

## Product Introduction

Rated Voltage:24V

Rated Torque: $\geq 8\text{N.m}$

Encoder:17-bit absolute multi-turn encoder

Driving technology:FOC (Field-Oriented Control) and SVPWM (Space Vector Modulation Technology)


Function:Built-in HMI interface: Equipped with an LCD display, status indicator lights and three physical buttons, parameter Settings and status monitoring can be completed without an upper computer. Comprehensive safety protection: Equipped with over ten diagnostic and protection functions including overvoltage, undervoltage, over-temperature, locked rotor, overload and software limit. Fault traceability: The error buffer can store 16 historical alarm records, which greatly facilitates on-site maintenance and fault detection in the later stage

Communication:CANopen and Modbus RTU (RS485)



## Safety Instructions

<b>⚠ Danger (May cause death or serious injury!)</b>	
Wiring job, be sure to by professional electrical engineer according to the connection diagram installation operation.	Danger of electric shock and fire.
Before wiring , make sure that the power supply is off.	Danger of electric shock and fire.
The ground wire of the integrated actuator and the input terminal of the power must be firmly installed.	Danger of electric shock and fire.
Do not bend , pull or clamp the connecting cable forcibly.	Danger of fire.
When using on the lifting device , please take measures to protect the position of the movable part.	Danger of injury.
Please set up circuit breakers and other safety devices to prevent external circuit short circuit and equipment failure can cut off the power supply in time.	Danger of electric shock and fire.
Do not use it in places with severe vibration and impact.	Danger of fire.
After the driver is powered off, the bus voltage will remain for a period of time. Do not touch the power input terminal within two minutes.	Danger of electric shock and fire.
For the power supply of the integrated actuator, please use the primary and secondary reinforced insulated DC power supply.	Danger of electric shock.
Please cut off the power supply of the integrated actuator during power failure, otherwise the integrated actuator will start suddenly after restoring the power supply.	Danger of injury.
When the integrated actuator is running, please ensure safety before releasing the holding force of the integrated actuator.	Danger of injury.
Do not use the integrated actuator near inflammable, explosive, corrosive environment and places easy to touch water.	Danger of electric shock and fire.
<b>⚠ Warning (May result in injury or damage to objects!)</b>	
The integrated actuator is strictly prohibited from being impacted: If it is impacted, the integrated actuator encoder may be damaged or offset with the magnet position, affecting the accuracy or operation of the actuator.	Risk of equipment failure.
Do not turn the actuator shaft when the integrated actuator power is OFF: If the actuator shaft is turned at more than 400rpm when the electromechanical power is OFF, the integrated actuator may cause drive damage due to regenerative current.	Risk of equipment failure.
When using the integrated actuator, do not exceed its specification value.	Danger of injury and motor fault.
Do not hold the integrated actuator output shaft or cable during handling.	Danger of injury and motor fault.
Please install the protective cover on the rotating part (output shaft) of the integrated actuator.	Danger of injury.
Do not stack obstacles hindering ventilation around the integrated actuator to ensure heat dissipation.	Danger of motor fault.

Do not touch the integrated actuator when it is running or within a short time after it stops running. Please post a warning sign in a conspicuous position.	Danger of scalding.
Please use the integrated actuator according to the specified parameters.	Danger of motor fault and fire.
Please install an emergency stop device or emergency stop circuit outside the integrated actuator to ensure safe shutdown in case of failure or abnormal operation.	Danger of injury.
Please do not touch the shell during insulation resistance measurement or insulation withstand voltage test.	Danger of electric shock.
When the integrated actuator is abnormal, please stop running immediately and cut off the power supply to avoid fire or injury.	Danger of injury and fire.
When using, ensure that the grounding resistance of the system is less than $4\Omega$ . When multiple integrated actuators are used in parallel, the grounding resistance between the ground of each integrated actuator is less than or equal to $0.1\Omega$ . The interface of the master controller and the slave station of the integrated servo actuator should be in common ground, and the grounding resistance should be less than or equal to $0.1\Omega$ . The integrated actuator shell shall be installed on the integrated actuator bracket through the installation hole. The bracket shall be reliably connected to the ground, and the grounding resistance shall be less than or equal to $0.1\Omega$ .	Danger of motor fault.
The power supply of the integrated actuator needs to be connected with a capacitor above $4700\mu\text{F}$ , which is used to absorb the regenerative current generated by the external force and excessive deceleration of the actuator and reduce the peak starting current of the high speed response of the large inertia load. Otherwise, it will cause serious damage of the actuator.	Danger of motor fault.
 <b>Caution</b>	
Do not disassemble or modify the integrated actuator, otherwise it may cause injury. For inspection or repair, please contact mrcmotion, inc.	
When the integrated actuator is scrapped, please disassemble it as far as possible and treat it as industrial waste.	
Before use, please read and fully understand the "Safety Instructions" to use the integrated actuator correctly.	
This product is designed and manufactured for use in general industrial equipment. Don't use it for any other purpose. We hereby state that we will not be liable for any damages caused by ignoring this advice.	

## Summary

### Preface

Thank you for using MAP40 series Position Actuator products of Beijing mrcmotion Control Technology Co., Ltd! Please read this manual carefully before using!

MAP40 series position actuator is a high-performance, low-power positioning product independently developed by our company. This product, with its outstanding closed-loop control system and highly integrated one-piece development concept, integrates servo motors, encoders, drivers and interfaces into one. It adopts bus or manual control and features small size, simple wiring and safe use. We hope that our company's products can offer you more alternative solutions with superior performance, excellent quality and good cost performance, and better help you achieve the expected motion control.

This manual is an explanation of the MAP40 series position actuator, providing information such as motor selection, technical specifications, terminal definitions, and cable wiring. For specific information on the motor's functions and communication protocols, etc., please read the Communication Manual or consult the technical support staff of MAP40.

As our company is committed to the continuous iteration and improvement of our products, if there are any changes to the information provided by us, please refer to the latest version. We will not notify you separately.

## About Manuals and Acquire

- Unauthorized reprinting or copying of all or part of the contents of this manual is prohibited.
- Please understand that the performance, specifications and appearance of the product may be changed without prior notice due to improvements.
- We strive to make the content of this manual as correct as possible. If you find any problems or errors or omissions, please contact mrcmotion, inc.
- This manual is not shipped with the product. To obtain the electronic PDF file, you can obtain it in the following ways:
  - Log in to the official website of mrcmotion, inc. (<https://www.mrcmotion.cn>) , "Member Center - Data download", log in to search keywords and download.
  - Scan the QR code on the product to obtain product related information.

## Contents

1.	Product Inspection and Model Description.....	1
1.1	Unpacking Inspection .....	1
1.2	Product Model.....	1
1.2.1	Naming Rules .....	1
1.2.2	Installation Dimension .....	2
2.	Specifications.....	3
2.1	Technical Specifications.....	3
2.2	Definition of Terminal.....	5
2.2.1	Power Port .....	5
2.2.2	Communication Port.....	6
3.	Install and Connect .....	7
3.1	Installation Precautions .....	7
3.1.1	Installation Places .....	7
3.1.2	Installation Requirements .....	7
3.1.3	Installation Cautions .....	7
3.2	Cable Wiring and grounding Requirement .....	7
3.2.1	Wiring Requirements .....	7
3.2.2	Grounding Requirements.....	8
3.3	Communication Distance.....	9
3.3.1	RS485 Communication.....	9
3.3.2	CAN Communication.....	10
3.4	Other Cable Wiring .....	11
3.4.1	Wiring Diagram of Communication.....	11
3.4.2	Debugging Wiring .....	12
3.4.3	External Control Wiring.....	12
3.4.4	Communication Networking Wiring .....	13
3.4.5	Network wiring requirements .....	13
3.5	Installation Instructions .....	14
3.5.1	Installation dimensions.....	14
3.5.2	Installation Instructions.....	14
4.	Cable Selection .....	15
5.	Display and Button Control .....	17

---

5.1	General .....	17
5.2	LCD Display.....	17
5.3	LED Display.....	18
6.	Functional Description .....	19
6.1	Equipment Control.....	19
6.2	Keypad Input (Button Functions).....	19
6.3	Control mode .....	20
6.3.1	Jog mode.....	20
6.3.1.1	Set jog speed.....	20
6.3.1.2	Set jog mode acceleration and deceleration .....	20
6.3.1.3	Execute jog mode.....	21
6.3.2	Positioning Mode.....	21
6.3.2.1	Set positioning speed .....	21
6.3.2.2	Set positioning mode acceleration and deceleration .....	22
6.3.2.3	Execute positioning mode .....	22
6.4	Menu structure .....	24
6.4.1	Mode(Operating Mode) .....	25
6.4.2	Param Disp(Parameter Display) .....	27
6.4.3	Param Set (Parameter Settings) .....	29
6.4.3.1	Bus.....	31
6.4.3.2	Positioning .....	35
6.4.3.3	Actuator.....	37
6.4.3.4	Limit .....	38
6.4.3.5	Options.....	40
6.4.3.6	Controller .....	43
6.4.3.7	Lang.....	46
6.4.4	Error Buff.....	47
6.4.5	Flowchart of Parameter Setting Func.....	49
7.	Alarm Function.....	50
8.	Daily Inspection and Maintenance .....	52
9.	Warranty Statement.....	53
9.1	<b>Warranty Period</b> .....	53
9.2	<b>Warranty Coverage</b> .....	53

10. Important Usage Instructions..... 54  
Version Change Record ..... 55

## 1. Product Inspection and Model Description

### 1.1 Unpacking Inspection

Please check the following items when unpacking:

- Whether it is the ordered product: Please check that the model and specification on the nameplate of the motor is the same as your order.
- Whether the product is damaged: Visually inspect the appearance for damage or scratches.
- Whether the screws are loose: Whether any screws are not locked or fall off.
- The actuator has a high-magnification reducer: Rotating it by hand may damage the product. Such operation is strictly prohibited.
- In case of any of the above situations, please contact us for proper solution.

Complete operational product components shall be included as follows:

- Integrated actuator.
- Communication cable required.
- Communication interface components required.

### 1.2 Product Model

#### 1.2.1 Naming Rules

<b>FAM P 40 05 D - XXX - R/14 - X - RXX</b>								
①	②	③	④	⑤	⑥	⑦	⑧	⑨
① Product Series: FAM				② Protection category: IP65				
③ Width of motor base: 40-40mm				④ Rated power: 05-50W				
⑤ Performance of encoder: D-17 bit multi-turn absolute value encoder								
⑥ Communication mode: CAN-CANopen, 485-RS485								
⑦ Shaft design/diameter: R/14:clamping ring $\Phi$ 14 mm; K10:keyway, $\Phi$ 10 mm								
⑧ Torque pin: 6:bolt, $\Phi$ 6 mm; 10:bolt, $\Phi$ 10 mm								
⑨ Gear ratio: R64: i=64								

Figure1-1 Naming Rules for MAP Series

1.2.2 Installation Dimension

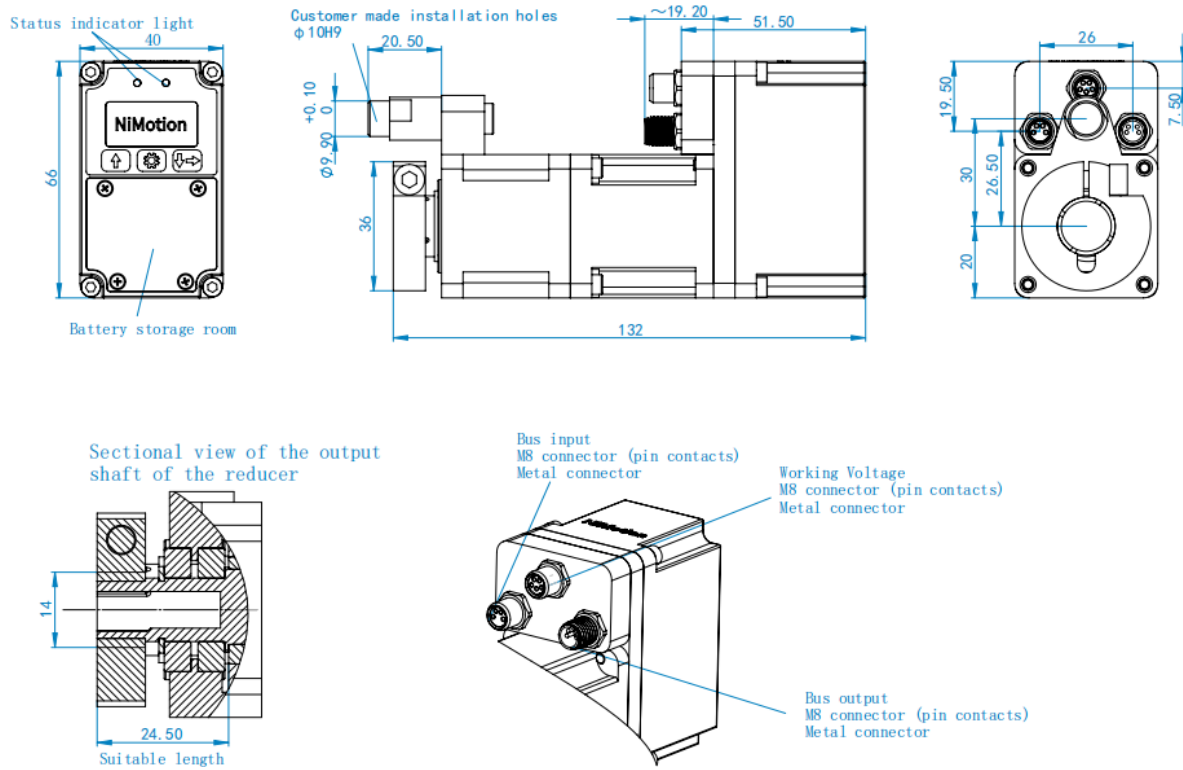


Figure1-2 Product Structure Diagram (Standard Model)

## 2. Specifications

### 2.1 Technical Specifications

Table 2-1 Motor Technical Specification

Model		MAP4005D-CAN-R/14-6-R64	MAP4005D-485-R/14-6-R64
Rated voltage (VDC)		24±10%	
Rated current (A)		3.43	
Rated power (W)		50	
IP rating		IP65	
Rated torque (N · m)/ Rated speed (rpm)		≥8 Nm; Max 47 RPM (Gear ratio i = 64)	
Operating mode		Intermittent operation S3, 25% load duration, cycle: 10 min. (refer to IEC60034-1)	
accuracy	Reducer accuracy	≤0.33°	
	Repeatability accuracy	±0.5°	
Battery	Specification	CR2477, 3V lithium battery, nominal capacity: 1000mAh.	
Standby current		<4uA	
Environment	Temperature(°C)	0~40	
	Humidity (RH)	10%~85%, No condensation	
	Altitude (m)	-300~3000	
	Installation environment	No corrosive gas, inflammable material, oil mist, etc., and no strong vibration	
	Installation method	Horizontal or vertical	
	Storage ambient temperature (°C)	-40~85	
	Pollution level (ppm)	SO2: <0.5; H2S: <0.1	
Driver method		FOC (magnetic field oriented control) technology and SVPWM	
Encoder	Type	Built-in magnetic encoder	
	Resolution	17 bits	
	Characteristics	Multi-circle absolute value count, power down automatic storage	
Communication protocol		CANopen, Modbus RTU(RS485)	

Model		MAP4005D-CAN-R/14-6-R64	MAP4005D-485-R/14-6-R64
Transmission Rate		<ul style="list-style-type: none"> <li>CANopen: 1Mbps,800kbps,500kbps,250kbps,125kbps,100kbps,50kbps,20kbps,10kbps; The default is 1Mbps.</li> <li>Modbus RTU(RS485): 1.5Mbps,1Mbps,500kbps,256kbps,115.2kbps, 57.6kbps, 38.4 kbps,19.2kbps,9.6kbps; The default is 115.2kbps.</li> </ul>	
Features	Fault diagnosis	Overvoltage/Undervoltage/Overtemperature/Hardware failure /Stall/Overload/Overspeed/Initialization failure /Storage failure/Over limit detection/Homing timeout/Track failure/Target position overflow fault, etc.	
	Fault reset	The alarm is self-reset, and the fault is manual reset.	
	Software position limit	The position range is set by the software, and the actuator lock shaft is out of the range and the alarm is raised.	
	Identification of parameters	It has the function of parameter identification and PI parameter self-tuning.	
	Recovery of position	It can be configured for single-turn position value recovery or multi-turn absolute position value recovery.	
	Gain switching	Two groups of gain parameters can be preset, and the two groups of gain can be switched automatically according to different motor operating states.	
	Resonance suppression	Effectively suppress vibration frequency range is greater than or equal to 300Hz.	
	Low frequency suppression	Effectively suppress vibration frequency range is less than or equal to 100Hz.	
	Parameter save and restore	To save and restore the default parameters.	
	Online upgrade	Update in time according to the actual needs of the product to improve maintainability and efficiency.	

