

EG2-1C2 ELECTRIC GRIPPER OPERATION INSTRUCTIONS



Instructions for EG2-1C2 Electric Gripper

EG2-1C2 Electric Gripper is a high-performance electric gripper integrated with the brushless servo system. It has many benefits such as precision and hybrid control over the force and positions, flexible gripping, compact structure, five-sided installation, integrated controller, fast and efficient layout of application scenarios.

The gripper has the following features:

- ① Grip force: EG2-1C2 can realize the grip force of 2-30N;
- ② Supply voltage: $24V \pm 10\%$;
- ③ Positioning repeatability: $\pm 0.01\text{mm}$; force repeatability: $\pm 0.2\text{N}$;
- ④ Total stroke: 0-12mm;
- ⑤ Overheating and over-current protection;
- ⑥ The RS485 serial port is used for communication and supports MODBUS RTU Protocol and the I/O mode.



Shipment Configuration of EG2-1C2 Electric Gripper

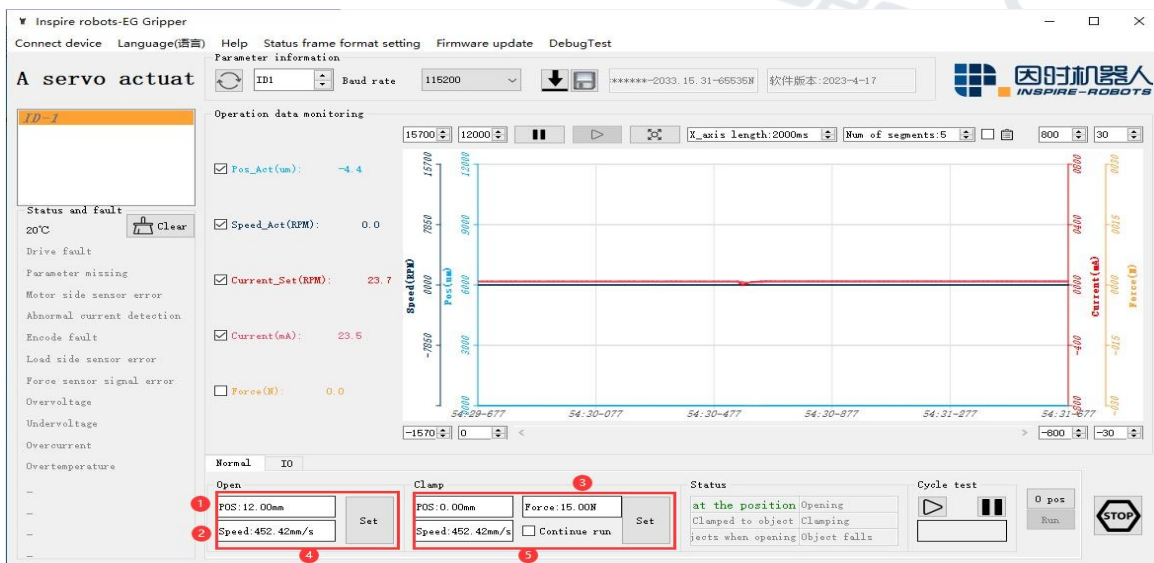
Instructions are provided below:

1. Connect the cable plug of the gripper to the supplied aviation plug cable. Connect the DC terminal of the aviation plug cable to the power adapter. Connect the USB port of the USB-RS485 module to the PC. Turn on power supply.

Note: "Automatically returning to the reference point after power-on" is the default function of the gripper after delivery.



2. Start "PC Software of Electric Gripper MCU". Select the corresponding COM port and baud rate. Click "Search" to successfully connect the PC software.



PC Software Diagram

① Position: A specific stroke can be set for gripper unclenching and grasping within the range of 0-12 mm;

- ② Speed: A speed can be set for gripper unclenching and grasping within the range of 0-90 mm/s;
- ③ Force control: The magnitude of grip force can be set within the range of 2-30 N;
- ④ Unclenching: Enter the position and speed properly, and then click "Setting"; the gripper will unclench and move to the set position;
- ⑤ Gripping: Enter the position and speed properly, and then click "Setting"; the gripper will close and move to the set position.

3. Modify the ID and baud rate of the gripper.

For example, the gripper ID is 1 and its baud rate is 115200.

