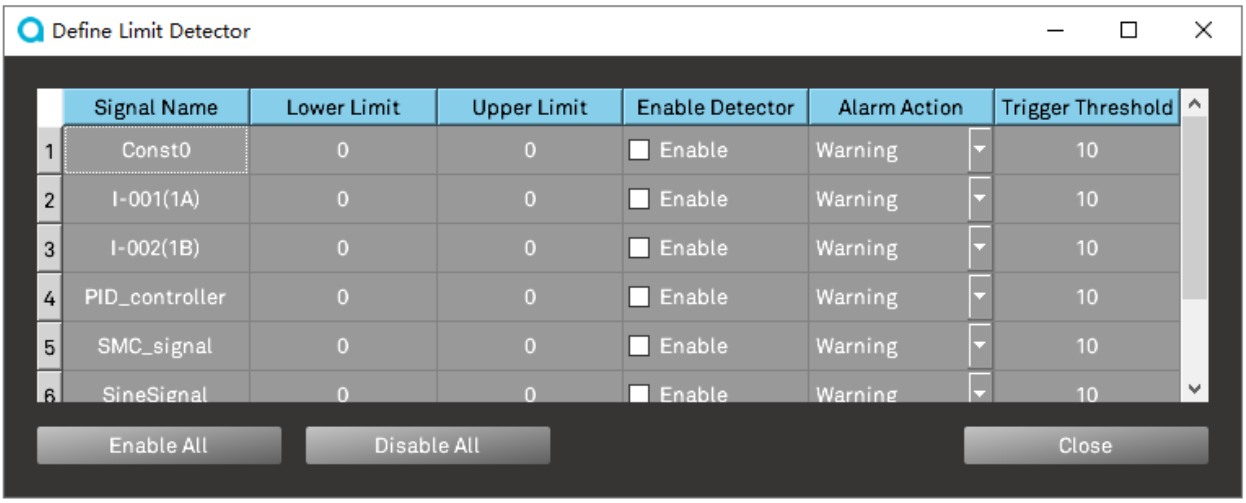

Figure 12 – Define Limit Detector window

3.2.8 Data Recorder

By clicking "Data Recorder", a window as shown in Figure 13 will be opened. The user can select the previously defined signal for recording. All the available signals are listed in the table, the user just need check the "Enable Record" check box to select them for recording. The user will use "Browse" for the

location to store the signal data, and use "Record Rate [Hz]" combo box to set the data recording rate. Select "Auto Record", the system will automatically turn on the signal recording function in real time control; otherwise, the user needs to manually turn it on. Click "OK" to save the setting; otherwise click "Cancel".

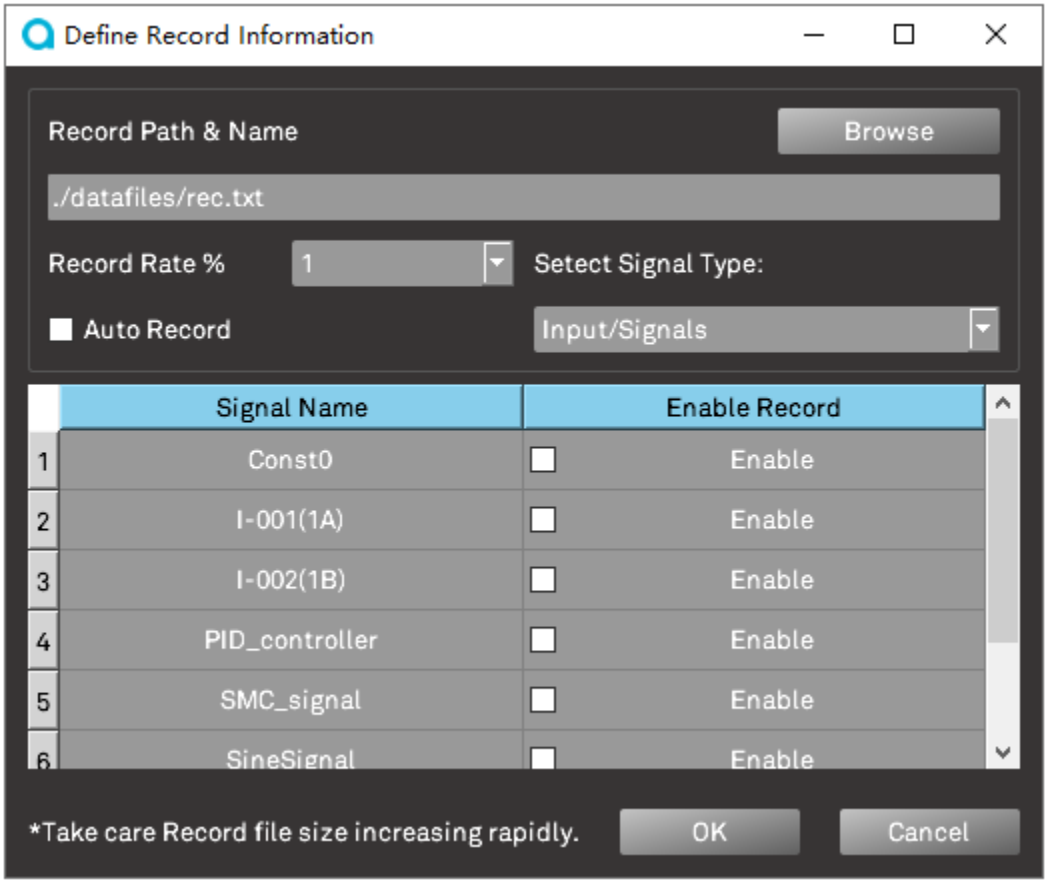

Figure 13– Define Record Information window

NOTE

When the Record is opened, if the name is not changed after the first record, the first record will be overwritten during the second record.

3.3 Display Menu

This table is describe items in the Input Channel.

Column	Description
Oscilloscope 	Provides real-time plotting to visualize all kinds of signals
X-Y Plot 	Provides real-time plotting to visualize all kinds of signals
Digital Meter 	Provides real-time meter to visualize all kinds of signals

3.3.1 Oscilloscope

By clicking "Oscilloscope", a window as shown in Figure 14 will be opened. The window provides real-time plotting to visualize all kinds of signals. The user can choose the scope limit on "Time" and "Y-data" by using "Time Span [Sec]" and "Ymax/Ymin", choose resolution of the plots by changing "Update Rate [Hz]". Curve value scope will update automatically when "Auto Range" is checked. And the user can also choose which curves to plot by selecting "+Plot Data", "-Plot Data" can cancel the selecting.

NOTE

After unchecking "Auto Range", you can set the display range of the image by yourself and click "Update" to apply.

