The SAC-N uniaxial controller
user's manual

catalogue

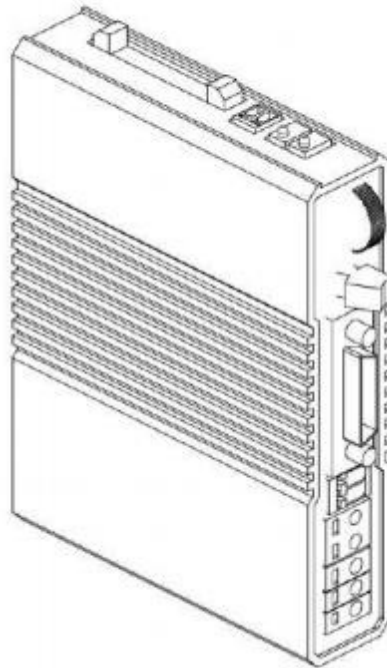# 1. Preface

1.1 SAC-N uniaxial controller product overview

SAC-N single axial controller is motor drive controller and supports Modbus-RTU, pulse and IO control mode. Corresponding control
Refer to this manual 5.3.1 for manufacturing mode switching.

.21 The SAC-N model number

The SAC-N single-axis controller series differ in the communication protocol of the controller, voltage, rated current, encoder interface, and whether there is customized content. The figure below shows the different models and their distinguishing features.

Drive series number	type	protocol	voltage	rated current	Encoder interface	Custom
Drive s Series	Type	C ommunication interface	V oltage		Encoder	
S AC	N	M 1	K	03	A 1	0

standard edition
abbreviated version
standard edition + Force-controlled sensing
abbreviated version + Force-controlled sensing

K	24 V

M	ModbusRTU (RS485) +Pulse+NP N
1	ModbusRTU (RS485)

Incremental ABZ + absolute SSI
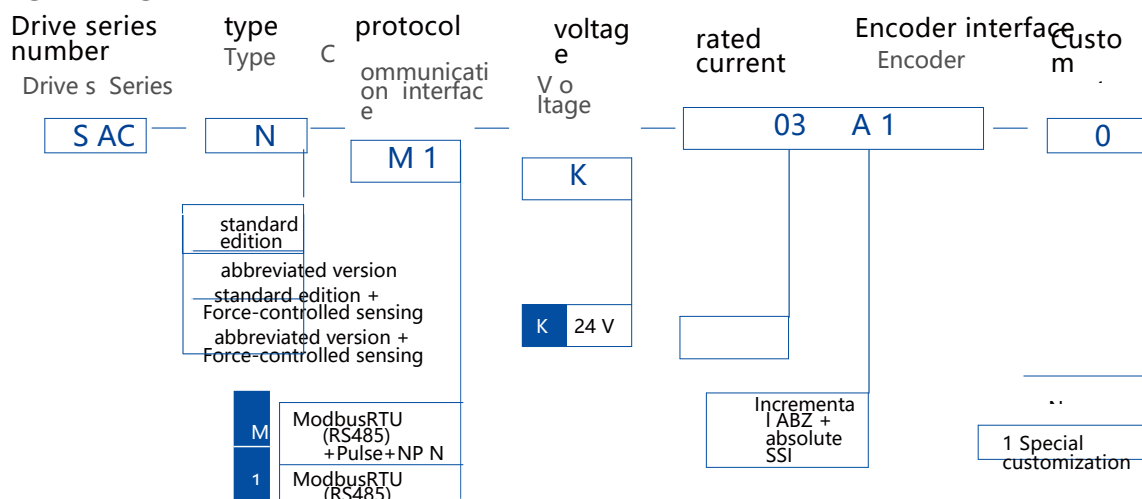
1 Special customization

Figure 1.2.1 Model definition of the SAC-N single-axis controller

2. Installation standards

.12 Safety guide

The SAC-N uniaxial controller is used as a component inside the machine. Machine manufacturers and integrators must ensure personnel safety and complete machine systems.

The machine manufacturer or integrator must consider the intended use of the SAC-N uniaxial controller when conducting a risk assessment. Based on the results of the assessment, appropriate safety measures must be implemented.

.22 Installation safety

Note: Improper handling of the SAC-N uniaxial controller can cause personal injury or equipment damage.

When connecting the SAC-N uniaxial controller to the other control equipment, ensure that the following basic guidelines are followed to prevent damage to the controller:

The SAC-N uniaxial controller must be grounded by the ground wire of the AC main power supply.

Any PLC or PC connected to the SAC-N must be connected to the same ground wire connected to the SAC-N uniaxial controller.

Review all relevant product data before installing or commissioning the SAC-N uniaxial controller.

Install in strict accordance with the product specifications and installation instructions.

.32 Installation instructions

To improve the reliability of the controller and give full play to its functions, please consider the following when installing:

Using the bracket on the back of the controller, install the controller on the ground conductive metal panel.

The metal panel must be strong enough for the installation ruler, refer to 3.1 dimensions.

When multiple uniaxial controllers are installed side by side in a cabinet or chassis, the minimum cell spacing is 10mm and the minimum top and bottom clearance is 150mm.

Keep the ambient temperature in the chassis not exceed 55℃ and the temperature of the backplane not exceed 40℃.

It is recommended to install a cooling fan at the bottom of the cabinet to achieve optimal heat dissipation.

Please avoid installing the following places in:

The temperature changes dramatically and can produce condensation.

Relative humidity exceeded 85% RH.

The existence of rancid gas, combustible gas.

Dust, salt, iron powder more.

The body bears a direct vibration or impact.

Direct sunlight.

Water, oil and chemicals.

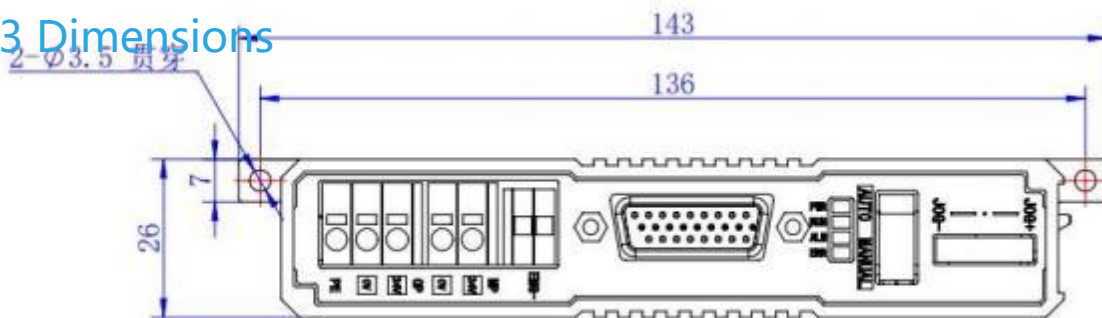Plug the vent hole.

Take adequate isolation measures when used in the following premises:
Generate static electricity and other interference.
To produce strong electric and magnetic fields.
On the power line or near the power line.

3. Specifications

.13 Dimensions

.1.1 Figure 3 Size diagram of SAC-N uniaxial controller (mm)
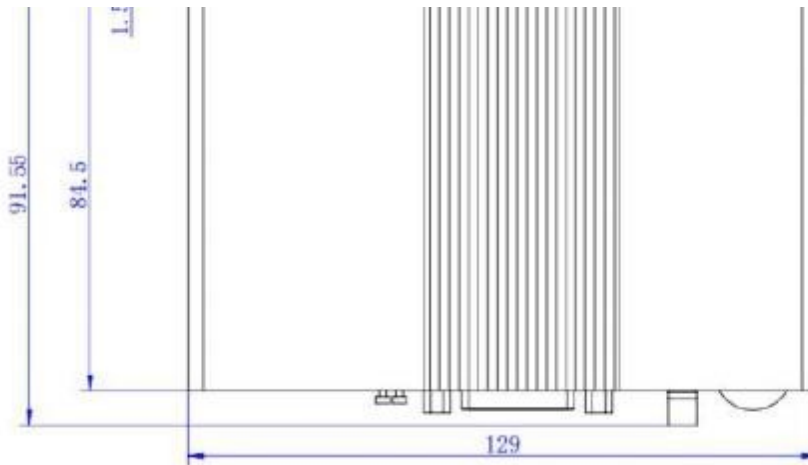
.1.2Figure 3 Size diagram of SAC-N uniaxial controller (mm)
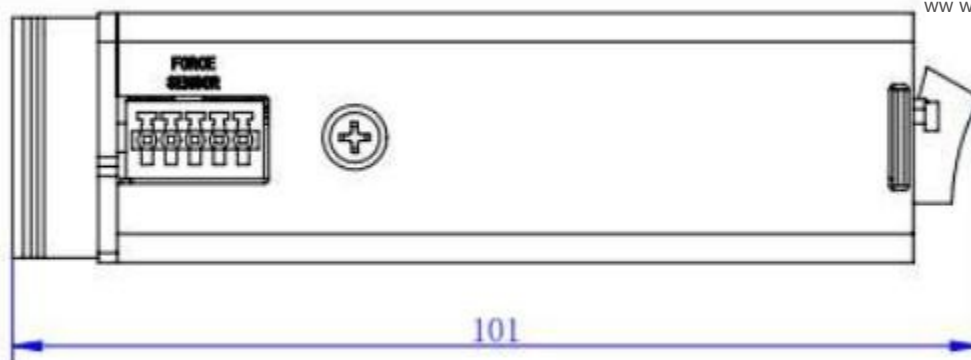
3.1.3 Size Drawing of SAC-N Single axial Controller (mm)

3.2 Communication specification

characteristic	standard
Modbus -RTU	RS 485:1 CH (based on Modbus protocol RTU) speed: 4.8~230.4Kbps
incoming pulse	Maximum frequency: 500 KHz
	Optical coupling input, the input voltage is 3.3V~24V
Digital signal input	High level: 10VDC~36VDC low level: 0 VDC ~ 5 VDC input frequency: <1 KHz
Digital signal output	Maximum output current: 50 mA

4. Controller settings

4.1 Overview of the settings

 Perform the following steps to install and set up the SAC-N single-axis controller.