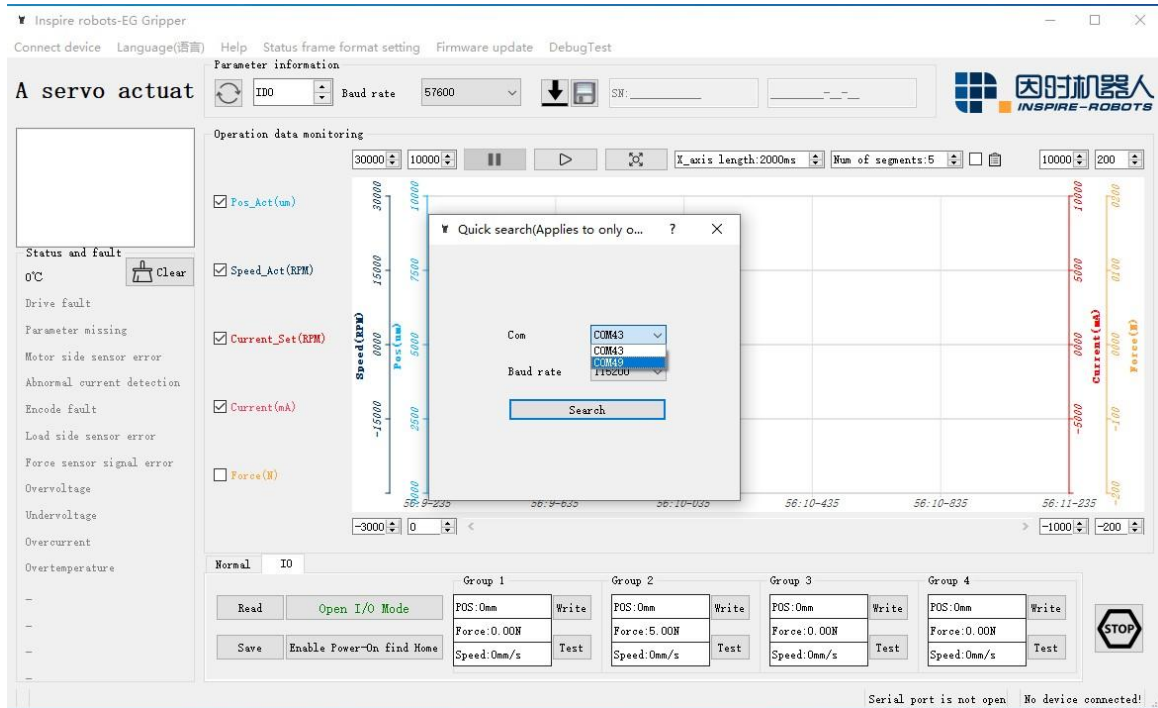
3.1 Perform modification with the debugging software in the PC.

- ① Connect the gripper as shown below.



Gripper Connection Diagram

② Start the PC software and select "Connect equipment" → "Quick Connection" → select the corresponding COM port and baud rate → "Search". The gripper will be connected successfully.