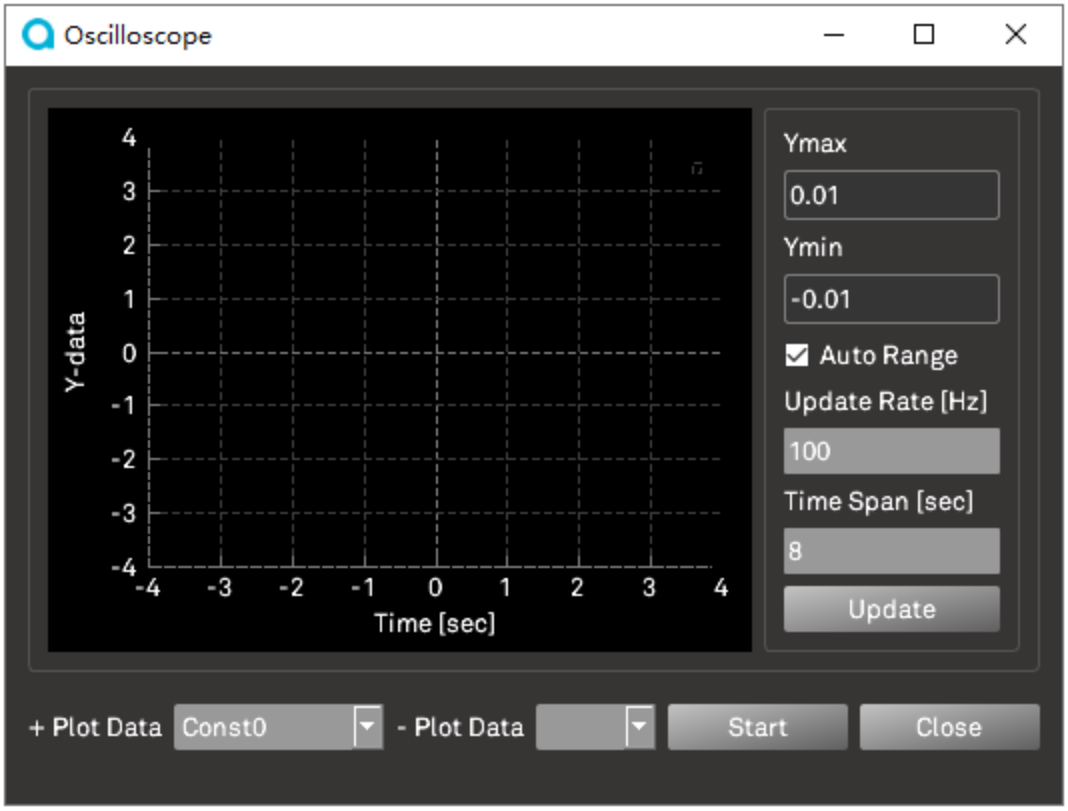

Figure 14 – Oscilloscope window

3.3.2 X-Y Plot

By clicking "X-Y Plot", a window as shown in Figure 15 will be opened. The window provides real-time plotting to visualize all kinds of signals. The user can choose the "X-data" and "Y-data" by using "X Data" and "Y Data" combo boxes.

NOTE

The system will automatically clear the historical data redraw after a certain period of time. The period varies according to the system frequency (the green progress bar will prompt).

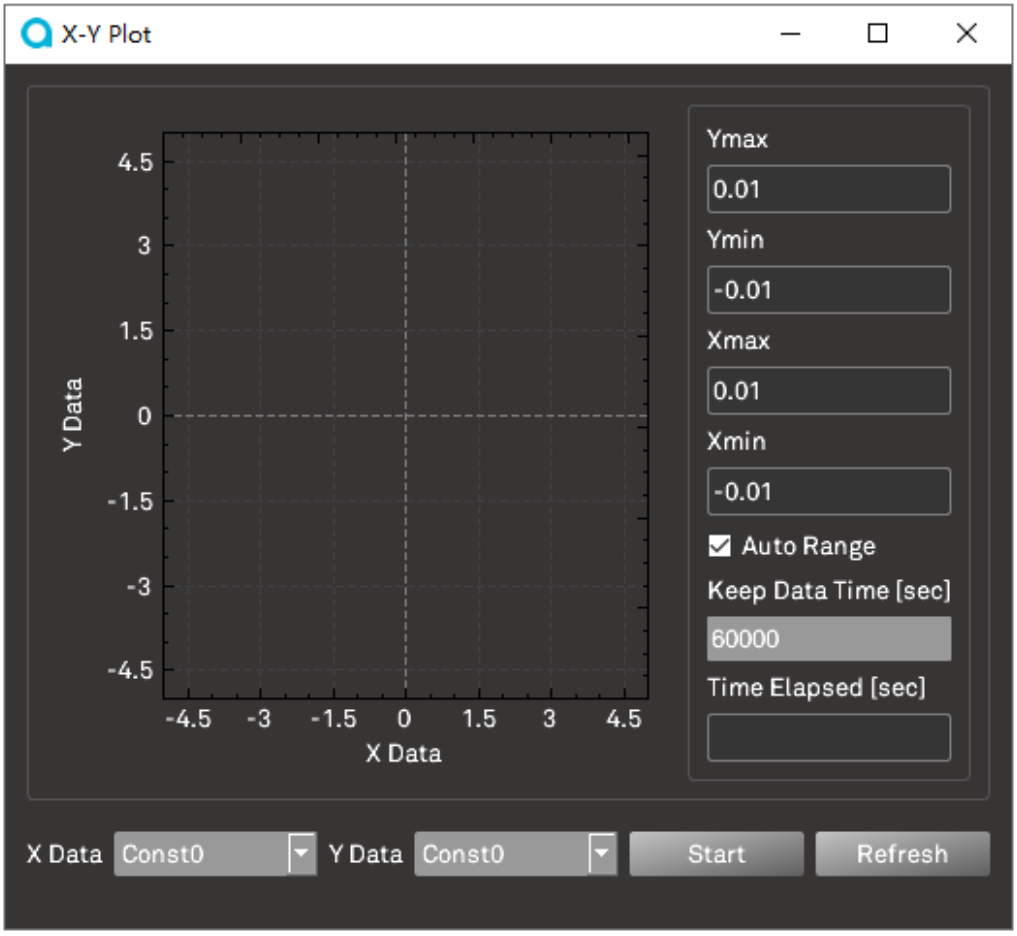

Figure 15 – X-Y Plot window

3.3.3 Digital Meter

By clicking "Digital Meter", a window as shown in Figure 16 will be opened. The window provides a real-time meter to visualize all kinds of signals. The user monitors the pre-defined signal's value in this window via "Available Meter(s)" selection. In the "File menu",by licking the "Open" button can reload the displaying information which was saved by the "Save" button before.

NOTE

Double-click on the listed signal name to discard its display.

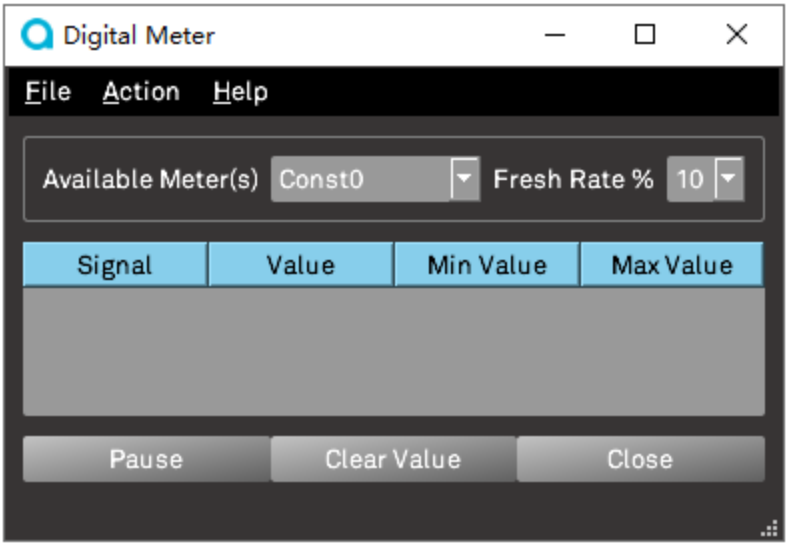

Figure 16 – Digital Meter window

3.4 Toolbox Menu

Column	Description
Signal Diagram 	Provides all kinds of signals define information to visualize
File Conversion	Provides format conversion of Txt files to Dat files,and Dat files to DIF/INT files
Experiment Site	Performs Hybrid testing via communicating with Hardware-in-the-loop Simulation Software(HSS) by UDP network protocol.

