XINJE

Xinje servo software

User manual

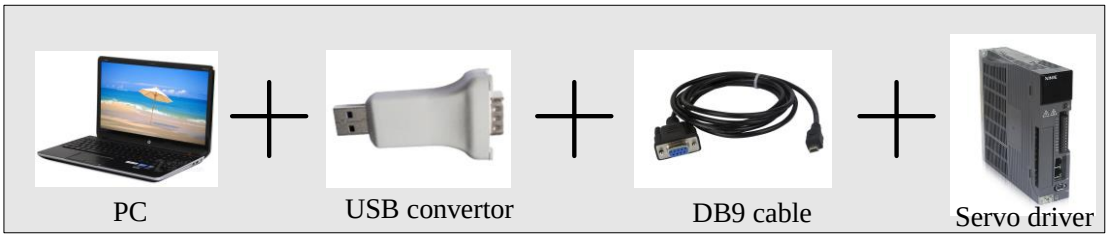
Wuxi Xinje Electric Co., Ltd.

Catalog

1 Servo communication

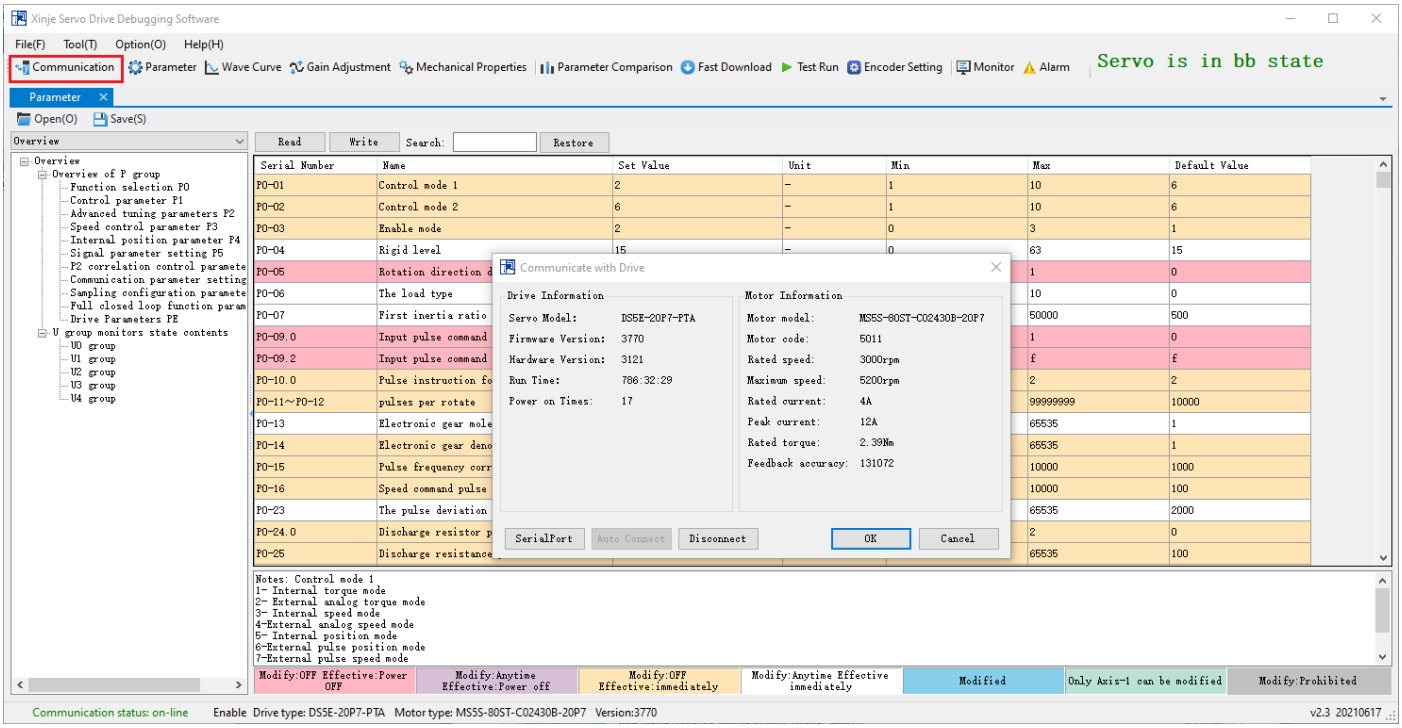
1.1 Servo connect to PC

The communication mode between the upper computer software and the servo driver is wired communication. The DB9 cable is connected to the computer (the laptop needs to add a USB convertor), and the other end is connected to the servo driver. The connection mode is as follows.



1.2 Start【driver communication】

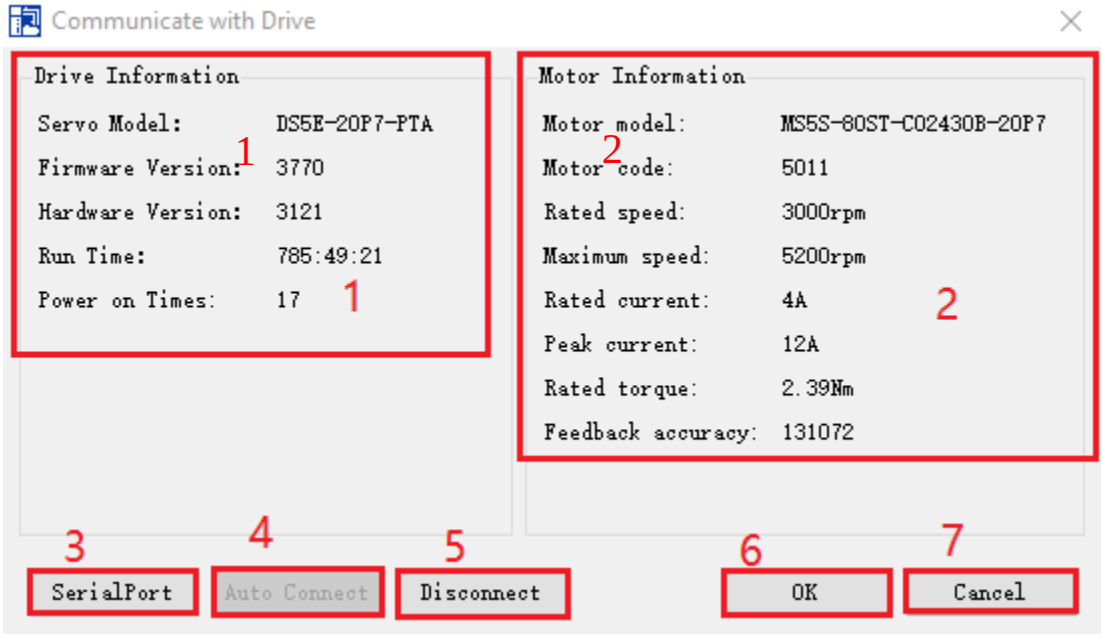
Click【communication】on the main interface, pop up【communicate with drive】window, which will show drive and motor information.



1.3 Close【communicate with drive】window

Click  of【communicate with drive】window to close the window.

1.4 【Communicate with drive】window



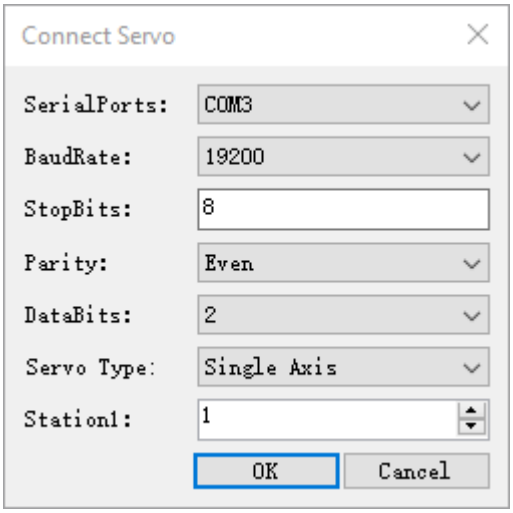
Area 1: drive information

Area 2: motor information

Note: if the servo motor is not connected, the information displayed in area 2 will be incomplete, and the motor model and motor code will not be displayed.

Area 3: serial port configuration

Click【serial port】, pop up【connect servo】window, click drop down box to set the serial port number, baud rate, data bit and so on. Please check P7-10 to know the RS232 parameters.



Note: if the serial port configuration is correct, the information will be displayed in area 1 and area 2. If the configuration is wrong or the serial port is occupied, the [communicate with drive] window will display [current serial port is not available, please check and configure the serial port again].

Area 4: auto connect

Auto Connect

The automatic connection is only valid when the station number is 1. Automatic connection can automatically find the serial port that can communicate with the servo and read the information of the driver and motor.

Area 5: disconnect

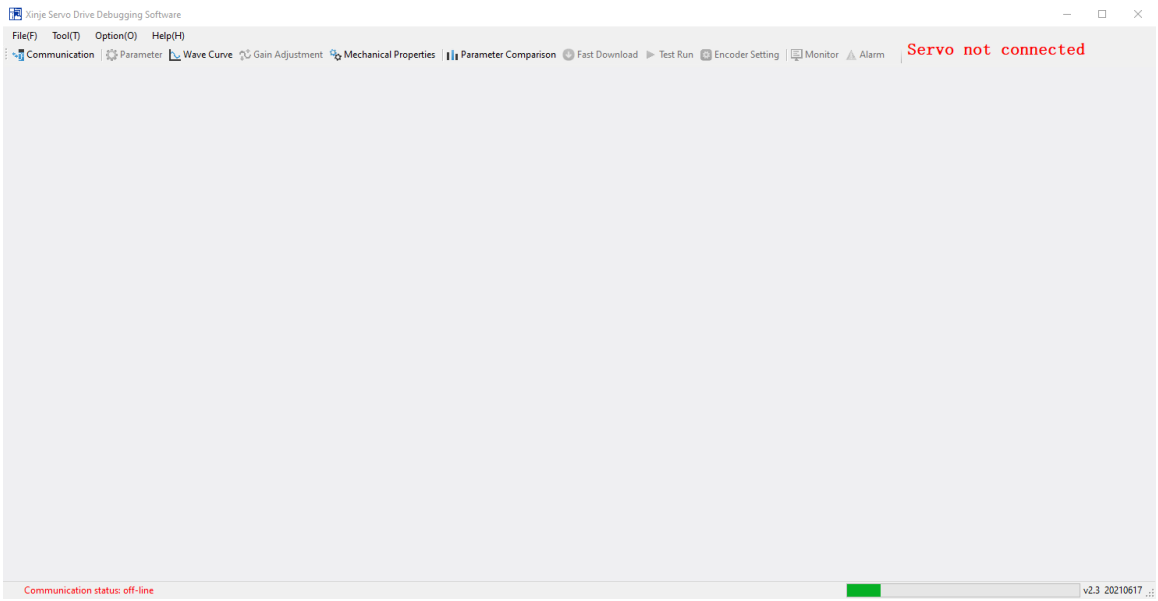
Disconnect

Click 【disconnect】to disconnect the connection between software and drive.

Area 6: ok

OK

Area 1 and area 2 display the correct information, and there is no prompt [no servo connection or servo not powered up], click OK to exit [communicate with drive], starts reading data at the same time. As shown in the following figure, the progress bar (data reading progress) is displayed in the lower right corner of the interface during data reading.



Area 7: cancel

Cancel

Close 【communicate with servo】window.

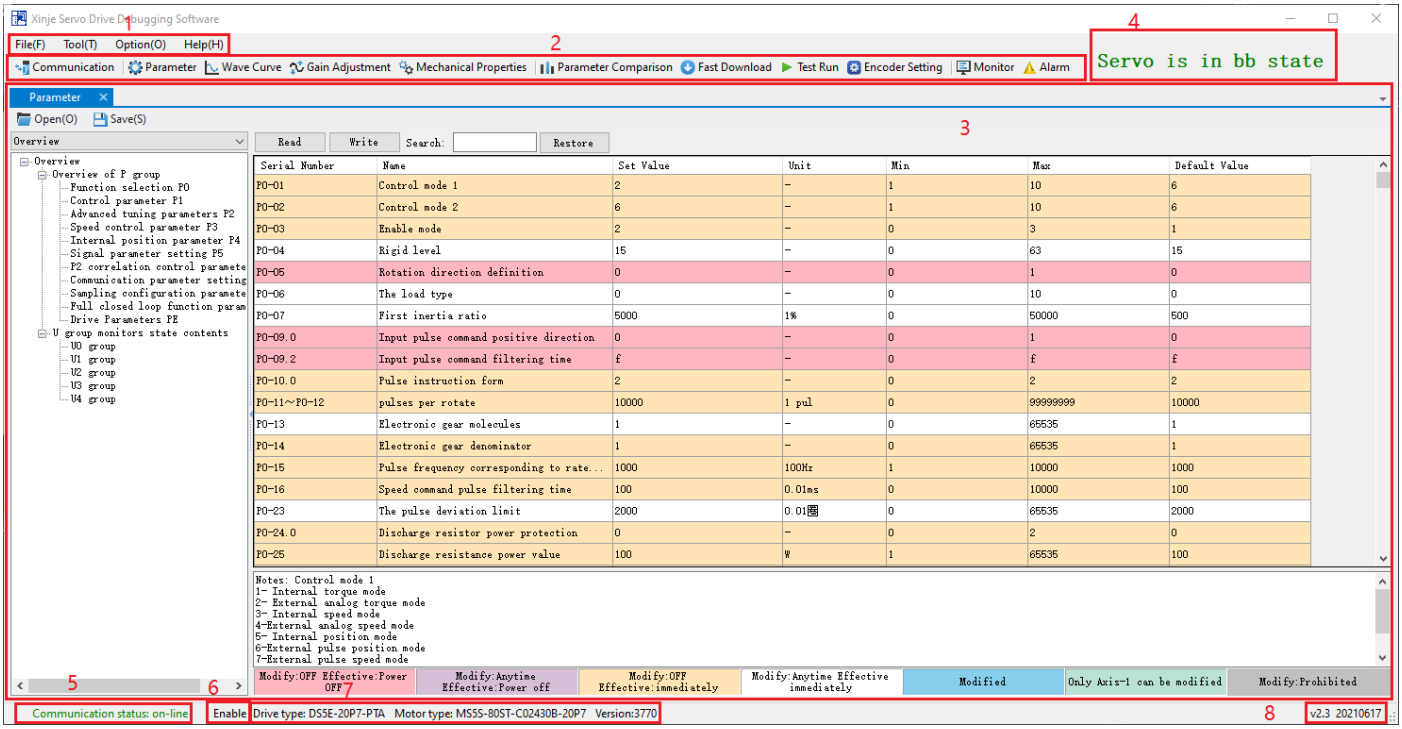
2 Basic introduction

2.1 File type

In the files used by servo software, in order to identify different function files, different file name suffixes are used to distinguish them. Please do not change the suffix, otherwise, the servo software unable to read.

Project files	Fie name.SPRO
Parameter setting-parameter file	Fie name.SVO
Curve collection-data file	Fie name.CSV (open with Excel)
Curve collection-image file	Fie name.emf/.png/.gif/.jpg/.tif/.bmp
Curve collection-export data	Fie name.csv(open with Excel)
Realtime monitor-recording file	Fie name.RSVM
Realtime monitor - image file	Fie name.emf/.png/.gif/.jpg/.tif/.bmp
Mechanical properties- data file	Fie name.SVP
Mechanical properties - image file	Fie name.emf/.png/.gif/.jpg/.tif/.bmp

2.2 Main interface



Area 1: toolbar

Area 2: function bar

Area 3: function display area (when offline, parameter setting, gain adjustment, test run, monitor and alarm functions are not available. When online, all functions are open)

Area 4: display the current status of servo

In the servo state display, the letter description (bb: idle state; Run: running; P-OT: forward drive forbidden state; N-OT: reverse drive forbidden state)

Area 5: display the communication status of upper computer. When offline, double-click to pop up the communication interface with drive. When online, double-click to change to offline.

Area 6: display enable status. When P0-03 is 2, double-click is valid, enabling is on or off, double click is invalid in other enabling mode.

Area 7: display driver model, motor model and firmware version information.

Area 8: display the upper computer version number.

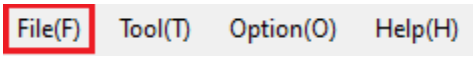
Different drives support different functions. Please refer to the following table:

Servo series	Function									
	Communi-cation	Parameter setting	Curve collection	Realtime monitor	Gain adjust	Mechanical properties	Parameter compare	Test run	Monitor	alarm
DS3	√	√	√				√	√	√	√
DS3E	√	√	√				√	√	√	√
DS5L	√	√	√	√	√	√	√	√	√	√
DS5B	√	√	√	√	√	√	√	√	√	√
DS5E	√	√	√	√	√	√	√	√	√	√
DS5C	√	√	√	√	√	√	√	√	√	√
DS5F	√	√	√	√	√	√	√	√	√	√
DS5K	√	√	√	√	√	√	√	√	√	√
DF3E	√	√	√	√	√	√	√	√	√	√
DS5L1	√	√	√	√	√	√	√	√	√	√
DS5C1	√	√	√	√	√	√	√	√	√	√
DS5N	√	√	√	√	√	√	√	√	√	√
DM5F	√	√	√	√	√	√	√	√	√	√

3 Menu

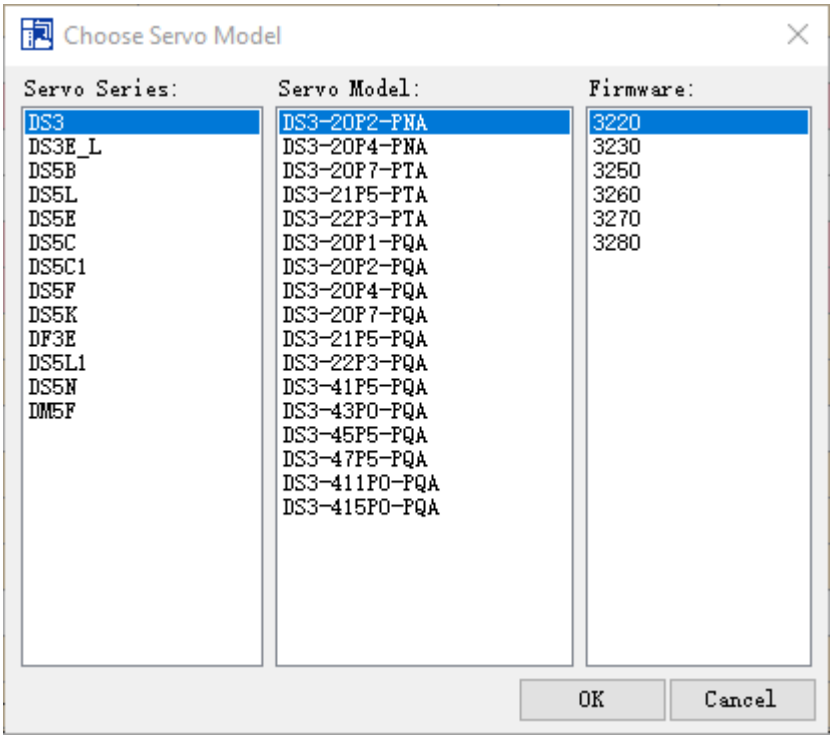
3.1 File

Click the file in the menu bar to pop up the drop-down box, including new project, open project, save project, close project and exit function.



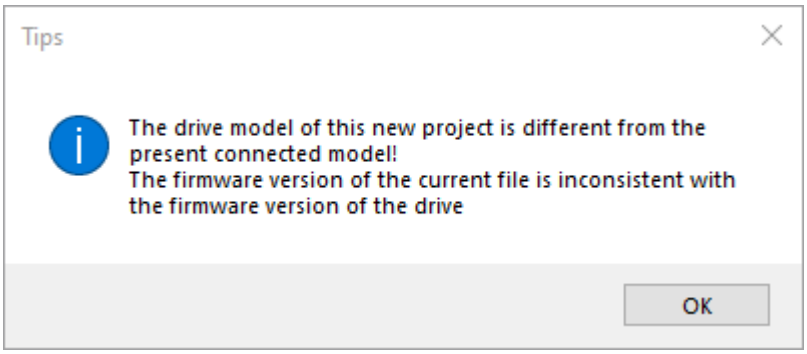
3.1.1 New project

Click 【new project 】in 【file】 to open the select servo model dialog box.

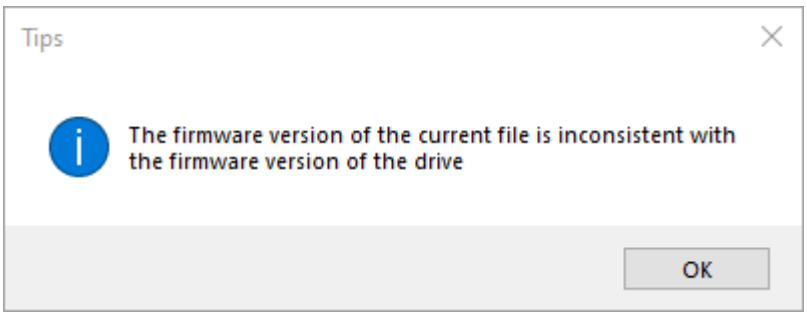


Open the new project offline, select the servo model to create a new one, and the similarities and differences of servo will not be detected.

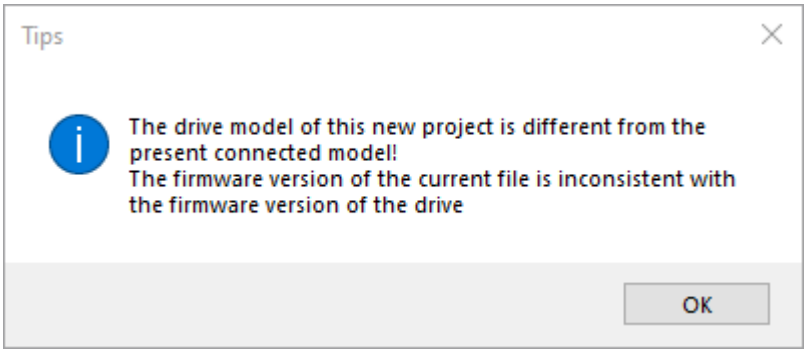
Open the new project online and select the servo model to create. If the firmware is the same as the current servo model, a prompt box pops up, and click OK to disconnect the upper computer from the servo.



Open the new project online and select the servo model to create a new project. If it is the same as the current servo model and the firmware version is different, a prompt box will pop up and the connection with the servo will be automatically disconnected.



Open the new project online and select the servo model to create. If the firmware version is different from the current servo model, a prompt box pops up, and click OK to disconnect the upper computer from the servo.

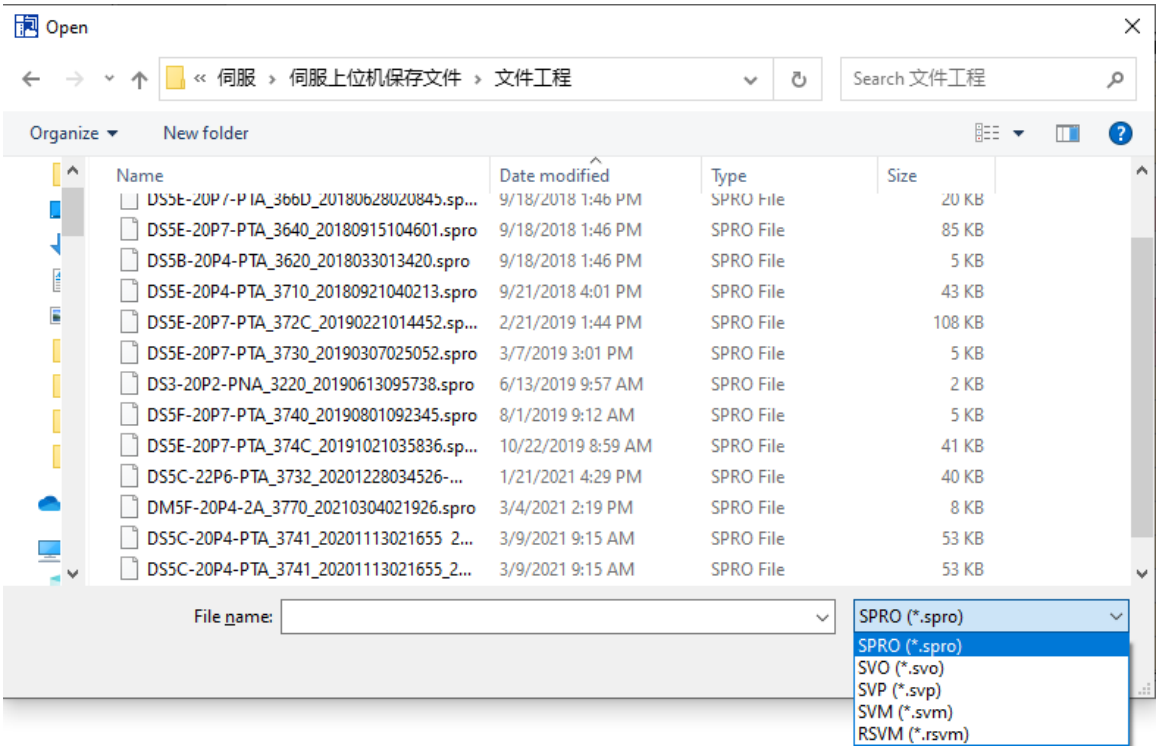


3.1.2 Open project

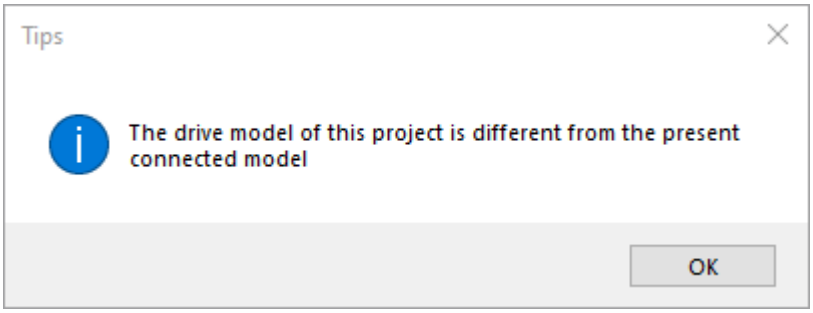
Open the saved file.

Click【file】【open project】, pop up the open project dialog box.