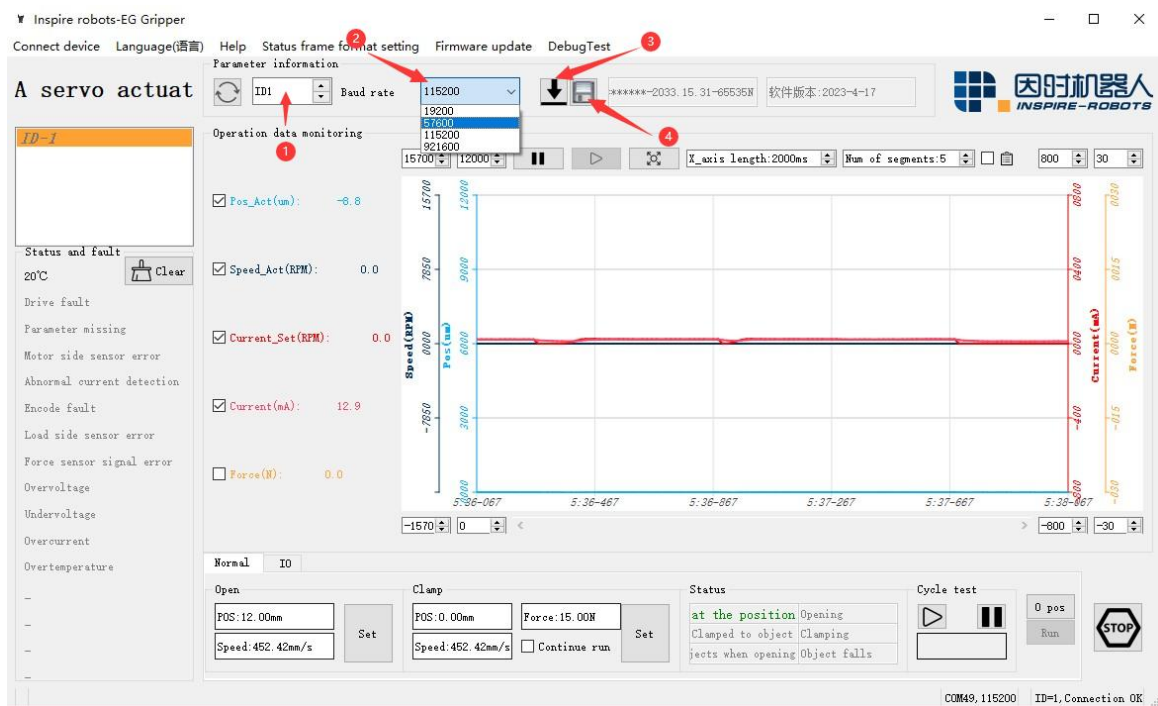


PC Software Connection Diagram ①



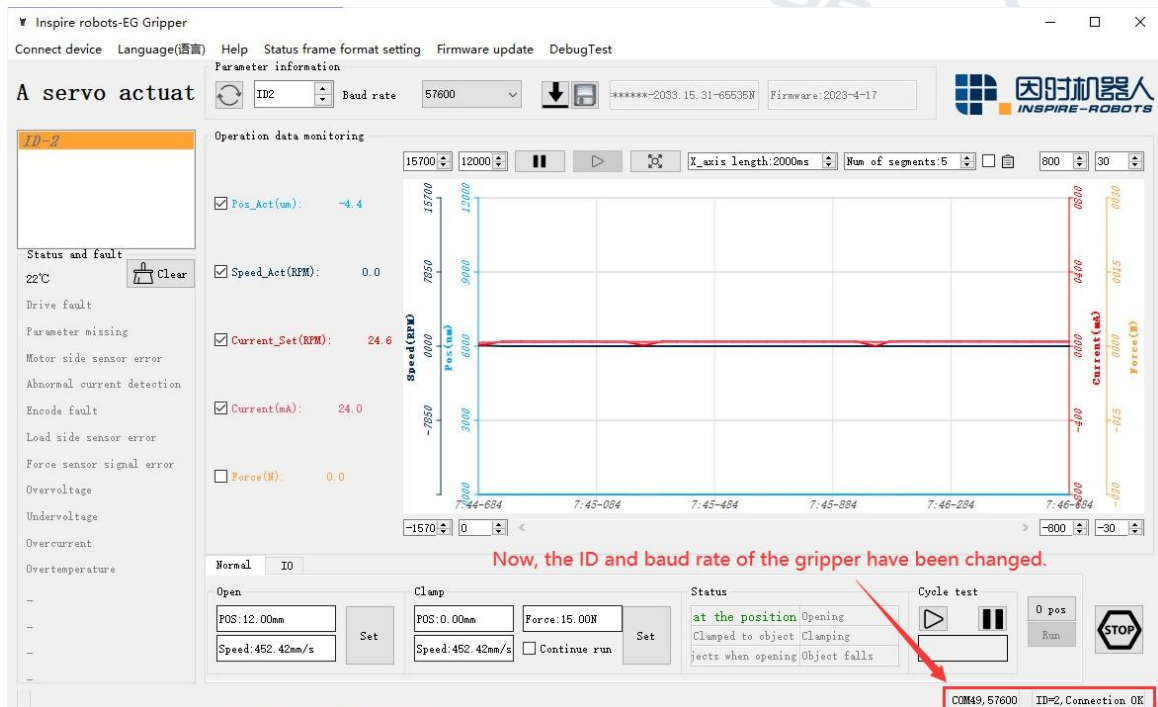
PC Software Connection Diagram ②

③ Change ID to 2 and the communication baud rate to 57600, and click "Setting". Then select "Save".