## 2.2 Definition of Terminal

### 2.2.1 Power Port

Power port is marked as X1.

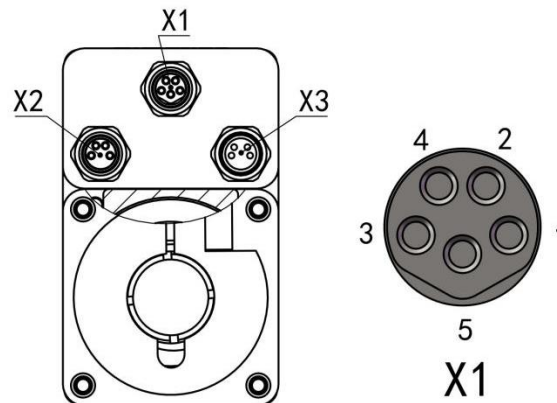


Figure2-1 Power port

Table2-2 Definition of Power Cable Ports

Pin	Function	Note
1	VCC	The two wires needs to connect power at the same time the positive
2		
3	GND	The two cables must be connected to the negative terminal of the power supply at the same time
4		
5	PE	GND

Note: The positive and negative poles of the power cord cannot be connected in reverse, otherwise the motor may be damaged. And the original manufacturer cannot provide warranty service for such damage.

### 2.2.2 Communication Port

CAN-IN/RS485-IN is marked as X2, CAN-OUT/RS485-OUT is marked as X3. The specific pins are defined as follows.

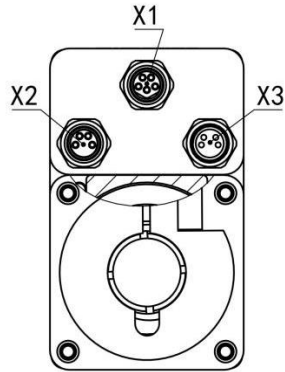


Figure2-2

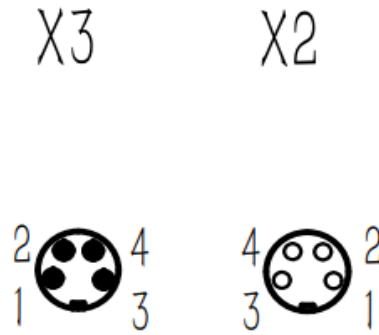


Figure2-3

Table2-3 Definition of Communication Cable Ports(Viewed from butt joint)

Wiring Table(CAN)				Wiring Table(RS485)			
X2 CAN IN		X3 CAN OUT		X2 RS485 IN		X3 RS485 OUT	
1	GND	1	GND	1	GND	1	GND
2	CANL	2	CANL	2	RS485+	2	RS485+
3	CANH	3	CANH	3	RS485-	3	RS485-
4	GND	4	GND	4	GND	4	GND
Shell	PE	Shell	PE	Shell	PE	Shell	PE

## 3. Install and Connect

### 3.1 Installation Precautions

#### 3.1.1 Installation Places

- ① Please install it in the control cabinet without direct sunlight, and do not place flammable materials around it.
- ② Do not use this product in a corrosive environment such as hydrogen sulfide, sulfite, chlorine, ammonia, chlorinated gas, acid, alkali, salt, or in an inflammable gas environment or combustible materials.
- ③ No cutting fluid, oil mist, iron powder, iron filings and other places.
- ④ Well-ventilated, dry and dust-free place.
- ⑤ A place without vibration.
- ⑥ Do not use gasoline, diluent, alcohol, acid and alkaline cleaning agent, so as to avoid the shell discoloring or damage.

#### 3.1.2 Installation Requirements

- ① The installation direction of the integrated motor should be consistent with the direction of the heat sink and the heat dissipation duct of the system to ensure good heat dissipation effect.
- ② The wiring end face of the integrated motor shall reserve at least 30mm space for easy maintenance and operation.
- ③ The integrated motor wiring should be tied at a distance of 30 ~ 40mm from the motor to prevent the loosening of the plug for a long time.
- ④ Before powering the integrated motor, make sure that the communication cables and power cables are connected correctly. If you need to use the IO function, you should connect the corresponding IO cables (Recommend using our company's standard cable).
- ⑤ According to the company's selected communication cable to correctly select the installation network, optional terminal matching head installed in the network terminal position, to achieve signal terminal matching.

#### 3.1.3 Installation Cautions

- ① When connecting with the machine, please use the coupling, and keep the axis of the servo motor and the axis of the machine in a straight line.
- ② Do not make the wire "bend" or exert "tension" on it;
- ③ When connecting the connectors, make sure that there are no foreign objects such as garbage or metal sheets in the connectors.
- ④ When carrying out the operation under the condition of keeping the cable connected, please be sure to hold the main body of the integrated motor. If only catch cables carrying, could damage the connector or cut cables.
- ⑤ If the use of curved cable, should be fully paid attention in the wiring operation, do not apply stress to the connector part. If stress is applied to the connector portion, it may cause connector damage.

### 3.2 Cable Wiring and grounding Requirement

#### 3.2.1 Wiring Requirements

Alternating electromagnetic fields around AC cables, especially in the power supply and integrated motor cables, may interfere with the actuator and other equipment. Please note the following requirements:

① The actuator power cord adopts 16AWG ~ 24AWG twisted-pair copper wire, and the temperature resistance should be greater than or equal to 105°C (the value is the recommended value, please select according to the actual working conditions).

② The communication cable adopts the characteristic impedance of 120Ω, 22AWG ~ 24AWG twisted-pair shielded line, and the temperature resistance should be greater than or equal to 105°C (the value is the recommended value, please select according to the actual working conditions).

③ All kinds of cable wiring should be divided into bundles and slots. Different types of cables should be crossed, and cables should be at right angles to each other.

### 3.2.2 Grounding Requirements

The product adopts common ground design internally, and the power supply, communication cable and IO port are common ground design. In order to make the product correctly grounding, please observe the following precautions:

① In order to prevent electric shock, please be sure to ground the ground terminal. For the method of grounding, please follow the relevant national or regional electrical regulations.

② In order to prevent electric shock, please confirm that the protective grounding conductor conforms to the technical specifications and local safety standards, and minimize the length of the grounding wire.

③ When using multiple devices, follow the instructions for grounding all devices. Improper grounding of the device may cause maloperation of the equipment.

④ The grounding terminal must be reliably grounded, otherwise it will lead to abnormal work or even damage of the equipment.

⑤ Do not share the ground terminal with the neutral wire (N-terminal) of the power supply.

⑥ Protective grounding conductor must use yellow-green copper conductor cable, and cannot be connected with circuit breakers and other switchgear.

⑦ Recommended installation on the conductive metal surface, to ensure that the entire conductive bottom of the equipment and the installation surface is good lap.

#### Common Power Supply Ground

In the communication networking of multiple actuator, if there are multiple power supplies in the system, the power supply should be common ground (common GND, that is, the negative pole of the power supply). The ground resistance of the electrical system involved in Unicom's communication bus is  $< 4\Omega$ .

#### Common Signal Ground

The main controller, communication bus master station and communication converter communication port connected to the communication bus of the actuator shall be isolated by electrical isolation technology, and the ground of the communication ground (RS485\_GND, CAN\_GND) and the communication interface of the actuator shall be common (common GND, namely communication interface GND).

#### Protective Grounding

The actuator shell should be installed to the actuator bracket through the mounting hole, and the bracket should be reliably connected to the ground. The resistance between the integrated actuator shell, the accessible grounding metal shell and the grounding terminal should not exceed 0.1Ω.

### 3.3 Communication Distance

#### 3.3.1 RS485 Communication

RS485 communication transmission medium can choose type A and type B two kinds of wire, A is shielded twisted pair, B is ordinary twisted pair. However, Type A wire is specified in the EN50170 standard, and Type A has a larger extension length than type B, as shown in Table 12.

Table3-1 Communication Distance and Baud Rate

Baud rate (bps)	Bus length (m)	Note
1.5M	100	This parameter is the estimation in the ideal state and is for reference only. The actual application is affected by many factors. Please refer to the actual application
1M	200	
500k	400	
256k	800	
115.2k	1000	
57.6k	1200	
38.4k	1200	
19.2k	1200	
9.6k	1200	

Under the ideal environment (the load RS485 bus device is one, the baud rate is 9600bps, the use of high-quality communication wire) the longest communication distance of RS485 bus theory is about 1200m.

RS485 bus communication distance reduction factors: there are a number of loads RS485 equipment, wire characteristic impedance does not meet the standard, the wire diameter is small, non-quality converter, equipment lightning protection complex and baud rate is too high factor, will shorten the RS485 communication distance.

For how to reduce interference and the impact of communication distance reduction: Both to increase the transmission distance, but also to ensure the stability of the transmission signal. It is usually necessary to stay away from interference sources (large mechanical equipment) as far as possible, increase shielding measures, increase repeaters, reduce the transmission rate (baud rate), and use high-quality communication cables and converters and so on.

### 3.3.2 CAN Communication

Table3-2\_ Communication Distance and Baud Rate

Baud rate (bit/s)	Bus length (m)	Note
1M	25	This parameter is the estimation in the ideal state and is for reference only. The actual application is affected by many factors. Please refer to the actual application
800k	50	
500k	100	
250k	250	
125k	500	
50k	1000	
20k	2500	
10k	5000	

The above tabulated data are the parameters in the ideal state. In practical application, when the distance of the wire to transmit the signal is too long, the signal will be distorted due to environmental problems (such as electromagnetic, electric field interference) and the characteristic impedance of the wire itself.

How to optimize the communication distance of the CAN bus: reduce the length of the branch, add appropriate matching resistance to the long branch, use shielded cables and correct grounding, reduce the number of CAN bus nodes, reduce the transmission rate (baud rate), increase the CAN repeater or hub, etc.