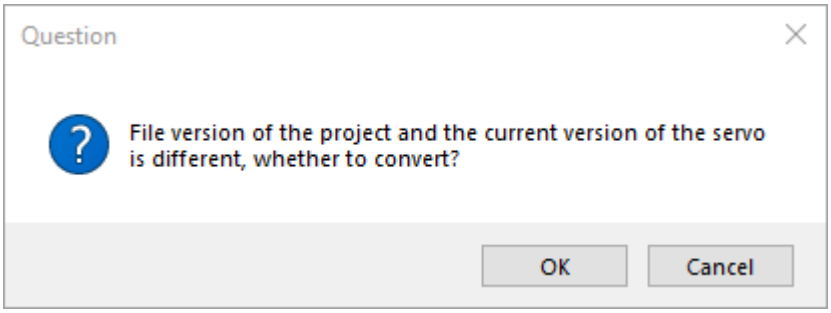
Open file format includes .spro/.svo/.svp/.svm.



If the project file (. SPRO) and parameter file (. SVO) opened are different from the current servo drive model, a prompt box will pop up and the connection with the servo will be automatically disconnected.



If the driver model is the same as the motor model and the firmware version is different, 【version conversion】 appears;

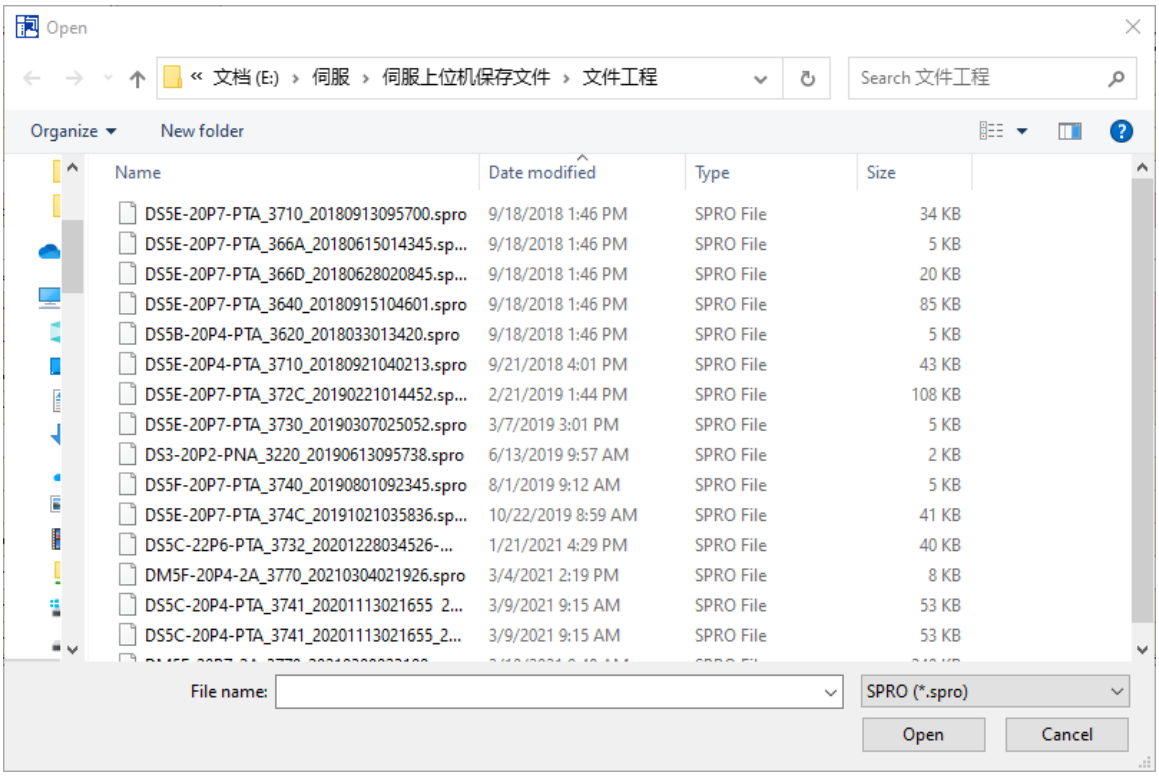


If the driver model, motor model and firmware version are the same, open the file directly;

If the current servo software is offline, open the project file directly.

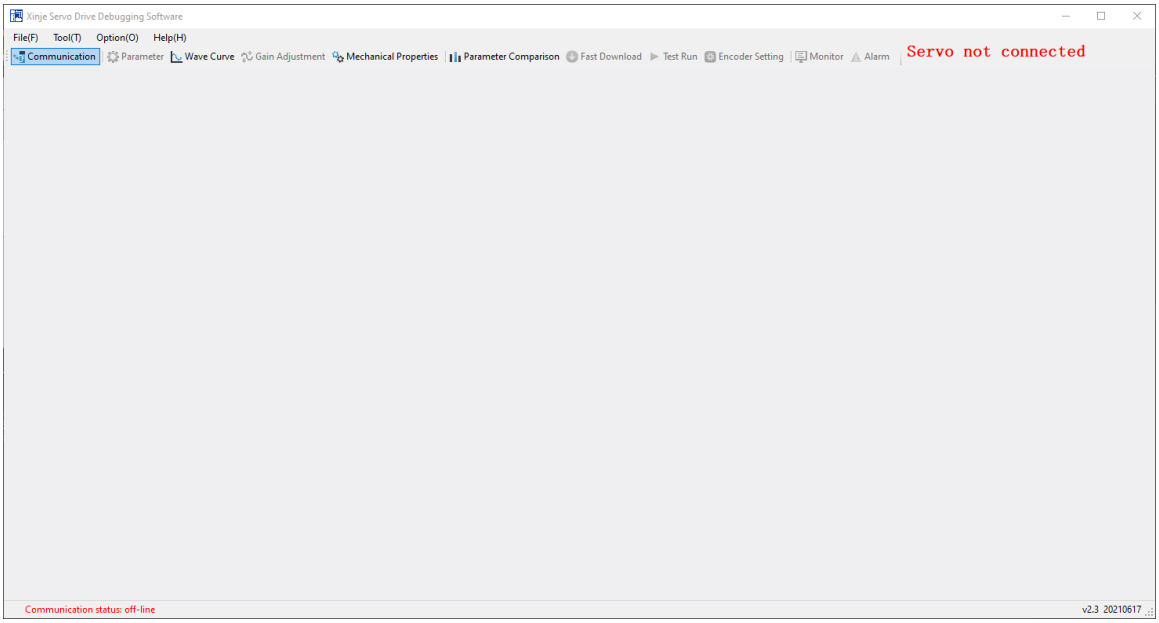
3.1.3 Save porject

Save the file of【parameter】, 【curve collection】, 【mechanical properties】as .SPRO files.



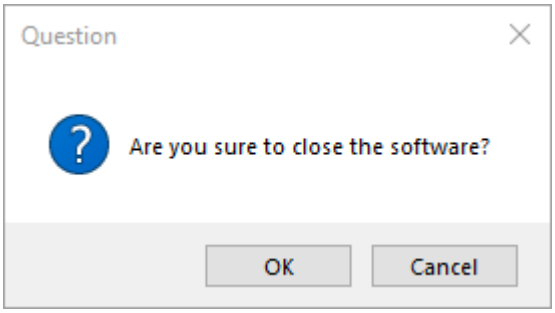
3.1.4 Close project

Close all the current interfaces and the software is offline.



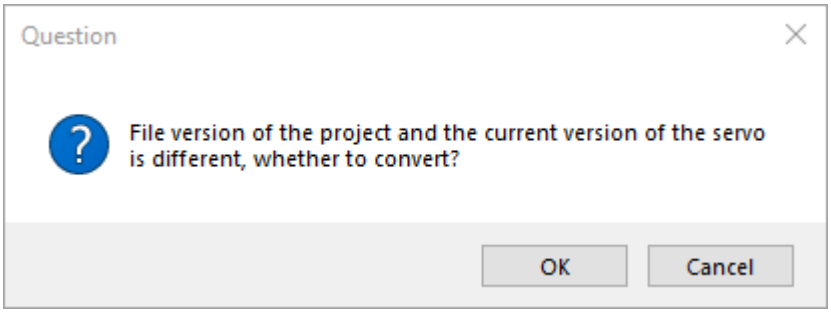
3.1.5 Exit

Pop up a prompt box to exit the software.



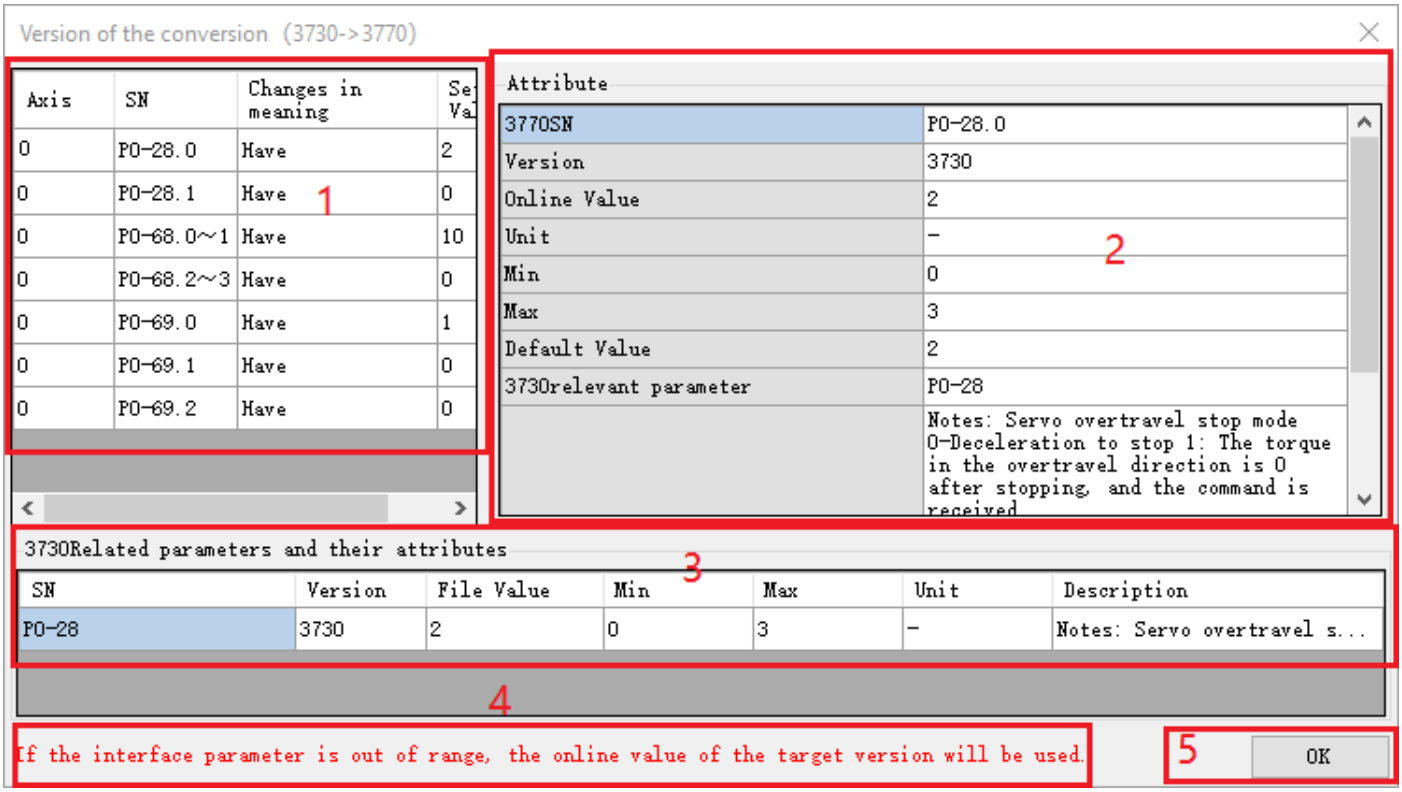
3.1.6 Version conversion

When the driver model and motor model of the project file (pro) or parameter file (SVO) saved in the history are the same as the servo currently connected, but the firmware version is different, the following dialog box will appear to prompt the user whether to convert the version.

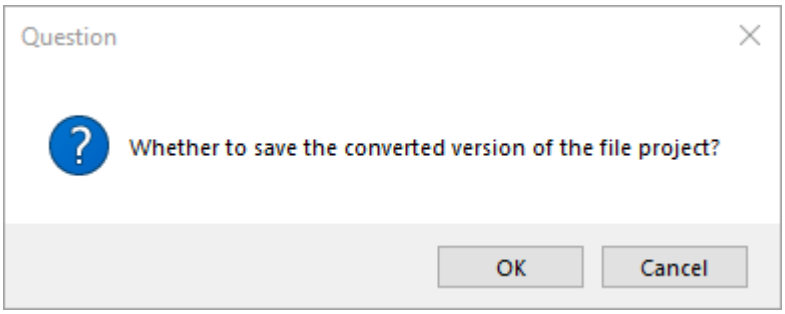


If the user clicks OK, the software starts version conversion; If the user clicks cancel, the version conversion will exit and the software will be offline automatically.

If the stored parameters need to be manually modified during version conversion, the following interface will be displayed:



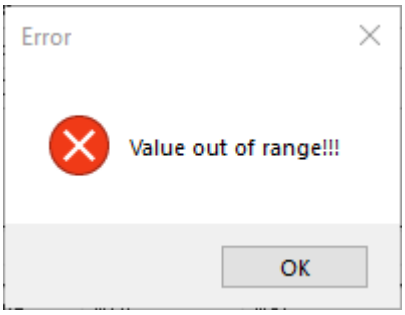
Area 1: displays the parameters that need to be manually modified by the user during version conversion.
Area 2: displays the properties of parameters in the project file that need to be converted. Note: the display parameter is the parameter related to the selected parameter in area 1.
Area 3: display the properties of the selected parameters in area 1, which is convenient for modifying the setting value.
Area 4: prompt.
Area 5: confirm the modification of parameters and complete version conversion. The save prompt is displayed at the same time.



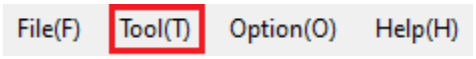
If the user clicks OK, save the project file; Click cancel to exit the interface and display the converted project file.

Note:

(1) The title of the interface will show which version of the current version conversion is
(2) The parameter serial number displayed in area 1 is the parameter serial number of the current servo version
(3) The setting value displayed in area 1 is the setting value of the relevant parameters in the project file to be converted, not the current servo setting value
(4) The settings in area 1 can be modified
(5) If the modified value is out of range, the following dialog box will appear and the set value will be restored.

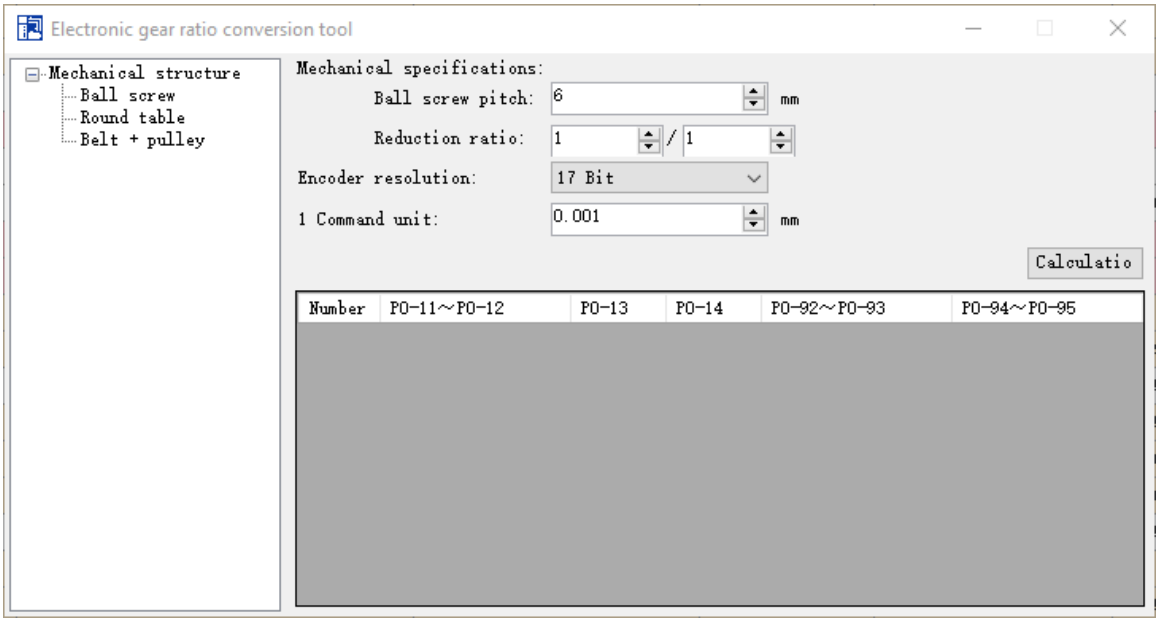


3.2 Tool



3.2.1 Gear ratio calculation

Click 【tool】【gear ratio calculation】, it will pop up below interface.



For example:

Mechanical structure: ball screw

Ball screw pitch: 6mm

Mechanical reduction ratio: 1:1

Encoder resolution: 17 bits

1 command unit: 0.001

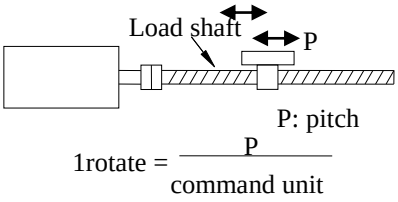
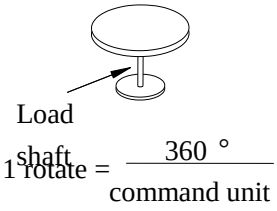
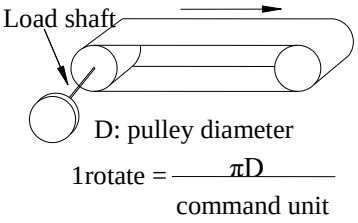
Click [calculate] to get three setting schemes

Method 1: P0-11~P0-12=6000, P0-13=1, P0-14=1, P0-92~P0-93=1, P0-94~P0-95=1

Method 2: P0-11~P0-12=0, P0-13=8192, P0-14=375, P0-92~P0-93=1, P0-94~P0-95=1

Method 3: P0-11~P0-12=0, P0-13=0, P0-14=0, P0-92~P0-93=8192, P0-94~P0-95=375

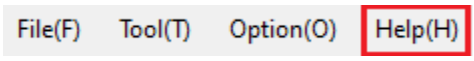
Example of electronic gear ratio setting:

Step	Ball screw	Round table	Belt + pulley
			
1	Ball screw pitch: 6mm Machine deceleration ratio: 1:1	1-circle rotate angle: 360 ° Deceleration ratio: 1:3	Pulley diameter: 100mm Deceleration ratio: 1:2
2	Encoder resolution 131072	Encoder resolution 131072	Encoder resolution 131072
3	1 command unit: 0.001mm	1 command unit: 0.1 °	1 command unit: 0.02mm
4	6mm/0.001mm=6000	360/0.1=3600	314mm/0.02mm=15700
5	P0-11=6000 P0-12=0	P0-11=3600 ×1/3=1200 P0-12=0	P0-11=15700 ×1/2=7850 P0-12=0
6	B/A=131072/6000	B/A=131072/1200	B/A=131072/7850
7	P0-13=131072 P0-14=6000 After reduction P0-13=8192 P0-14=375	P0-13=131072 P0-14=1200 After reduction P0-13=8192 P0-14=75	P0-13=131072 P0-14=7850 After reduction P0-13=65536 P0-14=3925 Conver to second gear ratio P0-92=5536 P0-93=6 P0-94=3925 P0-95=0

3.2.2 Calculator

Click 【tool】,【calculator】, it will pop up below interface:

3.3 Help



3.3.1 Software help

Click 【help】,【software help】to show the software manual.

3.3.2 Version

Click 【help】,【version】to show below interface:

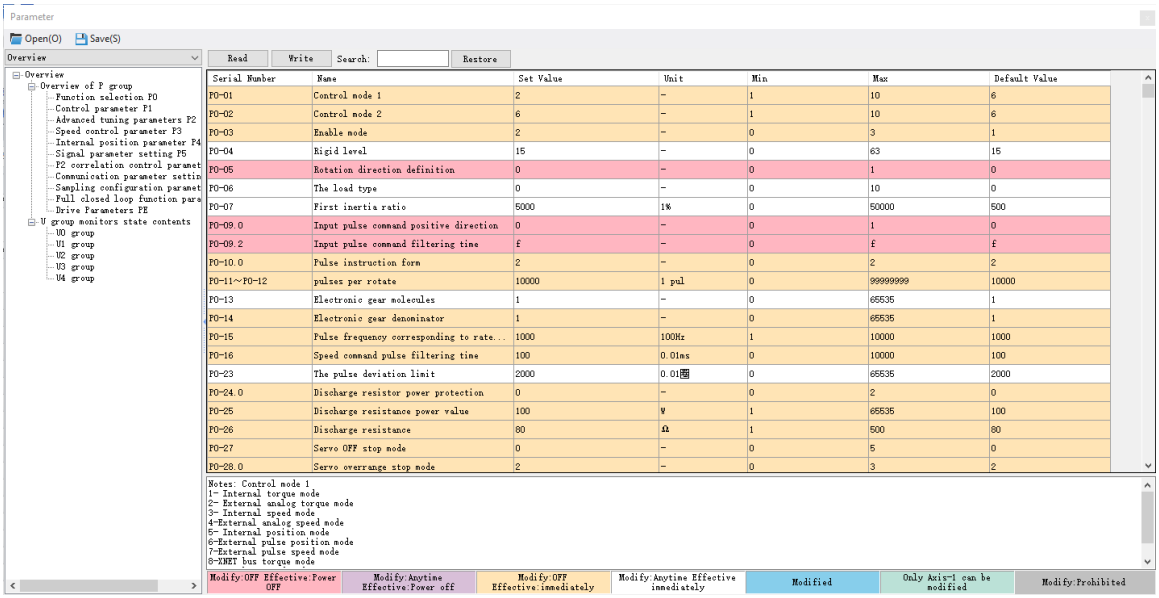
3.4 Option

Choose the language.

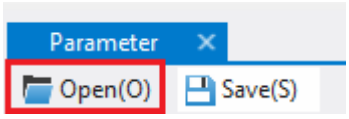
4 Parameter

4.1 Open the parameter configuration

Click【parameter】to show the parameter setting interface:



4.2 Open parameter files

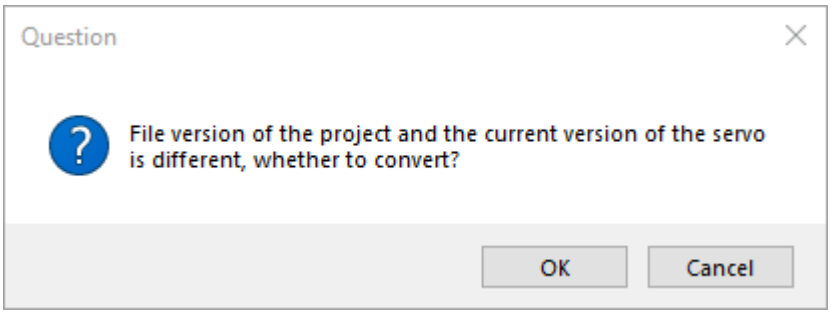


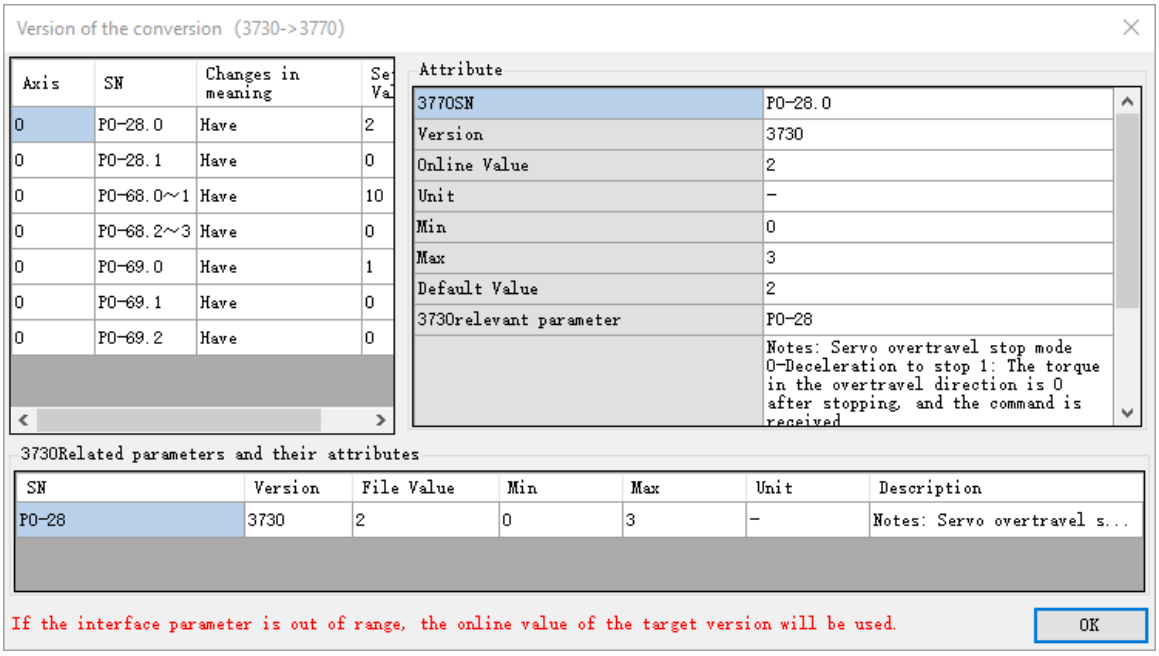
The upper computer opens the parameter file online.

1. When the open parameter file has the same driver model, the same motor model and the same firmware, the open file parameters will be displayed. At the same time, the difference between the current connected servo parameters will be compared, which is indicated by bright blue.

