

Drive Studio

Servo Debugging Software User Manual

V3.0

Table of Contents

1 Software Introduction	6
1.1 Drive Studio Introduction	6
1.2 Drive StudioConnection to Hardware	6
1.3 Drive StudioInstallation and Uninstallation	7
1.3.1 Installation	7
1.3.2 Uninstallation	9
1.3.3 Version Information	9
1.3.4 Precautions	9
2 Quick Start	10
2.1 New Project	10
2.2 Connect Device	12
2.2.1 Serial Port	12
2.2.2 Ethernet	13
2.3 Precautions	14
2.3.1 Serial Port	14
2.3.2 Ethernet	14
3 Basic Function	15
3.1 Project Operation	15
3.1.1 New Project	15
3.1.2 Open Project	16
3.1.3 Save Project	16
3.1.4 Close Project	16
3.1.5 Precautions	17
3.2 Multi-screen Display	18
3.3 Multi-device Debugging	19
3.4 Generate Support Package	20
3.5 Multilingual	21
4 BD3E-AP Driver Function	22
4.1 Toolbar Shortcut Functions	22
4.2 Configuration Wizard	23
4.2.1 Encoder Setting	23
4.2.2 Control Method and Command Input Setting	23
4.2.3 Frequency Divider Output Setting	26
4.2.4 Shutdown Mode Setting	26
4.2.5 Braking Resistor Setting	27
4.2.6 Button Function	27

4.3 Auto-tuning	29
4.3.1 Position Setting	29
4.3.2 Parameter Configuration	30
4.3.3 Tuning	31
4.3.4 Testing	31
4.3.5 Recipe Save	32
4.3.6 Precautions	32
4.4 Load estimation	33
4.4.1 Parameter Configuration	33
4.5 Oscilloscope	35
4.5.1 Continuous oscilloscope	35
4.5.2 Triggered oscilloscope	36
4.5.3 Menu item function	37
4.5.4 Precautions	38
4.6 Parameter setting	39
4.6.1 Grouping function	39
4.6.2 Search function	40
4.6.3 User permissions	40
4.6.4 Button Function	40
4.6.5 Menu item function	41
4.7 Parameter monitoring	42
4.7.1 Add Parameter	42
4.7.2 Delete Parameter	42
4.8 JOG Debugging	44
4.8.1 Speed Mode	44
4.8.2 Position Mode	45
4.8.3 Precautions	46
4.9 Black Box Function	47
4.9.1 Channel Configuration	47
4.9.2 Black Box Settings	48
4.9.3 Trigger settings	48
4.9.4 Button Function	49
4.10 I/O Signal Setting	50
4.10.1 Digital I/O	50
4.10.2 Virtual Digital I/O	51
4.11 Fault Management	53
4.11.1 Real-time Fault Monitoring	53
4.11.2 Fault Diagnosis	53
4.11.3 Fault History	54

4.11.4 Fault Dictionary	55
4.12 Mechanical Characteristics Analysis	56
4.12.1 Sweep Frequency Function	56
4.12.2 Menu item function	57
4.12.3 Precautions	57
4.13 Firmware Download	58
5 BD3E-EB Drive Function	59
5.1 Toolbar Shortcut Functions	59
5.2 Auto-tuning	59
5.2.1 Position Setting	60
5.2.2 Parameter Configuration	61
5.2.3 Tuning	61
5.2.4 Testing	62
5.2.5 Recipe Save	62
5.2.6 Precautions	63
5.3 Load estimation	64
5.3.1 Parameter Configuration	65
5.4 Oscilloscope	66
5.4.1 Continuous oscilloscope	66
5.4.2 Triggered oscilloscope	67
5.4.3 Menu item function	67
5.4.4 Precautions	69
5.5 Parameter setting	70
5.5.1 Grouping function	70
5.5.2 Search function	71
5.5.3 Button Function	71
5.5.4 Menu item function	72
5.6 Parameter monitoring	73
5.6.1 Add Parameter	73
5.6.2 Delete Parameter	73
5.7 Jog Debugging	75
5.7.1 Serial Speed	75
5.7.2 Serial Current	76
5.7.3 Serial Position	77
5.8 I/O Signal Setting	79
5.8.1 Digital I/O	79
5.9 Fault Management	81

5.9.1 Real-time Fault Monitoring	81
5.9.2 Fault Diagnosis	81
5.9.3 Fault History	82
5.9.4 Fault Dictionary	83
5.10 Mechanical Characteristics Analysis	84
5.10.1 Sweep Frequency Function	84
5.10.2 Menu item function	85
5.10.3 Precautions	85
5.11 Return to Zero	86
5.11.1 Parameter Configuration	86
5.12 Terminal	88
5.12.1 VarCom Command	88
5.13 Script	89
5.13.1 Menu item function	89
5.13.2 Edit Script	90
5.14 Firmware Download	91

1 Software Introduction

1.1 Drive Studio Introduction

Drive Studio is a general-purpose software for servo products, providing a complete configuration, debugging, and monitoring environment for servos.

1.2 Drive Studio Connection to Hardware

Using Drive Studio software to debug servos, it supports connections through serial port and Ethernet with the device. After setting the connection parameters (or scanning the device), you can perform online debugging of the servo device.

1.3 Drive Studio Installation and Uninstallation

1.3.1 Installation

1. After obtaining the installation package, use Windows Explorer to navigate to the directory containing the installation file, and double-click to open Setup_DriveStudio_x.x.x.x_x64.exe (please ensure that you are installing the latest version).
2. After launching the installation, you will see the following interface, indicating that the installation phase has begun. Click “Next Step” to start the installation:

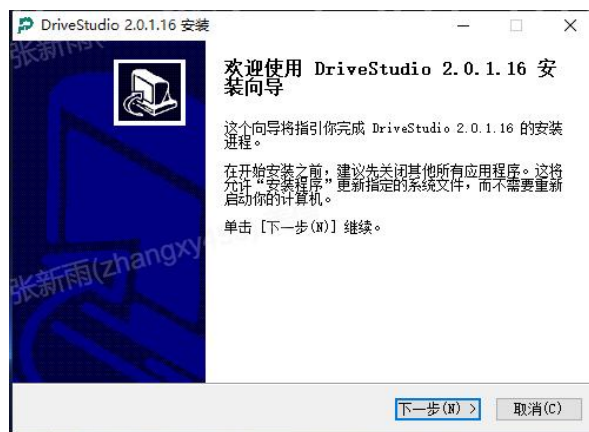


Figure 1- 1

3. Set the software installation path, please set an English installation path. Click “Install” to proceed to the next step:



Figure 1- 2

4. After the following interface is displayed, wait for the installation progress bar:



Figure 1- 3

5. Until the interface shown in the figure below appears, click “Finish” to complete theDrive Studio installation.



Figure 1- 4

6. After installation, the interface operation language defaults to Simplified Chinese. If you need to switch to another language, find the 【Tools】 menu in the softwaremenu bar and click it, then click the 【Options】 menu item to set the software language.



Figure 1- 5

1.3.2 Uninstallation

Uninstall Drive Studio using the standard Windows system method for uninstalling software. The specific steps are as follows:

1. Exit the Drive Studio software.
2. Select "Start->Settings->Control Panel" .
3. Select "Programs->Uninstall a Program" .
4. Select the software item to be uninstalled, find "DriveStudio" .
5. Right-click the list item with the mouse, select the "Uninstall" button, and confirm the uninstallation.

1.3.3 Version Information

The user can click the [Version Information] option in the software's [Help] menu to view the software version and historical update notes:



Figure 1- 6

1.3.4 Precautions

1. When installing Drive Studio, please check the remaining space on the computer's hard drive, and confirm that the target drive has at least 500M of available space.
2. It is recommended to install using the default directory; custom installation directories that include Chinese characters or spaces are not supported.
3. Before installing a new version, it is recommended to first uninstall the old version of the software.
4. To ensure the software can communicate properly with the device, the serial port driver must be correctly installed first. The installation program path is in the installation directory of the host computer: SerialPortDriver/CH343CDC/SETUP.EXE. Restart the computer after installation.

2 Quick Start

2.1 New Project

1. Double-click Left Mouse Button on the desktop software icon  This will start the Drive Studio software, the start page display is as follows:

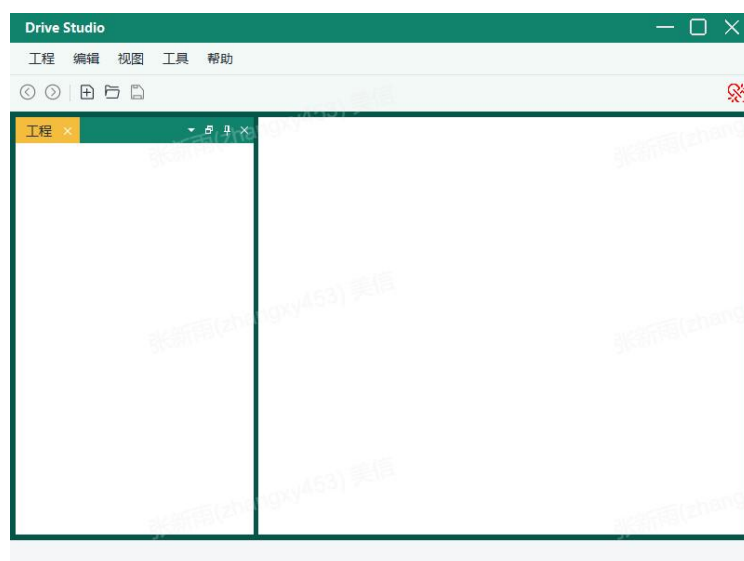


Figure 2- 1

2. In the software menu bar, find and click the **【Project】** menu, and click the **【New】** menu item to create a new project. In the new project window, select online mode, after the device scan is complete, and specify a project name and save path, as shown in the figure below:

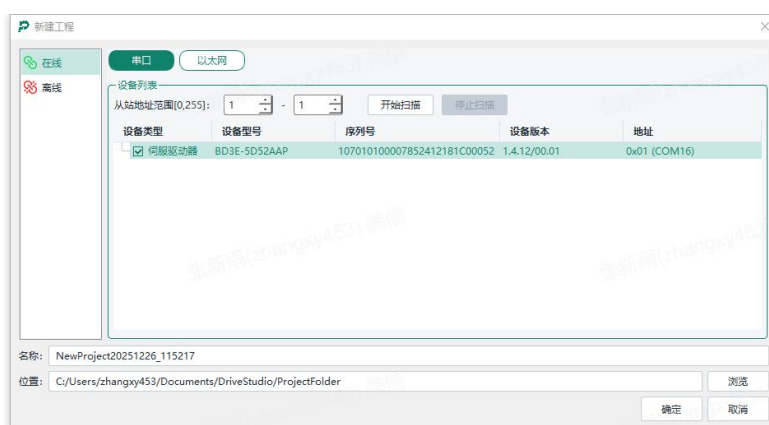


Figure 2- 2

- Click "OK" to enter the debugging interface, the window layout is as shown in the figure below:



Figure 2- 3

- The commonly used buttons in the left device area are as follows:



Figure 2- 4

2.2 Connect Device

Double-click Left Mouse Button on the 【Device】 node in the project window to open the 【Communication Settings】 option, as shown in the figure below:



Figure 2- 5

2.2.1 Serial Port

1. Directly modify the port and baud rate to connect the device, as shown in the figure below:



Figure 2- 6

2. By clicking the [Scan] button, scan for online devices, select the device, then click the [OK] button, or double-click the left mouse button on the device row to connect the device, as shown in the figure below:

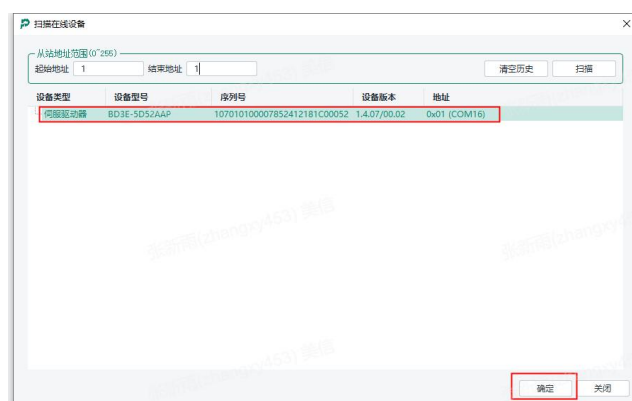


Figure 2- 7

2.2.2 Ethernet

1. Connect to the device by directly modifying the IP address and port, as shown in the figure below:

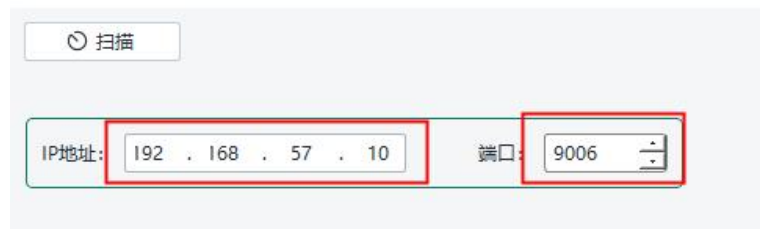


Figure 2-8

2. By clicking the [Scan] button, scan for online devices, select the device, then click the [OK] button, or double-click the left mouse button on the device row to connect the device, as shown in the figure below:

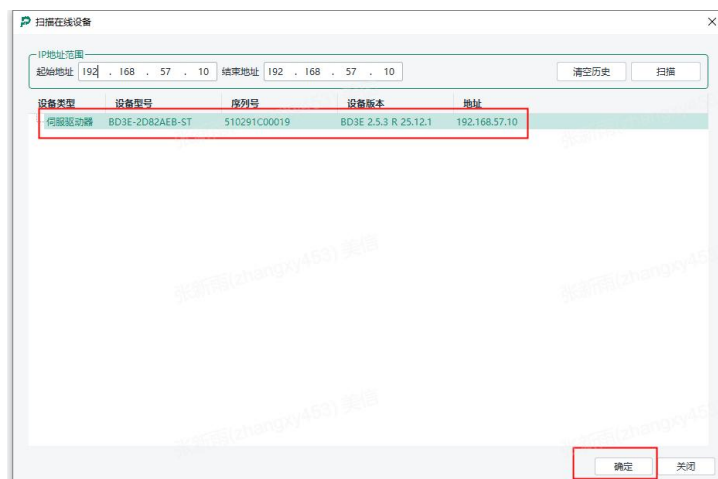


Figure 2-9

2.3 Precautions

2.3.1 Serial Port

1. Currently, only the baud rates of 19200, 115200, 921600, and 2000000 are supported.
2. Data bits, stop bits, and parity bits are pre-configured.
3. The default slave address range is 1, and the address range is automatically adjusted according to the requirement during device scanning.

2.3.2 Ethernet

1. Device scanning supports only the same subnet, and the IP address range is automatically adjusted according to the requirement.

3 Basic Function

3.1 Project Operation

3.1.1 New Project

Function Entry:

1. Menu bar: Find the [Project] menu in the software menu bar and click it, then create a new project by clicking the [New] menu item.
2. Toolbar: Software toolbar click[]icon,create a new project.
3. Keyboard: Through [Ctrl+N] shortcut, create a new project.

Creation method:

1. Online: Automatically scan online devices, display all online devices in a list, as shown in the following figure:

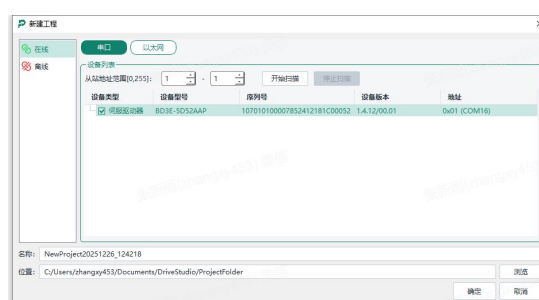


Figure 3- 1

2. Offline: Display supported devices in a graphical manner, as shown in the following figure:

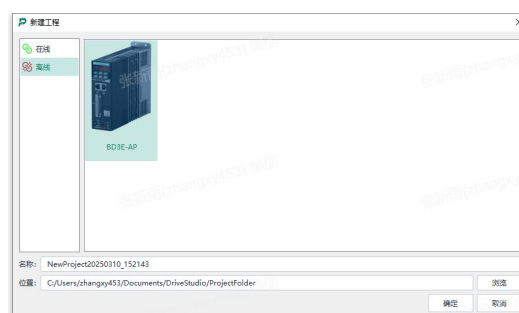


Figure 3- 2

3.1.2 Open Project

Function entry:

1. Menu bar: In the software menu bar, find the [Project] menu and click, open a project by clicking the [Open] menu item.
2. Toolbar: Software toolbar click[] icon, open a project.
3. Keyboard: Through [Ctrl+O] shortcut, open a project.
4. Menu bar: In the software menu bar, find the [Project] menu and click, open a recently used project by clicking the [Recent Projects] menu item, which displays the last 10 opened projects, select a project and open it.

3.1.3 Save Project

Function entry:

1. Menu bar: In the software menu bar, find and click the 【Project】 menu, and save the current project by clicking the 【Save】 menu item.
2. Toolbar: Software toolbar click[] icon, save the current project.
3. Keyboard: Save the current project by using the 【Ctrl+S】 shortcut key.
4. Menu bar: In the software menu bar, find and click the 【Project】 menu, and save the current project to another path by clicking the 【Save As】 menu item.
5. Keyboard: Save the current project to another path by using the 【Ctrl+Shift+S】 shortcut key.

3.1.4 Close Project

Function entry:

1. Menu bar: In the software menu bar, find and click the 【Project】 menu, and close the current project by clicking the 【Close】 menu item.
2. Keyboard: Close the current project by using the 【Ctrl+Shift+W】 shortcut key.
3. Project tree: Right-click the [Project node] in the project window, in the pop-up menu window, click the [Close project] menu item to close the current project, as shown in the following figure:

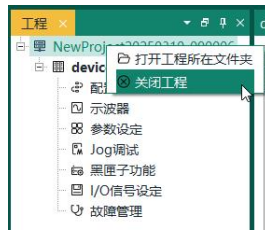


Figure 3- 3

3.1.5Precautions

1. Only project files generated by this software, with the extension project.prj, are supported.
2. The project path does not contain Chinese, spaces, or other symbols.

3.2 Multi-screen Display

The software supports the simultaneous display of multiple functions, facilitating users to view waveforms and monitor parameters during the adjustment process, as shown in the following figure:

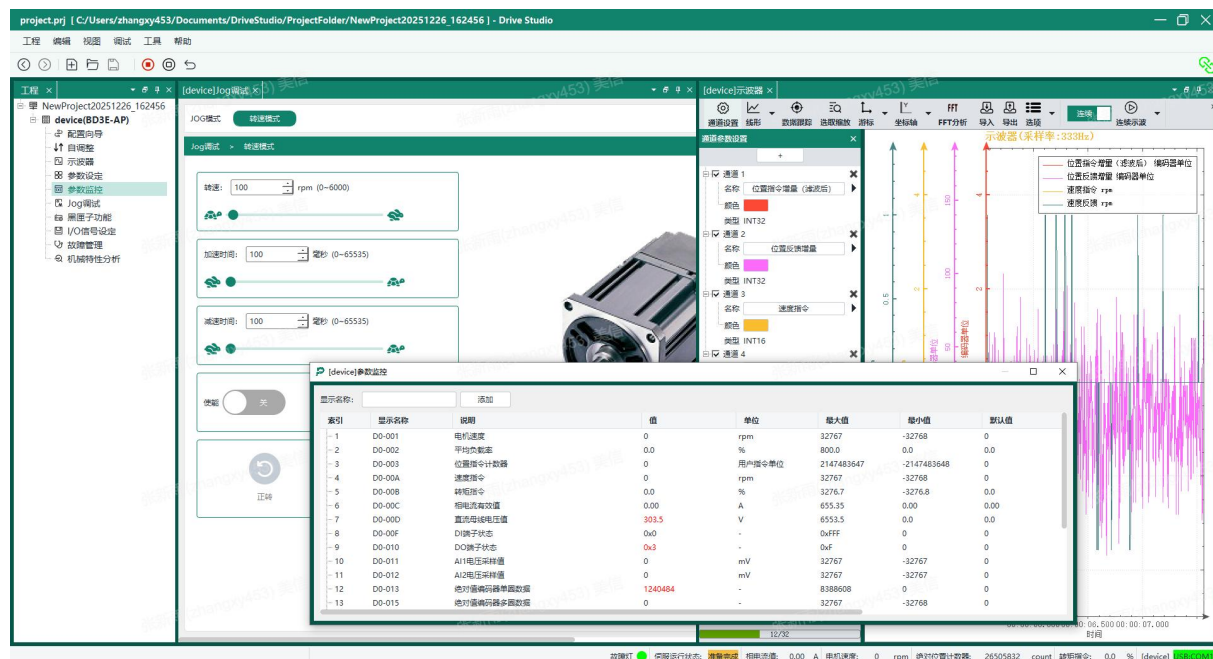


Figure 3-4

3.3 Multi-device Debugging

The project window supports the display of multiple devices; right-click the device node and select the [Set as current device] menu item to switch the currently online debugging device, as shown in the following figure:

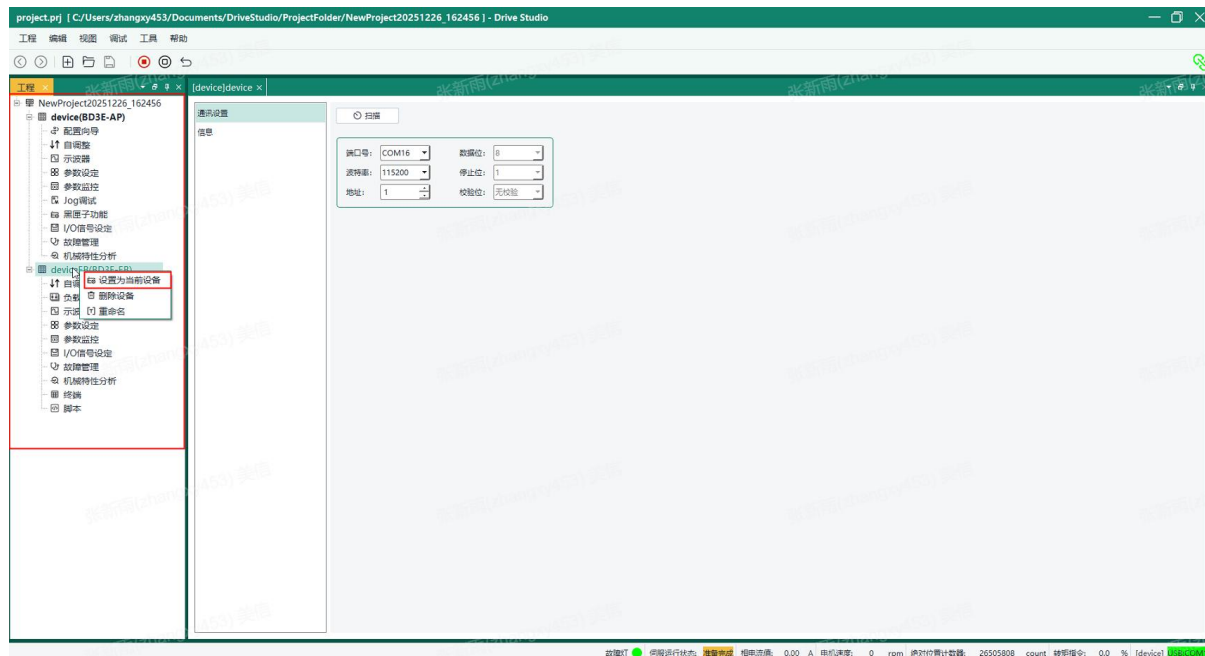


Figure 3-5

3.4 Generate Support Package

In the software menu bar, find and click the [Tools] menu, then click the [Generate support package] menu item to create a ZIP data package, as shown in the following figure:

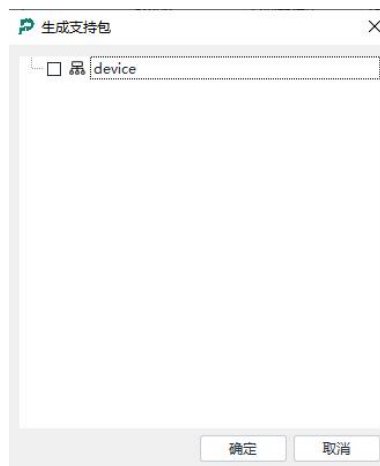


Figure 3- 6

1. Select the device from which you need to extract data.
2. Click OK to select the file save path.
3. Package the software operation logs, crash logs, drive failures, etc., into a ZIP file.