1. Install the SAC-N uniaxial controller.

2. All wiring and cable connections according to application requirements:

Controller input / output, and motor input / output

Motor feedback

• quick-stop control

• any power-generating or power-driven machine

 RS 485 Interface (if used)

I / O and Pulse cables (if used)

 Sensor cable (if used)

3. Connect the controller to the host machine (PC).

4. Power on the controller and the host machine. See 4.4 Controller pin definition.

5. Install the DHGripperUI software. Refer to the 7.1 Installation instructions.

6. If required, define the controller RS485, I / O and pulse cable address. See 4.4 Controller pin definition.

4.2 System wiring

Example: System wiring of the SAC uniaxial controller and the MCE-3GB-01-050 electric cylinder

P

main engine

brake hard

Controller pow
interface
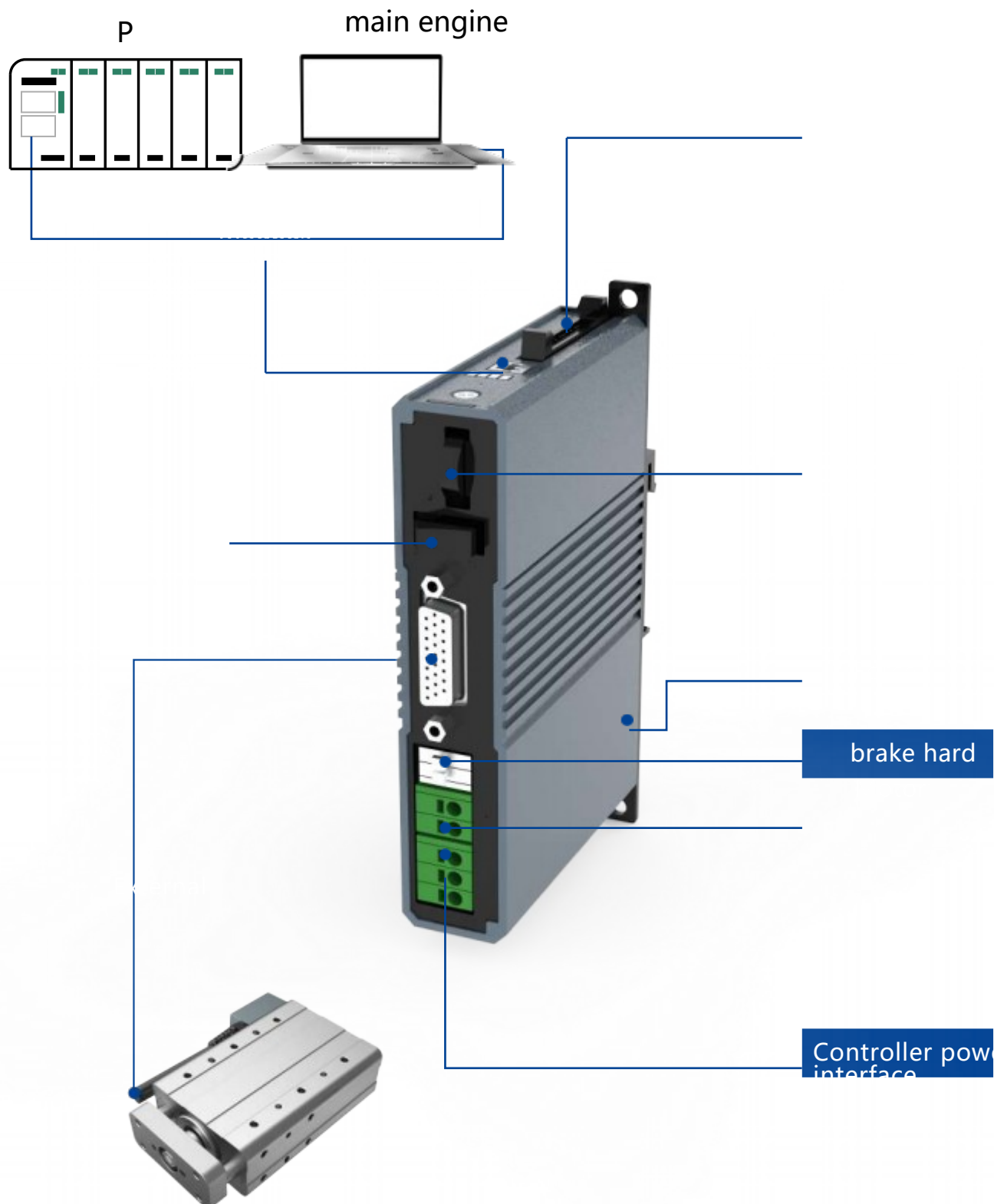
Figure 4.2.1 Wiring diagram of the SAC-N uniaxial control system

.34. Controller interface function
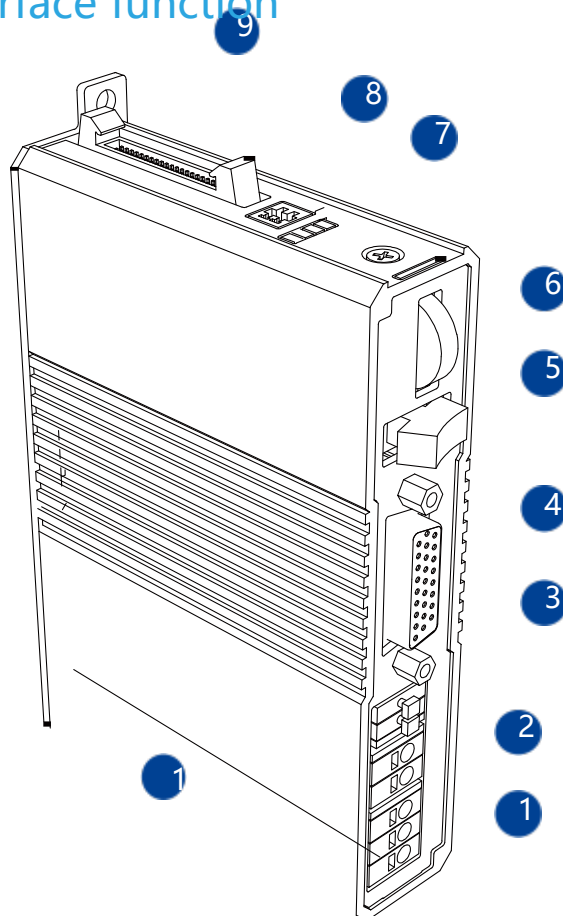
1. Power
   Logic power supply interface
   and PE (enclosure) interface.
2. Motor power supply interface
   Motor power supply interface.
3、STO
   Emergency-stop control interface.
4. DB26 interface
   DB 26 The interface includes motor UVW three-phase output, external lock
   control output, encoder difference ABZ and SSI input.
5. Mode switching
   Manual and switch automatically.
6、JOG
   In the manual mode, it is used to control the motor.
7. Indicators
   Power light and status light.
8, the R S 485 interface
   Used for debugging, control, and monitoring.
9, I / O, and the pulse interface
   I / O and pulse interface include I / O interface and pulse input and output.
10, the sensor interface
   Force-sensor interface.

.44 Controller pin definition

SAC-N single axis controller uses 24V DC power supply, controller power supply and motor power supply separately, power specification is selected according to the motor power size.
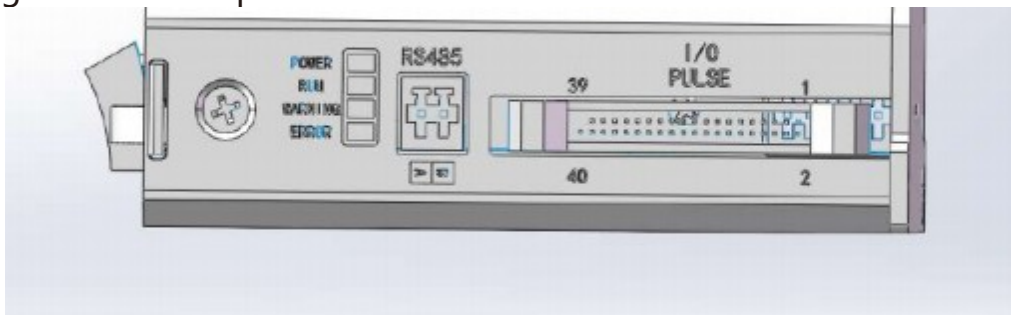
Note: 1~19 behavior odd feet, 2~20 behavior even feet.

RS 485 Interface definition		
Interface pin	Feet name	Feet function
1	A	485_A
2	B	485_B

SAC-N single axis controller uses IO-pulse mode to control the motor with pulse mode, 16 point IO mode and 32 point IO mode. The relevant definitions of I / O and PULSE interface are different in different modes. The specific interface definition can be checked in the following table.

I / O, PULS E interface definition

Pulse mode definition					
pin	Feet name	Feet function	pin	Feet name	Feet function
1	Pulse +	impulse input	21	obligate	
3	Puls e -		23	obligate	
5	I NPUT _COM	Enter the public end	25	obligate	
7	S ON	enable	27	obligate	
9	R ES	Clear the error	29	obligate	
11	H OME	Back to zero	31	obligate	
13	TL	torque limitation	33	obligate	
15	C STP	Forced stop	35	obligate	
17	D CLR	Clear the pulse deviation	37	obligate	
19	B KRL	Forced loose lock	39	PE	landing
2	Direction +		22	obligate	

4	Direction -	Pulse-direction input	24	ALM 1	Alarm code # 1

6	OUTPUT_COM	Output the public end	26	ALM 2	Alarm code # 2
8	P WR	Power status	28	ALM 4	Alarm code # 4
10	S V	Enable state	30	ALM 8	Alarm code # 8
12	P END	Positioning completed	32	ALM16	Alarm code: 16
14	H END	Back to zero state	34	ALM32	Alarm code: 32
16	TL R	In the torque limit	36	obligate	
18	A LM	Alarm status	38	obligate	
20	E MGS	Urgent stop state	40	obligate	

The 16-point IO pattern definition					
pin	Feet name	Feet function	pin	Feet name	Feet function
1	obligate		21	PC 8	Input point-PC8
3	obligate		23	obligate	
5	I NPUT _COM	Enter the public end	25	obligate	
7	H OME	Back to zero	27	obligate	
9	ST P	suspend	29	obligate	
11	C STR	The movement began	31	obligate	
13	R ES	Make a clear mistake	33	obligate	
15	PC 1	Input point 1	35	obligate	
17	PC 2	Input point 2	37	obligate	
19	PC 4	Input point 4	39	PE	landing
2	obligate		22	PM 8	Output point-PM8
4	obligate		24	obligate	
6	OUTPUT_COM	Output the public end	26	obligate	
8	H END	Back to zero state	28	obligate	
10	P END	Positioning completed	30	obligate	
12	TL R	In the torque limit	32	obligate	
14	A LM	Alarm status	34	obligate	
16	PM 1	Output point-PM1	36	obligate	
18	PM 2	Output point-PM2	38	obligate	
20	PM 4	Output point-	40	obligate	

		PM4			

The 32-point IO pattern definition					
pin	Feet name	Feet function	pin	Feet name	Feet function
1	obligate		21	J ISL	The JOG mode switching
3	obligate		23	JOG +	Regular point move
5	I NPUT _COM	Enter the public end	25	JOG -	Negative point move
7	PC 1	Input point 1	27	obligate	
9	PC 2	Input point 2	29	H OME	Back to zero
11	PC 4	Input point 4	31	ST P	suspend
13	PC 18	Input point 8	33	CSTR /PWRT	Start / record the current location
15	PC 16	Input point point 16	35	R ES	Clear the error
17	PC 32	Input point to point 32	37	S ON	enable
19	M ODE	Positioning / teaching mode	39	PE	landing
2	obligate		22	MODES	Teaching mode output
4	obligate		24	obligate	
6	OUTPUT_COM	Output the public end	26	obligate	
8	PM 1(ALM1)	Output point 1	28	H END	Back to zero state
10	PM 2(ALM2)	Output point 2	30	P END	Enable state
12	PM 4(ALM4)	Output point 4	32	S V	Positioning completed
14	PM 8(ALM8)	Output point 8	34	E MGS	Urgent stop state
16	PM 16(ALM13)	Output point, point 16	36	A LM	Alarm status
18	PM 32(ALM32)	Output point, point 32	38	obligate	
20	M OVE	kinestate	40	obligate	

Note: 1~25 behavior odd pins, 2~26 behavior even feet.

ENCODER Interface definition			
Interface pin	Feet function	Interface pin	Feet function
1	Magnetic knitting power supply 5V	2	Magnetic Z +
3	Magnetic knitting Power Supply GND	4	Magnetic Z-
5	Magnetic catalog: SDO +	6	Magnetic Component B +
7	Magnetic catalog of the SDO-	8	Magnetic compilation B-
9	Magnetic knitting CLK-	10	Magnetic A +
11	Magnetic knitting CLK +	12	Magnetic A-
13	Magnetic selection ENC _CS	14	obligate
15	Hold BRAKE +	16	Motor W phase
17	Holding lock BRAKE-	18	Motor W phase
19	obligate	20	Motor V phase
21	obligate	22	Motor V phase
23	obligate	24	Motor U phase
25	obligate	26	Motor U phase

Interface pin	Feet name	Feet function
1	PE	earth of casing
2	24V	Controller and motor DC 24V power interface
3	0V	The controller has a DC 0V power supply interface with the motor
4	EMG -	Urgent stop interface
5	C P	Controller power supply interface
6	M P	Motor power supply interface

pay attention to:

During normal use, EMG-two interfaces should be shorted, and when the disconnect, the power opportunity should be stopped urgently.

