The Manual for Debugging Software V3.0

CATALOG

1. Main Page Introduction

Figure 1: Interface Are

1.1. Open the Debugging Software V3.0

After the motor is powered on, double-click the EXE file named Assistant3.0, the software will automatically search for available serial ports and try to connect. The serial port status in the lower left corner of Figure 1 will display the serial port connection status. If the connection is successful, it will display that the serial port has been connected. If it fails, it will jump to the following interface,You can continue to click on the picture to try to reconnect.
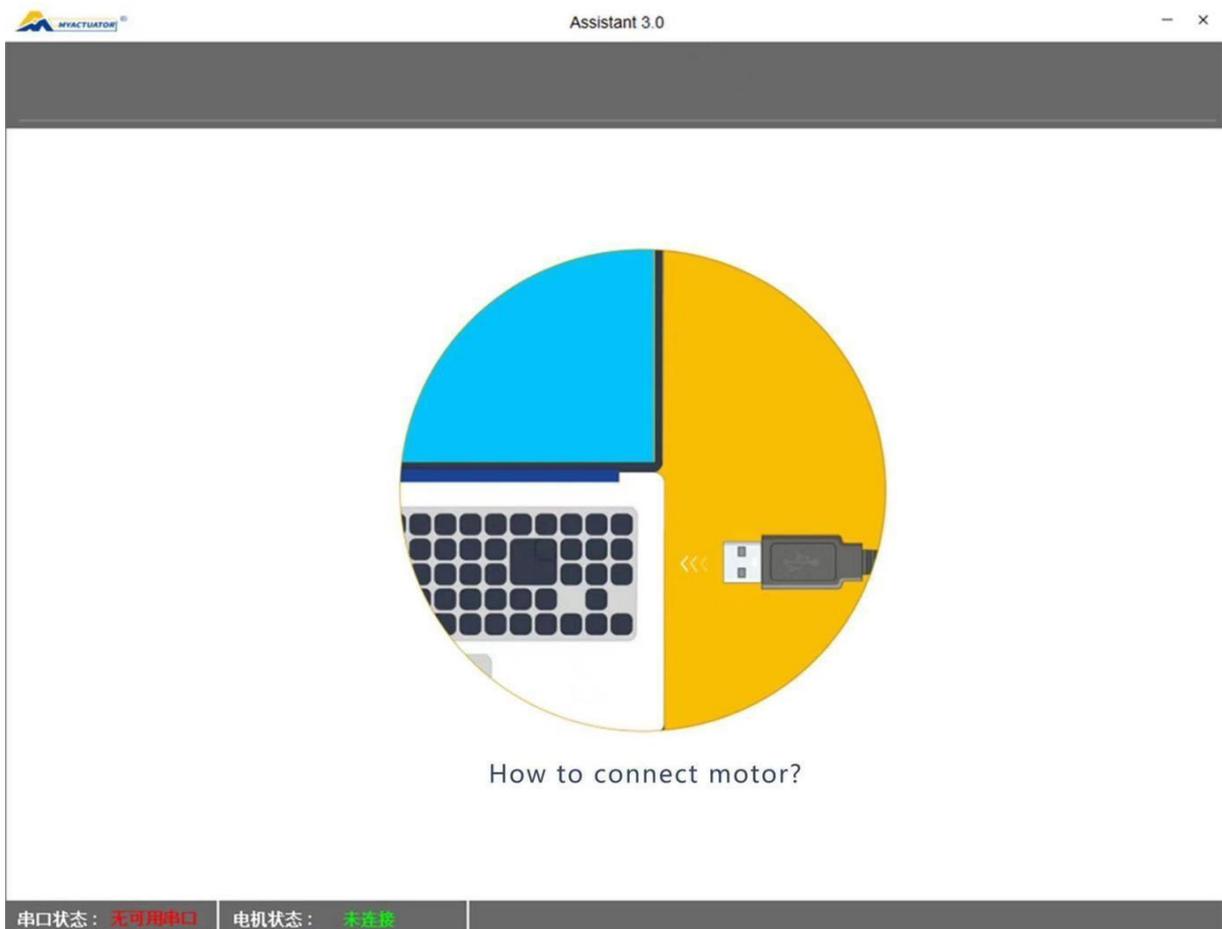
The possibility of connection failure are:

1) The motor is not successfully powered on, and the power supply and connectors need to be checked;
2) The communication connector is wired incorrectly;
3) The serial port of the computer is already occupied;
4) The debugger does not install a suitable driver;

1.2. The Interface Area Introduction

The interface area is divided into the following parts according Figure 1:

A: Main menu bar

B: Servo mode control panel

C: motion mode control panel

D: Real-time waveform status panel

E: Waveform display panel

F: Status bar

The main menu bar and status bar remain unchanged when the interface is switched, and other areas will change according to different menu bars.