3.5 Multilingual

In the software menu bar, find the [Tools] menu and click it. Then, click the [Options] menu item to set the software language, as shown in the figure below:



Figure 3- 7

1. Select the target language in the language selection options.
2. Click OK, and the language setting will take effect after restarting the software.

4 BD3E-AP Driver Function

4.1 Toolbar Shortcut Functions

When the device is online, the toolbar quick debugging menu items, as shown in the figure below:



Figure 4-1

4.2 Configuration Wizard

The configuration wizard function helps users set necessary parameters for the drive. Double-click the [Configuration Wizard] node in the project window with the left mouse button, as shown in the figure below:

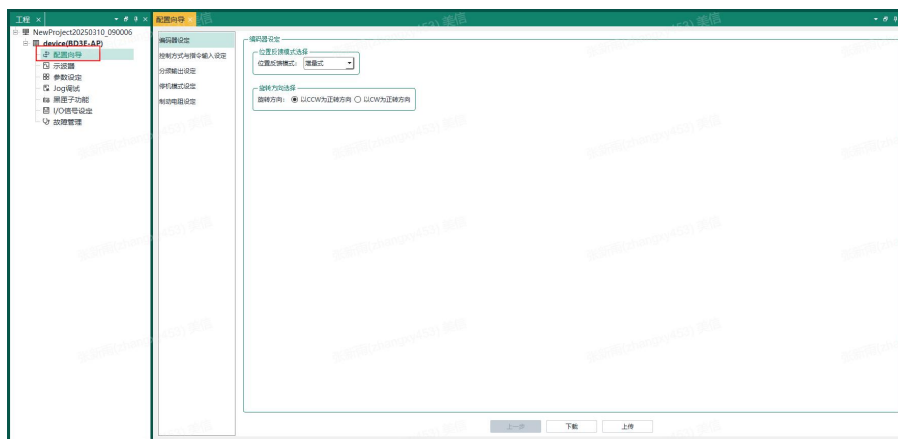


Figure 4- 2

4.2.1 Encoder Setting

Left-click the [Encoder Settings] option in the function window, to configure the position feedback mode, rotation direction, as shown in the figure below:

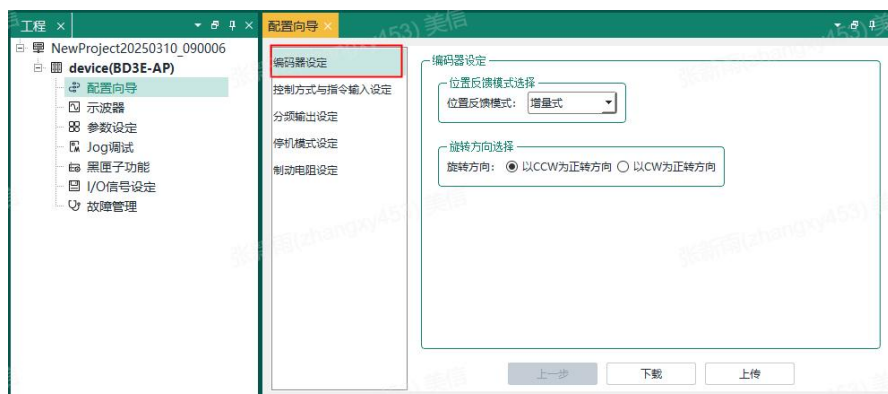


Figure 4- 3

4.2.2 Control Method and Command Input Setting

Left-click the [Control Method and Command Input Settings] option in the function window to configure related parameters, as shown in the figure below:

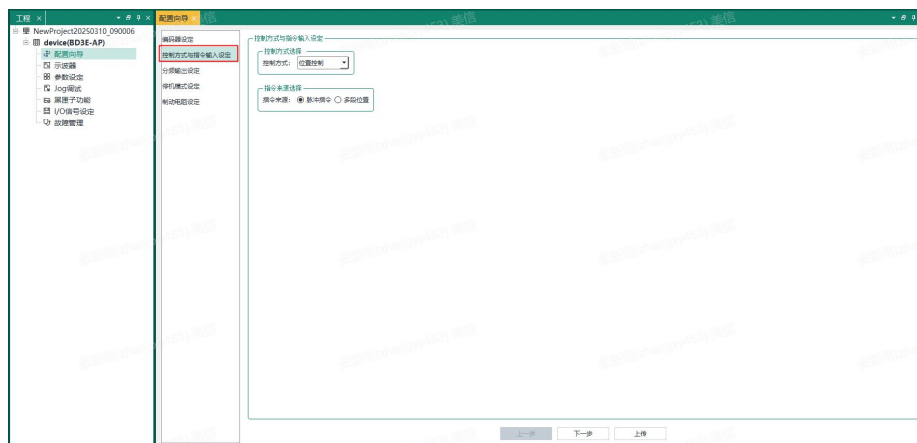


Figure 4- 4

The control method option supports three modes: position, speed, and torque. Depending on the selected control method, different parameters need to be configured:

1. For position control, parameters to be configured in sequence are shown in the figure below:

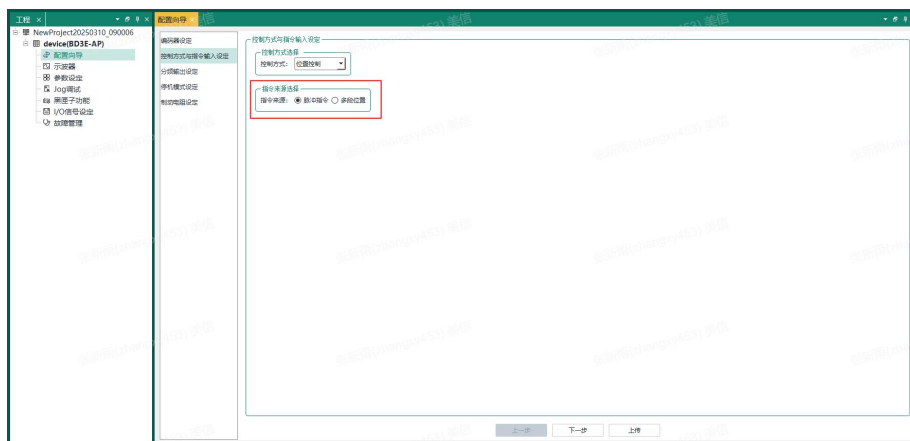


Figure 4- 5

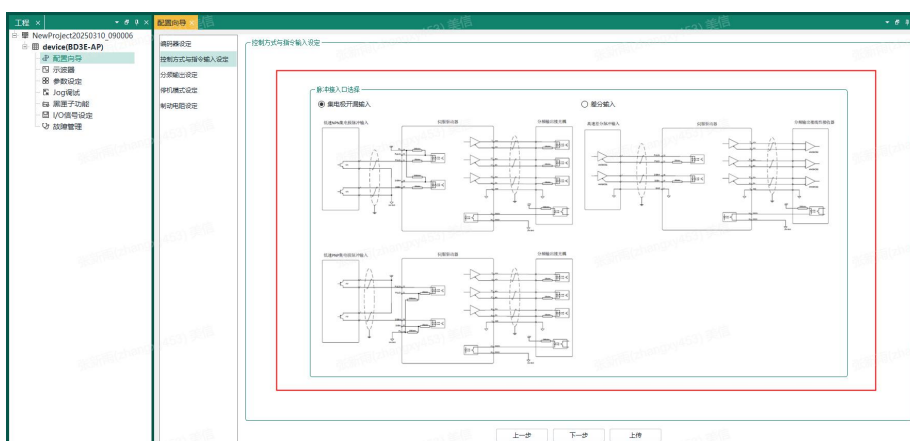


Figure 4- 6

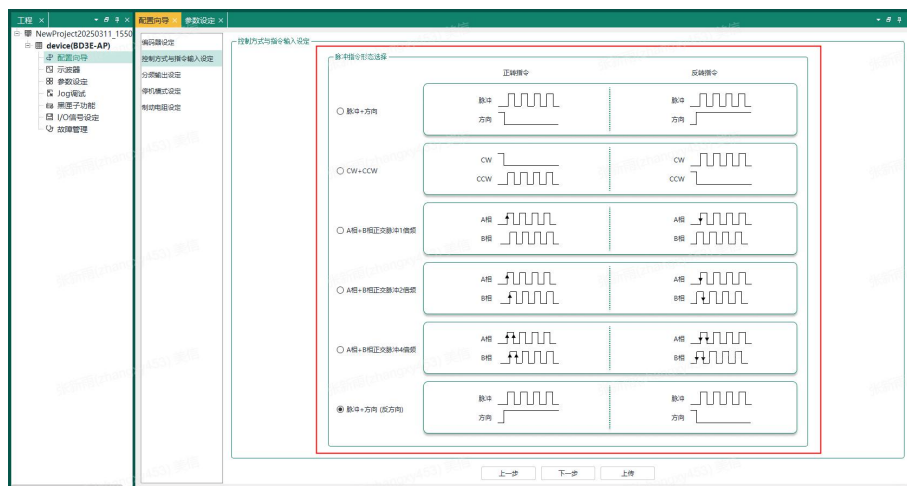


Figure 4- 7

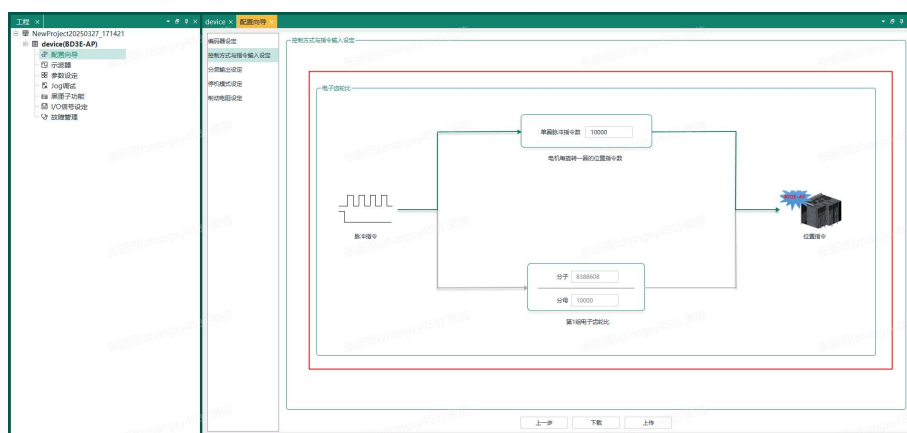


Figure 4- 8

Note: After setting the single-turn pulse count to 0, the configuration of the single-turn pulse count does not take effect. The relationship between the pulse command and the position command is set through the electronic gear ratio below.

2. Speed control, parameters that need to be configured, as shown in the following figure:

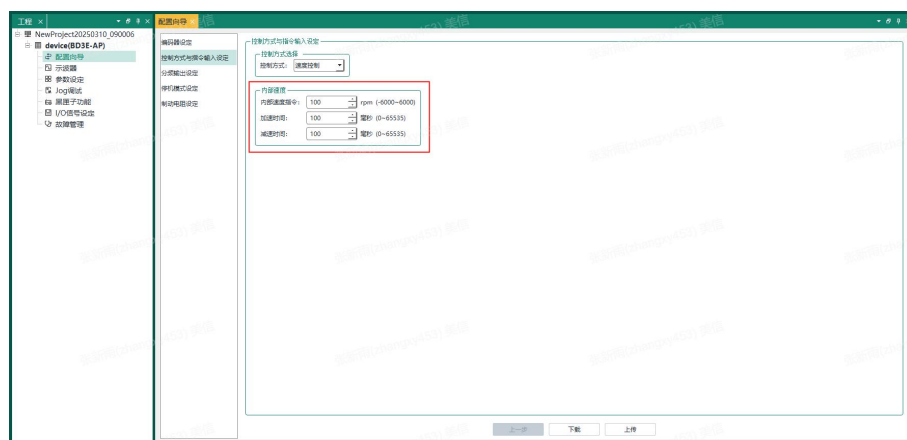


Figure 4- 9

3. Torque control, parameters that need to be configured, as shown in the following figure:

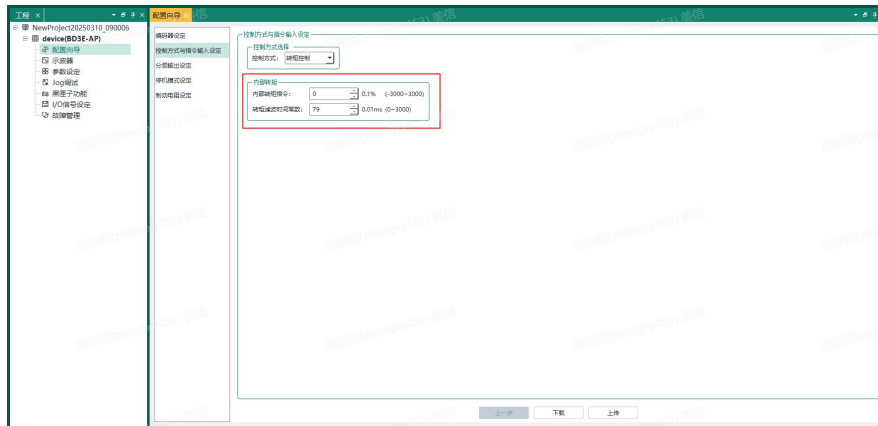


Figure 4- 10

4.2.3 Frequency Divider Output Setting

Left-click the [Divided Output Setting] option in the function window, the divided output setting is used to configure the number of single-turn pulses and pulse output timing for divided output, which can set the number of pulses output corresponding to each motor rotation and AB pulse timing, as shown in the following figure:

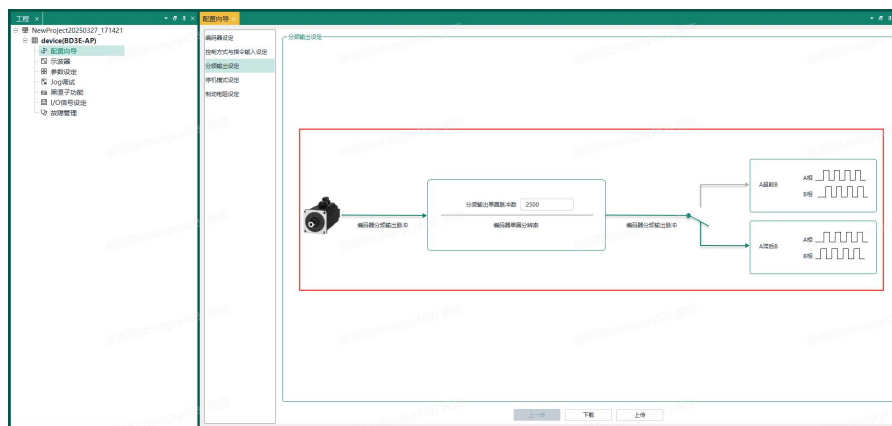


Figure 4- 11

4.2.4 Shutdown Mode Setting

Left-click the [Stop Mode Setting] option in the function window, in the stop mode setting, configurations can be made for the brake timing, servoOFF stop method, fault NO.1 stop method, fault NO.2 stop method, and overtravel stop method, as shown in the following figure:

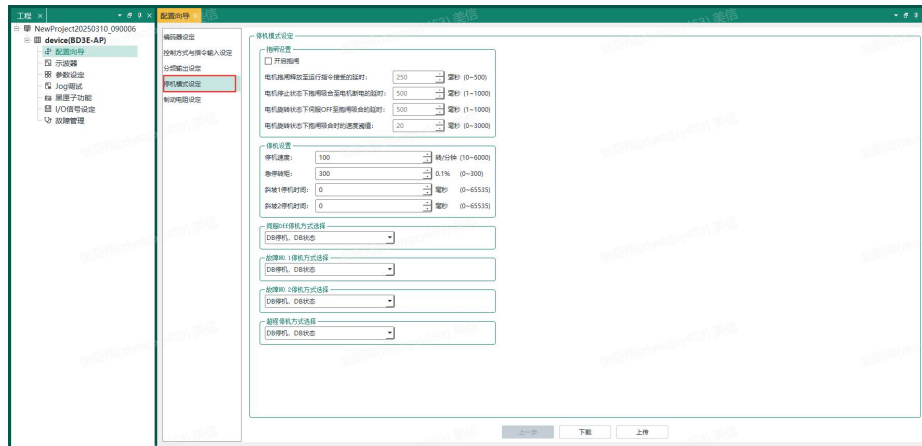


Figure 4- 12

4.2.5Braking Resistor Setting

Left-click the [Brake Resistor Setting] option in the function window to configure related parameters. When the motor's torque direction and speed direction are opposite, energy is transferred from the motor back to the drive, causing the bus voltage to rise. When the voltage rises to the brake point, the energy is dissipated through either an internal or external brake resistor; otherwise, the drive may be damaged, as shown in the following figure:

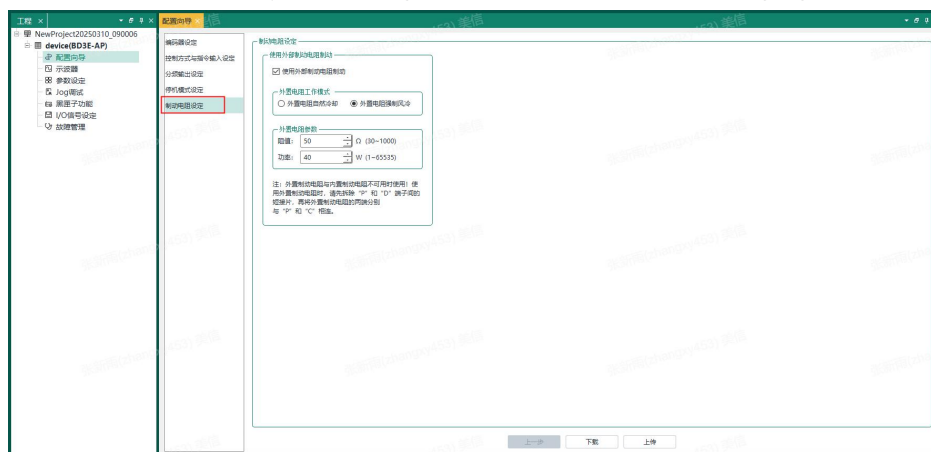


Figure 4- 13

Note:

1. The brake resistor can be either built-in or externally connected, but not both simultaneously.
2. When the use of an external brake resistor option is selected, you can choose between natural cooling and forced air cooling for the external resistor. At the same time, you need to configure the corresponding external resistor value and power.

4.2.6Button Function

- Download:Download the current interface configuration to the drive.

- Upload:Read the parameter setting values corresponding to the drive back to the configuration wizard interface.
- Previous Step:Allows you to return to the previous configuration interface.
- Next Step:Allows you to advance to the next configuration interface.

