NiMStudio 电机调试软件
用户使用手册
NiMStudio motor debugging software
User Manual

版 本 号：C

Version No.：C

NiMStudio V1.0.0

北京立迈胜控制技术有限责任公司

Beijing NiMotion control Technology Co., Ltd.

目录 Contents

1 关于手册 About the manual

1.1 简介 Introduction

本手册用以说明北京立迈胜控制技术有限责任公司所开发的 NiMStudio 电机调试软件的使用方法。

This manual is used to explain the use method of NiMStudio motor debugging software developed by Beijing NiMotion Control Technology Co., Ltd.

1.2 版本信息 Version information

手册版本 Manual version	日期 Date	修改记录 Modify record
A	2020/4/14	创建 Establish
B	2020/7/6	增加英文翻译 Add English translation
C	2020/8/17	修改 3.2 和 3.6 和部分图片 Modify 3.2 and 3.6 and some pictures

2 概述 Overview

2.1 环境准备 Environmental preparation

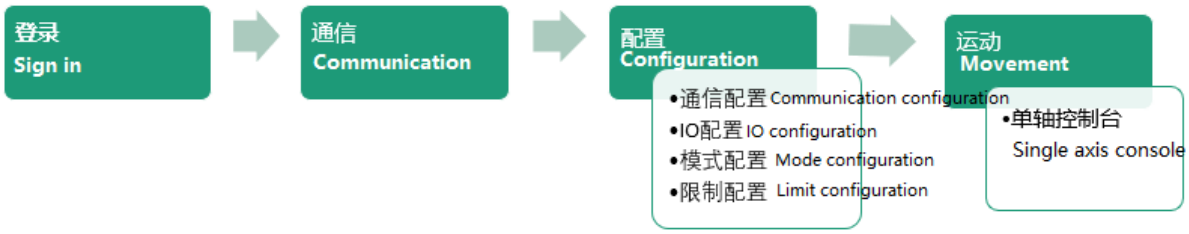
使用该上位机之前要安装 wireshark 抓包工具。

Install wireshark packet capture tool before using this host computer.

2.2 基本步骤 Basic steps

使用 NiMStudio 上位机调试电机的基本步骤如下：

The basic steps of using NiMStudio host computer to debug the motor are as follows:



1.登录步骤详见 3.1。

Please refer to 3.1 for the login procedure.

2.通信步骤详见 3.2.1.1。

Please refer to 3.2.1.1 for the communication procedure.

3.在通信配置页，配置控制台所需要的 PDO 详见 3.3.1，其他配置根据需要配置。

On the communication configuration page, please refer to 3.3.1 for the PDO required to configure the console. Other configurations are configured as required.

4.配置完成后，电机切换到操作状态，如果有故障清除故障，进入单轴控制台界面，开始运动，详见 3.5。

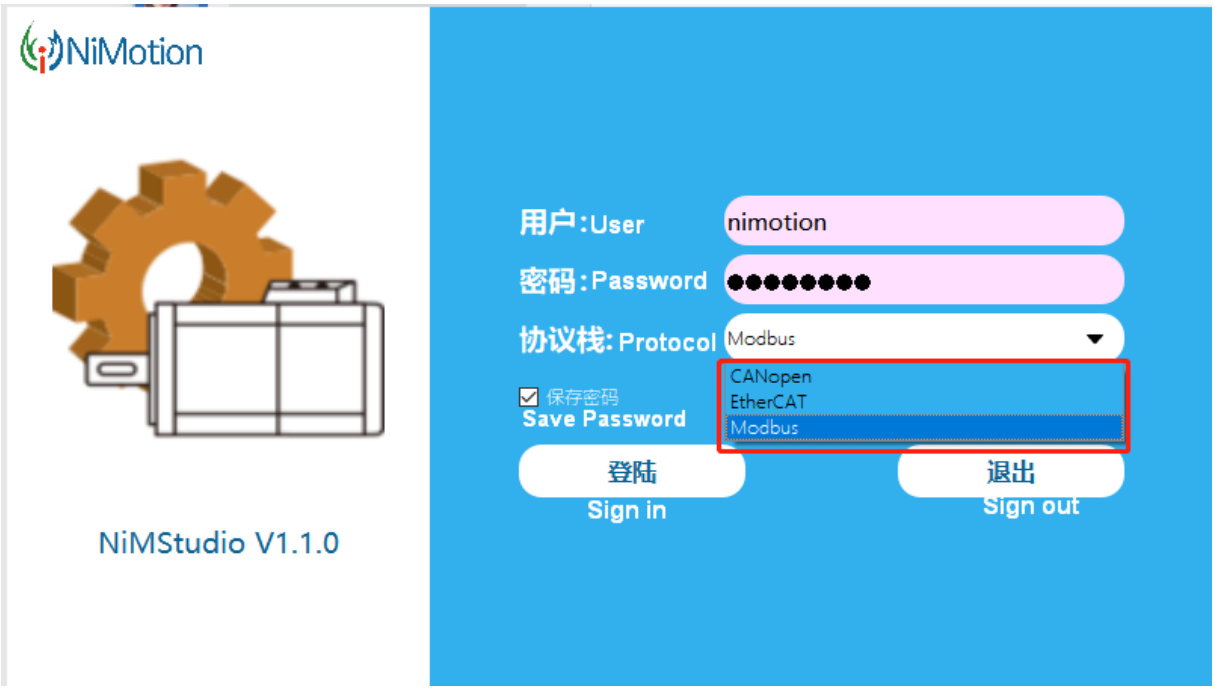
After the configuration is completed, the motor is switched to the operating state. If there is a fault to clear the fault, enter the single-axis console interface and start the movement. For details, see 3.5.

3 功能介绍 Function introduction

3.1 登录 Login

打开软件进入登录界面，输入用户名 nimotion、密码 nimotion（可勾选保存密码，下次可自动登录）；选择 CANopen 或者 EtherCAT 通信方式；点击“登录”。

Open the software to enter the login interface, enter the user name nimotion, password nimotion (you can check the save password, you can automatically log in next time); choose CANopen or EtherCAT communication method; click "Login".



3.2 主界面 Main interface

主界面主要包括标题、菜单、一级导航栏、二级导航栏、设备树和操作区域，如下图所示：

The main interface mainly includes the title, menu, first-level navigation bar, second-level navigation bar, device tree and operation area, as shown in the following figure:

3.2.1 菜单栏 Menu bar

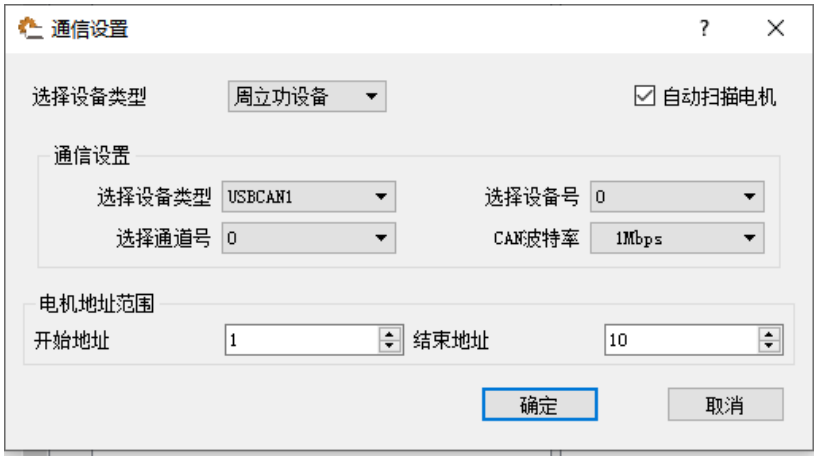
3.2.1.1 通信 Communication

在登录界面选择不同的方式后，依次点击“通信”“打开”。通信设置对话框会自动切换为对应的通信方式设置界面。

After selecting different methods on the login interface, click "Communication" and "Open" in turn. The communication setting dialog box will automatically switch to the corresponding communication method setting interface.

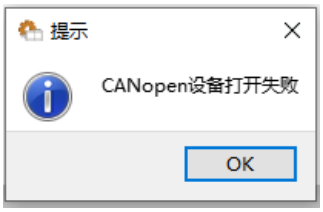
1.如果是 CANOPEN 通信，当点击“打开”时，出现打开连接的对话框，选择转换器类型，扫描的电机地址等，点击“确定”，打开连接，如下图：

1. If it is CANOPEN communication, when you click "Open", a dialog box to open the connection appears, select the converter type, the scanned motor address, etc., click "OK" to open the connection, as shown below:



连接失败则显示如下对话框。如果连接成功，则设备树显示连接的电机。

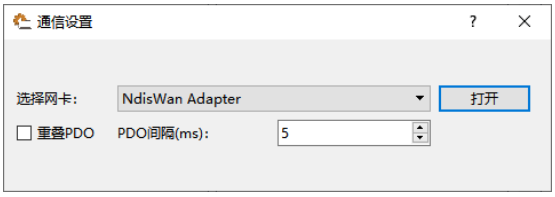
If the connection fails, the following dialog box is displayed. If the connection is successful, the device tree displays the connected motor.



2.如果是 EtherCAT 通信选择使用的网卡，设置是否使用重叠 PDO、PDO 间隔，点击打开。如果连接成功，则设备树显示连接的电机。

2. If it is the network card used for EtherCAT communication, set whether to use overlapping PDO, PDO interval, click to open. If the connection is successful, the device tree displays the connected motor.

如下图： As shown below:



3.2.1.2 语言 Language

菜单栏的“语言”项，支持中英文，按 F4 快捷键也可快速切换。

The "Language" item in the menu bar supports Chinese and English. You can also switch quickly by pressing the F4 shortcut key.

3.2.1.3 窗口 Window

菜单栏的“窗口”项，包括日志查询和数据列表。日志查询是对于不同等级的日志进行查看，如下图。当电机有参数读写错误时，可以查看到错误的原因。

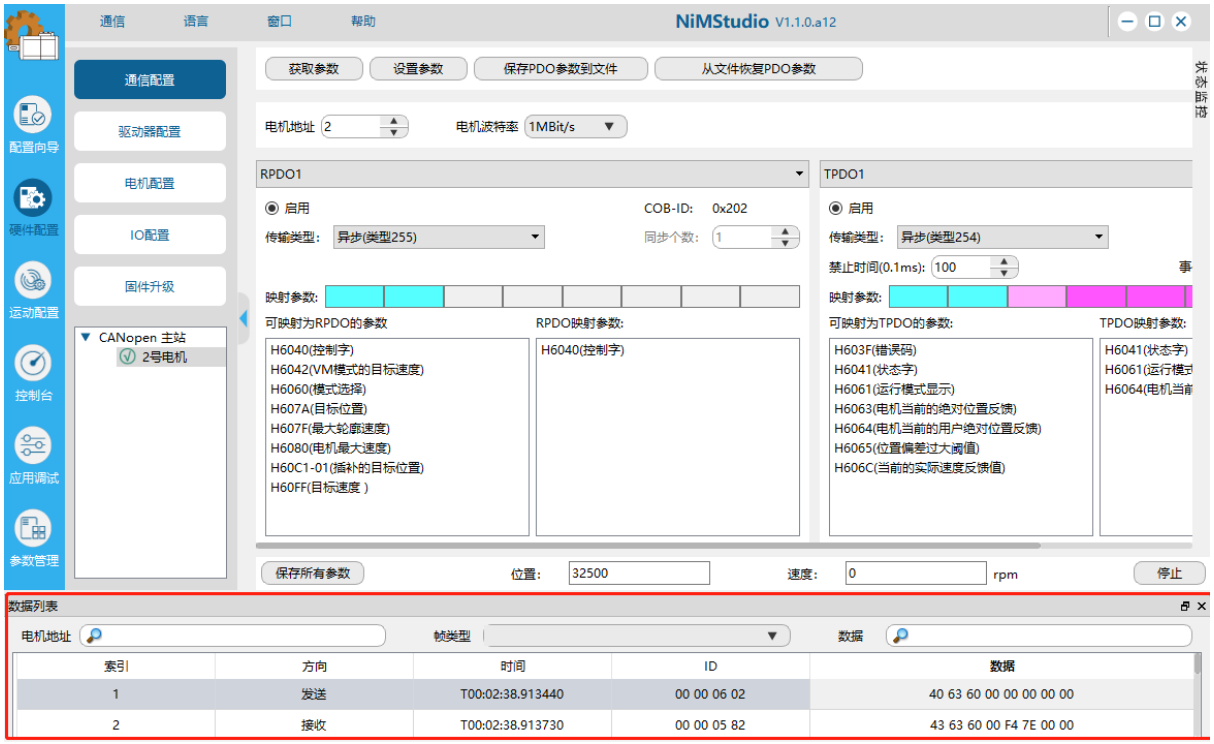
The "Window" item in the menu bar includes log query and data list. Log query is to view logs of different levels, as shown in the figure below. When the motor has a parameter reading or writing error, you can view the cause of the error.