3.4.1Signal Diagram

By clicking “Signal Diagram”, a window as shown in Figure 17 will be opened. The window provides all kinds of signals define information to visualize, such as:

- Input Signal
- Custom Signal

- Output Signal
- Sub Signal, generated by user-defined signals' output signals
- Signal Reference, displaying dependencies between various signals
-

> **NOTE**
>
> **Double-click the Signal Name field to open the Signal define Dialog to view the information definition information.**

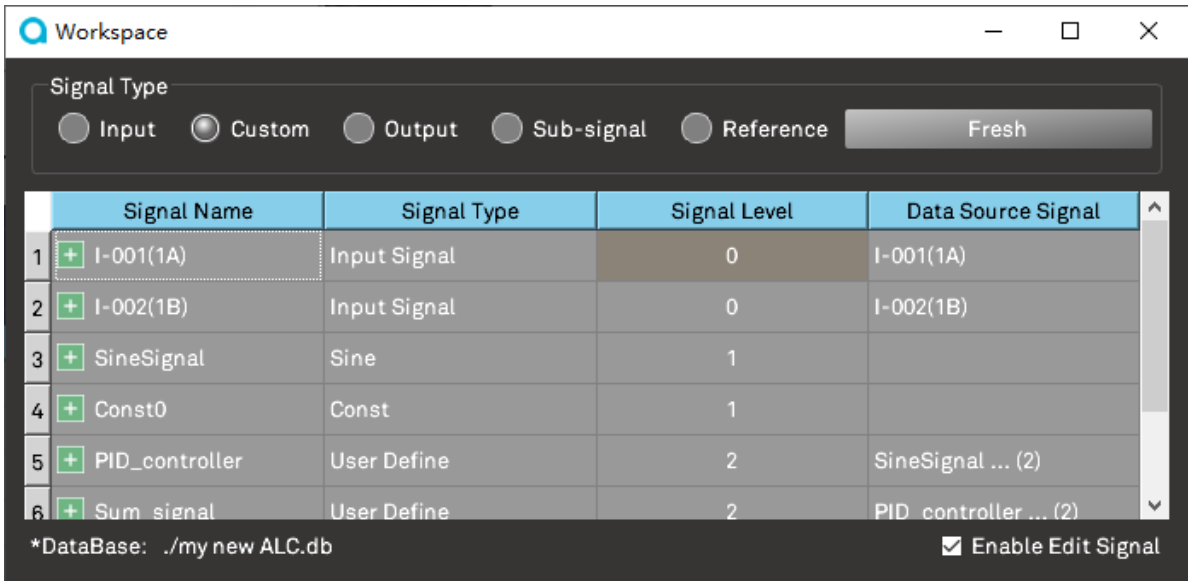

Figure 17 – Signal Diagram window

3.4.2 File Conversion

ALC 3.1 only uses the dat format file as the data source for the File signal.

By clicking "File Conversion", a window as shown in Figure 18 will be opened. The window provides format conversion of Txt files to Dat files, and Dat files to DIF/INT files.

By clicking "Browse", Select a Txt file from "Open data file" window, then click "open" to complete the link. Then enter an path in the box below, if you want to tell the Dat file output to the original directory, you can directly copy the above path, and change the extension "txt" to "dat". Then click" txt => dat " to complete the conversion. In addition, when users select a path of a **real dat file** in "Dat File", by clicking" Integration / Differential " to complete the conversion of Dat files to INT/DIF files.

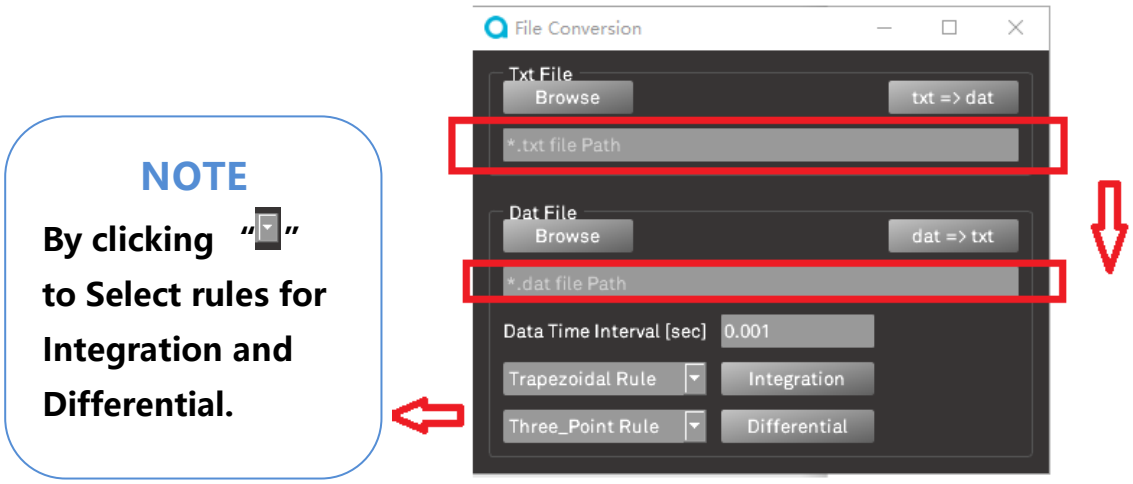

Figure 18 – File Conversion window

3.4.3 Experiment Site

ALC can performs Hybrid testing via communicating with Hardware-in-the-loop Simulation Software(HSS) by UDP network protocol.

By clicking "Experiment Site", a window as shown in Figure 19 will be opened. The window provides Experiment Site information to define for Hardware-in-the-loop Simulation Software(HSS).

"Reference Signal" will be replaced by HSS sending reference signal.

"Feedback 1", ALC will monitor this signal as condition of sending feedback signal to HSS. Feedback 1 signal will send back to HSS as first feedback signal.

"Feedback 2", this signal will send back to HSS as second feedback signal.

