

***iMotion* Software**

Operational Manual

3rd Edition

Weihong Electronic Technology Co., Ltd.

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Preface

About This manual

iMotion software needs to be run in Windows operating system, and communication between the computer and WSDV series driver is required, which is realized by USB cable.

With *iMotion* software, driver parameter setting, monitoring control as well as trial running and the like, can be accessed. Please refer to the operational manual and be careful in use.

With four chapters, this manual can be divided into four parts, as follows:

- 1) Part 1: preface, briefly introducing this manual and *iMotion* software.
- 2) Part 2: introduction to software installation and startup. Refer to chapter 1 for installing environment requirements, operations, uninstalling as well as software startup.
- 3) Part 3: introduction to each function, see chapter 2 to 10. Detailed description about each function and corresponding windows, operation steps are introduced in this part.
- 4) Part 4: appendix. See chapter 11. You can get the software license agreement.

Applicable Product Model

This manual is applicable to WSDV series WISE servo driver. Refer to the table below for details.

Product Model	Remarks
WISE Servo Driver	Abbreviated as WISE. Without further explanation, the driver in this manual refers to WISE servo driver. At present, there are six models: WSDV-1R2 (100W), WSDV-2R8 (400W), WSDV-5R0 (750W), WSDV-6R8 (1.0kW), WSDV-110 (1.5kW) and WSDV-140 (2.5kW).

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Revision History

You can refer to the following table for the revision records of each edition.

Date	Edition	Revision
2017.04	R3	<p>Main revisions in this edition are:</p> <ol style="list-style-type: none">1) Analog input adjustment added (see Section 1.3, Chapter 2 and Section 10.2).2) Speed pulse compensation function in waveform window added (see Section 4.2 and Section 4.2.1).3) Operation related with waveform acquisition updated (see Section 4.2).4) Operation related with gain tuning and vibration resistance updated (see Section 5.1 and Section 5.2).5) Description of relevant parameter window added (see Section 5.3).6) Operation related with trial run updated (see Chapter 6).
2016.11	R2	<p>Main revisions in this edition are:</p> <ol style="list-style-type: none">1) Info about WSDV-1R2 (0.1kW) and WSDV-140 (2.5kW) added.2) Software uninstallation and startup in Section 1.2 and 1.3 updated.3) Parameter loading method and editing in Chapter 3 updated.4) Introduction to waveform window and waveform acquisition in Chapter 4 updated.5) Operation related with gain tuning in Chapter 5 updated.6) Operation related with trial run in Section 6.2 updated.7) Pin definition setting in Chapter 8 updated.8) Axis setting in case of bus-type servo driver in Chapter 9 updated.9) Hardware updating operation in Section 10.2 updated.10) Introduction to driver registration window in Section 10.4 updated.
2016.04	R1	Released for the first time.

Precautions

Precautions can be divided into caution and warning according to the degree of possible loss or injury in case of negligence or omission of precautions stipulated in this manual.



: general info, mainly for informing, such as supplementary instructions and conditions to enable a function. In case of negligence or omission of this kind of precautions, you may not activate a function. Note that in some circumstances, negligence or omission of this kind of precautions could cause physical injury or machine damage.



: warning info requiring special attention. In case of negligence or omission of this kind of precautions, you may suffer physical injury, or even death, machine damage or other losses.

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1 Software Installation and Startup

1.1 Software Installation

iMotion software is used together with WSDV series servo driver produced by WEIHONG, and it is not applicable to the drivers of other brands, for your information.

1.1.1 Installation Environment Requirements

Please firstly make sure that your computer meets the following requirements before installing the software. Incorrect environment may lead to abnormal installation or usage of the software. Additionally, you should note that the software cannot be applied to several displays.

Specifications	
OS	Windows XP SP3 Chinese Version (32bit)
CPU	Pentium 41.0GHz or above
Memory	512M or above
Hardware	512M or above
Communication Interface	USB2.0
Display	
Resolution	1024*768 or above
Color Quality	24bpp (True Color) or above
Environment for the Software	
Installing Environment	Windows Installer 3.1 or above
Running Environment	.Net Framework 4.0 or above

1.1.2 Installation of *iMotion*

1. Double click on application “Setup.exe” to start installation. (Before executing this operation, please make sure the environment installation package has been installed.)

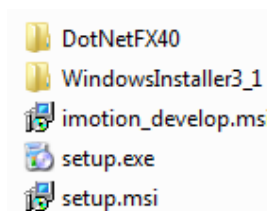


Fig. 1-1 Installation package

2. The application depends on *Microsoft .Net Framework 4.0*. Therefore, if *Microsoft .Net Framework*

4.0 has not been installed in the computer, it will be installed before software installation starts. Please follow tips to properly install it. While if *Microsoft .Net Framework 4.0* has already been installed before, it begins from the next step.

3. After *Microsoft .Net Framework 4.0* has been well installed, click “Next” to start the installation of *iMotion* software.

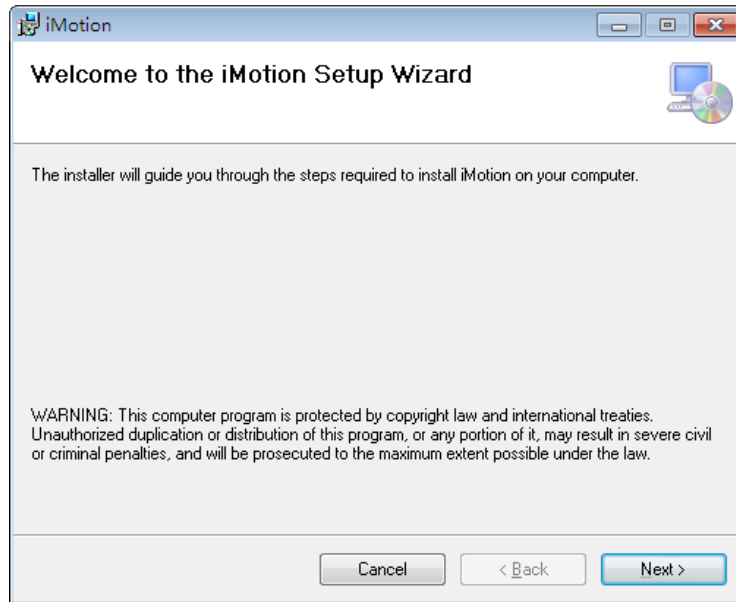


Fig. 1-2 *iMotion* setup wizard

4. Specify the path, and click “Next” to continue.

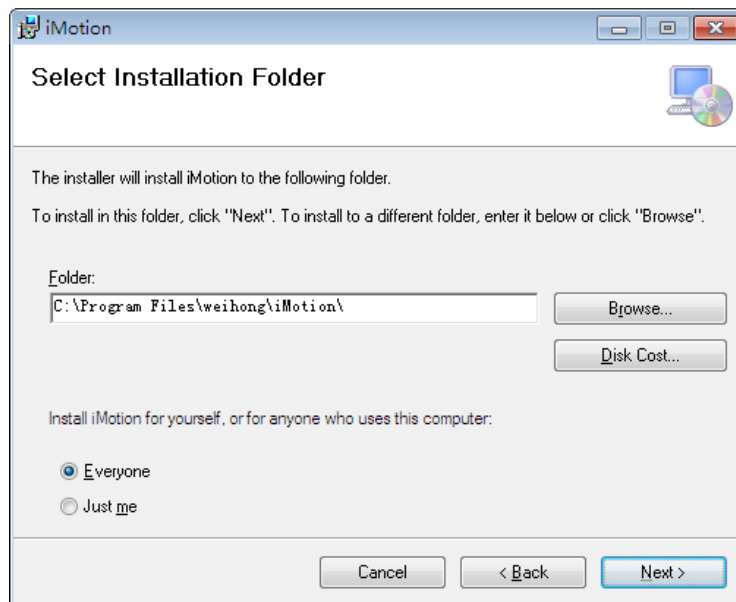


Fig. 1-3 Specify the path

5. A confirmation dialog box will appear. Click “Next” to continue, see Fig. 1-4.

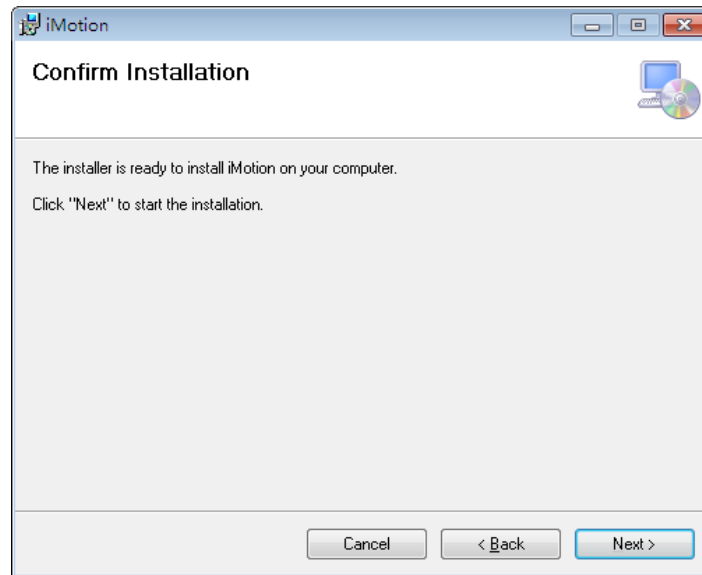


Fig. 1-4 Installation confirmation

6. During installing progress, compatible driver which is used for communication between PC and the servo driver is required to be installed. Click “Install” to start installation of the driver application.

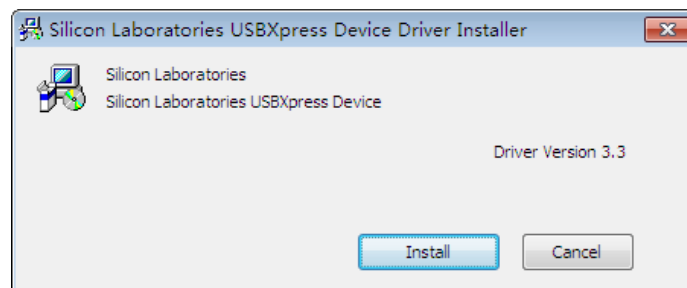


Fig. 1-5 Installation of compatible driver

7. As shown in Fig. 1-6, click “Close” to complete the installation of *iMotion* software.

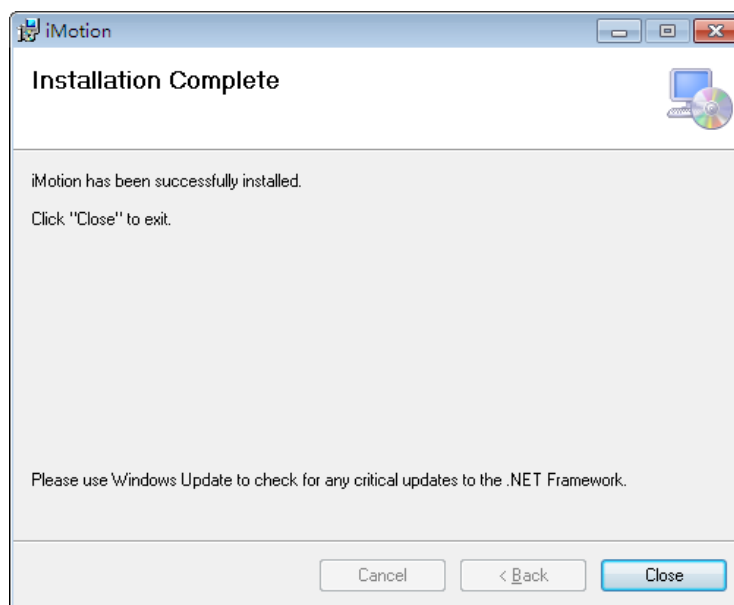


Fig. 1-6 Installation complete

1.2 Uninstallation of *iMotion*

[Operation]

On the desktop, click on “Start” → “All” → “iMotion” → “Uninstall.exe”, and click “Yes” on the dialog box popping up to uninstall the software.

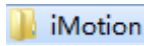

1.3 Startup of *iMotion*

[Operation]

Here are two methods to start the software:



1. Double click the icon  on desktop.

2. Click “Start” → “All” →  iMotion → .

[Communication setting]

After the software starts, communication setting with the driver is required, see Fig. 1-7.

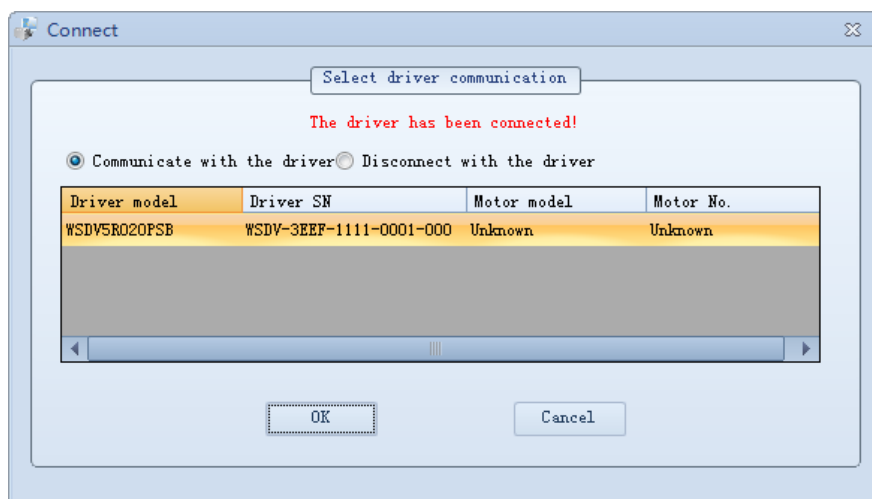


Fig. 1-7 Communication setting dialog box

If the driver is disconnected or “Disconnect with the driver” is chosen, only few functions such as parameter viewing, loading waveform and help context can be accessed on PC. Other functions are disabled. See in Fig. 1-8.