2. Motor Running Interface Introduction

When open the debugging software v3.0, the motor running interface is entered by default, and real-time data update is enabled.

2.1. Servo Mode Control Panel

There are 6 control buttons and 4 data input boxes in the servo mode control panel. The data entry box is to the right of the control buttons.After inputting valid data, click the button on the left to execute the corresponding.

1) Incremental Angle Control：

After entering the incremental target angle in the data input box, click the incremental angle button, and the motor will run the set incremental angle with the current position as the starting position.

2) Absolute Angle Control

After entering the absolute target angle in the data input box, click the absolute angle button, and the motor will run with the set absolute position as the target.

3) Speed Command

in the data input box, click the speed command button, and the motor will run at the set speed. The set speed is based on the speed of the motor end, that is, the input end of the reduction ratio.

4) Current Command

After entering the target current in the data input box, click the current command button, and the motor will run at the set current.

5) Stop Command
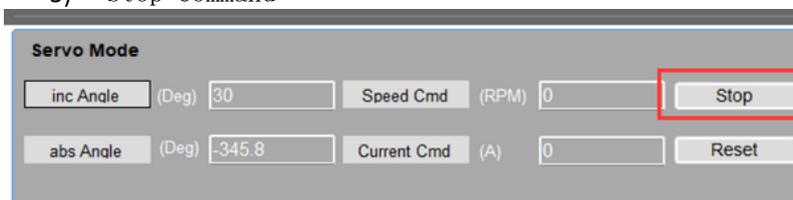
After the motor stop command, the motor will enter the standby state and there will be no output.

6) Reset Command
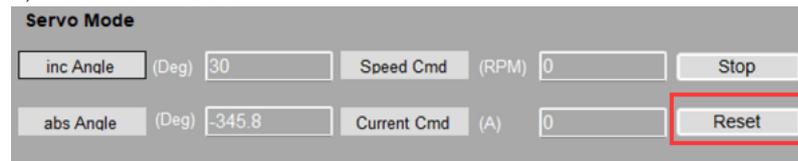
After the motor reset command, the motor program will be restarted.

2.2. Motion Mode Control Panel

There are 5 parameter input boxes and 1 control button in the motion control mode panel.

Motion Mode Control Panel

1) Desired angle:: p_des

Enter the desired angle in the input box, and the motor will run at this angle as the absolute target value. Only position mode is run when KD=0. Note that the unit is rad, and entering 6.28 is equivalent to setting the target angle to 360 degrees.

2) Desired speed: v_des
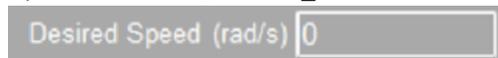
Enter the desired speed in the input box, and the motor will run at this target speed. Only the speed position is run when KP=0. The unit is rad/s, refer to the conversion unit formula: 1rad/s = 9.554RPM. The speed is the speed of the motor end, that is, the speed of the input end of the reducer.

3) Desired torque: t_ff

Enter the desired torque in the input box, and the motor will run with this target torque.

4) KP:

Indicates the deviation coefficient between the target angle and the feedback angle.

5) KD:

Indicates the deviation coefficient between the target speed and the feedback speed.

6) Motion control command

Motion Cmd

After inputting the 5 parameters, click the operation control command, and the motor will be calculated and output according to the expected value. Calculated as follows:

TorqueRef = (p_des - p_fb)*KP + (v_des - v_fb)*KD + t_ff;

TorqueRef:Indicates the final target torque output to the motor;

p_fb: actual angle feedback;

v_fb: actual speed feedback

2.3. Real-time Waveform Status Panel

1) Shaft Angle：

Indicates the actual angle at the output of the motor reducer.

2) Speed

Indicates the actual speed of the motor end, that is，the input end of the reducer.

3) Current：

Indicates the actual torque (Iq) current of the motor.

4) Motor Temperature：

Indicates the actual temperature of the motor.

5) Bus Voltage：

Indicates the actual voltage of the power supply terminal.