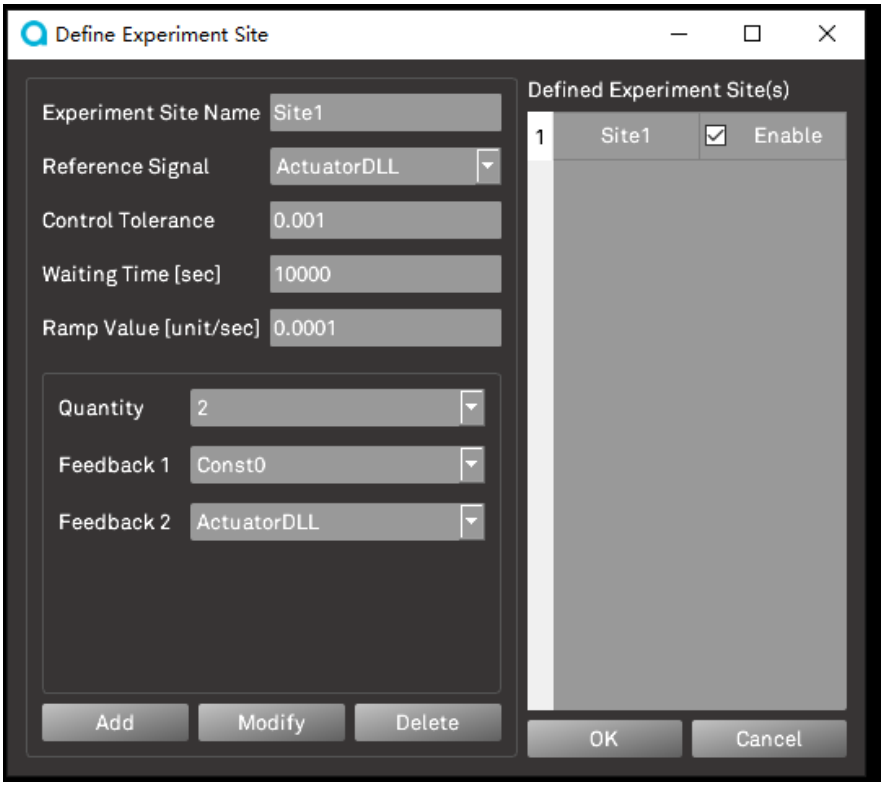

Figure 19 – Experiment Site window

3.5 Help Menu

Column	Description
User Manual	Provides the details of this user manual
Contact Information	Provides the details of ACTS contact information
About	Shows copyright page

3.5.1 User Manual

By clicking “User Manual”, a window as shown in Figure 20 will be opened. The window provides the details of this user manual

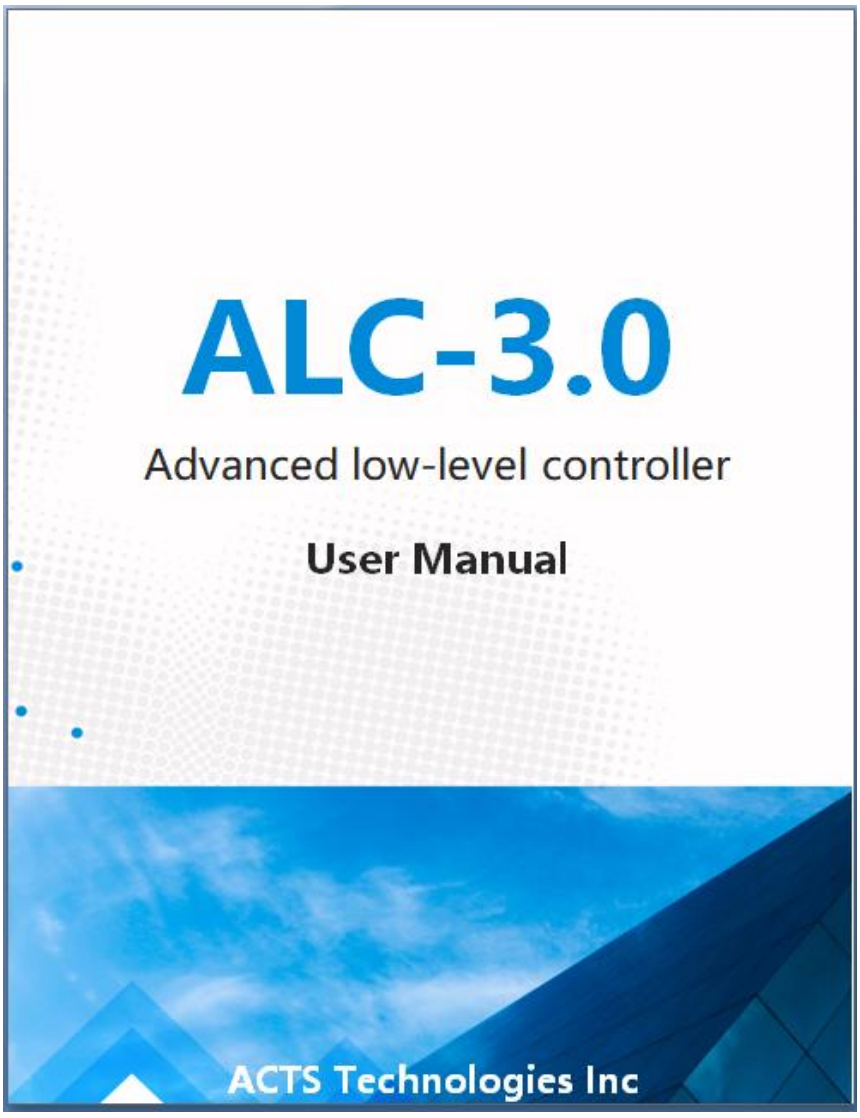

Figure 20 – User Manual window

3.5.2 Contact Information

By clicking “Contact Information”, a window as shown in Figure 21 will be opened. The window provides the details of ACTS contact information.

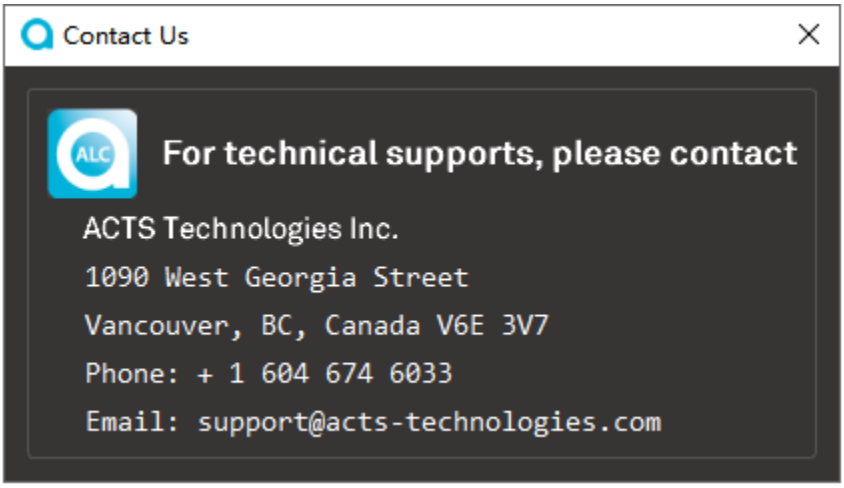

Figure 21– Contact Information window

3.5.3 About

By clicking “About Information”, a window of copyright page as shown in Figure 22 will be opened.

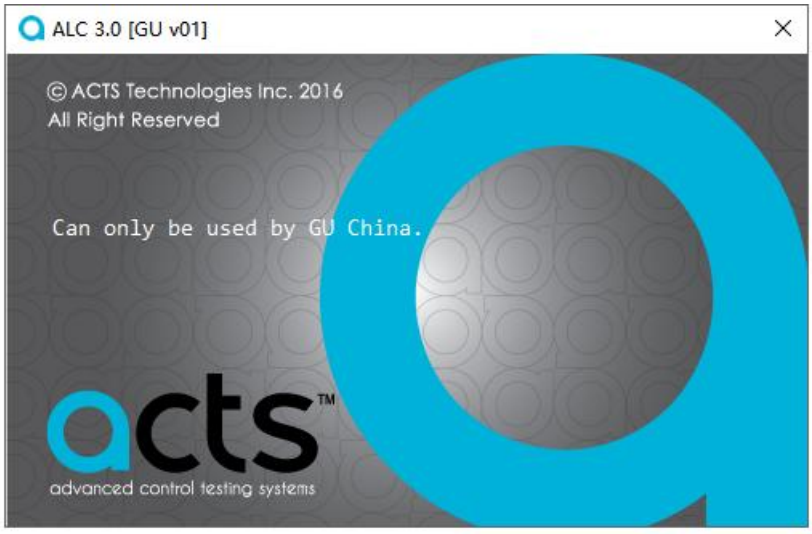

Figure 22 – About window

4. Shortcuts

Shortcuts

In order to make the user more convenient to use the common functions, the following shortcuts are placed in the shortcut bar. This section will describe options in the shortcut bar shown in the table below.