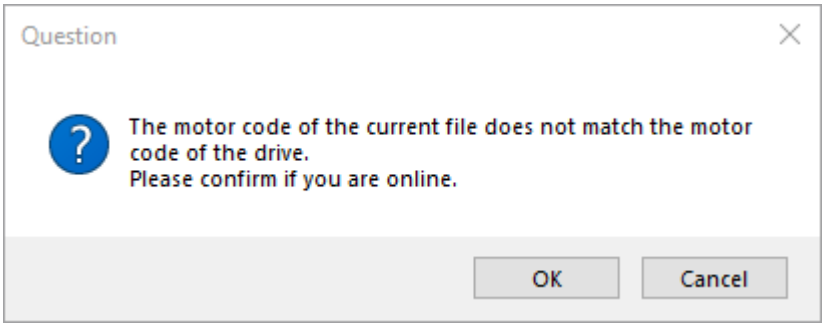
Serial Number	Name	Set Value	Unit	Min	Max	Default Value
P0-01	Control mode 1	1	-	1	10	6
P0-02	Control mode 2	6	-	1	10	6
P0-03	Enable mode	1	-	0	3	1
P0-04	Rigid level	15	-	0	63	15
P0-05	Rotation direction definition	1	-	0	1	0
P0-06	The load type	0	-	0	10	0
P0-07	First inertia ratio	4880	1%	0	50000	500
P0-09.0	Input pulse command positive direction	0	-	0	1	0
P0-09.2	Input pulse command filtering time	f	-	0	f	f

2. The firmware of the opened parameter file is different, and the drive model is the same, so version conversion is required.

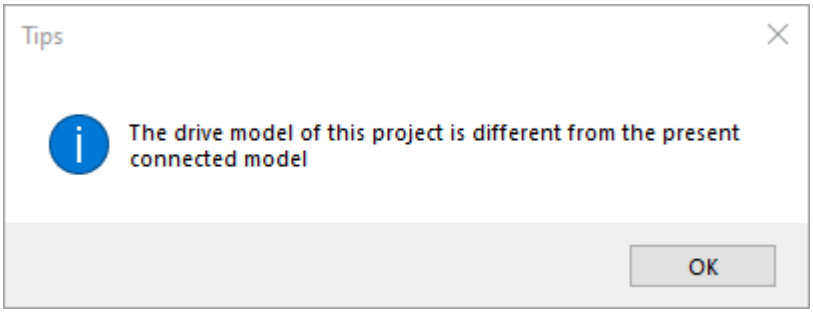




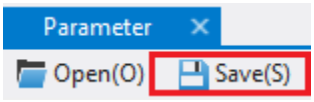
3. The open parameter file has different motor model, same drive model and same firmware. A prompt will pop up to confirm whether it is online.



4. Open the parameter file, drive model is different, motor model is the same, firmware is the same, pop-up prompt box, and then offline.

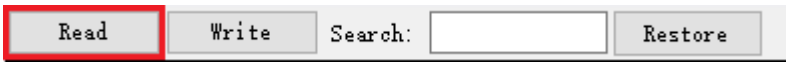


4.3 Parameter save



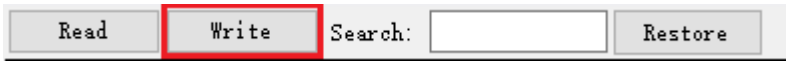
Save the current servo driver model, motor model, firmware version and P group parameters.

4.4 Read parameter



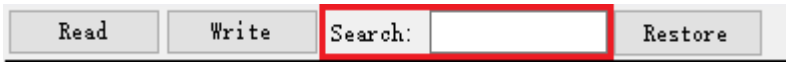
Read the current servo data, display the read success dialog box, prompt the user that the data reading completed.

4.5 Write parameter

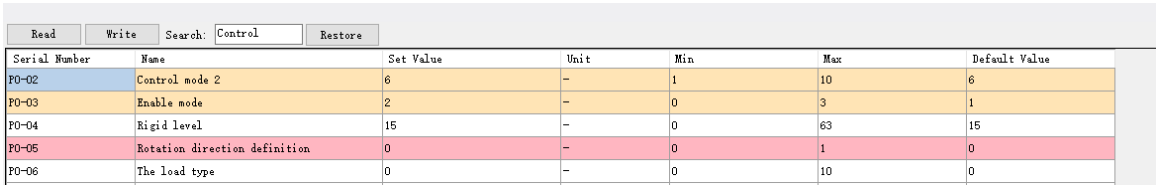


After modifying the parameter setting value, click write parameter to open the write prompt interface.

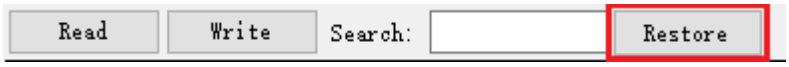
4.6 Search parameter



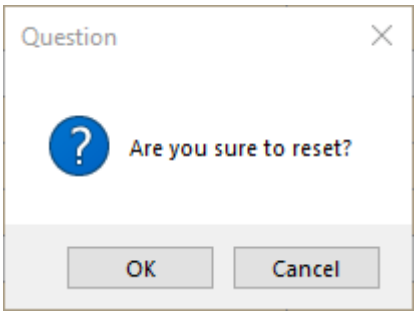
Search is to search the parameter serial number and name, support accurate search and fuzzy search, and press enter to search. The parameters searched are displayed in the first row of the table, and press enter to display the next parameter of the current search. Search results are displayed in a loop.



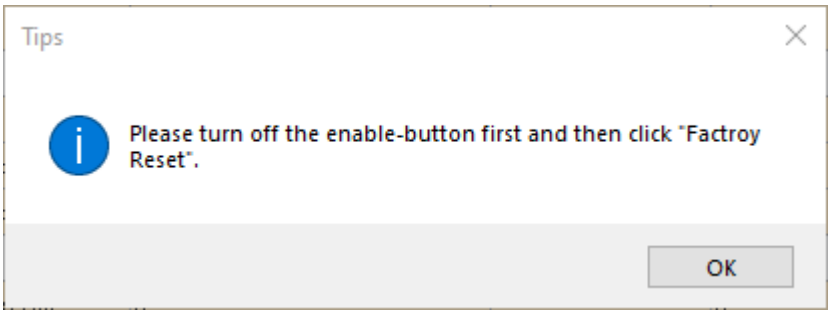
4.7 Restore



Click 【restore】when the enable is shut down. The confirmation dialog box will pop up, and click OK to restore the factory parameters.



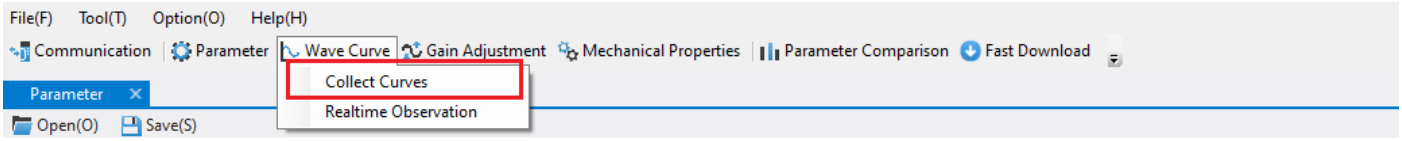
If the current servo is in the enabled state, click it and the following dialog box will appear to prompt the user. The user needs to turn off the enable to restore the factory settings.



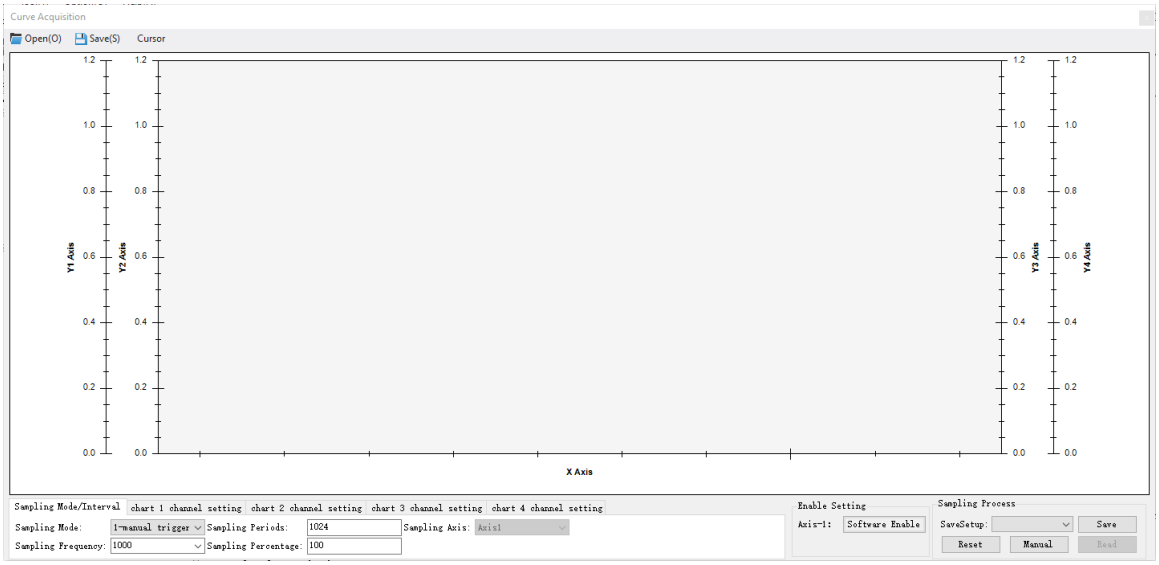
5 Waveform curve

5.1 Collect curves

The results of the motor action waveform are measured and displayed by drawing the waveform curve, which can be saved as the waveform data file.

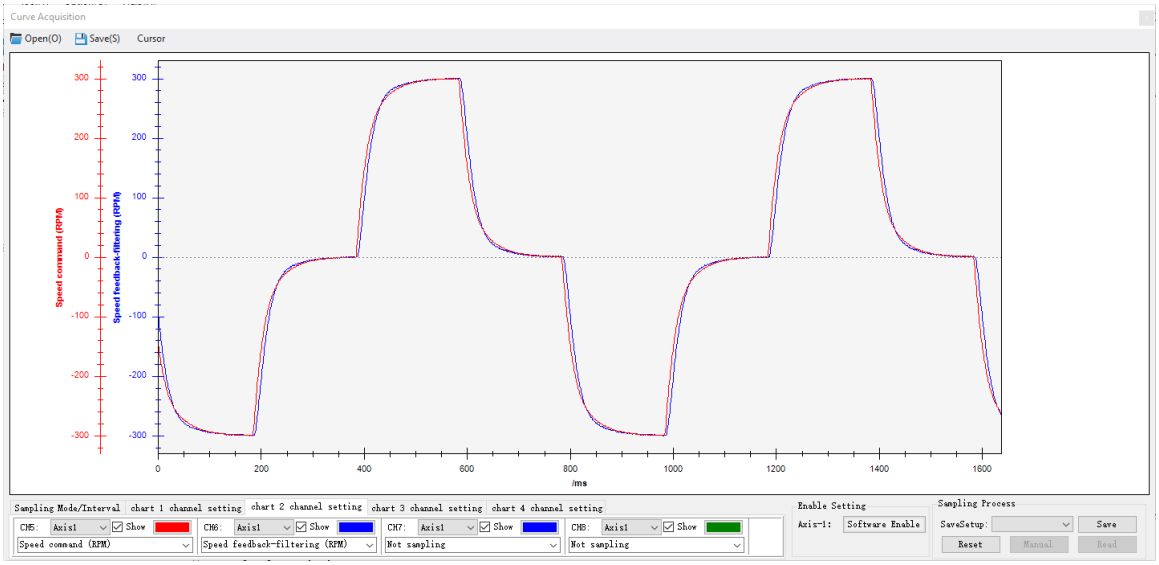


Click 【waveform curve】,【collect curves】to pop up the curve collection window:

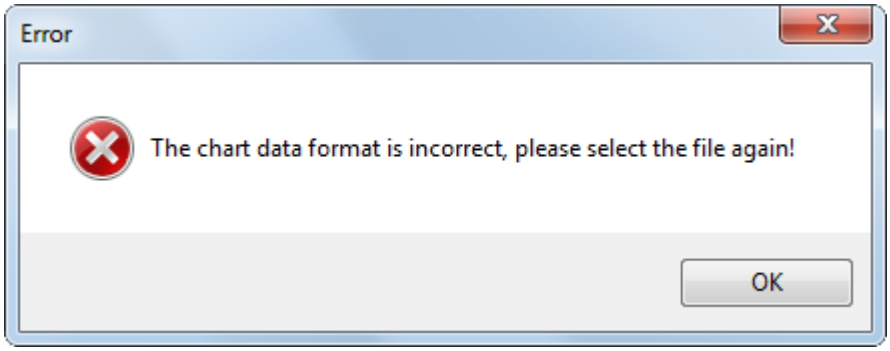


5.1.1 Open files

Open the history saved curve data file and display the image (the file path is displayed at the top of the software).

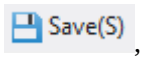


If the chart data file opened is incorrect, the following dialog box will be displayed to prompt the user.



5.1.2 Save files

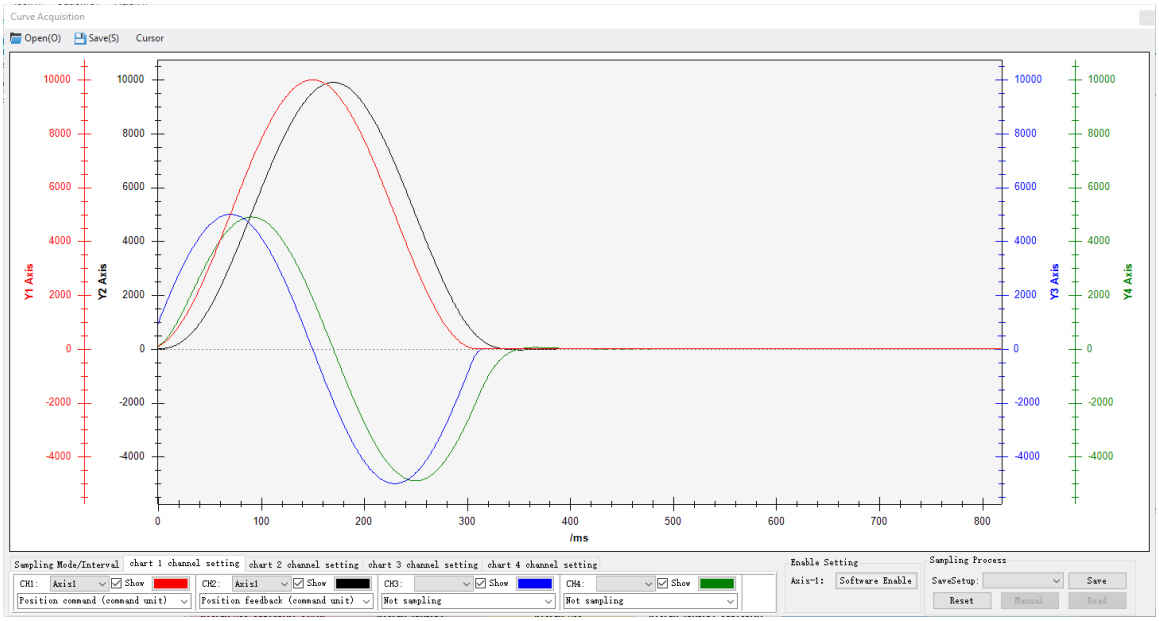
Save the collected data to the local.

The button here 

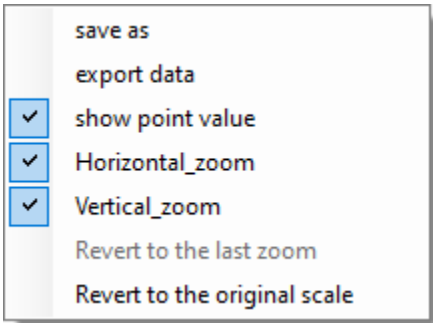
, what is saved is the sampled data and sampling configuration information (save format is. SVM).

5.1.3 Curves

The results of measuring motor action waveform can be displayed in the figure. By configuring sampling mode, sampling frequency, sampling period and sampling proportion, click to read data, and the graph of the measuring object will be displayed.



Waveform display area (Move the oscillogram: Ctrl + left click, and then move the mouse to drag the oscillogram to move. If the mouse has a wheel, press and hold the wheel to move the mouse and drag the oscillogram to move it.)
Right click the curve area to pop up the menu.



Righ click curve area ——【save as】: save the sampling data image (file name .emf/.png/.gif/.jpg/.tif/.bmp).

Righ click curve area ——【export data】: save the graph data (file name is .csv, open it with Excel).

Righ click curve area ——【show point value】: mouse passing the point, it will show or hide the value.

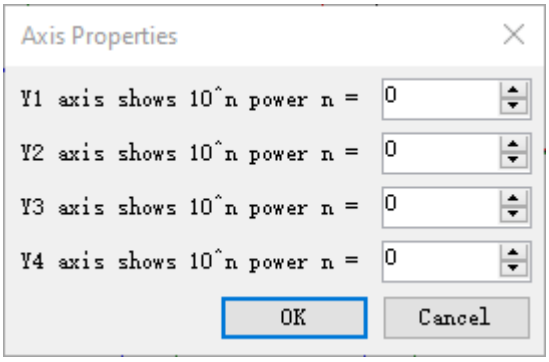
Righ click curve area ——【horizontal zoom】: horizontal zoom the appointed area.

Righ click curve area ——【vertical zoom】: vertical zoom the appointed area.

Righ click curve area ——【revert to the last zoom】: the waveform curve restores the last scale.

Righ click curve area ——【revert to the original scale】: the waveform curve is restored to the original scale.

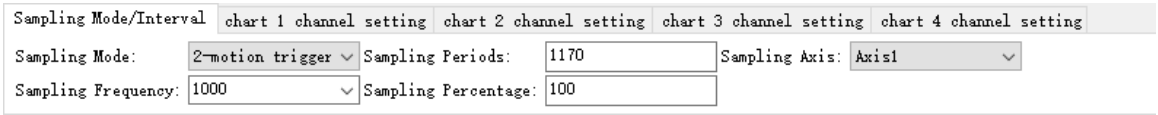
Ordinate area: double click the ordinate area to open the coordinate axis attribute dialog box, modify the power value, display and adjust the ordinate value (x * 10 ^ power value)



Abscissa area: double click the abscissa area to switch between sampling [/ time] and [/ ms].

5.1.4 Sampling mode/period

1. Configure sampling mode, sampling frequency, sampling period and sampling proportion.



Common sampling mode:

(1) Manual trigger - after the upper computer software configures this mode, the servo power on will always collect data. When the servo is not enabled, manual trigger can also obtain data.

(2) Motion trigger - after the upper computer software configures this mode, the PLC sends pulse command to make the motor rotate, and the software detects the existence of servo data area, and the data turns green (collectable)

(3) Enable trigger - after the upper computer software configures this mode, the servo is enabled, and the software detects

that the servo data area exists, and the data becomes green (collectable).

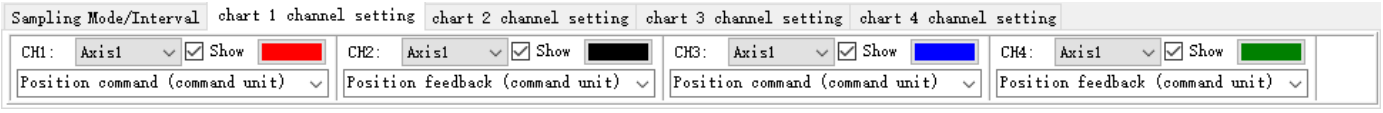
(4) Alarm trigger - after the upper computer software configures this mode, the servo will give an alarm, and the software will detect the existence of servo data area, and the data will turn green (collectable).

(5) Turn off enable trigger - after the upper computer software configures this mode, the servo is not enabled, and the software detects that the servo data area exists, and the data turns green (collectable).

Sampling frequency: the smaller the sampling frequency, the longer the sampling time.

Sampling period: set the sampling period, or automatically calculate the maximum sampling period of the current servo according to the configured channel, and write it to the servo.

2. Configure sampling channel, drop down to select the channel to sample, and can support manual input of sampling channel to configure the data to be sampled.



 : You can change the color of the corresponding channel curve display.

 : Select whether the corresponding channel curve is displayed.

Virtual channel:

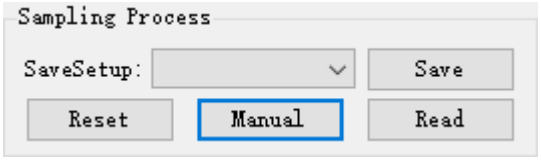
At present, the existing virtual channel: speed (virtual channel RPM), acceleration (virtual channel RPM / ms).

When the user configures a channel, if the channel configuration value with virtual channel is configured, the corresponding virtual channel will be automatically added in the channel configuration drop-down box; If the channel configuration with virtual channel is cancelled, the corresponding virtual channel will be automatically removed from the channel configuration drop-down box.

For example, channel configuration [position command], speed command (virtual channel RPM)] is automatically added in the channel configuration drop-down box; Channel configuration [position feedback], speed feedback (virtual channel RPM)] is automatically added in the channel configuration drop-down box; Channel configuration [speed feedback (RPM)], add [acceleration (virtual channel RPM / ms)]. If the channel is not configured with [position command], [position feedback] or [speed feedback (RPM)], the drop-down box will automatically delete [speed command (virtual channel RPM)], [speed feedback (virtual channel RPM)] or [acceleration (virtual channel RPM / MS)].

Note: the actual meaning of virtual channel configuration value in servo is the same as [no sampling], both are 0.

5.1.5 Sampling process



Save setting: save the sampling configuration.

 : The saved name of the sampling setting information saved by the user is displayed, which is

convenient for the user to select. After the user selects and clicks, the sampling configuration information corresponding to the save name will be displayed in the [sampling mode / interval]. The user does not need to configure the sampling settings one by one.

Software enable: enable mode is valid when clicking in software enable mode.

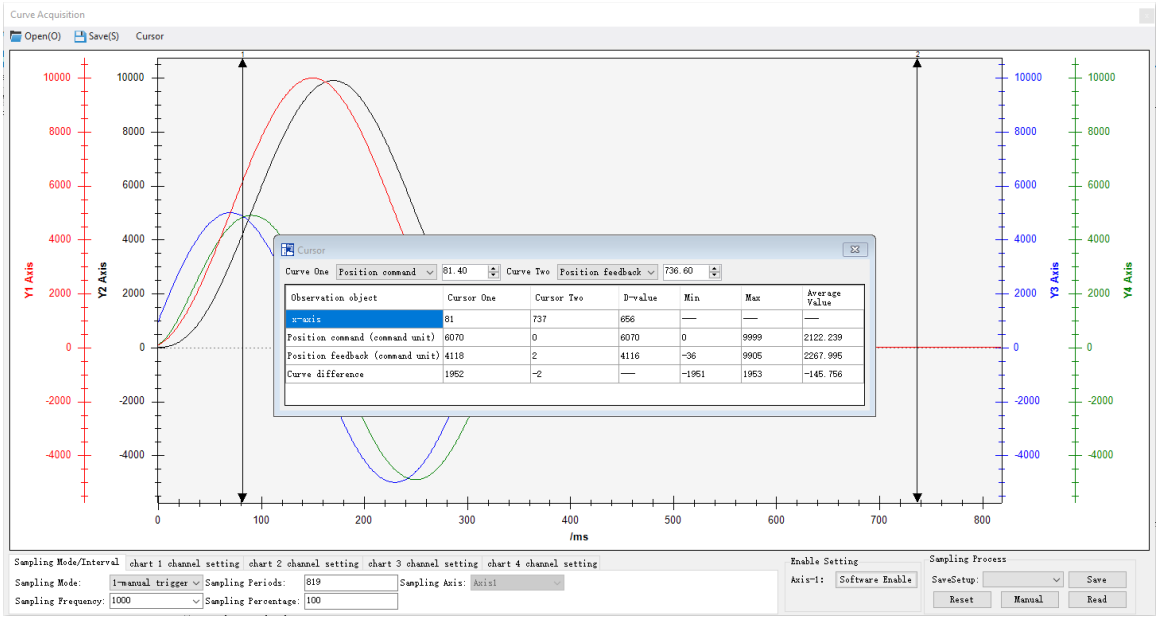
Manual trigger: this function is effective when the sampling mode is manual trigger mode.

Read data: after data acquisition, the button becomes clickable. Click read data to read data from the drive.

Data clearing: reset the sampling setting and clear the data in the sampling buffer of the drive, but the curve displayed on the interface will not be cleared.

5.1.6 Cursor compare

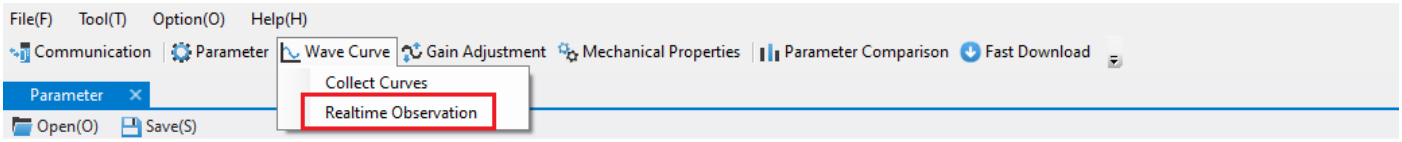
After the curve collection, the curve will be analyzed. Adding a cursor can accurately analyze the curve and get the comparison results.