Fig. 1-8 Function preview (disconnected to the driver)

If the driver is connected and “Communicate with the driver” is chosen, all software functions can be used normally. See in Fig. 1-9.



Fig. 1-9 Function preview (connected to the driver)



1. “Axis setting” is exclusive to bus type driver. It can be used only when bus-type driver is connected.
2. “Analog input adjustment” function under “Other” menu is exclusive to analog • pulse type driver. It can be used only when analog • pulse type driver is connected.

2 Monitor

[Function]

In monitoring window, the user can obtain and check information such as running state of the driver or the motor, I/O signals, internal status, etc. See Fig. 2-1 for the window.

[Window introduction]

Click “Monitor Operation” to open the monitor window. For M-II bus type driver, here is no “Analog input monitor”. See Fig. 2-1.

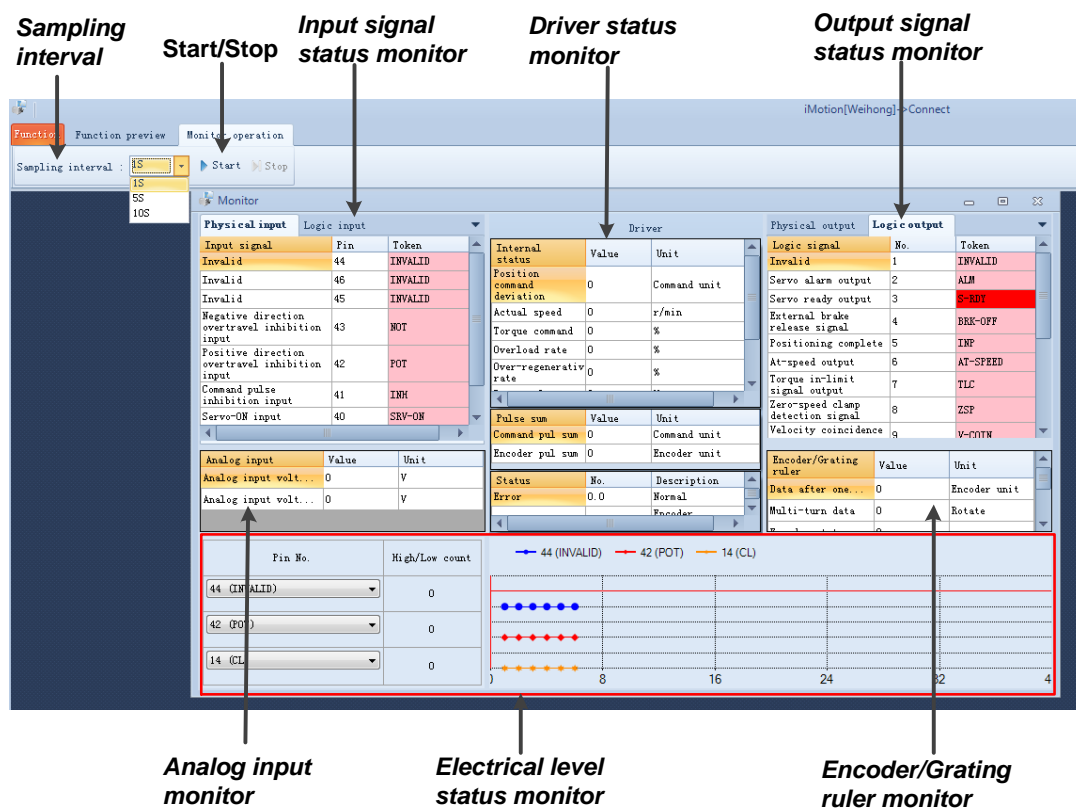


Fig. 2-1 Monitor window (in case of analog • pulse type driver)

- **Sampling interval**

It is used to set time period for data refreshing and sampling interval for signal status monitor.

- **Start/Stop**

It is used to start or stop sampling or refreshing.

- **Electrical level monitor**

1. Click “Stop” and select the input or output signal to be monitored under “Pin No.”
2. Set sampling interval, and click “Start”. After sampling starts, electrical level changes of signals will be displayed on the right.

● Input signal status monitor

Physical input

Send status of the input signal to the driver.

Physical input	Logic input	
Input signal	Pin	Token
General-purpose input	13	GP
Positive direction overtravel inhibition input	7	POT
Negative direction overtravel inhibition input	8	NOT
Homing deceleration limit switch	9	DEC
External latch signal input 1	10	EXT1
External latch signal input 2	11	EXT2
External latch signal input 3	12	EXT3

Red background: connects to COM
Pink background: represents Open

Logic input

It represents internal signal status of the driver.

Physical input	Logic input	
Logic signal	No.	Token
Invalid	1	INVALID
Positive direction overtravel inhibition input	2	POT
Negative direction overtravel inhibition input	3	NOT
Servo-ON input	4	SERV-ON
Alarm clear	5	A-CLR
Control mode switching input	6	C-MODE
Gain switching input	7	GAIN
Deviation counter clear input	8	CL
Command pulse inhibition input	9	INH
Torque in-limit switching input	10	TL-SEL
Anti-vibration control switching input 1	11	VS-SEL1

Pink background: represents Inactive
Red background: represents Active

● Output signal status monitor

Red background: the output transistor is ON

Pink background: the output transistor is OFF

Physical output:

Signals fed out from the driver.

Physical output	Logic output	
Output signal	Pin	Token
Servo alarm output	3/4	ALM
External brake release signal	1/2	BRK-OFF
Positioning complete	23/24	INF
Zero-speed detection signal	25/26	ZSP

Force output

Force output:

With this clicked, displaying of the front panel of the driver will be fixed to the current output signal status.

Logic output:

Status of the driver internal signal.

Physical output	Logic output	
Logic signal	No.	Token
Invalid	1	INVALID
Servo alarm output	2	ALM
Servo ready output	3	S-RDY
External brake release signal	4	BRK-OFF
Positioning complete	5	INF
At-speed output	6	AT-SPEED
Torque in-limit signal output	7	TLC
Zero-speed clamp detection signal	8	ZSP
Velocity coincidence	9	V-COIN

Note:

Checked item represents the signal which needs to be forced fed out.

Physical output		Logic output	
Force	Output signal	Pin	Token
<input type="checkbox"/>	Servo alarm output	3/4	ALM
<input type="checkbox"/>	External brake release signal	1/2	BRK-OFF
<input type="checkbox"/>	Positioning complete	23/24	INF
<input type="checkbox"/>	Zero-speed detection signal	25/26	ZSP

Force cancelled

Force cancelled:

Click the button or restart the driver to exit the monitoring state.

Red background: represent Active

Pink background: represents Inactive

● Driver status monitor

Position command deviation: It refers to the positional deviation of specified position and feedback position (command unit).

Actual speed: It refers to actual speed of the motor.

Torque command: It refers to the currently active torque command.

Overload rate: It refers to actual overload factor of the motor (the value must NOT exceed 100% when adjusting the motor).

Over-regenerative rate: It refers to the level rate when over-regenerative protection alarm occurs. Note that at this time, over-regenerative rate shown on the monitor is not equal to the regenerative energy.

Power voltage: It refers to the voltage across P-N of the driver.

Encoder position deviation: It refers to the positional deviation of specified position and feedback position (encoder unit).

It shows the sum of command pulse received by the encoder and the encoder pulse sum.

Driver		
Internal status	Value	Unit
Position command deviation	0	Command unit
Actual speed	0	r/min
Torque command	0	%
Overload rate	0	%
Over-regenerative rate	0	%
Power voltage	312	V
Pulse sum	Value	Unit
Command pul sum	0	Command unit
Encoder pul sum	0	Encoder unit
Status	No.	Description
Error	21.0	Encoder communication disconnect error protection

It shows error or alarm information of the encoder.

● Analog input monitor

Show the real-time changing of analog input voltage.

Analog input	Value	Unit
Analog input volt...	-12	V
Analog input volt...	-12	V



1. Because the driver communicates with PC via a USB cable, there may be slightly difference or delay between the displaying value on the window and that on the front panel.
2. The monitor doesn't a measuring unit. Therefore, displaying value on the monitor window only serves as estimation reference.

3 Parameter

3.1 Parameter Loading

[Operation]

1. Click “Parameter” to open a dialog box, as shown in Fig. 3-1.
2. Select the way to load parameters.
3. Click “OK” to open the parameter editing dialog box, as shown in Fig. 3-2.

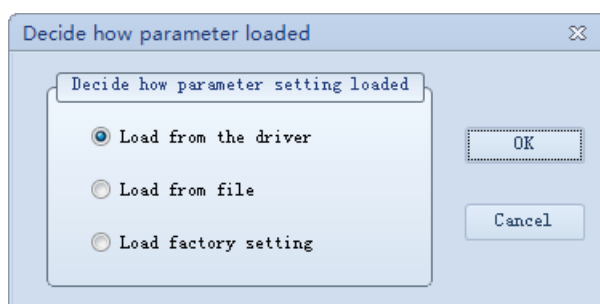


Fig. 3-1 Parameter loading method

[Parameter loading method]

- | | |
|----------------------|--|
| Load from the driver | It refers to reading driver parameters. With this method selected, modifications or changes to parameters will be passed to the driver. |
| Load from file | It refers to loading parameter settings in file. With this method selected, once command “Send to the driver” is not executed, modifications or changes to parameters will not be passed to the driver. |
| Load factory setting | <p>If the driver has not been connected, it loads standard driver parameter settings when the software is installed; while if the driver has been connected, it loads parameter settings in initialization area.</p> <p>With this method selected, once command “Send to the driver” is not executed, modifications or changes will not be passed to the driver.</p> |



1. Driver parameter saved in initialization area refers to the parameter settings after “Restore to factory setting” is executed. For different drivers, some parameter setting may be varied. Please refer to users’ manuals of WISE servo driver for details.
2. If the driver software version is too low, when “Load factory setting” is checked, parameter setting in initialization area cannot be loaded; instead, standard factory setting will be loaded when *iMotion* software is installed.

3.2 Parameter Window

Display parameter loading method, the current driver software version and hardware version. If parameter is loaded from file, it will display the file memory address, the software version and hardware version when the file is stored. “D” represents software version and “F” represents hardware version.

Parameter setting: click value box and input the target value then press “Enter” to complete the modification or press “Esc” to cancel.

Parameter attribute: the parameter background represents different parameter attribute.

Parameter description: display the detailed information of selected parameter.

Class	No.	Name	Range	Value	Unit
0	0	Rotational direction setup	0 ~ 1	1	
0	1	Control mode setup	0 ~ 3	1	
0	2	Real-time auto-gain tuning setup	0 ~ 6	0	
0	3	Selection of machine stiffness at re...	0 ~ 31	13	
0	4	Inertia ratio	0 ~ 10000	250	%
0	6	Command pulse rotational direction s...	0 ~ 1	0	
0	7	Command pulse input mode setup	0 ~ 3	3	
0	8	Command pulse counts per one motor r...	0 ~ 8388608	10000	Pulse after ...
0	9	1st numerator of electronic gear	0 ~ 1073741824	0	
0	10	Denominator of electronic gear	1 ~ 1073741824	10000	
0	11	Output pulse counts per one motor re...	1 ~ 2097152	2500	Pulse prior ...
0	12	Reversal of pulse output logic	0 ~ 1	0	
0	13	1st torque limit	0 ~ 500	300	%
0	14	Position deviation excess setup	0 ~ 1073741824	100000	Unit dependen...

Name: Rotational direction setup Range: 0~1 Value: 1 Effective: Reboot

Parameter description:
Setup the relationship between the direction of command and direction of motor rotation.
0: Motor turns CW in response to positive direction command (CW when viewed from load side shaft end);
1: Motor turns CCW in response to positive direction command (CCW when viewed from load side shaft end)

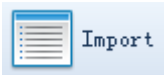
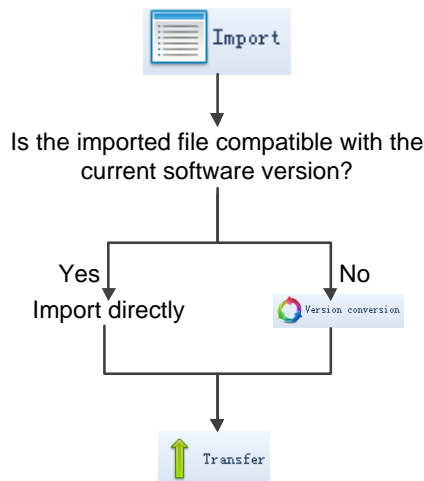




Fig. 3-2 Parameter editing window

- ☐: Parameters whose modification will take effect immediately. (If the changes need to be saved, please write it to EEPROM).
- ☐: Parameters whose modification will take effect only when the changes are written to EEPROM and the driver is repowered.
- ☐: Parameters which are read-only.