3.4 Other Cable Wiring

3.4.1 Wiring Diagram of Communication

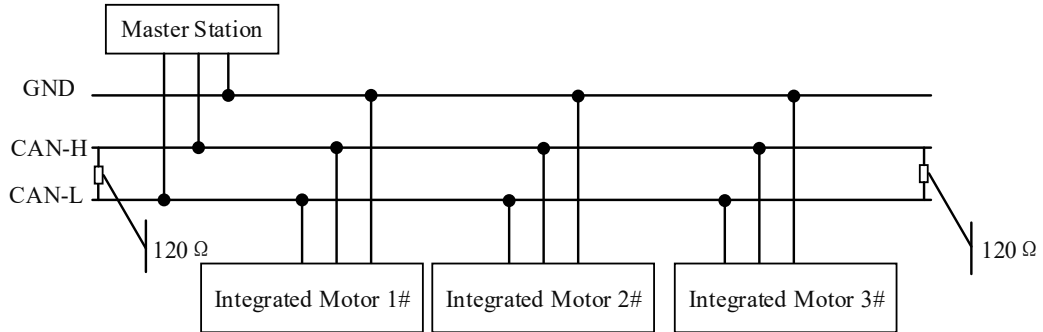


Figure3-1 Wiring Diagram of CANopen Communication

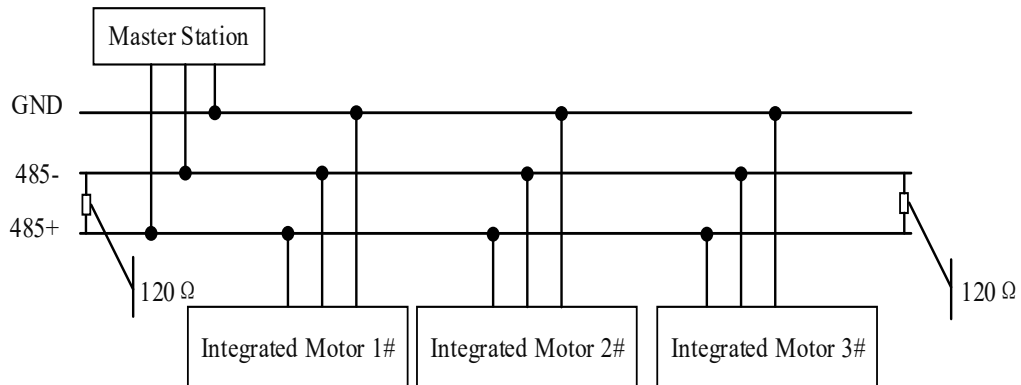


Figure3-2 Wiring Diagram of RS485 Communication

### 3.4.2 Debugging Wiring

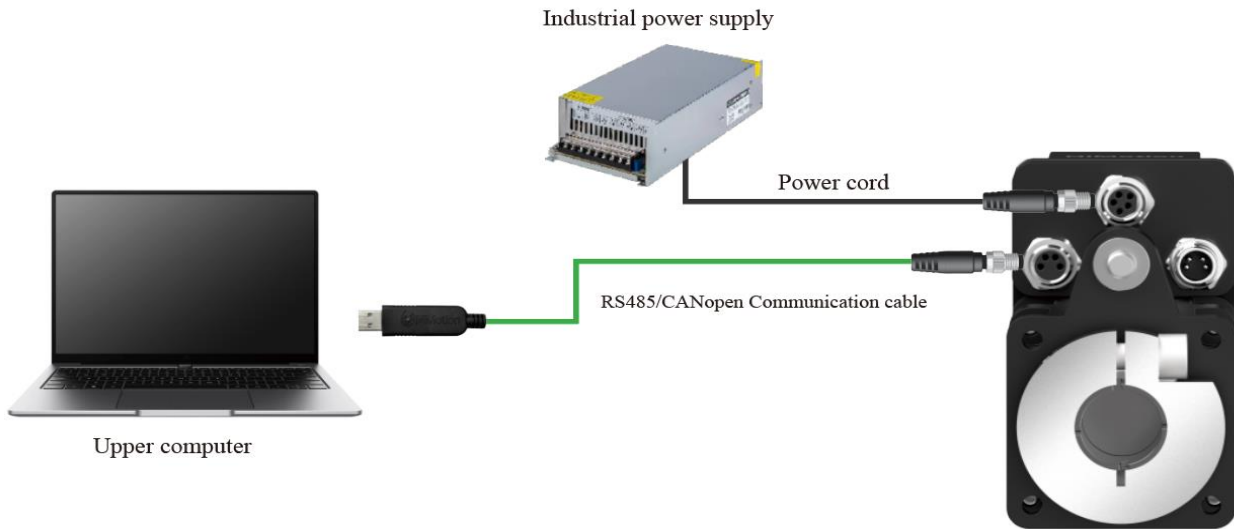


Figure3-3 Debugging wiring connection

### 3.4.3 External Control Wiring

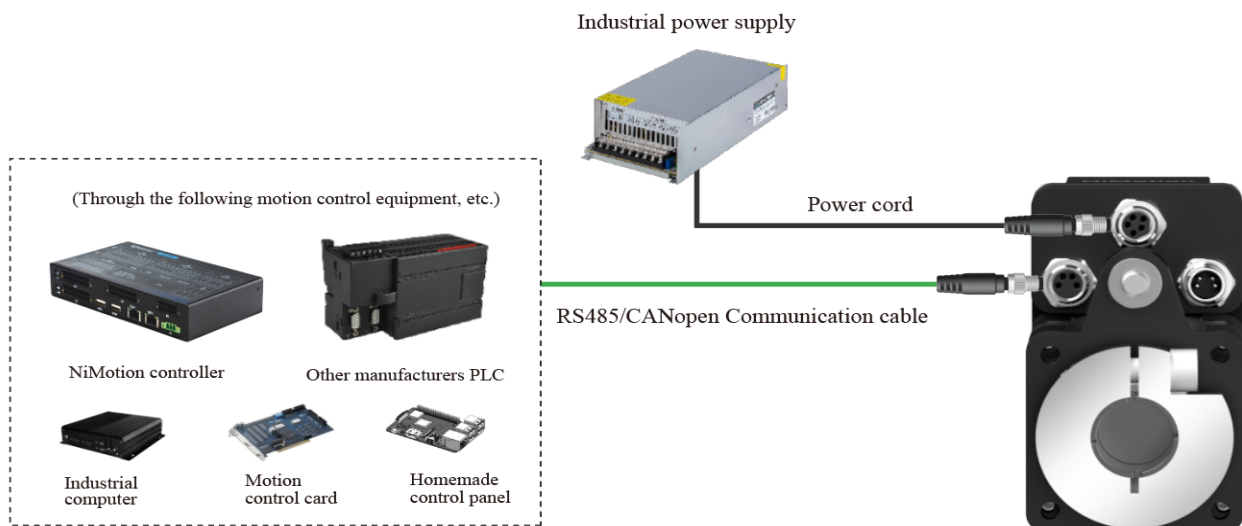


Figure3-4 External control wiring connection (Control via communication bus)

### 3.4.4 Communication Networking Wiring

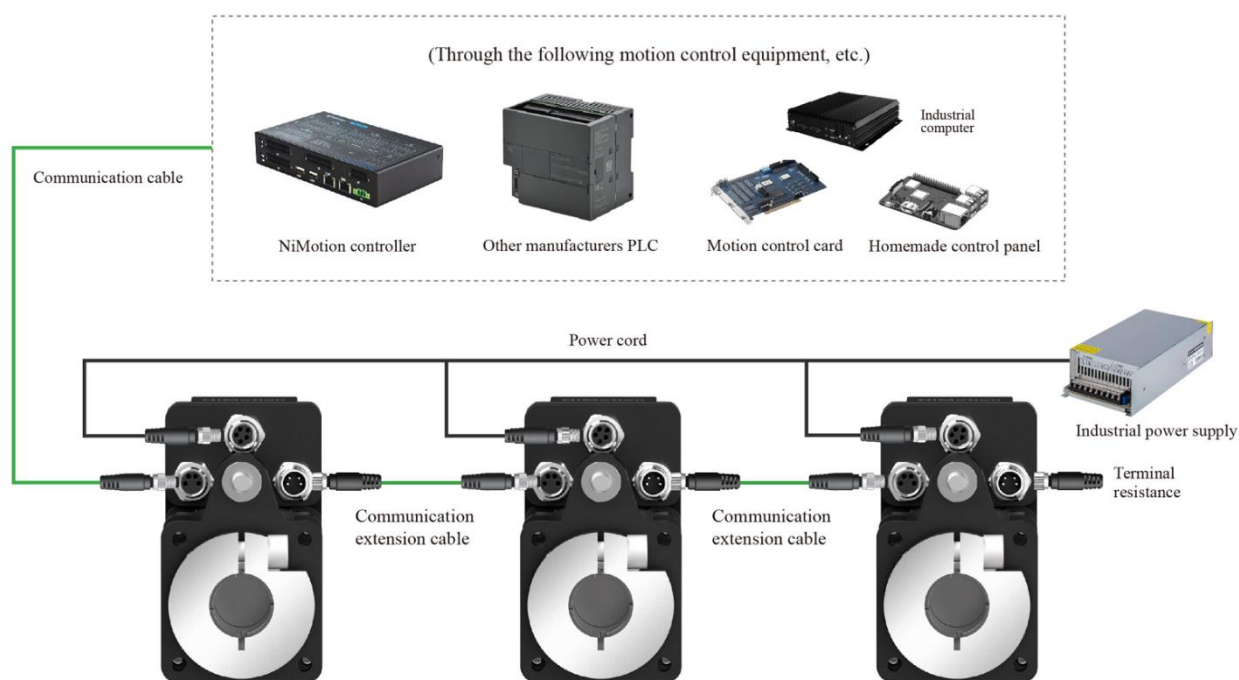


Figure3-5 Network topology (CANopen&RS485)

### 3.4.5 Network wiring requirements

#### a. RS485 networking requirements

- ① RS485 can use a variety of types of media for transmission, but should use in accordance with the "GBT 19582.2-2008 Modbus protocol implementation guide on serial links" standard cable.
- ② RS485 bus please be sure to use Daisy chain connection, all nodes RS485 signal reference connected together.
- ③ The terminal matching resistor must be configured at the end of the cable to prevent RS485 signal from reflection.
- ④ The node branch should be as short as possible: long branches cause obvious characteristic impedance mismatch, and then cause signal reflection, so the branch should be ensured as short as possible, generally not more than 30cm.
- ⑤ The number of bus nodes: depends on the actual application conditions and transmission media hardware characteristics.

#### b. CAN networking requirements

- ① Cables shall be connected in accordance with GBT 41588.3-2022 Road Vehicle Controller LAN (CAN) Part 3: Low-Speed Fault-tolerant, media-related Interfaces.
- ② The CAN bus please be sure to use Daisy chain connection, and the reference ground of CAN signal of all nodes is connected together.
- ③ The terminal matching resistor must be configured at the end of the cable to prevent CAN signal reflection.
- ④ The length of the branch node should not be too long, generally not more than 30cm.
- ⑤ The number of bus nodes: depends on the actual application conditions and transmission media hardware characteristics.

## 3.5 Installation Instructions

### 3.5.1 Installation dimensions

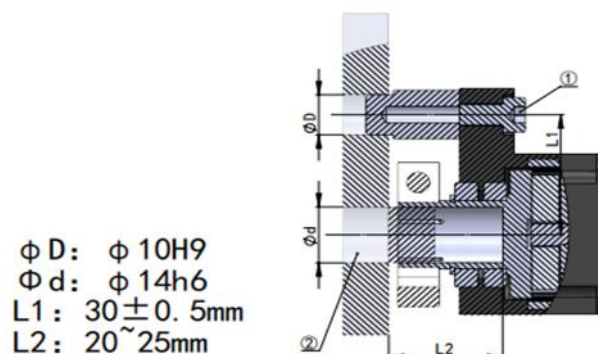


Figure 3-6 Installation dimension drawing

### 3.5.2 Installation Instructions

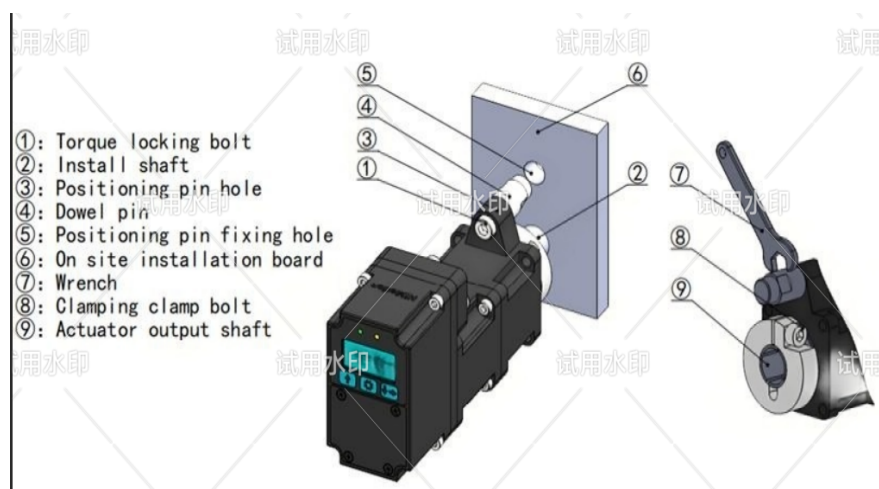


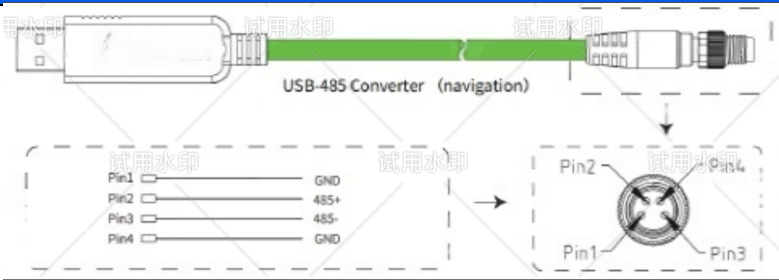
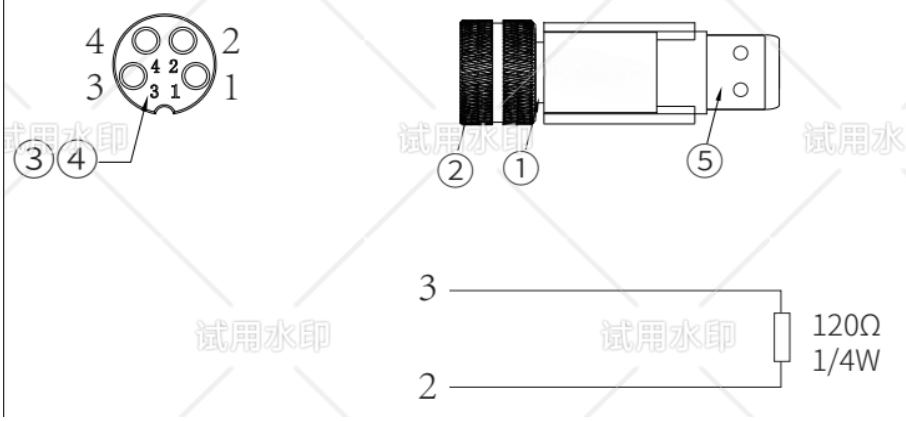
Figure 3-7 Product installation dimensions

- A. Drill M6 screw holes ⑤ on the fixed plate at the actuator position of the installation position, and use ⑦ wrench to lock the locating pin ④ onto the fixed plate ⑤.
- B. Loosen the clamping clamp bolt ⑧ on the output shaft ⑨ of the actuator of the reducer.
- C. Align the actuator output shaft ⑨ of the reducer with the installation shaft ②. Align the locating pin hole ③ with the locating pin ④. Install the position actuator in conjunction.
- D. After adjusting the position actuator to be appropriate, tighten the torque lock bolt ① and the clamp bolt ⑧.

## 4. Cable Selection

Table 4-1 Cable Selection

MAPseries integrated XX motor cable selection table																
Cable type	Cable appearance															
Power cord VDDX011P	<p>Line Color</p> <ul style="list-style-type: none"> <li>1 White brown VCC</li> <li>2 Blue Black GND</li> <li>3 Blue Black GND</li> <li>4 Grey PE</li> </ul>															
Communication cable VDCX008P/ VDCX009P	<table border="1"> <thead> <tr> <th>Serial number</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Colour</td> <td>White orange</td> <td>White blue</td> <td>Blue</td> <td>Orange</td> </tr> <tr> <td>Definition</td> <td>GND</td> <td>CANL/RS485+</td> <td>CANH/RS485-</td> <td>GND</td> </tr> </tbody> </table>	Serial number	1	2	3	4	Colour	White orange	White blue	Blue	Orange	Definition	GND	CANL/RS485+	CANH/RS485-	GND
Serial number	1	2	3	4												
Colour	White orange	White blue	Blue	Orange												
Definition	GND	CANL/RS485+	CANH/RS485-	GND												
Communication extension cable VDCX010P																
Communication converter SCM-USBCANI-L-LP	<p>USB-CAN Converter (navigation)</p> <ul style="list-style-type: none"> <li>Pin1 GND</li> <li>Pin2 CAN-L</li> <li>Pin3 CAN-H</li> <li>Pin4 GND</li> </ul>															

MAPseries integrated XX motor cable selection table	
Cable type	Cable appearance
Communication converter SCM-USB485A-L-LP	
Terminal resistance STRX001-120	

1. Communication converter: Used for RS485/CANopen communication, the integrated servo motor is connected to the computer for parameter setting and debugging.

2. Power cord: Used to introduce power to the integrated servo motor.

3. Communication cable: Used for RS485/CANopen integrated servo motor communication.

4. Communication extension cable: Used to extend the communication cable according to the actual application condition.

5. Terminal resistance: Used to connect at the end of the communication bus lines, improve the anti-interference ability.