4.3 Auto-tuning

Double-click the left mouse button on the [Auto-tuning] node in the project window, as shown in the following figure:

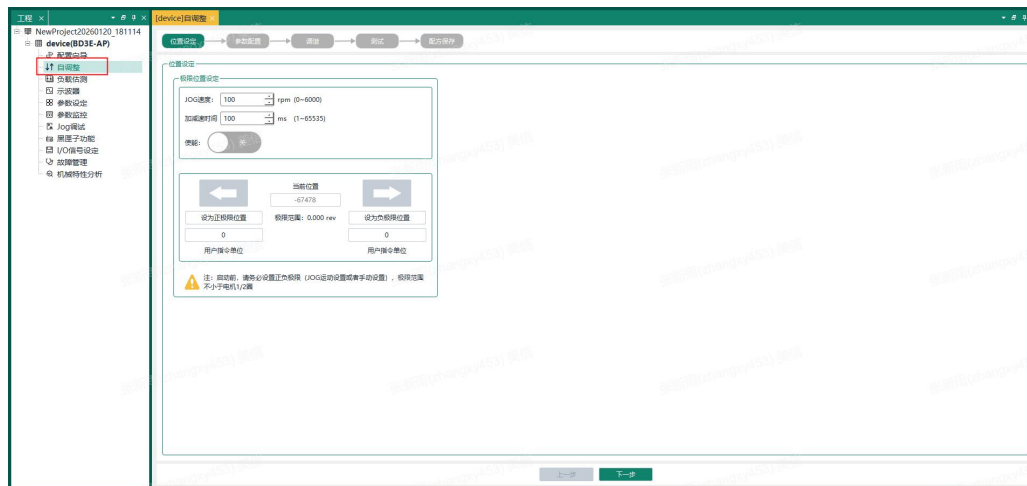


Figure 4-14

4.3.1 Position Setting

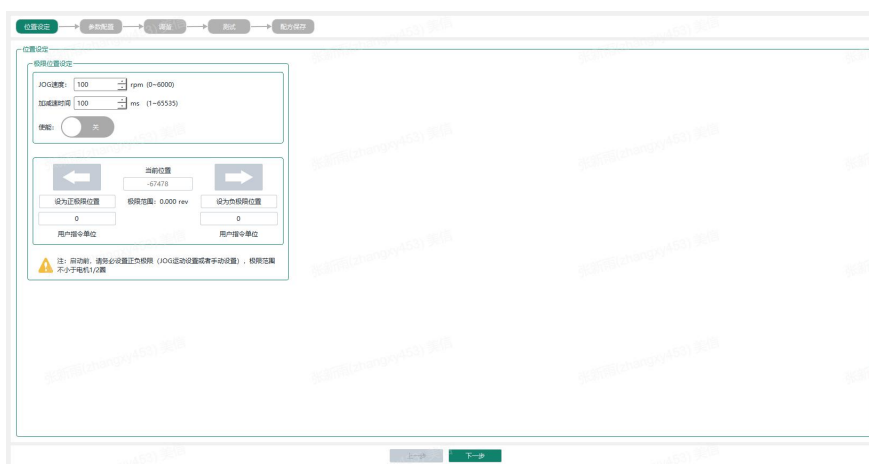


Figure 4-15

The usage procedure is as follows:

1. Configure JOG speed and acceleration/deceleration time parameters.
2. Click the [Enable] button to enable the motor.

3. Hold down the left mouse button  or  to control the rotation of the motor; the motor stops when the mouse button is released. The 'Current Position' displays the motor's current operating position in real-time, clicking the [Set as positive limit position] / [Set as negative limit position] button sets the current position as the positive or negative limit position.
4. Click the [Next Step] button to enter the 'Parameter Configuration' page;

4.3.2 Parameter Configuration

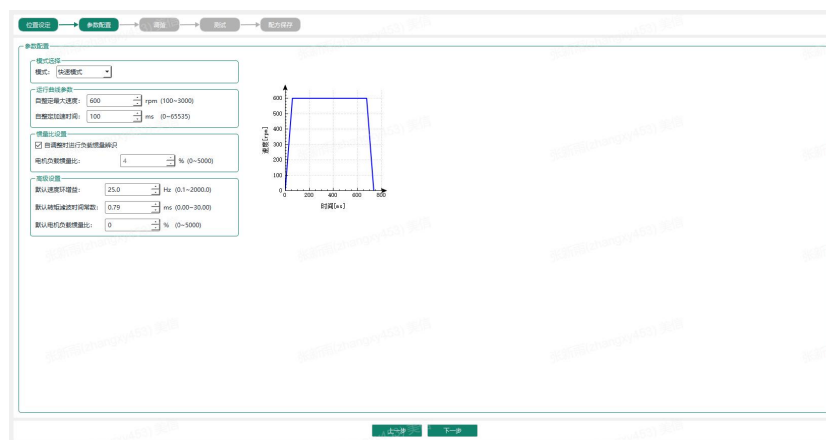


Figure 4-16

The usage procedure is as follows:

1. Set parameters according to the scene requirements, and the analog operation curve will be generated on the right based on the settings.
2. Click the [Next Step] button to enter the 'Tuning' page;

4.3.3 Tuning

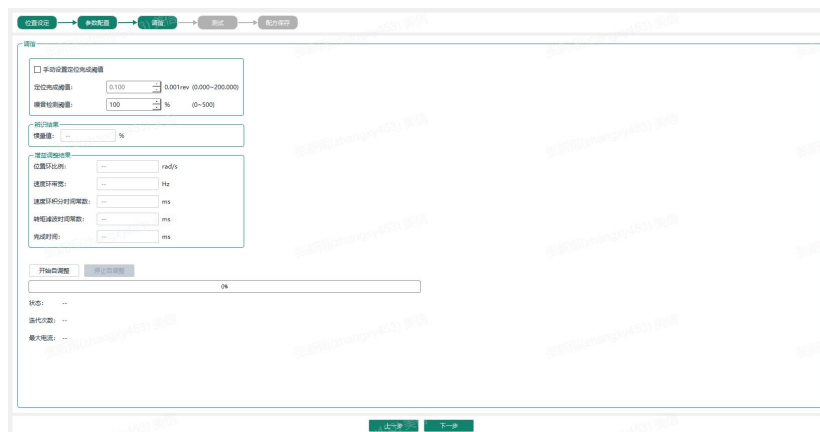


Figure 4-17

The usage procedure is as follows:

1. Set parameters according to the scene requirements.
2. Click the [Start Auto-tuning] button to perform auto-tuning; the progress bar shows the progress. During the tuning process, you can click the [Stop Auto-tuning] button to stop the tuning.
3. After the tuning is complete, click the [Next Step] button to enter the 'Test' page;

4.3.4 Testing

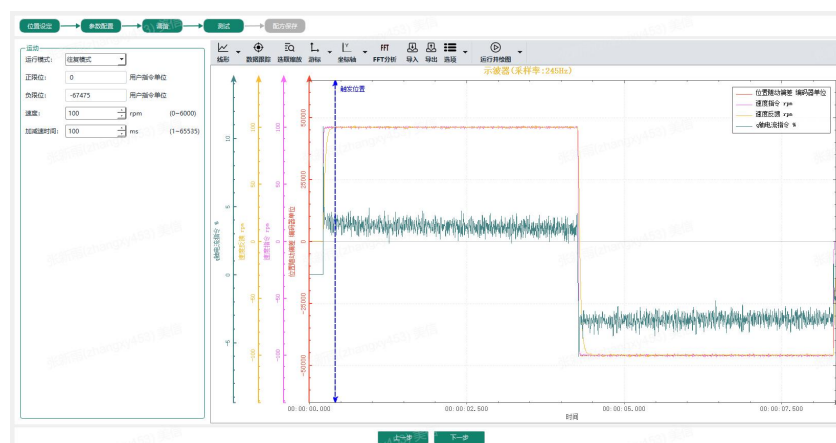


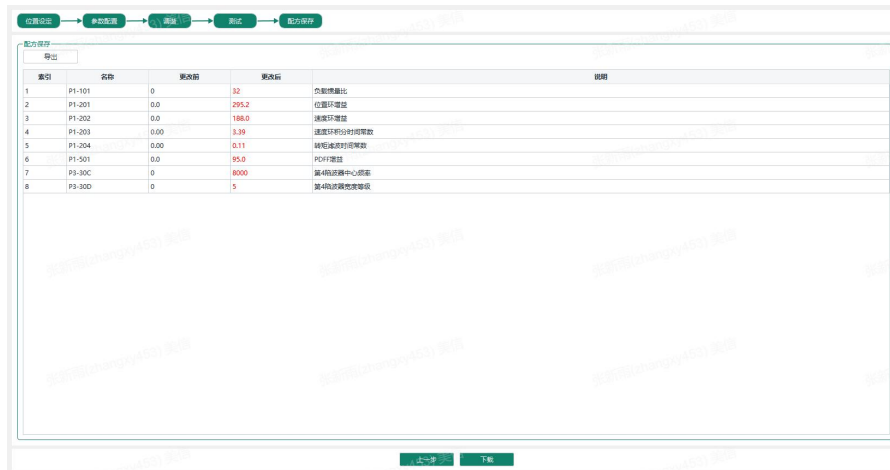
Figure 4-18

The usage procedure is as follows:

1. Parameter settings, including operating mode, positive and negative limits, speed, acceleration and deceleration time.

- Click  the button to perform data acquisition.
- Click the [Next Step] button to enter the 'Recipe Save' page.

4.3.5 Recipe Save



索引	名称	原值	新值	说明
1	P1-101	0	32	负载惯量比
2	P1-201	0.0	295.2	位置环增益
3	P1-202	0.0	188.0	速度环增益
4	P1-203	0.00	3.39	速度反馈积分时间常数
5	P1-204	0.00	0.11	转矩反馈积分时间常数
6	P1-501	0.0	95.0	PI控制增益
7	P3-30C	0	8000	第4轴位置中心偏差
8	P3-30D	0	5	第4轴位置偏差增益

Figure 4-19

- The adjusted result parameters will be displayed. After confirming that there are no errors, click the [Download] button to download the auto-tuned parameters to the drive.
- Click the [Export] button to save the tuning results to the recipe.

4.3.6 Precautions

- During mechanical analysis and oscilloscope data acquisition, the auto-tuning function cannot be used;

4.4 Load estimation

Double-click the [Load Estimation] node in the project window with the left mouse button, as shown in the following figure:

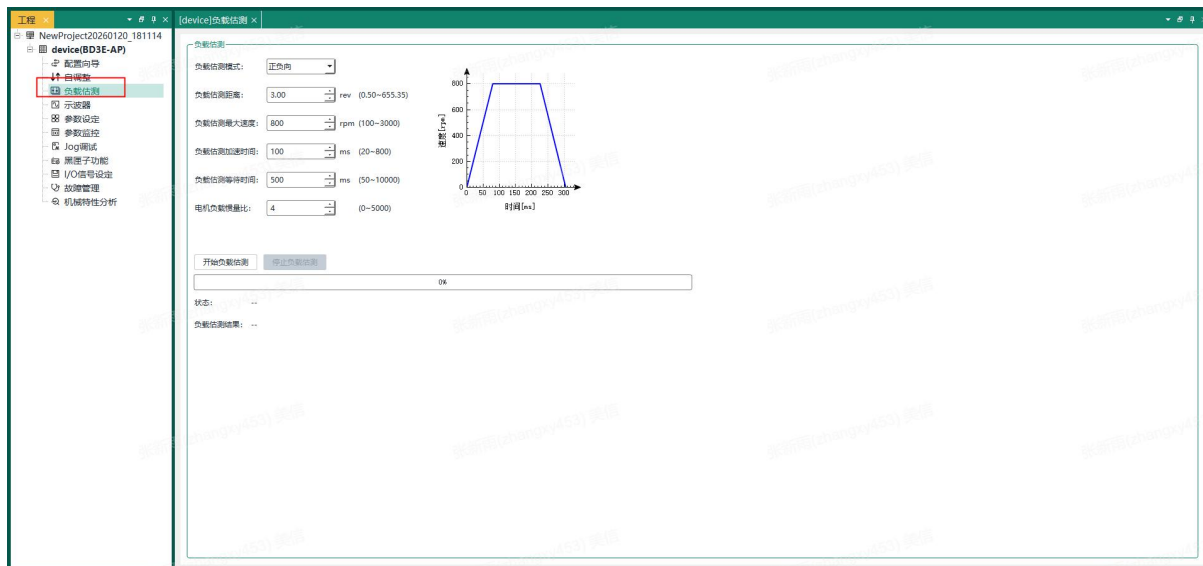


Figure 4-20

The usage procedure is as follows:

1. Set parameters according to the scene requirements, and the analog operation curve will be generated on the right based on the settings.
2. Click the [Start Load Estimation] button to perform load estimation; the progress bar shows the progress of load estimation. During the load estimation process, you can click the [Stop Load Estimation] button to stop the load estimation.
3. After completion, the load estimation results are automatically saved to the drive.

4.4.1 Parameter Configuration

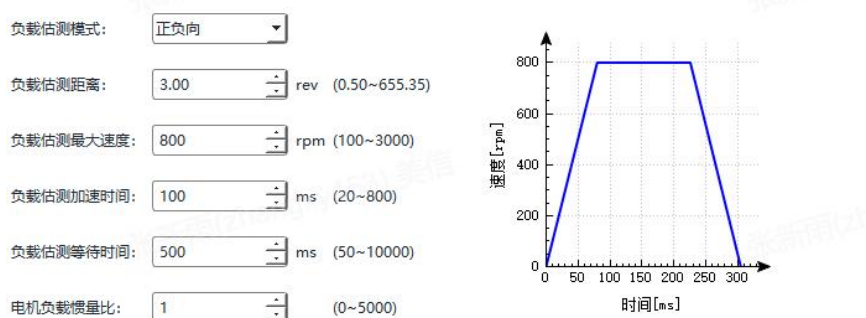


Figure 4-21

- Load Estimation Mode: Includes forward-backward movement mode.
- Load Estimation Distance: The travel distance during the load estimation process.
- Load estimation maximum speed: Load maximum speed during the estimation process.
- Load estimation acceleration time: Time for acceleration and deceleration during the load estimation process.
- Load estimation wait time: Time intervals required during the load estimation process.
- Motor Load Inertia Ratio: Current motor inertia value.

4.5 Oscilloscope

Double-click the 【Oscilloscope】 node in the project window as shown in the figure below:

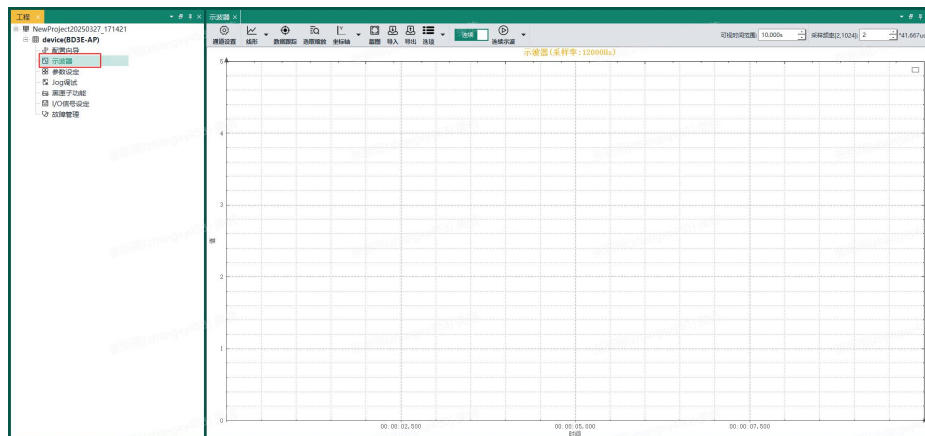


Figure 4- 22

4.5.1 Continuous oscilloscope

The usage procedure is as follows:

1. Channel settings, select the required channels in the channel parameter settings as shown in the figure below:

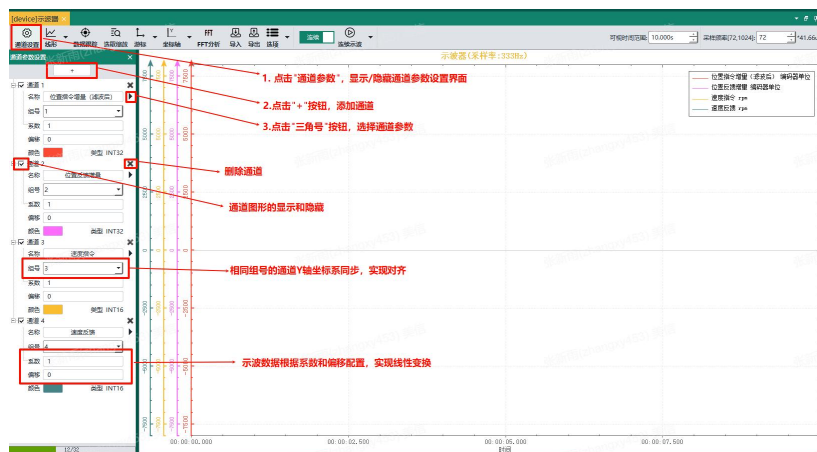


Figure 4- 23

通道参数

参数	参数编号	单位	数据类型
外部DI1	1	-	BIT
外部DI2	2	-	BIT
外部DI3	3	-	BIT
外部DI4	4	-	BIT
外部DI5	5	-	BIT
外部DI6	6	-	BIT
外部DI7	7	-	BIT
DO1	13	-	BIT
DO2	14	-	BIT
DO3	15	-	BIT
DO4	16	-	BIT
DO5	17	-	BIT
母线电压	32	0.1V	UINT16
AI1	33	mV	INT16
AI2	34	mV	INT16
AO1	35	mV	INT16
AO2	36	mV	INT16
位置指令计数值	160	编码器单位	INT64
位置指令增量	161	编码器单位	INT32
位置反馈增量	162	编码器单位	INT32
位置反馈差	163	编码器单位	INT32

确定 取消

Figure 4- 24

2. Sampling frequency setting *41.6us, the software will automatically calculate the range of sampling frequencies that can be set based on the number and size of the channels set.
3. Click Button, start continuous oscilloscope.
4. Click Button, stop oscilloscope.

4.5.2 Triggered oscilloscope

The usage procedure is as follows:

1. Click Button, switch to status.
2. Channel settings.
3. Trigger settings, set trigger conditions in the trigger settings window as shown in the following figure:

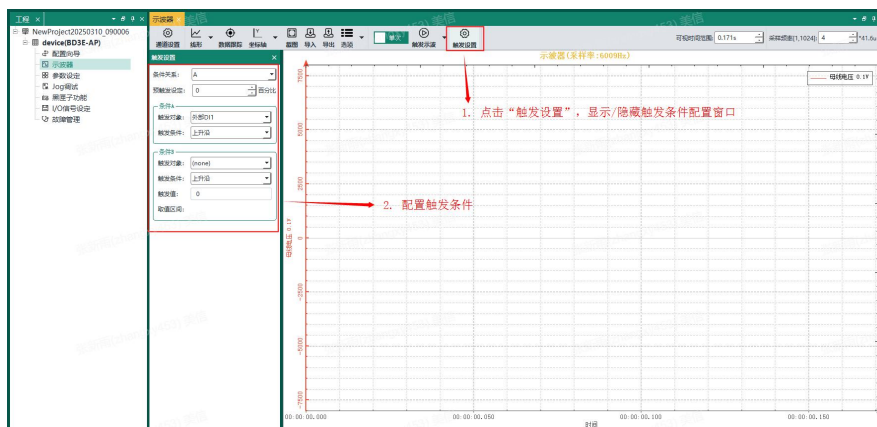


Figure 4- 25

4. Click  Button, start oscilloscope triggering.
5. Click  Button, stop oscilloscope.

4.5.3 Menu item function

Oscilloscope function, as shown in the following figure:

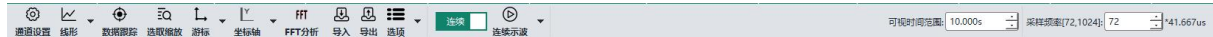


Figure 4- 26

- Channel settings: set sampling parameters.
- Line shape: graph style, can set line graph, scatter plot, point marker, and square wave display modes.
- Data tracking: Selecting this, the X/Y axis values of the point will be displayed in real-time according to the mouse pointer.
- Zoom selection: selecting this, the specified area can be magnified by left-clicking and dragging; double-clicking the left mouse button restores the display.
- Cursor: After setting vertical and horizontal cursors, the cursor information window will display. Cursor measurements can be taken by dragging the block with the left mouse button.
- Coordinate Axis: Set the curve display on the interface to X/Y axis adaptation, Y-axis alignment, Y-axis tiling, and coordinate axis adaptation.
- FFT Analysis: Perform FFT analysis, including amplitude frequency analysis. After selecting the corresponding channel curve, offline analysis mode is supported.
- Import/Export: Import and export oscilloscope data, supporting CSV and Excel table formats.
- Options: Set X/Y grid lines. The screenshot function captures the currently displayed waveform/saves the screenshot, supporting PNG and PDF format saving.
- Continuous/Single Button: Switch trigger mode.
- Oscilloscope Button: Start/stop oscilloscope.
- Trigger settings: Set trigger conditions.
- Visible time range: X-axis visible range.
- Sampling Frequency: $n \times 41.66\mu s$ period.
- Coordinate axis zoom in/out function: Click the coordinate axis and use the mouse scroll wheel to zoom in/out.