数据列表是以停靠窗口显示。双击数据列表窗口的菜单栏或者拖拽，窗口可以浮动或锁定。

The data list is displayed in the dock window. Double-click the menu bar of the data list window or drag and drop, the window can float or lock.

电机地址搜索框：可以输入要搜索的电机地址，若需要搜索多个电机地址，以空格分隔。帧类型：勾选要筛选出的帧类型。

Motor address search box: You can enter the motor address to be searched. If you need to search for multiple motor addresses, separate them with spaces. Frame type: Check the frame type to be filtered out.



3.2.1.4 帮助 Help

菜单栏的“窗口”项，包括“关于”和“帮助”。“关于”是软件的相关信息；“帮助”是软件使用的帮助文档。

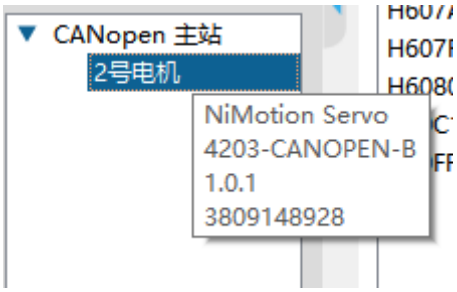
"Window" items in the menu bar, including "About" and "Help". "About" is the relevant information of the software; "Help" is the help document used by the software.

3.2.2 设备树 Device tree

设备树主要显示当前连接的电机。鼠标悬停到选中的电机上，机显示相关信息：设备名、硬件版本号、软件版本号、序列号。

The device tree mainly displays the currently connected motors. Hover over the selected motor, and the machine displays relevant information: device name, hardware version number, software version number, and serial number.

如下图： As shown below:



1. 选中当前电机，右键“显示菜单”，

   Select the current motor, right click "Display Menu",

2. 选择数据库：给电机指定参数数据库，选择中文数据库或者英文数据看库都可以。

   Select the database: Specify the parameter database for the motor, choose Chinese database or English data to see the database.

3. 清除故障：清除该电机的故障。

   Clear fault: clear the fault of the motor.

4. 切换到操作模式：

   选中的电机切换到操作模式(EtherCAT 下无此功能 EtherCAT 只能从主站切换）。

   Switch to operation mode: The selected motor is switched to operation mode (without this function under EtherCAT, EtherCAT can only be switched from the master station).

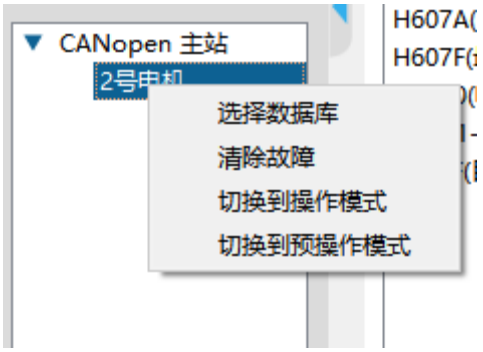
5. 切换到操作预模式：

   选中的电机切换到预操作模式(EtherCAT 下无此功能 EtherCAT 只能从主站切换）。

   Switch to pre-operation mode: The selected motor is switched to pre-operation mode (without

this function under EtherCAT, EtherCAT can only be switched from the master station).

如下图： As shown below:

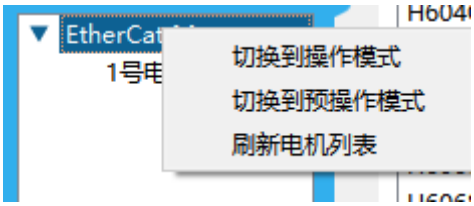


6. 右键点击“CANopen 主站”或“EtherCAT 主站”

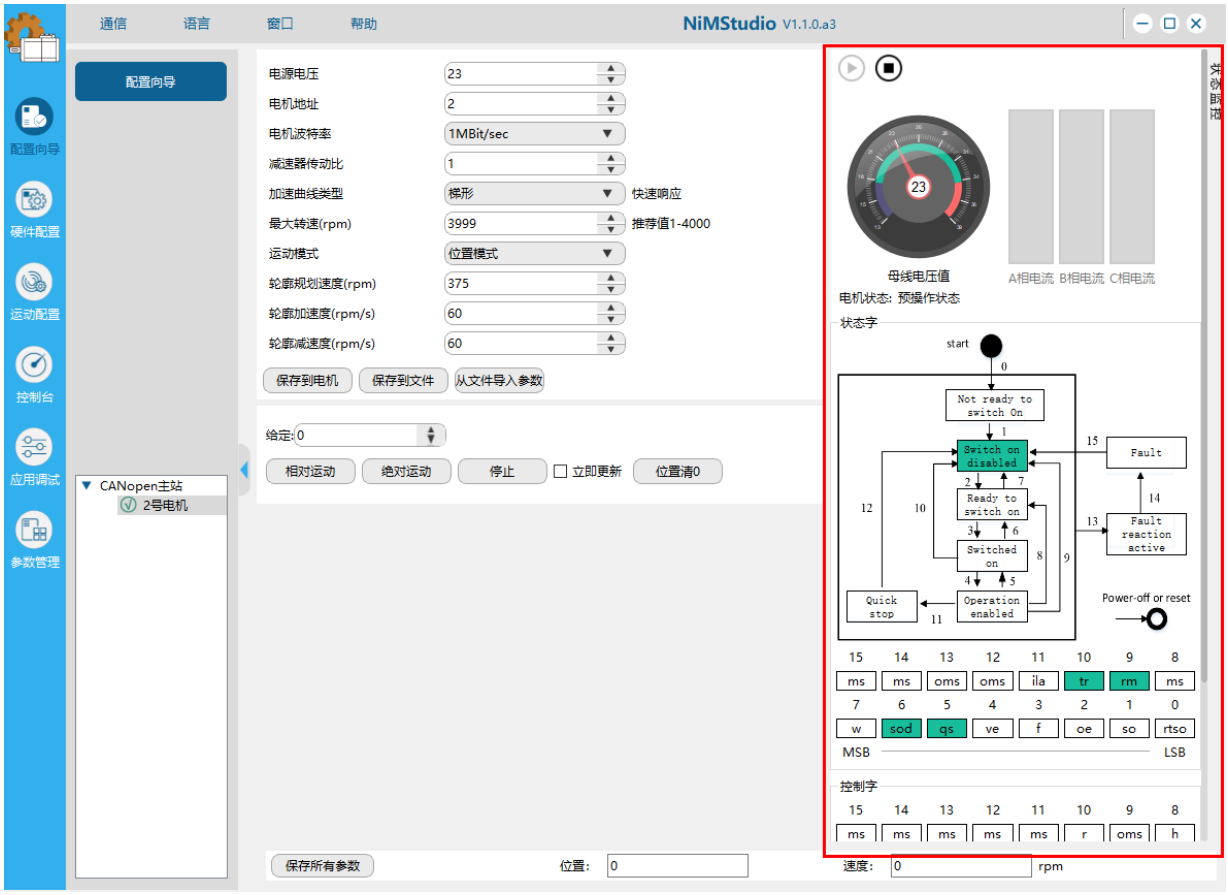
显示右键菜单，包括切换到操作模式，切换到预操作模式和刷新电机列表。如果电机处于 EtherCAT 的操作模式下刷新电机和切到操作模式不可用。从主站切换模式，则主站连接的所有电机都会切换到对应的模式下。

Right-click on "CANopen Master" or "EtherCAT Master" to display the right-click menu, including switching to operating mode, switching to pre-operating mode and refreshing the motor list. If the motor is in the EtherCAT operating mode, refreshing the motor and switching to the operating mode are not available. When the mode is switched from the master station, all motors connected to the master station will be switched to the corresponding mode.

如下图：As shown below:



3.2.3 状态监控 Status monitoring



仪表盘：显示母线电压值，三相电流值。（电机没有的参数，显示灰色）

Instrument panel: display bus voltage value, three-phase current value. (the parameters that the motor does not have are displayed in gray)

控制字、状态字、402 状态机图等具体的含义请查看《一体化低压伺服电机 CANopen 通讯用户手册》。

For the specific meanings of control word, status word, 402 state machine diagram, etc., please refer to "Integrated Low Voltage Servo Motor CANopen Communication User Manual".

额定参数：主要显示额定功率、转矩、转速、电流、母线电压值

Rated parameters: mainly display the rated power, torque, speed, current, bus voltage

3.2.4 全局参数区 Global parameter area

支持保存所有参数到电机的操作、实时监控电流反馈值、位置反馈值、速度反馈值（如果有某个参数不显示，那就是电机没有该参数）。

It supports the operation of saving all parameters to the motor, real-time monitoring of current feedback value, position feedback value, speed feedback value (if there is a parameter that is not displayed, it means that the motor does not have that parameter).

3.3 配置向导 Configuration Wizard

配置向导是针对不熟悉电机的使用者开发的，支持位置模式、速度模式、转矩模式。简单的配置几个参数，就可以使电机转起来。界面如下图所示。

The configuration wizard is developed for users who are not familiar with motors, and supports position mode, speed mode, and torque mode. Simply configure a few parameters to make the motor spin. The interface is shown in the figure below.

保存到电机：把已经设置好的参数保存到电机，功能相当于保存所有参数。

Save to motor: Save the set parameters to the motor, the function is equivalent to saving all parameters.

保存到文件：把当前界面上的值保存到文件。

Save to file: Save the value on the current interface to a file.

从文件导入参数：执行“保存到文件”后的文件，可通过该按钮设置到电机。

Import parameters from file: The file after executing "Save to File" can be set to the motor through this button.

3.4 硬件配置 Hardware configuration

硬件配置模块包括通信配置、驱动器配置、电机配置、传感器配置、IO 配置、固件下载。

The hardware configuration module includes communication configuration, driver configuration, motor configuration, sensor configuration, IO configuration, and firmware download.

3.4.1 通信配置 Communication configuration

选择左侧导航栏的通信配置页。在操作模式下，获取参数、设置参数、保存 PDO 参数到文件、从文件恢复 PDO 参数按钮不可用，要在设备树切换到预操作模式下才可用。（详见“主界面”的第三部分“设备树”），如下图：

Select the communication configuration page in the left navigation bar. In the operation mode, the buttons for obtaining parameters, setting parameters, saving PDO parameters to a file, and restoring PDO parameters from a file are not available. They are only available when the device tree is switched to the pre-operation mode. (See the third part of the "Main Interface" "Device Tree" for details), as shown below:

通信类型：设置电机的通信类型。包括 CANOPEN 和 EtherCAT

Communication type: Set the communication type of the motor. Including CANOPEN and EtherCAT

1. 获取参数：刷新这页的所有参数。快捷键 F5 可以刷新参数。

Get parameters: refresh all the parameters of this page. Shortcut key F5 can refresh the parameters.

2. 设置参数，在界面上设置完，并没有下发到电机，而是点击该按钮，统一下发到电机。

After setting the parameters, the settings on the interface are not sent to the motor, but click this button to send them to the motor uniformly.

3. 保存 PDO 参数到文件：可以把当前 PDO 所有的配置信息保存到文件

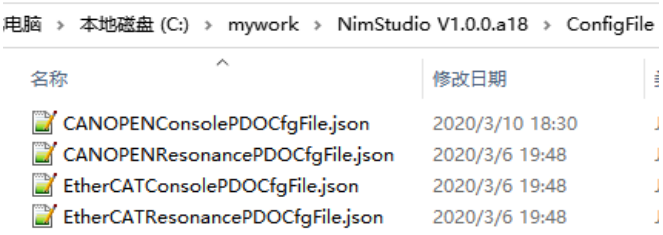
Save PDO parameters to file: can save all configuration information of current PDO to file

4. 从文件恢复 PDO 参数：选择 PDO 配置文件，可按文件里的配置设置到 PDO。

Restore PDO parameters from a file: Select the PDO configuration file, and set to PDO according to the configuration in the file.