.54. Description of the wiring principle

The following is a specific description of SAC-N single axial controller I / O and pulse wiring principle.
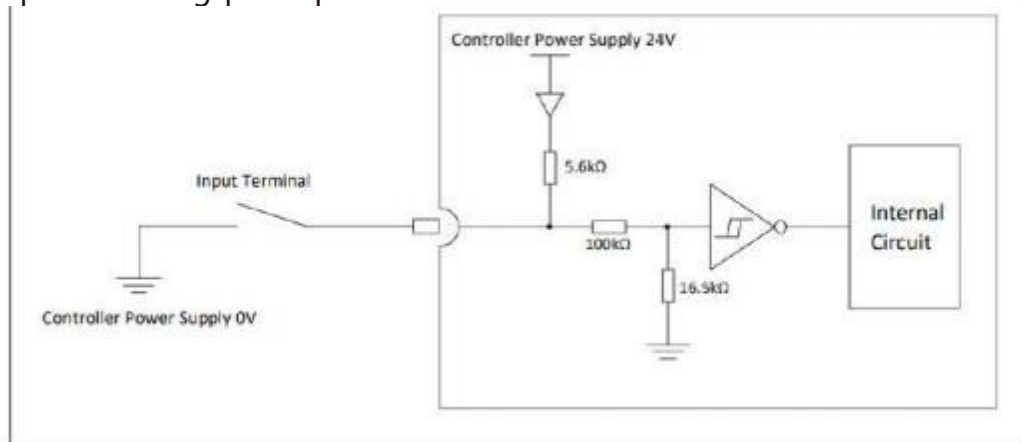
Figure 4.5.1 Source type (PNP) input and
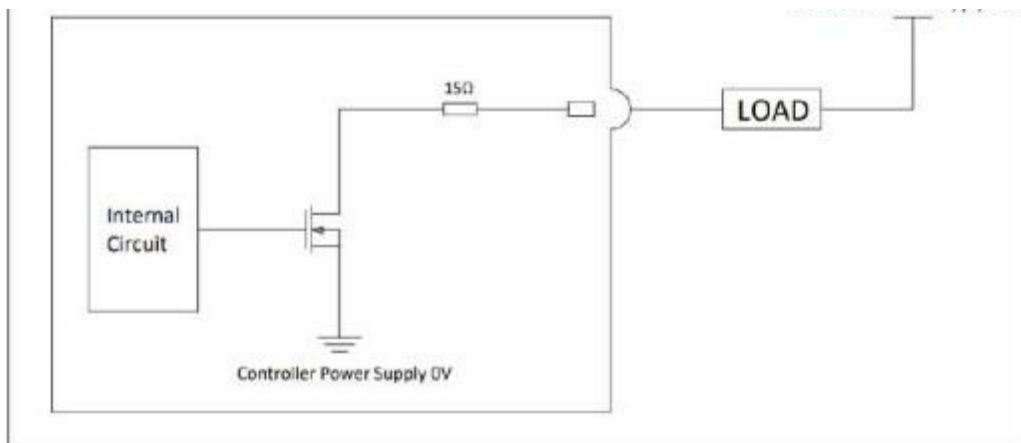
Figure 4.5.1 leakage (NPN) input and leakage (NPN) output connection method

.64 indicator definition

POWER: Power supply indicator light, always on means that the power supply is normal.

RUN: the program operation indicator light, which always indicates that the internal program is running normally.

WARNING: Communication indicator light; flashing indicates ongoing communication.

ERROR: Error indicator light, flashing indicates the motor error.

5. Instructions instructions

5.1 Command format

The controller uses the standard Modbus-RTU protocol, supporting 03,04,06 and 10 function codes.

For control, 03 and 06 function codes are generally used to control the read claw.03 function code and 06 function code are read to a single register, control instructions consists of address code (1 byte), function code (1 byte), starting address (2 bytes), data (2 bytes) and check code (2 bytes). We take the target position instruction 01 0616 00 00 01 4C 42 as an example, as shown in Table 5.1.1.

address code	FC	Register address	Register data	CRC check code
01	06	16 00	00 01	4C 42

Table 5.1, in the command format.1

Address code: the ID of the claw. Can be modified in the device ID, the default is 1. 01 The ModbusID of the motor is 01.

Function code: describe the read and write operation of the motor, whether to read data to the clamp or write data to the clamp, common function codes are 03 (read hold register) and 06 (write hold register). The target position instruction function code 06 represents a ready write.

Register address: the corresponding address of the motor function. The target location instruction address is 0x 1600.

Register data: Write the data to a specific register address to control the read data. The target position instruction writing 0001 represents moving to position 01.

CRC, check code: to ensure that the terminal equipment does not respond to the data that changes during the transmission process, to ensure the security and efficiency of the system. CRC verification adopts the 16-bit circulation hyperactivity method, converted according to the previous data, it can be seen that the CRC check code of this instruction is 4C 42.

If you need to read multiple register addresses or write to the register addresses, 04 (0x) and 10 (0x) function codes can be used to read and write the motor continuous register address. Please refer to the Modbus-RTU standard protocol for the specific control instruction format www .ip 33.com /crc .html 。

5.2 Command overview

The command consists of a base control address table and a status feedback address table.

Basic control address table: including mode switching, target position, maximum speed, acceleration / deceleration, push pressure and other control commands, is the main control command. Details are shown in Table 5.2.1.

function	Modbus Address (16 Input)	explain	write in	fetch

| Mode switching | 0x1409 | Switch the controller's control mode over the motor | Write 0x01: IO- -pulse mode; Write to 0x02: Modbus-RTU pattern. | 1: Motor by IO-pulse mode Control 2: Motor consists of 485 mode Control |

IO-pulse mode selection	0x1108		Switch the controller IO- -Pulse mode	Write 0x00: pulse mode; write 0x01:16 IO mode; write 0x02:32 IO mode;	Read the current setpoint
target location	0x1600		Positioning / push, final position	0-65535, unit 0.01mm	Read the current setpoint
Push pressure section route or distance of travel	0x1601		When PUSH = 1, it is the width of the push-pressure section Invalid when the PUSH = 0	0-65535, unit 0.01mm	Read the current setpoint
maximum speed	0x1602		During exercise maximum speed	Unit of 0.01mm / s	Read the current setpoint
Plus / minus velocity	0x1603		Add deceleration Set at the same time	1-100, and the percentage of vs	Read the current setpoint
pushing force	0x1604		The limit value of the force after entering the push segment	1-100, and the percentage of vs	Read the current setpoint
control word	0x 160 5	Bit 15	Lock control	0: No action 1: force to loose the lock	Read the current setpoint
		Bit 14	Absolute / relative position selection	0: Absolute Position 1: Incremental position	Read the current setpoint
		Bit 13	Push the direction	0: forward 1: reverse	Read the current setpoint
		Bit 12	thrust motion	0: Position motion 1: Push and pressure motion	Read the current setpoint
		Bit 11	obligate		
		Bit 10	obligate		
		Bit9	JOG +	0: Stop point movement 1: Forward point movement	Read the current setpoint
		Bit8	JOG -	0: Stop point 1: reverse point	Read the current setpoint
		Bit7	obligate		
		Bit6	obligate		
		Bit5	Motor enabling	0: Disability 1: enabling	Read the current setpoint
		Bit4	reset	Rising edge: reset	Read the current setpoint
		Bit3	suspend	0: Normal operation 1: pause	Read the current setpoint

Bit2	obligate		
Bit1	Back to zero	Rising edge: execution back to zero	Read the current setpoint
Bit0	Locate the logo	Rising edge: perform action	Read the current setpoint

Table 5.2.1 Basic Control address table

Status feedback address table: contains the current position, current current, current speed, alarm information and other status feedback, which is the main status feedback. Specific information is shown in Table 5.2.2.

function	Modbus Address (16 Input)		explain	Read state instructions	remarks
position feedback	0x160C		Feedback of the current location information	Read the current real-time location in 0.01mm	
current feedback	0x160D		Feedback the current current information	Read current current information, in mA	
rate feedback	0x160E		Feedback of the current speed information	Read the current speed information in 0.01mm / s	
Alarm code	0x160F		Feedback of the current alarm information	For detailed alarm information, please consult the 6 alarm information	Read the current setpoint
obligate	0x1610				
status word	0x 1611	Bit 15	Feedback on the emergency stop state	0: Non-emergency stop state 1: Emergency stop state	
		Bit 14	Feedback of the power supply status	0: Not prepared 1: Ready	Regardless of the alarm status or the servo status After the power supply is turned on, the controller works on The initialization ends normally, and the bit is 1
		Bit 12	thrust motion	0: Position motion 1: Push and pressure motion	Read the current setpoint
		Bit 13	obligate		
		Bit 12	obligate		
		Bit 11	obligate		
		Bit 10	Feedback motor enabling state	1: The motor is in the enabling state 0: The motor is in a disabled state	The motor is in the enabling state and can perform the operation action
		Bit9	Feedback of the alarm status	1: Have an alarm status	
		Bit8	Feedback of the motion state	1: The motor is in motion	
		Bit7	obligate		
		Bit6	Feedback back	0: No zero 1: No zero	

	to the zero state	completed	
Bit5	Feedback is in place state	1: In place	This signal has moved to the target position or is not pushed to the object and reached And 1 after the target position
Bit4	obligate		
Bit3	obligate		
Bit2	obligate		
Bit1	obligate		
Bit0	obligate		

Table 5.2.1 Basic Control address table

5.3 Details of common functions
5.3.1 Mode switching

The controller supports Modbus-RTU, pulse and IO control mode, and setting the internal register address is 0x 1409. The specific mode switching command is detailed in Table 5.3.1 below.

function	address	explain	write in	fetch
Mode switching	0x1409	Switch the controller's control mode over the motor	Write 0x01: IO-pulse mode; Write to 0x02: Modbus-RTU pattern.	1: The motor is of IO-pulse Mode is controlled 2: Motor consists of 485 Mode is controlled

Table 5.3.1 Mode switching instruction

The mode is set to IO mode.

Take setting and reading the IO-pulse mode as an example:
Set the IO-pulse mode (write operation):
Sent: 01 06 14 09 00 01 9D F8
Return: 01 06 14 09 00 01 9D F8
Read the current mode (read the operation):
Sent: 01 03 14 09 00 01 51 F8
Return: 01 03 02 xx xx crc1 crc2

.25.3 IO-pulse mode selection

When the controller selects IO-pulse mode for control, there is pulse mode, 16 point IO mode, 32 point IO mode, and when switching IO-pulse mode control, the internal register address is 0x1108. The specific mode selection command is detailed in Table 5.3.2 below.

function	address	explain	write in	fetch
IO-pulse mode selection	0x1108	Switch the controller IO- -Pulse mode	Write 0x00: pulse mode; write 0x01:16 IO mode; write 0x02:32 IO mode;	Read the current setpoint

Table 5.3.2 IO-Pulse mode selection instructions

Set up and read the pulse mode as an example:
Set the pulse mode (write operation):
Send: 01 06 11 08 00 00 0D 34
Return: 01 06 11 08 00 00 0D 34
Read the current mode (read the operation):
Sent: 01 03 11 08 00 01 00 F4
Return: 01 03 02 xx xx crc1 crc2

5.3.3 Return to zero

RS 485 Control should be back to zero, for the motor back to zero, do not control the motor back to zero. According to the different motor model, the zero time is not consistent, please control after the zero time.