Show description of setting value: with this checked, possible pull-down information box will appear when certain parameters are selected.


3.3 Parameter Editing Operation

3.3.1 Parameter Modifying, Reading, Saving, Transferring and Restoring

Modify	Click “Value” box in “Operation parameter” window to modify the parameter, then click “Enter” to complete. The modification can be saved after it is written into “EEP”.	
	<p>Reading parameters from the file (*.pm). Note that the imported parameters will not be sent to the driver. Only “Transfer” is enabled, parameter settings in the driver will be changed correspondingly.</p> <p>If loading method of “Load from the driver” is selected, refer to the right side for the operation flow.</p>	 <pre> graph TD Import[Import] --> Question{Is the imported file compatible with the current software version?} Question -- Yes --> Direct[Import directly] Question -- No --> Conversion[Version conversion] Direct --> Transfer[Transfer] Conversion --> Transfer </pre>
	Exporting parameters to the file (*.pm).	
	<p>Receiving parameters from the driver.</p> <p>If parameters have been modified on windows such as “Trial Run”, “Pin Definition” or “Gain”, etc., parameter values shown on editing window may be inconsistent with the actual values in the driver. At this time, you need to click “Receive” to read the latest values from the driver.</p>	
	<p>Sending current parameters to the driver.</p> <p>When parameter loading method of “Import from file”, “Load from file” or “Load factory setting” is selected, parameter modifications are not sent to the driver directly. You need to click “Transfer” to change the value in the driver.</p>	
	Making all driver’s parameters restore to default leaving-factory settings.	

3.3.2 Parameter Comparison

[Operation]

1. Click  on the toolbar to open parameter comparison dialog box (see Fig. 3-3).
2. Select loading method for parameter group 1 and group 2.
3. Click “OK” to show comparison results (see Fig. 3-4).

If the software version is too low, it will be unable to read parameter values from the initialization area of the driver. That is, “Read from initialization area of the driver” function will be unavailable. Refer to the caution in section 3.1 for details.

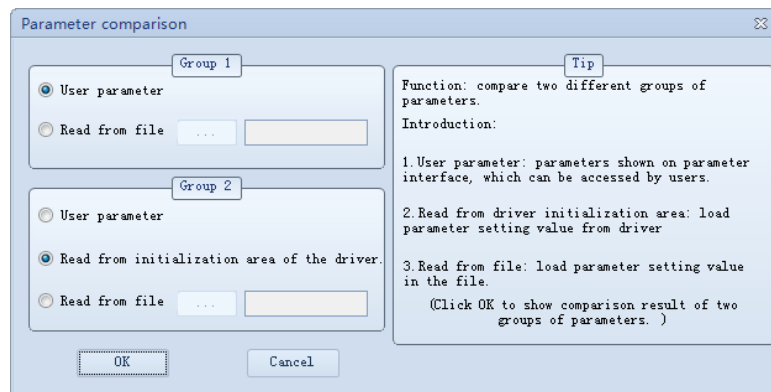


Fig. 3-3 Parameter comparison dialog box

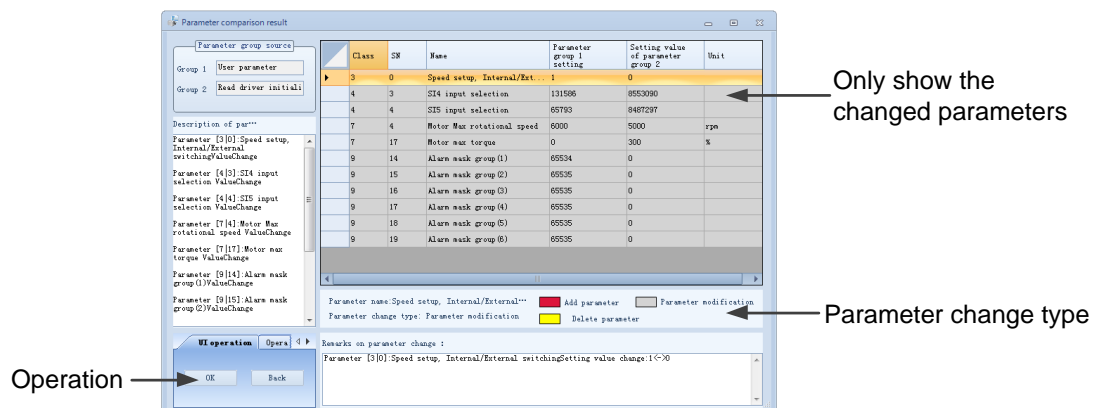





Fig. 3-4 Parameter comparison result window

-  Parameter adding
-  Parameter deleting
-  Parameter modifying

Compared with parameter group 2, the newly added parameters in group 1.

Compared with parameter group 2, the newly deleted parameters in group 1.

Compared with parameter group 2, parameters in group 1 whose attributes have been changed.

[Operation to comparison result]

UI Operation: in this area, click “OK” to exit the window; click “Back” to return to previous window as shown in Fig. 3-3.

Operation on result: to import or export the comparison result.

3.3.3 Version Conversion

[Function]

If the imported parameter file is unmatched with the current version of driver software, you can make a compatible version by using “Version conversion” function. Note that parameters after conversion will only reflect on operational window, but not saved into the file. If you want to save them to the file, you can execute “Export” function.

[Window introduction]

Click  in the toolbar to open “Version conversion” window. See Fig. 3-5.

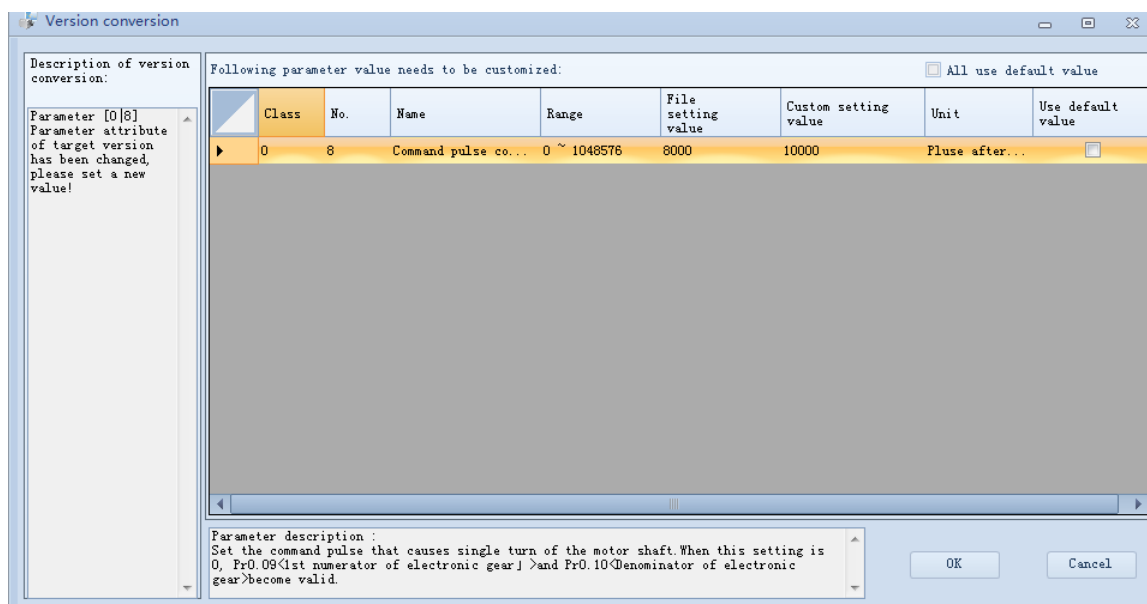


Fig. 3-5 Version conversion window

Name/Range	It refers to the name or setting range after conversion.
Unit	It is the unit in target version.
File setting value	It refers to the parameter setting value before conversion. For newly-added parameters in target version, default value is 0.
Custom setting value	It refers to setting value self-defined by the user, and it will be the preset value in target version.
Use default value	If checked, reset value will be used and it is unable to be modified.
All use default value	If checked, all parameters will use preset settings.
OK/Cancel	Click “OK” to execute version conversion, then “Transfer” function can be enabled. Click “Cancel” to give up the conversion.


[Explanation]

- When there is a new parameter in target version, it will be added directly, with preset value as parameter setting value. In addition, a prompt will appear asking the user to set a new value for it.

- When a parameter is absent in target version, it will be deleted directly.
- After conversion, if setting range of target version changes and the value in original file exceeds the range specified in target version, a prompt will appear asking the user to set a new value for it.
- If you don't want to enter parameter value one by one, you can check in the checkbox of "All use default value". In this way, those which need to be self-defined will use preset values in target version.

3.3.4 Writing Parameter to EEPROM



Click  to open a dialog box (see Fig. 3-6), in which , you can confirm the parameter modification. Click "OK", the parameter change will be written to EEP, while click "Cancel" to cancel the operation.

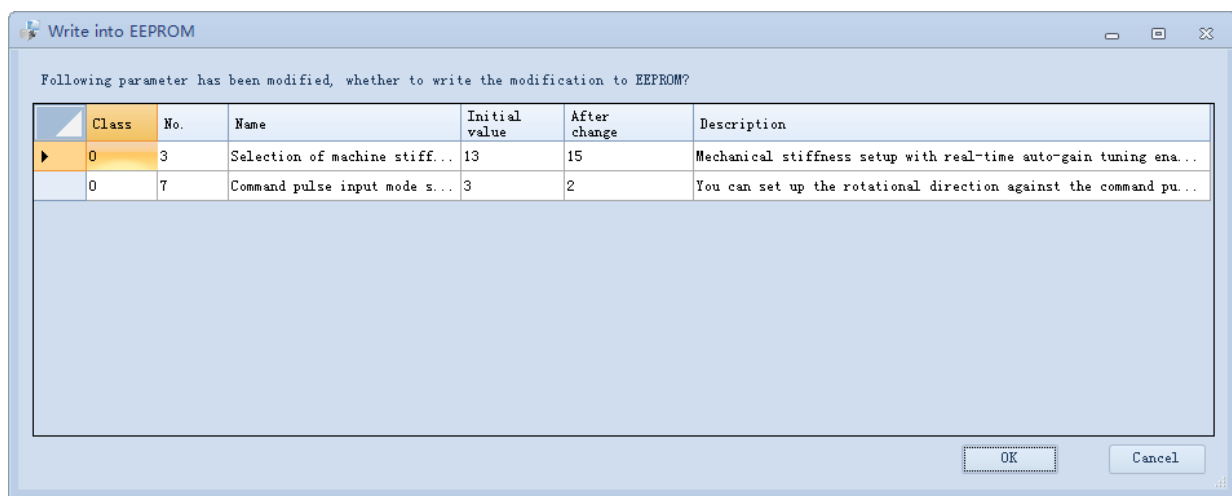


Fig. 3-6 Parameter modification confirmation dialog box

[Explanation]

- On condition that parameter value has been modified while not written into EEPROM, confirmation dialog box will appear when parameter editing window is being closed. After the parameter values have been written into EEPROM, the modification of those with yellow background will take effect when the driver is repowered.
- During writing to EEPROM, please don't power off the driver. If power interruption occurs, writing operation failed.
- If the parameter change cannot be saved, even though it has been sent to the driver, execute "EEP" to solve this problem.

4 Waveform

4.1 Introduction of Waveform Window

Click “Waveform” to open the waveform acquisition window as shown in Fig. 4-1.

At “Trigger prohibit”, the “Waveform attribute” contains “Sampling period”, “Speed pulse compensation”, “Smoothness” and “Item to be monitored”; at “Trigger enabled”, the “Waveform attribute” contains “General”, “Child condition A”, “Child condition B”, “Sampling period”, “Smoothness” and “Item to be monitored”.

Waveform representing motor actions is shown in “Waveform” window. The user can save waveform result to a file or read waveform data from a file.

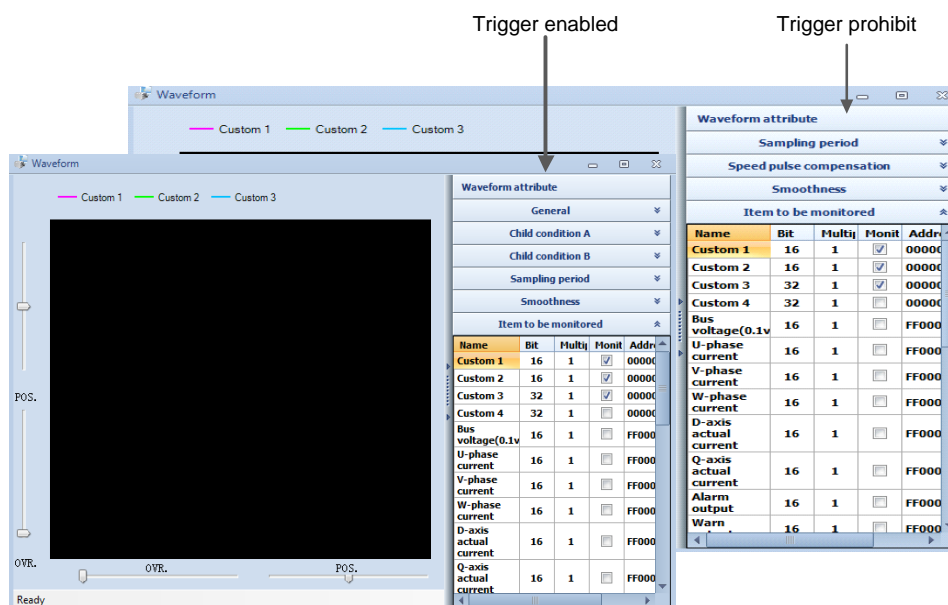


Fig. 4-1 Waveform window

[Toolbar]



To start waveform collection.