PC Software Connection Diagram ③

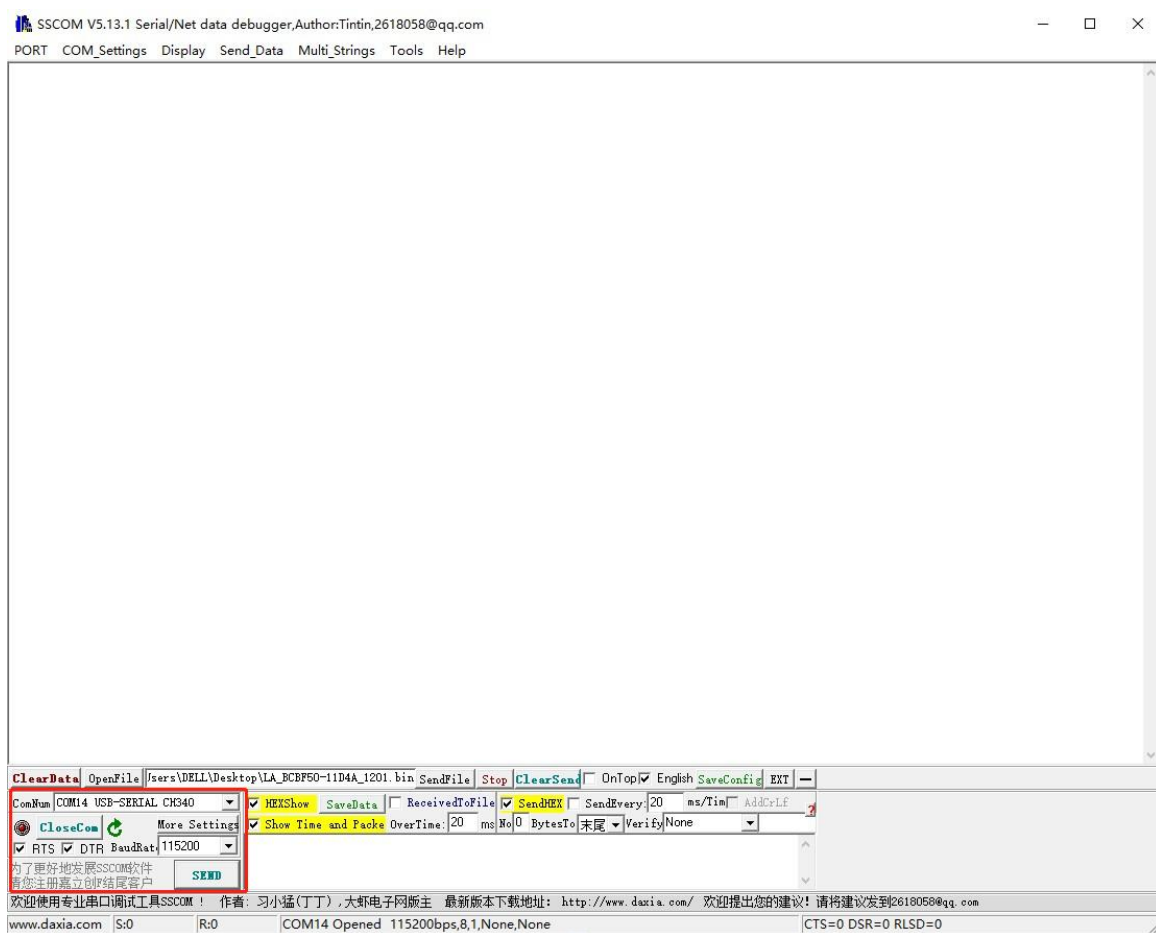
④ After power-off and restart, select "Connect equipment" → "Quick Connection" → select the corresponding COM port and baud rate → "Search" in the PC software.



PC Software Connection Diagram ④

3.2 Use the serial port debugging assistant software to modify the ID and baud rate.

- ① Start the serial port debugging assistant software. Select the corresponding port number and baud rate. Click "Open Serial Port".



Debugging Screen ① in the Serial Port Debugging Assistant Software

- ② Change the gripper ID from "1" to "2". Refer to the register instructions, and obtain the ID register address (0x06). Enter the instruction frame "55 AA 05 01 31 06 00 02 00 3F".

55 AA: frame header;

05: Length of data segment;

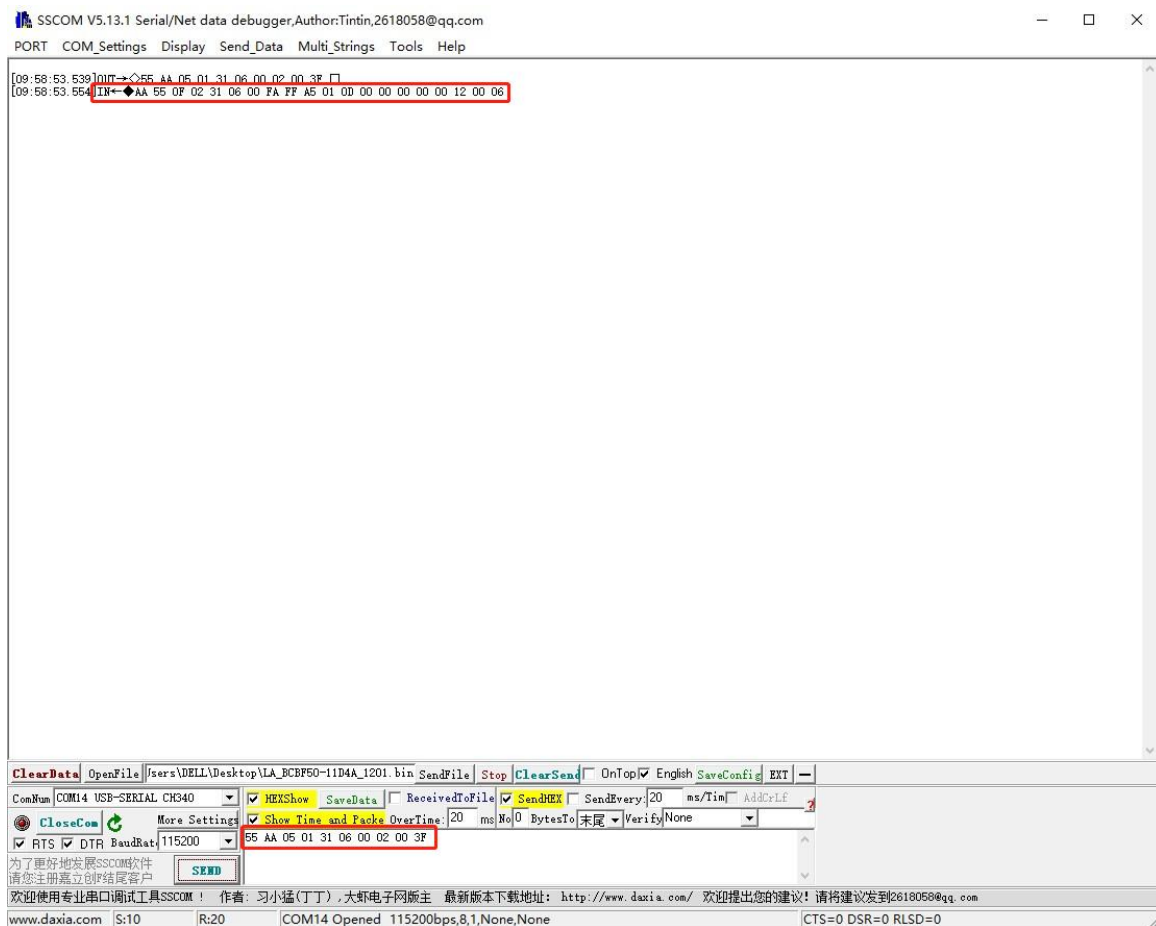
01: ID;