2.4. Waveform Display Panel
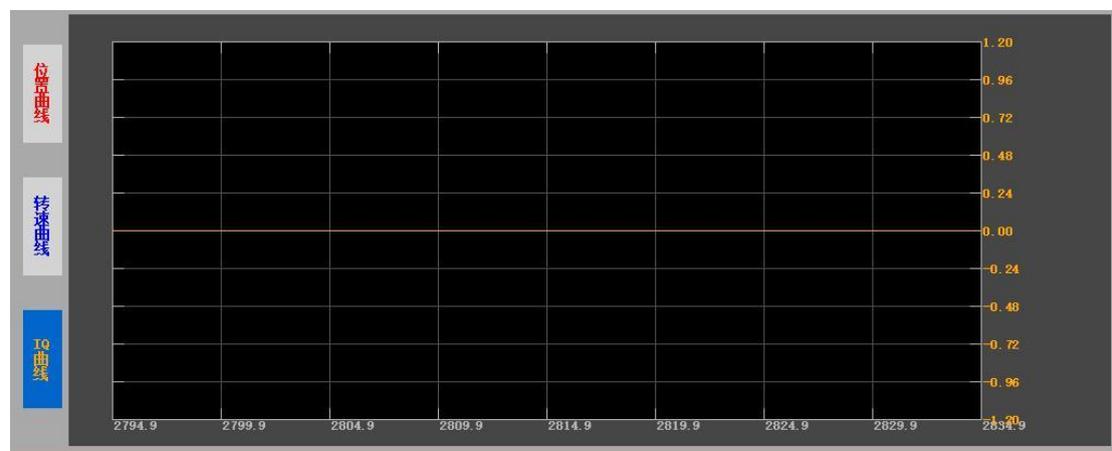
Figure 2: Waveform Display Interface

The waveform display interface can display 3 data waveforms individually or at the same time, namely IQ current, speed, and position. These three data are consistent with the angle, speed, and current feedback data in the real-time status bar. The

actual value of the data is displayed on the left and right sides, and its range is automatically adjusted according to the actual size.

2.5. Status Bar

| Comm States: Link OK | Motor States: Motor OK | |
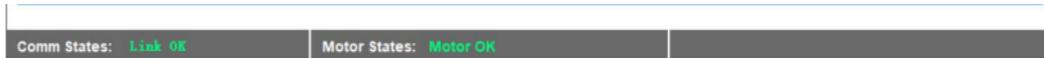
The serial port status indicates the serial port connection status. The motor status will prompt related errors.