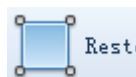
To save waveform to a file.



To stop waveform collection.



To load waveform from a file.



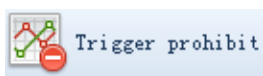
To restore waveform curve to original view.



To set triggering condition for waveform collection.



To magnify waveform curve.



To set prohibition condition for waveform collection.



To shrink waveform curve.




To set colors for waveform curves.

[Waveform attribute]

General	Set general triggering condition or information when “Trigger enabled”.
Child condition A	Set child condition A for waveform collection. Available when “Trigger enabled”.
Child condition B	Set child condition B for waveform collection. Available when “Trigger enabled”.
Sampling period	It specifies the time interval of two adjacent points in waveform collection.
Speed pulse compensation	Compensate the oscillation of motor cogging. It is available when “Trigger prohibit”.
Smoothness	It specified the smoothness of waveform curve.
Item to be monitored	Select the waveform to be monitored.

4.2 Waveform Collection Operation

4.2.1 Trigger Prohibit

Before waveform collection, please click  firstly.

[Operation]

- Common operation steps:
 1. Set sampling period under “Waveform attribute”.
 2. Select the items to be monitored (Note: the sum of selected item bits cannot exceed 64.)
 3. Click “Start” to start waveform collection.
 4. Click “Stop” to stop waveform collection.
 5. After waveform collection is finished, you can check waveform curve by setting “Smoothness” or clicking “Zoom out” and “Zoom in”.

- Operation steps of “Speed pulse compensation”:

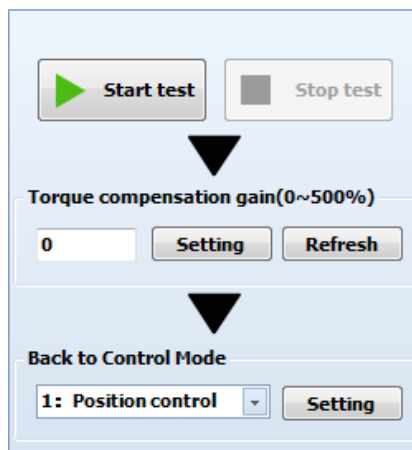


Fig. 4-2 Speed pulse compensation window

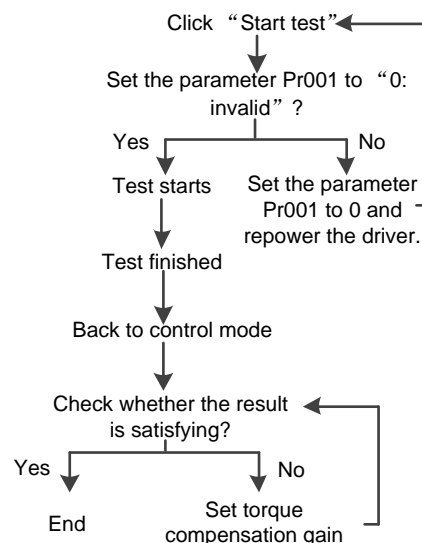


Fig. 4-3 Operation flow of speed pulse compensation

1. After “Start test” is clicked, the waveform display area only shows the curves of “Torque command” and “Actual speed”. It is not affected by the checked items in “Item to be monitored”. In addition, “Sampling period” and “Smoothness” are unavailable.
2. Please set torque compensation gain according to the actual condition. After setting, click “Setting” to make it take effect, then click “Start test” to check the result. You can repeat this step until the testing result meets your requirement.
3. After a satisfying result is obtained, set the back control mode.

4.2.2 Enable Trigger

Before waveform collection, please click  Trigger enabled firstly.

After “Trigger enabled” is activated, the driver will make judgement of the triggering condition. And only the condition is met, waveform will be displayed at the moment “Start” is clicked. After a period of time , the collection will stop automatically.

[Operation]

1. Set “General” attribute.
2. If the “Condition” under “General” menu is “Null”, please skip to step 3. If “A trigger” or “B trigger” selected, please continue to set “Child condition A” or “Child condition B”.
3. Set sampling period.
4. Select items to be monitored (Note: the sum of selected item bits cannot exceed 64.)
5. Click “Start” to start waveform collection.
6. After waveform collection is finished, you can check waveform curve by setting “Smoothness” or clicking “Zoom out” and “Zoom in”.



Waveforms in “Monitored item” can be chosen at will, regardless of “Trigger object” in child condition A and child condition B.

[Setting triggering condition]

1. Set triggering position, times and condition in “General” condition setting dialog box.

Fig. 4-4 General condition setting dialog box

Trigger position: it refers to the horizontal coordinate (X-axis) of the point when triggering condition is met.

Single trigger: ON refers to only one triggering; OFF refers to multiple repeated triggering.

Condition: “Null”, “A trigger”, “B trigger”, “A/B trigger”, and “A and B trigger” can be selected.

2. If “Null” is selected in “General”, there is no need to set Child condition A and B; while if triggering condition relates with A or B, corresponding setting is required. Following takes setting of Child condition A as an example.

Fig. 4-5 Child condition A setting dialog box

Trigger object: Select one waveform in waveform items as the object. When the item meets the requirements, waveform collection starts.

Trigger level: It specifies a value for the trigger object. When the trigger object approaches this value, waveform will be displayed.

Slope: It refers to the method of triggering object judging triggering level.

4.3 Waveform Operation

[Waveform zoom in/out]

As shown in Fig. 4-6, you can operate the waveform by dragging the override slide and position slide. In addition, you can operate it by the following methods.

1. With left mouse button pressed at the same time, selecting one part of the waveform can enlarge

the selected portion (or click  Zoom in and  Zoom out).

2. Double clicking the waveform can restore it to original size (or click  Restore).

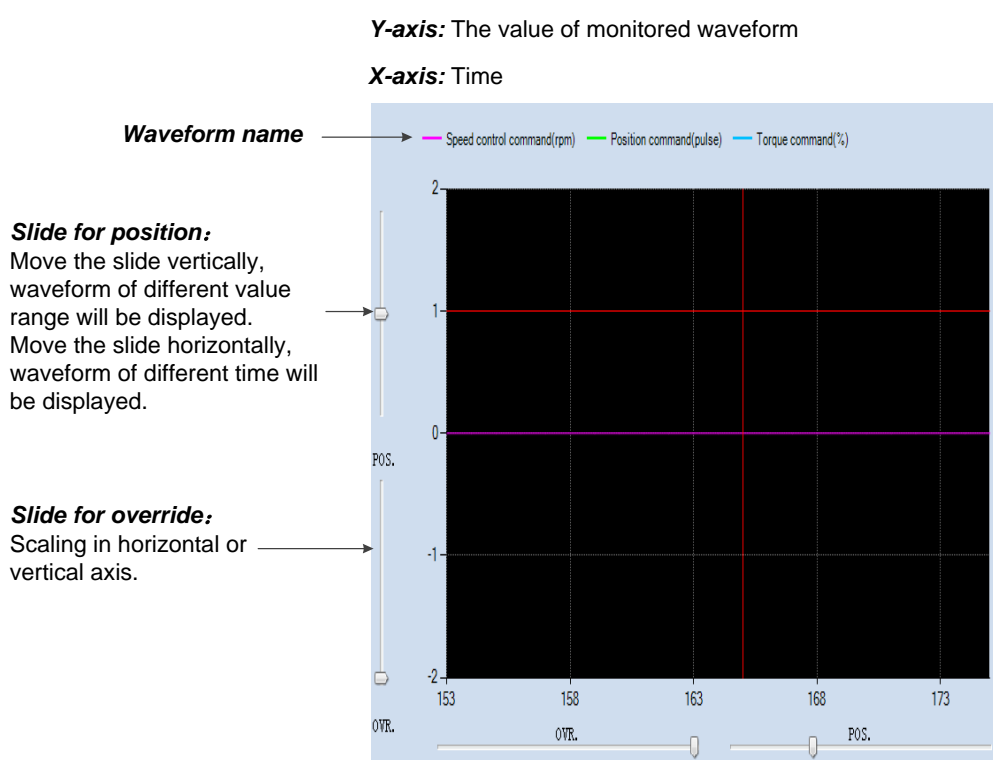


Fig. 4-6 Waveform display area

[Waveform smoothness]

By taking advantage of smoothness adjustment, the waveform can be smoother. However, please note that the adjustment can only make waveform looks like smoother with no change to actual waveform data collected.

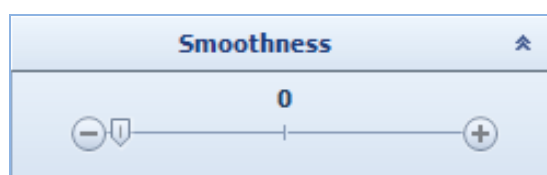
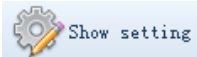


Fig. 4-7 Smoothness slide

[Waveform color setting]

Click  to open “Waveform setting” dialog box as shown in Fig. 4-8. In this window, you can set the color of background, grid, and waveform.

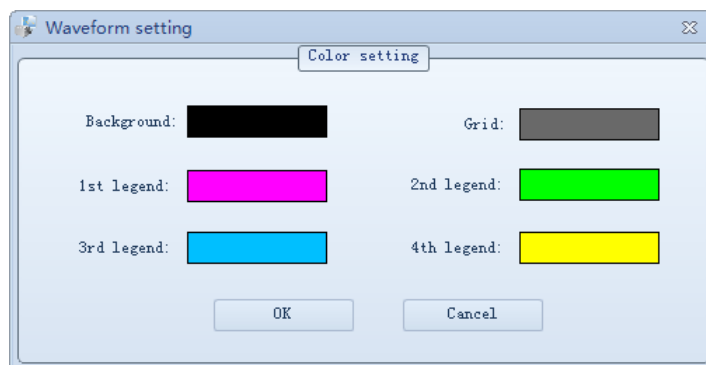




Fig. 4-8 Waveform color setting dialog box

[Import/Export of Waveform]

Click  and type in the waveform name to save it to the file; click , and select a waveform file to show it in *iMotion* software.

5 Gain Tuning

5.1 Real-time Auto Gain Tuning

Through gain tuning, auto adjustment of the driver can be realized.

Click “Gain” in the menu list under “Function” or on the toolbar under “Function preview”. The “Gain tuning” window is shown as Fig. 5-1.

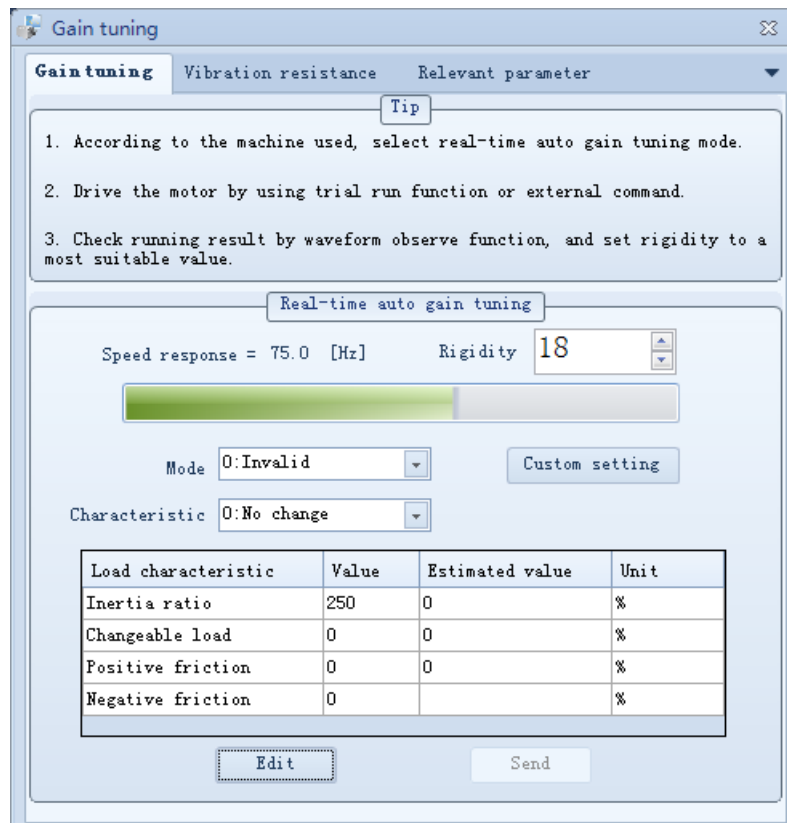
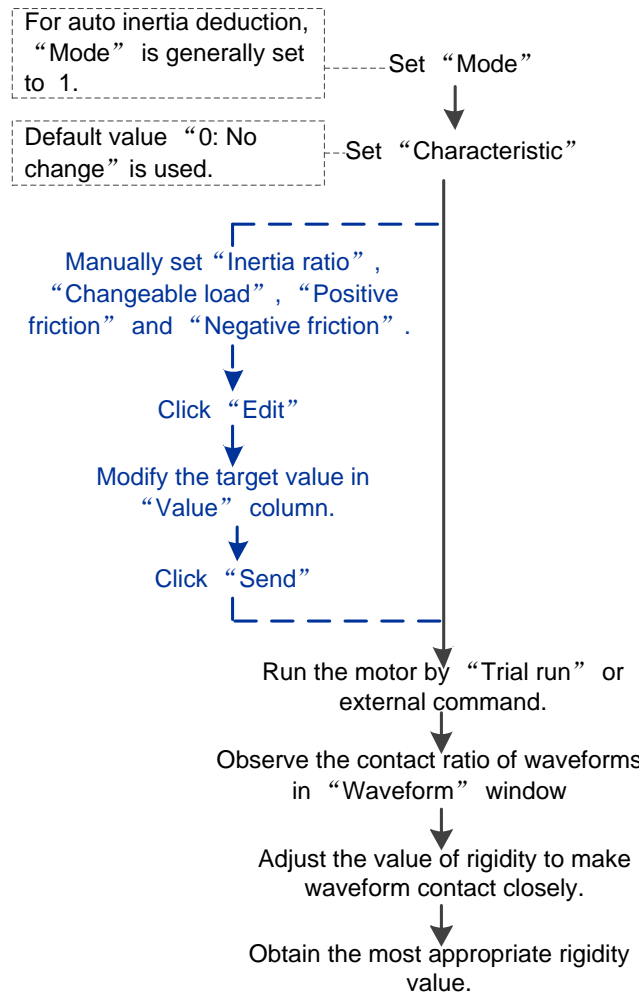