## 5. Display and Button Control


### 5.1 General

The positioner is equipped with a display screen, two indicator lights, and three tactile control buttons. These three buttons are used for parameter setting and menu navigation. The two indicator lights-Green (RUN) and Yellow (COM) - display the operating status of the positioner.



Figure 5-1 Operation and Control Interface

### 5.2 LCD Display

After the motor is powered on, the screen will briefly display the mrcmotion interface and then enter the positioner's main operation interface, where the first row of data indicates the Actual Position value of the positioner, and the second row displays the Target Position value (with the initial default being the factory setting upon first startup). On the left side of the screen, position guidance arrows  are provided, which will disappear when the absolute difference between the Actual Position and the Target Position falls within the positioning window.

Press and hold the button for 3 seconds to access the menu interface. The screen displays three lines of content at a time, which can be scrolled through cyclically using the button.

- ① In the menu selection interface, all three lines display the names of submenu items belonging to the current menu.
- ② In the parameter setting interface, the first line displays the Chinese name of the parameter, while the second line shows its configurable value, which can be adjusted using the buttons.
- ③ In the parameter display interface, the first line shows the parameter's Chinese name, while the second line displays the parameter value.

**5.3 LED Display**

Table5-1 Meaning of Indicator

Meaning	Green light (RUN)	Yellow light (COM)
The actuator power supply is normal, with no warnings and no faults.	Steady light	Light flashes slowly (1s flashing frequency)
A warning is present in the actuator.	Steady light	Light flashes slowly (0.5s flashing frequency)
A warning is present in the actuator.	Steady light	Light flashes slowly (0.25s flashing frequency)
The actuator power supply is abnormal.	Light off	Light off

## 6. Functional Description

### 6.1 Equipment Control

The positioner supports two control modes: Jog Mode and Positioning Mode. Motor-related parameters can be configured via the screen and buttons. The default mode upon power-up is Jog Mode. To switch to Positioning Mode, press and hold the button. The operating speed, acceleration, and deceleration for both modes can be modified under the "Operation Mode" settings. Note that jog control must be enabled before use (factory default: enabled). The option to enable or disable the jog function is located in the "Options" menu under "Parameter Settings".

### 6.2 Keypad Input (Button Functions)



Up Arrow Key: Navigates upward through menu items; adjusts values.



Bottom-Right Direction Key: Navigates downward through menu items, selects digits during parameter adjustment, and returns to the main menu interface.



Enter Key: Confirms selections and accesses menu options.

① During menu navigation, the Up Arrow Key cycles upward through menu options, while the Bottom-Right Direction Key cycles downward. Press the Enter Key to confirm and access the selected menu item. The last entry in each menu level is the "Return" option for going back to the previous level.

② During data configuration, the Bottom-Right Direction Key is used to select the digit to be modified (taking the initial value "00000" as an example: the cursor initially positions at the 1st digit from left to right. Each press of the Bottom-Right Direction Key moves the cursor sequentially to the next digit). When the cursor is positioned on a specific digit, press the Up Arrow Key to adjust its value cyclically from 0 to 9. After configuring all digits to the desired values using this method, press the Enter Key to save the settings.

③ For parameters that support direct keypad configuration, use the Up Arrow Key to cycle upward through available values or the Bottom-Right Direction Key to cycle downward. Once the cursor rests on the desired value, press the Enter Key to confirm the setting. The system will then automatically return to the previous menu level.

④ Press and hold the Enter Key for 3 seconds to return to the Position Information Display interface.

⑤ If no button is pressed for 30 seconds, the screen automatically returns to the positioner's main operation interface, displaying both the actual and target positions.

## 6.3 Control mode

After power-on, the screen briefly displays "mrcmotion" and then enters the main working interface of the position actuator (showing the actual position and target position of the actuator). Press and hold the "Confirm Key" for three seconds on this interface to enter the main menu interface. The control mode is divided into jog mode and positioning mode. After power-on, it defaults to jog mode. You can press and hold the button on the top position actuator. Start the Confirm Key and the right lower movement key. Release the button, the motor stops immediately.

Positioning mode: Long press the confirmation key and the right lower direction key to enter the setting position interface. Click the confirmation key, and the motor will run at the positioning speed to the set target position and then stop.

Configure jog mode and positioning mode related parameters under the first item 'Mode' in the main menu.




### 6.3.1 Jog mode

#### 6.3.1.1 Set jog speed

Take setting the jog speed to 500 rpm as an example.

Prerequisites for setting jog speed:

- Adjust the display interface to the jog speed setting screen(Path:Mode->Jog Speed->Jog Speed)

Jog Speed 0000	Initial state: When entering the jog speed interface, the cursor stays on the first position (counting from left to right).
Jog Speed 0000	Press  Once, Can make the cursor the second position (counting from left to right).
Jog Speed 0500	Press  Five times, You can adjust the jog speed setting to 500. Press  Setup Complete, And return to the previous menu




#### 6.3.1.2 Set jog mode acceleration and deceleration

Take setting the jog mode with acceleration and deceleration at 1000 rpm/s as an example.

Prerequisites for setting the start/stop mode acceleration and deceleration:

- Adjust the display interface to the acceleration/deceleration settings interface (Path: Mode->Accel&Decel->Accel&Decel)

Accel&Decel 00000	Initial state: When entering the jog speed interface, the cursor stays on the first position (counting from left to right).
----------------------	---

<p>Accel&amp;Decel</p> <p>00000</p>	<p>Press  Once, Can make the cursor the second position (counting from left to right).</p>
<p>Accel&amp;Decel</p> <p>01000</p>	<p>Press  Once, You can adjust the acceleration and deceleration settings up to 1000.</p> <p>Press  Setup Complete, And return to the previous menu.</p>

After setting and saving the jog speed and acceleration/deceleration, there is no need to set them again. You can directly control the actuator to operate in jog mode using the buttons

### 6.3.1.3 Execute jog mode

Press  Once, The motor will jog one increment in the forward/reverse direction.

Press  Once, The motor will jog one increment in the forward/reverse direction.

Note:

The unit of jog increment is related to the spindle pitch. When the spindle pitch is 0, the jog increment is in encoder units u. When the spindle pitch is greater than 0, the unit of the jog increment is mm.

The rotation direction in jog mode can be modified (Path: Param Set -> Positioning -> Rotation Dir -> Clockwise/Counterclockwise).



## 6.3.2 Positioning Mode


### 6.3.2.1 Set positioning speed

For example, set a positioning speed of 500 rpm.

Prerequisites for setting the positioning speed:

- Adjust the display interface to the positioning speed settings screen (Path: Mode -> Prof Speed -> Prof Speed)

<p>Prof Speed</p> <p>0000</p>	<p>Initial state: When entering the jog speed interface, the cursor stays on the first position (counting from left to right).</p>
<p>Prof Speed</p> <p>0000</p>	<p>Press  Once, Can make the cursor the second position (counting from left to right).</p>
<p>Prof Speed</p>	<p>Press  Five times, Adjust the positioning speed to 500 rpm.</p>




0500	Press  Setup Complete, And return to the previous menu.
------	--

### 6.3.2.2 Set positioning mode acceleration and deceleration

Take setting the positioning mode acceleration and deceleration to 1000 rpm/s as an example.

Prerequisites for setting the positioning mode acceleration and deceleration:



- Adjust the display interface to the acceleration/deceleration settings screen (Path: Mode->Accel&Decel->Accel&Decel)




Accel&Decel 00000	Initial state: When entering the jog speed interface, the cursor stays on the first position (counting from left to right).
Accel&Decel 00000	Press  Once, Can make the cursor the second position (counting from left to right).
Accel&Decel 01000	Press  Once, You can adjust the acceleration and deceleration settings up to 1000. Press  Setup Complete, And return to the previous menu.

- After setting and saving the positioning speed and acceleration/deceleration, there is no need to set them again. You can directly control the actuator to operate in positioning mode using the buttons.

### 6.3.2.3 Execute positioning mode

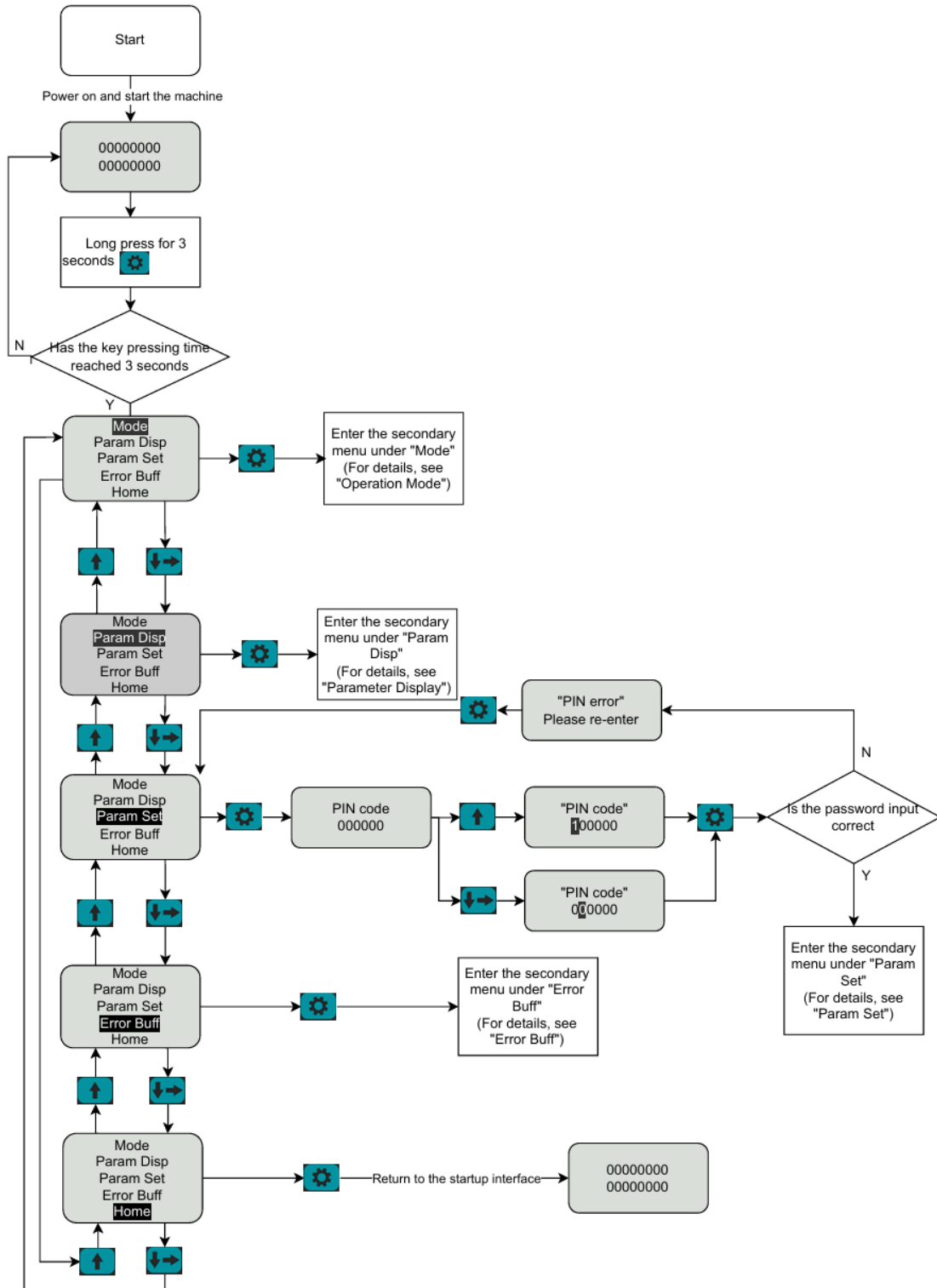
Take setting a position of 50,000 as an example.

Long press , And press and hold  3s, the actuator will enter the position setting interface in positioning mode

Set Pos 000000000	Initial state: When entering the set positioning mode interface, the cursor stays on the first position (counting from left to right).
Set Pos 000000000	Press  Five times, can move the cursor to the sixth position (counting from left to right).
Set Pos 000005000	Press  Five times, you can adjust the acceleration and deceleration settings to 50000. Press  Setup Complete, the motor stops after reaching the set target position. During operation, pressing any one of the three buttons will stop the

	actuator.
--	-----------

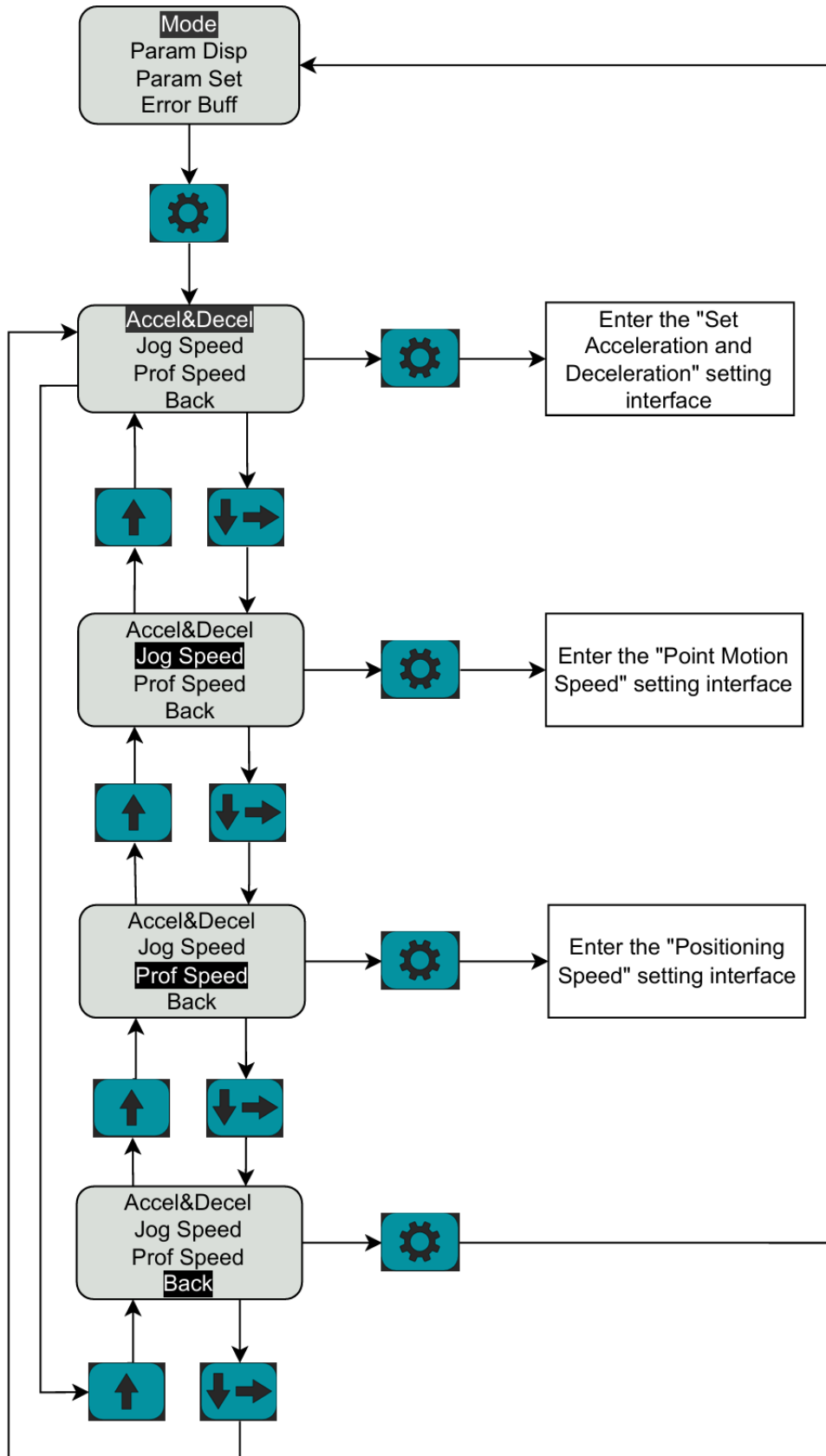
6.4 Menu structure



## 6.4.1 Mode(Operating Mode)

Main Menu	Submenu	Description
Mode	Accel&Decel	Set the acceleration and deceleration for jog mode/positioning mode
	Jog Speed	Set jog mode speed
	Prof Speed	Set the speed of the positioning mode
	Back	Return to Main Menu