Option	Description
Open 	Reference 3.1.2 Open
Save as 	Reference 3.1.3 Save as
Operator 	Reference 3.2.2 Operator
Signal 	Reference 3.2.3 Signal
Oscilloscope 	Reference 3.3.1 Oscilloscope
X-Y Plot 	Reference 3.3.2 X-Y Plot
Digital Meter 	Reference 3.3.3 Digital Meter
Signal Diagram 	Reference 3.4.1 Signal Diagram

5. Control Windows

Control Windows

5.1 Control Box

By clicking "Start/Pause" and "Stop" buttons, control thread can be started, paused and stopped.

NOTE

For device safety, after clicking "Stop", the output source defined by "Output Channel" will be forced to 0.

5.2 Alarm Box

Error and warning messages will be shown in Alarm Box. Click "Reset" button before restarts control thread when system pause or stops control thread when exceeding the limit.

5.3 Adjustment Box

By clicking "Signal Manage" button, a window as shown in Figure 23 will be opened. The window provides signal modifying dynamically while the control thread is running. All kinds of defined signals can be changed by types or parameters while the control thread is running.

NOTE

Users can use "  **" to adjust the value and use enter to quickly apply**

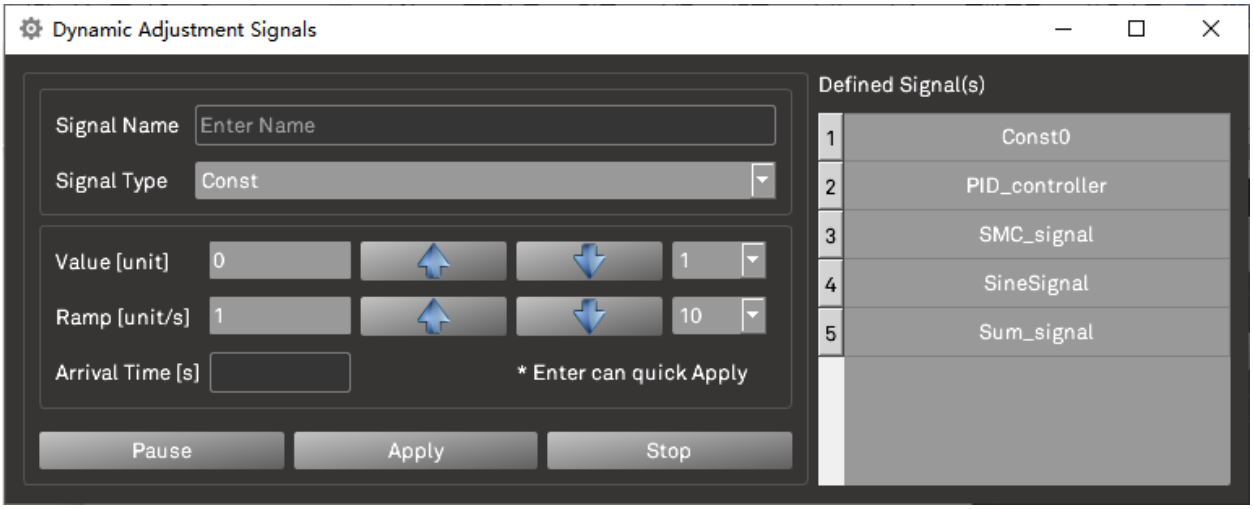

Figure 23 – Dynamic Adjustment signals window

"HSS Manage" button will be shown when project includes Experiment Site information setting. By clicking "HSS Manage" button, a window as shown in Figure 24 will be opened. The window provides HSS parameters setting dynamically during Hybrid testing.

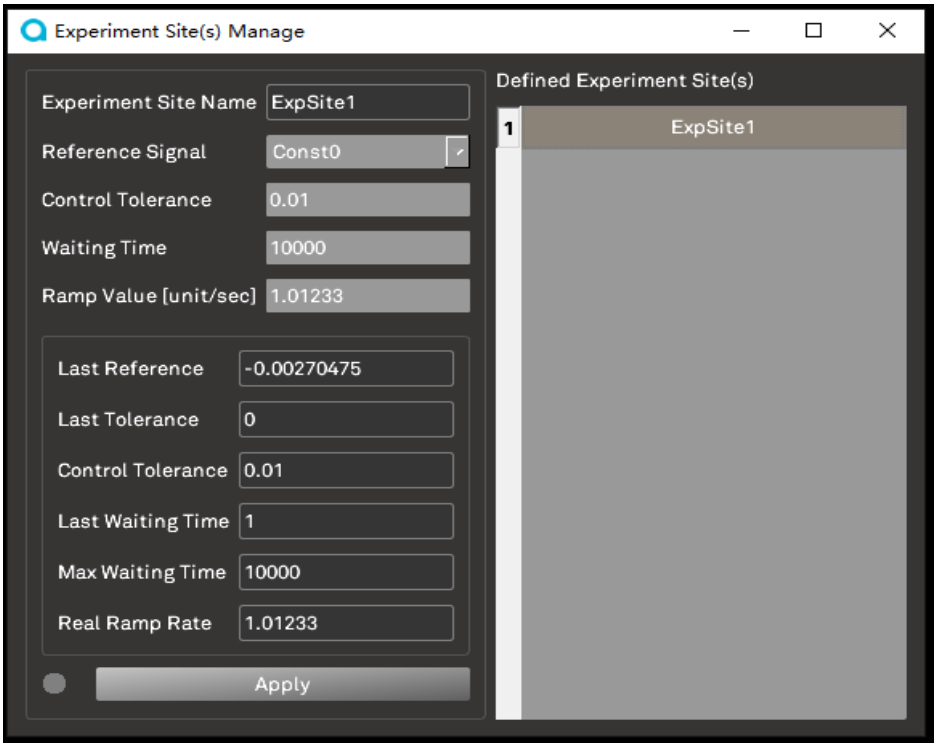

Figure 24- Experiment Site(s) Manage window

5.4 Record Box

By clicking "Start" or "Stop" buttons, "Record thread" can be started or stopped.

5.5 Project Information Box

Display system main control frequency, perform consumption time, system cycle, calculation time and other information in the system cycle.

The user can select "Working Frequency [Hz]" combo box to choose the main thread frequency.(Figure 25)

NOTE

Users can choose the frequency, but the frequency users change will not be saved in the project. Please refer to" 3.1.4 Description" to save the new frequency.