3. Introduction to the Basic Settings Interface

3.1. Enter the Interface
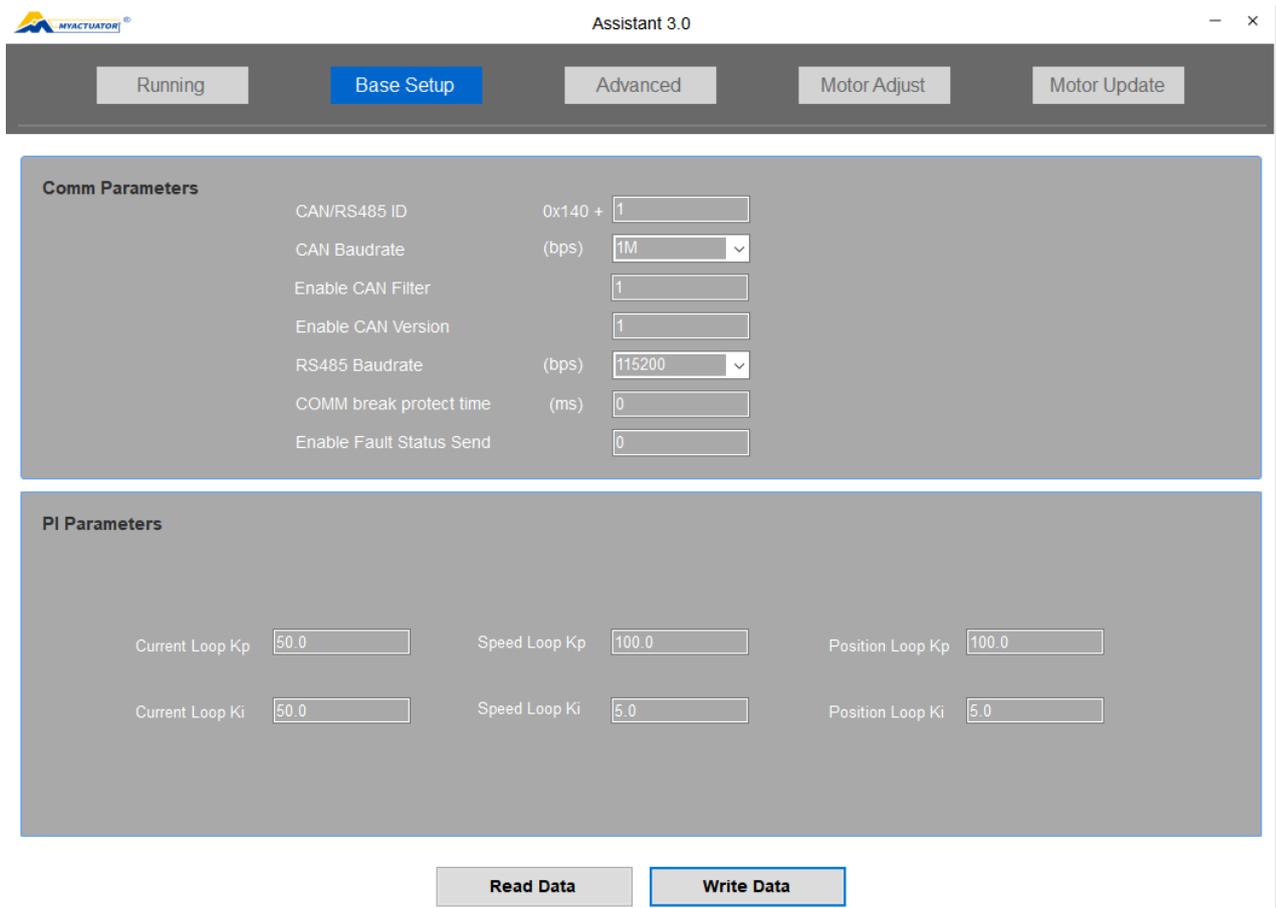
Figure 3: Basic settings interface

The basic setting of the main menu of the motor can enter the basic setting interface. The host computer has updated the parameters once after the connection, so the parameters displayed in the interface are the parameters read from the motor. The data can also be read again via the Read Data button.

3.2. Operation Introduction

1) Click to read data to update all parameters in the interface;

2) Modify the relevant data parameters, and then click Write Data to save;

3) If reading data or writing fails, you can click again to read data and write data to operate again.

3.3. Parameter Description

3.3.1. Communication Parameters

parameter name	Ranges	unit	Effective way	Description
CAN/RS485ID	1-32	decimal	effective immediately	means to send ID，0x140 + ID。
CAN Baudrate	optional	bps	effective immediately	Baud rate setting for CAN communication, providing optional baud rate.
Enable CAN Filter	0 or 1		Effective after restart	1 means that the CAN filter is turned on, which can improve the efficiency of motor transmission and reception in CAN communication. 0 means that the CAN filter is off, and it needs to be set to off when the multi-motor control command 0x280 is required。
Enable CAN Version	0 or 1		Effective after restart	1 means the CAN function is enabled. 0 means the CAN function is off. (The 485 board cannot enable the function)
RS485 Baudrate	optional	bps	effective immediately	The baud rate setting of RS485 communication provides optional baud rate.
COMM brake protect time	0- 2^{32} -1	millisecond	effective immediately	During the communication process, if the motor does not receive a command within the set time, it will stop outputting. If there is a holding brake, the holding brake will be closed. 0 means this function is invalid
Enable Fault Status Send	0 or 1		effective immediately	1 means that the error state is enabled, and the automatic command returns to the error state when an error is reported. 0 means turn off the error status enable

3.3.2. PI Parameters

parameter name	Ranges	unit	Effective way	Description
Current Loop Kp	0-255		effective immediately	The set value corresponds to the maximum range of KP inside the motor. If the maximum value of KP is 1, then 255 corresponds to 1. The maximum value is related to the motor model and cannot be modified by user
Current Loop KI	0-255		effective immediately	Ditto
Speed Loop KP	0-255		effective immediately	Ditto
Speed Loop KI	0-255		effective immediately	Ditto
position Loop KP	0-255		effective immediately	Ditto
position Loop KI	0-255		effective immediately	Ditto