Back to the Bit 1 bit of 0x1605, the trigger condition is the rising edge trigger, so 0x1605 of Bit 10 and motor before writing back to the zero command.

Bit 1 enable 0 (write) with 0x1605 before return zero command:

Sent: 01 10 16 00 00 06 0C 00 00 00 00 00 00 00 00 00 00 00 20 E5 6B
Return: 01 10 16 00 00 06 44 43

Carry out back to zero command (write operation):

Sent: 01 10 16 00 00 06 0C 00 00 00 00 00 00 00 00 00 00 00 22 64 AA
Return: 01 10 16 00 00 06 44 43

5.3.4 Disabled / enable

The controller sets the Bit 5 at 0x1605, which can read the settings at the Bit5 address of 0x1605. Take setting and reading the disability / enable states as an example:

Set the disabled state (write operation):

Sent: 01 10 16 00 00 06 0C 00 00 00 00 00 00 00 00 00 00 00 00 E4 B3
Return: 01 10 16 00 00 06 44 43

Set the enable state (write operation):

Sent: 01 10 16 00 00 06 0C 00 00 00 00 00 00 00 00 00 00 00 20 E5 6B
Return: 01 10 16 00 00 06 44 43

Read the disabled / enable state (read operation):
Sent: 01 03 16 05 00 01 90 43
Return: 01 03 02 xx xx crc1 crc2

.55.3 Preparation before exercise

Set motor and remove positioning markers before positioning (absolute positioning, relative positioning) and push movement. Take setting and reading motor enable and clearing positioning marker position as an example:

Set motor enable and clear positioning position (write):

Sent: 01 06 16 05 00 20 9C 5B
Return: 01 06 16 05 00 20 9C 5B

Read motor enabling state and clear positioning position (read operation):
Sent: 01 03 16 05 00 01 90 43
Return: 01 03 02 xx xx crc1 crc2

5.3.6 Absolute positioning

Set the absolute location command to Bit 14 with 0x1600 and 0x1605. Position value range is 0-65536, corresponding 16 decimal data is 00 00 00 01 00 00, set absolute displacement to 30.00mm position, push section stroke of 0.00mm, maximum speed of 300.00mm/s, add / decrease speed of 50%, push pressure of 0%:

write operation:
Sent: 01 10 16 00 00 06 0C 0B B8 00 00 75 30 00 32 00 00 00 21 73 0E
Return: 01 10 16 00 00 06 44 43

5.3.7 Relative positioning

Set the relative location command to Bit 14 with 0x1600 and 0x1605. Position value range is 0-65536, corresponding 16 decimal data is 00 00 00 01 00 00, set the distance of relative displacement 30.00mm, push section travel of 0.00mm, maximum speed of 300.00mm/s, add / decrease speed of 50%, push pressure of 0%:

write operation:
Sent: 01 10 16 00 00 06 0C 0B B8 00 00 75 30 00 32 00 00 40 21 42 CE
Return: 01 10 16 00 00 06 44 43

5.3.8 Push motion

The command address that sets the push segment length is B i t 12 at 0x1601 and 0x1605. Push section refers to the second push stroke of the motor. The speed of the second push stroke can be different from that of the first stroke. The corresponding 16 decimal data is 00 00 00 01 00 00. Address of push section speed (0x0309) and use please refer to the relevant motor manual, to set absolute-forward push movement to 80.00m m position, push section stroke of 50.00mm, maximum speed of 300.00mm/s, acceleration / deceleration of 100%, push pressure of 20% for example:

write operation:
Sent: 01 10 16 00 00 06 0C 1F 40 13 88 75 30 00 64 00 14 10 21 98 09
Return: 01 10 16 00 00 06 44 43

Set absolute-reverse push pressure movement to 0.00mm position, push section travel of 50.00mm, maximum speed of 300.00mm/s, add / decrease speed of 100%, push pressure of 20% for example:

write operation:
Sent: 01 10 16 00 00 06 0C 00 00 13 88 75 30 00 64 00 14 30 21 01 E3
Return: 01 10 16 00 00 06 44 43

With the relative-forward push movement, the relative displacement is 80.00mm, the push section stroke is 50.00m m, the maximum speed is 300.00mm/s, the addition / decrease speed is 100%, and the push pressure is 20% as an example:

write operation:
Sent: 01 10 16 00 00 06 0C 1F 40 13 88 75 30 00 64 00 14 50 21 A9 C9
Return: 01 10 16 00 00 06 44 43

By setting relative-reverse push pressure motion, relative displacement is-80.00mm, push section stroke is 50.00m m, maximum speed is 300.00mm/s, acceleration / deceleration speed is 100%, and push pressure is 20% as an example:
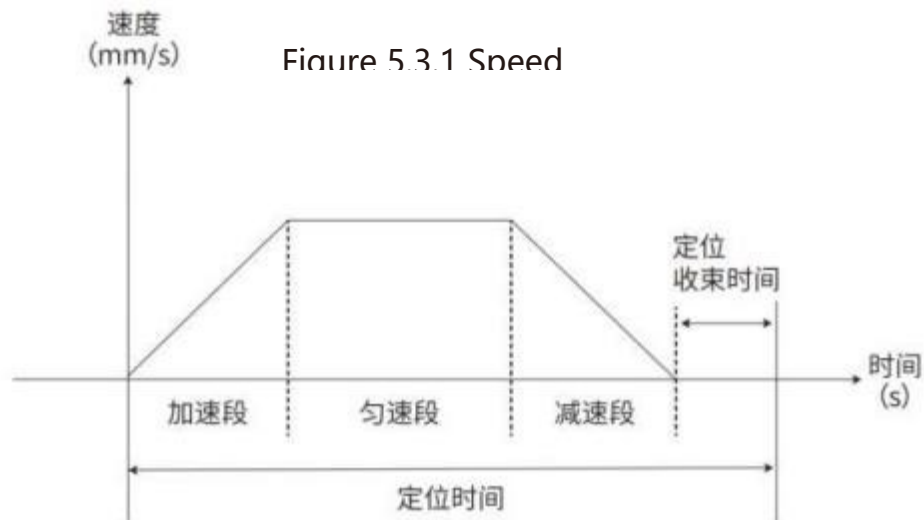
write operation:
Sent: 01 10 16 00 00 06 0C E0 C0 13 88 75 30 00 64 00 14 70 21 4E DE
Return: 01 10 16 00 00 06 44 43

Push and pressure segment diagram:
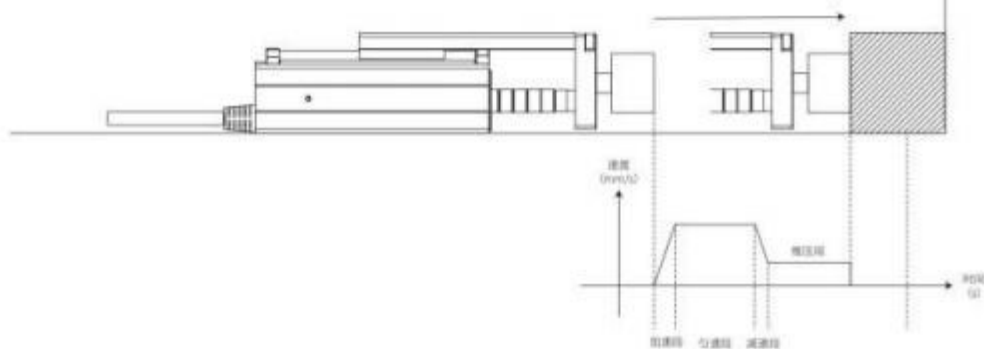
Operating speed relationship without push and pressure section:

Figure 5.3.1 Speed

.3.2 Figure 5 Speed relation without push and pressure segment setting

.3.95 JOG

Set the JOG motion commands to address Bit 8 at 0x 1605 and Bit 9 at 0x1605. Point action speed is 0x1602 and 0x1603 for forward JOG motion with a maximum speed of 20.00mm/s and add / acceleration of 20%:
write operation:
Sent: 01 10 16 00 00 06 0C 00 00 00 00 07 D0 00 14 00 00 02 20 44 23
Return: 01 10 16 00 00 06 44 43

Take the forward JOG motion with a maximum speed of 20.00mm/s and an acceleration of 20% as an example: write operation:

Sent: 01 10 16 00 00 06 0C 00 00 00 00 07 D0 00 14 00 00 01 20 44 D3
Return: 01 10 16 00 00 06 44 43

.3.105 The JOG stops

Set JOG stops to Bit 80x1605 and Bit 90x1605. Set the JOG forward / reverse motion stop as an example: write operation:

Sent: 01 10 16 00 00 06 0C 00 00 00 00 00 00 00 00 00 00 00 20 E5 6B
Return: 01 10 16 00 00 06 44 43

.3.115 Read the alarm message

When the ERROR indicator flashes, an error occurs and the specific alarm message is 0x160F. Read the alarm information of the controller as an example: read operation:

Sent: 01 03 16 0F 00 01 B0 41
Return: 01 03 02 xx xx crc1 crc2

5.3.12 Clear the alarm

Clear the controller alarm at Bit 4 at 0x1605. For the alarm information of the controller, refer to Chapter 6 of this manual to clear the alarm (alarm level: action relieved) as an example:

write operation:

Sent: 01 10 16 00 00 06 0C 00 00 00 00 00 00 00 00 00 00 00 30 E4 A7
Return: 01 10 16 00 00 06 44 43

5.3.13 Position feedback

The command address of the real-time feedback position is 0x 160C, and the position feedback can be used to read the current real-time position of the motor. The specific reading instructions are shown as follows:

Read the position status (read the operation):

Sent: 01 03 16 0C 00 01 40 41
Return: 01 03 02 xx xx crc1 crc2

.3.145 Current feedback

The command address for real time feedback current is 0x160D and current feedback can be used to read the current of the motor. The specific reading instructions are shown as follows:

Read the real-time current (read the operation):

Sent: 01 03 16 0D 00 01 11 81
Return: 01 03 02 xx xx crc1 crc2

5.3.15 Speed feedback

The command address for real-time feedback speed is 0x160E and speed feedback can be used to read the current speed of the motor. The specific reading instructions are shown as follows:

Read the real-time speed (read operation):

Sent: 01 03 16 0E 00 01 E1 81
Return: 01 03 02 xx xx crc1 crc2

5.3.16 State feedback

The feedback command address for the motor status is 0x1611. State feedback can be used to read the motor in place state, back to zero state, motion state, alarm state, etc. The specific reading instructions are shown as follows:

Read status feedback (read operation):

Sent: 01 03 16 11 00 01 D0 47
Return: 01 03 02 xx xx crc1 crc2

6. Alarm information

When the controller alarms, check the controller and motor with reference to the following table, and solve the fault according to the alarm level.