31: Instruction type;

06 00: ID register address;

20 00: The new ID is 2;

3F: Checksum



Debugging Screen ② in the Serial Port Debugging Assistant Software

Response frame received: AA 55 0F 02 31 06 00 00 00 00 00 99 00 00 00 00 14 00

F5

AA 55: frame header;

0F: Length of data segment;

02: ID;

31: Instruction type;

06 00: ID register address;

00 00: Actual position 0 (per-unit value, 16384: 100%);

00 00: Actual current 0 (per-unit value, 16384: 100%);

99 00: Actual force 153 (per-unit value, 16384: 100%);

00 00: Actual speed 0 (per-unit value, 16384: 100%);

00 00: Status code 0 (the gripper is grasping);

14 00: Temperature (20°C);

F5: Checksum

③ Change the baud rate to "57600". Refer to the register address instructions, and obtain the baud rate register address "0x07". The number corresponding to "57600" is 1. Enter the instruction frame "55 AA 05 02 31 07 00 01 00 40".

55 AA: frame header;

05: Length of data segment;

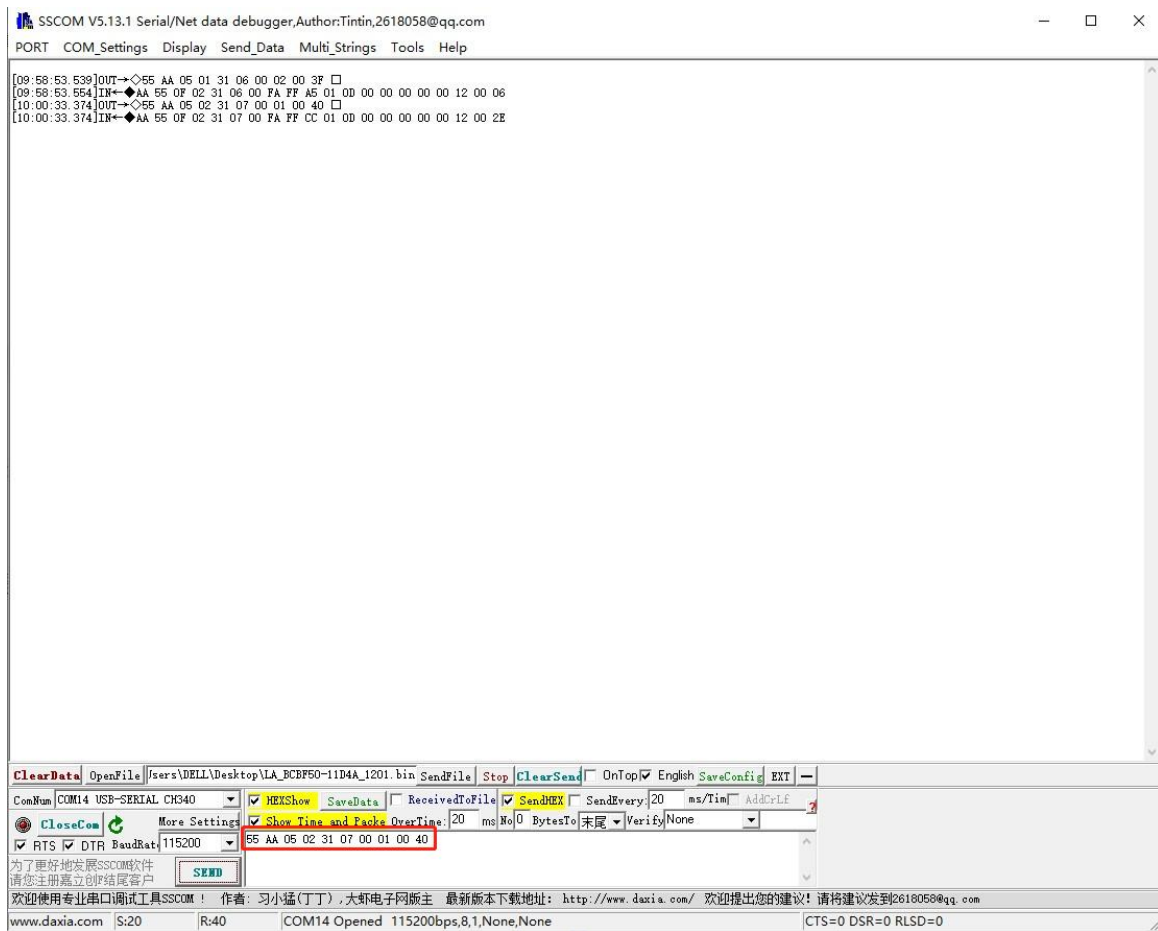
02: ID;