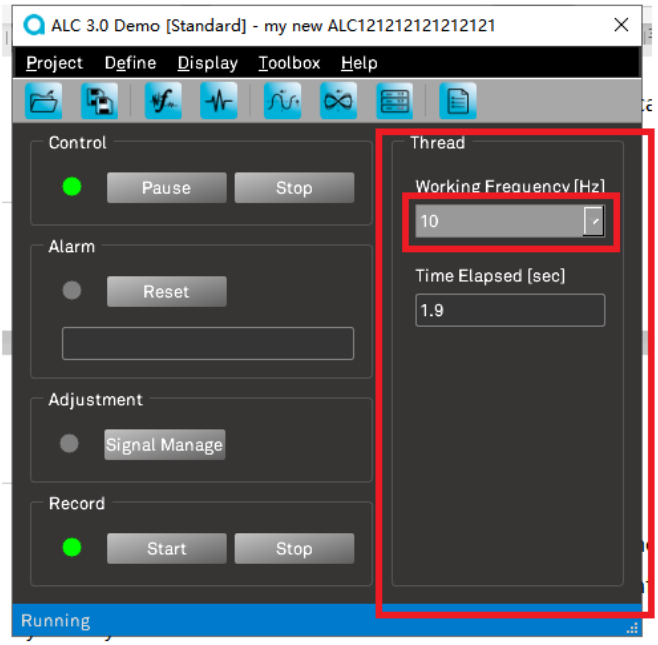

Figure 25- Experiment Site(s) Manage window

6. Operation

Operation

6.1 Safety Precautions

6.1.1 Safety gear

The experiment is dangerous. In order to ensure the safety of the experimenter, be sure to wear safety gear at all times (hard hat, steel toe shoe, safety class).

6.1.2 Check device status and connection status

Check the status of the equipment, whether the length of the cable is within the range, check whether each sensor is correctly connected, and the interface must be tightened to prevent the wrong transmission of the signal.

NOTE

Moving the acceleration sensor is a convenient way to confirm the signal

6.1.3 Program settings

Check the input and output signals, set the Set-point Balance, check whether the sensor sends back the correct signal, and then set Limit to prevent damage to the equipment beyond the range.

6.1.4 Hydraulic on

Before opening the hydraulic device, first confirm that 6.1.1, 6.1.2, and 6.1.3 are perfectly completed, then check whether there is oil leakage in the oil pipe, and finally turn on the cooling device to start the hydraulic equipment.

NOTE

After the oil pump is turned on, the actuator may perform the large-scale movement at any time, so it is necessary to ensure a certain safety distance from the actuator.

6.1.4 hydraulic off

After completing the experiment, please stop sending signals to the actuator. After confirming that the actuator is stable, turn off the hydraulic system. Please refer to the actual hydraulic system for specific operations.

6.2. Checklist

Before starting all operations, you must confirm that all equipment is in good condition and in a normal connection. In order to prevent missing inspection items before the experiment starts, the laboratory needs to refer to the following table to create a checklist, In order to ensure the safety of the experiment, each item of the inspection must be confirmed. If a problem is found or the situation cannot be confirmed, please make sure before starting the test

NOTE

Each checklist must be signed with the name of the operator, the time of the experiment, the problems that occurred during the experiment, or the equipment that may need repairs, etc.

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XXX Shake Table Operation Checklist (Daily*)

Operator: _____ **Date:** _____

Start Up

Hydraulic off	
Make sure all personnel have proper safety gear (hard hat, steel toe shoe, safety class).	
Check specimen and the shake table is properly secured.	
Check the cables are all properly secured and wired to the back to the controller.	
Check the table & cables have clearance for full movement range and make sure working area is fenced.	
Turn on pump room lights and check for oil leaks & spills.	
Heat exchange pump and water supply is turn ON (when temperature is above 30"C).	
Turn on the controller and check all features within the controller (displacement limit, acceleration limit with sensor, 0 voltage output to servo valve, etc.).	
Hydraulic on	
Announce hydraulic power up.	
HPS is turn ON, pressure established. Check low pressure is achieved from the gage.	
Listen for oil leaks (hissing sound) and monitor pressure on screen.	
Conduct low pressure displacement test, check limit detectors.	

During Testing

Make test announcement before the start of each test.	
Turn on high pressure, check for oil leaks & spills.	
Go to basement every 30 min ~ 45 min to check temp (switch on cooling system if temp > 30°C or shut down HPS system if temp> 50"C).	
Backup test data after each test.	

Shut Down

Shut down HPS (High- Low - Of). Monitor press & make announcement when safe to approach table.	
ESTOP button is pushed in.	
Water valve, circulation pump turned off, check for oil leaks. Make entry in HPS log book. Turn off all lights in pump room.	

Comments (problems, maintenance required, table issues, etc.)

*At the first use of each month, make sure the setup is properly tight with wrench.

6.3 Test Procedures

The hardware is composed of controller, data acquisition instrument, actuator (oil pump, etc.).After ALC is properly connected to the hardware, the experiment can be started.(Figure 26)

Figure 26- Hardware

Step 1 : Define Input Channel and Output Channel

Connect the sensor and actuator as shown in the figure27.Reference 3.1.1 and 3.1.4 to click "☑ Enable" to open the signal input and output channels actually used by the users.(Figure 27 shows connection with [1B] [2A] [2B] [3A] [7B])

NOTE

Make sure the module corresponds to the sensor and is well connected, otherwise it will damage the module or can not transmit signals.

Figure 27- Connect

Step 2 : Define Output signal

The output channel is a channel that transmits the output signal to the actuator. Before output the signal, the users must first know the upper and lower limits of the actuator receiving signal. Reference 3.2.2 and 3.2.3 to define a signal what users need, then select the defined signal in the output channel. Start/Stop output signal by clicking" 

" of Control Box.

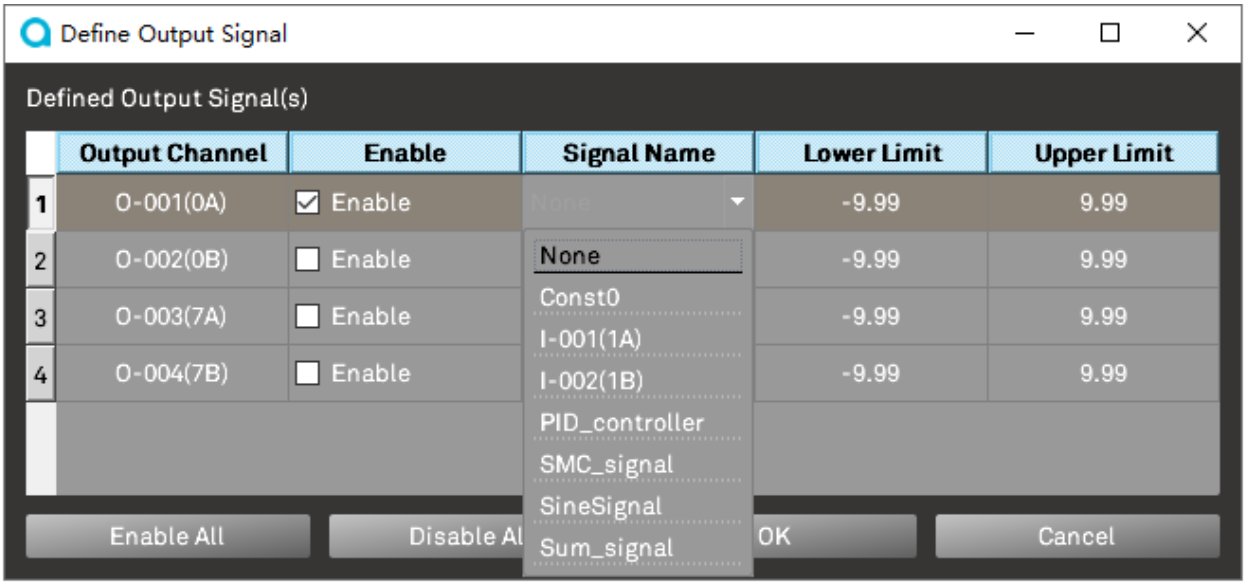


Figure 28- Connect

Step 3 : Define Input signal

The input channel is a channel that obtains the input signal from the sensor(Displacement , Acceleration, Force). Start/Stop obtains signal by clicking

" Start Stop " of Control Box. Then view the data through Digital Meter, and the Oscilloscope, users can clearly display the trends and extreme values (Reference 3.3.1 and 3.1.3).