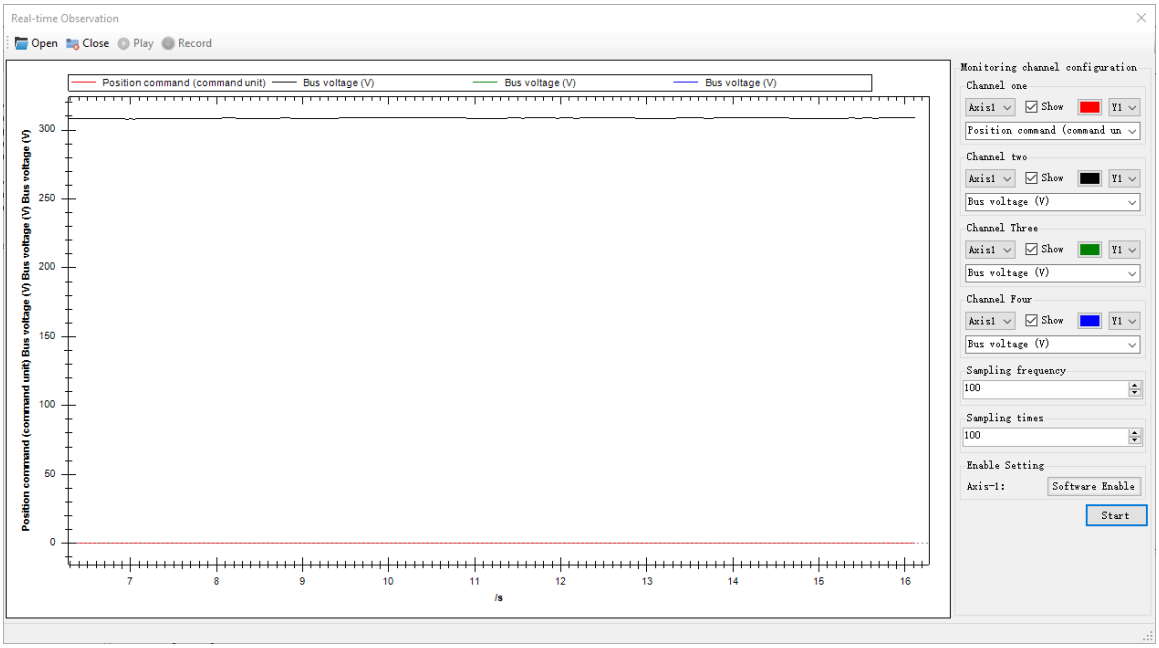


Place the mouse on the cursor, press and hold the left button to drag the cursor, or left click the curve area to change the position of cursor 1, right click the curve area to change the position of cursor 2.
When there is a cursor, enter the value in the input box on the right side of the drop-down box and press enter. The cursor on the image refreshes and the table displays the comparison result (the position of the cursor shown in the table is the point on the curve where the x-axis coordinate is closest to the input value).

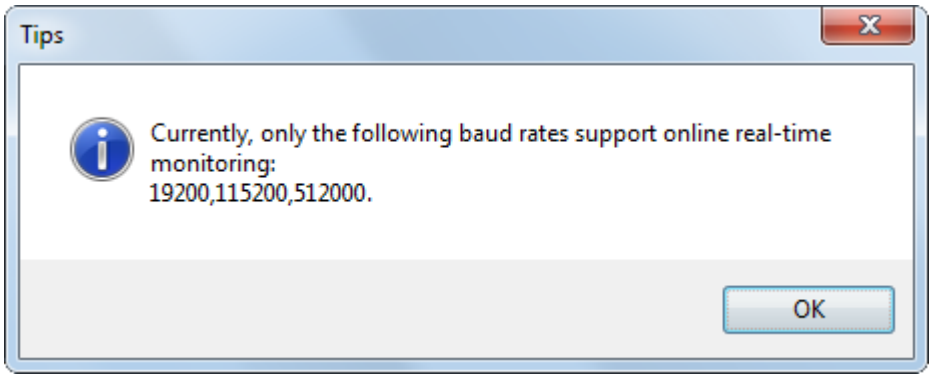
5.2 Realtime observation

Real time observation can continuously monitor the change of waveform. Click [waveform curve] to select real-time observation, and the real-time observation interface will pop up.





Real time monitoring can be open offline. When online, it can only be opened when the baud rate is 19200, 115200 and 512000, otherwise the following prompt box will pop up:



5.2.1 Monitoring channel

Location instruction(before fil : Drop down to select the sampling channel.

: The color of the corresponding channel curve.

: Select whether the corresponding channel curve is displayed.

Axis1 : The axis corresponding to the channel curve display.

Enable: Enable mode is valid in software enable mode.

Start: after selecting the channel, click Start, it will collect the data and display the curve, when the button

changes to 

, click 

, realtime observation end, and the button 

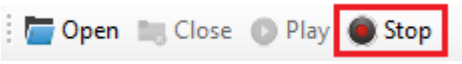
changes to 

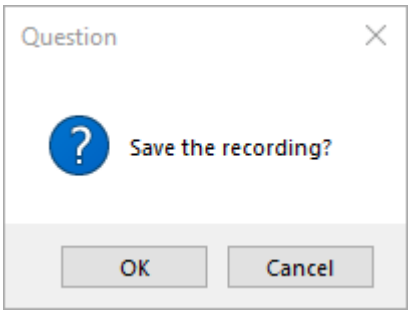
.

5.2.2 Record the curve

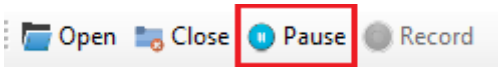
After collecting real-time curve starts, click record to start recording real-time monitoring data.

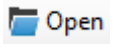
After recording, click stop to open the confirm save recording dialog box. Click OK to open the Save As dialog box to save to local.





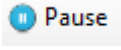
5.2.3 Play the curve

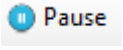


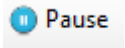
Click 

select the curve files, click 

, 

changes to 

, click 

to stop playing, at this time, 

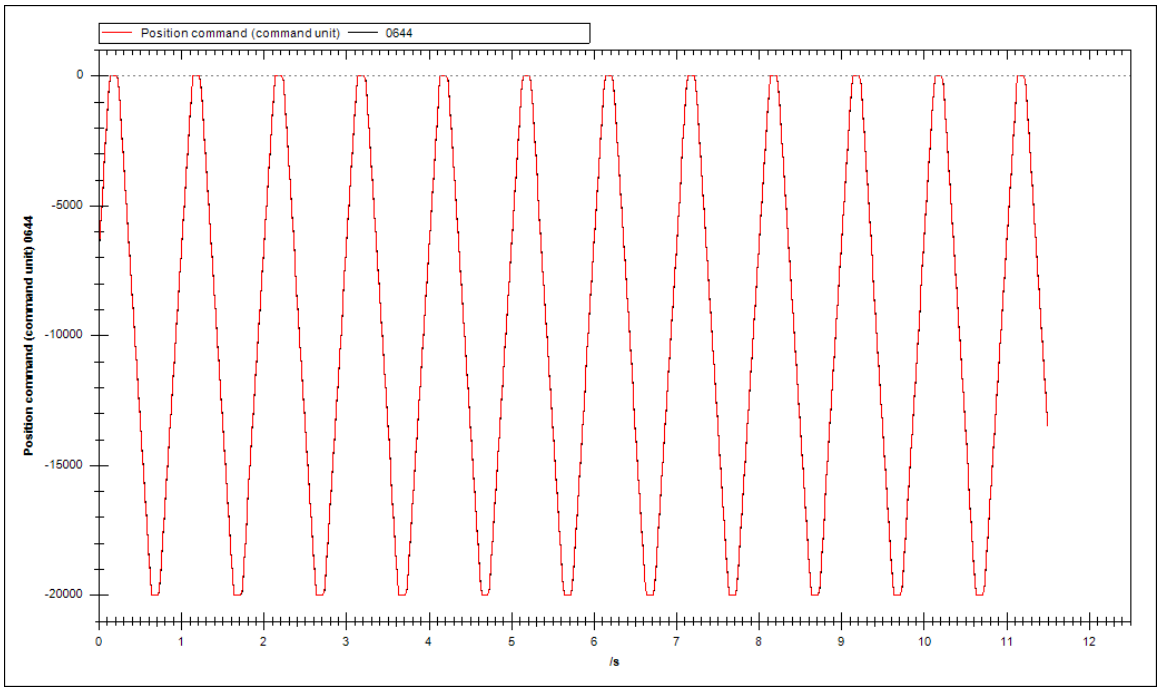
changes to 

.

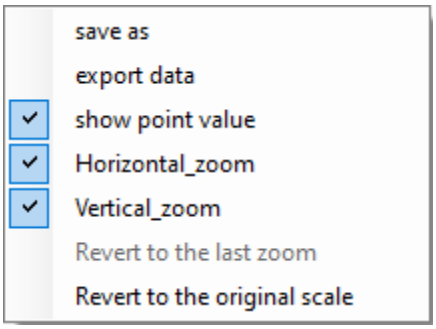
5.2.4 Close

Turn off the opened history data and clear the interface curve.

5.2.5 Curves



Right click the curves to pop up the menu.



【save as】: save the sampling data image (file name .emf/.png/.gif/.jpg/.tif/.bmp).

【export data】: save the graph data (file name is .csv, open it with Excel).

【show point value】: mouse passing the point, it will show or hide the value.

【horizontal zoom】: horizontal zoom the appointed area.

【vertical zoom】: vertical zoom the appointed area.

【revert to the last zoom】: the waveform curve restores the last scale.

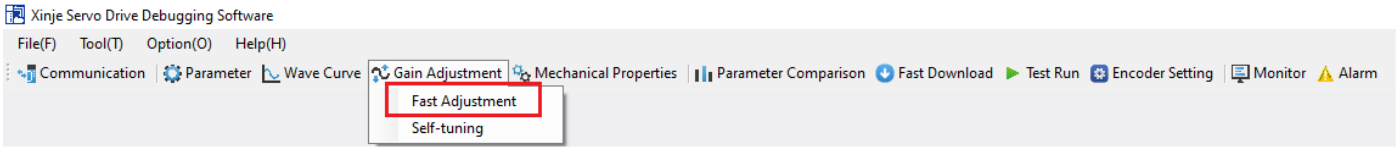
【revert to the original scale】: the waveform curve is restored to the original scale.

6 Gain adjustment

Gain adjustment is divided into fast adjustment and self-tuning. Fast adjustment is to find a suitable gain parameter by modifying the rigidity level. If the rigidity level does not meet the user requirements, the responsiveness parameter and rigidity parameter can be modified under the set rigidity level. Self-tuning is divided into internal instruction self-tuning and external instruction self-tuning. Self-tuning (internal command self-tuning) refers to the function of automatic operation (forward and reverse reciprocating motion) of servo unit without sending command from upper device, and adjusting according to mechanical characteristics during operation. Self-tuning (external instruction self-tuning) is the function of automatically adjusting the operation as the instruction from the upper device.
For details, please refer to the user manual of DS5 series servo driver.

6.1 Fast adjustment

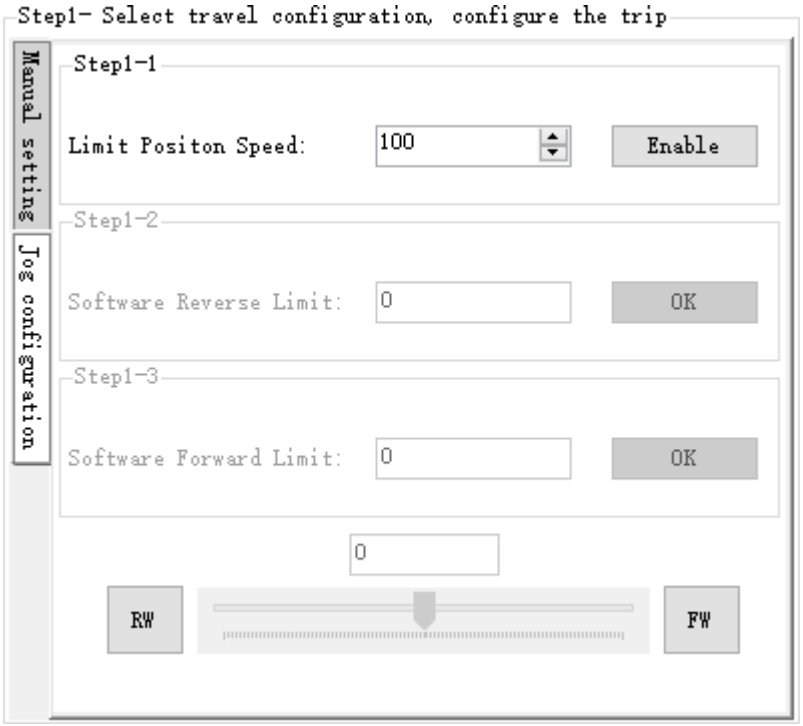
Click gain adjustment, select fast adjustment, and the fast adjustment interface will pop up.



Note: when the enable mode is 2, turn on the fast adjustment, and the upper computer will automatically turn off the enable.

6.1.1 Inertia identification

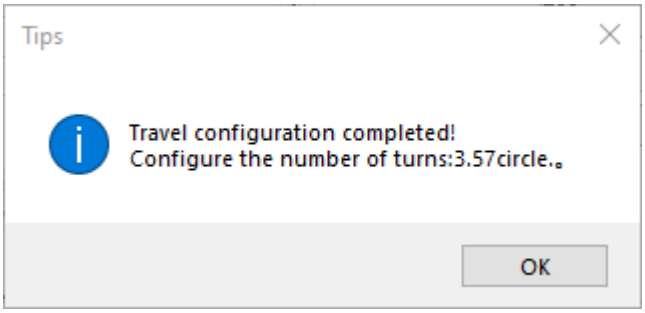
1. Jog configuration



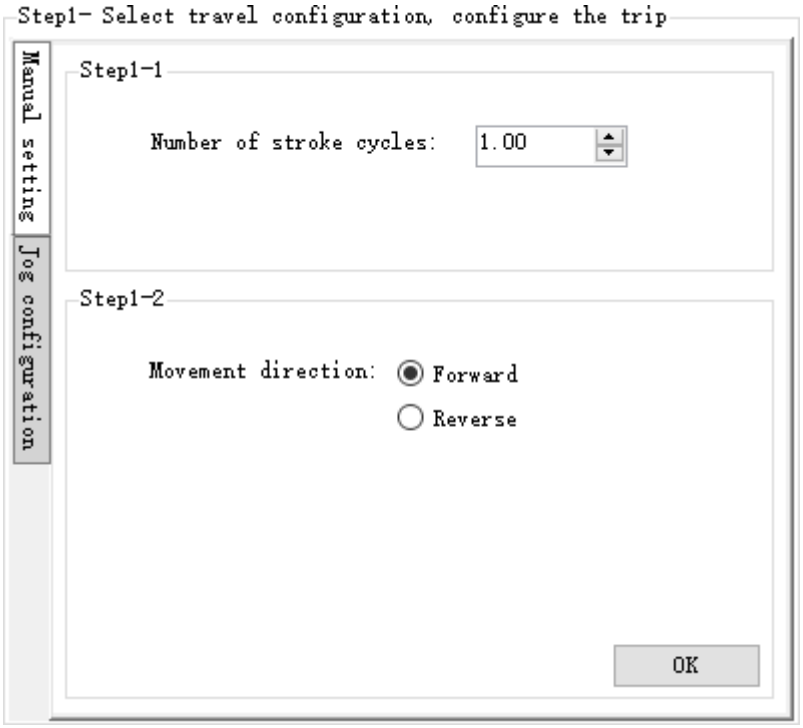
Setting-limit motion speed, click【servo enable】.

Setting-software reverse limit, click【ok】.

Setting-software forward limit, click【ok】, it will pop up below window, click ok.

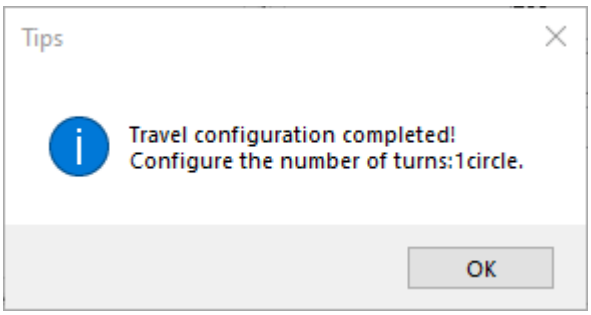


2. Manual setting



Set the travel circles.

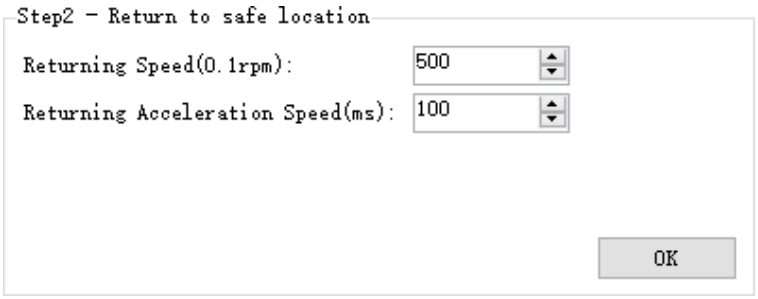
Set the motion direction, click ok. It will pop up below window, click ok.

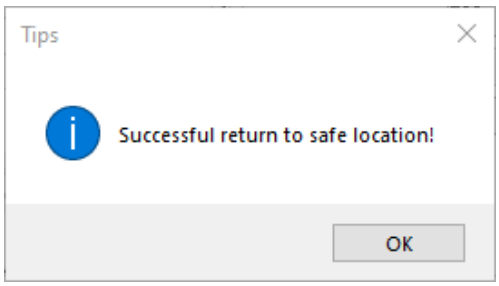


2. return to safe position

(manual setting has no return to safe position).

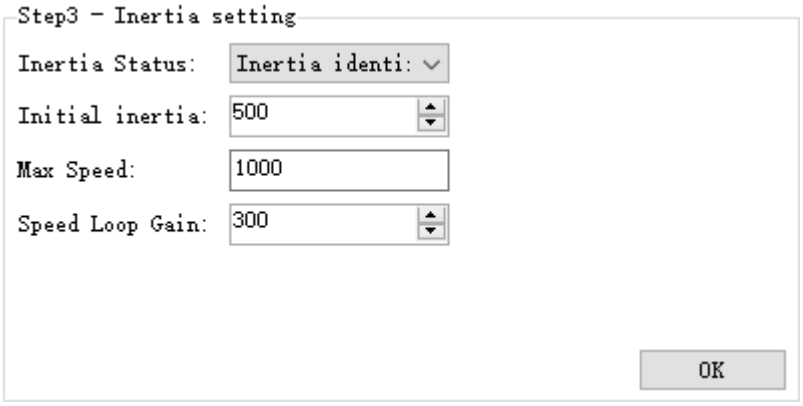
Set regression speed, regression acceleration, click OK to pop up the prompt box.

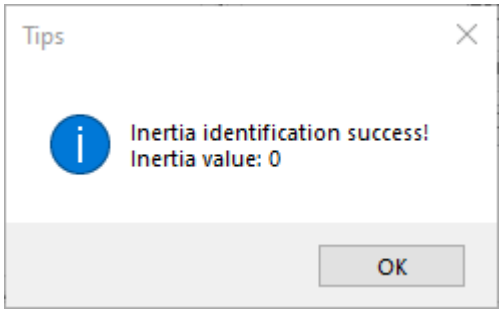




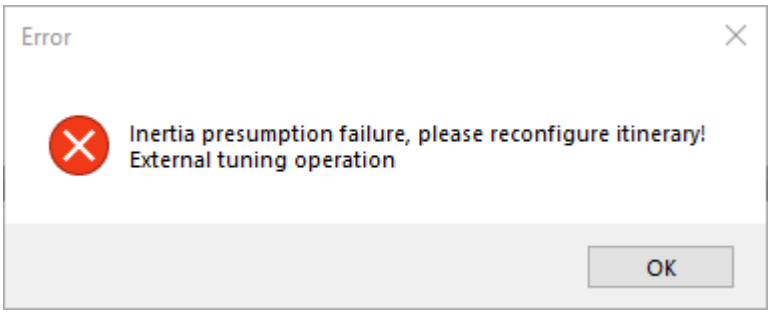
4. Inertia setting

Setting-inertia status.
Setting-initial inertia.
Setting-max speed, click ok. After the inertia identification is successful, a prompt box will pop up.





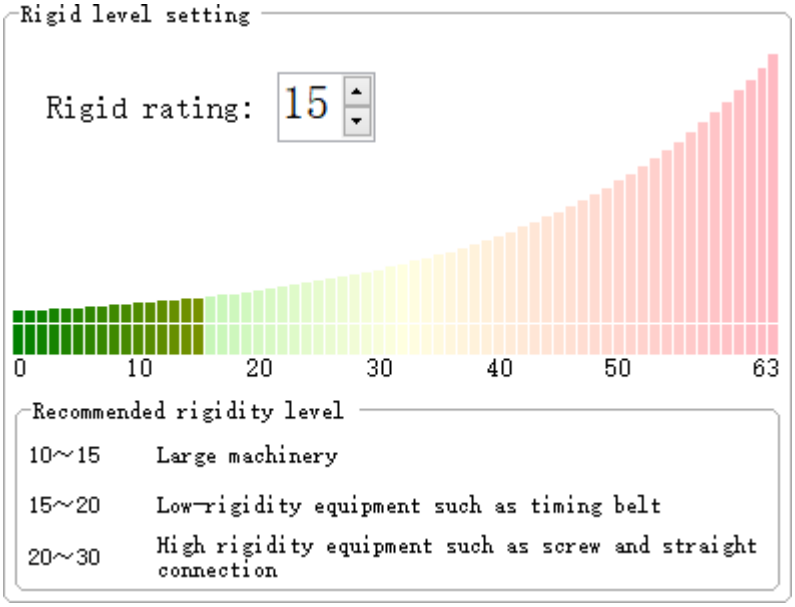
If the inertia identification is wrong, the error prompt box will pop up.



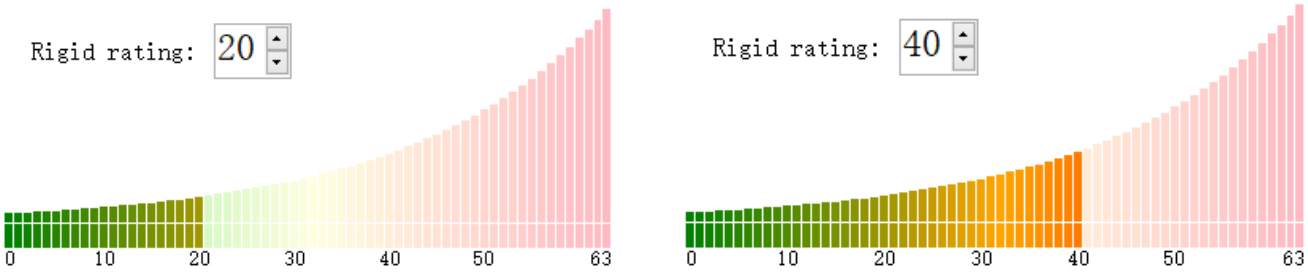
6.1.2 Rigidity level

1. Set the rigidity level

If the machine produces large noise, it is not suitable to increase the rigidity level. In the process of increasing the rigidity level, if resonance occurs, it is necessary to eliminate the resonance first, and then try to increase it.



If you modify the rigidity level parameter, the histogram will change.

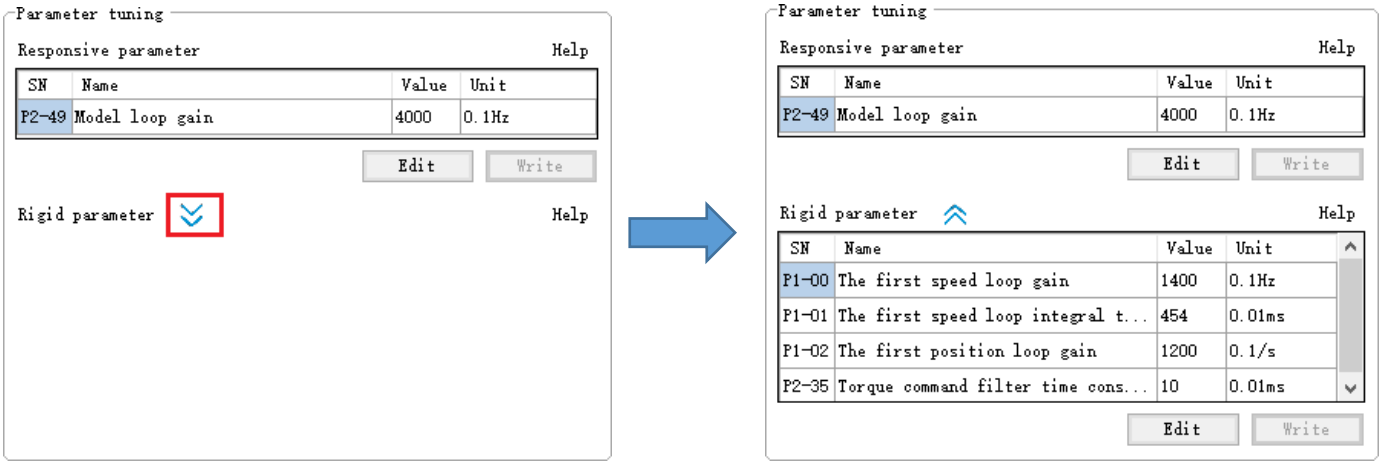


2. Fine tuning parameters

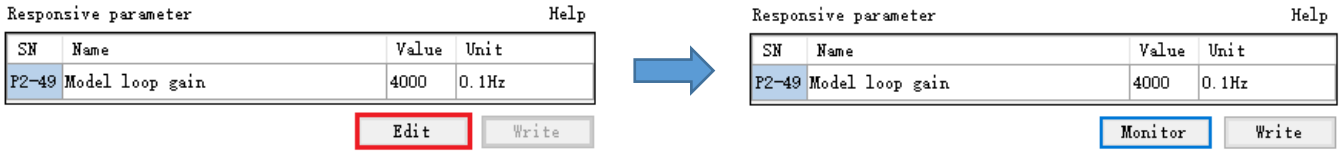
If the rigidity level does not meet the requirements of use, the response parameters and rigid parameters can be modified under the set rigidity level. Generally, only the response parameter P2-49 needs to be modified.

Click  Rigid parameter table can be displayed.

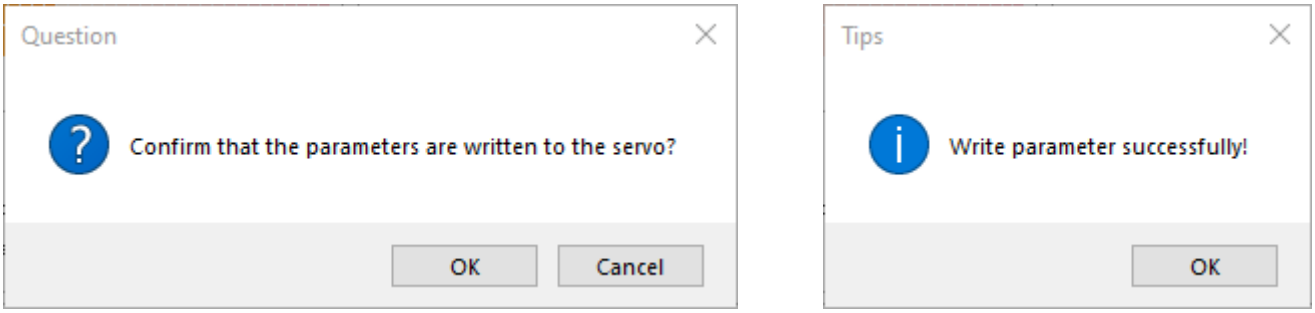
Click  Rigid parameter table can be hidden.