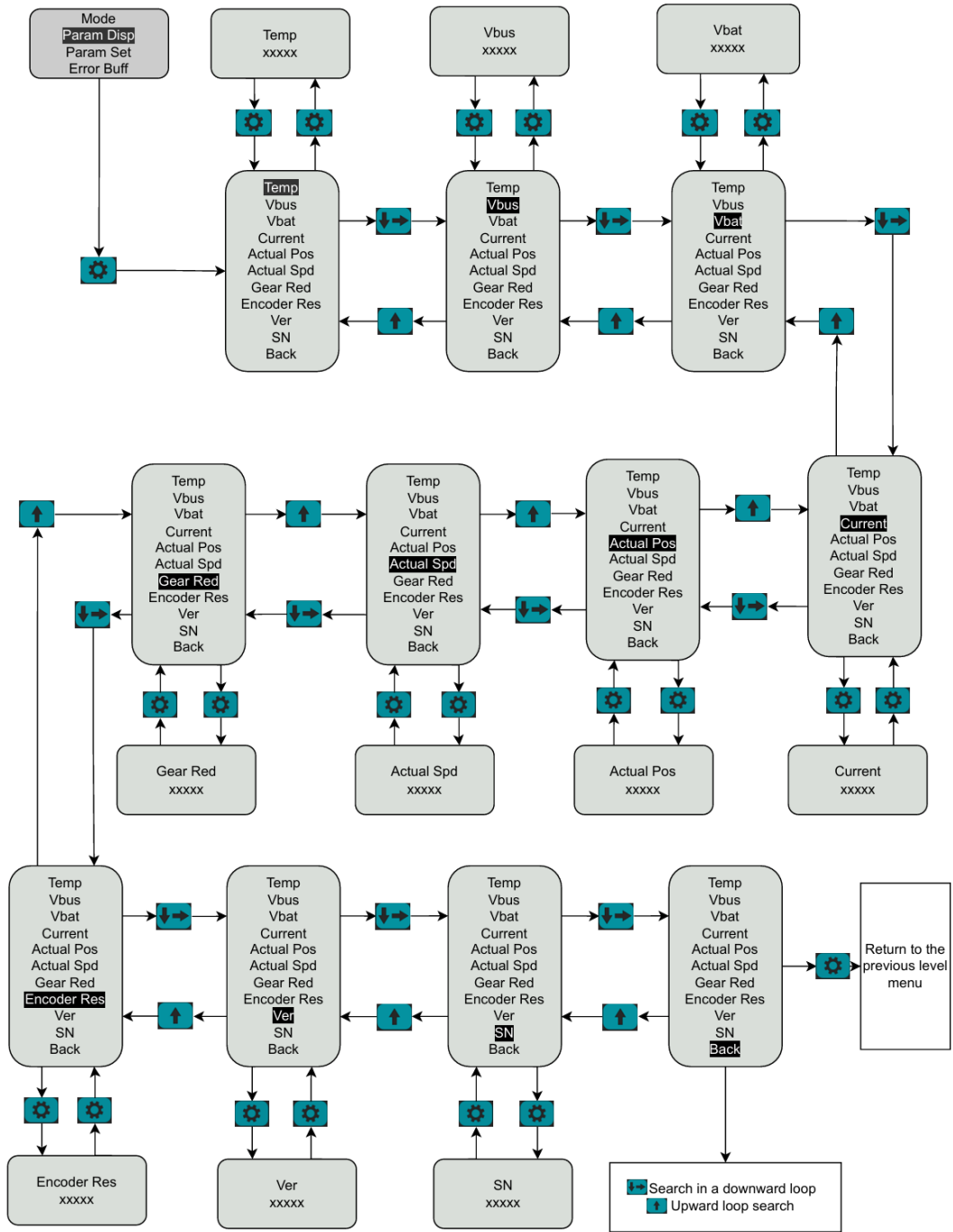
Flowchart of the Operation Process:



### 6.4.2 Param Disp(Parameter Display)

Menu	Param Disp
Temp	Monitor the current temperature of the device, unit: 1°C
Vbus	Power supply voltage of the monitoring equipment, unit: V
Vbat	Monitor the battery voltage of the multi-turn encoder, unit: V
Current	Current of the motor, unit: A
Actual Pos	Monitor the current actual position of the actuator, unit: mm or encoder unit u
Actual Spd	Monitor the motor's current actual operating speed, unit: rpm
Gear Red	Monitor the ratio of the motor shaft speed to the drive shaft speed of the current device
Encoder Res	This object should indicate the configured encoder increments and motor rotation counts
Ver	Device Software Version
SN	Device Serial Number

Operational Flow Diagram:

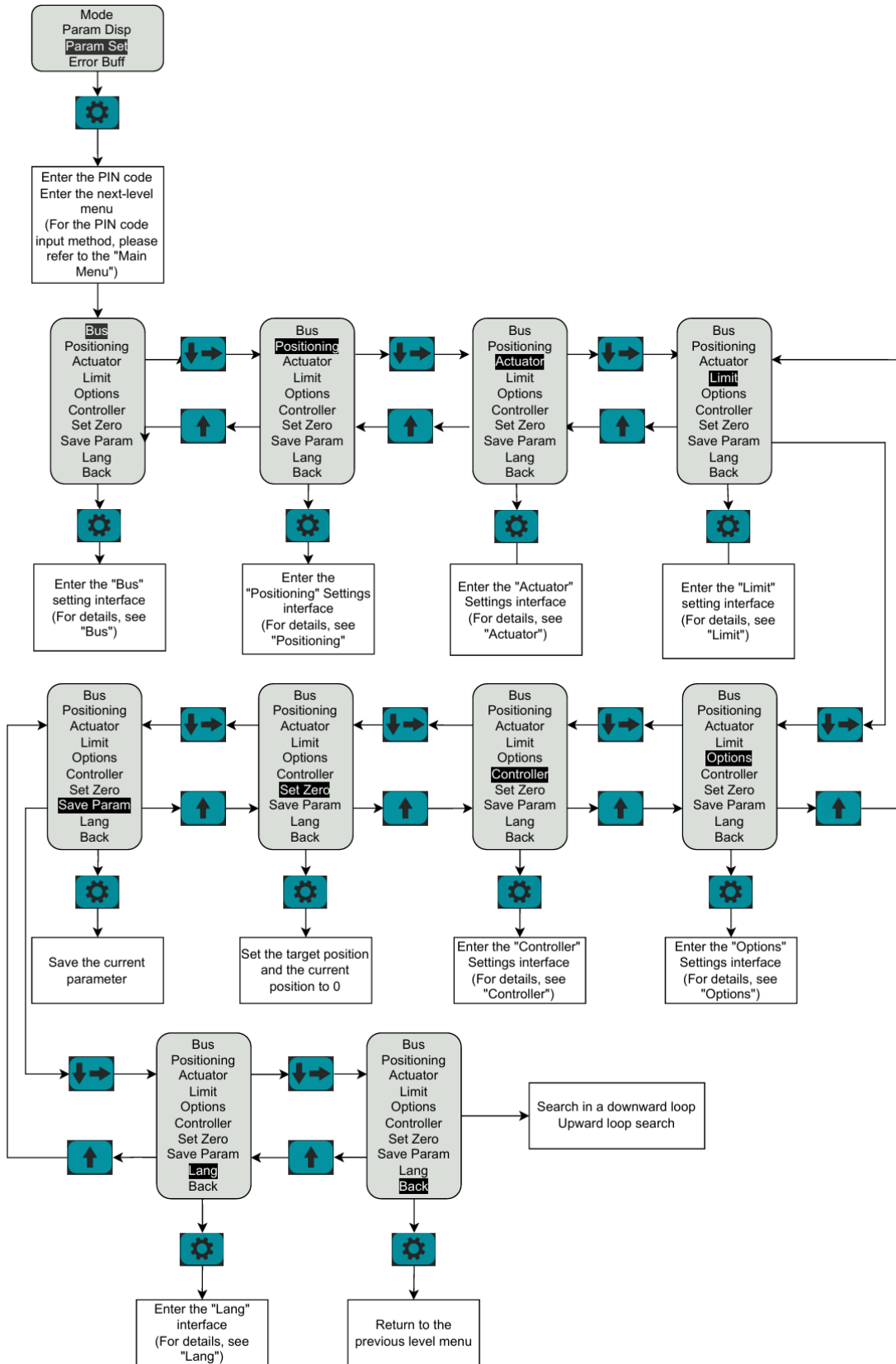


### 6.4.3 Param Set (Parameter Settings)

The 'Param Set' menu is divided into several submenus:

Menu	Submenu	Description
Param Set	Bus	Set the bus parameters, see 6.4.3.1 for details.
	Positioning	Set location-related parameters, see 6.4.3.2 for details.
	Actuator	Set the drive-related parameters, see 6.4.3.3 for details.
	Limit	Set the related restriction parameters; for details, see 6.4.3.4.
	Options	Set the option-related parameters, see section 6.4.3.5 for details.
	Controller	Set the controller-related parameters; for details, see 6.4.3.6.
	Set Zero	Set the target position and current position to 0.
	Save Param	Save current settings.
	Lang	Set the display screen language. For details, see 6.4.3.7.
	Back	Return to the previous menu.

Operation Flow Diagram:

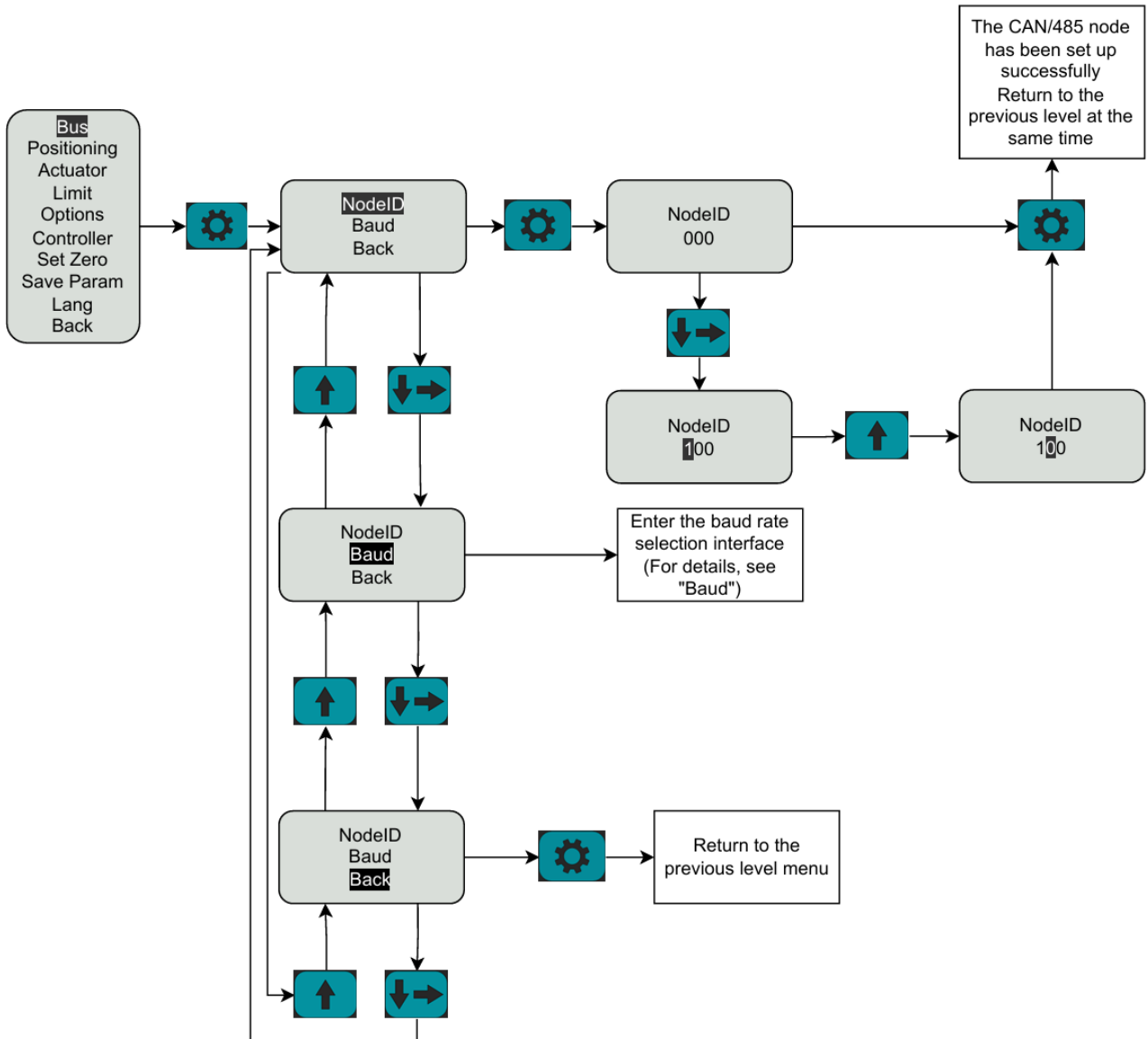


## 6.4.3.1 Bus

Menu	Param Set	Submenu	Bus
Parameter	Description		
NodeID(CANopen communication)	Node Address Range of values: 1-127 Factory Settings: 1		
Baud(CANopen communication)	Baud Rate Selection: 125kbps 250kbps 500kbps 800kbps 1Mbps Factory Settings: 1Mbps		
NodeID(RS485 communication)	Node Address Range of values: 1-247 Factory Settings: 1		
Baud(RS485 communication)	Baud Rate Selection: 19.2k bit/s 38.4k bit/s 57.6k bit/s 115.2k bit/s 256k bit/s 500k bit/s 1M bit/s Factory Settings: 115.2k bit/s		
Back	Return to the previous menu		