Figure 29- Input signal

NOTE

When defining a variable input signal, "Const0" is usually used to define the center point. For example, first set the "Const0" to the constant 1. When the "Const0" function is changed to a "Sine" function with an amplitude of 2 and a frequency of 1, the image will be centered on 1 with a range of -1 to 3.

Step 4 : Define Filter

The signal received directly from the input channel will have a lot of noise, so usually a filter is used to remove the noise. Reference 3.2.2 to define a Filter signal operator(Figure 30).Reference 3.2.3 to define a signal(Figure 31).Then view the filter data through Digital Meter, and the Oscilloscope.

NOTE

It is important to understand the hierarchical relationship between signal and signal operator.

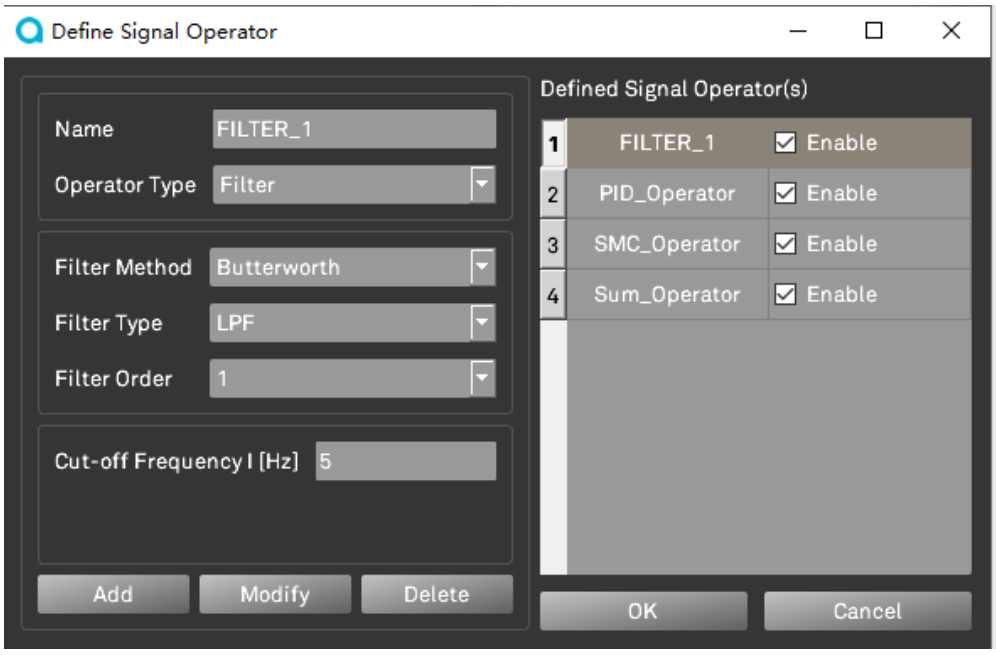


Figure 30- Filter signal operator

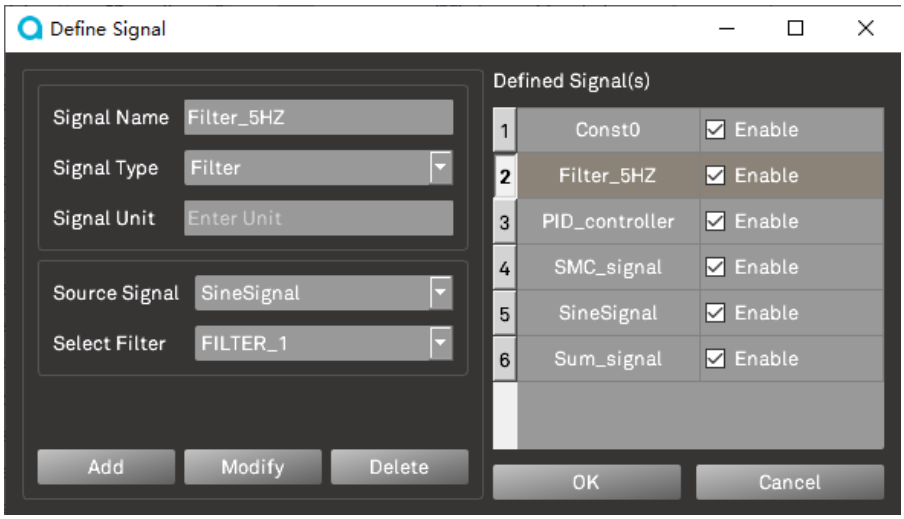
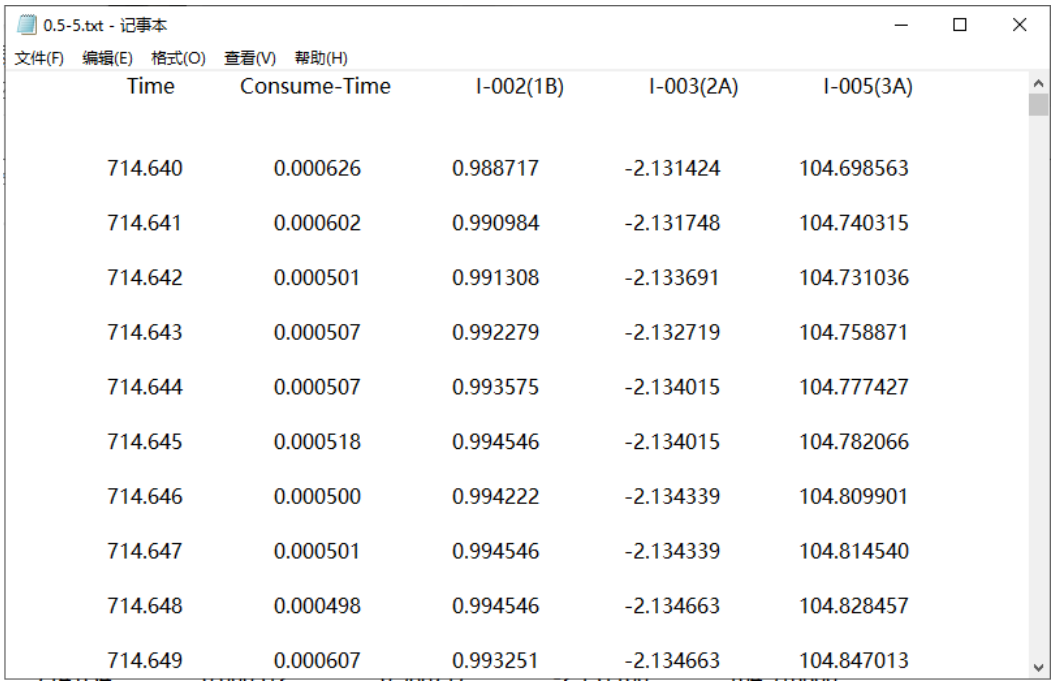


Figure 31- Filter signal

Step 5 : Record Data

When all signals are stable, users need to use the recorder function to record data in detail. Reference 5.4 and 3.2.8 to record what user need. Data will be saved in txt format(Figure 32).