31: Instruction type;

07 00: Baud rate register address;

01 00: Baud rate value, 1 = 57600;

40: Checksum



Debugging Screen ③ in the Serial Port Debugging Assistant Software

④ Send the parameter saving command to the gripper. Enter the instruction frame "55 AA 05 02 31 0C 00 01 00 45". 55 AA: frame header;

05: Length of data segment;

02: ID;

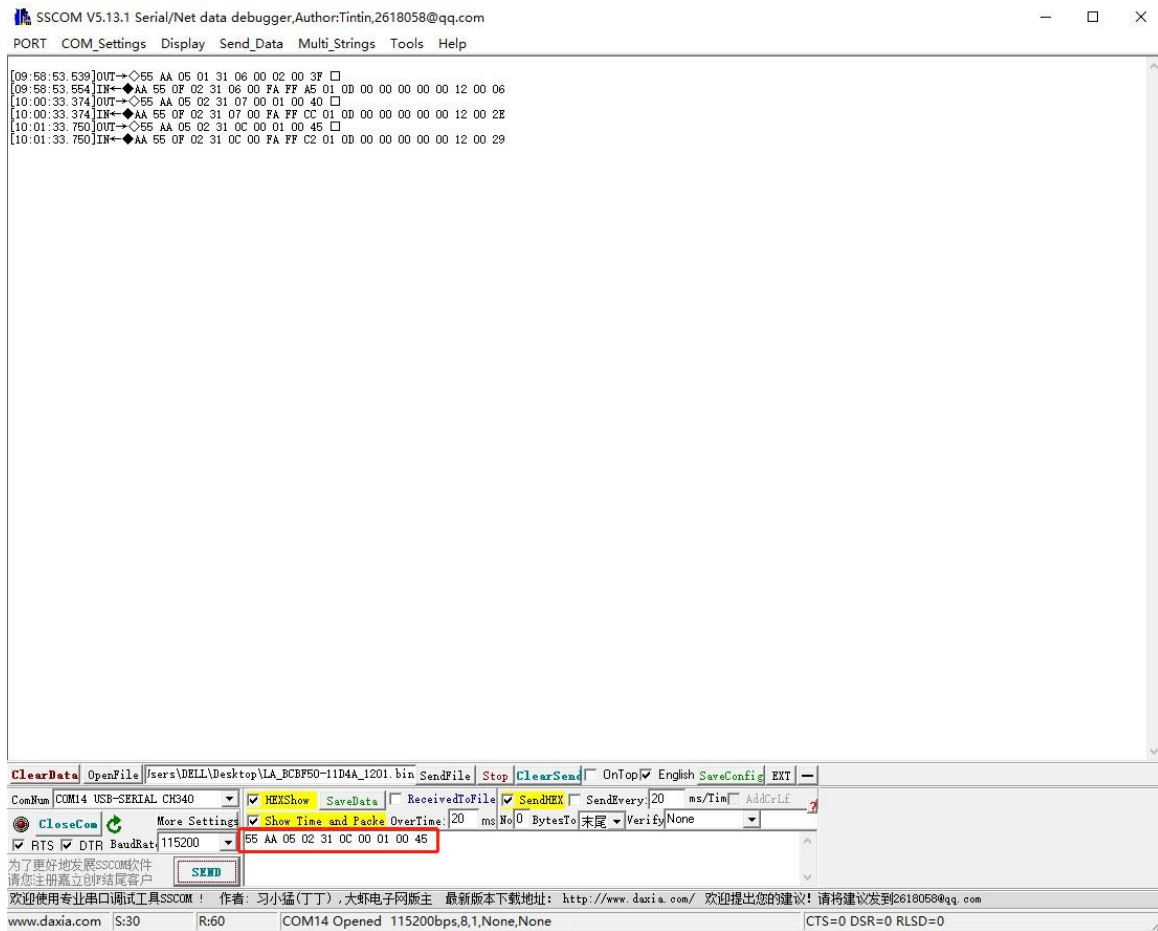
31: Instruction type;

0C 00: Register address for parameter saving;

01 00: 1 = Hold-over command;

40: Checksum

They will be valid after power-off and reboot (the hold-over command should be executed for modifying the ID and baud rate; they will become valid after power-off and reboot).