4. Introduction of Advanced Settings Interface

### 4.1. Enter the Interface
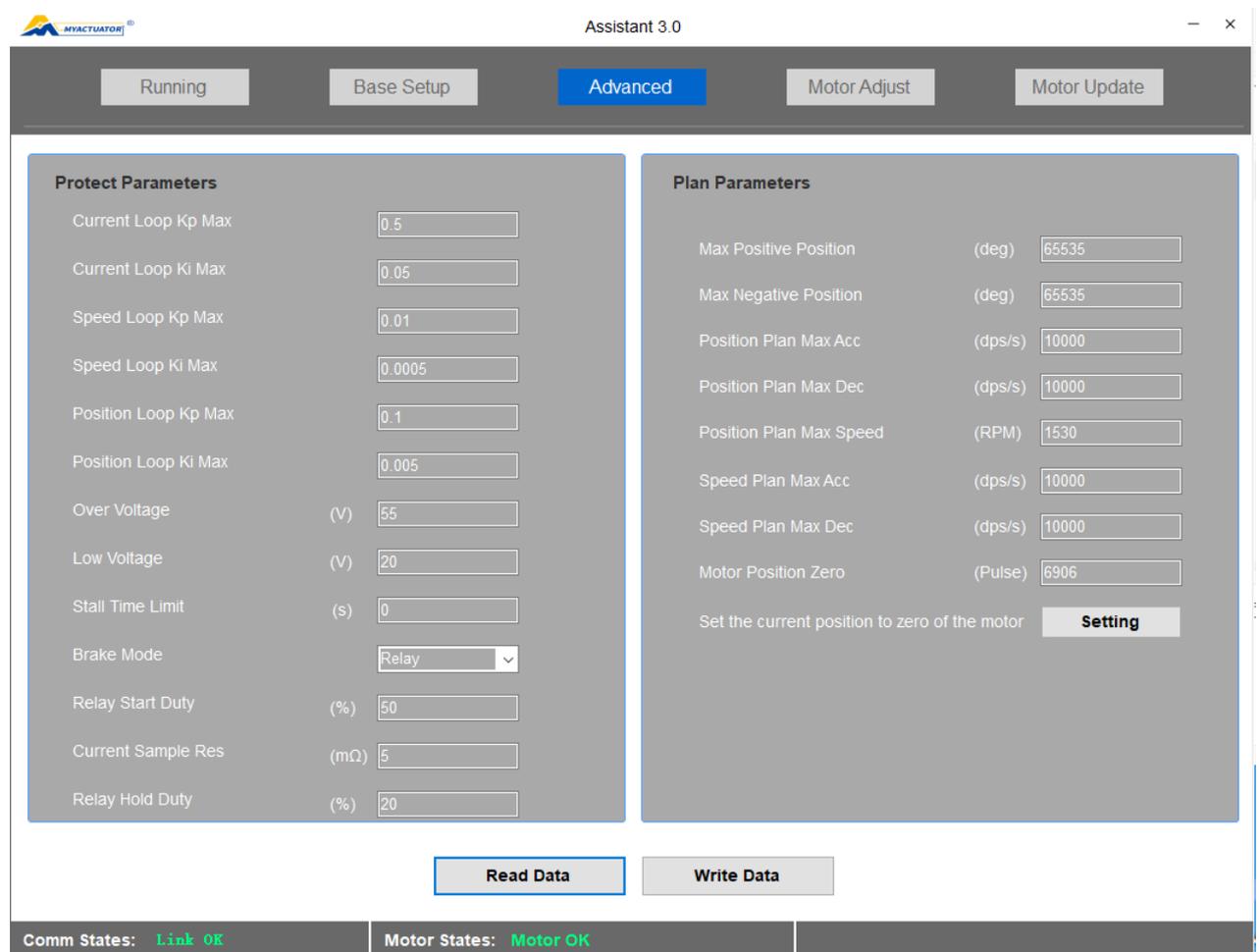
Figure 4: Advanced settings interface

4.1.1. Operation Introduction

1) Click to read data to update all parameters in the interface;

2) Modify the relevant data parameters, and then click Write Data to save;

3) If reading data or writing fails, you can click again to read data and write data to operate again.

4.2. Parameter Description

4.2.1. Protection Parameters

parameter name	Ranges	unit	Effective way	Description
Current loop KP Max	None	None	effective immediately	Read only
Current loop KI Max	None	None	effective immediately	Read only
Speed loop KP Max	None	None	effective immediately	Read only
Speed loop KI Max	None	None	effective immediately	Read only
Position loop KP Max	None	None	effective immediately	Read only
Position loop KI Max	None	None	effective immediately	Read only
Over Voltage	0-100	Volt	effective immediately	Read only
Low Voltage	0-100	Volt	effective immediately	Read only
Stall time limit	0- 2^{32} -1	millisecond	effective immediately	Set how long to stop the output after entering the locked rotor state, and close the brake if there is a brake。
Brake Mode	optional	None	effective immediately	Only one of the two functions of Relay and Resistor can be selected, select this function and open
Relay Start Duty	0-100%	None	effective immediately	The duty cycle of this option is maintained from the moment of startup to 2seconds
Current Sample Res	None	mR	None	Read only
Relay Hold Duty	0-100%	None	effective immediately	The duty cycle of this option is maintained after 2 seconds at the moment of startup