Time	Consume-Time	I-002(1B)	I-003(2A)	I-005(3A)
714.640	0.000626	0.988717	-2.131424	104.698563
714.641	0.000602	0.990984	-2.131748	104.740315
714.642	0.000501	0.991308	-2.133691	104.731036
714.643	0.000507	0.992279	-2.132719	104.758871
714.644	0.000507	0.993575	-2.134015	104.777427
714.645	0.000518	0.994546	-2.134015	104.782066
714.646	0.000500	0.994222	-2.134339	104.809901
714.647	0.000501	0.994546	-2.134339	104.814540
714.648	0.000498	0.994546	-2.134663	104.828457
714.649	0.000607	0.993251	-2.134663	104.847013

Figure 32- Record Data

6.4 How to define a PID controller

6.4.1 Define a PID Controller Dynamic Link Library

ALC pre-defined PID controller dynamic link library (./datafiles/UserDLL/advancedSignal_PID.dll) according to the ALC Standard DLL template.

6.4.2 Define a PID Operator

ALC pre-defined PID Operator for user as Figure 33:

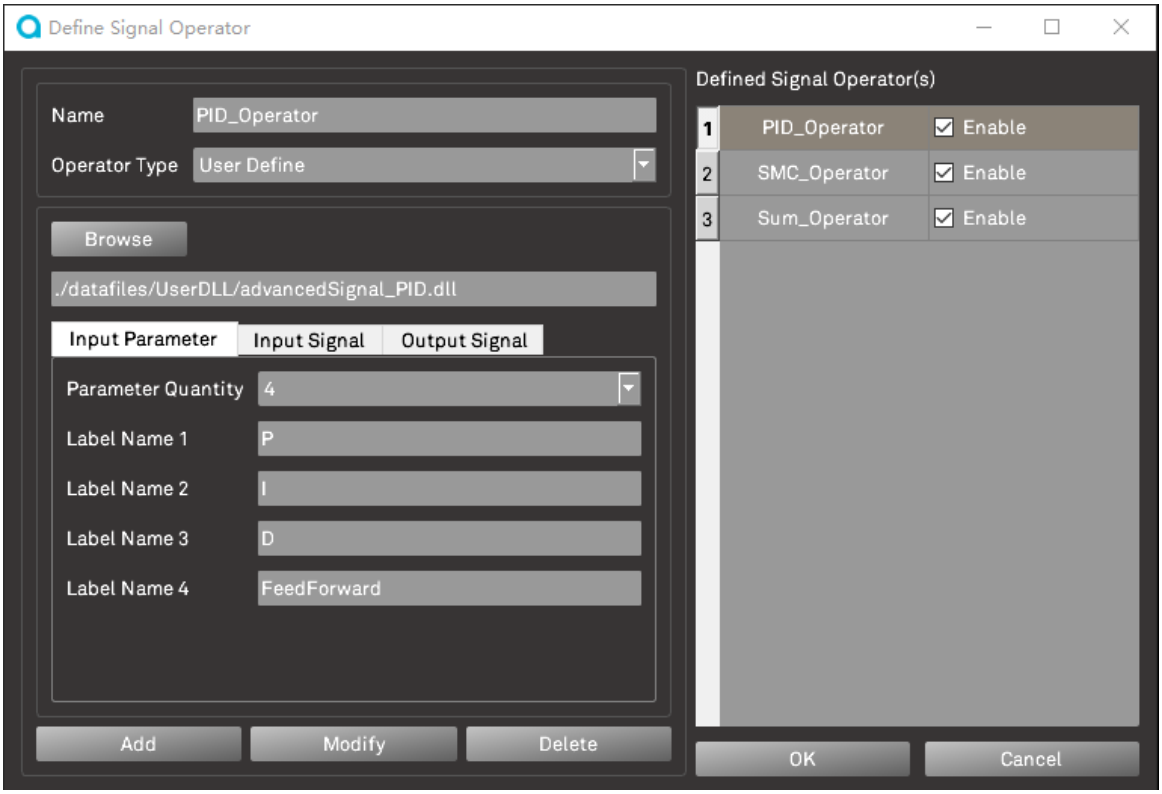


Figure 33 - define a PID operator window

6.4.3 Define a PID Controller Signal

ALC pre-defined PID controller signal for user as Figure-34:

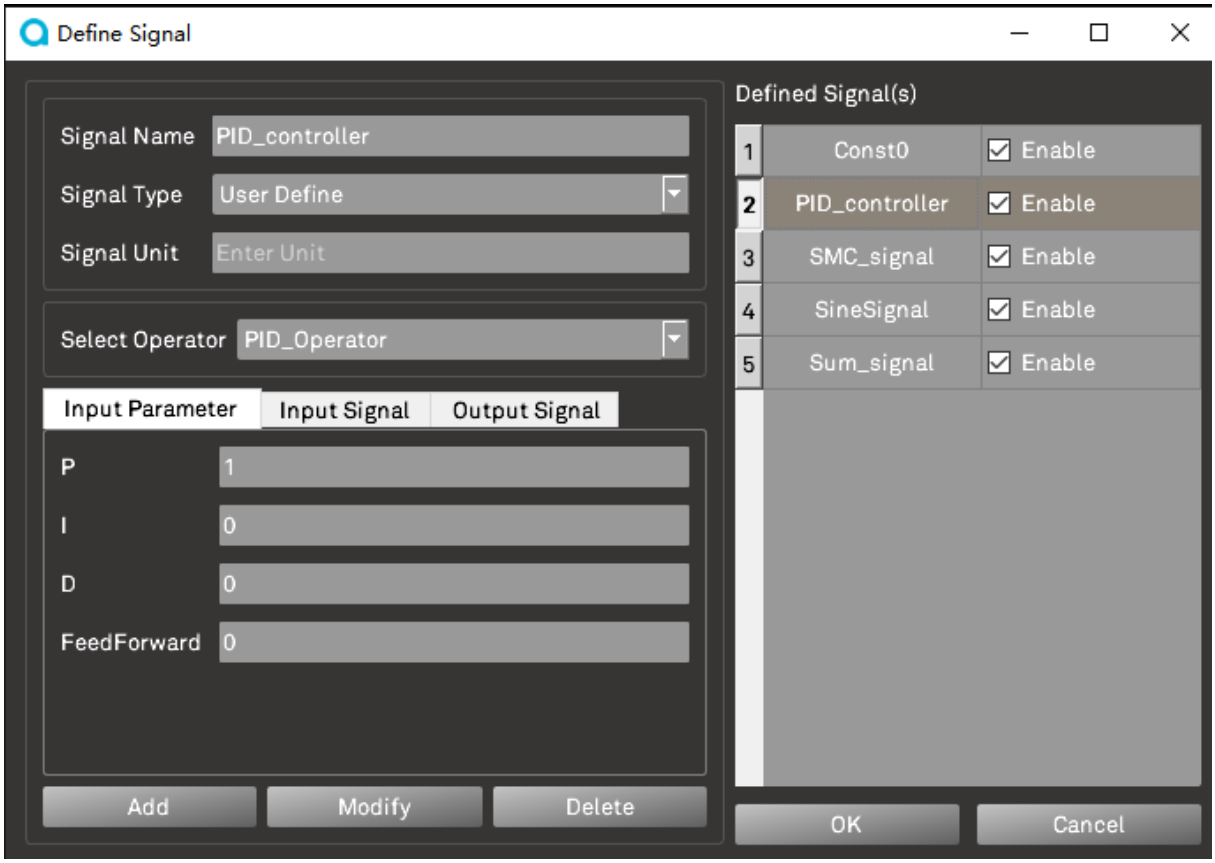


Figure 34 - define a PID controller signal window