配置文件如下：

The configuration file is as follows:



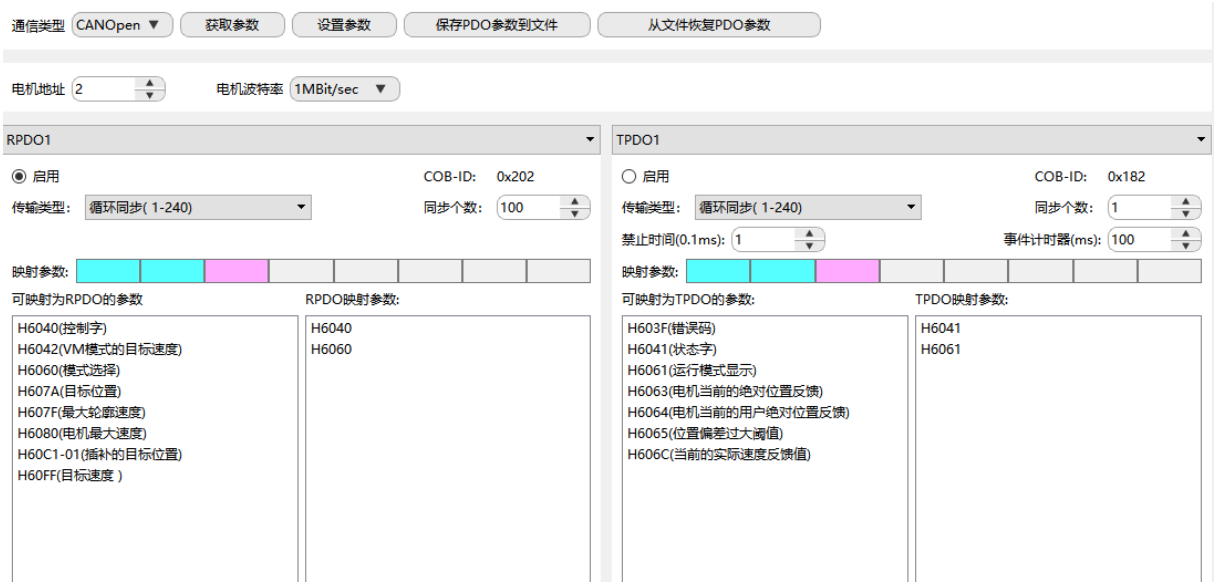
图中文件依次为 CANopen 协议下的控制台 PDO 配置文件、CANopen 协议下的振动抑制 PDO 配置文件、EtherCAT 协议下的控制台 PDO 配置文件、EtherCAT 协议下的振动抑制 PDO 配置文件

The files in the figure are the console PDO configuration file under the CANopen protocol, the vibration suppression PDO configuration file under the CANopen protocol, the console PDO configuration file under the EtherCAT protocol, and the vibration suppression PDO configuration file under the EtherCAT protocol.

3.4.1.1 CANopen 通信配置 CANopen communication configuration

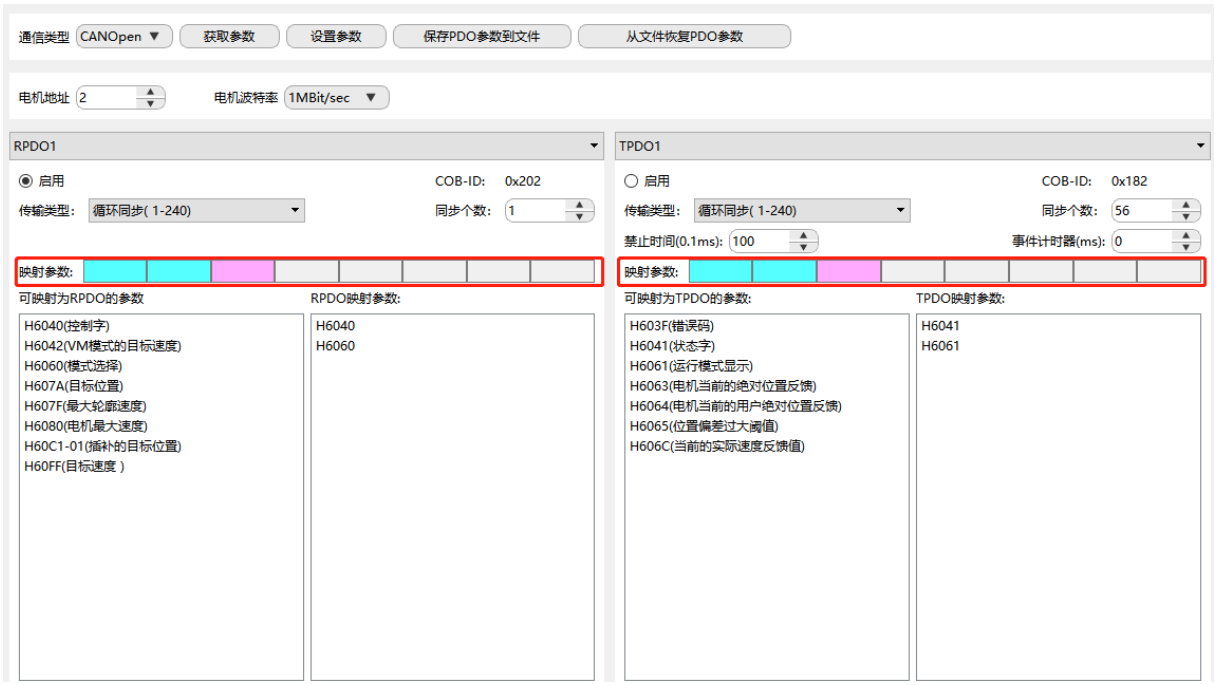
如果上位机在登录界面以 CANopen 通信方式登录，则界面如下图：

If the host computer logs in with CANopen communication on the login interface, the interface is as follows:



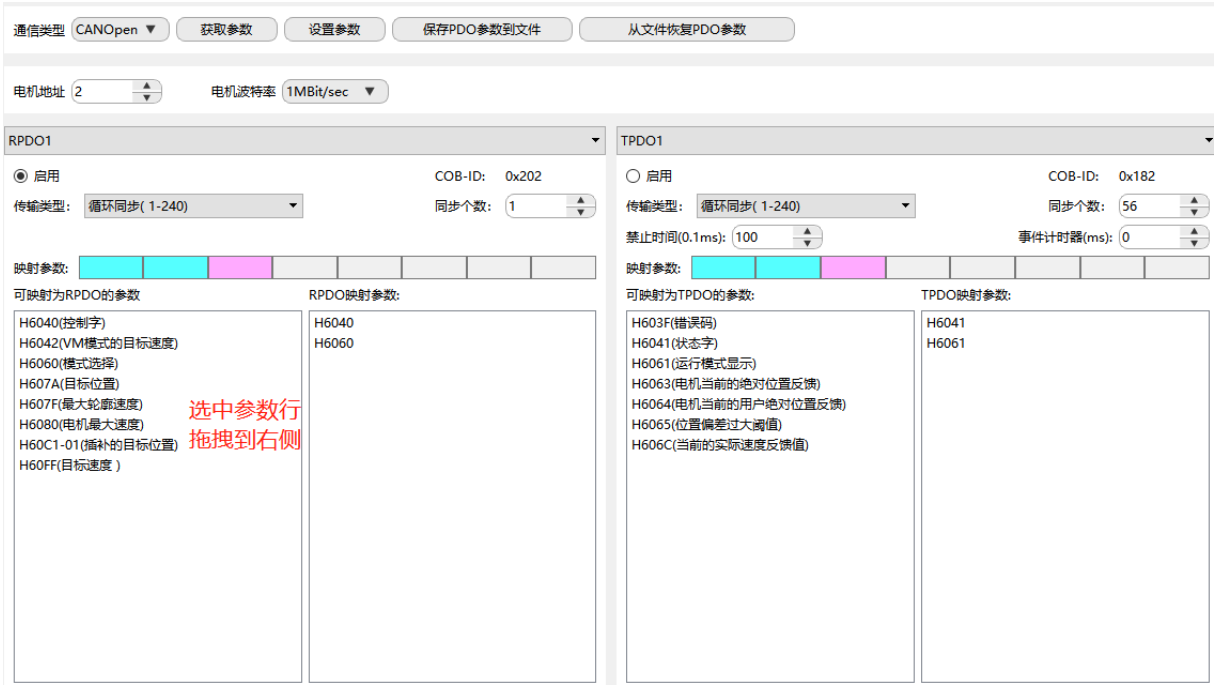
如下图所框选的内容，则反映的 PDO 数据字节占用的情况，每种颜色代表已经配置的参数，所占格数代表这个参数占用的字节。

The content selected as shown in the figure below reflects the occupation of PDO data bytes. Each color represents the parameter that has been configured, and the number of occupied grids represents the bytes occupied by this parameter.



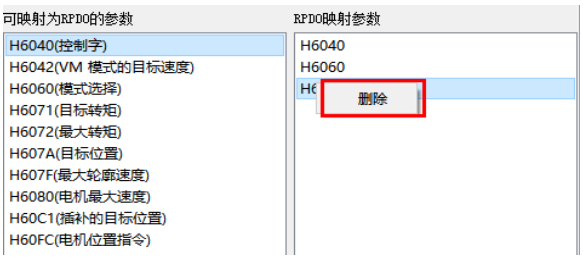
添加映射参数，通过拖拽添加参数。如下图：

Add mapping parameters, add parameters by dragging. As shown below:



删除映射参数，右键点击配置上的映射参数，则删除该参数。如下图：

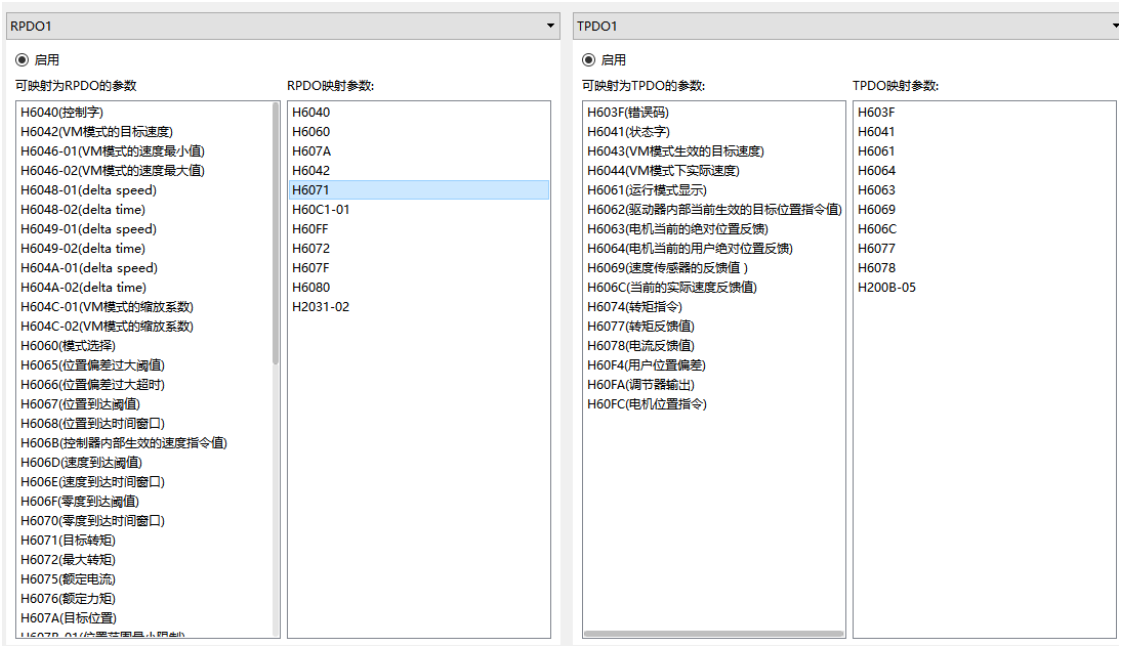
Delete the mapping parameter, right-click the mapping parameter on the configuration to delete the parameter. As shown below:



3.4.1.2 EtherCAT 通信配置 EtherCAT communication configuration

如果上位机在登录界面以 EtherCAT 通信方式登录，EtherCAT 通信配置主要包括 PDO 是否启用和映射参数的配置。添加和删除映射参数的操作与 CANOPEN 通信设置里的添加和删除映射参数操作相同。界面如下图：

If the host computer logs in with EtherCAT communication on the login interface, the EtherCAT communication configuration mainly includes whether PDO is enabled and the configuration of mapping parameters. The operations of adding and deleting mapping parameters are the same as those of CANOPEN communication settings. The interface is as follows:



3.4.2 驱动器配置 Drive configuration

点击左侧导航栏的“驱动器配置”，切换到驱动器配置页，

Click "Drive Configuration" on the left navigation bar to switch to the drive configuration page,

十进制和十六进制按钮是切换参数表格的不同进制的显示方式。

Decimal and hexadecimal buttons are used to switch the display mode of different decimals of the parameter table.

获取参数：从电机读取界面所有参数。快捷键 F5 可以刷新参数。

Get parameters: Read all the parameters of the interface from the motor. Shortcut key F5 can refresh the parameters.

设置参数：只能对参数表的设备值列进行设置：双击单元格，编辑参数，按键盘的 Enter 键或点击界面其他地方，则编辑完成，完成后就自动设置到电机了。

Parameter setting: Only the device value column of the parameter table can be set: double-click the cell, edit the parameter, press the Enter key on the keyboard or click elsewhere on the interface, the editing is completed, and it is automatically set to the motor after completion.