Right-click menu function, as shown in the figure below:

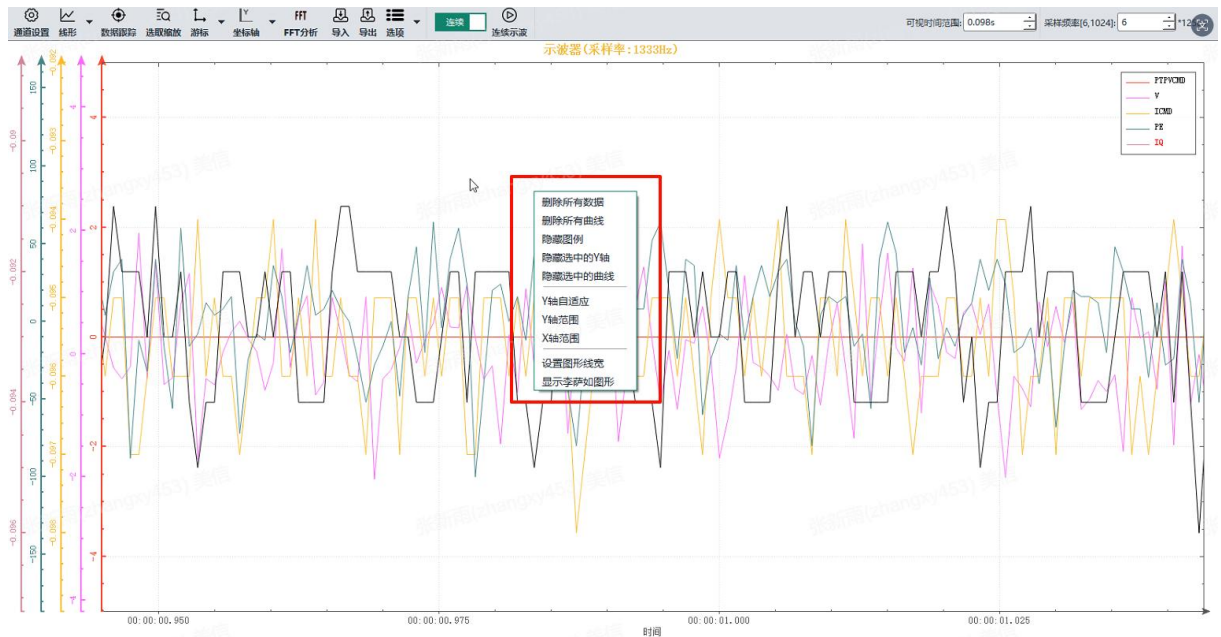


Figure 4-27

- Delete all data: Delete all channel sampling data.
- Delete all curves: Delete all channel configurations and sampling data.
- Hide/Show Legend: Hide/Show legend window.
- Hide/Show Selected Y-axis: Hide/Show the Y-axis of the selected channel;
- Hide/Show Selected Curve: Hide/Show the Y-axis and curve of the selected channel;
- Y-axis Adaptation: Y-axis adaptation of the selected channel;
- Y-axis Range: Set the Y-axis range of the selected channel;
- X-axis Range: Set the X-axis range;
- Set graph line width: Set the curve width;
- Display Lissajous Figure: Display the Lissajous figure window;

4.5.4 Precautions

1. During Mechanical Analysis and Auto-tuning data acquisition, the oscilloscope function is not available;

4.6 Parameter setting

Double-click the Left Mouse Button on the [Parameter setting] node in the project window, as shown in the figure below:



Figure 4- 28

4.6.1 Grouping function

In addition to the default groups of the device, the parameter setting provides the [Non-default Parameters] group, which mainly categorizes parameters with current values different from the default values into this group, as shown in the following figure:

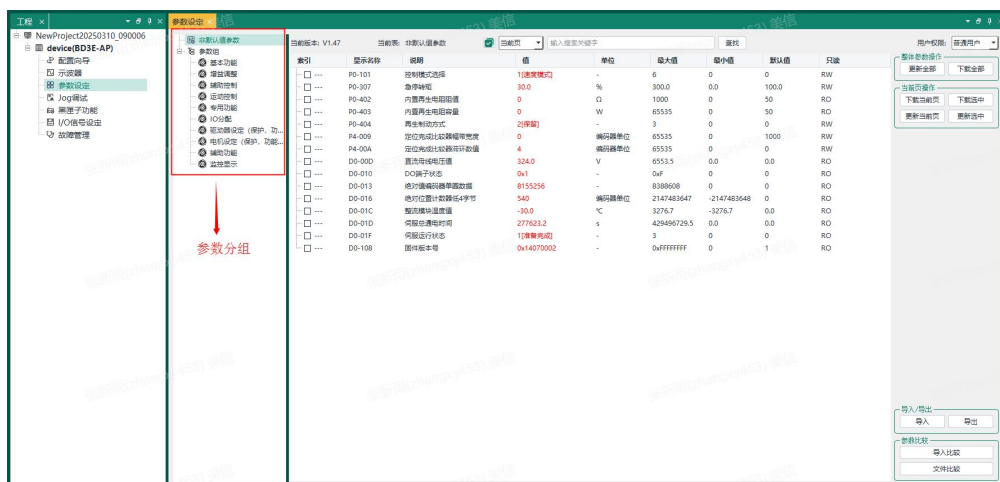


Figure 4- 29

4.6.2 Search function

Supports a search mode for full attribute text matching of parameters, allowing search on the current page/all pages, as shown in the following figure:



Figure 4- 30

4.6.3 User permissions

Depending on the different user roles, different parameter lists are displayed.

4.6.4 Button Function

- Update All: Read back the parameter values from the drive to the interface.
- Download All: Download the parameters of the parameter group to the drive.
- Update All Selected: Read back the values of the parameters checked in all groups from the drive to the interface.
- Download All Selected: Download the checked parameters in all groups to the drive.
- Download Current Page: Download the parameters of the current group to the drive.
- Update Current Page: Read the parameter values from the drive of the current group back to the interface.
- Download Selected: Download the selected parameters in the current group to the drive (or press the Enter key for quick download of the selected parameters).
- Update Selected: Read the values of the selected parameters in the current group from the drive back to the interface.
- Import/Export: Import and export parameter tables, supporting CSV format.

4.6.5 Menu item function

Right-click a parameter row in the parameter table to pop up the menu window, as shown in the figure below:



Figure 4- 31

- Add to Parameter Monitoring: Add the parameters selected by the mouse to the parameter monitoring module.
- Select Current Page: Select all parameters in the current group.
- Uncheck Current Page: Uncheck all parameters in the current group.
- Select All Pages: Check all parameters in all groups.
- Unselect All Pages: Uncheck all parameters in all groups.
- Update Current Row: Read the parameter values of the current row in the current group from the drive to the interface.
- Download Current Row: Download the parameter values of the current row in the current group to the drive.
- Update Selected Rows: Read the parameter values of the selected rows in the current group from the drive to the interface.
- Download Selected Rows: Download the parameter values of the selected rows in the current group to the drive.

4.7 Parameter monitoring

Double-click the **【Parameter Monitoring】** node in the project window, as shown in the following figure

索引	显示名称	说明	单位	最大值	最小值	默认值	数据类型
1	PS-003	上电45秒后	100_N_1	-	3	0	3
2	D0-001	电机速度	rpm	32767	-32768	0	整数
3	D0-002	平均负载率	%	800.0	0.0	0.0	浮点
4	D0-003	启动离线慢量识别	用户自定义	2147483647	-2147483648	0	整数
5	D0-004	速度反馈	rpm	32767	-32768	0	整数
6	D0-005	速度反馈	%	32767	-32768	0	整数
7	D0-006	速度反馈	A	65535	0.0	0.0	浮点
8	D0-007	速度反馈	V	65535	0.0	0.0	浮点
9	D0-008	速度反馈	0x0	0xFFFF	0	0	整数
10	D0-009	速度反馈	0x0	0xFFFF	0	0	整数
11	D0-010	速度反馈	mV	32767	-32767	0	整数
12	D0-011	速度反馈	mV	32767	-32767	0	整数
13	D0-012	速度反馈	0	0	0	0	整数
14	D0-013	速度反馈	0	0	0	0	整数
15	D0-014	速度反馈	0	0	0	0	整数
16	D0-015	速度反馈	0	0	0	0	整数
17	D0-016	速度反馈	0	0	0	0	整数
18	D0-017	速度反馈	0	0	0	0	整数
19	D0-018	速度反馈	0	0	0	0	整数
20	D0-019	速度反馈	0	0	0	0	整数
21	D0-020	速度反馈	0	0	0	0	整数
22	D0-021	速度反馈	0	0	0	0	整数
23	D0-022	速度反馈	0	0	0	0	整数

Figure 4-32

4.7.1 Add Parameter

Enter the display name, click the **【Add】** button, and add the parameter to the monitoring list, as shown in the following figure:

索引	显示名称	说明
1	C0-003	启动离线慢量识别
2	D0-001	电机速度
3	D0-002	平均负载率

Figure 4-33

4.7.2 Delete Parameter

Right-click and select items in the list (multiple items can be selected at once). In the pop-up menu, choose **[Delete]** to remove the monitoring parameters, as shown in the figure below:

		添加						
索引	寄存器名称	数据类型	值	单位	最大值	最小值	默认值	生效方式
-1	CO-003	当前电机速度识别	0x3	-	0xFF	0	0	立即生效
-2	DO-001	电机速度	0	rpm	32767	-32768	0	立即生效
-3	DO-002	平均负载率	0.0	%	800.0	0.0	0.0	立即生效
-4	DO-003	位置指令计数器	0	用户指令单位	2147483647	-2147483648	0	立即生效
-5	DO-004	速度指令	0	rpm	32767	-32768	0	立即生效
-6	DO-008	转矩指令	0.0	%	3276.7	-3276.8	0.0	立即生效
7	DO-00C	机电流有效值	0.00	A	655.35	0.00	0.00	立即生效
8	DO-00D	直流母线电压值	307.4	V	655.5	0.0	0.0	立即生效
9	DO-00F	D反馈状态	0x0	-	0xFFFF	0	0	立即生效
10	DO-010	DO端子状态	0x3	-	0x7	0	0	立即生效
11	DO-011	AI1电压采样值	0	mV	32767	-32767	0	立即生效
12	DO-012	AI2电压采样值	0	mV	32767	-32767	0	立即生效
13	DO-013	绝对位置反馈多圈位置	4602982	-	8888888	0	0	立即生效
14	DO-015	绝对位置反馈多圈位置	0	-	32767	-32768	0	立即生效
15	DO-016	绝对位置计数器4字节	2183	脉冲数单位	2147483647	-2147483648	0	立即生效
16	DO-018	绝对位置计数器4字节	0	脉冲数单位	2147483647	-2147483648	0	立即生效
17	DO-01C	温度反馈温度值	-30.0	°C	3276.7	-3276.7	0.0	立即生效
18	DO-01D	伺服运行时间	1731394.2	s	4294967295.5	0.0	0.0	立即生效
19	DO-01F	伺服运行状态	1[伺服抱闸]	-	3	0	0	立即生效
20	DO-020	当前报警号	0x0	-	0xFFFF	0	0	立即生效
21	DO-021	1轴报警标志位	0[无报警]	-	1	0	0	立即生效
22	DO-022	2轴报警标志位	0[无报警]	-	1	0	0	立即生效
23	DO-108	固件版本号	0x14110004	-	0xFFFFFFFF	0	1	停机生效

Figure 4-34

4.8 JOG Debugging

Double-click the left mouse button on the [Jog Debugging] node in the project window, as shown in the figure below:

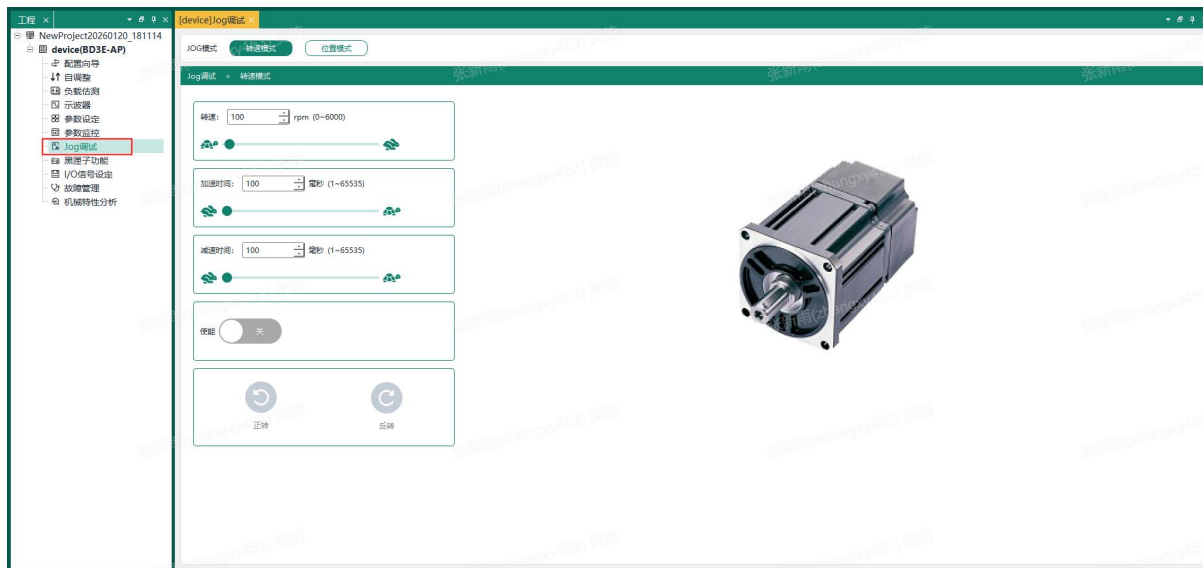


Figure 4- 35

4.8.1 Speed Mode

It can be used to control the motor rotation in jog mode, to check if the motor can run normally and if there are any abnormalities during rotation.

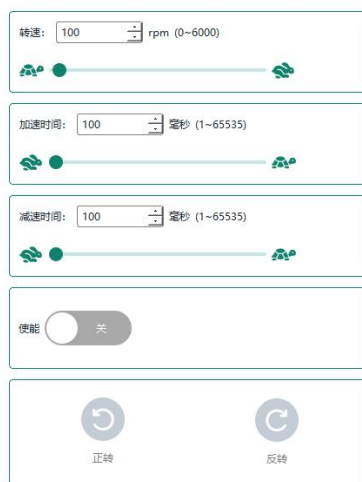


Figure 4-36

The usage procedure is as follows:

1. ConfigureSpeed, acceleration time, and deceleration time parameters.
2. Click the enable button to enable the motor.

3. Hold down the left mouse button for forward/reverse rotation, the motor will move. After releasing the mouse button, the motor will stop.

4.8.2 Position Mode

It can be used to control the motor to run reciprocally or in a fixed distance manner within the specified operating limit position at the designated speed.

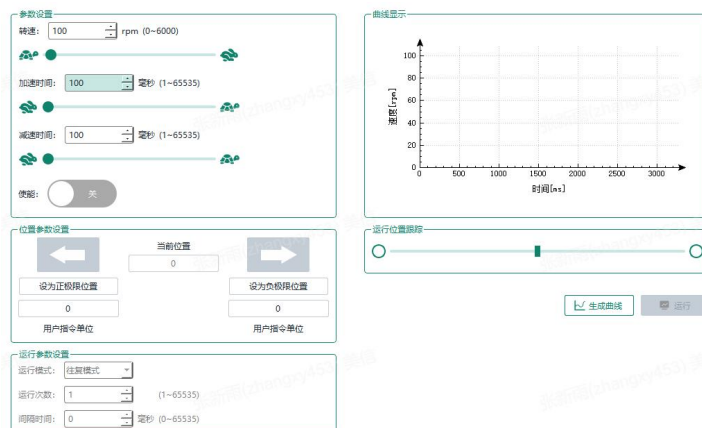


Figure 4-37

The usage procedure is as follows:

1. Configure the speed, acceleration time, and deceleration time parameters.
2. Click the enable button to enable the motor.
3. Position parameter setting, hold down the left mouse button  or  to control the rotation of the motor; the motor stops when the mouse button is released. "Current position" displays the motor's current operating position in real-time, click the **【Set as positive limit position】** / **【Set as negative limit position】** button to set the current position as the positive or negative limit position.
4. Running parameter settings, in "Reciprocating Mode" you can specify the number of reciprocating operation cycles, the motor will run reciprocally for the specified number of cycles within the specified limit position range; In "Distance Mode" you can specify the distance the motor should move within the operating limit range.
5. Click the **【Generate Curve】** button to create an analog operation curve based on the set parameters.
6. Click the **【Run】** button to start the operation, after starting, the cursor in the figure will dynamically display the running position; if the running position

exceeds the limit position, the corresponding indicator lights on both sides of the figure will turn red, as shown in the following figure.



Figure 4-38

4.8.3 Precautions

1. When the servo operation status is **【Ready Complete】**, it can be enabled.

4.9 Black Box Function

Double-click the **【Black Box Function】** node in the project window, as shown in the figure below:



Figure 4- 39

4.9.1 Channel Configuration

The Black Box can be configured with up to 8 channels and the number of bytes is less than or equal to 32. If the Black Box has not been configured, it defaults to 8 configured channels displayed in the selected channels, as shown in the figure below:



Figure 4- 40

- Add Channel:After selecting a channel in the channel information list, click  Add to Selected Channels.
- Delete Channel:After selecting a channel in the selected channels list, click  Delete from Selected Channels.

4.9.2Black Box Settings

As shown in the figure below:



Figure 4- 41

- Sampling Frequency: $n \times 41.667\mu s$ cycle (n is 1~1024).
- Trigger Position:Indicates the ratio of data displayed before the trigger position.
- Black Box Mode: Not enabled (turn off the black box function), any fault, specified fault, specified condition trigger.

When selecting specified faults, you can trigger by setting specific fault codes.

When selecting specified condition trigger, you can set trigger parameters in the trigger settings to initiate the trigger.

4.9.3Trigger settings

When the black box mode selects specified condition trigger, you can set trigger conditions as shown in the following figure:

Figure 4- 42

4.9.4 Button Function

- Read Black Box Data: When the black box status is recorded, click the button to read the black box data, and you can perform data tracking, Y-axis alignment, X/Y-axis adaptation, export, and other functions as shown in the following figure:



Figure 4- 43

- Clear Black Box Data: Click the button to clear the current Black Box data, the Black Box status will be No Record.
- Read Black Box Status: Click the button to update the Black Box status.
- Write Configuration Parameters: Click the button to download the Channel Settings, Trigger Settings, and Black Box Settings to the Drive.
- Read Configuration: Click the button to read the Channel Settings, Trigger Settings, and Black Box Settings from the Drive back to the interface.

4.10 I/O Signal Setting

Double-click the [I/O Signal Setting] node in the Project window, as shown in the figure below:

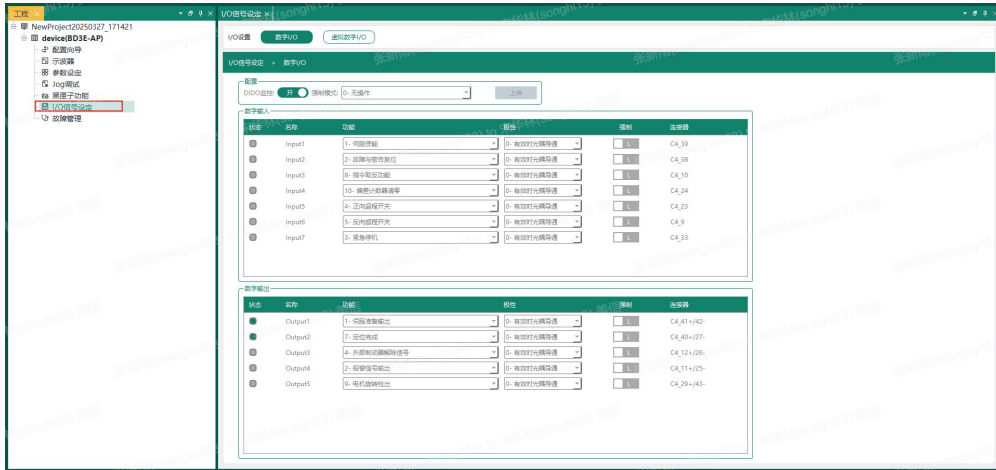


Figure 4- 44

4.10.1 Digital I/O

Select the [Digital I/O] option, as shown in the figure below:

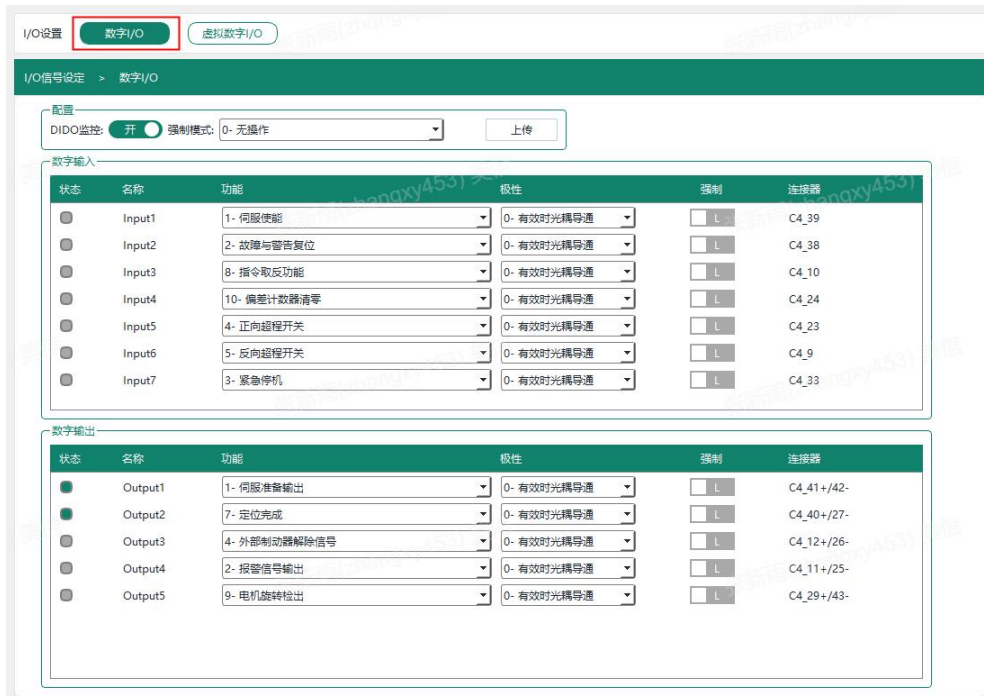


Figure 4- 45

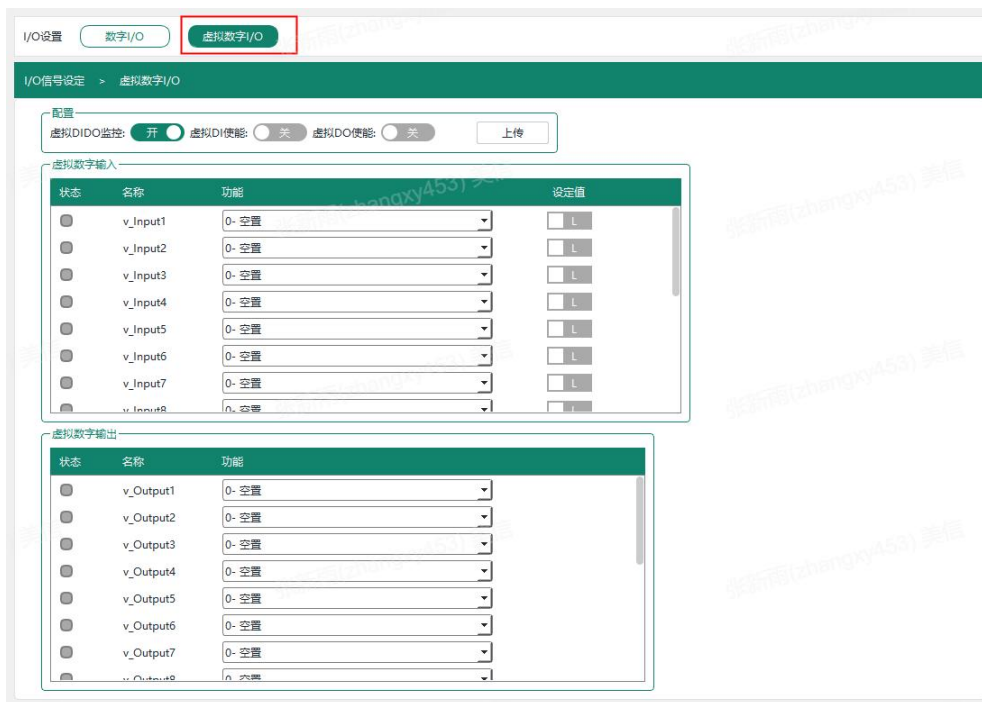
- Configuration:

1. DIDO Monitoring: Enabled by default, when enabled it will refresh DIDO all configuration and status information in real time.