4.2.2. Planning parameters

Parameter name	Ranges	unit	Effective way	Description
Max Positive Position	None	deg	effective immediately	the maximum position that can be traveled to in the position loop

Max Negative Position	None	deg	effective immediately	The minimum position that can be reached in the position loop, the program will treat it as a negative value
Position Plan Max Acc	100-60000	dps/s	effective immediately	During position loop operation, the acceleration time from the current speed to the set speed
Position Plan Max Dec	100-60000	dps/s	effective immediately	During position loop operation, the deceleration time from the current speed to the set speed
Position Plan Max Speed	10-motor rated speed	RPM	effective immediately	Maximum speed setting during position loop operation
Speed Plan Max Acc	100-60000	dps/s	effective immediately	During Speed loop operation, the acceleration time from the current speed to the set speed
Speed Plan Max Dec	100-60000	dps/s	effective immediately	During Speed loop operation, the deceleration time from the current speed to the set speed
Motor Position Zero	-462	Pulse	powercycle	Write the specified pulse as the zero point of the motor position. You can also read the zero pulse value of the current motor position
set the current position to zero of the motor	None	None	powercycle	After clicking the set button, the current motor position will be saved as the zero point position.

## 5. Introduction of Motor Adjust Interface

5.1. Enter the Interface

Figure 5: Motor Calibration Screen

5.2. Operation Introduction

1) Click read data to update the parameters;

2) Modify the appropriate open-loop matching current value, generally no more than half of the rated current at no-load;

3) Click the "Adjust Encoder" button and wait for the motor calibration;;

4) If the calibration fails, you can click the "Adjust Encoder" again;

5) Can increase the open-loop matching current to make the motor calibration successful;

6) After the calibration is successful, it will display that it has been Adjusted and saved, and there is no need to calibrate again after powering on again;;

7) Motor calibration is best to keep the motor in a no-load state;

5.3. Parameter Description

5.3.1. Master encoder

Parameter name	Ranges	unit	Effective way	Description
Enabled Powerdown Save MultTurn	0 or 1	None	effective immediately	1 means to enable the multi-turn value saving when power off, that is, the motor can remember the multi-turn position before power off even when the power is turned off. 0 means turn off the power-off save multi-turn value enable.
Pole-Paris	None		None	Read-only, the motor parameters cannot be modified by the user
Single-Resolution Value	None	None	None	Read-only, the motor parameters cannot be modified by the user
Adjust Current	0.1-motor rated current	A	effective immediately	The running current of the motor during calibration. If the current is too small, the torque will not be enough, and the motor calibration will fail. Excessive current is also likely to cause current protection. Generally within the rated current range。
Change Motor Direction	None	None	None	Read-only, the motor parameters cannot be modified by the user
Encoder Adjusted Value	None	None	None	Read-only, the calibration result cannot be modified by the user
Encoder Accuracy	None	None	None	Read-only, the calibration result cannot be modified by the user

5.3.2. Slaver Encoder

Parameter name	Ranges	unit	Effective way	Description
Encoder Direction	None	None	None	Read-only, the motor parameters cannot be modified by the user
Encoder BCT	None	None	None	Read-only, the motor parameters cannot be modified by the user
Encoder Adjust	0 or 2	None	None	Write 2 when calibrating the slaver encoder, and automatically change to 0 after the calibration is completed
Encoder Zero	None	None	None	Read-only, the motor parameters cannot be modified by the user