Alarm code (HEX)	Alarm level	The name of the alarm	Trigger conditions
80		Move the instructions when you servo the OFF	Communication mode: send movement commands if the motor is not enabled Pulse mode: The motor receives over 10 pulses outside without enabling
82		Back to zero	Communication mode: no such alarm Pulse mode: The motor receives more than 10 external pulses without returning to zero
83		When returning to zero is not completed The numerical instruction	Communication mode: the cylinder has not returned to the motor command impulse mode: no alarm
84		Move instructions back to zero	Communication mode: the electric cylinder is sending motion commands back to zero Pulse mode: The electric cylinder receives more than 10 external pulses when it is going back to zero
90	Action to remove	Software reset when servo ON	The motor is still in an enabling state when reset
A3		Location instruction information data exception	Location information of the overrun bit is received
B E		Back to zero timeout	It did not touch the blocking turning point after 20S movement
C 0		Actual speed is too fast	Actual speed above 4000 revolutions and continued for 200ms
C 9		overvoltage	The bus bar voltage is greater than 30V and lasts for some time
C B		Current sensor offset adjustment is abnormal	Initial mining voltage is outside 10% of 1.65V (Phase current sampling circuit is abnormal)
D 5		Deviation counter overflow in incomplete zero	In the case of non-blocking rotation during the zero process, the position deviation is greater than half a circle and keeps 1S
D 8		Deviation overflow	For non-push section, the position deviation is greater than 4 laps and maintained for 500ms, Improper electronic gear ratio setting will trigger this alarm, Indicates that the electric cylinder does not keep up with the target position
D 9		Travel soft limit limit error	When the motor is enabled, the current position exceeds the limit and maintains 1S

D C		The push and pressure action range exceeds the limit for error	After entering the push pressure section, there is an external force pushing the electric cylinder to the beginning of the push pressure position
E 5		Encoder received error	The encoder line is disconnected for 500ms or more
F6		undertension	The bus bar voltage is less than 12V and lasts for some time
F7		Block turn	The non-push section exceeds 5S
F8		The STO is in an emergency stop	Drive power supply broken line
86	After the restart clean up	Movement when the string input is valid	Communication mode: no such alarm Pulse mode: through the serial communication mode Updated the drive axis target location
A 4		Command counter overflow	1, the pulse of continuous input exceeded ± 2147483647 2, the electronic gear ratio setting is unreasonable
C 8		overcurrent	Motor current exceeds 8A
C A		Overheat (estimated heat value, Similar overload)	The actual current exceeds 1.5A for different times (the antiaging curve, the smaller the current, the slower the alarm) alarm

7. Instructions for using the upper computer

7.1 Installation instructions

DHGripperUI -32bit-XXXXX-X-VX.X.X. Exe is the installation file of Damachine and is suitable for Windows operating system. Here are the specific installation steps.

1. In order to enable the upper computer to use some privileged operations for the Window s operating system, please right-select "Run as an administrator" to open the upper computer installation file. As shown in the figure below:

Figure 7.1.1, select the installation permission

2. By default, the upper computer computer will be installed under disk C. If you want to change the installation directory, please choose " Browse..."" Select the target installation directory.

Figure 7.1.2, select the installation directory

3. After selecting the installation directory, click "Next" to enter the next page and the page will prompt whether to create a desktop shortcut. It is recommended to check the create desktop shortcut, and then continue to click "Next" to enter the next installation step.
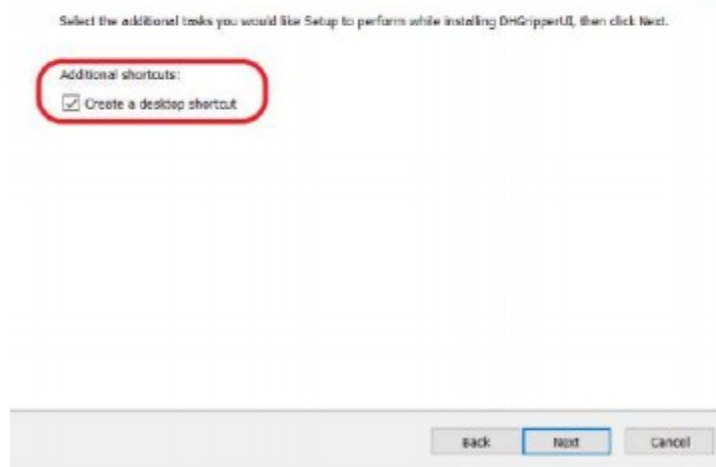
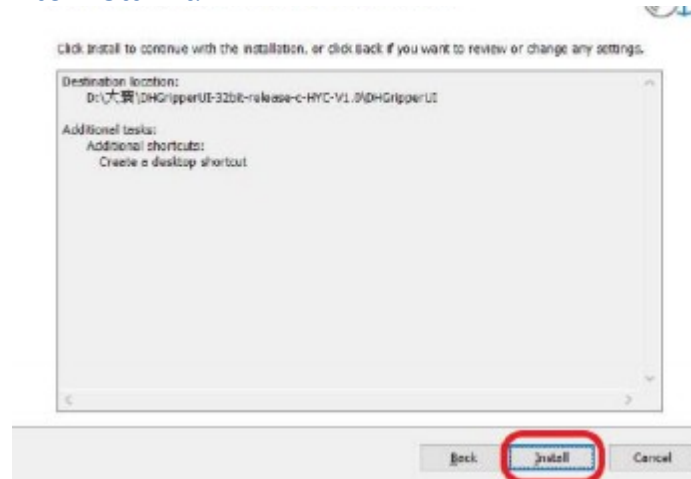.1.3 Figure 7 Create a desktop shortcut

4. Click "Install" to install it.

Figure 7.1.4 Start of installation

5. During the installation process, the driver installation program of "FTDICOM Driver s" will pop up. If the first installation machine, please select "Extract" and "Next page" to install this driver. The specific operation is shown in Figure 1.5; if not, select "Cance l" to skip. Setinstallation ends when the FTDICOM Drivers is installed or skipped.
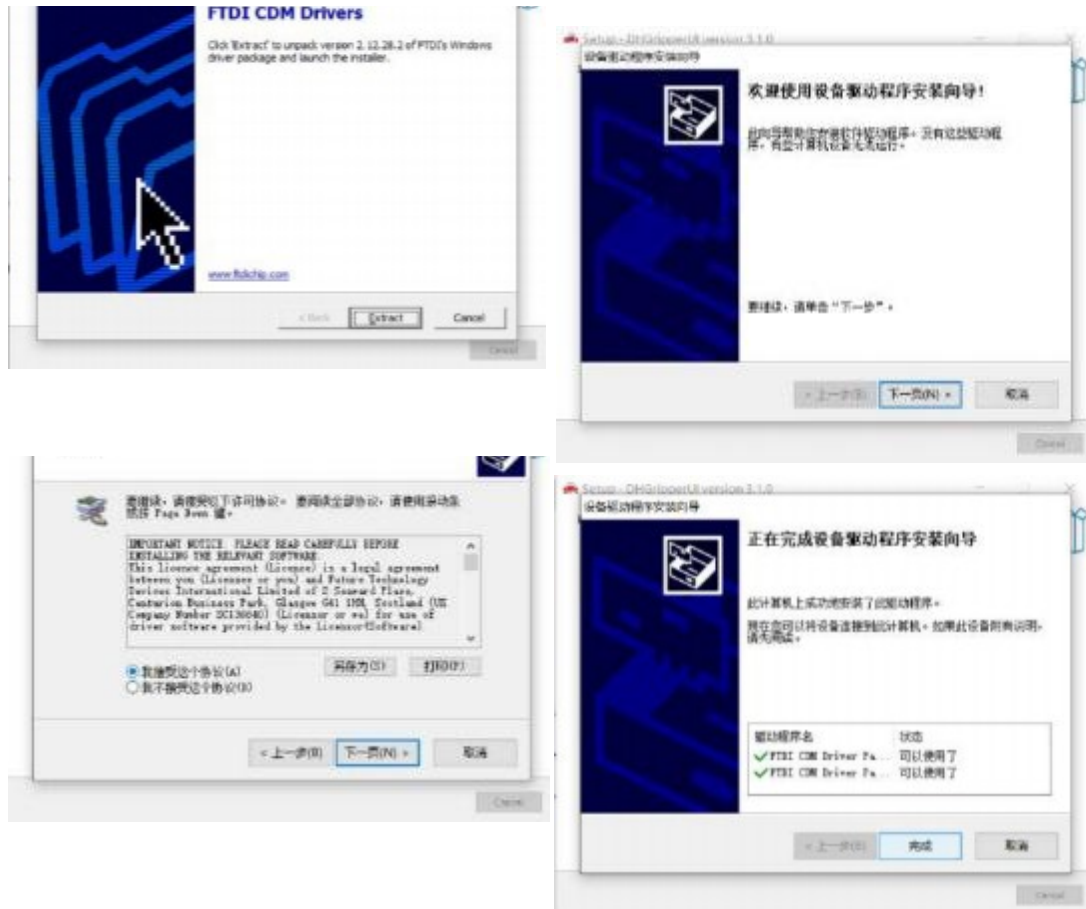
Figure 7.1.5 Installation driver
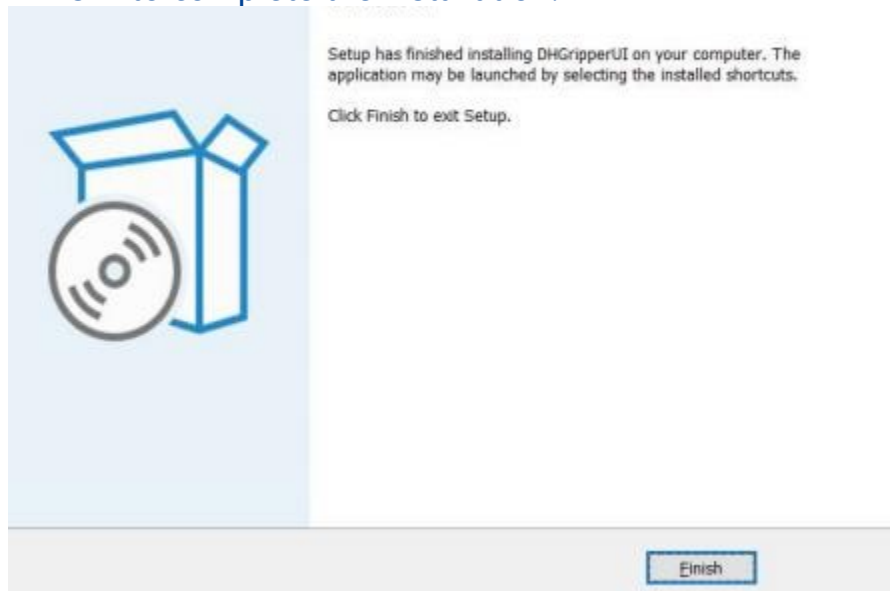
6. Click "Finish" to complete the installation.

Setup has finished installing DHGripperUI on your computer. The application may be launched by selecting the installed shortcuts.

Click Finish to exit Setup.

Finish

Figure 7.1.6 Installation is completed

Note: When you install to open the host program, please right-click "Run as administrator".

.27 Connection equipment

The connection interface of the upper computer is mainly composed of three parts, namely "automatic connection", "device scan" and "connection information display", which correspond to 1,2 and 3 in the following figure respectively.