Fig. 5-1 Gain tuning window

[Operation]

Following is the operation flow of gain adjustment:



[Explanation]

- Generally, manual modification for set value is not required. After "Mode" and "Characteristic" are set well, the motor can be run directly.
- When the "Mode" is set to "6: Custom setting", click "Custom setting" to open a dialog box where you can set more details.
- During motor running, the deduction value of load characteristic will be shown in the column of "Estimated value".
- To modify the value in "Value" column, please click "Edit" firstly. After modification, click "Send" to validate the parameter modification, or click "Monitor" to abolish the modification.



1. Please refer to the users' manuals of WISE servo driver for applicable range or cautions before making gain adjustment in this window.

- 2. All parameters in “Gain tuning” window are parameters in the driver, and *iMotion* cannot save the values. Therefore, in order to save the results, please click “Send” and excute “Write to EEP” after tuning.
- 3. “Gain tuning” window, “Parameter editing” window and “Pin allocation” window cannot be opened at the same time.

5.2 Vibration Resistance

When the machine tool with high stiffness vibrates heavily, “Vibration resistance” function can be used to improve this condition.

Click “Gain → Vibration resistance” to open the “Vibration resistance” window. When the button is displayed as “Edit” as shown in Fig. 5-2, it means the current window is in monitoring mode; when the button is displayed as “Monitor” as shown in Fig. 5-3, it means the current window is in editing mode.

When vibration caused by motor speed occurs, this window will only show the resonance frequency below $\leq 5000\text{Hz}$.

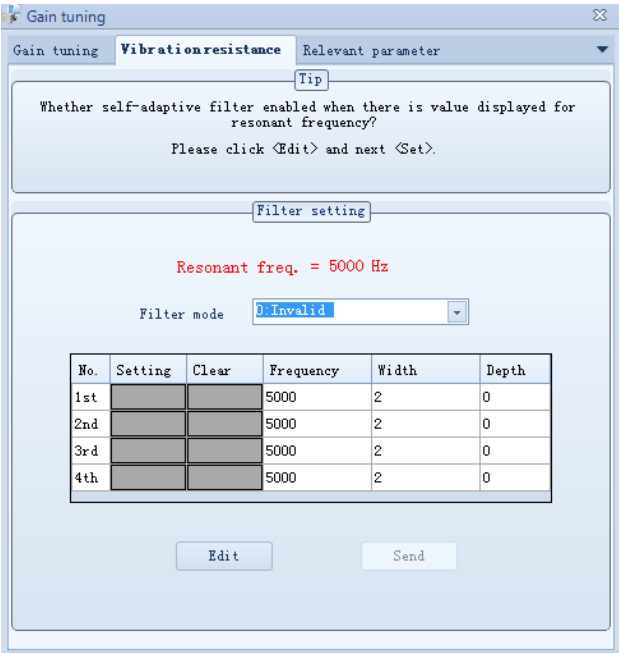


Fig. 5-2 Vibration resistance window (Monitor mode)

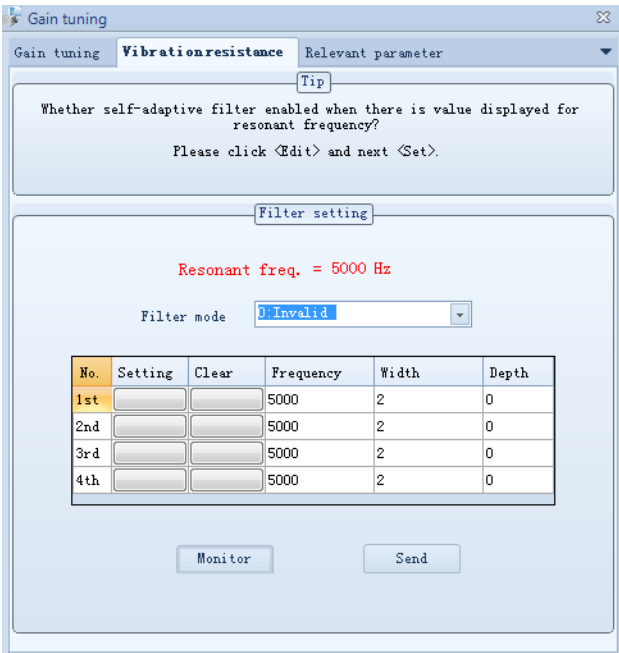


Fig. 5-3 Vibration resistance window (Edit mode)

[Filter mode setting]

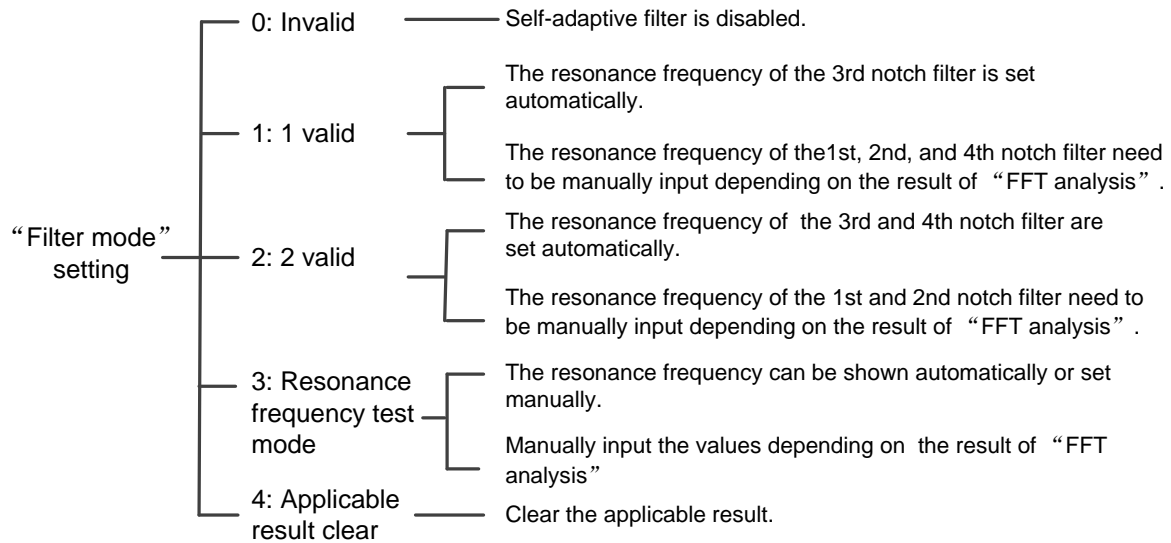



Fig. 5-4 Filter mode setting description

[Operation]

Here are the relevant operations of self-adaptive filter setting.

- Set filter mode, see Fig. 5-4 for details. Here are several conditions:
 - When "Filter mode" is set to "0: Invalid" or "4: applicable result clear", self-adaptive filter is disabled.
 - When "Filter mode" is set to "1: 1 valid" or "2: 2 valid", the resonance frequency which can be set automatically will be shown in the window as shown in Fig. 5-2, without other operations.
 - When "Filter mode" is set to "3: Resonance frequency test mode", you can click the boxes in "Setting" column, as shown in Fig. 5-3, to set the resonance frequency displayed on the current window to 1st~4th notch filters.
 - Skip to step 3 to set the resonance frequency which should be manually set depending on the result of "FFT analysis".
- Click "Other → FFT analysis" to open "FFT analysis" window.
- When there is external controller, use "Trial run" function to run the motor.
- Click  in "FFT analysis" window, then speed spectrum will be displayed as shown in Fig. 5-5, in which you can read resonance frequency.
- Open "Vibration resistance" window and click "Edit" to enter into editing interface (See Fig. 5-3). Input the values read from speed spectrum into the box in "Frequency" column. Then click "Set" and "Send" to validate the setting.