驱动器信息显示的是关于驱动器的相关的版本号。

The drive information shows the relevant version number of the drive.

如下图： As shown below:

3.4.3 电机配置 Motor configuration

点击左侧导航栏的“电机配置”，切换到电机配置页。主要是对与电机相关的参数（2000h 的参数）的配置。按钮功能同“驱动器配置”的按钮功能。

Click "Motor Configuration" in the left navigation bar to switch to the motor configuration page. It is mainly for the configuration of the parameters related to the motor (the parameter of 2000h). The button function is the same as the button function of "Drive Configuration".

3.4.4 传感器配置 Sensor configuration

点击左侧导航栏的“传感器配置”，切换到传感器配置页。主要是对编码器和电流传感器的相关的参数的配置。按钮功能同“驱动器配置”的按钮功能。

Click "Sensor Configuration" in the left navigation bar to switch to the sensor configuration page. Mainly the configuration of the relevant parameters of the encoder and current sensor. The button function is the same as the button function of "Drive Configuration".

3.4.5 IO配置 IO configuration

点击左侧导航栏的“IO 配置”，切换到 IO 配置页。包括对数字输入，数字输出，虚拟输入，虚拟输出接口的配置。按钮功能同“驱动器配置”的按钮功能。

Click "IO Configuration" on the left navigation bar to switch to the IO configuration page. Including the configuration of digital input, digital output, virtual input and virtual output interface. The button function is the same as the button function of "Drive Configuration".

3.4.6 固件下载 Firmware download

设置要下载固件的电机地址，选择固件文件，设置帧间隔，选择升级方式，升级固件。如果选择的固件太大、固件名不适用该电机，出现弹框提示，升级不成功。

Set the motor address to download the firmware, select the firmware file, set the frame interval, select the upgrade method, and upgrade the firmware. If the selected firmware is too large and the firmware name does not apply to the motor, a pop-up box prompts and the upgrade is not successful.

3.5 运动配置 Sports configuration

运动配置是对电机运动相关的参数的配置，包括模式配置，限制配置，诊断配置。

Motion configuration is the configuration of motor motion related parameters, including mode configuration, limit configuration, and diagnosis configuration.

3.5.1 模式配置 Mode configuration

选择左侧导航栏的“模式配置”选项，进入模式配置页。如下图。

Select the "Mode Configuration" option in the left navigation bar to enter the mode configuration page. As shown below.

十进制和十六进制按钮是切换参数表格的不同进制的显示方式。

Decimal and hexadecimal buttons are used to switch the display mode of different decimals of the parameter table.

获取参数：从电机读取界面所有参数。快捷键 F5 可以刷新参数。

Get parameters: Read all the parameters of the interface from the motor. Shortcut key F5 can refresh the parameters.

设置参数：只能对参数表的设备值列进行设置：双击单元格，编辑参数，按键盘的 Enter 键或点击界面其他地方，则编辑完成，完成后就自动设置到电机了。

Parameter setting: Only the device value column of the parameter table can be set: double-click the cell, edit the parameter, press the Enter key on the keyboard or click elsewhere on the

interface, the editing is completed, and it is automatically set to the motor after completion.

操作模式包括 CiA402 模式和厂家模式。选择不同模式，点击按钮”设置到 xx 模式”，会设置电机到对应模式。

Operating modes include CiA402 mode and factory mode. Select a different mode and click the button "Set to xx mode" to set the motor to the corresponding mode.

3.5.2 限制配置 Limit configuration

选择左侧导航栏的“限制配置”选项，进入限制配置页，配置界面主要对有关限制的一些参数的配置。如最大电流，最大转速，最大转矩，位置范围最小限制，位置范围最大限制等。按钮功能同“模式配置”的按钮功能。

Select the "Limit Configuration" option in the left navigation bar to enter the limit configuration page. The configuration interface mainly configures some parameters related to the limit. Such as maximum current, maximum speed, maximum torque, position range minimum limit, position range maximum limit, etc. The button function is the same as the button function of "Mode Configuration".

3.5.3 诊断配置 Diagnostic configuration

选择左侧导航栏的“限制配置”选项，进入限制配置页。诊断配置页是对故障参数和故障动作代的配置。故障参数配置是对与故障相关参数的配置。障动作配置界面只有反应码和自复位两列可以配置，如下图：

Select the "Restriction Configuration" option in the left navigation bar to enter the Restriction Configuration page. The diagnosis configuration page is the configuration of fault parameters and fault action generation. Fault parameter configuration is the configuration of parameters related to the fault. Only two columns of reaction code and self-reset can be configured on the obstacle action configuration interface, as shown in the following figure:

3.6 控制台 Console

控制台包括单轴控制台、故障日志

The console includes single-axis console and fault log

3.6.1 单轴控制台 single axle console

单轴台包括示波、状态栏、电机控制、PID 调节功能。

The single-axis table includes functions such as oscilloscope, status bar, motor control, PID adjustment.

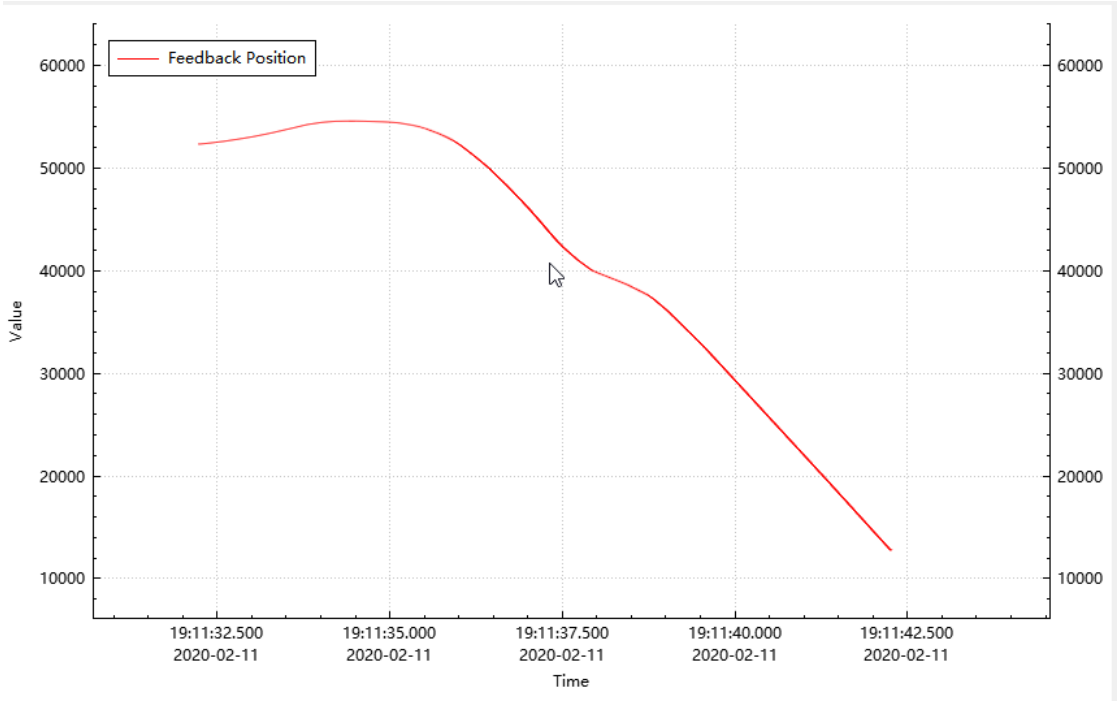
3.6.1.1 波形图 Waveform

波形图一种直观的方式来显示电机的各项数据，基本的操作如下：

Waveform diagram shows the data of the motor in an intuitive way. The basic operations are as follows:

1. 鼠标操作：鼠标左键为功能键，右键为拖动键，滚轮滚动以鼠标位置为中心点缩放。效果如图：

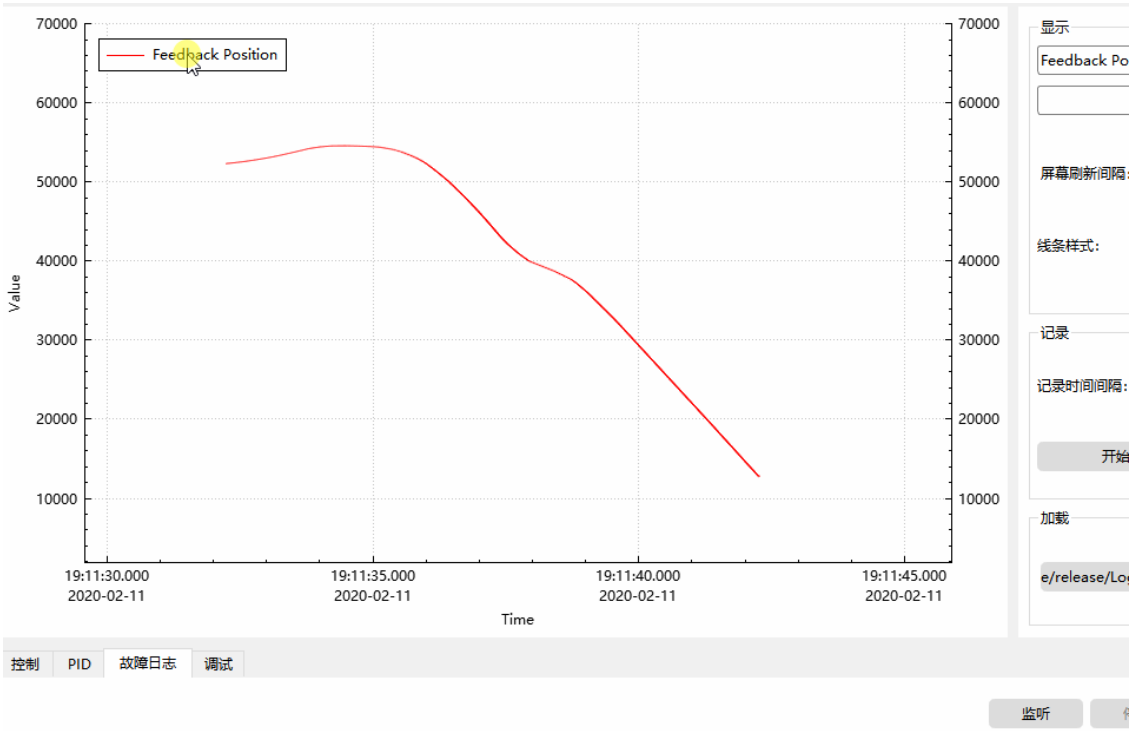
Mouse operation: The left button of the mouse is a function key, the right button is a drag button, and the scroll wheel is zoomed with the mouse position as the center point. The effect is as follows:



2. 曲线颜色更换：双击曲线标识来更换曲线显示颜色。

   Curve color replacement: Double-click the curve indicator to change the curve display color.