2. Forced Mode: Configure DI and DO forced functions separately, when forced DI is enabled, the status of DI can be changed through the forced function of digital input.
 3. Upload: Click to obtain the current configuration and status information of all DI/DO in the drive.
- Digital Input/Output:
 1. Status: Green when conducting, gray when off.
 2. Name: Input 1-7 correspond to hardware DI1-DI7, Output 1-5 correspond to hardware DO1-DO5.
 3. Function: Select the functions for each DI/DO from the dropdown options separately.
 4. Polarity: Indicates the status of the input/output optocoupler when active.
 5. Forcing: This function is effective when forced mode is enabled.
 6. Connector: Corresponds to the pin positions of connector C4, refer to the hardware wiring instructions.

4.10.2 Virtual Digital I/O

Select the **【Virtual Digital I/O】** option as shown in the figure below:



The screenshot shows the 'I/O Settings' window with the 'Virtual Digital I/O' tab selected. The 'Configuration' section at the top has three toggle switches: 'Virtual DIO Monitoring' (On), 'Virtual DI Enable' (Off), and 'Virtual DO Enable' (Off), along with an 'Upload' button. Below this are two main sections: 'Virtual Digital Input' and 'Virtual Digital Output'.

Virtual Digital Input Table:

状态	名称	功能	设定值
☐	v_Input1	0- 空置	☐ L
☐	v_Input2	0- 空置	☐ L
☐	v_Input3	0- 空置	☐ L
☐	v_Input4	0- 空置	☐ L
☐	v_Input5	0- 空置	☐ L
☐	v_Input6	0- 空置	☐ L
☐	v_Input7	0- 空置	☐ L
☐	v_Input8	0- 空置	☐ L

Virtual Digital Output Table:

状态	名称	功能
☐	v_Output1	0- 空置
☐	v_Output2	0- 空置
☐	v_Output3	0- 空置
☐	v_Output4	0- 空置
☐	v_Output5	0- 空置
☐	v_Output6	0- 空置
☐	v_Output7	0- 空置
☐	v_Output8	0- 空置

Figure 4- 46

- Configuration:
 1. Virtual DIO Monitoring: Default is enabled. After enabling, it will refresh the virtual DIO all configuration and status information in real time.
 2. Virtual DI Enable: Turn on when this function is used.
 3. Virtual DO Enable: Turn on when this function is used.
 4. Upload: Click to get the current virtual DIO all configuration and status information from the drive.
- Virtual Digital Input/Output:

1. Status: Green when valid, gray when invalid.
2. Name: A total of 16 virtual DI and 16 virtual DO.
3. Function: Select the functions for each DI/DO from the dropdown options separately.
4. Set Value: Set the virtual DI status.

4.11 Fault Management

Double-click the left mouse button on the [Fault Management] node in the project window, as shown in the figure below:

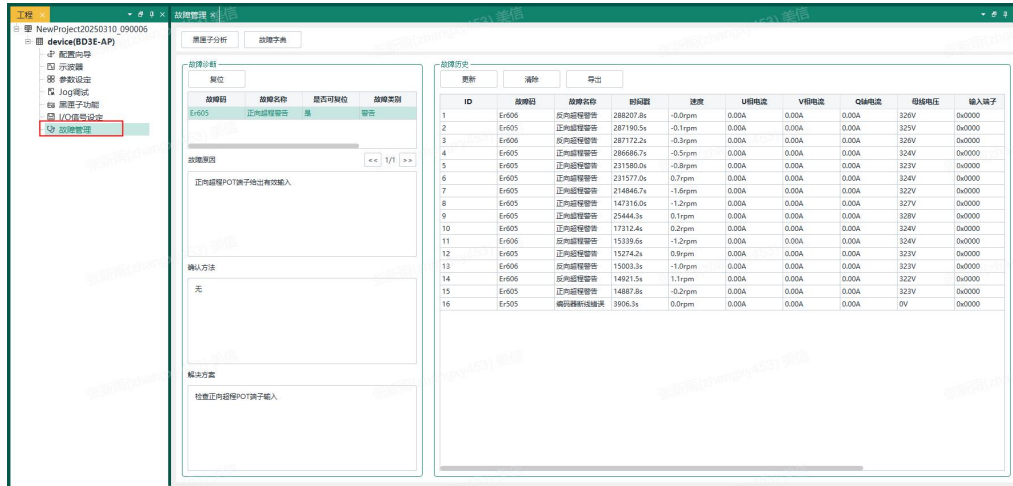


Figure 4- 47

4.11.1 Real-time Fault Monitoring

When the device fails, a pop-up box will automatically appear to notify the user. The user can click on Fault Clear to clear the current fault, and can click on Details to enter the Fault Management function to view details, as shown in the figure below:

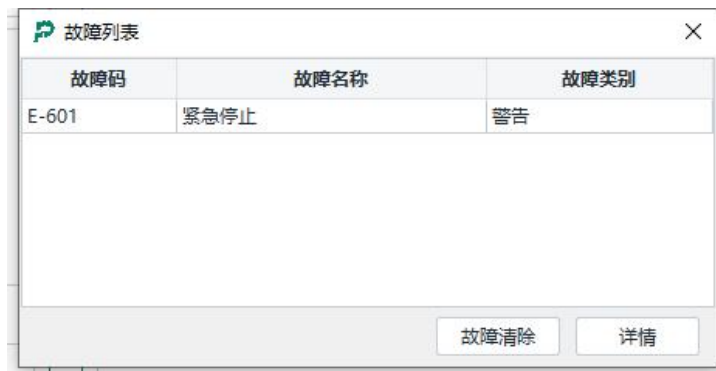


Figure 4-48

4.11.2 Fault Diagnosis

Real-time monitoring of current fault information, allowing you to view the cause and solution, as shown in the figure below:

故障诊断

复位

故障码	故障名称	是否可复位	故障类别
Er605	正向超程警告	是	警告

故障原因

正向超程POT端子给出有效输入

确认方法

无

解决方案

检查正向超程POT端子输入

Figure 4- 49

- **Reset:** Resets the current fault(Note: Fault No. 1 cannot be reset and requires a reboot of the drive to resolve).

4.11.3Fault History

View historical faults, showing up to 16 entries, as shown in the figure below:

故障历史

更新

清除

导出

ID	故障码	故障名称	时间戳	速度	U相电流	V相电流	Q轴电流	母线电压	输入端子
1	Er606	反向超程警告	288207.8s	-0.0rpm	0.00A	0.00A	0.00A	326V	0x0000
2	Er605	正向超程警告	287190.5s	-0.1rpm	0.00A	0.00A	0.00A	325V	0x0000
3	Er606	反向超程警告	287172.2s	-0.3rpm	0.00A	0.00A	0.00A	326V	0x0000
4	Er605	正向超程警告	286686.7s	-0.5rpm	0.00A	0.00A	0.00A	324V	0x0000
5	Er605	正向超程警告	231580.0s	-0.8rpm	0.00A	0.00A	0.00A	323V	0x0000
6	Er605	正向超程警告	231577.0s	0.7rpm	0.00A	0.00A	0.00A	324V	0x0000
7	Er605	正向超程警告	214846.7s	-1.6rpm	0.00A	0.00A	0.00A	322V	0x0000
8	Er605	正向超程警告	147316.0s	-1.2rpm	0.00A	0.00A	0.00A	327V	0x0000
9	Er605	正向超程警告	25444.3s	0.1rpm	0.00A	0.00A	0.00A	328V	0x0000
10	Er605	正向超程警告	17312.4s	0.2rpm	0.00A	0.00A	0.00A	324V	0x0000
11	Er606	反向超程警告	15339.6s	-1.2rpm	0.00A	0.00A	0.00A	324V	0x0000
12	Er605	正向超程警告	15274.2s	0.9rpm	0.00A	0.00A	0.00A	323V	0x0000
13	Er606	反向超程警告	15003.3s	-1.0rpm	0.00A	0.00A	0.00A	323V	0x0000
14	Er606	反向超程警告	14921.5s	1.1rpm	0.00A	0.00A	0.00A	322V	0x0000
15	Er605	正向超程警告	14887.8s	-0.2rpm	0.00A	0.00A	0.00A	323V	0x0000
16	Er505	编码器断线错误	3906.3s	0.0rpm	0.00A	0.00A	0.00A	0V	0x0000

Figure 4- 50

- **Update:**Retrieve all fault history records from the current drive, arranged in descending order by timestamp (starting from the time the drive is powered on).
- **Clear:** Clear all fault history stored in the current drive (not recoverable).
- **Export:** Save all currently read fault histories to a CSV file.

4.11.4Fault Dictionary

By clicking the [Fault Dictionary] button, the interface for viewing all fault information and related solutions for the drive is displayed, as shown in the following figure:

故障字典

×

故障码: 0x001(逆变模块无法识别)

故障码	故障名称	是否可复位	故障类别
Er001	逆变模块无法...	否	NO.1

故障原因

<< 1/1 >>

PowerID识别错误

确认方法

检查驱动额定功率、额定电流、最大电流参数的数值是否正确

解决方案

断电重启, 若无法解决请联系技术支持

Figure 4- 51

4.12 Mechanical Characteristics Analysis

Double-click the left mouse button on the [Mechanical Characteristics Analysis] node in the project window, as shown in the following figure:

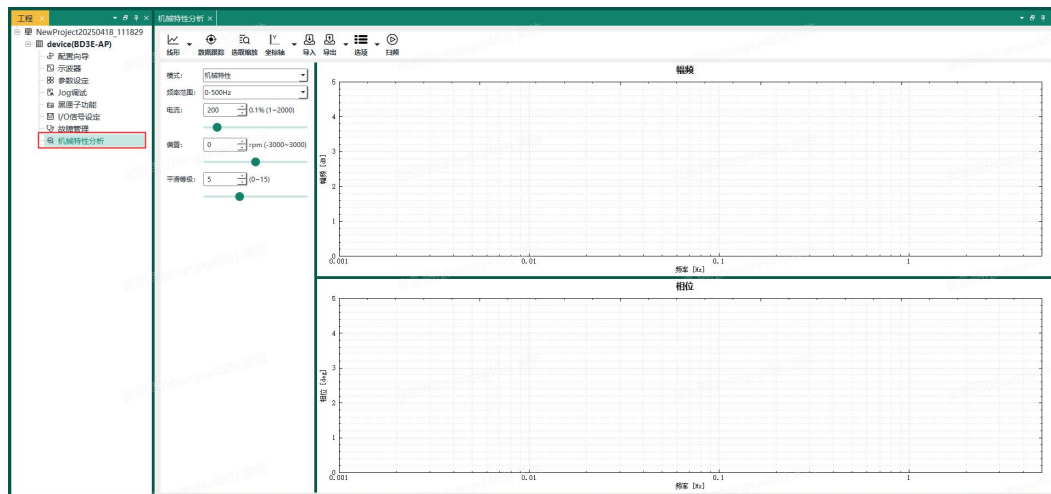


Figure 4- 52

4.12.1 Sweep Frequency Function

The usage procedure is as follows:

1. Parameter settings, as shown in the following figure:

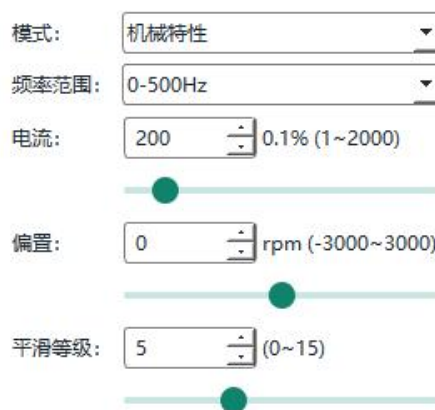


Figure 4- 53

2. Click  扫频 Button, start frequency sweep.
3. Click  扫频 Button, stop frequency sweep.

4.12.2 Menu item function

Mechanical analysis function, as shown in the following figure:



Figure 4- 54

- Linear: Chart style, can set the display modes of line graph, scatter plot, point marker, and square wave.
- Data tracking: Selecting this, the X/Y axis values of the point will be displayed in real-time according to the mouse pointer.
- Zoom Selection: After selection, use the left mouse button to frame the specific area for magnified display; double-click the left mouse button to restore the display.
- Coordinate axis: Set the interface curve display X/Y axis adaptation, Y-axis alignment, coordinate axis adaptation.
- Import/Export: Import Bode plot, export Bode plot/sampling data, supports CSV and Excel table formats.
- Options: can set X/Y grid lines.
- Sweep Button: Start/Stop sweeping.
- Coordinate axis zoom in/out function: Click the coordinate axis and use the mouse scroll wheel to zoom in/out.

4.12.3 Precautions

1. When the oscilloscope and auto-tuning data acquisition are in use, the sweeping function cannot be used;

4.13 Firmware Download

In the software menu bar, find the [Tools] menu and click it, then click the [Download Tool] menu item to perform firmware download, as shown in the figure below:

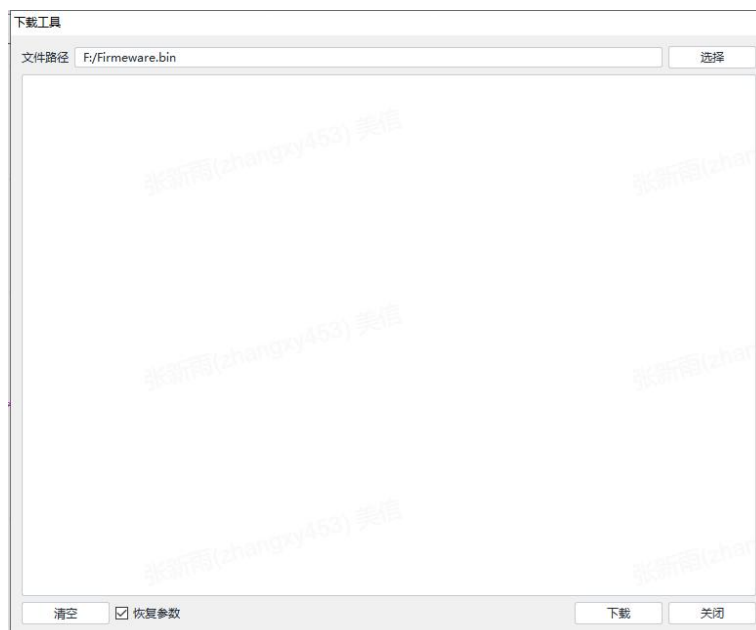


Figure 4- 55

1. Select the BIN file that needs to be updated.
2. Click download, and wait for the download to complete.
3. Select restore parameters; after the download is complete, the parameters configured in the drive before the download will be restored.
4. If the firmware upgrade fails, the corresponding error message will be displayed to inform the user.

5 BD3E-EB Drive Function

5.1 Toolbar Shortcut Functions

When the device is online, the toolbar quick debugging menu items, as shown in the figure below:



Figure 5-1

5.2 Auto-tuning

Double-click the left mouse button on the [Auto-tuning] node in the project window, as shown in the following figure:

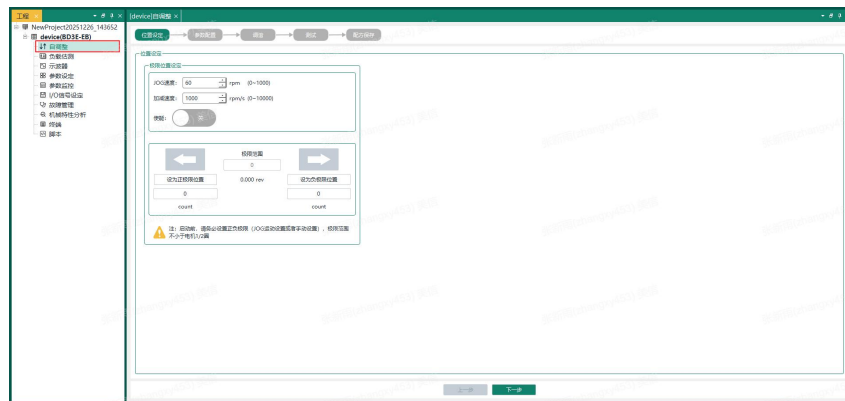


Figure 5-2

5.2.1 Position Setting

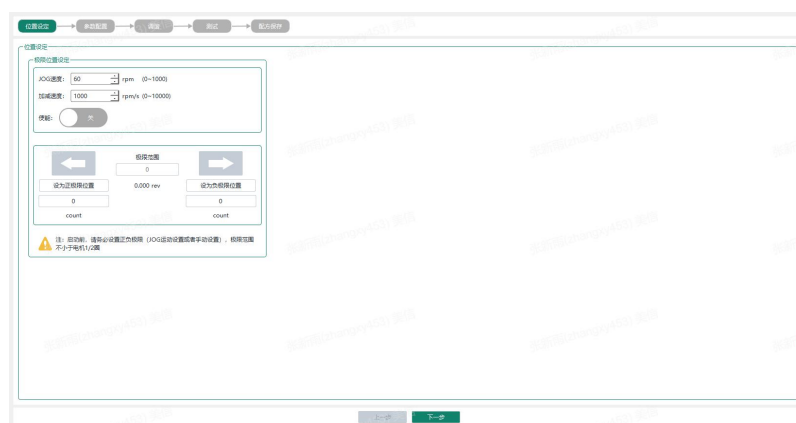


Figure 5-3

The usage procedure is as follows:

1. Configure JOG speed, acceleration and deceleration parameters.
2. Click the [Enable] button to enable the motor.
3. Hold down the left mouse button  or  to control the rotation of the motor; the motor stops when the mouse button is released. "Current position" displays the current operating position of the motor in real time; click the [Set as positive limit position] / [Set as negative limit position] button to set the current position as the positive or negative limit position, or directly edit and set the positive and negative limit positions.
4. Click the [Next Step] button to enter the 'Parameter Configuration' page;

5.2.2 Parameter Configuration

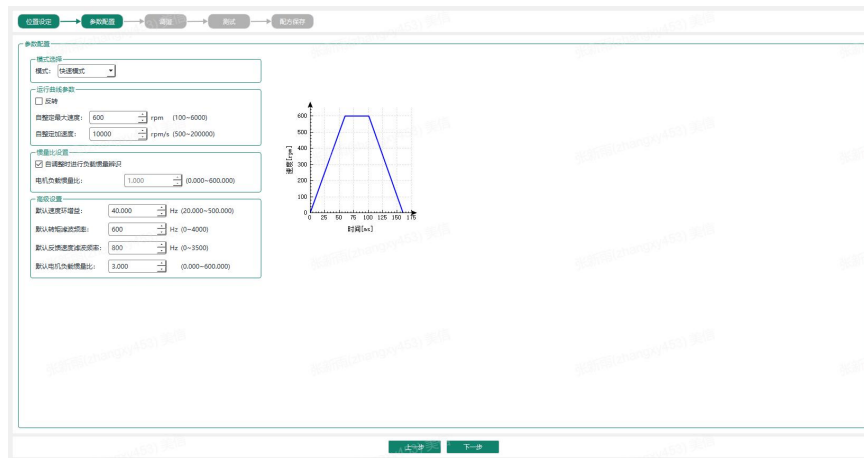


Figure 5-4

The usage procedure is as follows:

1. Set parameters according to the scene requirements, and the analog operation curve will be generated on the right based on the settings.
2. Click the [Next Step] button to enter the 'Tuning' page;

5.2.3 Tuning

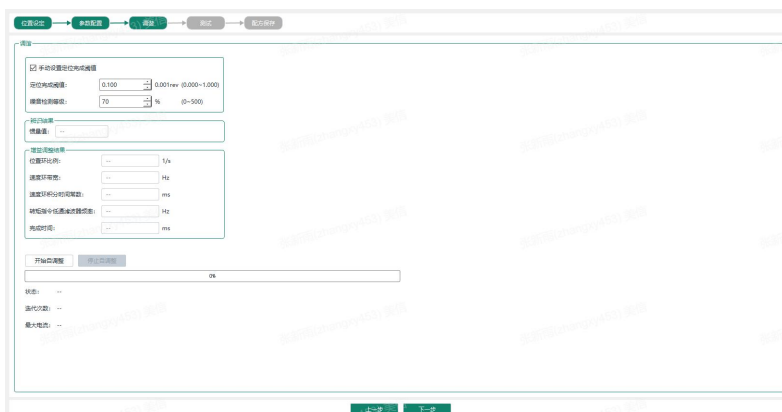


Figure 5-5

The usage procedure is as follows:

1. Set parameters according to the scene requirements.
2. Click the [Start Auto-tuning] button to perform auto-tuning; the progress bar shows the progress. During the tuning process, you can click the [Stop Auto-tuning] button to stop the tuning.

3. After the tuning is complete, click the [Next Step] button to enter the 'Test' page;

5.2.4 Testing

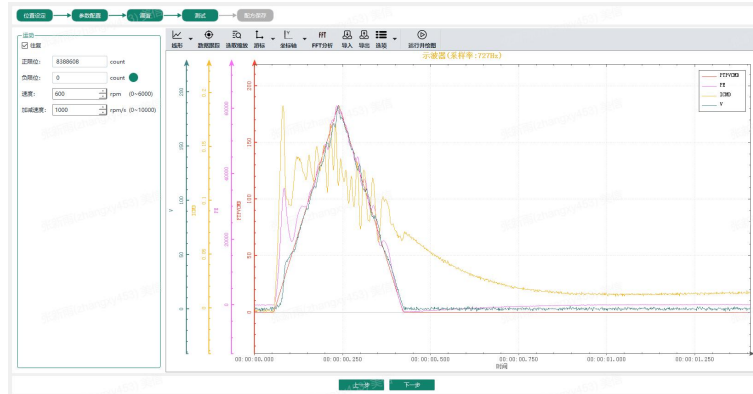


Figure 5-6

The usage procedure is as follows:

1. Parameter settings, including operating mode, positive and negative limits, speed, acceleration and deceleration.
2. Click  the button to perform data acquisition.
3. Click the [Next Step] button to enter the 'Recipe Save' page.