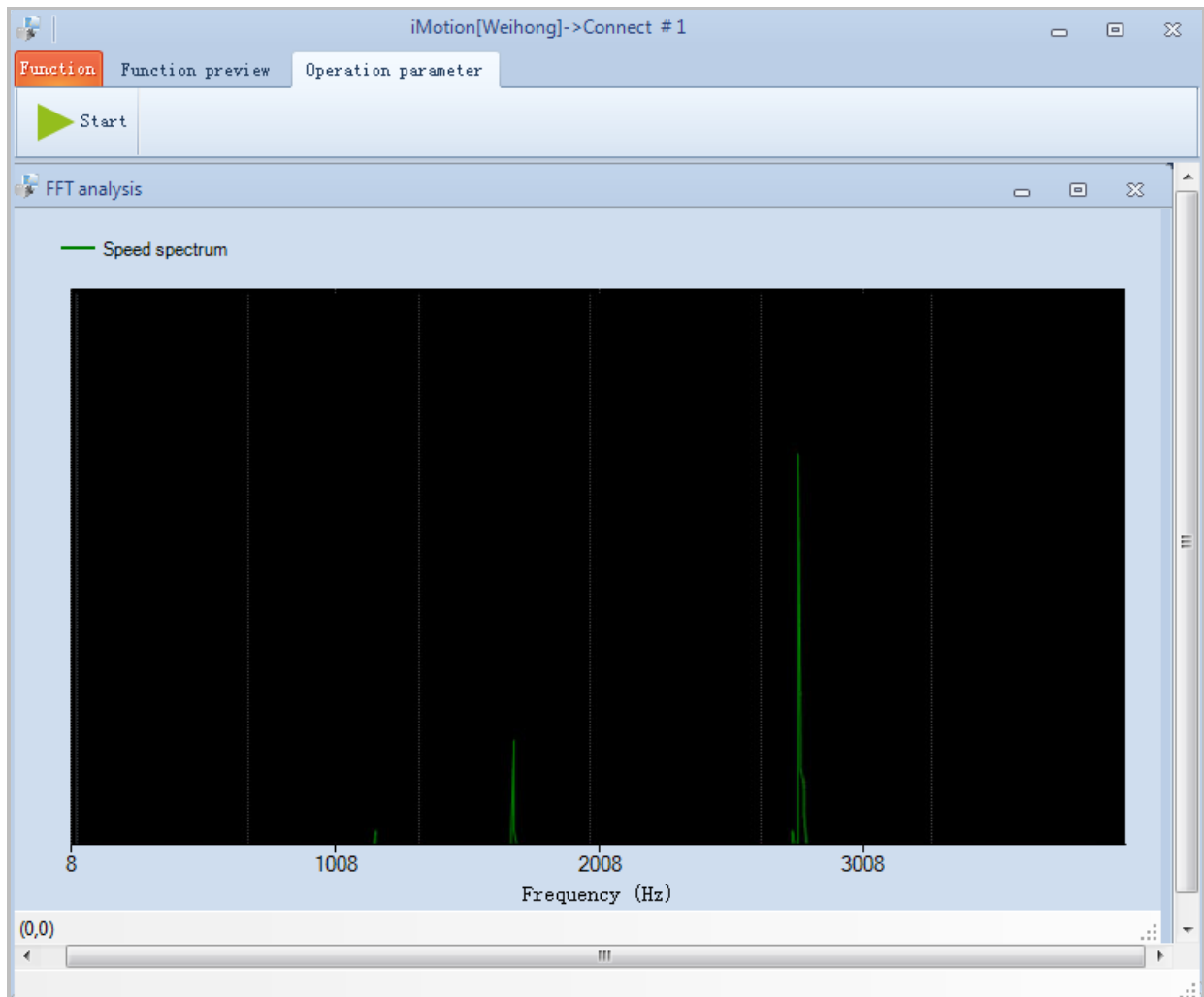


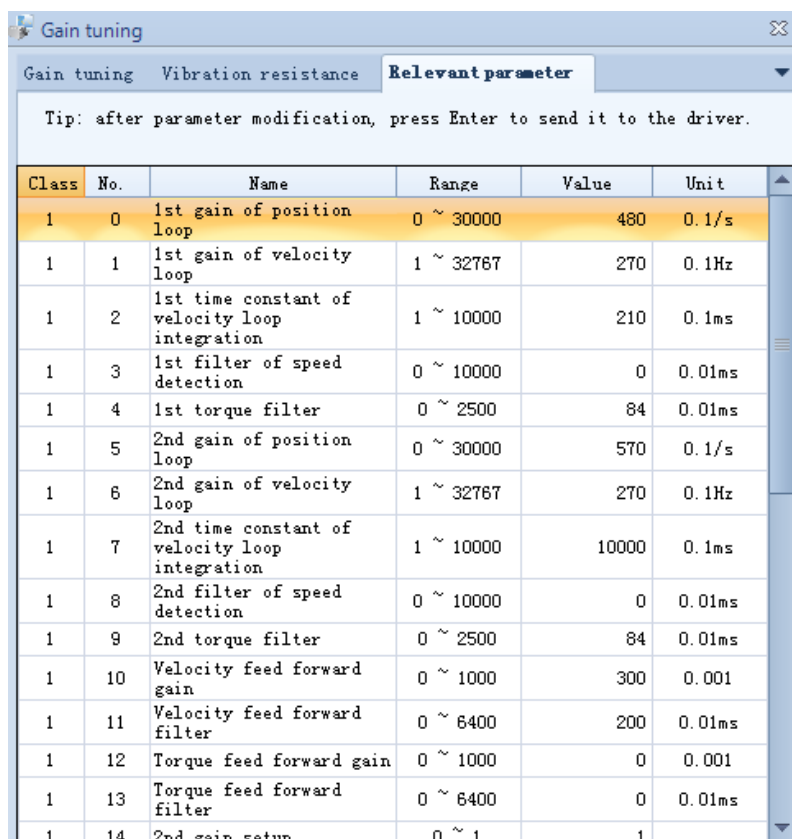
Fig. 5-5 FFT analysis window (Motor speed spectrum)

[Explanation]

- If self-adaptive filter is not used, and resonance frequency needs to be measured, please set "Filter mode" to "3: Resonance frequency test mode".
- Click boxes in "Setting" column as shown in Fig. 5-3 to directly set the current frequency as resonance frequency without inputting any value in the target box.
- Click "Send" to validate the modification, or click "Monitor" to cancel it.
- Click "Clear" to clear the resonance frequency.

5.3 Relevant Parameter

In “Relevant parameter” window, the user can check whether the parameters related to gain adjustment have been modified and make modification to the target parameters. But usually, the parameters are not modified here.



Class	No.	Name	Range	Value	Unit
1	0	1st gain of position loop	0 ~ 30000	480	0.1/s
1	1	1st gain of velocity loop	1 ~ 32767	270	0.1Hz
1	2	1st time constant of velocity loop integration	1 ~ 10000	210	0.1ms
1	3	1st filter of speed detection	0 ~ 10000	0	0.01ms
1	4	1st torque filter	0 ~ 2500	84	0.01ms
1	5	2nd gain of position loop	0 ~ 30000	570	0.1/s
1	6	2nd gain of velocity loop	1 ~ 32767	270	0.1Hz
1	7	2nd time constant of velocity loop integration	1 ~ 10000	10000	0.1ms
1	8	2nd filter of speed detection	0 ~ 10000	0	0.01ms
1	9	2nd torque filter	0 ~ 2500	84	0.01ms
1	10	Velocity feed forward gain	0 ~ 1000	300	0.001
1	11	Velocity feed forward filter	0 ~ 6400	200	0.01ms
1	12	Torque feed forward gain	0 ~ 1000	0	0.001
1	13	Torque feed forward filter	0 ~ 6400	0	0.01ms
1	14	2nd gain setup	0 ~ 1	1	

Fig. 5-6 Relevant parameter window

6 Trial Run

WSDV series servo driver is connected to PC via USB. “Trial run” function in *iMotion* can be used to make the motor run.

6.1 Operation Related with Running Range Setting

Click “Trial run” to open the “Running range setting” window, as shown in Fig. 6-1. See Fig. 6-2 for the operation flow of this window.



Parameter can be modified here, but the modification is usually operated in “Trial run” window.

MAX: The maximum position when the motor rotates to the left.

MOTOR: The current position of the motor.

MIN: The maximum position when the motor rotates to the right.

Jog(+): The motor rotates in CW direction.

Jog(-): The motor rotates in CCW direction.

Skip: Click “skip” to switch into “Trial run” window. At this time, the motor running range will not be restricted by the setting of MAX and MIN.

To trial run: Click “To trial run”, and the motor running range will be limited by the setting of MAX and MIN.

Tip

1. Before trial run, you can decide running range by <JOG> operation.
2. Click <Skip>, and trial run will not be restricted by the range.
3. Click <To trial run>, and trial run will be restricted by MAX(pulse)-MIN(pulse) range.

Fig. 6-1 Running range setting window

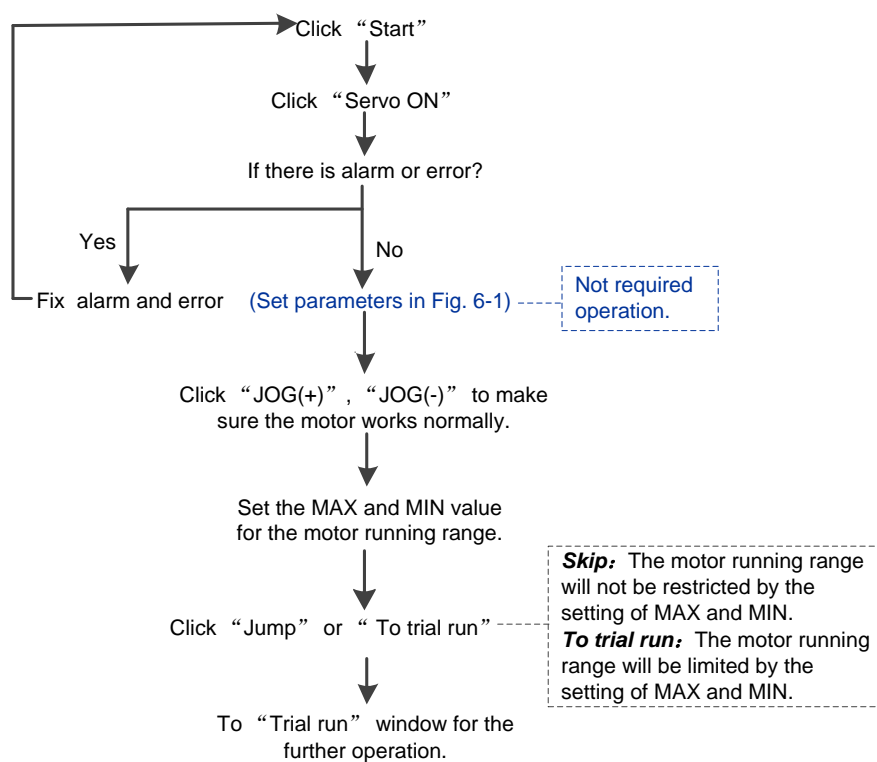












Fig. 6-2 Operation flow of running range setting




6.2 Operation Related with Trial Run





Fig. 6-3 Trial run window




1. At servo OFF, clicking  button turns the servo ON. While if it is in PAUSE state or during the execution of ZERO (returning to the origin), JOG ("CONT." can be checked), STEP ("CONT." can be checked), clicking this button makes stop.
2. When trial run has been set, clicking  button invalidates the trial running range setting.
3. When executing ZERO (returning to the origin), JOG ("CONT." can be checked), STEP ("CONT." can be checked), clicking  button makes the motor decelerate and stop; at this time, the button turns to ; further clicking  makes the motor continue the interrupted action.
4. Executing ZERO (returning to the origin) makes the motor rotate to the position whose coordinate is 0.
5. With  or  clicked, the motor rotates in positive direction or negative direction.





If  is checked, once  or  is clicked, the motor will speed up to specified speed within set time; if there is soft limit, the motor will stop at the soft limit, otherwise, the motor keeps running.


If  is not checked, once  or  is clicked, the motor speeds up to the specified speed within set time and keeps running at the speed; releasing the button makes the motor slow

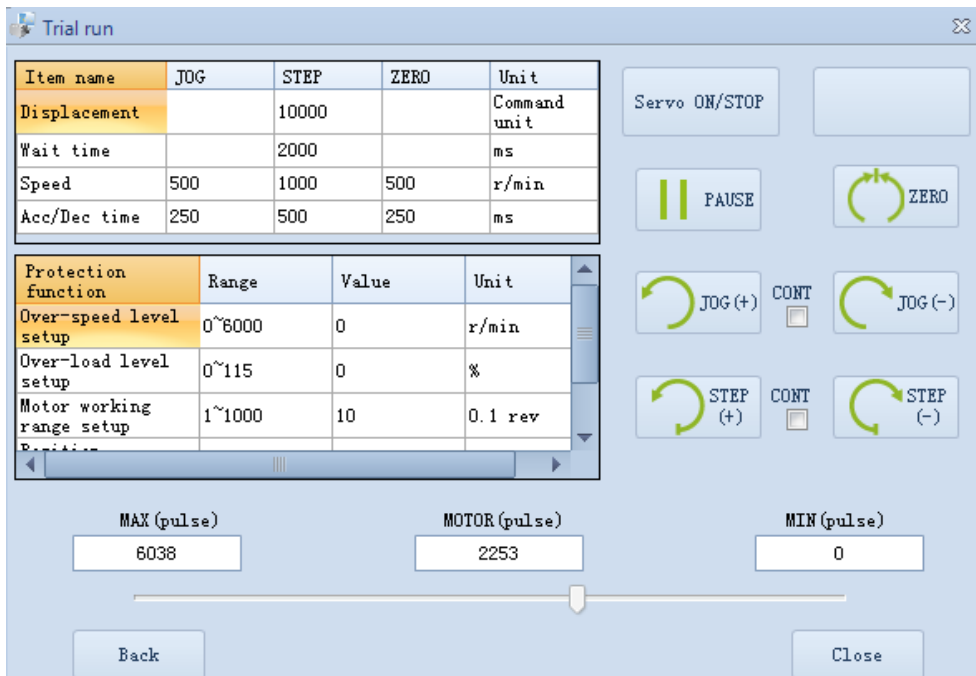
down to 0 within set time.

6. With  or  clicked, the motor rotates in positive direction or negative direction respectively.

If ☐  is checked, once  or  is clicked, the motor moves forward and backward repeatedly with the current position as datum.

If ☐  is not checked, the motor moves to the set distance. If  button is clicked or trial run window is closed during running, the motor stops immediately. If  button is clicked during running, the motor slows down and stop within the set time, and clicking  button again makes the motor keep running to the target position and stop.

7. Set the parameter as shown in Fig. 6-3 depending on the actual situation.
As shown in below, the range of (MAX, MIN) is set to (6034, 0), but the setting of STEP is 10000.
With  clicked, the motor running distance will exceed the set value of MAX. At this time, you can modify the set value of STEP to a smaller one such as 100. In addition, you can go back to the window shown in Fig. 6-1 to modify the set value of MAX and MIN.



The screenshot shows the 'Trial run' window with the following components:

Item name	JOG	STEP	ZERO	Unit
Displacement		10000		Command unit
Wait time		2000		ms
Speed	500	1000	500	r/min
Acc/Dec time	250	500	250	ms

Protection function	Range	Value	Unit
Over-speed level setup	0~6000	0	r/min
Over-load level setup	0~115	0	%
Motor working range setup	1~1000	10	0.1 rev

Control buttons and settings:

- Servo ON/STOP** button
- PAUSE** button (represented by two vertical bars)
- ZERO** button (represented by a circular arrow)
- JOG (+)** and **JOG (-)** buttons, each with a ☐ **CONT.** checkbox.
- STEP (+)** and **STEP (-)** buttons, each with a ☐ **CONT.** checkbox.
- MAX (pulse)** input field: 6038
- MOTOR (pulse)** input field: 2253
- MIN (pulse)** input field: 0
- A horizontal slider bar below the input fields.
- Back** and **Close** buttons at the bottom.

7 Alarm

Clicking “Alarm” to open the alarm window, which is composed of two windows, “Current alarm” and “Alarm history”.