Operation Flow Diagram:

① CAN/485 Node Address Setting



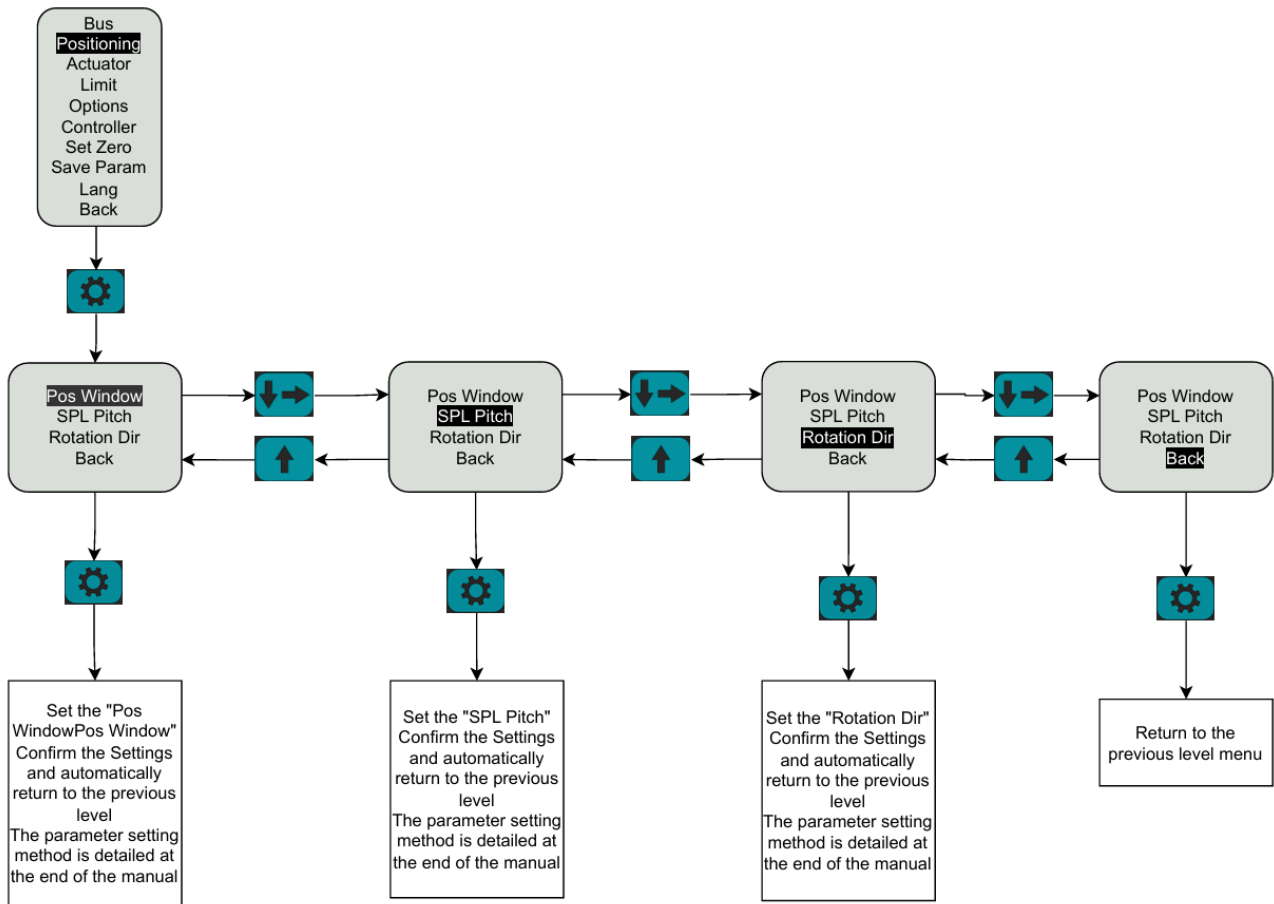




## 6.4.3.2 Positioning

Menu	Param Set	Submenu	Positioning
Parameter	Description		
Pos Window	Range value of the actuator target position (unit: encoder units u) Data Range:0-9999 Factory Settings: 10		
SPL Pitch	SPL Pitch Spindle pitch parameter = 0:Position values are output in jog increments. Spindle pitch parameter > 0: (When operating the actuator on the spindle) position values are re output as movement distances in 1/100 mm increments, rather than as incremental outputs. The input for the target position is now also in 1/100 mm. For example, a spindle with a 2 mm pitch — spindle pitch parameter = 200. Unit: mm Data range: 0-999 Factory setting: 0		
Rotation Dir	Rotation Dir Clockwise Counterclockwise Factory default: clockwise (needs to be saved and power cycled after setting)		
Back	Return to the previous menu		

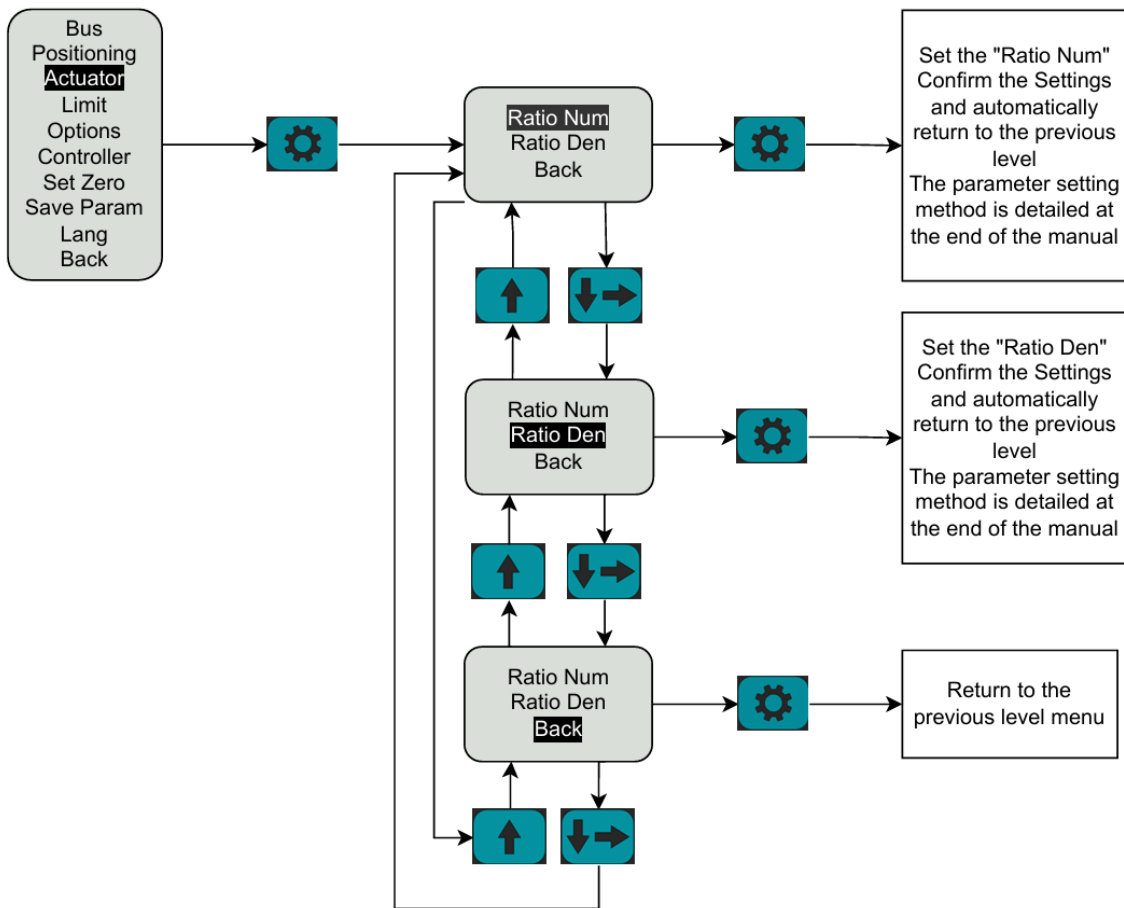
Operation Flow Diagram:



6.4.3.3 Actuator

Menu	Param Set	Submenu	Actuator
Parameter			
Ratio Num		Number of rotations of the motor shaft Data Range:0-4294967295 Factory settings:64	
Ratio Den		Number of rotations of the drive shaft Data Range:0-4294967295 Factory settings:1	
Back		Return to the previous menu	

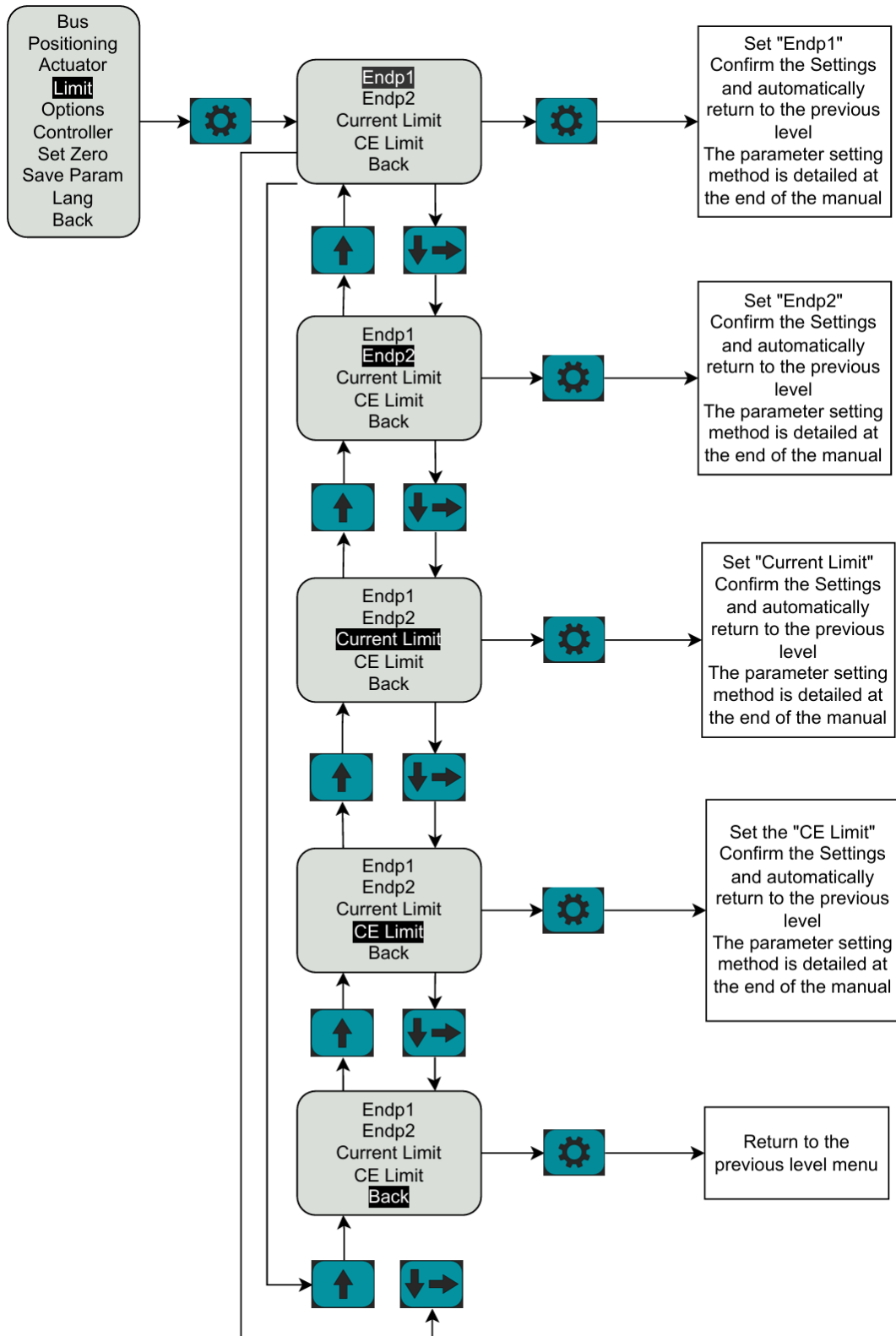
Operation Flow Diagram:



## 6.4.3.4 Limit

Menu	Param Set	Submenu	Limit
Parameter	Description		
Endp1	Minimum software absolute position limit Spindle pitch = 0, the value is the jog increment, unit: encoder units (u) Spindle pitch > 0, the value is the increment travel distance in 1/100 mm. Unit: mm Data range: -2147483648~2147483647 Factory setting: -2147483628 Note: If Software Limit 1 = Software Limit 2, the software limit is disabled.		
Endp2	Maximum Software Absolute Position Limit Spindle pitch = 0, the value is the jog increment, unit: encoder unit u Spindle pitch > 0, the value is the incremental travel distance in 1/100 mm. Unit: mm Data range: -2147483648~2147483647 Factory setting: 2147483627 Note: If Software Limit 1 = Software Limit 2, the software limit will be disabled.		
Current Limit	Maximum current limit of the servo motor (unit: A) Factory setting: 6.87		
CE Limit	Follower error limit during actuator operation (unit: encoder units u) Data range: 0~4294967295 Factory setting: 50		
Back	Return to the previous menu		