5.2.5 Recipe Save

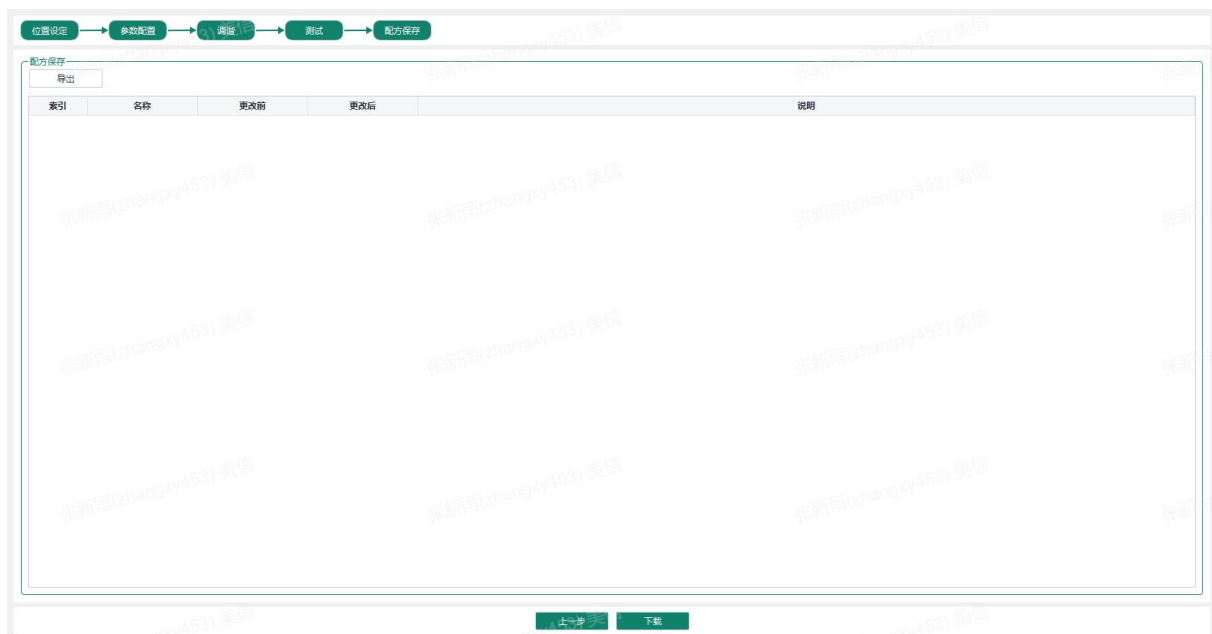


Figure 5-7

1. The adjusted result parameters will be displayed. After confirming that there are no errors, click the [Download] button to download the auto-tuned parameters to the drive.
2. Click the [Export] button to save the tuning results to the recipe.

5.2.6Precautions

1. During mechanical analysis and oscilloscope data acquisition, the auto-tuning function cannot be used;

5.3 Load estimation

Double-click the [Load Estimation] node in the project window with the left mouse button, as shown in the following figure:

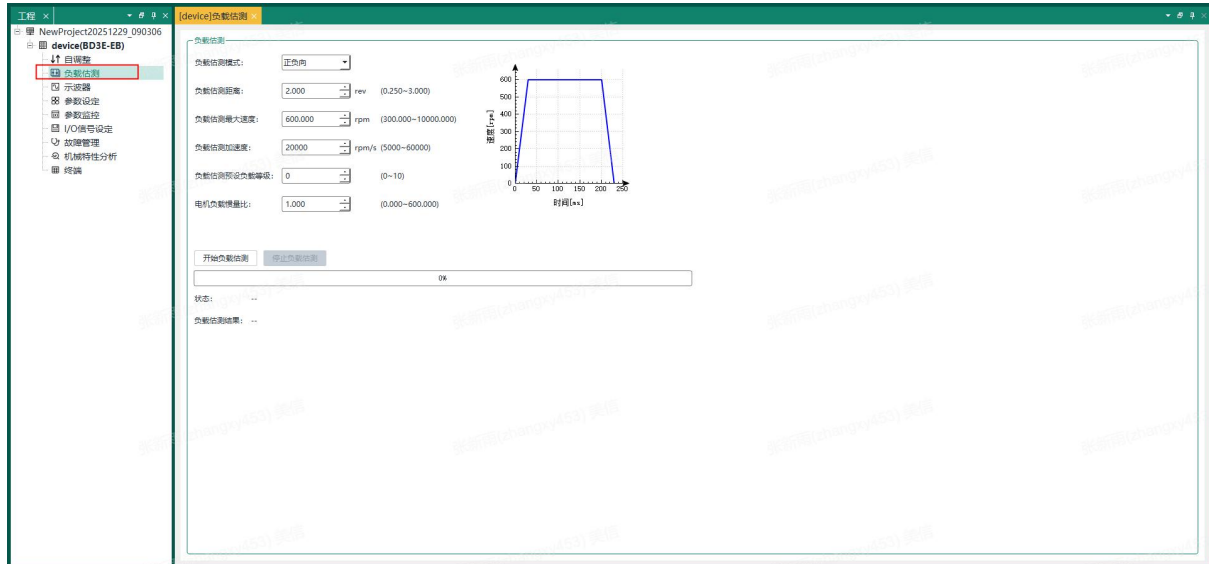


Figure 5-8

The usage procedure is as follows:

1. Set parameters according to the scene requirements, and the analog operation curve will be generated on the right based on the settings.
2. Click the [Start Load Estimation] button to perform load estimation; the progress bar shows the progress of load estimation. During the load estimation process, you can click the [Stop Load Estimation] button to stop the load estimation.
3. After completion, a pop-up window will display the estimation results, as shown in the figure below;



Figure 5-9

4. Click [Yes] to save the load estimation results to the drive.

5.3.1 Parameter Configuration

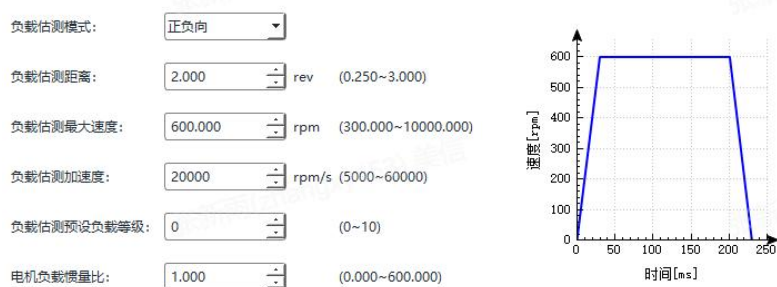


Figure 5-10

- Load Estimation Mode: Includes forward-negative motion, negative-forward motion, forward motion, negative motion four motion modes.
- Load Estimation Distance: The travel distance during the load estimation process.
- Load estimation maximum speed: Load maximum speed during the estimation process.
- Load Estimation Acceleration: Acceleration and deceleration values during acceleration and deceleration processes.
- Load Estimation Preset Load Level: Initial load level in the load estimation process.
- Motor Load Inertia Ratio: Current motor inertia value.

5.4 Oscilloscope

Double-click the 【Oscilloscope】 node in the project window as shown in the figure below:

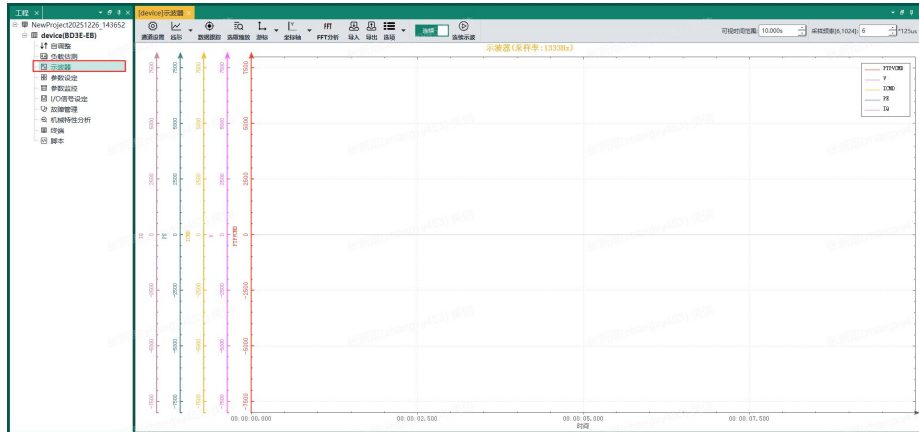


Figure 5- 11

5.4.1 Continuous oscilloscope

The usage procedure is as follows:

1. Channel Settings, configure the required channels in the channel parameter settings, as shown in the figure below:

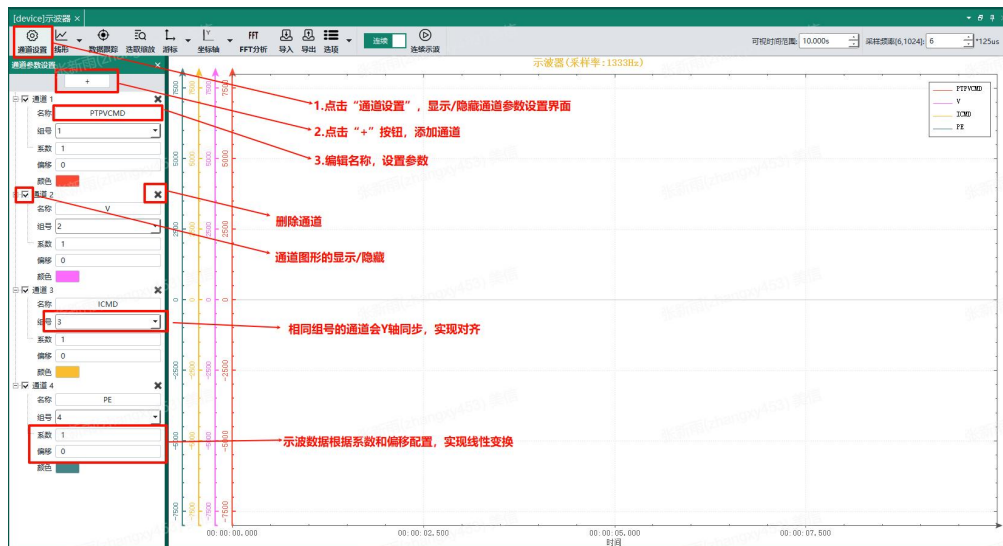


Figure 5- 12

2. Sampling frequency setting 采样频率[6,1024]: 6 *125us
3. Click ▶ Button, start continuous oscilloscope.
4. Click ⏏ Button, stop oscilloscope.

5.4.2 Triggered oscilloscope

The usage procedure is as follows:

1. Click  Button, switch to  status.
2. Channel settings.
3. Trigger settings, set trigger conditions in the trigger settings window as shown in the following figure:

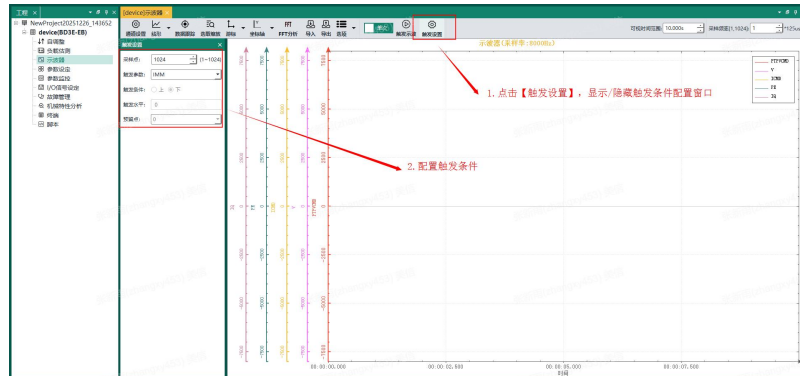


Figure 5- 13

4. Click  Button, start oscilloscope triggering.
5. Click  Button, stop oscilloscope.

5.4.3 Menu item function

Oscilloscope function, as shown in the following figure:



Figure 5- 14

- Channel settings: set sampling parameters.
- Line shape: graph style, can set line graph, scatter plot, point marker, and square wave display modes.
- Data tracking: Selecting this, the X/Y axis values of the point will be displayed in real-time according to the mouse pointer.
 - Zoom selection: selecting this, the specified area can be magnified by left-clicking and dragging; double-clicking the left mouse button restores the display.
 - Cursor: After setting vertical and horizontal cursors, the cursor information window will display. Cursor measurements can be taken by dragging the block with the left mouse button.
 - Coordinate Axis: Set the curve display on the interface to X/Y axis adaptation, Y-axis alignment, Y-axis tiling, and coordinate axis adaptation.
 - FFT Analysis: Perform FFT analysis, including amplitude frequency analysis. After selecting the corresponding channel curve, offline analysis mode is supported.

- Import/Export: Import and export oscilloscope data, supporting CSV and Excel table formats.
- Options: Set X/Y grid lines. The screenshot function captures the currently displayed waveform/saves the screenshot, supporting PNG and PDF format saving.
- Continuous/Single Button: Switch trigger mode.
- Oscilloscope Button: Start/stop oscilloscope.
- Trigger settings: Set trigger conditions.
- Visible time range: X-axis visible range.
- Sampling Frequency: $n \times 125\mu\text{s}$ cycle.
- Coordinate axis zoom in/out function: Click the coordinate axis and use the mouse scroll wheel to zoom in/out.

Right-click menu function, as shown in the figure below:

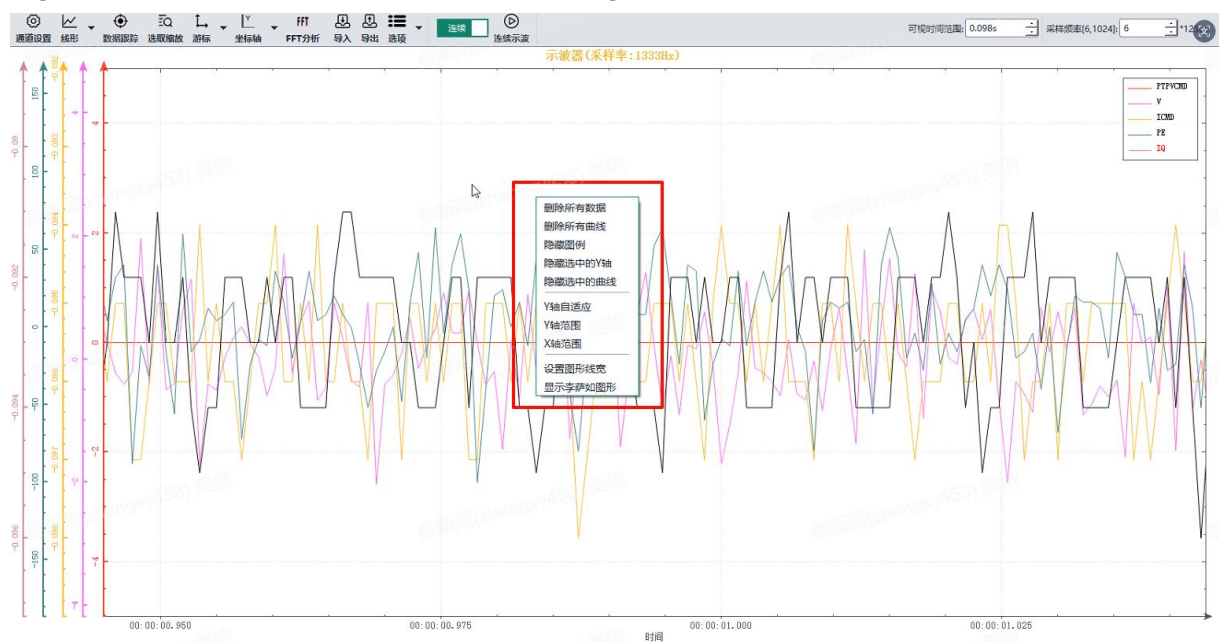


Figure 5-15

- Delete all data: Delete all channel sampling data.
- Delete all curves: Delete all channel configurations and sampling data.
- Hide/Show Legend: Hide/Show legend window.
- Hide/Show Selected Y-axis: Hide/Show the Y-axis of the selected channel;
- Hide/Show Selected Curve: Hide/Show the Y-axis and curve of the selected channel;
- Y-axis Adaptation: Y-axis adaptation of the selected channel;
- Y-axis Range: Set the Y-axis range of the selected channel;
- X-axis Range: Set the X-axis range;
- Set graph line width: Set the curve width;
- Display Lissajous Figure: Display the Lissajous figure window;

5.4.4 Precautions

1. During Mechanical Analysis and Auto-tuning data acquisition, the oscilloscope function is not available;

5.5 Parameter setting

Double-click the Left Mouse Button on the [Parameter setting] node in the project window, as shown in the figure below:

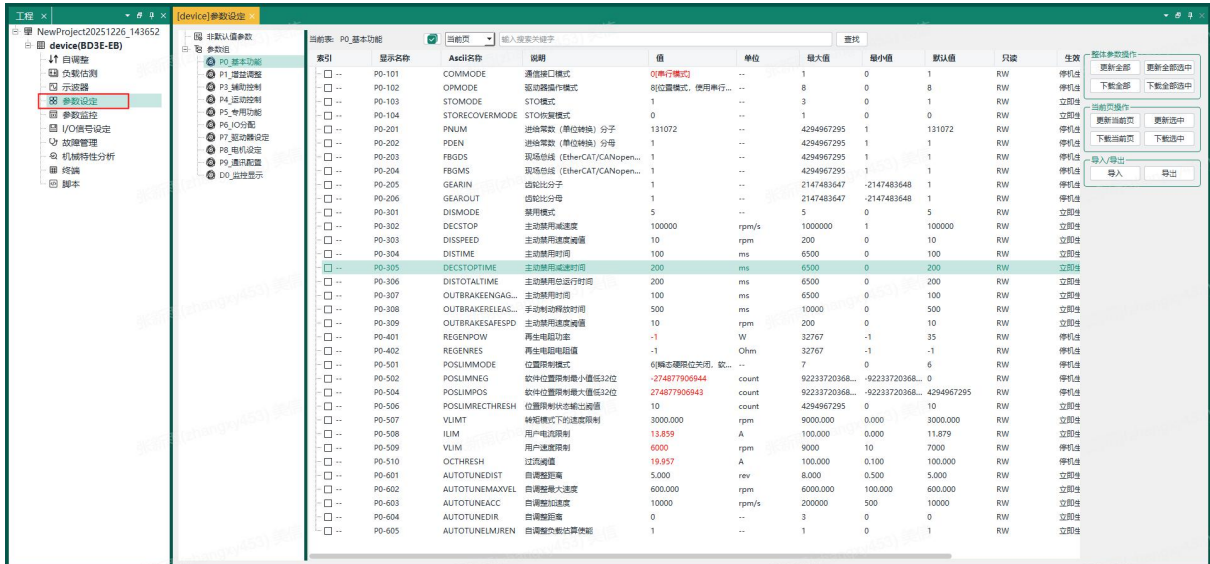


Figure 5- 16

5.5.1 Grouping function

In addition to the default groups of the device, the parameter setting provides the [Non-default Parameters] group, which mainly categorizes parameters with current values different from the default values into this group, as shown in the following figure:

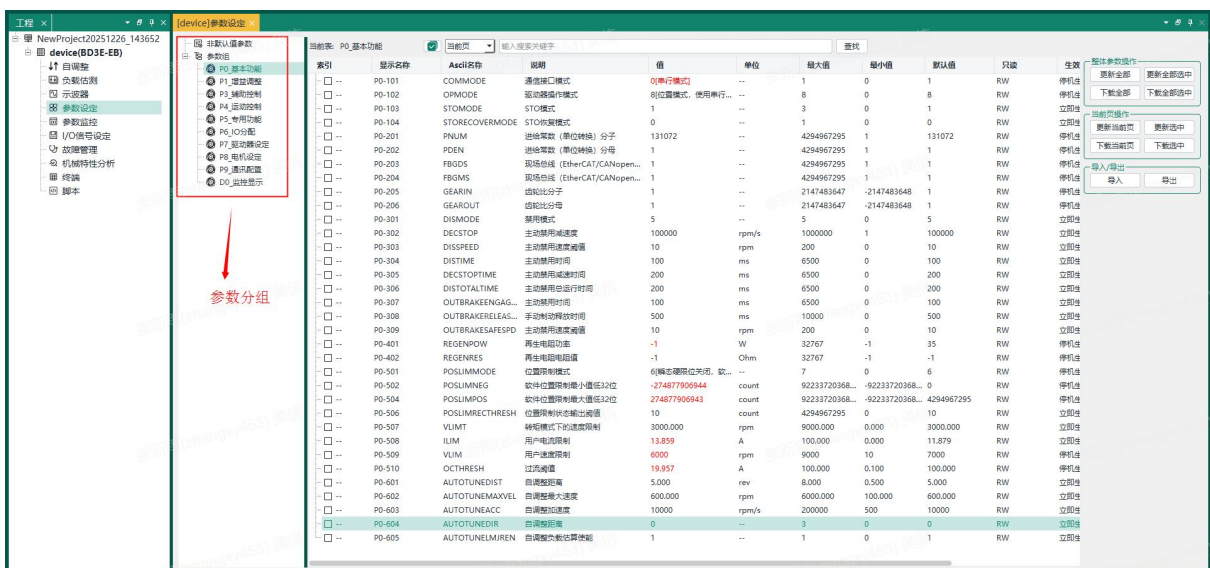


Figure 5- 17

5.5.2 Search function

Supports a search mode for full attribute text matching of parameters, allowing search on the current page/all pages, as shown in the following figure:

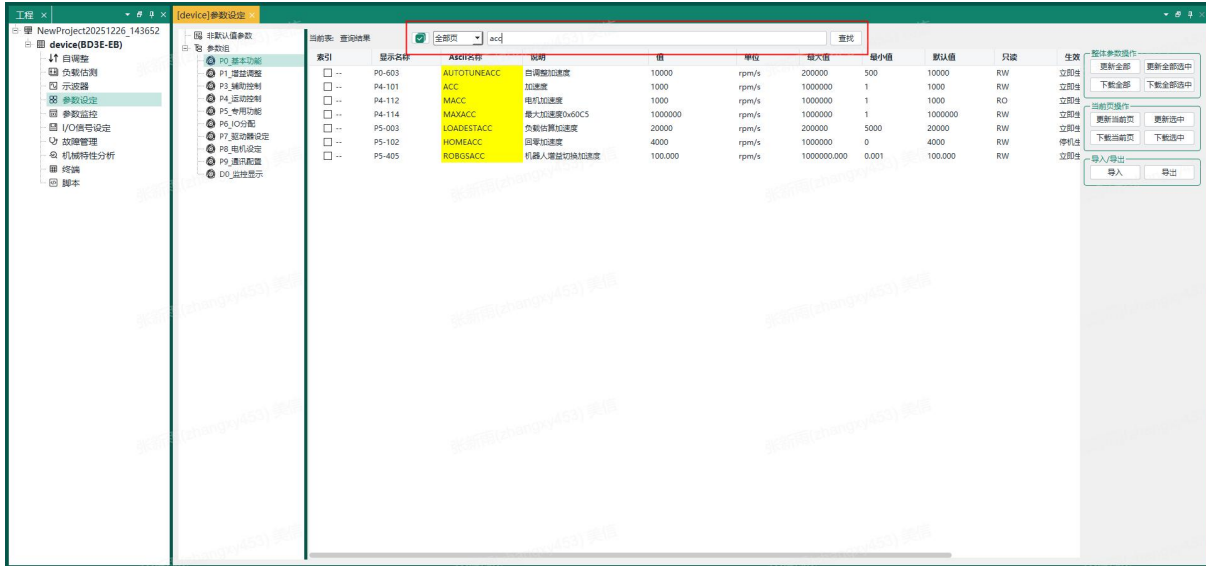


Figure 5- 18

5.5.3 Button Function

- Update All: Read back the parameter values from the drive to the interface.
- Download All: Download the parameters of the parameter group to the drive.
- Update All Selected: Read back the values of the parameters checked in all groups from the drive to the interface.
- Download All Selected: Download the checked parameters in all groups to the drive.
- Download Current Page: Download the parameters of the current group to the drive.
- Update Current Page: Read the parameter values from the drive of the current group back to the interface.
- Download Selected: Download the selected parameters in the current group to the drive (or press the Enter key for quick download of the selected parameters).
- Update Selected: Read the values of the selected parameters in the current group from the drive back to the interface.
- Import/Export: Import and export parameter tables, supporting CSV format.