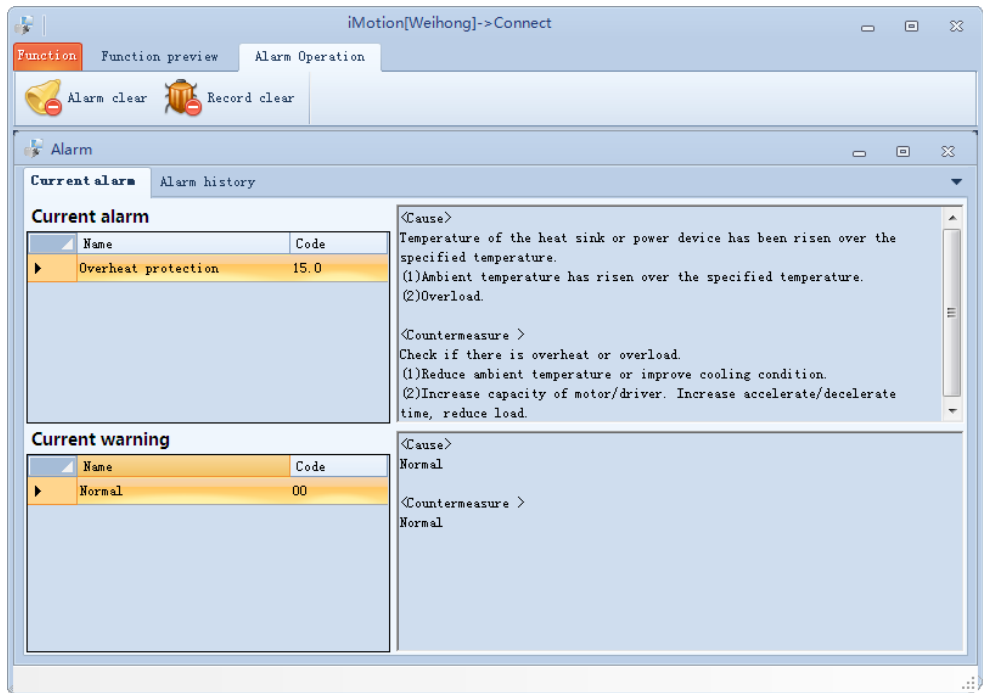


Fig. 7-1 Current alarm window

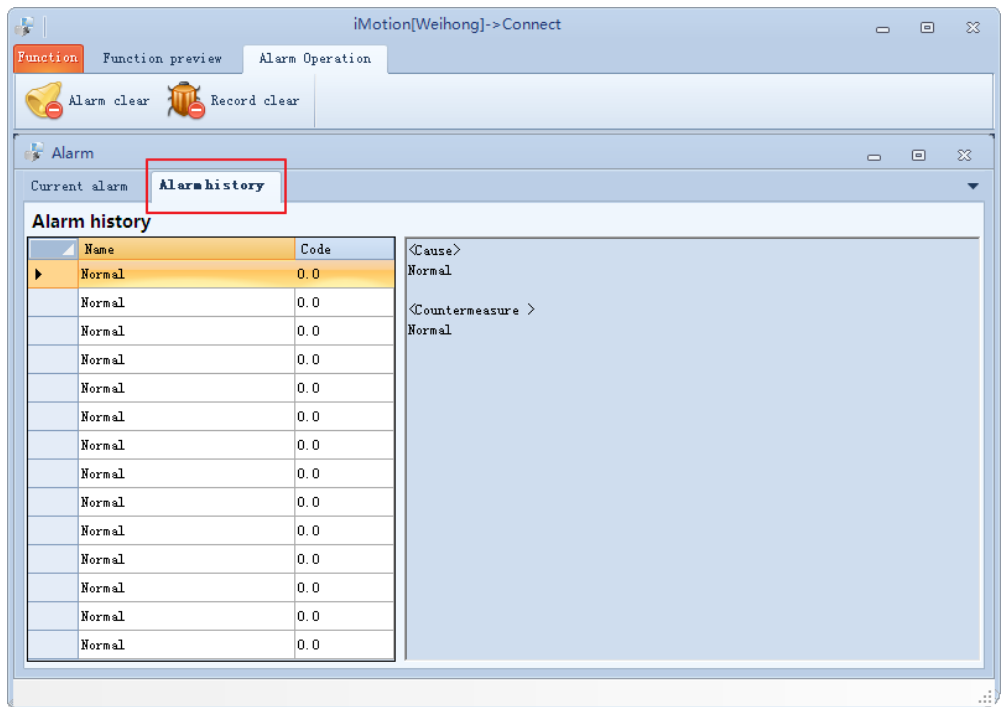




Fig. 7-2 Alarm history window

[Function]

To review alarm, alarm causes, and alarm countermeasures.

[Explanation]

- When there is active alarm or warning, the window will pop up automatically. After alarm occurred, you can clear the alarm as offered countermeasures; if it is not cleared, the alarm will be active all the time.
- After alarm occurrence, clicking  can clear the current alarm, while it is invalid for those with unclearable attribute (refer to users' manuals of WISE servo driver for details). And for alarms which are unable to be cleared, try the possible causes and countermeasures on the right side.
- Click  to clear history alarms.

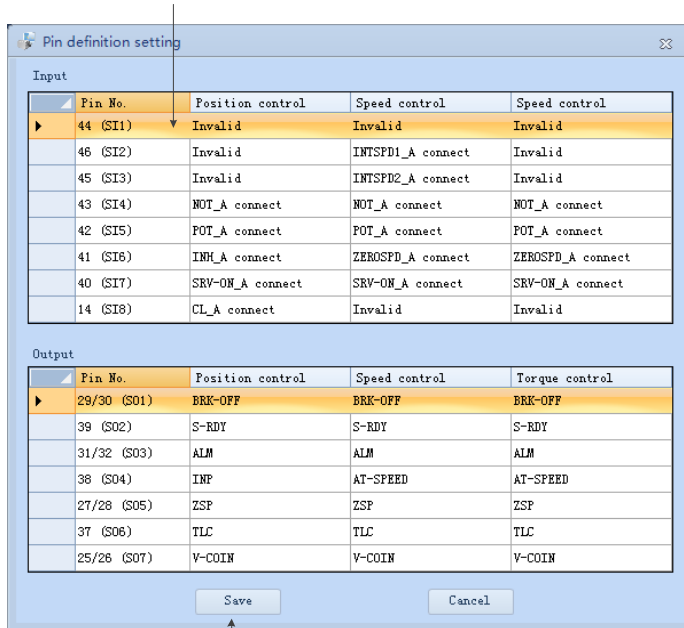
8 Pin Definition Setting

I/O signals can be allocated by “Pin definition” function.

[Set input pin definition]

See figure below for the setting steps for input pin definition

1. Double click the input pin to be set.



The 'Pin definition setting' window displays two tables for configuring I/O pins.

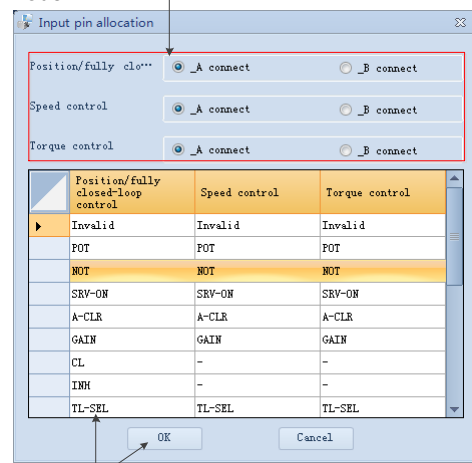
Input			
Pin No.	Position control	Speed control	Speed control
44 (SI1)	Invalid	Invalid	Invalid
46 (SI2)	Invalid	INTSPD1_A connect	Invalid
45 (SI3)	Invalid	INTSPD2_A connect	Invalid
43 (SI4)	NOT_A connect	NOT_A connect	NOT_A connect
42 (SI5)	POT_A connect	POT_A connect	POT_A connect
41 (SI6)	INH_A connect	ZEROSPD_A connect	ZEROSPD_A connect
40 (SI7)	SRV-ON_A connect	SRV-ON_A connect	SRV-ON_A connect
14 (SI8)	CL_A connect	Invalid	Invalid

Output			
Pin No.	Position control	Speed control	Torque control
29/30 (S01)	BRK-OFF	BRK-OFF	BRK-OFF
39 (S02)	S-RDY	S-RDY	S-RDY
31/32 (S03)	ALM	ALM	ALM
38 (S04)	INP	AT-SPEED	AT-SPEED
27/28 (S05)	ZSP	ZSP	ZSP
37 (S06)	TLC	TLC	TLC
25/26 (S07)	V-COIN	V-COIN	V-COIN

Buttons: Save, Cancel

4. Click “Save” to write the parameter to EEPROM; or click “Cancel” to cancel the writing.

2. Set the contact method in different control mode.



The 'Input pin allocation' window allows setting contact methods for different control modes.

Position/fully closed-loop control: ☒ _A connect ☐ _B connect

Speed control: ☒ _A connect ☐ _B connect

Torque control: ☒ _A connect ☐ _B connect

	Position/fully closed-loop control	Speed control	Torque control
Invalid	Invalid	Invalid	Invalid
POT	POT	POT	POT
NOT	NOT	NOT	NOT
SRV-ON	SRV-ON	SRV-ON	SRV-ON
A-CLR	A-CLR	A-CLR	A-CLR
GAIN	GAIN	GAIN	GAIN
CL	-	-	-
INH	-	-	-
TL-SEL	TL-SEL	TL-SEL	TL-SEL

Buttons: OK, Cancel

3. Choose the function to be specified, and click “OK” to go back to the previous pin definition setting window.

[Set output pin definition]

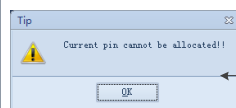
1. Double click the output pin to be set.

Pin definition setting

Input			
Pin No.	Position control	Speed control	Speed control
44 (SI1)	Invalid	Invalid	Invalid
46 (SI2)	Invalid	INTSPD1_A connect	Invalid
45 (SI3)	Invalid	INTSPD2_A connect	Invalid
43 (SI4)	NOT_A connect	NOT_A connect	NOT_A connect
42 (SI5)	POT_A connect	POT_A connect	POT_A connect
41 (SI6)	INH_A connect	ZEROSPD_A connect	ZEROSPD_A connect
40 (SI7)	SRV-ON_A connect	SRV-ON_A connect	SRV-ON_A connect
14 (SI8)	CL_A connect	Invalid	Invalid

Output			
Pin No.	Position control	Speed control	Torque control
29/30 (S01)	BRK-OFF	BRK-OFF	BRK-OFF
39 (S02)	S-RDY	S-RDY	S-RDY
31/32 (S03)	ALM	ALM	ALM
38 (S04)	INP	AT-SPEED	AT-SPEED
27/28 (S05)	ZSP	ZSP	ZSP
37 (S06)	TLC	TLC	TLC
25/26 (S07)	V-COIN	V-COIN	V-COIN

Save Cancel



2. This dialog box will appear for output pins which are beyond allocation.

Output pin allocation

Position/fully closed-loop control	Speed control	Torque control
Invalid	Invalid	Invalid
ALM	ALM	ALM
S-RDY	S-RDY	S-RDY
BRK-OFF	BRK-OFF	BRK-OFF
INP	-	-
-	AT-SPEED	AT-SPEED
TLC	TLC	TLC
ZSP	ZSP	ZSP
V-COIN	V-COIN	V-COIN
WARN1	WARN1	WARN1
WARN2	WARN2	WARN2
P-CMD	-	-
INP2	-	-
-	-	V-LIMIT

OK Cancel

3. Choose the function to be specified, and click “OK” to go back to the previous pin definition setting window.

4. Click “Save” to write the parameter to EEPROM, or click “Cancel” to cancel the writing.



1. Windows of “Pin allocation setting”, “Parameter” and “Gain tuning” cannot be opened at the same time.
2. Pin connection way needs to be set before allocating input pins. Please refer to the users’ manuals of WISE servo driver for detailed information about the allocation of input and output signals.
3. For input pins, one input signal cannot be allocated to different pin No., namely, repeated setting is prohibited; while for output pins, repeated allocation is allowed.
4. Pin definition setting remains invalid until the driver is repowered.

9 Axis Setting

“Axis Setting” function is a special function in bus-type servo driver. When *iMotion* software is connected to pulse type servo driver or analog • pulse type servo driver, the function is disabled.

Click “Axis setting” to open the window, as shown in Fig. 9-1.

Enter the axis address and click “Set”, and then click “OK” in the pop-up dialog box to restart the driver and validate the setting.