6. Motor Update Interface Introduction

6.1. Enter the Interface
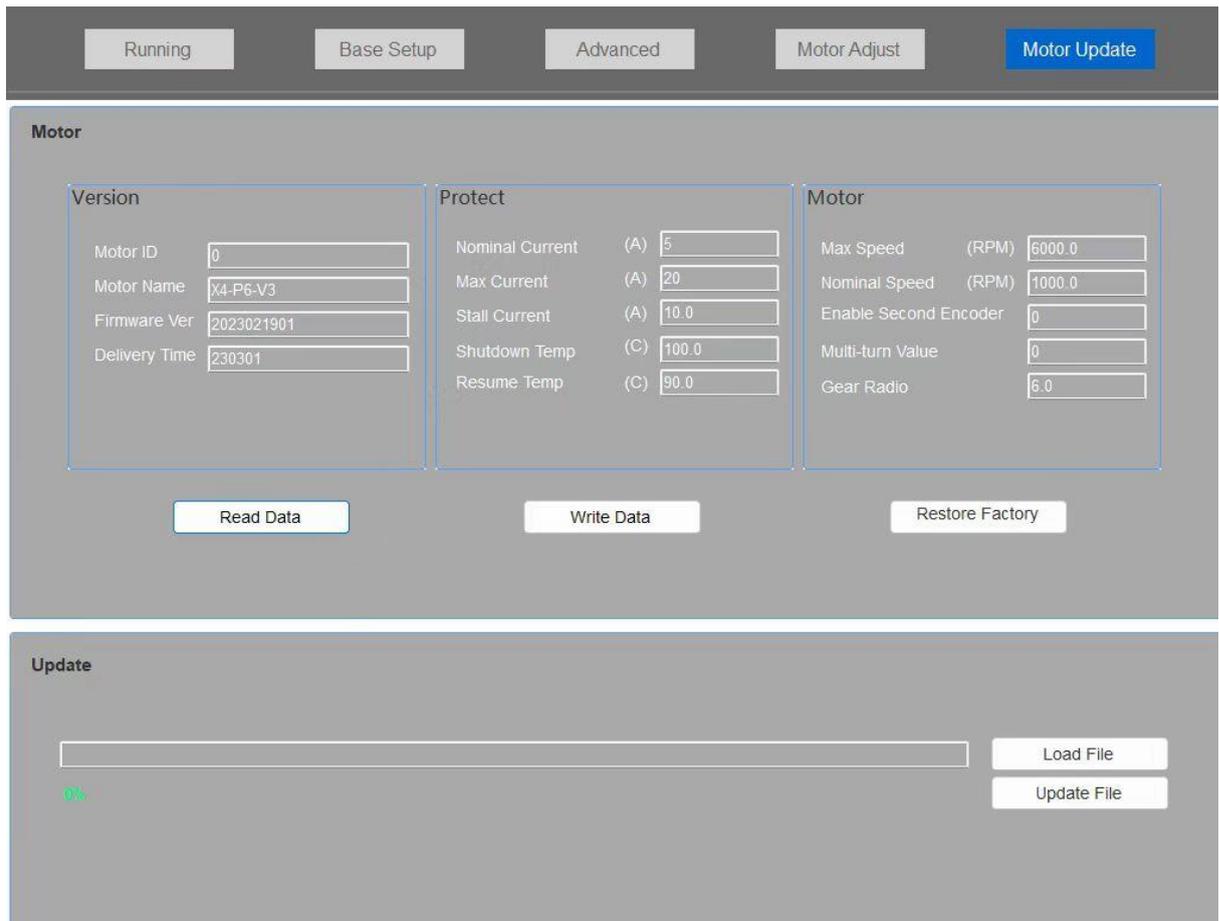
Figure 6：Motor Update Interface

6.2. Operation Introduction

6.2.1. Read Parameters

Click the read button to read the motor-related parameters;

6.2.2. Restore Factory

Click the "Restore Factory" button, select the HEX file corresponding to the motor, and then restore all the calibration parameters to the Reset;


Figure 7: Select factory default hex file

6.2.3. Update

MYACTUATOR will optimize the driver functions and customers can update them remotely.