   效果如图： The effect is as follows:

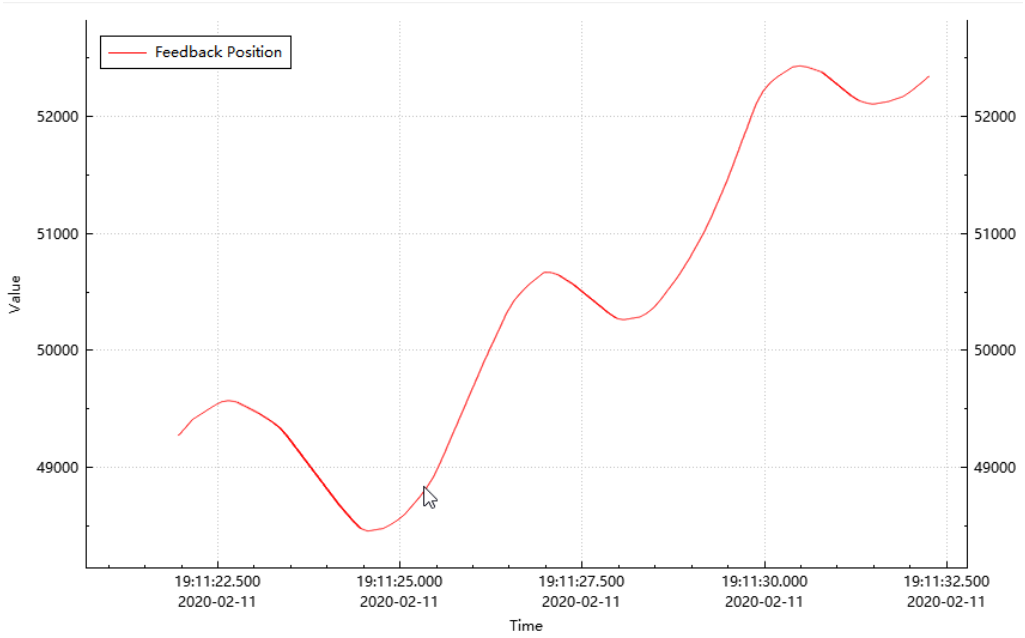


3.6.1.2 波形辅助 Waveform assistant

1. 锚点：Anchor point: 

锚点功能选中后，单击曲线的任何一点会弹出气泡窗显示当前位置的 XY 轴坐标，效果如图：

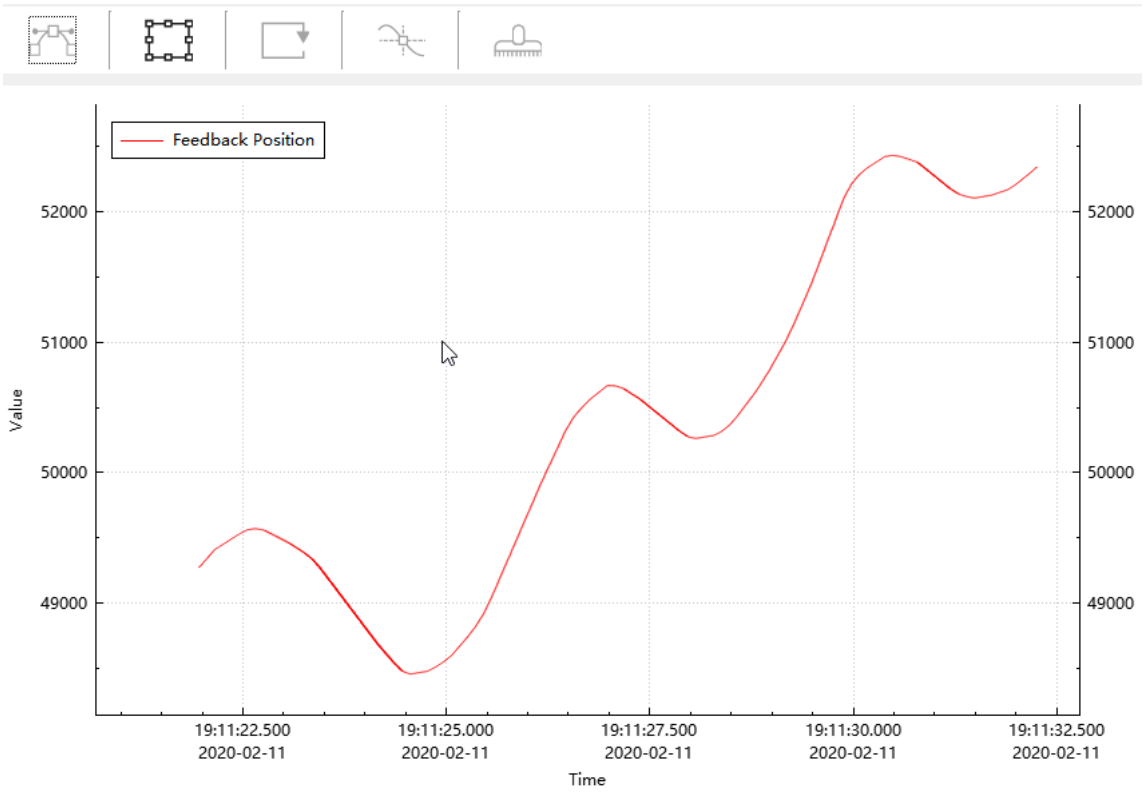
After the anchor point function is selected, clicking on any point of the curve will pop up a bubble window to display the XY axis coordinates of the current position. The effect is shown in the figure:



2. 框选：Box selection: 

选中框选功能后，可以拖动鼠标拉出一个矩形区域，区域内的曲线会被放大至波形图全屏幕的范围，观察结束后选择恢复功能恢复刚才被放大的比例，效果如图：

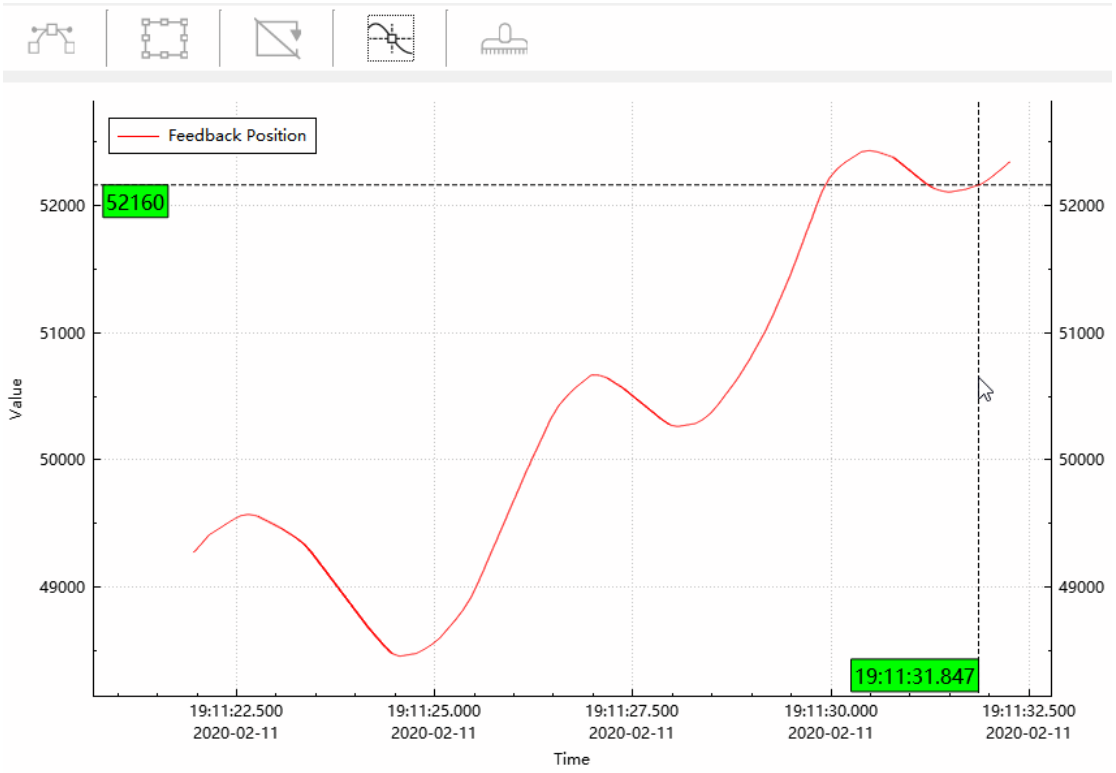
After selecting the frame selection function, you can drag the mouse to pull out a rectangular area. The curve in the area will be enlarged to the full screen of the waveform. After the observation is completed, select the restore function to restore the ratio that was just enlarged. The effect is as shown in the figure:



3. 游标：Cursor:

游标功能选中后，鼠标在波形图中移动时，会自动定位当前鼠标 Y 坐标法线与曲线的交叉点，并显示该点的 XY 轴坐标，效果如图：

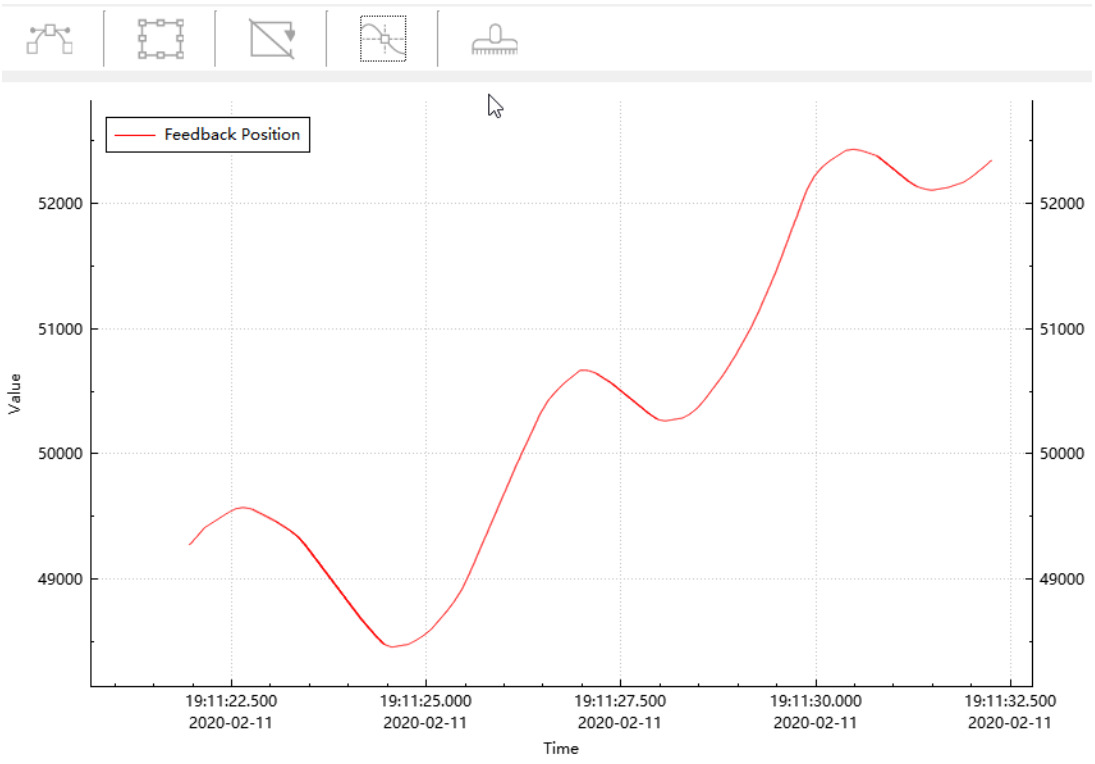
After the cursor function is selected, when the mouse moves in the waveform chart, it will automatically locate the intersection point of the current mouse Y coordinate normal and the curve, and display the XY axis coordinates of the point. The effect is as shown in the figure:



4. 清屏： Clear screen: 

清除当前显示的所有曲线数据，效果如图：

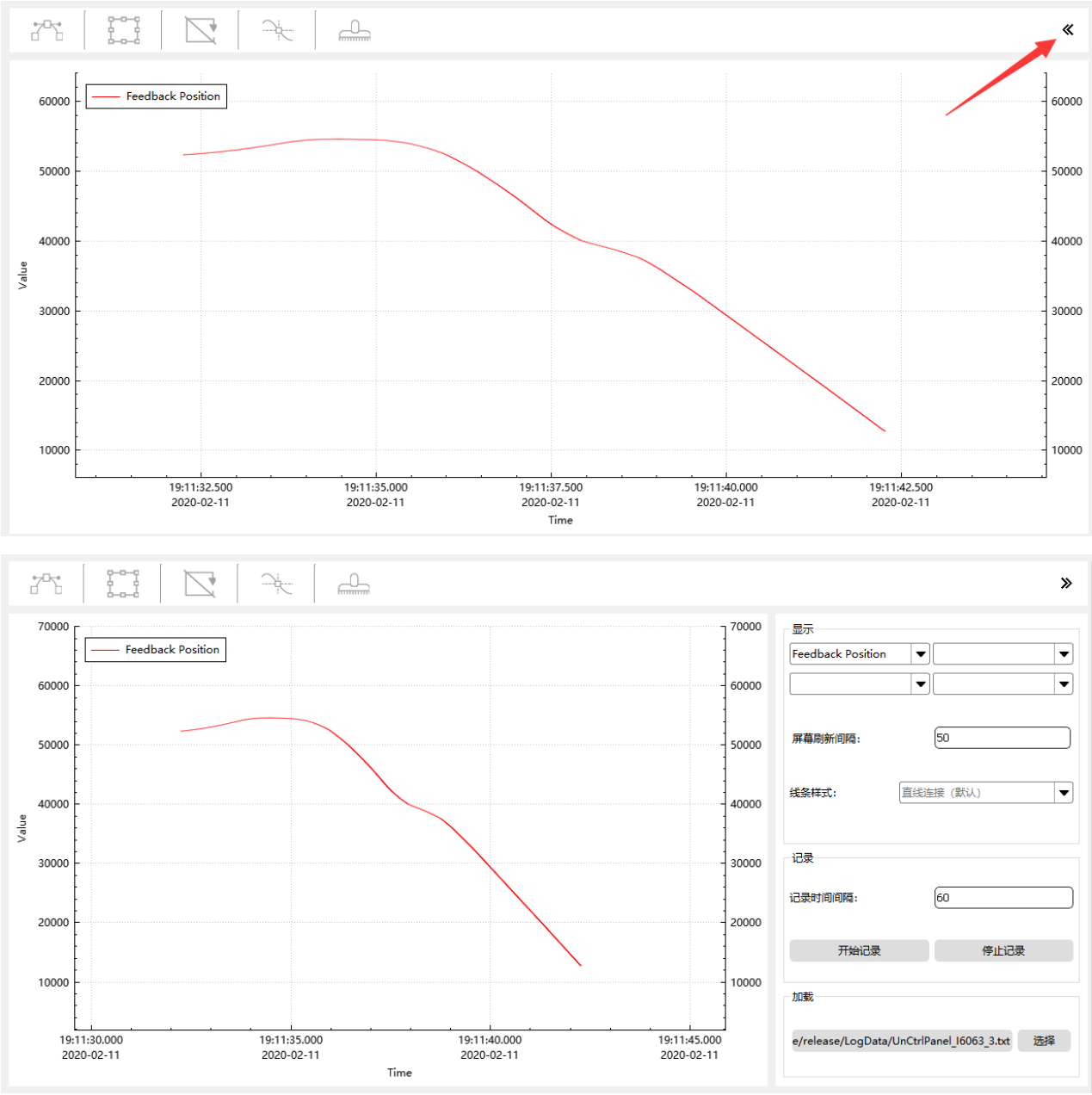
Clear all the curve data currently displayed, the effect is as follows:



3.6.1.3 工具栏 Toolbar

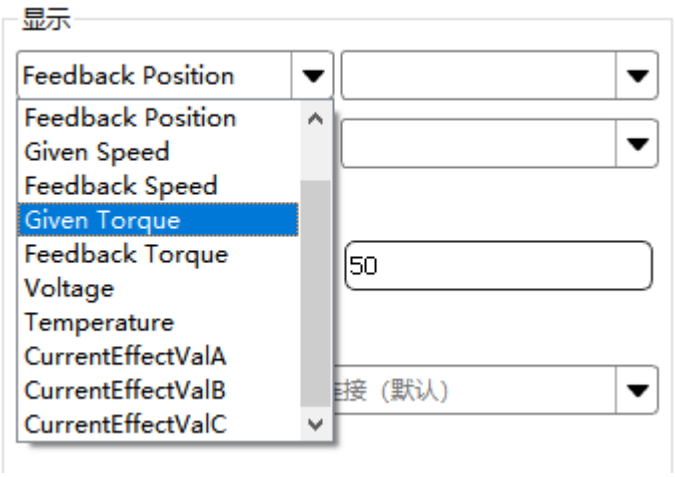
点击右侧三角形按钮展开工具栏，如图：

Click the triangle button on the right to expand the toolbar, as shown in the figure:



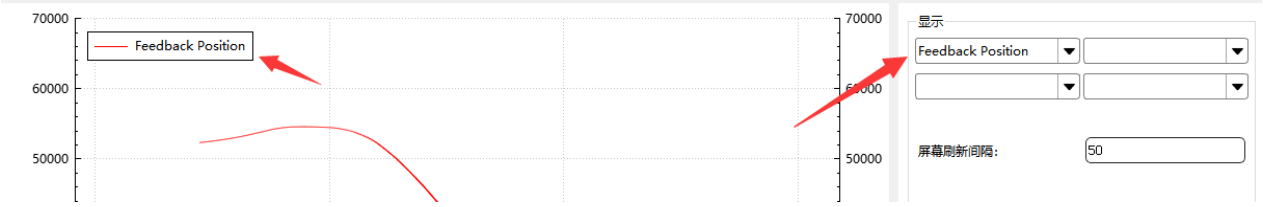
1. 曲线选择：示波图最多支持显示 4 条曲线、11 种不同类型的数据，如图：

Curve selection: The oscilloscope supports up to 4 curves and 11 different types of data, as shown in the figure:



选择数据类型后示波图会显示对应曲线的名称和曲线颜色，如图：

After selecting the data type, the oscilloscope will display the name and color of the corresponding curve, as shown in the figure:

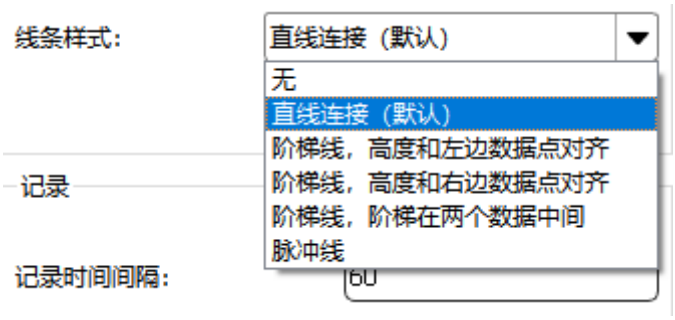


2. 屏幕刷新间隔：调整示波图刷新显示的时间间隔，调整范围为 50-5000ms

Screen refresh interval: adjust the time interval of oscilloscope refresh display, the adjustment range is 50-5000ms

3. 线条样式：提供 6 种不同的数据连点方式，如下图：

Line style: Provide 6 different data connection methods, as shown below:



4. 曲线数据记录/恢复： Curve data recording/restoration:

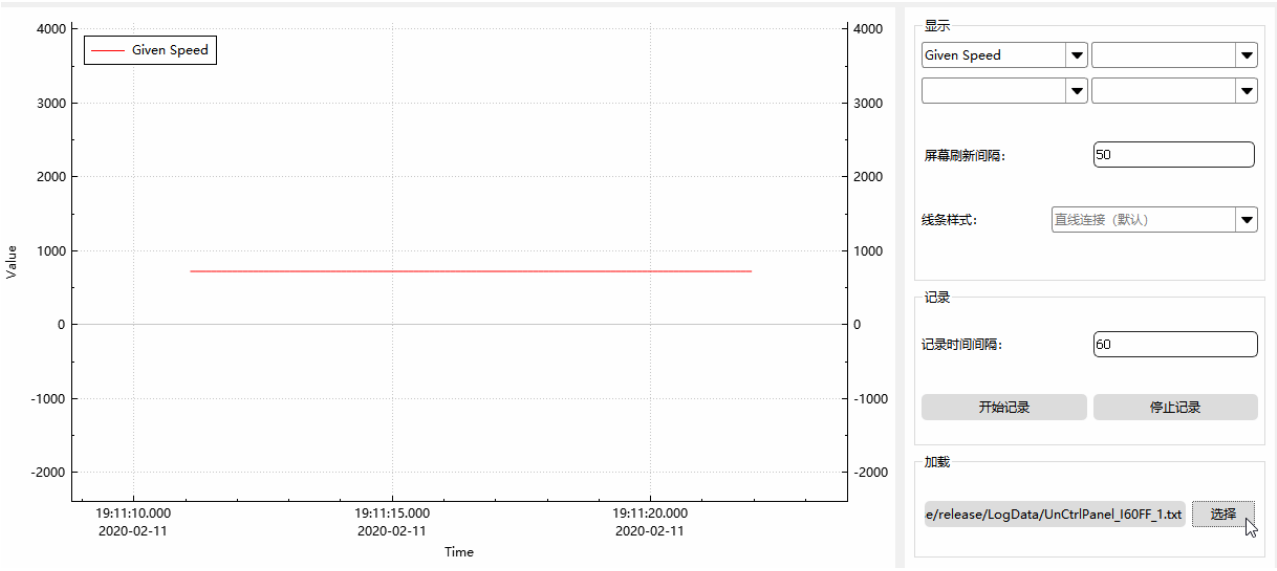
记录：设置记录的时间间隔后，数据开始记录，数字会进行倒数，每个设定时间间隔都会储存一个文件，直到用户点击停止记录为止。

Recording: After setting the recording interval, the data starts to record, and the number will be counted down. Each set time interval will store a file until the user clicks to stop recording.

加载：点击选择按钮，选中要加载的曲线文件之后即可显示出相关数据。

Load: Click the select button and select the curve file to be loaded to display the relevant data.

效果图： Effect picture:



3.6.1.4 电机控制 Motor control

控制模块会根据当前电机的不同运行模式呈现不同的控制界面，目前支持四种电机模式，分别为：PP 模式、PV 模式、PT 模式、HM 模式。具体的操作流程请结合《一体化低压伺服电机 CANopen 通讯用户手册》中的相关内容一起查看。

The control module will present different control interfaces according to the different operating modes of the current motor. Currently, four motor modes are supported: PP mode, PV mode, PT mode, and HM mode. Please refer to the relevant content in the "Integrated Low-Voltage Servo Motor CANopen Communication User Manual" for the specific operation process.

注意：如果没有配置对应的 PDO，跳入单轴控制台界面时候会弹框提示，要使用“通信配置”界面的“从文件恢复 PDO 参数”按钮，来配置 PDO。电机运动前要从设备树切换到操作模式，如果有故障要清除故障。

Note: If the corresponding PDO is not configured, a prompt will pop up when jumping into the single-axis console interface. Use the "Restore PDO Parameters from File" button on the "Communication Configuration" interface to configure the PDO. Before the motor moves, switch from the device tree to the operating mode, and clear the fault if there is a fault.

3.6.1.5 PID 调节 PID adjustment

拖动条可以实时调整相关参数的数值，用户也可以在下图数字框填写数值后回车生效。

The drag bar can adjust the value of the relevant parameters in real time, and the user can also fill in the value in the number box below and press Enter to take effect.

3.6.2 故障日志 Fault log

用户点击监听按钮开始进行报警监听，当电机发生报警时会在报警表格中显示报警的详细信息。

The user clicks the monitor button to start the alarm monitoring. When the motor generates an alarm, the alarm detailed information will be displayed in the alarm table.

3.7 应用调试 Application debugging

应用调试模块是关于电机调试的一些操作和参数配置，包括调试指令、振动抑制。

The application debugging module is about some operations and parameter configuration of motor debugging, including debugging instructions and vibration suppression.

3.7.1 调试指令 Debugging instructions

1. 选择左侧导航栏的“调试指令”选项，进入调试指令页。

Select the "Debug Command" option in the left navigation bar to enter the debug command page.

2. 选择配置文件（json 格式）

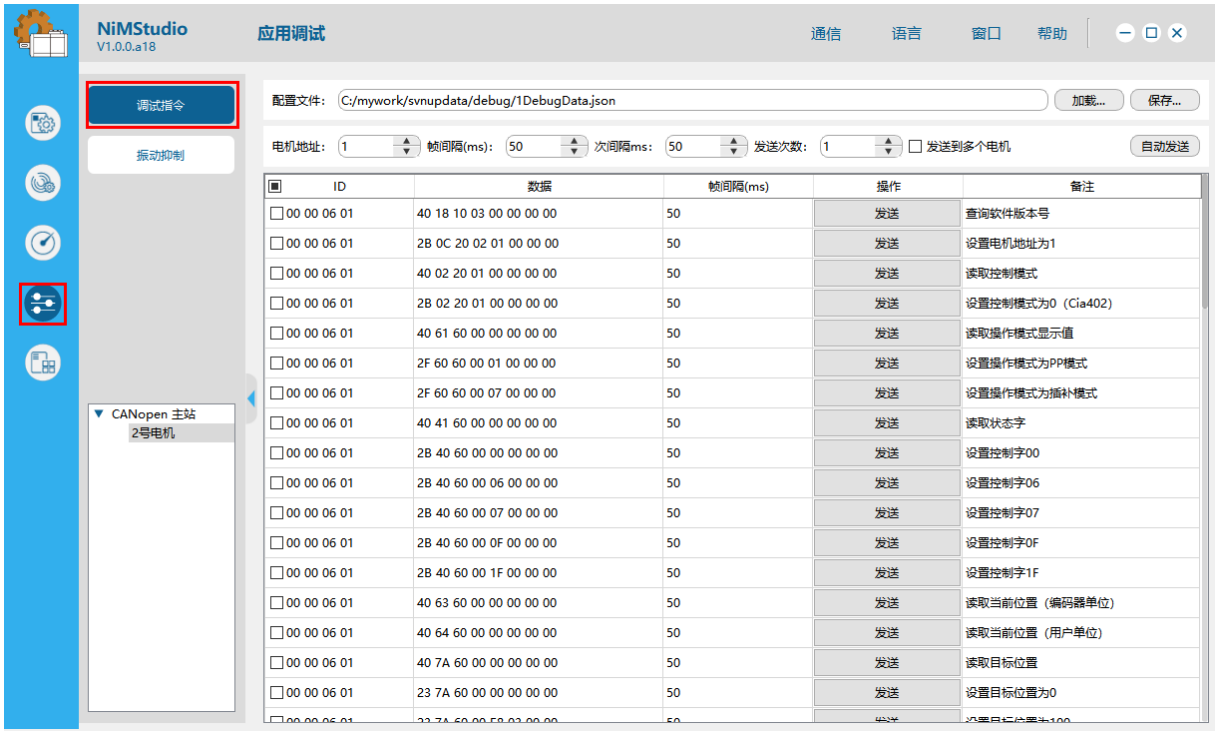
修改发送相关的参数，在报文表格里勾选要发送的指令，点击“自动发送”，即可按照设置的条件自动发送。在报文表格里点击“发送”按钮，可仅发送该行的报文。

Select the configuration file (json format), modify the sending-related parameters, check the instructions to be sent in the message table, and click "Auto Send" to send automatically according to the set conditions. Click the "Send" button in the message table to send only the message of that row.