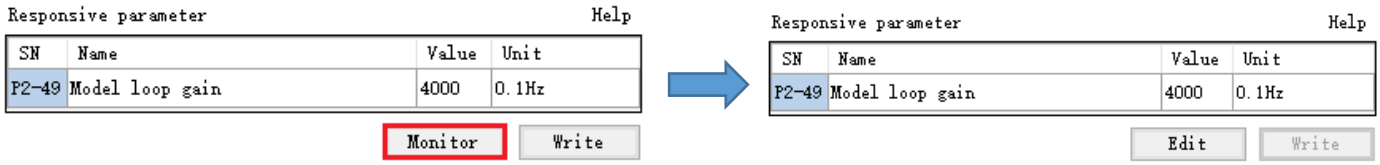
Click 【parameter edit】, enter the editable state and the parameters can be written.



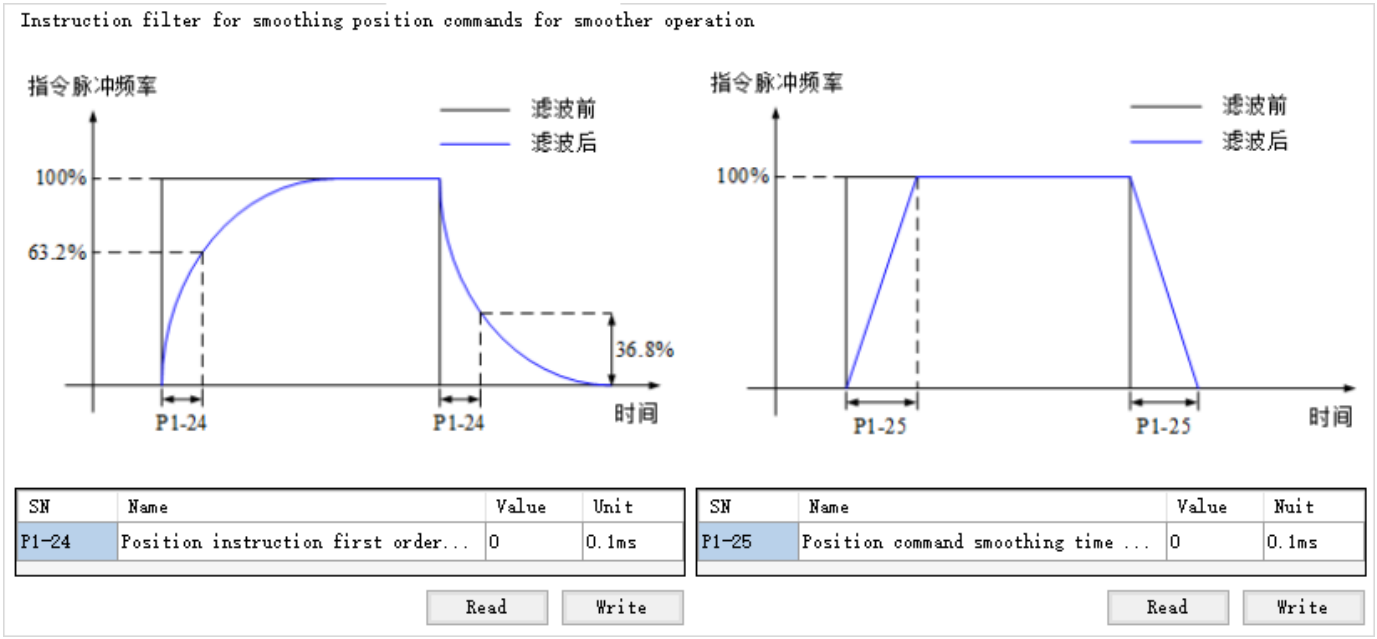
Click 【parameter write】, pop up the inquiry box. Click OK to pop up the prompt box.



Click 【monitor】, in the monitoring state, the parameters cannot be edited or written.



6.1.3 Command filter



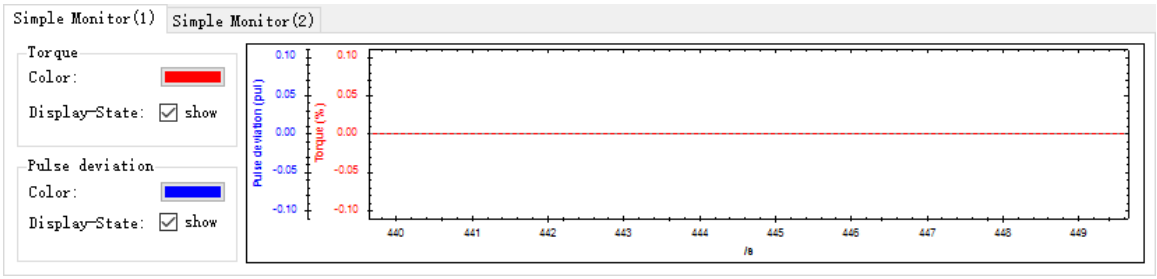
Parameter reading: read the parameters P1-24 and P1-25 in the drive, and refresh the table.

Parameter writing: modify the parameters P1-24 and P1-25, and click parameter writing to write the parameters to the driver.

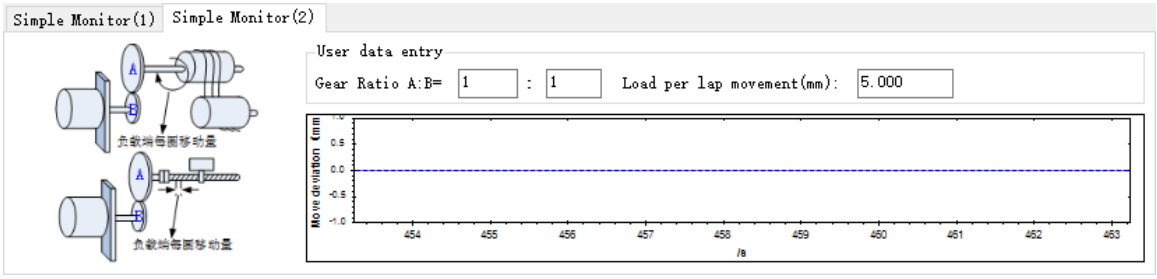
6.1.4 Simple monitor 1

Pulse deviation (pul): real time display of servo pulse deviation value.

Torque (%): real time display servo torque value.



6.1.5 Simple monitor 2



Example 1

Transmission ratio: 1:1

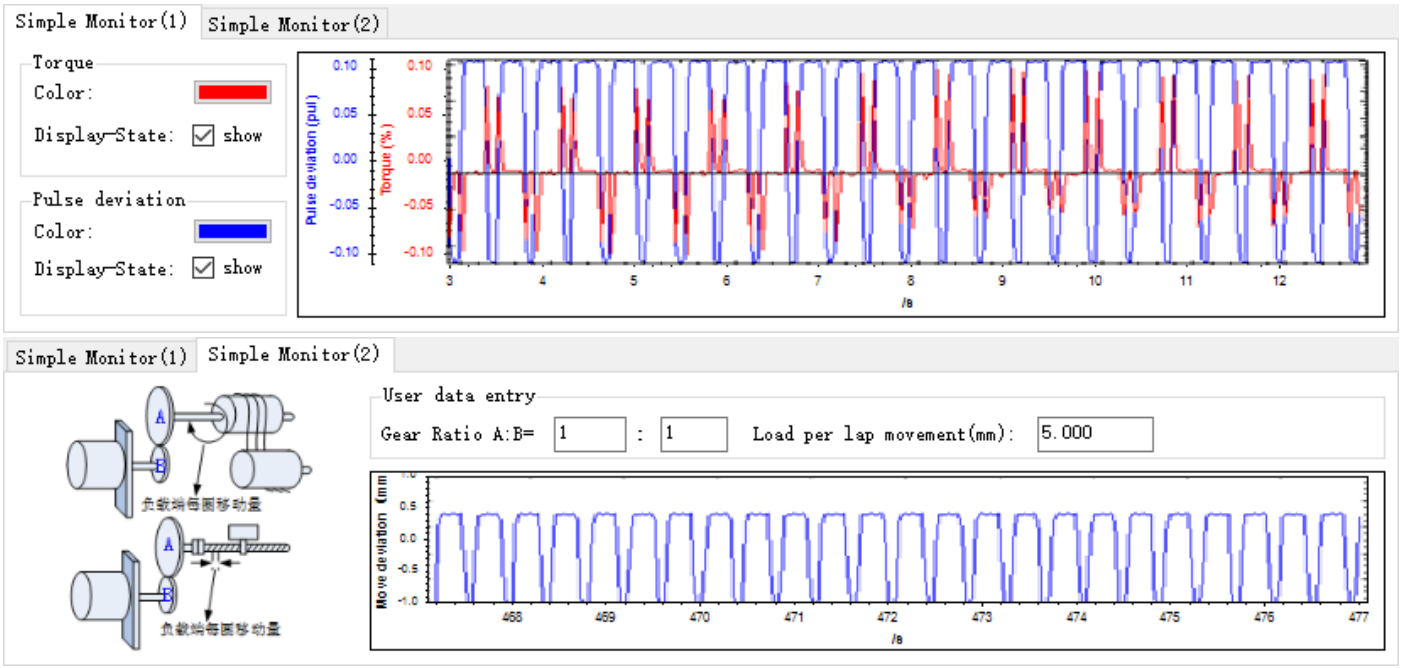
Load end movement per turn (mm): 5

Servo pulses per turn: 10000

Then the servo rotates for 1 turn and the load end moves for 5mm

When the simple monitor (1) is turned on during the servo operation, the real-time pulse deviation is about 1400 pulses.

When the simple monitor (2) is turned on, the load end movement deviation is about 0.7mm.



Example 2

Transmission ratio: 1:2

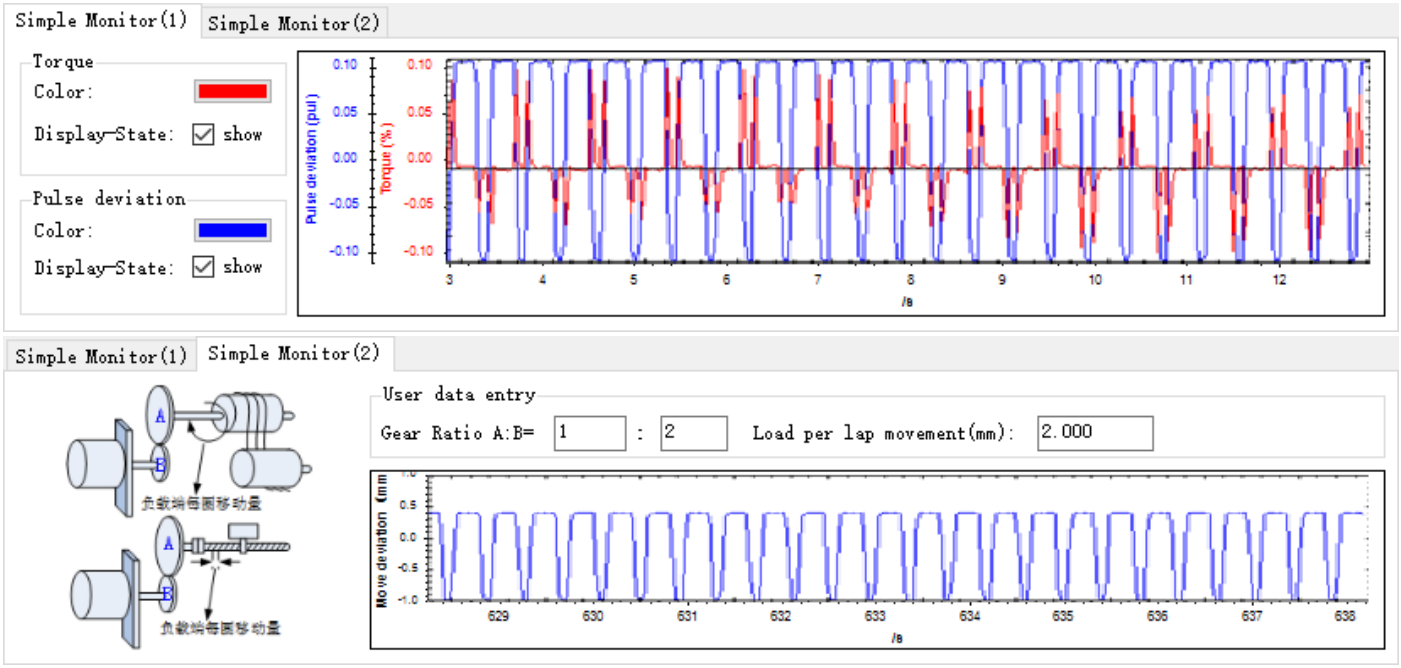
Load end movement per turn (mm): 2mm

Servo pulses per turn: 10000

Then the servo rotates for 1 turn and the load end moves for 1 mm

When the simple monitor 1 is turned on during the servo operation, the real-time pulse deviation is about 1400 pulses.

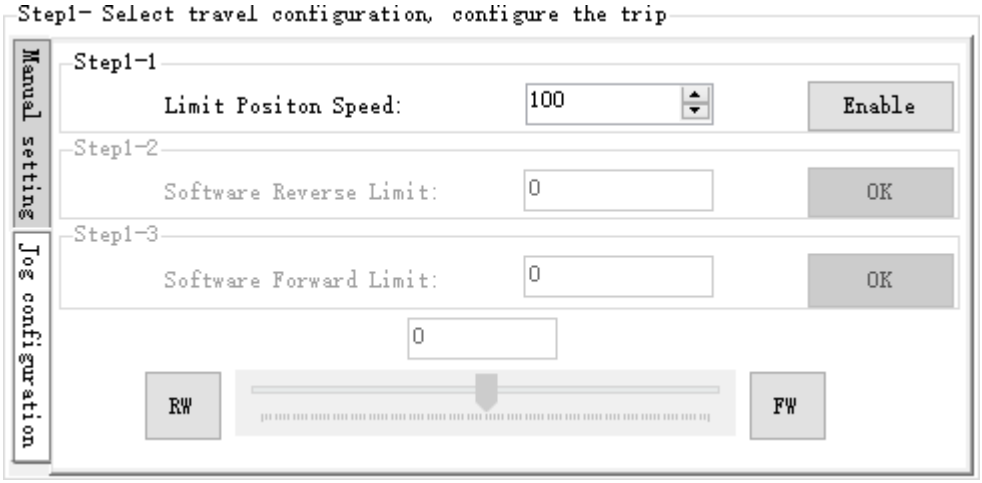
When the simple monitor 2 is turned on, the load end movement deviation is about 0.14mm.



6.2 Self-tuning

6.2.1 Travel configuration

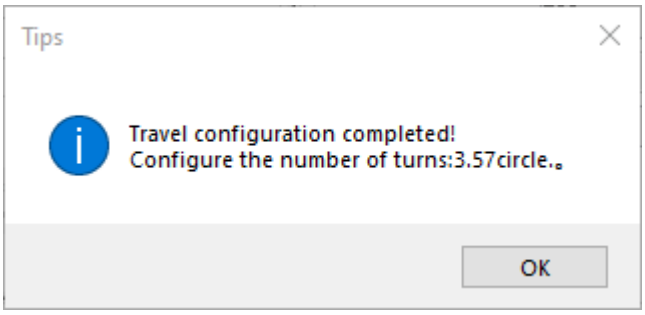
1. Jog configuration



Limit motion speed, click【servo enable】.

Software reverse limit, click【ok】.

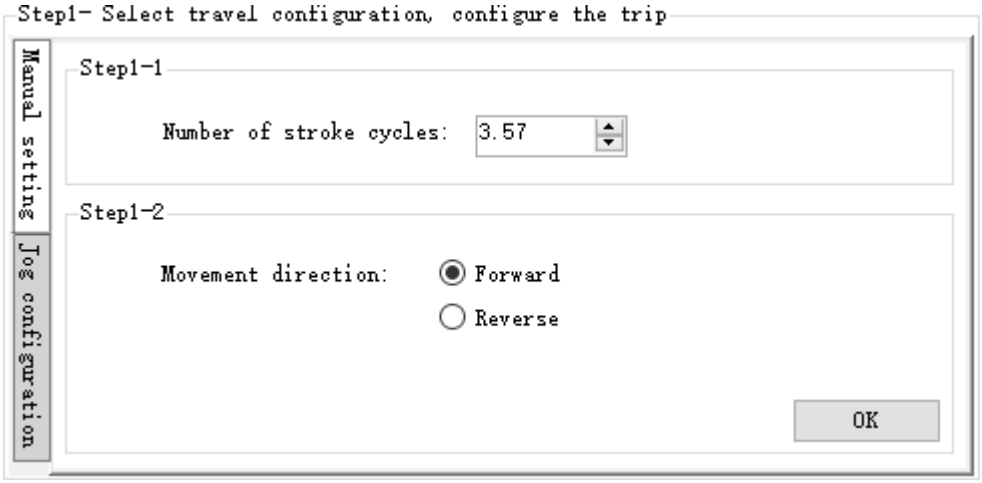
Software forward limit, click【ok】. Pop up a prompt box, click OK.

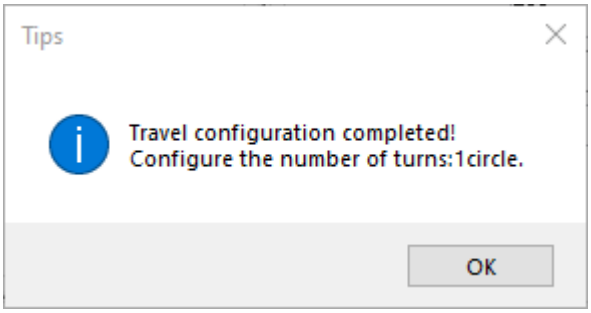


2. Manual setting

Set the travel circles.

Set the movement direction, click OK, and a prompt dialog box will pop up. Click OK.

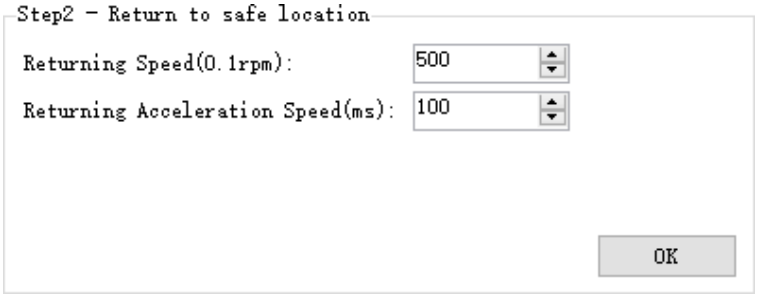


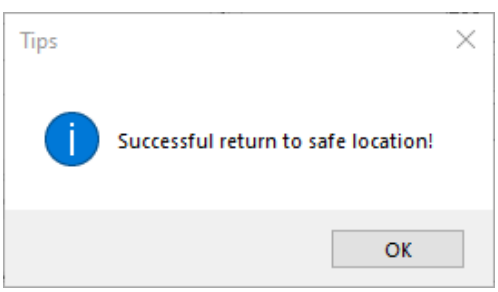


2. Return to safe position

(manually setting has no return to safe position.)

Set the regression speed and acceleration, and click OK to pop up the prompt box.





Note: the maximum travel turns can be set to 30. If the travel of 40 turns is manually configured, the inertia identification is carried out according to 30 turns. After the inertia identification, the self-tuning is carried out, and the set travel is 30 turns.

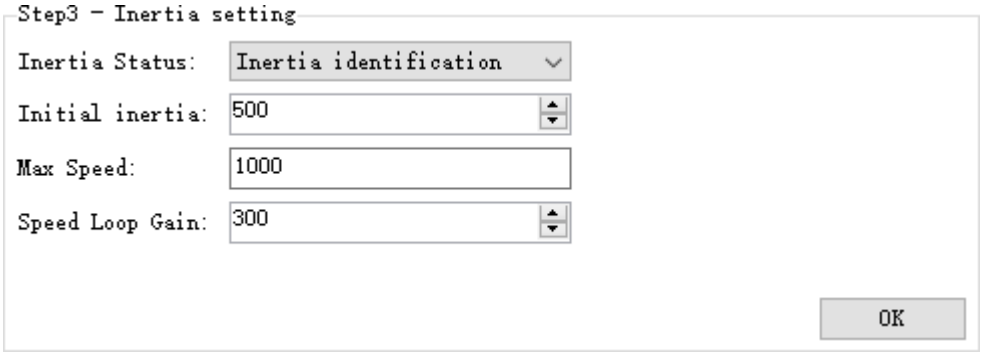
6.2.2 Tuning configuration

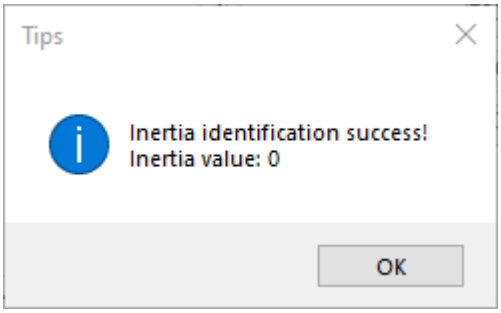
1. Inertia setting

Setting - inertia state.

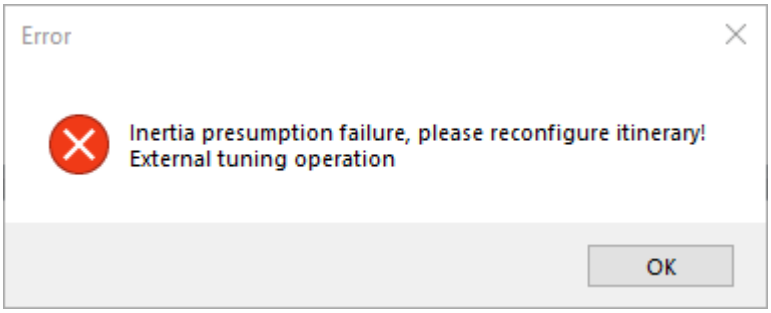
Setting - initial inertia.

Set the maximum speed. Click OK. After the inertia identification is successful, a prompt box will pop up.

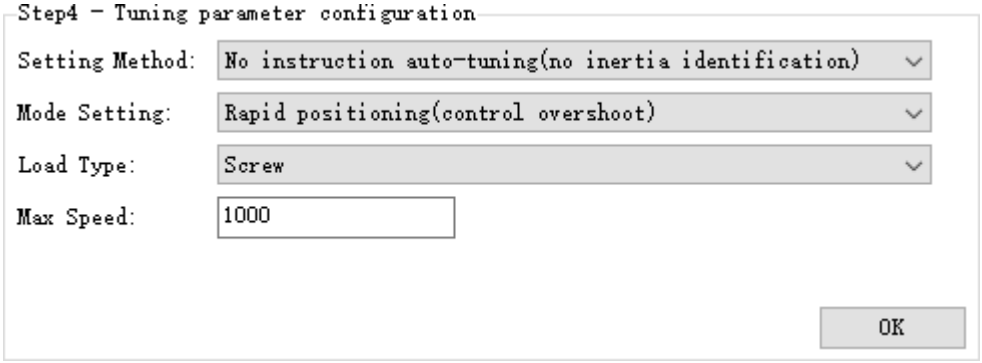




If the inertia identification is wrong, the error prompt box will pop up.