5.5.4 Menu item function

Right-click a parameter row in the parameter table to pop up the menu window, as shown in the figure below:

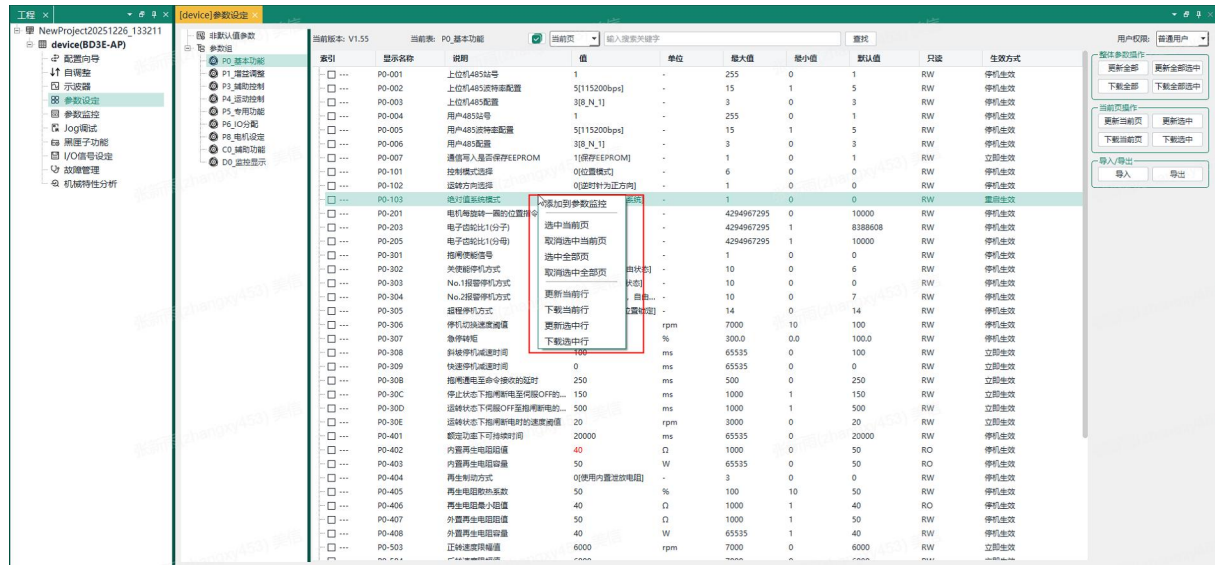


Figure 5- 19

- Add to Parameter Monitoring: Add the parameters selected by the mouse to the parameter monitoring module.
- Select Current Page: Select all parameters in the current group.
- Uncheck Current Page: Uncheck all parameters in the current group.
- Select All Pages: Check all parameters in all groups.
- Unselect All Pages: Uncheck all parameters in all groups.
- Update Current Row: Read the parameter values of the current row in the current group from the drive to the interface.
- Download Current Row: Download the parameter values of the current row in the current group to the drive.
- Update Selected Rows: Read the parameter values of the selected rows in the current group from the drive to the interface.
- Download Selected Rows: Download the parameter values of the selected rows in the current group to the drive.

5.6 Parameter monitoring

Double-click the 【Parameter Monitoring】 node in the project window, as shown in the following figure

索引	显示名称	Ascii名称	说明	值	单位	最大值	最小值	默认值	生效方式	CANopen/EtherCAT
-1	D0-001	SYSST	系统模式状态	3	--	9	0	0	立即生效	
-2	D0-002	APPST	应用状态机当前状态	1	--	7	0	1	立即生效	
-3	D0-003	PCMD	位置指令	3116	count	9223372036854775...	-922337203685477...	0	立即生效	
-4	D0-005	PF8	位置反馈	3088	count	9223372036854775...	-922337203685477...	0	立即生效	
-5	D0-007	FE	位置误差	-36	count	9223372036854775...	-922337203685477...	0	立即生效	
-6	D0-009	V	速度	-0.339	rpm	10000.000	-10000.000	0.000	立即生效	
-7	D0-010	VCMD	速度指令	0.019	rpm	10000.000	-10000.000	0.000	立即生效	
-8	D0-011	ICMD	电流指令	-0.062	A	100.000	-100.000	0.000	立即生效	
-9	D0-012	IDCMD	D轴电流指令	0.000	A	100.000	-100.000	0.000	立即生效	
-10	D0-013	IQ	电流反馈	0.000	A	100.000	-100.000	0.000	立即生效	0x2067-0
-11	D0-014	ID	电流反馈	0.000	A	100.000	-100.000	0.000	立即生效	0x2066-0
-12	D0-015	I	电机电流	0.000	A	100.000	-100.000	0.000	立即生效	
-13	D0-016	VBUSREADOUT	总线电压测量值	312.344	V	850.000	0.000	0.000	立即生效	
-14	D0-017	ELECTANGLE	电气位置	37448	0-65535	65535	0	0	立即生效	0x2016-0
-15	D0-018	MFB	电机位置反馈	3100	count	9223372036854775...	-922337203685477...	0	立即生效	
-16	D0-020	ENCMULTITURN	驱动器使用的编码器步数	0	rev	9223372036854775...	-922337203685477...	0	立即生效	
-17	D0-022	ENCINGLETURN	编码器步数	3112	count	2147483647	-2147483648	0	立即生效	
-18	D0-023	ENCINGLETURN2	编码器步数	3144	count	2147483647	-2147483648	0	立即生效	
-19	D0-024	MECHANGLE	电机机械角度	24	65536/rev	65535	0	0	立即生效	0x2028-0
-20	D0-025	HWPEXT	脉冲计数值	0	count	2147483647	-2147483648	0	立即生效	
-21	D0-028	MENCRCVALUE	电机编码器CRC计数, 增量和绝对	0	--	65535	0	0	立即生效	
-22	D0-030	COLDTCURACT	电机电流	-0.062	--	100.000	-100.000	0.000	立即生效	
-23	D0-031	COLDTI	电机电流反馈	0.000	A	100.000	-100.000	0.000	立即生效	
-24	D0-032	COLDTALPOUT	电机电流反馈结果	0.000	rad/s^2	1000000.000	-1000000.000	0.000	立即生效	
-25	D0-033	COLDTPFB	电机电流反馈位置	0	count	2147483647	-2147483648	0	立即生效	
-26	D0-034	STOIST	STO状态	0	--	1	0	0	立即生效	
-27	D0-035	MENCTIMEOUTVAL...	电机编码器超时计数, 增量和绝对	10	--	65535	0	0	立即生效	
-28	D0-036	MFOLD	电机折返状态	0	--	1	0	0	立即生效	0x202E-0
-29	D0-037	MFOLDT	电机折返时间	75.389	s	1000.000	0.000	0.000	立即生效	0x2031-0
-30	D0-038	MFOLD	电机折返时间	24.300	A	300.000	0.000	0.000	立即生效	0x2033-0
-31	D0-040	IMAX	驱动器和电机的最大电流	13.859	A	100.000	0.000	11.879	立即生效	0x20F0-0
-32	D0-041	VMAX	电机和驱动器的最大速度	6000	rpm	9.000	0.010	6.000	立即生效	0x20EE-0
-33	D0-042	GEARTOTALMAX	电子齿轮比乘积最大值	8000.000	--	10000.000	0.001	8000.000	立即生效	0x2303-0
-34	D0-043	HOMINGERRCODE	回零错误代码	0	--	14	0	0	立即生效	

Figure 5-20

5.6.1 Add Parameter

Enter ASCII name, click the [Add] button to add parameters to the monitoring list, as shown in the figure below:

索引	显示名称	Ascii名称	说明
1	P4-101	ACC	加速度
2	D0-001	SYSST	系统模式状态
3	D0-002	APPST	应用状态机当前状态
4	D0-003	PCMD	位置指令

Figure 5-21

5.6.2 Delete Parameter

Right-click and select items in the list (multiple items can be selected at once). In the pop-up menu, choose [Delete] to remove the monitoring parameters, as shown in the figure below:

目錄表		目錄		單位		最大值	最小值	單位	公差
1	DO-001	速度/位置/速度/位置	0.1	-	mm/s	0	0	mm/s	±0.01
2	DO-002	速度/位置	0	rpm	32767	-32767	0	rpm	±0.01
3	DO-003	速度/位置	0	%	800.0	0.0	0.0	%	±0.01
4	DO-004	位置/速度/位置/速度	0	mm/s	2147483647	-2147483648	0	mm/s	±0.01
5	DO-005	速度/位置	0	rpm	32767	-32767	0	rpm	±0.01
6	DO-006	速度/位置	0.0	%	3276.7	-3276.8	0.0	%	±0.01
7	DO-007	速度/位置/速度/位置	0.0	-	855.5	0.0	0.0	-	±0.01
8	DO-008	速度/位置/速度/位置	0.0	V	655.5	0.0	0.0	V	±0.01
9	DO-009	速度/位置/速度/位置	0.0	-	32767	0	0	-	±0.01
10	DO-010	速度/位置/速度/位置	0.0	mm/s	32767	-32767	0	mm/s	±0.01
11	DO-011	速度/位置/速度/位置	0	mm/s	32767	-32767	0	mm/s	±0.01
12	DO-012	速度/位置/速度/位置	0	mm/s	32767	-32767	0	mm/s	±0.01
13	DO-013	速度/位置/速度/位置/速度/位置	0.0	-	855.5	0.0	0.0	-	±0.01
14	DO-014	速度/位置/速度/位置/速度/位置	0	-	32767	-32767	0	-	±0.01
15	DO-015	速度/位置/速度/位置/速度/位置	0.0	mm/s	2147483647	-2147483648	0	mm/s	±0.01
16	DO-016	速度/位置/速度/位置/速度/位置	0	mm/s	2147483647	-2147483648	0	mm/s	±0.01
17	DO-017	速度/位置/速度/位置/速度/位置	0.0	mm/s	32767	-32767	0.0	mm/s	±0.01
18	DO-018	速度/位置/速度/位置/速度/位置	0.0	mm/s	32767	-32767	0.0	mm/s	±0.01
19	DO-019	速度/位置/速度/位置/速度/位置	0.0	mm/s	32767	-32767	0.0	mm/s	±0.01
20	DO-020	速度/位置/速度/位置/速度/位置	0.0	mm/s	32767	-32767	0.0	mm/s	±0.01
21	DO-021	速度/位置/速度/位置/速度/位置	0.0	mm/s	32767	-32767	0.0	mm/s	±0.01
22	DO-022	速度/位置/速度/位置/速度/位置	0.0	mm/s	32767	-32767	0.0	mm/s	±0.01
23	DO-023	速度/位置/速度/位置/速度/位置	0.0	mm/s	32767	-32767	0.0	mm/s	±0.01

Figure 5-22

5.7 Jog Debugging

Double-click the left mouse button on the [Jog Debugging] node in the project window, as shown in the figure below.

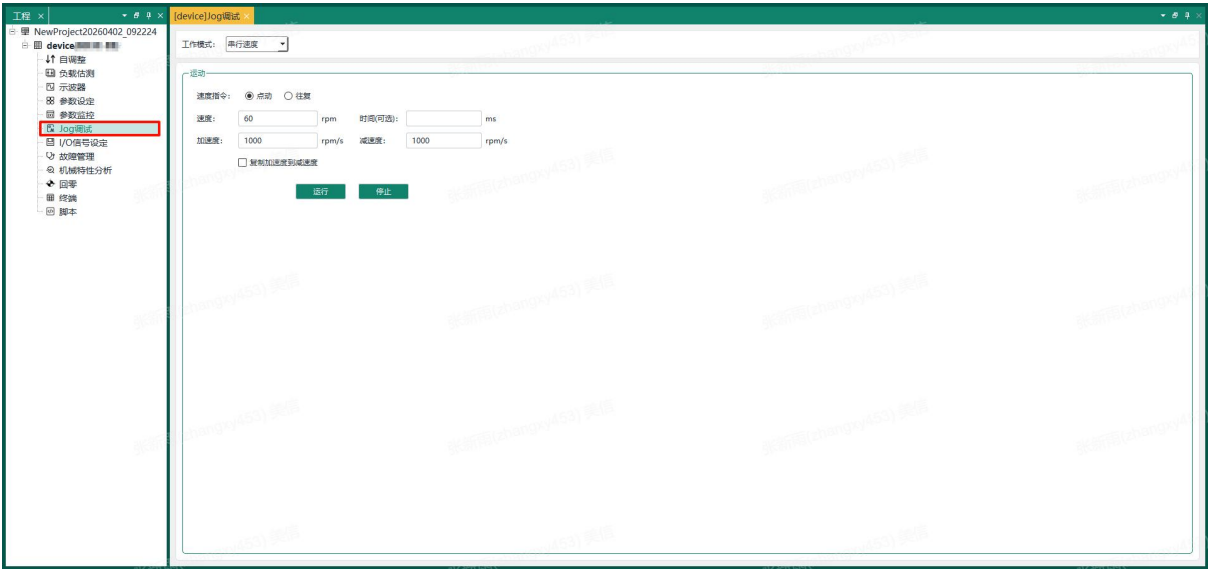


Figure 5-23

5.7.1 Serial Speed

1. Jog Mode, used for single-step motion control of servo motors;



Figure 5-24

Speed	Set the motor running speed, supports positive and negative values (e.g., -60 rpm indicates reverse rotation)
Acceleration	Set the motor's acceleration rate from stationary to target speed
Deceleration	Set the motor's deceleration rate from target speed to stop
Copy Acceleration to Deceleration	One-click synchronization of acceleration values to deceleration parameters, simplifying operation
Time (Optional)	Optional parameter, used to limit the duration of a single run; if left blank, the motor will run continuously
Run/Stop	Button to control the motor's start or stop

2. Reciprocating Mode, used for continuous motion control of servo motors;

速度指令: ☐ 点动 ☒ 往复

速度1: rpm 时间1: ms

速度2: rpm 时间2: ms

加速度: rpm/s 减速度: rpm/s

☐ 复制加速度到减速度

Figure 5-25

Speed 1	Set the motor running speed, supports positive and negative values (e.g., -60 rpm indicates reverse rotation)
Time 1	Speed 1 Single Run Time
Speed 2	Set the motor running speed, supports positive and negative values (e.g., 60 rpm indicates forward rotation)
Time 2	Speed 2 Single Run Time
Acceleration	Set the motor's acceleration rate from stationary to target speed
Deceleration	Set the motor's deceleration rate from target speed to stop
Copy Acceleration to Deceleration	One-click synchronization of acceleration values to deceleration parameters, simplifying operation
Run/Stop	Button to control the motor's start or stop

The usage procedure is as follows:

1. Drive Enable;
2. Select Jog/Reciprocating Mode;
3. Enter target speed, time, acceleration/deceleration;
4. Click the 'Run' button, the motor starts according to the set parameters;
5. Click the 'Stop' button, the motor decelerates to a stop according to the deceleration parameter;

5.7.2 Serial Current

电流指令: A

Figure 5-26

Current Command	Set the current value for the motor during operation
Run/Stop	Button to control the motor's start or stop

The usage procedure is as follows:

1. Drive Enable;
2. Enter the target current value;
3. Click the 'Run' button, the motor starts at the set current;
4. Click the 'Stop' button, the motor stops immediately;

5.7.3Serial Position

1. Absolute, used for the servo motor to move to a specified position;



Figure 5-27

Operating mode	If reciprocating, it indicates the motor moves between Position 1 and Position 2
Position 1/Position 2	Target Position
Speed	Set Motor Operating Speed
Acceleration	Set the motor's acceleration rate from stationary to target speed
Deceleration	Set the motor's deceleration rate from target speed to stop
Copy Acceleration to Deceleration	One-click synchronization of acceleration values to deceleration parameters, simplifying operation
Run/Stop	Button to control the motor's start or stop
Generate Curve	Generate Analog Operation Curve

2. Incremental, used for servo motors to run a specified distance from the current actual position;



Figure 5-28

Operating mode	If reciprocating, it indicates the motor runs a specified distance from the current actual position (dynamic switching forward and reverse direction)
Position	Specified distance for motor operation
Speed	Set Motor Operating Speed
Acceleration	Set the motor's acceleration rate from stationary to target speed
Deceleration	Set the motor's deceleration rate from target speed to stop
Copy Acceleration to Deceleration	One-click synchronization of acceleration values to deceleration parameters, simplifying operation
Run/Stop	Button to control the motor's start or stop
Generate Curve	Generate Analog Operation Curve

The usage procedure is as follows:

1. Drive Enable;
2. Select Absolute/Incremental;
3. Select Reciprocating or Not;
4. Set Position, Speed, Acceleration/Deceleration;
5. Click the 'Run' button, the motor starts according to the set parameters;
6. Click the 'Stop' button, the motor stops immediately;

5.8 I/O Signal Setting

Double-click the[I/O Signal Setting]node in the Project window, as shown in the figure below:

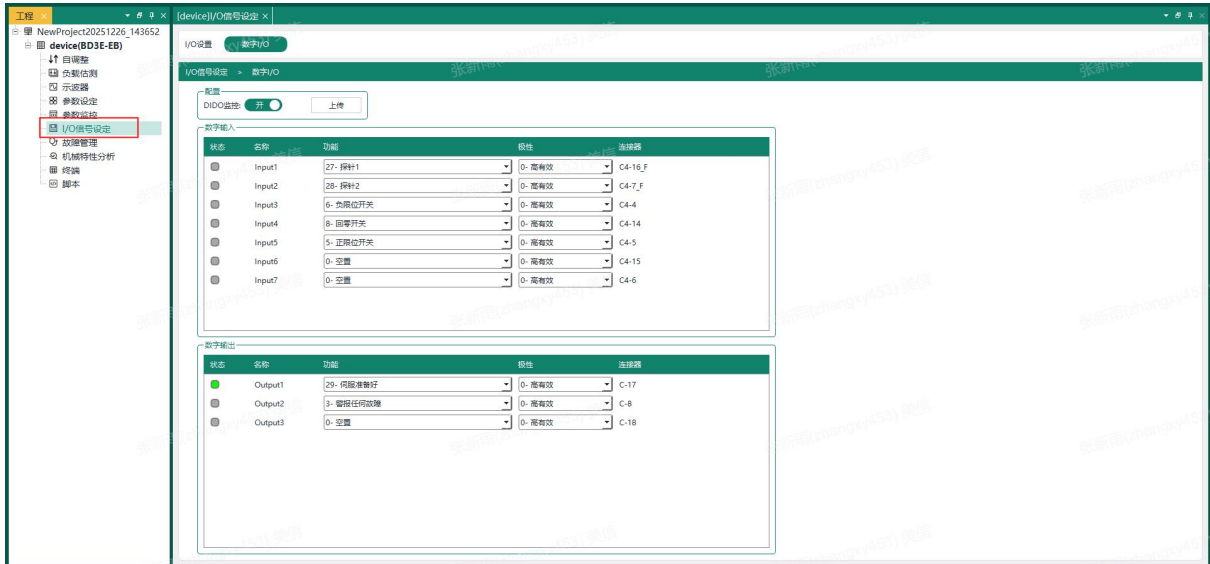


Figure 5- 29

5.8.1 Digital I/O

Select the[Digital I/O]option, as shown in the figure below:

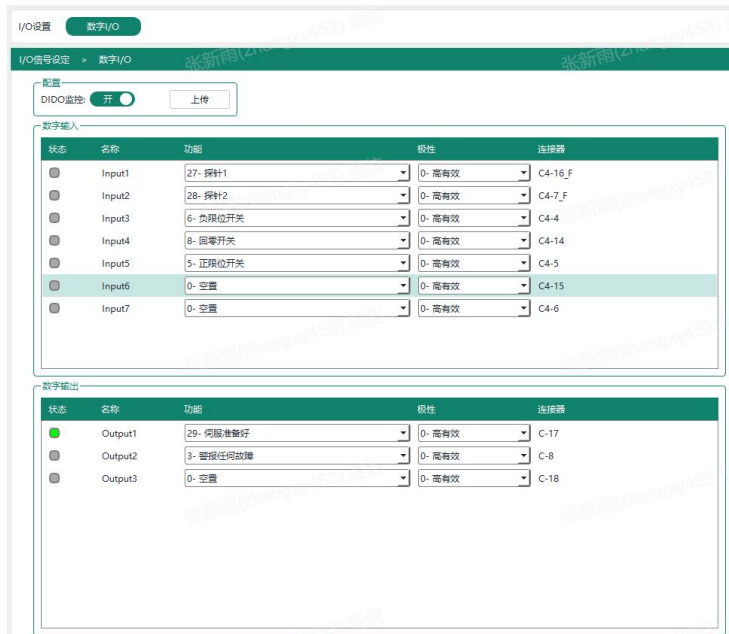


Figure 5- 30

- Configuration:

1. DIDO Monitoring: Enabled by default, when enabled it will refresh DIDO all configuration and status information in real time.
 2. Upload: Click to obtain the current configuration and status information of all DIDO in the drive.
- Digital Input/Output:
 1. Status: Green when conducting, gray when off.
 2. Name: Input 1-7 correspond to hardware DI1-DI7, Output 1-3 correspond to hardware DO1-DO3.
 3. Function: Select the functions for each DI/DO from the dropdown options separately.
 4. Polarity: Indicates the status of the input/output optocoupler when active.
 5. Connector: Refer to the hardware wiring instructions.