表格的右键菜单是关于表格行的一些操作。

The right-click menu of the table is about some operations of the table row.

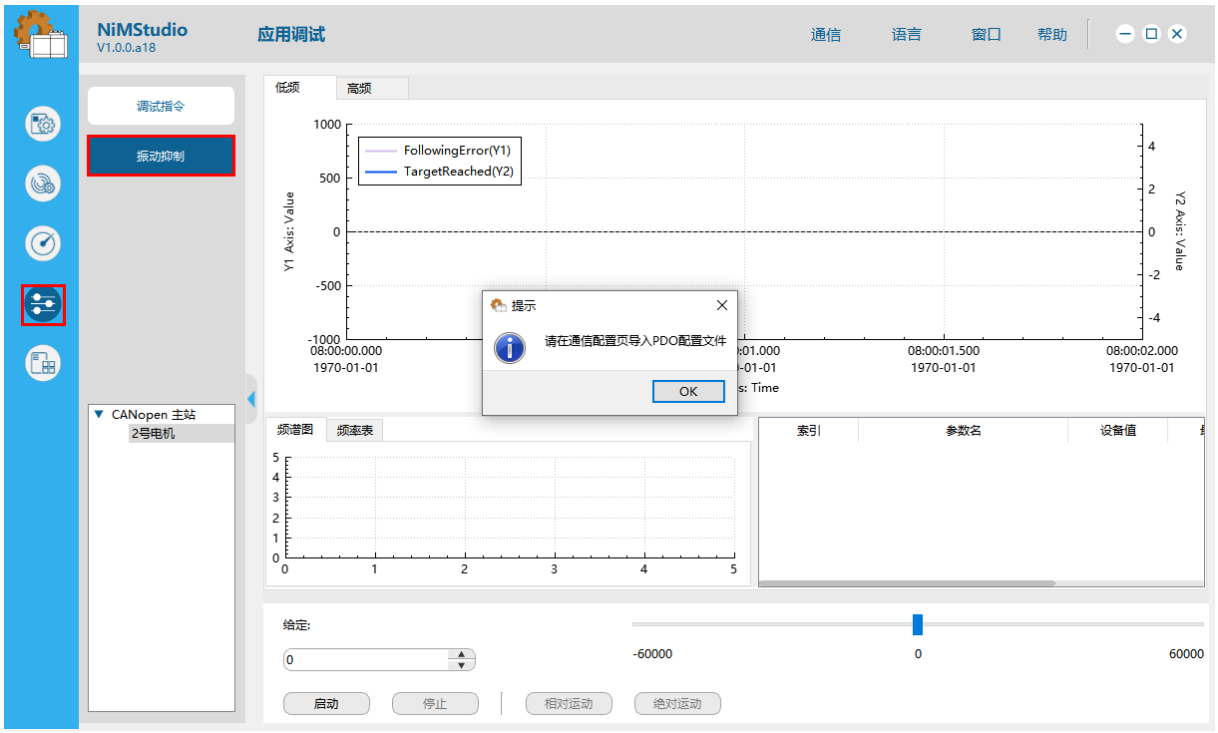
如下图： As shown below:



3.7.2 振动抑制 Vibration suppression

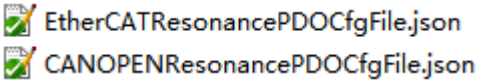
选择左侧导航栏的“振动抑制”选项，进入共振抑制页。如下图：

Select the "Vibration Suppression" option in the left navigation bar to enter the resonance suppression page. As shown below:



如果电机里的 PDO 配置不符合共振抑制所使用的 PDO 配置，则弹框会提示，需要在通信配置页的“从文件恢复”中导入共振抑制的配置文件（配置文件在软件目录下的 ConfigFile 文件夹下，配置文件如下）。

If the PDO configuration in the motor does not match the PDO configuration used for resonance suppression, the pop-up box will prompt that you need to import the resonance suppression configuration file (the configuration file is in the ConfigFile file in the software directory) in "Recover from File" on the communication configuration page Folder, the configuration file is as follows).



如果电机里的 PDO 配置符合共振抑制所使用的 PDO 配置，可无弹框提示。

If the PDO configuration in the motor conforms to the PDO configuration used for resonance suppression, there is no box prompt.

进入该界面，就会把电机操作模式设置为轮廓位置模式，设置目标位置，开始运动。

After entering this interface, the motor operation mode will be set to the contour position mode, the target position will be set, and the movement will start.

曲线界面将会出现对应参数的曲线。（要行程短，速度快，停止后才能出现振动现象）

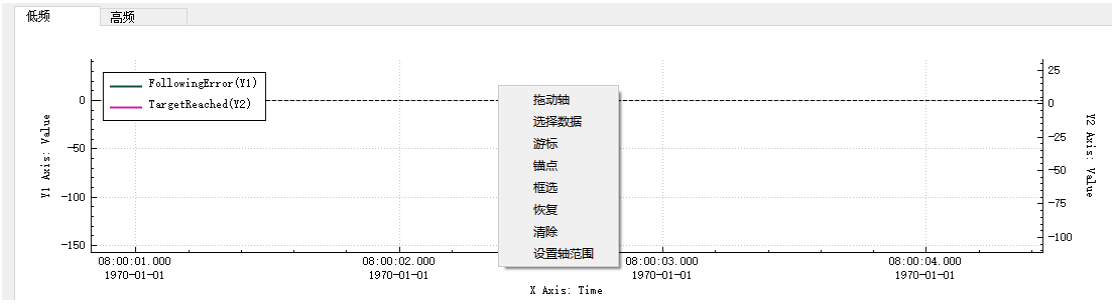
A curve corresponding to the parameter will appear on the curve interface. (Short travel, fast speed, vibration can only occur after stopping)

点击“低频”，显示低频下的共振相关参数的曲线，点击“高频”，显示高频下的共振相关参数的曲线。曲线包括 X 轴、Y1 轴、Y2 轴。

Click "Low Frequency" to display the curve of resonance-related parameters at low frequencies, and click "High Frequency" to display the curve of resonance-related parameters at high frequencies. The curve includes X axis, Y1 axis, and Y2 axis.

右键菜单的子项如下图：

The sub-items of the right-click menu are as follows:



拖动轴：坐标轴可以拖动，显示不同范围内的数据。但是不能框选数据进行 FFT 计算了。

Drag axis: The coordinate axis can be dragged to display data in different ranges. But the data cannot be framed for FFT calculation.

选择数据:” 可以框选数据进行 FFT 计算，但坐标轴不能拖动了。（低频：选择电机停止后的跟随误差曲线；高频：选择在运动过程中的转矩给定曲线）

Select data:" You can frame the data for FFT calculation, but the coordinate axis cannot be dragged. (Low frequency: select the following error curve after the motor stops; high frequency: select the torque reference curve during the movement)

游标：显示游标。

Cursor: Display the cursor.

锚点：显示鼠标指针所在位置坐标的值。

Anchor point: Displays the coordinate value of the position of the mouse pointer.

框选：放大框选区域。

Frame selection: Enlarge the frame selection area.

恢复：框选区域恢复为原来大小。

Restore: The framed area is restored to its original size.

清除：清除曲线。

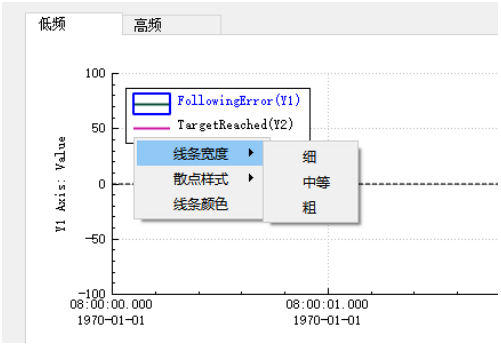
Clear: Clear the curve.

设置轴范围：设置坐标轴范围。

Set axis range: Set the coordinate axis range.

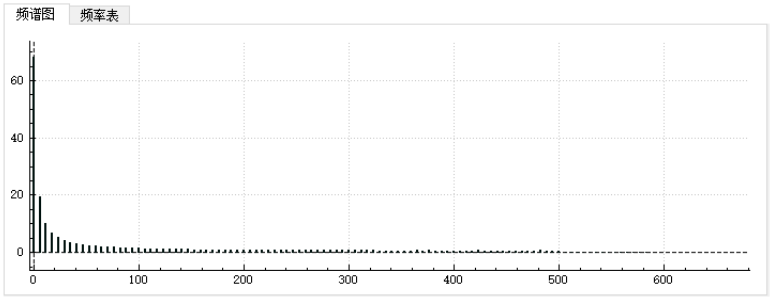
选中图例，左键双击，设置曲线宽度，样式，颜色的等。

Select the legend and double-click with the left button to set the curve width, style, color, etc.



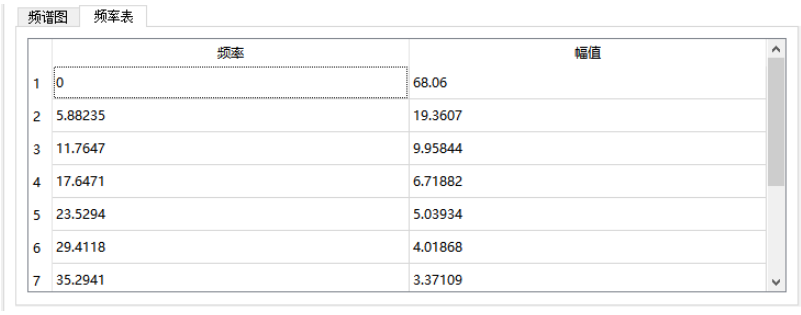
框选曲线（高频的只会选中转矩给定参数，低频的只会选中位置跟随误差参数），计算 FFT 后得到的频谱图，如下图：

Frame select the curve (high frequency will only select the torque given parameter, low frequency will only select the position following error parameter), calculate the spectrum chart obtained after FFT, as shown below:



频率表显示的是幅值由大到小排列后的前 10 个频率，如下图。

The frequency table shows the first 10 frequencies arranged from large to small, as shown in the figure below.



	频率	幅值
1	0	68.06
2	5.88235	19.3607
3	11.7647	9.95844
4	17.6471	6.71882
5	23.5294	5.03934
6	29.4118	4.01868
7	35.2941	3.37109

通过参数表格，设置参数来调节共振抑制。通过快捷键 F5 刷新参数。

Through the parameter table, set the parameters to adjust the resonance suppression. Use the shortcut key F5 to refresh the parameters.

低频参数：

Low frequency parameters:

H2009-05 设置为 1 则开启抑制。H2009-1D 设置为识别出来的共振频率。如果参数设置正确，在停止后则不会出现振动。

Set H2009-05 to 1 to turn on suppression. H2009-1D is set to the identified resonance frequency. If the parameters are set correctly, there will be no vibration after stopping.

高频参数：

High frequency parameters:

H2009-0D 设置为高频共振下识别出的频率，H2009-0E 设置陷波器宽度， H2009-0F 设置陷波器深度。

H2009-0D is set to the frequency identified under high-frequency resonance, H2009-0E sets the trap width, and H2009-0F sets the trap depth.