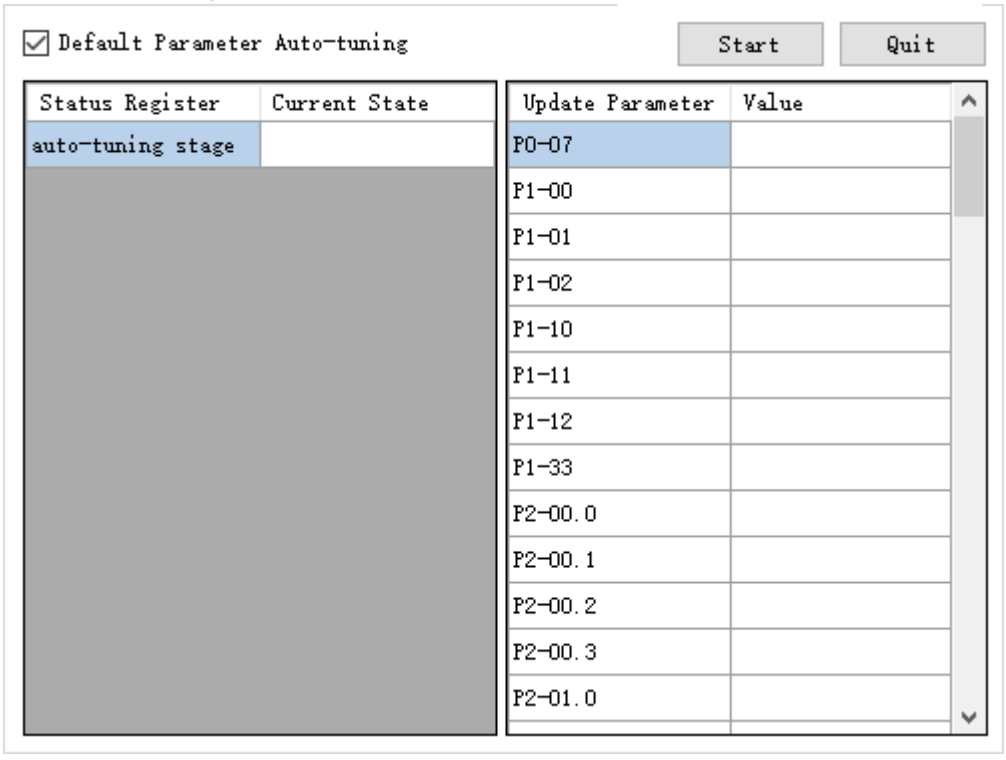
2. tuning parameter setting



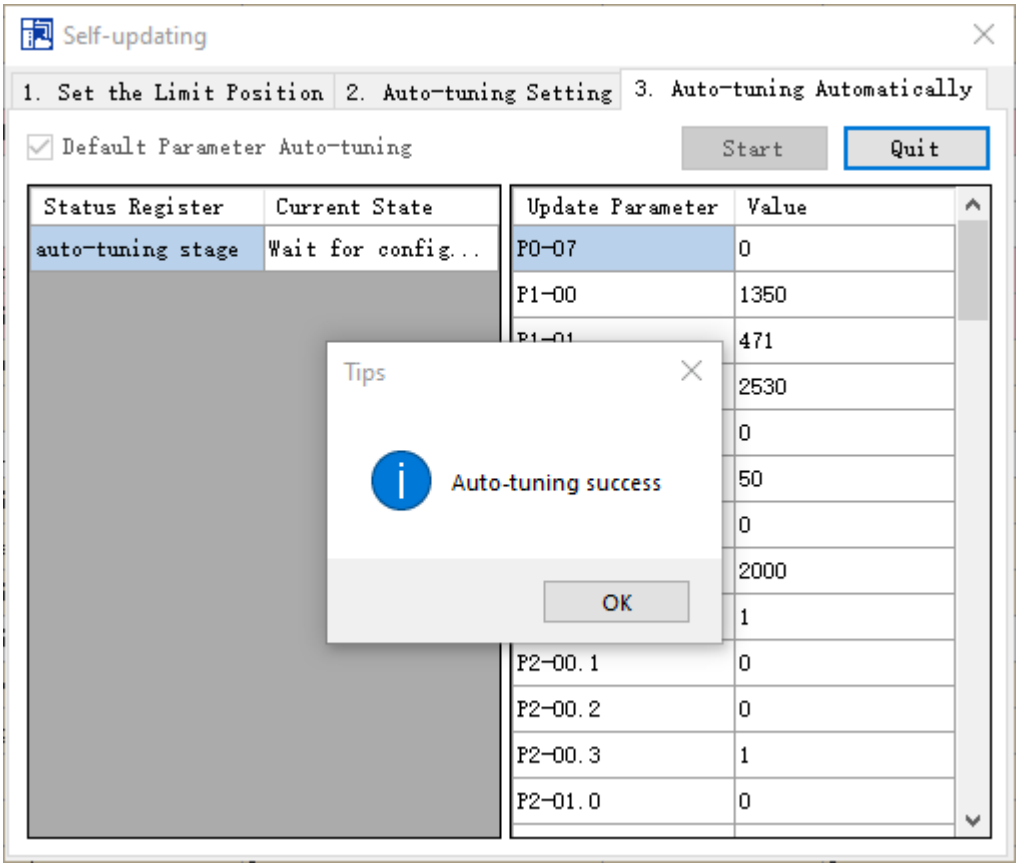
Mode	Explanation
Soft	Soft gain adjustment. Besides the gain adjustment, the notch filter is also adjusted automatically.
Rapid positioning	Make special adjustment for positioning purpose. In addition to the gain adjustment, it also automatically adjusts the model loop gain and notch filter.
Rapid positioning (control overshoot)	In the positioning of the use of non overshoot adjustment. In addition to gain adjustment, it is also automatically adjusted model loop gain and notch filter.

Load type	Explanation
Synchronous belt	It is suitable for the adjustment of low rigidity mechanism such as synchronous belt mechanism.
Lead screw	It is suitable for the adjustment of high rigidity mechanism such as ball screw mechanism. Please select this type if there is no corresponding mechanism.
Rigid joint	It is suitable for the adjustment of higher rigidity system.

6.2.3 Self-tuning

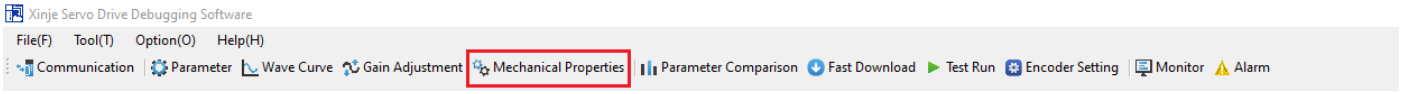


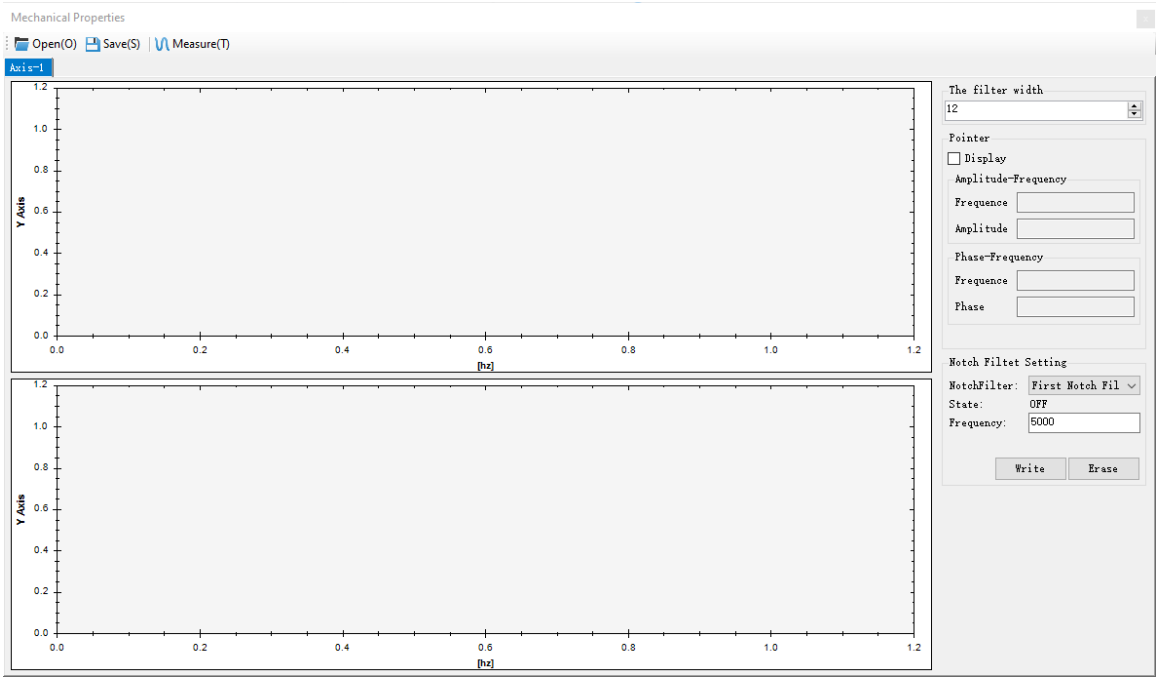
Click 【start tune】, wait for the tuning completion.


Self-updating
1. Set the Limit Position
2. Auto-tuning Setting
3. Auto-tuning Automatically
Default Parameter Auto-tuning
Start
Quit
Status Register
Current State
auto-tuning stage
Wait for config...
Update Parameter
Value
P0-07
0
P1-00
1350
471
2530
0
50
0
2000
1
P2-00.1
0
P2-00.2
0
P2-00.3
1
P2-01.0
0
Tips
Auto-tuning success
OK

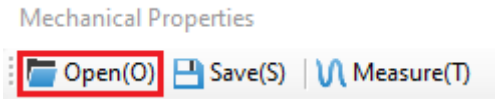
7 Mechanical properties

The mechanical system has a certain resonance frequency. When the servo gain is increased, it may produce continuous vibration near the mechanical resonance frequency. Generally, the gain can not continue to improve when the servo gain is between 400Hz and 1000Hz. The resonance frequency can be found in most cases through the mechanical properties function of the Xinje upper computer. At most, five frequency points can be set. After the vibration is eliminated, if it is necessary to improve the responsiveness, the gain can be further improved.



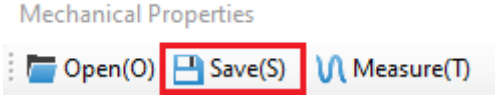


7.1 Open file

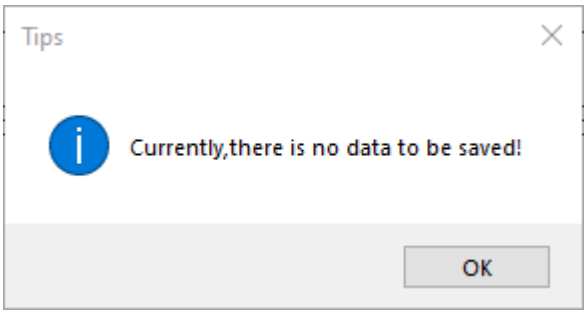


Open the saved mechanical characteristic spectrum (amplitude frequency, phase frequency).

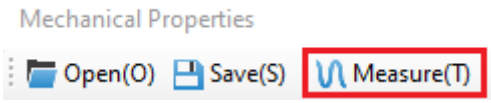
7.2 Save file



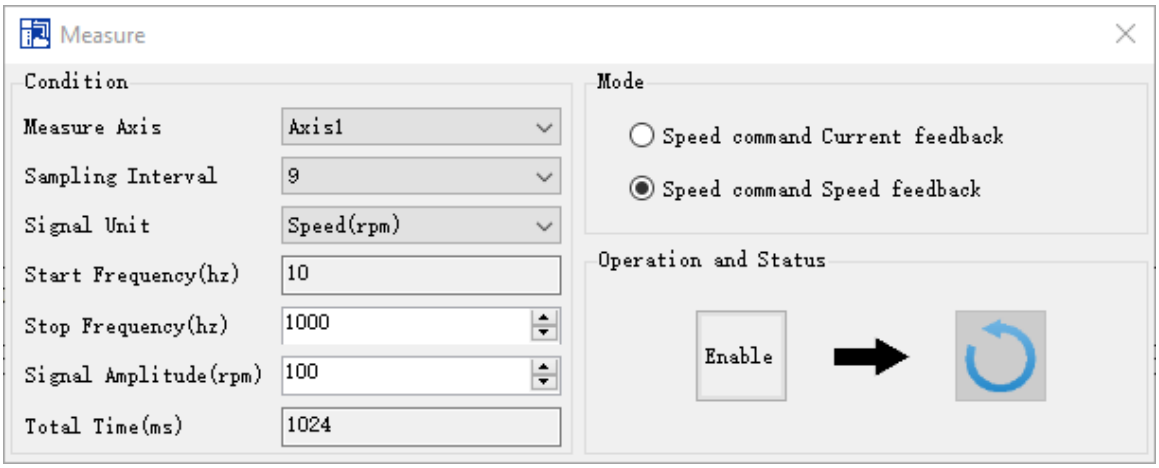
Save mechanical characteristic spectrum (amplitude frequency, phase frequency), save format. SVP.
If no measurement has been made, the following dialog box will pop up:



7.3 Measurement of mechanical properties



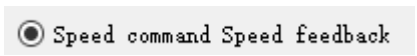
Click 【measure】, it will show the measurement interface.



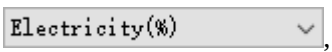
It will show【measure】interface. Set the condition parameters and mode, click【enable】, then click  , to obtain the data of mechanical properties analysis.

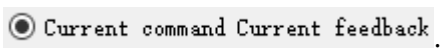
Sampling interval: select the sampling interval and adjust the total time.
Unit signal: select signal unit (for different signal units, the measurement modes are different).
Start frequency and end frequency: the frequency range of detection is 10 ~ 1000Hz.
Mode: select the measurement mode, that is, the object to be analyzed for mechanical characteristics.

When the unit signal is 

, the measurement mode is 

.

When the unit signal is 

, the measurement mode is 

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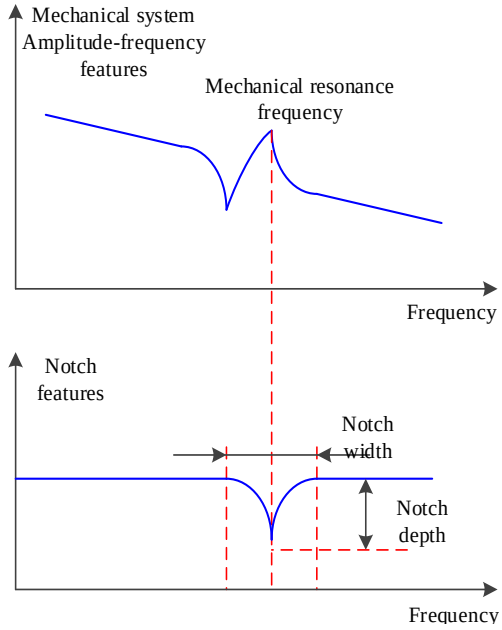
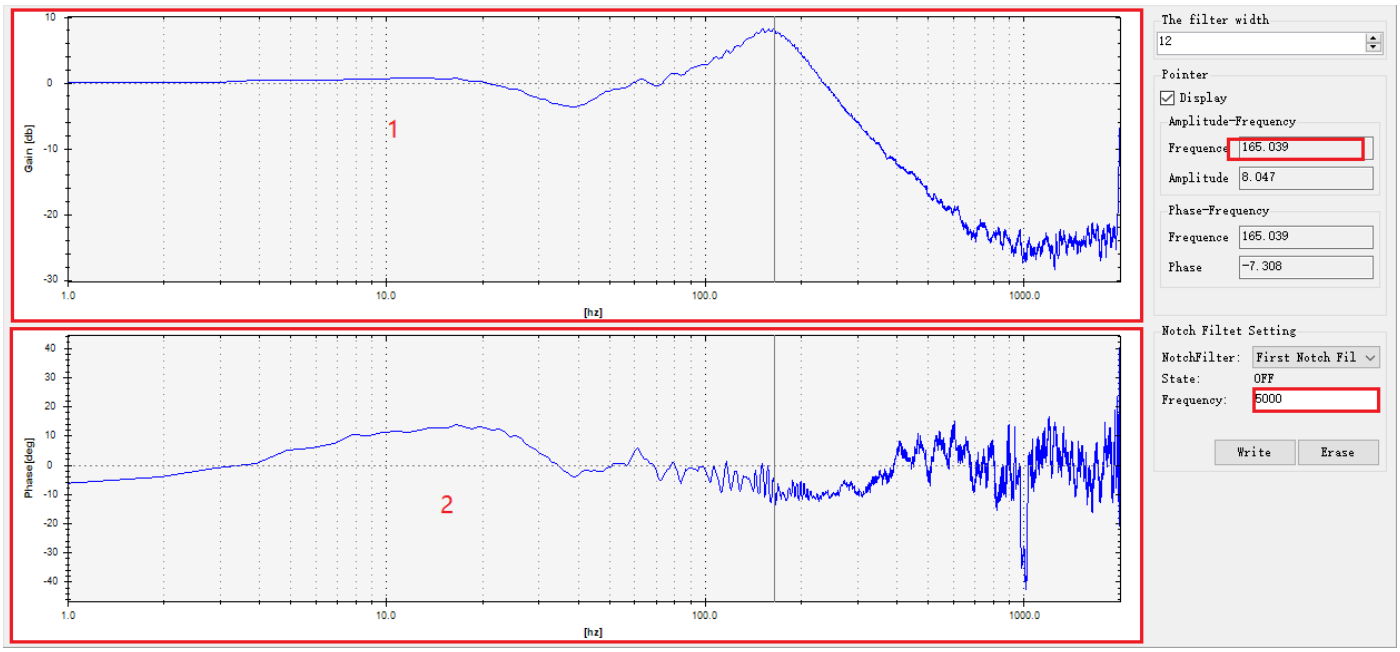
7.4 Mechanical properties curves

The notch filter can suppress the mechanical resonance by reducing the gain at a specific frequency. After setting the notch filter correctly, the vibration can be effectively suppressed and the servo gain can be increased.



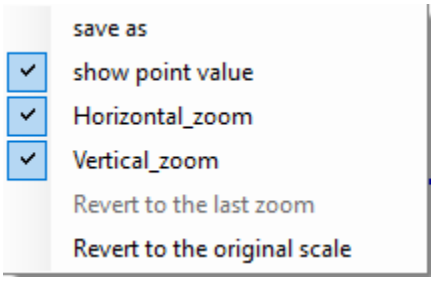
After the resonance of the motor occurs, click the mechanical properties measurement. After the mechanical properties measurement is completed, the mechanical properties curve will be generated. Click the check box displayed in the pointer to find the resonance frequency point. Click the left mouse button on the curve to get the amplitude frequency and phase frequency values. Input the frequency value into the frequency set by the notch filter and click write.



Area 1: frequency spectrum image display.

Area 2: phase spectrum image display.

Right click the waveform curve area to pop up the right-click menu.



【save as】: save the sampling data image (file name .emf/.png/.gif/.jpg/.tif/.bmp).

【show point value】: mouse passing the point, it will show or hide the value.

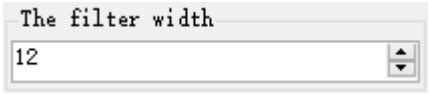
【horizontal zoom】: horizontal zoom the appointed area.

【vertical zoom】: vertical zoom the appointed area.

【revert to the last zoom】: the waveform curve restores the last scale.

【revert to the original scale】: the waveform curve is restored to the original scale.

7.5 Filter width

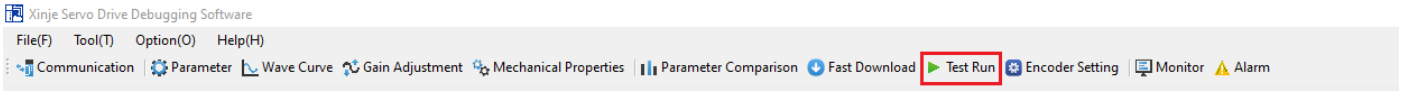


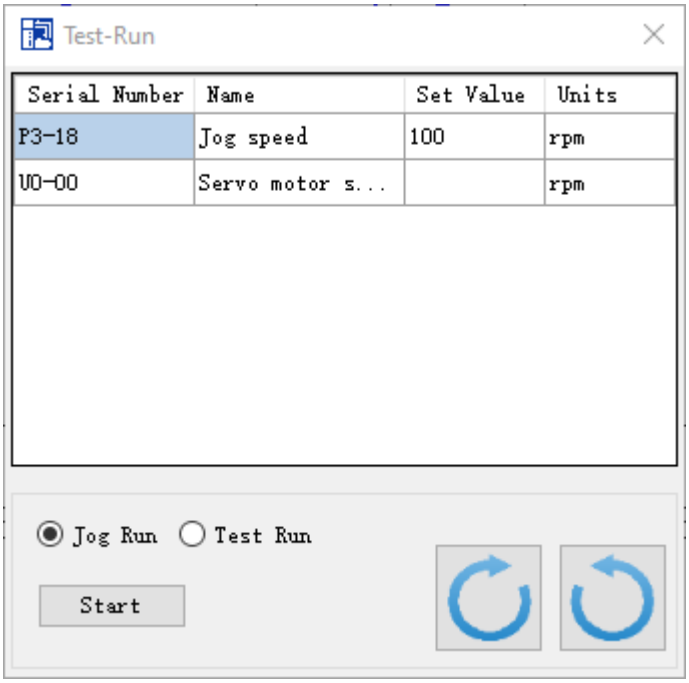
Filter width: the larger the filter width, the smoother the curve.

8 Test run

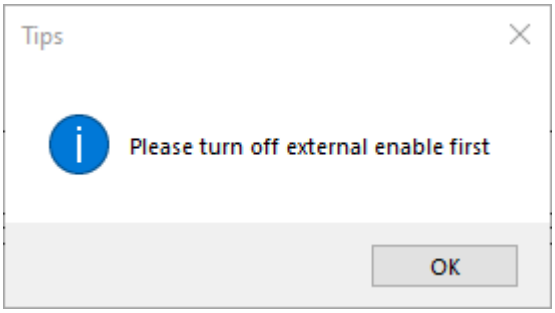
8.1 Test run interface

When the enable is shut off, click【test run】, pop up the test run interface.

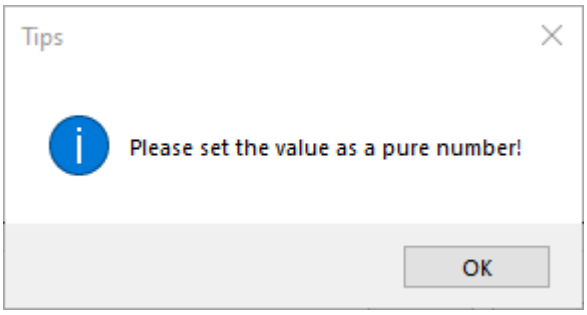




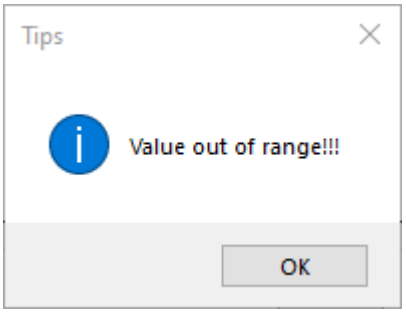
If clicking【test run】when the servo is enabled, it will show below window.



If the value of jog speed is not a number, a prompt box will pop up.



If the value of jog speed exceeds the range, a prompt box will pop up.



8.2 Jog run

Select jog 

Click 

: servo is enabled.

Press and hold  : motor will run forward.

Press and hold  : motor will run reverse.

8.3 Test run

Select 

Click 

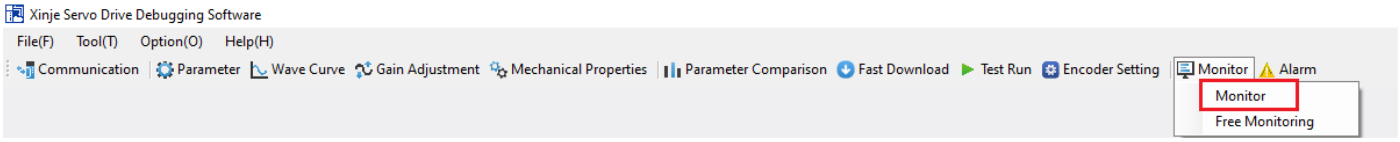
: servo is enabled.

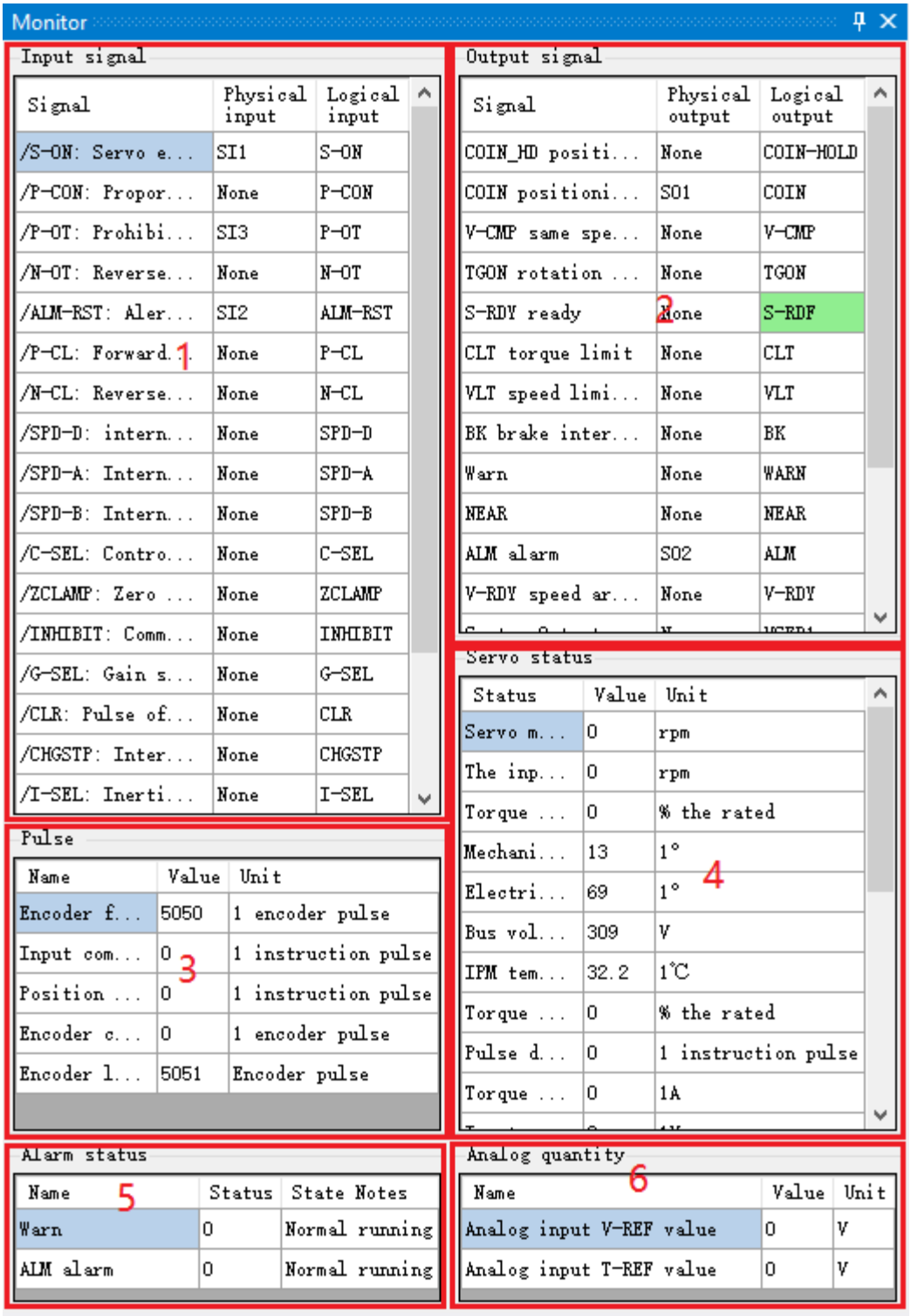
Press and hold  : motor will run forward.

Press and hold  : motor will run reverse.

9 Monitor

Click 【monitor】-【monitor】, pop up the monitor interface.





Area 1: display input signal status information. Green: signal input; White: no signal input.

Area 2: display output signal status information. Green: signal output; White: no signal output.

Area 3: display the pulse information received by the driver.

Area 4: display the operation information of the drive.