Automatic Connect is used when the computer is only connected to one device. Device Scan is used when the computer is connected to multiple devices. The text box at "Connect Information Display" provides the plug and pull information of the device and the handshake information when the device is recognized.
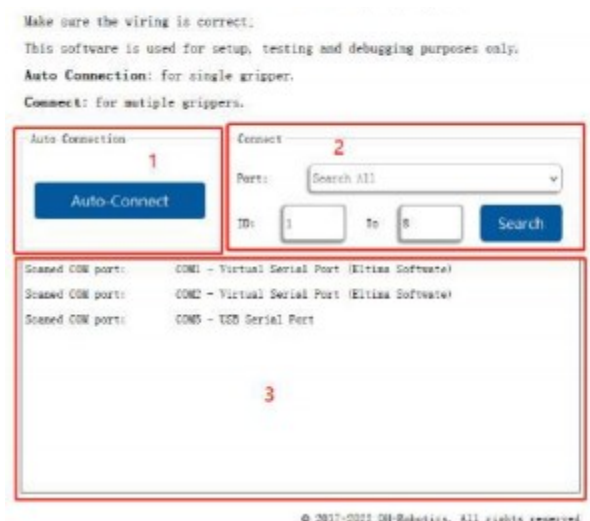
1. The connection mode of the upper computer and the equipment using USB to 485 is sh
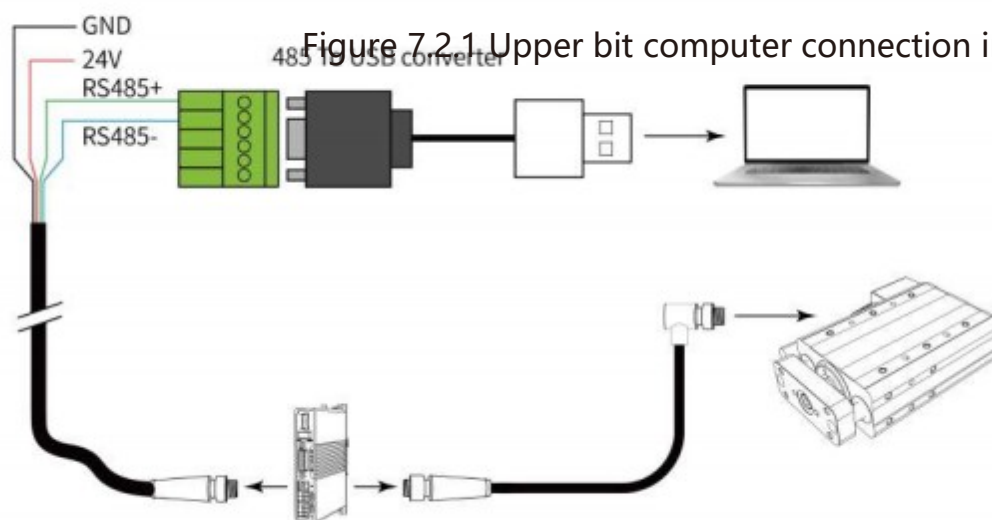
Figure 7.2.1 Upper bit computer connection interface

Figure 7.2.2

2. After confirming the connection, connect the USB plug to the USB interface of the PC terminal. Then the text box at the "Connection Information Display" will display: "Scaned COM port: COMX-USB Serial Port".
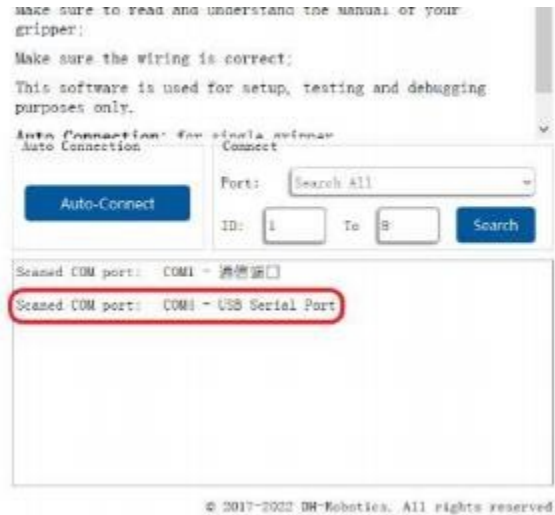
make sure to read and understand the manual of your gripper;

Make sure the wiring is correct;

This software is used for setup, testing and debugging purposes only.

Figure 2.3 Communication success prompt

① If only one device is connected, click "Auto-Connect" to automatically connect to the device and jump to the control interface.

② If more than two devices are connected, you need to click the "Search" button, click the program will select according to the "Por t", with different port rate, different data bits, and Modbus ID range at "ID", combined into a group of serial configuration, to configure the handshake scanning, if the handshake, the serial configuration will join a list and displayed on the right side of the "connection information display" interface, at this time can double-click the configuration in the list, the program will use this configuration to connect the device.

7.3, language switching

To use the Chinese version of the upper computer software, please connect the device, click the "Language" menu in the tag bar on the upper left of the software, select "Chinese", then the box will display "restart the software to switch the complete language" otherwise the software is still in English.
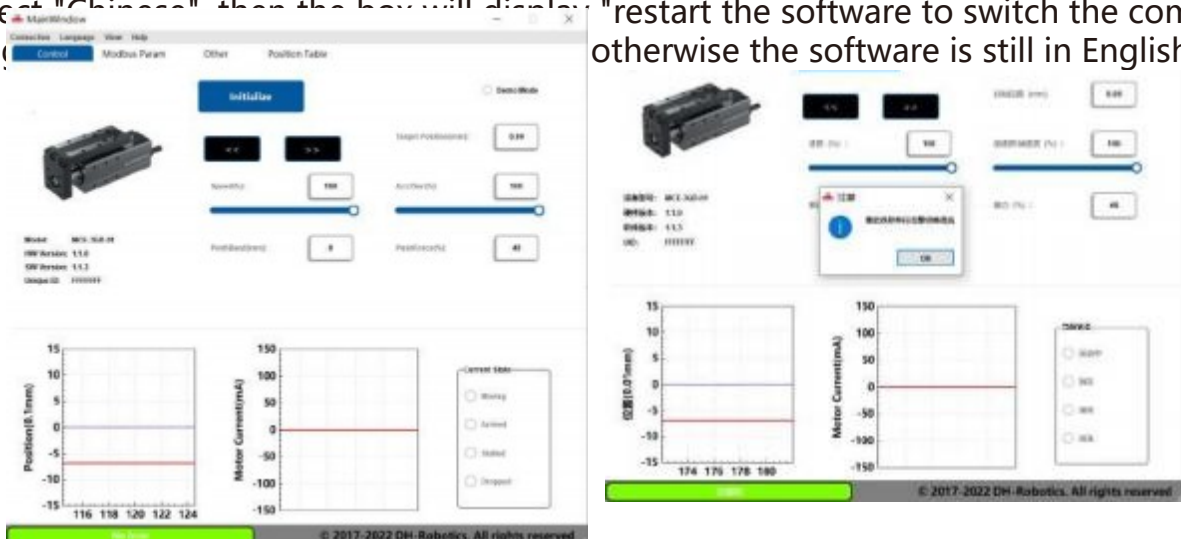
Figure 7.3.1, language switching interface

7.4 Control equipment

After successfully connecting the device, the upper computer jumps to the main control interface. The main interface consists mainly of three parts, namely, the basic control module, the status display module and the register control module.

Figure 7.4.1, Main interface of the upper machine

7.4.1 Control interface

The Control (Control) page of the Control Tab provides basic equipment operations with the interface description:

Figure 7.4.2 Main interface of upper computer control

Interface description
　① Initialization and demonstration mode: the initialization function is used for calibration
　　② Control interface: it can write the force value, speed, increase / deceleration, push se
　　③ Current status: displays the current status of the device in real time, and the option s

7.4.2 Error feedback

Error status indicates that the label will be green when without error and red when error with error code (see Chapter 6 for specific error code explanation), as shown in Fig.
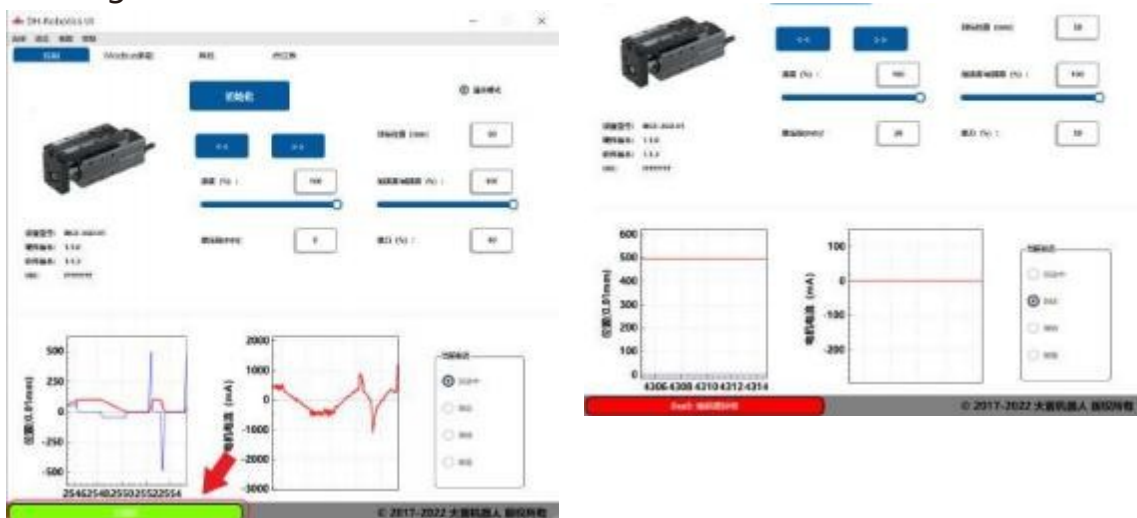

Figure 7.4.3

7.4.3, register control

Click "View (View)" and select "Register (Register)", a register table will be added to the right side of the software, where some registers of the device are provided in the form of a list, and a register can be written at the list.
The title of each label on the right register table indicates the starting address of all registers under the current tab page, and the hexadecheal value on the left of each tab page indicates the offset of the register corresponding to the current row for the starting address.
To write a register, first select the register to be written, and then double-click the line of the register. At this time, an input interface will pop up, input the corresponding value (decimal), and click "OK" to write.
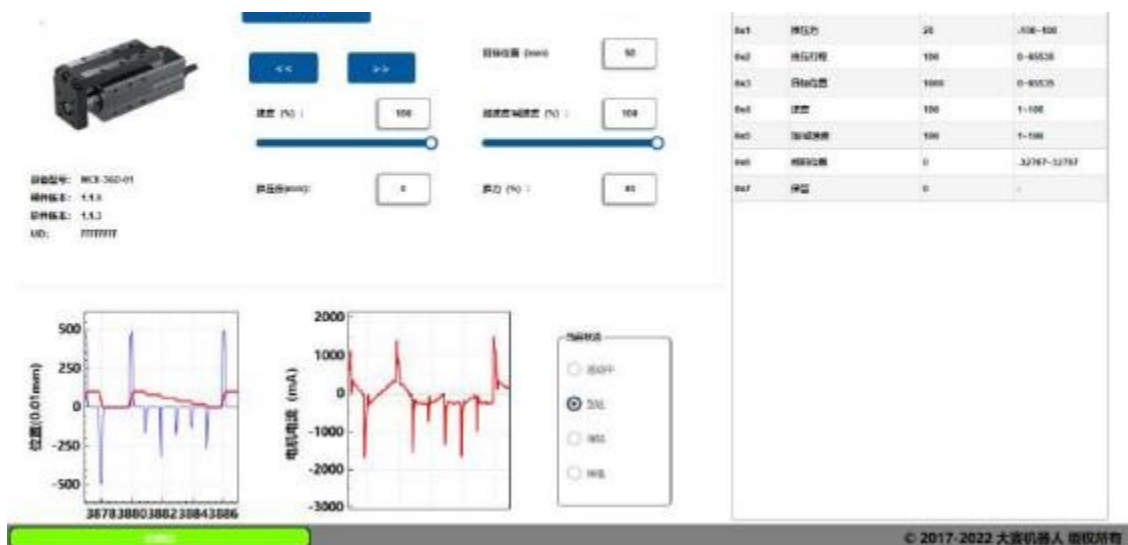
Figure 7.4.4 Upper computer register control interface

7.4.4 Parameter import and export

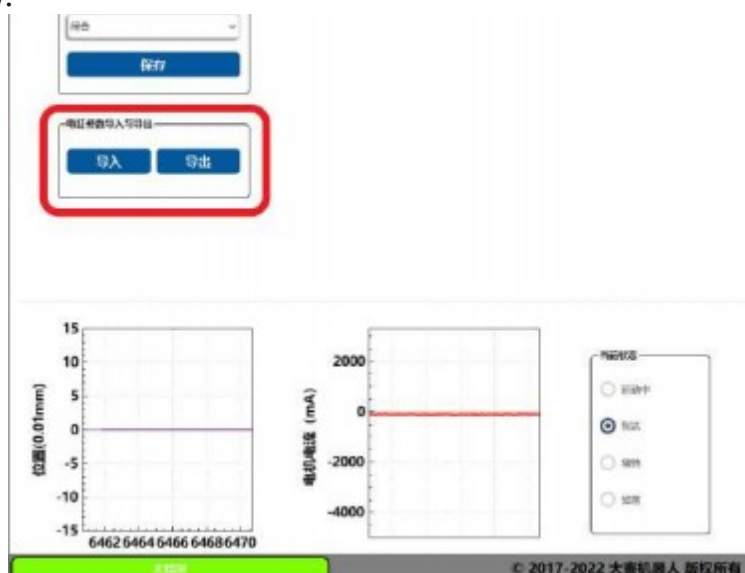Import / export of parameters to quickly set and view the device. As shown in the figure below.