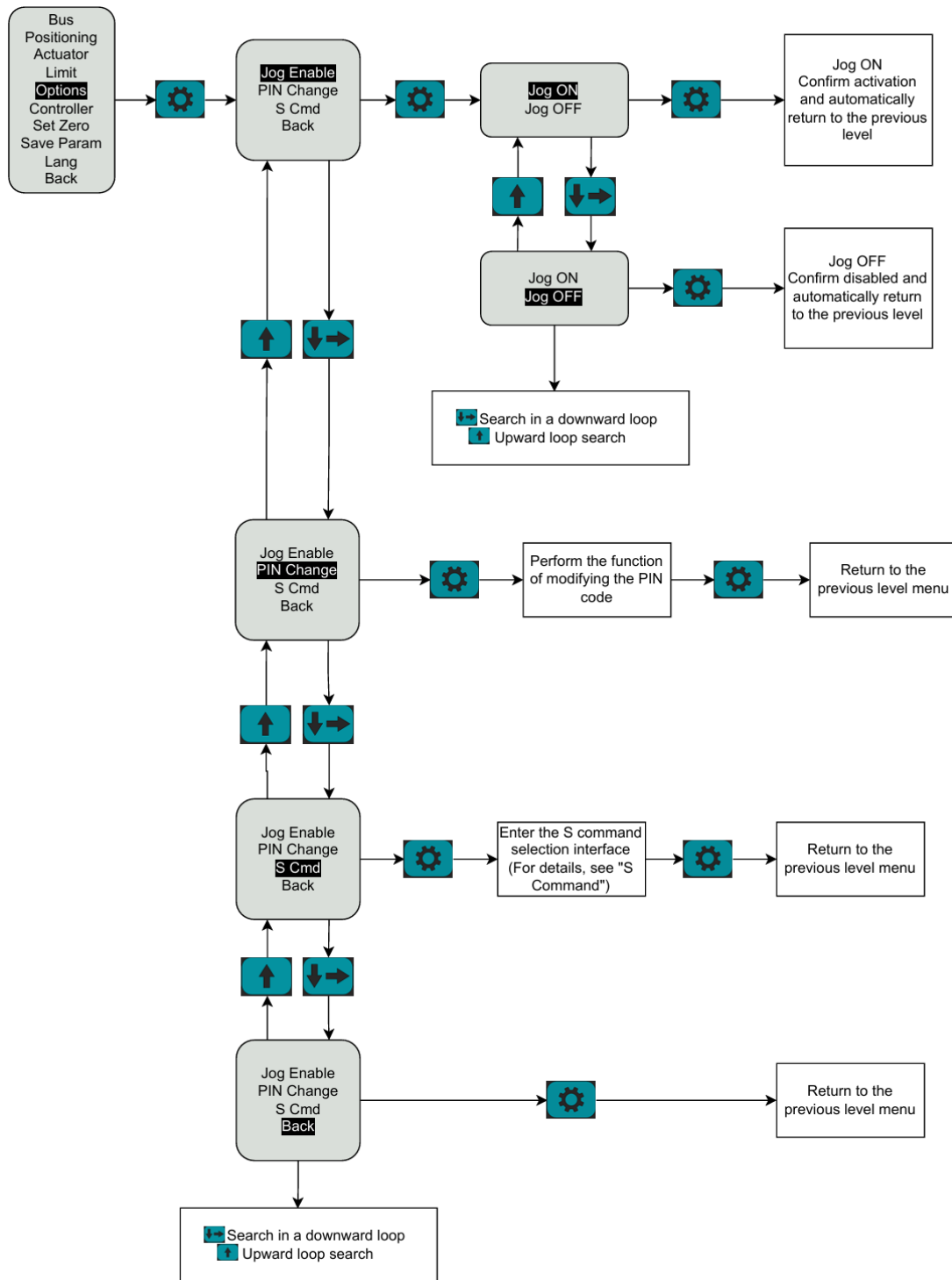
Operation Flow Diagram:



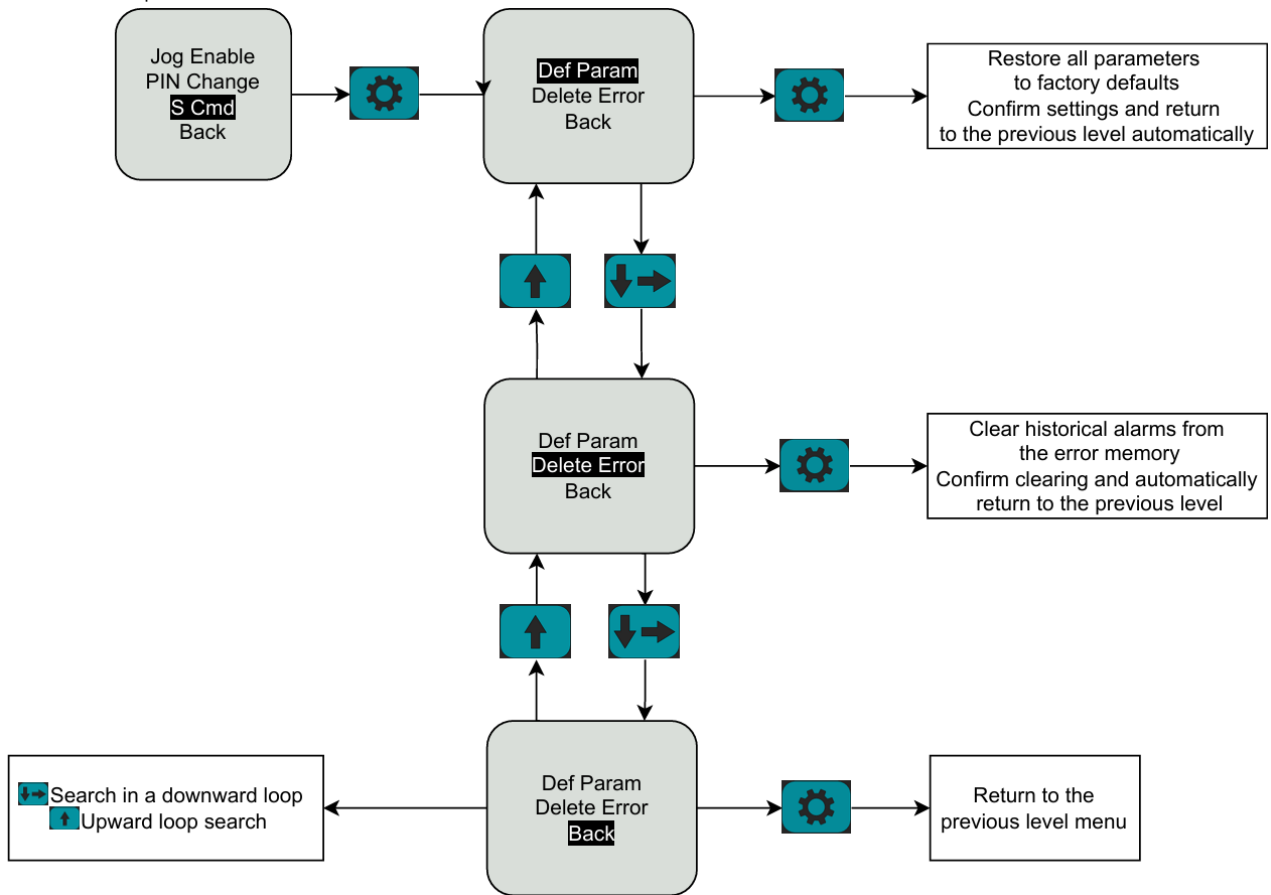
## 6.4.3.5 Options

Menu	Param Set	Submenu	Options
Parameter		Description	
Jog Enable		Enable jog function Disable jog function Default setting: Enable jog function	
PIN Change		Change PIN code settings. The PIN code is used for password protection when entering jog mode and parameter mode. If the user forgets the password, please contact our company, and we will provide a solution. Range: 000000-065535 Factory setting: 000000	
S Cmd		S Command Options: Restore Factory Settings Clear Historical Alarms	
Back		Return to the previous menu	

Operation Flow Diagram:



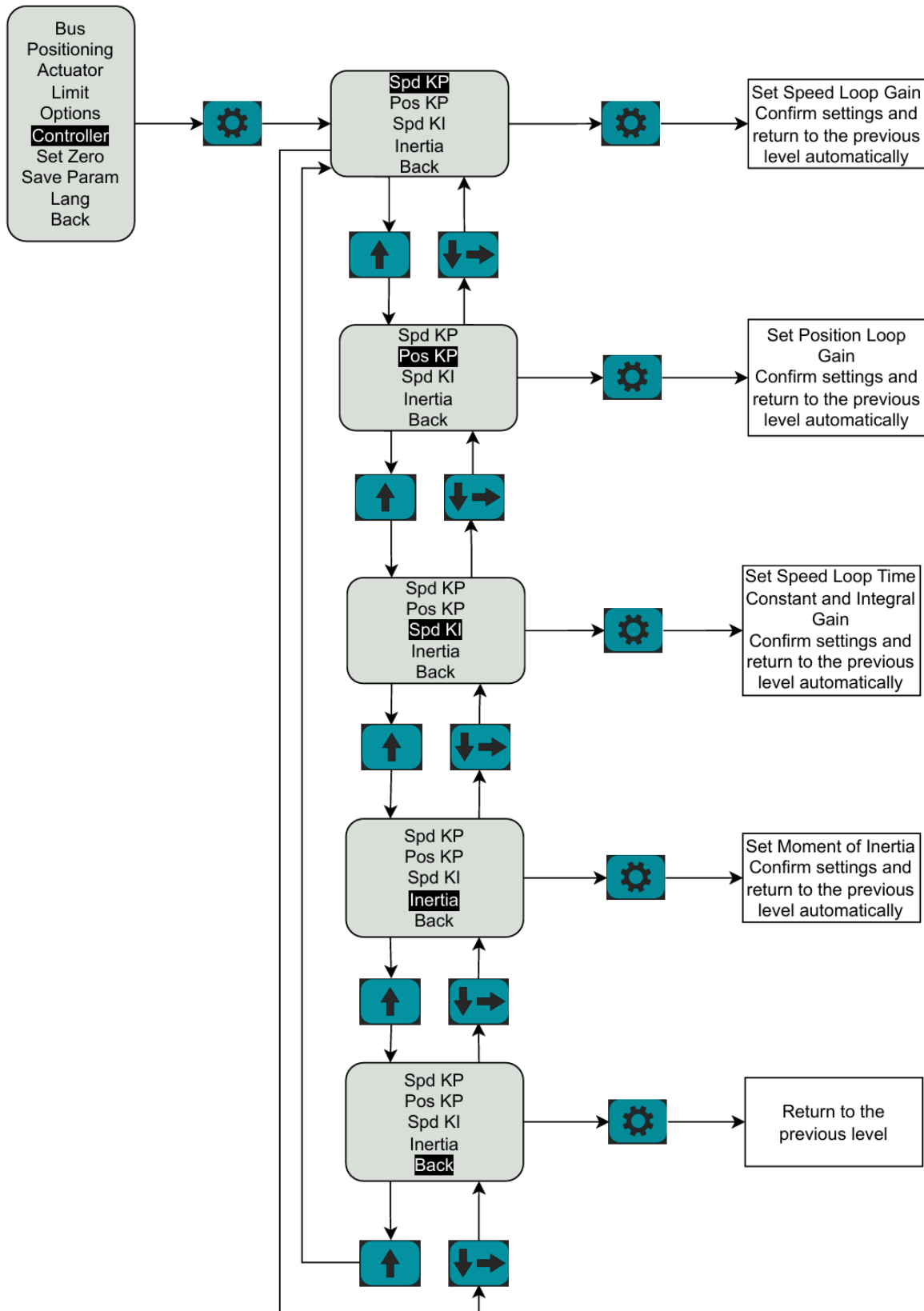
S Command Operation Process:



## 6.4.3.6 Controller

Menu	Param Set	Submenu	Controller
Parameter	Description		
Spd KP	<p>Set the proportional gain of the speed loop. This parameter determines the response of the speed loop; the larger it is, the faster the speed loop responds, but setting it too high may cause vibration. In Jog Mode 1, if you want to increase the position loop gain, you need to increase the speed loop gain at the same time.</p> <p>Data range: 1-20000 Factory setting: 270</p>		
Pos KP	<p>Set the proportional gain of the position loop. This parameter determines the responsiveness of the position loop. Setting a higher position loop gain can shorten positioning time, but setting it too high may cause vibrations.</p> <p>Data range: 0-20000 Factory setting: 48</p>		
Spd KI	<p>Set the integral time constant of the speed loop. The smaller the value set, the stronger the integral effect, and the deviation value will approach 0 faster when stopping. When this parameter is set to 65535, there is no integral effect.</p> <p>Data range: 0-51200 Factory setting: 2100</p>		
Inertia	<p>Unit: 0.01 kg • cm<sup>2</sup> Data range: 1-65535 Factory setting: 5</p>		
Back	Return to the previous menu		

Operation Flow Diagram:

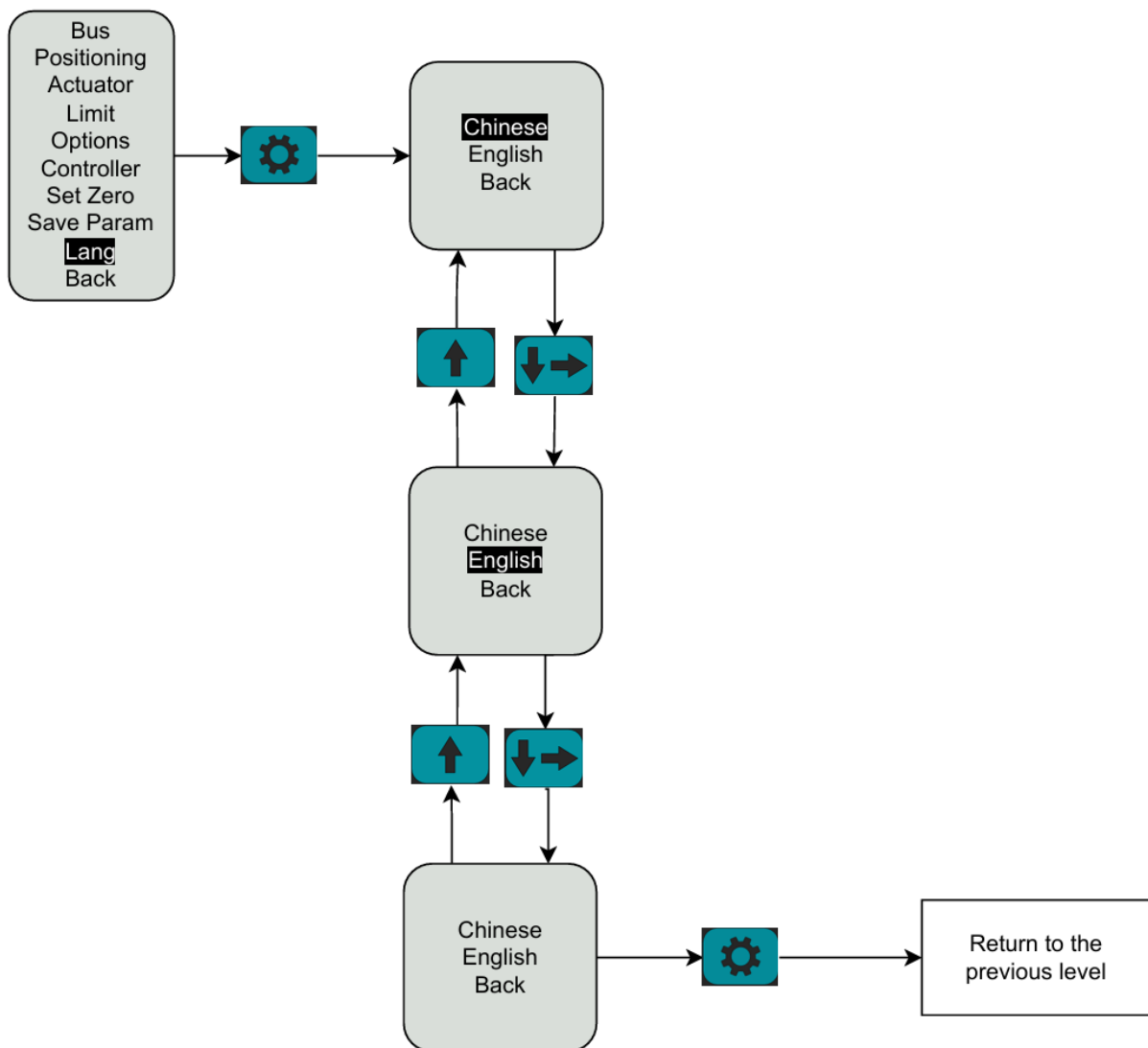




6.4.3.7 Lang

Menu	Param Set	Submenu	Lang
Parameter	Description		
汉语	Set the interface to display in Chinese		
English	Set the interface to display in English		
Back	Return to the previous menu		