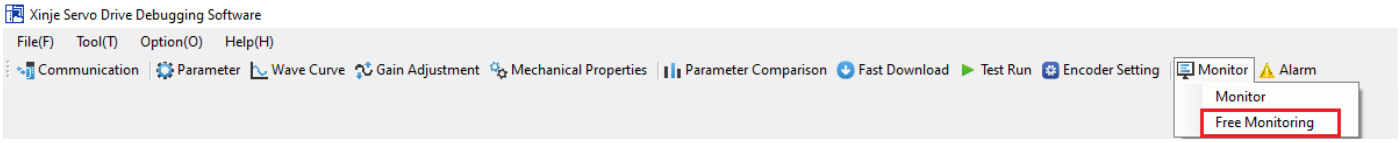
Area 5: display the alarm information of the drive.

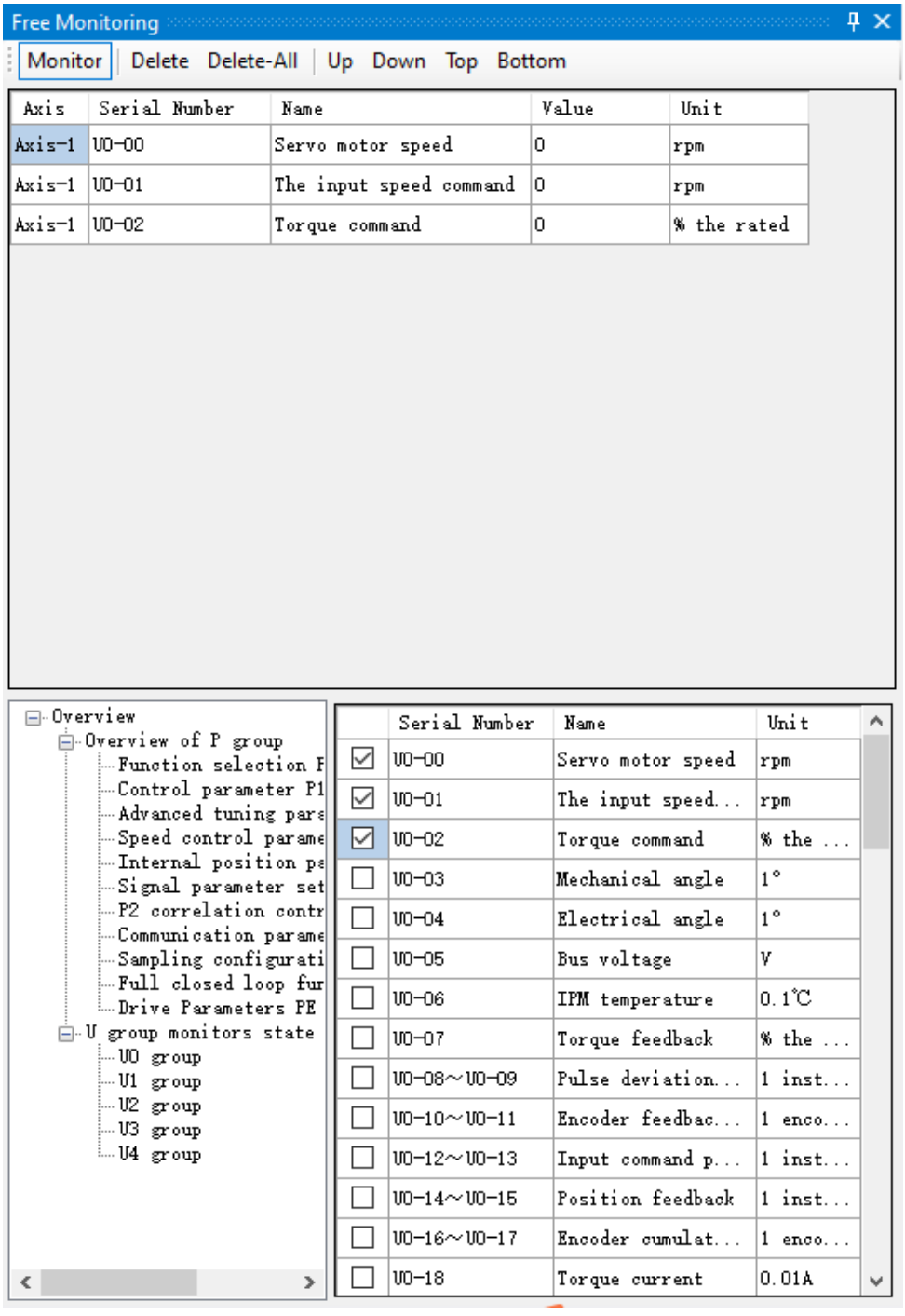
Area 6: display driver analog input signal information.

10 Free monitor

Click 【monitor】-【free monitor】, pop up the free monitor interface.

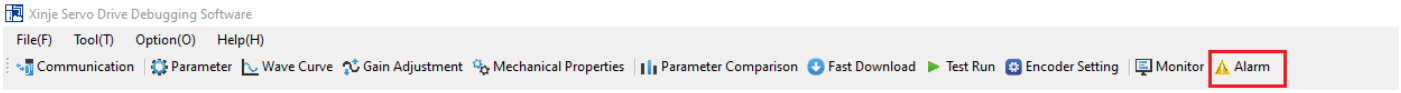
The user can monitor the selected group P parameters and group U parameters in real time.

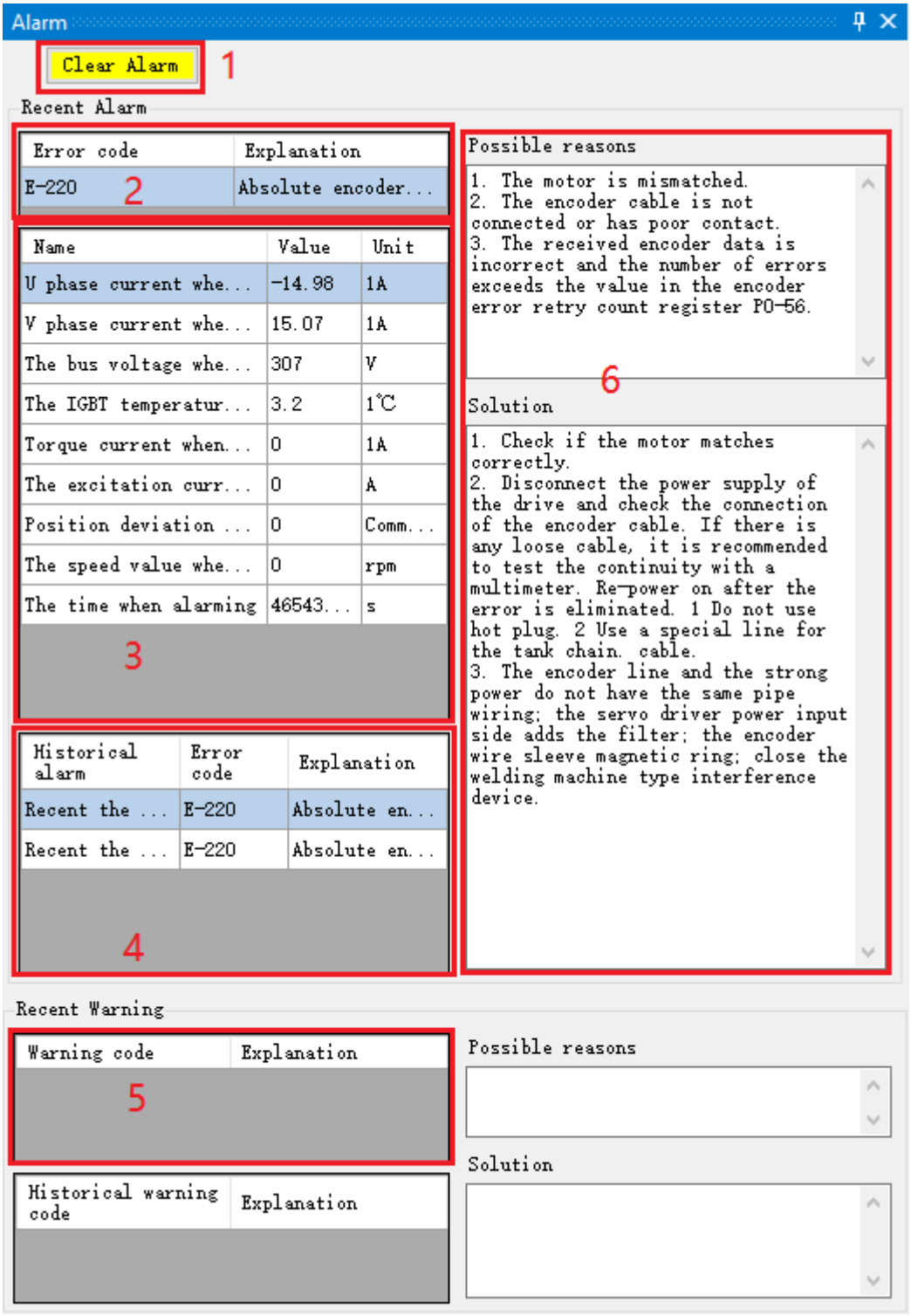




11 Alarm

Click 【alarm】, the alarm interface pops up. When the driver gives an alarm, the alarm flashes to prompt the user.





Area 1: Clear Alarm clear the current alarm, the servo returns to the state before the alarm, or clear the alarm on the

drive panel.

Area 2: display the error code and alarm description when the alarm occurs.

Area 3: display the servo / click information when the alarm occurs.

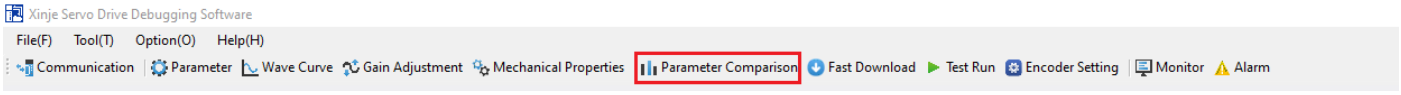
Area 4: display 5 alarm records except current alarm.

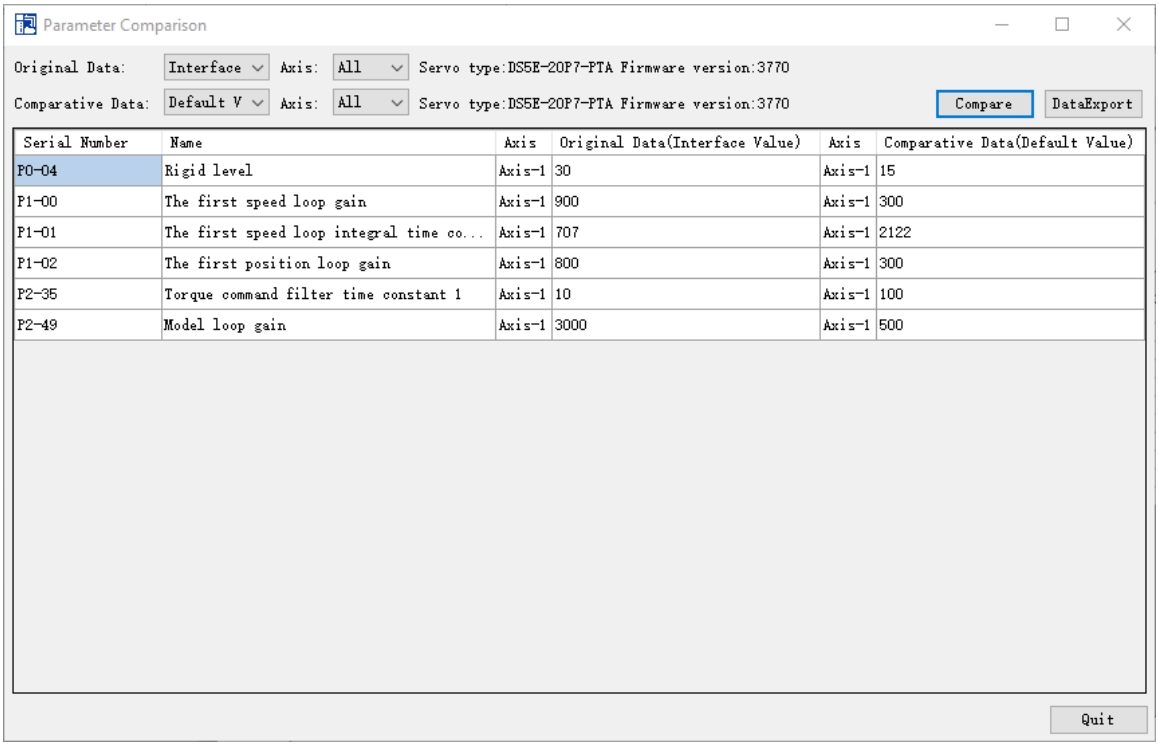
Area 5: display the warning code and warning description when the warning occurs.

Area 6: display the cause of the alarm / warning and the method to solve the alarm / warning.

12 Parameter comparison

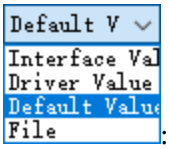
click【parameter comparison】to show the parameter comparison interface.





Original Data:

Comparative Data: : The comparison Party of the data selected by the user.



: The object selected by the user for comparison (interface value, drive value, default value, file).

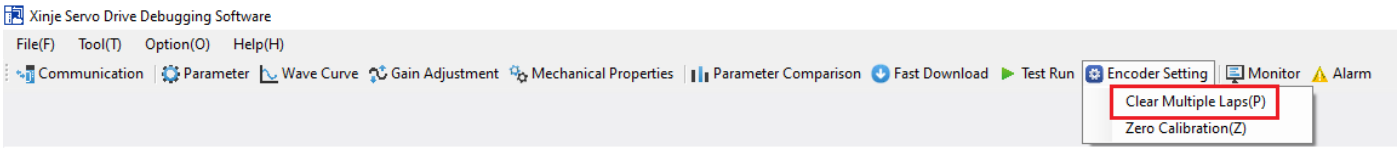
Compare : When both parties need to compare is selected, click Compare button to start the comparison. After the comparison is completed, the comparison results will be displayed in the comparison results display area.

DataExport : The data is saved in local, the format is .csv.

Quit : exit the parameter comparison interface.

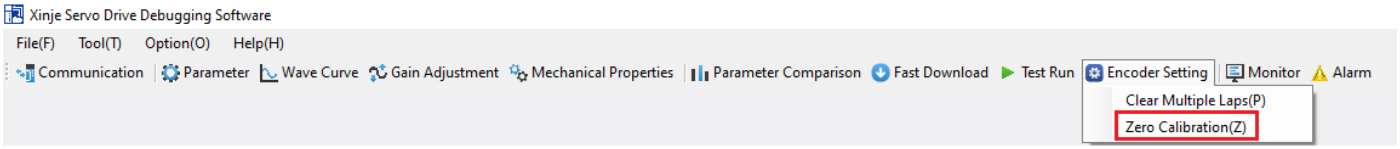
13 Encoder setting

13.1 Clear multi-turns



The encoder needs to clear the number of multi turns in the servo bb state. The current number of multi turns absolute value U0-91 will be set to zero, and the current position feedback U0-57 ~ U0-59 of the absolute value encoder will also change.

13.2 Zero point calibration



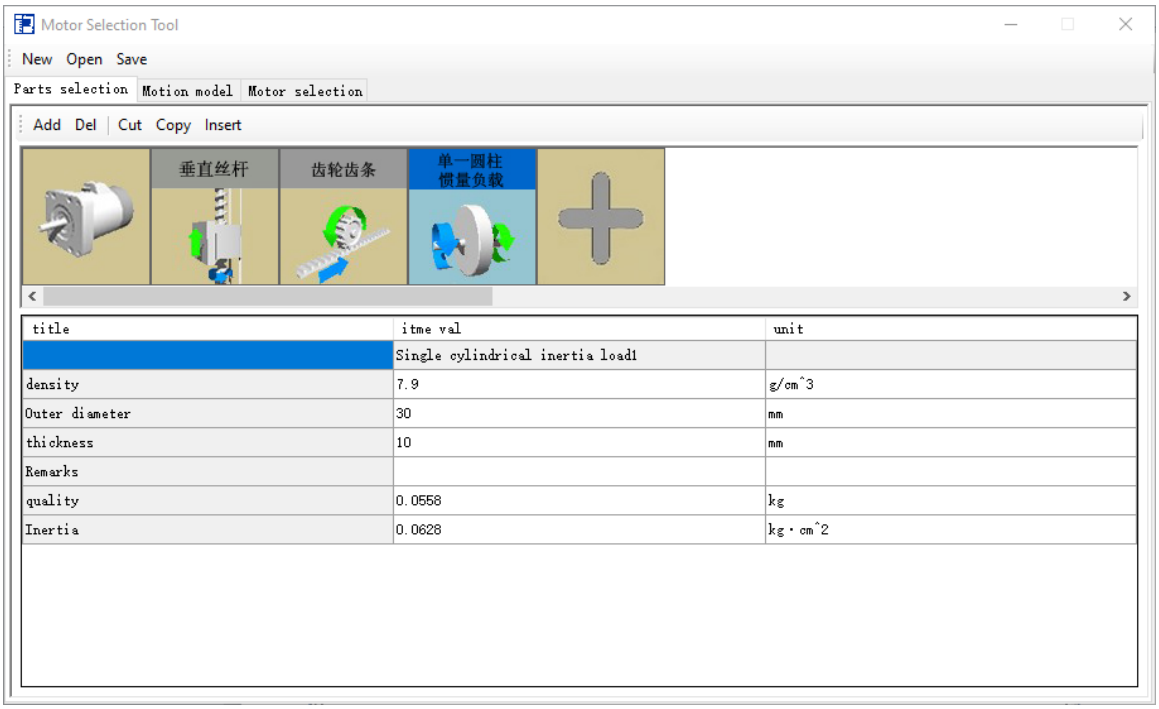
Zero point calibration, U0-94 ~ 97 is used to display the absolute position of the motor after calibration, and U0-94 ~ 97 will be set to zero after zero point calibration.

14 Motor selection tool

14.1 About motor selection tool

The motor selection tool consists of the following parts.
Component selection: input data of mechanism components and other components.
Motion model: input motion model
Motor selection: input search conditions to accurately determine the calculation results of all motors suitable for it.

14.2 Component selection



14.2.1 Component connection

click【add】or【+】to enter component selection interface. It can be connected to the former component after selection, up to 20 components can be connected. Starting from the parts connected to the shaft side of the motor, push it to the load side step by step.
1. Selection of component block diagram
Click【add】(Insert to the right side of the part with the cursor) or【+】(insert to the end of the parts) to enter component selection interface, double click the required part or select the part and click OK to add the part.
Note: since the motor shaft is a rotary output, the components connecting the motor shaft side must also be rotary input components.
(rotation - linear motion, rotation - rotation, rotating load)

2. Delete the component

Select the component and click【delete】to delete it. (If the deletion of this part makes the front and back parts unable to connect, it cannot be deleted).

3. Cut the component

Select the component and click【cut】to cut the component. (If cutting this part makes it impossible to connect the front and back parts, it cannot be cut).

4. Copy the component

Select the component and click【copy】to copy the component.

5. Insert the component

Inserts the cut and copied parts to the right of the selected part (If the front and back parts cannot be connected after inserting the part, it cannot be inserted).

14.2.2 Component specification input

Select the part that you want to input data, and its parameters will appear below the part. Items in the default data should be changed as necessary.

The unit of each item value can be changed. When the unit is changed after data input, the data will be changed.

14.2.3 About mechanism components

- **Rotation → linear motion (A component that converts a rotating input into a linear motion)**

  - Horizontal screw rod -- the mechanism that the screw rod rotates to drive the nut to move horizontally.
  - Vertical screw rod -- the mechanism that the screw rod rotates to drive the workpiece to move vertically.
  - Horizontal rotation of screw rod and nut -- the mechanism of screw rod horizontal movement driven by nut rotation.
  - Vertical rotation of screw rod and nut -- the mechanism that the screw rod moves vertically driven by the rotation of nut.
  - Horizontal conveyor belt -- a mechanism that drives the conveyor belt to move horizontally by rotating the driving pulley.
  - Vertical conveyor belt -- the mechanism that drives the vertical movement of the conveyor belt by the rotation of the driving pulley.
  - Horizontal rack and gear -- the mechanism that drives the rack to move horizontally by the rotation of the gear.
  - Vertical rack and gear - the mechanism that drives the vertical movement of the rack by the rotation of the gear.
  - Roller feeding -- the mechanism that drives the sheet workpiece by the rotation of the driving roller.
  - Running trolley -- the mechanism that the rotation of the axle drives the trolley to run.

- **Rotation → rotation (A component that converts a rotating input into a rotating output to convey power)**

  - Coupling -- it is mainly used for power transmission of rotating parts, and can also be used for hollow inertia load.
  - Reducer -- it is mainly used for reducer with input and output shaft, reducer and speed increasing mechanism, and can also be used for gear directly connected to motor alone.
  - Gear -- a gear mechanism composed of teeth.
  - Synchronous toothed belt--a mechanism that connects drive pulley and driven pulley by belt to convey power. Sprocket + chain can also be used.

- **Linear motion → rotation (it can be connected to a mechanism with power transmission components that can convert linear motion input into rotary output)**

  - Rack and gear -- the mechanism that makes the rack move in a straight direction and drives the gear to rotate. It can be used horizontally and vertically.

- Screw rod -- the mechanism that makes the nut move in a straight direction and drives the screw rod to rotate. It can be used horizontally and vertically.

➢ **Rotating load (load generated by rotating input, including inertia load, friction load and external force load)**

- Single cylinder inertia load - only inertia calculated from the shape of the workpiece is attached.
- Eccentric cylinder inertia load - only the inertia calculated by the shape and eccentricity of the workpiece is added.
- Multi-section cylinder inertia load - only the inertia calculated by the shape of the segment cylinder with up to three segments is attached.
- Prism inertia load - only inertia calculated from the shape of the workpiece is attached.
- Eccentric prism inertia load - only inertia calculated by shape and eccentricity of workpiece is added.
- Rotating external force component - the rotating output part in front of it, acting on the external force load with directionality, can be used for the motion model only attached to a certain range.
- Rotating friction part - butt joint the rotating output part in front and act on friction load without polarity (both directions of rotation can be acted on).
- Indexing table - the load that increases the number of workpieces and eccentricity to act on the rotating axis of the indexing table.
- Inertia direct input - attach known inertia values to the rotating output unit in front of it.

➢ **Linear motion load (load generated by linear motion input, including weight load, friction load and external force load)**

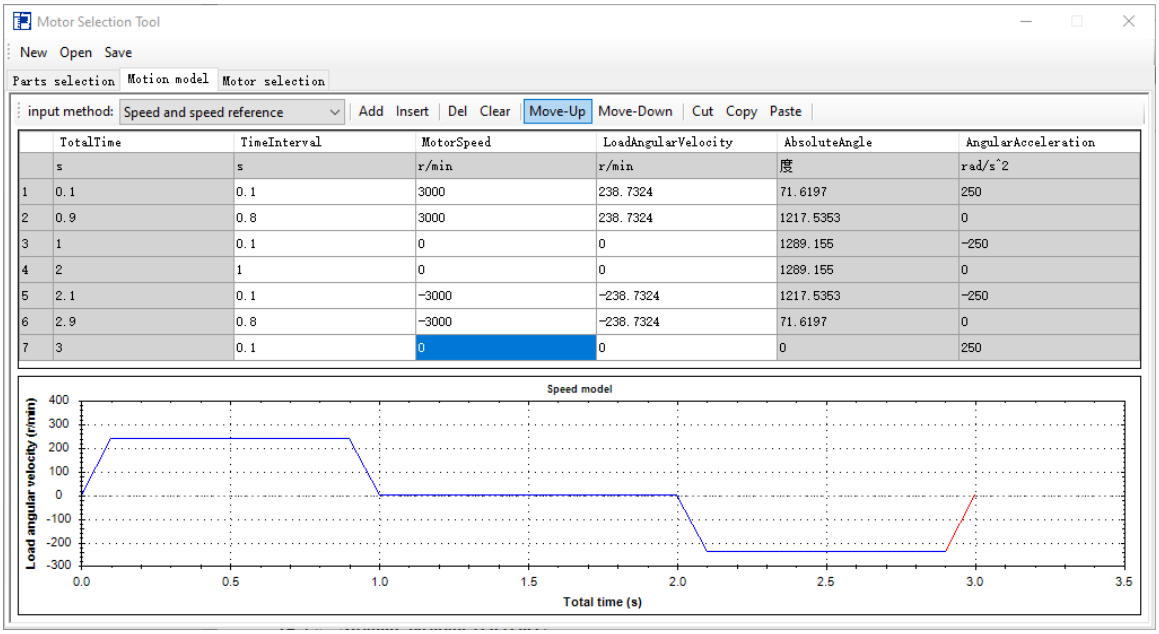
- Additional single linear motion - the weight of the workpiece is added to the part with linear output (e.g. horizontal screw rod). It can be used in both horizontal and vertical directions.
- Additional vertical linear motion with balancing device - on the part with vertical linear output (e.g. screw rod vertical), it is attached by the mass of the workpiece with balancing device mechanism.
- The linear motion external force component – connect the linear motion output component in the front and act with directional external force load. It can be used for the motion model which is only attached in a certain interval.
- Linear friction component – connect the output component of linear motion butted in front, acting with the friction load without polarity (both directions of rotation can act).

14.3 Motion model

There are two input modes in the motion model, speed-speed reference and absolute position reference. The motion model can enter up to 100 lines.

14.3.1 Speed-speed reference

Plan the line chart according to the input time interval, motor speed or load angular speed.
You can input a motion model with input and rotation number changing during the motion. The following example shows that the final load is a linear load.
The first line: after 0.1 second, the load speed is accelerated from 0 to 500mm/s.
The second line: the load is maintained at a speed of 500mm/s for 0.8 seconds.
The third line: after 0.1 second, the load speed decelerates to 0 mm/s.
The fourth line: the load is maintained at the speed of 0 mm/s for 1 s.
The fifth line: the fifth line begins to move backward in the same pattern to return to its original position.
The negative number of motor speed and load speed indicates the rotation direction and moving direction of the motor.