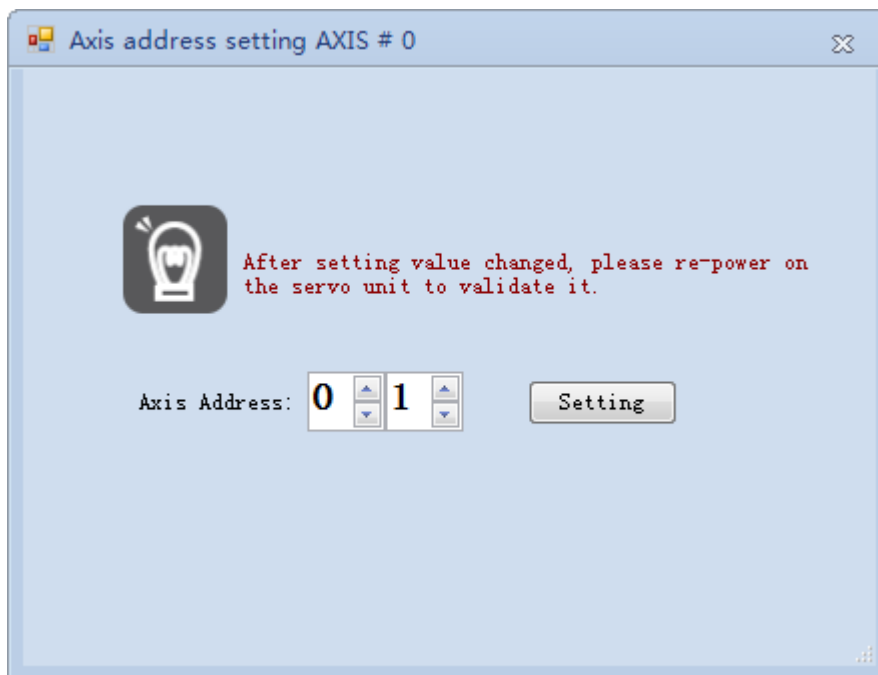


Fig. 9-1 Axis setting window



1. It is recommended to set the axis address in order (X-axis: 1; Y-axis: 2; Z-axis: 3.....). 0 means disabling the communication function.
2. Within the same control system, axis address No. for each axis driver cannot be duplicated.

10 Others

In the pull-down menu list of “Other”, functions such as FFT analysis, encoder initialization, analog input adjustment, hardware update, driver registration can be accessed. See Fig. 10-1 for details.



Fig. 10-1 Pull-down menu list under “Other”

10.1 Absolute Encoder Initialization

[Function]

Initialize absolute encoder. After initialization, revolutions of absolute encoder will be cleared to zero, and encoder alarm will be cleared as well.

[Operation]

1. Click “Encoder clear” in the pull-down list of “Other”. A confirmation dialog box will pop up (see Fig. 10-2).
2. Click “OK” to initialize the absolute encoder.

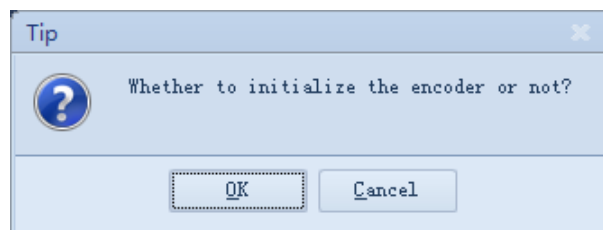


Fig. 10-2 Encoder initialization confirmation dialog box



1. With servo ON, initialization of the absolute encoder is unavailable. Therefore, please turn servo OFF first before executing absolute encoder initialization.
2. For bus type servo driver, there is no servo ON signal.

10.2 Analog Input Adjustment

[Function]

With this function, the deviation of analog input signal can be adjusted automatically. In addition, it also can be used to manually adjust filter and over-voltage setting.

This function is exclusive to analog • pulse type driver.

[Operation]

1. Click “Analog input adjustment” in the pull-down list of “Other”. A dialog box will pop up (See Fig. 10-3)
2. Select “Analog input 1” or “Analog input 2”. Here will take “Analog input 1” as an example.
3. Click “Auto adjustment” to measure and set the deviation of analog input.
4. After auto adjustment, click “Write into EEP” to write the set value of parameter into driver EEPROM.

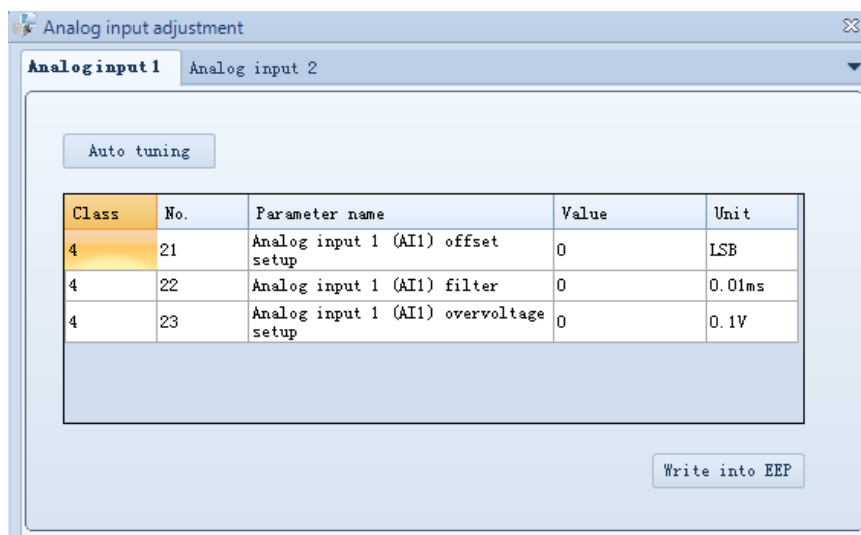


Fig. 10-3 Analog input adjustment window

[Explanation]

- The set value of parameter Pr421, Pr422, Pr423, Pr424, Pr425 and Pr426 can be modified in “Parameter” window or “Analog input adjustment” window. After modification, please execute “Write to EEP”.
- If auto adjustment failed (See Fig. 10-4), please confirm whether the relevant parameters are set well. Then try this operation again.
- “Analog input adjustment” window and “Parameter” window cannot be opened at the same time.

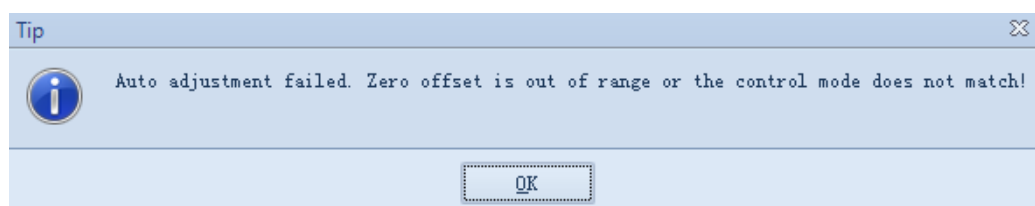


Fig. 10-4 Auto adjustment failed

10.3 Hardware Updating

If hardware is to be updated, “Boot” mode should be entered first. Pressing LEFT arrow key of the driver for several seconds before power-up can access “Boot” mode.

Click “Update hardware” in the pull-down list under “Other” to open the hardware updating window, as shown in Fig. 10-5. The hardware can be updated both automatically and manually.

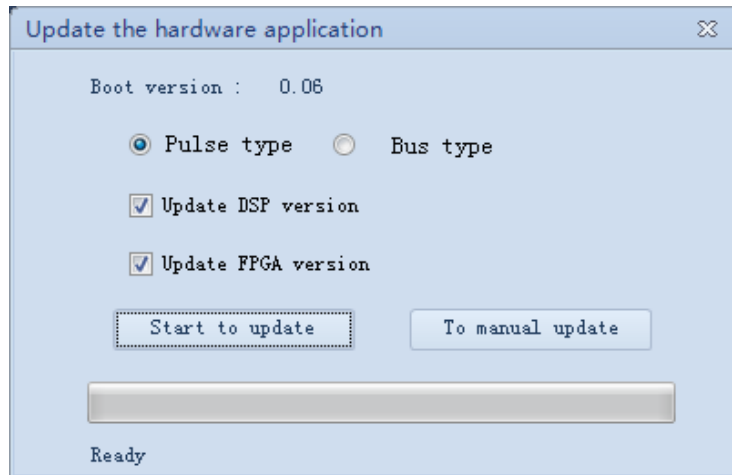


Fig. 10-5 Hardware updating window

[Auto updating]

1. As shown in Fig. 10-5, choose the driver type as the one you have used. Pulse type driver and bus type driver are optional.
2. Select the hardware type to be updated (both “Update DSP version” and “Update FPGA version” are checked by default).
3. Click “Start to update”.
4. After updating, you need to restart the driver to validate the newly updated hardware version.

[Manual updating]

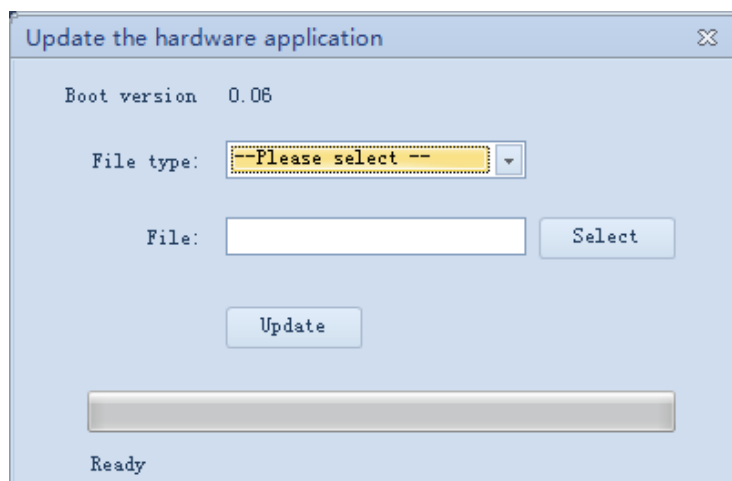


Fig. 10-6 Manual updating window

1. As shown in Fig. 10-5, click “To manual update” to switch to manual updating window, see Fig. 10-6.
2. Select the file type to be updated. Here are two types: DSP version and FPGA version.
3. Click “Select” to open the box where you can specify the target file.
4. Click “Update” to start updating.
5. For manual updating, only one type of the driver can be updated at one time. If other hardware needs to be updated further, repeat steps 3~5. If there no other hardware needs to be updated, close the updating window and back to the interface as shown in Fig. 10-5.
6. After updating, you need to restart the driver to validate the newly updated hardware version.

10.4 Driver Registration

If registered time for the driver is overdue, alarm prompt “Driver registered time overdue” will occur, and the driver stops working. At this time, valid registration code is required to re-activate the driver.

[Operation]

1. Click “Driver registration” in the pull-down list of “Other” to open the driver registration window, see Fig. 10-7.
2. Enter the valid registration code in “Register code” input box.
3. The registration code can be obtained via APP “NcStudio Generator”. Refer to Section “Driver Registration” in users’ manuals of WISE servo driver for details.
4. Click “Register”. After registration, restart the driver to re-activate it.

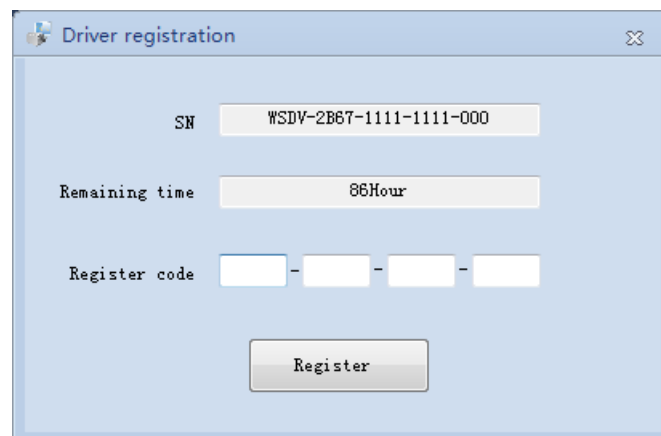


Fig. 10-7 Driver registration window

10.5 Language Selection

Multiple languages are supported in *iMotion* software. At present, Simplified Chinese, Traditional Chinese and English are optional.

Click “Language selection” in the pull-down list of “Other” to open the language selection window, as shown in Fig. 10-8.

After your language decision, click “OK” and further confirm in the prompt dialog box, as shown in Fig. 10-9. Click “OK” in the dialog box, then the software will restart and the language is switched successfully. Click “Cancel” to exit language selection and the target language will take effect after the software is restarted.

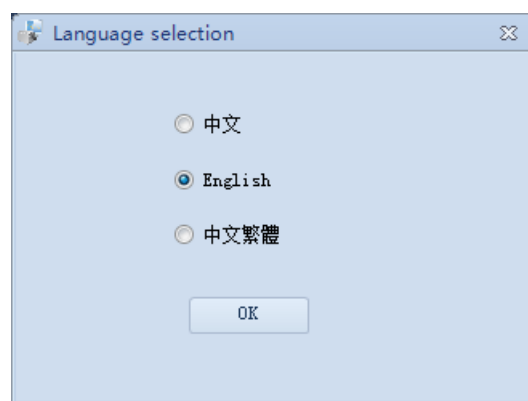


Fig. 10-8 Language selection

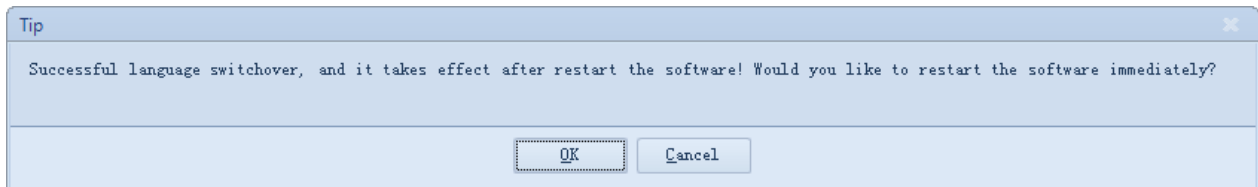


Fig. 10-9 Language switchover tip

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