3.7.3 EEPROM

EEPROM 界面仅支持 EtherCAT 协议，包括从 bin 文件写入到 EEPROM、把 EEPROM 内容读到文件，并显示在界面。

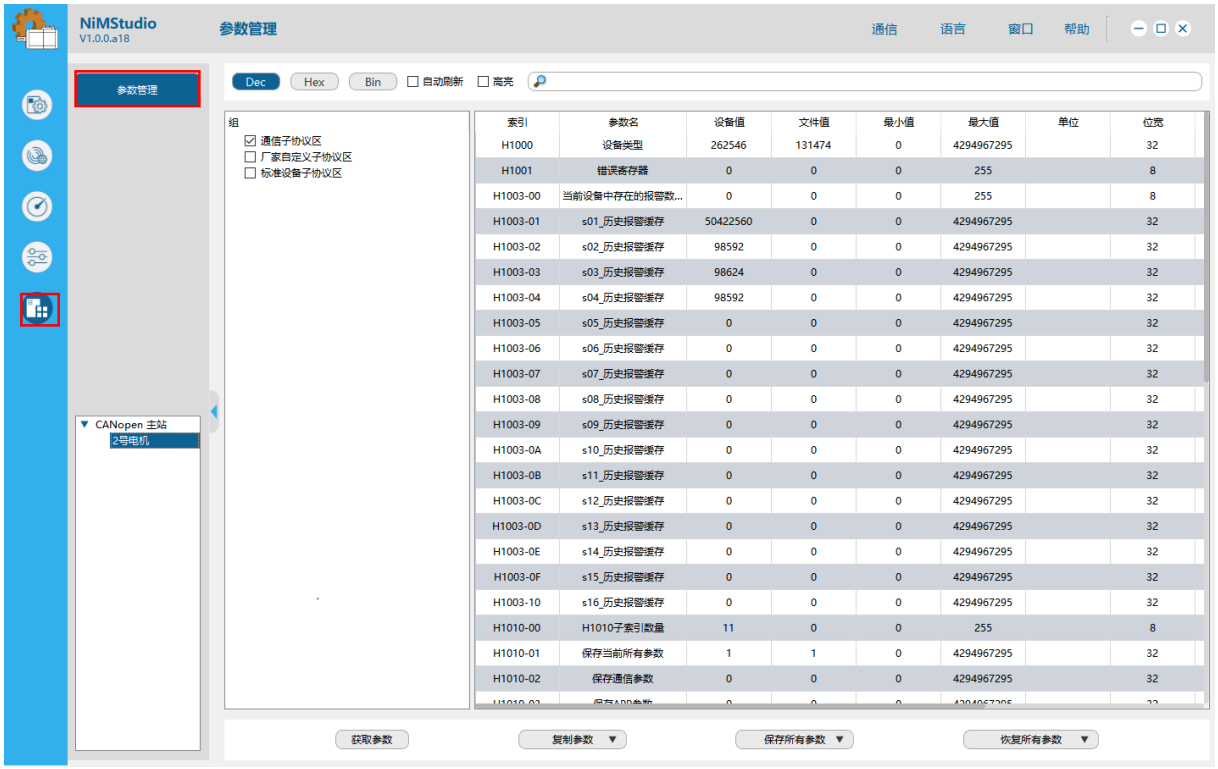
3.8 参数管理 Parameter management

参数管理是对电机的参数读取，设置，保存，恢复等操作的模块。

Parameter management is a module that reads, sets, saves, and restores motor parameters.

展开左侧导航栏的“参数管理”选项，选择“参数管理”子项，就会切换到参数管理界面。如下图所示：

Expand the "Parameter Management" option in the left navigation bar and select the "Parameter Management" sub-item, it will switch to the parameter management interface. As shown below:

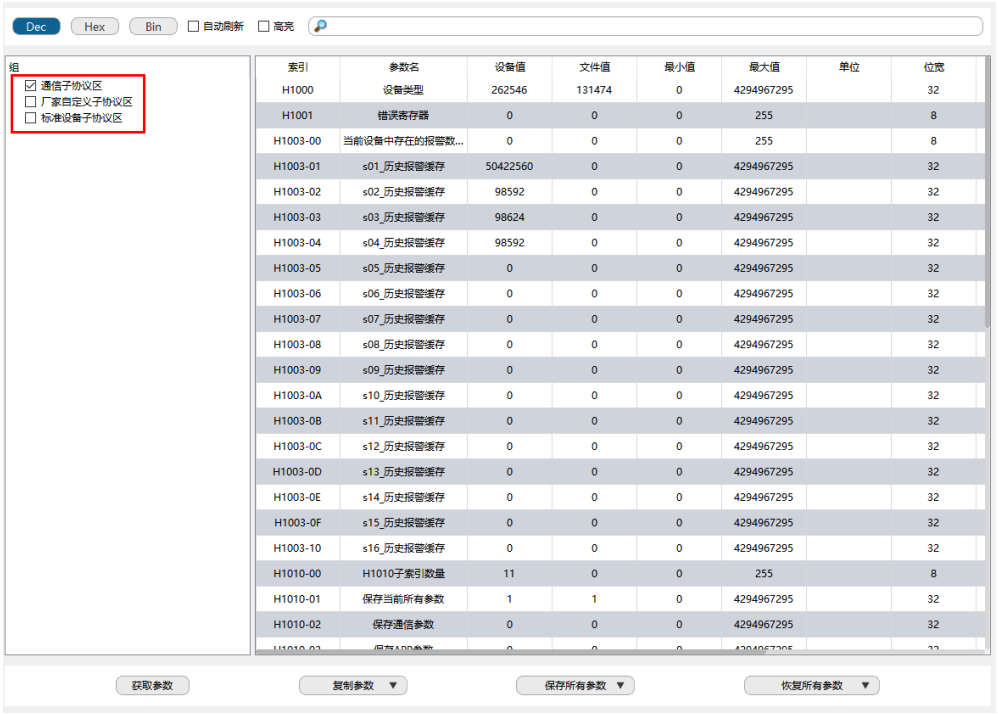


索引	参数名	设备值	文件值	最小值	最大值	单位	位宽
H1000	设备类型	262546	131474	0	4294967295		32
H1001	错误寄存器	0	0	0	255		8
H1003-00	当前设备中存在的报警数...	0	0	0	255		8
H1003-01	s01_历史报警缓存	50422560	0	0	4294967295		32
H1003-02	s02_历史报警缓存	98592	0	0	4294967295		32
H1003-03	s03_历史报警缓存	98624	0	0	4294967295		32
H1003-04	s04_历史报警缓存	98592	0	0	4294967295		32
H1003-05	s05_历史报警缓存	0	0	0	4294967295		32
H1003-06	s06_历史报警缓存	0	0	0	4294967295		32
H1003-07	s07_历史报警缓存	0	0	0	4294967295		32
H1003-08	s08_历史报警缓存	0	0	0	4294967295		32
H1003-09	s09_历史报警缓存	0	0	0	4294967295		32
H1003-0A	s10_历史报警缓存	0	0	0	4294967295		32
H1003-0B	s11_历史报警缓存	0	0	0	4294967295		32
H1003-0C	s12_历史报警缓存	0	0	0	4294967295		32
H1003-0D	s13_历史报警缓存	0	0	0	4294967295		32
H1003-0E	s14_历史报警缓存	0	0	0	4294967295		32
H1003-0F	s15_历史报警缓存	0	0	0	4294967295		32
H1003-10	s16_历史报警缓存	0	0	0	4294967295		32
H1010-00	H1010子索引数量	11	0	0	255		8
H1010-01	保存当前所有参数	1	1	0	4294967295		32
H1010-02	保存通信参数	0	0	0	4294967295		32

3.8.1 参数组 Parameter group

勾选组名，切换不同组的参数。如下图：

Check the group name to switch the parameters of different groups. As shown below:



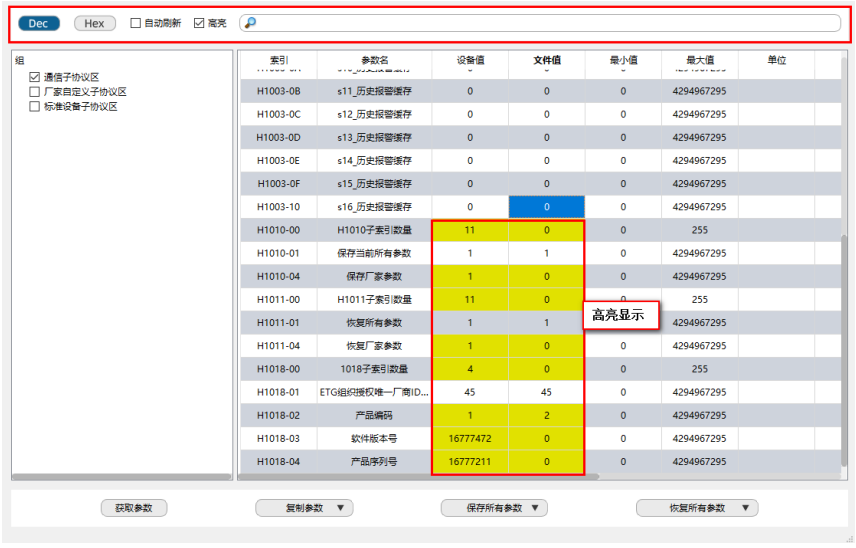
3.8.2 参数表 Parameter table

点击十进制和十六进制的单选按钮是用来切换参数表数据的不同进制。（索引列不会变化）。

Clicking the radio buttons for Decimal and Hexadecimal is used to switch between different decimals of the parameter table data. (The index column will not change).

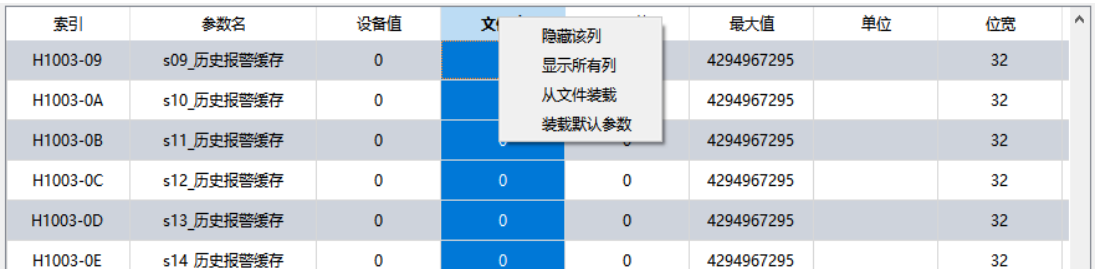
勾选“自动刷新”，设置刷新时间，参数表自动刷新。勾选“高亮”，当设备值和文件值不同，则高亮显示。搜索框：搜索索引列和参数名列。

Tick "Auto Refresh" to set the refresh time and the parameter table is automatically refreshed. Tick "Highlight", when the device value and file value are different, it will be highlighted. Search box: search index column and parameter name column.



右键点击“文件值”表头，显示右键菜单。点击“从文件装载”，选择文件，则将文件里是“Device Value”列装载“文件值”列（文件格式）。“装载默认参数”，则显示的是数据库的文件值。

Right-click the "File Value" table header to display the right-click menu. Click "Load from file", select the file, and then load the "Device Value" column (file format) in the "Device Value" column of the file. "Load default parameters", the file values of the database are displayed.



3.8.3 参数操作 Parameter operation

1. “获取参数”：获取选中组的参数值。快捷键 F5 可以刷新参数。

"Get Parameter": Get the parameter value of the selected group. Shortcut key F5 can refresh the parameters.

2. “复制参数”：当连接多个电机时，把当前选中的电机参数复制到其他电机。

"Copy parameters": When multiple motors are connected, copy the currently selected motor parameters to other motors.

3. “保存所有参数”：选择不同的子项，保存电机不同区的参数。

"Save all parameters": Select different sub-items to save the parameters of different areas of the motor.

4. “恢复所有参数”：选择不同的子项，恢复电机不同区的参数。

"Restore all parameters": Select different sub-items to restore parameters in different areas of the motor.

5. “保存到文件”功能和“从文件恢复”见 3.7.4

See 3.7.4 for "Save to File" function and "Restore from File"

6. 设置参数：

只能对参数表的设备值列进行设置：双击单元格，编辑参数，按键盘的 Enter 键或点击界面其他地方，则编辑完成，完成后就自动设置到电机了。

Parameter setting: Only the device value column of the parameter table can be set: double-click the cell, edit the parameter, press the Enter key on the keyboard or click elsewhere on the interface, the editing is completed, and it is automatically set to the motor after completion.

3.8.4 参数文件 Parameter file

1. “保存为文件”功能会把参数表索引，设备值，参数名三列保存到文件。

The "Save as file" function will save the parameter table index, device value, and parameter name to the file.

2. “从文件恢复”功能可以把文件里的设备值下载到电机。

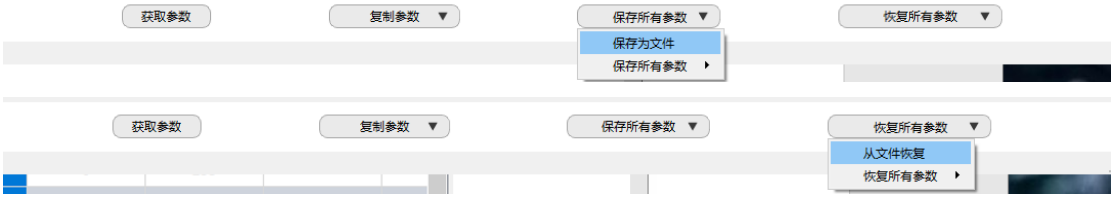
The "Restore from file" function can download the device values in the file to the motor.

3. “从文件装载”功能可以把文件里的设备值显示在参数表“文件值”列。

"Load from file" function can display the device value in the file in the "File value" column of the parameter table.

这三个功能使用的是相同的文件格式。如下图：

These three functions use the same file format. As shown below:



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