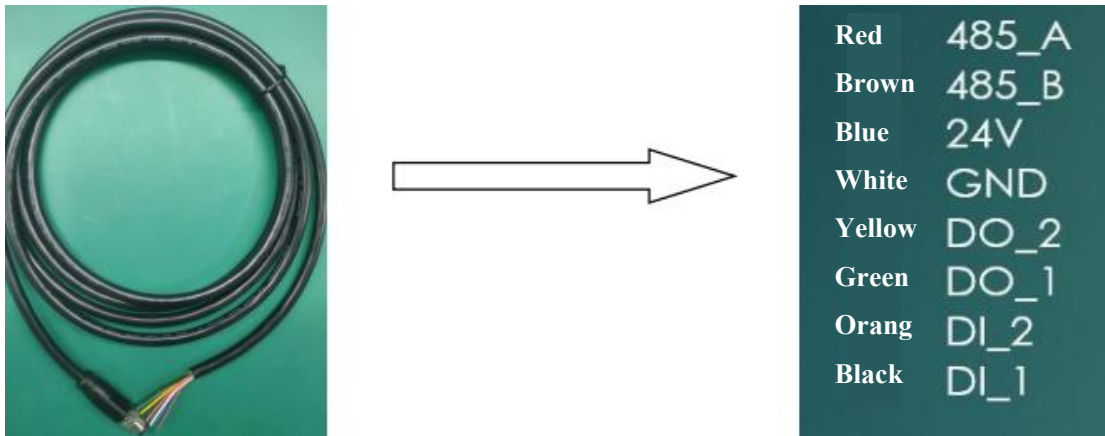


Debugging Screen ④ in the Serial Port Debugging Assistant Software

4. I/O control

The I/O mode is a common control mode in the industry. Hardware wiring is performed to control grippers. When the I/O control mode is used, the gripper should be set to the I/O mode in advance, and its four groups of I/O running status should also be set properly.

Functions corresponding to the cable colors of the gripper are defined below.



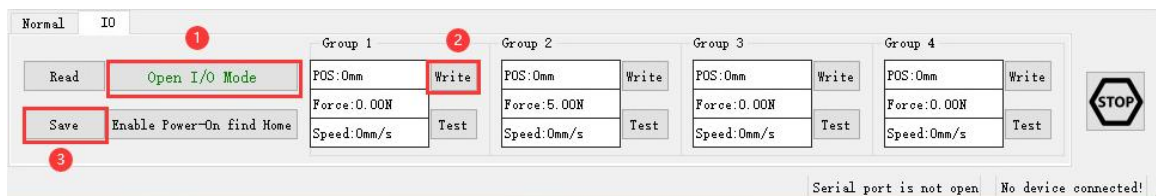
Note: In the following text, INPUT1 is the black wire (DI_1); INPUT2 is the orange wire (DI_2); OUTPUT1 is the green wire (DO_1); OUTPUT2 is the green wire (DO_2).

4.1 I/O configuration

Four statuses of the I/O mode can be configured with the serial port software. Alternatively, our debugging software can be used to configure the gripper parameters.

For specific wiring and configuration methods, refer to "1.3 Electrical interface". After four groups of parameters are configured, the pin statuses of INPUT 1 and INPUT 2 can be set to control the gripper. The output pins OUTPUT 1 and OUTPUT 2 can be detected to acquire the gripper status.

Configuration is shown below:



Procedure for shifting the I/O mode:

- ① Start the I/O mode: First of all, start the I/O mode.
- ② Configure four groups of I/O parameters: Set four groups of gripper parameters, including position, force and speed. After parameters are configured, click the "Write" button behind the corresponding data to write data.

③ Save: Click the "Save" button to write parameters to the internal Flash register. Then you can control the gripper after reboot.

④ Reboot: After reboot, the mode will be successfully shifted to the I/O mode. You can control the gripper according to the INPUT signal. OUTPUT will reflect the running status.

The pin statuses (0 V and high-resistance (OFF) state) of INPUT 1 and INPUT 2 can be set to control the gripper. Each INPUT pin can identify two input states. So you can set four gripper statuses (00 10 01 11). Specific pins and corresponding statuses are listed below.

Note: "High-resistance" (the same below) is the state of extreme resistance and corresponds to the state of gripper connection failure.