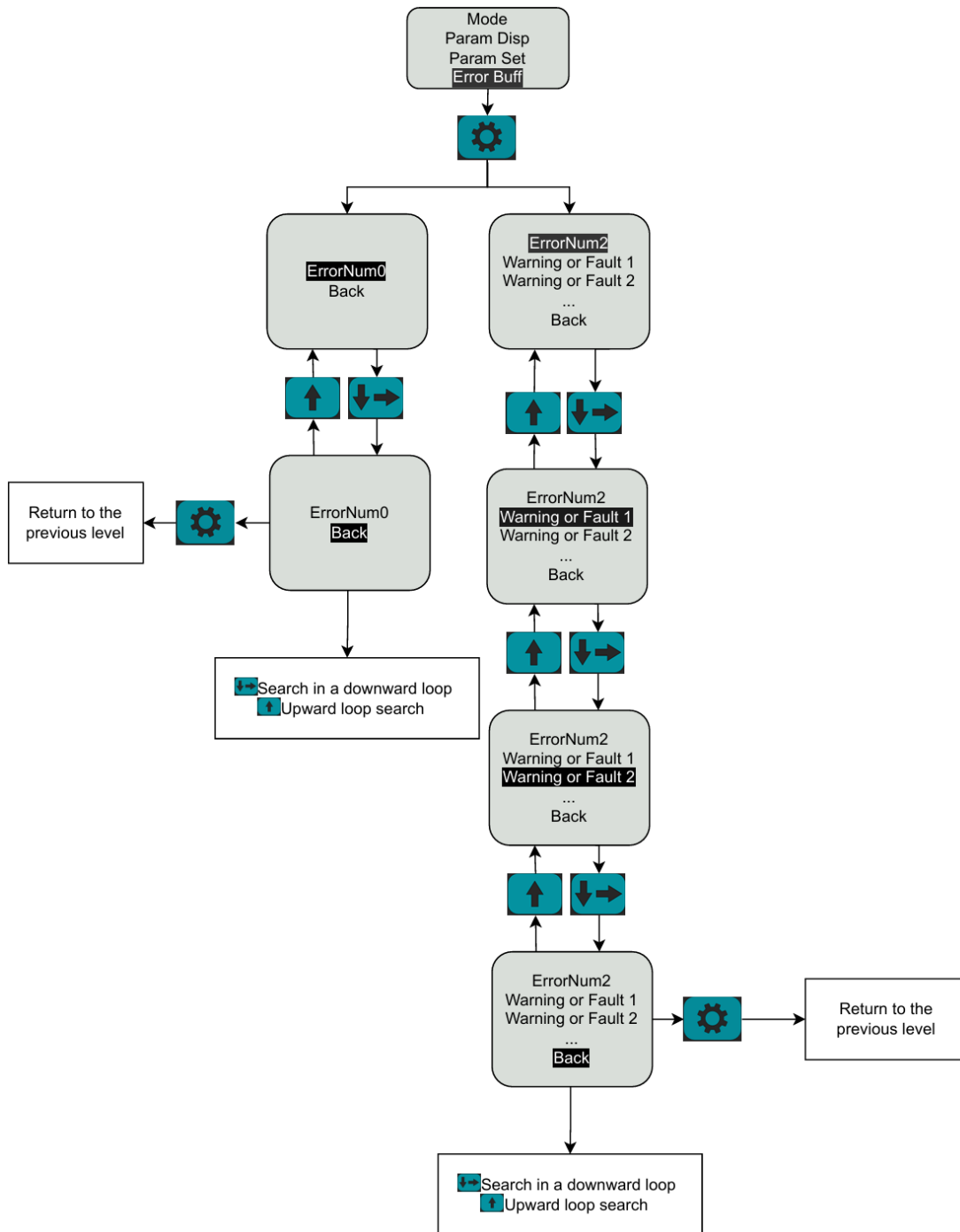
Operation Flow Diagram:



6.4.4 Error Buff

Parameter	Description
ErrorNum	Display the total number of errors currently present on the device
Warning or Fault 1	Displays the warnings and faults currently occurring on the device (latest ones). For specific error details and troubleshooting methods, see Table 8-1.
Warning or Fault 2	Displays the warnings and faults currently occurring on the device. For specific error details and troubleshooting methods, see Table 8-1.

Operation Flow Diagram:



When the ErrorNum is 0, the display does not show the historical alarm information;

When the ErrorNum is not 0, the historical alarm information can be read.

The submenu items in the error memory display warnings or fault records that occur during the operation of the product.

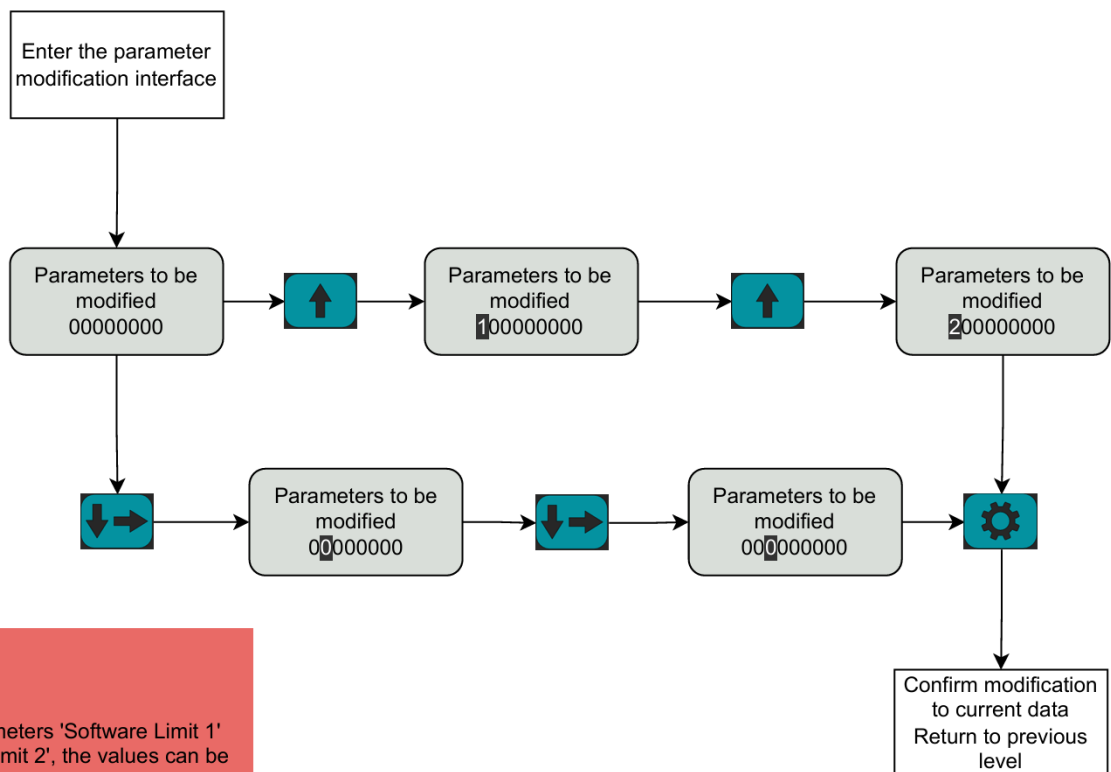
Warnings or fault records are entered into the memory for storing warnings or faults in the order they are detected. A total of 16 warning or fault queues will be displayed, following the first-in, first-out (FIFO) rule. When the historical warning or fault storage is full, generating a new warning or fault will delete the earliest warning or fault, and the previous warnings or faults will move down accordingly.

Warnings and Faults:

**Warning:** A warning does not affect the operation of the positioner. It will disappear once the cause is eliminated. The positioner will exit the fault state when the alarm error is cleared.

**Fault:** A fault will cause the positioner to stop immediately. The fault state is indicated on the display. The positioner needs to be manually reset to clear the fault state after the fault is resolved.

6.4.5 Flowchart of Parameter Setting Func



**Note**

In the two parameters 'Software Limit 1' and 'Software Limit 2', the values can be positive or negative. When setting these parameters, the first character (from left to right) is the sign, which can be selected using the up arrow key.

## 7. Alarm Function

Table7-1 Alarm Function

Alarm Contents	Alarm Code	Default Alarm Type	Self reset or not
Over current	0x2300	Fault	No
Over Load	0x4012311	Alarm	Yes
Stall Fault	0x3002312	Pause and lock the shaf	No
Over Voltage	0x13210	Fault	Yes
Under voltage	0x1013220	Fault	Yes
Relief Fault	0x13211	Fault	Yes
Temp High	0x14210	Fault	Yes
Temp Low	0x14220	Fault	Yes
Driver Fault	0x5080	Fault	No
Flash Err1	0x5540	Fault	No
Flash Err2	0x5541	Fault	No
Flash Err3	0x4005542	Alarm	No
Flash Err4	0x5543	Fault	No
PowerDown 1	0x4005544	Alarm	No
PowerDown 2	0x4005545	Alarm	No
Init Fault	0x6000	Fault	No
Param Error	0x16320	Fault	Yes
Reg Fault	0x6321	Fault	No
Batt Low	0x7301	Fault	No
Batt Warn	0x4017302	Alarm	Yes
MultiTurn Error	0x1017304	Fault	Yes

Alarm Contents	Alarm Code	Default Alarm Type	Self reset or not
Pulse Fault	0x7305	Fault	No
Encoder Err 1	0x7306	Fault	No
Encoder Err 2	0x4017307	Alarm	Yes
Encoder Err 3	0x7309	Fault	No
Over Speed	0x17310	Fault	Yes
Com Fault	0x17501	Fault	Yes
Pos Error	0x8611	Fault	No
Soft Limit Err	0x3018613	Pause and lock the shaf	No
Sync Fault	0x8700	Fault	No
Curve Calc err	0x4018615	Alarm	Yes
Target Ovflw	0x18616	Fault	No
Curve Too Small	0x5018617	ignore	Yes
ID Fault	0XFF01	Fault	No
Cmd Disabled	0x401FF02	Alarm	No
The screen shows "Other Error". Please contact the manufacturer.			
Note: Please refer to the corresponding communication manual for more details of alarm failure.			

## 8. Daily Inspection and Maintenance

Table8-1 Daily Inspection and Maintenance

Inspection Items	Inspection Time	Key points of inspection and maintenance	Note
Vibration and sound inspection	Everyday	Visual and auditory judgment	-
Fixing and connecting	At least once a week	Periodically check whether the screws at the motor installation site, the motor rotor and the mechanical connection, the screws at the terminal station and the mechanical part are loose.	-
Inspection of appearance	Once a week	Wipe with cloth or clean with air gun.	-
Replace oil seal	At least every 5000h/ time	Remove the motor from the machine and then replace the oil seal	Motors with oil seal only
battery	Once a year	Replace the battery. Note: When replacing the battery, the main power supply of the integrated motor needs to be switched on	
Comprehensive inspection	At least once every 20,000 hours or every 5 years	-	-

## 9. Warranty Statement

### 9.1 Warranty Period

● The product quality warranty period is 1 year from purchase. However, for motors equipped with a brake, the warranty is subject to the axis acceleration/deceleration cycles not exceeding the service life. (Within the allowable angular acceleration and deceleration, the service life is 5,000,000 cycles, referring to the number of acceleration/deceleration cycles before a sharp change in brake backlash occurs.)

### 9.2 Warranty Coverage

● If the product is used properly in strict accordance with this manual and a fault is confirmed within the warranty period, free repair service will be provided.

● Non-warranty repair cases within the warranty period:

● ① Damage caused by improper use, inappropriate repair or modification;

● ② Damage caused by dropping, impact or other transportation factors after delivery;

● ③ Damage caused by use beyond the designed specifications of the equipment;

● ④ Damage caused by fire, earthquake, lightning strike, wind disaster, chloride corrosion, abnormal voltage or other natural disasters;

● ⑤ Damage caused by intrusion of water, oil, metal or other foreign substances;

● ⑥ Damage caused by parts with standard mechanical life exceeding their respective service life.

● The warranty is limited to the main body of the purchased product.

● Other associated damages caused by product failure are not covered by our repair and compensation.

## 10. Important Usage Instructions

- This product is developed, designed and manufactured in accordance with standards applicable to general industrial applications. It has not been developed or tested in compliance with technical specifications for equipment and systems in special fields involving personal safety, medical treatment, national defense, military industry, etc.
- Installation, commissioning, wiring, operation, maintenance and inspection of this product must be performed by qualified personnel with relevant professional knowledge and skills.
- The tightening torque of fasteners for product installation shall be set properly according to the strength grade of screws and material of the mounting surface to prevent loosening or breakage.
- If a failure of this product integrated into equipment may cause major accidents or losses, special safety design and corresponding safety devices shall be configured before installation.
- If you plan to use this product in special applications such as nuclear power control equipment, aerospace equipment, medical equipment, high-purity equipment or other safety-related devices, you must confirm pre-sales technical details with our company fully.
- This product has passed quality control according to standard procedures to ensure stable operation. However, it may still malfunction due to unexpected external factors (such as noise interference, electrostatic shock, power fluctuation, circuit abnormality or sudden component failure). Users must implement fault protection design and ensure that the operating environment and procedures comply with safety regulations.
- If the motor shaft operates without electrical grounding, the motor bearings may suffer from electric corrosion due to the product structure and installation environment, which may lead to increased bearing noise.
- If the product is used in an environment with high concentrations of sulfur or sulfide gases (such as H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, Cl<sub>2</sub>, etc.), chip resistor open circuits or poor contact may occur due to sulfuration. Please take corresponding measures during the system design stage.
- The input voltage of this product must strictly comply with the rated parameters. If the input voltage significantly exceeds the rated range, it will cause irreversible damage to internal core components, with safety risks such as smoking and fire. Please inspect and confirm the input voltage before use.

## Version Change Record

Version	Description of Revised Content	Date
A	Establish	2026-2-26

•