Figure 7.4.5 Parameter import and export interface

Click Export and "YES" to export the parameters of the device, as shown in the figure below. The exported parameters are saved to the software installation directory by default as a Excel table.
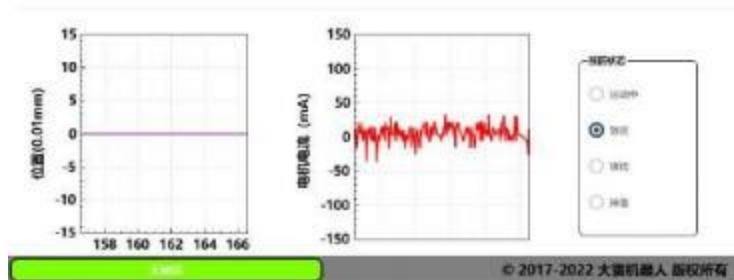
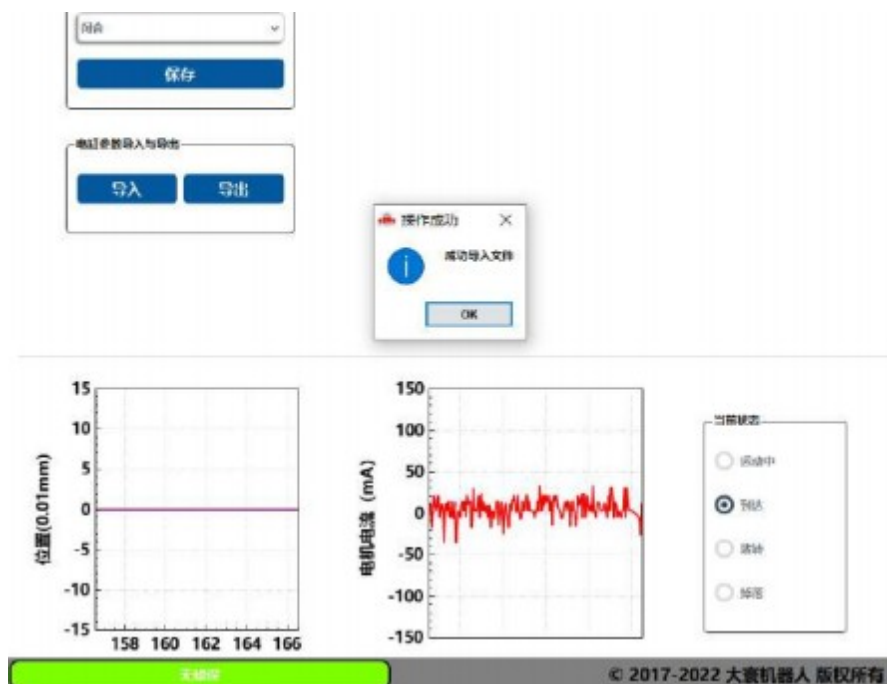Figure 7.4.6 Successfully exported device parameters

Find the software installation directory to see the folder of the date of the export device parameters. The Excel table data of the open folder is the parameter of the device.

The exported Excel table data can be modified and saved to import this Excel table to complete the import of parameters.

7.5, Introduction to the common registers
.5.17 Control (0x 0100)

0x0	原点	0	0,1,2,3,165
0x1	推压力	40	-100~100
0x2	推压行程	0	0~65535
0x3	目标位置	0	0~65535
0x4	速度	100	1~100
0x5	加/减速度	100	1~100
0x6	相对位置	0	-32767~32767
0x7	保留	0	-

explain	Modbus Address (16 Input)	function	remarks
origin	0x0100	Recalibrate the device and return to zero	The SAC-N uniaxial controller controls the electric cylinder back to the original reference 7.6.1
pushing force	0x0101	Set the force value of the device	Unit: Percentage
Push the stroke	0x0102	Set the total length of the push section	Unit: 0.01mm
target location	0x0103	Set the device movement to the specified location	Unit: 0.01mm
velocity	0x0104	Set the maximum speed for the motion segment	Unit: Percentage
Plus / minus speed	0x0105	Set the acceleration and deceleration during movement	Unit: Percentage
relative position	0x0106	Set the positional control relative to the current position	Unit: 0.01mm

.5.27 feedback (0x0200)

0x0	原点状态	1	-
0x1	运动状态	1	-
0x2	当前位置	0	-
0x3	当前速度	0	-
0x4	当前电流	104	-
0x5	错误码	0	-
0x6	力传感器反馈	0	-
0x7	保留	31	-

explain	Modbus Address (16 Input)	function	remarks
Origin state	0x0200	Feedback on the current origin status of the device	0: No return to zero; 1: Successful return to zero; 2: Back to zero.
kinestate	0x0201	Feedback on the current motion state of the device	0: movement; 1: reach position; 2: blocking.
current location	0x0202	Feedback of the device's current location	Feedback the real-time location in 0.01mm.

			information	
The current speed	0x0203	Feedback of the device's current speed information	Feedback on the real-time speed, given in unit mm/s.
Current current	0x0204	Feedback current current information	Feedback the real-time current, in mA.
Error code	0x0205	Feedback on the device's current error message	See Chapter 7 for error details.

7.5.3 User Parameters (0x 0300)

0x0	保存	0	0,1
0x1	回零方向	1	0,1
0x2	从机地址	1	1~247
0x3	波特率	0	0,1,2,3,4,5,6
0x4	停止位	0	0,1
0x5	校验位	0	0,1,2
0x6	行程限制_低	5000	0~65535
0x7	行程限制_高	0	0~65535
0x8	原点偏置	100	-32768~32768
0x9	推压速度	20	1~100
0xa	推压方向	0	0,1,2

explain	Modbus Address (16 Input)	function	remarks
preserve	0x0300	Write to the fl ash action	0: Default, 1: Write all parameters to the flash
Back to zero direction	0x0301	Set the return to the zero direction of the device	0: Forward to zero; 1: Back to zero (default: 1)
From the machine address	0x0302	Set up the Modbus I D of the device	1-247 (default: 1)
Baud rate	0x0303	Set the Modbus-baud rate of the device	0-5 : 115200 , 57600 , 38400 , 19200 , 9600,4800 (default: 0)
stop bit	0x0304	Set the Modbus stop bit for the device	0:1 Stop bits; 1:2 stop bits (default: 0)
check bit	0x0305	Set the Modbus calibration bit of the device	0: no check; 1: odd check; 2: even check (default: 0)
Travel Limits-Low	0x0306	Set up the travel path of the device	Unit: 0.01mm
Origin bias	0x0308	Sets the origin offset trip of the device	Unit: 0.01mm
Push pressure speed	0x0309	Set the push segment speed of the device	Percentage of units

Push the direction	0x030A	Set the push direction of the equipment	0: forward, 1: reverse, 2: two-way

7.5.4 Special Functions (0x 0500)

0x2	停转	0	0,1,2
0x3	清除错误	0	0,1
0x4	上电自动初始化	0	0,1
0x5	控制模式	1	0~65535
0x6	保留	4096	0,1,165
0x7	保留	100	-
0x8	保留	0	0~255
0x9	保留	0	0,1
0xa	系统命令	1	0,1
0xb	目标力	0	0~65535
0xc	Kp	1	0~65535
0xd	Ti	0	0~65535
0xe	Td	0	0~65535
0xf	T	0	0~65535
0x10	规划时间(ms)	0	0~65535
0x11	规划减速度	0	0~65535
0x12	力传感器编号	0	0~65535

explain	Modbus Address (16 Input)	function	remarks
Emergency to open / close	0x0500	Force the device on / off without initialization	0: Default; 1: forced open; 2: forced close
stall	0x0502	The control devices stop turning	0: Default, 1: stop turn
Clear the error	0x0503	Clear the current error message	0: Default, 1: Clear
Power on automatically initialization	0x0504	Set whether the device is powered on and automatically return to zero	0: off, 1: on
Electronic gear ratio molecules	0x0506	Set the electronic gear ratio molecule of the device	
Electronic gear score mother	0x0507	Set the electronic gear generator	

7.5.5 SAC-N Uniaxial Controller (0x 1600)

0x1	推压段宽度（PUSH = 1）无效 （PUSH = 0）	0 —	0~65535
0x2	运动时的最大速度	0	0~65535
0x3	减速度同时设置	0	0~100
0x4	进入推压段后力的限制值	0	0~100
0x5	控制字	2	0~65535
0xc	反馈当前位置信息	0	0~65535
0xd	反馈当前电流信息	0	0~65535
0xe	反馈当前速度信息	0	0~65535
0xf	反馈当前报警信息	0	0~65535
0x10	预留	0	0~65535
0x11	状态字	0	0~65535

| explain	Modbus Address (16 Input)		function	remarks
Positionin g / push, final position	0x1600		Set up, prepare for movement To the specified location	0-65535, in 0.01mm.
Push section width	0x1601		Set the push section width	0x 1605 Bit 121; 0x 1605 Bit 120.
Maximum speed during movement	0x1602		Maximum speed of the device during motion	Unit: 0.01mm / s
The deceleration is set simultaneously	0x1603		Set the increase and decrease speed of the equipment simultaneously	Unit: Percentage
The limit value of the force after entering the push segment	0x1604		The limit value of the force after entering the push segment	Unit: Percentage
Electronic gear score mother	0x0507		Set the electronic gear generator	Unit: Percentage
		Bit 15	Lock control	0: No action; 1: forcibly loose the lock
		Bit 14	Absolute / relative position selection	0: absolute position; 1: incremental position

control word	0x1605	Bit 13	Push the direction	0: forward; 1: reverse
		Bit 12	thrust motion	0: Position motion; 1: Push and pressure motion
		Bit 11	obligate	

control word	0x1605	Bit 10	obligate	
		Bit9	JOG +	0: stop the point moving; 1: forward point moving
		Bit8	JOG -	0: Stop; 1: Reverrreverse
		Bit7	obligate	
		Bit6	obligate	
		Bit5	Motor enabling	0: disability; 1: enable
		Bit4	reset	Rising edge: reset
		Bit3	suspend	0: Normal operation; 1: pause
		Bit2	obligate	
		Bit1	Back to zero	Rising edge: execution back to zero
		Bit0	Locate the logo	Rising edge: perform action
Feedback of the current location information	0x160C		Current location information of the device	Unit: 0.01mm
Feedback the current current information	0x160D		Current current information of the device	unit:mA
Feedback of the current speed information	0x160E		The current speed information of the device	Unit: 0.01mm / s
Feedback of the current alarm information	0x160F		Current alarm information of the device	decimal display
status word	0x1611	Bit 15	Feedback on the emergency stop state	0: Non-emergency stop state; 1: Emergency stop state
		Bit 14	Feedback of the power supply status	0: Not prepared; 1: ready
		Bit 13	obligate	
		Bit 12	obligate	
		Bit 11	obligate	
		Bit 10	Feedback motor enabling state	1: The motor is in the enabling state; 0: The motor is in a disabled state
		Bit9	Feedback of the alarm status	1: Have an alarm status
		Bit8	Feedback of the motion state	1: The motor is in motion
		Bit7	obligate	
		Bit6	Feedback back to the zero state	0: no zero; 1: no zero completed
		Bit5	Feedback is in place state	1: In place