5.9 Fault Management

Double-click the left mouse button on the [Fault Management] node in the project window, as shown in the figure below:

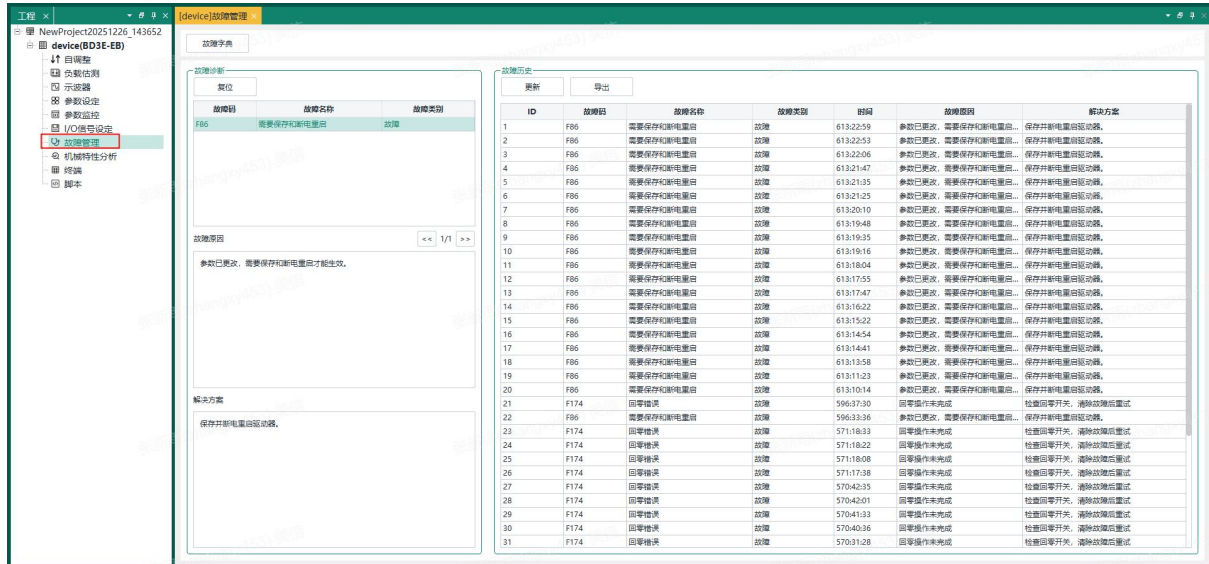


Figure 5- 31

5.9.1Real-time Fault Monitoring

When the device fails, a pop-up box will automatically appear to notify the user. The user can click on Fault Clear to clear the current fault, and can click on Details to enter the Fault Management function to view details, as shown in the figure below:



Figure 5-32

5.9.2Fault Diagnosis

Real-time monitoring of current fault information, allowing you to view the cause and solution, as shown in the figure below:



Figure 5- 33

- Reset: Reset the current fault.

5.9.3 Fault History

You can view historical faults, with a maximum of 40 records displayed, as shown in the figure below:

故障历史						
更新 导出						
ID	故障码	故障名称	故障类别	时间	故障原因	解决方案
1	F86	需要保存和断电重启	故障	617:37:14	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
2	F86	需要保存和断电重启	故障	613:22:59	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
3	F86	需要保存和断电重启	故障	613:22:53	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
4	F86	需要保存和断电重启	故障	613:22:06	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
5	F86	需要保存和断电重启	故障	613:21:47	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
6	F86	需要保存和断电重启	故障	613:21:35	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
7	F86	需要保存和断电重启	故障	613:21:25	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
8	F86	需要保存和断电重启	故障	613:20:10	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
9	F86	需要保存和断电重启	故障	613:19:48	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
10	F86	需要保存和断电重启	故障	613:19:35	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
11	F86	需要保存和断电重启	故障	613:19:16	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
12	F86	需要保存和断电重启	故障	613:18:04	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
13	F86	需要保存和断电重启	故障	613:17:55	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
14	F86	需要保存和断电重启	故障	613:17:47	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
15	F86	需要保存和断电重启	故障	613:16:22	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
16	F86	需要保存和断电重启	故障	613:15:22	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
17	F86	需要保存和断电重启	故障	613:14:54	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
18	F86	需要保存和断电重启	故障	613:14:41	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
19	F86	需要保存和断电重启	故障	613:13:58	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
20	F86	需要保存和断电重启	故障	613:11:23	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
21	F86	需要保存和断电重启	故障	613:10:14	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
22	F174	回零错误	故障	596:37:30	回零操作未完成	检查回零开关，清除故障后重试
23	F86	需要保存和断电重启	故障	596:33:36	参数已更改，需要保存和断电重启...	保存并断电重启驱动。
24	F174	回零错误	故障	571:18:33	回零操作未完成	检查回零开关，清除故障后重试
25	F174	回零错误	故障	571:18:22	回零操作未完成	检查回零开关，清除故障后重试
26	F174	回零错误	故障	571:18:08	回零操作未完成	检查回零开关，清除故障后重试
27	F174	回零错误	故障	571:17:38	回零操作未完成	检查回零开关，清除故障后重试
28	F174	回零错误	故障	570:42:35	回零操作未完成	检查回零开关，清除故障后重试
29	F174	回零错误	故障	570:42:01	回零操作未完成	检查回零开关，清除故障后重试
30	F174	回零错误	故障	570:41:33	回零操作未完成	检查回零开关，清除故障后重试
31	F174	回零错误	故障	570:40:36	回零操作未完成	检查回零开关，清除故障后重试

Figure 5- 34

- Update: Retrieve all fault history from the current drive, sorted in descending order by timestamp.
- Export: Save all currently read fault histories to a CSV file.

5.9.4Fault Dictionary

By clicking the [Fault Dictionary] button, the interface for viewing all fault information and related solutions for the drive is displayed, as shown in the following figure:



Figure 5- 35

5.10 Mechanical Characteristics Analysis

Double-click the left mouse button on the [Mechanical Characteristics Analysis] node in the project window, as shown in the following figure:

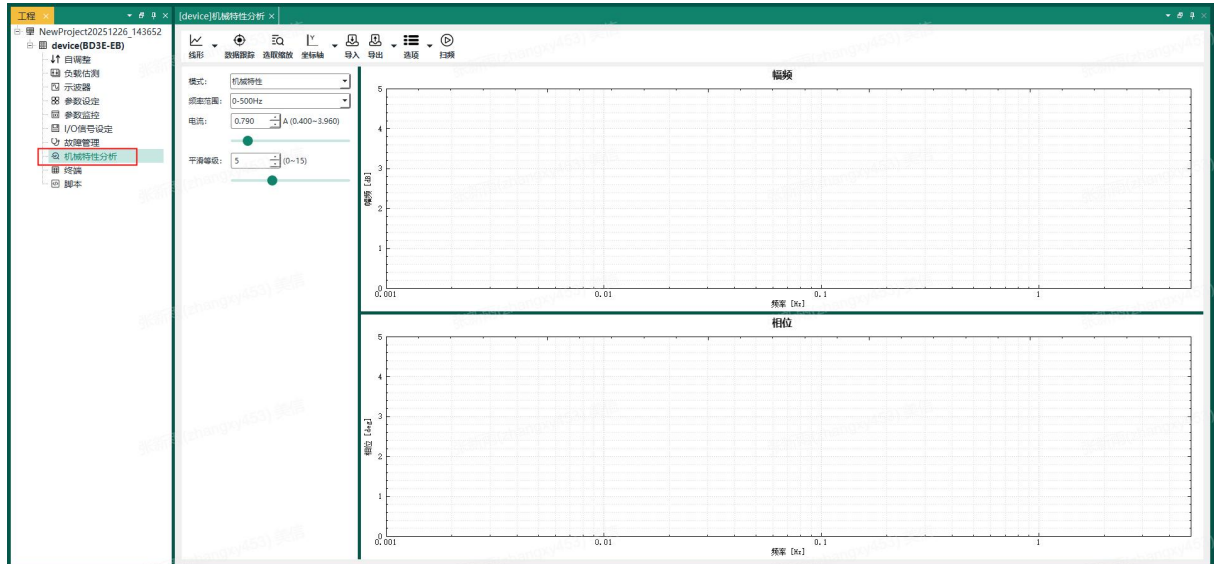


Figure 5- 36

5.10.1 Sweep Frequency Function

The usage procedure is as follows:

1. Parameter settings, as shown in the following figure:



Figure 5- 37

2. Click  扫频 Button, start frequency sweep.
3. Click  扫频 Button, stop frequency sweep.

5.10.2 Menu item function

Mechanical analysis function, as shown in the following figure:



Figure 5- 38

- Linear: Chart style, can set the display modes of line graph, scatter plot, point marker, and square wave.
- Data tracking: Selecting this, the X/Y axis values of the point will be displayed in real-time according to the mouse pointer.
- Zoom Selection: After selection, use the left mouse button to frame the specific area for magnified display; double-click the left mouse button to restore the display.
- Coordinate axis: Set the interface curve display X/Y axis adaptation, Y-axis alignment, coordinate axis adaptation.
- Import/Export: Import Bode plot, export Bode plot/sampling data, supports CSV and Excel table formats.
- Options: can set X/Y grid lines.
- Sweep Button: Start/Stop sweeping.
- Coordinate axis zoom in/out function: Click the coordinate axis and use the mouse scroll wheel to zoom in/out.

5.10.3 Precautions

1. When the oscilloscope and auto-tuning data acquisition are in use, the sweeping function cannot be used;

5.11 Return to Zero

Double-click the [Return to Zero] node in the project window with the left mouse button, as shown in the figure below:

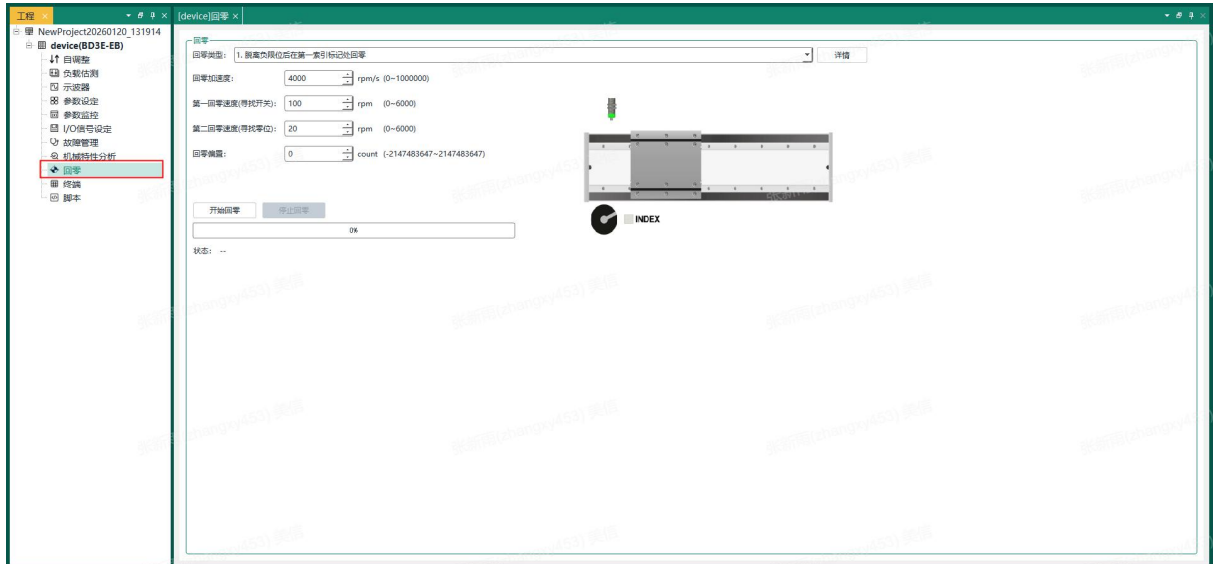


Figure 5- 39

5.11.1 Parameter Configuration

1. Set the return to zero type, acceleration, speed, bias, and other parameters according to the scene requirements, as shown in the figure below.

回零类型: 1. 脱离限位后在第一索引标记处回零

回零加速度: 4000 rpm/s (0~1000000)

第一回零速度(寻找开关): 100 rpm (0~6000)

第二回零速度(寻找零位): 20 rpm (0~6000)

回零偏置: 0 count (-2147483647~2147483647)

Figure 5-40

2. Click the [Start Return to Zero] button to perform the return to zero operation. The progress bar displays the return to zero progress. During the return to zero process, you can click the [Stop Return to Zero] button to stop the operation, as shown in the figure below.

开始回零 停止回零

95%

状态: 1 [回零运行中]

Figure 5-41

- Click the [Details] button to view the detailed description of the return to zero type, as shown in the figure below.



Figure 5-42



Figure 5-43

5.12 Terminal

Double-click the [Terminal] node in the Project window as shown in the following figure:

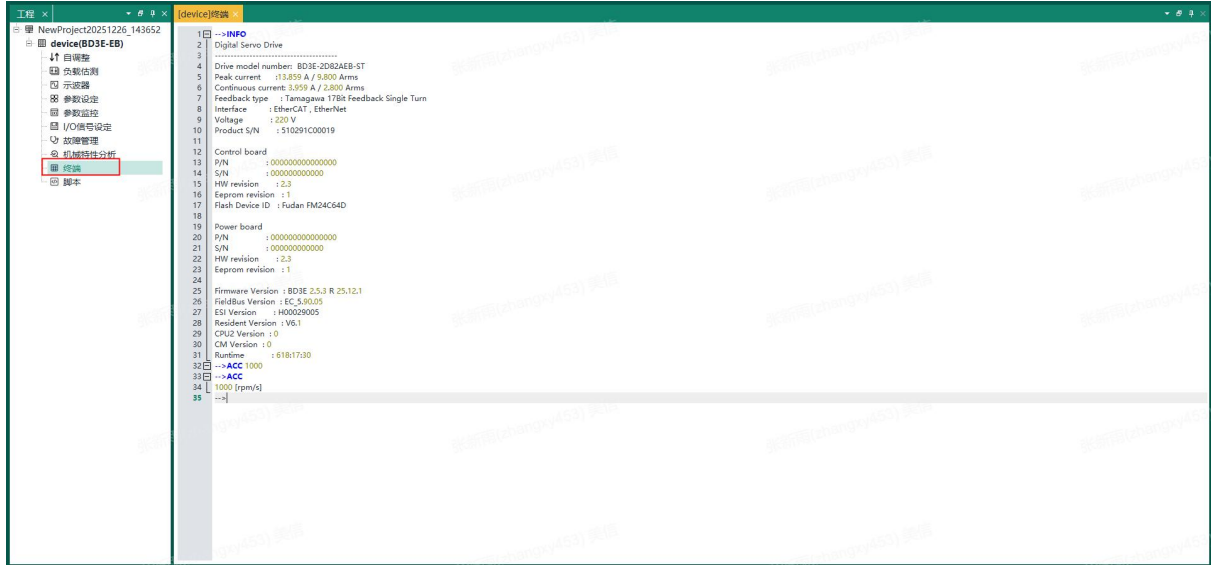


Figure 5- 44

5.12.1 VarCom Command

Enter the VarCom command in the terminal window. In the online state, it can communicate with the drive, configure drive functions, as shown in the following example:

1. Enter the read command.

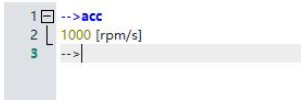


Figure 5-45

2. Enter the write command.

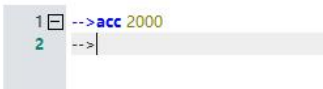


Figure 5-46

3. Enter the error command.

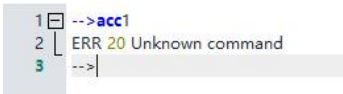


Figure 5-47

5.13Script

Double-click the [Script] node in the Project window as shown in the following figure:

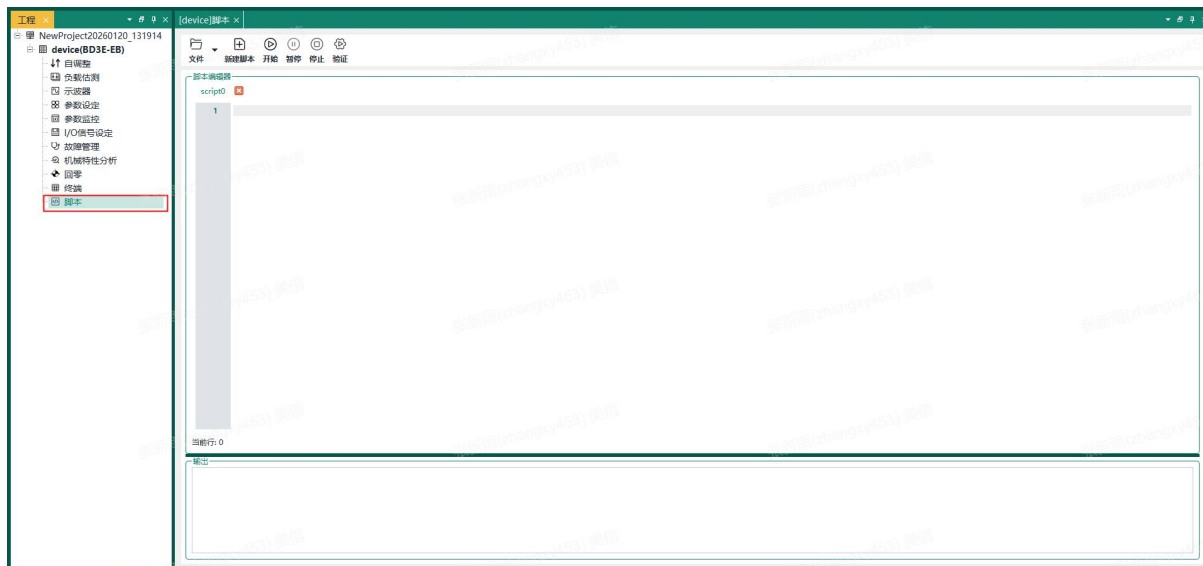


Figure 5- 48

5.13.1Menu item function

The menu items functions are as shown in the following figure:



Figure 5-49

- File: The dropdown options include open, save script file, close script tab window, clear script editor content, and other functions.
- New Script: Create a new script tab window.
- Start: Begin executing the script content.
- Pause/Resume: During script execution, you can pause/resume the run.
- Stop: During script execution, you can stop the run.
- Validation: Check the validity of the script content; if validation fails, the script cannot be executed.

5.13.2Edit Script

Edit the content in the script editor window, as shown in the following figure:



Figure 5-50

1. Edit manually or open a local script file; when opening a file, the default path is the installation directory, which includes sample script files, as shown in the following figure.

名称	修改日期	类型
3_LOOP_SCRIPT.txt	2026/1/16 18:04	文本文档
Continuous-oscilloscope-script.txt	2026/1/16 18:04	文本文档
ERROR_DEMO.txt	2026/1/16 18:04	文本文档
goto-1loop.txt	2026/1/16 18:04	文本文档
goto-2loop.txt	2026/1/16 18:04	文本文档
IF_SCRIPT.txt	2026/1/16 18:04	文本文档
RESET_SCRIPT.txt	2026/1/16 18:04	文本文档
Trigger-oscilloscope-script.txt	2026/1/16 18:04	文本文档
wizard3a.txt	2026/1/16 18:04	文本文档

Figure 5-51

- After editing the script, click the [Start] button to begin executing the script.
- If the script content validation fails, an error message window will be displayed automatically, and the text color of the error line will be red, as shown in the following figure.



Figure 5-52

4. During the script execution, the output window will print the information after #print in the script;

5.14 Firmware Download

In the software menu bar, find the [Tools] menu and click it, then click the [Download Tool] menu item to perform firmware download, as shown in the figure below:

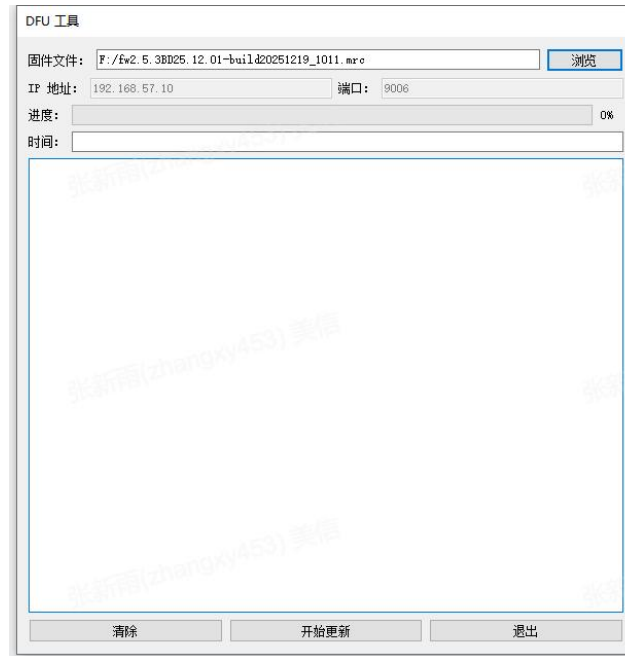


Figure 5- 53

1. Select the mrc file that needs to be updated.
2. Click start update and wait for the download to complete.
3. If the firmware upgrade fails, the corresponding error message will be displayed to inform the user.