Click the Load File button, select the firmware, and load the firmware data.
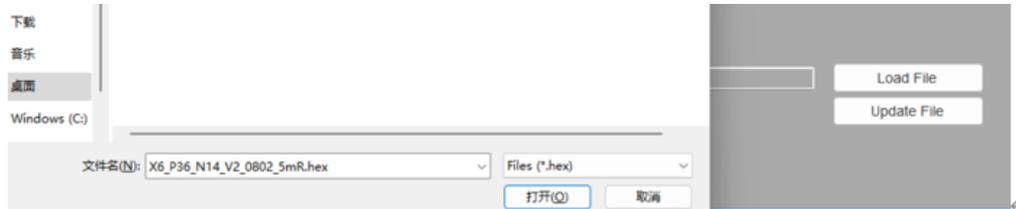
Click "Update File" to update the program, the update process will display the update progress in real time, prompt any red Error message, you need to find the cause of the problem and click 'Update File' again to re-update the program
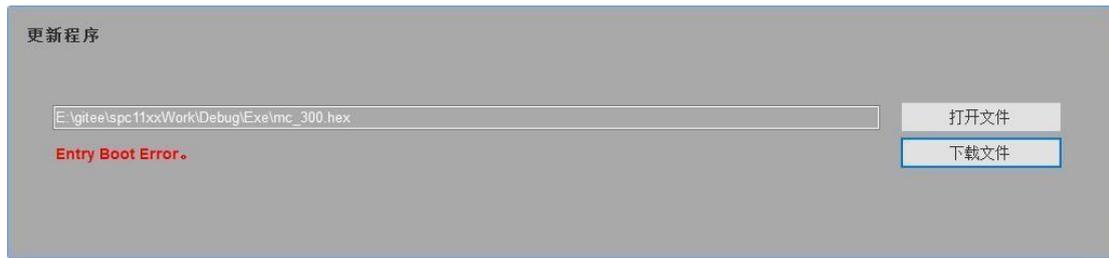
After the update process is completed, the BOOT mode is launched to display the following information.

6.2.4. Update Program Error Reasons and Solutions

1) During the flashing process, the communication is interfered and the flashing fails. Try to avoid the interference and restart the flashing.

2) In the process of flashing, if the power is suddenly lost or the computer fails, you need to restart the flashing under stable conditions.

3) If the re-flash is unsuccessful for many times, contact the manufacturer for processing or return to the factory

6.3. Parameter Description

Parameter name	Ranges	unit	Effective way	Description
Motor ID	None	None	None	Read only, factory parameters
Motor Name	None	None	None	Read only, factory parameters
Firmware Ver	None	None	None	Read only, factory parameters
Nominal Current	None	A	None	Read only, the current the motor can run continuously
Maximum phase current limit	None	A	None	Read-only, motor phase current protection point, which will trigger protection in case of short circuit, phase loss, or runaway
Stall Current	None	A	None	Read only, peak current that can be run for a short time
Shutdown Temp	0-150	°C	None	Read-only, when the motor temperature reaches the protection point, it will stop outputting and reporting an error

Resume Temp	0-150	° C	None	Read only, normal operation will resume when the motor temperature reaches the recovery point.
Max Speed	None	RPM	None	Read-only, the motor will stop outputting an error when it reaches the maximum speed
Nominal Speed	None	RPM	None	Read only, the maximum speed the motor can achieve at rated voltage.
Enable Second Encoder	None	None	None	Read-only, indicating whether the motor has dual encoder function
Multi-turn Value	0-65535	Turn	None	Read only, the saved motor position multi-turn value before the last power
Gear Radio	None	None	None	Read only, the size of the motor reduction ratio

7. Error Message Description

Error message	Description	Solution
hardware overcurrent	If the motor current exceeds the limit value, there may be short circuit, phase loss, loss of control, motor damage	Check the power supply and motor wiring for short circuit, phase loss, or parameter error.
Stall error	After the current reaches the locked-rotor current, the speed is very low and continues for a period of time. Indicates that the motor load is too large	The load may exceed the operating range of the motor.
undervoltage error	The power input is lower than the set undervoltage value	Check whether the input voltage of the power supply is too low and can be increased to an appropriate value
Overvoltage error	The power input is higher than value the set overvoltage value	Check whether the input voltage of the power supply is too high and can be reduced to an appropriate value

Phase current overcurrent	The software detects that the motor current exceeds the limit value, and there may be short circuit, phase loss, loss of control, motor damage, etc	Check the power supply and motor wiring for short circuit, phase loss, or parameter error
Power overrun error	If the input current of the power supply exceeds the limit value, there may be a situation where the load is too large or the speed is too high	Reduce the load or reduce the motor running speed
Calibration parameter read error	Failed to write parameters causing parameters losing	Update parameters by restoring factory settings
overspeed error	The motor running speed exceeds the limit value, there may be overpressure and drag use.	Check whether the input power is over-voltage, and whether there is a possibility of forcibly dragging the motor
Motor overtemperature error	If the motor temperature exceeds the set value, there may be short circuit, parameter error, and long-term overload use	Check whether the motor parameters are correct, whether there is a short circuit, and whether the load is too large
Encoder calibration error	The encoder calibration result deviates too much from the standard value	Check whether the motor load is too large, you can remove or lighten the load, increase the open-loop matching current appropriately, and calibrate the motor again.