Bit4	obligate	
Bit3	obligate	
Bit2	obligate	
Bit1	obligate	
Bit0	obligate	

7.6 Example of the upper-computer communication control MCE-3GD-01 with the SAC-N uniaxial controller

First, we first find the interface of the SAC-N-N uniaxial controller 0x1600, as shown in Fig.
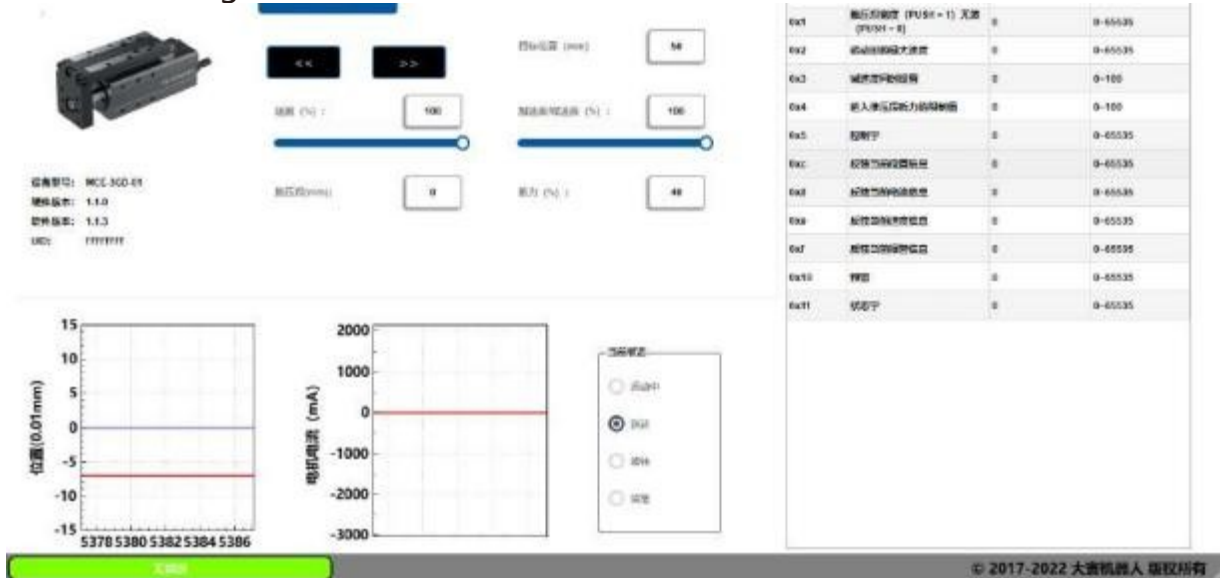
.1Figure 6 interface of SAC-N uniaxial controller 0x1600

7.6.1 Upper computer and SAC-N single-axis controller communication control MCE-3GD-01 back to zero

Back to the Bit 1 bit of 0x1605, the trigger condition is the rising edge trigger, so 0x 1605 of Bit 10 and motor before writing back to the zero command.

1. Before executing the zero command, the Bit 1 of 0x1605 to 0 is 0x00 20, and 0x1605 (control word) of the upper computer is written to 32, as shown in the figure below:
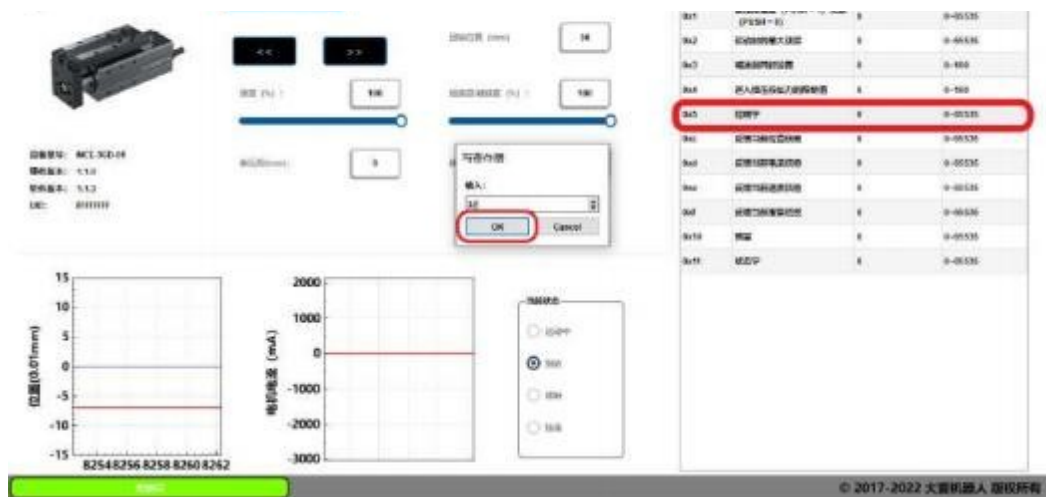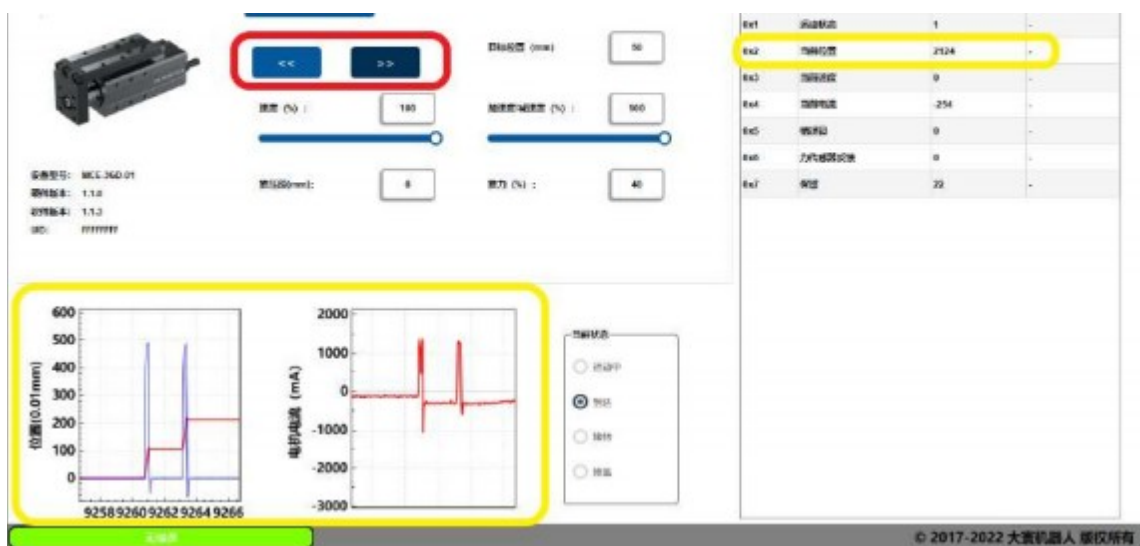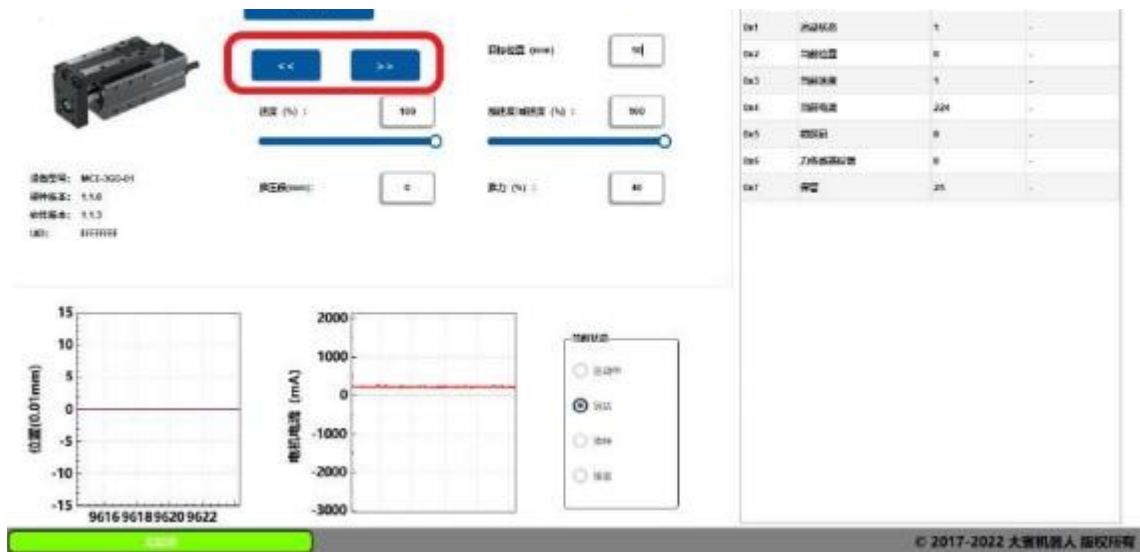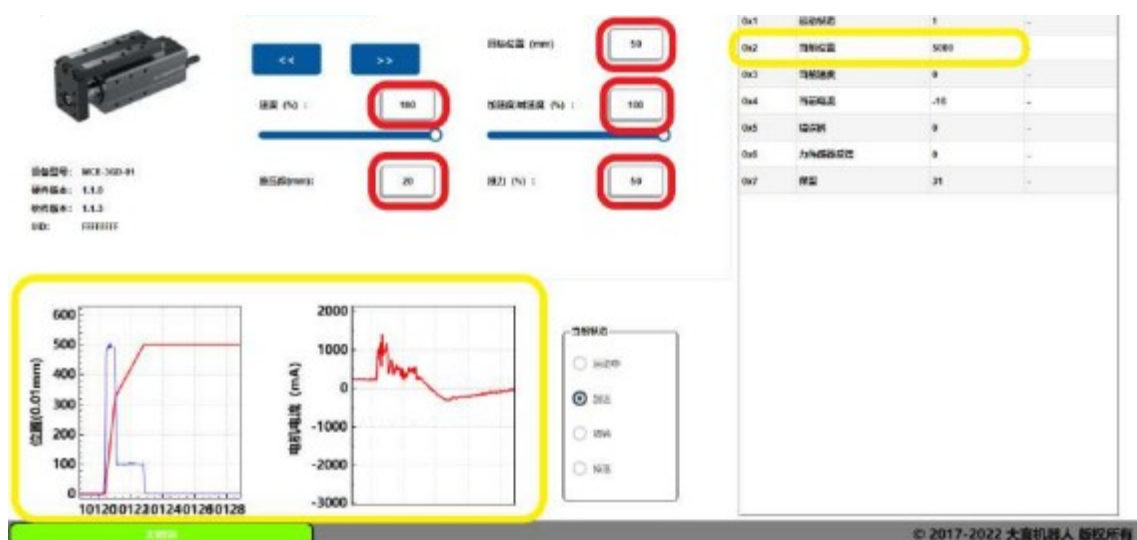
7.6.3 Absolute positioning of MCE-3GD-01 for upper computer communication with SAC-N single axis controller

www.db

7.6.3 Absolute positioning of MCE-3G D-01 for upper computer communication with SAC-N single axis controller

The speed, deceleration, push and thrust can be set in the control interface,

Wechat official account