INPUT 1 (black wire)	INPUT 2 (orange wire)	Pin status	I/O state	Action
High-resistance (OFF)	High-resistance (OFF)	0 0	1st group of status	Target position 1; target force 1; target speed 1
High-resistance (OFF)	0 V	0 1	2nd group of status	Target position 2; target force 2; target speed 2
0 V	High-resistance (OFF)	1 0	3rd group of status	Target position 3; target force 3; target speed 3
0 V	0 V	1 1	4th group of status	Target position 4; target force 4; target speed 4

The output pins OUTPUT 1 and OUTPUT 2 can be detected to acquire the current status of the gripper. In the gripper running process, four gripper statuses can be read. Details are shown below.

Note: The default digital I/O is NPN. Input and output are valid at 0 V (valid at a low level).

OUTPUT 1 (green wire)	OUTPUT 2 (yellow wire)	Pin status	I/O state	Action
High-resistance (OFF)	High-resistance (OFF)	0 0	1st group of status	The gripper has moved to the target position.
High-resistance	0 V	0 1	2nd group of	The gripper is grasping.

(OFF)			status	
0 V	High-resistance (OFF)	1 0	3rd group of status	The gripper is unclenching.
0 V	0 V	1 1	4th group of status	The gripper has grasped the object.

4.2 I/O Applications

After parameters are configured, hardware wiring is required, including 24 V, GND, INPUT 1, INPUT 2, OUTPUT 1, and OUTPUT 2. Connect INPUT and OUTPUT to corresponding devices. Reboot after correct wiring is confirmed. The gripper will perform automatic initialization. Next, control the gripper according to the INPUT signal. OUTPUT will reflect the running status.

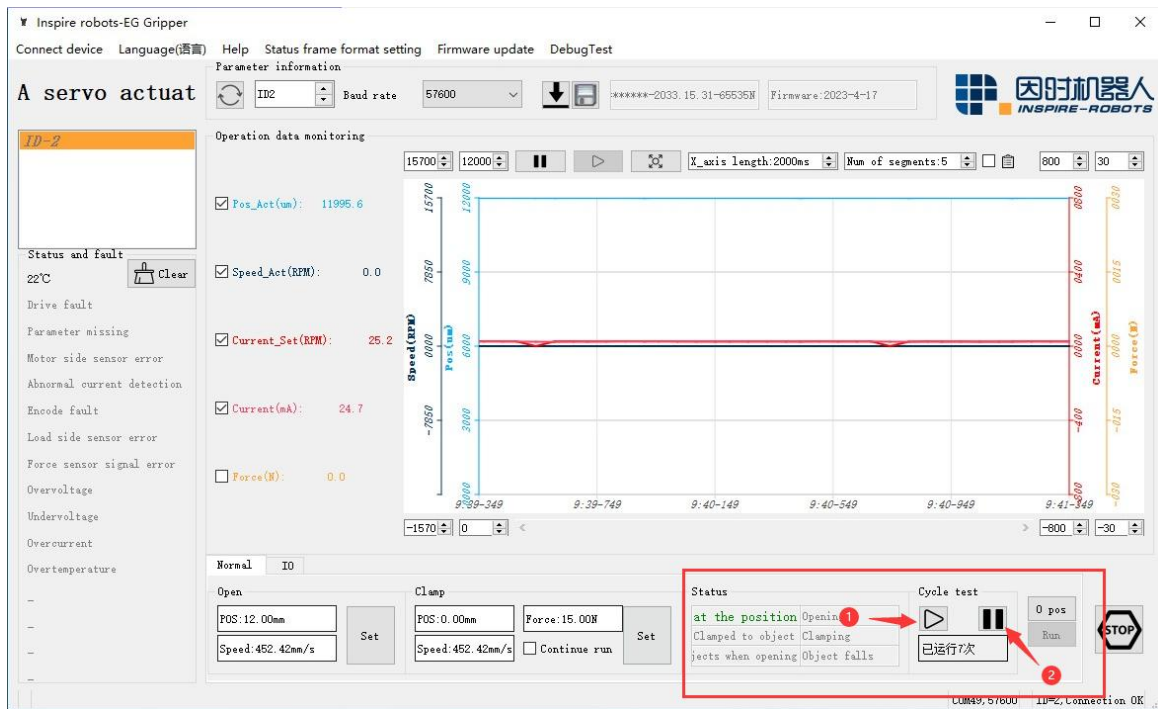
4.3 Indicator lamps' meaning

The indicator lamps of the gripper are defined below:

Gripper status	Indicator lamp color
The gripper is running (grasping or unclenching).	Blinking in green
The gripper has grasped the object.	Blinking in orange
The gripper has moved to the target position.	Normally ON in green
Grasped object is being dropped	Blinking in red
An error occurs.	Normally ON in red

5. Loop test of gripper

After the gripper is connected to the communication interface successfully, click 1 "Start", and then the gripper will perform the reciprocating motion for testing. Click 2 "Stop".



PC Software Connection Diagram