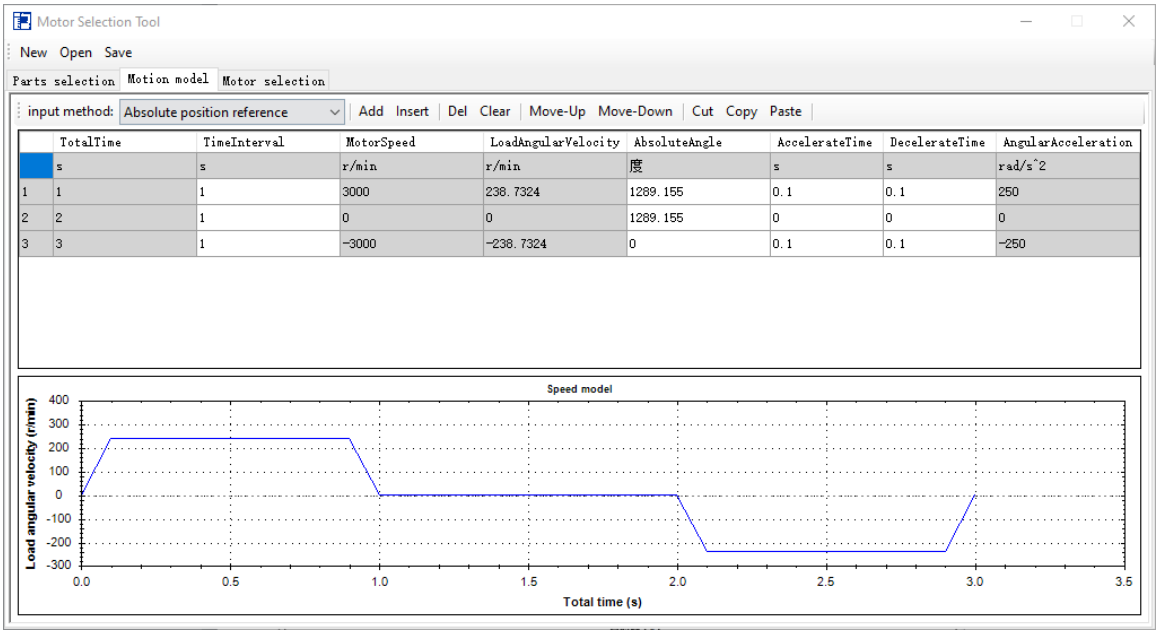


	TotalTime	TimeInterval	MotorSpeed	LoadAngularVelocity	AbsoluteAngle	AngularAcceleration
	s	s	r/min	r/min	度	rad/s^2
1	0.1	0.1	3000	238.7324	71.6197	250
2	0.9	0.8	3000	238.7324	1217.5353	0
3	1	0.1	0	0	1289.155	-250
4	2	1	0	0	1289.155	0
5	2.1	0.1	-3000	-238.7324	1217.5353	-250
6	2.9	0.8	-3000	-238.7324	71.6197	0
7	3	0.1	0	0	0	250

14.3.2 Absolute position reference

In the specified time interval, set the time interval, absolute position, acceleration time and deceleration time to make the specified trapezoidal or triangular driving model. It is not allowed to input the motion model with speed change during the motion. The following is an example of a linear load as the final load.

The first line: move to 450mm within 1s, with acceleration time of 0.1s and deceleration time of 0.1s.
The second line: stay at the absolute position 450 mm for 1 s.
The third line: move from 450 mm to 0 mm in absolute position within 1 s, in which the acceleration time is 0.1s and the deceleration time is 0.1s, indicating that the trapezoidal mode returns to its original position.



	TotalTime	TimeInterval	MotorSpeed	LoadAngularVelocity	AbsoluteAngle	AccelerateTime	DecelerateTime	AngularAcceleration
	s	s	r/min	r/min	度	s	s	rad/s^2
1	1	1	3000	238.7324	1289.155	0.1	0.1	250
2	2	1	0	0	1289.155	0	0	0
3	3	1	-3000	-238.7324	0	0.1	0.1	-250

14.3.3 Motion model edit

1. Data input and change
Data input and change can only be edited for white cells, and gray cells can only be displayed and cannot be edited.
Select edit object cells with the mouse or cursor and enter directly from the keyboard.

2. Unit change
When you enter a unit other than the default setting, you can change the unit individually.
Use the mouse or cursor to select the unit you want to change. Double click to pop up the drop-down menu and select the unit you want to change.

3. Add, insert, delete and empty lines
To add a blank line, insert a blank line at the bottom. You must input data after adding a blank line.
Line insertion, that is, the blank line is inserted above the line where the cursor is located.
To delete a line is to delete the line where the cursor is located.
Empty lines, the data in the speed reference and absolute position reference are all cleared.

4. Line move up and down
Line up, that is, move up one line the cursor located line, the curve will also change.
Line down, that is, move down one line the cursor located line, and the curve will also change.

5. Cutting, copying and pasting of lines
To cut and paste a line, select the object line and cut it. At this time, you can paste the cut object above the selected line.
To copy and paste a line, select the object line and copy it. At this time, you can paste the copied object above the selected line.

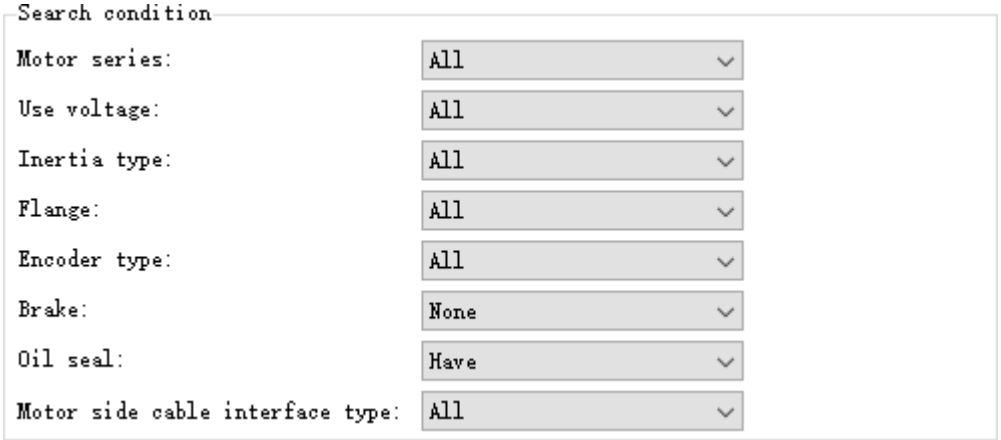
Note: if there are blank lines in the motion model, the velocity chart cannot be drawn correctly. When inserting blank lines, be sure to enter data.

14.4 Motor selection

After the input of the motion model is completed, click the motor selection to move to the motor selection interface.

14.4.1 Set the search conditions

Motor series: select motor series, MS, MS5, MS6.
Voltage: 220V or 380V.
Inertia type: MS series motors are not divided into inertia type, MS5 and MS6 series motors are divided into low inertia, medium inertia and high inertia.
Flange: motor flange selection.
Encoder type: select the motor encoder type.
Brake: select whether the motor holding brake is available or not.
Oil seal: select whether there is oil seal for motor.
Motor side cable interface type: MS5 series motor has S01 and S02 cable interface types.



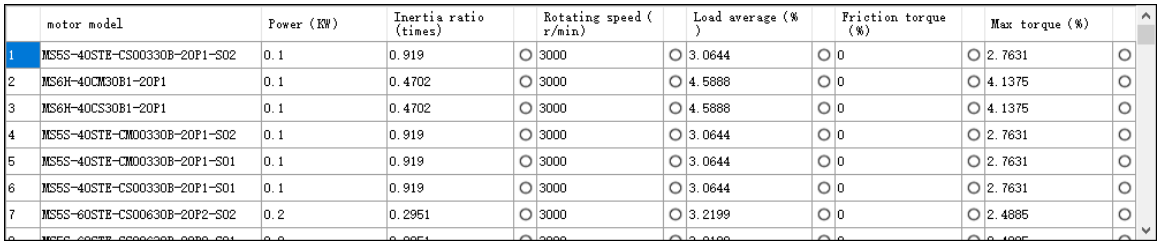
14.4.2 Indication level setting

If any value of each judgment item exceeds the set item value, the motor model will not be indicated.

Indication level setting

title		Item value
Inertia (times)	≤	30
Maximum speed (r/min)	≤	6000
Average load (%)	≤	100
Friction torque (%)	≤	100
Maximum torque (%)	≤	100

14.4.3 List of calculation results



	motor model	Power (KW)	Inertia ratio (times)	Rotating speed (r/min)	Load average (%)	Friction torque (%)	Max torque (%)
1	MS5S-40STE-CS00330B-20P1-S02	0.1	0.919	3000	3.0644	0	2.7631
2	MS6H-40CM30B1-20P1	0.1	0.4702	3000	4.5888	0	4.1375
3	MS6H-40CS30B1-20P1	0.1	0.4702	3000	4.5888	0	4.1375
4	MS5S-40STE-CM00330B-20P1-S02	0.1	0.919	3000	3.0644	0	2.7631
5	MS5S-40STE-CM00330B-20P1-S01	0.1	0.919	3000	3.0644	0	2.7631
6	MS5S-40STE-CS00330B-20P1-S01	0.1	0.919	3000	3.0644	0	2.7631
7	MS5S-60STE-CS00630B-20P2-S02	0.2	0.2951	3000	3.2199	0	2.4885

Motor model: display the motor model after judgment.

Power (KW): refers to the rated output power of the motor.

Inertia ratio (times): the ratio of load inertia and rotor inertia of motor shaft. If the judgment benchmark exceeds the recommended inertia ratio in the product catalog, it shall be expressed by△.

Speed (r/min): the maximum speed of motor on the motion model is expressed in r/min（ O below rated speed, exceeding rated speed but below maximum speed is △ and the maximum speed exceeding allowable is×.)

Average load (%): the ratio of the average load torque and rated torque at run time is expressed in %. O is below 80% of judgement reference, and △ for more than 80% and less than 100%, over 100% is×.

Friction torque (%): the ratio of friction torque and rated torque is expressed in %. O is below 80% of judgement reference, and △ for more than 80% and less than 100%, over 100% is×.

Maximum torque (%): the ratio of the maximum torque and the allowable maximum torque is expressed in %. O is below 80% of judgement reference, and △ for more than 80% and less than 100%, over 100% is×.

14.4.4 Details of the results

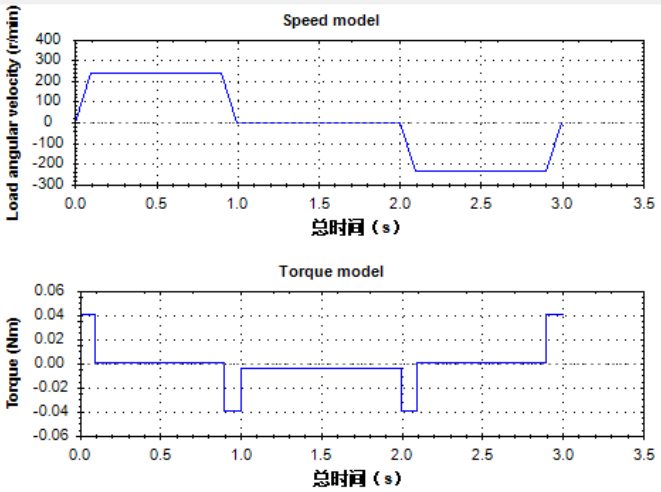
Double click the motor model name to open the motor details dialog box. Please confirm the contents according to the motor details.

Motor details

Specification details

title	specification
Motor model	MS6H-40CM30B1-20P1
Power (KW)	0.1
Voltage (V)	220V
Encoder	Multi-turn 17-bi...
Inertia type	High inertia
Brake	None
Oil seal	Have
Motor-side cable interface type	安谱插头
Rated speed (RPM)	3000
Maximum speed (RPM)	6500
Rated torque (Nm)	0.32
Torque(Nm)	0.96
Rated current (mA)	850
Maximum current (mA)	2550

Motion model



Judgment details

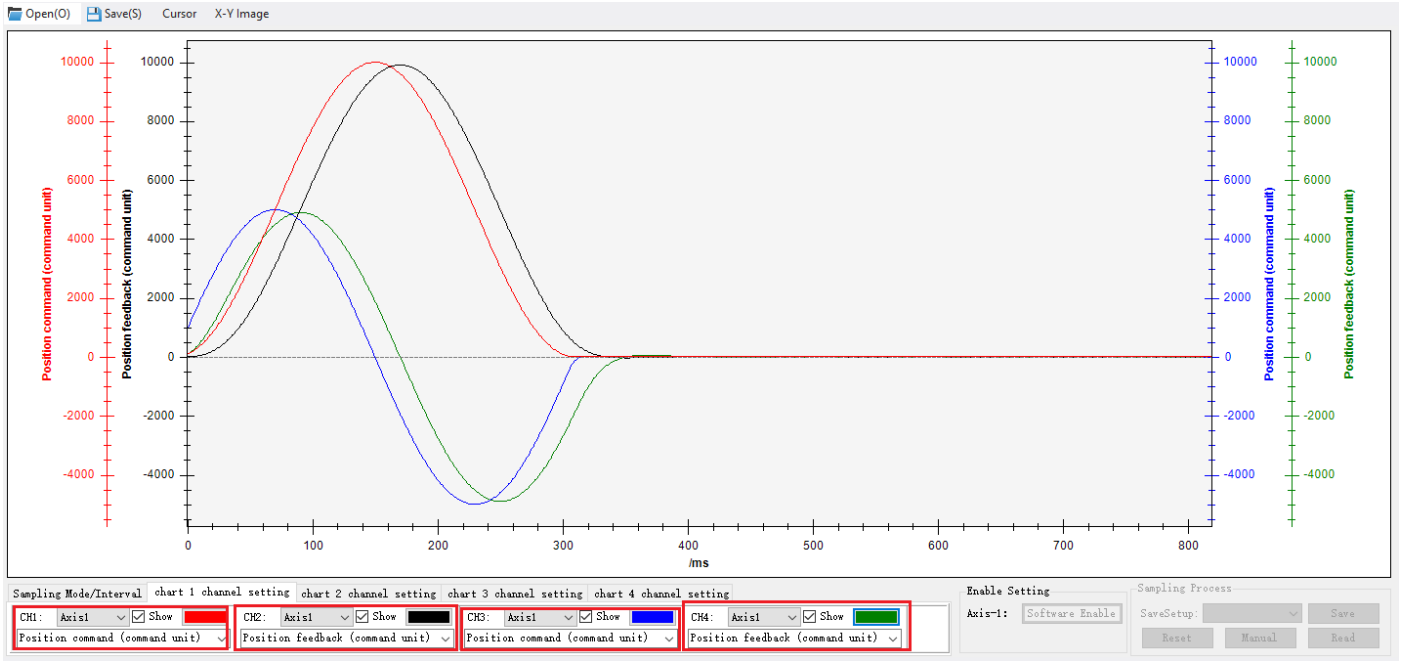
Name	Rated	Calculation results	Judgment criteria	%(times)	critical result
Rotor inertia ratio	0.086kg/cm^2	0.0404kg/cm^2	30Times	0.4702Times	○
Rotating speed	3000r/min	3000r/min	3000r/min	100%	○
Load average	0.32Nm	0.0147Nm	80%	4.5888%	○
Friction torque	0.32Nm	0Nm	80%	0%	○
Torque	0.96Nm	0.0397Nm	80%	4.1375%	○
Stop holding torque	0.32Nm	0Nm	80%	0%	○

15 Application of DM5F series in upper computer

15.1 X-Y image

After the upper computer is connected with DM5F series driver, X-Y image function is added in curve acquisition. Taking circular interpolation as an example, the X-Y image function is introduced.

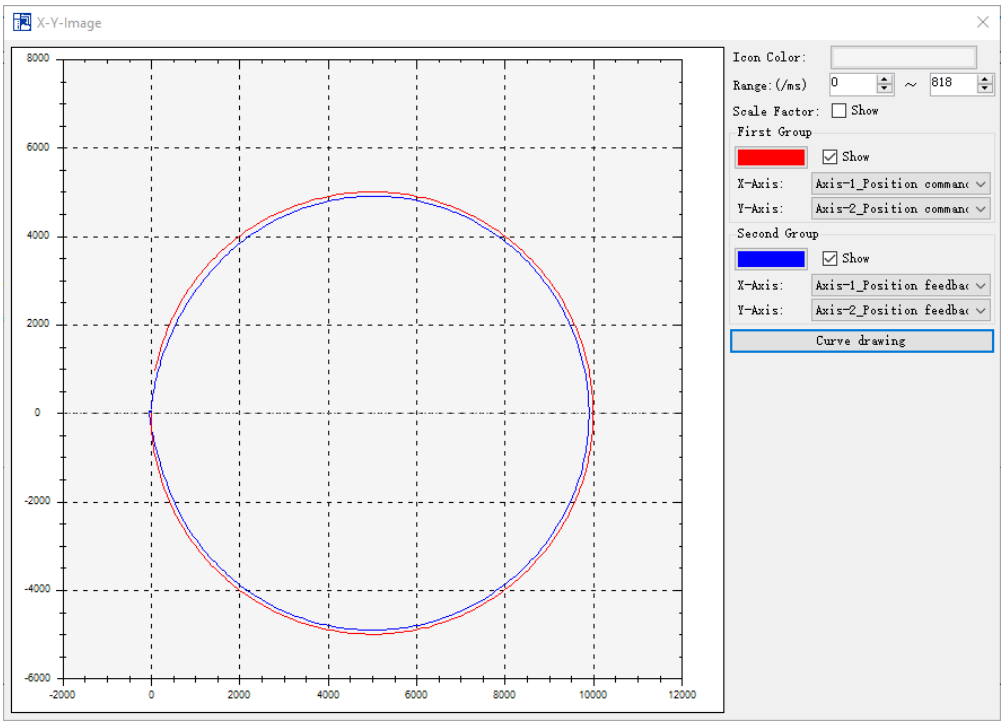
1. PLC programming, using circular interpolation instruction to plan a circle, trigger sampling (can be triggered by motion, sampling ratio is 90), run the program, and then read the data, read the position instruction and position feedback of axis 1 and axis 2, as shown in the figure below.



2. click X-Y image

The x-axis and Y-axis of the first group select axis 1 position command and axis 2 position command respectively.

The x-axis and Y-axis of the second group select axis 1 position feedback and axis 2 position feedback respectively. After the curve is drawn, the fitted circle will be displayed.



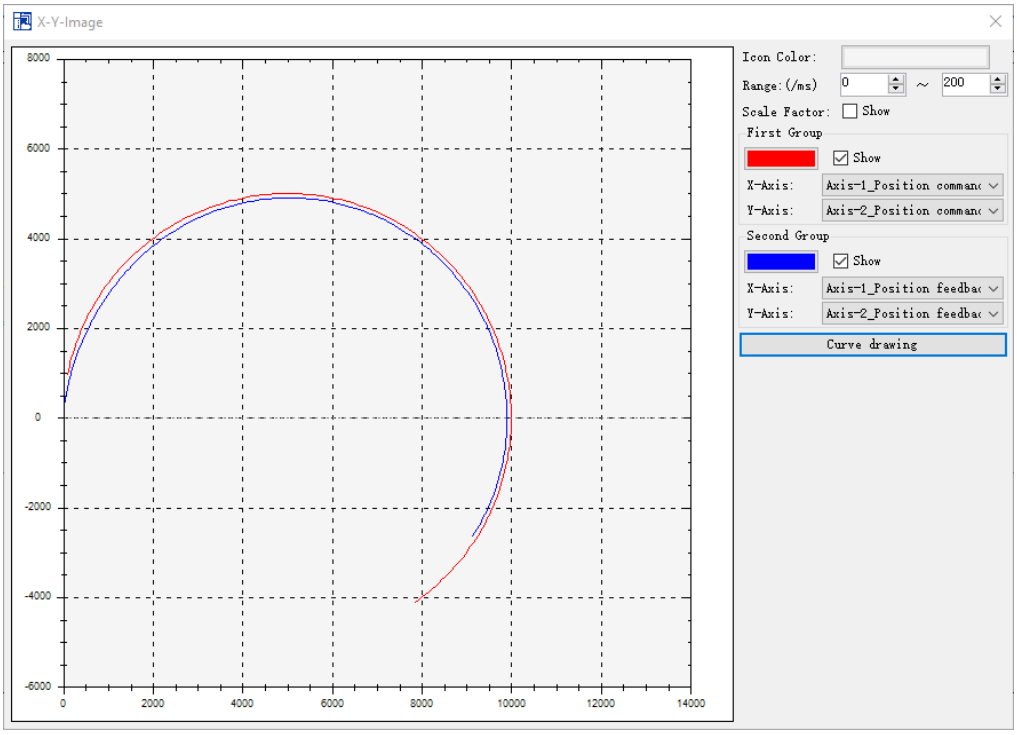
3. Curve analysis

The maximum range here is related to the sampling frequency and the number of sampling periods.

Change the maximum value to 200, and click the curve drawing, as shown in the figure below.

Curve before adjustment

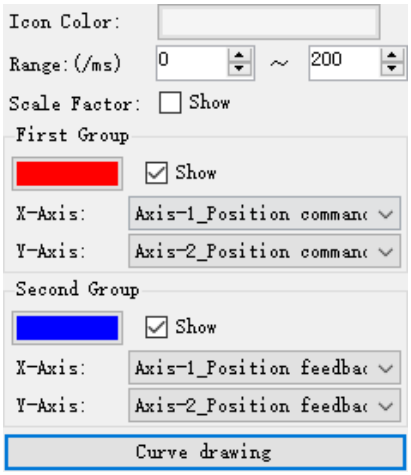
It can be seen here that when the starting point is 0 and rotates clockwise, the response time of the two axes has obvious deviation, and the servo rigidity needs to be adjusted.



4. Proportion factor

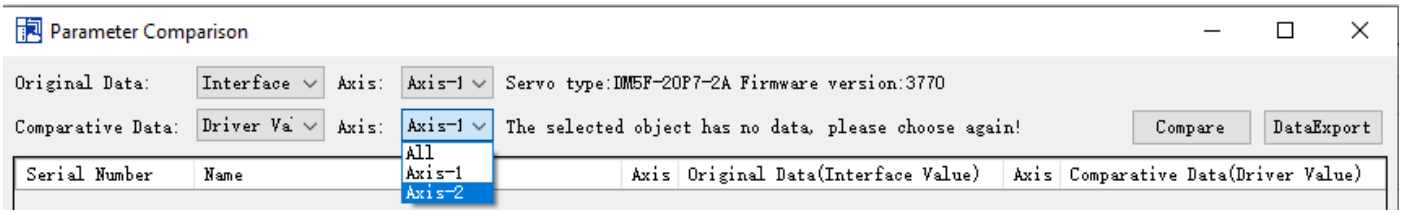
Click the proportion factor check box to adjust the proportion factor value.

The user can adjust the proportion factor according to the mechanical structure and pulse unit, and the default is 1:1.

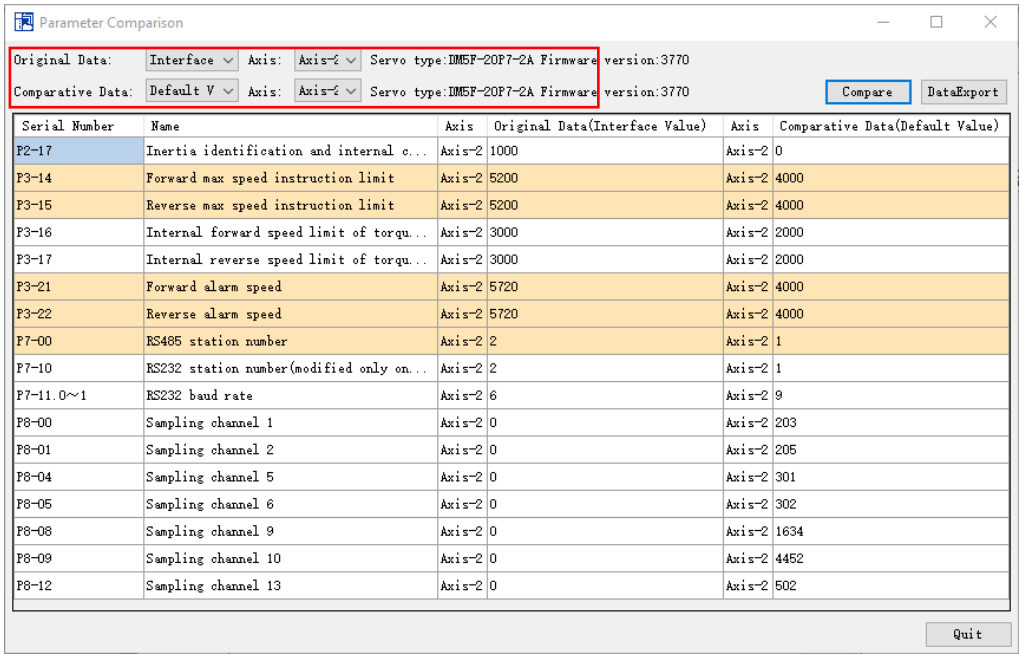


15.2 Parameter comparison

DM5F series driver parameter comparison is slightly different, you can choose axis 1 or axis 2.



For example, compare the drive value of axis 2 with the preset value of axis 2, as shown in the figure below.



Serial Number	Name	Axis	Original Data(Interface Value)	Axis	Comparative Data(Default Value)
P2-17	Inertia identification and internal c...	Axis-2	1000	Axis-2	0
P3-14	Forward max speed instruction limit	Axis-2	5200	Axis-2	4000
P3-15	Reverse max speed instruction limit	Axis-2	5200	Axis-2	4000
P3-16	Internal forward speed limit of torqu...	Axis-2	3000	Axis-2	2000
P3-17	Internal reverse speed limit of torqu...	Axis-2	3000	Axis-2	2000
P3-21	Forward alarm speed	Axis-2	5720	Axis-2	4000
P3-22	Reverse alarm speed	Axis-2	5720	Axis-2	4000
P7-00	RS485 station number	Axis-2	2	Axis-2	1
P7-10	RS232 station number(modified only on...	Axis-2	2	Axis-2	1
P7-11.0~1	RS232 baud rate	Axis-2	6	Axis-2	9
P8-00	Sampling channel 1	Axis-2	0	Axis-2	203
P8-01	Sampling channel 2	Axis-2	0	Axis-2	205
P8-04	Sampling channel 5	Axis-2	0	Axis-2	301
P8-05	Sampling channel 6	Axis-2	0	Axis-2	302
P8-08	Sampling channel 9	Axis-2	0	Axis-2	1634
P8-09	Sampling channel 10	Axis-2	0	Axis-2	4452
P8-12	Sampling channel 13	Axis-2	0	Axis-2	502